EUROPEAN HEALTH AND DIGITAL EXECUTIVE AGENCY (HADEA)

HADEA.A – Health and Food
A.3 – Health research

GRANT AGREEMENT

Project 101095430 — MARCHES

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':

AARHUS UNIVERSITET (AU), PIC 999997736, established in NORDRE RINGGADE 1, AARHUS C 8000, Denmark,

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

2. **UMEA UNIVERSITET (UMU)**, PIC 999881821, established in UNIVERSITETOMRADET, UMEA 901 87, Sweden,

3. **TARTU ULIKOOL (UTARTU)**, PIC 999895013, established in ULIKOOLI 18, TARTU 50090, Estonia,

4. **UNIVERZITA KARLOVA (CU)**, PIC 999923434, established in OVOCNY TRH 560/5, PRAHA 1 116 36, Czechia,

5. **MENON ECONOMICS AS (MENON)**, PIC 905008643, established in SORKEDALSVEIEN 10B, OSLO 0369, Norway,

6. **FUNDACION PRIVADA INSTITUTO DE SALUD GLOBAL BARCELONA (ISG)**, PIC 951414122, established in C ROSSELLO 132 PLANTA 05, BARCELONA 08036, Spain,

7. **INSTITUTI PER POLITIKA SOCIALE MUSINE KOKALARI (ISP)**, PIC 890184618, established in STREET B MATI 1 RESIDIO 5 ENTRANCE B 51-1, PRISHTINA 10 000, Kosovo * UN resolution,

8. **BARCELONA SUPERCOMPUTING CENTER CENTRO NACIONAL DE SUPERCOMPUTACION (BSC)**, PIC 999655520, established in CALLE JORDI GIRONA 31, BARCELONA 08034, Spain,

9. **Geological Survey of Denmark and Greenland (GEUS)**, PIC 999459677, established in OSTER VOLDGADE 10, KOBENHAVN K 1350, Denmark,

10. **EESTI KESKKONNAUURINGUTE KESKUS (EERC)**, PIC 915844901, established in MARJA 4D, TALLINN 10617, Estonia,

11. **NIBIO - NORSK INSTITUTT FOR BIOOKONOMI (NIBIO)**, PIC 999754848, established in HOEGSKOLEVEIEN 7, AAS 1430, Norway,

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)

Annex 1 Description of the action[1]

Annex 2 Estimated budget for the action

Annex 2a Additional information on unit costs and contributions (if applicable)

Annex 3 Accession forms (if applicable)[2]

Annex 3a Declaration on joint and several liability of affiliated entities (if applicable)[3]

Annex 4 Model for the financial statements

Annex 5 Specific rules (if applicable)

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

TERMS AND CONDITIONS

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DATA SHEET

1. General data

Project summary:

Project summary
To underpin regular use of integrated economic and health modeling in impact assessments and socio-economic analysis by public authorities, the MARCHES project aims to advance methodological rigor and consistency in accounting for the welfare economic health costs of air pollution and drinking water nitrate, based on systematic reviews of health effects, and by extending the consensus on established approaches on premature mortality with disability-adjustment of the associated morbidity burdens, while developing European-wide exposure modeling for integrated assessment. Based on expert and stakeholder consultations, the project will provide guidelines and unit prices for an accounting approach that can be applied routinely by EU and national authorities, subject to data availability and policy scenarios. This will be demonstrated in case studies with public authorities in five Member States (CZ; DK; EE; ES; SE) and in one west-Balkan country (XK).

Keywords:

- Public and environmental health

Project number: 101095430

Project name: Methodologies for Assessing the Real Costs to Health of Environmental Stressors

Project acronym: MARCHES

Call: HORIZON-HLTH-2022-ENVHLTH-04

Topic: HORIZON-HLTH-2022-ENVHLTH-04-01

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 January 2023

Project end date: 31 December 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	AU	AARHUS UNIVERSITET	DK	999997736	1 565 111.00	1 565 111.00
2	BEN	UMU	UMEA UNIVERSITET	SE	999881821	266 949.00	266 949.00
3	BEN	UTARTU	TARTU ULIKOOL	EE	999895013	263 424.00	263 424.00
4	BEN	CU	UNIVERZITA KARLOVA	CZ	999923434	453 456.00	453 456.00
5	BEN	MENON	MENON ECONOMICS AS	NO	905008643	478 387.50	478 387.00
6	BEN	ISG	FUNDACION PRIVADA INSTITUTO DE SALUD GLOBAL BARCELONA	ES	951414122	365 085.00	365 085.00
7	BEN	ISP	INSTITUTI PER POLITIKA SOCIALE MUSINE KOKALARI	XK	890184618	58 041.00	58 041.00

N°	Role	Short name	Legal name	Ctry	PIC	Total eligible costs (BEN and AE)	Max grant amount
8	BEN	BSC	BARCELONA SUPERCOMPUTING CENTER CENTRO NACIONAL DE SUPERCOMPUTACION	ES	999655520	177 690.00	177 690.00
9	BEN	GEUS	Geological Survey of Denmark and Greenland	DK	999459677	35 313.00	35 313.00
10	BEN	EERC	EESTI KESKKONNAUURINGUTE KESKUS	EE	915844901	109 806.25	109 806.00
11	BEN	NIBIO	NIBIO - NORSK INSTITUTT FOR BIOOKONOMI	NO	999754848	226 019.00	226 019.00
Total						3 999 281.75	3 999 281.00

Coordinator:

– AARHUS UNIVERSITET (AU)

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)
3 999 281.75	100	3 999 281.00	3 999 281.00

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)	2 132 816.56

Reporting and payment modalities (art 21, 22):

Mutual Insurance Mechanism (MIM): Yes

MIM contribution: 5% of the maximum grant amount (199 964.05), 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:

DK8502164069053238

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

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)

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 **101095430 — MARCHES** ('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

Not applicable

ARTICLE 9 — OTHER PARTICIPANTS INVOLVED IN THE ACTION

9.1 Associated partners

Not applicable

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:

- 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.

[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).

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.

[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).

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).

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] 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

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

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:

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).

(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

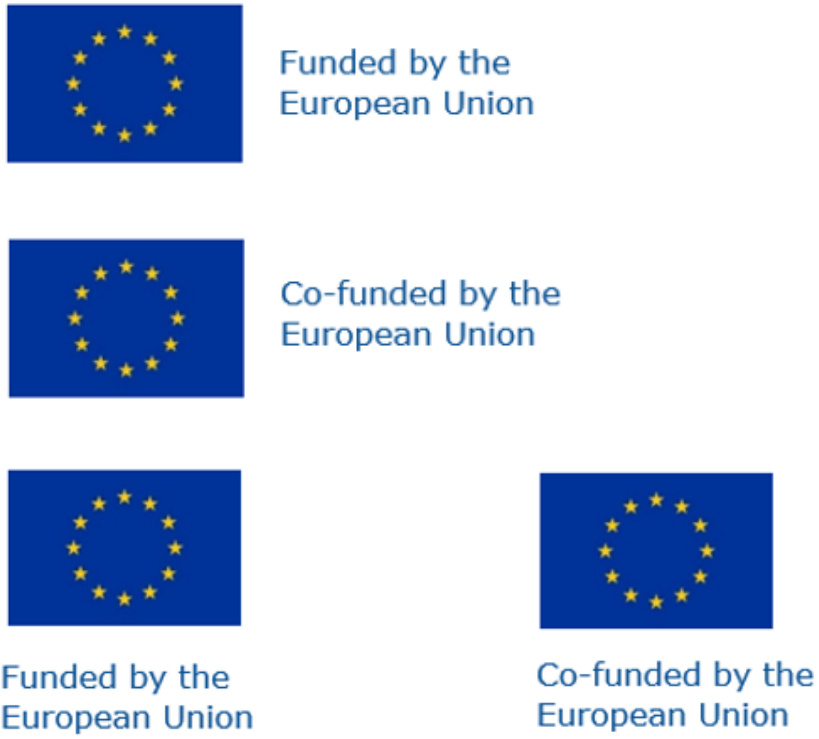
17.1 Communication — Dissemination — Promoting the action

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):



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*.

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).

[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 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.

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).

[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).

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
- 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

[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).

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

JESPER JUEL HOLST with ECAS id njueljes signed in the Participant Portal on 11/11/2022 at 08:16:14 (transaction id SigId-77738-tstLyQdsmSWQbMqrRezYBzd446gePwHLdMzzZnzc1neP6oR74gWnBujuzjX6txzYaeMO6Fvpa9HtKfEqo6zkVuUU-rS0vSrmBGYCYOonzu9chxJ-DzhR8h99brkfAy1stfPvvzqVzMPNTIHtIM6IOJYdK6wpva49w0WBYg45g68sNwq2JHtbYhJHWohXHfAgTzUhTYe). Timestamp by third party at 2022.11.11 08:16:22 CET

For the granting authority

Signed by Stephane HOGAN with ECAS id hoganst as an authorised representative on 11-11-2022 09:19:05 (transaction id SigId-78664-GV6s5EoMOqzm7mf3kloZme67sOOdNyHtnjRRdPg838jerpCa8e46l1vNwUrJOwdWA8asRdIMDzb0Kj2zShZIAN0-rS0vSrmBGYCYOonzu9chxJ-bmiqyd72YiJ5VbhxvegpvCHOdB23M1XzdUBUXWKxNYdxZxvsVluLn8tZVGGDMuGlEhRSb5ezs61JKwAOHNiYuK) 2022.11.11 09:19:10 CET

ANNEX 1

Horizon Europe (HORIZON)

Description of the action (DoA)

Part A

Part B

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:	101095430
Project name:	Methodologies for Assessing the Real Costs to Health of Environmental Stressors
Project acronym:	MARCHES
Call:	HORIZON-HLTH-2022-ENVHLTH-04
Topic:	HORIZON-HLTH-2022-ENVHLTH-04-01
Type of action:	HORIZON-RIA
Service:	HADEA/A/03
Project starting date:	fixed date: 1 January 2023
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.

To underpin regular use of integrated economic and health modeling in impact assessments and socio-economic analysis by public authorities, the MARCHES project aims to advance methodological rigor and consistency in accounting for the welfare economic health costs of air pollution and drinking water nitrate, based on systematic reviews of health effects, and by extending the consensus on established approaches on premature mortality with disability-adjustment of the associated morbidity burdens, while developing European-wide exposure modeling for integrated assessment. Based on expert and stakeholder consultations, the project will provide guidelines and unit prices for an accounting approach that can be applied routinely by EU and national authorities, subject to data availability and policy scenarios. This will be demonstrated in case studies with public authorities in five Member States (CZ; DK; EE; ES; SE) and in one west-Balkan country (XK).

LIST OF PARTICIPANTS

PARTICIPANTS

Grant Preparation (Beneficiaries screen) — Enter the info.

Number	Role	Short name	Legal name	Country	PIC
1	COO	AU	AARHUS UNIVERSITET	DK	999997736
2	BEN	UMU	UMEA UNIVERSITET	SE	999881821
3	BEN	UTARTU	TARTU ULIKOOL	EE	999895013
4	BEN	CU	UNIVERZITA KARLOVA	CZ	999923434
5	BEN	MENON	MENON ECONOMICS AS	NO	905008643
6	BEN	ISG	FUNDACION PRIVADA INSTITUTO DE SALUD GLOBAL BARCELONA	ES	951414122
7	BEN	ISP	INSTITUTI PER POLITIKA SOCIALE MUSINE KOKALARI	XK	890184618
8	BEN	BSC	BARCELONA SUPERCOMPUTING CENTER CENTRO NACIONAL DE SUPERCOMPUTACION	ES	999655520
9	BEN	GEUS	Geological Survey of Denmark and Greenland	DK	999459677
10	BEN	EERC	EESTI KESKKONNAUURINGUTE KESKUS	EE	915844901
11	BEN	NIBIO	NIBIO - NORSK INSTITUTT FOR BIOOKONOMI	NO	999754848

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	Deliverables
WP1	Management	1 - AU	19.00	1	48	D1.1 – Data Management Plan D1.2 – Final Data Management Plan D1.3 – Cluster Data Management Strategy D1.4 – Policy Strategy of the cluster D1.5 – Scientific strategy of the cluster
WP2	Exposure-response functions based on systematic reviews	1 - AU	65.00	1	20	D2.1 – Selected air pollution exposure-response functions with baseline incidences for EVA D2.2 – Selected drinking water nitrate exposure-response functions with baseline incidences
WP3	Economic valuation of new health endpoints of morbidity, disabilities and mortality	5 - MENON	43.00	1	42	D3.1 – Direct WTP estimates for morbidity impacts and DALY/QALY D3.2 – Indirect WTP estimates for morbidity impacts and DALY/QALY consistent with VSL/VOLY D3.3 – User-friendly tool on WTP values for health endpoints
WP4	Quality of life indicators	3 - UTARTU	31.00	1	36	D4.1 – Well-being in societal and environmental exposure context
WP5	Innovative methodologies for exposure assessment and unit prices	1 - AU	76.00	1	40	D5.1 – Final assessment of exposures and unit prices for nitrate in drinking water in case study areas D5.2 – Final assessment of exposures and unit prices for air pollution in case study areas

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	Deliverables
						D5.3 – Assessment with EVA model of health impacts and unit prices of air pollution at national level D5.4 – Recommendations for methodological approach and data sets for guidance document on generic health impact assessment
WP6	Costs of inaction and action - case studies	6 - ISG	61.00	9	45	D6.1 – Costs of action and inaction on air pollution in Catalonia D6.2 – Costs of action and inaction on air pollution in Estonia D6.3 – Costs of action and inaction on air pollution in Øresund region D6.4 – Costs of action and inaction on air pollution in Kosovo D6.5 – Costs of action and inaction on drinking water nitrogen pollution in Zelivka catchment D6.6 – Costs of action and inaction on drinking water nitrogen pollution in Jutland
WP7	Dissemination and communication activities	1 - AU	38.00	1	48	D7.1 – Plan for dissemination and exploitation including communication activities D7.2 – Guidance document on methodology for calculating external costs of drinking water nitrates D7.3 – Guidance document on methodology for calculating external costs of air pollution, with unit prices of ten emission

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	Deliverables
						sectors in all EU, EFTA and west-Balkan countries D7.4 – Spatial health risk map of Europe with indicators of air pollution risks to the general public D7.5 – Two policy briefs with infographics D7.6 – Three policy briefs with infographics D7.7 – Three more policy briefs with infographics D7.8 – Website launch D7.9 – Final plan for dissemination and exploitation including communication activities D7.10 – Cluster web portal and visual identity D7.11 – Cluster's common dissemination and communication strategy D7.12 – Cluster brochure D7.13 – Cluster newsletter 1 D7.14 – Policy brief 1 D7.15 – Cluster newsletter 2 D7.16 – Policy brief 2 D7.17 – Cluster newsletter 3 D7.18 – Policy brief 3

Associated with document Ref. Ares(2022)7741548 - 09/11/2022

Work package WP1 – Management

Work Package Number	WP1	Lead Beneficiary	1. AU
Work Package Name	Management		
Start Month	1	End Month	48

Objectives
To ensure the efficient co-ordination and the overall management of MARCHES project, including the preparation and the maintenance of the Consortium Agreement; to ensure that all partners' contributions are well integrated and coordinated and that deliverables are produced in a timely manner; and to ensure compliance with all relevant regulations of the HE program, including the knowledge management issues.

Description
Task 1.1 Administrative coordination (AU, all) The activities will ensure sound legal, contractual and administrative management of the project, in compliance with the contractual obligations, good management practices and the provisions of the Consortium Agreement. These activities include 1) representation of the consortium in contact with the HE project officer(s) and various other scientific and policy bodies, 2) co-ordination of the IP and knowledge management issues (incl. Data Management Plan), 3) oversight of ethical and gender aspects within the project, 4) monitoring the fulfilment of the project's objectives, 5) supervise the working of the Steering Group (SG), 6) prepare for the Annual Team Meetings (ATM), 7) establishment of an intranet platform for an effective communication and information exchange among the project partners, 8) Set up an advisory board of eminent experts. Particular attention will be given to ensure good linkages and exchange of information between WPs and take precautions against critical risks. Updating of the consortium agreement if required. All members of the consortium will contribute to continuous, periodic and final reporting. The PI of MARCHES is prof. Mikael Skou ANDERSEN, and co-PI is senior scientist Camilla GEELS.

Work package WP2 – Exposure-response functions based on systematic reviews

Work Package Number	WP2	Lead Beneficiary	1. AU
Work Package Name	Exposure-response functions based on systematic reviews		
Start Month	1	End Month	20

Objectives
We will establish and update exposure-response (ER) functions for air pollution and drinking water nitrate based on systematic reviews. We focus on morbidity and mortality at exposure levels relevant to European conditions. We will use published systematic reviews with meta-analyses of ER functions to update and expand the current functions from WHO-HRAPIE used in risk assessments, i.e. EVA system, and to derive ER functions for drinking water nitrates. A new systematic review will be conducted to cover important health endpoints for nitrates related to infants. Data gaps will be identified to guide future research.

Description
Task 2.1 Workshop on systematic review methodology in environmental health. (AU-PH, UMU, ISG & invitation to other funded consortia of this call for joint activity). Facilitated by third-party expertise on SRs in environmental health, we will develop a consistent approach for use of SRs, while introducing and set-up relevant SR software. Outcome of workshop will be a common SR protocol following Navigation Guide of SRs in environmental health/Handbook for Conducting SR for Health Effects Evaluation. We will coordinate the review and updating of SRs with other funded consortia to identify the most relevant outcomes from the gross list described here and cover as many as possible, avoiding redundancies in the work ahead. Task 2.2: Review and update of systematic reviews of air pollution health effects. (AU-PH, UMU) Review of SR's focusing on studies with exposure measurements available in the EU, or with comparable conditions, making SR relevant for regulation and new data available after HRAPIE. We will investigate PM2.5 and NO2's

associations with five “emerging” outcomes (diabetes, dementia, Parkinson’s, low birth weight, depression). Further we will review SR’s on associations with asthma (of children and adults), lung cancer and COPD in Europe, updating with results from ELAPSE and other recent studies. SRs are carried out with one reviewer from AU, one reviewer from UMU and mediators from AU and UMU. Data gaps will be identified.
Task 2.3 Systematic review of drinking water nitrate health effects. (AU-PH, ISG)
Review and update of SRs focusing on morbidity outcomes in terms of cancer in gastrointestinal tract. New systematic review focusing on infants, covering reproductive and adverse birth outcomes as well as methemoglobinemia. SRs are carried out with one reviewer from AU, one reviewer from ISG and mediators from AU and ISG. Data gaps will be identified.
Task 2.4 Update the ER-functions for EVA-model. (AU-PH, UMU, ISG)
From the SRs in Task 2.2, and 2.3 and the other projects funded in this call, we will update the ER-functions of the EVA-model system for economic valuation of air pollution. We will identify ER functions for the drinking water modelling. We will update the baseline incidences with WHO data. Results will be used in WP5.

Work package WP3 – Economic valuation of new health endpoints of morbidity, disabilities and mortality

Work Package Number	WP3	**Lead Beneficiary**	5. MENON
Work Package Name	Economic valuation of new health endpoints of morbidity, disabilities and mortality		
Start Month	1	**End Month**	42

Objectives
To derive the economic value for the key morbidity health endpoints identified in WP2. To elicit willingness-to-pay (WTP) to avoid the disutility of the selected morbidity endpoints differing in severity and/or duration in order to provide disutility weights for estimation of a Quality Adjusted Life Year (QALY) and its economic value based on Value Of a Life Year (VOLY) estimates. To analyse the role of risk aversion and changing wealth in deriving VOLY and consider the implications for generalization/benefit transfer of VOLY and QALY estimates. The economic values will include both the disutility from being ill (from the new studies) as well as Cost-Of-Illness estimates (from existing studies).

Description
Task 3.1 Review of valuation literature and health endpoint selection (AU, CU, MENON) We review the literature on monetary valuation of morbidity, human development impairment and mental health, with special focus on the health endpoints for which reliable dose-response, exposure-response or concentration-response functions are expected from WP2. We will crosscheck with other projects, including OECD/ECHA’s SWACHE valuation project series where WTP values are currently being derived by Stated Preference (SP) for estimating the disutility of ten different endpoints. Recent research aiming to derive VOLY as well as WTP per QALY (Quality Adjusted Life Year) will be summarised, including a recent scoping paper on VOLY by Chilton et al.48 Knowledge on QALYs and DALYs (Disability Adjusted Life Years) for relevant health end points will be summarised, paying special attention to the Global Burden of Disease (GBD) studies. Based on the review, specific health endpoints for the new monetary valuation studies in Task 3.2 and 3.3 will be determined in a project workshop. Task 3.2 WTP for new health endpoints and WTP-QALY/WTP-DALY (MENON, CU, AU). A survey instrument will be developed and tested with a comprehensive pre-survey, through one-on-one individual pilot interviews carried out in the countries where the survey will be conducted (in total at least 30 interviews). The primary goal of this survey is to elicit individual preferences for both reducing the risk of certain health endpoints (as selected in task 3.1), where the valued illnesses will be described with varying severity and duration, and the loss in QALY/DALY associated with the illness. Both WTP and QALY/DALY values will be derived for several different health outcomes. The range of variations will allow us to experimentally derive WTP per QALY/DALY, aiming to identify severity-, duration-, and context-specific functions of WTP per QALY/DALY. Sampling plan will be developed, and the data will be gathered with a multi-country survey conducted in six jurisdictions (Catalonia, Czech Republic, Denmark, Estonia, Kosovo, Sweden) with a total sample size of at least 6,000 observations. We will conduct discrete choice experiments (valuing individual attributes of the health endpoints including severity and duration) and contingent valuation questions of the same endpoints, in a randomized order, to increase the validity of the resulting estimates of disutility of these

endpoints. Advanced econometric analysis of these extensive data sets will be conducted, addressing observed and unobserved preference heterogeneity.
Task 3.3 Testing consistency between VSL, VOLY and QALY/DALY valuations (CU, MENON)
In order to investigate compatibility of the two frameworks for deriving a VOLY and the WTP-QALY framework, we will test and develop a new approach for deriving individual preferences for small risk reductions that will allow us to derive VSL and VOLY in a consistent way, relying on the assumptions of Expected Utility theory. Our starting point is valuation of premature mortality that is based on preferences for reducing the unconditional risk of dying. However, more recently VSL has also been derived from reducing the probability of getting a fatal illness, increasing the conditional survival, while considering both risk factors. Moreover, Alberini and Scasny found that quality-of-life impacts of fatal illnesses do not affect individuals' valuation of mortality risks. Since previous research has shown it to be very challenging to elicit individuals' preferences for increasing life expectancy directly, there have recently been attempts to use a modified "chained" approach.21, 22, There a VOLY value is derived from linking a WTP estimate for non-fatal illnesses and changes in life expectancy in normal health ("that is as bad as suffering the non-fatal injury or illness" 48) in modified standard gamble.22, 48 We will build on all these streams of recent research, acknowledging the shortcomings of the "chained" approach, and develop a novel instrument for deriving the value of a life year (VOLY) and hence a disability/quality-adjusted life year (DALY/QALY) from VSL, where we will: i] consistently elicit also information about perceived life expectancy and QALY, ii] pay special attention to age-factors, as suggested by Hammitt , and iii] deal with subjectively perceived time (intertemporal) preferences. The data will be gathered in a multi-country survey conducted in six European jurisdictions (Catalonia, Czech Republic, Denmark, Estonia, Kosovo, Sweden) with a total sample size of 6,000 observations. We will again rely on stated preference valuation techniques in terms of discrete choice experiment and contingent valuation surveys to elicit preferences for reducing health risks, increasing perceived life expectancy, and uncover intertemporal preferences. Econometric analysis of these extensive data will be conducted, dealing also with observed and unobserved preference heterogeneity.
Task 3.4 Generalized values based on benefit transfer procedures (CU, MENON, AU)
Based on outcomes from 3.2 and 3.3, we will perform income-adjusted benefit transfer (BT) as recommended by OECD, complemented by any context-specific BT functions identified, to derive WTP values for each jurisdiction and with harmonised values for the whole EU. A user-friendly spreadsheet tool will be built to determine the WTP value for a range of health effect endpoints, for given jurisdiction and given time. Cost-of-Illness data will also be collected in order to supplement the disutility values with medical and treatment costs as well as productivity loss to get an overall economic value of the selected health endpoints/illnesses.

Work package WP4 – Quality of life indicators

Work Package Number	WP4	**Lead Beneficiary**	3. UTARTU
Work Package Name	Quality of life indicators		
Start Month	1	**End Month**	36

Objectives
The aims of this WP are to collaboratively develop and test explanatory models for understanding the drivers of environmental health concerns and the related psycho-somatic effects while building synergies between the environmental exposure, psychological, socio-structural and socio-institutional study approaches. This may help detect and understand possible cross-national differences, including in the valuation results on health-related burdens.

Description
Task 4.1. EU-wide wellbeing and pollution burden analysis. (UTARTU, UMU, AU) We will analyse patterns across Europe as characterized by the European Social Survey (ESS) subjective well-being indicators of life satisfaction, informed by literature review and previous studies . We use Geographic Information Systems (GIS) to combine ESS data from Rounds 7 and 8 with modelled air quality data (cf tasks 5.2 and 7.4) and available EU strategic noise mapping to produce the first cross-national examination of the association between subjective wellbeing and pollution levels at a sub-national i.e. regional level. ESS is a cross-national survey that has mapped the attitudes, beliefs and behaviour patterns of the various populations across Europe, covering up to 40 countries at NUTS3 level. The ESS survey includes headline measures of subjective wellbeing such as 'life satisfaction' and 'happiness' as part of its core questionnaire to respondents in each round. The quality of life (e.g. markers of depression,

sleep disturbance) and health problems (CVD, allergies, pains, digestion problems, diabetes) have been surveyed in-depth.
Task 4.2. Experimental population survey. (UMU, UTARTU)
We will develop an experimental survey in the three high-resolution air pollution case study areas of MARCHES (Catalonia/Estonia/Øresund), to see if high-resolution mapping can improve precision in clarifying the prevalence, co- and multi-morbidity, moderating and mediating factors that underlie the poor psychological well-being and symptoms related to environmental exposures and sensitivities. We will explore the prevalence of environmental health worries, symptoms, psycho-social stresses in relation to actual and perceived exposures and socio-demographic factors and housing. The respondents' (1,000 in each case study area) addresses data will be geo-coded – and the fully anonymised individual data will be linked to high-resolution air pollution exposure data (task 5.2) of the grid cell (1 km x 1 km) area, where the respondents live, to be able to link it to the modelled pollution exposures. In our analysis, we will pay attention to specific age sub-groups, gender and inequalities that may exhibit lower health status and higher levels of hypersensitivity, worry and symptoms.
Task 4.3. Comparative analysis and explanatory models of societal and environmental contexts. (UTARTU, UMU, ISG, ISP, CU, AU)
Possible divergences in pollution levels and quality-of-life indicators across Europe raise important questions about the significance of societal attention and context on the dominating beliefs about risks, the levels of worry and the related mental and physical well-being (including "nocebo" effect). We use qualitative expert interviews in combination with proxy indicators of societal concern and policy attention to air pollution risks in the case study area by the following indicator examples: policy measures e.g. existence of strategy and/or action plan for air pollution reduction in the region; air pollution warning systems; fiscal measures including congestion charging, low emission zoning, car free zoning in urban areas; share of population dependent on the air-polluting economic activities in the case study area; level of environmental health concerns in general. Such factors may shape beliefs and drive worries on health impacts in specific societal contexts. We will gather evidence, including documentary materials and in-depth interviews in each country with key informants (minimum six per case study) on the main socio-institutional drivers of societal worries on health effects and external costs of environmental stressors. We aim to build explanatory models and clarify the significance of context-specific institutional and informational agendas in shaping the levels of attention to and worry about environmental health risks.

Work package WP5 – Innovative methodologies for exposure assessment and unit prices

Work Package Number	WP5	**Lead Beneficiary**	1. AU
Work Package Name	Innovative methodologies for exposure assessment and unit prices		
Start Month	1	**End Month**	40

Objectives
To assess sector- and country-specific health effects and unit prices from breathing polluted air at the European scale and in case study areas. To develop and apply a rigorous methodology for estimation of health effects and unit prices from drinking nitrate-polluted water in case study areas To develop generic methodologies for health impact assessment based on publicly available environmental data sets for use in national and local contexts to underpin robust guidelines and recommendations for impact assessment.

Description
Task 5.1 Drinking water nitrate exposure and catchment-specific unit prices for case study areas (NIBIO, GEUS, AU, CU) Detailed health impact assessment including local scale resolution nitrogen leaching modeling for two selected case areas (Jutland/DK groundwater and Zelivka/CR surface water) will be performed with the SWAT/SWAT+ model for both case studies, while for the groundwater case study also mapping derived from the MIKE-SHE based high-resolution DK-model will be used. The latter model has been designed for high performance in the specific country, while the SWAT/SWAT+ model is a catchment modeling tool that has won wide acceptance for simulating hydrological processes and the associated nitrogen flows in Europe. The modeling tools will be applied to provide predictions of the marginal changes in nitrogen concentrations in drinking water as a result of variations in within-field nitrogen surpluses and out-of-fields management measures. Soil, land use, crop, soil management and climate data will be collected for setting up the models.

The SWAT/SWAT+ model will be calibrated against the measured discharge data, total N and nitrate concentration at the catchment's outlet. Empirical data for calibration of nitrogen flows over time into groundwater bodies will be derived from previous dating of oxic groundwaters. When linked with health effects exposure-response functions (from WP2) and valuation of mortality/morbidity/disability (from WP3) this will allow for estimations of the external costs per unit of nitrogen and vice-versa the monetary benefits of reductions.
Task 5.2 Air pollution exposure and sector-specific unit prices for case study areas (BSC/AU, EERC)
Detailed high-resolution air pollution modeling for three selected case study areas (Øresund, Catalonia, and Estonia) at 1 km x 1 km resolution will be performed with the UBM model (Øresund), the Monarch model (Catalonia) and the AirViro/MATCH model (Estonia). These models have been designed for high performance in the specific regions and includes detailed local emission inventories. Following the approach detailed in Task 5.4, sector wise simulations will be made to assess impacts of individual emission sectors on air pollution levels. The resulting high resolution air pollution concentration levels and sector emission totals will be used as input to the updated EVA system and the output is high-resolution health externality data and unit prices for the case study areas. This high resolution data sets will be contrasted to the data derived for Denmark, Sweden, Catalonia and Estonia in Task 5.4 to understand the impact with respect to loss of precision, of the generalization performed in the European scale data set. In close collaboration with WP6, the results of this analysis will be framed to become relevant and usable for local policy makers in the case study areas.
Task 5.3 Air pollution exposure and unit prices in case study area with a paucity of local data (AU, BSC, EERC)
A generic methodology for applying readily available public air quality and source allocation data will be developed based on the EMEP source-receptor matrices, the CAMS air quality reanalyses and the CAMS policy tool data on emission source allocation as well as other available data. This methodology is intended to support public authorities in countries with a paucity of detailed spatial data on air pollution emissions. The results will feed into the WP6 case study on Kosovo to test and show how the methodology performs. By contrasting exposure estimations from the different approaches pursued, a deeper understanding of the possible limitations of applying the generic data vs the high resolution data based on local emissions and high resolution modeling will be established. The methodology will provide pointers towards priorities for data collection most urgently needed where gaps prevail.
Task 5.4 Input to guidance document on air pollution: country- and emission sector-specific unit prices for Europe (AU, BSC, EERC)
The regional chemistry-transport model (DEHM) as part of the Copernicus Atmosphere Monitoring Service (CAMS) is set up for Europe including CAMS emissions and a representative driving meteorology. DEHM will be run with a 20 km x 20 km resolution for each individual country in Europe (EU27 + EFTA and West Balkan countries) with 1) all emissions and 2) for each emission sector (by reducing the sector with 20%, i.e. the brute force approach). This provides detailed environmental input on air pollution exposure levels country by country with sectoral disaggregation. The EVA system (updated with exposure-response functions from WP2 and valuation input from WP3), will utilise these data to provide estimates of the health impacts, total costs and unit prices (in €/kg) for emissions from all emission sectors individually for all countries in Europe for mortality as well as important morbidity/disability endpoints. Sensitivity analyses with respect to the impact/added value of the updated information from WP2 and WP3 will also be carried out. To assess the uncertainty accompanying the brute force method for emission reduction scenarios, a few scenarios will also be run using the very accurate but also highly resource demanding tagging methodology, which is also embedded in the DEHM model.

Work package WP6 – Costs of inaction and action - case studies

Work Package Number	WP6	**Lead Beneficiary**	6. ISG
Work Package Name	Costs of inaction and action - case studies		
Start Month	9	**End Month**	45

Objectives
The objective of WP6 is to identify the cost of action and inaction using cost-benefit analysis in four air pollution cases and two nitrate drinking water pollution cases. The cost-benefit analysis will be calculated from avoided health impacts using the unit prices from WP5 compared with the cost of different mitigation policies. One case study is devoted to show how to scale cost-benefit calculations to regions with a paucity of data and local-scale modeling.

Description
Task 6.1 Consultations with stakeholders and experts on methodological issues (ISG, AU, UTARTU, BSC)

Following the results from WP2, 3 and 5, and prior to the first workshops with public authorities in the case study areas (tasks 6.3 and 6.4), consultations will be made with stakeholders and experts as described in section 1.1 (SO7) and 1.2.4 to present results and enhance understanding of their implications, as well as to seek advice on key methodological issues that come up. A second round of workshops will be conducted with stakeholders and experts when the preliminary results become available from the case studies, allowing them to provide further input while gaining insights into the appraisal techniques. This consultation process aims to help develop a shared understanding and underpin consensus on best practices and the relevant metrics, while promoting wider use across Europe.

Task 6.2 Harmonising methods for welfare economic appraisals of mitigation costs (AU, UTARTU, BSC, ISG)

While the unit prices of WP5 are metrics for the benefits of pollution reductions, task 6.2 for the purpose of the case studies of task 6.3 and 6.4 will establish a common methodological framework for the appraisal of the mitigation costs (costs of action), based on a consistent welfare economic approach. Our framework will follow the OECD guidelines for cost-benefit analysis and clarify any issues that have been raised during the first round of workshops with public authorities, to ensure a consistent approach across the various national contexts, where different approaches may prevail. For instance, while this task will ensure that the approach to discounting is done according to the Ramsey formula, as EC recommends, clarification is required on consistent sources and time frames for assumptions on future economic growth and taxation rates (cf. formula in footnote 1).

Task 6.3 Air pollution and the costs of action (AU, UTARTU, EERC, ISG/BSC)

We will explore and estimate the costs of action in relation to air pollution with socio-economic cost-benefit analysis in collaboration with relevant public authorities in each of the case study areas of Øresund (Copenhagen/Malmø), Catalonia, Estonia and Kosovo. Exploratory workshops in each region will kick off this activity by identifying some scenarios of action of relevance to the specifics of each region. For the case studies, the standard unit prices developed under WP5 will be applied for estimations of the benefits of emissions reductions, complemented by the findings of the high-resolution analysis (The unit prices represent the costs of inaction). Mitigation measures focusing on transportation and heating with small-scale biomass heat stoves are likely to be relevant in three of four case study areas. For assessing policies that influence the mode of transport a modified transport choice model developed by the Danish Energy Agency (2020 can be used. We may also consider the direct and indirect potentials of low- or zero-emissions zones. In relation to heating, alternatives comprise a range of measures (insulation, heat pumps; district heating etc.) for which cost curves exist, though they will need adjustment to national price levels. There may also be indirect costs or gains of choices in heating via changes in house prices, for which a theoretical model has been developed. Whether the detailed data available in the Danish house price database can be replicated in other case study areas will be investigated.

Task 6.4 Drinking water nitrate pollution (AU, CU, NIBIO, GEUS, ISG)

We will explore and estimate the costs of action in relation to drinking water nitrate pollution with socio-economic cost-benefit analysis in collaboration with relevant public authorities in each of the case study areas of Zelivka (Czech Republic) and Jutland (Denmark). Exploratory workshops in each region will kick off this activity by identifying some scenarios of action of relevance to the specifics of each region. Mitigation measures will focus on reducing nitrate leakage from farmland into groundwater bodies and as runoff into streams, lakes and reservoirs. Regulation that mitigates nitrate pollution by inducing changes in farm practices such as fertilizer management, livestock management, soil management, and land-use changes will be assessed using a production function. The costs of the stipulated regulations will then be assessed in relation to the potential health impacts of reduced nitrate concentration in drinking water and other co-benefits. A cost-curve for the relevant mitigation measures can be derived from the recently published catalogue on measures to reduce nitrogen loads by Danish Centre for Food and Agriculture at Aarhus University. Moreover, the crosscutting mitigation linkages between nitrogen and air pollution will be devoted attention, as some measures reduce aquatic pollution by simply increasing ammonia emissions (e.g. mini-wetlands), which needs to be factored in when establishing the cost-curve. This helps respect the do-no-significant-harm principle.

Work package WP7 – Dissemination and communication activities

Work Package Number	WP7	**Lead Beneficiary**	1. AU
Work Package Name	Dissemination and communication activities		
Start Month	1	**End Month**	48

Objectives
To disseminate results to advisors, analysts, decisionmakers and citizens and communicate findings to attract attention from these target groups on health risks and costs related to air pollution and drinking water nitrates.

Description
Task 7.1 Guidance document on methodology for drinking water nitrate pollution (AU, NIBIO) The first MARCHES guidance document will explain at a generic level the methodology for modelling drinking water nitrate pollution costs developed under task 5.1. In the absence of European-wide models and datasets that can account for the emissions from the rootzone of farmers' fertilizer practices, the guidance document will explain how data can be retrieved, e.g. from Eurostat nutrient balance accounts, for the purpose of a suitable catchment model to estimate the nitrate pulse to the relevant water bodies. Based on the two drinking water case studies (WP6) the guidance document will provide illustrative guidance on how to set up the impact pathway sequence, with authoritative values for the appropriate exposure-response functions and health effect valuations relating to nitrates. The uncertainties and the EC discount rate formula will be explained too. Task 7.2 Guidance document with unit prices of air pollution for Europe (AU, MENON) The second MARCHES guidance document collates the outputs from task 5.4 in terms of air pollution unit prices for ten emission sectors in all EU, EFTA and west-Balkan countries covering each of the main air pollutants (PM2.5, SOx, NOx, NH3, O3) with a profound methodological explanation of how the unit prices have been calculated and what the uncertainties are. To allow target groups (cf. 2.2) to inspect the individual steps in the calculations of the impact-pathway sequence the guidance document will have supplementary documentation. Besides data and references for the exposure-response functions and economic valuation of health endpoints the supplementary documentation will include an inventory with data for the atmospheric modelling outputs in each grid cell at 20 km x 20 km resolution. Due to its European-wide coverage the guidance document will have relevance also in areas with a paucity of local-scale models and data. How to apply the EC's discount rate formula will be explained too. Task 7.3 Spatial mapping of European-wide air pollution health risks (AU, BSC, EERC) Based on WP5 results, this task will disseminate the identified health risks to citizens and policymakers by mapping the relative risks across Europe as an easy to understand aggregate indicator, that accounts as well for premature mortality as the life-years lost (incl. disabilities) caused by air pollution. It will show with a geographical resolution of approximately 11 km x 11 km how the statistical risks differ spatially across individual countries and Europe as a whole. Moreover, based on the higher-resolution modelling performed in the case study areas of Øresund, Catalonia and Estonia, separate map sections with higher spatial resolution will be produced. The health risk maps will be made available from the MARCHES website, with announcements via Twitter, and further disseminated in a peer-reviewed journal article with comparison to more conventional indicators of air pollution and air quality such as the European Air Quality Index. 7.4. Policy briefs with infographics (ISG, AU, UTARTU, ISP) To communicate results from the project to the main target groups, concise policy briefs with infographics will be developed for each of the main deliverables of WP3-6. This will allow the interested audience to learn about the main outcomes of the project in an easy-to-understand language. Policy briefs will provide references to journal articles and data sets from MARCHES with DOI and guidance on how to get hold of them. A special effort will be to distribute them to west-Balkan countries in some of the national languages.

STAFF EFFORT

Staff effort per participant

Grant Preparation (Work packages - Effort screen) — Enter the info.

Participant	WP1	WP2	WP3	WP4	WP5	WP6	WP7	Total Person-Months
1 - AU	10.00	28.00	4.00	1.00	34.00	24.00	16.00	117.00
2 - UMU	1.00	22.00		6.00			1.00	30.00
3 - UTARTU	1.00			21.00		6.00	1.00	29.00
4 - CU	1.00		24.00	1.00	3.00	6.00	1.00	36.00
5 - MENON	1.00		15.00			1.00	1.00	18.00
6 - ISG	1.00	15.00		1.00		9.00	9.00	35.00
7 - ISP	1.00			1.00	2.00	6.00	6.00	16.00
8 - BSC	1.00				13.00	6.00	1.00	21.00
9 - GEUS					3.00			3.00
10 - EERC	1.00				9.00	1.00	1.00	12.00
11 - NIBIO	1.00				12.00	2.00	1.00	16.00
Total Person-Months	19.00	65.00	43.00	31.00	76.00	61.00	38.00	333.00

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	Data Management Plan	WP1	1 - AU	DMP — Data Management Plan	PU - Public	6
D1.2	Final Data Management Plan	WP1	1 - AU	DMP — Data Management Plan	PU - Public	48
D1.3	Cluster Data Management Strategy	WP1	1 - AU	DMP — Data Management Plan	PU - Public	12
D1.4	Policy Strategy of the cluster	WP1	1 - AU	R — Document, report	PU - Public	12
D1.5	Scientific strategy of the cluster	WP1	1 - AU	R — Document, report	PU - Public	12
D2.1	Selected air pollution exposure-response functions with baseline incidences for EVA	WP2	1 - AU	R — Document, report	PU - Public	20
D2.2	Selected drinking water nitrate exposure-response functions with baseline incidences	WP2	1 - AU	R — Document, report	PU - Public	20
D3.1	Direct WTP estimates for morbidity impacts and DALY/QALY	WP3	5 - MENON	R — Document, report	PU - Public	30
D3.2	Indirect WTP estimates for morbidity impacts and DALY/QALY consistent with VSL/VOLY	WP3	4 - CU	R — Document, report	PU - Public	30

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Deliverable No	Deliverable Name	Work Package No	Lead Beneficiary	Type	Dissemination Level	Due Date (month)
D3.3	User-friendly tool on WTP values for health endpoints	WP3	4 - CU	R — Document, report	PU - Public	40
D4.1	Well-being in societal and environmental exposure context	WP4	3 - UTARTU	R — Document, report	PU - Public	36
D5.1	Final assessment of exposures and unit prices for nitrate in drinking water in case study areas	WP5	11 - NIBIO	R — Document, report	PU - Public	33
D5.2	Final assessment of exposures and unit prices for air pollution in case study areas	WP5	1 - AU	R — Document, report	PU - Public	36
D5.3	Assessment with EVA model of health impacts and unit prices of air pollution at national level	WP5	1 - AU	R — Document, report	PU - Public	40
D5.4	Recommendations for methodological approach and data sets for guidance document on generic health impact assessment	WP5	1 - AU	R — Document, report	PU - Public	40
D6.1	Costs of action and inaction on air pollution in Catalonia	WP6	8 - BSC	R — Document, report	PU - Public	45
D6.2	Costs of action and inaction on air pollution in Estonia	WP6	3 - UTARTU	R — Document, report	PU - Public	45

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Deliverable No	Deliverable Name	Work Package No	Lead Beneficiary	Type	Dissemination Level	Due Date (month)
D6.3	Costs of action and inaction on air pollution in Øresund region	WP6	1 - AU	R — Document, report	PU - Public	45
D6.4	Costs of action and inaction on air pollution in Kosovo	WP6	1 - AU	R — Document, report	PU - Public	45
D6.5	Costs of action and inaction on drinking water nitrogen pollution in Zelivka catchment	WP6	4 - CU	R — Document, report	PU - Public	45
D6.6	Costs of action and inaction on drinking water nitrogen pollution in Jutland	WP6	1 - AU	R — Document, report	PU - Public	45
D7.1	Plan for dissemination and exploitation including communication activities	WP7	1 - AU	R — Document, report	SEN - Sensitive	6
D7.2	Guidance document on methodology for calculating external costs of drinking water nitrates	WP7	1 - AU	R — Document, report	PU - Public	48
D7.3	Guidance document on methodology for calculating external costs of air pollution, with unit prices of ten emission sectors in all EU, EFTA and west-Balkan countries	WP7	1 - AU	R — Document, report	PU - Public	48
D7.4	Spatial health risk map of Europe with indicators of air pollution risks to the general public	WP7	1 - AU	R — Document, report	PU - Public	36

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Deliverable No	Deliverable Name	Work Package No	Lead Beneficiary	Type	Dissemination Level	Due Date (month)
D7.5	Two policy briefs with infographics	WP7	6 - ISG	DEC —Websites, patent filings, videos, etc	PU - Public	18
D7.6	Three policy briefs with infographics	WP7	6 - ISG	DEC —Websites, patent filings, videos, etc	PU - Public	36
D7.7	Three more policy briefs with infographics	WP7	6 - ISG	DEC —Websites, patent filings, videos, etc	PU - Public	48
D7.8	Website launch	WP7	1 - AU	DEC —Websites, patent filings, videos, etc	PU - Public	6
D7.9	Final plan for dissemination and exploitation including communication activities	WP7	1 - AU	R — Document, report	SEN - Sensitive	48
D7.10	Cluster web portal and visual identity	WP7	1 - AU	DEC —Websites, patent filings, videos, etc	PU - Public	9
D7.11	Cluster's common dissemination and communication strategy	WP7	1 - AU	R — Document, report	SEN - Sensitive	12
D7.12	Cluster brochure	WP7	1 - AU	DEC —Websites, patent filings, videos, etc	PU - Public	12
D7.13	Cluster newsletter 1	WP7	1 - AU	DEC —Websites, patent filings, videos, etc	PU - Public	18
D7.14	Policy brief 1	WP7	1 - AU	DEC —Websites, patent filings, videos, etc	PU - Public	18

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Deliverable No	Deliverable Name	Work Package No	Lead Beneficiary	Type	Dissemination Level	Due Date (month)
D7.15	Cluster newsletter 2	WP7	1 - AU	DEC —Websites, patent filings, videos, etc	PU - Public	36
D7.16	Policy brief 2	WP7	1 - AU	DEC —Websites, patent filings, videos, etc	PU - Public	36
D7.17	Cluster newsletter 3	WP7	1 - AU	DEC —Websites, patent filings, videos, etc	PU - Public	48
D7.18	Policy brief 3	WP7	1 - AU	DEC —Websites, patent filings, videos, etc	PU - Public	48

Associated with document Ref. Ares(2022)7741548 - 09/11/2022

Deliverable D1.1 – Data Management Plan

Deliverable Number	D1.1	Lead Beneficiary	1. AU
Deliverable Name	Data Management Plan		
Type	DMP — Data Management Plan	Dissemination Level	PU - Public
Due Date (month)	6	Work Package No	WP1

Description
The Data Management Plan (DMP) (DL1.1) (M6) will provide operating procedures to fulfil three main objectives; a) a harmonized set of heterogenous data (health, geographical, atmospheric, socio-economic) across the different countries and case study areas respectively, including for the delivery of metadata b) quality control with data processing and c) data indexing and publication with controlled data sharing mechanisms, including persistent identifiers (PID). The plan will ensure that the data can be found, accessed, interoperated and reused in accordance with FAIR principles. The DeiC (Danish e-infrastructure Cooperation) webtool DMPonline (https://dmponline.deic.dk/plans) will be used for setting up and disseminating a data management plan consistent with the Horizon DMP template. The DMP of MARCHES will be publicly available on the DeiC platform. Data will be stored for public assess at the platform of Zenodo (http://zenodo.org). The platform allows results from projects funded under Horizon Europe to be stored, shared and showcased (both data and publications) and licensed under Creative Commons. A Data Manager (Dr. Steen Solvang Jensen of AU) will be appointed to oversee the establishment, updating and implementation of the data management plan.

Deliverable D1.2 – Final Data Management Plan

Deliverable Number	D1.2	Lead Beneficiary	1. AU
Deliverable Name	Final Data Management Plan		
Type	DMP — Data Management Plan	Dissemination Level	PU - Public
Due Date (month)	48	Work Package No	WP1

Description
The Data Management Plan (DMP) (DL1.1) (M6) will provide operating procedures to fulfil three main objectives; a) a harmonized set of heterogenous data (health, geographical, atmospheric, socio-economic) across the different countries and case study areas respectively, including for the delivery of metadata b) quality control with data processing and c) data indexing and publication with controlled data sharing mechanisms, including persistent identifiers (PID). The plan will ensure that the data can be found, accessed, interoperated and reused in accordance with FAIR principles. The DeiC (Danish e-infrastructure Cooperation) webtool DMPonline (https://dmponline.deic.dk/plans) will be used for setting up and disseminating a data management plan consistent with the Horizon DMP template. The DMP of MARCHES will be publicly available on the DeiC platform. Data will be stored for public assess at the platform of Zenodo (http://zenodo.org). The platform allows results from projects funded under Horizon Europe to be stored, shared and showcased (both data and publications) and licensed under Creative Commons. A Data Manager (Dr. Steen Solvang Jensen of AU) will be appointed to oversee the establishment, updating and implementation of the data management plan.

Deliverable D1.3 – Cluster Data Management Strategy

Deliverable Number	D1.3	Lead Beneficiary	1. AU
Deliverable Name	Cluster Data Management Strategy		
Type	DMP — Data Management Plan	Dissemination Level	PU - Public

Due Date (month)	12	**Work Package No**	WP1

Description
Cluster Data Management Strategy (M12)

Deliverable D1.4 – Policy Strategy of the cluster

Deliverable Number	D1.4	**Lead Beneficiary**	1. AU
Deliverable Name	Policy Strategy of the cluster		
Type	R — Document, report	**Dissemination Level**	PU - Public
Due Date (month)	12	**Work Package No**	WP1

Description
Policy Strategy of the cluster (M12)

Deliverable D1.5 – Scientific strategy of the cluster

Deliverable Number	D1.5	**Lead Beneficiary**	1. AU
Deliverable Name	Scientific strategy of the cluster		
Type	R — Document, report	**Dissemination Level**	PU - Public
Due Date (month)	12	**Work Package No**	WP1

Description
Scientific strategy of the cluster (M12)

Deliverable D2.1 – Selected air pollution exposure-response functions with baseline incidences for EVA

Deliverable Number	D2.1	**Lead Beneficiary**	1. AU
Deliverable Name	Selected air pollution exposure-response functions with baseline incidences for EVA		
Type	R — Document, report	**Dissemination Level**	PU - Public
Due Date (month)	20	**Work Package No**	WP2

Description
For air pollution we give priority to the following morbidity impacts: asthma incidence, lung cancer and COPD, e.g. for O3, PM2.5 and NO2. While these health endpoints are frequently included in the integrated assessment models of air pollution (based on the 2013 WHO recommendations), the specific exposure-response functions applied are relatively dated and need to be reevaluated based on the available systematic reviews of the health literature. However, considering COPD as well as asthma we will provide an update, to reflect results from the ELAPSE project and other studies published in recent years. Additionally, we will address a series of 'new' outcomes from air pollution identified in the health literature (i.e. diabetes, cognitive disorders/dementia, Parkinson's disease, low birth weight, depression) to investigate whether evidence from the recently published systematic reviews is sufficiently robust (considering possible confounders) to allow for inclusion in impact assessments in a European setting, and what the relevant exposure-response functions are. The metrics applied for air pollution will mainly be primary/secondary PM2.5, NO2 and O3 with epidemiological studies based on two-pollutant models warranting the strongest interest in order to avoid any double-

counting of the health impacts identified. Considering the availability of the recently published systematic review on air pollution mortality by WHO (including cardiovascular effects), we see limited value in replication and will from this review extract exposure-response functions relevant to European conditions.
The exposure-response functions identified will hinge on the population sub-groups identified in epidemiological studies; we will distinguish between acute and chronic effects, the latter resulting from exposure over several years. Considering the findings of ELAPSE, careful attention will be paid to possible non-linearities of exposure-response functions, especially associated with low-level exposures. Critical data gaps will be identified as regards environment and health risk factors.

Deliverable D2.2 – Selected drinking water nitrate exposure-response functions with baseline incidences

Deliverable Number	D2.2	**Lead Beneficiary**	1. AU
Deliverable Name	Selected drinking water nitrate exposure-response functions with baseline incidences		
Type	R — Document, report	**Dissemination Level**	PU - Public
Due Date (month)	20	**Work Package No**	WP2

Description
For drinking water nitrate, we give priority to two morbidity endpoints: besides cancers related to gastro-intestinal sites also impacts on infants in terms of adverse birth outcomes and methemoglobinemia. While for the gastro intestinal health endpoint we will rely on findings from recent systematic review, our novel systematic review of impacts on infants aims to identify whether these could be included with a high degree of certainty. The WP will also present figures for the possible impacts in areas where there is a scarcity of studies available in the literature, hence pointing to research needs and data gaps that should warrant further interest. The exposure-response functions identified will hinge on the population sub-groups identified in epidemiological studies; we will distinguish between acute and chronic effects, the latter resulting from exposure over several years. Attention will be paid to possible non-linearities of exposure-response functions, especially associated with low-level exposures. Critical data gaps will be identified as regards environment and health risk factors.

Deliverable D3.1 – Direct WTP estimates for morbidity impacts and DALY/QALY

Deliverable Number	D3.1	**Lead Beneficiary**	5. MENON
Deliverable Name	Direct WTP estimates for morbidity impacts and DALY/QALY		
Type	R — Document, report	**Dissemination Level**	PU - Public
Due Date (month)	30	**Work Package No**	WP3

Description
We will design, test and carry out new stated preference surveys in six countries (corresponding to the case study areas of WP6) of selected health endpoints. We will then conduct benefit transfer tests across countries applying state-of-the art benefit transfer guidance, while estimating benefit transfer errors, to develop improved common EU unit value estimates of the selected morbidity endpoints. Besides chronic illnesses like COPD (chronic obstructive pulmonary disease) the range of new endpoints like diabetes, dementia, Parkinson's disease, preeclampsia, low birth weight, and depression warrant interest, pending on the outcome of WP2 in terms of relevant exposure-response functions.

Associated with document Ref. Ares(2022)7741548 - 09/11/2022

Deliverable D3.2 – Indirect WTP estimates for morbidity impacts and DALY/QALY consistent with VSL/VOLY

Deliverable Number	D3.2	**Lead Beneficiary**	4. CU
Deliverable Name	Indirect WTP estimates for morbidity impacts and DALY/QALY consistent with VSL/ VOLY		
Type	R — Document, report	**Dissemination Level**	PU - Public
Due Date (month)	30	**Work Package No**	WP3

Description
In order to investigate compatibility of the two frameworks for deriving a VOLY and the WTP-QALY framework, we will test and develop a new approach for deriving individual preferences for small risk reductions that will allow us to derive VSL and VOLY in a consistent way. We will build on recent research and develop a novel instrument for deriving the value of a life year (VOLY) and hence a disability/quality-adjusted life year (DALY/QALY) from VSL, where we will: i] consistently elicit also information about perceived life expectancy and QALY, ii] pay special attention to age-factors and iii] deal with subjectively perceived time (intertemporal) preferences. The data will be gathered in a multi-country survey conducted in six European jurisdictions (Catalonia, Czech Republic, Denmark, Estonia, Kosovo, Sweden) with a total sample size of 6,000 observations. We will again rely on stated preference valuation techniques in terms of discrete choice experiment and contingent valuation surveys to elicit preferences for reducing health risks, increasing perceived life expectancy, and uncover intertemporal preferences. Econometric analysis of these extensive data will be conducted, dealing also with observed and unobserved preference heterogeneity.

Deliverable D3.3 – User-friendly tool on WTP values for health endpoints

Deliverable Number	D3.3	**Lead Beneficiary**	4. CU
Deliverable Name	User-friendly tool on WTP values for health endpoints		
Type	R — Document, report	**Dissemination Level**	PU - Public
Due Date (month)	40	**Work Package No**	WP3

Description
A user-friendly spreadsheet tool will be built to determine the WTP value for a range of health effect endpoints, for given jurisdiction and given time.

Deliverable D4.1 – Well-being in societal and environmental exposure context

Deliverable Number	D4.1	**Lead Beneficiary**	3. UTARTU
Deliverable Name	Well-being in societal and environmental exposure context		
Type	R — Document, report	**Dissemination Level**	PU - Public
Due Date (month)	36	**Work Package No**	WP4

Description
This DL will examine whether and to what extent linkages can be traced between the objective health burdens and costs that can be estimated (cf. WP2 and WP3) and the perceptions of the quality of life as influenced by other variables, by exploring data compiled by the European Social Survey (ESS). Moreover, it will report on a cross-national survey specifically addressing and mapping pollution concerns in several

countries (corresponding to the case study areas of WP6 with high-resolution air pollution modelling), to explore the prevalence of worries, symptoms, psycho-social stresses and perceived exposures across very different parts of Europe.

Deliverable D5.1 – Final assessment of exposures and unit prices for nitrate in drinking water in case study areas

Deliverable Number	D5.1	**Lead Beneficiary**	11. NIBIO
Deliverable Name	Final assessment of exposures and unit prices for nitrate in drinking water in case study areas		
Type	R — Document, report	**Dissemination Level**	PU - Public
Due Date (month)	33	**Work Package No**	WP5

Description
Detailed health impact assessment including local scale resolution nitrogen leaching modeling for two selected case areas (Jutland/DK groundwater and Zelivka/CR surface water) will be performed with the SWAT/SWAT+ model for both case studies, while for the groundwater case study also mapping derived from a high-resolution DK-model will be used. When linked with health effects exposure-response functions (from WP2) and valuation of mortality/morbidity/disability (from WP3) this will allow for estimations of the external costs per unit of nitrogen.

Deliverable D5.2 – Final assessment of exposures and unit prices for air pollution in case study areas

Deliverable Number	D5.2	**Lead Beneficiary**	1. AU
Deliverable Name	Final assessment of exposures and unit prices for air pollution in case study areas		
Type	R — Document, report	**Dissemination Level**	PU - Public
Due Date (month)	36	**Work Package No**	WP5

Description
Detailed high-resolution air pollution modeling for three selected case study areas (Øresund, Catalonia, and Estonia) at 1 km x 1 km resolution will be performed with the UBM model (Øresund), the Monarch model (Catalonia) and the AirViro/MATCH model (Estonia). These models have been designed for high performance in the specific regions and includes detailed local emission inventories. Following the approach detailed in Task 5.4, sector wise simulations will be made to assess impacts of individual emission sectors on air pollution levels. The resulting high resolution air pollution concentration levels and sector emission totals will be used as input to the updated EVA system and the output is high-resolution health externality data and unit prices for the case study areas.

Deliverable D5.3 – Assessment with EVA model of health impacts and unit prices of air pollution at national level

Deliverable Number	D5.3	**Lead Beneficiary**	1. AU
Deliverable Name	Assessment with EVA model of health impacts and unit prices of air pollution at national level		
Type	R — Document, report	**Dissemination Level**	PU - Public
Due Date (month)	40	**Work Package No**	WP5

Description

A generic methodology for applying readily available public air quality and source allocation data will be developed based on the EMEP source-receptor matrices, the CAMS air quality reanalyzes and the CAMS policy tool data on emission source allocation as well as other available data. This methodology is intended to support public authorities in countries with a paucity of detailed spatial data on air pollution emissions.

Deliverable D5.4 – Recommendations for methodological approach and data sets for guidance document on generic health impact assessment

Deliverable Number	D5.4	**Lead Beneficiary**	1. AU
Deliverable Name	Recommendations for methodological approach and data sets for guidance document on generic health impact assessment		
Type	R — Document, report	**Dissemination Level**	PU - Public
Due Date (month)	40	**Work Package No**	WP5

Description
The regional chemistry-transport model (DEHM) as part of the Copernicus Atmosphere Monitoring Service (CAMS) is set up for Europe including CAMS emissions and a representative driving meteorology. DEHM will be run with a 20 km x 20 km resolution for each individual country in Europe (EU27 + EFTA and West Balkan countries) with 1) all emissions and 2) for each emission sector (by reducing the sector with 20%, i.e. the brute force approach). This provides detailed environmental input on air pollution exposure levels country by country with sectoral disaggregation. The EVA system (updated with exposure-response functions from WP2 and valuation input from WP3), will utilise these data to provide estimates of the health impacts, total costs and unit prices (in €/kg) for emissions from all emission sectors individually for all countries in Europe for mortality as well as important morbidity/disability endpoints.

Deliverable D6.1 – Costs of action and inaction on air pollution in Catalonia

Deliverable Number	D6.1	**Lead Beneficiary**	8. BSC
Deliverable Name	Costs of action and inaction on air pollution in Catalonia		
Type	R — Document, report	**Dissemination Level**	PU - Public
Due Date (month)	45	**Work Package No**	WP6

Description
We will explore and estimate the costs of action in relation to air pollution with socio-economic cost-benefit analysis in collaboration with public authorities in the case study area. The standard unit prices developed under WP5 will be applied for estimations of the benefits of emissions reductions, complemented by the findings of the high-resolution analysis.

Deliverable D6.2 – Costs of action and inaction on air pollution in Estonia

Deliverable Number	D6.2	**Lead Beneficiary**	3. UTARTU
Deliverable Name	Costs of action and inaction on air pollution in Estonia		
Type	R — Document, report	**Dissemination Level**	PU - Public
Due Date (month)	45	**Work Package No**	WP6

Description
We will explore and estimate the costs of action in relation to air pollution with socio-economic cost-benefit analysis in

collaboration with public authorities in the case study area. The standard unit prices developed under WP5 will be applied for estimations of the benefits of emissions reductions, complemented by the findings of the high-resolution analysis.

Deliverable D6.3 – Costs of action and inaction on air pollution in Øresund region

Deliverable Number	D6.3	**Lead Beneficiary**	1. AU
Deliverable Name	Costs of action and inaction on air pollution in Øresund region		
Type	R — Document, report	**Dissemination Level**	PU - Public
Due Date (month)	45	**Work Package No**	WP6

Description
We will explore and estimate the costs of action in relation to air pollution with socio-economic cost-benefit analysis in collaboration with public authorities in the case study area. The standard unit prices developed under WP5 will be applied for estimations of the benefits of emissions reductions, complemented by the findings of the high-resolution analysis.

Deliverable D6.4 – Costs of action and inaction on air pollution in Kosovo

Deliverable Number	D6.4	**Lead Beneficiary**	1. AU
Deliverable Name	Costs of action and inaction on air pollution in Kosovo		
Type	R — Document, report	**Dissemination Level**	PU - Public
Due Date (month)	45	**Work Package No**	WP6

Description
We will explore and estimate the costs of action in relation to air pollution with socio-economic cost-benefit analysis in collaboration with public authorities in the case study area. The standard unit prices developed under WP5 will be applied for estimations of the benefits of emissions reductions.

Deliverable D6.5 – Costs of action and inaction on drinking water nitrogen pollution in Zelivka catchment

Deliverable Number	D6.5	**Lead Beneficiary**	4. CU
Deliverable Name	Costs of action and inaction on drinking water nitrogen pollution in Zelivka catchment		
Type	R — Document, report	**Dissemination Level**	PU - Public
Due Date (month)	45	**Work Package No**	WP6

Description
We will explore and estimate the costs of action in relation to drinking water nitrate pollution with socioeconomic cost-benefit analysis in collaboration with relevant public authorities. The costs of stipulated regulations will be assessed in relation to the potential health impacts of reduced nitrate concentration in drinking water and other co-benefits.

Deliverable D6.6 – Costs of action and inaction on drinking water nitrogen pollution in Jutland

Deliverable Number	D6.6	**Lead Beneficiary**	1. AU

Deliverable Name	Costs of action and inaction on drinking water nitrogen pollution in Jutland		
Type	R — Document, report	**Dissemination Level**	PU - Public
Due Date (month)	45	**Work Package No**	WP6

Description
We will explore and estimate the costs of action in relation to drinking water nitrate pollution with socioeconomic cost-benefit analysis in collaboration with relevant public authorities. The costs of stipulated regulations will be assessed in relation to the potential health impacts of reduced nitrate concentration in drinking water and other co-benefits.

Deliverable D7.1 – Plan for dissemination and exploitation including communication activities

Deliverable Number	D7.1	**Lead Beneficiary**	1. AU
Deliverable Name	Plan for dissemination and exploitation including communication activities		
Type	R — Document, report	**Dissemination Level**	SEN - Sensitive
Due Date (month)	6	**Work Package No**	WP7

Description
Activities will be carried out during the entire project period as specified in the detailed dissemination, communication and exploitation plan to be finalized during the first six months of the project

Deliverable D7.2 – Guidance document on methodology for calculating external costs of drinking water nitrates

Deliverable Number	D7.2	**Lead Beneficiary**	1. AU
Deliverable Name	Guidance document on methodology for calculating external costs of drinking water nitrates		
Type	R — Document, report	**Dissemination Level**	PU - Public
Due Date (month)	48	**Work Package No**	WP7

Description
Based on the two drinking water case studies (WP6) the guidance document will provide illustrative guidance on how to set up the impact pathway sequence, with authoritative values for the appropriate exposure-response functions and health effect valuations relating to nitrates.

Deliverable D7.3 – Guidance document on methodology for calculating external costs of air pollution, with unit prices of ten emission sectors in all EU, EFTA and west-Balkan countries

Deliverable Number	D7.3	**Lead Beneficiary**	1. AU
Deliverable Name	Guidance document on methodology for calculating external costs of air pollution, with unit prices of ten emission sectors in all EU, EFTA and west-Balkan countries		
Type	R — Document, report	**Dissemination Level**	PU - Public
Due Date (month)	48	**Work Package No**	WP7

Description

The guidance document collates the outputs from task 5.4 in terms of air pollution unit prices for ten emission sectors in all EU, EFTA and west-Balkan countries covering each of the main air pollutants (PM2.5, SOx, NOx, NH3, O3) with a profound methodological explanation of how the unit prices have been calculated and what the uncertainties are.

Deliverable D7.4 – Spatial health risk map of Europe with indicators of air pollution risks to the general public

Deliverable Number	D7.4	**Lead Beneficiary**	1. AU
Deliverable Name	Spatial health risk map of Europe with indicators of air pollution risks to the general public		
Type	R — Document, report	**Dissemination Level**	PU - Public
Due Date (month)	36	**Work Package No**	WP7

Description
Concise policy briefs with infographics will be developed for each of the main deliverables of WP3-6.

Deliverable D7.5 – Two policy briefs with infographics

Deliverable Number	D7.5	**Lead Beneficiary**	6. ISG
Deliverable Name	Two policy briefs with infographics		
Type	DEC —Websites, patent filings, videos, etc	**Dissemination Level**	PU - Public
Due Date (month)	18	**Work Package No**	WP7

Description
Concise policy briefs with infographics will be developed for each of the main deliverables of WP3-6.

Deliverable D7.6 – Three policy briefs with infographics

Deliverable Number	D7.6	**Lead Beneficiary**	6. ISG
Deliverable Name	Three policy briefs with infographics		
Type	DEC —Websites, patent filings, videos, etc	**Dissemination Level**	PU - Public
Due Date (month)	36	**Work Package No**	WP7

Description
Concise policy briefs with infographics will be developed for each of the main deliverables of WP3-6.

Deliverable D7.7 – Three more policy briefs with infographics

Deliverable Number	D7.7	**Lead Beneficiary**	6. ISG
Deliverable Name	Three more policy briefs with infographics		

Type	DEC —Websites, patent filings, videos, etc	**Dissemination Level**	PU - Public
Due Date (month)	48	**Work Package No**	WP7

Description
Concise policy briefs with infographics will be developed for each of the main deliverables of WP3-6.

Deliverable D7.8 – Website launch

Deliverable Number	D7.8	**Lead Beneficiary**	1. AU
Deliverable Name	Website launch		
Type	DEC —Websites, patent filings, videos, etc	**Dissemination Level**	PU - Public
Due Date (month)	6	**Work Package No**	WP7

Description
A project website will be designed and developed applying the MARCHES visual identity. The website will be a main entry point to general information on the project, with link to open access publications and the Researchgate.net page. Core scientific results will be summarized at the website. The website language will be English.

Deliverable D7.9 – Final plan for dissemination and exploitation including communication activities

Deliverable Number	D7.9	**Lead Beneficiary**	1. AU
Deliverable Name	Final plan for dissemination and exploitation including communication activities		
Type	R — Document, report	**Dissemination Level**	SEN - Sensitive
Due Date (month)	48	**Work Package No**	WP7

Description
Final plan for dissemination and exploitation including communication activities

Deliverable D7.10 – Cluster web portal and visual identity

Deliverable Number	D7.10	**Lead Beneficiary**	1. AU
Deliverable Name	Cluster web portal and visual identity		
Type	DEC —Websites, patent filings, videos, etc	**Dissemination Level**	PU - Public
Due Date (month)	9	**Work Package No**	WP7

Description
Cluster web portal and visual identity (M9)

Deliverable D7.11 – Cluster's common dissemination and communication strategy

Deliverable Number	D7.11	**Lead Beneficiary**	1. AU
Deliverable Name	Cluster's common dissemination and communication strategy		
Type	R — Document, report	**Dissemination Level**	SEN - Sensitive
Due Date (month)	12	**Work Package No**	WP7

Description
Cluster's common dissemination and communication strategy (M12)

Deliverable D7.12 – Cluster brochure

Deliverable Number	D7.12	**Lead Beneficiary**	1. AU
Deliverable Name	Cluster brochure		
Type	DEC —Websites, patent filings, videos, etc	**Dissemination Level**	PU - Public
Due Date (month)	12	**Work Package No**	WP7

Description
Cluster brochure (M12)

Deliverable D7.13 – Cluster newsletter 1

Deliverable Number	D7.13	**Lead Beneficiary**	1. AU
Deliverable Name	Cluster newsletter 1		
Type	DEC —Websites, patent filings, videos, etc	**Dissemination Level**	PU - Public
Due Date (month)	18	**Work Package No**	WP7

Description
Cluster newsletter 1 (M18)

Deliverable D7.14 – Policy brief 1

Deliverable Number	D7.14	**Lead Beneficiary**	1. AU
Deliverable Name	Policy brief 1		
Type	DEC —Websites, patent filings, videos, etc	**Dissemination Level**	PU - Public
Due Date (month)	18	**Work Package No**	WP7

Description
Cluster Policy brief 1 (M18)

Deliverable D7.15 – Cluster newsletter 2

Deliverable Number	D7.15	Lead Beneficiary	1. AU
Deliverable Name	Cluster newsletter 2		
Type	DEC —Websites, patent filings, videos, etc	Dissemination Level	PU - Public
Due Date (month)	36	Work Package No	WP7

Description
Cluster newsletter 2 (M36)

Deliverable D7.16 – Policy brief 2

Deliverable Number	D7.16	Lead Beneficiary	1. AU
Deliverable Name	Policy brief 2		
Type	DEC —Websites, patent filings, videos, etc	Dissemination Level	PU - Public
Due Date (month)	36	Work Package No	WP7

Description
Cluster Policy brief 2 (M36)

Deliverable D7.17 – Cluster newsletter 3

Deliverable Number	D7.17	Lead Beneficiary	1. AU
Deliverable Name	Cluster newsletter 3		
Type	DEC —Websites, patent filings, videos, etc	Dissemination Level	PU - Public
Due Date (month)	48	Work Package No	WP7

Description
Cluster newsletter 3 (M48)

Deliverable D7.18 – Policy brief 3

Deliverable Number	D7.18	Lead Beneficiary	1. AU
Deliverable Name	Policy brief 3		
Type	DEC —Websites, patent filings, videos, etc	Dissemination Level	PU - Public
Due Date (month)	48	Work Package No	WP7

Description
Cluster Policy brief 3 (M48)

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	Kick-off meeting	WP1	1-AU	Agenda & attendance list	1
2	Second Annual Team Meeting	WP1	1-AU	Agenda & attendance list	17
3	Third Annual Team Meeting	WP1	1-AU	Agenda & attendance list	30
4	Fourth Annual Team Meeting	WP1	1-AU	Agenda & attendance list	42
5	Draft meta-review air pollution	WP2	2-UMU	Manuscript	15
6	Draft meta-review nitrates	WP2	6-ISG	Manuscript	15
7	Review of valuation literature	WP3	1-AU	Scoping study	4
8	Pre-survey instruments ready	WP3	5-MENON	Questionnaire	8
9	Morbidity WTP survey completed	WP3	5-MENON	Data delivered	15
10	Premature mortality survey completed	WP3	4-CU	Data delivered	18
11	ESS analysis completed	WP4	3-UTARTU	Journal article submitted	24
12	Experimental survey	WP4	2-UMU	Journal article subm.	27
13	Comparative analysis	WP4	3-UTARTU	Journal article subm.	36
14	Input data and setup for the local scale nitrogen leaching modeling ready	WP5	11-NIBIO	Local scale nitrate simulations initiated	6
15	Input data and setup of high-resolution local scale atmospheric modeling ready		8-BSC	High-resolution atmospheric simulations initiated	6
16	Input data and setup of the regional DEHM model ready	WP5	1-AU	Regional atmospheric simulations initiated	3

Milestones

Grant Preparation (Milestones screen) — Enter the info.

Milestone No	Milestone Name	Work Package No	Lead Beneficiary	Means of Verification	Due Date (month)
17	Draft of recommendations for methodological method	WP5	1-AU	Draft recommend-ations	36
18	Stakeholder workshops 1&2	WP6	1-AU	Agenda & attendance list	22
19	Stakeholder workshops 3&4	WP6	1-AU	Agenda & attendance lists	42
20	Case study workshop 1 (ES)	WP6	8-BSC	Agenda & attendance list	15
21	Case study workshop 2 (EE)	WP6	3-UTARTU	Agenda & attendance list	15
22	Case study workshop 3 (DK/SE)	WP6	1-AU	Agenda & attendance list	15
23	Case study workshop 4 (XK)	WP6	1-AU	Agenda & attendance list	15
24	Case study workshop 5 (CZ)	WP6	4-CU	Agenda & attendance list	17
25	Case study workshop 6 (DK)	WP6	1-AU	Agenda & attendance list	17
26	2 Policy briefs w infographics	WP7	6-ISG	Uploaded to website	18
27	3 Policy briefs w infographics	WP7	6-ISG	Uploaded to website	36
28	3 more policy briefs w infographics	WP7	6-ISG	Uploaded to website	48
29	Health risk mapping	WP7	1-AU	Concept note	18

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	Key researchers within the consortium leave their employment for another role elsewhere, or through ill health, retirement etc. (Medium/Medium)	WP1, WP3, WP5, WP4, WP2, WP6, WP7	Teams consist of multiple members who have capacity to take over each other's tasks. Each partner will distribute the work internally to reduce the reliance on one person.
2	The financial records and management of a project consortium member is inadequate, or there are financial irregularities found within the project (Low/Low)	WP1, WP3, WP5, WP4, WP2, WP6, WP7	Existing experience of Project Manager in EU projects reduces risk; There will be supervision of new Horizon participants in financial reporting requirements.
3	External supplier defaults (Low/High)	WP3, WP4	Select external suppliers to ensure they are financially stable and viable going forward.
4	Failure to establish consortium agreement in agreed timescale (Low/High)	WP1	Keep process and progress open and clear to all members; Exploit the relevant previous experience of members; Encourage a culture of openness and trust; Request scanned signatures prior to receiving originals
5	Delayed delivery of exposure-response functions (Medium/Low)	WP2	Develop preliminary estimates based on existing WHO-HRAPIE recommendations (air) and EXIOPOL (water)
6	Failure or difficulties in methods development on disability adjustment (Medium/Medium)	WP3	Use of second-best method based on Global Burden of Disease disability weights for preliminary estimations
7	Travel restrictions due to covid impeding fieldwork for comparative analysis (High/Low)	WP4	Use zoom or other virtual solution
8	Failure in data acquisition in selected non-EU jurisdictions, i.e. Kosovo (Medium/Medium)	WP5	Check against data reported to European Environment Agency and other international institutions. As a last resort interpolate data from existing older sources.
9	Delayed results from WP5 available for case studies (Medium/High)	WP6	Timely communication keeping close contact and adjustment of milestone delivery time points
10	Complications in generating spatial risk map sections on case areas	WP7	Substitute case areas with other map sections

Critical risks & risk management strategy

Grant Preparation (Critical Risks screen) — Enter the info.

Risk number	Description	Work Package No(s)	Proposed Mitigation Measures
11	The project fails in some element of research (Low/ Medium)	WP1, WP3, WP5, WP4, WP2, WP6, WP7	The project has clear milestones monitoring progress and any failures including on the interaction between consortium members; Fixed schedule for Steering Group meetings of WP-leaders to monitor progress.
12	The completion of tasks within a WP exceeds the time estimated, causing slippage of the achievement of deliverables (High/Medium)	WP1, WP3, WP5, WP4, WP2, WP6, WP7	In-built contingency time in each WP schedule; Meetings between WP Leaders and Project Manager, either physical or virtual, to monitor progress.

European Commission

METHODOLOGIES FOR ASSESSING THE REAL COSTS TO HEALTH OF ENVIRONMENTAL STRESSORS (MARCHES)

TABLE OF HISTORY OF CHANGES	
Version (date)	Changes
	Annex 1 Part A
1.1 (30.8.22)	*Critical risks #8:* text edited to clarify on 'implementation' that this refers to a non-EU jurisdiction, i.e. Kosovo, and including further risk-mitigation options
1.1 (30.8.22)	*Deliverables #26:* DL7.8 'Website launch' (new)
1.2 (30.9.22)	*Deliverables #27:* DL7.9 'Final plan for DEC' added (as per original proposal)
1.2 (30.9.22)	*Deliverables #28-39*: 12 cluster deliverables added
	Annex 1 Part B
1.1 (30.8.22)	*Page 2:* List of abbreviations inserted (NB: the following abbreviations are no longer used, as now written in full throughout part B: IRL; CAP; CVD; ESS; GBD; IARC; NLES; LCA)
1.1 (30.8.22)	*Page 9-10, Section 1.2.2; para on 'Morbidity valuation':* text inserted (marked in **red**) to clarify on 'excellence' that our methodology indeed goes beyond already existing ones on this important aspect
1.1 (30.8.22)	*Page 21, Section 2.1; para on 'Outcome 3':* text inserted (marked in **red**) to clarify on 'impact' that the two guidance documents resulting from MARCHES (DLs 7.1 and 7.2) will provide common guidelines for the stakeholder community
1.1 (30.8.22)	*Tables 7-11 (3.1a-3.1f) transferred into Part A*
1.1 (30.8.22)	*Page 32:* subcontracting justification details and total sum inserted into table 12 (3.1g)
1.1 (30.8.22)	*Page 33:* expenditure breakdowns inserted bottom of table 13 (3.1h)
1.1 (30.8.22)	*Page 35:* Section 4 'Ethics self-assesment' added
1.2 (30.9.22)	*Page 33:* Minimum amount declared for partner 4/CU corrected (Tb 13/3.1h)

Contents

Abbreviations	
CAMS: Copernicus Atmosphere Monitoring Service COPD: chronic obstructive pulmonary disease DALY: disability adjusted life year DEHM; Danish Eulerian hemispheric model EIONET: European environment information and observation network EVA: Economic Valuation of Air Pollution model GNFR: Gridded Nomenclature For Reporting HIA: Health impact assessment	IPA: Impact Pathway Analysis OECD: Organization for Economic Cooperation and Development QALY: quality adjusted life year SWAT: Soil and Water Assessment Tool VOLY: Value of a life year VSL: Value of statistical life WTP: Willingness-to-Pay

1. EXCELLENCE

1.1. Objectives and ambition

The air we breathe and the water we drink provide essential life-support to humans and are critical to the opportunities for maintaining good health throughout a lifetime. Air pollution is currently considered the largest environmental burden in Europe causing about 350,000 premature deaths annually.[1] Drinking water quality is compromised in many parts of Europe from leaching of agricultural fertilizer nitrates that have been found to trigger cancers from long-term exposures at low concentrations.[2] The two stressors are intricately interlinked via ammonia evaporation from these chemical and organic fertilizers, interacting with sulfates and nitrates in the atmosphere to form secondary particles. The risk of problem-shifting, e.g. from water to air hence needs to be considered.

To underpin regular use of integrated economic and health modeling in impact assessments and socio-economic analysis by public authorities, the MARCHES project aims to advance **methodological rigor and consistency** in accounting for the welfare economic health costs of **air pollution** and **drinking water nitrate**, based on **systematic reviews** of health effects**,** and by extending the consensus on established approaches on premature mortality with **disability-adjustment** of the associated morbidity burdens, while developing European-wide **exposure modeling** for integrated assessment. Based on **expert and stakeholder consultations**, the project will provide **guidelines and unit prices** for an accounting approach that can be applied routinely by EU and national authorities, subject to data availability and **policy scenarios**. This will be demonstrated in case studies **with public authorities** in five Member States (CZ; DK; EE; ES; SE) and in one west-Balkan country (XK).

The MARCHES project will – as explained below - **go beyond state-of-the-art** in several ways; by identifying exposure-response functions relevant to European conditions; by adding a disability dimension to health cost accounting; by setting a European standard for high-quality exposure modeling and by addressing drinking water nitrates with impact-pathway analysis. It will have ambition by developing guidelines for how future impact assessments specifically can integrate health costs of air and drinking water pollution, with methodological implications for how to account for environmental stressors in general.

Health-costs are site-specific as they depend on sources, their dispersion and transport in the environment and resulting exposures. They have been shown to differ across EU Member States as well as among different sectors of the economy.[3] Whereas health impact assessments (HIA) typically provide figures for the health burdens per se, emissions can be followed through to monetary valuation of health burdens with **impact pathway analysis (IPA)**[4] where the principal steps are as follows (see Figure 1).

- characterization of pressures and quantification of their environmental burdens **(emissions)**,
- modeling of transport and dispersion patterns to account for the resulting marginal pollutant concentration changes in receptors at local and regional scale **(dispersion)**,
- for the priority pathways, forecasting of the expected impacts on basis of exposure-response functions derived from state-of-the-art epidemiological and other health literature (**exposure-response**),
- monetary valuation of health effect end-points according to benefit transfer procedures and estimation of the marginal social cost for the quantified emissions changes (**valuation**).

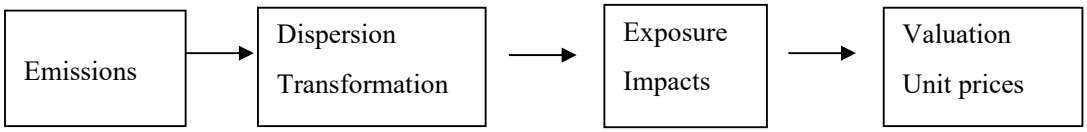


Figure 1. The impact pathway sequence (Rabl and Peuportier, 1995).

The MARCHES project will start from the guidance provided by WHO and OECD for impact pathway analysis of health effects. While WHO's expert HRAPIE panel identified the relevant exposure-response functions for health effects of individual air pollutants at the time[5], OECD's meta-study on the economic value of preventing fatalities ('value of statistical life') has shown how to derive the value of lost life years and do benefit transfer to policy sites.[6] Adhering to and building on such guidance to IPA studies is essential for maintaining a consistent methodology for assessing welfare economic health costs of environmental stressors generally and of air and nitrate pollution particularly.

The MARCHES project will contribute to future guidance on IPA by screening systematic HIA reviews of 'new' health endpoints to see if the evidence is sufficiently robust for inclusion in IPA. It will do dispersion and exposure modeling with some of the best state-of-the-art atmospheric and hydrological models available. Furthermore, it will conduct new original valuation studies for health endpoints where there are gaps in our knowledge, while demonstrating to public authorities in six case study areas how to apply IPA for analysis of relevant policy scenarios.

Morbidity impacts will be especially scrutinized, as one of the MARCHES project's objectives is to account more rigorously for life-years lived with disabilities as a result of exposures, besides the life-years lost from premature mortality. WHO's expert panel has identified exposure-response functions for air pollutants[5], indicating uncertainty intervals, and a recent systematic review of drinking water nitrate has identified an association with gastric cancer, from which an exposure-response function can be derived.[2] While previous integrated assessments of pollution costs have shown a relatively modest economic significance of the morbidity end-points, we hypothesize that a more proper quality-adjusted accounting method for years lived with disabilities, as will be developed and applied in the MARCHES project, must be expected to affect the balance between health costs of morbidity and costs associated with premature mortality. Besides the costs that can be monetized, we hypothesize that among certain vulnerable groups, there is a prevalence of

environmental health worries, symptoms, psycho-social stresses and perceived exposures correlating with actual exposures. Finally, while the recent 2021 WHO systematic review[7] on mortality suggests a need to adjust the exposure-response functions for air pollution mortality upwards, the findings will be analyzed by MARCHES for the conditions in Europe of mostly lower exposures than in the many third-world country studies considered by WHO.

IPA studies on health burdens from air pollution differ to a certain extent in their estimations of the number of premature deaths, reflecting besides the site-specificity of emissions and exposures, some deeper differences in the approaches and techniques used by different **atmospheric models**. The MARCHES project relies on one of only nine high-resolution models in Europe that have qualified for inclusion in the CAMS (*Copernicus Atmosphere Monitoring Service*) model ensemble, the DEHM model.[28] Additionally, based on the availability of the CAMS/COPERNICUS ensemble results, the MARCHES project aims to develop a standard for authoritative exposure modeling to inform impact assessments at EU level. This should not preclude Member State authorities from resorting to the availability of national models based on guidance from the project, and our case studies, enriched with atmospheric modeling based on local information, will shed light on the possible margins of uncertainty.

As for the IPA of drinking water nitrate contamination, the MARCHES project will conduct pilot-studies at rural sites in two Member States with process-based SWAT/SWAT+ catchment level **hydro-geochemical modeling** to identify the nitrate pulse from the crop root zone to aquifers and surface waters, and in turn into drinking water supply. The SWAT model has gained recognition across Europe in recent years as an authoritative tool for modeling of the transport of water and nutrients (N) at catchment scale; it will be complemented by a catchment-specific high-resolution groundwater body model. Nitrate contamination is mainly an issue where drinking water is supplied from surface waters or aquifers near the surface, as nitrates degrade once entering an oxygen-free zone. About 200 million citizens in Member States rely on drinking water supply from surface waters, and many more in rural areas from wells and aquifers near the surface. Although nitrogen surpluses vary, reporting by Member States shows that concentrations frequently exceed values above which health effects may occur for individuals exposed over many years of intake. This IPA will advance the modeling approaches from a tentative previous attempt with the Danish Nitrogen Leaching Estimator model in the FP6 EXIOPOL project.[8]

On economic valuation, the MARCHES project will focus its contribution on developing a methodology to account for the welfare economic costs of the years lived with disabilities as a result of exposures and prior to the premature deaths. The Global Burden of Disease project's disability weights can be used for this purpose, e.g. to identify the welfare economic costs of a life trajectory with chronic obstructive pulmonary disease (COPD), but there are gaps in the health endpoints covered that MARCHES will close. The MARCHES project will also contribute with a new and original morbidity valuation study based on stated preferences surveys in six countries to elicit citizen's Willingness-to-Pay (WTP) to avoid selected morbidity endpoints. These welfare estimates can be compared to the valuation of the same morbidity endpoints using Global Burden of Disease (GBD) disability weights and the Value of a Life Year (VOLY) derived from the Value of Statistical Life (VSL) to seek to validate the life year approach to morbidity valuation. A scoping of quality of life issues and well-being in different countries based on the European Social Survey and in-depth survey techniques will help shed further light on possible differences across Europe inflicting on the economic valuation.

In projecting health costs from exposures where there is latency involved (health effects occurring with delay), the specific value and approach chosen for discounting costs that will arise in the future into net present values, will obviously be of significance to the results. The MARCHES project will follow the recommendations of the European Commission to use the Ramsey formula for the social discount rate and will provide guidance to public authorities on its application to enhance the understanding and correct implementation of this important methodological choice.

Table 1. Specific objectives (SO) of MARCHES.

	Specific objectives
SO1	To provide an updated set of exposure-response functions relevant for European conditions representing the main morbidity and mortality health outcomes associated with breathing polluted air and drinking nitrate-polluted water. To be based on WHO recommendations and recent systematic HIA reviews of the medical and scientific literature, including by MARCHES and other ENVHLTH-04-01 funded projects, with MARCHES contributing an original systematic review relating to nitrates and infants, while identifying data gaps and research needs/priorities. **Means of verification:** DL 2.1 and DL2.2 delivered. **Achievability:** High, due to WHO recommendations and to the extent the new evidence is robust.
SO2	To contribute towards a consistent framework of metrics for economic valuation of morbidity and mortality valuations, including life-years with disabilities (reflecting a quality of life aspect), pertinent to environmental stressors in general and to air pollution and nitrate-polluted drinking water specifically. This will help close current gaps related to economic valuation of several health endpoints on morbidity. To be based on the latest OECD's guidelines and new stated preference surveys by MARCHES in six countries of Europe.[a] **Means of verification:** DL 3.1, 3.2 and 3.3 delivered. **Achievability:** High, as disability weights from can be used to inform survey respondents
SO3	To explore further on the possible linkages and consistency between on one hand the health burdens we can quantify (cf. SO1) and quality of life indicators (cf. SO2), and on the other hand more subjective measures of psycho-social well-being and health, MARCHES will analyze data on these aspects in different national contexts available from the European Social Survey (ESS), complemented by a novel in-depth survey in six countries of Europe. This may help detect and understand possible cross-national differences, including in the valuation results on health-related burdens. **Means of verification:** DL 4.1 delivered. **Achievability:** High, due to European Social Survey data.
SO4	For the purposes of socio-economic analyses and impact assessments, to provide novel and differentiated estimates of the unit prices related to air pollution (€ per kg emission) for >10 sectors of the economy in all EU Member States, EFTA and west Balkan countries in accordance with FAIR data principles. The unit prices will be based on impact pathway analysis with atmospheric modeling from the DEHM[28] and EVA models. It will be accompanied by guidance on the application of these unit prices and a user-friendly roadmap to appropriate data and modeling tools for their future update. **Means of verification:** DL 5.2 and 5.3 delivered. **Achievability:** High, due to previous experience and availability of EVA model (see box 1 p.10).
SO5	For the purposes of socio-economic analyses and impact assessments, to pilot and demonstrate a novel methodology for impact pathway analysis with state-of-the-art process-based hydrological modeling to derive catchment-specific unit prices related to drinking water nitrates pollution from fertilizers (differentiated on chemical and organic), accompanied by user-friendly guidance to regulators of an open knowledge base of existing data and suitable modeling approaches for application of the methodology in catchments across Europe in accordance with FAIR principles. **Means of verification:** DL 5.1 delivered. **Achievability:** High, due to experiences with impact-pathway analysis of nitrate in EXIOPOL.
SO6	To demonstrate with case studies in five EU Member States (DK; CZ; EE; ES; SE) and one associated country (XK) how unit prices of environmental stressors can be applied in socio-economic/cost-benefit analyses of the costs of action and non-action, focusing on scenarios that are pertinent to decision-makers according to national circumstances and priorities, while based on the active involvement of public authorities in the individual regions/countries (cf. letters of support for MARCHES). For the purpose of case studies will be used and compared various local-scale environmental models to possibly obtain higher resolution and precision. **Means of verification:** DL 6.1, 6.2, 6.3, 6.4, 6.5 and 6.6 delivered.

[a] Metrics will respect the UN Convention on the Rights of Persons with Disabilities.

	Achievability: High; consortium covers all countries and works regularly with public authorities.
SO7	As a cross-cutting objective to SO1-SO6, the individual steps of the impact pathway approach's methodology as applied in MARCHES (exposure-response functions; valuation methodology; data and modeling choices; discounting and other methods to weigh the present against the future) will be conferred with experts and stakeholders, to enhance understanding, acceptance, usability and a shared understanding of the specific applications made, with invitations for several workshops to fora comprising expertise and stakeholders from all Member States, EFTA and west-Balkan countries. Joint networking and activities of MARCHES with other ENVHLTH-04-01 and HE/EU funded projects, as well as potential collaboration with JRC. **Means of verification:** DL 7.2, 7.3 and 7.4 delivered. **Achievability:** High; methodology is widely used across EU and has a community of experts.

It follows from the above that the MARCHES project will contribute towards most of the outcomes defined in destination 2 of the Horizon Europe Work Programme on Health, specifically:

- Making regulators and policy-makers aware of health risk factors
- Underpinning policies and programs with solid scientific evidence
- Addressing determinants of health burdens upstream and at their roots
- Protecting citizens health and well-being from pollution by clarifying its costs to society
- Strengthening preconditions for a preventive approach, aiming to reduce premature deaths
- Enhancing understanding of the complexities of identifying effective measures to tackle environment and health issues

1.2. Methodology

For impact assessments required under European law to be reasonably consistent, there is need to mainstream the methodologies, tools and models applied to be in conformity with the most authoritative data streams, selected as far as possible from the official monitoring, reporting and verification hubs, and with the best state-of-the-art appraisal and modeling techniques available.

A main assumption of MARCHES is that with health-related costs reflecting exposures, the methodology required must be able to deliver site-specific results, in turn necessitating the use of advanced, high-resolution appraisal tools and models of environmental exposures. By site-specific results, we refer to the geographical coordinates of exposures as well as to the sectoral origin of emissions (it has been shown that emissions of air pollution from high chimneys will cause exposures different from street-level exhausts in proximity of people and homes, and in a similar vein there is evidence how farm nitrogen surpluses in loamy catchments leach to water bodies at a lower rate than where soils are sandy, affecting drinking water attributes differently – while population densities are key to the outcomes in both instances).

A main feature of the MARCHES project is the methodological focus; as the health costs from environmental stressors arrived at are bound to represent projections, uncertainties in the estimates are endemic. By identifying the most authoritative data streams and modeling capabilities, the MARCHES project will (subject to consultations with experts and related projects funded under the present call) endeavor to provide a gold-plated guideline for estimations that can be accessed and applied by EU and national public authorities.

Considering air pollution, the EVA (*Economic Valuation of Air Pollution*) model's regional-scale calculations will be calibrated with recent results from the CAMS (*Copernicus Atmosphere Monitoring Service*) model ensemble validation, while local-scale calculations will be done based on high-resolution gridded emissions inventories for the three air pollution case study areas. These procedures will enable MARCHES to derive estimates of the air pollution costs in €/kg for the main conventional emissions for each of the GNFR (Gridded Nomenclature For Reporting) sectors, which will be an innovation in comparison to the more crude 'catch-all' estimates at Member State level in several previous studies funded by EC[3, 9], and allowing analysts (incl. public authorities) to distinguish not only between the health costs of emissions from transport and larger stationary sources, but all ten emission sectors. Considering water

pollution, catchment-level modeling of nitrogen leaching with the SWAT/SWAT+ model will allow for disaggregation of the projected health costs, backtracking to the costs in €/kg of nitrogen-fertilizer surplus lost to the rootzone, and eventually to €/kg of fertilizer-N added to fields – subject to farming practices in the catchment in question. Such figures will allow analysts (incl. public authorities) to strike a balance between possible health costs and costs of chemical and organic fertilizer management to farmers.

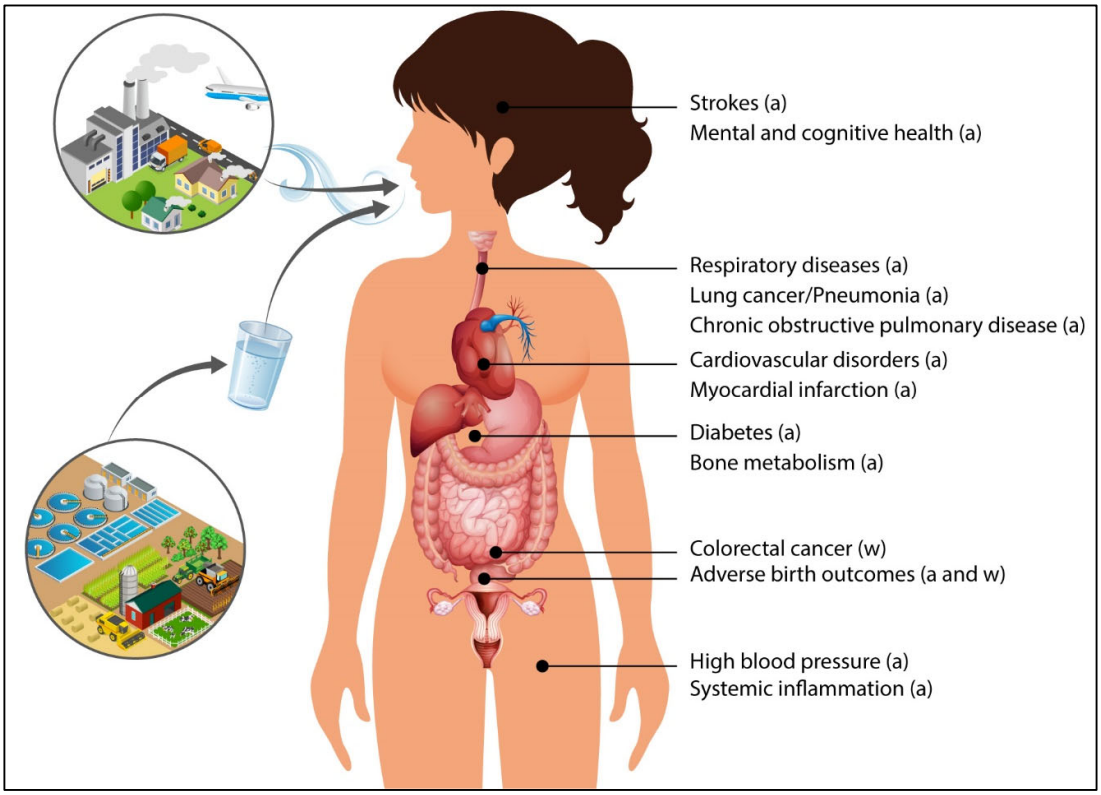


Figure 2. Examples of health burdens relevant to MARCHES; (a) air pollution related; (w) nitrate in drinking water related.

The methodological framework applied in MARCHES to project health costs and fulfil the objectives is the impact pathway approach. The impact pathway approach is a transparent and flexible framework for analyzing the complex connections between humans and the environment. It allows specific linkages or interactions to be isolated while retaining relevance to the larger system and implies causal relationships between the components. While being modified and developed in numerous ways, the generic approach is widely applied in environmental policy research, including issues related to climate change and air pollution[9]. The contribution of MARCHES is to develop this well-established framework by advancing the scientific knowledge for important steps of the impact pathway leading to health and economic impacts from air and water pollution, as described below and illustrated in Figure 2.

1.2.1. Methodology for exposure-response functions based on systematic reviews (WP2)

In the initial phase of the project, we will coordinate with the other ENVHLTH funded projects in order to cover as many health outcomes as possible and to avoid redundancies. As a basis for ensuring a high quality and consistency of systematic review methods, we propose to conduct as a joint activity among the ENVHLTH funded projects, a workshop on systematic reviews in environmental health.

Considering the objective of developing and consolidating a methodology that besides accounting for premature mortality can also adjust for the influence of exposures on life quality, i.e. years lived with disabilities, the MARCHES project will, in order to provide added value, focus on morbidities in specific

areas of key interest. Our methodology will mainly be to rely on systematic reviews reported in scientific journals, while in some instance to update them by screening for more recent original studies. Moreover, for nitrates where there is a paucity of systematic reviews, we will conduct a novel systematic review.

For air pollution we give priority to the following morbidity impacts: asthma incidence, lung cancer and COPD, e.g. for O_3, $PM_{2.5}$ and NO_2. While these health endpoints are frequently included in the integrated assessment models of air pollution (based on the 2013 WHO recommendations[5]), the specific exposure-response functions applied are relatively dated and need to be reevaluated based on the available systematic reviews of the health literature.[10] However, considering COPD as well as asthma we will provide an update, to reflect results from the ELAPSE project and other studies published in recent years. Additionally, we will address a series of 'new' outcomes from air pollution identified in the health literature (i.e. diabetes, cognitive disorders/dementia, Parkinson's disease, low birth weight, depression) to investigate whether evidence from the recently published systematic reviews[11] is sufficiently robust (considering possible confounders) to allow for inclusion in impact assessments in a European setting, and what the relevant exposure-response functions are. The metrics applied for air pollution will mainly be primary/secondary $PM_{2.5}$, NO_2 and O_3 with epidemiological studies based on two-pollutant models warranting the strongest interest in order to avoid any double-counting of the health impacts identified. Considering the availability of the recently published systematic review on air pollution mortality by WHO[7] (including cardiovascular effects), we see limited value in replication and will from this review extract exposure-response functions relevant to European conditions.

For drinking water nitrate, we give priority to two morbidity endpoints: besides cancers related to gastro-intestinal sites also impacts on infants in terms of adverse birth outcomes and methemoglobinemia. These health effects warrant attention, considering a range of epidemiological studies suggesting a link to nitrate intakes via drinking water at lower concentration levels than the WHO guideline of 50 $mgNO_3/l$. This threshold was established in the 1950's based on occurrence of acute infantile methemoglobinemia ('blue baby syndrome') without a conventional safety factor.[12] An expert panel of the International Agency for Research on Cancer has thus concluded that "ingested nitrate or nitrite under conditions that result in endogenous nitrosation is probably carcinogenic to humans (group 2A)".[13] While for the gastro intestinal health endpoint we will rely on findings from a recent systematic review, our novel systematic review of impacts on infants aims to identify whether these could be included with a high degree of certainty. The activities will also present figures for the possible impacts in areas where there is a scarcity of studies available in the literature, hence pointing to research needs and data gaps that should warrant further interest.

Based on the systematic reviews, we will conduct **meta-analyses**. The exposure-response functions identified will hinge on the population sub-groups identified in epidemiological studies; we will distinguish between acute and chronic effects, the latter resulting from exposure over several years. Considering the findings of ELAPSE, careful attention will be paid to possible non-linearities of exposure-response functions, especially associated with low-level exposures. Critical data gaps will be identified as regards environment and health risk factors.

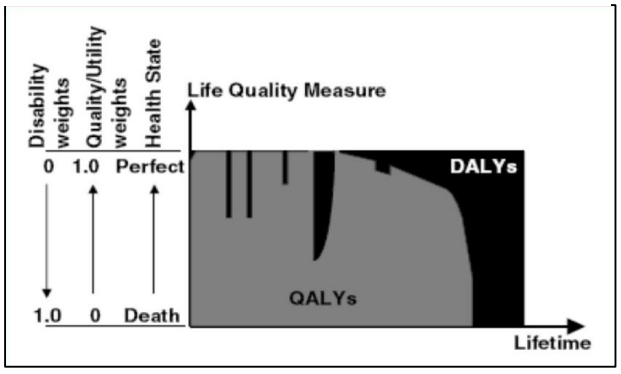
We will base our systematic review efforts on the Navigation Guide[14] for systematic reviews in environmental health and the Handbook for Conducting Systematic Reviews for Health Effects Evaluations[15] and report in accordance with PRISMA guidelines. It implies that there should be two individuals involved in doing the review, with an additional mediator. Protocols and systematic reviews will be shared with other funded consortia and on an open platform, e.g. MedRxiv, to enable discussions and achieve cross-topical consistency.

1.2.2. Methodology for consistent economic valuation of morbidity, mortality and disabilities within a unified framework (WP3)

Mortality valuation: For mortality risk valuation, the MARCHES project will apply OECD's meta-study recommendations[6, 16] in tandem with OECD's guidelines on cost-benefit analysis for environment[17] along with any updates to be issued by OECD in the course of the project. We do so because based on OECD's path-breaking meta-review of stated-preference studies on the willingness-to-pay for mortality-risk reductions, there is increasingly consensus on how to derive values for policy analysis for different countries and sites.[18] OECD's meta-study guidelines suggest a VSL (*value of statistical life*) base value of 3 million USD for OECD countries, while for EU27 it suggests a base value of 3.6 million USD, though both base values are accompanied by considerable upper and lower bound uncertainties. OECD's meta-study guidelines show how these base values should be updated in time with increases in real income, while adjusting with inflation and purchasing-power parities for transfers to specific national contexts. The meta-study guidelines moreover show how to derive from VSL the *value of a life year* (VOLY) on the assumption that the discounted net present value of the sum of VOLY's must be equal to the VSL. The procedure of deriving VOLY from VSL has been the so far preferred approach in numerous policy analysis studies for consistency purposes, as the international literature is scarce on estimates from directly survey elicited VOLY values.[19] Very recent research has utilized the so-called chained approach[20], linking WTP elicited for certain health endpoint and standard gamble with health risk outcomes described by a change in remaining life expectancy, as in Nielsen et al 2022.[21] Adding one more attempt to survey WTP for VOLY would not change the fundamental mismatch, as a much larger evidence base is available for VSL studies. Moreover, an authoritative discount rate for the derivation of VOLY is available by using the Ramsey discounting rule[b] according to the specific recommendation of the European Commission's guidelines on cost-benefit analysis.[22]

Morbidity valuation: the MARCHES project will focus its innovative research effort on addressing a range of morbidity endpoints, where there is a critical shortage of valuation studies, presently causing a rather crude representation of illnesses and reduced qualities of life in policy analyses. To achieve estimates more consistent with those for mortality-risk, we see a strong need for more applications of stated preference methods[23] (i.e. Contingent valuation and Choice Experiments) in this area; besides chronic illnesses like COPD (*chronic obstructive pulmonary disease*) the range of new endpoints like diabetes, dementia, Parkinson's disease, preeclampsia, low birth weight, and depression warrant interest. Some recent attempts to monetize DALY's (*disability adjusted life years*) and/or QALY's (*quality adjusted life years*) (see figure 3 for the concepts) have relied on the disability weights (see Table 2) from the Global Burden of Disease (GBD) project in combination with VOLY to value the losses as a preliminary assessment of the welfare loss from these endpoints. WTP per QALY has recently been applied in health impact assessment (HIA) in UK, following Franklin.[24] However, simply multiplying DALY or QALY weights with a constant VOLY might not give correct representations of preferences and the associated welfare loss, as shown by Hammitt and Haninger.[25] Thus, it is critical to examine preferences by new stated preference surveys of relevant morbidity and health endpoints, where the valued illnesses will be described with varying severity and duration, whereby the project aims to

Figure 3: DALY vs QALY. Black: 100% disability = dead. Less than 100% DALY (disability adjusted life year) is some fraction of QALY (quality adjusted life year).



[b] Social Rate of Time Preference (SRTP) = p + e.g. where p is time preference, g is growth and e is elasticity of marginal utility of consumption; e is measured as the progressivity of national personal income taxes; e=ln(1-t')/ln(1-t) where t' and t are respectively the marginal and average income tax rates for an average tax payer.

develop a novel methodology to account for DALY/QALY. To achieve this, we will design, test and carry out new stated preference surveys in six countries (corresponding to the case study areas of WP6) of selected health endpoints. We will then conduct benefit transfer tests across countries applying state-of-the art benefit transfer guidance[24], while estimating benefit transfer errors, to develop improved common EU unit value estimates of the selected morbidity endpoints. Several of these health endpoints will also be relevant for assessing health impacts from chemicals (e.g. low birth weight) - and we will aim at selecting and describing such health endpoints in a way that health impact assessments of other environmental stressors, e.g. relating to chemicals, will benefit from this multi-country stated preference study.

Table 2. Disability weights derived by GBD (Global Burden of Disease) study[26]

COPD		**Asthma**		**Lung cancer**		**Stroke**	
Mild	0.019	Controlled	0.015	Diagnosis	0.288	Mild	0.019
Moderate	0.225	Partly contr.	0.036	Metastatic	0.451	Moderate	0.070
Severe	0.408	Uncontrolled	0.133	Terminal	0.540	Severe	0.316
Dementia		**Parkinssons**		**Diabetes**		**Heart failure**	
Mild	0.069	Mild	0.010	Foot	0.020	Mild	0.041
Moderate	0.377	Moderate	0.267	Neuropathy	0.133	Moderate	0.072
Severe	0.449	Severe	0.575			Severe	0.179

1.2.3. Methodology to explore subjective well-being indicators versus health metrics (WP4)

MARCHES will examine whether and to what extent linkages can be traced between the objective health burdens and costs that can be estimated (cf. WP2 and WP3) and the perceptions of the quality of life as influenced by other variables, by exploring data compiled by the European Social Survey. This survey includes headline measures of subjective well-being such as 'life satisfaction' and 'happiness' along with more objective measures of a broad palette of health problems (including also allergies, pains, digestion problems, diabetes, cardiovascular diseases etc.) that are well suited for the analysis of MARCHES, e.g. on the perceived quality of life and differences across different national contexts, as in indicators of subjective well-being.

MARCHES will also conduct its own cross-national survey specifically addressing and mapping pollution concerns in six countries (corresponding to the case study areas of WP6), to explore the prevalence of worries, symptoms, psycho-social stresses and perceived exposures across very different parts of Europe. The survey will be a structured questionnaire with 1000 respondents in each country being reached by telephone to allow for clarification and dialogue during the interview. Based on the survey results, we will pay attention especially to vulnerable subgroups, whether by age or gender, e.g. those exhibiting lower health status and higher level of hypersensitivity, worry and symptoms. In tandem with this survey, we will gather evidence from desk review of literature and media coverage on the main socio-institutional drivers of belief-systems related to health problems and environmental burdens in each of the case study areas, as the dominating beliefs about risks, the level of worry and the related well-being to some extent is shaped by societal information communicated by media, whether conventional or novel digital ones.

1.2.4. Methodology and modeling tools to assess health impacts for socio-economic analysis (WP5)

We will estimate the health effects and costs that can be attributed to exposures using the EVA model (*Economic Valuation of Air pollution*)[27] for air pollution (see Box 1), while establishing a novel integrated assessment approach for drinking water nitrate pollution.

Considering the objective to provide guidance to public authorities on how to integrate health burdens in impact assessments and cost-benefit analysis, we will provide novel estimates of the marginal health effects and costs of changes in exposures as well as of the total costs. The marginal impacts will reflect so-called brute force scenarios with a partial reduction (20%) in each emission sector and pollution component giving rise to the health burdens to capture any non-linearities in atmospheric chemistry respectively in nitrogen

leaching. The brute force method for air pollution will be compared with a tagging methodology to estimate uncertainties in methodology for marginal impacts in the modeling approaches.

For air pollution, the MARCHES project will use the regional-scale atmospheric chemistry-transport model DEHM[28] covering all of Europe to model the marginal health effects and costs, as well for each of the 27 EU Member States and the EFTA[c] and west Balkan countries[d], as for the standard emission sectors defined in GNFR (Gridded Nomenclature For Reporting) for each of the countries. In accordance with the impact pathway approach the EVA model will use the exposure-response functions identified in WP2 and valuation estimates developed in WP3 and link them with concentration values from the DEHM modeling. This will provide estimates of the marginal costs of air pollution, and vice versa of the benefits of reductions in emissions and exposures, as required for state-of-the-art socio-economic/cost-benefit analysis, while capturing important sectoral differences, reflecting e.g. sectoral exhaust/chimney heights affecting the dispersion and transformation of pollutants. The DEHM model is one of only nine (from summer 2022: eleven) regional-scale atmospheric models accepted for the CAMS (*Copernicus Atmosphere Monitoring Service*) model ensemble. As meteorological input to the atmospheric modeling, we will use data for a recent and representative year. The resulting estimates will be suitable for the purpose of providing guidance to public authorities at national, regional and city/local level (see box 1).

(Box 1) **EVA** (Economic Valuation of Air Pollution) is an integrated assessment model to account for health effects of air pollution and the related external costs. It is based on the impact pathway approach and uses gridded air pollution data from chemistry-transport models as input. These are then combined with population data (density and age distribution) to estimate exposures. By applying exposure-response functions to baseline health data, premature mortality (life years and lives lost) as well as the increases in a range of morbidity endpoints (incl. hospitalizations) can be estimated. Finally, economic valuations of the health effect endpoints are applied to estimate the resulting external costs. The current version includes health effects and costs associated to both long- and short-term exposure of $PM_{2.5}$, NO_2, SO_2 and O_3, based on the WHO HRAPIE recommendations.[5] With sector wise simulations by the chemistry-transport models, the external costs can be disaggregated into emission sectors and pollution components in € per kg. This leads to the **unit prices**, reflecting the health cost for emitting e.g. a kg NH_3 in the agricultural sector. Moreover, a geographical disaggregation can be made, attributing external costs to the site (e.g. country, region or city) where it will occur.

EVA has been used at different scales, e.g. for Europe[27, 29], the Nordic region[30] and the Arctic.[31] It has been frequently used for Denmark and major Danish cities, based on high-resolution (1 km x 1 km) modeling and is part of the national program for monitoring of air quality.[32] The EVA **unit prices** are routinely used in socio-economic analyses by Danish Ministries and other public bodies for more than a decade. EVA has been used for advising public authorities on mitigation strategies, e.g. to explore the scientific basis for regulation of wood stoves.[33] At the international level, EVA has been compared to other state-of-the-art assessment tools on air pollution.[34]

For the purpose of the three detailed case studies on air pollution in collaboration with public authorities, the atmospheric modeling with DEHM will be complemented with high-resolution local scale modeling, with tools developed by the MARCHES project partners, e.g. by AU for the cross-border Øresund region, by BSC on Catalonia and by EERC on Estonia (Table 3). The local scale modeling captures with higher precision the proximity of emission sources to housing and population hubs, as it is done within a 1 km x 1 km grid. We will compare the local-scale models and their results to see how they manage to capture specific features of the topography and prevailing climate, while evaluating carefully the significance of adding the local scale modeling to complement regional-scale modeling. Linking local scale models into a wider regional modeling complex with estimations of health effects and costs is a demanding innovative activity.

[c] Iceland, Norway and Switzerland (with Liechtenstein).
[d] Albania, Bosnia-Herzegovina, Kosovo, North Macedonia, Montenegro, Serbia.

Table 3. An overview of the models and data used for the detailed air pollution case studies

Case study area	Air pollution model	Boundary input	Emission inventory and model
Øresund region (Cph/Malmö)	UBM 1 km x 1 km resolution	DEHM regional values	1 km x 1 km national inventory; SPREAD[35]
Catalonia	MONARCH (run in nested mode)	Regional nested input from MONARCH	1 km x 1 km national inventory; HERMES[36]
Estonia	AirViro/MATCH	DEHM regional values	1 km x 1 km national inventory; EERC EDB[37]

Since local scale models and complete high-resolution GIS-coded emission sources are not readily available in large tracts of Europe, and to explore the usability of the Copernicus service, a further activity will be to provide guidance on a second-best solution, based on CAMS data available in the public domain. We will compare the relative significance of imputing local scale exposures from CAMS, while also comparing DEHM and CAMS results using Kosovo as an explorative case study. Our guidance documents (see WP7) will address the relevant procedures for public authorities that are facing data and modeling gaps.

The provision of GNFR sectoral estimates of unit prices for all EU, EFTA and west-Balkan countries, as well as the linking of regional and local scale modeling for the purpose of estimating health effects and costs was not previously done in studies for the European Commission and will represent a significant advance.

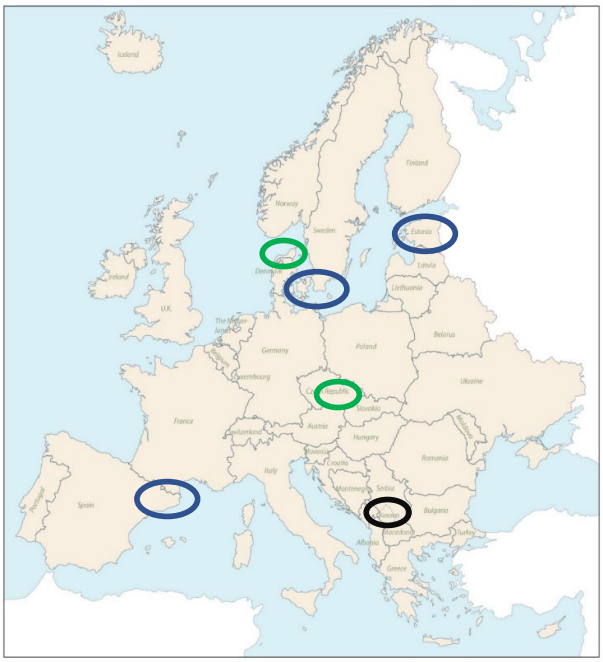
For drinking water nitrate pollution, the MARCHES project relies on the SWAT (*Soil and Water Assessment Tool; https://swat.tamu.edu/*) process-based model to evaluate the nitrogen loss from agricultural fertilizer practices within and below the root zone. Thus, the nitrogen surplus represents the share of nitrogen not absorbed by crops in the harvest year, leading to both increase of N-concentration in the root zone and nitrate leaching towards the deeper water-saturated layers. Drinking water is extracted from various sources, as well as from deep Groundwater Bodies as from Surface Water Bodies and oxic groundwater in the surface near Groundwater Bodies. As for the deep Groundwater Bodies, nitrates will be reaching an oxygen free zone with natural breakdown, whereas nitrates are hardly being reduced in the oxic groundwater near the surface, which however frequently serves as a source of drinking water from wells and smaller water supply works. Drinking water sourced from Surface Water Bodies (lakes, reservoirs and rivers) will be influenced by the nitrogen run-off too, though with some reduction during aquatic transport. The modeling accounts for the relevant hydrological compartments (via quantifying the water balance elements like surface runoff, evapotranspiration, deep percolation etc.), identifying a dose-response function for the nitrogen pulse that is catchment-specific, depending e.g. on properties of the soil, agricultural practices and climate-dependent mineralization rates.

While the overall health impacts can be estimated based on monitoring values of the nitrogen concentrations in drinking water combined with the exposure-response functions identified in WP2, it is more challenging to derive unit prices and to disentangle impacts of the possible policy scenarios with improved fertilizer management, where the incremental changes in nitrogen concentrations and timing of fertilization operations in response to the crop N-demand are of interest. We will however rely on previous studies[38] that have used CFC- and Tritium-Helium spectrometry to establish the residence times of oxic groundwaters in order to derive dose-response functions for how the annual influx of nitrogen contributes to the accumulated stock of nitrogen, which will enable estimations of unit prices, reflecting the marginal impacts on exposures and health outcomes.

1.2.5. The costs of inaction and action - case studies involving public authorities (WP6)

The unit prices estimated in WP5 for the environmental stressors of air pollution and drinking water nitrate will be applied in the case studies explained below (see also Map 1), for the purpose of showing how a reasonable societal balance between costs of inaction and the costs of action can be achieved. By action is referred to the abatement measures adopted to reduce exposures from environmental stressors. In comparison, the costs of inaction reflect a do-nothing scenario or scenarios involving only very limited reductions in exposures. Realistically all policy-relevant scenarios will involve only partial reductions, due to transboundary influences (air pollution) respectively a stock of accumulated pollutants that require many years to degrade (nitrates), hence, essential for the choice of case studies is the ability and competencies to do integrated assessment modeling that can account for the implications of relative rather than absolute changes.

We have selected three locations for case studies relating to air pollution, spanning a range of European geo-regions, where data and modeling competencies are available to simulate relevant scenarios of action versus inaction. The involvement of consortium partners has been carefully aligned with the choice of these locations that for air pollution comprise Catalonia (Spain) in southern Europe, Estonia in eastern Europe and the cross-border Øresund region (Denmark/Sweden cf. Map 2) in northern Europe. The three principal locations for air pollution related case studies differ in terms of topography, population density and overall air pollution levels, while they all have a good air quality monitoring network, detailed emission inventories and population data, as well as a long record of multi-scale air quality modeling comprising regional and local/urban air pollution models (allowing for obtaining 1 km x1 km resolution of the resulting air pollution concentrations). The local scale models applied capture key differences, e.g. in topography and climate, between the three regions. In order to describe the gradients within the regions, as well as the inflow of pollution from the surrounding areas, the high-resolution local-scale modelling will be combined with regional modeling covering a larger domain. One further jurisdiction, Kosovo, has been selected for exploring the options with DEHM/CAMS data in the absence of local-scale air pollution modeling and with a paucity of data – as is the case in other Balkan countries too. Balkan countries have some of the highest air pollution levels in Europe.



Map 1. Case study locations. Green: Drinking water nitrate; Zelivka (CZ) and Jutland (DK). Blue: Air pollution; Catalonia (ES), Estonia (EE) and Øresund (DK/SE). Black: Kosovo (XK).

For drinking water nitrates, we have selected two rural locations where farming is predominant, and where drinking water is sourced from surface water and ground water respectively, namely the Zelivka catchment (Czech Republic) and a Jutland catchment (Denmark). For the two locations, we will rely on applications of the SWAT/SWAT+ models to account for the nitrogen surplus arising from agricultural practices and the run-off to surface waters. The Zelivka reservoir supplies drinking water to Prague directly from surface waters with nitrogen concentrations below the WHO threshold but above the 25 mgNO_3/l guide value of the old drinking water directive. The sourcing from oxic groundwater in the Jutland case implies that a further

modeling step will be made using Groundwater Body specific nitrate delay response maps and Groundwater Body specific infiltration area maps, recently developed by GEUS as a part of a research project for the Danish Environmental Protection Agency. Nitrogen monitoring of water supply is done routinely in both catchments and for the groundwater aquifers in the Jutland case, the JUPITER database of GEUS holds high-resolution data for all intakes and bore holes with their redox levels (above which nitrogen contamination may occur, which is a pressing issue in the region).

Map 2 Øresund cross-border region

The specific scenarios to be explored will be developed upon consultation with relevant public authorities, however the following scenarios are illustrative of our understanding of what might prove effective to reduce the costs of inaction while not incurring too high costs of action.

For air pollution, previous studies indicate that electrification and district heating can help reduce emissions from individual heating units, while being more energy efficient, thus offering long-run efficiency. However, scrubbers and filters on larger installations may also prove cost-effective in the short run, as could restrictions on residential wood-burning furnaces in densely populated areas. Restrictions on diesel vehicles and modernization of the vehicle fleet are other measures that warrant interest, e.g. through Low Emission Zones, Ultra Low Emission Zones and Zero Emission zones, along with electrification of road transport.[39] Measures that reduce traffic also have benefits to air pollution, e.g. congestion charging or 'superblocks' (restrictions of through traffic in defined city areas).

For nitrates, previous studies indicate that increasing the utilization rates of nitrogen in animal manure can help lower the use of chemical fertilizers, hence reducing the amount of lost nitrogen (nitrogen surplus) at low cost – mainly by educating farmers and offering good fertilizer planning tools. There should be manure storage capacity to allow manure to be spread during seasons where crops grow and with proper equipment. To support groundwater, protection zones around boreholes with restrictions could be considered. The costs of such measures will be contrasted with the value/benefits of avoided exposures.

1.2.6 Methodology for involvement and consultation of public authorities, stakeholders and experts

To demonstrate and help foster acceptance of developed methodologies, the MARCHES project has obtained letters of support for collaboration from public authorities in the following Member States;

Czech Republic: Czech Environmental Information Agency and National Institute of Public Health

Denmark: Municipality of Copenhagen, Dept. of Environment

Estonia: Ministry of Environment

Spain: Ministry of Climate Action, Food and Rural Agenda, Regional Government of Catalonia

Sweden: Municipality of Malmö, Dept. of Environment (confirmed by email)

The letters of support (included at the end of section 2 on Impact) confirm the willingness of these public authorities to engage with the project case studies and make use of input, suggestions and support provided from the research activities of MARCHES. We expect also to be able to make arrangements with public authorities in Kosovo where Ministry of Health and Ministry of Environment have been contacted.

The MARCHES project will in dialogue with the respective public authorities, develop the policy scenarios on action versus in-action for WP6, so that they are relevant and pertinent to inform their policymakers on

suitable measures that are cost-effective in reducing any health burdens from air or drinking water nitrate pollution. We have planned and budgeted for three workshops in real life in each country, to be complemented with ad-hoc virtual meetings and interactions with these authorities.

To foster wider acceptance and hopefully some ownership to the methodologies for impact assessment of MARCHES among stakeholders in the European Union, the results from the systematic reviews (WP2) and the framework for economic valuation (WP3) along with the methodologies to be applied in the modeling (WP5) and the case studies (WP6) will be shared, presented and discussed with national representatives invited from the EIONET groups on 'Human health and environment' and 'Water directives' of the European Environment Agency.[e] These representatives, predominantly from Ministries or Agencies of Environment, include all EU Member States, EFTA and west Balkan countries. We have planned and budgeted for four workshops in real life with the EIONET members. They will be consulted as well prior to the case studies, as when preliminary results become available and questions may arise about specific implementation choices. Consultations will be done via invited workshops taking place back-to-back with regular meetings. For these workshops, invitations will be extended to other relevant stakeholder fora of national (European) representatives, notably within OECD and WHO, as well as to other EU bodies/agencies and academics/reputed individual experts. This is to ensure a wide outreach, as the relevant responsibilities may be differently allocated in the various countries. The four workshops may be complemented with ad-hoc virtual meetings and interactions on specific methodological issues or aspects.

The MARCHES project is moreover prepared to participate and engage with the networking and joint activities among the projects to be funded under the call, or other Horizon/EU programs as appropriate. We have thus in the budget tentatively reserved 4% of the total budget (cf. Table 14) for joint meetings and joint networking activities, that we understand will be defined in detail during a possible contract negotiation.

1.2.7 Methodological challenges

The country- and emission sector-specific air pollution costs for Europe (Task 5.3) will be based on chemistry-transport modeling with the DEHM model. In order to make it computationally feasible to carry out the required model simulations for all emission sectors and all countries (EU27 + EFTA and West Balkan countries) separately, we have chosen a European model domain with a spatial resolution of 20 km x 20 km. For a local pollutant like NO_2, the large gradients around the sources will not be fully described at this resolution, and as a no-effect threshold is conventionally applied for NO_2 in health assessments, this may lead to a conservative estimate for this component. However, in the case study areas we will extend the modelling to include high resolution models, that with a 1 km x 1 km will be able to describe the spatial gradients in much greater detail. By comparing the resulting cost estimates, it will be possible to evaluate the uncertainty related to 20 km resolution and this information will be part of the guidance document.

Detailed hydrogeochemical modeling of nitrate concentration in the drinking water reservoirs at case-study level is rather data demanding. There might be unforeseen problems with data scarcity or missing data in the study catchments. As a solution, we will rely on our expertise in applying various estimation (e.g. for soil properties) and extrapolation (for meteorological data) techniques to derive missing data for SWAT modelling. Alternatively, reference catchments – from earlier projects – or statistical data will be used to describe the typical management behavior in the pilot catchments (crop rotation schemes, crop properties, fertilization strategies etc.). Model calibration is the process when we tune model parameters to minimize the difference between the model output and the reference data (daily measured discharge and nitrate concentration in our case). It is difficult to predict how successful the model calibration will be. As the evaluation is done on a larger time scale (we are interested in the annual N-balance, e.g. of the Zelivka water reservoir), we will calibrate the model on monthly time-step. Such integration in time always makes it easier to obtain better goodness-of-fit statistics. Additionally, we will describe, what would be needed for more

[e] https://www.eea.europa.eu/about-us/countries-and-eionet

detailed analyses, e.g., what should be monitored, measured, or what kind of data should be collected from farmers in the future to ensure better model performance on a daily timestep.

1.2.8. Link to other international and national efforts

MARCHES will build directly on the outcomes and experiences gained in the large NordicWelfAir project (funded by NordForsk 2015-2023 €3.25M; https://projects.au.dk/nordicwelfair) led by AU and with participation by UMU, MENON and 13 other partners from across all Nordic countries. By taking advantage of the comprehensive and detailed data available for the Nordic countries, each step of the impact pathway sequence has been updated in order to investigate the links between air pollution, health impacts and welfare. A new high-resolution emission inventory[40] for the UBM model has been established and evaluated with a 1 km x 1 km grid covering the Nordic area[41] and will be applied in WP5 for the Øresund case study.

Within NordicWelfAir health effect endpoints have been investigated for their links to air pollution, by combining 40 years of air pollution data with national health registers and cohorts, and several of these studies are relevant to the update of exposure-response functions in WP3. AU is also part of ELAPSE (Effects of Low-Level Air Pollution: A Study in Europe), an important European-wide collaboration on mortality and morbidity effects of long-term exposure to low-level $PM_{2.5}$, Black Carbon, NO_2 and O_3 based on a merger of European cohorts. Findings from ELAPSE on asthma and COPD will be useful for updating meta-analyses and systematic reviews on these endpoints. Moreover, UMU is involved in research on some 'new' endpoints as partner in the H2020 TUBE project on cognitive impacts of ultrafine particles and as WP-leader in the EU-JPND ADAIR project on biological links between air pollution and Alzheimer's. UMU also participates in the H2020 Nautilius project on shipping emissions.

AU is partner in the HE EXHAUSTION project where the EVA model is applied to explore the interactions between air pollution and heat waves for public health. In this project the EVA model is being scaled to all EU Member States, which will help underpin activities in WP5 of MARCHES.

UTARTU for the Estonian Ministry of Social Affairs applies the standard impact pathway methodology in the project "Comparison of the Impact of Ambient Air Quality on Human Health in Estonia in 2010 and 2020 and Forecast of the Health Effects of Air Pollution by 2030" (10/2021-08/2022). Moreover UTARTU for the Estonian Science Agency explores various mitigation options in the project "Reshaping Estonian energy, mobility and telecommunications systems on the verge of the second deep transition" (1/2019-12/2023)

The atmospheric models (MONARCH and DEHM) developed by BSC and AU are part of the Copernicus regional production (CAMS2_40) model ensemble. The continuous model developments and evaluations will directly feed into MARCHES, where the most updated model versions will be applied. BSC is partner in the H2020 RI-URBANS project which demonstrates service tools from atmospheric research infrastructures and takes part in CAMS2_61 which produces new and updated datasets useful for European air quality simulations in WP5.

NIBIO is involved in the Nordic Center of Excellence project BIOWATER that evaluates the future changes in nutrient – including total N and nitrate – loads to surface water bodies from agricultural areas, considering different bioeconomic pathways. Within this project the NIBIO team set up and calibrated three different catchment-based biogeochemical models for specific catchments. MARCHES will benefit from the gained experience in setting up, calibrating and validating the SWAT model for agriculture-dominated areas, calibration strategies and methods used for estimating missing input data and model parameters.

MARCHES will benefit from experiences in evaluating the impact of urban mobility plan's on emissions and air quality levels for case studies in WP6 from the involvement of BSC in the project VITALISE, which quantifies the impact of Barcelona's urban mobility plans and policies upon local and regional air quality and public health. BSC as responsible for CALIOPE-CAT (The operational air quality forecast system for Catalonia) provides operational forecasting of air quality for Catalonia at high spatial (1 km x 1 km) and

temporal (1 hour) resolution, outputs which are used by the Directorate General of Environmental Quality and Climate Change of the Government of Catalonia to support air quality management and planning strategies (http://www.bsc.es/caliope/en/forecasts?language=en), which will support WP6 further.

NIBIO has experience too in evaluating specific scenarios and measures, e.g. in the art. 185 BONUS RECOCA project focusing on measures for reducing the loads of nutrients (nitrogen and phosphorus) to the Baltic Sea. The NIBIO team set up, parameterized, calibrated, and validated a SWAT project for the Pärnu catchment in Estonia. Further, various fertilizer strategies were introduced (type, amount, timing) and tested for their effects on reducing the nitrate concentration of surface waters and nutrient loads towards the coastal areas. The MARCHES project will benefit from the gained experience in implementing different fertilizer scenarios in the SWAT model.

Finally, AU has close links to the European Commission's Joint Research Center via Scientific Project Officer Dario Caro, a former researcher at AU who maintains regular contacts as honorary associate professor at AU. The MARCHES consortium is prepared to collaborate with JRC experts as members or observers to the consortium, should the project be selected.

1.2.9. Collaboration among disciplines and interdisciplinarity

The methodological core in terms of the impact pathway approach that MARCHES adheres to is inherently interdisciplinary. In order to assess and quantify the link between environmental stressors and the occurrence of related health impacts and socio-economic costs there is need for a highly interdisciplinary approach with collaboration among different scientific disciplines. MARCHES is bringing scientific expertise from health science, environmental economics, atmospheric and hydrological modelling and social sciences together within a shared framework for collaboration. MARCHES has expertise on mitigation scenario developments and stakeholder consultations too, which will help ensure relevance of the project outcomes for society. Such a complex approach is unique – this enables evaluation on health effects of various interlinked processes that are usually studied in a segregated way. Although not a formal requirement to this topic, social sciences are truly integrated with natural sciences and health science.

Most of the team members have a long experience in engaging with interdisciplinary research and are familiar with the key concepts and methodologies required for the purpose of the project, and we will foster this further by having dedicated cross-WP meetings early on in the project, where the applied methods and expected outcomes are discussed. This is important for ensuring that the data feeding from one WP to another WP is fit for purpose. For instance, the environmental economists will cross-check with the health experts that the survey descriptions of severity and duration of specific diseases are appropriate.

While the individual steps of the impact pathway have to some extent a disciplinary orientation, the success of the various WPs hinge on their ability to deliver knowledge and data relevant for the next steps in the impact pathway sequence. As a result of the close interconnection new perspectives and research questions can be expected to arise for the various disciplines. The health scientists for instance will need to clarify besides the exposure-response functions also what evidence we have for latency periods (as impacts that arise into the future require a discounting procedure) while economic valuation must be developed relating to new health endpoints.

1.2.10 Gender

The MARCHES consortium is fully aware of and embraces the policies of equal opportunities between women and men, the effective promotion of gender equality and the gender dimension in Research and Innovation in relation to Horizon Europe, which will be promoted within the frame of the project. Coordinator AU has a gender equality plan in place, that is regularly updated and amended, and all relevant partners (UMU, UTARTU, CU, ISG, BSC, EERC, GEUS, NIBIO) have gender equality plans implemented too. While four partner teams (UMU, UTARTU, NIBIO, ISP) are led by women, two of the five RTD-WPs

of MARCHES will have female leads (WP4 and WP5), helping to reduce the imbalances which evidently are there in our areas of research.

MARCHES will reflect on the gender dimension in its research, taking into consideration how men and women may have different perspectives on environmental health issues and attribute them differently in economic terms. Hence, results from the meta-analyses based on systematic reviews (WP2) and results from the valuation surveys in WP3 will as far as possible be reported separately according to gender, and the same goes for the analysis and survey in WP4 on human well-being. Surveys will include a box to tick for non-binary individuals.

The lifetables used to estimate premature mortality in the EVA model are calculated separately for men and women, thus providing a baseline reflecting the shorter expected lifetime of men in all countries and their higher baseline mortality risk. Among other reasons, men have a higher mortality rate from accidents and other fatalities (including suicide) and these are deducted in the EVA lifetable baseline to avoid overstating the relative increase in premature mortality from pollution. However, the more risk averse track record of women may besides their occupations (or lack of) reflect different attitudes to risk-taking, that may spill over into how they value the management of health risks from pollution and how much they are willing to pay for risk reductions. The extent to which such gendered differences reflect individual risks per se or whether concerns for family members, e.g. by loss of a provider, lead to higher premiums on risk-reductions by women are aspects that also will be investigated with the WP3 valuation surveys.

Although women have longer average lifetimes, they might be more susceptible to pollution-related risks. In relation to respiratory diseases, the smaller lung capacity of women is likely to inflict for instance on a trajectory of COPD, with women progressing slightly faster to a terminal stage.[42] A major cohort study on drinking water nitrate and cancer sites found an association only for women, perhaps due to lower labor market participation rates leading to reliance on tap water from a single source, while men may be relying more on alcoholic liquids to quell thirst.[43] There is research showing that IQ-reductions from childhood lead exposure penalizes women more than men, due to men relying less on a high IQ for their lifetime income.[44] These and other indications lead us to be sensitive to gendered differences and their implications for the results of MARCHES.

Considering meetings with stakeholders and experts, as well as the case study workshops, we will seek a balanced participation by both genders.

1.2.11 Open science

MARCHES is aware of and commits itself to the Open Science approach of Horizon Europe.

All data generated (including new data from modeling and surveys) will be made Findable, Accessible, Interoperable and Reusable (FAIR). Specifically, MARCHES will make available the results from the environmental modeling of exposures in a gridded format, which will allow users to inspect data of the individual steps of the impact pathway sequence. The gridded format will be an improvement over the source-receptor matrices of EMEP on air pollution that are available only at country level. It will allow public authorities to transparently follow through how the modeling results of exposures affect the population according to the exposure-response functions and valuation metrics applied, as will be carefully explained in the guidance documents of WP7. The first results of the individual steps in the impact pathway sequence will be shared with stakeholders and experts in open workshops, where also the applied modeling tools will be explained (cf. 1.2.7). Once the results have been used for the case studies a second round of workshops will take place to enable input, comments and suggestions prior to finalization and publication.

We aim to publish in high impact journals, which also includes journals from Elsevier and EGU publications. The EGU, through Copernicus Publications, publishes several peer-reviewed open access journals, some of which are two-stage journals with public peer-review and interactive public discussions. This publication process helps foster and provide a lasting record of scientific discussion; maximize the

effectiveness and transparency of scientific quality assurance; enable rapid publication of new scientific results and make scientific publications Open Access. Furthermore, there are formal agreements in place between the national research authorities in Denmark, Norway and Sweden and major publishers (Elsevier, Springer, Wiley, Taylor and Francis etc) to ensure that articles with corresponding authors (not necessarily lead authors) from these countries can be published Open Access in listed hybrid journals without incurring fees. Moreover, the consortium agreement will commit participants to insist that copyrights agreements with hybrid journals in any other instances will include a termination clause according to which researchers can post articles as published on their own websites following an embargo period of 1 year, while they should be allowed to make own versions of the submitted manuscript available pre-publication through an institutional repository, ensuring de-facto open-access e.g. via ResearchGate.net announcements.

To ease access the project webpage of MARCHES will in all circumstances contain digital identifiers to all publications and data from the project, as well as to other outputs.

1.2.12 Data management

The Data Management Plan (DMP) (DL1.1) (M6) will provide operating procedures to fulfil three main objectives; a) a harmonized set of heterogenous data (health, geographical, atmospheric, socio-economic) across the different countries and case study areas respectively, including for the delivery of metadata b) quality control with data processing and c) data indexing and publication with controlled data sharing mechanisms, including persistent identifiers (PID). The plan will ensure that the data can be found, accessed, interoperated and reused in accordance with FAIR principles.

The DeiC (*Danish e-infrastructure Cooperation*) webtool DMPonline (https://dmponline.deic.dk/plans) will be used for setting up and disseminating a data management plan consistent with the Horizon DMP template. The DMP of MARCHES will be publicly available on the DeiC platform. Data will be stored for public assess at the platform of Zenodo (http://zenodo.org). The platform allows results from projects funded under Horizon Europe to be stored, shared and showcased (both data and publications) and licensed under Creative Commons. A Data Manager (Dr. Steen Solvang Jensen of AU) will be appointed to oversee the establishment, updating and implementation of the data management plan.

Key data generated by MARCHES is briefly outlined in the following:

The type of existing data that will be applied as input for the air pollution modeling in WP5 will be gridded numerical data in netcdf or ascii formats made available by existing data infrastructures. This includes population densities (EUROSTAT), emissions (CAMS-REG and ECCAD), reanalysis of meteorology and air pollution (Copernicus Atmosphere Data Store/ECMWF). Based on the modeling new numerical data will be generated as binary gridded data for air pollution and as ascii formatted data for health effects and costs. As the gridded 3D air pollution data will be generated for all of Europe as well as per country/sector, the total size of the new numerical data in WP5 will be around 55 TB. These data will be stored locally at the high performance computing facility of Aarhus University. A subset covering the annual mean data for Europe will be deposited at Zenodo. Likewise, the final products in the form of (ascii) tables with unit prices will be freely available and widely disseminated through WP6 and WP7.

Input data for surface water quality modeling in WP5 consists of case study environmental data, including digital elevation model, soil map, watershed map and land use map in standard GIS and tabular formats (GeoTIFF, GeoPackage, .csv). Other types of data used for setting up the SWAT model – e.g., meteorological data, soil management data, crop rotation scheme – will be stored in ascii format. Water quality modelling will generate new data of approx. 1 TB size. All the input and output data will be stored locally at the high performance computing facility of NIBIO.

The final products of air and water quality modelling in the form of tables with unit prices will be freely available and efficiently disseminated through WP6 and WP7. Data will be deposited into at an open-access

research data repository with permanent digital object identifiers (e.g. Zenodo, EOSC), in accordance with the MARCHES data management plan.

MARCHES will process individual level data from surveys (see WP3 and WP4) which although anonymized might be sensitive and requiring special storage and consents. Personal data refers to any information related to an identified or identifiable natural person, directly or indirectly, particularly by means of a personal number or the like (article 2(a) of the EU directive 95/46/EC). Such data will be handled according to the General Data Protection Regulation (GDPR). Partners handling personal data will apply for approval from the Regional Ethics Committees (RECs). The Ethics self-assessment report (see form A) elaborates on measures to handle personal data within MARCHES. Any personal data will be stored on data repositories compliant with GDPR, e.g. SIF (*Sensitive Information Facility*) of Aarhus University.

2. IMPACT

2.1. Pathways towards impacts of MARCHES

Reducing mortality and morbidity related to environmental stressors of air and drinking water pollution will have tremendous impact on society through saved health care costs and through reduced suffering for very many citizens, altogether increasing societal welfare and productivity. The impact assessment methods developed and consolidated by the MARCHES project will when applied by public authorities help diminish premature deaths among vulnerable groups, notably the chronically ill, elderly, infants and individuals with low socio-economic standing and thereby lower the burden of informal caretaking to the benefit of the individual and his/her relatives and/or network.

The projections of cost and benefit estimates by MARCHES will enable evidence-based decision-making. Thus, the project will provide important input to policy making with impacts ultimately to be expected at local, regional, national and European levels. Specifically, the unit prices of air pollution reflect co-benefits of reducing fossil fuels, thus affecting the cost-benefit ratios of switching to renewables (when unit prices from EVA were first applied in official economic analysis by Danish Ministries a decade ago, they helped prove the advantages of wind energy and other non-fossil energy carriers and spurred significantly their extension).

Finally, MARCHES will have an impact on science by the screening and development of systematic health reviews that identify significant data and knowledge gaps, by demonstrating how - with novel methodologies - it is possible to account economically for the costs related to years lived with disabilities and reduced quality of life and by piloting high-resolution exposure modeling at the frontiers of environmental sciences that will help underpin better targeted interventions.

> *Outcome 1: "EU and national public authorities regularly use economic and health modeling in policy impact assessments and policy evaluation, and promote the use of these to other stakeholders"*

The WP7 guidance documents that result from MARCHES are a contribution that will enable public authorities (e.g. environmental, health and economic ministries) to directly apply estimates of the unit prices of the environmental stressors of the MARCHES project in their respective impact assessments or cost-benefit analyses. This delivery will be in line with the practices of Aarhus University that leads MARCHES and which, for the past 10-15 years, has officially supplied such figures on air pollution costs to its national public authorities, that (along with major cities and others) are making regular use of them. While the traditions and capacities to undertake such studies vary considerably across Europe, the guidance documents from MARCHES will be consistent with and complement the wider frame of guidance documents published by OECD, WHO and the European Commission, by presenting the actual economic and health modeling required to integrate the costs of environmental stressors. The guidance document on air pollution will in

addition to the actual unit prices per kg of emission at sectoral level in the 27 EU Member states plus EFTA/west Balkan countries for direct application, provide a methodological explanation for their updating, explaining what data and environmental models that need to be combined, and how to keep pace with inflation and trends in real income, thus constituting a document with a long lifetime and lasting impact.

> *Outcome 2: "Stakeholders agree on the most relevant population health and quality of life metrics, including DALYs (Disability Adjusted Life Years) or QALYs (Quality Adjusted Life Years), and economic metrics"*

While there is presently wide agreement among stakeholders in Europe about the VSL/VOLY metrics, the MARCHES project will contribute towards including also DALY/QALY metrics in future guidance from OECD and others to complement rather than substitute already established metrics. The MARCHES project is well positioned to support this outcome, as MENON Economics has been lead author of OECD's guidance documents on mortality and health valuation. For the same reason, the MARCHES project is also well placed to further disseminate and expand knowledge on how to apply the basic VSL/VOLY metrics. Besides the target groups mentioned in relation to outcome 1, this has relevance also for transport and agriculture ministries that prepare and manage the 'upstream' policies affecting pollution levels.

> *Outcome 3: "The stakeholder community follows common guidelines and methodologies for integrative socio-economic assessments and cost-benefit analysis of environmental pollution in Europe"*

The stakeholder community comprises public authorities at different levels of governance as well as a wider palette of non-governmental professional interest organizations that are in continuous dialogue with the authorities about public policies in several diverse areas. What unifies them is that they all for the purpose of economic expertise rely on members of the economics profession. Thus, the pathway to achieve the desired outcome of adherence to common guidelines and methodologies is to gain acceptance in the economics profession for how to do integrative socio-economic assessments. Such acceptance has come a long way already, however many economists have received limited or no training in this area. The MARCHES project will contribute towards the desired outcome by publishing its findings, methodologies and recommendations in well-reputed scientific journals of the economics profession, to gain and demonstrate their acceptance, and by contributing at international conferences and events to disseminate the results of the project, in order to reach a vital profession. The MARCHES project is well staffed for these purposes with environmental economists of very high caliber and reputation, who will be key to a credible translation of environmental health burdens into economics and for reaching the target group of professional economists. Additionally, the two guidance documents that result from the project (DL 7.2 and 7.3) will provide common guidelines and methodologies for integrative socio-economic assessments and cost-benefit analysis relating to air and water pollution to be used by the stakeholder community. They will be designed in a user-friendly way, to enable and facilitate application by public authorities and other stakeholders. Via the four stakeholder workshops back-to-back with EIONET meetings we will reach out to the stakeholder communities across Europe and via their involvement early on be able to take account of specific needs and priorities to facilitate subsequent uptake and application of the guidelines.

Wider impacts

In the longer term, MARCHES will through the above-mentioned outcomes also contribute to the overall wider impact of the HLTH destination: 'living and working environments are health-promoting and sustainable thanks to better understanding of environmental, occupational, social and economic determinants of health'. More specifically the project will contribute directly to:

a) *Impacts on citizen awareness of pollution (cf. HLTH destination 2, first bullet)*

Many citizens will be interested to find out what the pollution cost figures reflect in terms of the health risks of chronic morbidity and premature mortality, which is why the MARCHES reporting will include the

expected physical health impacts (e.g. average loss of expected lifetime for the population and of vulnerable subgroups thereof), e.g. with the geographical health risk mapping for Europe of WP7, as well as the monetized ones. Experience shows that once estimates of the costs of environmental stressors become available it helps create a wider societal awareness about the implications of pollution to the daily lives of citizens. The WP4 analysis relating to the subjective perceptions of the quality of life will allow the project to contrast these findings with more evidence-based metrics, allowing MARCHES to identify possible lacunas in the public understanding of what determines good quality of life conditions.

Key performance indicator: Eurobarometer surveys will record increases in environmental awareness. While the share of respondents who agree that "environmental issues have a direct effect on their daily life and health" declined from 81% in 2017 to 78% in the 2020 survey, we stipulate that it will increase next time to well above the 2017 level.

b) Impacts on public and private decision-makers (cf. HLTH destination 2, bullets 2, 3 and 8)

For many decision-makers, appraisals of projects and policies involve assessments of their environmental consequences, frequently relying on life-cycle assessment that can account only for the physical emissions figures but without any methodology to attribute environmental stressors monetary figures or to weigh them against other measures of economic activity. In recent years, many public bodies and some businesses have started to apply a social cost of carbon as part of their decarbonization efforts. It can be expected that once figures for the unit prices of emissions at sectoral level become available and gain recognition throughout Europe such figures will be integrated in routine appraisals. While the MARCHES project cannot cover all the relevant stressors it will provide methodological innovation and consolidation of importance for such a trajectory. The results will be highly relevant to the overarching policy frameworks of the European Union, as well as to larger industries and public bodies in the sectors of energy and water supply that have professionalized units where uptake can be expected.

Key performance indicator: applications of unit prices in assessments by public and private actors will increase, as reflected in the number of downloads of the guidelines of the MARCHES project that we assume will be > 500 in the first three years.

a) Impacts on air and drinking water quality (cf. HLTH destination 2, bullets 4-7)

The legal requirements for air quality and drinking water quality are being exceeded in many parts of Europe.[f] We expect that the increased awareness and attention to the health implications of air quality and drinking water quality that the MARCHES project will help bring about, will have direct knock-on effects to public authorities and public utilities strengthening their compliance efforts. This impact is expected to go well beyond those regions where we will collaborate with public authorities.

Key performance indicator: improved compliance rates with the NEC and Drinking Water Directives, as regularly monitored by the European Commission, causing a reduction in the number of infringement letters to Member States by >25%.

Barriers to expected impacts and measures to overcome these

Formal guidance documents from the European Commission on the specific methodologies for delivering the impact assessments required under European law stipulate that both quantitative and qualitative impacts should be considered. The **Better Regulation guidance** states specifically that environmental impacts should be considered in terms of **"quantified costs and benefits wherever possible"**.[45]

[f] Air quality: Commission refers Bulgaria and Spain to the Court for failing to protect citizens from poor air quality; https://ec.europa.eu/commission/presscorner/detail/en/IP_19_4256; Nitrates: https://ec.europa.eu/environment/water/water-nitrates/pdf/nitrates_directive_implementation_report.pdf

While this requirement may help facilitate uptake of the unit prices and guidance document resulting from MARCHES at the EU level, some of the external consultants preparing impact assessments to the EU may not be familiar with the wider welfare economic framework and the complex methodological requirements for doing cost-benefit analysis properly. There is hence a risk that the unit prices will be misrepresented in such analyses, for which a separate quality control procedure might be needed to hedge against undesired uses and impacts, e.g. by the Regulatory Scrutiny Board of the EC.

At the level of EU Member States, the traditions and capacities for developing in-depth analyses, including economic analyses, prior to decision-making by national administrations varies considerably. The tradition seems to be stronger among the northern and north-western Member States, than among most of the southern and central-and-eastern Member States. There are partly historical reasons for those differences, but it should not be neglected that the capacity to operate and staff highly specialized units capable of providing independent economic analyses come at a cost that in the end needs to be shouldered by taxpayers, thus being contingent on GDP. To overcome such barriers will require a wider framework for promoting the use of economic analysis in support of decision-making, including with independent Economic Expert Councils to oversee and advise governments in all Member States, possibly with economic support from EU.

There may be further barriers in terms of national administrations with insufficient horizontal coordination among Ministries, whereby Ministries of Finance are insulated from evidence accumulated in other parts of the administration on environment and health burdens. OECD's working groups are an important instrument to overcome such barriers, as cross-sectoral fora such as the Working Party on Integrating Environment and Economic Policies (gathering high-level ministry officials) offer an opportunity for exchange of information and learning in a less formal way than in the framework of day-to-day procedures in national administrations. The European Union system of advisory bodies and working groups with Member State representatives can also be mobilized to facilitate horizontal coordination.

2.2. Measures to maximize impact – Dissemination, communication and exploitation (WP7)

DISSEMINATION activities will be carried out during the entire project period as specified in the detailed dissemination, communication and exploitation plan to be finalized during the first six months of the project (D7.1). The plan will be subsequently updated and revised during each General Team meeting in accordance with the procedures of the Consortium Agreement. Still, some key activities and deliverables have already been identified.

The stakeholder consultations with national and international experts back-to-back with EIONET meetings will help disseminate the methodologies and results to a wide audience, well beyond the specific case study regions of MARCHES and their public authorities. There will be workshops relating to meetings of the 'Environment and health' and the 'Water directives' working groups respectively, one each mid-stage during the project and one each when the draft case study reports become available. Written materials will be distributed to the participants in advance, to allow them to scrutinize and engage with project results. The PI as member and vicechair of the EEA Scientific Committee since 2016 is well positioned to facilitate interactions with EIONET.

We will invite and seek to attract participants from Ministries of Finance for the workshops, and from Economic Councils where they exist. Should we not be sufficiently successful in this endeavor, then we will approach via our contacts in OECD the relevant Working Parties and offer to present results and findings at one of their meetings.

The two guidance documents with methodology on drinking water nitrate and with unit prices of air pollution for 10 sectors in all Member States, EFTA and west Balkan countries will be a major achievement of the project. To disseminate and promote use of this document at the **EU level**, we will take several initiatives;

- approach the **Better Regulation unit of SECGEN** of the European Commission, responsible for issuing guidance on impact assessments, to draw their attention to the MARCHES unit price guidance (cf. WP7) and suggest they make a direct reference to it in their better Regulation guidance,
- approach **DG MOVE** that has under its dossier the **Eurovignette Directive**, according to which Member States from 2026 must impose distance-based road charges, reflecting also the external costs of air pollution from heavy goods vehicles, to present findings and highlight differences to previous consultancy studies without appropriate atmospheric modeling
- approach **DG AGRI** that has under its responsibilities to oversee the **national Common Agricultural Policy strategic plans** which are setting out responsibilities for spending of rural development funds, to show how Member States can estimate external costs of surplus fertilizers to inform support schemes for compliance with the requirements of the Nitrates Directive to adjust fertilizers with the needs of crops,
- approach the **Water Directors' Forum** with Member State representatives to provide similar insights from the results

At **national level**, MARCHES partners will deliver the main project results to individuals and units of the national environment and health agencies, and similar, with which they maintain regular contacts and exchanges. Examples are the Danish Ministry of Environment, Norwegian Environment Agency, Norwegian Institute of Public Health, Sweden's Environmental Protection Agency, Public Health Agency and Road Transport Administration, Estonia's Ministry of Environment, Catalonia's Department of Climate Action, Food and Rural Agenda, Kosovo's Ministry of Environment, and Czech Ministry of Environment.

Scientific outputs in terms of forthcoming journal articles will be advertised to relevant academic communities (of researchers, students, knowledge brokers etc.) via the MARCHES project website and a dedicated MARCHES page at the **Researchgate.net portal**, which enables project followers to register for receiving updates on new publications, reports, pre-prints etc. and to request these directly from the authors. There will also be presentations at scientific conferences. The PI as associate editor of 'Frontier's in Environmental Economics' contemplates a special issue on environment and health with contributions from the project.

To disseminate results to citizens and the general public, we will develop **spatial health risk maps** of Europe for long-term exposure. The service will be developed based on the EVA-system and ENSEMBLE reanalyzed modeled hourly air quality data from Copernicus Atmosphere Monitoring Service (CAMS) with a geographical resolution of about 11 km x 11 km. As communicating the significance of such functions or the related cost estimates to the public at large is challenging, we will develop different indicators for health risk and related costs that are easy to communicate to citizens and policymakers. These indicators will take the perspective of citizens and illustrate the relative health risk of living in different countries, regions, urban and rural areas. Examples of such indicators could be risk of premature death as an index or the implications to the expected average lifetime of citizens of exposures, i.e. the number of lost life years and disability-adjusted life-years at projected levels of exposures. Similar indicators for health-related costs will be derived. They will complement existing risk maps, e.g. by the European Environment Agency, that show low/medium/high exposures but without quantification of health implications.

COMMUNICATION: In the initial stage of the project and to inform an interested audience (media, experts, citizens etc.) about the project, we will produce a **flyer** summarizing the project and its partners and aims. This flyer will be distributed via social media and other digital media, besides in a physical format. The latter will be in **English, French and German**, while there will be additional digital versions in the national languages of the partner institutions (cf. WP7).

To reach and inform policy advisors and decision-makers about outcomes of the project activities, each of the WP's 2-6 will produce a **policy brief with infographics**. The first of these are expected to be available by M18 based on WP2. They will be distributed as a minimum to all Ministries of Health respectively

Environment in the EU, EFTA and West Balkan candidate countries, e.g. via the representatives of the relevant EIONET working groups of the European Environment Agency (EEA), as well as to European Commission services and to units of OECD and WHO of relevance. They will be translated into several languages, including some of the west-Balkan region.

Brand development: A coherent and appealing visual identity will be designed (see task 7.1) comprising logo and templates for presentation and event material.

Project Website: A project website will be designed and developed applying the MARCHES visual identity. The website will be a main entry point to general information on the project, with link to open access publications and the Researchgate.net page. Core scientific results will be summarized at the website. Links to relevant projects and initiatives will be high-lighted to foster links with other relevant projects, funded by the EU or national research funding. Website analytics will be used to decide if improvements should be made to ensure that the information is easy to find. The website language will be English. However, we will use tags to ensure that it is easy to find the communication material which is available in languages other than English. The website will be kept up-to date by an editorial team comprising communications professionals from AU and ISG.

Use of Social Media: Using social media is increasingly recognized as an important and low-cost way of public engagement, hence we will develop communication products designed for easy sharing on social media. Twitter is regarded as the most effective social medium for communicating scientific results, but as attracting followers on project basis can be challenging, the partners will use their institutional brand names and accounts (e.g. @AarhusUni 20,000; @UmeaUniversity 12,000; @UniTartu 7,000; @CharlesUniPRG 3,000) with hashtag #MARCHES on project tweets and other social media posts. Further, important Twitter accounts will be tagged in tweets to increase the probability that the messages will be further communicated through external channels. Publication through these channels often result in media attention of the daily press and weekly magazines. The HE project officer will be notified where major media coverage can be expected or if triggered.

The measures to maximize impact are coordinated in WP7. This WP is led by Aarhus University, which has an experienced team in coordinating the dissemination and communication efforts of large-scale international projects related to environment, health and greening of society, e.g. from the projects NordicWelfAir (Nordforsk funded), NOWAGG (New Nordic Ways to Green Growth; Nordforsk funded) and TOOLS2SEA (BONUS/H2020). All partners will contribute actively to WP7, as shown in the WP7 description. ISG has a professional dissemination and communication team that will further help strengthen outreach of the project.

EXPLOITATION:
MARCHES will early develop a strategy for the continued exploitations of project advancements (DL7.1). The development of such a strategy will help coordinate exploitation activities between partners, increase partners' awareness of the benefits of carrying out such activities, and facilitate a lasting legacy. The partners are expected to finance such activities themselves or by acquiring additional funding. Table 4 below summarizes preliminary indications of exploitation plans of partners.

Table 4. Exploitation plans and strategies per partner.

AU	MARCHES will play a pivotal role for extending the work of the AU team on health impacts and costs related to environmental stressors and will position AU as a center for interdisciplinary research on this topic. The team is continuously involved in various international projects and collaborations where the new knowledge can be shared and which will benefit from the results coming out of MARCHES.
UMU	MARCHES will facilitate expansion of the substantial work around health impacts and economical costs attributed to air pollution exposure currently ongoing in the UMU team.

	MARCHES will furthermore be a steppingstone for capacity building around health effects of nitrate in drinking water for the UMU team, pioneering in a national context.
UTARTU	The information on quality of life related to air and drinking water quality will enrich the current knowledge that has been focused mainly on mortality and morbidity effects. This information will be shared with local, and EU-wide policy makers and incorporated into further studies.
MENON	MENON Economics will advance knowledge on how to include valuation of years lived with disabilities in impact assessments, which will be relevant to its future updating of OECD guidelines on mortality and morbidity valuation
BSC	The sector wise high resolution air quality simulations will allow advancing our current knowledge on the contribution of individual emission sectors on air pollution levels and to improve its representation inside the CALIOPE-CAT air quality forecast system. Moreover, the methodology for cost-benefit analysis developed under WP6 will allow us in the future to expand activities in this area.
EERC	High resolution air quality modeling results per each sector will allow advancing our current knowledge on the contribution of individual emission sectors on air pollution levels. Furthermore, MARCHES helps to improve the AirViro air quality modelling and emission database system, which operationally provides air quality products to support air quality management and planning strategies in Estonia and in surrounding countries.
NIBIO	The project will advance knowledge on how to perform hydrological modeling with the purpose of determining nitrate concentrations in surface waters and oxic groundwater, which will be significant for NIBIO in supporting implementation of the Nitrates and Drinking Water directives

Strategy for management of intellectual property: Management of the knowledge produced and the intellectual property protection will be specifically addressed in the Consortium Agreement (CA) between the partners. The CA will include the consortium rules and protocols for dissemination, like standard criteria for confidentiality and data protection, ownership and exploitation rights. The CA knowledge management will be based on the principle that foreground knowledge arising in EXHAUSTION will be accessible on a royalty free basis to the entire consortium for research and education purposes during and after the project. Background knowledge that is needed to perform the project work will be accessible to the partners, free of charge, during the project period. Rules for foreground ownership will be stated in the CA. In relation to Intellectual Property protection every partner that creates a project result that the partner deems worthy of IP protection must notify the PI without delay. The PI will initiate a Steering Group process for IP management. The result will not be disclosed to the public before it has been formally assessed. The partner wishing to protect the result must take action to protect the result within three months of the conclusion of the result assessment. If no protective action has been taken, the result may be disclosed to the public. Details of the IP protection assessment will be written into the CA.

2.3. Summary

Table 5. CANVAS table – part one

SPECIFIC NEEDS	EXPECTED RESULTS	D&E&C MEASURES
Drinking water nitrate contamination About 200 million citizens in Member States rely on drinking water supply from surface waters, and many more in rural areas from wells and aquifers near the surface. Although nitrogen surpluses (e.g. from chemical fertilizers) vary, concentrations occasionally exceed values above which cancers and other negative health effects may occur, when exposed over many years of intake. **Air pollution** Annually about 350,000 premature deaths in EU is linked to air pollution, most of which result from exposures over many years triggering chronically poor health conditions and less healthy life years among some citizens. In both instances there is need to account for the monetary costs to society of these environmental stressors, factoring in as well mortality as morbidity – the latter including life years lived with disabilities and reduced quality of life.	Exposure-response functions valid for European conditions derived from systematic reviews of health effect endpoints. Metrics and methods to account for and value economically life years lived with disabilities. Updated integrated assessment model EVA to account for the external costs of individual air pollutants, while factoring in disabilities and new health effect endpoints. Novel integrated assessment catchment modeling of drinking water nitrogen contamination to account for the external costs of nitrogen leaching. Guidance document with unit prices of individual air pollutants, disaggregated by sector, for all Member States plus EFTA and west Balkan countries. 2-3 postdocs trained, enhancing capacity in this field of research and research-based guidance to public authorities.	Information to and consultation with EIONET experts/stakeholders et al. about findings, to aim for a shared understanding of best practice. Dissemination of unit prices targeted at key units in the European Commission (Better Regulation/SECGEN; DG MOVE; DG AGRI; Water Directors Forum). Dissemination of the illustrative case study results and unit prices to authorities in Member States with which participants have regular contact. Scientific publications in the relevant international journals, open access. Communication to policy-makers and citizens via the website, infographics, policy briefs in several languages, using Twitter to attract attention Exploitation: the updated and integrated assessment model EVA will be available upon request to model specific scenarios for stakeholders.

Table 6. CANVAS table – part two

TARGET GROUPS	OUTCOMES	IMPACTS
Policy advisors, regulators and analysts in health and environment administrations of Member States, EFTA and west-Balkan countries, at national, regional and local level. Impact Assessment staff and/or consultants to European Union bodies in the Energy, Transport, Agriculture, Health and Environment sectors. Public utilities in the water, energy and transport sectors. Experts at OECD, IEA, WHO and other international organizations. Health professionals and health care organizations. General public, mass media.	More EU and national public authorities regularly use economic and health modeling in policy impact assessments and policy evaluation, promoting its use. Underpinning a consensus on the most relevant population health and quality of life metrics, including economic metrics of DALYs/QALYs. Stakeholder communities understand and adhere to common approaches and methodologies for integrated assessments of environmental stressors for the purpose of socio-economic analysis. Improved compliance rates by public authorities with the relevant EU directives and new data for their next update. Improved citizen awareness of the significance of pollution to healthy lives and economic productivity.	Reductions in air pollution and reductions in nitrate contamination of drinking water leading to extended life expectancies and more healthy life years, including in Member States currently suffering from high pollution levels. Some common diseases currently absorbing many resources in the health and community systems (e.g. COPD) will diminish or become less severe, freeing resources to address other pressing health concerns better. A healthier population will allow more citizens to stay longer in the labor market, improving economic performance and GDP per capita. Overall happiness and societal welfare may increase.

Letters of support from public authorities:

Generalitat de Catalunya
Departament d'Acció Climàtica, Alimentació i Agenda Rural
Direcció General de Qualitat Ambiental i Canvi Climàtic

Dear Madam/Sir,

The Directorate General of Environmental Quality and Climate Change, Ministry of Climate Action, Food and Rural Agenda, Government of Catalonia, confirms its interest in the research proposal MARCHES (**M**ethodologies for **A**ssessing the **R**eal **C**osts to **H**ealth of **E**nvironmental **S**tressors), submitted to Horizon Europe in April, 2022, by a consortium led by Professor Mikael Skou Andersen, Aarhus University (Denmark).

The MARCHES project aims to advance methods for improved accounting of the welfare economic health costs of air pollution and drinking water nitrate. The project will provide guidelines for an accounting approach that can be applied universally in Europe, subject to decision makers' requests for policy scenarios and data availability, as will be demonstrated in case studies.

Catalonia will be covered as one of the case studies. The plan is to carry out high resolution air pollution modelling and assessment of the related health costs. For that, the Barcelona Supercomputing Center (BSC) will use the air quality modelling system that currently provides operational forecasts to DTES. The results of this task in combination with the assessment of health costs will support the administration in setting priorities for how best to tackle challenges related to environment stressors.

We strongly support the MARCHES proposal. Should the proposal be accepted, we would be delighted to use further input, suggestions and support provided to us.

Sincerely,

Marc Sanglas Alcantarilla
General director
Directorate General of Environmental Quality and Climate Change
Ministry of Climate Action, Food and Rural Agenda
Government of Catalonia
Signed electronically

'00'01+ 12:04:41 2022.03.24

cenia

Mgr. Miroslav Havránek
Director

To whom it may concern

Letter of support

Czech Environmental Information Agency (CENIA) confirms its interest in the research proposal MARCHES (Methodologies for Assessing the Real Costs to Health of Environmental Stressors), submitted to Horizon Europe in April, 2022, by a consortium led by Professor Mikael Skou Andersen, Aarhus University (Denmark) and with participation of the Charles University Environment Centre.

The project aims to advance methods for improved accounting of the welfare economic health costs of air pollution and drinking water nitrate. Our main interest is the fact that the project will provide guidelines for an accounting approach that can be applied universally in Europe, subject to decision makers' requests for policy scenarios and data availability, as will be demonstrated in case studies. We believe that our organisation might use such guidelines to further its mission in the field of environmental assessment.

Sincerely,

Mgr. Miroslav Havránek
Digitálně podepsal Mgr. Miroslav Havránek
Datum: 2022.04.04 09:01:27 +02'00'

Name: Miroslav Havránek
Position: Director, CENIA
Organization: Czech Environmental Information Agency (CENIA)

Czech Environmental Information Agency

Center for Forebyggelse og Folkesundhed
Sundheds- og Omsorgsforvaltningen

KØBENHAVNS KOMMUNE

Letter of support

We support the project proposal "*METHODS TO ASSESS REAL COSTS TO HEALTH OF ENVIRONMENTAL STRESSORS (MARCHES)*", to be submitted to a call under Horizon Europe, HORIZON-HLTH-2022-ENVHLTH-04-01: Methods for assessing health-related costs of environmental stressors with Professor Mikael Skou Andersen, Aarhus University, Department of Environmental Science, Denmark as main applicant.

7. april 2022

Despite reductions in air pollution over the past decades, the city of Copenhagen continues to face challenges of the health burden of air pollution and managing the many different sources of air pollution – whether from traffic or from combustion at businesses and households.

From the prospective of the Municipality of Copenhagen the project will be important and helpful for the following aspects:

- We believe that improving the methods for health effect assessment and related socio-economic costs is important for allowing the public administration to understand and analyze the effectiveness of different abatement measures, and to set priorities for how best to tackle the air pollution challenges.
- We are looking forward to development of common guidelines and methodologies for socio-economic assessments and cost-benefit analysis of environmental pollution and policy measures.

In 2019 the City of Copenhagen established an expert group with national experts within air pollution and health effects. The purpose of the expert group is to contribute to supporting the Municipality of Copenhagen's work to create increased knowledge about the adverse health effects of air pollution in Copenhagen and make suggestions and recommendations to the Municipality of Copenhagen on possible policy measures and initiatives with an impact on health and air pollution in the municipality. The project proposal fits very well within that aim and the project and results will be presented and discussed in the expert group.

Date: 7 April 2022
Kind regards
Katrine Schjønning

Katrine Schjønning
Chief of Public Health
City of Copenhagen

Center for Forebyggelse og Folkesundhed
Afdeling for Strategisk Folkesundhed
Borups Allé 41, 8. etage
2200 København N

EAN-nummer
5798009290359

REPUBLIC OF ESTONIA
MINISTRY OF THE ENVIRONMENT

European Commission

Our ref 14.04.2022 No 18-1/22/1625-2

Letter of Support

Estonian Ministry of Environment confirms its interest in the research proposal MARCHES (Methodologies for Assessing the Real Costs to Health of Environmental Stressors), submitted to Horizon Europe in April, 2022, by a consortium led by Professor Mikael Skou Andersen, Aarhus University (Denmark) and with participation of the Estonian Environmental Research Centre.

The MARCHES project aims to advance methods for improved accounting of the welfare economic health costs of air pollution and drinking water nitrate. The project will provide guidelines for an accounting approach that can be applied universally in Europe, subject to decision makers' requests for policy scenarios and data availability, as will be demonstrated in case studies.

Catalonia will be covered as one of the case studies. The plan is to carry out high resolution air pollution modelling and assessment of the related health costs. For that, the Estonian Environmental Research Centre will use the air quality modelling system that currently provides operational forecasts to DTES. The results of this task will support the administration in setting priorities for how best to tackle challenges related to environment stressors.

We strongly support the MARCHES proposal. Should the proposal be accepted, we would be delighted to use further input, suggestions and support provided to us.

Sincerely,

H. Münt

KESKKONNAMINISTEERIUM

Meelis Münt
Secretary General

Address Narva maantee 7a, Tallinn 15172, Estonia/ Phone +372 626 2802/ E-mail keskkonnaministeerium@envir.ee/
Web Page www.envir.ee/ Registration No 70001231

3. QUALITY AND EFFICIENCY OF IMPLEMENTATION

3.1. Work plan and resources

MARCHES is divided into seven work packages. Figure 4 indicates the overall structure of MARCHES and the flow in-between WPs and the methods and resources applied. As illustrated here, the overall management and coordination in WP1 supports all WPs, while the main results are feeding into WP7, where the activities supporting dissemination and communication are carried out.

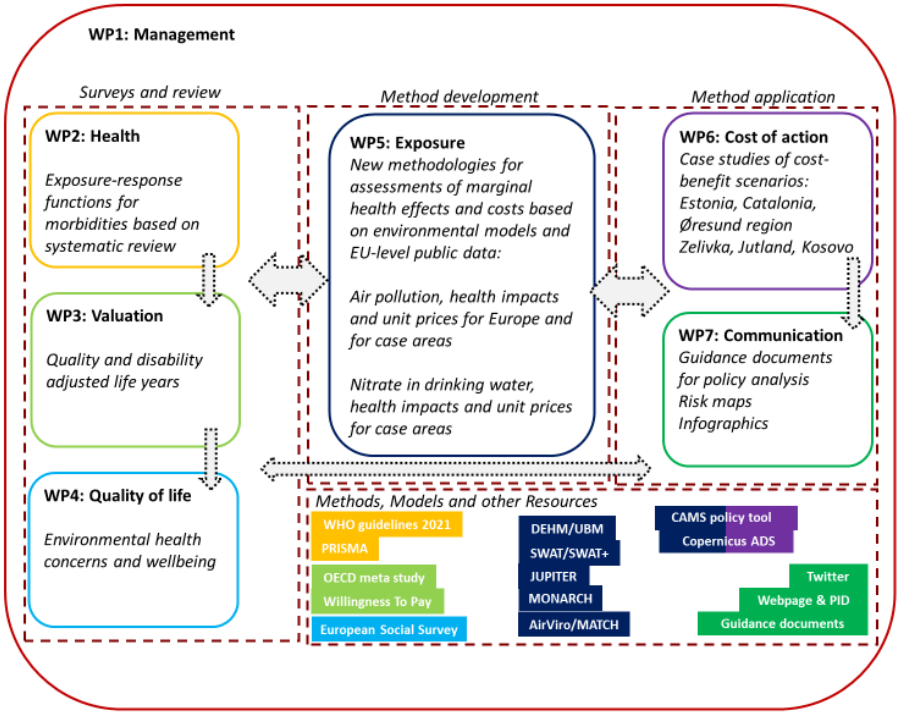


Figure 4. Work Package diagram

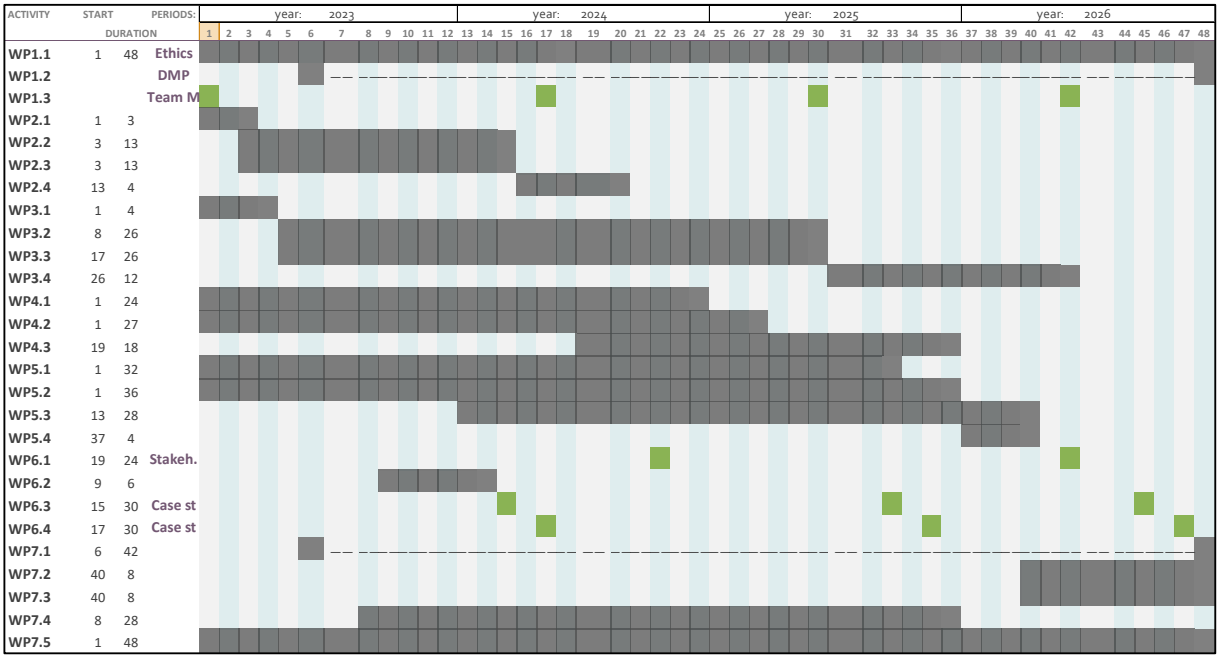


Figure 5. Gantt chart showing the timing of the work packages and their pertaining tasks.

Table 12. (3.1g)

Subcontracting costs	Cost (€)	Description of tasks and justification
MENON	75,000	WTP web-survey on morbidity health endpoints by external contractor with panel respondents (cf. WP3 task 2 details)
CU	75,000	WTP web-survey on premature mortality health endpoints by external contractor with panel respondents (cf. WP3 task 3 details)
UTARTU	75,000	The field-work of population survey (questionnaire developed by MARCHES researchers on wellbeing, environmental health worries etc,) will be conducted by (inter)national sociological research company. The company will be selected in an open call. (cf. WP4 task 2 details)
Total	225,000	

Table 13. (3.1h)

'Purchase costs' items (only when their sum exceeds 15% of personnel costs)				
Participant		**Cost (€)**	**Justification**	**Total**
AU	T&S	50,000	Attending annual team meetings (€30,000); Joint networking meetings w ENVHLTH projects (€20,000); Hosting four stakeholder workshops (€40,000)	245,400
	O	60,000	Joint networking activities w ENVHLTH projects (€20,000)	
	<15%	135,400		
UTARTU	T&S	24,800	Attending annual team meetings (€11,100); Joint networking meetings w ENVHLTH projects (€7,000); Scientific conference (€4,000); Interview travels (€3,000);	43,800
	O	5,000	Hosting annual team meeting (€5,000)	
	<15%	14,000		
CU	T&S	18,100	Attending annual team meetings (€11,100); Joint networking meetings w ENVHLTH projects (€7,000);	57,600
	O	5,000	Hosting annual team meeting (€5,000)	
	<15%	34,500		
ISG	T&S	18,100	Attending annual team meetings (€11,100); Joint networking meetings w ENVHLTH projects (€7,000);	52,800
	O	5,000	Hosting annual team meeting (€5,000)	
	<15%	29,700		
ISP	T&S	13,300	Joint networking meetings w ENVHLTH projects (€7,000); Attending annual team meetings (€4,800); Attending stakeholder workshop on air pollution (€2,000)	24,300
	O	8,000	Hosting case study meetings w public authorities in XK (€3,500); Dissemination (€3,000); Joint networking activities w ENVHLTH projects (€1,500)	
	<15%	3,000		
BSC	T&S	16,600	Attending annual team meetings (€9,600); Joint networking meetings w ENVHLTH projects (€7,000)	30,100
	<15%	13,500		
EERC	T&S	20,600	Attending annual team meetings (€9,600); Joint networking meetings w ENVHLTH projects (€7,000); Participating in stakeholder meetings air poll. (€2,000)	31,100
	O	3,000	Hosting case study meetings w public auth. (€3,000)	
	<15%	7,500		

NIBIO	T&S	16,600	Attending annual team meetings (€9,600); Joint networking meetings w ENVHLTH projects (€7,000);	36,100
	<15%	19,500		
T&S: Travel and subsistence; O: Other goods, works and services <15%: remaining costs below 15% of personnel costs				
T&S: Annual team meetings will be hosted by AU, UTARTU, CU and ISG. Budget has €1200 for travel, accommodation and per diems per non-host participant of which hotel €135/night, transport €700. Same unit rates are in budget for travels to workshops and case study meetings, though national rules&rates will apply. O: Stakeholder workshop budget is for venue incl. catering and participant support. Budget has €60 per participant (75 per workshop, 4 workshops in total) for venue incl. catering and €135/night to support lodging of invited participants in need. Case study meeting budget is for venue incl. catering at €60 per participant (15 per meeting, 3 per case study, 18 non-virtual meetings in total).				

Table 14. Sum of funds allocated on partner budgets for Joint Networking and Joint Activities with ENVHLTH projects

Item	Direct costs (€)	Indirect costs (€)	Sum (€)
Joint networking	90,000	22,500	112,500
Joint activities	38,000	9,500	47,500
Total joint activities	128,000	32,000	160,000

3.2. Capacity of participants and consortium as a whole

Consortium match with objectives

To enable the development of robust guidelines for integration of welfare economic estimates of health-related costs of pollution into impact assessment, the MARCHES project gathers expertise in public health, environmental economics, exposure modeling and policy analysis covering the entire sequence from emissions to health endpoints, focusing on priority stressors related to the daily intake/inhalation of water and air by citizens.

Table 15.

Spc. Obj.	Consortium expertise
SO1	Public health expertise for deriving exposure-response functions is delivered by AU, UMU and ISG
SO2	Environmental economics expertise needed for developing consistent metrics for mortality, morbidity and disabilities is delivered by MENON, CU and AU.
SO3	Social science expertise needed for exploring on the possible linkages between human well-being and health burdens/quality-of-life indicators is delivered by UTARTU and UMU mainly.
SO4	Atmospheric modeling expertise at European scale is delivered by AU, while high-resolution local-scale modeling expertise is delivered by BSC and EERC as well as AU.
SO5	Hydrological modeling expertise for European catchments is delivered by NIBIO, while high-resolution local scale expertise on Groundwater Bodies is delivered by GEUS.
SO6	Economics expertise needed for the cost-of-action/inaction case studies in six jurisdictions across Europe is delivered by AU, CU, BSC and UTARTU. Expertise on scenario development and stakeholder consultation is delivered by ISG, while expertise on policy analysis is delivered by AU. Engagement with public authorities in Kosovo is supported via ISP.
SO7	For the cross-cutting objective of stakeholder and expert consultations, all the above mentioned expertise of the consortium and their interdisciplinary collaborations are of significance.

Complementarity of the consortium

The MARCHES consortium consists of 11 partners from 7 EU and associated countries (Czech Republic, Denmark, Estonia, Kosovo, Norway, Spain-Catalonia and Sweden) covering adequately the geographical and pollution diversity in Europe, as well as the availability of high-resolution environmental modeling relevant to air pollution and drinking water nitrates. Most of the partners work routinely with relevant public

authorities in their respective countries or regions and are well positioned to facilitate the uptake by these of the MARCHES results, by demonstrating best-practice methodologies, while developing deployment blueprints for application also in territories with data and modeling shortcomings. Most of the partners are from smaller countries, where there are less administrative veto-points for introducing new procedures and appraisal techniques, than in some larger countries.

As detailed in Table 16, each partner has a clear role in MARCHES, and together will ensure that all tasks are carried out professionally to serve the objectives of the project. A bottom-up and iterative process has made sure adequate resources will be available for each partner to fulfil their roles.

Table 16. Role of each partner.

Partner	Contribution to the project per partner
AU	AU is coordinator of MARCHES. AU participates with two departments; Environmental Science and Public Health. AU Public Health will lead on systematic reviews and exposure-response functions in WP2, while AU Environmental Science will lead WP5, especially with the atmospheric modelling and EVA model. AU will further contribute to WP6 cost-of-action case studies, being responsible for Øresund, Jutland and Kosovo. AU will also provide support to economic valuation in WP3. As coordinator AU will lead on management, dissemination and communication, supported by all partners.
UMU	UMU participates with its public health expertise to the systematic reviews in WP2 relating to health effects of air pollution and with its expertise on psycho-social aspects of human well-being to the quality of life survey and analyses in WP4.
UTARTU	UTARTU will lead the research in WP4 on the possible linkages between human well-being and objective quality-of-life indicators. UTARTU will in WP6 be responsible for the Estonia cost-of-action case-study.
CU	CU will contribute to the economic valuation of health endpoints in WP3 and the development of metrics for disabilities. CU will contribute to WP6 case studies, being responsible for Zelivka cost-of-action case study. CU will in WP5 supply baseline data.
MENON	MENON will lead on the economic valuation of health endpoints and the development of metrics for disabilities. This includes the survey instrument.
ISG	ISG will lead WP6, especially on the activities related to scenario development with public authorities and on stakeholder consultations. ISG in WP2 participates with its public health expertise to contribute on health effects of nitrates
ISP	ISP will contribute to WP6 case studies, mainly facilitating the Kosovo case study and support with data for WP5, and contribute to communication efforts in the west-Balkan area
BSC	BSC will in WP5 contribute local-scale modelling of the case study area Catalonia and in WP6 to the cost-of-action case study on Catalonia.
EERC	EERC will in WP5 contribute local-scale modelling of the case study area Estonia
NIBIO	NIBIO will in WP5 be responsible for hydrological modelling relating to drinking water nitrates in both case study areas (Zelivka and Jutland) with the SWAT model
GEUS	GEUS will in WP5 provide the nitrate pulse for the Groundwater Body in Jutland case study on drinking water

4. ETHICS SELF-ASSESSMENT

Ethical dimension of the objectives, methodology and likely impact

The MARCHES project will be applying standard social science questionnaire methodologies to collect information and elicit preferences from individual adult citizens in six countries, including one non-EU country (Kosovo) (WP3/WP4), and it will gather stakeholders and experts from EU Member States, EFTA and west-Balkan countries for workshops to seek their input and opinion on methodologies developed to account for the costs of pollution of air and drinking water (WP5). It will also do workshops with staff from

public authorities in six regions, of which one non-EU (WP6). Social scientists will be in charge of the surveys. The ethical standards and guidelines of Horizon Europe will be rigorously applied, regardless of the country in which the research is carried out.

In general, the methodologies are relatively low risk from the physical, mental, social, and cultural points of view. The surveys can be summarized as the collection of low risk questionnaire data and secondary data analyses. Vulnerable populations (e.g. ethnic minorities and elderly people) will be included with sensitive and appropriate recruitment, consenting and performance of the study.

In general, approval and oversight for each individual survey will be sought with the local Research Ethical Authority of the individual Partner Institution leading for that specific Task; where the research is being performed at multiple institutions, once approved by the Partner Institution leading that Task, these Ethics Protocols will presented to the local Research Ethics Authorities of the other participating Partner Institutions. No studies will take place without appropriate Research Ethics Authority approval (Menon Economics will use the local Research Ethical Authority of the university where one of its staff have a double appointment). Ethics protocols submitted will include information regarding funding, institutional affiliations, and any potential conflicts of interest.

The actual surveys will be implemented in collaboration with one or more professional survey companies that have an existing panel of citizens that have agreed to participate in survey studies and who are familiar with the procedures for web-surveys (WP3) or telephone interviews (WP4). In WP4 participants will be asked about their home address, to enable linking with geo-coded data on air pollution exposure data. As the exposures are calculated in a grid with a resolution that is coarse (typically 1 km x 1 km) in relation to the specific address, the chances of identifying the respondent directly from the geo-coded data are close to zero.

Data collection in non-EU countries: Collection of survey data will take place in both the EU and Kosovo. All EU surveys will be analyzed by EU/EFTA(Norway) based researchers and appropriate protocols will be in place for the transfer of data. Norway has a security arrangement with EU. The relevant research protocols will be submitted for consideration, comment, guidance, and approval to a Research Ethics Authority or other national competent authority in Kosovo before any individual study begins. No EU data will be sent to Kosovo, unless in fully anonymized form, as the country does not have a security arrangement with EU at present. No data is to be collected in Norway.

Kosovo is a country fully associated to Horizon Europe, however the risks of travelling in the country for the purpose of workshops with public authorities might be deemed slightly higher than in EU itself, e.g. due to the ethnic cleavages in the region. MARCHES will take appropriate safeguards based on updated travel advice from competent EU Member State authorities. We consider the Kosovo case study an important contribution to the project, as it has some of the highest levels of air pollution in Europe, for which reason the country partner initially approached the coordinator for support to a national project.

Compliance with ethical principles and relevant legislations

The overarching principle of MARCHES is that the interests and welfare of human beings within the environment shall prevail over the sole interest of society or science, bearing in mind the United Nations Convention for the protection of human rights and fundamental freedoms from 1950. All studies in MARCHES will follow regulations in both national and international legal and ethical rules. Concerning international statutes, the ethical framework will follow the intentions of the Nuremberg Code (1947) and be in accordance with the World Medical Association's (WMA's) Declaration of Helsinki in its last version of 2013 (64th WMA General Assembly, Fortaleza, Brazil, October 2013). All activities will conform to the most recent European Union Directives. The charter of Fundamental rights of the EU Directive 95/46/EC of the European Parliament and of the Council of 24 October 1995, or any updated or new version, on the protection of individuals with regards to the processing of personal data and on the free movement of such data will, without exceptions, be followed. European, national and institutional requirements and codes of

practices will be considered in all work. The activities in non-EU countries will be fully in compliance with the above – and they are to our knowledge fully allowed within the EU, certainly in Denmark.

The interviewers will be trained and experienced in doing surveys, thus they have experience how not to harm study participants socially, emotionally or psychologically. Moreover, as most of the panelist have been participating also earlier in similar studies, they have experience in responding. The research itself will be conducted by individuals with the appropriate scientific training and qualifications.

In order to evaluate relationships between the environment and human health benefits, some of the studies need to involve evaluations and analyses of some personal data, such as home address. The necessary data will be handled in accordance with national and European laws and regulations; in particular, data protection, confidentiality, and de-identification will at the time of processing follow the most recent directives of the European Parliament and of the Council of 24 October 1995.

For data collection from direct contact with human participants (e.g. during interviews) the requirements include: 1) informed consent for each participant in a language they can understand and clearly explained information that she/he can withdraw from the study at any time without having to motivate her/his decision nor suffering any prejudice; and 2) information about the data processing operations and the contact details of the relevant data protection officer manager, e.g. for withdrawing consent.

As home address together with other survey data is sensitive data, this must be handled with special care. For this the address will be kept in datafiles and -folders separate from other data. All respondents will be allocated special code that enables later linking questionnaire data with exposure data. The process of geocoding goes as follows: First, each participant is allocated geographical coordinates based on the home addresses. Second, each geocoded respondent will be linked with air pollution data, i.e. air pollution exposure value with one decimal place accuracy. Those values with participants' codes will be given back to survey implementer who will add this data into the datafile. The final database to be used does not include specific address coordinates or any data that could enable identify the specific persons. Where any personal information is acquired, it will be safety stored in secure facilities, and names will be replaced by unique study numbers, and stored separately.

In the survey data management, the EU General Data Protection Regulation (GDPR) will be followed. The consortium will produce a Data Management Plan and has an appointed Data Manager. The universities involved in MARCHES have data protection officers who they can consult in data management process. Only aggregated data that cannot be linked to any specific person, will be made public.

In relation to workshops and meetings with staff of public authorities, written consents will be a precondition for any recordings and the terms for their use (Chatham House rules). All ethical protections and regulations will also apply to any stakeholders including staff from public authorities.

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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 - AU	1 006 688.80	0.00	0.00	0.00	137 400.00	0.00	108 000.00	0.00	313 022.20	1 565 111.00	100	1 565 111.00	1 565 111.00	1 565 111.00
2 - UMU	185 759.20	0.00	0.00	0.00	24 300.00	0.00	3 500.00	0.00	53 389.80	266 949.00	100	266 949.00	266 949.00	266 949.00
3 - UTARTU	106 939.20	0.00	0.00	75 000.00	35 300.00	0.00	8 500.00	0.00	37 684.80	263 424.00	100	263 424.00	263 424.00	263 424.00
4 - CU	245 164.80	0.00	0.00	75 000.00	41 100.00	0.00	16 500.00	0.00	75 691.20	453 456.00	100	453 456.00	453 456.00	453 456.00
5 - MENON	286 110.00	0.00	0.00	75 000.00	29 100.00	0.00	7 500.00	0.00	80 677.50	478 387.50	100	478 387.50	478 387.00	478 387.00
6 - ISG	239 268.00	0.00	0.00	0.00	41 300.00	0.00	11 500.00	0.00	73 017.00	365 085.00	100	365 085.00	365 085.00	365 085.00
7 - ISP	22 132.80	0.00	0.00	0.00	16 800.00	0.00	7 500.00	0.00	11 608.20	58 041.00	100	58 041.00	58 041.00	58 041.00
8 - BSC	112 052.00	0.00	0.00	0.00	27 600.00	0.00	2 500.00	0.00	35 538.00	177 690.00	100	177 690.00	177 690.00	177 690.00
9 - GEUS	24 600.40	0.00	0.00	0.00	3 650.00	0.00	0.00	0.00	7 062.60	35 313.00	100	35 313.00	35 313.00	35 313.00
10 - EERC	56 745.00	0.00	0.00	0.00	25 600.00	0.00	5 500.00	0.00	21 961.25	109 806.25	100	109 806.25	109 806.00	109 806.00
11 - NIBIO	144 715.20	0.00	0.00	0.00	32 600.00	0.00	3 500.00	0.00	45 203.80	226 019.00	100	226 019.00	226 019.00	226 019.00
Σ consortium	2 430 175.40	0.00	0.00	225 000.00	414 750.00	0.00	174 500.00	0.00	754 856.35	3 999 281.75		3 999 281.75	3 999 281.00	3 999 281.00

[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

UMEA UNIVERSITET (UMU), PIC 999881821, established in UNIVERSITETOMRADET, UMEA 901 87, Sweden,

hereby agrees

to become beneficiary

in Agreement No 101095430 — MARCHES ('the Agreement')

between AARHUS UNIVERSITET (AU) **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

Per RAGNARSSON with ECAS id nragnper signed in the Participant Portal on 16/11/2022 at 08:00:08 (transaction id SigId-1738-YG8m0i HzrHrtCUzo4vMM9qUcEA97EpPpKH5biaa1MKXi8gmBBykgzLWfKw8 VJ2jo0hj6H5b3Kx4BS8PYNqcEguG-jpJZscgsw0KzOcDzY5LHew0-JdQL QzbPd49EisZDwo2bGSyeFy0CG0FDqzT15zcLi4MCG55CXzTu2HXR9A h4lLGdEfzIr9zvh7oHEhydYUtMRIZm). Timestamp by third party at 2022.11.16 08:00:13 CET

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

TARTU ULIKOOL (UTARTU), PIC 999895013, established in ULIKOOLI 18, TARTU 50090, Estonia,

hereby agrees

to become beneficiary

in Agreement No 101095430 — MARCHES ('the Agreement')

between AARHUS UNIVERSITET (AU) **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

Siret Rutiku with ECAS id n00a2iti signed in the Participant Portal on 15/11/2022 at 06:56:55 (transaction id SigId-108937-8g2QuUI8OnYICIuCOdfzMDu8NwpIcUwOpIrVBR5xCFHFIAApgbAGycFmUqBTIXDGWOckzn3nguzMbFIhPXSzrC8-rS0vSrmBGYCYOonzu9chxJ-VsBL8DRZuKHQhdIVVQMKPS4k90U78GDFe9qwJ5yFmxxKvdVNWmQu4Uq5XqKbALfXTsuMh8mfBRu6VwdpQsgYaW). Timestamp by third party at 2022.11.15 06:57:03 CET

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

UNIVERZITA KARLOVA (CU), PIC 999923434, established in OVOCNY TRH 560/5, PRAHA 1 116 36, Czechia,

hereby agrees

to become beneficiary

in Agreement No 101095430 — MARCHES ('the Agreement')

between AARHUS UNIVERSITET (AU) **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

Jan FROUZ with ECAS id nfroujan signed in the Participant Portal on 11/11/2022 at 12:52:35 (transaction id SigId-83829-JFPiZzpYADCDNGx563JaqssbhZsjS1pcERm0ztQMKzzjKJn5UCy3qvTSzv95ZYhRUiXGwGOQ1zkMCdovA409DuzK-rS0vSrmBGYCYOonzu9chxJ-JhuRUAVFRENjCEHDr9ipUpitOF57aPejvCSYXAcrkSzPFZfcVtvl1r5ZHMA58tRqe512gItYC6mlzSWUAhcKaR). Timestamp by third party at 2022.11.11 12:52:40 CET

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

MENON ECONOMICS AS (MENON), PIC 905008643, established in SORKEDALSVEIEN 10B, OSLO 0369, Norway,

hereby agrees

to become beneficiary

in Agreement No 101095430 — MARCHES ('the Agreement')

between AARHUS UNIVERSITET (AU) **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

Henrik Lindhjem with ECAS id n009eju4 signed in the Participant Portal on 18/11/2022 at 12:16:16 (transaction id SigId-25045-9HVRhYH62CEsYKqm61Kn60txK9mWE1zzUeROyzw4XSYfWil7kf5UZaT5Kaxdej9rmfVouBfBbWEg7WSiiDzgbW-rS0vSrmBGYCE4gJvsVbRLK-78MJu00dv0vy9OQTPrYnLqLNLlb10gQSPkC2vLQzomGf0KfqEo4f6lLBQ6kt0hjo2aMRR8JdOx2R7Tibkzmtpe). Timestamp by third party at 2022.11.18 12:16:23 CET

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

FUNDACION PRIVADA INSTITUTO DE SALUD GLOBAL BARCELONA (ISG), PIC 951414122, established in C ROSSELLO 132 PLANTA 05, BARCELONA 08036, Spain,

hereby agrees

to become beneficiary

in Agreement No 101095430 — MARCHES ('the Agreement')

between AARHUS UNIVERSITET (AU) **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

Antoni PLASÈNCIA with ECAS id nplasena signed in the Participant Portal on 11/11/2022 at 09:36:08 (transaction id SigId-79009-KrD6Js8BtmeQ9ZaBSmrJn1xfZSZkIcFJC1geSeLjRs2DFIoc5DhTWUSswB3zPphL742rr9hXuHPIzfxfbnUML9-rS0vSrmBGYCYOonzu9chxJ-poEI3LHitq60yfHHC0fp6T9GoCBQ4PjsbVOMiFQpEFPPprrxeRhfdRJwXWyq5EmFcPFzc06OocN0RbUXJWHhaa). Timestamp by third party at 2022.11.11 09:36:15 CET

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

INSTITUTI PER POLITIKA SOCIALE MUSINE KOKALARI (ISP), PIC 890184618, established in STREET B MATI 1 RESIDIO 5 ENTRANCE B 51-1, PRISHTINA 10 000, Kosovo * UN resolution,

hereby agrees

to become beneficiary

in Agreement No 101095430 — MARCHES ('the Agreement')

between AARHUS UNIVERSITET (AU) **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

Marigone Drevinja with ECAS id n003i0jx signed in the Participant Portal on 14/11/2022 at 10:41:02 (transaction id SigId-95830-YXWudwH3NG3reMYDum7zIQEMfZtXX4EG68UcKWrwFHUczZBN3EFpv5lsLDKr2u9zs62vgnbYj2BgnGzRHpNmq4u-rS0vSrmBGYCYOonzu9chxJ-hYgeyI22Oze9AReulAc4bbuWhdcsiI3AYivOseZzd15kvlSrnwnirOzzdapZktcCIzlA7ozysuUx5YH12Fd8klX0). Timestamp by third party at 2022.11.14 10:41:10 CET

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

BARCELONA SUPERCOMPUTING CENTER CENTRO NACIONAL DE SUPERCOMPUTACION (BSC), PIC 999655520, established in CALLE JORDI GIRONA 31, BARCELONA 08034, Spain,

hereby agrees

to become beneficiary

in Agreement No 101095430 — MARCHES ('the Agreement')

between AARHUS UNIVERSITET (AU) **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

Mateo VALERO with ECAS id nvalerme signed in the Participant Portal on 11/11/2022 at 09:25:33 (transaction id SigId-78770-Mbgq aTDCbJ5yocA7Rgs6stWzmY0XTJZ0s6jcPm2K9fQ4J98Ur4HffMMFu54 Tvt7sRiCGsHczzzomyPZeBd5VK8m-rS0vSrmBGYCYOonzu9chxJ-ikd RyVZAdnzTczzvFJsRUZMlfRTrg3JeCG39lQzrUcAH6tHMLiMUu02NSO 5fF2MFIbmx7a55qYtS98lzaB0wHi0). Timestamp by third party at 2022.11.11 09:25:38 CET

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

Geological Survey of Denmark and Greenland (GEUS), PIC 999459677, established in OSTER VOLDGADE 10, KOBENHAVN K 1350, Denmark,

hereby agrees

to become beneficiary

in Agreement No 101095430 — MARCHES ('the Agreement')

between AARHUS UNIVERSITET (AU) **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

Heidi BARLEBO with ECAS id nbarlehe signed in the Participant Portal on 11/11/2022 at 13:28:07 (transaction id SigId-84457-V7GgjXiIRPzXRtwi12Ge0BuxJyVOiTtWTQtVsURebxMzuL6Xo2q0u7zMJlWZvmY8UM2zu3t5jHguzbOEQFzIG2kG-rS0vSrmBGYCYOonzu9chxJ-3zGBnpMBwfD2dRGIkGFNdoVzvjO6DiqQ962L7Sitq1zQru57JuVBvpAfaCdzwelvUrFvRvvWU8gX5S3RuuNMshe). Timestamp by third party at 2022.11.11 13:28:12 CET

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

EESTI KESKKONNAUURINGUTE KESKUS (EERC), PIC 915844901, established in MARJA 4D, TALLINN 10617, Estonia,

hereby agrees

to become beneficiary

in Agreement No 101095430 — MARCHES ('the Agreement')

between AARHUS UNIVERSITET (AU) **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

Margus Kört with ECAS id n00350ze signed in the Participant Portal on 14/11/2022 at 07:20:02 (transaction id SigId-92509-6W7cG8zSYz bAK1eysExSvjygLtCi8jROasjZZku4KmB1Ug8NOQXH4JIwXdnQNXRxA vX12gr2dTazfooLOXFGdjW-rS0vSrmBGYCYOonzu9chxJ-LaHJ6WkdN GyQEH6zNCFhFl5zeFbLQKw74MfRK9oEVC7kLlqbWLzkQUCfMvCp05 UOFF9RjsnDb0LmTixYzJamGa4). Timestamp by third party at 2022.11.14 07:20:08 CET

ANNEX 3

ACCESSION FORM FOR BENEFICIARIES

NIBIO - NORSK INSTITUTT FOR BIOOKONOMI (NIBIO), PIC 999754848, established in HOEGSKOLEVEIEN 7, AAS 1430, Norway,

hereby agrees

to become beneficiary

in Agreement No 101095430 — MARCHES ('the Agreement')

between AARHUS UNIVERSITET (AU) **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

Unni LIAHJELL ELLINGSEN with ECAS id nliahjun signed in the Participant Portal on 11/11/2022 at 10:28:13 (transaction id SigId-80220-aGpaO04ZGNYjEhIxISFQHTseHgT9ctFxKb8cXAKSGvfb5FRNcFyZCODzacOzHOv5XZ3hYIpLklm55UYKqqsQQl-rS0vSrmBGYCYOonzu9chxJ-vZzNToRzf5czqgKj9SWbCeykXCkrQ8AzyVKEYgJ55UzGJccCAiy9aOpOuymkuB3czZcdYfbzktWKzayimJWsLc7c). Timestamp by third party at 2022.11.11 10:28:19 CET

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:

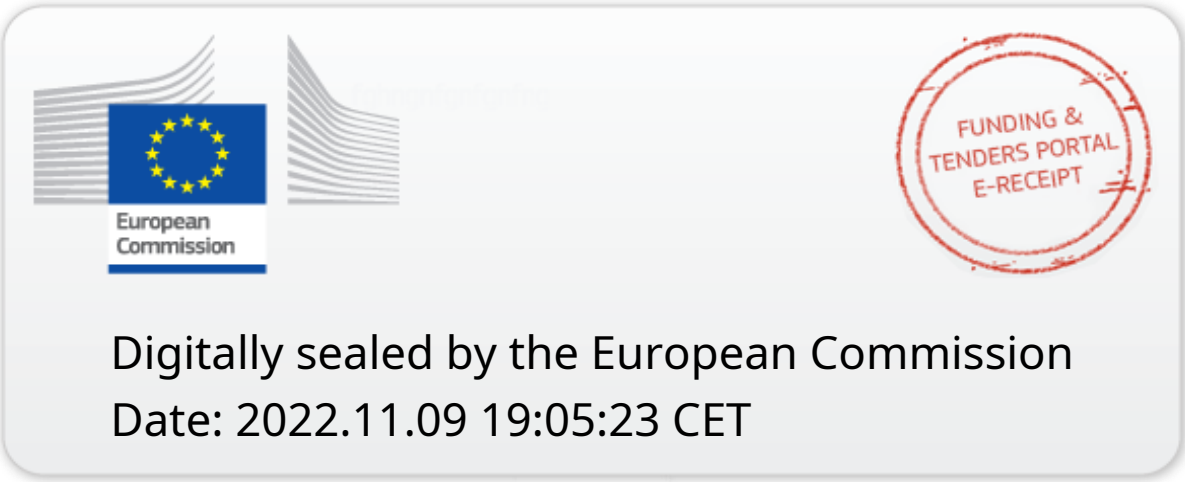
  The beneficiaries must have the virtual access services assessed periodically by a board composed of international experts in the field, at least half of whom must be independent from the consortium (unless otherwise specified in Annex 1). For this purpose, information and statistics on the users and 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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