

# CONTRATTI DELL'ENEA CON LA **COMMISSIONE EUROPEA**



**DATI RIASSUNTIVI 2023**



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**Dati riassuntivi 2023**

Maggio 2024

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*Attraverso questa pubblicazione, vorremmo esprimere ad Anna Pibiri la nostra sincera gratitudine per gli anni di dedizione e impegno dedicati a questa tematica.*

*Mentre ti prepari per questa nuova fase della tua vita, ti auguriamo il meglio in ogni ambito.*

*Che la tua prossima fase sia ricca di serenità e soddisfazioni.*

*Grazie di cuore per tutto*

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## NOTA INTRODUTTIVA

Il rapporto annuale *'Contratti dell'ENEA con la Commissione Europea'* presenta una panoramica completa delle attività progettuali dell'Agenzia, finanziate da programmi dell'Unione Europea (UE).

L'ENEA, infatti, partecipa da anni con successo a programmi e iniziative dell'UE, in particolare i Programmi Quadro Ricerca e Innovazione e il Programma Quadro Euratom, che costituiscono un'importante fonte di finanziamento esterno per l'Agenzia. Nel presente rapporto sono stati considerati tutti i contratti stipulati dall'Agenzia, in vigore nel corso del 2023, relativi sia a progetti finanziati attraverso la precedente programmazione europea (2014-2020) non ancora conclusi e sia a progetti finanziati attraverso la nuova programmazione europea (2021-2027), i cui primi bandi sono stati pubblicati nel 2021.

L'ENEA ha partecipato con numerose proposte ai nuovi bandi, confermando e migliorando gli eccellenti risultati già ottenuti nella programmazione 2014-2020.

Il rapporto annuale contiene dati di sintesi aggregati e informazioni di dettaglio su progetti cofinanziati dall'UE e formalizzati attraverso specifici contratti. I dati sono elaborati sulla base dei contenuti della banca dati progetti UE dell'ENEA (<https://www.progettiue.enea.it>).

La banca dati è disponibile su web dal 2009, raccogliendo e rendendo omogenee le informazioni sui contratti stipulati dall'ENEA con la Commissione Europea (CE) e completandole con dati ricavati dai documenti contrattuali. Tale strumento, gestito dalla Direzione Trasferimento Tecnologico (TTEC), ha l'obiettivo di favorire la diffusione di informazioni all'interno e all'esterno dell'Agenzia, costituendo anche uno strumento a supporto della progettualità dei ricercatori.

Ad oggi, sono presenti nella banca dati oltre 1170 contratti, per ciascuno dei quali sono disponibili, tra le altre, informazioni dettagliate relative a: programma di finanziamento dell'UE, acronimo, del progetto, date di inizio e fine, abstract e attività ENEA, sito web del progetto, coordinatore e partenariato, responsabile ENEA.

Ciò consente di realizzare report complessi quali l'analisi del partenariato nazionale ed internazionale dell'ENEA per tipologia, per area geografica e per progetto. È possibile produrre anche elaborazioni ad hoc relative all'esperienza specifica dell'Agenzia in determinate aree geografiche e/o ambiti di ricerca, da utilizzare, ad esempio, come 'referenze' dell'ENEA, indispensabili nel caso della partecipazione a *tenders* della CE e a *calls for proposals* di specifici programmi nazionali, europei e internazionali. La banca dati, quindi, oltre ad essere una "buona pratica" nonché uno strumento di raccolta, analisi e condivisione delle informazioni sui progetti in corso, rende disponibili elementi utili alla formulazione di strategie e alla definizione di accordi con partner nazionali e internazionali.

I dati sono organizzati in quattro diverse sezioni: i risultati di partecipazione dell'ENEA alla programmazione 2021-2027, i contratti stipulati nel 2023, i contratti in corso nel 2023. Infine, una sezione è interamente dedicata alla partecipazione dell'ENEA al Consorzio EUROfusion che, per l'entità del finanziamento e le modalità di aggiudicazione e funzionamento, non è assimilabile agli altri progetti ed è, pertanto, oggetto di approfondimento specifico nella

sezione 2; per questi motivi il co-finanziamento riconosciuto a ENEA non è incluso nei dati di sintesi elaborati nel presente rapporto.

La pubblicazione è completata dall'allegato relativo alle schede sintetiche di ciascuno dei 162 progetti in corso nell'anno in esame.

La fonte di tutte le figure e le tabelle rappresentate nel presente rapporto è la Banca Dati Progetti UE: [progettiue.enea.it](http://progettiue.enea.it).

Le analisi sulla partecipazione sono basate su dati provenienti dal Funding and Tenders Portal della EU.

*Maggio 2024*

## 1. La partecipazione dell'ENEA ai bandi della programmazione europea 2021-2027 (dati aggiornati al 31 dicembre 2023)

L'analisi sulla partecipazione dell'Agenzia è stata elaborata sulla base della lista delle proposte presentate dall'ENEA in risposta ai bandi della programmazione europea 2021-2027, pubblicata sull'*EU Funding and Tenders Portal*, (<https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/home>) a cui accedono il LEAR (Legal Entity Appointed Representative) designato e l'*Account Administrator* dell'Agenzia. I dati elaborati sono aggiornati al 31 dicembre 2023 e si riferiscono, pertanto, ai soli programmi e proposte presenti nel portale della Commissione.

Con riferimento ai primi bandi della nuova programmazione 2021-2027, in particolare quelli di Horizon Europe, su un totale di 298 proposte presentate nell'intero periodo di programmazione, l'ENEA ha presentato 100 proposte con scadenza 2023, relative ai bandi dei programmi *Horizon Europe*, *LIFE2027*, *Euratom2027*, *EU Defence Fund (EDF)*, *Digital*, *Erasmus2027*, *Interregional Innovation Investments (I3)*, *Single Market Programme (SMP)*, *Internal Security Fund (ISF)* e *Union Civil Protection Mechanism (UCPM) 2021-2027*.

Delle 100 proposte presentate nel 2023, 56 sono state valutate alla data del 31 dicembre, di cui 21 sono state dichiarate finanziabili per un ammontare totale riconosciuto all'ENEA pari a circa 6 milioni di euro<sup>1</sup>. Il tasso di successo delle proposte dell'ENEA che sono state valutate per tutti i programmi monitorati dal portale è, quindi, pari a circa il 37,5% (solo per Horizon Europe circa il 35%).

Nelle 100 proposte con scadenza 2023, l'Agenzia si è presentata in 13 (di cui 10 in Horizon Europe) con il ruolo di coordinatore (13%), mentre nelle 21 proposte dichiarate finanziabili, l'ENEA si è proposta come coordinatore in 3 di esse (14%). Il tasso di successo delle proposte a coordinamento, calcolato su quelle finora valutate, al 31 dicembre 2023, è pari al 23%.<sup>2</sup> Le 3 proposte a coordinamento ENEA sono finanziate dai programmi *UCPM*, *EIT - Raw Materials KIC* e *Research Infrastructures*.

La maggior parte delle 21 proposte finanziate in Horizon Europe risulta essere concentrata nel secondo Pillar (*Digital, Industry and Space*, 4 proposte); (*Climate, Energy and Mobility*, 5 proposte); (*Clean Hydrogen Partnership*, 2 proposte) e nel primo Pillar (*Research Infrastructures*, 5 proposte).

È opportuno considerare che il numero di progetti finanziati e l'entità del contributo all'ENEA per anno sono influenzati anche dal susseguirsi delle scadenze dei bandi e dal budget stanziato dai singoli programmi.

Una parte consistente delle 100 proposte presentate da ENEA risulta ancora in valutazione, come evidenziato nell'illustrazione seguente di [Figura 1](#).

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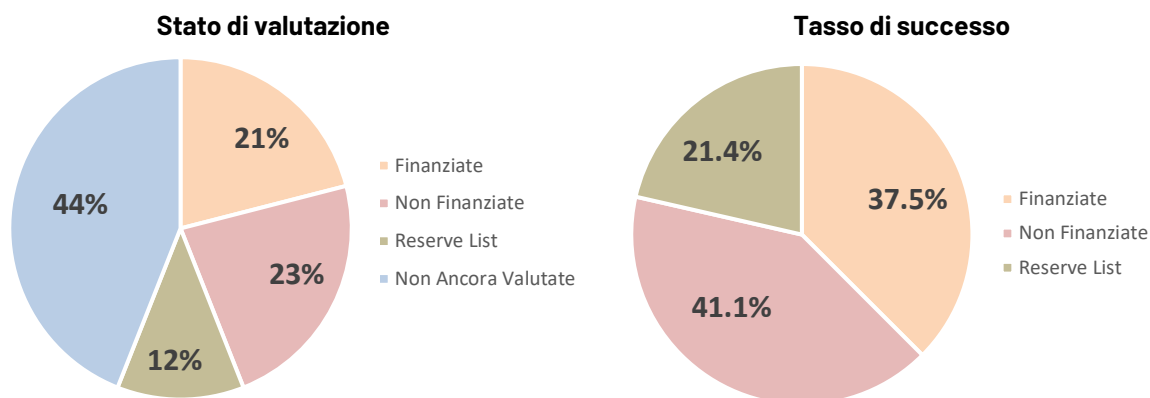
<sup>1</sup> Fonte: *EC funding and tenders portal*, 31 dicembre 2023

<sup>2</sup> idem c.s



**Figura 1**

**Stato di valutazione e tasso di successo delle 100 proposte presentate nei bandi con scadenza 2023 (1° gennaio – 31 dicembre 2023)**

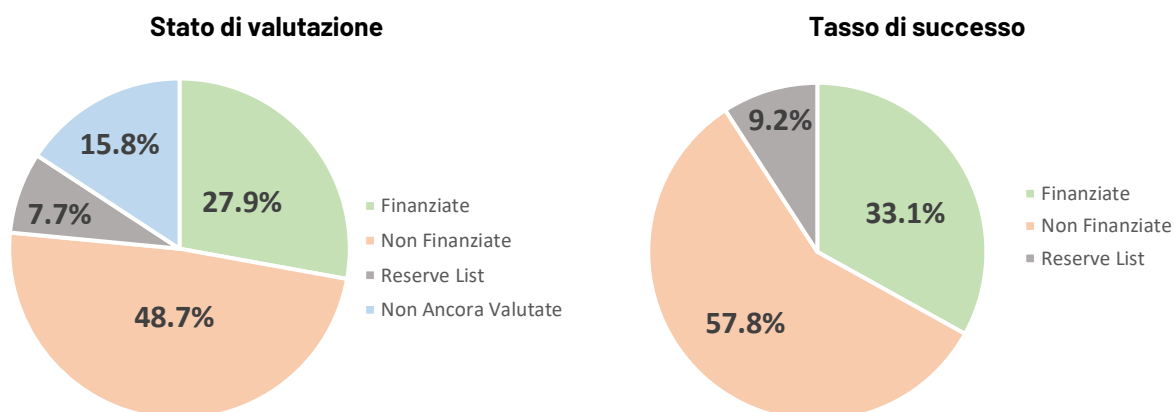


In conclusione, la partecipazione dell'ENEA dall'inizio della programmazione europea 2021-2027 fino al 31 dicembre 2023 ha contato 298 proposte presentate, di cui complessivamente 83 finanziate, con un conseguente tasso di successo dell'Agenzia rispetto alle proposte valutate, per tutti i programmi monitorati dal portale *progettive.enea.it*, pari a circa il 33%.

L'attuale stato di valutazione e tasso di successo delle 298 proposte presentate nell'intero periodo è riportato nella seguente [Figura 2](#).

**Figura 2**

**Stato di valutazione e tasso di successo delle 298 proposte presentate nel periodo di programmazione 2021-2027 (dati cumulati fino al 31 dicembre 2023)**



## 2. La partecipazione dell'ENEA a Eurofusion

EUROfusion - *European Consortium for the Development of Fusion Energy* è il Consorzio europeo a cui l'Euratom, dal 2014, ha affidato il programma fusione.

Dopo la prima fase di attività di EUROfusion nel corso del programma quadro Horizon 2020, nel 2021 è stato sottoscritto il Grant Agreement (n. 101052200) di Horizon Europe relativo alle attività con arco temporale fino al 2025, salvo successivi atti aggiuntivi.

EUROfusion deve attuare la *Road Map* europea sulla fusione; in particolare, l'attività di ricerca del Consorzio è mirata alla prosecuzione delle attività del progetto ITER (*International Thermonuclear Experimental Reactor*), alla gestione delle ultime fasi dell'operazione di JET (*Joint European Thorus*) e al supporto della realizzazione del reattore dimostrativo DEMO (*Demonstration Fusion Power Reactor*) intorno al 2050.

Al Consorzio aderiscono organizzazioni di 25 Stati Membri più Norvegia, Regno Unito, Svizzera e Ucraina, coordinati dal Max-Planck Institute für Plasmaphysik<sup>3</sup>.

Partecipano alle attività di ricerca del Consorzio EUROfusion anche *'affiliated entities'* collegate a un *'Programme Manager'* che coordina le attività delle organizzazioni del proprio Paese.

Come *'Programme Manager'* per l'Italia è stata designata l'ENEA, che coordina i seguenti 20 partner:

- ANN, Ansaldo Nucleare S.p.a.
- CINECA Consorzio
- CNR, Consiglio Nazionale delle Ricerche
- Consorzio Create
- Consorzio per l'attuazione del progetto "Divertor Tokamak Test" (DTT S.c.a.r.l.)
- Consorzio RFX
- INFN, Istituto Nazionale di Fisica Nucleare
- LT Calcoli
- Politecnico di Milano
- Politecnico di Torino
- RINA Consulting - Centro Sviluppo Materiali S.p.A.
- Università degli Studi della Tuscia
- Università degli Studi di Cagliari
- Università di Catania
- Università di Milano Bicocca
- Università di Palermo
- Università di Pisa
- Università di Roma La Sapienza
- Università Roma Tre
- Università Tor Vergata

Per il 2023, il bilancio del Grant Agreement assegna complessivamente ai partecipanti italiani un contributo complessivo massimo di 17 milioni di euro circa, di cui 6,2 milioni di euro circa previsti per le attività dell'ENEA.

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<sup>3</sup> <https://www.euro-fusion.org>

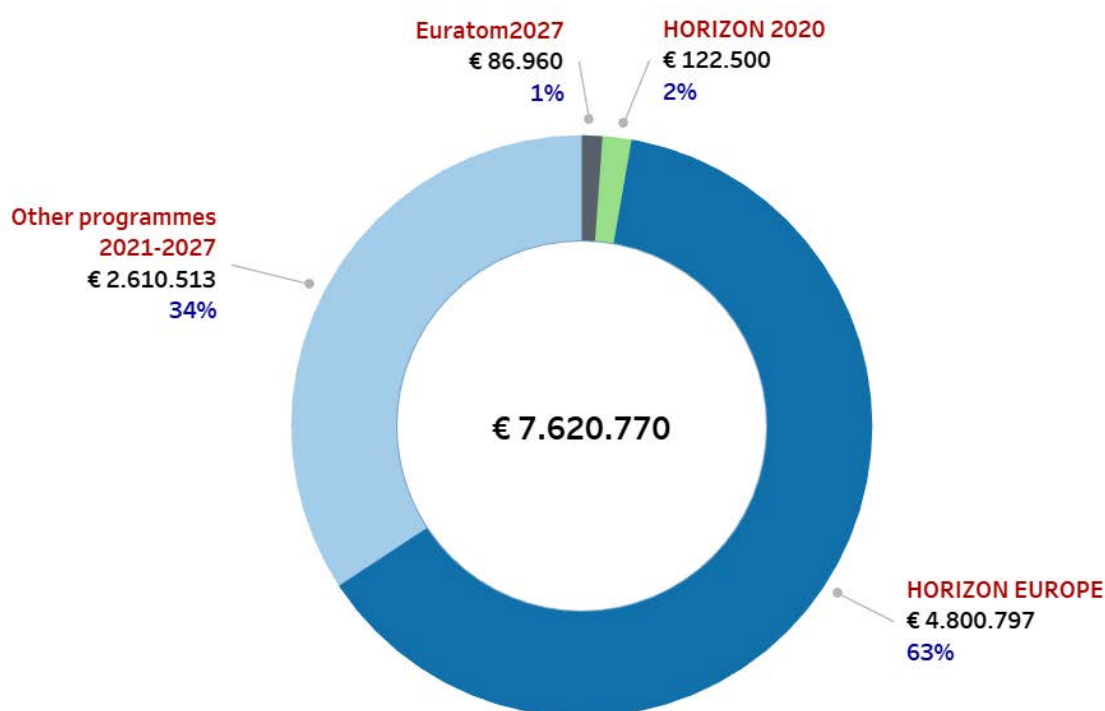
### 3. Contratti stipulati nel 2023

Nel 2023, complessivamente, l'ENEA ha stipulato con la Commissione Europea (CE) 29 contratti, relativi ad altrettanti progetti cofinanziati nell'ambito di programmi diversi, per un contributo totale assegnato all'ENEA di circa 7,6 milioni di euro, da ripartire nell'arco di validità pluriennale di ciascun contratto. Tale importo risulta nella media dei contributi acquisiti dall'Agenzia relativi agli ultimi tre cicli di programmazione europea: 10,1 milioni di euro/anno nel periodo 2014-2021, 9,5 milioni di euro/anno nella programmazione 2007-2013 e 5,9 milioni di euro/anno in quella 2000-2006.

Il contributo acquisito dall'ENEA nel 2023 deriva dai programmi Horizon Europe per il 63% e da altri programmi diversi da Horizon Europe (*LIFE2027, UCPM2027, EDF, Interreg Central Europe2027, Erasmus+*) per il 34% (Figura 3).

Figura 3

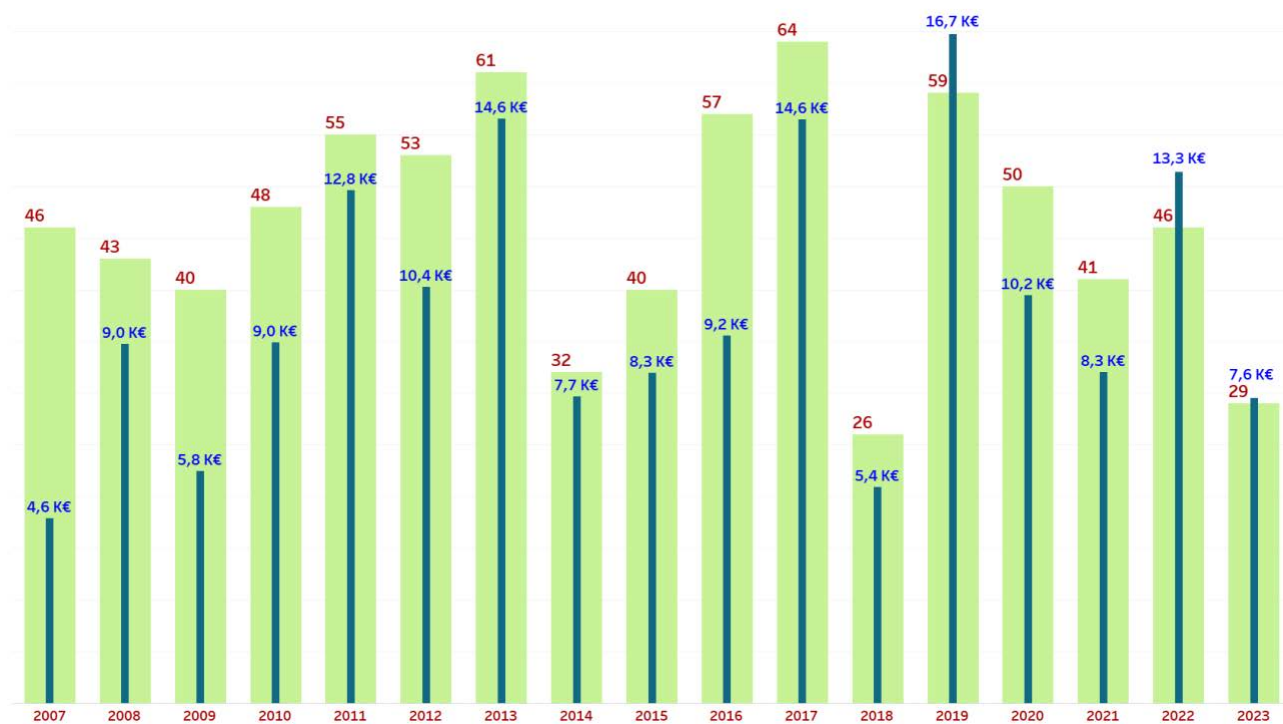
Contratti stipulati nel 2023, ripartizione percentuale per programma del contributo acquisito dall'ENEA per l'intero periodo di validità contrattuale



La Figura 4 mostra complessivamente il numero di progetti stipulati ed il contributo acquisito dall'ENEA dal 2007 al 2023; il numero di progetti finanziati e l'entità del contributo all'ENEA per anno sono influenzati anche dal susseguirsi delle scadenze dei bandi e dal budget stanziato dai singoli programmi.

Figura 4

Numero di contratti stipulati dal 2007 al 2023 e relativo contributo all'ENEA

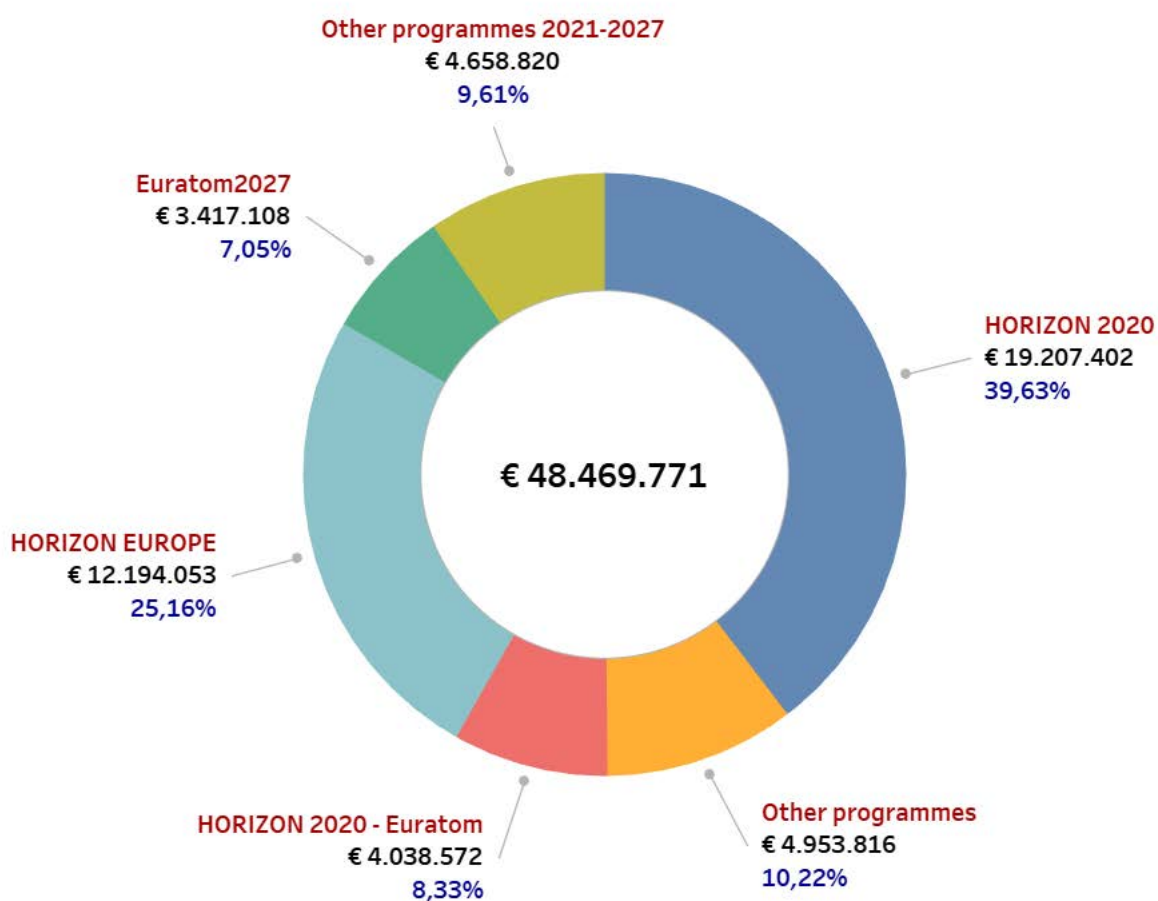


## 4. Contratti in corso nel 2023

Le attività dell'ENEA in corso nel 2023, cofinanziate da programmi dell'UE, sono riconducibili a 162 contratti, di cui 29 stipulati nello stesso anno. Il co-finanziamento comunitario totale assegnato all'Agenzia è di circa 48,5 milioni di euro, da ripartire nell'arco pluriennale di validità di ciascun contratto.

Nel corso del 2023 le attività ancora in corso finanziate dalla programmazione europea 2014-2020 sono state affiancate da quelle finanziate attraverso la nuova programmazione 2021-2027 (Horizon Europe, Euratom2027 e Altri Programmi) rappresentando quest'ultima il 41,8% del contributo totale assegnato all'ENEA (Figura 5).

**Figura 5**  
**Contratti in corso nel 2023, ripartizione percentuale del contributo per programma**



## 4.1 Aree tematiche

Allo scopo di fornire ulteriori elementi di analisi, tutti i progetti presenti nella banca dati sono stati classificati anche in base all'area tematica in cui ricade l'attività progettuale, identificata indipendentemente dallo strumento di finanziamento.

La [Figura 6](#) mostra l'aggregazione per aree tematiche dei progetti in corso nel 2023 ed evidenzia che circa il 43,8% del contributo ottenuto dall'Agenzia deriva da progetti ricadenti nell'area energia, a cui seguono le aree Scienze della vita (11,6%) e Ambiente (10,4%).

Per quanto attiene alla sola area Energia, oltre il 35% del relativo contributo ricevuto dall'ENEA proviene da progetti nel settore delle Rinnovabili, il 26% dal settore della Fissione, il 22% dal settore efficienza energetica e il 7,6% dal settore della fusione ([Figura 7](#)).

Con riferimento all'area tematica Ambiente, il 60% del contributo assegnato all'Agenzia deriva da progetti nel settore del Cambiamento Climatico e circa il 20% da quelli relativi alla Qualità dell'aria ([Figura 8](#)).

**Figura 6**

**Contratti in corso nel 2023, ripartizione percentuale del contributo per aree tematiche**

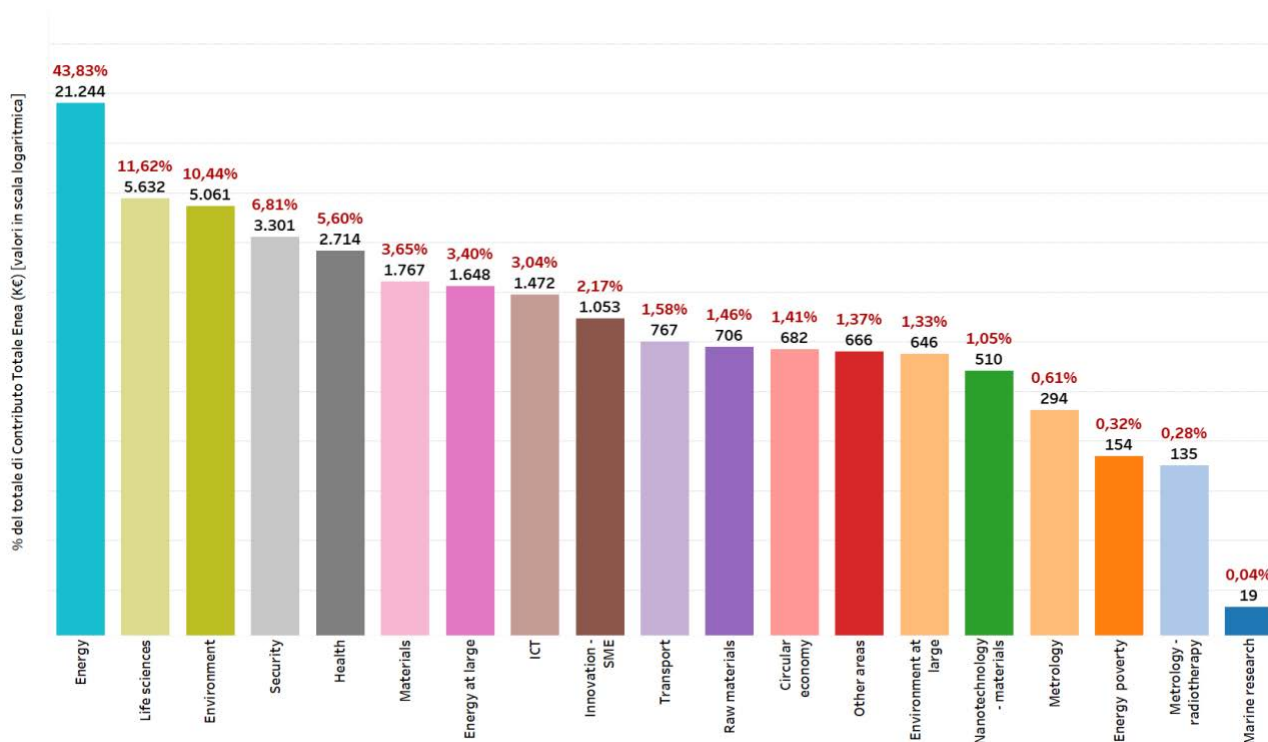


Figura 7

Contratti in corso nel 2023, ripartizione percentuale del contributo, area tematica "Energy"

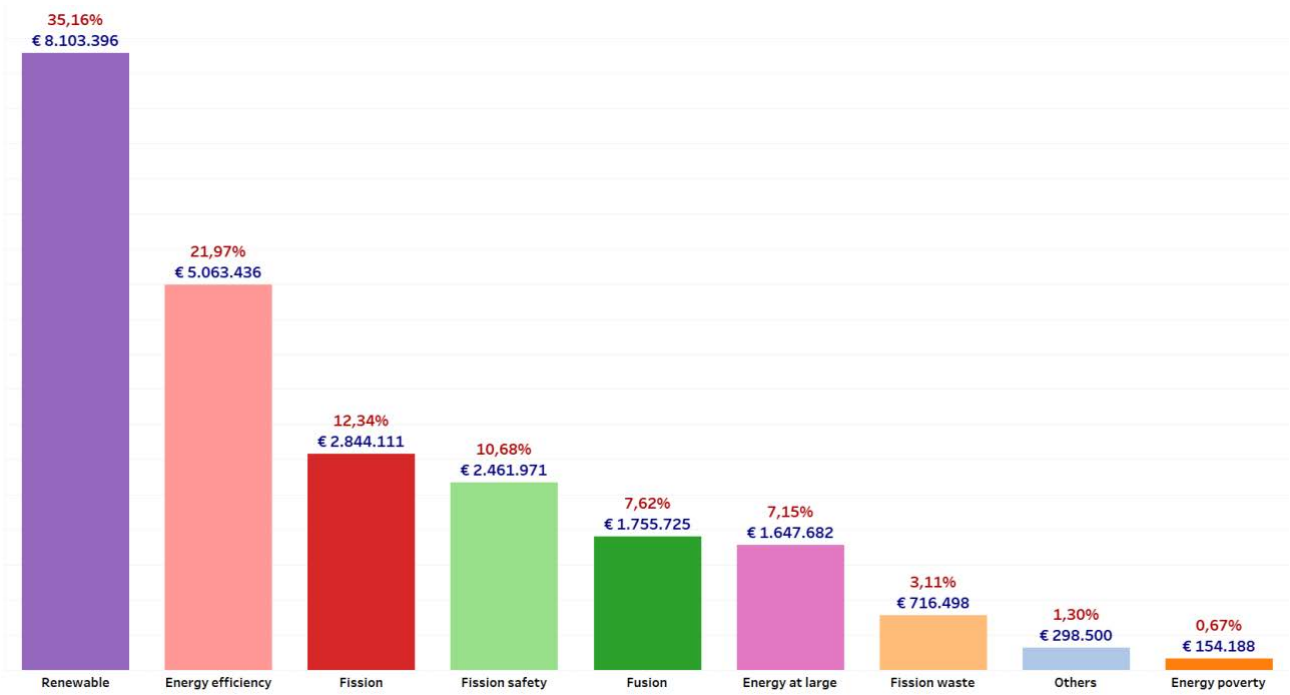
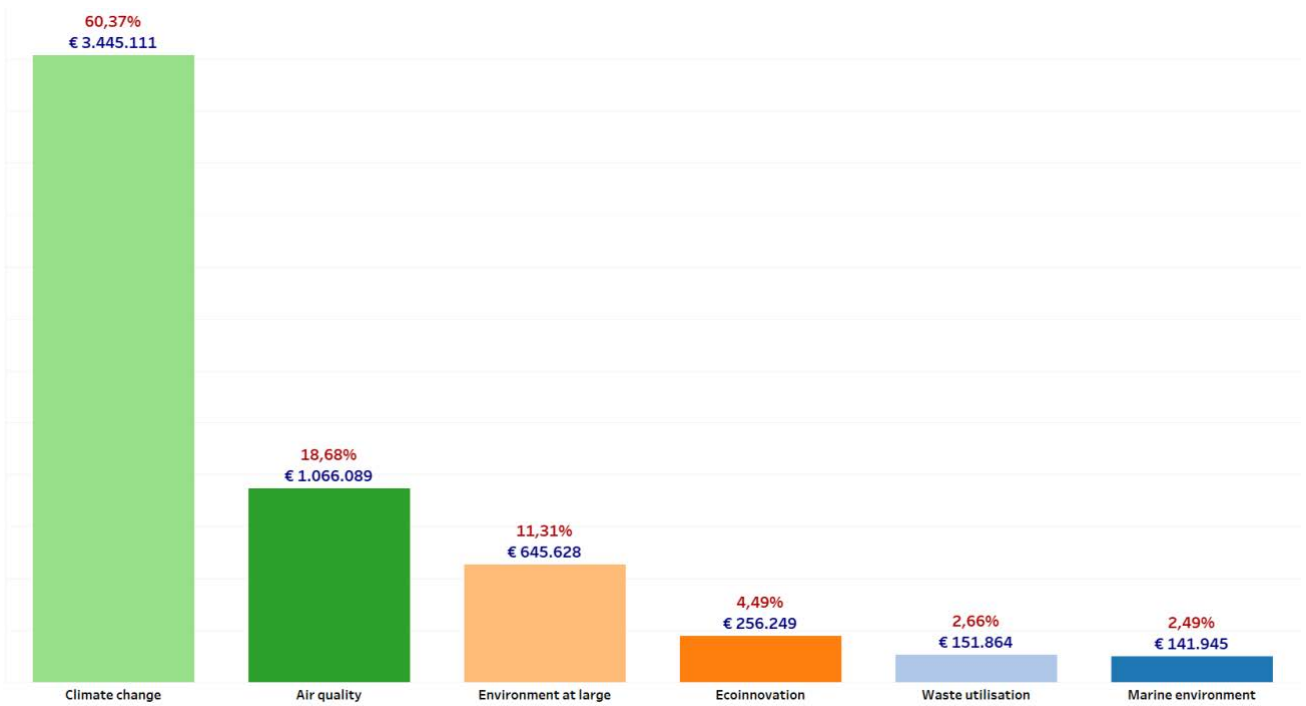


Figura 8

Contratti in corso nel 2023, ripartizione percentuale del contributo, area tematica "Environment"



## 4.2 Partenariato

I progetti finanziati da programmi dell'Unione Europea sono tipicamente multi-partner e transnazionali e, nei Programmi Quadro, i requisiti minimi di partecipazione prevedono almeno tre partner di tre diversi Stati membri o Stati associati, con alcune eccezioni per azioni specifiche.

Le organizzazioni di Paesi membri dell'Unione Europea ricevono dall'UE il co-finanziamento previsto dalla tipologia di azione, così come i partecipanti dei Paesi che hanno concluso un accordo di associazione al Programma Quadro<sup>4</sup>. Un partner di un Paese Terzo non associato, invece, non accede al finanziamento UE ma, in alcuni casi, sono i governi dei Paesi Terzi a sostenerne la partecipazione. Inoltre, un Paese Terzo può essere finanziato dall'UE soltanto se è considerato a reddito medio-basso, se è stato previsto nel programma di lavoro e se la partecipazione del soggetto è considerata dalla CE essenziale per l'esecuzione del progetto.

Nel 2023 l'ENEA ha partecipato a 162 progetti, che hanno coinvolto complessivamente circa 1500 partner di 58 diversi Paesi e organizzazioni internazionali per più di 2500 partecipazioni (Tabella 1) e le mappe mostrano la distribuzione geografica dei partner dell'ENEA nei progetti in corso nel 2023 (Figure 9, 10, 11,12).

La Tabella 1 riporta il numero di contratti, di partner e di partecipazioni per Paese; i Paesi con il maggior numero di partecipazioni, dopo l'Italia (390), sono la Germania (273), la Francia (259), la Spagna (224) e il Belgio (165).

Tra i Paesi candidati all'adesione all'UE, e già associati a Horizon Europe, Ucraina e Turchia sono quelli con cui l'ENEA collabora maggiormente (15 e 14 partecipazioni rispettivamente); la Serbia ha 10 partecipazioni, la Bosnia-Erzegovina 3, Albania e Moldavia 2 ciascuno, il Montenegro una.

Nell'area mediterranea non UE, Israele conta 7 partecipazioni; la Tunisia è presente con 5 partecipazioni, il Marocco e l'Algeria con 4 e 3 rispettivamente, seguiti da Giordania, Libano e Siria con una partecipazione ciascuno.

In quest'area è attivo in particolare il progetto meetMED iniziato nel 2018 e che prosegue fino al 2024 con meetMEED II. Coordinato dall'Associazione MEDENER, di cui l'ENEA ha la Presidenza, il progetto ha l'obiettivo di facilitare la transizione energetica nei Paesi euro-mediterranei attraverso un sensibile incremento delle fonti rinnovabili e dell'efficienza energetica nel mix energetico dell'area entro il 2040.

Tra i Paesi europei extra UE, le collaborazioni più numerose (99) sono con il Regno Unito, associato a Horizon Europe dal 1° gennaio 2024, seguito dalla Svizzera (ad oggi associata a H2020 ma non ancora a Horizon Europe) e dalla Norvegia, associata a entrambi i Programmi Quadro (rispettivamente 75 e 42 partecipazioni); seguono l'Islanda (con 2 partecipazioni) e, infine, la Russia (1 progetto).

Numerose sono anche le collaborazioni con il resto del mondo: Stati Uniti d'America (6 partecipazioni), Cina (4 partecipazioni), Corea del Sud, Canada, Giappone e Taiwan (3 partecipazioni ciascuno), Australia e Perù (entrambi con 2 partecipazioni), Cile, Ruanda e Sudafrica (1 progetto ciascuno).

Per quanto riguarda, invece, la ripartizione geografica dei partner italiani dell'ENEA (Figura 13), il Lazio è la regione con il maggior numero di partecipazioni (121), seguita da Lombardia (53), Piemonte (29), Toscana (27), Emilia-Romagna (25), Campania (22), Veneto (21) e Puglia (20).

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<sup>4</sup> [Updates on the association of third countries to Horizon Europe](#)



Con riferimento alla tipologia dei partner, tra quelli italiani dell'ENEA le industrie rappresentano il 21,9%, seguiti dai centri di ricerca (21%) e dalle università e dagli istituti di alta formazione (13,7%).

Secondo i requisiti stabiliti dalla UE<sup>5</sup>, le piccole e medie imprese (PMI) costituiscono circa il 4,7% dei partner italiani.

La rete di relazioni che l'ENEA ha stabilito a livello internazionale è significativa anche riguardo alla tipologia di attività dei partner: le organizzazioni di ricerca rappresentano il 29,4% del partenariato internazionale, seguiti dalle università e istituti di alta formazione (19,1%), dalle industrie (14,3%) e dai partner pubblici (11,4%). Tra le altre tipologie di partner, le PMI si assestano su una presenza del 4,3% (Figura 14).

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<sup>5</sup> La categoria delle microimprese, delle piccole imprese e delle medie imprese (PMI) è costituita da imprese che occupano meno di 250 persone, il cui fatturato annuo non supera i 50 milioni di EUR e/o il cui totale di bilancio annuo non supera i 43 milioni di EUR (estratto dell'articolo 2 dell'allegato alla raccomandazione 2003/361/CE).

**Tabella 1**

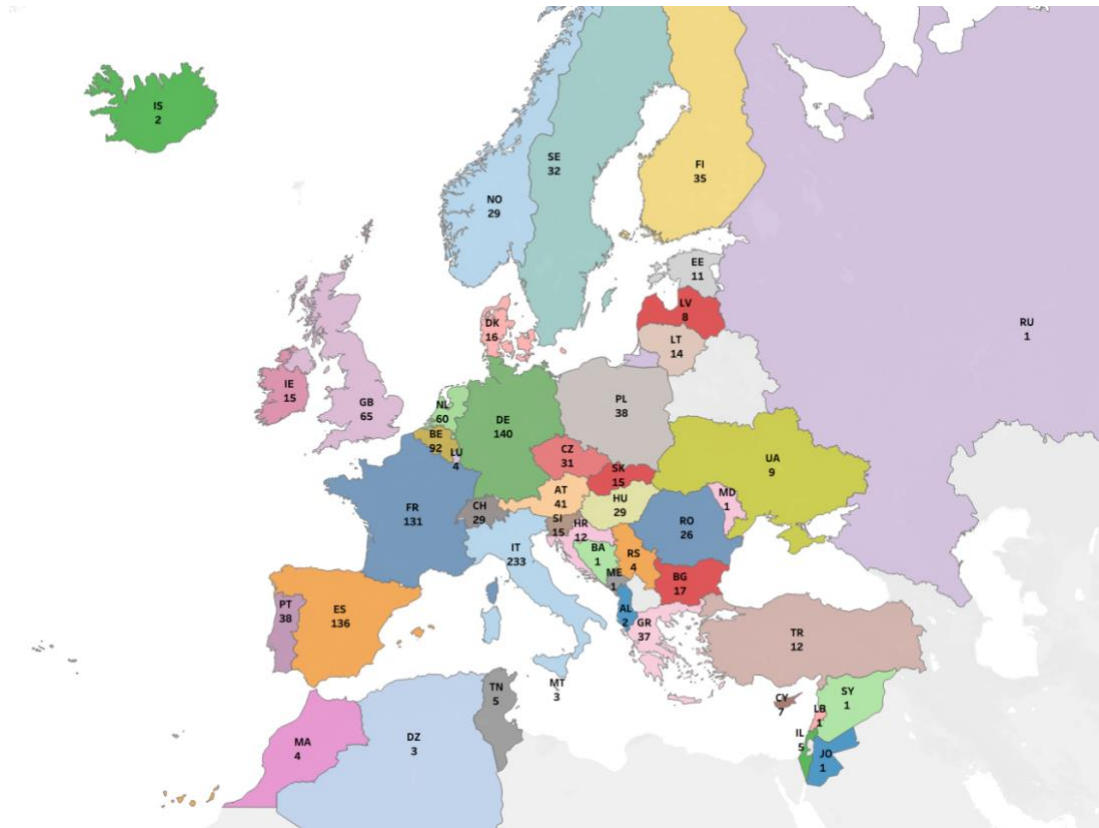
**Contratti in corso nel 2023, numero di contratti, partner e partecipazioni per Paese (escluso l'ENEA)**

| Gruppi Paesi (politico)      | Paese                 | N. Contratti | N. Partner  | N. Partecipazioni |
|------------------------------|-----------------------|--------------|-------------|-------------------|
| <b>Totale complessivo</b>    |                       | <b>162</b>   | <b>1455</b> | <b>2563</b>       |
| <b>Membri UE</b>             | Austria               | 47           | 41          | 65                |
|                              | Belgio                | 87           | 92          | 165               |
|                              | Bulgaria              | 20           | 17          | 22                |
|                              | Cipro                 | 10           | 7           | 10                |
|                              | Croazia               | 15           | 12          | 20                |
|                              | Danimarca             | 26           | 16          | 32                |
|                              | Estonia               | 11           | 11          | 14                |
|                              | Finlandia             | 51           | 35          | 79                |
|                              | Francia               | 98           | 131         | 259               |
|                              | Germania              | 121          | 140         | 273               |
|                              | Grecia                | 45           | 37          | 67                |
|                              | Irlanda               | 18           | 15          | 20                |
|                              | Italia                | 118          | 233         | 390               |
|                              | Lettonia              | 11           | 8           | 11                |
|                              | Lituania              | 22           | 14          | 24                |
|                              | Lussemburgo           | 6            | 4           | 6                 |
|                              | Malta                 | 6            | 3           | 6                 |
|                              | Paesi Bassi           | 63           | 60          | 108               |
|                              | Polonia               | 48           | 38          | 64                |
|                              | Portogallo            | 40           | 38          | 61                |
| Repubblica Ceca              | 50                    | 31           | 71          |                   |
| Romania                      | 35                    | 26           | 48          |                   |
| Slovacchia                   | 18                    | 15           | 19          |                   |
| Slovenia                     | 28                    | 15           | 33          |                   |
| Spagna                       | 96                    | 136          | 224         |                   |
| Svezia                       | 46                    | 32           | 67          |                   |
| Ungheria                     | 30                    | 29           | 43          |                   |
| <b>Candidati adesione UE</b> | Albania *             | 2            | 2           | 2                 |
|                              | Bosnia-Erzegovina     | 3            | 1           | 3                 |
|                              | Moldavia *            | 2            | 1           | 2                 |
|                              | Montenegro *          | 1            | 1           | 1                 |
|                              | Serbia *              | 10           | 4           | 10                |
|                              | Turchia *             | 13           | 12          | 14                |
|                              | Ucraina *             | 11           | 9           | 15                |
| <b>Mediterraneo non UE</b>   | Algeria               | 2            | 3           | 3                 |
|                              | Giordania             | 1            | 1           | 1                 |
|                              | Israele *             | 4            | 5           | 7                 |
|                              | Libano                | 1            | 1           | 1                 |
|                              | Marocco               | 3            | 4           | 4                 |
|                              | Siria                 | 1            | 1           | 1                 |
|                              | Tunisia *             | 4            | 5           | 5                 |
| <b>Europei non UE</b>        | Islanda *             | 2            | 2           | 2                 |
|                              | Norvegia *            | 32           | 29          | 42                |
|                              | Regno Unito           | 51           | 65          | 99                |
|                              | Russia                | 1            | 1           | 1                 |
|                              | Svizzera              | 52           | 29          | 75                |
| <b>Resto del mondo</b>       | Australia             | 2            | 2           | 2                 |
|                              | Canada                | 3            | 3           | 3                 |
|                              | Cile                  | 1            | 1           | 1                 |
|                              | Cina                  | 3            | 4           | 4                 |
|                              | Corea del Sud         | 3            | 3           | 3                 |
|                              | Giappone              | 3            | 3           | 3                 |
|                              | Peru'                 | 2            | 2           | 2                 |
|                              | Ruanda                | 1            | 1           | 1                 |
|                              | Stati Uniti D'america | 5            | 6           | 6                 |
|                              | Sudafrica             | 1            | 1           | 1                 |
|                              | Taiwan                | 2            | 2           | 3                 |
| <b>Organ. Internazionali</b> | Organ. Internazionali | 32           | 15          | 45                |

\* Paesi Terzi associati a Horizon Europe

**Figura 9**

**Contratti in corso nel 2023, partner del continente europeo e dell'area mediterranea**

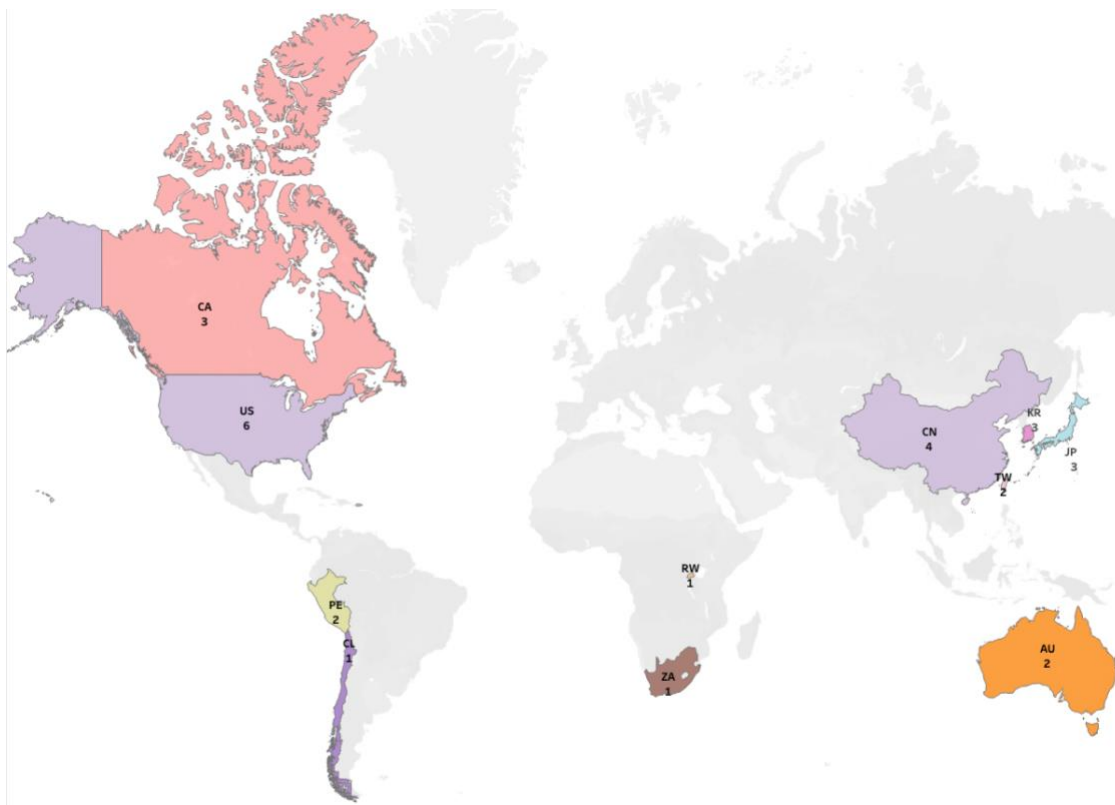


**Figura 10**

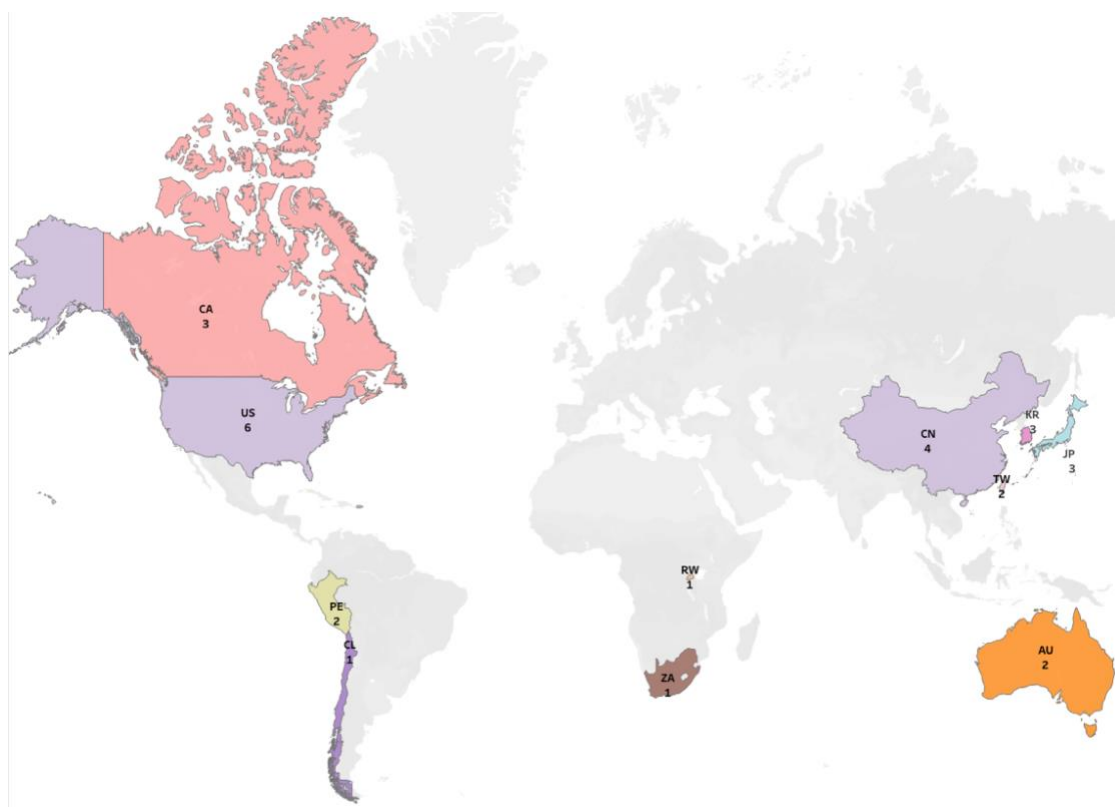
**Contratti in corso nel 2023, partecipazioni di partner del continente europeo e dell'area mediterranea**



**Figura 11**  
**Contratti in corso nel 2023, partner del resto del mondo**



**Figura 12**  
**Contratti in corso nel 2023, partecipazioni di partner del resto del mondo**



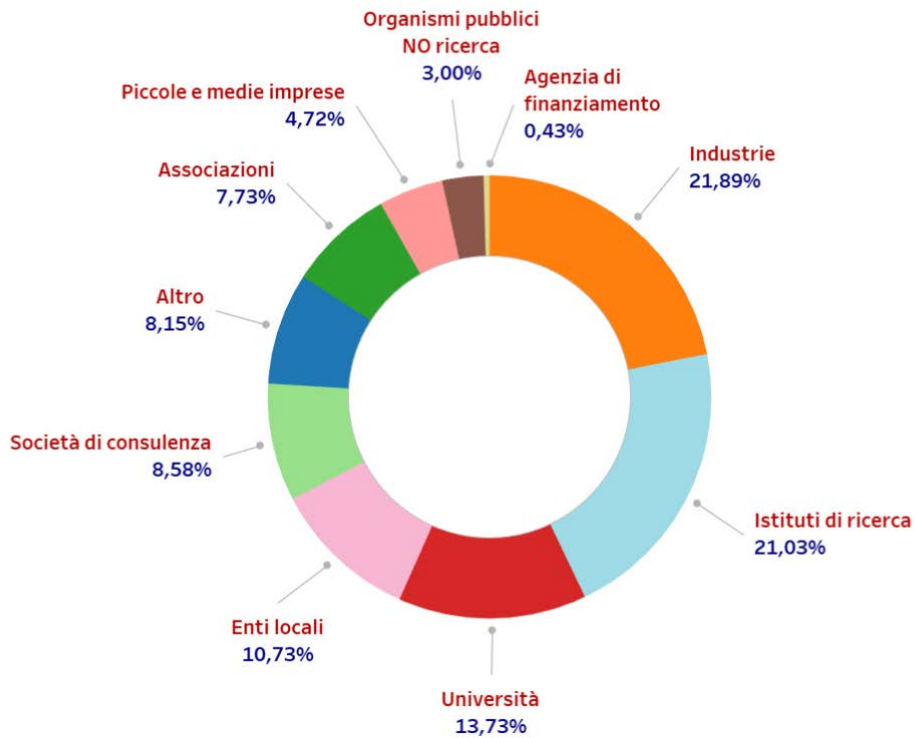
**Figura 13**

**Contratti in corso nel 2023, partecipazioni e partner italiani per regione**

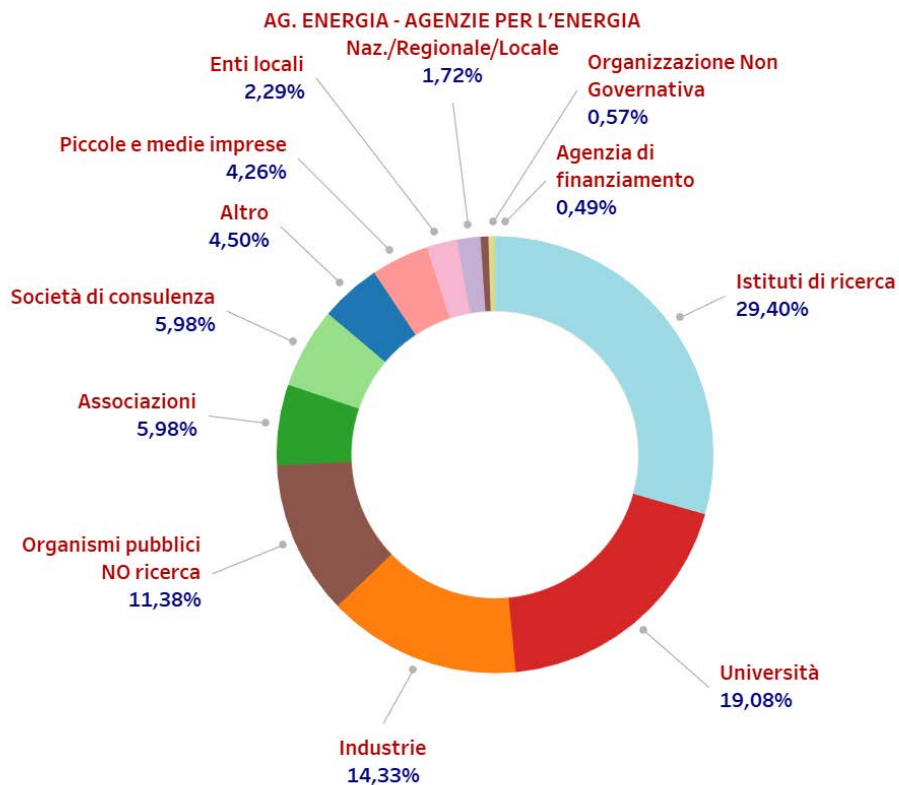


**Figura 14**  
**Contratti in corso nel 2023 - Tipologia dei partner**

Tipologia dei partner italiani dell'ENEA



Tipologia dei partner internazionali dell'ENEA



### 4.3 Coordinamento

Nel 2023 i progetti coordinati dall'ENEA sono stati 17, pari al 10,4% dei 162 in corso nell'anno a cui l'Agenzia partecipa. Il budget complessivo dei progetti coordinati si aggira attorno ai 74 milioni di euro, di cui circa 9 milioni di euro assegnati all'ENEA.

La **Tabella 2** mostra l'elenco dei progetti a coordinamento dell'Agenzia in corso nel 2023, indicando per ciascuno il programma di finanziamento e l'area tematica in cui ricade l'attività. Ulteriori informazioni di dettaglio sono disponibili nelle schede sintetiche di ciascun progetto (Allegato 1).

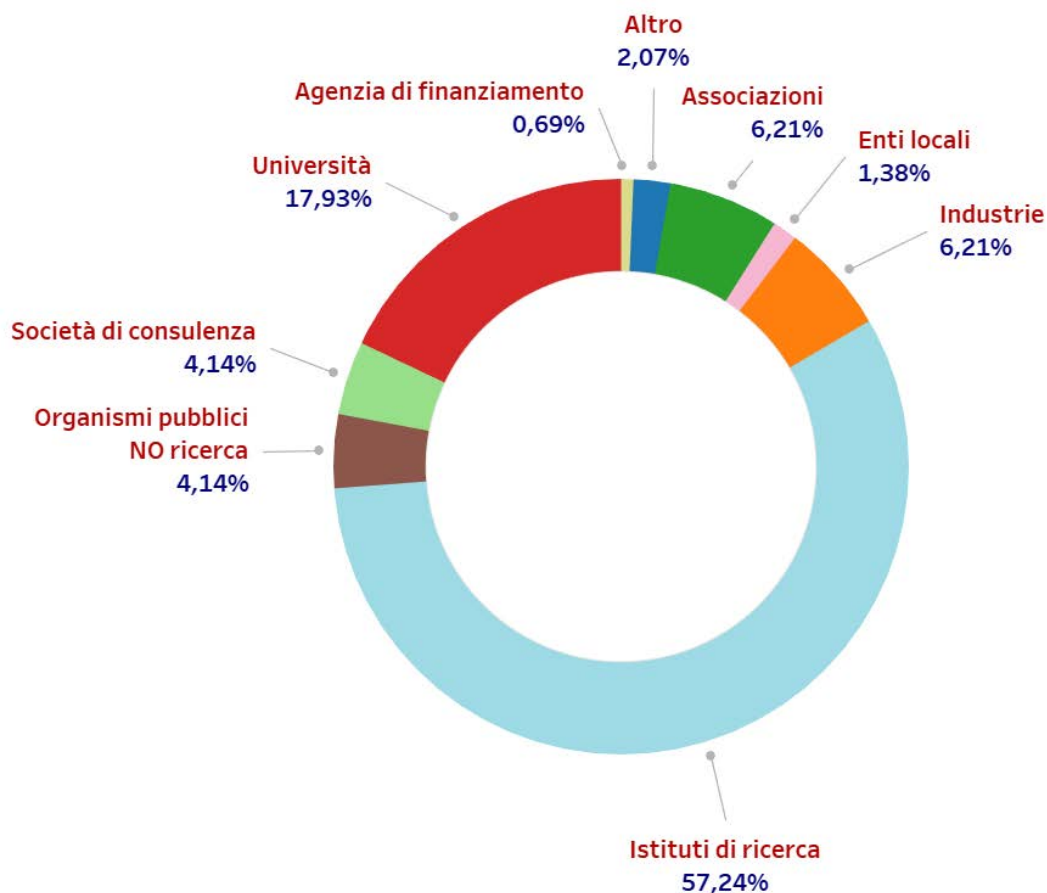
**Tabella 2**  
**Contratti in corso nel 2023 a coordinamento ENEA**

| PQ                                | Anno Stipula | Data Fine  | Acronimo                    | Area Tematica                | Programma UE   | Costo Totale Progetto | Contributo Totale Progetto |
|-----------------------------------|--------------|------------|-----------------------------|------------------------------|--|-----------------------|----------------------------|
| <b>HORIZON EUROPE</b>             | 2022         | 31/08/2025 | REPRODIVAC                  | Life sciences                | Cluster 6 - Food, Bioeconomy, Natural Resources, Agriculture and Environment | 3.136.284,00 €        | 3.125.324,00 €             |
|                                   | 2023         | 31/12/2025 | EIT Raw materials FENICE_23 | Raw materials                | EIT - Raw Materials KIC  | 2.996.579,00 €        | 2.094.683,00 €             |
|                                   | 2023         | 30/06/2025 | PRO-GRACE                   | Life sciences - food genetic | Research Infrastructures (2021-2027)   | 2.847.250,00 €        | 2.847.250,00 €             |
| <b>Euratom2027</b>                | 2022         | 30/09/2026 | SASPAM-SA                   | Energy - fission             | Euratom fissione   | 4.276.039,00 €        | 2.991.694,00 €             |
| <b>HORIZON 2020</b>               | 2020         | 31/08/2023 | LEAP4SME                    | Energy - efficiency          | Energy   | 1.895.028,00 €        | 1.895.028,00 €             |
|                                   |              | 31/10/2024 | eNeuron                     | Energy at large              | Energy   | 6.319.693,00 €        | 5.731.118,00 €             |
|                                   | 2021         | 29/02/2024 | GREENROAD                   | Energy - efficiency          | Energy   | 1.186.126,00 €        | 1.186.126,00 €             |
|                                   | 2021         | 31/10/2024 | RISEUP                      | Health                       | Future and Emerging Technologies (FET)                                       | 2.999.836,00 €        | 2.999.836,00 €             |
|                                   | 2021         | 31/03/2024 | TEXTAROSSA                  | ICT                          | JTI - EuroHPC  | 6.012.709,00 €        | 2.051.376,00 €             |
|                                   | 2021         | 30/06/2024 | PROMETEO                    | Energy - renewable           | JTI - Hydrogen   | 2.765.206,00 €        | 2.499.531,00 €             |
|                                   |              | 31/08/2024 | SO-FREE                     | Energy - renewable           | JTI - Hydrogen   | 3.045.355,00 €        | 2.739.094,00 €             |
|                                   | 2019         | 31/07/2024 | INCLUDING                   | Energy - fission safety      | Secure societies   | 3.585.529,00 €        | 3.585.529,00 €             |
|                                   | 2020         | 30/06/2024 | RISEN                       | Security                     | Secure societies   | 6.995.876,00 €        | 6.995.876,00 €             |
| <b>HORIZON 2020 - Euratom</b>     | 2020         | 31/10/2024 | PASCAL                      | Energy - fission safety      | Euratom fissione   | 4.610.189,00 €        | 3.799.238,00 €             |
|                                   | 2020         | 13/04/2024 | F4E-FPA-327-SG07            | Energy - fusion              | F4E - Fusion for energy  | 4.155.088,00 €        | 1.819.126,00 €             |
| <b>Other programmes</b>           | 2019         | 30/04/2023 | LIFE MAGIS                  | Environment - ecoinnovation  | LIFE (2014-2020)   | 2.624.168,00 €        | 1.385.942,00 €             |
| <b>Other programmes 2021-2027</b> | 2023         | 29/09/2026 | RescEU-CBRN-DSIM-IT         | Security                     | UCPM - Union Civil Protection Mechanism                                      | 26.701.048,00 €       | 26.701.048,00 €            |

Con riferimento, invece, ai progetti a cui l'ENEA partecipa come partner, il 57,2% sono coordinati da organizzazioni di ricerca, circa il 18% da università e istituti di alta formazione e il 6% da industrie (**Figura 15**).

Figura 15

Contratti in corso nel 2023, ripartizione percentuale per tipologia dei coordinatori



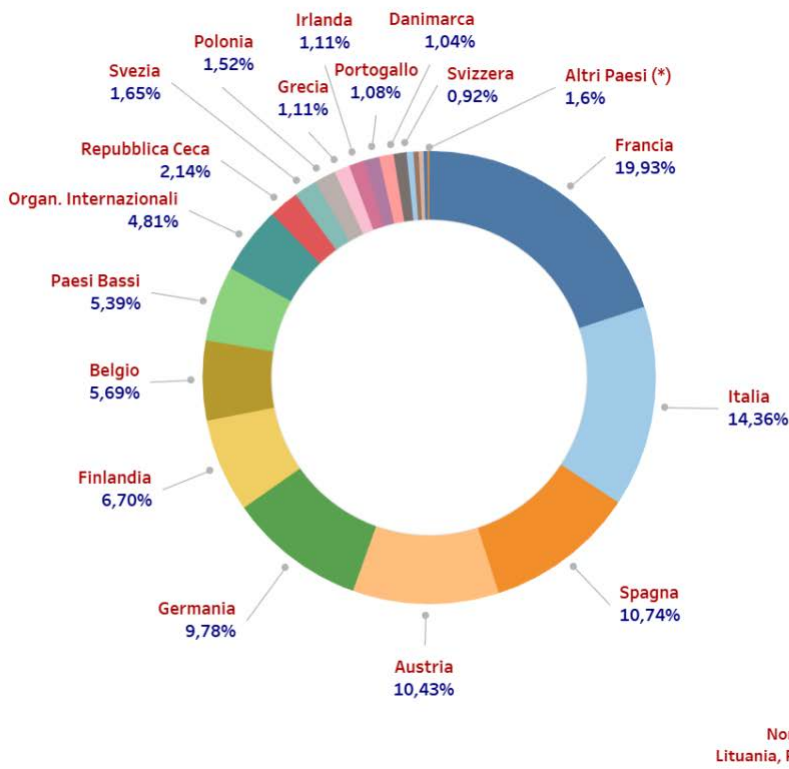
Con riferimento al contributo totale assegnato ai progetti (Figura 16), i coordinatori francesi gestiscono il budget maggiore (19,93%), seguiti da italiani (14,36%), spagnoli (10,74%), austriaci (10,43%) e tedeschi (9,78%).

In termini di numero di progetti (Figura 17), le organizzazioni italiane coordinano la quota maggiore (19%), seguite dai partecipanti francesi (14,48%), spagnoli (11,72%), tedeschi (11,72%) e da quelli di Belgio (6,21%) e Paesi Bassi (6,21%). Da segnalare la costante discesa, dal 2016, del numero di progetti a coordinamento britannico a causa del compimento della *Brexit*: nel 2016 l'11% dei progetti a partecipazione ENEA in corso nell'anno erano coordinati da organizzazioni del Regno Unito e nel 2019 e nel 2020 tale percentuale è scesa al 4%, arrivando al 2% nel 2021 e ad un solo progetto nel 2022. Il 2023 è caratterizzato dalla totale assenza di progetti coordinati da soggetti del Regno Unito.



**Figura 16**

**Contratti in corso nel 2023, ripartizione percentuale del contributo totale per Paese dei coordinatori (esclusi i progetti coordinati da ENEA)**

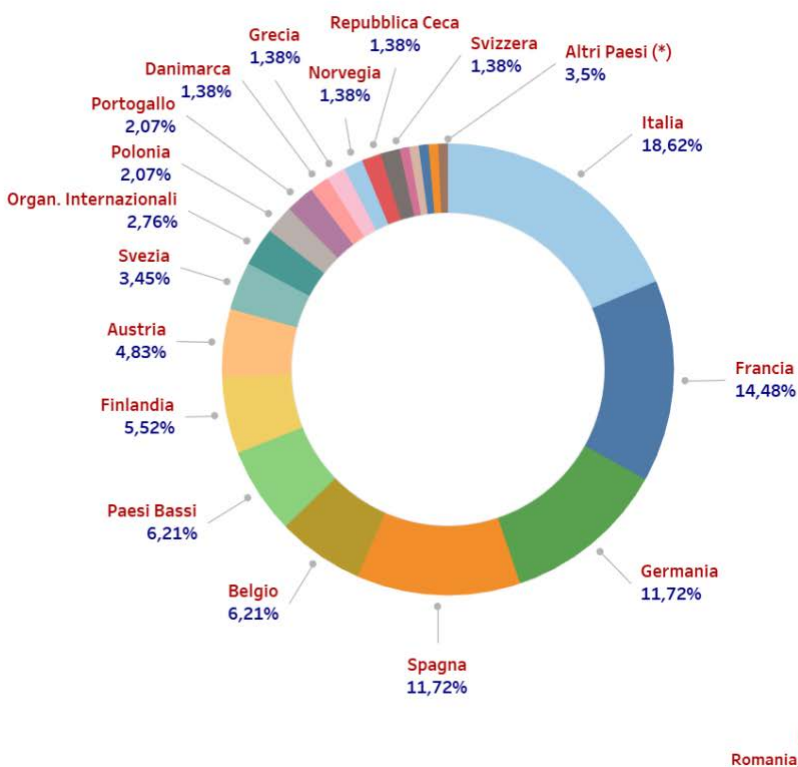


| Paese                 | RFI    |
|-----------------------|--------|
| Francia               | 19,93% |
| Italia                | 14,36% |
| Spagna                | 10,74% |
| Austria               | 10,43% |
| Germania              | 9,78%  |
| Finlandia             | 6,70%  |
| Belgio                | 5,69%  |
| Paesi Bassi           | 5,39%  |
| Organ. Internazionali | 4,81%  |
| Repubblica Ceca       | 2,14%  |
| Svezia                | 1,65%  |
| Polonia               | 1,52%  |
| Grecia                | 1,11%  |
| Irlanda               | 1,11%  |
| Portogallo            | 1,08%  |
| Danimarca             | 1,04%  |
| Svizzera              | 0,92%  |
| Norvegia              | 0,48%  |
| Slovenia              | 0,37%  |
| Lituania              | 0,35%  |
| Romania               | 0,28%  |
| Serbia                | 0,12%  |

% del totale Contributo Progetto  
0,12% 19,93%

**Figura 17**

**Contratti in corso nel 2023, ripartizione percentuale del numero di progetti per Paese dei coordinatori (esclusi i progetti coordinati da ENEA)**



| Paese                 | RFI    |
|-----------------------|--------|
| Italia                | 18,62% |
| Francia               | 14,48% |
| Germania              | 11,72% |
| Spagna                | 11,72% |
| Belgio                | 6,21%  |
| Paesi Bassi           | 6,21%  |
| Finlandia             | 5,52%  |
| Austria               | 4,83%  |
| Svezia                | 3,45%  |
| Organ. Internazionali | 2,76%  |
| Polonia               | 2,07%  |
| Portogallo            | 2,07%  |
| Danimarca             | 1,38%  |
| Grecia                | 1,38%  |
| Norvegia              | 1,38%  |
| Repubblica Ceca       | 1,38%  |
| Svizzera              | 1,38%  |
| Irlanda               | 0,69%  |
| Lituania              | 0,69%  |
| Romania               | 0,69%  |
| Serbia                | 0,69%  |
| Slovenia              | 0,69%  |

% del totale Contratti  
0,69% 18,62%

Si osserva, pertanto, che, rispetto ai contratti in corso nel 2022, il posizionamento risulta invariato in termini di progetti gestiti da coordinatori italiani, mentre l'ammontare medio del contributo ai medesimi, risulta notevolmente accresciuto, benché ancora di poco inferiore rispetto a quello dei progetti a coordinamento francese.

Nella [Tabella 3](#) sono elencati i coordinatori per Paese, ad esclusione dell'ENEA, e i relativi progetti.

**Tabella 3**  
**Contratti in corso nel 2023, coordinatori per Paese (ENEA escluso)**

| PAESE   | NOME PARTNER  | TIPOLOGIA                     | AREA TEMATICA                | ACRONIMO PROGETTO          | PROGRAMMA QUADRO           | PROGRAMMA UE   |
|---|---|-------------------------------|------------------------------|----------------------------|----------------------------|--|
| <b>AUSTRIA</b>                                      | AIT - AUSTRIAN INSTITUTE OF TECHNOLOGY  | ISTITUTI DI RICERCA           | ENERGY - TRANSPORT           | 3BELIEVE                   | HORIZON 2020               | ENERGY   |
|   |   |                               | ENVIRONMENT - CLIMATE CHANGE | KNOWING                    | HORIZON EUROPE             | CLUSTER 5 - D1 CLIMATE SCIENCES  |
|   | AVL LIST GMBH   | INDUSTRIE                     | ENERGY - RENEWABLE           | FUELSOME                   | HORIZON EUROPE             | CLUSTER 5 - D2 CROSS-CUTTING SOLUTIONS                                       |
|   | BMK - FEDERAL MINISTRY FOR CLIMATE ACTION, ENVIRONMENT, ENERGY, MOBILITY, INNOVATION AND TECHNOLOGY | ORGANISMI PUBBLICI NO RICERCA | URBAN DEVELOPMENT            | DUT                        | HORIZON EUROPE             | CLUSTER 5 - D2 CROSS-CUTTING SOLUTIONS                                       |
|   | IIASA - INTERNATIONAL INSTITUTE FOR APPLIED SYSTEMS ANALYSIS  | ISTITUTI DI RICERCA           | ENVIRONMENT - CLIMATE CHANGE | FORESTNAVIGATOR            | HORIZON EUROPE             | CLUSTER 5 - D1 CLIMATE SCIENCES  |
|   | RTDS ASSOCIATION  | SOCIETÀ DI CONSULENZA         | LIFE SCIENCES                | FNS-CLOUD                  | HORIZON 2020               | FOOD SECURITY, SUSTAINABLE AGRICULTURE AND THE BIOECONOMY                    |
| UNIV. TECHNICAL WIEN                                | UNIVERSITÀ  | ENERGY - EFFICIENCY           | LIFE22-CET-EPBD.WISE         | OTHER PROGRAMMES 2021-2027 | LIFE (2021-2027)           |  |
| <b>BELGIO</b>                                       | ASSOCIATION EUROPEENNE DE L   | ASSOCIAZIONI                  | ENERGY - RENEWABLE           | SEETIP OCEAN               | HORIZON EUROPE             | CLUSTER 5 - D3 ENERGY SUPPLY   |
|   | ESTELA EUROPEAN SOLAR THERMAL ELECTRICITY ASSOCIATION   | ASSOCIAZIONI                  | ENERGY - SOLAR               | CST4ALL                    | HORIZON EUROPE             | CLUSTER 5 - D3 ENERGY SUPPLY   |
|   | ETN - EUROPEAN TURBINE NETWORK A.I.S.B.L  | ASSOCIAZIONI                  | ENERGY - RENEWABLE           | CO2OLHEAT                  | HORIZON 2020               | ENERGY   |
|   | IBF - INTERNATIONAL CONSULTING SA   | SOCIETÀ DI CONSULENZA         | ENERGY - EFFICIENCY          | ALGERIA                    | OTHER PROGRAMMES           | ENI - EUROPEAN NEIGHBOURHOOD INSTRUMENTS (2014-2020)                         |
|   | SCK CEN - STUDIECENTRUM VOOR KERNENERGIE / CENTRE D'ETUDE DE L'ENERGIE NUCLEAIRE                    | ISTITUTI DI RICERCA           | ENERGY - FISSION             | PATRICIA                   | HORIZON 2020 - EURATOM     | EURATOM FISSIONE   |
|   |   |                               | ENERGY - FISSION SAFETY      | ANSELMUS                   | EURATOM2027                | EURATOM FISSIONE   |
|   |   |                               | ENERGY - FISSION WASTE       | HARPERS                    | EURATOM2027                | EURATOM FISSIONE   |
|   | TWINDS  | ALTRO                         | LIFE SCIENCES - FOOD SAFETY  | DRG4FOOD                   | HORIZON EUROPE             | CLUSTER 6 - FOOD, BIOECONOMY, NATURAL RESOURCES, AGRICULTURE AND ENVIRONMENT |
| VITO - FLEMISH INSTITUTE FOR TECHNOLOGICAL RESEARCH | ISTITUTI DI RICERCA   | MATERIALS                     | ACROBAT                      | HORIZON 2020               | ERA-MIN3                   |  |
| <b>DANIMARCA</b>                                    | DEA DANISH ENERGY AUTHORITY   | ORGANISMI PUBBLICI NO RICERCA | ENERGY - EFFICIENCY          | LIFE21-CET-CA-CAEPBD6      | OTHER PROGRAMMES 2021-2027 | LIFE (2021-2027)   |
|   | UNIV. AALBORG   | UNIVERSITÀ                    | ENERGY - EFFICIENCY          | E-DYCE                     | HORIZON 2020               | ENERGY   |

| PAESE  | NOME PARTNER                                | TIPOLOGIA   | AREA TEMATICA                           | ACRONIMO PROGETTO         | PROGRAMMA QUADRO                        | PROGRAMMA UE   |   |
|--|---|---|---|---------------------------|---|--|---|
| FINLANDIA  | LUKE - NATURAL RESOURCES INSTITUTE FINLAND  | ISTITUTI DI RICERCA   | LIFE SCIENCES - FOOD INDUSTRY           | DELISOIL                  | HORIZON EUROPE                          | MISSION SOIL   |   |
|  |   |   |   | SIMBA                     | HORIZON 2020                            | FOOD SECURITY, SUSTAINABLE AGRICULTURE AND THE BIOECONOMY          |   |
|  | STUK RADIATION AND NUCLEAR SAFETY AUTHORITY | ISTITUTI DI RICERCA   | METROLOGY                               | GUIDERADPROS              | HORIZON EUROPE                          | EPM - EUROPEAN PARTNERSHIP ON METROLOGY                            |   |
|  |   |   |   | METROLOGY - RADIOTHERAPY  | TRAMEXI                                 | HORIZON EUROPE   | EPM - EUROPEAN PARTNERSHIP ON METROLOGY |
|  | UNIV. OF APPLIED SCIENCES VAASA (VAMK)      | UNIVERSITA  | ENERGY - HYDROGEN                       | H2EXCELLENCE              | OTHER PROGRAMMES 2021-2027              | ERASMUS +  |   |
|  | VTT TECHNICAL RESEARCH CENTRE OF FINLAND    | ISTITUTI DI RICERCA   | ENERGY - FISSION                        | ELSMOR                    | HORIZON 2020 - EURATOM                  | EURATOM FISSIONE   |   |
|  |   |   | ENERGY - FISSION WASTE                  | PREDIS                    | HORIZON 2020 - EURATOM                  | EURATOM FISSIONE   |   |
|  |   |   | LIFE SCIENCES                           | INNCOCELLS                | HORIZON 2020                            | FOOD SECURITY, SUSTAINABLE AGRICULTURE AND THE BIOECONOMY          |   |
|  | FRANCIA                                     | ADEME - AGENCE DE L'ENVIRONNEMENT ET DE L'AMAI TRISE DE L'ENERGIE | ISTITUTI DI RICERCA                     | ENERGY - EFFICIENCY       | LIFE21-CET-POLICY- ODYSSEEMURE FIT-4-55 | OTHER PROGRAMMES 2021-2027   | LIFE (2021-2027)                        |
|  |   | ARGANS LTD  | INDUSTRIE                               | ENVIRONMENT - AIR QUALITY | LIFE AIRFRESH                           | OTHER PROGRAMMES   | LIFE (2014-2020)                        |
| BRGM - BUREAU DE RECHERCHES GEOLOGIQUES ET MINIERES                  |   | ISTITUTI DI RICERCA   | ENVIRONMENT - CLIMATE CHANGE            | COCLICO                   | HORIZON 2020                            | CLIMATE ACTION, ENVIRONMENT, RESOURCE EFFICIENCY AND RAW MATERIALS |   |
| CEA - COMMISSARIAT A L'ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES |   | ISTITUTI DI RICERCA   | ENERGY - FISSION                        | CLEANDEM                  | HORIZON 2020 - EURATOM                  | EURATOM FISSIONE   |   |
|  |   |   |   | ESFR-SIMPLE               | EURATOM2027                             | EURATOM FISSIONE   |   |
|  |   |   |   | PUMMA                     | HORIZON 2020 - EURATOM                  | EURATOM FISSIONE   |   |
|  |   |   |   | TANDEM                    | EURATOM2027                             | EURATOM FISSIONE   |   |
|  |   |   |   | TITANS                    | EURATOM2027                             | EURATOM FISSIONE   |   |
|  |   |   | ENERGY - FISSION SAFETY                 | OPERAHPC                  | EURATOM2027                             | EURATOM FISSIONE   |   |
|  |   |   | ENERGY - PHOTOVOLTAIC                   | EVERPV                    | HORIZON EUROPE                          | CLUSTER 5 - D3 ENERGY SUPPLY                                       |   |
|  |   |   | METROLOGY                               | 19NET04 MIRA              | OTHER PROGRAMMES                        | EMPIR  |   |
|  |   |   | RAW MATERIALS                           | PHOTORAMA                 | HORIZON 2020                            | CLIMATE ACTION, ENVIRONMENT, RESOURCE EFFICIENCY AND RAW MATERIALS |   |
|  |   |   |   | SCREEN2                   | HORIZON 2020                            | CLIMATE ACTION, ENVIRONMENT, RESOURCE EFFICIENCY AND RAW MATERIALS |   |
| CNRS - FRENCH NATIONAL CENTRE FOR SCIENTIFIC RESEARCH                |   | ISTITUTI DI RICERCA   | LIFE SCIENCES                           | AGROSERV                  | HORIZON EUROPE                          | RESEARCH INFRASTRUCTURES (2021-2027)                               |   |
| EDF - ELECTRICITE DE FRANCE SA                                       |   | INDUSTRIE   | ENERGY - FISSION                        | PASTELS                   | HORIZON 2020 - EURATOM                  | EURATOM FISSIONE   |   |
| INRAE - INSTITUT NATIONAL DE RECHERCHE POUR L                        |   | ISTITUTI DI RICERCA   | LIFE SCIENCES - SUSTAINABLE DEVELOPMENT | EJP SOIL                  | HORIZON 2020                            | FOOD SECURITY, SUSTAINABLE AGRICULTURE AND THE BIOECONOMY          |   |

| PAESE      | NOME PARTNER  | TIPOLOGIA                     | AREA TEMATICA                 | ACRONIMO PROGETTO          | PROGRAMMA QUADRO               | PROGRAMMA UE  |
|------------|---|-------------------------------|-------------------------------|----------------------------|--------------------------------|---|
| FRANCIA    | IRSN INSTITUT DE RADIOPROTECTION ET DE SURETE NUCLEAIRE                     | ISTITUTI DI RICERCA           | ENERGY - FISSION              | ASSASS                     | EURATOM2027                    | EURATOM FISSIONE  |
|            |   |                               | ENERGY - FISSION SAFETY       | R2CA                       | HORIZON 2020 - EURATOM         | EURATOM FISSIONE  |
|            |   |                               | RADIOPROTECTION               | PIANOFORTE                 | EURATOM2027                    | EURATOM FISSIONE  |
|            | METEO-FRANCE CENTRE NATIONAL DE RECHERCHES METEOROLOGIQUES                  | ISTITUTI DI RICERCA           | ENVIRONMENT - AIR QUALITY     | CAMS2_40                   | OTHER PROGRAMMES               | COPERNICUS  |
| NUCADVISOR | SOCIETÀ DI CONSULENZA   | ENERGY - FISSION SAFETY       | ENER/20/NUCL/SI2.838109       | OTHER PROGRAMMES           | SERVICE CONTRACT               |   |
| GERMANIA   | CLIMATE ALLIANCE - KLIMA-BUENDNIS - ALIANZA DEL CLIMA E.V.                  | ASSOCIAZIONI                  | ENERGY - EFFICIENCY           | LIFE22-CET-EU PEERS        | OTHER PROGRAMMES 2021-2027     | LIFE (2021-2027)  |
|            | DLR - GERMAN AEROSPACE CENTER E.V.  | ISTITUTI DI RICERCA           | ENERGY - HYDROGEN             | HYSELECT                   | HORIZON EUROPE                 | CLEAN HYDROGEN JU   |
|            |   |                               | ENERGY - SOLAR                | EUROPATMOS<br>SULPHURREAL  | HORIZON 2020<br>HORIZON EUROPE | ERA-NET<br>EIC - EUROPEAN INNOVATION COUNCIL                                  |
|            | EMPIRICA  | ISTITUTI DI RICERCA           | ENERGY - EFFICIENCY           | TUNES                      | OTHER PROGRAMMES 2021-2027     | LIFE (2021-2027)  |
|            | FHG - FRAUNHOFER GESELLSCHAFT ZUR FOERDERUNG DER ANGEWANDTEN FORSCHUNG E.V. | ISTITUTI DI RICERCA           | ENERGY - EFFICIENCY           | LIFE22-CET-SEED MICAT      | OTHER PROGRAMMES 2021-2027     | LIFE (2021-2027)  |
|            | HELMHOLTZ-ZENTRUM BERLIN FUR MATERIALIEN UND ENERGIE GMBH (HZB)             | ISTITUTI DI RICERCA           | ENERGY - PHOTOVOLTAIC         | VIPERLAB                   | HORIZON 2020                   | EUROPEAN RESEARCH INFRASTRUCTURES   |
|            | HELMHOLTZ-ZENTRUM DRESDEN-ROSSENDORF EV                                     | ISTITUTI DI RICERCA           | ENERGY - FISSION              | ARIEL                      | HORIZON 2020 - EURATOM         | EURATOM FISSIONE  |
|            |   |                               | MATERIALS                     | REMADE-AT-ARI              | HORIZON EUROPE                 | RESEARCH INFRASTRUCTURES (2021-2027)  |
|            | KIT KARLSRUHER INSTITUT FUER TECHNOLOGIE                                    | UNIVERSITÀ                    | ENERGY AT LARGE               | STORIES                    | HORIZON 2020                   | EUROPEAN RESEARCH INFRASTRUCTURES   |
|            |   |                               | MATERIALS                     | INNUMAT                    | EURATOM2027                    | EURATOM FISSIONE  |
|            | PTB PHYSIKALISCH TECHNISCHE BUNDESANSTALT                                   | ISTITUTI DI RICERCA           | METROLOGY                     | 19ENV01 TRACERADON         | OTHER PROGRAMMES               | EMPIR   |
|            |   |                               |                               | 19NET03 SUPPORT BSS        | OTHER PROGRAMMES               | EMPIR   |
|            | UBA - GERMAN ENVIRONMENTAL AGENCY   | ORGANISMI PUBBLICI NO RICERCA | CIRCULAR ECONOMY              | NICE                       | OTHER PROGRAMMES 2021-2027     | INTERREG CENTRAL EUROPE 2021-2027   |
|            | UNIV. FREIE BERLIN  | UNIVERSITÀ                    | ENERGY - RENEWABLE            | COME RES                   | HORIZON 2020                   | ENERGY  |
|            | UNIV. TECHNICAL MUNICH (TUM)  | UNIVERSITÀ                    | LIFE SCIENCES - FOOD INDUSTRY | PROVIDE                    | HORIZON 2020                   | FOOD SECURITY, SUSTAINABLE AGRICULTURE AND THE BIOECONOMY                     |
| GRECIA     | MONOLITHOS RECYCLING TECHNOLOGIES   | INDUSTRIE                     | MATERIALS                     | CHEMPGM                    | HORIZON 2020                   | MSCA MARIE SKL. CURIE ACTIONS   |
|            | UNIV. ARISTOTLE OF THESSALONIKI (AUTH)                                      | UNIVERSITÀ                    | HEALTH                        | SEAWAVE                    | HORIZON EUROPE                 | CLUSTER 1 - HEALTH  |
| IRLANDA    | UNIV. LIMERICK  | UNIVERSITÀ                    | NANOTECHNOLOGY - MATERIALS    | SI-DRIVE                   | HORIZON 2020                   | NMBP NANOTECHN., ADV MATERIALS, ADV MANUFACTURING AND PROCESSING, AND BIOTECH |
| ITALIA     | 9-TECH  | ISTITUTI DI RICERCA           | MATERIALS                     | EIT RAW MATERIALS PARISVAL | HORIZON EUROPE                 | EIT - RAW MATERIALS KIC   |
|            | ACCADEMIA EUROPEA DI BOLZANO  | ISTITUTI DI RICERCA           | ENERGY - PHOTOVOLTAIC         | SYMBIOSYST                 | HORIZON EUROPE                 | CLUSTER 5 - D3 ENERGY SUPPLY  |

| PAESE                                    | NOME PARTNER  | TIPOLOGIA                     | AREA TEMATICA                          | ACRONIMO PROGETTO          | PROGRAMMA QUADRO           | PROGRAMMA UE   |  |
|--|---|-------------------------------|--|----------------------------|----------------------------|--|--|
| ITALIA                                   | ARMA DEI CARABINIERI - COMANDO UNITÀ FORESTALI, AMBIENTALI E AGROALIMENTARI (CUFAA) | ORGANISMI PUBBLICI NO RICERCA | ENVIRONMENT - AIR QUALITY              | LIFE MODERN (NEC)          | OTHER PROGRAMMES           | LIFE (2014-2020)   |  |
|  | C.A.E.N. SPA COSTRUZIONI APPARECCHIATURE ELETTRONICHE NUCLEARI                      | INDUSTRIE                     | ENERGY - FISSION WASTE                 | MICADO                     | HORIZON 2020 - EURATOM     | EURATOM FISSIONE   |  |
|  | CETMA - CENTRO DI RICERCHE EUROPEO DI TECNOLOGIE, DESIGN E MATERIALI                | ISTITUTI DI RICERCA           | ICT                                    | CETMA-DIHSME               | OTHER PROGRAMMES 2021-2027 | DIGITAL  |  |
|  | CNIT - CONSORZIO NAZIONALE INTERUNIVERSITARIO PER LE TELECOMUNICAZIONI              | ISTITUTI DI RICERCA           | ICT                                    | I-NEST                     | OTHER PROGRAMMES 2021-2027 | DIGITAL  |  |
|  | CNR - CONSIGLIO NAZIONALE DELLE RICERCHE  | ISTITUTI DI RICERCA           | ENVIRONMENT - CLIMATE CHANGE           | BEYOND EPICA               | HORIZON 2020               | CLIMATE ACTION, ENVIRONMENT, RESOURCE EFFICIENCY AND RAW MATERIALS |  |
|  |   |                               | ENVIRONMENT AT LARGE                   | GENESYS                    | HORIZON EUROPE             | CLUSTER 2 - CULTURE, CREATIVITY AND INCLUSIVE SOCIETY              |  |
|  |   |                               | LIFE SCIENCES - FOOD SAFETY            | FOODSAFETY4EU              | HORIZON 2020               | FOOD SECURITY, SUSTAINABLE AGRICULTURE AND THE BIOECONOMY          |  |
|  |   |                               | MATERIALS                              | PULSE-COM                  | HORIZON 2020               | FUTURE AND EMERGING TECHNOLOGIES (FET)                             |  |
|  | COMUNE DI BARLETTA  | ENTI LOCALI                   | ENERGY - EFFICIENCY                    | EFFECTS                    | OTHER PROGRAMMES           | INTERREG-IPA-CBC ITALY-ALBANIA-MONTENEGRO                          |  |
|  | FEM - FONDAZIONE EDMUND MACH  | ISTITUTI DI RICERCA           | LIFE SCIENCES - FOOD INDUSTRY SECURITY | PROMEDLIFE                 | HORIZON 2020               | PRIMA (2018-2028)  |  |
|  | FONDAZIONE SAFE   | ASSOCIAZIONI                  |  | MOSAIC                     | OTHER PROGRAMMES 2021-2027 | EDF - EUROPEAN DEFENCE FUND (2021-2027)                            |  |
|  |   |                               |  |                            | VERTIGO                    | OTHER PROGRAMMES   | EDIDP (2019-2020)  |
|  |   |                               |  |                            | TRICK                      | HORIZON 2020   | CLIMATE ACTION, ENVIRONMENT, RESOURCE EFFICIENCY AND RAW MATERIALS |
|  | FRATELLI PIACENZA SPA   | INDUSTRIE                     | CIRCULAR ECONOMY                       |                            |                            |  |  |
|  | INFN - ISTITUTO NAZIONALE DI FISICA NUCLEARE  | ISTITUTI DI RICERCA           | LASER                                  | EUPRAXIA                   | HORIZON EUROPE             | RESEARCH INFRASTRUCTURES (2021-2027)                               |  |
|  | ISINNOVA - ISTITUTO DI STUDI PER L'INTEGRAZIONE DEI SISTEMI                         | ISTITUTI DI RICERCA           | ENERGY - RENEWABLE                     | BIOMETHAVERS E             | HORIZON EUROPE             | CLUSTER 5 - D3 ENERGY SUPPLY                                       |  |
|  | KEY2 - KEY TO BUSINESS SRL  | SOCIETÀ DI CONSULENZA         | ICT                                    | DYDAS                      | OTHER PROGRAMMES           | CEF (CONNECTING EUROPE FACILITY)- TELECOM                          |  |
|  | LEGAMBIENTE NAZIONALE APS RETE ASSOCIATIVA ETS                                      | ALTRO                         | ENVIRONMENT AT LARGE                   | LIFE BLUE LAKES            | OTHER PROGRAMMES           | LIFE (2014-2020)   |  |
|  | POLITECNICO DI MILANO   | UNIVERSITÀ                    | ENERGY - HYDROGEN                      | E-SHYIPS                   | HORIZON 2020               | JTI - HYDROGEN   |  |
|  | RIINA CONSULTING  | SOCIETÀ DI CONSULENZA         | ENERGY - EFFICIENCY                    | MULTICLIMACT               | HORIZON EUROPE             | CLUSTER 5 - D4 ENERGY USE  |  |
| S.I. IMPRESA - SERVIZI INTEGRATI IMPRESA | ENTI LOCALI   | INNOVATION - SME              | BRIDGECONOMIES 2022-2025               | OTHER PROGRAMMES 2021-2027 | SMP - COSME                |  |  |
| SNAM SPA                                 | INDUSTRIE   | ENERGY - HYDROGEN             | THOTH2                                 | HORIZON EUROPE             | CLEAN HYDROGEN JU          |  |  |

| PAESE                 | NOME PARTNER   | TIPOLOGIA                     | AREA TEMATICA             | ACRONIMO PROGETTO           | PROGRAMMA QUADRO             | PROGRAMMA UE  |
|-----------------------|--|-------------------------------|---------------------------|-----------------------------|------------------------------|---|
| ITALIA                | UNIV. GUGLIELMO MARCONI TELEMATICA (USGM)                                      | UNIVERSITÀ                    | ENERGY - RENEWABLE        | BLAZE<br>GICO               | HORIZON 2020<br>HORIZON 2020 | ENERGY<br>ENERGY  |
|                       | UNIV. PISA   | UNIVERSITÀ                    | MATERIALS                 | CEM-WAVE                    | HORIZON 2020                 | NMBP NANOTECHN., ADV MATERIALS, ADV MANUFACTURING AND PROCESSING, AND BIOTECH |
|                       | UNIV. TUSCIA   | UNIVERSITÀ                    | LIFE SCIENCES             | IMPRESA                     | HORIZON 2020                 | PRIMA (2018-2028)   |
| LITUANIA              | LEI LITHUANIAN ENERGY INSTITUTE  | ISTITUTI DI RICERCA           | ENERGY - FISSION          | HARMONISE                   | EURATOM2027                  | EURATOM FISSIONE  |
| NORVEGIA              | SINTEF   | ISTITUTI DI RICERCA           | ENERGY - HYDROGEN         | PROTOSTACK                  | HORIZON EUROPE               | CLEAN HYDROGEN JU   |
|                       | UNIV. WESTERN NORWAY OF APPLIED SCIENCES                                       | UNIVERSITÀ                    | ICT                       | EERADATA                    | HORIZON 2020                 | ENERGY  |
| ORGAN. INTERNAZIONALI | ECMWF - EUROPEAN CENTRE FOR MEDIUM-RANGE WEATHER FORECASTS                     | ISTITUTI DI RICERCA           | ENVIRONMENT - AIR QUALITY | CAMEO                       | HORIZON EUROPE               | CLUSTER 4 - DIGITAL, INDUSTRY AND SPACE                                       |
|                       | EMBL - EUROPEAN MOLECULAR BIOLOGY LABORATORY                                   | ISTITUTI DI RICERCA           | ENVIRONMENT - MARINE      | BIOCEAN5D                   | HORIZON EUROPE               | CLUSTER 6 - FOOD, BIOECONOMY, NATURAL RESOURCES, AGRICULTURE AND ENVIRONMENT  |
|                       | ENEN - EUROPEAN NUCLEAR EDUCATION NETWORK                                      | ASSOCIAZIONI                  | ENERGY - FISSION          | ENEN2PLUS                   | EURATOM2027                  | EURATOM FISSIONE  |
|                       | MEDENER - MEDITERRANEAN ASSOCIATION OF NATIONAL AGENCIES FOR ENERGY MANAGEMENT | ASSOCIAZIONI                  | ENERGY AT LARGE           | MEETMED II                  | OTHER PROGRAMMES             | ENI - EUROPEAN NEIGHBOURHOOD INSTRUMENTS (2014-2020)                          |
| PAESI BASSI           | IEECP - INSTITUTE FOR EUROPEAN ENERGY AND CLIMATE POLICY STICHTING             | ISTITUTI DI RICERCA           | ENERGY - EFFICIENCY       | LIFE22-CET-ENEFIRST PLUS    | OTHER PROGRAMMES 2021-2027   | LIFE (2021-2027)  |
|                       |  |                               | ENERGY POVERTY            | ENPOR                       | HORIZON 2020                 | ENERGY  |
|                       | KIC INNOENERGY SE  | ALTRO                         | ENERGY - BATTERIES        | BEST                        | HORIZON EUROPE               | CLUSTER 5 - D2 CROSS-CUTTING SOLUTIONS  |
|                       | MARIS MARINE INFORMATION SERVICE B.V.  | INDUSTRIE                     | MARINE RESEARCH           | EMODNET DATA INGESTION N. 3 | OTHER PROGRAMMES 2021-2027   | EMFAF - EUROPEAN MARITIME, FISHERIES AND AQUACULTURE FUND(2021-2027)          |
|                       | MINISTRY OF ECONOMIC AFFAIRS AND CLIMATE POLICY                                | ORGANISMI PUBBLICI NO RICERCA | ENERGY - EFFICIENCY       | CA EED3                     | HORIZON 2020                 | ENERGY  |
|                       | NKI - NATIONAL CANCER INSTITUTE  | ISTITUTI DI RICERCA           | LIFE SCIENCES             | INEXT-DISCOVERY             | HORIZON 2020                 | EUROPEAN RESEARCH INFRASTRUCTURES   |
|                       | PROSAFE - THE PRODUCT SAFETY ENFORCEMENT FORUM OF EUROPE                       | ASSOCIAZIONI                  | ENERGY - EFFICIENCY       | EEPLIANT 3                  | HORIZON 2020                 | ENERGY  |
|                       | TNO - NETHERLANDS ORGANISATION FOR APPLIED SCIENTIFIC RESEARCH                 | ISTITUTI DI RICERCA           | ENERGY - EFFICIENCY       | GEAR-AT-SME                 | HORIZON 2020                 | ENERGY  |
|                       | UNIV. UTRECHT  | UNIVERSITÀ                    | HEALTH                    | POLYRISK                    | HORIZON 2020                 | HEALTH  |
| POLONIA               | IETU - INSTITUTE FOR ECOLOGY OF INDUSTRIAL AREAS                               | ISTITUTI DI RICERCA           | ENVIRONMENT AT LARGE      | LIFEPROETV                  | OTHER PROGRAMMES             | LIFE (2014-2020)  |
|                       | LUKASIEWICZ - POZNAN INSTITUTE OF TECHNOLOGY                                   | ISTITUTI DI RICERCA           | TRANSPORT                 | CRISTAL                     | HORIZON EUROPE               | CLUSTER 5 - D6 TRANSPORT AND SMART MOBILITY SERVICES                          |
|                       | NCBJ - NATIONAL CENTER FOR NUCLEAR RESEARCH                                    | ISTITUTI DI RICERCA           | ENERGY - FISSION          | SECURE                      | EURATOM2027                  | EURATOM FISSIONE  |

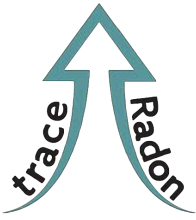
| PAESE                 | NOME PARTNER   | TIPOLOGIA                     | AREA TEMATICA                | ACRONIMO PROGETTO      | PROGRAMMA QUADRO                  | PROGRAMMA UE   |
|-----------------------|--|-------------------------------|------------------------------|------------------------|-----------------------------------|--|
| PORTOGALLO            | IPP - INSTITUTO POLITECNICO DE PORTALEGRE  | UNIVERSITÀ                    | ENERGY - HYDROGEN            | WASTE2H2               | HORIZON 2020                      | SPREADING EXCELLENCE AND WIDENING PARTICIPATION - TWINNING                   |
|                       | UNIV. EVORA  | UNIVERSITÀ                    | ENERGY - RENEWABLE           | SALTOPOWER             | HORIZON EUROPE                    | WIDERA - WIDENING PARTICIPATION AND SPREADING EXCELLENCE                     |
|                       |  |                               | ENERGY - THERMODYNAMIC SOLAR | MSA-TROUGH             | HORIZON EUROPE                    | CLUSTER 5 - D3 ENERGY SUPPLY   |
| REPUBBLICA CECA       | CMI - CZECH METROLOGY INSTITUTE  | ISTITUTI DI RICERCA           | METROLOGY - RADIOTHERAPY     | ALPHAMET               | HORIZON EUROPE                    | EPM - EUROPEAN PARTNERSHIP ON METROLOGY                                      |
|                       | UNIV. CZECH OF LIFE SCIENCES PRAGUE  | UNIVERSITÀ                    | LIFE SCIENCES                | ECO-READY              | HORIZON EUROPE                    | CLUSTER 6 - FOOD, BIOECONOMY, NATURAL RESOURCES, AGRICULTURE AND ENVIRONMENT |
| ROMANIA               | UEFISCDI - EXECUTIVE UNIT FOR RESEARCH, DEVELOPMENT AND INNOVATION HIGHER EDUCATION FUNDING                  | ORGANISMI PUBBLICI NO RICERCA | ENVIRONMENT - CLIMATE CHANGE | CAPACITIES             | HORIZON EUROPE                    | MISSION CLIMATE NEUTRAL AND SMART CITIES                                     |
| SERBIA                | VINCA INSTITUTE OF NUCLEAR SCIENCES  | ISTITUTI DI RICERCA           | ENVIRONMENT - AIR QUALITY    | VIDIS                  | HORIZON 2020                      | SPREADING EXCELLENCE AND WIDENING PARTICIPATION - WIDESPREAD                 |
| SLOVENIA              | JSI - JOZEF STEFAN INSTITUT  | ISTITUTI DI RICERCA           | ENERGY - RENEWABLE           | REACTT                 | HORIZON 2020                      | JTI - HYDROGEN   |
| SPAGNA                | CIEMAT - CENTRO DE INVESTIGACIONES ENERGETICAS, MEDIOAMBIENTALES Y TECNOLOGICAS                              | ISTITUTI DI RICERCA           | ENERGY - FISSION             | ORIENT-NM              | HORIZON 2020 - EURATOM            | EURATOM FISSIONE   |
|                       |  |                               |                              | SANDA                  | HORIZON 2020 - EURATOM            | EURATOM FISSIONE   |
|                       |  |                               |                              | SEAKNOT                | EURATOM2027                       | EURATOM FISSIONE   |
|                       | ENERGY - FISSION SAFETY  | ENERGY - SOLAR                | MUSA                         | HORIZON 2020 - EURATOM | EURATOM FISSIONE                  |  |
|                       |  |                               | SFERA III                    | HORIZON 2020           | EUROPEAN RESEARCH INFRASTRUCTURES |  |
|                       | CSIC - SPANISH NATIONAL RESEARCH COUNCIL   | ISTITUTI DI RICERCA           | LIFE SCIENCES - FOOD GENETIC | HARNESSTOM             | HORIZON 2020                      | FOOD SECURITY, SUSTAINABLE AGRICULTURE AND THE BIOECONOMY                    |
|                       |  |                               | METROLOGY                    | MINKE                  | HORIZON 2020                      | EUROPEAN RESEARCH INFRASTRUCTURES  |
|                       | ESDONES - CONSORCIO IFMIF-DONES ESPAÑA   | ISTITUTI DI RICERCA           | ENERGY - FUSION              | DONES-CONP1            | EURATOM2027                       | EURATOM FUSIONE  |
|                       | ETRA INVESTIGACION Y DESAROLLO SA  | INDUSTRIE                     | TRANSPORT                    | USER-CHI               | HORIZON 2020                      | TRANSPORT  |
|                       | FUNDACIO ENT   | ISTITUTI DI RICERCA           | CIRCULAR ECONOMY             | BIOCIRCULARCITIES      | HORIZON 2020                      | JTI - BIO BASED INDUSTRIES   |
|                       | FUNDACION CARTIF   | ISTITUTI DI RICERCA           | ENERGY - EFFICIENCY          | REHOUSE                | HORIZON EUROPE                    | CLUSTER 5 - D4 ENERGY USE  |
|                       | FUNDACION DE LA COMUNIDAD VALENCIANA PARA LA INVESTIGACION, PROMOCION Y ESTUDIOS COMERCIALES DE VALENCIAPORT | ISTITUTI DI RICERCA           | ENERGY - HYDROGEN            | H2PORTS                | HORIZON 2020                      | JTI - HYDROGEN   |
|                       | GNE - GLOBAL NEW ENERGY FINANCES SL  | AGENZIA DI FINANZIAMENTO      | ENERGY AT LARGE              | SER                    | HORIZON 2020                      | ENERGY   |
|                       | IREC - FUNDACIO INSTITUT DE RECERCA DE L'ENERGIA DE CATALUNYA  | ISTITUTI DI RICERCA           | ENERGY - PHOTOVOLTAIC        | CUSTOM-ART             | HORIZON 2020                      | ENERGY   |
| R2M SOLUTION SPAIN SL | SOCIETÀ DI CONSULENZA  | ENERGY - RENEWABLE            | LIGHTNESS                    | HORIZON 2020           | ENERGY                            |  |

| PAESE    | NOME PARTNER                                      | TIPOLOGIA           | AREA TEMATICA                   | ACRONIMO PROGETTO | PROGRAMMA QUADRO | PROGRAMMA UE                           |
|----------|---|---------------------|---------------------------------|-------------------|------------------|--|
| SPAGNA   | UNIV. DA CORUNA                                   | UNIVERSITÀ          | ENERGY AT LARGE                 | ENTRANCES         | HORIZON 2020     | ENERGY                                 |
|          | UNIV. POLITECNICA VALENCIA (UPV)                  | UNIVERSITÀ          | ENVIRONMENT - WASTE UTILISATION | CONDEREFF         | OTHER PROGRAMMES | INTERREG EUROPE                        |
| SVEZIA   | FOI SWEDISH DEFENCE RESEARCH AGENCY               | ISTITUTI DI RICERCA | SECURITY                        | EXERTER           | HORIZON 2020     | SECURE SOCIETIES                       |
|          |   |                     |                                 | STYX              | OTHER PROGRAMMES | EUROPEAN DEFENCE AGENCY CAPTECH        |
|          | UNIV. TECHNOLOGY CHALMERS                         | UNIVERSITÀ          | ENERGY - FISSION SAFETY         | FREDMANS          | EURATOM2027      | EURATOM FISSIONE                       |
|          | UNIV. UPPSALA                                     | UNIVERSITÀ          | ENERGY - BATTERIES              | B2030 CSA3        | HORIZON EUROPE   | CLUSTER 5 - D2 CROSS-CUTTING SOLUTIONS |
|          |   |                     |                                 | BATTERY 2030PLUS  | HORIZON 2020     | ENERGY                                 |
| SVIZZERA | CERN - EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH | ISTITUTI DI RICERCA | ENERGY - FUSION                 | RADNEXT           | HORIZON 2020     | EUROPEAN RESEARCH INFRASTRUCTURES      |
|          | ECOLE POLYTECHNIQUE FEDERALE DE LAUSANNE          | UNIVERSITÀ          | ENERGY - HYDROGEN               | WASTE2WATTS       | HORIZON 2020     | JTI - HYDROGEN                         |



## Elenco delle schede sintetiche dei progetti

|                             |                          |                     |
|-----------------------------|--------------------------|---------------------|
| 19ENV01 traceRadon          | ENTRANCES                | PASCAL              |
| 19NET03 Support BSS         | ESFR-SIMPLE              | PASTELS             |
| 19NET04 MIRA                | EuPRAXIA                 | PATRICIA            |
| 3beLiEVe                    | EuroPaTMoS               | PHOTORAMA           |
| ACROBAT                     | EVERPV                   | PIANOFORTE          |
| AgroServ                    | EXERTER                  | POLYRISK            |
| Algeria                     | F4E-FPA-327 SG07         | PREDIS              |
| AlphaMet                    | FNS-CLOUD                | PRO-GRACE           |
| ANSELMUS                    | FOODSAFETY4EU            | PROMEDLIFE          |
| ARIEL                       | ForestNavigator          | PROMETEO            |
| ASSASS                      | FREDMANS                 | PROTOSTACK          |
| B2030 CSA3                  | FueISOME                 | PROVIDE             |
| BATTERY 2030PLUS            | GEAR-at-SME              | PULSE-COM           |
| BEST                        | gEneSys                  | PUMMA               |
| Beyond EPICA                | GICO                     | R2CA                |
| BIOcean5D                   | GREENROAD                | RADNEXT             |
| BIOCIRCULARCITIES           | GuideRadPROS             | REACTT              |
| BIOMETHAVERSE               | H2Excellence             | REHOUSE             |
| BLAZE                       | H2PORTS                  | ReMade-at-ARI       |
| BRIDGEconomies 2022-2025    | HARMONISE                | REPRODIVAC          |
| CA EED3                     | HARNESSTOM               | RescEU-CBRN-DSIM-IT |
| CAMEO                       | HARPERS                  | RISEN               |
| CAMS2_40                    | HySelect                 | RISEUP              |
| CapaCITIES                  | I-NEST                   | SALTOpower          |
| CEM-WAVE                    | IMPRESA                  | SANDA               |
| CETMA-DIHSME                | INCLUDING                | SASPAM-SA           |
| CHemPGM                     | iNEXT-Discovery          | SCREEN2             |
| CLEANDEM                    | InnCoCells               | SEAKNOT             |
| CO2OLHEAT                   | INNUMAT                  | SEAWave             |
| CoCliCo                     | KNOWING                  | SECURE              |
| COME RES                    | LEAP4SME                 | SEETIP Ocean        |
| CONDEREFF                   | LEAPS-INNOV              | SER                 |
| CRISTAL                     | LIFE AIRFRESH            | SFERA III           |
| CST4ALL                     | LIFE BLUE LAKES          | Si-DRIVE            |
| CUSTOM-ART                  | LIFE MAGIS               | SIMBA               |
| DeliSoil                    | LIFE MODERn (NEC)        | SO-FREE             |
| DONES-ConP1                 | LIFE21-CET-CA-CAEPBD6    | StoRIES             |
| DRG4Food                    | LIFE21-CET-POLICY-       | STYX                |
| DUT                         | OdysseeMure fit-4-55     | SULPHURREAL         |
| DYDAS                       | LIFE22-CET-ENEFIRST PLUS | SYMBIOSYST          |
| E-DYCE                      | LIFE22-CET-EPBD.wise     | TANDEM              |
| e-SHyIPS                    | LIFE22-CET-EU Peers      | TEXTAROSSA          |
| ECO-READY                   | LIFE22-CET-SEED MICAT    | THOTH2              |
| EEPLIANT 3                  | LIFeproETV               | TITANS              |
| EERADATA                    | LIGHTNESS                | TraMeXI             |
| EFFECTS                     | meetMED II               | TRICK               |
| EIT Raw materials FENICE_23 | MICADO                   | tunES               |
| EIT Raw materials PARSIVAL  | MINKE                    | USER-CHI            |
| EJP SOIL                    | MoSaiC                   | VERTIgO             |
| ELSMOR                      | MSA-Trough               | VIDIS               |
| EMODNET Data Ingestion n. 3 | MULTICLIMACT             | VIPERLAB            |
| ENEN2plus                   | MUSA                     | WASTE2H2            |
| ENER/20/NUCL/SI2.838109     | NiCE                     | WASTE2WATTS         |
| eNeuron                     | OperaHPC                 |                     |
| ENPOR                       | ORIENT-NM                |                     |



## Radon metrology for use in climate change observation and radiation protection at the environmental level

Coordinatore: PTB PHYSIKALISCH TECHNISCHE BUNDESANSTALT (Germania)

N. Partner: 18

### Abstract:

Radon gas is the main source of natural radiation exposure to the public and its environmental distribution must be known. It is emitted almost evenly from ice-free land allowing its use as a tracker for quantifying and pin-pointing the sources of greenhouse gas (GHG) emissions using the Radon Tracer Method (RTM). Improved quantification measurements are required to locate Radon Priority Areas (RPA) and for validating GHG emission models. The project will develop traceable measurements for low-level atmospheric radon along with a reference-standard radon monitor, with results validated using long-term, field-based inter-comparisons. For the first time, a standard methodology for the RTM will be developed together with a validated, high-resolution radon flux map. RPAs will also be identified which has never been attempted before due to a lack of quality data. The results will support radiation protection measures and GHG emission models, leading to increased safety and a better identification of the sources of damaging pollutants.

Anno di stipula: 2020

Tipo progetto: N/A - Non applicabile

Programma UE: Other programmes  
EMPIR

Data inizio: 01-06-2020

Data scadenza: 31-05-2023

Contributo totale: € 2.245.357

Costo eleggibile totale: € 2.255.607

Contributo a ENEA: € 168.508

Costo eleggibile ENEA: € 168.508

Doc. approvazione: 066/2020/FSN

Codice atto: PF5AAH

Resp. scientifico ENEA: CAPOGNI MARCO

Unità: FSN-INMRI

### Attività ENEA:

L'ENEA-INMRI, oltre alla partecipazione ai work package di impatto/comunicazione (WP5) e gestionale (WP6), parteciperà attivamente a tre dei quattro work package tecnici previsti ovvero: WP1: Misure tracciabili di concentrazione di attività di radon outdoor. In tale work package l'ENEA-INMRI sarà impegnato nei tre obiettivi del progetto fornendo il proprio contributo allo sviluppo di sorgenti di radon di bassa concentrazione di attività (inferiore a 100 Bq/m<sup>3</sup>), di un campione di trasferimento per tarare strumenti per la misura di radon in accordo con la norma tecnica IEC 61577 e di taratura di sistemi di misura del radon alla concentrazione su indicata con basso livello di incertezza. WP2: Misure di flusso di radon. In tale work package l'ENEA-INMRI sarà impegnato per sviluppare capacità di misure di radon in campo basate su campioni di riferimento e sistemi campione di trasferimento e per armonizzare tali sistemi attraverso interconfronti. Anche in questo caso l'Istituto sarà impegnato nei 4 obiettivi del WP. WP3: Validazione dei modelli e basi di dati per il flusso di radon. In questo work package l'ENEA-INMRI contribuirà a validare modelli e dati riguardanti il flusso di radon sulla base di misure e sistemi di riferimento/trasferimento sviluppati nei work package precedenti. Tale lavoro supporterà tecniche RTM e la modellizzazione di dispersioni atmosferiche anche in relazione al problema dei gas serra e per applicazioni di radio-protezione.

Coordinatore: PTB PHYSIKALISCH TECHNISCHE BUNDESANSTALT (Germania)

N. Partner:

### Abstract:

Radiation protection legislation has been overhauled to better protect European citizens. A revision of the EURATOM Directive broadened its scope to cover all radiation sources and categories of exposure. Occupational, medical, public and environmental risks are now all included, partly in response to lessons learned from the Fukushima nuclear accident. Radiation protection measurement (dosimetry) will need to become more responsive to changing needs, by supporting new technologies such as pulsed doses in nuclear medicine, more harmonised worker protection measures, and digitalisation trends. As there is no comprehensive facility capable of supporting all these requirements, a European Metrology Network for reliable radiation protection regulation is being considered, to help introduce a legally enforceable European quality assurance system. The project will formulate a defining scope and organisational basis for a network. After engaging with stakeholders, it will produce a research agenda designed to ensure that suitable reference fields and standards can be developed to support radiation protection regulations. Knowledge-sharing requirements and input to international standards will also be addressed. Facilities established by the project will support quality assessment in all radiation protection issues. On completion of the project, a network could be called upon to support the development of more harmonised procedures and capabilities in service provision and research, so the quality of radiation protection dosimetry can support better radiation protection measures for all European citizens.

Anno di stipula: 2020

Tipo progetto: N/A - Non applicabile

Programma UE: Other programmes  
EMPIR

Data inizio: 01-06-2020

Data scadenza: 31-05-2024

Contributo totale: € 476.467

Costo eleggibile totale: € 525.152

Contributo a ENEA: € 10.500

Costo eleggibile ENEA: € 10.500

Doc. approvazione: 184/2020/PRES

Codice atto: PF5AAG

Resp. scientifico ENEA: PINTO MASSIMO

Unità: FSN-INMRI

### Attività ENEA:

INMRI ENEA partecipa a tutti work package.



## Support for a European Metrology Network on the medical use of ionising radiation

**Coordinatore:** CEA - COMMISSARIAT A L'ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES (Francia)

**N. Partner:**

### Abstract:

Radiation therapies are expected to continue to be in the front line for providing effective cancer treatment and diagnoses. Europe has a strong record of developing medical applications of ionising radiation, and demands for improved treatments are expected to drive further innovation. For example, technologies are being developed that combine imaging and radiation, radio-pharmaceuticals and applications of pulsed radiation. Access to such devices is uneven across Europe as some metrology institutes are disadvantaged through lack of access to state-of-the-art research facilities, while the complexity, costs, evolving regulatory requirements, and discrepancies in knowledge and capability each act to compromise the provision of effective metrological infrastructure. Demand for new technologies imposes requirements for new measurement techniques, informed by the best research. Understanding of adverse side-effects is also essential. However, no single body exists specifically to coordinate solutions, so Europe's metrology institutes are not able to serve some important measurement needs of equipment manufacturers, academics, standards organisations, and bodies representing radiation oncology, medical physics, pre-clinical research, and medical staff. This four-year project will enable facilities to be shared and a dialogue initiated between stakeholders. A Strategic Research Agenda for the coming decade will be proposed, regulatory needs defined, and knowledge-sharing offered. Within 12 months, a specific plan for a metrology research infrastructure will be presented via a European Metrology Network. These actions are expected to support enhanced research reproducibility and standards development, enabling safer, more efficient treatments and diagnoses. Improved understanding will also speed the development of new therapies and diagnostic tools, while increased understanding of risk factors will improve patient safety.

**Anno di stipula:** 2020

**Tipo progetto:** N/A - Non applicabile

**Programma UE:** Other programmes

EMPIR

**Data inizio:** 01-06-2020

**Data scadenza:** 31-05-2024

**Contributo totale:** € 396.963

**Costo eleggibile totale:** € 454.024

**Contributo a ENEA:** € 18.900

**Costo eleggibile ENEA:** € 18.900

**Doc. approvazione:** 070/2020/FSN

**Codice atto:** PF5AAI

**Resp. scientifico ENEA:** CAPOGNI MARCO

**Unità:** FSN-INMRI

### Attività ENEA:

Il progetto è finalizzato alla realizzazione di reti metrologiche a supporto della comunità scientifica europea. Risulta strategico il contributo che INMRI-ENEA può apportare alla definizione delle Network sopra menzionate. Inoltre, la definizione e l'appartenenza ad una rete metrologica europea offrirà all'Istituto la possibilità di attivare nuovi e rilevanti servizi metrologici avanzati alla comunità medica nazionale.



## Delivering the 3b generation of LNMO cells for the xEV market of 2025 and beyond

Coordinatore: AIT - AUSTRIAN INSTITUTE OF TECHNOLOGY (Austria)

N. Partner:

### Abstract:

The development of better materials for use in rechargeable batteries is vital for the future of the electric vehicle market. One of these materials is lithium nickel manganese oxide (LNMO), a cobalt-free cathode material that's a cost-effective alternative to current lithium-ion (Li-ion) battery materials. Using LNMO, the EU-funded 3beLiEVe project aims to produce the next generation of Li-ion rechargeable batteries for electric vehicles in 2025 and beyond. Along with the next-gen battery cells, the project will also develop and integrate internal and external sensors for the cell. The data obtained from these sensors will provide a more timely and accurate view of the state of the cell and will be used to implement smart operating strategies that extend the life of the cell and improve its safety. The smart battery management system will process this data and manage an adaptive liquid cooling system. Manufacturing, second life and recycling aspects are also considered. The project's innovations will play a role in strengthening the European battery and automotive industry.

Anno di stipula: 2020

Tipo progetto: RIA - Research and Innovation Action

Programma UE: HORIZON 2020  
Energy

Data inizio: 01-01-2020

Data scadenza: 31-12-2023

Contributo totale: € 10.833.760

Costo eleggibile totale: € 10.833.760

Contributo a ENEA: € 298.500

Costo eleggibile ENEA: € 298.500

Doc. approvazione: 01/2020/FSN

Codice atto: PF7AAV

Resp. scientifico ENEA: MANNORI SIMONE

Unità: FSN-TECFIS-DIM

### Attività ENEA:

L'ENEA contribuisce alle attività del work package 4 'Battery sensors, cooling, BMS, modules and packaging. In particolare ENEA è responsabile dell'integrazione di tutti i sensori (interni ed esterni) installati a livello della singola cella. Oltre all'integrazione hardware/software con il BMS (Battery Management System) ENEA è responsabile del collaudo 'in condizioni reali' del sottoinsieme cella/sensori.



Coordinatore: VITO - FLEMISH INSTITUTE FOR TECHNOLOGICAL RESEARCH (Belgio)

N. Partner:

**Abstract:**

Globally, olivine-type lithium iron phosphate (LiFePO<sub>4</sub>, LFP) batteries have gained a considerable share within the lithium ion battery (LIB) market (23-36% in 2015-2016). However, no dedicated, economically-viable, industrial-scale recycling process exists for LFP type LIBs in Europe or elsewhere. Nevertheless, LFP batteries contain three critical raw materials (CRMs), namely 0.8 wt.% lithium, 2.5 wt.% phosphorus and 16 wt.% graphite on battery cell basis. Efficient recycling of LFP LIBs is also required from an environmental point of view as the electrolyte contains toxic agents. ACROBAT aims to recycle end-of-life LFP LIBs via efficient, innovative and environmentally-friendly processes and separation techniques to recover a maximum amount of EU-CRMs as high-value products and base metals (ferrous and Cu/Al fractions). The specific ACROBAT objectives are to research, develop and validate (i) LFP-dedicated pre-treatment (i.e., shredding, mechanical separation) of EoL LFP LIBs with reduced cross-contamination; (ii) continuous, contact-free, in-line characterisation of LFP black mass; (iii) extractive recovery of electrolyte materials (i.e., conducting salts, organic solvents); (iv) recovery of graphite by froth flotation; (v) recovery of lithium as battery-grade lithium hydroxide monohydrate by HCl-based hydro-/solvo metallurgy; and (vi) direct recycling of LFP black mass by tandem hydrometallurgy-hydrothermal synthesis. The sustainability of the ACROBAT flowsheet is evaluated by a life cycle assessment. Overall, the ACROBAT consortium (VITO, ENEA, Fraunhofer ILT, KU Leuven, Accurec) aims to recover 90% of the EU-CRMs (i.e. Li, P and graphite) and recycle LFP cathode material, graphite and electrolyte, respectively up to 5.4, 6.2 and 4.4 kt/y by 2030 in Europe. This would represent an overall value of 180 M€. ACROBAT's Industrial Advisory Board (Umicore, Aurubis, Bebat, Sorbat and Electrocyling) will catalyse the industrial valorisation of the project results.

Anno di stipula: 2023

Tipo progetto: ERANET COFUND

Programma UE: HORIZON 2020

ERA-MIN3

Data inizio: 01-08-2022

Data scadenza: 31-07-2024

Contributo totale: € 1.124.296

Costo eleggibile totale: € 1.548.796

Contributo a ENEA: € 122.500

Costo eleggibile ENEA: € 245.000

Doc. approvazione: 202/2023/SSPT/USER

Codice atto: PS6AED

Resp. scientifico ENEA: FORTE FEDERICA

Unità: SSPT-USER-T4RM

**Attività ENEA:**

L'ENEA studierà le possibilità di valorizzazione dell'elettrolita con l'obiettivo di recuperare il sale (LiPF<sub>6</sub>) e/o i solventi organici (dimetilcarbonato e carbonato di etilene). In particolare gli obiettivi realizzativi (coincidenti con le Task descritte nel progetto internazionale), sono elencati di seguito: • Definizione del protocollo analitico (M1-M18) • Sviluppo e ottimizzazione del processo di recupero (M13-M24)



## Integrated SERVICES supporting a sustainable AGROecological transition

**Coordinatore:** CNRS - FRENCH NATIONAL CENTRE FOR SCIENTIFIC RESEARCH (Francia)

**N. Partner:**

### Abstract:

Developing a resilient and sustainable agriculture system, and the agroecological transitions requires a deep understanding of agroecosystems, their interactions with the environment, and management practices. AgroServ features a large consortium of research infrastructures, most of them being on the EU roadmap, and a vast offer of services at all scales, from the molecule to the organism, to the ecosystem, to the society. AgroServ will facilitate a systemic and holistic approach to understand the threats and challenges agriculture is facing, towards the implementation of a resilient and sustainable agri-food system. We propose a transdisciplinary offer of services, integrating the actors of the agriculture system in the research process, of which the farmers are the first, thanks to a wide offer of living labs across Europe. Most of the relevant field of sciences are represented in AgroServ, from natural to social sciences. We will develop a wider catalogue of integrated and customized services, thanks to a specific approach of service pipelines designed from a gap analysis, stakeholder and user demands. A strong community building and training program for access managers and users will be implemented to facilitate multi- and transdisciplinary research with all relevant actors. Results from the research performed under AgroServ will be synthesized to be used in the scope of evidence-based policy making. Data from AgroServ will be open and compliant with FAIR practices, and made available on the long-term to the communities, and be linked with the main European initiatives, as the EOSC. Strong links will be established with existing or future programs under H2020 and Horizon Europe, such as the partnerships agroecology, living labs and research infrastructures, and agriculture of data, as well as the two CSA AE4EU and ALL-READY, and the missions soil and plant health, and waters. AgroServ will collaborate with other relevant initiative in the Pillar II to of HE.

**Anno di stipula:** 2022

**Tipo progetto:** RIA - Research and Innovation Action

**Programma UE:** HORIZON EUROPE  
Research Infrastructures (2021-2027)

**Data inizio:** 01-09-2022

**Data scadenza:** 31-08-2027

**Contributo totale:** € 14.252.873

**Costo eleggibile totale:** € 14.252.873

**Contributo a ENEA:** € 493.245

**Costo eleggibile ENEA:** € 493.245

**Doc. approvazione:** 141/2022/SSPT-BIOAG

**Codice atto:** PS1ACS

**Resp. scientifico ENEA:** ZOANI CLAUDIA

**Unità:** SSPT-BIOAG

### Attività ENEA:

ENEA è coinvolto in 6 dei 9 WPs "tecnici" nei quali si articola il progetto e nella fornitura di servizi integrati per il TNA. In particolare, ENEA partecipa ai seguenti WP: WP2 - AgroServ integration and customisation of services WP5 - Community building and user's engagement WP6 - Open innovation hub (WP Leader) WP7 - Developing a roadmap for long-term sustainability beyond 2027 WP8 - Outreach, dissemination, exploitation of results WP9 - Project management and monitoring WP14 - TA METROFOOD-RI



## Assistenza tecnica au programme d

Coordinatore: IBF - INTERNATIONAL CONSULTING SA (Belgio)

N. Partner:

## Abstract:

Ce marché concerne la composante Assistance Technique du Programme d'Appui au secteur des énergies renouvelables principalement électriques et de l'efficacité énergétique en Algérie, dont les principales parties prenantes sont le Ministère de l'Énergie, le Ministère de l'Environnement et des Énergies Renouvelables, le Ministère de l'Habitat, de l'Urbanisme et de la Ville, les Ministères de l'Industrie et du Commerce, la Commission de Régulation de l'Électricité et du Gaz (CREG), l'Agence Nationale pour la Promotion et la Rationalisation de l'Utilisation de l'Énergie (APRUE), les sociétés du groupe SONELGAZ (y compris GRTE, OS, SKTM et sociétés de distribution), ainsi que le Centre National d'Études et de Recherches Intégrées du Bâtiment (CNERIB) et le Centre de Développement des Énergies Renouvelables (CDER). Il vise à fournir de l'expertise de haut niveau sur trois axes stratégiques : Axe 1 - Institutionnel, politique et réglementaire Axe 2 - Énergies renouvelables Axe 3 - Efficacité énergétique

Anno di stipula: 2019

Tipo progetto: N/A - Non applicabile

Programma UE: Other programmes

ENI - European Neighbourhood Instruments (2014-2020)

Data inizio: 08-04-2019

Data scadenza: 27-04-2023

Contributo totale: € 8.243.455

Costo eleggibile totale: € 8.243.455

Contributo a ENEA: € 2.060.864

Costo eleggibile ENEA: € 2.171.935

Doc. approvazione: 59/E/2019/DTE

Codice atto: PT0AAG

Resp. scientifico ENEA: DE IULIIS SIMONA

Unità: DTE

## Attività ENEA:

L'ENEA svolge le attività necessarie al conseguimento degli obiettivi tramite l'Unità Studi Analisi e Valutazioni e i Dipartimenti "Tecnologie Energetiche", "Unità per l'Efficienza Energetica", "Sostenibilità dei sistemi produttivi e territoriali". L'ENEA ha un ruolo chiave nell'indirizzo delle politiche energetiche dell'Algeria sui temi dello sviluppo economico sostenibile in ambito energetico, ricoprendo un ruolo di primo piano anche con le aziende che in Algeria operano nel settore.





Coordinatore: CMI - CZECH METROLOGY INSTITUTE (Repubblica Ceca)

N. Partner:

#### Abstract:

Targeted alpha therapy (TAT) is a rapidly growing cancer treatment modality, whereby alpha-emitting radiopharmaceuticals selectively target tumours whilst minimising the radiation to healthy tissues. Presently only  $^{223}\text{RaCl}_2$  has regulatory approval, but its success resulted in unprecedented levels of interest and investment in TAT for a variety of cancers. It is showing promising efficacy and increased survival in clinical trials; however, several unmet and unique measurement challenges remain a barrier to enable the safe and optimised implementation of emerging targeted alpha therapies. This project will provide the metrology needed to support end-to-end traceability before wide routine adoption.

Anno di stipula: 2023

Tipo progetto: RIA - Research and Innovation Action

Programma UE: HORIZON EUROPE  
EPM - European Partnership on Metrology

Data inizio: 01-09-2023

Data scadenza: 31-08-2026

Contributo totale: € 1.887.356

Costo eleggibile totale: € 1.887.356

Contributo a ENEA: € 50.000

Costo eleggibile ENEA: € 50.000

Doc. approvazione: 123/2023/FSN

Codice atto: PF5AAN

Resp. scientifico ENEA: CAPOGNI MARCO

Unità: FSN-INMRI

#### Attività ENEA:

L'ENEA-INMRI, oltre alla partecipazione ai work package di impatto/comunicazione (WP5) e gestionale (WP6), parteciperà attivamente al WP1: Standards di attività e dati nucleari di decadimento per imaging e dosimetria per radionuclidi emettitori alfa. In questo work package l'ENEA-INMRI sarà impegnato soprattutto nello sviluppo, in collaborazione con altri partner europei, di un nuovo standard di Ac-225.



Coordinatore: SCK CEN - STUDIECENTRUM VOOR KERNENERGIE / CENTRE D'ETUDE DE L'ENERGIE NUCLEAIRE (Belgio) N. Partner:

**Abstract:**

The importance of low carbon energy sources in the efforts against rapid climate change makes nuclear energy part of a sustainable energy mix. Although there have been years of experience feedback with water cooled reactors, fundamental improvement, particularly regarding intrinsic safety and reduced nuclear waste generation is possible using advanced nuclear designs. Heavy metal cooled systems such as the lead fast reactor (LFR) combine the advantages of a fast reactor system that reduces waste with the intrinsic safety related properties such as the high boiling point, chemical inertia and improved heat transfer. ANSELMUS responds to the Horizon-Euratom -2021-NRT-01-02 call Safety of advanced and innovative nuclear designs and fuels. Its objective is to contribute significantly to the safety assessment of heavy-liquid-metal (HLM) systems, in particular ALFRED and MYRRHA as these are included in the roadmap for the development of advanced systems in Europe. It will use the maturity of both designs to create two detailed phenomena identification and ranking tables (PIRT) that identify all verification and validation needs and are used for further safety evaluation. The project will also experimentally validate key safety related sub-systems including the safety rods, failed fuel pin detection and the coolant chemistry control system. We also will improve the validation of numerical models describing the fuel assembly through experiments and simulations and work on reactor safety monitoring and inspection of HLM systems focusing on high temperature vessel inspection. Moreover, ANSELMUS will look into the societal impact of HLM reactors by assessing the integration of LFR in a mixed energy landscape, including economical aspects, and by addressing social and ethical considerations of advanced nuclear technologies. Finally, a dedicated effort will be put into education and dissemination towards all stakeholders including policy makers and the general public.

Anno di stipula: 2022  
 Tipo progetto: RIA - Research and Innovation Action  
 Programma UE: Euratom2027  
 Euratom fissione  
 Data inizio: 01-09-2022  
 Data scadenza: 31-08-2026

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Contributo totale: € 3.464.443  
 Costo eleggibile totale: € 4.509.865  
 Contributo a ENEA: € 682.969  
 Costo eleggibile ENEA: € 921.875

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Doc. approvazione: 081/2022/FSN  
 Codice atto: PF0AAR  
 Resp. scientifico ENEA: TARANTINO MARIANO  
 Unità: FSN-PROIN

**Attività ENEA:**

ENEA è coinvolta nei seguenti work package (WP): - WP1 PIRT on HLM systems; - WP2 Fuel assembly safety (12 PM) - WP3 Validation of safety systems (30 PM) - WP4 Reactor safety monitoring & inspection



Coordinatore: HELMHOLTZ-ZENTRUM DRESDEN-ROSSENDORF EV (Germania)

N. Partner:

**Abstract:**

For the continuing improvement of the safety of current and planned nuclear facilities accurate and precise nuclear data are required to simulate the ongoing processes on the atomic level. In order to maintain the transfer of knowledge to the younger generation and to countries with less advanced nuclear programs the most modern and state of the art neutron beam facilities based on accelerators and research reactors will unite in this project international experts with interested early stage researchers (ESR) and technicians to work on the most challenging problems. Experimental work in international teams at these facilities will be the most effective training and competence building tool. The project will provide at least 3000 additional beam time hours for external users groups at the neutron facilities of the consortium. Up to 90 ESR and technicians will be able to receive full mobility and logistical support to participate in these experiments at 23 different accelerator or reactor based neutron facilities. The training of ESR in the field of nuclear physics and nuclear engineering will be complemented by up to 30 research stays of up to 12 weeks duration for extended work at the participating facilities. These activities, which are also open to senior scientists and now also to technical and professional staff, will continue to foster the exchange of knowledge that has grown in earlier EURATOM work programmes, e.g. within CHANDA, or ERINDA. The scientific proposals for experiments and training of ESR will be selected by a Project Advisory Committee consisting of high-level experts based on scientific excellence and relevance to improve nuclear safety and support of current nuclear data needs as addressed by IAEA and NEA. In order to increase the visibility and attractiveness at the university level four summer schools with about 80 participants shall be organized, where the wider target group should be students with physics and engineering backgrounds.

Anno di stipula: 2019

Tipo progetto: CSA - Coordination and support action

Programma UE: HORIZON 2020 - Euratom  
Euratom fissione

Data inizio: 01-09-2019

Data scadenza: 31-08-2023

Contributo totale: € 1.998.670

Costo eleggibile totale: € 1.998.670

Contributo a ENEA: N/D

Costo eleggibile ENEA: N/D

Doc. approvazione: 111/2019/FSN;  
40/2023/FSN

Codice atto: CF3AAM

Resp. scientifico ENEA: PIETROPAOLO  
ANTONINO

Unità: FSN-FUSTEC-TEN

**Attività ENEA:**

ENEA sarà coinvolta nello svolgimento di misure di sezioni d'urto nucleari, verifica di dati nucleari esistenti e caratterizzazione di rivelatori per misure di fisica nucleare, attraverso campagne sperimentali con il generatore di neutroni FNG di Frascati (FSN-FUSTEC-TEN).

## Artificial intelligence for the Simulation of Severe Accidents



Coordinatore: IRSN INSTITUT DE RADIOPROTECTION ET DE SURETE NUCLEAIRE (Francia) N. Partner:

**Abstract:**

The ASSAS project aims at developing a proof-of-concept SA (severe accident) simulator based on ASTEC (Accident Source Term Evaluation Code). The prototype basic-principle simulator will model a simplified generic Western-type pressurized light water reactor (PWR). It will have a graphical user interface to control the simulation and visualize the results. It will run in real-time and even much faster for some phases of the accident. The prototype will be able to show the main phenomena occurring during a SA, including invessel and ex-vessel phases. It is meant to train students, nuclear energy professionals and non-specialists. In addition to its direct use, the prototype will demonstrate the feasibility of developing different types of fast-running SA simulators, while keeping the accuracy of the underlying physical models. Thus, different computational solutions will be explored in parallel. Code optimisation and parallelisation will be implemented. Beside these reliable techniques, different machine-learning methods will be tested to develop fast surrogate models. This alternate path is riskier, but it could drastically enhance the performances of the code. A comprehensive review of ASTEC's structure and available algorithms will be performed to define the most relevant modelling strategies, which may include the replacement of specific calculations steps, entire modules of ASTEC or more global surrogate models. Solutions will be explored to extend the models developed for the PWR simulator to other reactor types and SA codes. The training data-base of SA sequences used for machine-learning will be made openly available. Developing an enhanced version of ASTEC and interfacing it with a commercial simulation environment will make it possible for the industry to develop engineering and full-scale simulators in the future. These can be used to design SA management guidelines, to develop new safety systems and to train operators to use them.

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|--------------------------|--------------------------------------|
| Anno di stipula:         | 2022                                 |
| Tipo progetto:           | RIA - Research and Innovation Action |
| Programma UE:            | Euratom2027<br>Euratom fissione      |
| Data inizio:             | 01-11-2022                           |
| Data scadenza:           | 31-10-2026                           |
| Contributo totale:       | € 3.008.132                          |
| Costo eleggibile totale: | € 3.700.349                          |
| Contributo a ENEA:       | € 160.875                            |
| Costo eleggibile ENEA:   | € 247.500                            |
| Doc. approvazione:       | 078 /2022/FSN                        |
| Codice atto:             | PF6AAU                               |
| Resp. scientifico ENEA:  | MASCARI FULVIO                       |
| Unità:                   | FSN-SICNUC-SIN                       |

**Attività ENEA:**

ENEA è coinvolta nei seguenti work package: . WP1 dedicato alla definizione della strategia di modellazione ed al supporto degli altri WPs. . WP2 dedicato alla generazione del database necessario per il training degli algoritmi di machine learning per i modelli surrogati . WP3 dedicato all'esplorazione dell'applicabilità di diverse metodologie di machine learning e sviluppo di modelli surrogati . WP6 dedicato alla comunicazione ed alla disseminazione dei risultati del progetto, all'organizzazione delle attività di training e alle conclusioni del progetto.



## BATTERY 2030-CSA3 large-scale research initiative: At the heart of a connected green society

Coordinatore: UNIV. UPPSALA (Svezia)

N. Partner:

### Abstract:

Collaborative, long-term research on future battery technologies has since 2019 been supported by the European Commission with the BATTERY 2030+ initiative. This project, BATTERY 2030+ CSA3, builds on earlier CSA efforts to coordinate and monitor research projects earmarked BATTERY 2030+ to work together towards the goals in the BATTERY 2030+ roadmap. Other HE R&I projects are invited as associated. The overall aim of the BATTERY 2030+ initiative, is to invent the batteries of the future by providing breakthrough technologies to the European battery industry across the full value chain; to strengthen long-term European leadership in both existing markets (road transport, stationary energy storage), and future emerging applications (aerospace, medical devices, internet of things). In this third phase Accelerated Materials Discovery, Battery Interfaces, Smart Functionalities, Manufacturing and Recycling are covered. BATTERY 2030+ CSA3 builds on, and extends beyond, the earlier achievements of the BATTERY 2030+ initiative with five objectives: - Obj 1: Implementation and monitoring of the research activities contributing to the BATTERY 2030+ initiative - Obj 2: Update and develop the BATTERY 2030+ roadmap, by mapping ongoing R&I activities and identifying emerging obstacles and research needs - Obj 3: Accelerate the research by identifying and making available best practices and guidelines for ontology development, data sharing and standardizations - Obj 4: Contribute to European curricula in future battery technologies - Obj 5: Promote and communicate the objectives and the achievements of the BATTERY 2030+ initiative and strengthen collaboration with other EU R&I battery initiatives The CSA3 consortium consists of 19 leading European universities and research institutes (UU, AIT, CEA, CIC Energigune, CIDETEC, CNRS/LRCS, DTU, EMPA, ENEA, FRAUNHOFER, FZJ, KIT, WWU, NIC, POLITO, SINTEF, TU Delft, VUB, and WTU) and 4 Associations (Recharge, EASE, EMIRI, and VDI-VDE-T)

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|--------------------------|--|
| Anno di stipula:         | 2023   |
| Tipo progetto:           | CSA - Coordination and support action                    |
| Programma UE:            | HORIZON EUROPE<br>Cluster 5 - D2 Cross-cutting solutions |
| Data inizio:             | 01-09-2023   |
| Data scadenza:           | 31-08-2026   |
| Contributo totale:       | € 3.102.224  |
| Costo eleggibile totale: | € 3.102.224  |
| Contributo a ENEA:       | € 30.500   |
| Costo eleggibile ENEA:   | € 30.500   |
| Doc. approvazione:       | 87/2023/TERIN  |
| Codice atto:             | PK4AAX   |
| Resp. scientifico ENEA:  | AURORA ANNALISA  |
| Unità:                   | TERIN-PSU-ABI  |

### Attività ENEA:

Il consorzio Battery 2030+ è al suo terzo mandato e l'ENEA è presente in esso fin dalla prima costituzione. Da tal contesto sono scaturite ben due roadmap e una serie di call di H2020. In questa terza fase l'ENEA proseguirà con il suo ruolo attivo con l'obiettivo di continuare a rafforzare e coordinare i network nazionali da innestare a livello europeo. In questo progetto l'ENEA è coinvolta nelle seguenti task: 1. Task 1.2: Meetings with B2030+ associated projects to collaborate with the CSA3 and the B2030+ projects 2. Task 2.2: Research Vision and Research & Innovation Roadmap 3. Task 5.3: Communication and dissemination coordination within the European R&I landscape 4. Task 6.1: Strategic decision making



## BATTERY 2030+ large-scale research initiative: At the heart of a connected green society

Coordinatore: UNIV. UPPSALA (Svezia)

N. Partner:

### Abstract:

Batteries are one key technology enabling a climate-neutral Europe by 2050. A pan-European research and innovation action is necessary to tackle the challenges preventing batteries to reach ultrahigh performance and to rapidly find new sustainable battery materials. The BATTERY 2030+ large-scale research initiative aims to invent the batteries of the future by providing breakthrough technologies to the European battery industry throughout the value chain and enable long-term European leadership in both existing markets (road transport, stationary energy storage), and future emerging applications (robotics, aerospace, medical devices, internet of things). This application for a Coordination and Support Action, with the acronym BATTERY 2030PLUS, will lead to the continued development of the BATTERY 2030+ large-scale research initiative. It kick-starts a European long-term research initiative on batteries. The main objectives are to develop the BATTERY 2030+ R&I roadmap and facilitate its implementation by coordinating and monitoring the consortia winning the calls LC-BAT-12, 13, 14 -2020. In addition, this consortium will in collaboration with the LC-BAT projects, propose guidelines for data sharing, standardization of protocols, and modelling methods/tools. The consortium will also prepare a common strategy for the protection and commercial exploitation of the results, as well as building competence by new European curricula and facilitate the communication, dialogue, and cooperation on cross-cutting topics. Together with the ETIP Batteries Europe the consortium will develop the SET-Plan for batteries and establish links to national and international battery stakeholder networks.

|                          |                                       |
|--------------------------|---------------------------------------|
| Anno di stipula:         | 2020                                  |
| Tipo progetto:           | CSA - Coordination and support action |
| Programma UE:            | HORIZON 2020<br>Energy                |
| Data inizio:             | 01-09-2020                            |
| Data scadenza:           | 31-08-2023                            |
| Contributo totale:       | € 2.098.703                           |
| Costo eleggibile totale: | € 2.098.703                           |
| Contributo a ENEA:       | € 21.650                              |
| Costo eleggibile ENEA:   | € 21.650                              |
| Doc. approvazione:       | 75/2020/DTE                           |
| Codice atto:             | PT4ABC                                |
| Resp. scientifico ENEA:  | MORENO MARGHERITA                     |
| Unità:                   | DTE-PCU-SPCT                          |

### Attività ENEA:

L'ENEA è coinvolta in numerose task: 1.2: Organise meetings with LC-BAT 12, 13 and 14 projects 1.4: contribute to standardisation of protocols for experimental data and for modelling methods/tools 2.1: science and innovation roadmap 2.2: mapping of current activities contributin to identified R&I areas 2.3: proposition of future R&I actions 4.1: communication and dissemination 4.2: stakeholder engagement 4.3: annual conferences 5.1: strategic decision making 5.2: operational management

Coordinatore: KIC INNOENERGY SE (Paesi Bassi)

N. Partner:

**Abstract:**

Batteries Europe Secretariat (BEST) proposal aims to enrich, strengthen and extend the key role of Batteries Europe by gathering academia, industry and research expertise within the Secretariat to consolidate the Battery R&I community and assist the existing platform in the achievement of their ambitious goals. BEST consortium will engage in its experts working groups industry stakeholders, academia, policy makers, researchers and citizens from all the value chain, especially broadening involvement on underrepresented domains and countries. BEST will contribute to gain synergies among battery R&I stakeholders' landscape, consolidate the workflow among the initiatives, facilitate free and inclusive access to information, strength industry-research collaboration to push technology developments to reduce time to market of new solutions, reinforce European talent attraction capacity and provide fact-based orientations to policy makers. The Secretariat will gather expertise to develop Strategic R&I agenda, design updated roadmaps, establish KPIs per application (transport, stationary, portable, etc.) to nurture the SET Plan, contribute to standards and reporting methodologies harmonization, promote education on battery fields and rise social awareness. The Secretariat will organize workshops per objectives, complemented with experts' interviews, discussion forums, scientific papers review, etc. to confront current state of the art with future trends, considering international tendencies. BEST is formed by 11 partners and 4 affiliated entities, led by Innenergy, with ZABALA, CLERENS SINTEF, VDI/VDE INNOVATION, CICenergiGUNE INSTM (UNIMIB, UNIPV, POLITO), EERA, EASE and ENEA. The partners are promoters of main European initiatives related to batteries that has facilitated the establishment of collaboration flows to bring Batteries Europe Platform to next stage in 36 months.

Anno di stipula: 2022

Tipo progetto: CSA - Coordination and support action

Programma UE: HORIZON EUROPE  
Cluster 5 - D2 Cross-cutting solutions

Data inizio: 01-05-2022

Data scadenza: 30-04-2025

Contributo totale: € 2.999.886

Costo eleggibile totale: € 2.999.976

Contributo a ENEA: € 263.588

Costo eleggibile ENEA: € 263.588

Doc. approvazione: 104/2022/TERIN

Codice atto: PK4AAQ

Resp. scientifico ENEA: AURORA ANNALISA

Unità: TERIN-PSU-ABI

**Attività ENEA:**

L'ENEA è coinvolta con peso differente in tutti i WP ad eccezione del secondo. Il maggior e considerevole contributo è nel WP3 (R&I for European Industrial Competitiveness) in cui fornirà supporto nella stesura della (i) SRIA (Strategic Research and Innovation Agenda), (ii) delle Roadmaps dei singoli WG di Batteries Europe, (iii) nella definizione delle KPI (Key Performance Indicators) e nella definizione delle linee guida per uniformare gli standard e le metodologie di reporting nell'ambito della letteratura scientifica inerente alle batterie. In quest'ultima task l'ENEA svolge il ruolo di coordinamento.

## Beyond EPICA Oldest Ice Core: 1,5 Myr of greenhouse gas – climate feedbacks

Coordinatore: CNR - CONSIGLIO NAZIONALE DELLE RICERCHE (Italia)

N. Partner:

## Abstract:

To better constrain the long-term response of Earth's climate system to continuing greenhouse gas emissions, it is essential to turn to the past. A key advance would be to understand the shift in Earth's climate response to orbital forcing during the 'Mid-Pleistocene transition' [MPT, 900,000 (900 kyr) to 1.2 million years (1.2 Myr) ago], when a dominant 40 kyr cyclicity gave way to the current 100 kyr period. It is critical to understand the role of forcing factors and especially of greenhouse gases in this transition. Unravelling such key linkages between the carbon cycle, ice sheets, atmosphere and ocean behaviour is vital, assisting society to design an effective mitigation and adaptation strategy for climate change. Only ice cores contain direct and quantitative information about past climate forcing and atmospheric responses. However, the longest (EPICA) ice core record available to date covers only the last 800 kyr. The RIA Topic LC-CLA-08-2018 empowers the European ice core community to perform such an oldest ice core drilling and the project 'Beyond EPICA' is taking on this unique challenge and opportunity. The overarching scientific objective driving 'Beyond EPICA' is to obtain quantitative, high-resolution ice-core information on climate and environmental changes over the last 1.5 Myr. The cause and effect relationship that led to the enigmatic MPT change in the climate system is not understood yet, as important information on global changes in the climate system is still missing. Most of this information, including the phasing of these changes in the Earth System can only be derived from a continuous ice core from Antarctica covering the last 1.5 Myr. This proposal uses the planning derived during the recent BE-OI CSA, and offers an excellent team (the only team globally that could at present accept the challenge of the call), underpinned by excellent infrastructure and capacity, and is currently ensuring it has an excellent location for the core.

Anno di stipula: 2019

Tipo progetto: RIA - Research and Innovation Action

Programma UE: HORIZON 2020  
Climate Action, Environment, Resource Efficiency and Raw Materials

Data inizio: 01-06-2019

Data scadenza: 31-05-2025

Contributo totale: € 10.999.942

Costo eleggibile totale: € 10.999.942

Contributo a ENEA: € 2.610.000

Costo eleggibile ENEA: € 2.610.000

Doc. approvazione: 96/2019/PRES

Codice atto: PA0AAK

Resp. scientifico ENEA: FREZZOTTI MASSIMO

Unità: SSPT-PROTER-OAC

## Attività ENEA:

L'ENEA è impegnata nel progetto attraverso l'Unità Tecnica Antartide che ha il compito di attuare le attività logistiche, integrandole nella più ampia e generale gestione delle spedizioni antartiche e della stazione Concordia. Per gli aspetti scientifici del progetto l'Unità Tecnica Antartide si avvale del supporto del Dipartimento Sostenibilità dei sistemi produttivi e territoriali.





## MARINE BIODIVERSITY ASSESSMENT AND PREDICTION ACROSS SPATIAL, TEMPORAL AND HUMAN SCALES

**Coordinatore:** EMBL - EUROPEAN MOLECULAR BIOLOGY LABORATORY (Organ. Internazionali) **N. Partner:**

### Abstract:

Marine biodiversity sustains ecosystem services for planetary and human health. Recent surveys of marine ecosystems have unveiled our ignorance of the richness and functioning of marine life, which is changing in the Anthropocene at a faster pace than terrestrial life. BIOcean5D unites major European centers in molecular/cell biology (EMBL), marine biology (EMBRC), and sequencing (Genoscope), together with 26 partners from 11 countries, to build a unique suite of technologies, protocols, and models allowing holistic re-exploration of marine biodiversity, from viruses to mammals, from genomes to holobionts, across multiple spatial and temporal scales stretching from pre-industrial to today. A focus is to understand pan-European biodiversity land-to-sea gradients and ecosystem services, including marine exposomes, notably with an expedition (TREC, 2023/24) that will deploy mobile labs, research vessels including the Tara schooner, and innovative citizen science tools, across 21 coastal countries and 35 marine labs from the Mediterranean to Arctic seas. New data will be harmonized with existing data into an open-access data hub, leveraging international infrastructures, and generating transformative, crosstechnologies/cross-scales standard marine biodiversity knowledge at the socio-ecosystem level. Knowledge will inform and constrain (i) new theories and models of marine biodiversity ecological and evolutionary dynamics and drivers, at both taxonomic and functional scales, (ii) a portfolio of novel holistic indicators of marine ecosystem health, (iii) innovative methods and protocols for economic and legal valuations of marine biodiversity and services integrating the dynamical and functional complexity of marine life. BIOcean5D will create a unique opportunity to bridge molecular/subcellular biology to organismal biology, theoretical ecology and econometrics, and marine complex systems to social sciences, toward the sustainable preservation of our oceans and seas.

**Anno di stipula:** 2022

**Tipo progetto:** RIA - Research and Innovation Action

**Programma UE:** HORIZON EUROPE  
Cluster 6 - Food, Bioeconomy, Natural Resources, Agriculture and Environment

**Data inizio:** 01-12-2022

**Data scadenza:** 30-11-2026

**Contributo totale:** € 15.449.903

**Costo eleggibile totale:** € 15.449.903

**Contributo a ENEA:** € 141.945

**Costo eleggibile ENEA:** € 141.945

**Doc. approvazione:** 126/2022/SSPT-MET

**Codice atto:** PS2ACJ

**Resp. scientifico ENEA:** NAPOLITANO ERNESTO

**Unità:** SSPT-MET-CLIM

### Attività ENEA:

Le attività ENEA prevedono la produzione di una simulazione di tipo hindcast (ricostruzione del clima passato) ad altissima risoluzione spaziale per il Mar Mediterraneo che tenga conto non solo delle variabili fisiche ma anche di tutte le variabili biogeochimiche. In particolare sono previste le seguenti attività: costruzione del modello fisico; implementazione della componente biogeochimica; produzione dei forzanti meteorologici; realizzazione della simulazione di hindcast.



## Exploring the circular bioeconomy potential in cities. Proactive instruments for implementation by policy makers and stakeholders

Coordinatore: FUNDACIO ENT (Spagna)

N. Partner:

### Abstract:

BIOCIRCULARCITIES aims at supporting the development of innovative and comprehensive regulatory frameworks and roadmaps aligned with circular bioeconomy principles, centred on 'bio-based waste' and based on feedback from multi-actor participatory processes. The project has been designed to i) explore the circular economy potential of unexploited bio-based waste streams generated in 3 European urban contexts around the cities of Barcelona (ES), Naples (IT) and Pazardzhik (BG); ii) identify and analyse circular bioeconomy best practices across the EU that could be used as successful example to use in the pilot areas; iii) detect regulatory and business opportunities and shortcomings for the introduction of bio-based processes and products into local and international markets, and iv) propose proactive instruments and policy roadmaps for supporting the circular bioeconomy and expand it to the European context. The strength of the project lies in the capability to bring together multiple actors belonging to the quadruple helix (businesses, research institutions, public authorities and civil society) to build the collaborative knowledge needed to map the different perspectives about legal and market limits/potentials for developing circular bioeconomy. Having a holistic picture of the legal and market opportunities and barriers in the 3 case study areas will make it possible to check the applicability of the identified best practices and other feasible solutions. The fiscal and economic impact due to the introduction of specific regulations will be considered to foresee the investments needed to support industry in making changes towards a more circular use of bioresources. Results obtained at local level will be a source of contents to develop generic guidelines to be exploited and further developed through communication, dissemination and exploitation actions at local and international levels.

|                          |  |
|--------------------------|--|
| Anno di stipula:         | 2021                                       |
| Tipo progetto:           | CSA - Coordination and support action      |
| Programma UE:            | HORIZON 2020<br>JTI - Bio Based Industries |
| Data inizio:             | 01-10-2021                                 |
| Data scadenza:           | 30-09-2023                                 |
| Contributo totale:       | € 999.894                                  |
| Costo eleggibile totale: | € 999.894                                  |
| Contributo a ENEA:       | € 154.139                                  |
| Costo eleggibile ENEA:   | € 154.139                                  |
| Doc. approvazione:       | 69/2021/SSPT/USER                          |
| Codice atto:             | PS6ADI                                     |
| Resp. scientifico ENEA:  | ZUCARO AMALIA                              |
| Unità:                   | SSPT-USER-T4RM                             |

### Attività ENEA:

ENEA contribuisce a tutti i workpackage, con un ruolo di leadership per il workpackage 2 "Exploring the sustainability of bioeconomy supply chains in a Life Cycle Thinking perspective".

**Coordinatore:** ISINNOVA - Istituto di Studi per l'Integrazione dei Sistemi (Italia)

**N. Partner:**
**Abstract:**

BIOMETHAVERSE (Demonstrating and Connecting Production Innovations in the BIOMETHAne uniVERSE) aims to diversify the technology basis for biomethane production in Europe, to increase its cost-effectiveness, and to contribute both to the uptake of biomethane technologies and to the priorities of the SET Plan Action 8. To this aim five innovative biomethane production pathways will be demonstrated in five European countries: France, Greece, Italy, Sweden, and Ukraine. The project is based on the following founding pillars: Demonstration of innovative biomethane pathways; Technology optimisation and upscaling by techno-economic flowsheeting; Environmental and social sustainability assessment; Replicability, market penetration, support to planning decisions of other investors and project developers, policy recommendations to policy makers; Dissemination, exploitation and communication of project results. BIOMETHAVERSE relates, within the Work Program 2021-2022 on Climate, Energy and Mobility, to the Call "Sustainable, secure and competitive energy supply", specifically to the topic HORIZON-CL5-2021-D3-03-16: Innovative biomethane production as an energy carrier and a fuel. The project production routes cover one or a combination of the following production pathways: thermochemical, biochemical, electrochemical, and biological. As a starting point, four demonstration plants use conventional anaerobic digestion (AD), and one uses conventional gasification. In the BIOMETHAVERSE demonstrators, CO<sub>2</sub> effluents from AD or gasification and other intermediate products are combined with renewable hydrogen or renewable electricity directly to increase the overall biomethane yield. All demonstrated production routes go beyond conventional technologies, with a circular approach for energy and material, while aiming at reducing the overall biomethane production costs and increasing the biomethane production. The demonstrated technologies will reach TRL 6-7 at the end of the project.

**Anno di stipula:** 2022

**Tipo progetto:** IA - Innovation Action

**Programma UE:** HORIZON EUROPE  
Cluster 5 - D3 Energy supply

**Data inizio:** 01-10-2022

**Data scadenza:** 31-03-2027

**Contributo totale:** € 9.871.769

**Costo eleggibile totale:** € 11.489.961

**Contributo a ENEA:** € 595.325

**Costo eleggibile ENEA:** € 595.325

**Doc. approvazione:** 196/2022/TERIN

**Codice atto:** PK4AAS

**Resp. scientifico ENEA:** AGOSTINI ALESSANDRO

**Unità:** TERIN-PSU-ABI

**Attività ENEA:**

Le attività di pertinenza ENEA sono di natura modellistica pertanto non richiedono l'utilizzo di laboratori e prevedono come prodotti rapporti, pubblicazioni e databases. 1 - Supporto al coordinamento (WP1) 1.1 leadership task 1.2 ed elaborazione e aggiornamento Data Management Plan (Task 1.2) (6 PM) 3 – leadership della valutazione e ottimizzazione dei casi studio (WP3) 3.1 definizione della metodologia e strategia di raccolta dati (task 3.1) 3.2 modellazione dei casi studio e valutazione tecnoeconomica (task 3.2)



## Biomass Low cost Advanced Zero Emission small-to-medium scale integrated gasifier-fuel cell combined heat and power plant

Coordinatore: UNIV. GUGLIELMO MARCONI TELEMATICA (USGM) (Italia)

N. Partner:

### Abstract:

BLAZE aims at developing Low cost, Advanced and Zero Emission first-of-a-kind small-to-medium Biomass CHP. This aim is reached by developing bubbling fluidised bed technology integrating high temperature cleaning & conditioning system (IBFBG, that can convert heterogeneous feedstocks in a syngas with zero particulate matter and ultra-low tar and contaminants content), an integrated high temperature gas cleaning approach for HCl and H<sub>2</sub>S removal and an innovative key component for thermal and chemical integration of solid oxide fuel cell (efficient gas recirculation of the fuel cell anode exhaust to the gasification process via a steam-driven high speed micro-compressor using gas bearing technology). The technology is developed for a CHP capacity range from small (25-100 kWe) to medium (0.1-5 MWe) scale and is characterised by the widest fuel spectrum applicable (forest, agricultural, industrial and municipal waste also with high moisture, ash and contaminants content), high efficiencies (50% electrical versus the actual 20%), low investment (< 4 k€/kWe) and operation (~ 0.05 €/kWh) costs as well as almost zero gaseous and PM emissions, projecting electricity production cost below 0.10 €/kWh. Gasification, gas cleaning & conditioning and fuel cells will be tested at lab scale and 25 kWe SOFC will be thermally and chemically integrated in 100 kWth IBFBG demonstrating the achievement of new milestones, increasing competitiveness of European industry, energy system reliability and flexibility and biomass plants social acceptance. Process simulations, computer aided design, tests, performance evaluation, risk and safety analysis as well as a technology assessment part covering techno-economic, environmental and overall impact assessments and market studies will be carried out together with a clear dissemination, exploitation and communication plan, that can count on the involvement of the main gasifier, gas conditioning and SOFC European companies and research centres.

|                          |                                      |
|--------------------------|--------------------------------------|
| Anno di stipula:         | 2019                                 |
| Tipo progetto:           | RIA - Research and Innovation Action |
| Programma UE:            | HORIZON 2020<br>Energy               |
| Data inizio:             | 01-03-2019                           |
| Data scadenza:           | 31-05-2023                           |
| Contributo totale:       | € 4.255.615                          |
| Costo eleggibile totale: | € 4.255.615                          |
| Contributo a ENEA:       | € 210.375                            |
| Costo eleggibile ENEA:   | € 210.375                            |
| Doc. approvazione:       | 23/E/2019/DTE                        |
| Codice atto:             | PT1AAS                               |
| Resp. scientifico ENEA:  | BARISANO DONATELLA                   |
| Unità:                   | DTE-BBC-TER                          |

### Attività ENEA:

According to the project framework, ENEA is involved both in work packages (WP) focused on activities of project management and exploitation of results, and in WPs of R&D. Specifically, on these latter, ENEA participates with its consolidated know-how and well-equipped infrastructures on gasification and high-temperature fuel cells. At Trisaia Research Centre, different types of biomass residues, selected among those considered of major interest and possible use, will be tested. After chemical and physical-chemical characterization, the identified feedstocks will be used in experimental gasification campaigns in fluidized-bed reactor. The objective of these campaigns will be to define the process conditions at which the conversion of biomass into gaseous product will be the highest. Moreover, through the use of primary (in-bed) methods for reducing the load of contaminants directly in the implementation phase of the gasification process, materials will be identified that can contribute to the production of a gaseous stream of high quality, in terms of composition and calorific value, and low degree of contamination. At Casaccia Research Center, solid-oxide fuel cells (SOFC) will be tested to study their performance according to the quality of the supplied gas. The attention will be focused on the main contaminants of the produced gas to identify the type of SOFC that, in the final project phase of technologies integration, will achieve the best performances (i.e. high electrical efficiency, stability in operation and long lifetime).



## Business Relays for Innovation and Development Growing Economies

Coordinatore: S.I. IMPRESA - SERVIZI INTEGRATI IMPRESA (Italia)

N. Partner:

## Abstract:

The project "BRIDGEconomies\_2022-2025 (Business Relays for Innovation and Development of Growing Economies) proposed by this consortium covers the following regions of Southern Italy: Abruzzo, Basilicata, Calabria, Campania, Molise, Apulia and Sicily. The members of the consortium and their Host Structures include public/semi-public entities, whose activities are directly addressed to SMEs, guaranteeing an interregional coverage and services providing in all activity areas indicated in the call. The Consortium, already having a multi-annual experience in the Enterprise Europe Network, includes: the Italian Chamber of Commerce System - representing all entrepreneurial associations and the labour/civil society - specialised in services to SMEs, including the Special Agency of Naples Chamber of Commerce (SI IMPRESA); - an industrial association at regional level, in Sicily (Sicindustria); - scientific and technological organisation, specialised in innovation/research services to SMEs, including the National government Agency for new technologies, energy and environment (ENEA). Consortium partner will support SMEs, to innovate, grow and scale in the single market and beyond, contributing to their triple transition towards: sustainability, digitalisation and resilience. The proposed Consortium has 12 partners, involved since 2008 in the Enterprise Europe Network and one new partner which is a public/private organisation participated by ENEA (CETMA).

Anno di stipula: 2022  
 Tipo progetto: SA - Azioni di supporto  
 Programma UE: Other programmes 2021-2027  
 SMP - COSME  
 Data inizio: 01-01-2022  
 Data scadenza: 30-06-2025

Contributo totale: € 7.088.722  
 Costo eleggibile totale: € 11.764.210  
 Contributo a ENEA: € 1.053.124  
 Costo eleggibile ENEA: € 1.755.207

Doc. approvazione: 10/2022/ISV  
 Codice atto: PZ1AAC  
 Resp. scientifico ENEA: AMERIGHI OSCAR  
 Unità: ISV-DST-KES

## Attività ENEA:

Le attività di pertinenza ENEA riguarderanno la partecipazione al nodo della rete Enterprise Europe Network (EEN) denominato BRIDGEconomies, nelle regioni del Sud Italia. In particolare ENEA parteciperà alle attività del nodo EEN BRIDGEconomies per le regioni Campania e Puglia. Unità ENEA coinvolte: ISV-DST-KES, ISV-STP, ISV-MARK; ISER-POR; TERIN, TERIN-ICT, TERIN-STSN-SGRE; SSPT-SEC, SSPT, SSPT-USER-RISE, SSPT-USER-T4RM



Coordinatore: MINISTRY OF ECONOMIC AFFAIRS AND CLIMATE POLICY (Paesi Bassi)

N. Partner:

**Abstract:**

The objective of the 3rd Concerted Action on the Energy Efficiency Directive (CA EED3) is to foster exchange of information and experience among Member States and other participating countries (Norway) with a view to facilitating the implementation of the Directive of 2018/2002 amending Directive 2012/27/EU of the European Parliament and of the Council on energy efficiency (EED), including the implementation of the foreseen recast of this Directive. The Action follows on from the CA ESD, CA EED and CA-EED 2 which has helped MS with the interpretation of the legislation, the implementation options and support via detailed information and access to experts on mature policies and practices. The specific objectives of the Action are: • To enhance and structure the sharing of information and experiences from national implementation whilst promoting good practice concepts in activities to improve and strengthen MS implementation of the EED. • To encourage dialogue between MS on common approaches for the effective implementation of particular parts of the EED and synergies with RED and EPBD. • To complement the work of the EED Committee assisting the European Commission. The expected impact of the Action consists of a more harmonized approach and improved implementation of the EED in MS, as well as the transfer of good practices between countries and strengthened cross fertilisation with CA EPBD and CA RES. The CA EED3 brings together a unique group of experts and policy makers, it is the only informal group with full representation of all Member States and Norway and by its very nature provides MS, DG Energy and CINEA with a unique opportunity to communicate in an informal way on a technical level with relevant experts. The Concerted Action community has developed during the course of the CA ESD, CA EED and CA-EED 2 making it easy to find entry points in MS where without the Action contacts would be difficult. In turn the road is paved for bilateral cooperation.

Anno di stipula: 2022

Tipo progetto: CSA - Coordination and support action

Programma UE: HORIZON 2020  
Energy

Data inizio: 01-01-2022

Data scadenza: 31-12-2027

Contributo totale: € 4.999.770

Costo eleggibile totale: € 4.999.770

Contributo a ENEA: € 70.490

Costo eleggibile ENEA: € 70.490

Doc. approvazione: 26/2021/DUEE-SPS

Codice atto: PW3ABA

Resp. scientifico ENEA: SALAMA ANNA MARIA

Unità: DUEE-SPS-MPE

**Attività ENEA:**

L'ENEA partecipa contribuendo alle attività di tutti i WP (sotto riportati) ma in particolare a quelle dei WP 3, 4, 5 e 7: . WP1: Coordinamento . WP2: Team di Gestione del Progetto (Management Team) . WP3: Aree di Esperti e Settori Tematici (Domains) . WP4: Gruppi di Lavoro . WP5: Riunioni Plenarie di Progetto, Riunioni dei Punti di Contatto Nazionali e Visite Studio . WP6: comunicazione e divulgazione dei risultati . WP7: attività di reporting.



Coordinatore: ECMWF - EUROPEAN CENTRE FOR MEDIUM-RANGE WEATHER FORECASTS (Organ. Internazionali) N. Partner:

**Abstract:**

Monitoring the composition of the atmosphere is a key objective of the European Union's flagship Space programme Copernicus, with the Copernicus Atmosphere Monitoring Service (CAMS) providing free and continuous data and information on atmospheric composition. The CAMS Service Evolution (CAMEO) project will enhance the quality and efficiency of the CAMS service and help CAMS to better respond to policy needs such as air pollutant and greenhouse gases monitoring, the fulfilment of sustainable development goals, and sustainable and clean energy. CAMEO will help prepare CAMS for the uptake of forthcoming satellite data, including Sentinel-4, -5 and 3MI, and advance the aerosol and trace gas data assimilation methods and inversion capacity of the global and regional CAMS production systems. CAMEO will develop methods to provide uncertainty information for users of CAMS emissions, policy, solar radiation and deposition products in response to prominent requests from current CAMS users. CAMEO will contribute to the medium to long-term evolution of the CAMS production systems and products. The transfer of developments from CAMEO into subsequent improvements of CAMS operational service elements is a main driver for the project and is the main pathway to impact for CAMEO. The CAMEO consortium, led by ECMWF, the entity entrusted to operate CAMS, includes several CAMS partners thus allowing CAMEO developments to be carried out directly within the CAMS production systems and facilitating the transition of CAMEO results to future upgrades of the CAMS service. This will maximise the impact and outcomes of CAMEO as it can make full use of the existing CAMS infrastructure for data sharing, data delivery and communication, thus supporting policymakers, business and citizens with enhanced atmospheric environmental information.

Anno di stipula: 2023

Tipo progetto: RIA - Research and Innovation Action

Programma UE: HORIZON EUROPE  
Cluster 4 - Digital, Industry and Space

Data inizio: 01-01-2023

Data scadenza: 31-12-2025

Contributo totale: € 7.499.953

Costo eleggibile totale: € 7.499.953

Contributo a ENEA: € 110.000

Costo eleggibile ENEA: € 110.000

Doc. approvazione: 231/2022/SSPT-MET

Codice atto: PS2ACM

Resp. scientifico ENEA: ADANI MARIO

Unità: SSPT-MET-INAT

**Attività ENEA:**

Le attività previste dal progetto CAMEO costituiscono il naturale prosieguo del progetto CAMS50 (leader Meteo France), svolto insieme ad altri 9 istituti europei e del progetto CAMS2\_40 che prevede la messa in operatività del modello MINNI al pari degli altri partner. L'attività proposta consente all'Italia e al modello di calcolo di ENEA (diffuso tra l'altro in molteplici Agenzie Regionali per l'Ambiente) di sviluppare nuove funzionalità utili ai servizi CAMS e mantenere un livello di sviluppo pari agli altri sistemi modellistici del progetto CAMS2\_40. L'ENEA dovrà sviluppare all'interno del sistema modellistico MINNI la capacità di poter assimilare i prodotti del sensore satellitare Tropomi montato su uno dei satelliti costellazione Sentinel nell'ambito del programma Copernicus. In particolare l'attività prevede: • di innovare algoritmi di assimilazione già esistenti • di produrre esperimenti numerici di assimilazione per gli inquinanti CO, O3, SO2 e NO2 • di produrre report periodici sulle attività svolte



## MF for the provision of Regional Air Quality Products

Coordinatore: METEO-FRANCE CENTRE NATIONAL DE RECHERCHES METEOROLOGIQUES (Francia) N. Partner:

## Abstract:

This ITT, entitled 'Regional air quality products' is for the operational delivery of the European-scale air quality component of CAMS. It consists of a set of services, which are further detailed in the technical specification in ITT documents. The production must be based upon a geographically distributed ensemble of more than ten individual models and a central processing function to deliver three numerical data streams: on a daily basis, analyses for the previous day and forecasts for key air pollutants up to +96h with a temporal resolution of one hour; with a delay of a few weeks (in order to maximise the number of observations), interim reanalyses shall be produced daily with systems frozen in their configuration of January 1st every year; with a delay of up to two years (due to the delay in getting fully validated data), reanalyses shall be produced with frozen systems, which are only updated every few years. All the individual Regional Systems must be mature, well-validated and operated by their main developers. This aspect is essential so that the operators can directly maintain a continuous workflow of changes to the numerical systems, in order to include new research developments, to make corrections reflecting findings from verification and validation activities, as well as to implement changes to better meet user requirements. Acquisition of data, production of analyses, reanalyses and forecasts, data dissemination services and support to the users form the bulk of the operational delivery and development activities that are procured within this ITT.

Anno di stipula: 2021  
 Tipo progetto: Service contract  
 Programma UE: Other programmes  
 Copernicus  
 Data inizio: 01-11-2021  
 Data scadenza: 31-05-2025

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Contributo totale: € 6.496.496  
 Costo eleggibile totale: € 6.496.496  
 Contributo a ENEA: € 466.000  
 Costo eleggibile ENEA: € 466.000

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Doc. approvazione: 316/2021/SSPT-MET  
 Codice atto: CS2ACA  
 Resp. scientifico ENEA: ADANI MARIO  
 Unità: SSPT-MET-INAT

## Attività ENEA:

L'ENEA svolge in particolare le seguenti attività: . Congiuntamente con TERIN-ICT-HPC, mantenere attiva una versione operativa del modello previsionale nei termini del contratto CAMS2\_40 Regional Air Quality Production, con: operazioni quotidiane di acquisizione delle previsioni meteorologiche operative ad alta risoluzione fornite da ECMWF; acquisizione del dataset di incendi e condizioni al contorno chimiche fornite dal programma Copernicus; acquisizione ed assimilazione delle osservazioni di qualità dell'aria fornite dall' European Environment Agency (EEA) e delle osservazioni avanzate sulla composizione chimica fornite dai programmi ACTRIS and EMEP; . Ricepire gli sviluppi del modello così come richiesti dal committente a tutti gli 11 modelli operativi . Produrre report periodici di varia tipologia, secondo la tempistica indicata dal committente.



**Coordinatore:** UEFISCDI - EXECUTIVE UNIT FOR RESEARCH, DEVELOPMENT AND INNOVATION. **Partner:** HIGHER EDUCATION FUNDING (Romania)

**Abstract:**

CapaCITIES will shape a European environment conducive to urban climate neutrality transitions for national, regional and local authorities. The project aims to initiate and strengthen national change processes by establishing national networks and governance structures and by providing dedicated support for public authorities to put enabling conditions and measures for cities in place for achieving the cities mission. To achieve this ambition, the CapaCITIES consortium represents 15 European countries who have committed to initiate and strengthen national change processes by ministerial or other high political level. CapaCITIES thereby build on a well-established network of national authorities (national ministries and agencies responsible for urban transition) with its relevant urban stakeholder organisations beyond the consortium partners and countries. To all project partners CapaCITIES offers dedicated services to in support of national change process. First, a transnational alliance for public authorities to exchange, learn and inspire each other in their transition towards climate neutral cities. Second, support in prototyping innovative multi-level and cross sector governance structures. Third, thematic capacity building for public authorities and support in taking effective local action and fourth, strategic synergies and access to other initiatives that address the climate neutral and smart cities mission.

**Anno di stipula:** 2022

**Tipo progetto:** CSA - Coordination and support action

**Programma UE:** HORIZON EUROPE  
Mission Climate neutral and smart cities

**Data inizio:** 01-10-2022

**Data scadenza:** 30-09-2024

**Contributo totale:** € 1.997.951

**Costo eleggibile totale:** € 1.997.952

**Contributo a ENEA:** € 65.187

**Costo eleggibile ENEA:** € 65.187

**Doc. approvazione:** 175/2022/TERIN

**Codice atto:** PK5AAK

**Resp. scientifico ENEA:** CLERICI MAESTOSI  
PAOLA

**Unità:** TERIN-SEN

**Attività ENEA:**

ENEA TERIN SEN coordina attività a supporto della crescita professionale dei dipendenti delle pubbliche amministrazioni urbane in merito ai temi della sostenibilità energetica e svolge funzioni di supporto alla diffusione ed alla replicabilità dei modelli di sostenibilità urbana anche attraverso strumenti e metodi già ampiamente utilizzati nel corso degli anni.



## Novel Ceramic Matrix Composites produced with Microwave assisted Chemical Vapour Infiltration process for energy-intensive industries

Coordinatore: UNIV. PISA (Italia)

N. Partner:

### Abstract:

The "European Green Deal" aims at Europe as the first climate-neutral continent by 2050. Research and innovation on technologies allowing intense exploitation of renewable energy is paramount. Renewable energy sources are, for their very nature, fluctuating, and potentially generating extreme conditions. Adaptation and optimisation of current processes to changes caused by increased use of renewable energy sources is particularly important in energy-intensive industries. Novel materials are needed to sustain conditions, such as higher temperatures and corrosive environments and, at the same time, guarantee energy efficiency and high-performances. Materials potentially able to withstand such extreme conditions keeping excellent thermo-mechanical properties already exist, but are currently used only in sectors such as aerospace due to the high production costs: Ceramic Matrix Composites (CMCs). In CEM-WAVE we aim at introducing an innovative CMC production process, based on Microwave-assisted Chemical Vapour Infiltration (MW-CVI) technologies. This novel proposed process will extremely reduce processing costs, thus making CMCs sustainable for process industries in energy-intensive sectors such as steelmaking. In more detail, CEM-WAVE aims at validating, in a radiant tube furnace, a small scale CMC-based tube embedded with sensors, substituting Inconel/Stainless steel alloys currently employed. The research and innovation work will be flanked by Artificial Intelligence (AI)-aided modelling research to predict the material behaviour, and will develop innovative joining and coating technologies to produce complex shaped components and further improving their high-temperature corrosion resistance. Life-Cycle Assessment (LCA), Life-Cycle Costing (LCC) and Thermo-economic Analysis (TA) will guarantee that the project follows at every step the best directions in term of sustainability and future market uptake of the generated results.

Anno di stipula: 2020

Tipo progetto: RIA - Research and Innovation Action

Programma UE: HORIZON 2020  
NMBP Nanotechn., Adv Materials, Adv Manufacturing and Processing, and Biotech

Data inizio: 01-10-2020

Data scadenza: 31-03-2024

Contributo totale: € 4.878.720

Costo eleggibile totale: € 4.878.720

Contributo a ENEA: € 189.614

Costo eleggibile ENEA: € 189.614

Doc. approvazione: 166/2020/SSPT-PROMAS

Codice atto: PS3ACV

Resp. scientifico ENEA: MINGAZZINI CLAUDIO

Unità: SSPT-PROMAS-TEMAF

### Attività ENEA:

Le attività ENEA prevedono l'esecuzione di attività sperimentali relative alla qualificazione dei nuovi materiali, nonché un contributo alla messa a punto dei processi. L'ENEA è work package leader del WP4 (caratterizzazione meccanica ed ageing accelerato dei materiali) ed è anche coinvolto nei WP1, WP6, WP8, WP9 e WP10).

Coordinatore: CETMA - Centro di Ricerche Europeo di Tecnologie, Design e Materiali (Italia)

N. Partner:

**Abstract:**

The project proposes the creation of an EDIH by CETMA, a non-profit RTO with over 20 years of experience in innovation services to SMEs in Southern Italy. The project is strongly focused on the local economic and social reality (Apulia and Basilicata) where the partners are strongly rooted. It starts from the vision that AI, HPC and CS technologies can bring significant benefits to the development of the Territory, but this requires that all local actors are involved such as PA and SMEs, even the smallest and even those operating in more traditional sectors. Based on the experience of CETMA and analysis of innovation experts, CETMA-DIHSME starts from the consideration that to foster innovation in small businesses, in addition to "problem solving" services (technology consulting, research, engineering, etc.), it is necessary to support SMEs with "problem setting" services (strategic analysis, business planning, fundraising, supply chain relations, etc.). This is the way to break the vicious circle that grips them because they generally do not have their own resources to devote to these functions and are unable to seize the opportunities of new technologies. For this reason, the project foresees an integrated offer of "business and strategy setting" and technological services. An intensive promotional campaign has been planned to attract as much as possible the SMEs that are generally too busy in their daily routine. An integrated offer of demonstrations has been planned for all sectors of the local economy and for local administrations. The project aims to trigger synergies with the relevant opportunities offered by regional, national, and European innovation policies and funding. It also wants to exploit the great opportunities of the creation of a structured network of EDIH to promote cohesion between European territories to take advantage of social, economic, and environmental benefits.

Anno di stipula: 2022

Tipo progetto: DIGITAL Simple Grants

Programma UE: Other programmes 2021-2027

Programma UE: DIGITAL

Data inizio: 01-09-2022

Data scadenza: 30-09-2025

Contributo totale: € 2.924.738

Costo eleggibile totale: € 5.849.476

Contributo a ENEA: € 227.157

Costo eleggibile ENEA: € 454.313

Doc. approvazione: 188 /2022/TERIN

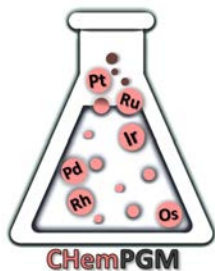
Codice atto: PK3AAF

Resp. scientifico ENEA: MARIANO ANGELO

Unità: TERIN-ICT

**Attività ENEA:**

Il progetto coinvolge competenze già presenti in ENEA nei seguenti campi: • Applicazione di sistemi di calcolo ad alte prestazioni (HPC); • Integrazione di grandi moli di dati (Big Data) provenienti da sorgenti eterogenee e funzionalità di accesso agli stessi in modo distribuito; • Gestione di ambienti virtuali basati su cloud computing; • Intelligenza Artificiale • Cybersecurity



Coordinatore: MONOLITHOS RECYCLING TECHNOLOGIES (Grecia)

N. Partner:

#### Abstract:

The CHemPGM project is a joint initiative of 7 expert organizations from the fields of chemistry, engineering, mining, metallurgy and materials science, designed to conduct fundamental research regarding the chemistry of platinum group metals (PGMs) and utilize the obtained knowledge to improve and secure the PGMs value chain. Specifically, the project aims: i) to establish fundamental knowledge regarding the chemistry of the PGMs, their reactions and complexation with other metals and chemical compounds, and the corresponding reactivities during leaching, separation and recovery processes; ii) to gain a complete understanding of the mechanisms associated with the above-mentioned processes, during the utilization of secondary materials to extract PGMs and incorporate them into new materials and processes such as nanomaterials, catalysis and CO<sub>2</sub> capture; iii) to create knowledge, provide expertise and educate the public. This will lead to the upgrading of existing processes and the development of new ones, aligned with sustainable principles, to ensure a circular operation model of the relevant industries. Through the involvement of universities, RTOs and SMEs, CHemPGM is backed by a well-rounded team, with multiyear expertise in the relevant fields, capable to deliver high-quality results regarding the project objectives. The consortium approaches the challenge from a multidiscipline aspect and proposes a balanced number of secondments alongside trainings, workshops, seminars and events that guarantee a cross-sectorial synergy among them. As a result, CHemPGM will broaden the expertise of the organizations, contribute to the advancement of the secondees and enhance the potential for innovation to its stakeholders and those inter-related with it. Overall, the methodology for carrying out the tasks involved, guarantees the smooth running of the project and the successful fulfillment of the objectives to contribute towards a more efficient and sustainable future.

Anno di stipula: 2021

Tipo progetto: MSCA RISE - Research and Innovation Staff Exchange

Programma UE: HORIZON 2020  
MSCA Marie Skl. Curie Actions

Data inizio: 01-05-2021

Data scadenza: 30-04-2025

Contributo totale: € 736.000

Costo eleggibile totale: € 736.000

Contributo a ENEA: € 110.400

Costo eleggibile ENEA: € 110.400

Doc. approvazione: 430/2020/PRES

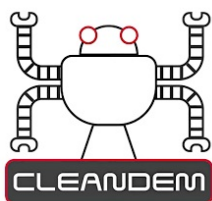
Codice atto: PK4AAC

Resp. scientifico ENEA: GRILLI MARIA LUISA

Unità: TERIN-PSU-IPSE

#### Attività ENEA:

L'obiettivo specifico dei ricercatori ENEA all'interno del progetto è quello della sintesi e caratterizzazione di materiali innovativi che utilizzano i metalli del gruppo del Pt, riciclati dagli altri partner, per lo sviluppo di materiali innovativi per la cattura e riutilizzo della CO<sub>2</sub> e/o per l'implementazione di processi catalitici. Queste attività sono di importanza strategica per il gruppo e integreranno le attività già esistenti sulla cattura della CO<sub>2</sub>.



## Cyber physical Equipment for unManned Nuclear DEcommissioning Measurements

**Coordinatore:** CEA - COMMISSARIAT A L'ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES (Francia)

**N. Partner:**

### Abstract:

The CLEANDEM project, with its collaboration of 11 partners from 4 EU countries, proposes a technological breakthrough associated to various dismantling and decommissioning (D&D) operational steps with an Unmanned Ground Vehicle (UGV) Platform. The CLEANDEM strategy will be based on innovative detection technology systems that will constitute a toolbox for equipping an intelligent robotic platform for fully remote operations. The pre-identified technologies are low-cost sensors. The CLEANDEM project, with its collaboration of 11 partners from 4 different EU countries, proposes a technological breakthrough for dismantling and decommissioning (D&D) operations of nuclear sites, employing an Unmanned Ground Vehicle (UGV) Platform equipped with innovative radiological sensing probes. The aim of the project is to deliver a cyber physical system which will support the end-users' operations, initially performing a radiological assessment of the area and then monitoring D&D operations throughout the final characterization of the plant. This will result in a 3D and fully detailed digital twin of the surveyed area augmented with radiological information provided by the sensors, thus enabling an efficient and effective planning of the dismantling actions and optimizing the nuclear waste sorting for reprocessing or for delivery to the final storage. Targeted impacts of the UGV Platform are to: save time, drastically reduce costs, minimize human intervention, improve workers and population safety and be greener; all of those driving the project execution to match the stakeholders' expectation. The effectiveness of the UGV Platform will be assessed in an extensive testing and validation campaign that will be performed in laboratories, in simulated environment and finally on the field. A demonstration event in a real nuclear site, involving all project partners and external stakeholders, will conclude the three years project activities opening for further exploitation in the D&D market.

**Anno di stipula:** 2021

**Tipo progetto:** IA - Innovation Action

**Programma UE:** HORIZON 2020 - Euratom

Euratom fissione

**Data inizio:** 01-03-2021

**Data scadenza:** 29-02-2024

**Contributo totale:** € 2.795.752

**Costo eleggibile totale:** € 3.414.843

**Contributo a ENEA:** € 151.000

**Costo eleggibile ENEA:** € 151.000

**Doc. approvazione:** 019 /2021/FSN

**Codice atto:** PF1AAG

**Resp. scientifico ENEA:** LEPORE LUIGI

**Unità:** FSN-FISS-CRGR

### Attività ENEA:

L'Agenzia ENEA è coinvolta principalmente nei Work Package 4 "Gamma and neutron detection and identification technologies", 6 "Contamination monitoring" e 8 "Data fusion and DT". Il ruolo dell'ENEA sarà quello di: - WP4: collaborare alle prove sperimentali inerenti al sistema di discriminazione Gamma Neutroni. Il Laboratorio di Caratterizzazione Radiologica parteciperà alla taratura del sistema in laboratorio; predisporrà ed eseguirà prove con le sorgenti di taratura gamma e neutroni per la caratterizzazione dei sistemi per testare e verificare le procedure operative. - WP6: progettare e realizzare un sistema di monitoraggio per la rivelazione continua di C-14 utilizzando elaborazioni digitali del segnale. Il sistema sarà installato in un idoneo impianto nucleare o deposito di rifiuti per il monitoraggio dell'aria atmosferica. - WP8: ottimizzare e coordinare i dati acquisiti da diverse fonti (sensori, campioni di materiali, database storico, ecc.).



## Supercritical CO<sub>2</sub> power cycles demonstration in Operational environment Locally valorising industrial Waste Heat

Coordinatore: ETN - EUROPEAN TURBINE NETWORK A.I.S.B.L (Belgio)

N. Partner:

### Abstract:

CO2OLHEAT will demonstrate at TRL7 in the CEMEX cement manufacturing plant in Prachovice (CZ) the operation of a 2 MW Waste-Heat-to-power (WH2P) skid based on a 2MW-sCO<sub>2</sub> cycle able to efficiently valorize local waste heat at a significant temperature of 400°C. Capitalizing consortium excellent knowledge coming from previous sCO<sub>2</sub> turbomachinery design experience and EU funded projects on industrial waste heat valorisation (TASIO, i-THERM, sCO<sub>2</sub>-FLEX etc.) and stimulated by SPIRE roadmap and EU sCO<sub>2</sub> R&D initiatives, CO2OLHEAT aims to valorize waste heat even at higher temperature if compared with the traditional steam/ORC solutions. The project will demonstrate the EU MW scale first-of-a-kind waste heat-sCO<sub>2</sub> plant towards a cheaper/more flexible waste heat valorisation. The project will strengthen EU industrial leadership in both energy intensive industries (making them more competitive) and turbomachinery sectors, bridging the current gap on sCO<sub>2</sub> turbomachinery that EU has with US and Japan-Korea. The project will analyse sCO<sub>2</sub> WH2P potential from a technical, economic and environmental point of view, developing innovative models for the design of the cycle and of the turbomachinery as well as investigating CO2OLHEAT cycle benefits in the cement, glass, aluminium, power generation sectors via techno-economic and Life Cycle based replication feasibility studies, involving relevant EU industrial players (EDF, ENGIE, MYTH, CEMEX, SISECAM, CELSA). The project is coordinated by ETN and involves an industry driven consortium with key turbomachinery OEM (SIE-BH), energy intensive industries, energy utilities and R&D partners all committed to bring soon CO2OLHEAT sCO<sub>2</sub> cycle technologies on the market. Thanks to its robust demonstration and replication campaign (also foreseeing extra-EU stakeholders collaboration), CO2OLHEAT can be considered a “demonstration to market” project, being keystone for EU sCO<sub>2</sub> turbomachinery industry and for a more effective waste heat valorisation.

Anno di stipula: 2021

Tipo progetto: IA - Innovation Action

Programma UE: HORIZON 2020  
Energy

Data inizio: 01-06-2021

Data scadenza: 31-05-2025

Contributo totale: € 13.999.996

Costo eleggibile totale: € 18.813.891

Contributo a ENEA: € 189.163

Costo eleggibile ENEA: € 189.163

Doc. approvazione: 53/2021/TERIN

Codice atto: PK4AAG

Resp. scientifico ENEA: MESSINA GIUSEPPE

Unità: DTE-PCU-IPSE

### Attività ENEA:

Le attività che l'ENEA svolgerà all'interno del progetto "CO2OLHEAT" saranno inquadrare nei seguenti work packages: WP1 - analisi di scenario e definizione dei requisiti dell'impianto CO2OLHEAT; WP2 - unità turbo-expander: studi di scale-up del concetto e della tecnologia CO2OLHEAT per potenze maggiori di 5 MW; WP3 - turbina sCO<sub>2</sub>: studi di scale-up del concetto e della tecnologia CO2OLHEAT per potenze maggiori di 5 MW; WP6 – campagna presso il sito di dimostrazione Prachovice; WP 7 - analisi di replicabilità e di impatto; WP 8 - disseminazione, comunicazione e sfruttamento: ; WP9 - coordinamento e gestione del progetto: coinvolgimento nei Task di gestione del consorzio sotto la guida di ETN, nel monitoraggio del progresso delle attività, nella redazione di rapporti, e nella gestione del piano di garanzia della qualità scientifica e dei rischi.



Coordinatore: BRGM - BUREAU DE RECHERCHES GEOLOGIQUES ET MINIERES (Francia)

N. Partner:

#### Abstract:

Even if climate change mitigation objectives agreed in Paris are met, sea level will rise at least by 0.3 to 0.6m in 2100 and then continue rising for centuries. The potential impacts for coastal flooding are a major source of concern for Europe because many infrastructures are located close to shorelines or in low-lying areas. Broad scale coastal climate services and platforms available today have successfully addressed the need to raise awareness on mitigation. However, an authoritative, consistent and decision oriented platform is still missing to meet the needs of adaptation practitioners concerned with (1) the routine identification of coastal territories at risk from inundation, (2) coastal land use planning or (3) maintaining coastal infrastructure services. The Coastal Climate Core Service (CoCliCo) project aims at informing decision-making on coastal risk and adaptation, by delivering an open web-platform exploring dominant risk drivers, adjusting visualisation and analysis techniques to local decision contexts, and combining relevant and high-quality geospatial information layers. Through the platform, users will be able to visualize, download and analyse multiple decision-oriented coastal risk scenarios relevant to the rich user narratives of our Demonstration Case Studies addressing the three needs raised above. To meet this challenge, CoCliCo brings together European organizations and scholars that have proven track records of delivering broad-scale coastal risk and adaptation assessment, as well as leading research and technologies in interoperable geospatial data management, decision sciences and risk communication.

Anno di stipula: 2021

Tipo progetto: RIA - Research and Innovation Action

Programma UE: HORIZON 2020  
Climate Action, Environment, Resource Efficiency and Raw Materials

Data inizio: 01-09-2021

Data scadenza: 31-08-2025

Contributo totale: € 5.999.641

Costo eleggibile totale: € 5.999.641

Contributo a ENEA: € 297.125

Costo eleggibile ENEA: € 297.125

Doc. approvazione: 105/2021/SSPT-MET

Codice atto: PS2ABW

Resp. scientifico ENEA: SANNINO GIANMARIA

Unità: SSPT-MET-CLIM

#### Attività ENEA:

ENEA sarà coinvolta in 7 degli 8 Work-packages del progetto. Nel corso del progetto ENEA si occuperà principalmente dell'esecuzione di simulazioni climatiche per la proiezione del livello del mare in area mediterranea e del Mar Nero ad alta risoluzione e la gestione dei rapporti con Federlogistica Italia e la divulgazione dei risultati presso gli stakeholder nazionali (autorità portuali, RFI, Confcommercio, ecc).



## Community Energy for the uptake of RES in the electricity sector. Connecting long-term visions with short-term actions

Coordinatore: UNIV. FREIE BERLIN (Germania)

N. Partner:

### Abstract:

COME RES aims to facilitate the market uptake of RES in the electricity sector by supporting, with a set of specific activities, the implementation of the provisions for renewable energy communities (RECs) as defined in the new Renewable Energy Directive to be transposed in 2021. Taking a multi- and transdisciplinary approach, COME RES aids the development of RECs in nine European countries (BE, DE, IT, LV, NL, NO, PL, PT, SP). It covers different socio-technological systems including community PV, wind (onshore), storage and integrated solutions. The countries selected range from pioneers that have gained broad experience of community energy (CE) to countries that are just beginning to look at CE. COME RES analyses legal, socioeconomic, spatial and environmental characteristics, and the reasons for the slow deployment of RECs in selected target regions. Stakeholder desks consisting of the project partners and committed community, market and policy actors in each country take on the operational tasks. Both overall and specific objectives will be reached by i) analysing the potentials, barriers and drivers for RECs in the target regions, ii) carrying out stakeholder dialogues, iii) developing regional action plans and business-model proposals for target regions, iv) examining good/best practice cases that are transferable to specific local, regional and national contexts, v) initiating transfers of best practice solutions via policy labs supported by capacity development and training and vi) developing a renewable energy community platform. The consortium synchronises project activities with the transposition/implementation of the Clean Energy Package and its provisions for RECs in policy labs. Policy lessons with validity across Europe will be drawn and recommendations proposed. Over 85 stakeholders and market actors have provided letters of support expressing their commitment to support the project and implement its results.

|                          |                                       |
|--------------------------|---------------------------------------|
| Anno di stipula:         | 2020                                  |
| Tipo progetto:           | CSA - Coordination and support action |
| Programma UE:            | HORIZON 2020<br>Energy                |
| Data inizio:             | 01-09-2020                            |
| Data scadenza:           | 28-02-2023                            |
| Contributo totale:       | € 2.998.448                           |
| Costo eleggibile totale: | € 2.998.848                           |
| Contributo a ENEA:       | € 134.875                             |
| Costo eleggibile ENEA:   | € 134.875                             |
| Doc. approvazione:       | 80/2020/DTE                           |
| Codice atto:             | PT7AAO                                |
| Resp. scientifico ENEA:  | MASSA GILDA                           |
| Unità:                   | DTE                                   |

### Attività ENEA:

I principali contributi forniti da ENEA riguarderanno i - seguenti work package: - WP3 (Country Desks and stakeholder dialogues) con la responsabilità del Task 3.1 "Stakeholder identification and engagement plans" e del Task 3.2.3 "Desk Italy" in collaborazione con Ecoazioni; - i WP6 (Supporting the development of renewable energy communities through capacity development and best practice transfer) e WP7 (Policy monitoring, policy assessment and policy lessons) i cui obiettivi generali sono evidenziare i casi studio di realizzazione delle REC e ricavare approfondimenti nonché fornire input per la politica a vari livelli di governance.





## Construction & demolition waste management policies for improved resource efficiency

Coordinatore: UNIV. POLITECNICA VALENCIA (UPV) (Spagna)

N. Partner: 8

### Abstract:

The challenge and opportunity faced by the CONDEREFF regions is to accelerate their policy work on improving resource efficiency at territorial level. The EU Construction & Demolition Waste Management Protocol and the transition towards Circular Economy can guide the regulative roll-out of C&D waste management across EU regions; accordingly, the proliferation of infrastructures & methods for recycling and re-use of C&D waste materials can introduce a green growth opportunity. Regions can exploit this opportunity by improving their policy instruments to factor these developments in, and support projects and processes to this direction. **OBJECTIVE AND EXPECTED CHANGE** The CONDEREFF project brings together 8 partners from 7 countries to exchange experiences and practices on how to move forward from existing procedures on C&D waste management towards the adoption and further exploitation of the best practices and measures applied in the field. The project will enable the participating regions to advance their goals for resource efficiency and green growth through the proper management of C&D waste, which can boost demand for C&D recycled materials and support both sustainability and recycling in the construction sector.

Anno di stipula: 2018

Tipo progetto: N/A - Non applicabile

Programma UE: Other programmes  
Interreg Europe

Data inizio: 01-06-2018

Data scadenza: 31-05-2023

Contributo totale: € 1.354.450

Costo eleggibile totale: € 1.617.955

Contributo a ENEA: € 151.864

Costo eleggibile ENEA: € 178.663

Doc. approvazione: 105/2020 e  
176/2020/SSPT/USER

Codice atto: PS6ABU

Resp. scientifico ENEA: LUCIANO ANTONELLA

Unità: SSPT-USER-RISE

### Attività ENEA:

ENEA will develop a methodology to assess the methodology for partners to survey on public awareness, perception and acceptance of C&D waste and to analyse the perceived value and potential for re-use. ENEA will assist the consortium with the collection/provision of input relevant to baseline studies, supporting the CONDEREFF partnership in the description and assessment of the regional context in the field of C&D waste management, and providing insights from EU regions beyond the partnership. As recycling and C&D waste expert, ENEA will participate in the interregional workshops. ENEA will be responsible for the exchange of experience visit on selection, permits and monitoring of C&D waste management sites and facilities preparing the thematic input paper and organising the event. It will also participate in the policy and industry symposium on promoting and incentivising re-use of C&D waste.



## Climate resilient and environmentally sustainable transport infrastructure, with a focus on inland waterways

Coordinatore: LUKASIEWICZ - POZNAN INSTITUTE OF TECHNOLOGY (Polonia)

N. Partner:

### Abstract:

It is the key objective of the project CRISTAL (36 months) to increase the share of freight transport on inland water transport (IWT) by a minimum of 20% and to demonstrate on its three pilot sites (Italy, Poland and France) strategies to improve reliability by 80%. CRISTAL project will assure IWT capacity at 50% even during extreme weather events. Towards that CRISTAL will co-create, test and implement integrated, cooperative and innovative solutions in its three pilot partners' areas identified in Italy, France and Poland. The project will include the aspects of technological innovation/development and digitalization; further advancement towards the Physical Internet, governance solution and business models, will be proposed while targeting sustainability and infrastructure resilience requirements.

Anno di stipula: 2022

Tipo progetto: IA - Innovation Action

Programma UE: HORIZON EUROPE

Cluster 5 - D6 Transport and Smart Mobility services

Data inizio: 01-09-2022

Data scadenza: 31-08-2025

Contributo totale: € 6.371.049

Costo eleggibile totale: € 6.837.453

Contributo a ENEA: € 421.563

Costo eleggibile ENEA: € 421.563

Doc. approvazione: 112/2022/TERIN

Codice atto: PK5AAH

Resp. scientifico ENEA: GIOVINAZZI SONIA

Unità: TERIN-SEN-APIC

### Attività ENEA:

ENEA sarà leader del workpackage WP2, denominato "Technologies" nel quale sarà responsabile delle seguenti Tasks: - Task 2.1 Technologies for improving the resilient and reliable navigability - Task 2.2 Technologies for the resilient management of engineered Inland waterway infrastructures - Task 2.3 Software architecture of CRISTAL acquisition - Task 2.4 End-users interfaces including ad-hoc defined dashboards and mobile Apps for navigability, preventive maintenance as well as to support corridor management ENEA contribuirà, inoltre, ad altri workpackages del progetto.



## SUPPORT TO THE ACTIVITIES OF THE CONCENTRATED SOLAR THERMAL TECHNOLOGY AREA OF THE SET PLAN

Coordinatore: ESTELA EUROPEAN SOLAR THERMAL ELECTRICITY ASSOCIATION (Belgio)

N. Partner:

### Abstract:

The main hurdle the Concentrated Solar Thermal Technologies (CST) sector has been facing over the last decade in Europe is the assumed level of the costs of CSP power plants with a too narrow perception of its use as flexibility provider to the sole electricity systems. To mitigate this, the CST4ALL project identifies an array of hybridisation and cooperation initiatives at the interface between CST and other technologies for applications relevant to the 3 sectors (electricity, heat and fuels) incorporating the work products of various ETIPs. Well-aligned on current EU initiatives (Smart Sector Integration, Fit for 55, CETP) and specific energy strategies across the reviewed Member States to provide answers to the most urgent challenges of decarbonisation, the core deliverable of CST4ALL consists of an intertwined set of workshops with respective industry and R&I focus. These shall bring together, better coordinate and incentivise the interaction of main stakeholders at key technology interfaces with the CSP sector building on combined technological and non-technological improvements. Both the research and the industry perspectives are first analysed aiming primarily at supporting and enlarging the network of active stakeholders in the CSP Implementation Working Group in the SET Plan and to raise the general awareness about the role CST can play in a future sustainable energy mix. These workshops finally result in specific proposals at EU level from a cross-sector perspective to foster public/private funding for R&I and create the necessary political/regulatory framework conditions for the execution of the new CSP Implementation Plan.

Anno di stipula: 2022

Tipo progetto: CSA - Coordination and support action

Programma UE: HORIZON EUROPE

Cluster 5 - D3 Energy supply

Data inizio: 01-10-2022

Data scadenza: 30-09-2025

Contributo totale: € 599.529

Costo eleggibile totale: € 599.529

Contributo a ENEA: € 50.625

Costo eleggibile ENEA: € 50.625

Doc. approvazione: 143/2022/TERIN

Codice atto: PK7AAF

Resp. scientifico ENEA: TURCHETTI LUCA

Unità: TERIN-STSN-SCIS

### Attività ENEA:

ENEA partecipa alle normali attività di progetto tra cui: partecipazione ed organizzazione a meeting e workshop di progetto, raccolta ed elaborazione delle informazioni prodotte in questi eventi e stesura di report. Le attività di progetto saranno svolte con la partecipazione del personale afferente a TERIN-STSN.



## DISRUPTIVE KESTERITES-BASED THIN FILM TECHNOLOGIES CUSTOMISED FOR CHALLENGING ARCHITECTURAL AND ACTIVE URBAN FURNITURE APPLICATIONS

Coordinatore: IREC - FUNDACIO INSTITUT DE RECERCA DE L'ENERGIA DE CATALUNYA (Spagna) Partner:

### Abstract:

CUSTOM-ART aims at developing the next generation of building and product integrated photovoltaic modules (BIPV and PIPV respectively), based on earth-abundant and fully sustainable thin film technologies. Nowadays, BIPV and PIPV are identified as key enabling technologies to make “near Zero Energy Buildings” and “net Zero Energy Districts” more realistic, through the integration of a new generation of photovoltaic modules capable of entirely replacing architectural/mobility/urban-furniture passive elements. This promising scenario of mass realisation of BIPV and PIPV solutions can only be achieved by developing cost-efficient and sustainable thin film technologies with unbeatable aesthetic functionalities, including mechanical flexibility and optical tuneability. Unfortunately, mature materials already available at the market such as Cu(In,Ga)Se<sub>2</sub> or CdTe are formed by scarce and expensive elements (In, Ga and Te), or toxic ones (Cd). Considering this, CUSTOM-ART will join for the first time a leading group of companies and academic partners all around Europe, to develop advanced BIPV and PIPV products (flexible and semi-transparent solar modules), based on earth abundant kesterite materials, which have been demonstrated in two previous European projects to be at the forefront of emerging inorganic thin film technologies. By combining advanced strategies for materials properties management, with customized modules design in a circular economy approach, two types of products will be developed including flexible PV modules (polymer and steel supports) and semi-transparent (polymer). CUSTOM-ART will bring these technologies from TRL4-5 up to TRL7, demonstrating very competitive conversion efficiencies (20% at cell and 16% at module level) and durability (over 35 years), at a reduced production cost (< 75 €/m<sup>2</sup>), using exclusively abundant elements and contributing to ensure the full sustainability and competitiveness of the European BIPV and PIPV Industry.

Anno di stipula: 2020

Tipo progetto: IA - Innovation Action

Programma UE: HORIZON 2020

Energy

Data inizio: 01-09-2020

Data scadenza: 29-02-2024

Contributo totale: € 6.999.745

Costo eleggibile totale: € 8.016.422

Contributo a ENEA: € 216.512

Costo eleggibile ENEA: € 216.512

Doc. approvazione: 97/2020/DTE

Codice atto: PT2ABD

Resp. scientifico ENEA: MITTIGA ALBERTO

Unità: DTE-FSN-TEF

### Attività ENEA:

WP1: Sviluppo di celle ad alta efficienza e test di stabilità: TASK 1.1. Ottimizzazione dell'assorbitore in kesterite; TASK 1.2. Miglioramento della efficienza tramite drogaggio (con elementi alcalini) e modifiche alla composizione chimica dell'assorbitore in kesterite; TASK 1.3. Scelta e ottimizzazione dei contatti frontale e posteriore della cella. WP2 – Incapsulamento, stabilità e affidabilità: TASK 2.1. Tempo di vita dei dispositivi non incapsulati; WP5 – Analisi dei costi, riciclaggio, LCA; TASK 5.1. Life cycle assessment; TASK 5.2. Life cycle cost (lcc) analyses; TASK 5.3. Socio-economic impact analysis in the context of circular economy WP6 – Sfruttamento e disseminazione: TASK 6.1 Communication and dissemination strategy; TASK 6.2 Implementation of project identity and online communication channels TASK 6.3 Market and stakeholder analysis and needs TASK 6.4 Exploitation Plan



## DeliSoil – Delivering Soil improvers through improved recycling and processing solutions for food industry residues streams

Coordinatore: LUKE - NATURAL RESOURCES INSTITUTE FINLAND (Finlandia)

N. Partner:

### Abstract:

DeliSoil will adopt a multi-actor, transdisciplinary approach to co-design processes that minimise food processing waste and valorise its by-products. We will apply a circular bioeconomy approach to the waste hierarchy, creating sustainable soil improvers in support of soil health in Europe. DeliSoil's 5 regional Living Labs (LLs), with actors along the entire food value chain, will use innovative technologies to convert residues from food processing and production industries into tailored soil improvers. Research partners and companies will evaluate the soil improvers in state-of-the-art laboratories, and landowners will test the project's solutions. The tailored soil improvers will be tested for stability, biosafety and molecular parameters, and their impacts on soil health, agronomical performance, and environmental risks will be evaluated. Environmental footprints will also be measured for selected products. We will identify technological, legislative, financial, and social barriers and enablers for the conversion of food processing residue streams into organic soil improvers and fertilising products, and use these results to analyse fairness throughout the LL value chains. Together with stakeholders, we will build communities and create networks to facilitate knowledge sharing of DeliSoil's key exploitable results, empower interdisciplinary design processes to improve soil health through the valorisation of food by-products, and increase societal soil literacy. The Living Labs will share their solutions for using side-streams from vegetable, meat, insect cultivation, mixed food, tomato, olive oil, and wine industry actors. Our proposed Lighthouses will allow inter-European partnering and demonstrate improved waste management sites integrating optimal practices in a circular bioeconomy framework. We will work in close cooperation with other EU projects and the European Soil Observatory (EUSO) to ensure coordinated delivery of Soil Mission goals.

Anno di stipula: 2023

Tipo progetto: RIA - Research and Innovation Action

Programma UE: HORIZON EUROPE  
Mission Soil

Data inizio: 01-06-2023

Data scadenza: 31-05-2027

Contributo totale: € 7.000.000

Costo eleggibile totale: € 7.000.000

Contributo a ENEA: € 681.840

Costo eleggibile ENEA: € 681.840

Doc. approvazione: 131/2023/SSPT-BIOAG

Codice atto: PS1ADM

Resp. scientifico ENEA: BEVIVINO ANNAMARIA

Unità: SSPT-BIOAG-SOQUAS

### Attività ENEA:

ENEA rivestirà il ruolo di Partner, Leader del WP2 'Soil health improvement' ed è coinvolto in tutti i 7 WP nei quali si articola il progetto: WP1: Food Industry processing residue streams WP2: Soil health improvement WP3: Enablers for the conversion of food by-products and waste to soil improvers and fertilising products WP4: Environmental care WP5: Multi-actors engagement and collaboration Tentative: "Lighthouses, multi-actors and socioeconomics" WP6: Dissemination, Exploitation & Communication WP7: Project Management & Coordination



Coordinatore: esDONES - CONSORCIO IFMIF-DONES ESPAÑA (Spagna)

N. Partner:

**Abstract:**

DONES-ConP1 is a project which answers to the call of support action for consolidating the IFMIF-DONES ESFRI facility. It will be linked to the brandnew DONES Programme serving as a transition for policy makers until funds are available, consolidate and expand the users community. The project will deal not only with the Construction Phase of the facility, but also with the operation and exploitation phase of the project. Although the Andalusia and the Spanish Government are ready to finance the investment to the extent of 50%, Croatia a 5%, and EURATOM through F4E are also ready to invest another 20%, negotiations with different partners are ongoing in order to secure and equilibrate the full construction budget and to assure the operation costs. This Consolidation support action is the ideal framework to ensure these contributions. The project will work on critical financial, legal and organisational issues related to the international character of the IFMIF-DONES facility during its construction and operation phases. The experience of the partners supplying in-kind procurements to other European and International facilities is a clear asset to benefit and developing update models for all the documentation and planning related with in-kind of commercial procurements at IFMIF-DONES. One of the main objectives of the project is to consolidate the scientific users community of both fusion and non-fusion experiments. The project shall consolidate the recently created community, developing cutting edge proposals in fields of nuclear physics, medicine or industry. The DONES Experimental Programme is one of the key objectives of the project. Finally, the project will update all the DONES Programme documentation in order to ensure they are ready for the start of the construction, and also the installation and commissioning phases. This will include an update of the documentation related to licensing of the proposal of experiments, and the transport to support facilities.

Anno di stipula: 2023

Tipo progetto: CSA - Coordination and support action

Programma UE: Euratom2027

Euratom fusione

Data inizio: 01-11-2023

Data scadenza: 31-10-2025

Contributo totale: € 1.249.820

Costo eleggibile totale: € 1.906.700

Contributo a ENEA: € 86.960

Costo eleggibile ENEA: € 124.225

Doc. approvazione: 22/2024/FSN

Codice atto: PF6ABC

Resp. scientifico ENEA: TARANTINO MARIANO

Unità: FSN-SICNUC

**Attività ENEA:**

L'ENEA è coinvolta su tutti i 4 Work-packages WP1 - Coordination & dissemination WP2 - Outreach, development and engagement of scientific and engineering user community WP3 - Development of in-kind & partnering agreements WP4 - Project Preparation for construction



## Empowering a fair and responsible European FoodRegister, fostering citizen sovereignty and creating a data-driven food system

Coordinatore: TWINDS (Belgio)

N. Partner: 8

### Abstract:

The overall goal of our project is to achieve trust in a data-driven food system by implementing Digital Responsibility Goals for the food sector. This will enable new levels of innovation for example in food safety, sustainability, personalized nutrition, reduction of food waste and fair conditions throughout the entire food chain. The programme works on a clear strategic roadmap (a new virtual food system), a set technological enablers, demonstration of solutions, a structured funding programme with open calls, and measures to guide and support the food ecosystem of third party beneficiaries, citizens, stakeholders. As a consortium, we maintain the perspective that technology is not a means to an end, but acts merely as an empowering enabler, providing the means to achieve a wide variety of innovative and valuable use cases. Use cases that promise to serve a broader audience, provided that adequate access also is considered as a prerequisite. Currently however, technology is primarily developed from the perspective and needs of corporations and / or authorities- a limitation that risks perpetuating or further exacerbating the above-mentioned lack of trust within the markets that they serve. With a more diverse and human-centric driven perspective we believe the new use cases that will emerge and the technology development required to realise them will contribute to a more sustainable ecosystem that is "trustworthy by default". To truly design for trust, the entire chain of activities and underlying assumptions towards developing technology has to be based on fundamental values like responsibility, privacy and user control - especially when dealing with valuable and sensitive food data. The starting point of all assumptions needs to be the user and their values - not a business model or (legitimate) state interests.

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| Anno di stipula:         | 2022   |
| Tipo progetto:           | RIA - Research and Innovation Action   |
| Programma UE:            | HORIZON EUROPE<br>Cluster 6 - Food, Bioeconomy, Natural Resources, Agriculture and Environment |
| Data inizio:             | 01-12-2022   |
| Data scadenza:           | 30-11-2025   |
| Contributo totale:       | € 4.000.000  |
| Costo eleggibile totale: | € 4.000.000  |
| Contributo a ENEA:       | € 326.250  |
| Costo eleggibile ENEA:   | € 326.250  |
| Doc. approvazione:       | 271/2022/SSPT-BIOAG  |
| Codice atto:             | PS1ADA   |
| Resp. scientifico ENEA:  | ZOANI CLAUDIA  |
| Unità:                   | SSPT-BIOAG   |

### Attività ENEA:

ENEA riveste il ruolo di Partner, partecipando alle attività di tutti i WP e svolgendo in particolare il ruolo di Task Leader per la Task 1.2 Scientific Coordination (WP Coordination & Project Management), monitoring and risk management e la Task 2.4 Policy Briefings (WP Virtual food system roadmap).



Coordinatore: BMK - FEDERAL MINISTRY FOR CLIMATE ACTION, ENVIRONMENT, ENERGY, MOBILITY, INNOVATION AND TECHNOLOGY (Austria) N. Partner:

**Abstract:**

Driving Urban Transitions to a Sustainable Future (DUT) is the new programme of JPI Urban Europe starting in 2022. The DUT Partnership steps up the game to tackle urban challenges. Through research and innovation, we enable local authorities and municipalities, business, and citizens to translate global strategies into local action. We develop the skills and tools to make urban change happen and boost the urgently needed urban transformations towards a sustainable future with enhanced quality of life in cities. DUT is realised as a European partnership of more than 60 partners from 27 countries, involving national and regional policy makers, funders and urban-related policy agencies to invest in urban R&I and strengthen a European innovation eco-system for urban transitions. Building upon the JPI Urban Europe achievements, DUT aims to create a strong community around urban transitions and to establish a well-known research and innovation platform that will help cities become more sustainable, inclusive and liveable. DUT is one out of 49 European partnerships under Horizon Europe framework and the only one addressing urban development in its complexity, with a close link to the European mission of 100 climate-neutral and smart cities.

Anno di stipula: 2022  
 Tipo progetto: Programme Cofund Actions  
 Programma UE: HORIZON EUROPE  
 Cluster 5 - D2 Cross-cutting solutions  
 Data inizio: 01-01-2022  
 Data scadenza: 31-12-2028

Contributo totale: € 37.000.000

Costo eleggibile totale: € 172.369.768

Contributo a ENEA: € 578.125

Costo eleggibile ENEA: € 578.125

Doc. approvazione: 113/2022/TERIN e  
195/2023/TERIN

Codice atto: PK5AAI

Resp. scientifico ENEA: CLERICI MAESTOSI  
PAOLA

Unità: TERIN-SEN

**Attività ENEA:**

ENEA coordina il WP6 'Capacity building for the Transition Pathways' e sarà inoltre impegnato ad eseguire le seguenti attività: Task 2.2 Strategic development of the 15-Minute City Transition Pathway Task 2.3 Strategic development of the Positive Energy Districts Transition Pathway Task 2.4 Strategic development of the Circular Urban Regenerative Economies Transition Pathway Task 6.2 Target group specific empowerment Task 7.2.2 Develop and implement a valorisation strategy: Neighbourhood Transformation Showcasing Task 7.3 Towards replication and mainstreaming





Coordinatore: KEY2 - KEY TO BUSINESS SRL (Italia)

N. Partner: 5

**Abstract:**

The Action aims to develop a collaborative platform DYDAS (Dynamic Data Analytics Services) for offering data, algorithms, processing, and analysis services to a large number of users from different public and private user communities. The platform will act as an e-marketplace enabling transactions for accessing data and added value services enabled by High Performance Computing (HPC) and based on Big Data technologies, Machine Learning (ML), Artificial Intelligence (AI) and advanced data analytics. Geospatial Data Architecture will be a key element of the platform, which through the adoption of a Geospatial Data Model and of interoperability rules will enable seamless large dataset integration and processing capabilities for using geospatial data of different type and sources with data that are not intrinsically geo-referenced. The Action will test the platform data analytics capabilities through the integration and operation of three use cases (maritime, energy and mobility), which will demonstrate functionalities and service potential of the DYDAS platform. Finally, the exploitation and dissemination activities will foster the uptake of the platform by national and local administrations, industry, application developers and service providers, academia and research centres.

Anno di stipula: 2019

Tipo progetto: N/A - Non applicabile

Programma UE: Other programmes

CEF (Connecting Europe Facility)  
- TELECOM

Data inizio: 01-10-2019

Data scadenza: 31-01-2023

Contributo totale: € 2.045.580

Costo eleggibile totale: € 2.727.440

Contributo a ENEA: € 341.865

Costo eleggibile ENEA: € 455.820

Doc. approvazione: 61/E/2019/DTE

Codice atto: PT3AAI

Resp. scientifico ENEA: PONTI GIOVANNI

Unità: DTE-ICT-HPC

**Attività ENEA:**

Il contributo dell'ENEA al progetto è relativo all'area tecnico scientifica dell'High Performance Computing con particolare riguardo alla gestione di grandi moli di dati, alla loro fruizione e alla definizione dell'infrastruttura di cloud computing; sarà inoltre definito lo scenario per lo use case marittimo (unità organizzative coinvolte DTE-ICT e SSPT-MET).



**Achieving Ecological Resilient Dynamism for the European food system  
through consumer-driven policies, socio-ecological challenges,  
biodiversity, data-driven policy, sustainable futures**

Coordinatore: UNIV. CZECH OF LIFE SCIENCES PRAGUE (Repubblica Ceca)

N. Partner:

**Abstract:**

The ECO-READY project will develop a real-time surveillance system, an Observatory offered as an e-platform and as a mobile application. This will function as the necessary singular source of information, provide real-time assessments for the food system, and update forecasts frequently and consistently. The Observatory will be available to society, policymakers, the scientific community, and the agri-food industry, and integrated with a network of 10 Living Labs, supported through the third party funding process, covering all bioclimatic regions in Europe, forming the ECO-READY project knowledge infrastructure. ECO-READY will produce knowledgebased resilience strategies, and develop tools that will be embedded on the Observatory. The underlining principle behind the ECO-READY approach is, resilient dynamism, or tackling immediate problems and long-term challenges at the same time. The Living Labs network will facilitate 'concept to action' through the co-creation of scenarios addressing their regional needs, the development of policy recommendations, contingency plans, and resilience strategies, and embed them on the Observatory. Furthermore, ECO-READY will develop an early warning system and decision support tools using innovative Artificial Intelligence based on holistic prediction models and Life Cycle Assessment results. ECO-READY will ensure that European farmers and society's interests be reflected in future policymaking and monitoring, through early-stage active engagement incorporating bottom-up recommendations, facilitated by the increased usership of the digital tools developed, and resulting in increased awareness for climate-adaptive and mitigating agri-food products. Furthermore, the Observatory smart application will include tools that will empower the citizens to actively engage in policy making, and interact directly with the scientific community, farmers, and industry and policy makers, thus driving change in consumption habits.

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|--------------------------|--|
| Anno di stipula:         | 2022   |
| Tipo progetto:           | RIA - Research and Innovation Action   |
| Programma UE:            | HORIZON EUROPE<br>Cluster 6 - Food, Bioeconomy, Natural Resources, Agriculture and Environment |
| Data inizio:             | 01-12-2022   |
| Data scadenza:           | 30-11-2026   |
| Contributo totale:       | € 13.628.429   |
| Costo eleggibile totale: | € 13.628.429   |
| Contributo a ENEA:       | € 267.000  |
| Costo eleggibile ENEA:   | € 267.000  |
| Doc. approvazione:       | 285/2022/SSPT-BIOAG  |
| Codice atto:             | PS1ADB   |
| Resp. scientifico ENEA:  | BEVIVINO ANNAMARIA   |
| Unità:                   | SSPT-BIOAG-SOQUAS  |

**Attività ENEA:**

ENEA riveste il ruolo di partner ed è coinvolto nei seguenti workpackage: WP1 - Scoping and outlining the extended European Food Social-Ecological system WP2 - Stakeholders' engagement and empowerment WP6 - Communication and post-project sustainability WP7 - Project management In particolare, parteciperà attivamente alle attività previste dal WP1 con un ruolo di leader della Task T1.2 "Connecting the project scope with CAP, Green Deal and other EC Frameworks & Policies". Nel WP2 contribuirà attraverso l'expertise e la capitalizzazione di progetti in corso che prevedono il coinvolgimento degli stakeholder. In WP6 sosterrà le principali attività di comunicazione e disseminazione ed in WP7 collaborerà alla gestione del progetto.



Coordinatore: UNIV. AALBORG (Danimarca)

N. Partner: 10

**Abstract:**

Current steady-state energy labels have several shortcomings, but the inherent inability to accurately reflect dynamic and changing conditions is the most impactful one. Steady-state labels result in high discrepancies with post occupancy behaviour - performance gap. This inaccuracy does not allow the building owner to make informed decisions on time, and restricts the potential of economical exploitation of the building. E-DYCE will combine innovative approaches with established and widely available tools to create a methodology capable of implementing scalable and adaptable dynamic energy performance certification (DEPC): - Create a technology neutral methodology for dynamic labelling based on maximizing the free running potential of the building and promoting the use of passive and low cost solutions (e.g. ventilative cooling) instead of constant reliance on mechanical systems. - Communicate clear actions to the user, as well as their positive effects on the energy consumption to motivate and improve energy behavior. - Validate the methodology through implementing DEPC in 39 buildings across 5 locations in 4 countries for a total of 60,000m<sup>2</sup> heated area. - Generate energy savings of 1.8 GWh/year, from the first year and aiming to exceed 370GWh and 50million euros in savings by 2028, accounting only for the areas participating in the project. - Strengthen collaboration between energy experts, authorities and building owners to share the benefits of reliable dynamic certification. - Adapt to any level of building typology, climate, smartness and scale through dynamic simulation of performance utilizing resolutions from real time, to minutes, hours or days: from traditional buildings to smart-homes. E-DYCE will be compatible to existing and emerging EPC methods, or can function as a stand-alone DEPC labelling process. The process will not require investment for the user, instead depending on sharing the savings for revenue streams.

Anno di stipula: 2020  
 Tipo progetto: IA - Innovation Action  
 Programma UE: HORIZON 2020  
 Energy  
 Data inizio: 01-09-2020  
 Data scadenza: 31-08-2023

|                          |             |
|--------------------------|-------------|
| Contributo totale:       | € 2.498.178 |
| Costo eleggibile totale: | € 2.936.065 |
| Contributo a ENEA:       | € 150.813   |
| Costo eleggibile ENEA:   | € 150.813   |

Doc. approvazione: 62/2020/DTE  
 Codice atto: PT5ABH  
 Resp. scientifico ENEA: ZINZI MICHELE  
 Unità: DTE-SEN

**Attività ENEA:**

Obiettivo principale dell'ENEA è promuovere l'edificio F40 del CR Casaccia come Living Lab in grado di applicare, testare e qualificare tecnologie energetiche e costruttive di tipo smart building. In questa ottica le azioni utili messe in piedi dal progetto sono quelle relative alla validazione in campo, ferma restando una partecipazione marginale in tutti i work package del progetto. L'ENEA partecipa ai seguenti work package (WP): • WP1: Consolidamento delle specifiche per energy performance e certification di tipo dinamico; • WP2: Modellazione dei dati e progettazione del progetto energetico; • WP3: Generazione della piattaforma di simulazione e ottimizzazione, con particolare riferimento alla possibilità di collegamenti con altri strumenti di calcolo; • WP4: Estensione delle funzionalità della piattaforma di calcolo e sua validazione in campo. ENEA coordina il Task 4.3-Model comparison and demonstration in controlled conditions; • WP5: Dimostrazione a larga scala di fattibilità e accuratezza dello schema di certificazione dinamica sviluppato; • WP6: Disseminazione dei risultati, attraverso partecipazioni ad eventi scientifici, sviluppo di una roadmap per future applicazioni, approccio al processo regolatorio e di standardizzazione; • WP7: management del progetto



**Coordinatore:** PROSAFE - THE PRODUCT SAFETY ENFORCEMENT FORUM OF EUROPE (PaesiN. Partner: Bassi)

**Abstract:**

This proposal proposes a substantial project of a pan-EU market surveillance action to achieve impacts in line with the aims and objectives of the Horizon 2020 ? Work Programme 2018-2020 Secure, Clean and Efficient Energy. The project, if approved, will be the most comprehensive and complex product market surveillance exercise ever undertaken in the EU's energy efficiency and Ecodesign sector, building on and reinforcing the successes and momentum of the predecessor programmes: Energy Efficiency Compliant Products (ECOPLIANT, EEPLIANT2014 and EEPLIANT2), Market Surveillance Project for TYRES 2015 (MSTyr15). The proposed activities are structured around the needs and priorities identified by the memberships of the Energy Labelling and Eco-design ADCOs. These, without surprise, closely match the requirements set in the Call with ref. no. H2020-IBA-SC3-energy-2018, Exchange of information and best practices, development of common methods, protocols, checklists or IT tools (e.g. web crawlers), execution of joint surveillance activities, strengthening the collaboration with customs authorities, communication, establishment of centres of excellence for product testing, support the development of the Energy Labelling products registration database, input into standardisation, addressing challenging issues like defeat devices, software updates, plausibility testing, support for international alignment of test standards are all covered. The methodology to be used for addressing those requirements will include the delivery of a programme structure consisting of a matrix of activities both horizontal (method development and capacity improvement) and vertical (product inspection and testing). This will result in building further expertise, developing and adopting common best practices and protocols by the Member State Authorities (MSAs). Altogether, Energy Efficiency Compliant Products 3 (EEPLIANT3) is expected to substantially enhance the impacts and the overall effectiveness and efficiency of market surveillance across the European Union (EU).

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|---------------------------------|--------------------------|
| <b>Anno di stipula:</b>         | 2019                     |
| <b>Tipo progetto:</b>           | CS2-IA Innovation Action |
| <b>Programma UE:</b>            | HORIZON 2020<br>Energy   |
| <b>Data inizio:</b>             | 01-06-2019               |
| <b>Data scadenza:</b>           | 30-11-2023               |
| <b>Contributo totale:</b>       | € 6.851.481              |
| <b>Costo eleggibile totale:</b> | € 6.851.481              |
| <b>Contributo a ENEA:</b>       | € 146.123                |
| <b>Costo eleggibile ENEA:</b>   | € 146.123                |
| <b>Doc. approvazione:</b>       | 17/2019/DUEE             |
| <b>Codice atto:</b>             | PW3AAH                   |
| <b>Resp. scientifico ENEA:</b>  | PRESUTTO MILENA          |
| <b>Unità:</b>                   | DUEE                     |

**Attività ENEA:**

Le attività progettuali a carico ENEA prevedono principalmente il supporto nella creazione di centri di eccellenza per testare i prodotti, nel lancio di nuove sfide per la sorveglianza del mercato, nei controlli su condizionatori e ventilatori, nei controlli sulle asciugatrici, nei controlli su lampade. In particolare l'ENEA è work package leader nel WP6 'Nuove sfide per la sorveglianza del mercato'.



## Towards a FAIR and open data ecosystem in the low carbon energy research community

Coordinatore: UNIV. WESTERN NORWAY OF APPLIED SCIENCES (Norvegia)

N. Partner:

### Abstract:

The majority of databases are unfit for deploying advanced analytical tools by humans and machines, causing forgone opportunities arising from advanced ICT solutions. It adds to the problem that the transition towards low carbon and sustainable energy systems requires the integration of interdisciplinary and complex data. It means that it is not sufficient to only account for physical and technical attributes, but also socio-economic and environmental ones. Otherwise, society is misinformed about the consequences of upcoming fundamental systemic changes, affecting acceptance building and the creation of ownership for the energy transition. Transparent and integrated management of energy data with useful metadata information and quality assurance provides the basis for society to choose, monitor, and implement sustainable transition pathways; and for the industry to be innovative. Therefore, databases need to adhere to the principles of open and FAIR data (findability, accessibility, interoperability, re-usability). However, the concepts and infrastructures for FAIR and open data management are currently not existing in low carbon energy research. The overall objective of EERAdata is to develop, explore, and test a FAIR and open data ecosystem. This new data infrastructure is established through the broad involvement of the energy research community in a series of workshops and is applied in four selected use cases, covering essential aspects of data-driven low carbon energy research. EERAdata also implements an open platform for uniform and seamless access to energy data and establishes a pool of experts and data stewards to facilitate a mental shift in the community towards FAIR and open data practices. A key element is the active linking of EERAdata to national initiatives, the European Open Science Cloud, the Research Data Alliance, and others. In this way, the project builds a critical mass to explore the prospects of large-scale FAIR and open energy data.

Anno di stipula: 2020

Tipo progetto: CSA - Coordination and support action

Programma UE: HORIZON 2020  
Energy

Data inizio: 01-03-2020

Data scadenza: 28-02-2023

Contributo totale: € 999.913

Costo eleggibile totale: € 999.913

Contributo a ENEA: € 111.950

Costo eleggibile ENEA: € 111.950

Doc. approvazione: 19/2020/DTE

Codice atto: PT2ABB

Resp. scientifico ENEA: CELINO MASSIMO

Unità: DTE-ICT

### Attività ENEA:

L'ENEA è leader del work package 6 'Materials for low carbon energy' e si occupa della applicazione delle metodiche FAIR nel settore dei materiali per l'energia. Partecipa inoltre ai seguenti work package: 1 - coordination and management; 2 - capacity building; 3 - community platform; 4 - use case 1 'buildings efficiency'; 5 - use case 2 'power transmission & distribution' 6 - use case 3 'materials for low carbon energy' 7 - use case 4 'energy and efficiency policies' 8 - communication, dissemination & exploitation

Coordinatore: COMUNE DI BARLETTA (Italia)

N. Partner:

**Abstract:**

The buildings sector represents approximately 40% of the EU's total energy consumption. In this respect, Europe has issued an ad hoc Directive on the Energy Performance of Buildings and several actions have been putting in place by each Country to tackle this issue. For this, the CB cooperation between Italy, Albania and Montenegro is important in order to exchange experiences, transfer innovation aimed at reducing the heating demand (in terms of annual energy balance) and minimising the cooling peak power demand. Supporting sector operators to identify cost-effective approaches to renovations relevant to the building type and climatic zone is also considered important. As for other priorities, creating an effective system involving public institutions, sector operators and other relevant stakeholders is strongly supported, and one result expected from this is enhanced capacities of public authorities to plan and implement sustainable energy policies and measures. EFFECTS project intends to deepen the issues related to Energy Efficiency in School Buildings in the CB Area, evaluating possible strategies of intervention to reduce the negative impact on environment and climate change, and at the same time to have a positive impact on the budget of local bodies, and on the improvement of indoor comfort. School is the most adequate context to diffuse a culture of Sustainability and Energy saving that can be expressed not only in structural interventions, but also through educative action, participatory and sharing experiences that can and must be adopted referring to the didactical approach within the School System itself. Through specific pilot actions, students, teachers and families will have the opportunity to closely participate actively at the efficiency planning and renovation process and to experience its impact on the indoor environment for themselves.

Anno di stipula: 2021

Tipo progetto: N/A - Non applicabile

 Programma UE: Other programmes  
Interreg-IPA-CBC Italy-Albania-Montenegro

Data inizio: 01-09-2020

Data scadenza: 30-09-2023

Contributo totale: € 614.124

Costo eleggibile totale: € 722.500

Contributo a ENEA: € 72.239

Costo eleggibile ENEA: € 84.987

Doc. approvazione: 31/2021/SSPT-PROMAS

Codice atto: PS3ADB

 Resp. scientifico ENEA: LUPRANO VINCENZA  
ANNA MARIA

 Unità: SSPT-PROMAS-MATAS,  
DUEE-SIST-SUD

**Attività ENEA:**

L'ENEA di Brindisi e l'ENEA di Bari insieme sperimenteranno un modulo per l'aumento della consapevolezza pubblica sui temi dell'efficienza energetica nelle 4 regioni di pertinenza del progetto partendo dalle specificità delle regioni stesse. In particolare l'ENEA di Brindisi curerà la parte relativa al trasferimento di una metodologia di approccio agli studenti per studiare il confort microclimatico e l'ENEA di Bari curerà la parte relativa all'efficienza energetica. In particolare sono previste le seguenti fasi: •WPM Gestione del Progetto •WP T1 Analisi e valutazione del sistema energetico •WP T2 INVESTMENT: Caso Studio: "CBC Schools Living LAB on Energy Efficiency and Renewable Energy Sources",



Coordinatore: ENEA (Italia)

N. Partner: 10

**Abstract:**

FENICE is a TRL 8 upscaling project on recyclable & biobased Fibre Metal Laminates (FML) and other composites for lighter, more sustainable & safer battery box production, with higher fire resistance. By the end of 2025, FENICE will deliver (1) validated and precertified materials, with customisable characteristics, SDS and TDS; (2) battery box demonstrators & production optimisation; (3) LCA. By 2026, industrialisation in transports will start, aiming at producing 100k-1M battery boxes per year

Anno di stipula: 2023

Tipo progetto: N/A - Non applicabile

Programma UE: HORIZON EUROPE  
EIT - Raw Materials KIC

Data inizio: 01-01-2023

Data scadenza: 31-12-2025

Contributo totale: € 2.094.683

Costo eleggibile totale: € 2.996.579

Contributo a ENEA: € 230.506

Costo eleggibile ENEA: € 351.013

Doc. approvazione: 154/2023/SSPT-PROMAS

Codice atto: PS3ADX

Resp. scientifico ENEA: MINGAZZINI CLAUDIO

Unità: SSPT-PROMAS-TEMAF

**Attività ENEA:**

Attività finalizzate allo sviluppo di tecnologie di produzione di box batteria per la trazione elettrica in materiale a base FML (Fiber Metal Laminates).



Coordinatore: 9-TECH (Italia)

N. Partner: 9

**Abstract:**

PARSIVAL aims to solve the issue of EoL photovoltaic (PV) panels in Apulia (IT) and in Extremadura (ES) regions by studying the use of PV refurbishment&recycling technologies in these areas, and to create a value chain for silicon from PV recycling by studying three applications for recovered PV cells that contain mainly Silicon but also aluminum paste and silicon nitride. PARSIVAL will create a long-lasting network and help training future professionals for the RIS countries development.

Anno di stipula: 2023

Tipo progetto: N/A - Non applicabile

Programma UE: HORIZON EUROPE  
EIT - Raw Materials KIC

Data inizio: 01-01-2023

Data scadenza: 31-12-2024

Contributo totale: € 934.967

Costo eleggibile totale: € 982.668

Contributo a ENEA: € 106.500

Costo eleggibile ENEA: € 112.500

Doc. approvazione: 134/2023/SSPT-PROMAS

Codice atto: PS3ADV

Resp. scientifico ENEA: PROTOPAPA MARIA LUCIA

Unità: SSPT-PROMAS-MATAS

**Attività ENEA:**

ENEA è coinvolta nella caratterizzazione del materiale a base silicio recuperato dal processo di carbonizzazione dei pannelli dismessi realizzato da 9-Tech (coordinatore di progetto). La lavorazione della polvere consentirà di ottenere una polvere a granulometria fine che verrà testata da ENEA come materiale anodico nelle batterie a ioni di litio. ENEA sarà anche coinvolta nella valutazione del processo di pre-trattamento dei pannelli fotovoltaici a fine vita finalizzato, tra l'altro, alla delaminazione del back-sheet. ENEA è inoltre coinvolta nella diffusione dei risultati di progetto.



Coordinatore: INRAE - INSTITUT NATIONAL DE RECHERCHE POUR L (Francia)

N. Partner:

**Abstract:**

The main objective of EJP SOIL is to create an enabling environment to enhance the contribution of agricultural soils to key societal challenges such as climate change adaptation and mitigation, sustainable agricultural production, ecosystem services provision and prevention and restoration of land and soil degradation. The EJP SOIL will build a sustainable European integrated research community on agricultural soils and will develop and deploy a roadmap on climate-smart sustainable agricultural soil management. The EJP SOIL roadmap is based on a knowledge framework with 4 interacting components. Knowledge development is set out in project calls with internal and external partners. Knowledge sharing & transfer is framed in capacity building for young scientists, enhancing general public awareness and fostering societal understanding and appreciation of agricultural soil management and its contribution to society. Knowledge harmonization, storage & organization supports harmonised soil information and reporting practices. Knowledge application deals with ways to overcome barriers for adoption of novel practices in a European context, co-developing adequate tools and providing evidence-based recommendations for EU policies. EJP SOIL activities in interaction with stakeholders, MSs and DG AGRI will pursue the long-term goal of promoting farmers as stewards of land and soil resources and support policy development and deployment, in particular the CAP and Climate policies. The EJP SOIL addresses 6 expected impacts with targeted activities in response to societal, scientific, policy and operational challenges. A first annual workplan based on the roadmap is provided as part of the proposal. The EJP Soil consortium unites a unique group of 26 leading European research institutes and universities in 24 countries. The consortium has developed this proposal in close collaboration with its programme owners and has secured over 40M€ in co-funding and 10M€ for external calls over 5 years.

Anno di stipula: 2021

Tipo progetto: COFUND-EJP European Joint Programme COFUND

 Programma UE: HORIZON 2020  
Food Security, Sustainable Agriculture and the Bioeconomy

Data inizio: 18-03-2021

Data scadenza: 31-01-2026

Contributo totale: € 40.000.000

Costo eleggibile totale: € 80.000.000

Contributo a ENEA: € 74.406

Costo eleggibile ENEA: € 148.813

Doc. approvazione: 20/2021/SSPT-BIOAG

Codice atto: PS1ABX

Resp. scientifico ENEA: BEVIVINO ANNAMARIA

Unità: SSPT-BIOAG-SOQUAS

**Attività ENEA:**

L'ENEA in qualità di parte terza (Linked Third Party) si prefigge di collaborare con il Beneficiario (CREA) per il raggiungimento degli obiettivi legati alle attività tecnico-scientifiche previste nel progetto, in particolare nei seguenti WP: WP2 - Roadmap for EU Agricultural Soil Management research WP3 - Research alignment. Internal calls WP6 - Supporting harmonised soil information and reporting WP9 - Dissemination and outreach for European scale impacts



## Towards European Licencing of Small Modular Reactors

Coordinatore: VTT TECHNICAL RESEARCH CENTRE OF FINLAND (Finlandia)

N. Partner:

## Abstract:

ELSMOR (towards European Lisencing of Small MOdular Reactors) aims to create methods and tools for the European stakeholders to assess and verify the safety of light water small modular reactors (LW-SMR) that would be deployed in Europe. ELSMOR advances the understanding and technological solutions pertaining to light water SMRs on several fronts: • Collection, analysis, and dissemination of the information on the potential and challenges of Small Modular Reactors to various stakeholders, including the public, decision makers and regulators. • Development of the high level methods to assess the safety of LW-SMRs • Improvement of the European experimental research infrastructure to assist in the evaluation of the novel safety features of the future LW-SMRs. • Improvement of the European nuclear safety analysis codes to demonstrate the capability to assess the safety of the future LW-SMRs Establishing education and training in the field of innovative nuclear reactors for young professionals is also emphasized. The ELSMOR project is built upon the expertise of the consortium that consists of technical support organizations, technical research centres, industrial partners, and universities with the long experience in European nuclear safety analysis and the development and implementation of innovative nuclear technologies. The industrial partners include utilities, small medium sized enterprises as well as the consortium currently developing the French LW-SMR (F-SMR design). The developers of European safety analysis tools and other computer codes use their well-established paths for exploitation of the improved and validated simulation tools. The licencing approaches and methods would be expected to be directly utilized by SMR designers like the French consortium. The outcomes should make the licencing process more fluid and comprehensive; this should also be true from the regulator point of view.

Anno di stipula: 2019

Tipo progetto: RIA - Research and Innovation Action

Programma UE: HORIZON 2020 - Euratom  
Euratom fissione

Data inizio: 01-09-2019

Data scadenza: 31-08-2023

Contributo totale: € 3.494.704

Costo eleggibile totale: € 4.279.581

Contributo a ENEA: € 217.000

Costo eleggibile ENEA: € 270.900

Doc. approvazione: 072/2019/FSN

Codice atto: PF6AAK

Resp. scientifico ENEA: LOMBARDO CALOGERA

Unità: FSN-SICNUC-SIN

## Attività ENEA:

L'ENEA coordina il work package 3 "Core cooling safety functions" e partecipa a tutti i work package del progetto: WP 1 Identification of improved safety features of LW-SMRs WP 2 Development of safety case methodology WP 4 Containment safety functions WP 5 Application of safety case methodology WP 6 Synthesis, Recommendations and Dissemination WP 7 Education and training WP 8 Management



# EMODnet



Coordinatore: MARIS MARINE INFORMATION SERVICE B.V. (Paesi Bassi)

N. Partner:

#### Abstract:

A partnership of over a hundred and twenty European organisations work together under EMODnet in seven thematic groups to assemble marine data from diverse sources and resources in order to make them more accessible and more interoperable. Part of their work involves building gateways to national, regional or thematic repositories and creating products based on marine and maritime data held by public bodies. However, many data collected by public authorities, researchers and private operators of coastal or offshore facilities still do not arrive to these national or regional repositories and are thus unavailable to potential users. This creates additional costs for those working on marine issues who will have the choice of accepting lower confidence in their analysis than would otherwise be the case, or being compelled to needlessly repeat observations. There is therefore the need to streamline the data ingestion process so that data holders from public and private sectors can easily release their data for safekeeping and subsequent distribution through EMODnet or other means.

Anno di stipula: 2022

Tipo progetto: Service contract

Programma UE: Other programmes 2021-2027

EMFAF - European Maritime, Fisheries and Aquaculture Fund (2021-2027)

Data inizio: 30-03-2022

Data scadenza: 29-03-2024

Contributo totale: € 2.680.000

Costo eleggibile totale: € 2.680.000

Contributo a ENEA: € 18.750

Costo eleggibile ENEA: € 18.750

Doc. approvazione: 133/2022/SSPT-PROTER

Codice atto: CS4ABH

Resp. scientifico ENEA: PECCI LEDA

Unità: SSPT-PROTER-BES

#### Attività ENEA:

ENEA partecipa al progetto come subcontraente del coordinatore MARIS; le attività ENEA sono relative ai seguenti workpackage: WP2- Mantenere ed ulteriormente sviluppare percorsi per facilitare le trasmissioni di dati marini nel repository appropriato WP3 - Facilitare il trasferimento machine-to-machine WP4 - Attività di marketing e disseminazione



## Building European Nuclear Competence through continuous Advanced and Structured Education and Training Actions

Coordinatore: ENEN - European Nuclear Education Network (Organ. Internazionali)

N. Partner:

### Abstract:

Nuclear power and non-power technologies are technically very complex facilities that operate in the increasingly challenging regulatory framework and market conditions. Development, construction, operation, decommissioning, waste management and oversight of these facilities require personnel with excellent education, skills and motivation: nuclear specialists, that are equipped to work in multidisciplinary, multicultural and competitive environments. ENEN# stands for the largest and most integrative nuclear Education and Training (E&T) efforts up to date. Attraction of excellent new talents followed by outstanding development through E&, crosscultural and cross-disciplinary activities are the overarching objectives. Excellent workforce should remain the basic enabler of safe longterm operation of existing and development of advanced facilities. A detailed insight into the EU supply and demand of nuclear human resources for power and non-power applications will be developed. This will include industries, academia, technical safety organizations and regulators. Higher number of nuclear talents will be achieved through dedicated career related events and competitions for high school pupils and teachers, students (BSc, MSC, PhD), postdocs and lifelong learners. A strong mobility program will support over 100 personyears of nuclear career enhancing experience to about 1.000 learners with over 2,5 million EUR. Cross-border and cross-disciplinary mobility within and beyond EU will be promoted in cooperation with JRC, OECD/NEA and partners from USA, China, Korea and Japan. A single hub will be established to provide information on available educational, training and job opportunities. Appropriate connections with the complementary NRT-12 project facilitating access to research infrastructures will be maintained. A centralized platform with coherent information on vocational training programs, developed during the project, will be established.

Anno di stipula: 2022

Tipo progetto: CSA - Coordination and support action

Programma UE: Euratom2027  
Euratom fissione

Data inizio: 01-06-2022

Data scadenza: 31-05-2026

Contributo totale: € 6.819.707

Costo eleggibile totale: € 7.156.424

Contributo a ENEA: € 81.875

Costo eleggibile ENEA: € 81.875

Doc. approvazione: 077/2022/FSN

Codice atto: PF6AAX

Resp. scientifico ENEA: FERRUCCI BARBARA

Unità: FSN-SICNUC-TNMT

### Attività ENEA:

L'ENEA partecipa ai seguenti work package (WP): WP1 – Human Resources analysis in the nuclear sector WP2 – Informing and attracting new talents WP3 – Enhancing nuclear competences: continuous E&T programs Le attività sono svolte presso i centri ENEA di Bologna e Brasimone.



## Implementation of nuclear and radiological emergency preparedness and response requirements in EU Member States and neighbouring countries

Coordinatore: NucAdvisor (Francia)

N. Partner:

### Abstract:

Review and evaluate the practical implementation of national emergency preparedness and response arrangements, emergency management systems and emergency plan in all EU Member States and participating countries in line with the provisions of the BSS and Nuclear Safety Directives. Provide information on the effectiveness of existing arrangements and capabilities in practice; review to what extent existing international and European standards, guidance and approaches are applied in practice: share national experiences amongst the relevant authorities and highlight effective practices that would improve public confidence.

Anno di stipula: 2021  
 Tipo progetto: Service contract  
 Programma UE: Other programmes  
 Service contract  
 Data inizio: 01-01-2021  
 Data scadenza: 14-02-2023

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|                          |           |
|--------------------------|-----------|
| Contributo totale:       | € 490.000 |
| Costo eleggibile totale: | € 490.000 |
| Contributo a ENEA:       | € 67.086  |
| Costo eleggibile ENEA:   | € 67.086  |

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Doc. approvazione: 47/2021/FSN  
 Codice atto: CF6AAL  
 Resp. scientifico ENEA: ROCCHI FEDERICO  
 Unità: FSN-SICNUC-PSSN

### Attività ENEA:

ENEA è coinvolta in tutte le task del contratto, ma è particolarmente impegnata nella Task 2, ove dovranno essere preparati, analizzati e presentati due "case studies" con particolare rilevanza transfrontaliera.



Coordinatore: ENEA (Italia)

N. Partner:

**Abstract:**

The main goal of the eNeuron project is to develop innovative tools for the optimal design and operation of local energy communities (LECs) integrating distributed energy resources and multiple energy carriers at different scales. This goal will be achieved, by having in mind all the potential benefits achievable for the different actors involved and by promoting the Energy Hub concept, as a conceptual model for controlling and managing multi-carrier and integrated energy systems in order to optimize their architecture and operation. In order to ensure both the short-term and the long-term sustainability of this new energy paradigm and thus support an effective implementation and deployment, economic and environmental aspects will be taken into account in the optimization tools through a multi-objective approach. eNeuron's proposed tools enable tangible sustainability and energy security benefits for all the stakeholders in the LEC. Local prosumers (households, commercial and industrial actors) stand to benefit through the reduction of energy costs while leveraging local, low carbon energy. Developers and solution providers will find new opportunities for technologies as part of an integrated, replicable operational business model. Distribution system operators (DSOs) benefit from avoiding grid congestion and deferring network investments. Policy makers benefit from increasingly sustainable and secure energy supply systems. eNeuron is a high TRL project in line with the Work Programme, by developing innovative approaches and methodologies to optimally plan and operate integrated LECs through the optimal selection and use of multiple energy carriers and by considering both short- and long-run priorities. Through optimally coordinating all energy carriers and vectors, cost-effective and low-carbon solutions will be provided for fostering the deployment and implementation of this new energy paradigm at European level.

|                          |                        |
|--------------------------|------------------------|
| Anno di stipula:         | 2020                   |
| Tipo progetto:           | IA - Innovation Action |
| Programma UE:            | HORIZON 2020<br>Energy |
| Data inizio:             | 01-11-2020             |
| Data scadenza:           | 31-10-2024             |
| Contributo totale:       | € 5.731.118            |
| Costo eleggibile totale: | € 6.319.693            |
| Contributo a ENEA:       | € 487.500              |
| Costo eleggibile ENEA:   | € 487.500              |
| Doc. approvazione:       | 101/2020/DTE           |
| Codice atto:             | PT7AAP                 |
| Resp. scientifico ENEA:  | DI SOMMA MARIALaura    |
| Unità:                   | DTE-STSN-SGRE          |

**Attività ENEA:**

L'ENEA coordina il progetto eNeuron (WP1) ed è anche responsabile del WP3 che ha l'obiettivo principale di identificare la "Comunità energetica locale integrata" in base agli sviluppi e alle politiche normative più recenti in Europa, nonché di definire una mappatura dettagliata delle principali tecnologie abilitanti e degli attori chiave con potenziale interesse per l'implementazione di questo nuovo paradigma energetico a livello locale. Sulla base di questa analisi preliminare, verranno sviluppati i casi d'uso e i modelli di business di eNeuron. L'ENEA inoltre parteciperà attivamente ai seguenti wopackage: . WP2: attività relative all'analisi critica dell'attuale stato di implementazione di sistemi energetici multi-vettore locali integrati in Europa; . WP4 sviluppo del tool eNeuron; . WP5: modellizzazione degli elementi di flessibilità e delle reti di distribuzione e definizione degli scenari, nonché alla simulazione delle soluzioni tecniche fornite dal tool eNeuron; . WP6: valutazione tecno-economica dei risultati dei test svolti nei siti pilota in Europa; . WP7: valutazione del potenziale di replicazione delle soluzioni implementate nei siti pilota. L'ENEA contribuirà anche all'elaborazione di raccomandazioni e linee guida generali per favorire la decarbonizzazione delle isole energetiche; . WP8: attività di diffusione e disseminazione.



## Actions to Mitigate Energy Poverty in the Private Rented Sector

**Coordinatore:** IECEP - INSTITUTE FOR EUROPEAN ENERGY AND CLIMATE POLICY STICHTINGN. **Partner:** (Paesi Bassi)

### Abstract:

Energy poverty remains at high levels in the EU Member States due to increasing energy costs and slow progress on energy efficiency improvements. Despite various policies in place that directly or indirectly mitigate energy poverty in the household level, energy poverty is increasing in the private rented sector (PRS). The PRS also presents quite specific issues that cannot be dealt adequately in the framework of energy poverty linked directly to energy efficiency, such as a) difficulty to identify and quantify energy poor households in the PRS; and b) the delivery of energy efficiency measures to these households is difficult due to structural problems like information deficits, split incentives and others. ENPOR thus aims to overcome both challenges – making energy poverty in the PRS visible and as far as possible quantifiable, and also test energy efficiency support schemes to address it. This can increase the effectiveness of policies at a local or regional level, an alignment with structural measures is needed. Dedicated actions are therefore needed that actively contribute to alleviating energy poverty in the PRS by identifying energy poor tenants (and respective homeowners) as well as understanding and addressing their needs. TO this end, ENPOR will support the adaption and implementation of ten policies in 7 Member States tailored to the specific needs of the PRS and will integrate them into broader policy objectives. To achieve that, ENPOR will examine in depth energy poverty policies for the PRS across the EU, Monitor the dimensions of energy poverty in the PRS, support tailored policies and will provide guidelines for other countries. Through ENPOR partners links with the Covenant of Mayors, EU Energy Poverty Observatory and market (Union of Tenants and Associations of homeowners), the high-level dialogue on the EU level for the energy poverty in the PRS will be promoted.

**Anno di stipula:** 2020

**Tipo progetto:** CSA - Coordination and support action

**Programma UE:** HORIZON 2020

Energy

**Data inizio:** 01-09-2020

**Data scadenza:** 30-11-2023

**Contributo totale:** € 1.999.966

**Costo eleggibile totale:** € 1.999.966

**Contributo a ENEA:** € 154.188

**Costo eleggibile ENEA:** € 154.188

**Doc. approvazione:** 16/2020/DUEE

**Codice atto:** PW3AAO

**Resp. scientifico ENEA:** PANDOLFI EDOARDO

**Unità:** DUEE-SPS-MPE

### Attività ENEA:

Le attività di ENEA sono principalmente legate ai seguenti WP: - WP3: "Design of the policies for energy poverty in the PRS": questo WP rappresenta l'attività principale del progetto. Le Agenzie per l'energia (e altri partner di ENPOR) dovranno fornire supporto ai governi nazionali e regionali in Germania, Grecia, Estonia, Italia, Croazia, Austria e Paesi Bassi per adattare dieci politiche esistenti per il SAP. - WP4 "Engagement of energy poverty groups and relevant actors": l'ENEA è il responsabile di questo WP e gestisce la parte legata al capacity building. Gli obiettivi di questo WP sono: istituire i Regional Energy Action (REACT) group per consentire lo scambio di conoscenze locali e nazionali sulla povertà energetica nell'ASP; svolgere attività di capacity building alle parti interessate per migliorare l'attuazione delle politiche ENPOR; integrare le attività ENPOR nel dialogo politico a livello UE e in altre iniziative sulla povertà energetica. - WP5 "Exploitation, dissemination and policy recommendations": lo scopo di questo WP è quello di trarre insegnamenti dall'attuazione delle politiche promosse da ENPOR ed evidenziare quali sono stati le strategie più efficaci per superare le barriere nell'APS in modo che possano essere adottate da una comunità più ampia. - WP6 "Communication activities": questo WP racchiude tutte le attività di comunicazione necessarie alla buona riuscita del progetto tra cui: definizione di un piano di comunicazione, creazione di un sito web, eventi, attività di networking.



## Energy TRANSitions from Coal and carbon: Effects on Societies

Coordinatore: UNIV. DA CORUNA (Spagna)

N. Partner:

## Abstract:

"This project is framed under the topic ""SSH aspects of the Clean-Energy Transition"" and it tries to interpret the ""Challenges facing the carbon intensive regions"" within a multi-contextual framework: 1) the de-carbonisation policies; 2) the ongoing processes of de-territorialisation; and 3) the territorial dimension of clean energy transition. These contextual elements are presented in the project, providing an interpretation of the main research questions of the topic.: a) The de-carbonisation of coal and carbon intensive regions risks to be a cul de sac of the energy transition process. Along with this process a set of conflicts emerge and move from local to national and European level and vice-versa. One of the main ideas of the project is analysing these conflicts and the negotiation processes related to them, as well as the political cultures and discourses behind these conflicts; b) The challenges facing coal and carbon-intensive regions are studied in the light of the ongoing process at the territorial level. Another main idea of the project is to identifying the factors of de-territorialisation in action in different coal and carbon-intensive regions and to explain their dynamics and interactions; c) The clean energy transition cannot be understood only as a technological change or as an industrial shift, and it is studied as a socio-economic-psychological process affecting the life of local communities. In this respect the project is focused on the study of the coping strategies from a wide array of perspectives: A multidimensional perspective, combining different disciplinary frameworks; a comparative perspective, developing a comprehensive set of case studies; and a multilevel perspective, involving different key players at territorial, regional, national, European and global level. Each of these strategies will be developed in a specific strand of research: Theoretical strand, Analytic strand, and Pro-active strand."

Anno di stipula: 2020  
 Tipo progetto: RIA - Research and Innovation Action  
 Programma UE: HORIZON 2020  
 Energy  
 Data inizio: 01-05-2020  
 Data scadenza: 30-10-2023

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 Contributo totale: € 2.999.524

Costo eleggibile totale: € 2.999.524

Contributo a ENEA: € 193.958

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 Costo eleggibile ENEA: € 193.958

Doc. approvazione: 41/2020/DTE

Codice atto: PT6AAK

Resp. scientifico ENEA: CERONE NADIA

Unità: DTE

## Attività ENEA:

L'ENEA è impegnata in tutti i work package (WP) del progetto; i principali contributi forniti da ENEA riguardano i seguenti WP: WP4 'Carbon-intensive regions case studies' in cui è leader della task 4.1 'Brindisi case study'; WP6 'Knowledge co-production and recommendations' il cui obiettivo generale è quello di integrare le conoscenze maturate e i dati raccolti nel corso del progetto per definire e categorizzare sia le barriere da superare sia le prospettive da valorizzare nel contesto dello scenario di transizione energetica nei paesi europei a alta intensità di carbonio e carbone.





## European Sodium Fast Reactor - Safety by Innovative Monitoring, Power Level flexibility and Experimental research

**Coordinatore:** CEA - COMMISSARIAT A L'ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES (Francia)

**N. Partner:**

### Abstract:

To facilitate the integration of the future nuclear reactors into the European energy system, it is necessary to demonstrate that the reactors have uncompromised safety and meet the future societal needs. The ESFR-SIMPLE project aims at challenging the current European Sodium Fast Reactor (ESFR) design to improve its safety and economics through implementation of innovative technologies in accordance with the ESNII roadmap. The project has 5 specific objectives: 1) Rethink the ESFR design in order to simplify it and make it more cost-competitive, while still achieving resource sustainability and having safety reinforced by intrinsic behaviour. This can be accomplished through reducing the size of the reactor, which will also allow taking advantage of Small Modular Reactor features such as transportability, modularisation, standardisation, and flexible operation, all ultimately leading to improved economics. 2) Assess impact of alternative technologies, such as metallic fuel and compact secondary system design, for the large-size ESFR on the economics and safety. 3) Propose, develop and assess advanced methods of monitoring and processing operational data using Artificial Intelligence, e.g., to optimise fault detection in steam generators at an early stage. 4) Produce new experimental data in order to assist in qualification of innovative components, such as expansion bellows, core catcher and thermo-electric pumps. 5) Ensure that the knowledge generated in the project is shared not only among the project partner institutions, but also with a wide range of stakeholders in Europe and internationally. The project activities will also be informed by the public and other stakeholders' perception of risks and benefits of ESFR technology. Close interactions with EU safety regulator experts will enable continued review and recommendation of the solutions proposed and developed in the project.

|                                 |                                      |
|---------------------------------|--------------------------------------|
| <b>Anno di stipula:</b>         | 2022                                 |
| <b>Tipo progetto:</b>           | RIA - Research and Innovation Action |
| <b>Programma UE:</b>            | Euratom2027<br>Euratom fissione      |
| <b>Data inizio:</b>             | 01-10-2022                           |
| <b>Data scadenza:</b>           | 30-09-2026                           |
| <b>Contributo totale:</b>       | € 3.046.561                          |
| <b>Costo eleggibile totale:</b> | € 6.506.234                          |
| <b>Contributo a ENEA:</b>       | € 78.727                             |
| <b>Costo eleggibile ENEA:</b>   | € 152.768                            |
| <b>Doc. approvazione:</b>       | 067/2022/FSN                         |
| <b>Codice atto:</b>             | PF6AAR                               |
| <b>Resp. scientifico ENEA:</b>  | POLIDORI<br>MASSIMILIANO             |
| <b>Unità:</b>                   | FSN-SICNUC-SIN                       |

### Attività ENEA:

ENEA sarà coinvolta nei seguenti work package: WP4 dedicato a studi di sicurezza di SMR WP8 dedicato all'ottimizzazione dell'elemento di combustibile

Coordinatore: POLITECNICO DI MILANO (Italia)

N. Partner: 15

**Abstract:**

Hydrogen fuel cells market potentials in the maritime sector have been demonstrated in the last years with several vessels flagship projects. Despite hydrogen is a worldwide considered a valid option to reach the emission reduction targets, also part of the International Maritime Organization (IMO) strategy, a regulatory framework applicable to hydrogen fuelled ships is not yet available. E-SHyIPS brings together the Hydrogen and maritime stakeholders and international experts, through an Advisory Board, to gather new knowledge based on regulatory framework review and experimental data on ship design, safety systems, material and components and bunkering procedures. The approach is "vessel independent", in order to avoid the burdens of customized projects, and is focused on the risk and safety assessment methodologies. Based on this, e-SHyIPS will define a pre-standardization plan for IGF code update for the hydrogen-based fuels passenger ships and a roadmap for the boost of Hydrogen economy in the maritime sector.

Anno di stipula: 2021

Tipo progetto: FCH2-RIA

Programma UE: HORIZON 2020

Programma UE: JTI - Hydrogen

Data inizio: 01-01-2021

Data scadenza: 31-12-2024

Contributo totale: € 2.500.000

Costo eleggibile totale: € 2.500.000

Contributo a ENEA: € 25.000

Costo eleggibile ENEA: € 25.000

Doc. approvazione: 134/2021/TERIN

Codice atto: PK4AAJ

Resp. scientifico ENEA: CIGLOTTI VIVIANA

Unità: TERIN-PSU-ABI

**Attività ENEA:**

ENEA svolgerà il ruolo di terza parte di ATENA e sarà coinvolta nei seguenti WP come supporto ad ATENA; in particolare le attività di competenza ENEA si possono riassumere e sintetizzare nei seguenti punti: • WP1-Task 1.1: Project concept and functional scenarios definition and review; • WP2- Task 2.1: Vessel Requirements Definition: Functional and Technical; • WP6- Task 6.1: Definition of functional requirements for the use of hydrogen in maritime; • WP7- Dissemination, Communication and Exploitation. Le attività verranno condotte in diretta collaborazione con ATENA.



Coordinatore: INFN - ISTITUTO NAZIONALE DI FISICA NUCLEARE (Italia)

N. Partner:

**Abstract:**

EuPRAXIA is a distributed, compact and innovative accelerator facility based on plasma technology. It has been selected for the 2021 Update of the ESFRI Roadmap. In its first phase, its consortium of 51 institutes and industry partners will construct an electron-beamdriven plasma accelerator in the metropolitan area of Rome, thus bringing innovation, potential for spin-off companies, state-of-the art scientific applications and a vibrant international user community to the middle of Italy. In its second phase, EuPRAXIA will build one laser-driven plasma accelerator at a site to be chosen between several options in Europe. EuPRAXIA will serve users in ultra-fast science, e.g. on high-resolution medical imaging, deeply penetrating positron annihilation spectroscopy for materials and with Europe's most southern free-electron laser (FEL). It will offer fascinating capabilities for research on biomolecules, viruses and microscopic processes. EuPRAXIA will thus be a transformative step in the development of ultra-compact accelerators and applications. The Preparatory Phase project EuPRAXIA-PP will prepare its full implementation.

Anno di stipula: 2022  
 Tipo progetto: CSA - Coordination and support action  
 Programma UE: HORIZON EUROPE  
 Research Infrastructures (2021-2027)  
 Data inizio: 01-11-2022  
 Data scadenza: 31-10-2026

Contributo totale: € 2.490.000

Costo eleggibile totale: € 2.490.000

Contributo a ENEA: € 30.000

Costo eleggibile ENEA: € 30.000

Doc. approvazione: 114/2022/FSN

Codice atto: PF2AAK

Resp. scientifico ENEA: NGUYEN FEDERICO

Unità: FSN-FUSPHY-TSM

**Attività ENEA:**

L'ENEA partecipa al Work Package 9 – RF, Magnets and Beamline Components, del quale è il Co-Leader.



Coordinatore: DLR - GERMAN AEROSPACE CENTER E.V. (Germania)

N. Partner:

**Abstract:**

EuroPaTMOs pulls together the European expertise and testing infrastructure for parabolic trough (PTC) with molten salt (MS), to accelerate transfer of technology from R&D to commercial deployment. Two leading European CSP companies (TSK Flagsol and Rioglass Solar) join forces with three SMEs providing risk assessment and quality assurance services (CSP Services GmbH), quality assurance equipment and measurement services (CSP Services España), electrical scope and operating teams for CSP (Ductolux) to develop a selling proposition with reduced risk and competitive cost. This industrial endeavor is supported by a strong R&D complement consisting of two large R&D institutions (DLR and ENEA) and three Universities (UCM, UNEX and UEVORA) with complementary specializations and abilities. Together they gather two of the most important European infrastructures for PTC-MS research and specialized lab and technical scale facilities for component testing and investigation of corrosion and salts degradation issues. This unique constellation enables the consortium to tackle all subtopics of Topic 2 by parallel investigations on the different test facilities, integrating the results and experiences of previous and ongoing projects in this field. In particular, the following issues will be addressed: Evaluate critical plant components regarding reliability (review of consortium joint knowledge, laboratory testing, operation in realistic environment). Develop a process control concept based on a virtual solar field, to be validated on a full size collector loop enabling hardware-in-the-loop simulation of a full solar field. Develop and demonstrate O&M procedures for exceptional molten salt operations (e.g. filling, draining, repair of leakages, re-vitalizing frozen parts). Carry out and document systematic risk assessment including mitigation measures. Develop high performance receiver tube and validate in relevant environment. Provide methods and equipment for advanced QA and monitoring during construction and operation of PTC-MS solar fields

Anno di stipula: 2022

Tipo progetto: ERANET COFUND

Programma UE: HORIZON 2020

ERA-NET

Data inizio: 01-02-2021

Data scadenza: 31-01-2024

Contributo totale: € 2.644.476

Costo eleggibile totale: € 3.404.387

Contributo a ENEA: € 150.000

Costo eleggibile ENEA: € 300.000

Doc. approvazione: 141/2022/TERIN

Codice atto: PK7AAE

Resp. scientifico ENEA: GAGGIOLI WALTER

Unità: TERIN-STSN

**Attività ENEA:**

L'ENEA, in qualità di leader del WP3-Demonstration of molten salt specific operations, sarà coinvolta nelle attività di Ricerca afferenti al raggiungimento dei Milestones di progetto n°1.2, per l'identificazione dei componenti dell'impianto da testare e sul milestone n° 3.1, per la definizione della matrice di test sperimentali. In aggiunta l'ENEA produrrà il Deliverable n°1.4, il rapporto sui test dei componenti chiave dell'impianto eseguiti presso l'ENEA; il Deliverable n°1.5, un report sul confronto dei risultati delle campagne di prova eseguite sui componenti chiave dell'impianto; e il Deliverable n° 3.1, il rapporto sui test sperimentali di riempimento e drenaggio dei sali fusi eseguiti in ENEA.



## Highly efficient delamination technologies to recover and reuse metals, glass, polymers from end-of-life photovoltaic panels

**Coordinatore:** CEA - COMMISSARIAT A L'ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES (Francia)

**N. Partner:**

### Abstract:

EVERPV's objective is to provide EU with efficient solutions for a sustainable treatment of end-of-life PV panels and recovery of high purity and high integrity materials. Based on the grinding of PV panels waste from the backside and/or the use of IR lamps heating, EVERPV will demonstrate two innovative technologies to delaminate the different layers of the PV panel. Combined with recycling processes, it will enable to recover glass with less than 1% impurities, encapsulant and backsheets polymers with a purity over 99%, and silver with a purity of 99%. Besides, the project will cluster with other EU-funded consortia already addressing the recycling of silicon (e.g. PHOTORAMA) to provide with a global solution. The new delamination technologies will be respectively demonstrated at ENVIE recycling plant and at 9TECH to reach TRL7. The technology demonstrated during EVERPV project targets to process more than 3000 tons of solar panels per year, thus recovering enough raw materials recovered to produce more than 350 000 new panels per year by 2030. EVERPV will finally demonstrate the potential for reusability of recovered materials in several industrial value chains in particular in the PV industry. The project will lead a strategic analysis on the potential of new EoL panels circular value chains based on estimated PV waste generation together with environmental and societal impact assessments. EVERPV has gathered a consortium of 16 participants from 8 countries whose expertise ranges from solar PV materials and recycling processes (CEA, CSEM, ENEA, TEC), recyclers (ENVIE, 9TECH), process industries and materials suppliers (SGB, DTF, DPL, JBR), PV modules manufacturing (VAL), collecting and waste treatment organizations (SOREN, ERION), policy-making, business and training facilitators (SPE, UNITAR, BI).

**Anno di stipula:** 2023  
**Tipo progetto:** IA - Innovation Action  
**Programma UE:** HORIZON EUROPE  
 Cluster 5 - D3 Energy supply  
**Data inizio:** 01-09-2023  
**Data scadenza:** 31-08-2026

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**Contributo totale:** € 5.367.184  
**Costo eleggibile totale:** € 5.367.184  
**Contributo a ENEA:** € 634.263  
**Costo eleggibile ENEA:** € 634.263

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**Doc. approvazione:** 199/2023/SSPT-USER  
**Codice atto:** PS6AEC  
**Resp. scientifico ENEA:** TAMMARO MARCO  
**Unità:** SSPT-USER-T4RM

### Attività ENEA:

L'ENEA partecipa come Partner per attività sperimentali e di studi. In particolare: attività sperimentali su impianto prototipale in Casaccia per ottimizzare il processo di recupero di materie dai rifiuti composti da pannelli fotovoltaici a fine vita e basato su brevetto ENEA-BetaTech; sviluppo in laboratorio di processi di recupero dell'argento contenuto nelle matrici recuperate con il processo sopra descritto; valutazione impatto ambientale, mediante LCA/LCC, dei processi di trattamento e recupero oggetto del progetto



Coordinatore: FOI SWEDISH DEFENCE RESEARCH AGENCY (Svezia)

N. Partner:

**Abstract:**

EXERTER connects 22 practitioners from 13 EU Member States into a Network with Explosives Specialists within the Security of Explosives (SoE) area. The objective of the EXERTER Network is to bridge the difficulties for security practitioners to capture and utilize research results and to direct the industry's innovation efforts to address the most pressing needs in the fight against terrorism and serious crime. Practitioners will via EXERTER get improved operational capability via novel technologies, methods and knowledge to aid them in executing more efficient countermeasures in a changing threat environment. In cooperation with key practitioners in the Network, the project will each year define one unique scenario based on past events to facilitate the identification of capability gaps along different counter-terrorist phases associated with PREVENT, DETECT, MITIGATE and REACT. With its explosives expertise, EXERTER will provide recommendations to the SoE community on how these gaps can be countered by (i) directing innovators into targeted areas to which research programmes should focus, (ii) proposing standardization priority areas and (iii) advising on exploitation and commercialisation opportunities. Ongoing research activities will continuously be reviewed to promote practitioners' uptake of results and knowledge. Academia and research institutes will be supported by the technical expertise within EXERTER to lower exploitation barriers for promising research by enhancing their interaction with security industry. EXERTER will assess evolving threats requiring immediate attention of the SoE community - thus widely addressing emerging technologies and trends. Annual interaction workshops will be held where explosives practitioners, research institutes and academia as well as industry gather to discuss the current state of play and future roadmaps to answer to urgent capability requirements.

Anno di stipula: 2018

Tipo progetto: CSA - Coordination and support action

Programma UE: HORIZON 2020  
Secure societies

Data inizio: 01-06-2018

Data scadenza: 31-05-2023

Contributo totale: € 3.498.869

Costo eleggibile totale: € 3.498.869

Contributo a ENEA: € 150.313

Costo eleggibile ENEA: € 150.313

Doc. approvazione: 052/2018/FSN

Codice atto: PF7AAG

Resp. scientifico ENEA: CHIRICO ROBERTO

Unità: FSN-TECFIS-DIM

**Attività ENEA:**

Diagnostiche fisiche finalizzate all'uso di precursori degli esplosivi.



## Development of the final design and prototyping

Coordinatore: ENEA (Italia)

N. Partner: 7

## Abstract:

The ultimate objective of the project is to complete the design of all ITER RNC components including electronics and software up to a Final Design stage such that final Built-To-Print and Manufacturing Specifications can be produced by a F4E contractor to input the Manufacturing Readiness Review.

Anno di stipula: 2020

Tipo progetto: N/A - Non applicabile

Programma UE: HORIZON 2020 - Euratom  
F4E - Fusion for energy

Data inizio: 14-02-2020

Data scadenza: 13-04-2024

Contributo totale: € 1.819.126

Costo eleggibile totale: € 4.155.088

Contributo a ENEA: € 1.267.827

Costo eleggibile ENEA: € 2.820.040

Doc. approvazione: 015/2020/FSN

Codice atto: PF3AAF

Resp. scientifico ENEA: MAROCCO DANIELE

Unità: FSN-FUSTEC

## Attività ENEA:

L'ENEA coordina il progetto.



Coordinatore: RTDS ASSOCIATION (Austria)

N. Partner:

**Abstract:**

FNS-Cloud will overcome fragmentation problems by integrating existing FNS data, which is essential for high-end, pan-European FNS research, addressing FNS, diet, health, and consumer behaviours as well as on sustainable agriculture and the bio-economy. Current fragmented FNS resources not only result in knowledge gaps that inhibit public health and agricultural policy, and the food industry from developing effective solutions, making production sustainable and consumption healthier, but also do not enable exploitation of FNS knowledge for the benefit of European citizens. FNS-Cloud will, through three Demonstrators; Agri-Food, Nutrition & Lifestyle and NCDs & the Microbiome to facilitate: (1) Analyses of regional and country-specific differences in diet including nutrition, (epi)genetics, microbiota, consumer behaviours, culture and lifestyle and their effects on health (obesity, NCDs, ethnic and traditional foods), which are essential for public health and agri-food and health policies; (2) Improved understanding agricultural differences within Europe and what these means in terms of creating a sustainable, resilient food systems for healthy diets; and (3) Clear definitions of boundaries and how these affect the compositions of foods and consumer choices and, ultimately, personal and public health in the future. Long-term sustainability of the FNS-Cloud will be based on Services that have the capacity to link with new resources and enable cross-talk amongst them; access to FNS-Cloud data will be open access, underpinned by FAIR principles (findable, accessible, interoperable and re-useable). FNS-Cloud will work closely with the proposed Food, Nutrition and Health Research Infrastructure (FNHRI) as well as METROFOOD-RI and other existing ESFRI RIs (e.g. ELIXIR, ECRIN) in which several FNS-Cloud Beneficiaries are involved directly.

Anno di stipula: 2019  
 Tipo progetto: IA - Innovation Action  
 Programma UE: HORIZON 2020  
 Food Security, Sustainable Agriculture and the Bioeconomy  
 Data inizio: 01-10-2019  
 Data scadenza: 31-12-2023

Contributo totale: € 10.912.775

Costo eleggibile totale: € 10.912.775

Contributo a ENEA: € 331.138

Costo eleggibile ENEA: € 331.138

Doc. approvazione: 229/2019/SSPT-BIOAG

Codice atto: PS1ABB

Resp. scientifico ENEA: ZOANI CLAUDIA

Unità: SSPT-BIOAG

**Attività ENEA:**

L'attività dell'ENEA s'inserisce pienamente negli obiettivi e nelle azioni condotte per la realizzazione e il coordinamento dell'infrastruttura di ricerca METROFOOD-RI. L'ENEA partecipa alle attività previste nei seguenti work package: 2. Data standardisation and interoperability; 4. Use cases; 5. FSN demonstrators; 6. Education and training; 7. Dissemination, exploitation, communication and community; 8. Coordination





## FOODSAFETY4EU - MULTI-STAKEHOLDER PLATFORM FOR FOOD SAFETY IN EUROPE

Coordinatore: CNR - CONSIGLIO NAZIONALE DELLE RICERCHE (Italia)

N. Partner:

### Abstract:

FOODSAFETY4EU is a Project focused to design, develop and release a multi-stakeholder platform for the future European Food Safety System (FSS), by structuring a participatory process, which sustains a responsive and adaptive community of FSS actors. The platform will enable the FSS actors to access efficiently resources and data, synchronize food safety research strategies, share and exchange scientific knowledge and contributions for the future EU FSS. It will boost interactive cooperation within the system and with the civil society for enhancing public confidence through dedicated tools. A European Food Safety Forum will be set up to officially consolidate the participatory process and guarantee the long term science-policy-society interface. New digital tools, co-designed strategies and communication models will support Food Safety Authorities (FSAs), EU Agencies, policy makers, scientists and civil society in a coordinate approach, thus contributing to strengthen the EU approach to risk assessment & communication. The multi-actor consortium is pooled by a core group of 23 partners from 12 countries: scientific experts in food safety will work closely with key actors with complementary knowledge in: a) developing and structuring of participatory processes; b) stakeholders engagement, communication and networking; c) e-platforms, smart tools, data management; d) Food Safety policies implementation; e) representing the voices from food and feed industry, consumers and the civil society. A network of other 44 Food Safety actors – engaged as “Supporting partners” – are committed to populate the platform and interact by expressing opinions, sharing information, data and reports; providing strategy advice and assuring a multiplier impact of project results.

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|--------------------------|---|
| Anno di stipula:         | 2021  |
| Tipo progetto:           | CSA - Coordination and support action                                     |
| Programma UE:            | HORIZON 2020<br>Food Security, Sustainable Agriculture and the Bioeconomy |
| Data inizio:             | 01-01-2021  |
| Data scadenza:           | 31-12-2023  |
| Contributo totale:       | € 3.000.000   |
| Costo eleggibile totale: | € 3.000.000   |
| Contributo a ENEA:       | € 195.000   |
| Costo eleggibile ENEA:   | € 195.000   |
| Doc. approvazione:       | 158/2020/SSPT-BIOAG   |
| Codice atto:             | PS1ABQ  |
| Resp. scientifico ENEA:  | ZOANI CLAUDIA   |
| Unità:                   | SSPT-BIOAG  |

### Attività ENEA:

ENEA partecipa attivamente alle attività previste dai seguenti WP: WP1: SAFE4FOOD digital tools. In particolare ENEA curerà l'implementazione dei digital tools per la food safety, rivestendo il ruolo di WP1 Leader. WP3: Improvement of roadmaps for the future FSS - integration and forecasting WP4: Definition of the Research & Innovation framework for the future policies WP5: Strategies to improve public awareness of Food Safety and civil society engagement WP6: Co-design of the platform strategy and business model for long term cooperation WP7: Dissemination, Communication and Exploitation WP8: Coordination and Project Management



## Navigating European Forests and forest bioeconomy sustainably to EU climate neutrality

Coordinatore: IIASA - INTERNATIONAL INSTITUTE FOR APPLIED SYSTEMS ANALYSIS (Austria) N. Partner:

### Abstract:

ForestNavigator aims at assessing the climate mitigation potential of European forests and forest-based sectors through modelling of policy pathways, consistent with the best standards of LULUCF reporting, and informing the public authorities on the most suitable approach to forest policy and bioeconomy. With a primarily European scope, ForestNavigator zooms into carefully selected EU Member States to enhance the consistency of the EU and national pathways, but the project also zooms out towards the global scale, and selected key EU trading partners, accounting for extra-EU future drivers and potential leakage effects. The project will rely on a newly developed integrated policy modelling framework for the EU forests and forest bioeconomy covering i) all relevant mitigation strategies from forest management to energy and material substitution, ii) climate change impacts, adaptation, and natural disturbances, iii) biophysical climate feedbacks, iv) systematically accounting for impacts on biodiversity, forest ecosystem services, and other forest functions, incl. jobs and green growth. To increase the accessibility of the models and pathways assessments, their understanding and transparency, a novel decision-making platform will be established consisting of the web-based ForestNavigator Portal, and a community of policymakers, national authorities, and modelers, the Forest Policy Modelling Forum. To reach its ambitious objectives, ForestNavigator will i) harmonize, integrate and continuously update existing datasets by, including national inventories with new remote sensing data and models ii) start from complex forest and climate models and through emulators build them into operational policy modelling tools, iii) integrate biophysical and socio-economic information, iv) consider EU forests and forest bioeconomy in the broader context of other land use and economic sectors, v) rely on input from policy makers and other stakeholders.

|                          |   |
|--------------------------|---|
| Anno di stipula:         | 2022  |
| Tipo progetto:           | RIA - Research and Innovation Action              |
| Programma UE:            | HORIZON EUROPE<br>Cluster 5 - D1 Climate Sciences |
| Data inizio:             | 01-10-2022  |
| Data scadenza:           | 30-09-2026  |
| Contributo totale:       | € 5.995.241                                       |
| Costo eleggibile totale: | € 5.995.241                                       |
| Contributo a ENEA:       | € 212.653   |
| Costo eleggibile ENEA:   | € 212.653   |
| Doc. approvazione:       | 93/2022/SSPT-MET                                  |
| Codice atto:             | PS2ACI  |
| Resp. scientifico ENEA:  | MICHETTI MELANIA                                  |
| Unità:                   | SSPT-MET  |

### Attività ENEA:

Le attività ENEA prevedono il reperimento, la produzione e l'analisi di dati utili a: i) raccogliere le valutazioni di diversi portatori di interesse verso diverse combinazioni di gestione forestale; ii) valutare i trade-off tra diversi servizi ecosistemici forestali iii) produrre una metanalisi sul servizio ecosistemico culturale/ricreativo delle foreste. ENEA supporterà inoltre le attività di coinvolgimento di differenti categorie di stakeholder all'interno del progetto e la disseminazione dei risultati.



## Fuel Recycle and Experimentally Demonstrated Manufacturing of Advanced Nuclear Solutions for Safety

Coordinatore: UNIV. TECHNOLOGY CHALMERS (Svezia)

N. Partner:

### Abstract:

FREDMANS aims to increase safety and efficiency in both nuclear power production as well as the recycling of spent fuel. Changing from oxide fuel to a more fissile dense material with higher thermal conductivity can enhance both safety of operation and the economic impact of nuclear power. At the same time, a transition to a greener society with respect to both the generation and usage of electricity will drastically increase consumption of finite materials. Generation is predicted to increase by 16?20 times, in particular as electrification replaces the direct use of fossil fuels for heating and transportation. The nuclear industry can mitigate their part of the resource use through the recycling of spent nuclear fuel. This can enhance the actual power output by about 20 times. However, today there has been no full industrial demonstration of the complete recycling of nuclear fuel, although one time recycling, including of plutonium, has been used on large scale for many years e.g. in France. The model fuel is nitride fuel. It may be more energy efficient/economically advantageous to recycle not only the fissile material, but also the required isotopically enriched N-15 that is otherwise currently a costly raw material. The project sets objectives that address the overall goals of the SET plan, SNETP and EERA JPNM SRA to answer the specific aims of this call relating to the safety of advanced fuels and their recyclability, in particular nitrides highlighted in the call. We will prove that advanced fuels are a viable option for industrial use that can enhance the safety, sustainability and economics of nuclear power operation. The work packages are: Advanced Manufacturing, Recyclability, Waste Management, and Industrial Applications. Across all these WPs, the crucial aspect of safety is held in high focus. As the real safety of future nuclear systems is achieved through well educated people, an extensive Training & Education work package is included.

Anno di stipula: 2022  
 Tipo progetto: RIA - Research and Innovation Action  
 Programma UE: Euratom2027  
 Euratom fissione  
 Data inizio: 01-09-2022  
 Data scadenza: 31-08-2026

Contributo totale: € 2.503.797

Costo eleggibile totale: € 2.904.416

Contributo a ENEA: € 22.000

Costo eleggibile ENEA: € 24.375

Doc. approvazione: 080/2022/FSN

Codice atto: PF6AAV

Resp. scientifico ENEA: LODI FRANCESCO

Unità: FSN-SICNUC-PSSN

### Attività ENEA:

ENEA è coinvolta nei seguenti work package (WP): - WP4 dedicato al progetto concettuale dell'impianto di fabbricazione e riprocessamento di combustibile nitruro Task 4.2: Design concettuale della fabbrica di UN e relativo impianto di arricchimento di N-15. Il risultato sarà il layout preliminare dell'impianto, la definizione dei flussi di materiale e la descrizione concettuale dei principali componenti.

Coordinatore: AVL LIST GMBH (Austria)

N. Partner:

**Abstract:**

Shipping is responsible for the emission of about 1 billion tons of carbon dioxide (CO<sub>2</sub>) and about 2.5% of global greenhouse gas (GHG) emissions worldwide. The drastic reduction of GHG emissions from ships has been set as one of the urgent targets to achieve the EU Green deal objectives. As a result, the maritime industry, which is a hard-to-decarbonize sector, is actively seeking for alternate solutions/technology which can make it more climate friendly but at the same time does not compromise on the current performance levels. Leveraging novel concepts as well as assets from former projects and initiatives, the project FuelSOME focuses on establishing the technological feasibility of a flexible, scalable, and multi-fuel capable energy generation system based on Solid Oxide Fuel Cells (SOFC) technology specially catered for long-distance maritime shipping. This system will be able to operate on Ammonia, Methanol and Hydrogen and their mixtures for which short and long-term sustainable supply pathways will be explored. Finally, on a broader level, an in-depth and detailed investigation on the environmental, social, and economic benefits of developing such a system for the European industry, the maritime sector and the citizens will be carried out. The future roadmap of the project is that the outcomes generated will not only benefit the maritime industry but can also serve as a blueprint/launchpad for implementing the same technology in other hard to abate emission sectors and/or, thereby enabling multi-fuel energy generators to become the norm in the future. The consortium comprises 8 partners: 7 partners from 6 European Member States and 1 partner from a non-associated third country (Switzerland). The FuelSOME consortium unites the necessary multidisciplinary knowledge, expertise, skills, and resources to constitute a representative value chain of actors, which together can achieve the project's ambitious objectives.

|                          |  |
|--------------------------|--|
| Anno di stipula:         | 2022   |
| Tipo progetto:           | RIA - Research and Innovation Action                     |
| Programma UE:            | HORIZON EUROPE<br>Cluster 5 - D2 Cross-cutting solutions |
| Data inizio:             | 01-09-2022   |
| Data scadenza:           | 31-08-2026   |
| Contributo totale:       | € 2.499.986  |
| Costo eleggibile totale: | € 2.687.486  |
| Contributo a ENEA:       | € 25.000   |
| Costo eleggibile ENEA:   | € 25.000   |
| Doc. approvazione:       | 156/TERIN/   |
| Codice atto:             | PK4AAR   |
| Resp. scientifico ENEA:  | CIGIOTTI VIVIANA   |
| Unità:                   | TERIN-PSU-ABI  |

**Attività ENEA:**

ENEA svolgerà il ruolo di terza parte di ATENA e sarà coinvolta nei seguenti WP come supporto ad ATENA; in particolare le attività di competenza ENEA si possono riassumere e sintetizzare nei seguenti punti: • WP4-Task 4.1: System definition and overarching impact assessment framework for TEA and LCSA; • WP4-Task 4.2: Techno-economic analysis; • WP4-Task 4.3: Prospective Life Cycle Sustainability Assessment (LCSA) focusing on environmental, social and economic impacts, including biodiversity); • WP5- Dissemination, Communication and Exploitation.



## GENERATE ENERGY EFFICIENT ACTING AND RESULTS AT SMALL & MEDIUM ENTERPRISES

**Coordinatore:** TNO - NETHERLANDS ORGANISATION FOR APPLIED SCIENTIFIC RESEARCH (Paesi Bassi) **N. Partner:**

### Abstract:

The untapped potential of energy efficiency will be addressed by the GEAR@SME consortium by substantiating the role of a local Trusted Partner to bridge the gap between SMEs (demand side) and suppliers of energy services toward SMEs (supply side) such that SMEs will effectively undergo energy audits and implement energy saving measures. The Trusted Partner will be supported by the GEAR@SME methodology, which aims to catalyse the implementation of energy efficiency measures by taking a local, collective approach based on multiple benefits, tailored to the specific locality. After demonstrating the effectiveness of the common methodology in four use cases, large-scale rollout will be supported by an online platform offering documentation, stand-alone tools, and an interactive platform to support a Community of Practice for Trusted Partners. The GEAR@SME methodology will be tested and validated in four countries (Germany, Italy, Netherlands and Romania), reaching out to a minimum of 300 SMEs per location. While four locations will be targeted within the project as use case, another 80 locations will be reached through the communication and exploitation activities within project lifetime. Beyond project lifetime, another 600 locations will be reached through dissemination events and the online portal. The GEAR@SME consortium has extensive expertise on activating, organising and enabling SMEs to take energy efficiency actions, from concept to validation to implementation. The team includes research organisations (TNO, C-MAC), consultancies with expertise on SMEs and energy efficiency (CIT, CCS). Validation of the methodology will be carried out by CCS, C-MAC, BEA and SERVELECT all of whom have track records in engaging with SMEs on energy issues. Finally, an exploitation strategy and further roll out will be carried out by SYNNO and multiplier organisations (CNA, CLOK and TUCN).

**Anno di stipula:** 2021

**Tipo progetto:** CSA - Coordination and support action

**Programma UE:** HORIZON 2020

Energy

**Data inizio:** 01-09-2020

**Data scadenza:** 28-02-2023

**Contributo totale:** € 1.993.228

**Costo eleggibile totale:** € 1.993.228

**Contributo a ENEA:** € 98.773

**Costo eleggibile ENEA:** € 98.773

**Doc. approvazione:** 17/2021/DUEE-SPS

**Codice atto:** PW3AAX

**Resp. scientifico ENEA:** SEGRETO MARIA-ANNA

**Unità:** DUEE-SPS-SEI

### Attività ENEA:

ENEA partecipa al progetto in qualità di "third linked party" associata al partner CERTIMAC. Gli obiettivi del Progetto intercettano diversi ambiti in cui ENEA è attivamente impegnata da anni nella sua attività di supporto alle politiche pubbliche in tema di efficienza energetica. ENEA ha il compito di analizzare gli strumenti esistenti per i servizi di efficienza energetica, adattarli per l'approccio GEAR@SME e sviluppare strumenti strategici integrali per colmare il divario tra domanda e offerta di servizi di efficienza energetica.



## Transforming Gendered Interrelations of Power and Inequalities for Just Energy Systems

Coordinatore: CNR - CONSIGLIO NAZIONALE DELLE RICERCHE (Italia)

N. Partner:

### Abstract:

gEneSys advances understanding of gender & social inequalities in energy transition policies, processes & outcomes through new research & by closing knowledge gaps. The Group of the Chief Scientific Advisers to the EU recommend that “the transition to carbon-neutrality must be just and fair”. Just Transition Mechanism states that “in order to be successful and socially acceptable for all, the transition has to be fair and inclusive” & all possible mechanisms should be deployed to mitigate adverse consequences. The European Green Deal takes a narrow focus on mitigation: mostly male workers in the old fossil fuel sectors. EGD includes the goal of “Supplying clean, affordable and secure energy”, which parallels SDG7 to “ensure access to affordable, reliable, sustainable, and modern energy for all”. Like EGD, SDG7 is gender blind: it has no gender indicators or targets, even though “access” & “affordable” are concepts that hide multitude of power and gender inequality relations. gEneSys cooperate with partners in Africa to tackle the gender concerns in the EU's and UN's aims to transform energy & will show how to integrate gender perspectives into SDG7 for gender equality benefits. gEneSys will improve understanding of “intersectionality” through analysis of existing data and by collecting, analysing, and theorising original data collected through extensive surveys. gEneSys conceptualises energy transition as a dynamic, gendered, mission-oriented sociotechnical innovation ecosystem with technological, policy, social, environmental, governance, & economic subsystems, each with its own sustainability visions, values, and priorities, as well as change actors and stakeholder. The dynamic nature of energy transition ecosystem opens-up opportunities to give women & men the same chances to participate influence, & benefit from the changes.

Anno di stipula: 2023

Tipo progetto: RIA - Research and Innovation Action

Programma UE: HORIZON EUROPE  
Cluster 2 - Culture, creativity and inclusive society

Data inizio: 01-02-2023

Data scadenza: 31-01-2026

Contributo totale: € 2.656.489

Costo eleggibile totale: € 2.656.489

Contributo a ENEA: € 425.000

Costo eleggibile ENEA: € 425.000

Doc. approvazione: 234/2022/TERIN

Codice atto: PK5AAM

Resp. scientifico ENEA: DE NICOLA ANTONIO

Unità: TERIN-SEN-APIC

### Attività ENEA:

L'ENEA è coinvolta in qualità di leader nel WP1 (Gendered analysis of knowledge creation landscape for energy transition) e nei seguenti workpackage: . WP2 (Exploring gendered intersectional patterns in citizen's behaviours and orientations towards energy transition) . WP3 (Development of Concrete Solutions to Advance Women in Energy Transition) . WP4 (International cooperation between Europe and Africa) . WP5 (Development of credible pathways for equitable, just, and fair energy transitions) . WP6 (Dissemination and Impact) . WP7 (Management and Coordination)

## Gasification Integrated with CO2 capture and conversion



Coordinatore: UNIV. GUGLIELMO MARCONI TELEMATICA (USGM) (Italia)

N. Partner:

**Abstract:**

In order to overcome the main barriers that prevent renewable energy technologies from forming the backbone of the energy system, GICO develops new materials (CO2 capture sorbents; high temperature inorganic removal sorbents; catalytic filter candles; membranes for oxygen separation and methanol production) and technologies (Hydro Thermal Carbonisation; Sorption Enhanced Gasification; Hot Gas Conditioning; Carbon Capture, Storage and Use; Power To Gas via Plasma conversion) to: ? produce intermediate solid (5 vs 15 €/MWh) and gaseous (10 vs 30 €/MWh with zero particulate and ppb contaminants level) bioenergy carriers, ? capture CO2 (40 €/t vs 90 €/t) receiving waste high alkali content and producing bricks, ? convert CO2 to CO and O2 (90 vs 10% efficiency) storing renewable electricity excess ? produce methanol (35 vs 75 €/MWh) and electricity (100 vs 200 €/MWh), GICO encompasses technology development (materials, processes, simulations, integrated system besides full-scale design) and assessment (techno-economical, environmental, social impacts and market) and dissemination activities. GICO activities are fully innovative and constitute a breakthrough (in materials and processes development and integration) involving methodological, technological and exploitation developments achieved previously by partners' research over many years. The GICO activities aim at developing small to medium scale residual biomass plants (i.e. 2-20 t/day and 500-5,000 kWe, compatible with the standard residual biomass availability of few thousand tons per year) will change the actual social acceptance of the energy plants. They will no longer be seen as distant large consumers of resources and emitters of pollutants but as local small/medium plants connected to communities (for waste, materials and energy with negative/zero emissions) within the circular business model (industrial symbiosis with jointly located industries) that GICO promotes.

Anno di stipula: 2020

Tipo progetto: RIA - Research and Innovation Action

Programma UE: HORIZON 2020

Energy

Data inizio: 01-12-2020

Data scadenza: 30-11-2024

Contributo totale: € 3.928.258

Costo eleggibile totale: € 3.928.258

Contributo a ENEA: € 532.760

Costo eleggibile ENEA: € 532.760

Doc. approvazione: 162/2020/TERIN

Codice atto: PK4AAB

Resp. scientifico ENEA: STENDARDO STEFANO

Unità: TERIN-PSU

**Attività ENEA:**

Nelle attività sono coinvolti impianti e laboratori dei Centri Ricerca ENEA di Trisaia e di Casaccia. In particolare: Trisaia e Casaccia nel work package 2 'Gasification and sorbent test' ; Casaccia si occuperà anche del work package 3 'CO" Conversion to CO and O2separation' e del work package 4 'Lab scale prototype: model, integration and tests'. Entrambi i centri contribuiranno anche alle attività trasversali previste nel WP1 (Management) e WP6 (Dissemination and exploitation) finalizzati rispettivamente alla gestione del progetto e alla implementazione delle azioni di diffusione e sfruttamento dei risultati generati.



## GROWING ENERGY EFFICIENCY THROUGH NATIONAL ROUNDTABLES ADDRESSES

Coordinatore: ENEA (Italia)

N. Partner:

### Abstract:

The project aims at facilitating the dialogue between Italian public and private key actors on financing issues related to energy efficiency in the existing and new buildings sector and fostering collaboration, innovation and action through the establishment of a permanent national roundtable and connected events at local level. The project will set up a national roundtable with selected high level stakeholders in order to allow an in-depth discussion about current barriers and market failures, as well as share best practice and innovative financing solutions, with the goal to improve stakeholders' awareness and knowledge and to identify the necessary political and regulatory framework. In parallel, local events and initiatives will be organized to engage as many stakeholders as possible, enabling capacity building, dissemination, replication activities and scale up of "success stories": local actors are one of the main drivers of the energy transition and they bring forward tremendous opportunities for investment and innovation in a number of fields. National roundtables and local events will be organised in order to trigger a continuous and mutually reinforcing virtuous circle. The combination of a top-down and bottom-up approach will create the conditions for the development of tailor made support tools and instruments for the different stakeholders involved. The outcomes of the national roundtables and the local events will be analysed, and a roadmap for PAs and industry sector including strategic and operative recommendations for the implementation of financial instruments will be elaborated. Connections with past and current similar initiatives at EU level will be pursued throughout the project, in order to keep the national outputs in line with EU requirements and the provisions put in place to face the ongoing global situation. Finally, different strategies to maintain the roundtables as a permanent forum after the end of the project will be proposed.

|                          |                                       |
|--------------------------|---------------------------------------|
| Anno di stipula:         | 2021                                  |
| Tipo progetto:           | CSA - Coordination and support action |
| Programma UE:            | HORIZON 2020<br>Energy                |
| Data inizio:             | 01-09-2021                            |
| Data scadenza:           | 29-02-2024                            |
| Contributo totale:       | € 1.186.126                           |
| Costo eleggibile totale: | € 1.186.126                           |
| Contributo a ENEA:       | € 265.468                             |
| Costo eleggibile ENEA:   | € 265.468                             |
| Doc. approvazione:       | 12/2021/DUEE-SPS                      |
| Codice atto:             | PW3AAV                                |
| Resp. scientifico ENEA:  | PANDOLFI EDOARDO                      |
| Unità:                   | DUEE-SPS-MPE                          |

### Attività ENEA:

L'ENEA coordina il progetto, contribuendo alle attività di tutti i work package. In particolare: - è leader del WP1 - Coordination and Management che include tutte le attività di gestione del progetto volte a garantire che le attività rispettino quanto previsto nel GA inclusa la pianificazione temporale ed il relativo budget; - è inoltre leader del WP6 - Dissemination and communication volto alla promozione e diffusione dei risultati del progetto.





## Harmonisation, update and implementation of standards related to radiation protection dosimeters for photon radiation

Coordinatore: STUK RADIATION AND NUCLEAR SAFETY AUTHORITY (Finlandia)

N. Partner:

### Abstract:

The recent update of the basic standard for photon reference radiation fields, ISO 4037, presented huge challenges to calibration laboratories and industry in the field of radiation protection. To avoid a failure to implement ISO 4037, collaborative research is needed to solve several serious issues that became apparent during initial implementation. ISO 4037, in conjunction with the new quantities proposed in ICRU Report 95, provides the basis for type testing standards that must be harmonized early to ensure timely development of new dosimeters. This research, which is beyond the capabilities of a single NMI or country, will additionally provide metrology networks, IAEA, and policymakers with the necessary scientific data to guide a possible implementation in metrology institutes and industry.

Anno di stipula: 2023

Tipo progetto: RIA - Research and Innovation Action

Programma UE: HORIZON EUROPE  
EPM - European Partnership on Metrology

Data inizio: 01-06-2023

Data scadenza: 31-05-2026

Contributo totale: € 973.834

Costo eleggibile totale: € 973.834

Contributo a ENEA: € 41.250

Costo eleggibile ENEA: € 41.250

Doc. approvazione: 115/2023/FSN

Codice atto: PF5AAL

Resp. scientifico ENEA: PINTO MASSIMO

Unità: FSN-INMRI

### Attività ENEA:

L'ENEA partecipa attivamente al WP 1 'Validation of requirements and methods related to reference fields according to ISO 4037 and guide for spectrometry' e al WP 2 'Training on requirements of ISO 4037 and calibration in reference fields'.

## H2Excellence: Fuel Cells and Green Hydrogen Centers of Vocational Excellence towards affordable, secure, and sustainable energy for Europe



Coordinatore: UNIV. OF APPLIED SCIENCES VAASA (VAMK) (Finlandia)

N. Partner:

### Abstract:

H2Excellence aims to establish a platform of centres of vocational excellence (CoVEs) in the field of fuel cells and green hydrogen technologies that will forge a collaborative educational, training and development program designed to close the existing industry skills gaps. The CoVEs will bring together all key stakeholders such as universities, VET schools, industrial partners, and governmental bodies, forming strong links at European, national, and regional level. It is envisaged that different local clusters will be set up across countries with strong potential in the industry (e.g., PT, ES, FR, FI, PL, and IT), with foreseen extension across Europe and a joint focus on different aspects of the hydrogen value chain, from production to applications and cross-cutting issues. H2Excellence will create world-class reference points for training in green hydrogen technologies for both initial training of young people, engineers as well as for up-skilling and res-killing of adults, through flexible and timely offer of training for the skills needs of companies in the green hydrogen sector. The VET clusters will undertake activities such as developing transnational, joint curricula, and lifelong trainings; interaction with universities to understand the current state-of-the-art technologies; exchange of VET teachers, students, and staff; partnerships between companies and professionals; regional ecosystems mapping and integration within the national/regional economic and innovation ecosystems. H2Excellence brings together 24 partners from 8 different Erasmus+ EU countries (+ 1 international partner). Fully in line with the EU Green Deal goals and energy transition targets, the project intends to create the infrastructure necessary to embed vocational excellence in the European hydrogen sector, as well as to contribute to transforming the sector towards quality employment and career-long opportunities.

Anno di stipula: 2023

Tipo progetto: ERASMUS-LS ERASMUS Lump Sum Grants

Programma UE: Other programmes 2021-2027  
Erasmus +

Data inizio: 15-06-2023

Data scadenza: 14-06-2027

Contributo totale: € 3.996.343

Costo eleggibile totale: € 4.995.436

Contributo a ENEA: € 184.992

Costo eleggibile ENEA: € 231.239

Doc. approvazione: 140/2023/TERIN

Codice atto: PK4AAY

Resp. scientifico ENEA: SANTONI FRANCESCA

Unità: TERIN-PSU-ABI

### Attività ENEA:

L'ENEA porterà avanti un'analisi approfondita dello stato dell'arte delle tecnologie delle celle a combustibile e dell'idrogeno, indicando le roadmap europee, nazionali e regionali al fine di valutare il livello di maturità di questo ecosistema, le rispettive tabelle di marcia e lo stato di attuazione dei progetti sull'idrogeno che potrebbero avere un impatto sul mercato del lavoro negli anni a venire (Task 2.1). Inoltre, sosterrà le azioni di mobilità previste dal progetto, con interesse ad ospitare e formare insegnanti e studenti sulle tecnologie per la produzione di Idrogeno verde sulla base delle iniziative e progetti di ricerca esistenti nei suoi laboratori (Task 3.7), e provvederà a supportare i partner per l'organizzazione di visite in loco dedicate a mostrare i progetti dimostrativi su larga scala (Hydrogen Demo Valley),(Task 5.4). Infine, contribuirà come pilastro scientifico alla H2Excellence European Hydrogen Academy (Task 4.6), e alla ricerca e formazione di aziende (PMI) su temi specifici dell'Idrogeno (Task 4.4).

**Coordinatore:** FUNDACION DE LA COMUNIDAD VALENCIANA PARA LA INVESTIGACION, PROMOCION Y ESTUDIOS COMERCIALES DE VALENCIAPORT (Spagna)

**N. Partner:**

**Abstract:**

Hydrogen is an energy carrier with great potential for clean, efficient power in transport applications. Hydrogen can be obtained from different sources, which in combination with fuel cells it can improve energy efficiency especially when hydrogen is produced by renewable energy sources. The action proposed tries to introduce hydrogen as an alternative fuel in the port industry. The H2Ports project is an Action aligned with the needs and objectives of the European Commission and the port industry. The aim is to provide efficient solutions to facilitate a fast evolution from a fossil fuel based industry towards a low carbon and zero-emission sector. Hydrogen has been proved in other logistics and transportation sectors as a solution to power machinery and vehicles, therefore the action proposes different pilots to bridge the gap between prototypes and pre-commercial products:

- The first prototype will comprise a reach stacker powered with hydrogen and tested under a real life trial, in a Port Container Terminal.
- The second prototype will comprise a yard tractor equipped with a set of fuel cells. The design will enable the tractor to perform different operations like container horizontal transport or ro-ro loading/unloading operations.
- The third prototype will comprise a mobile Hydrogen supply station, which will provide the needed fuel under the appropriate thermodynamic conditions for guaranteeing the continuous working cycles of the abovementioned equipment. The H2Ports project would also have a transversal objective that consists on developing a sustainable hydrogen supply chain at the port, coordinating all actors involved: customers, hydrogen producers, suppliers, etc. The expected results of the project are to test and validate hydrogen-powered solutions in the port-maritime industry, with the aim of having applicable and real solutions without affecting to port operations while producing zero local emissions.

**Anno di stipula:** 2020

**Tipo progetto:** RIA - Research and Innovation Action

**Programma UE:** HORIZON 2020

JTI - Hydrogen

**Data inizio:** 01-07-2020

**Data scadenza:** 31-12-2024

**Contributo totale:** € 3.999.948

**Costo eleggibile totale:** € 4.117.198

**Contributo a ENEA:** € 28.750

**Costo eleggibile ENEA:** € 28.750

**Doc. approvazione:** 124/2020/TERIN

**Codice atto:** PK4AAA

**Resp. scientifico ENEA:** CIGIOTTI VIVIANA

**Unità:** TERIN-PSU-ABI

**Attività ENEA:**

L'ENEA è parte terza del partner ATENA da luglio 2020 ed è coinvolta nelle attività del work package 4; in particolare: WP4-T4.1 "Design" - Definizione del proof of concept del nuovo veicolo elettrico con cella a combustibile; WP4-T4.1 "Design" - Analisi dei componenti necessari all'integrazione della cella a combustibile nello yard truck; WP4-T4.1 "Design" - Testing della cella a combustibile ? WP4-T4.3 "Piloting" - Analisi Costi/Benefici della nuova soluzione di veicolo FCV alimentato ad idrogeno e valutazione dei casi studio più significativi applicati all'ecosistema porto.



## Harmonisation of licensing procedures, codes and standards for future fission and fusion plants

Coordinatore: LEI LITHUANIAN ENERGY INSTITUTE (Lituania)

N. Partner:

### Abstract:

HARMONISE puts forward a holistic approach for studying the body of knowledge required to accomplish harmonization and standardization of methodologies, codes and standards as well as the assessment of nuclear reactor components. Departure from a prescriptive-based to a performance-based approach in nuclear regulatory regimes is to be examined under the prism of conformity with the safety objectives of innovative fission and fusion facilities. To this end, data related to fusion installations is expected to stem from the ITER safety demonstrations, whereas data pertinent to advanced fission designs – such as fast breeder reactors and SMRs – will be extracted from relevant EC-funded projects. The basis for HARMONISE activities will be the outcomes of relevant research and cooperation activities in standardization and nuclear safety considering also the lessons learnt from the stress tests performed in the EU. HARMONISE will examine issues related to qualification, standardization, V&V and licensing of fission and fusion installations, while taking into account stakeholder involvement. The benefits of adopting digital twins of nuclear installations during the design phase will be reviewed, while also identifying the cross-cutting activities that contribute to collaborative research efforts between fission and fusion. HARMONISE will address issues related to the preliminary safety assessments and licensing needs of innovative fission and fusion installations; risk-informed, performance-based approaches in licensing reviews and regulatory decision-making; harmonisation and standardisation on component assessments, methodologies, codes and standards and draw lessons from earlier experience in harmonisation efforts. HARMONISE findings will be disseminated to the nuclear safety regulators of EU MSs along with the State Nuclear Regulatory Inspectorate of Ukraine as material to be considered during safety verification and licensing of future fission and fusion installations.

Anno di stipula: 2022

Tipo progetto: CSA - Coordination and support action

Programma UE: Euratom2027  
Euratom fissione

Data inizio: 01-06-2022

Data scadenza: 31-05-2025

Contributo totale: € 2.500.000

Costo eleggibile totale: € 2.843.500

Contributo a ENEA: € 177.750

Costo eleggibile ENEA: € 197.500

Doc. approvazione: 072/2022/FSN

Codice atto: PF6AAW

Resp. scientifico ENEA: LODI FRANCESCO

Unità: FSN-SICNUC-PSSN

### Attività ENEA:

ENEA è coinvolta con ruolo di leader nel work package (WP2) dedicato all'individuazione delle necessità legate alla sicurezza di impianti innovativi e alle relative sfide di armonizzazione. È inoltre coinvolta con ruolo di supporto nei seguenti work package: • WP1 dedicato alla creazione di un network con tutti gli stakeholder i cui risultati del progetto possono essere di interesse; • WP3 dedicato allo sviluppo concettuale di un nuovo contesto di licensing basato su metriche di rischio e performance • WP4 dedicato alla individuazione dei gap presenti nelle attuali norme ingegneristiche (codes and standards) per applicazione a reattori innovativi • WP5 dedicato a disseminazione e comunicazione dei risultati per promuovere le attività del progetto



## Harnessing the value of tomato genetic resources for now and the future

Coordinatore: CSIC - SPANISH NATIONAL RESEARCH COUNCIL (Spagna)

N. Partner:

### Abstract:

Tomato is a paradigm of crop domestication: a widely cultivated and consumed vegetable but with reduced genetic diversity and therefore highly vulnerable to emerging diseases and climate change. Fortunately, tomato is rich in genetic resources and information to overcome those difficulties and a coalition of scientists and breeding experts which have generated a large amount of this information have been organized under an effective management structure and a series of objectives to overcome those threats. HARNESSTOM aims to demonstrate that increasing use of Genetic Resources is key for food safety and security and can lead to innovation and benefit all stakeholders. By capitalizing on the large effort done recently in several EU-funded projects to connect phenotypes/genotypes in a large number of accessions from different germplasm banks and academia, HARNESSTOM will first collect, centralize and normalize this wealth of information in a way that is easily searchable and displayed in a user-friendly manner adapted to different type of users. Second, HARNESSTOM will develop four prebreeding programs addressing the major challenges of the field: 1) introducing resistances against major emerging diseases, 2) improving tomato tolerance to climate change, 3) improving quality 4) increasing resilience in traditional European tomato by participatory breeding. And additional goal is to increase speed and efficiency in prebreeding what is needed to be able to respond to the emerging challenges in a timely and effective manner. Joint leadership of both academia and industry in each of the WP and the participation of two NGOs representing different stakeholders guarantees the results of the project will have an impact in industry innovation and also in the society. An efficient management and outreach and communication platform is also in place to make sure the project runs smoothly and the interests of all stakeholders are protected

Anno di stipula: 2020

Tipo progetto: IA - Innovation Action

Programma UE: HORIZON 2020

Food Security, Sustainable Agriculture and the Bioeconomy

Data inizio: 01-10-2020

Data scadenza: 30-09-2024

Contributo totale: € 7.048.236

Costo eleggibile totale: € 8.075.196

Contributo a ENEA: € 500.000

Costo eleggibile ENEA: € 500.000

Doc. approvazione: 126/2020/SSPT-BIOAG

Codice atto: PS1ABM

Resp. scientifico ENEA: GIULIANO GIOVANNI

Unità: SSPT-BIOAG

### Attività ENEA:

ENEA coordina il WP4 (Tools to increase the speed, efficiency and precision of breeding) e partecipa ai seguenti WP: . 1 Project Management and Coordination . 2 Societal issues. Stakeholder engagement and project dissemination; legislation and public acceptance; ethics . 3 One-stop-shop for tomato GenRes information, visualization and prebreeding tools . 7 Improving fruit quality . 9 Global assessment of advanced materials, marketing strategy, life cycle assessment



Coordinatore: SCK CEN - STUDIECENTRUM VOOR KERNENERGIE / CENTRE D'ETUDE DE L'ENERGIE NUCLEAIRE (Belgio) N. Partner:

**Abstract:**

The project aims to establish and clarify the benefits and added value of more aligned and harmonised regulations and standards for prioritised topics related to decommissioning and initial phases of radioactive waste handling, including shared processing facilities between Member States (MS). The project has a two-phase approach: first engaging with Stakeholders to assess needs and pros/cons for harmonisation and identify priority areas for deeper analysis (WP2). The second phase will pursue deeper engagement with Stakeholders to further assess the highest ranked priority areas in Work Packages (WP) focusing on (i) cross border services and cooperation (WP3), (ii) circular economy (WP4), and (iii) advanced technologies (WP5). These WPs will review (inter)national practices, capture lessons learned, and assess opportunities. WP6 on Regulatory Framework will identify regulatory differences between MS and evaluate strengths, weaknesses, opportunities, and threats associated with harmonisation, while quantifying the benefits of aligned regulations and proposing harmonisation methodologies. The project will: - support coordination between Stakeholders, - enhance existing commitments to facilitate sharing and exchange of knowledge and experience, - develop strategies for shared treatment and storage facilities, cross border services and cooperation, and explore additional mechanisms to build capacity in MS, - assess and clarify the benefits and any disadvantages of harmonisation, - deliver S&T-based solutions and share best practices by engaging and supporting coordination between different actors through the TSOs and regulators, - define conditions and opportunities of a high safety circular economy. The action will reinforce the activities of the EURAD, PREDIS, and SHARE projects, while encompassing MS national programs and the wider European Community, including i.e. ERDO, ENSREG, WENRA, IAEA, OECD NEA, IGDTP, SNETP, DigiDecom.

Anno di stipula: 2022

Tipo progetto: CSA - Coordination and support action

Programma UE: Euratom2027  
Euratom fissione

Data inizio: 01-06-2022

Data scadenza: 31-05-2025

Contributo totale: € 2.434.460

Costo eleggibile totale: € 2.434.460

Contributo a ENEA: € 115.125

Costo eleggibile ENEA: € 115.125

Doc. approvazione: 069/2022/FSN

Codice atto: PF1AAK

Resp. scientifico ENEA: GANDOLFO GIADA

Unità: FSN-FISS-CRGR

**Attività ENEA:**

L'ENEA sarà leader del WP7 "Engagement and Dissemination", il cui scopo è coinvolgere la comunità nucleare e comunicare, diffondere e sfruttare i risultati generati nel progetto e identificare le parti interessate che trarrebbero maggior beneficio dalle attività del progetto. Inoltre, l'Agenzia sarà coinvolta nel WP1 "Project Management" e in 3 dei 5 Work Package tecnici: WP2 "Strategic Tasks", WP5 "Advanced Technologies" e WP6 "Regulatory Framework".



## Efficient water splitting via a flexible solar-powered Hybrid thermochemical-Sulphur dioxide depolarized Electrolysis Cycle

Coordinatore: DLR - GERMAN AEROSPACE CENTER E.V. (Germania)

N. Partner:

### Abstract:

HySelect will demonstrate the production of hydrogen (H<sub>2</sub>) by splitting water via concentrated solar technologies (CST) with an attractive efficiency and cost, through the hybrid sulphur cycle (HyS). The HyS consists of two central steps: the high temperature - yet below-900C -decomposition of sulphuric acid forming sulphur dioxide (SO<sub>2</sub>) and the subsequent low temperature (50-80C) SO<sub>2</sub> depolarised electrolysis (SDE) of water to produce H<sub>2</sub>. HySelect will introduce, develop and operate under real conditions a complete H<sub>2</sub> production chain focusing on two innovative, full scale plant prototype core devices for both steps of the HyS cycle: an allothermally heated, spatially decoupled from a centrifugal particle solar receiver, sulphuric acid decomposition-sulphur trioxide splitting (SAD-STS) reactor and a sulphur dioxide depolarized electrolyser (SDE) without expensive Platinum Group Metals (PGMs). Furthermore, a heat recovery system will be integrated to exploit the temperature difference within the cycle and boost the overall process efficiency. In the course of the work, non-critical materials and catalysts will be developed, qualified and integrated into the plant scale prototype units for both the acid splitting reactor and the SDE unit. Experimental work will be accompanied by component modelling and overall process simulation and culminate with a demonstration of the complete process integrating its key units of a 750kWth centrifugal particle receiver, a hot particles storage system, a 250kWth SAD-STS and a 100kWe SDE into a pilot plant. Testing for a period of at least 6 months in a large-scale solar tower, driven with smart operation and control strategies, will establish the HySelect targeted efficiency and costs. Finally, an overall process evaluation will be carried out in order to assess the technical and economic prospects of the HySelect technology, directly linked to the know-how and developments of the sulphuric acid and water electolysers industries.

|                          |                                      |
|--------------------------|--------------------------------------|
| Anno di stipula:         | 2023                                 |
| Tipo progetto:           | RIA - Research and Innovation Action |
| Programma UE:            | HORIZON EUROPE<br>Clean Hydrogen JU  |
| Data inizio:             | 01-01-2023                           |
| Data scadenza:           | 31-12-2026                           |
| Contributo totale:       | € 3.982.105                          |
| Costo eleggibile totale: | € 3.982.105                          |
| Contributo a ENEA:       | € 314.063                            |
| Costo eleggibile ENEA:   | € 314.063                            |
| Doc. approvazione:       | 227/2022/TERIN                       |
| Codice atto:             | PK7AAG                               |
| Resp. scientifico ENEA:  | LANCHI MICHELA                       |
| Unità:                   | TERIN-STSN-SCIS                      |

### Attività ENEA:

ENEA è presente nei seguenti workpackage: WP1: attività di coordinamento WP2: focalizzato sulle attività di progettazione e simulazione di processo, oltre che sull'analisi tecnico-economica (ENEA Lead partner) WP8: dedicato alla definizione delle strategie operative e di controllo, all'interfacciamento del processo con la sorgente solare, all'integrazione dei componenti e al testing dell'impianto WP9: diffusione dei risultati della ricerca



## IMProvingRESilience to Abiotic stresses in durum wheat: enhancing knowledge by genetic, physiological and "omics" approaches and increasing Mediterranean germplasm biodiversity by crop wild relatives-based introgressomics

Coordinatore: UNIV. TUSCIA (Italia)

N. Partner: 6

### Abstract:

As a means of countering the insufficient genetic variation of the durum wheat (DW) crop to cope with increasing environmental stresses, a strategic objective of IMPRESA is the focus on wild wheat relatives (WWRs), belonging to the Triticeae tribe, as valuable sources for identification and transfer of abiotic stress tolerance genes/alleles into cultivated DW. Most WWRs evolved in harsh, dry or nutrient-limited environments; thus, WWRs' noteworthy tolerance to environmental stresses is the expected result of their natural adaptation. IMPRESA aims to capitalize on this potential and accomplish results of practical value within the project duration by using DW-WWR genetic materials in which variable amounts of the alien donor are combined with the DW genome (from segmental introgression/recombinant lines, to synthetic amphiploids), and can be transferred into locally suited DW cultivars by well established, breeder-friendly, non-GMO strategies of "chromosome engineering".

Anno di stipula: 2021  
 Tipo progetto: JRP - Joint research project  
 Programma UE: HORIZON 2020  
 PRIMA (2018-2028)  
 Data inizio: 02-09-2019  
 Data scadenza: 02-09-2023

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|                          |           |
|--------------------------|-----------|
| Contributo totale:       | € 417.600 |
| Costo eleggibile totale: | € 612.000 |
| Contributo a ENEA:       | € 110.600 |
| Costo eleggibile ENEA:   | € 158.000 |

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Doc. approvazione: 162/2021/SSPT-BIOAG  
 Codice atto: PS1ACE  
 Resp. scientifico ENEA: GIORGI DEBORA  
 Unità: SSPT-BIOAG-BIOTEC

### Attività ENEA:

Le attività prevedono : . esecuzione di analisi citogenetico-molecolari sui materiali in selezione per l'identificazione della composizione genomica degli anfiploidi di frumento e la caratterizzazione delle linee di ntrogressione (anfiploidi parziali, linee di addizione o ricombinanti) . Prove in serra in condizioni controllate per la valutazione della risposta a stress salini di linee ricombinanti Durum wheat –/Wild Wheat Relatives; . Studio degli effetti della salinità sul ciclo cellulare mediante "Citometria a Flusso" . "Chromosome sorting" mediante citometria a Flusso. . Conduzione di incroci tra linee ricombinanti risultate tolleranti allo stress e frumenti selezionati, anche originari dei Paesi partner; . Partecipazione alle indagini "omiche" (in collaborazione con Univ. Viterbo) . Disseminazione dei risultati, training.





Coordinatore: ENEA (Italia)

N. Partner:

**Abstract:**

INCLUDING connects 15 Partners from 10 EU Member States (MS), bringing together infrastructure, equipment and experts coming from Medical Organizations, Fire Corps, Government Department, Municipalities, Law Enforcement Agencies, Ministries, Governmental and Civilian Research Institutes and Industries operating in the field of radiological and nuclear emergencies. Far from being a simple aggregation of entities separated geographically and with complementary expertise, INCLUDING pursues to develop a Federation in which individual Members will cooperate together to provide a common framework to standardize access to their respective facilities, enhance interoperability and to allow a more intensive use of expensive equipment. The operative tool to manage the Federation will be a web-based platform with a sophisticated architecture and whose functionality has been proven in a previous EU project. At the same time the project aims to enhance practical know-how and to boost a European sustainable training and development framework for practitioners in the Radiological and Nuclear Security sector. The INCLUDING project will be flexible in order to include new facilities and innovation in technology, organizations and procedures. The plurality of facilities and expertise in the INCLUDING Federation reflects the complex and intertwined structure of the prevention and response phases of RN threats and will provide to the practitioners a set of real or emulated scenarios where to test concept of operations in a controlled environment. The Joint Actions will be the focal points of the project. They are multidisciplinary field exercises, tabletop exercises, training, serious gaming and simulation organized at their premises by the project partners and with the objective of demonstrating the added value of the Federated scheme and of the use of an innovative tool like the INCLUDING web based Platform to manage a pan European network of training facilities and resources.

|                          |                                       |
|--------------------------|---------------------------------------|
| Anno di stipula:         | 2019                                  |
| Tipo progetto:           | CSA - Coordination and support action |
| Programma UE:            | HORIZON 2020<br>Secure societies      |
| Data inizio:             | 01-08-2019                            |
| Data scadenza:           | 31-07-2024                            |
| Contributo totale:       | € 3.585.529                           |
| Costo eleggibile totale: | € 3.585.529                           |
| Contributo a ENEA:       | € 564.606                             |
| Costo eleggibile ENEA:   | € 564.606                             |
| Doc. approvazione:       | 116/2019/FSN                          |
| Codice atto:             | PF7AAS                                |
| Resp. scientifico ENEA:  | CIMINO MONICA                         |
| Unità:                   | FSN-TECFIS-DIM                        |

**Attività ENEA:**

L'ENEA coordina il progetto. La partecipazione al progetto coinvolge personale di diverse unità tecniche dell'ENEA: FSN-TECFIS-DIM, FSN-SICNUC, FSN-FISS, ISER-CAS, DTE-PCU-STMA. L'ENEA è leader dei seguenti WP: WP1 Project Management, WP7 Dissemination and exploitation, WP8 Ethics requirements. Inoltre l'ENEA partecipa alle attività del WP2 The Federated Cluster



## Italian National hub Enabling and Enhancing networked applications & Services for digitally Transforming SMEs and Public Administrations

**Coordinatore:** CNIT - CONSORZIO NAZIONALE INTERUNIVERSITARIO PER LE TELECOMUNICAZIONI (Italia)

**N. Partner:**

### Abstract:

I-NEST (Italian National hub Enabling and enhancing networked applications and Services for digitally Transforming Small-Medium Enterprises and Public Administrations) provides a transversal, multi-sector digitalization support for connected businesses, administrations and other digital innovation hubs, exploiting fixed and mobile network infrastructures and cloud-native, intelligent, highperformance, secure services. The hub operates with a national coverage, thanks to a network of points-of-presence and demo-centers implemented at the 88 offices of the Italian Chambers of Commerce and in 5 National Research Laboratories of CNIT, a consortium of 38 Italian Universities. The hub is specialized in emerging intelligent and secure communication and computing infrastructures, exploiting 5G as a powerful innovation platform. These infrastructures can enable innovative applications in multiple fields, improve efficiency and sustainability of supply chains and industrial ecosystems, and create new opportunities for SMEs and PAs. The hub services are designed for addressing the knowledge, capability, demand-supply and financial gaps of stakeholders working in non-ICT vertical domains. Technology awareness will be built by presenting concrete 5G economical scenarios and use cases, showcasing innovative artificial intelligence applications and analysing cybersecurity threats. Training programs and consultancy services will exploit the hub testing facilities and prototyping platforms, including a high-performance-computing platform for process simulation. Multiple players will be encouraged to share tools and interact on these facilities for creating conditions for collaboration, circularity, and open innovation. Support will be provided not only for identifying and applying for funding opportunities, including the current National Plan for Resilience and Recovery, but also for effectively and efficiently utilizing the granted funds.

**Anno di stipula:** 2022

**Tipo progetto:** DIGITAL Simple Grants

**Programma UE:** Other programmes 2021-2027  
DIGITAL

**Data inizio:** 01-10-2022

**Data scadenza:** 30-09-2025

**Contributo totale:** € 2.878.550

**Costo eleggibile totale:** € 5.757.103

**Contributo a ENEA:** € 572.149

**Costo eleggibile ENEA:** € 1.144.299

**Doc. approvazione:** 180/2022/TERIN

**Codice atto:** PK5AAL

**Resp. scientifico ENEA:** D'AGOSTINO  
GREGORIO

**Unità:** TERIN-SEN-APIC

### Attività ENEA:

L'ENEA ha la responsabilità del WP3 relativo al "Training and Skill Development" e partecipa a tutti gli organi direttivi del progetto (WP1 "EDIH Management and Sustainability"). Parteciperà prevalentemente al WP3 e WP4 "Test-Before-invest Innovation Support".



Coordinatore: NKI - NATIONAL CANCER INSTITUTE (Paesi Bassi)

N. Partner:

#### Abstract:

Structural biology reveals the molecular architecture of life; the three-dimensional structure of biomolecules and how they interact to form complex machineries and cells. Structural biology is key to innovations in chemistry, biotechnology and medicine: new drugs, advanced vaccines, novel biomaterials, engineered enzymes for food production, a cleaner environment, and efficient biofuels. iNEXT-Discovery takes on the challenge of proactively supporting the uptake of existing tools, and the innovation of new tools, to promote scientific Discovery and translation in a range of disciplines, building on the success of the H2020 project iNEXT (infrastructure for NMR, EM and X-rays for Translational research). iNEXT-Discovery brings together a strong network of leading structural biology facilities in partnership with regional experts and ESFRI communities in medicinal chemistry, translational medicine, biological imaging, and food research, to disseminate knowledge and services. We aim to stimulate the wider uptake of structural biology across Europe, across scientific disciplines and research sectors. Significant hardware and software advances allow targeting transnational access to advanced instrumentation also to scientists without previous expertise in structural biology: uptake will be facilitated by training and thematic calls focused on new communities. Access to our instrumentation and expertise will ultimately allow European scientists to gain structural insight that can translate into innovations in the biomedical, food, biotechnological and biomaterials sectors. Our joint research activities will roll-out advances in key technologies for translational research: fragment screening for drug development, EM efficiency and capacity, NMR applications to extend structures beyond three dimensions, and integrative structural biology approaches to look at macromolecules in cells. All our activities support innovative research of both academic and industrial users.

|                          |   |
|--------------------------|---|
| Anno di stipula:         | 2020  |
| Tipo progetto:           | RIA - Research and Innovation Action              |
| Programma UE:            | HORIZON 2020<br>European Research Infrastructures |
| Data inizio:             | 01-02-2020  |
| Data scadenza:           | 31-01-2024  |
| Contributo totale:       | € 9.987.744                                       |
| Costo eleggibile totale: | € 9.987.744                                       |
| Contributo a ENEA:       | € 24.375  |
| Costo eleggibile ENEA:   | € 24.375  |
| Doc. approvazione:       | 284/2019/SSPT-BIOAG                               |
| Codice atto:             | PS1ABG  |
| Resp. scientifico ENEA:  | ZOANI CLAUDIA                                     |
| Unità:                   | SSPT-BIOAG  |

#### Attività ENEA:

L'ENEA riveste il ruolo di partner, partecipando alle attività previste dal work package 3 e in particolare dalla task 3.4 'Engaging with the food research community'. In qualità di coordinatore del progetto METROFOOD-RI l'ENEA ha il compito di coordinare i link con il "food" definendo le opportunità per potenziali collaborazioni inter-settoriali e promuovendo attività di ricerca congiunta e training.



## Innovative high-value cosmetic products from plants and plant cells

Coordinatore: VTT TECHNICAL RESEARCH CENTRE OF FINLAND (Finlandia)

N. Partner:

### Abstract:

The InnCoCells project will develop innovative and sustainable plant-based production processes for the commercial exploitation of scientifically validated cosmetic ingredients based on underutilised plant resources. We will optimise these resources for profitable and sustainable production using cell cultures, aeroponics and greenhouse/field cultivation. We will apply systematic approaches including metabolic engineering tools to optimise growth conditions and the yields of valuable bioactive, small-molecule compounds and ingredients. The optimised processes will be demonstrated by pilot-scale production and subsequent product extraction/purification. We will bring at least ten cosmetic ingredients to the pre-commercial stage. InnCoCells includes a cascade biorefinery concept in which by-products and biowaste are utilised for the extraction of further bioactive molecules. The processes will be characterised by techno-economic assessment and life cycle analysis to ensure economic feasibility and a reduced environmental footprint. The ingredients and extracts will be evaluated using a unique panel of innovative enzyme-based and cell-based assays to ensure safety and validate claimed activities based on robust scientific data without animal testing. We will implement a unique stakeholder engagement strategy, including the assembly of a Stakeholder Group to guide our research program based on the needs of industry, academia, farmers, policymakers and consumers. The consortium includes eight SMEs and one large company from the cosmetic sector among the 17 partners to facilitate exploitation. We will develop bespoke communications strategies for different stakeholders and for public engagement. We will also interact closely with the regulatory authorities in Europe. This industry-driven and interdisciplinary project will ultimately increase the strength of the European bioeconomy by supporting the development of innovative biobased goods and markets.

Anno di stipula: 2021

Tipo progetto: RIA - Research and Innovation Action

Programma UE: HORIZON 2020  
Food Security, Sustainable Agriculture and the Bioeconomy

Data inizio: 01-05-2021

Data scadenza: 30-04-2025

Contributo totale: € 7.905.559

Costo eleggibile totale: € 7.905.559

Contributo a ENEA: € 339.063

Costo eleggibile ENEA: € 339.063

Doc. approvazione: 57/2021/SSPT-BIOAG

Codice atto: PS1ABZ

Resp. scientifico ENEA: DIRETTO GIANFRANCO

Unità: SSPT-BIOAG-BIOTEC

### Attività ENEA:

L'ENEA è coinvolto nei work package 1, 5, 7 e 8 del progetto, svolgendo attività di ricerca inerenti la crescita di specie vegetali fuori suolo (coltivazione idroponica) e di metabolomica, caratterizzazione di prodotti bioattivi innovativi, sostenibilità, disseminazione, comunicazione e management.



Coordinatore: KIT KARLSRUHER INSTITUT FUER TECHNOLOGIE (Germania)

N. Partner:

**Abstract:**

INNUMAT aims to develop innovative structural materials for nuclear applications and put them on track towards qualification for fission lead-cooled and molten salt fast reactors as well as fusion DEMO. High entropy alloys (HEAs), a new class of materials with a vast development potential and very promising properties, as well as alumina forming austenitic (AFA) steels, already identified as prospective structural materials for Gen IV and Small Modular Reactors, are in the main focus in which advanced material solutions are considered as well, in particular weld overlay and coated 15-15Ti for lead-cooled fast reactors, among others MYRRHA and ALFRED, and coated EUROFER and advanced oxide dispersion strengthened (ODS) steel for fusion DEMO. Some of these structural materials are of potential applicability also outside the nuclear field, e.g. in concentrated solar power and/or in H2 confinement. The project is thus cross-cutting because of the target applications as well as because of the accelerated methodologies for materials discovery, screening and qualification that it pursues, applied at different technology readiness levels (TRLs). The differences in TRL, application conditions and requirements of the considered materials result in different objectives and hence different research tracks through the project with even different efforts. Common goal is to rapidly increase the TRL for the desired nuclear applications towards requirements of corrosion resistance, high temperature strength, thermal stability and irradiation tolerance, which are not met by current structural materials. Therefore, computational and experimental high throughput material screening methods will be applied and roadmaps for accelerated qualification will be established paving a fast way to more efficient safe sustainable nuclear energy systems with considerable contribution to the overall mission of developing economic energy systems with reduced/zero CO2 emissions.

Anno di stipula: 2022

Tipo progetto: RIA - Research and Innovation Action

Programma UE: Euratom2027  
Euratom fissione

Data inizio: 01-09-2022

Data scadenza: 31-08-2026

Contributo totale: € 7.815.063

Costo eleggibile totale: € 9.880.955

Contributo a ENEA: € 679.634

Costo eleggibile ENEA: € 894.566

Doc. approvazione: Disp. 376/2022/PRES

Codice atto: PF4AAR

Resp. scientifico ENEA: BASSINI SERENA

Unità: FSN-ING-SMN

**Attività ENEA:**

L'ENEA partecipa ai seguenti work package: WP1. dedicato all'approvvigionamento ed alla sintesi dei materiali per tutte le linee di ricerca ed alle caratterizzazioni in ingresso WP2. Nel WP2 verrà studiata la compatibilità dei materiali sviluppati nel WP1 con l'ambiente applicativo (metalli liquidi pesanti e sali fusi) rispetto alla corrosione, erosione ed al deterioramento delle proprietà meccaniche. WP3. La caratterizzazione meccanica avanzata dei materiali considerati sarà condotta nel WP3 ben oltre la caratterizzazione di base prevista nel WP1. Il lavoro sperimentale del WP3 comprenderà anche prove di thermal aging WP4. Questo work package sarà dedicato ad esplorare la tolleranza all'irraggiamento neutronico dei materiali sviluppati attraverso programmi di irradiazione ionica e neutronica. WP5. Metodologie di qualifica e standardizzazione. WP7. Disseminazione dei risultati e gestione dei dati prodotti



## Framework for defining climate mitigation pathways based on understanding and integrated assessment of climate impacts, adaptation strategies and societal transformation

Coordinatore: AIT - AUSTRIAN INSTITUTE OF TECHNOLOGY (Austria)

N. Partner:

### Abstract:

According to the EU's Climate Adaptation Strategy (COM(2021) 82), "improving knowledge and managing uncertainty" is key for realising the vision of a climate neutral and climate-resilient Union, as "Climate change is having such a pervasive impact that our response to it must be systemic". Thus, there is an urgent need for an integrated approach for an enhanced understanding of the interaction, complementarity and trade-offs between adaptation and mitigation measures, especially regarding the expected increase in regional mean temperature, precipitation and changing soil moisture (IPCC AR6 WG I). Furthermore, this understanding and knowledge needs to be provided to a broad audience to support local authorities in EU partner countries in developing regional programmes. KNOWING aims to develop a modelling framework to help understand and quantify the interactions between impacts and risks of climate change, mitigation pathways and adaptation strategies. The framework will be used to assess thAdvancing climate science and further broadening and deepening the knowledge base is essential to inform the societal transition towards a climate neutral and climate resilient society by 2050, as well as towards a more ambitious greenhouse gas reduction target by 2030. There is a need for research that furthers our understanding of past, present and expected future changes in climate and its implications on ecosystems and society, closing knowledge gaps, and develops the tools that support policy coherence and the implementation of effective mitigation and adaptation solutions. Currently, there is a lack of knowledge of the Earth system and the ability to predict and project its changes under different natural and socio-economic drivers, especially regarding complex interrelations, rebound effects and behavioural aspects. Therefore, a holistic, system-aware and behaviour centred approach is needed to identify and implement realistic and effective climate mitigation pathways.

|                          |   |
|--------------------------|---|
| Anno di stipula:         | 2022  |
| Tipo progetto:           | RIA - Research and Innovation Action              |
| Programma UE:            | HORIZON EUROPE<br>Cluster 5 - D1 Climate Sciences |
| Data inizio:             | 01-06-2022  |
| Data scadenza:           | 31-05-2026  |
| Contributo totale:       | € 6.204.907                                       |
| Costo eleggibile totale: | € 6.204.910                                       |
| Contributo a ENEA:       | € 260.146   |
| Costo eleggibile ENEA:   | € 260.146   |
| Doc. approvazione:       | 88/2022/SSPT-MET                                  |
| Codice atto:             | PS2ACH  |
| Resp. scientifico ENEA:  | PISACANE GIOVANNA                                 |
| Unità:                   | SSPT-MET-CLIM                                     |

### Attività ENEA:

Le attività ENEA prevedono il reperimento, la produzione e l'analisi dei dati climatici necessari per il progetto e la partecipazione attiva alla definizione dei parametri critici. In particolare: la ricognizione delle analisi e dei dati esistenti e produzione dei dati aggiuntivi necessari attraverso simulazioni numeriche; la raccolta dei dati e loro organizzazione e selezione; la partecipazione alle attività di co-creazione con gli stakeholder, per la definizione dei sistemi dinamici di interesse e dei parametri critici che li descrivono; il calcolo e mappatura degli indicatori critici; la disseminazione dei risultati. Il laboratorio ENEA TERIN-ICT-HPC fornirà il supporto informatico necessario alla realizzazione delle simulazioni climatiche sull'infrastruttura HPC CRESCO6.

Coordinatore: ENEA (Italia)

N. Partner:

**Abstract:**

The proposed project intends to support Member States in establishing or improving national and local schemes for SMEs to undergo energy audits and implement cost-effective recommended energy-saving measures. An initial work of policies and programmes mapping will be followed by an in-depth understanding of their strengths and weaknesses, with the aim of overcoming the current criticalities and bottlenecks. At the same time a work of characterisation of SMEs in terms of energy consumption, size and sector will be carried out to understand effective ways to properly address existing and innovative energy audit policies. Provided a continuous interaction (by means of workshops, questionnaires, meetings) with policy makers as well as SMEs and ESCOs/Energy Auditors associations, a set of policy proposals and recommendations will be then developed and diffused. The priorities guiding the policy and recommendation development will be: - Effectiveness and orientation to real market needs; - Integration with other points of the EED, particularly article 7 Energy Efficiency Obligation Schemes and alternative measures; - Replicability, at least for SMEs sector/size/region; A fundamental part of the project, with a relevant participation requested to each partner, will be a continuous action of capacity building and dissemination addressed to policy makers and relevant stakeholders at European, National and Regional level. In order to concentrate the efforts on new challenges and to valorise previous efforts, the Consortium is committed to take as much advantage as possible of results obtained in previous pertinent EU funded projects (such as ENSPOL, ODYSSEE-MURE, EPATEE) and relevant initiatives such as EEFIG and its related Sustainable Energy Investment Forums. On request of the European Institutions, the Consortium would also be very glad to contribute, through findings and results of the project, to the current debate on the SME definition.

Anno di stipula: 2020

Tipo progetto: CSA - Coordination and support action

Programma UE: HORIZON 2020

Energy

Data inizio: 01-09-2020

Data scadenza: 31-08-2023

Contributo totale: € 1.895.028

Costo eleggibile totale: € 1.895.028

Contributo a ENEA: € 404.369

Costo eleggibile ENEA: € 404.369

Doc. approvazione: 17/2020/DUEE-SPS

Codice atto: PW3AAP

Resp. scientifico ENEA: BIELE ENRICO

Unità: DUEE-SPS-ESE

**Attività ENEA:**

ENEA svolge il ruolo di coordinatore del progetto e di leader del Work Package dedicato alle proposte di efficaci strumenti per il supporto ai policy-maker nel superamento delle attuali criticità legate ai programmi sulle PMI.



## LEAPS pilot to foster open innovation for accelerator-based light sources in Europe

Coordinatore: DESY - DEUTSCHES ELEKTRONEN SYNCHROTRON DESY (Germania)

N. Partner:

### Abstract:

The European synchrotron radiation sources and free electron lasers serve a broad scientific community with more than 24000 users and play a vital role in most research fields from basic science in physics, chemistry and biology to applied areas in health, engineering, environment, cultural heritage and high-impact industrial applications. Rising international competition requires the European facilities to coordinate and combine complementary strengths and capabilities. Established in 2017, the League of European Accelerator-Based Photon Sources (LEAPS) seeks to realise synergies across Europe's light sources. The increasing complexity of technology and a shorter life cycle require the photon sources to open up innovation to their partner facilities, users and industrial suppliers to promote creativity, novelty and resource efficiency. The LEAPS-INNOV pilot project will contribute to solving key technological challenges for the light sources, over 50 facilities in Europe and worldwide, and in particular will support their newest generation - diffraction-limited storage rings and X-ray FELs. It will kick-start the implementation of the LEAPS Technology Roadmap and, at the same time, will enhance partnership with industry through open innovation by offering joint technological developments and advanced research capabilities for industry as collaborators, suppliers and users. Six technology work packages (WP) form the heart of LEAPS-INNOV, based on their potential for co-innovation and their ability to enhance European leadership of both, LEAPS facilities and industry. They integrate 50-some companies, are supported by an industry networking WP and complemented by pilot activities towards co-creation with the Horizon Europe clusters. In the context of open innovation, LEAPS-INNOV focusses on new approaches for partnership between industry and the photon science community, with the goal of accumulating a strategy for long-term industry engagement for LEAPS in Europe

|                          |   |
|--------------------------|---|
| Anno di stipula:         | 2021  |
| Tipo progetto:           | RIA - Research and Innovation Action              |
| Programma UE:            | HORIZON 2020<br>European Research Infrastructures |
| Data inizio:             | 01-04-2021  |
| Data scadenza:           | 31-03-2025  |
| Contributo totale:       | € 9.999.991                                       |
| Costo eleggibile totale: | € 10.000.000                                      |
| Contributo a ENEA:       | € 27.500  |
| Costo eleggibile ENEA:   | € 27.500  |
| Doc. approvazione:       | 038/2021/FSN                                      |
| Codice atto:             | PF2AAJ  |
| Resp. scientifico ENEA:  | NGUYEN FEDERICO                                   |
| Unità:                   | FSN-FUSPHY-TSM                                    |

### Attività ENEA:

L'ENEA partecipa al Work Package 6 – LEAPS Insertion Devices, dispositivi d'inserzione, con esplicito riferimento agli ondulatori magnetici, nel Task 6.1 – Industry involvement.





AIRFRESH

## Air pollution removal by urban forests for a better human well-being

Coordinatore: ARGANS LTD (Francia)

N. Partner:

## Abstract:

Urban reforestation, e.g. by increasing the tree density in cities, and peri-urban reforestation near densely populated cities where it is not easy to plant trees, can help improve air quality in cities. As large-scale reforestation is not feasible within a project, a test area will be implemented in Aix-en-Provence and Florence as front-runner cities and living labs. AIRFRESH aims to: . Estimate the air pollution (PM, NO<sub>2</sub>, CO<sub>2</sub> and O<sub>3</sub>) removal capacity by urban trees and shrubs by a reforested test area in both cities. . Estimate and quantify the environmental and health benefits provided by a new reforested test area. . Propose recommendations for reforestation policies (e.g. number and type of tree species to be planted) for attainment of the legislative air quality standards in both cities. . Our findings will be translated into a guidebook to support urban policies for sustainable city planning (local urban masterplan) and to make choices for "greening up" the environment to improve citizens' well-being.

Anno di stipula: 2020  
 Tipo progetto: N/A - Non applicabile  
 Programma UE: Other programmes  
 LIFE (2014-2020)  
 Data inizio: 01-09-2020  
 Data scadenza: 01-12-2024

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Contributo totale: € 673.512  
 Costo eleggibile totale: € 1.225.070  
 Contributo a ENEA: € 152.196  
 Costo eleggibile ENEA: € 276.620

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Doc. approvazione: 338/2020/PRES  
 Codice atto: PS2ABR  
 Resp. scientifico ENEA: DE MARCO  
 ALESSANDRA  
 Unità: SSPT-PVS

## Attività ENEA:

La partecipazione al progetto AIRFRESH, svolto in stretta collaborazione con i partner europei estremamente qualificati, consente all'ENEA di sviluppare ulteriori competenze e rivestire un ruolo di primo piano nella lotta all'inquinamento atmosferico.



Coordinatore: LEGAMBIENTE NAZIONALE APS RETE ASSOCIATIVA ETS (Italia)

N. Partner: 7

**Abstract:**

The main goal of LIFE BLUE LAKES is to prevent and reduce plastic waste in Italian and German lakes. The project will apply an integrated approach to five lakes in Germany and Italy, combining governance, training, information and awareness-raising activities. It will contribute to both the EU plastics strategy and the circular economy action plan. The projects specific objectives include: • improving the governance, management and decision-making processes concerning microplastic pollution in lakes (e.g. through a new support tool and suggestions on plastic waste treatment, discharge limits, monitoring programmes, wastewater treatment process improvements and awareness-raising initiatives); • increased commitment by local economic actors (e.g. industries, farmers, tourist operators) near the main lakes in Italy and Germany to reducing the impact of their activities; • reducing the entry of microplastics into lake basins from WWTPs through developing and disseminating a technical protocol for sewage treatment; • establishing close cooperation between relevant industries to develop solutions to reduce and prevent additional primary loads of microplastics; • raising the awareness of residents living close to the main lakes in Italy and Germany about the problem of microplastics; and • influencing the political agenda at national (German and Italian) and European level in order to improve the existing regulatory framework for tackling microplastic pollution in lake basins.

Anno di stipula: 2019

Tipo progetto: N/A - Non applicabile

Programma UE: Other programmes  
LIFE (2014-2020)

Data inizio: 01-10-2019

Data scadenza: 30-09-2023

Contributo totale: € 1.391.990

Costo eleggibile totale: € 2.530.927

Contributo a ENEA: € 123.200

Costo eleggibile ENEA: € 235.400

Doc. approvazione: 375/2019/PRES

Codice atto: PS4ABW

Resp. scientifico ENEA: SIGHICELLI MARIA

Unità: SSPT-PROTER-BES

**Attività ENEA:**

L'attività ENEA, svolta in collaborazione con gli altri partner italiani e tedeschi, prevede: . La realizzazione di campagne di formazione destinate alla Pubblica Amministrazione e sviluppo di programmi di monitoraggio delle microplastiche nei laghi; . La stesura di protocolli tecnici per la valutazione delle microplastiche presenti nelle aree pilota del Nord (Lago di Garda) e Centro Italia (Lago Trasimeno e Lago di Bracciano) . Le attività di comunicazione e coinvolgimento delle comunità locali e diffusione dei risultati



Coordinatore: ENEA (Italia)

N. Partner: 9

**Abstract:**

The LIFE MAGIS project will target consumers and producers to support the launch and spread of the PEF method and of the PEF-based Made Green in Italy scheme. The project will thus stimulate PEF-related innovation, improve communication about green products, and incentivise consumers to purchase greener products. To do this, LIFE MAGIS will develop new Italian product category rules for the carrying out of PEF studies on specific products (PEFCRs). The PEFCRs will cover certain food products (snacks, ice cream, fruit, cheese and coffee), leather products, window fittings and cosmetics. The project will also: . Help define PEFCRs at EU level through its work on new product groups at national level; . Demonstrate the effectiveness of the PEF method in promoting sustainable models of production and consumption; encourage better-informed and conscious consumer choices and ensure the transparency and comparability of environmental information; . Create tools and approaches to make PEF easily replicable and transferable to other Member States.

Anno di stipula: 2019  
 Tipo progetto: N/A - Non applicabile  
 Programma UE: Other programmes  
 LIFE (2014-2020)  
 Data inizio: 02-09-2019  
 Data scadenza: 30-04-2023

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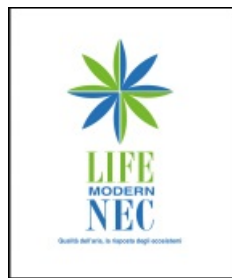
|                          |             |
|--------------------------|-------------|
| Contributo totale:       | € 1.385.942 |
| Costo eleggibile totale: | € 2.624.168 |
| Contributo a ENEA:       | € 256.249   |
| Costo eleggibile ENEA:   | € 450.049   |

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Doc. approvazione: 230/2019/SSPT-USER  
 Codice atto: PS6ACK  
 Resp. scientifico ENEA: CORTESI SARA  
 Unità: SSPT-USER-RISE

**Attività ENEA:**

L'ENEA coordina il progetto. Le attività ENEA prevedono: . Valutazione dell'implementazione del metodo PEF nelle regole di categoria di prodotto (RCP) sviluppate dai gruppi di lavoro proponenti, come da regolamento dello schema Made Green in Italy; . Verifica della conformità con il metodo PEF e con lo schema Made Green in Italy delle analisi condotte durante il progetto; . Sviluppo di dataset conformi allo schema Made Green in Italy, sviluppati a partire dalle analisi condotte durante il progetto; . Attività di comunicazione, disseminazione e supporto alla replicabilità dello schema a livello europeo; . Coordinamento e monitoraggio del progetto



## new MOnitoring system to Detect the Effects of Reduced pollutants emissions resulting from NEC Directive adoption

**Coordinatore:** ARMA DEI CARABINIERI - Comando Unità Forestali, Ambientali e Agroalimentari (CUFAA) (Italia) **N. Partner:**

### Abstract:

The main objective of the LIFE MODERn (NEC) project is to comply with the NEC Directive and enhance the representativeness of sites and indicators, thus improving the Italian NEC network. In particular, the project aims to: Establish national emissions ceilings of certain atmospheric pollutants, linking them to the impacts on ecosystems; Expand the network of monitoring sites so that it is fully representative of the variety of Italian freshwater and forest ecosystems; Introduce and test a new set of indicators and develop new monitoring protocols to study the impacts of air pollution on biodiversity (plant functional groups, lichens, selected groups of fauna, and selected biological indicators in water bodies) and air pollution chemistry and transparency; Measure pollutant effects in remote areas that can provide the full background level for comparison with health-related impacts in urban areas; Assess mass balances of the major nutrient and pollutant flows through the atmosphere-forest-soil-water system, to quantify the long-term trends of the most relevant impacts; Distinguish between impacts resulting from pollutant emissions and those related to other drivers (climate change, management, land-use) by applying a multivariate statistical approach on NEC Directive target pollutants and on data collected during the 20-year environmental monitoring at ICP Forests and ICP Waters sites in Italy; Improve the awareness of experts in the Italian and European NEC network by promoting internet data dissemination through the FAIR (Findable, Accessible, Interoperable and Reusable) Data Principles and the development of specific software; Raise awareness among the Italian public about pollution sources and their impacts on ecosystems, including by promoting the NEC network; and Increase knowledge exchange between EU Member States involved in implementation of the NEC Directive to discuss and promote common strategies and solutions.

**Anno di stipula:** 2021  
**Tipo progetto:** N/A - Non applicabile  
**Programma UE:** Other programmes  
 LIFE (2014-2020)  
**Data inizio:** 01-10-2021  
**Data scadenza:** 30-09-2025

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**Contributo totale:** € 1.877.109  
**Costo eleggibile totale:** € 3.414.809  
**Contributo a ENEA:** € 143.768  
**Costo eleggibile ENEA:** € 287.536

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**Doc. approvazione:** 9/2021/PRES  
**Codice atto:** PS0ABA  
**Resp. scientifico ENEA:** DE MARCO  
 ALESSANDRA

**Unità:** SSPT-PVS

### Attività ENEA:

Le attività di ENEA prevedono: . Interazione e contatto con la EU; . Valutazione della rete di monitoraggio per gli ecosistemi terrestri e acquatici e per gli impatti dell'ozono sulla vegetazione; . Messa a punto e validazione di metodologia per la quantificazione del "Visibility Index", che sarà però posto come nuovo indicatore per l'implementazione della direttiva NEC.



## 6th Concerted Action supporting Member States and participating countries in implementing the Energy Performance of Buildings Directive

Coordinatore: DEA DANISH ENERGY AUTHORITY (Danimarca)

N. Partner:

### Abstract:

The overall objective of the Concerted Action EPBD is to foster exchange of information and experience among Member States and other associated countries (Norway) with regards to the implementation of the specific European Union legislation and policy on the energy performance of buildings, and in particular with regards to the transposition and implementation of the EPBD (DIRECTIVE 2018/844/EU) and the on-going revision of this directive. The specific objectives of the CA are to: 1. Enhance and structure sharing of information and experience from national implementation and promote good practice in activities of Member States for implementation of the Energy Performance of Buildings Directive (EPBD). 2. Create favourable conditions for faster convergence of national procedures on EPBD-related matters. 3. Develop a direct collaboration with the other two buildings-related Concerted Actions that were established within the IEE programme: the CA-RES, focussing on transposition and implementation of the Renewable Energy Systems Directive (DIRECTIVE 2018/2001/EU); and the CA-EED, focusing on transposition and implementation of the Energy Efficiency Directive (DIRECTIVE 2018/2002/EU), where National Energy Plans are expected to include initiatives towards building energy efficiency. 4. Supplement the work of the Article 26 Committee and establish a dialogue with the European Committee for Standardization (CEN) in their work and implementation of standards to support the implementation of the zero carbon and life cycle calculations. 5. Support for European Member States and Norway to use National Renovation Plans to support progress on the EPBD implementation and increased renovation activities. As with previous instalments of the Concerted Action, CAV\_EPBD will strive to result in a more harmonized approach, improved implementation and actual application of the EPBD in all the countries involved, as well as helping to disseminate best practices between the countries.

Anno di stipula: 2022  
 Tipo progetto: N/A - Non applicabile  
 Programma UE: Other programmes 2021-2027  
 LIFE (2021-2027)  
 Data inizio: 01-11-2022  
 Data scadenza: 31-10-2027

|                          |             |
|--------------------------|-------------|
| Contributo totale:       | € 5.000.000 |
| Costo eleggibile totale: | € 5.263.175 |
| Contributo a ENEA:       | € 141.964   |
| Costo eleggibile ENEA:   | € 149.436   |

Doc. approvazione: 44/2022/DUEE-SPS  
 Codice atto: PW3ABD  
 Resp. scientifico ENEA: AZZOLINI GABRIELLA  
 Unità: DUEE-SPS-SAP

### Attività ENEA:

L'ENEA partecipa alle otto task del progetto e coordina la Task 2.5: Decarbonization/Zero emission buildings.

Coordinatore: ADEME - AGENCE DE L'ENVIRONNEMENT ET DE L'AMÉNAGEMENT DE L'ÉNERGIE (Francia) N. Partner:

**Abstract:**

ODYSSEE-MURE "Monitoring the Energy Efficiency Pillar for Climate Neutrality" aims at supporting policy makers in EU Commission, Member States (MS) and Energy Community (EnC) countries to implement the framework of the EU Energy Efficiency Directive (EED) as efficiently as possible at national level. It provides updated, well-experienced, user-friendly databases and web-tools for monitoring and evaluating impacts of EE policies. The ODYSSEE database and facilities contain and analyse latest available energy demand and energy efficiency indicators. The MURE database and facilities contain and analyse energy efficiency policies and measures. These tools have been successfully used in the past and will be extended from 27 EU MS to 9 EnC countries, supported by a specific buddy system from selected partners of the EU27. New tools, such as a web-based Energy Efficiency Policy Assessment Tool and a Policy Radar, will strengthen capabilities of EU MS and EnC. The project will enhance, update and modernise ODYSSEE-MURE tools and databases for support to EU MS and EnC through regional and national training events as well as dissemination channels such as country/sector profiles, newsletters, policy briefs, webinars and social media. In addition, we disseminate the analysis developed in this project, through cooperation with the European Council for an Energy Efficient Economy (eceee) that organises the most important energy efficiency events, and which gathers policy makers, researchers and industry. We further disseminate the results through cooperation with international/ regional organisations such as the Energy Community Secretariat, the International Energy Agency IEA, EEA, UN Cepal/Eclac and OLADE. ODYSSEE-MURE has a decentral, though harmonised, approach combining a strong Technical Coordination (ADEME, Enerdata, Fraunhofer ISI) with a large number of National Teams (EE agencies), and an efficient project management structure adapted to the large number of partners.

Anno di stipula: 2022  
 Tipo progetto: N/A - Non applicabile  
 Programma UE: Other programmes 2021-2027  
 LIFE (2021-2027)  
 Data inizio: 01-10-2022  
 Data scadenza: 31-03-2025

Contributo totale: € 1.853.113  
 Costo eleggibile totale: € 1.950.645  
 Contributo a ENEA: € 35.163  
 Costo eleggibile ENEA: € 36.986

Doc. approvazione: 48/2022/DUEE-SPS  
 Codice atto: PW3ABE  
 Resp. scientifico ENEA: IORIO GIULIA  
 Unità: DUEE-SPS-MPE

**Attività ENEA:**

L'ENEA è l'unico partner italiano del progetto ed è coinvolto nelle attività previste nei WP1, 2, 3 e 6 che prevedono principalmente: . il monitoraggio dei progressi in materia di efficienza energetica (database e strumenti in ODYSSEE); . la valutazione delle misure di politica di efficienza energetica (database e strumenti in MURE); . l'organizzazione di un meeting di progetto per consentire il dialogo e lo scambio di esperienze tra i partner al fine di rafforzare le competenze interne.



Coordinatore: IEECP - INSTITUTE FOR EUROPEAN ENERGY AND CLIMATE POLICY STICHTINGN. Partner: (Paesi Bassi)

#### Abstract:

The energy efficiency first (EE1st) principle is defined and endorsed in EU legislation. The purpose of EE1st is to consider the demandside resources, such as energy efficiency and demand-response as the other types of energy resources for energy planning, investment, and policy. However, the previous evaluations of the National Energy and Climate Plan (NECP) and similar projects, such as ENEFIRST show that implementing the EE1st is easier said than done. Therefore, the ENEFIRSTPLUS proposal aims to support the key stakeholders to complement the existing resources (from European commissions, ENEFIRST and other projects) for investment in energy infrastructure, energy planning, and designing incentives. Through this project, new practical guidelines and "real-life examples" are provided on implementing the EE1st. In addition, the ENEFIRSTPLUS pursues to test the resources for 8 "real-life" cases in 4 countries and extend the outcomes to 27 MS. Building capacity and stakeholders' engagement through learning cycles are one of the core components of ENEFIRSTPLUS which results in a community of practice. Furthermore, one-stop-shop is developed to provide the most relevant information and resources about EE1st in a single place.

Anno di stipula: 2023  
 Tipo progetto: LIFE ProJect Grants  
 Programma UE: Other programmes 2021-2027  
 LIFE (2021-2027)  
 Data inizio: 01-11-2023  
 Data scadenza: 31-10-2026

|                          |             |
|--------------------------|-------------|
| Contributo totale:       | € 1.493.437 |
| Costo eleggibile totale: | € 1.572.039 |
| Contributo a ENEA:       | € 158.269   |
| Costo eleggibile ENEA:   | € 166.599   |

Doc. approvazione: 26/2023/DUEE-SIST  
 Codice atto: PW4ABA  
 Resp. scientifico ENEA: MATERA MAURIZIO  
 Unità: DUEE-SIST-SUD

#### Attività ENEA:

ENEA partecipa a tutti i WP, in particolare sarà: - leader del WP 6 "Sustainability, Replication and Exploitation activities"; - leader del Task T.4.3 "Analysis and discussion of the pilot cases' results and outputs"; - leader del Task T.6.3 "EE1st forum and Community of Practice"



## Effective implementation of the EPBD in line with short-term and long-term policy requirements

Coordinatore: UNIV. TECHNICAL WIEN (Austria)

N. Partner: 9

### Abstract:

Energy and climate targets require a radical increase in efforts for implementing and strengthening policies in the building sector. The proposal for a revised EPBD introduced several elements to reach these goals e.g., zero-emission buildings (ZEB), national building renovation plans (NBRP), minimum energy performance standards (MEPS). Other instruments are strengthened: building renovation passports (BRP) and energy performance certificates (EPC). Recent developments (gas/energy/economic crises) have triggered short-term actions and objectives, leaving Member States (MS) with the challenging task to find solutions to implement them all at once and avoid lock-in effects. The project will achieve three objectives: 1) Support public authorities in six MS (focus countries) in the design, implementation and evaluation of instruments (re-) defined in the proposal of the EPBD (ZEB, NBRP, MEPS, BRPs, EPCs) 2) Adopt a consistent approach for the implementation of building policies stemming from the EPBD recast and use synergies with Fitfor55 and other EU strategies 3) Build a replicable model to support the implementation of EU legislation by closely engaging with CA-EPBD, network agencies, and national partners of the Renovate Europe Campaign as well as policy makers and stakeholders. We will analyse national examples, provide support and technical advice and develop tailored policy packages and tools adapted to the specific needs of focus countries. These will include guidelines on how to design policies and instruments, measure their effectiveness (monitoring, reporting and policy evaluation) and adjust to EU and national needs and objectives. The project will establish an intensive stakeholder engagement in focus countries, including policy fora and bilateral exchanges with implementing bodies. Selected activities and results will be provided to focus countries; replication and adaptation to EU-27 will be assured through a series of workshops at EU level.

Anno di stipula: 2023

Tipo progetto: LIFE ProJect Grants

Programma UE: Other programmes 2021-2027

LIFE (2021-2027)

Data inizio: 01-10-2023

Data scadenza: 30-06-2026

Contributo totale: € 1.999.308

Costo eleggibile totale: € 2.104.535

Contributo a ENEA: € 84.022

Costo eleggibile ENEA: € 88.444

Doc. approvazione: 25/2023/DUEE-SIST

Codice atto: PW4AAZ

Resp. scientifico ENEA: ZANGHIRELLA FABIO

Unità: DUEE-SIST-NORD

### Attività ENEA:

L'ENEA partecipa al WP1 di coordinamento ed è leader del Task 2.1, che si occuperà di investigare il concetto di "zero emission building" (ZEB). Partecipa anche ai seguenti work package: WP 3 (Minimum Energy Performance Standards); WP4 (Building Renovation Passport – per il monitoraggio dei policy needs, l'elaborazione di soluzioni per l'implementazione ed il monitoraggio nei Focus Country e per la realizzazione di linee guida per la replicabilità in altri Paesi membri UE; WP5 (Energy Performance Certificates): gruppo di lavoro policy needs e status quo degli EPC; WP6 per verificare e garantire che le soluzioni di policy individuate nei WP 2-5 siano coerenti ed armonizzate tra loro. WP7 (coinvolgimento degli stakeholder e comunicazione e disseminazione).





## European Practitioners for Integrated Home Renovation Services

Coordinatore: CLIMATE ALLIANCE - KLIMA-BUENDNIS - ALIANZA DEL CLIMA e.V. (Germania) N. Partner:

**Abstract:**

Integrated Home Renovation Services (IHRS) offer holistic solutions for home renovations and are part of the enabling framework breaking barriers to renovation. The overall objective of EU Peers is to support the development of IHRS as key instruments to accelerating residential energy renovation in the EU. By creating a European Community of Practice of IHRS practitioner, involving at least 615 members, including 175 IHRS, EU Peers will strengthen and upscale the IHRS concept. The inclusive Community will provide multiple entry points and opportunities to participate in order to provide the maximum benefit to its members. For this purpose, 7 Community platforms, for 6 priority countries (IT, FR, ES, LV, HU, IRE) as well as for other EU countries, will be established. At least 45 exchange & collaboration meetings will take place at national and European level. The first generation of IHRS will strongly benefit from exchange of experience and convergence to foster residential retrofit: Beside an online knowledge repository and digital collaboration tool to network among peers, EU Peers will offer 3 types of capacity-building, consisting of at least 34 capacity building sessions. EU Peers will contribute to a faster and better implementation of IHRS models across Europe, providing a start-up aid to at least emerging IHRS initiatives. The project will advocate for improved framework conditions: European and national policy recommendations will be developed and be subject of 7 public policy debates. EU Peers will tackle improvements in the collaboration among actors along the renovation journey by organising 12 stakeholder dialogues. In addition, a campaign to engage public authorities to support the IHRS deployment in their area will target 150 public authorities across Europe. Creating a strong effect within the Community and beyond, EU Peers will provide data-based evidence that will illustrate the results and impact of its members and the IHRS movement in general.

|                          |  |
|--------------------------|--|
| Anno di stipula:         | 2023   |
| Tipo progetto:           | LIFE Project Grants                            |
| Programma UE:            | Other programmes 2021-2027<br>LIFE (2021-2027) |
| Data inizio:             | 01-09-2023                                     |
| Data scadenza:           | 31-08-2026                                     |
| Contributo totale:       | € 2.438.812                                    |
| Costo eleggibile totale: | € 2.567.171                                    |
| Contributo a ENEA:       | € 242.791                                      |
| Costo eleggibile ENEA:   | € 255.570                                      |
| Doc. approvazione:       | 18/2023/DUEE-SIST                              |
| Codice atto:             | PW4AAY   |
| Resp. scientifico ENEA:  | HUGONY FRANCESCA                               |
| Unità:                   | DUEE-SIST-NORD                                 |

**Attività ENEA:**

L'ENEA è coinvolta in tutti i WP; in particolare nel WP4 – “Tackling Community challenges through capacity building”, di cui è responsabile, e nel WP6 'Towards improved framework conditions for the deployment of IHRS'.



## Support Energy Efficiency Deployment with the Multiple Impacts Calculation Tool

**Coordinatore:** FHG - FRAUNHOFER GESELLSCHAFT ZUR FOERDERUNG DER ANGEWANDTENN. **Partner:** FORSCHUNG E.V. (Germania)

### Abstract:

SEED MICAT supports EU and member states at national, regional and local governance levels in including Multiple Impacts (MI) of carbon neutrality pathways in their operationalisation and implementation of the Energy Efficiency First (EE1) principle, "sowing thus the seeds" for a broad application of the principle. Considering MI in target setting (such as impacts on health, on supply security, on area use and on biodiversity) argues for a fast phase-out of fossil fuels but also for a careful analysis of MI related to different pathways to climate neutrality, with varying contributions from energy demand and energy supply options. This requires in particular extending the MI framework (previously developed in the MICAT project for energy efficiency) to renewable energy sources (and other climate neutrality pathways such as hydrogen). It further advocates the integration of policy modules (as developed in the ODYSSEE-MURE and REFEREE projects) to allow for an assessment of single and cross-sectoral policies, broadening the potential applications of the MI framework and the MICATool (a modular tool developed previously in MICAT and which allows to adapt the MI framework flexibly to different climate neutrality pathways). Further, new MI need to be considered in the MI framework, such as the impacts of climate neutrality pathways on on biodiversity. Through showcases of the MI framework at European, national, regional and local levels, as well as thematic showcases (on import dependency, on energy system resilience and on impacts on biodiversity), we demonstrate the ability of the MI concept to implement the EE1 principle based on an analytical approach. SEED MICAT accompanies these showcases with a replication analysis (notably at national level), a capacity building component on the MI framework and the MICATool, as well as a strong dissemination approach for spreading knowledge on how the MI framework supports implementing the EE1 principle.

**Anno di stipula:** 2023  
**Tipo progetto:** LIFE ProJect Grants  
**Programma UE:** Other programmes 2021-2027  
 LIFE (2021-2027)  
**Data inizio:** 01-12-2023  
**Data scadenza:** 30-11-2026

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|                                 |             |
|---------------------------------|-------------|
| <b>Contributo totale:</b>       | € 1.494.151 |
| <b>Costo eleggibile totale:</b> | € 1.572.791 |
| <b>Contributo a ENEA:</b>       | € 114.458   |
| <b>Costo eleggibile ENEA:</b>   | € 120.482   |

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**Doc. approvazione:** 17/2023/DUEE-SIST  
**Codice atto:** PW4AAX  
**Resp. scientifico ENEA:** TAMBURRINO  
 SALVATORE  
**Unità:** DUEE-SIST-SUD

### Attività ENEA:

L'ENEA è coinvolta nei seguenti work package: WP1 - Project management and coordination WP4 - Analysing and showcasing Multiple Impacts of energy efficiency and climate neutrality pathways at national, regional and local levels WP7 - Communication and dissemination



## Promotion and implementation of ETV as an EU voluntary scheme for verifying performance of environmental technologies

Coordinatore: IETU - INSTITUTE FOR ECOLOGY OF INDUSTRIAL AREAS (Polonia)

N. Partner:

### Abstract:

The overall goal of LIFEproETV is to promote and ensure the effective implementation of Environmental Technology Verification (ETV) in Poland, as a voluntary scheme with a strong recognition and acceptance on the EU market. To achieve the goal, the project beneficiaries will: • Increase the awareness, knowledge and understanding about ETV as a voluntary environmental scheme, which facilitates market entry of new environmental technologies (supply side) and supports transparent, evidence-based procurement decisions (demand side); • Build capacity, skills and a knowledge base for EU-wide ETV uptake and easy access of SMEs to ETV; • Create a favourable policy environment to encourage the uptake of ETV on EU and domestic markets, as a tool for helping achieve environmental, climate and innovation policy objectives; and • Foster the scale-up of the EU ETV pilot programme within Member States and towards new technology areas. The project, by promoting eco-innovation within ETV, contributes to achieving the objectives of EU policy in the field of environmental protection, including climate and air protection. It also helps implement the objectives of the European Green Deal (COM/2019/640), including the achievement of the climate neutrality target by 2050, and the EU action plan for the Circular Economy (COM/2015/0614).

Anno di stipula: 2020

Tipo progetto: N/A - Non applicabile

Programma UE: Other programmes  
LIFE (2014-2020)

Data inizio: 01-09-2020

Data scadenza: 31-12-2023

Contributo totale: € 988.370

Costo eleggibile totale: € 1.876.282

Contributo a ENEA: € 97.428

Costo eleggibile ENEA: € 256.387

Doc. approvazione: 6/2021/PRES

Codice atto: PS6ADF

Resp. scientifico ENEA: SBAFFONI SILVIA

Unità: SSPT-USER-RISE

### Attività ENEA:

ENEA coordinerà l'azione B.4 (Establish an EU wide framework for ETV recognition and market acceptance) e due task. Le attività ENEA prevedono: . la creazione di una comunità ETV di stakeholders per garantire che le attività di comunicazione e promozione pianificate abbiano un reale impatto sul reale riconoscimento dell'ETV da parte del mercato; . l'elaborazione di una metodologia per la promozione e il riconoscimento da parte del mercato europeo del programma ETV; . la diffusione dei risultati del progetto tra le parti interessate nell'UE utilizzando vari canali e strumenti come newsletter di progetti, volantini, opuscoli e documenti tecnici.



## market uptake of citizen energy communities enabLing a HIGH peneTration of renewable Energy SourceS

Coordinatore: R2M SOLUTION SPAIN SL (Spagna)

N. Partner:

### Abstract:

LIGHTNESS will increase the Renewable Energy hosting capacity, to securely achieve the EU target for 2030, by supporting the market uptake of Citizen Energy Communities through a turnkey social engagement, regulatory roadmap, low-cost technological package and innovative business models to unlock the full flexibility potential, reduce the final energy consumption and CO2 emissions and bring economic, social and environmental benefits to the communities and across the energy value chain. LIGHTNESS solution will elaborate and execute ambitious end users engagement plans for the involved sites with continuous iterations and solution adaptation to achieve a direct engagement of +500 households and +30 tertiary buildings and an immediate replication potential to over 70.000 persons. LIGHTNESS solution will create digital twins for holistic assessment of 5 CECs case studies across 5 countries to be then deployed and monitored. Case studies consist in an energy cooperative (ES), a social housing building (PL), a private multi-apartment building (IT), a business park (FR) and 2 CECs to uphold the interaction among them (NL). The different regulatory and policy frameworks will allow to exchange best practices and providing road maps for the authorities. Overall, LIGHTNESS will engage +3000 end users, professionals, policy makers in EU, will consent a minimum 25% increase of renewable hosting capacity by making available up to 20% of flexibility in peak times from residential and tertiary buildings, will reduce up to 30% the Prosumers and CECs energy cost and up to 30% of CAPEX and OPEX costs for DSOs. LIGHTNESS has received the support from 59 organisations from which we can highlight EPEX-Spot, STEDIN, LIANDER, ACCIONA, VEOLIA, BAM, 10 EU cities, 9 energy agencies, 9 energy cooperatives, and 3 extra EU replicators from India, Turkey and Africa/America. The project management structure is gender balanced with two women and two men serving in the positions of responsibility.

Anno di stipula: 2020

Tipo progetto: CSA - Coordination and support action

Programma UE: HORIZON 2020

Energy

Data inizio: 01-12-2020

Data scadenza: 30-11-2023

Contributo totale: € 2.924.250

Costo eleggibile totale: € 2.924.250

Contributo a ENEA: € 258.125

Costo eleggibile ENEA: € 258.125

Doc. approvazione: 23/2020/DUEE-SPS

Codice atto: PW3AAS

Resp. scientifico ENEA: BALDI FRANCESCO

Unità: DUEE-SPS-SEI

### Attività ENEA:

ENEA è leader del Work Package 2, "CECs and Flexibility Framework conditions and recommendations". E' inoltre leader di quattro diverse task che si occuperanno di : . analizzare le comunità energetiche esistenti in Europa e sviluppare benchmark di riferimento (task 2.2); . mappare gli stakeholders più rilevanti a livello europeo (task 2.3); . sviluppare linee guida per l'integrazione delle Comunità Energetiche nelle politiche nazionali e per l'allineamento con gli obiettivi UE, progettazione e simulazione dei casi studio (task 6.3).

## Mitigation enabling energy transition in the Southern Neighbourhood



Coordinatore: MEDENER - MEDITERRANEAN ASSOCIATION OF NATIONAL AGENCIES FOR ENERGY MANAGEMENT (Organ. Internazionali) N. Partner:

## Abstract:

MeetMED project begins its second phase aiming to enhance the energy security of beneficiary countries (namely Algeria, Egypt, Jordan, Lebanon, Libya, Morocco, Palestine and Tunisia) while fostering their transition to low carbon economy. Accordingly, meetMED II will be contributing to the creation of more stable, efficient, competitive and climate-resilient socioeconomic contexts in the targeted countries. MeetMED II activities aim at strengthening the implementation of EE measures and improving countries' energy mix focusing on building and appliances' sectors through a multiscale, multi-partner and inclusive approach at local and regional levels, thereby fostering regional cooperation.

Anno di stipula: 2021

Tipo progetto: N/A - Non applicabile

Programma UE: Other programmes  
ENI - European Neighbourhood Instruments (2014-2020)

Data inizio: 01-01-2021

Data scadenza: 30-06-2024

Contributo totale: € 5.000.000

Costo eleggibile totale: € 5.556.380

Contributo a ENEA: € 352.913

Costo eleggibile ENEA: € 436.798

Doc. approvazione: 266/2021/PRES

Codice atto: PW3AAW

Resp. scientifico ENEA: VIOLA CORINNA

Unità: DUEE-SPS-MPE

## Attività ENEA:

ENEA svolge le seguenti attività nel progetto: • Partecipazione al WPI - Project Management; • Work Package Leader del WP2 - Strategies and policies; • Task Leader del Task 2.1 - Stakeholders' engagement and dynamic dissemination of information; • Task Leader del Task 3.1.4 - Implement a set of tools for energy management in schools and provide guidance for deep building renovation, which includes renewable energy solutions, storage, and energy management system; • Partecipazione al Task 3.2 - Professional training and capacity building; • Task Leader del Task 5.1.2 - Financing Energy Efficiency in Buildings and Appliances; • Partecipazione al WP6 "Communication / information and Education strategy".



**Coordinatore:** C.A.E.N. SPA COSTRUZIONI APPARECCHIATURE ELETTRONICHE NUCLEARI (Italia) **N. Partner:**

**Abstract:**

The goal of the MICADO project is to propose a cost-effective solution for non-destructing characterization of nuclear waste, implementing a digitization process that could become a referenced standard facilitating and harmonizing the methodology used for the in-field Waste Management and Dismantling & Decommissioning operations. The D&D process of nuclear infrastructures demands methods for a full traceability of waste material to improve quality management and operational safety. Precise procedures provide twofold benefits: the optimization of costs, associated with D&D, and the minimization of the dose exposure to operators and personnel. The absence of a consistent and straightforward solution to characterize all types of materials, along with the lack of an integrated solution for digitizing the enormous amount of data produced, is a critical issue. Now the systems rely on the operator's ability to maintain high operational skills and quality assurance with precision measurements that unfortunately today very often are associating high uncertainties not allowing therefore a real optimization of the waste. The utilization of several un-automatized instruments implies taking many notes and inserting them into specific ad-hoc format and on a database manually, without the possibility to combine data including previously available legacy data's if present. The RCMS Digi-Waste solution proposed in the MICADO project will result in a proven modular solution offering an opportunity to proactively develop a unified and standardized Waste NDA Characterization Procedure and Method that could become an international reference allowing all Nuclear Operators - Research Laboratories & Safety Authorities to facilitate their exchanges. The MICADO project involves some key EU players with major knowledge in nuclear waste having all in common the interest to converge in technologies, methods and implementing a full digitization process applied to nuclear waste management.

**Anno di stipula:** 2019

**Tipo progetto:** IA - Innovation Action

**Programma UE:** HORIZON 2020 - Euratom  
Euratom fissione

**Data inizio:** 01-06-2019

**Data scadenza:** 28-02-2023

**Contributo totale:** € 4.442.163

**Costo eleggibile totale:** € 4.986.644

**Contributo a ENEA:** € 513.488

**Costo eleggibile ENEA:** € 513.488

**Doc. approvazione:** 081/2019/FSN

**Codice atto:** PF1AAE

**Resp. scientifico ENEA:** CHERUBINI NADIA

**Unità:** FSN-FISS e FSN-INMR

**Attività ENEA:**

L'ENEA è leader del work package 10 ed è coinvolta principalmente nei work package 4, 5, 6, 7 occupandosi di: . Progettazione e realizzazione di un sistema modulare per la caratterizzazione radiologica di rifiuti contenenti alfa emettitori mediante tecniche neutroniche passive e attive e preparazione dei test dimostrativi sul campo; . Collaborazione allo sviluppo di un sistema automatico per la caratterizzazione completa dei rifiuti radioattivi contenenti radionuclidi gamma emettitori; . Preparazione di alcuni standard di calibrazione da utilizzarsi come materiali di riferimento nelle attività sperimentali; . Collaborazione durante la fase di ricerca per l'accoppiamento di sistemi di interrogazione neutronica e fotonica utilizzando un acceleratore di elettroni; . Partecipazione alla realizzazione e integrazione della piattaforma software DigiWaste; . Coordinazione delle attività dei partner per la 'Field Demonstration' finale.



Coordinatore: CSIC - SPANISH NATIONAL RESEARCH COUNCIL (Spagna)

N. Partner:

**Abstract:**

MINKE will integrate key European marine metrology research infrastructures, to coordinate their use and development and propose an innovative framework of "quality of oceanographic data" for the different European actors in charge of monitoring and managing the marine ecosystems. MINKE proposes a new vision in the design of marine monitoring networks considering two dimensions of data quality, accuracy and completeness, as the driving components of the quality in data acquisition. This new vision will be framed in a quintuple helix model of innovation, incorporating all the elements involved in the monitoring network design: ? the context (ocean health), identifying the Essential Ocean variables (EOVs) as the key parameters to monitor ? the civil society (NGO, Makers community, Social media and Citizen Science platforms) as the key actors to ensure data completeness ? the academia researching new methods to ensure the accuracy and the global quality of the final products, developing tools for integrating the information of top-qualified oceanographic instruments and low-cost instrumentation. ? the industry improving the performance of the observations with new instrumentation, data-transmission systems and cost-effective technologies ? the governments that provide the legal and socio-economic frameworks to develop the proposed network The present proposal, through the different Integration Activities (Networking, Transnational-Virtual Access and Joint Research), aims to lay the groundwork for creating the necessary synergies among the different involved actors in the quintuple helix model of innovation, creating a new community with complementary capabilities for Ocean & Coastal Observation, that will facilitate the transition towards a blue growth socio-economic system.

Anno di stipula: 2021

Tipo progetto: RIA - Research and Innovation Action

 Programma UE: HORIZON 2020  
European Research Infrastructures

Data inizio: 01-04-2021

Data scadenza: 31-03-2025

Contributo totale: € 4.994.955

Costo eleggibile totale: € 4.994.955

Contributo a ENEA: € 55.057

Costo eleggibile ENEA: € 55.057

Doc. approvazione: 39/2021/SSPT-PROTER

Codice atto: PS4ACR

Resp. scientifico ENEA: RESEGHETTI FRANCO

Unità: SSPT-PROTER-BES

**Attività ENEA:**

ENEA è coinvolto nel WP2 (Promoting Operational Integration through Harmonization of Procedures) e si occuperà di: • misure in situ e caratterizzazione metrologica della strumentazione marina; • sviluppo delle migliori pratiche per gli strumenti e analisi dell'incertezza relativa agli EOVS ENEA è coinvolto inoltre nel WP10 (Management, Communication and Ethics), come gli altri 21 partners partecipanti alla proposta, per lo svolgimento della seguente attività: • l'obiettivo generale del WP10 è fornire, promuovere e gestire tutti i compiti, gli strumenti, le strutture e le strategie necessarie per una gestione e governance quotidiana efficace, adeguata e trasparente del consorzio durante tutto l'arco di vita del progetto .



## real-time Monitoring and Sampling of CB menaces for improved dynamic mapping of threats, vulnerabilities and response capacities

Coordinatore: FONDAZIONE SAFE (Italia)

N. Partner:

### Abstract:

MoSaiC is a research project focused on real-time monitoring of CBRN events paired with innovative sampling capabilities, to enhance dynamic mapping of threats, vulnerabilities and response capacities, inter alia addressing CBRN forensics priorities. The initiative will provide additional features to existing CBRN DIM platforms by working on the integration of a set of sensing capabilities which include: • Research on innovative and low-cost CB monitoring technologies installed on UAV and UGV systems (building inter alia on the H2020 projects ROCSAFE and 5G!Drones, and focusing on miniaturization of previously deployed technological solutions); • Research on innovative sampling technologies based primarily on the concept of "smart swabs", enabling fast and non-destructive in situ analysis of a sample that can later be analyzed a second time in the lab by standard forensic; • Nearly real-time 3D mapping and processing of areas affected by CBRN contamination (indoor and outdoor), with a high-degree of autonomy. • Real-time visualization for Incident Commanders, including flowing of data from 3D mapping and CB monitoring sensors. • Real-time communication between C2 systems and drones, robots and sensors for CB monitoring and sampling missions. The project is formally supported by five EU Member States MoDs (Italy, Austria, Denmark, the Netherlands and Estonia) thanks to the cooperation of their industrial players as well as public/private academic and research institutions. Over its thirty-six months of implementation, MoSaiC will provide tangible research outcomes with the complete design of an integrated, disruptive CBRN DIM technology able to provide real-time monitoring of CB threats, enhanced real-time C2 solutions for EU military forces. It will set a cornerstone for an improved industrial sovereignty of the EU in CBRN DIM applications.

|                  |   |
|------------------|---|
| Anno di stipula: | 2023  |
| Tipo progetto:   | EDF Research Actions  |
| Programma UE:    | Other programmes 2021-2027<br>EDF - European Defence Fund (2021-2027) |
| Data inizio:     | 01-01-2023  |
| Data scadenza:   | 31-12-2025  |

|                          |             |
|--------------------------|-------------|
| Contributo totale:       | € 4.401.672 |
| Costo eleggibile totale: | € 4.401.672 |
| Contributo a ENEA:       | € 467.500   |
| Costo eleggibile ENEA:   | € 467.500   |

|                         |                |
|-------------------------|----------------|
| Doc. approvazione:      | 195/2022/FSN   |
| Codice atto:            | PF7ABU         |
| Resp. scientifico ENEA: | FIORANI LUCA   |
| Unità:                  | FSN-TECFIS-DIM |

### Attività ENEA:

L'ENEA partecipa alle attività afferenti ai WP1, WP2 e WP8: . WP1: partner per la gestione degli aspetti organizzativi e di gestione del progetto. . WP2: sviluppatore di tecnologie laser per l'identificazione ed il monitoraggio di minacce chimiche e biologiche in situazione di crisi derivanti da scenari di attacco da parte di soggetti intenzionati a destabilizzare l'ordine all'interno della Comunità Europea. . WP8: il laboratorio FSN-TECFIS-DIM dell'ENEA coordinerà le attività finalizzate a validare il sistema MOSAIC ed a sviluppare un programma di sfruttamento futuro dei risultati ottenuti dal progetto.





Coordinatore: UNIV. EVORA (Portogallo)

N. Partner: 7

**Abstract:**

Within the MSA-Trough project a fix-focus parabolic trough is developed by an international consortium of 7 partners. The novelty of the new collector is the complete independence (detachment) between the concentrator and the fixed absorber tube, so that the absorber tube string is not moved by the concentrator and can be designed in a continuous line up to a length of more than 0,8km. Due to the new design not only the collector connection piping becomes obsolete but also all flexible connections in the solar field are omitted, leading to a significant reduction in investment costs as well as in pressure drop and heat losses. Because of its horizontal "storm-position" wind loads are reduced by 75%, thus steel structure, pylons and foundations can be designed very light and cost-saving. In addition, biodegradable and very stable thin-glass sandwich mirrors will be developed, which increase the optical efficiency by 2% due to better reflectivity. A further important project highlight is the development of an automatic mirror washing device, which will recycle about 90% of washing water and increase the solar field performance by 4% because of daily washing. The new MSA-Trough design will be especially suitable for dispatchable power generation at very high temperature (555°C) using directly molten salt as heat transfer fluid and storage medium, thus reaching a very high cycle efficiency and an excellent volumetric storage capacity. A 350m-collector (aperture 6,7m) will be erected and tested with molten salt at the EMSP. Optical, mechanical and thermal tests will be carried out in order to verify the collector quality and efficiency. In order to eliminate heat losses during nights the "overnight drainage strategy" will be tested and optimized. Compared to current parabolic trough power plants the use of MSA-Trough collectors will increase the annual electrical output by 24,5% and reduce the solar field costs by 30%.

Anno di stipula: 2023

Tipo progetto: IA - Innovation Action

 Programma UE: HORIZON EUROPE  
 Cluster 5 - D3 Energy supply

Data inizio: 01-10-2023

Data scadenza: 31-03-2027

Contributo totale: € 5.421.360

Costo eleggibile totale: € 6.535.765

Contributo a ENEA: € 468.125

Costo eleggibile ENEA: € 468.125

Doc. approvazione: 201/2023/TERIN

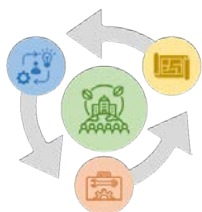
Codice atto: PK7AAJ

Resp. scientifico ENEA: RUSSO VALERIA

Unità: TERIN-STSN

**Attività ENEA:**

ENEA è presente in tutti i WPs del progetto tranne il WP2 relativo alla realizzazione del prototipo. L'Agenzia, in particolare, avrà la responsabilità del WP5 "Optimization of collector operation and maintenance" e dei task 5.2 (Night operation optimization by additional receiver insulation), 5.3 (Part load operation optimization) e 5.6 (Evaluation and optimization of operation and maintenance). L'ENEA è responsabile dei seguenti Deliverable: D5.3 – Report on "night operation with additional insulation, D2.1 - MS driven energy system management and power/gas grid integration solutions, D5.1 on night operation with additional insulation.", D5.4 – Part load operation report, D5.8 – Final operation-maintenance evaluation report e Milestone MS15- Outlet temperature controller successfully tested, MS17 - Final operation and maintenance concepts developed.



MULTICLIMACT

## CLIMate adaptation ACTions to improve resilience, preparedness and responsiveness of the built environment against multiple hazards at multiple sc

Coordinatore: RINA CONSULTING (Italia)

N. Partner:

**Abstract:**

As climatic conditions are constantly changing and the frequency of extreme events increases, there is an urgency of planning, designing and retrofitting the built environment in order to adapt it to present and future risks. Too frequently the built environment is a driver of vulnerability, rather than being a shelter for citizens. For this reason, mitigation and adaptation need to be pursued actively, putting built environment and human resilience at the center of a climate and future-proofing action. The MULTICLIMACT project aims to develop a mainstreamed framework and a tool for supporting public stakeholders and citizens to assess the resilience of the built environment and its people at multiple scales (buildings, urban areas, territories) against locally relevant natural and climatic hazards and supply-chains, as well as to support them to enhance their preparedness and responsiveness across their life cycle. The mainstreamed approach will include a method specifically targeted for including several types of built environment assets, including human well-being, health, and quality of life as an essential scale of analysis and action. MULTICLIMACT will support resilience-enabling ACTions by implementing a toolkit of 18 reliable, easy-to-implement and cost-effective Design methods, Materials, and Digital Solutions, enabling users to easily estimate the impact of their implementation on the resilience of the targeted asset, integrating a multidisciplinary approach integrating socio-economic, life, engineering, and climate disciplines. The MULTICLIMACT approach is integrated with relevant international and European initiatives, building upon existing knowledge and instruments, and demonstrating the proposed approach in four case studies that represent various geographical location, natural and climatic hazards, social and economic systems and scales of analysis, ranging from single buildings (including cultural heritage) to the urban and territorial scales

Anno di stipula: 2023

Tipo progetto: IA - Innovation Action

Programma UE: HORIZON EUROPE

Cluster 5 - D4 Energy use

Data inizio: 01-10-2023

Data scadenza: 31-03-2027

Contributo totale: € 7.499.166

Costo eleggibile totale: € 7.499.166

Contributo a ENEA: € 495.250

Costo eleggibile ENEA: € 495.250

Doc. approvazione: 206/2023/TERIN

Codice atto: PK5AAP

Resp. scientifico ENEA: DI PIETRO ANTONIO

Unità: TERIN-SEN-APIC

**Attività ENEA:**

Le attività in cui ENEA è coinvolta è riconducibile a otto work package: WP1: supporting the built environment adaptation to climate change – Plan and Design WP3: Materials and Technologies for supporting the built environment preparedness and responsiveness to disrupting events – Plan and Design WP4: Digital solutions for supporting the protective role of the built environment for people safety and quality of living – Plan and Design WP9: Materials and Technologies for supporting the built environment preparedness and responsiveness to disrupting events – Develop WP10: Digital solutions for supporting the protective role of the built environment for people safety and quality of living – Develop WP11: MULTICLIMACT in-field demonstration – Test WP15: MULTICLIMACT in-field demonstration - Deploy WP17: Project coordination for Phase 3



## MANAGEMENT AND UNCERTAINTIES OF SEVERE ACCIDENTS

Coordinatore: CIEMAT - CENTRO DE INVESTIGACIONES ENERGETICAS, MEDIOAMBIENTALES Y TECNOLOGICAS (Spagna) Partner:

## Abstract:

In the current state of maturity of severe accident codes in terms of phenomena addressed and extensive validation conducted, the time has come to foster BEPU, Best Estimate Plus Uncertainties, application in the severe accident (SA) domain, and accident management (AM). The advantages with respect to deterministic analysis are known: avoid adopting conservative assumptions in the model and allow identifying safety margins, quantify likelihood of reaching specific values and, through the distribution variance provide insights into dominating uncertain parameters. The overall objective of the Management and Uncertainties of Severe Accident (MUSA) project is to assess the capability of SA codes when modelling reactor and SFP (Spent Fuel Pool) accident scenarios of Gen II and III. To do so UQ (Uncertainty Quantification) methods are to be used, with emphasis on the effect of already-set and innovative accident management measures on accident unfolding, particularly those related to ST (Source Term) mitigation. Therefore, ST related Figures Of Merit (FOM) are to be used in the UQ application. The MUSA project proposes an innovative research agenda in order to move forward the predictive capability of SA analysis codes by combining them with the best available/improved UQ tools and embedding accident management as an intrinsic aspect of SA analyses. MUSA develops through key activities which also describe the main outcomes foreseen from the project: identification and quantification of uncertainty sources in SA analyses; review and adaptation of UQ methods; and testing such methods against reactor and SFP accident analyses, including AM. Given the focus of FOM on source term, the project will identify variables governing ST uncertainties that would be worth investigating further. All the ingredients necessary to conduct the project are already available: analytical tools, experimental data, postulated reactor and SFP scenarios and, technical and scientific competences.

Anno di stipula: 2019  
 Tipo progetto: RIA - Research and Innovation Action  
 Programma UE: HORIZON 2020 - Euratom  
 Euratom fissione  
 Data inizio: 01-06-2019  
 Data scadenza: 31-05-2023

Contributo totale: € 3.186.503

Costo eleggibile totale: € 5.768.453

Contributo a ENEA: € 176.863

Costo eleggibile ENEA: € 232.550

Doc. approvazione: 087/2019/FSN

Codice atto: PF6AAJ

Resp. scientifico ENEA: MASCARI FULVIO

Unità: FSN-SICNUC-SIN

## Attività ENEA:

L'ENEA è coinvolto in porporzioni diverse in tutti i work package. In particolare contribuirà: . Nel WP2 all'identificazione e quantificaione delle sorgenti di incertezza oer GEN II/III/III+; . Nel WP3 alla revisione delle metodologie per quantificare le incertezze; . Nel WP4 all'applicazione delle metodologie di incertezza per il calcolo di esperimenti condotti nell'impianto sperimentale, di tipo integrale, PHEBUS e coordinerà queste attività; . Nel WP5 all'applicazione di metodologie di incertezza per il calcolo di scenari incidentali in generico PWR-900; . Nel WP6 alla simulazione di scenari incidentali in SFP e eventuali analisi di sensibilità o incertezza.

Coordinatore: UBA - GERMAN ENVIRONMENTAL AGENCY (Germania)

N. Partner:

#### Abstract:

European city centres are changing: In recent decades, they were resource-intensive centres of consumption. Currently, the online trade is growing, which increasingly shifts consumption from stationary trade to the digitalised sphere. In connection with the COVID19 pandemic, numerous shops had to close and supply chains were interrupted. In contrast, alternative and sustainable consumption models leading to more circularity and sufficiency increase. However, due to the current framework conditions these models usually only remain in their niche and are only seen by "interested parties" at most. Consumers therefore lack a central and easily accessible offer of alternative forms of consumption. NiCE brings these two challenges together: a transformation of central places in cities that make it easy for their inhabitants to implement sustainable lifestyles and at the same time to (re)animate centres in a more circular way. We want to show various practical approaches in different settings that consciously strengthen these new forms of consumption, make them visible in urban centres and bring all relevant actors together. One such setting is for example a "multifunctional resource centre", where several services and offers (such as different repair services) are accessible at one central spot. NiCE partners will prepare, document and evaluate these approaches in transnational teams to develop viable, transferable models and approaches: How to use empty spaces for circular offers? How to run and economically sustain central resource centres? How to combine transnational online trade with local circular services? Educational, inspirational, and exchange formats at transnational, national and regional level will transfer our results to municipalities, regions, providers of alternative consumption and business models, citizen associations and policymakers and invites for further joint activities to establish circular city centres throughout Central Europe

Anno di stipula: 2023

Tipo progetto: N/A - Non applicabile

Programma UE: Other programmes 2021-2027  
Interreg Central Europe 2021-2027

Data inizio: 01-05-2023

Data scadenza: 30-04-2026

Contributo totale: € 1.776.614

Costo eleggibile totale: € 2.220.767

Contributo a ENEA: € 153.735

Costo eleggibile ENEA: € 192.169

Doc. approvazione: 115/2023/SSPT

Codice atto: PS0ABG

Resp. scientifico ENEA: CAPPELLARO  
FRANCESCA

Unità: SSPT-SEC

#### Attività ENEA:

Le attività ENEA prevedono l'esecuzione di un pilota sul tema della gestione circolare della risorsa idrica, attraverso un ULL sviluppato dall'ENEA all'interno della città di Bologna nonché la partecipazione alle attività del progetto, ai meeting interni e a quelli di diffusione dei risultati. L'ENEA parteciperà a tutti i work package: • WP 0 Project Management per la redazione di report di progetto e la partecipazione ai meeting con i partner; • WP 1 Assessing, showing and framing the challenges and potentials of circular lifestyles in city centres: contribuirà all'assessment dello status quo dell'economia circolare a livello locale e regionale e alle attività di raccolta delle buone pratiche di consumo circolare a livello urbano; • WP 2 Development of practical tools and approaches to promote circular lifestyles in city centres: si occuperà della realizzazione del pilot italiano nella città di Bologna con focus sulla risorsa idrica; • WP 3 Transfer and capitalisation of solutions promoting circular lifestyles in city centres: svolgerà un ruolo attivo nei workshop ed eventi interattivi sui temi del progetto e nella disseminazione e diffusione delle fasi e dei risultati di progetto.



Coordinatore: CEA - COMMISSARIAT A L'ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES (Francia)

N. Partner:

**Abstract:**

Increasing further the safety of light water nuclear reactors in the new operating conditions induced by their integration in a more varied energy mix brings many new challenges for fuel development. This calls for effective and validated tools enabling one to capture the complexity of the behaviour of fuel elements under various operation conditions from nominal to design basis accident ones.. The objective of the OperaHPC proposal is to develop open tools using High Performance Computing (HPC) enabling a full 3D high-fidelity thermo-mechanical simulation of the fuel element including the material microstructure. This will contribute to the design of so-called fuel element digital twins. This development includes an ambitious basic research program devoted to the investigation of non-linear mechanical behaviour of irradiated fuel using multiscale experiments and simulations from the atomic scale up to the material law. This will yield the detailed description of the in-pile behaviour of the fuel element and the materials data necessary for the simulation. The tools developed will be assessed against state-of-the-art 1D/3D fuel performance codes for verification, definition of boundary conditions and coupling with neutronic, thermochemical and thermohydraulic codes. Validation and uncertainty analyses will also be performed through the comparison of the results of the 3D simulations with the experimental data available from irradiation programs. The knowledge from these advanced simulations will be transferred to industrial fuel performance codes thanks to the application of new methods based on reduced order and meta models, including Artificial Intelligence. The HPC tools will finally be applied to the detailed evaluation of innovative fuel element concepts, including (enhanced) accident tolerant fuels, under transient conditions in several light water reactor designs.

Anno di stipula: 2022

Tipo progetto: RIA - Research and Innovation Action

Programma UE: Euratom2027  
Euratom fissione

Data inizio: 01-11-2022

Data scadenza: 30-04-2027

Contributo totale: € 2.846.944

Costo eleggibile totale: € 4.515.552

Contributo a ENEA: € 170.300

Costo eleggibile ENEA: € 262.000

Doc. approvazione: 104/2022/FSN

Codice atto: PF6ABA

Resp. scientifico ENEA: CERVONE ANTONIO

Unità: FSN-SICNUC-SIN

**Attività ENEA:**

ENEA è coinvolta dei seguenti Work Package: • WP4 - Development of 3D HPC simulation tools for the thermomechanical behavior of fuel elements under irradiation • WP5 - Verification and validation, uncertainties and sensitivity analyses • WP6 - Development of improved models for industrial fuel performance codes • WP7 – Simulation of fuel element behavior in operating and accidental transient conditions • WP8 – Education and training, exploitation, dissemination and communication



**Coordinatore:** CIEMAT - CENTRO DE INVESTIGACIONES ENERGETICAS, MEDIOAMBIENTALES Y TECNOLOGICAS (Spagna) **Partner:**

**Abstract:**

ORIENT-NM answers the Euratom WP 2019-20 call NFRP-08, which requests to explore the possibility of establishing a European Joint Programme (EJP) on nuclear materials. Accordingly, ORIENT-NM will: 1. Produce a convincing strategic research agenda (SRA) for materials for all nuclear fission reactor generations (until 2040), consistent with national programmes and industrial needs, including supply chain constraints, paying attention to standardisation issues and verifying the availability of suitable infrastructures; 2. Elaborate an efficient EJP governance and legal structure, including attention for decision-making processes, intellectual property issues, promotion of innovation and analysis of potentially available resources, as well as an implementation scheme caring among others for quality assurance, SRA updating, knowledge and data management; all this considering different possible scenarios; 3. To identify appropriate ways of interactions between the EJP and other bodies and initiatives that bear connections with nuclear materials (stake-holders), including international organisations, standardisation bodies, technical safety organisations, fusion and non-nuclear energy communities, other associations, while addressing the issue of a coordinated use of nuclear materials infrastructures. All of the above will be done in close dialogue with Member States and European Commission, as well as all other stakeholders, in order to meet their requirements and expectations from an EJP on nuclear materials and raise the interest of identified research owners and research managers, by demonstrating the added value of such EJP. The key outcomes will be: A. Critical assessment of the added value of an EJP on nuclear materials; B. Vision Paper and SRA; C. Possible EJP structure, governance, legal aspects and implementation; D. Set of protocols for the interaction of the EJP with other stakeholders. Documents listed under A, C and D will complement and integrate the SRA.

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| <b>Anno di stipula:</b>         | 2020                                       |
| <b>Tipo progetto:</b>           | CSA - Coordination and support action      |
| <b>Programma UE:</b>            | HORIZON 2020 - Euratom<br>Euratom fissione |
| <b>Data inizio:</b>             | 01-10-2020                                 |
| <b>Data scadenza:</b>           | 31-03-2023                                 |
| <b>Contributo totale:</b>       | € 1.099.589                                |
| <b>Costo eleggibile totale:</b> | € 1.756.380                                |
| <b>Contributo a ENEA:</b>       | € 92.224                                   |
| <b>Costo eleggibile ENEA:</b>   | € 186.788                                  |
| <b>Doc. approvazione:</b>       | 068/2020/FSN                               |
| <b>Codice atto:</b>             | PF4AAO                                     |
| <b>Resp. scientifico ENEA:</b>  | ANGIOLINI MASSIMO<br>EMILIO                |
| <b>Unità:</b>                   | FSN-ING-SMN                                |

**Attività ENEA:**

ENEA è coinvolta nei seguenti Work Package: . WP1 con il ruolo di coordinamento. Tale WP sarà interamente dedicato alla raccolta di informazioni sui programmi nazionali ed all'analisi dell'interesse de-gli Stati membri per un EJP sui materiali nucleari . WP2 relativamente alla stesura del Vision Paper della SRA dell'EJP . WP3 relativamente all'organizzazione dell'EJP in tutti i suoi aspetti; go-vernance e struttura, questioni legali, implementazione, education and training . WP4 relativamente all'interazione con gli organismi che si occupano di standardizzazione, di codici di progettazione, della gestione dei dati e delle conoscenze, dell'interazione dell'EJP con gli organismi che gestiscono le infrastrutture per lo studio dei materiali. . WP5 relativamente alla stesura ed attuazione della Strategia per le attività di diffusione e comunicazione delle informazioni

## PROOF OF AUGMENTED SAFETY CONDITIONS IN ADVANCED LIQUID-METAL-COOLED SYSTEMS



Coordinatore: ENEA (Italia)

N. Partner:

### Abstract:

The PASCAL project is devoted at significantly contribute to the advancement of the safety research on innovative heavy liquid metal cooled reactors, with the ambition to generate evidence that is ready-for-use in the discussions between the ALFRED and MYRRHA designers and the respective safety authorities in the pre-licensing phase. The goals of PASCAL also set an ambition of relevance and quality to the results, which is reflected in structuring and organizing the proposal. Relevant experiments in representative conditions are planned, and - wherever applicable - accompanied by simulations with the objective of extending their domain of validation and reducing uncertainties. The selected activities all address the main reference: supporting the justification of resilience to severe accident conditions, aiming to demonstrate the claim that no off-site emergency measures are needed for an HLM-cooled system. Finally, the project will strengthen the longstanding collaborations among European organizations, and will strongly support the education and training of a new generation of experts, to secure safety culture is preserved.

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| Anno di stipula:         | 2020                                       |
| Tipo progetto:           | RIA - Research and Innovation Action       |
| Programma UE:            | HORIZON 2020 - Euratom<br>Euratom fissione |
| Data inizio:             | 01-11-2020                                 |
| Data scadenza:           | 31-10-2024                                 |
| <hr/>                    |  |
| Contributo totale:       | € 3.799.238                                |
| Costo eleggibile totale: | € 4.610.189                                |
| Contributo a ENEA:       | € 562.969                                  |
| Costo eleggibile ENEA:   | € 750.625                                  |
| <hr/>                    |  |
| Doc. approvazione:       | 140/2020/FSN                               |
| Codice atto:             | PF6AAQ                                     |
| Resp. scientifico ENEA:  | GRASSO GIACOMO                             |
| Unità:                   | FSN-SICNUC-PSSN                            |

### Attività ENEA:

L'ENEA coordina il progetto ed è coinvolta nei seguenti work package. . WP4 dedicato allo studio di tecniche di prevenzione di fallimenti (ENEA coordina) Task 4.1: vibrazioni fluido-indotte sul fascio di barrette di combustibile (ENEA coordina) Sub-Task 4.1.1 progettazione, allestimento ed esecuzione di prove sperimentali di vibrazioni fluido indotte nel fascio di barrette di un elemento di combustibile di ALFRED (ENEA coordina) Sub-Task 4.1.2 analisi numerica dei risultati sperimentali, loro interpretazione e validazione dei codici di calcolo . WP6 dedicato alla gestione del progetto (ENEA coordina)



## Passive Systems: Simulating the Thermal-hydraulics with Experimental Studies

Coordinatore: EDF - ELECTRICITE DE FRANCE SA (Francia)

N. Partner: 11

### Abstract:

PASTEELS aims to significantly increase the knowledge within Europe of innovative passive systems, namely SACOs and CWCs, and the ability of several European system and CFD computational codes to be able to accurately model key phenomena such as natural circulation loops and condensation. This is very challenging due to their very specific properties, i.e. small driving forces working against high resistive forces which are specific to the concept of these technologies. Given the growing use of the SACO and CWC technologies in non-European NPPs, it is essential, especially with the foreseen future use of Small Medium Reactors (SMR) that the European nuclear community is able to adapt its current numerical tools to this promising technology. Extensive experimental testing (SET, CET and integral experiments) with representative operating conditions on semi-industrial full scale test facilities (PKL facility [DE] and PASI facility [FI]) will provide essential data to support the improvement of the numerical activities. Existing data from PERSEO and HERO-2 facilities will also be used. The numerical and experimental activities will be conducted in an integrated step-by-step approach. PASTEELS will investigate improvements to models, novel methodologies for the coupling of system and CFD codes working at different scales. Additionally, important knowledge on the behaviour of the SACO and CWC will be captured through the observation of their behaviour during the test campaigns. Different and similar computational codes will be used by the partners in order to be able to benchmark and compare the different results obtained, understand the causes and propose strategies to improve them. All project results will feed into extensive methodology guidelines and a roadmap to achieving licensing and implementation of these innovative passive system technologies in future European NPPs.

Anno di stipula: 2020  
 Tipo progetto: IA - Innovation Action  
 Programma UE: HORIZON 2020 - Euratom  
 Euratom fissione  
 Data inizio: 01-09-2020  
 Data scadenza: 29-02-2024

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Contributo totale: € 2.993.263  
 Costo eleggibile totale: € 3.801.458  
 Contributo a ENEA: € 188.300  
 Costo eleggibile ENEA: € 269.000

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Doc. approvazione: 67/2020/FSN  
 Codice atto: PF6AAO  
 Resp. scientifico ENEA: POLIDORI  
 MASSIMILIANO  
 Unità: FSN-SICNUC-SIN

### Attività ENEA:

ENEA è coinvolta nei seguenti work package: • WP2 dedicato allo studio di test a effetti separati (SET) e combinati (CET) • WP3 dedicato alla costruzione di un Safety Condenser e sperimentazione su facility PKL



Coordinatore: SCK CEN - STUDIECENTRUM VOOR KERNENERGIE / CENTRE D'ETUDE DE L'ENERGIE NUCLEAIRE (Belgio) N. Partner:

**Abstract:**

Climate change is one of the main issues facing humanity. Due to its low CO2 emission, nuclear power is part of a sustainable energy mix. However, safety and waste issues cannot be taken lightly. For the latter the way forward is to recycle spent fuel with the goal to close the fuel cycle. This eases ultimate radioactive waste management, increases proliferation resistance and drastically improves economy and sustainability by better use of fuel resources. The SNETP deployment plan describes a technical needs fuel recycling including partitioning of spent fuel, fabrication and characterisation of minor actinide bearing fuel and the development of transmutation systems. This proposal follows that plan and answers to NRFP7 of the 2018-2019 EURATOM call: Research and Innovation for Partitioning and/or Transmutation. It focusses on research on advanced partitioning to efficiently separate Am from spent fuel, on experimental and fuel performance code development work studying the behaviour of Am bearing fuel under irradiation and on the safety related research supporting the licensing process of MYRRHA in its role in the development trajectory for a dedicated accelerator driven transmuter. It may be noted that for first time, the communities working of partitioning, transmutation and the development of MYRRHA are joint in one project. Besides the technical work described above, dedicated work packages deals with education focussing on pre-and post-graduate students, and with dissemination where besides the specific stakeholders also high school pupils and the general public is targeted. A further task on knowledge management includes the both foreground data as well as metadata to so ensure proper QA for V&V is possible. The project is performed using a combination of experiments, theoretical studies and numerical simulations for which the expertise of 26 research centres and universities from 14 EU countries, Switzerland, Korea, Russia and the US is pooled.

Anno di stipula: 2020

Tipo progetto: RIA - Research and Innovation Action

Programma UE: HORIZON 2020 - Euratom  
Euratom fissione

Data inizio: 01-09-2020

Data scadenza: 31-08-2024

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Contributo totale: € 6.499.980

Costo eleggibile totale: € 8.924.941

Contributo a ENEA: € 380.213

Costo eleggibile ENEA: € 503.125

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Doc. approvazione: 075/2020/FSN

Codice atto: PF4AAN

Resp. scientifico ENEA: MARTELLI DANIELE

Unità: FSN-ING-PRO

**Attività ENEA:**

ENEA è coinvolta nel Dominio 3, 4, 5: - DOMAIN 3: WP31 (WP7) Fuel Cladding Behavior 3 Nell'ambito del TASK 312 "Mechanical Properties of corroded fuel pins" ENEA contribuirà a verificare gli effetti della corrosione indotta dal metallo liquido pesante (LBE) sulla resistenza meccanica delle cladding in 15-15Ti proposte per il reattore MYRRHA. - DOMAIN 4: WP42 (WP11) System Thermal Hydraulics Safety Nell' ambito del TASK 4211 "Experimental investigation of the transition between natural circulation modes in CIRCE" ENEA condurrà sperimentazioni sulla stabilità della circolazione naturale in condizioni rappresentative degli scenari incidentali di riferimento per il reattore MYRRHA. - DOMAIN 5: WP52 (WP14) Knowledge management, education and training Nell' ambito del TASK 521 "Dissemination, education and communication" ENEA organizzerà incontri annuali con le scuole medie-superiori locali e non allo scopo di presentare il progetto, i risultati raggiunti e includendo visite ai laboratori e alle facility sperimentali. Nell' ambito del TASK 522 "Knowledge management" ENEA provvederà alla elaborazione e stesura di un data management and quality plan.



## PHOtovoltaic waste management - advanced Technologies for recOvery and recycling of secondary Raw Materials from end-of-life modules

**Coordinatore:** CEA - COMMISSARIAT A L'ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES (Francia)

**N. Partner:**

### Abstract:

Since the last decades, Waste Electrical and Electronic Equipment (WEEE) have been drastically increasing in Europe, particularly for recent technologies such as Photovoltaic (PV) devices. These products are designed as complex sandwiches, which make the recovery of the critical (Si, In, Ga) and precious (Ag) raw materials encapsulated in the layers extremely challenging. The overall objective of PHOTORAMA is to draw up a profitable and sustainable circular value chain that will lead to a carbon neutral PV industry. PHOTORAMA will develop and demonstrate the industrial prospective of recycling solutions to recover and recycle all the materials 'components from End-of-life PV panels. A complementary consortium of 13 European companies and research institutes has built the framework of PHOTORAMA as follow: (1) the development of innovative processes and technologies from TRL4-5 to TRL7 to establish a sound recycling scheme to increase significantly resource efficiency with decisive cost-cutting solutions. The implementation of automated disassembly and sandwich opening as layer separation (MONDRAGON, DFD, CEA) enabling high-recovery (> 95%) of secondary raw materials: Ag, Si (SINTEF, CEA, IDENER) and In, Ga (LUXCHEMTECH) from EoL PV panels (crystalline silicon, thin films), (2) the full-circularity approach emphasised from collection (PV CYCLE) to marketable new products from Si, In, Ga, Ag (RHP), glass (MALTHA) mainly for PV manufacturing (EGP), (3) the demonstration of the business viability and attractiveness of its technological solutions (BIFA, ENEA) as one of the most competitive perspective for PV recycling. PHOTORAMA will strengthen this ambitious model with environmental impacts assessments and a strategic dissemination and exploitation plan supported by a strong effort for raising societal awareness (ZSI). The implementation of PHOTORAMA recycling scheme would unlock already more than 100,000 tons of valuable secondary raw materials by 2030.

**Anno di stipula:** 2021

**Tipo progetto:** IA - Innovation Action

**Programma UE:** HORIZON 2020  
Climate Action, Environment, Resource Efficiency and Raw Materials

**Data inizio:** 01-05-2021

**Data scadenza:** 30-04-2024

**Contributo totale:** € 8.381.666

**Costo eleggibile totale:** € 10.365.764

**Contributo a ENEA:** € 400.134

**Costo eleggibile ENEA:** € 400.134

**Doc. approvazione:** 93/2021/TERIN

**Codice atto:** PK2AAB

**Resp. scientifico ENEA:** IZZI MASSIMO

**Unità:** TERIN-FSD-IIF

### Attività ENEA:

L' ENEA partecipa alle attività di sviluppo di linea pilota per Tecnologie avanzate per il recupero di materiali critici e preziosi da pannelli fotovoltaici a fine vita come Silicio, Indio, Gallio, Argento. In particolare il progetto mira allo sviluppo di un ecodesign attraverso 2 diversi tipi di processo di recupero dei metalli che riducono al minimo l'uso di sostanze chimiche consentendo, al contempo, un elevato tasso di riciclaggio dei materiali di ingresso. Riutilizzo dei materiali riciclati per linea produzione PV.



**Partnership for european research in radiation Protection and detection of ionising radiation: towards a safer use and improved protection of the environment and human health**

Coordinatore: IRSN INSTITUT DE RADIOPROTECTION ET DE SURETE NUCLEAIRE (Francia) N. Partner:

**Abstract:**

The ambition of the PIANOFORTE Partnership is to improve radiological protection of members of the public, patients, workers and environment in all exposure scenarios and provide solutions and recommendations for optimised protection in accordance with the Basic Safety Standards. Research projects focusing on identified research and innovation priorities will be selected through a serie of three competitive open calls. The input to define the research priorities will be based on the priorities defined in the Joint Road Map (JRM) developed during the H2020 CONCERT EJP but also on the results of ongoing H2020 projects and on the expectations expressed by other actions carried out in other European programmes, in particular the SAMIRA action plan. High priority will be dedicated to medical applications considering that 1) medical exposures are, by far, the largest artificial source of exposure of the European population and 2) the fight against cancer is a top priority of the present European Commission. In order to ensure an appropriate continuity in the research goals and methodologies, in line with the contents of the CONCERT JRM, two other priorities have been identified to further understand and reduce uncertainties associated with health risk estimates for exposure at low doses in order to consolidate regulations and improve practices and to further enhance a science-based European methodology for emergency management and long-term recovery. Once the research priorities defined, the open call system will promote excellence in science and widening participation through a process open to the whole radiation protection community. Beyond the research actions, the selected projects will be able to benefit from the system of sharing and mutualisation of infrastructures that will be implemented at the European level. This will be accompanied by education and training schemes for health workforce and young scientists to increase Europe's research capacity in the field.

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| Anno di stipula:         | 2022   |
| Tipo progetto:           | EJP COFUND - Coordinamento di progetti nazionali di Ricerca ed Innovazione |
| Programma UE:            | Euratom2027<br>Euratom fissione  |
| Data inizio:             | 01-06-2022   |
| Data scadenza:           | 31-05-2027   |
| Contributo totale:       | € 29.414.411   |
| Costo eleggibile totale: | € 45.252.945   |
| Contributo a ENEA:       | € 30.371   |
| Costo eleggibile ENEA:   | € 46.725   |
| Doc. approvazione:       | 119/2022/SSPT  |
| Codice atto:             | PS5ABE   |
| Resp. scientifico ENEA:  | PAZZAGLIA SIMONETTA  |
| Unità:                   | SSPT-TECS-TEB  |

**Attività ENEA:**

L'ENEA rivestirà il ruolo di Partner nel progetto nella Task 2.2 (Update of the Joint Road Map) e sarà Sub-Task leader (Identification of changes affecting the Joint Roadmap including the update of platform SRAs). In particolare l'ENEA coordinerà l'analisi dei cambiamenti nel campo delle applicazioni mediche delle radiazioni ionizzanti dovute ai progressi tecnologici, e/o ai cambiamenti ambientali e climatici. Il time-frame di questa analisi permetterà di includere i progressi scientifici e tecnologici nelle tematiche dei bandi di ricerca finanziati da PIANOFORTE. Questo input sarà sintetizzato nella milestone 2.2.2 al mese 32 del progetto. ENEA ha accettato l'università di Pavia come "Affiliated Entity" in PIANOFORTE.



## Understanding human exposure and health hazard of micro- and nanoplastic contaminants in our environment

Coordinatore: UNIV. UTRECHT (Paesi Bassi)

N. Partner:

### Abstract:

The POLYRISK project aims unraveling the risks of microplastic and nanoplastic particles (MNP) that are ubiquitous in our environment and are likely to be entering the human body via inhalation and ingestion. The most bioavailable low-micron and nano-sized MNP, pose the biggest analytical challenges or today's analytical chemists. Existing knowledge about the adverse pro-inflammatory effects of airborne particulate matter and nanoparticles, combined with pro-inflammatory evidence of MNP exposure observed in animal models and in vitro pilot tests with human immune cells, suggests that MNP may cause immunotoxicity in humans. Occupational exposure of workers to fibrous MNP can indeed lead to granulomatous lesions, causing respiratory irritation, functional abnormalities and flock worker's lung. Currently, human health risk assessment protocols specific to MNP are not available and key data is missing. This hampers science-based decision making. On this backdrop, POLYRISK's human risk assessment strategy will combine highly advanced sampling, sample pretreatment and analytical methods to detect MNP in complex matrices, up-to-date fit-for-purpose hazard assessment technologies and multiple real-life human exposure scenarios. We will focus on key toxic events linked to several chronic inflammatory diseases. The consortium uniquely brings together interdisciplinary experience and know-how on quality-controlled chemical analyses of MNP and additives, intestinal and respiratory toxicity models, human exposure epidemiology, immunotoxicology and real-life high-exposure studies. POLYRISK's novel human risk assessment strategy is based on mechanistic reasoning and pragmatically accommodates the complexity of the MNP toxicant class. Building with ground-breaking science, stakeholder engagement and strong communication, POLYRISK aims to rapidly reduce current MNP risk uncertainties and support EU efforts to ensure public health is adequately protected from the potential risks of MNP pollution. POLYRISK is a part of the European cluster on Health Impacts of Micro- and Nanoplastics.

Anno di stipula: 2021

Tipo progetto: RIA - Research and Innovation Action

Programma UE: HORIZON 2020  
Health

Data inizio: 01-04-2021

Data scadenza: 31-03-2025

Contributo totale: € 5.991.078

Costo eleggibile totale: € 5.991.078

Contributo a ENEA: € 185.250

Costo eleggibile ENEA: € 185.250

Doc. approvazione: 10/2021/SSPT-PROTER

Codice atto: PS4ACQ

Resp. scientifico ENEA: MANZO SONIA

Unità: SSPT-PROTER

### Attività ENEA:

L'ENEA è coinvolto nella preparazione di materiali e nella messa a punto di metodi per la valutazione dell'esposizione (WP1), nella caratterizzazione di materiali plastici in scenari di vita reale (WP3), nella definizione del rischio da microplastiche (WP4) e nella redazione di Standard operational procedures per la valutazione delle microplastiche (WP5). In particolare, ENEA si occuperà principalmente di produrre e qualificare un set di materiali plastici micrometrici arricchiti con contaminanti ambientali selezionati (e.g. IPA, PCB, ecc.) e di caratterizzarli anche per gli effetti ecotossici



Coordinatore: VTT TECHNICAL RESEARCH CENTRE OF FINLAND (Finlandia)

N. Partner:

**Abstract:**

The PREDIS project targets the development and implementation of activities for pre-disposal treatment of radioactive waste streams other than nuclear fuel and high-level radioactive waste. Member States will profit from measurable benefits including the further development and increase in Technological Readiness Level of treatment and conditioning methodologies for wastes for which no adequate or industrially mature solutions are currently available, including metallic material (WP4), liquid organic waste (WP5) and solid organic waste (WP6), and by testing and evaluating innovations in cemented waste handling and pre-disposal storage (WP7). These technical Work Packages align with priorities formulated within the Roadmap Theme 2 of EURAD and with those identified by the project's industrial End Users Group (EUG), and follow the 50% co-funding principle. Furthermore, PREDIS will produce tools guiding decision-making on the added value of the developed technologies and their impact on the design, safety and economics of waste management and disposal (WP2). PREDIS will also liaise with EURAD to provide complementarity on areas including the adaptation and update of the reference founding documents of the EJP (vision, roadmap, governance and implementation mechanisms) (WP2), and the organisation of training courses and mobility training schemes to enhance sharing and transfer of knowledge and competences as part of knowledge management activities (WP3). The PREDIS consortium, which includes 47 partners from 18 Member States, and EUG, which specifically targets Radioactive Waste Producers (RWP) as a separate group within the radioactive waste management process. PREDIS also encompasses the wider European Community, allowing cross-fertilisation and interaction between different national programmes. Numerous dissemination activities (WP1), including with Nugenia, IAEA and NEA, will be undertaken to maximize PREDIS's impact to all the identified Stakeholders in the field

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| Anno di stipula:         | 2020                                       |
| Tipo progetto:           | RIA - Research and Innovation Action       |
| Programma UE:            | HORIZON 2020 - Euratom<br>Euratom fissione |
| Data inizio:             | 01-09-2020                                 |
| Data scadenza:           | 31-08-2024                                 |
| Contributo totale:       | € 14.000.000                               |
| Costo eleggibile totale: | € 23.773.742                               |
| Contributo a ENEA:       | € 87.885                                   |
| Costo eleggibile ENEA:   | € 175.770                                  |
| Doc. approvazione:       | 065/2020/FSN                               |
| Codice atto:             | PF1AAF                                     |
| Resp. scientifico ENEA:  | MARZO GIUSEPPE<br>AUGUSTO                  |
| Unità:                   | FSN-FISS-CRGR                              |

**Attività ENEA:**

L'ENEA è coinvolta nel WP5 "Innovations in liquid organic waste treatment and conditioning" e, più specificatamente, nei Task 5.4 (Study of conditioning matrix) e Task 5.6 (Implementation & Dissemination). Nel WP5 saranno studiate le prestazioni delle diverse matrici di condizionamento dei rifiuti liquidi organici. L'Agenzia sarà coinvolta per un totale di 18.7 mesi/uomo (PM).

Coordinatore: ENEA (Italia)

N. Partner:

**Abstract:**

Plants are the basis of all food, feed and renewable bioenergy production and are essential for the transition from a fossil-based to a bio-based economy. Plant Genetic Resources (PGR) play a key role in ensuring this transition, as well as food security and climate mitigation. More than 2 million plant accessions are preserved “ex situ” in 410 institutes in Europe and associated countries and listed in the EURISCO database; even more diversity is found “in situ” in European farmlands and wild habitats, where it contributes significantly to agricultural resilience and climate mitigation. Detailed information on “ex situ” accessions is, at best, fragmentary, while for “in situ” accessions it is almost non-existent. A considerable part of these resources could be lost over the coming decade due to limitations in the “ex-situ” infrastructure and management, climate change, habitat loss, and invasive/alien species. The roadmap 2016 of the European Strategy Forum on Research Infrastructures (ESFRI) identifies a clear gap in the sector “Plant facilities – unlocking green power”, i.e. the lack of a European Research Infrastructure (RI) specifically dedicated to PGRs. PRO-GRACE will undertake the first step to fill this gap, by developing the concept of a novel (RI) dedicated to the conservation and study of PGRs. The concept will describe the proposed distributed structure, governance, economic plan and scientific services of the proposed RI, and will be the basis for a full proposal at the next ESFRI call. If implemented, this new RI will aim to catalog, describe, preserve and enhance European plant agrobiodiversity, and translate the results into conservation practices and agricultural innovation, and will collaborate with global organizations dedicated to Plant Genetic Resources and with other established ESFRI RIs working on complementary fields. (eg ELIXIR, EMPHASYS, DISSCO, LIFEWATCH, MIRRI).

|                          |   |
|--------------------------|---|
| Anno di stipula:         | 2023  |
| Tipo progetto:           | RIA - Research and Innovation Action                      |
| Programma UE:            | HORIZON EUROPE<br>Research Infrastructures<br>(2021-2027) |
| Data inizio:             | 01-01-2023  |
| Data scadenza:           | 30-06-2025  |
| Contributo totale:       | € 2.847.250   |
| Costo eleggibile totale: | € 2.847.250   |
| Contributo a ENEA:       | € 290.000   |
| Costo eleggibile ENEA:   | € 290.000   |
| Doc. approvazione:       | 495/2022/PRES   |
| Codice atto:             | PS1ADC  |
| Resp. scientifico ENEA:  | GIULIANO GIOVANNI   |
| Unità:                   | SSPT-BIOAG  |

**Attività ENEA:**

L'ENEA coordina il progetto, partecipando a tutti i WP, ma svolgendo le principali attività nei seguenti workpackage: . WP1 (Inventory and information system), nel quale curerà la base di dati fenotipici, genomici e metabolomici sviluppata nel progetto G2P-SOL (coord ENEA) appena concluso, e la interfacerà al database Europeo sulle risorse genetiche EURISCO; . WP3 (Technologies and scientific services) nel quale parteciperà alle fasi di “concept development” e “proof of concept” dei servizi offerti dalla futura infrastruttura di ricerca, proponendosi come uno dei nodi fornitori di tali servizi. . WP6 (Dissemination, communication and training) in cui parteciperà alle varie fasi di disseminazione, comunicazione e “training” del progetto, organizzando fra l'altro il “workshop” finale.

Coordinatore: FEM - FONDAZIONE EDMUND MACH (Italia)

N. Partner: 12

### Abstract:

PROMEDLIFE aims to increase adherence to the MD through a multi-actor approach by encouraging the adoption of a healthy eating lifestyle while decreasing the environmental and economic impact of food production and processing. It also aims to attain optimal food communication and education through training programs that target primary and (upper) secondary students as well as their families, from children to older adults.

Anno di stipula: 2022

Tipo progetto: N/A - Non applicabile

Programma UE: HORIZON 2020  
PRIMA (2018-2028)

Data inizio: 01-04-2022

Data scadenza: 31-03-2026

Contributo totale: € 2.363.973

Costo eleggibile totale: € 2.590.863

Contributo a ENEA: € 253.313

Costo eleggibile ENEA: € 253.313

Doc. approvazione: 01/2022/SSPT-BIOAG

Codice atto: PS1ACG

Resp. scientifico ENEA: DIRETTO GIANFRANCO

Unità: SSPT-BIOAG-BIOTEC

### Attività ENEA:

L'ENEA, partner del progetto, parteciperà allo studio degli stili di vita adottati nei Paesi coinvolti grazie ad approcci innovativi e avanzati per la caratterizzazione, la rintracciabilità e la verifica dell'autenticità dei prodotti agro-alimentari, unendo le sue competenze scientifiche ad un'analisi delle percezioni dei consumatori.



## Hydrogen PROduction by MEans of solar heat and power in high TEMperature Solid Oxide Electrolysers

Coordinatore: ENEA (Italia)

N. Partner: 9

### Abstract:

PROMETEO aims at producing green hydrogen from renewable heat & power sources by high temperature electrolysis in areas of low electricity prices associated to photovoltaic or wind. Solid Oxide Electrolysis (SOE) is a highly efficient technology to convert heat & power into hydrogen from water usually validated in steady-state operation. However, the heat for the steam generation may not be available for the operation of the SOE when inexpensive power is offered (e.g. off-grid peak, photovoltaics or wind). Thus, the challenge is to optimize the coupling of the SOE with two intermittent sources: non-programmable renewable electricity and high-temperature solar heat from Concentrating Solar (CS) systems with Thermal Energy Storage (TES) to supply solar heat when power is made available. In PROMETEO a fully integrated optimized system will be developed, where the SOE combined with the TES and ancillary components will efficiently convert intermittent heat & power sources to hydrogen. The design will satisfy different criteria: end-users' needs, sustainability aspects, regulatory & safety concerns, scale-up and engineering issues. The players of the value-chain will play key roles in the partnership created around the project: from developers and research organizations, to the electrolyzer supplier, system integrator/engineering and end-users. A fully-equipped modular prototype with at least 25 kW<sub>e</sub> SOE (about 15 kg/day hydrogen production) and TES (for 24 hours operation) will be designed, built, connected to representative external power/heat sources and validated in real context (TRL 5). Particular attention will be given to partial load operation, transients and hot stand-by periods. Industrial end-users will lead to techno-economic & sustainability studies to apply the technology upscaled (up to 100 MW) in on-grid & off-grid scenarios for different end-uses: utility for grid balancing, power-to-gas, and hydrogen as feedstock for the fertilizer & chemical industry.

Anno di stipula: 2021

Tipo progetto: FCH2-RIA

Programma UE: HORIZON 2020

JTI - Hydrogen

Data inizio: 01-01-2021

Data scadenza: 30-06-2024

Contributo totale: € 2.499.531

Costo eleggibile totale: € 2.765.206

Contributo a ENEA: € 416.000

Costo eleggibile ENEA: € 416.000

Doc. approvazione: 193/2020/TERIN

Codice atto: PK7AAB

Resp. scientifico ENEA: GIACONIA ALBERTO

Unità: TERIN-STSN

### Attività ENEA:

L'ENEA assume il triplice ruolo di coordinatore del progetto/consorzio, coordinatore tecnico di un Work Package e di sviluppatore della tecnologia. Per la copertura dei ruoli di coordinamento l'ENEA potrà avvalersi di una struttura già attrezzata, disponibilità di risorse umane e consolidata esperienza maturata nel coordinamento e gestione di progetti Europei similari (per dimensione, tipologia e ambizione). Le attività sperimentali riguardano lo sviluppo di un prototipo di sistema di accumulo termico integrato con generatore di vapore: per tale sperimentazione la divisione TERIN-STSN usufruirà dei propri laboratori attrezzati e del personale qualificato.



Coordinatore: SINTEF (Norvegia)

N. Partner: 8

**Abstract:**

PROTOSTACK will create a radically new, compact and modular PCCEL stack design with integrated hot-box for operation and delivery of hydrogen up to 30 bar. The stack will be demonstrated at 5 kW and provide a pathway for further scale-up to systems of hundreds of kW. These achievements will be an important proof of technological feasibility that will attest to the advancement of PCCEL technology from TRL 2 to TRL 4. To achieve its ambitious goals, the project consortium gathers research and industry partners that are world-leading within proton ceramic technologies, with recognized expertise relevant to the research and development of electrolysers, membrane-reactors, materials, electrochemistry, and process engineering. The overall consortium will engage in wide communication and dissemination activities to ensure maximum impact of the project's outcomes and the industry partners have high ambition for business exploitation and commercialisation of the PROTOSTACK technology.

Anno di stipula: 2023

Tipo progetto: RIA - Research and Innovation Action

 Programma UE: HORIZON EUROPE  
 Clean Hydrogen JU

Data inizio: 01-01-2023

Data scadenza: 31-12-2025

Contributo totale: € 2.497.014

Costo eleggibile totale: € 2.497.014

Contributo a ENEA: € 25.000

Costo eleggibile ENEA: € 25.000

Doc. approvazione: 32/2023/TERIN

Codice atto: PK4AAV

Resp. scientifico ENEA: CIGIOTTI VIVIANA

Unità: TERIN-PSU-ABI

**Attività ENEA:**

ENEA SVOLGE il ruolo di Affiliated Entity di ATENA ed è coinvolta, come supporto ad ATENA, nelle seguenti task del WP6: • WP6-Task 6.1: Evaluation framework and data collection strategy; • WP6-Task 6.2: Techno-economic assessment; • WP6-Task 6.3: Environmental sustainability evaluation; • WP6-Task 6.4: Opportunity assessment and business case development; • WP7-Dissemination, Communication and Exploitation.



## PROtein sources for nutritional security and biodiVersity in a clrcular food system

Coordinatore: UNIV. TECHNICAL MUNICH (TUM) (Germania)

N. Partner:

### Abstract:

The project focuses on valorisation of food transformation industry by-products for use in bakery production. This will be based on “green” innovation processes, which will use also material from organic products and the resulting new products can be marketed “organic”. With the aim to promote circularity in the agrifood systems, 4 specific objectives have been identified: identify by-products rich in nutrients and bioactives, valorise wastes and by-products, promote circular Food Systems, define strategies to put the new products into the market. After having mapped sources of proteins and bioactive compounds from agrifood processes by-products, byproducts from different food production chains (e.g.: dairy, oilseeds, brewery, meat, prickly pear cactus) will be valorised treating them with innovative “clean technologies” in pilot facilities to extract bioactive compounds (e.g. oils, waxes, fatty acids, carotenoids, polyphenols, tocopherols) and obtain defatted protein cakes to be used for producing new bakery products. 3 case studies will be implemented. Quality & safety of sources, intermediate-, end- and by-products, as well as the health enhancing properties of plant and by products extracts, will be assessed. The new products will be tested for consumers’ perception and acceptance and the technologies implemented at industrial scale. Environmental and socio-economic sustainability will be assessed, and integrated traceability systems and innovative processes for human health and well-being developed. PROVIDE is designed to achieve a multi-sector impact (public authorities, market system, consumers/society, healthcare, environment, sustainability&circular economy), thus reflecting its multidisciplinary (anal. chemistry, (micro)biology and biotechnol., environm., food technologies, etc.), multi-actor and Pan-European (Scandinavia – Norway; Central Europe - Germany; South-East Europe – Romania; Southern Europe - Italy) & Northern African (Morocco) approach.

Anno di stipula: 2021

Tipo progetto: ERANET COFUND

Programma UE: HORIZON 2020  
Food Security, Sustainable Agriculture and the Bioeconomy

Data inizio: 01-01-2021

Data scadenza: 30-11-2023

Contributo totale: € 723.000

Costo eleggibile totale: € 878.000

Contributo a ENEA: € 117.354

Costo eleggibile ENEA: € 198.564

Doc. approvazione: 49/2021/PRES

Codice atto: PS1ABV

Resp. scientifico ENEA: ZOANI CLAUDIA

Unità: SSPT-BIOAG

### Attività ENEA:

ENEA riveste il ruolo di partner e partecipa alle attività di tutti i WP di progetto, coinvolgendo competenze legate alla qualità & sicurezza alimentare, caratterizzazione chimico-analitica di materie prime e prodotti, processi di estrazione di molecole ad elevato valore aggiunto da scarti e sotto-prodotti, sostenibilità ed economia circolare. ENEA riveste il ruolo di leader dei seguenti WP: - WP 4 Technological innovation and food processing - WP 7 Environmental and socio-economic sustainability: towards zero waste - WP 9 Demonstration and technology transfer



## Photo-Piezo-ActUators based on Light Sensitive COMposite

Coordinatore: CNR - CONSIGLIO NAZIONALE DELLE RICERCHE (Italia)

N. Partner:

## Abstract:

PULSE-COM aims to explore technological breakthroughs developing and integrating a new class of Photo-Piezo-Actuators to open a radical new future technology. Our vision is based on the use of low cost photo-mobile polymer (PMP) films and a leadfree piezo-composite (PZL) to target their use in innovative new fields never before considered. Starting from phenomenological and modelling aspects of the composite materials, we will fabricate and experimentally characterize Photo-Piezo-Actuators (PMP-PZL) proof of concept devices. The project will address through an ambitious interdisciplinary research to the employment of proper materials and the appropriate optical strategies to increase and tune the absorption of the light and finally to increase the PMP devices efficiency. With the same target electromechanical models and innovative growth processes will guide the optimization of the piezocomposite to improve its performance, and thus its sensitivity when coupled with the PMP. The PMP-PZL device will be integrated into more complex opto-electronic systems through high-risk incremental research to achieve pioneering industrial implementation. Specifically, we target the realization of cutting-edge applications based on photo-activated Meso-scale machines as opto-switches and opto-microvalves, Reconfigurable Optics and Photoenergy Harvesting Systems. Our study can open a new window on the future development of light-driven nanomotors and their potential applications in different areas such as biomedical, environmental and nanoengineering fields.

Anno di stipula: 2019  
 Tipo progetto: RIA - Research and Innovation Action  
 Programma UE: HORIZON 2020  
 Future and Emerging Technologies (FET)  
 Data inizio: 01-12-2019  
 Data scadenza: 30-06-2023

|                          |             |
|--------------------------|-------------|
| Contributo totale:       | € 2.980.015 |
| Costo eleggibile totale: | € 2.980.015 |
| Contributo a ENEA:       | € 511.250   |
| Costo eleggibile ENEA:   | € 511.250   |

Doc. approvazione: 220/2019/SSPT-PROMAS  
 Codice atto: PS3ACB  
 Resp. scientifico ENEA: NENNA GIUSEPPE  
 Unità: SSPT-PROMAS-NANO

## Attività ENEA:

L'ENEA è coinvolta nei seguenti work package: WP1: ENEA partecipa alla ottimizzazione dei materiali polimerici fotomobili, alla realizzazione degli elettrodi; WP2: ENEA è il leader di questo WP focalizzato alla ottimizzazione dei dispositivi fotomobili (PMP) e piezo (PZL) e ne completa inoltre la caratterizzazione sia ottica che elettrica; WP3: ENEA ha la responsabilità di ideare un set up sperimentale dedicato alla caratterizzazione del dispositivo PNP-PZL in risposta alle diverse lunghezze d'onda di luce incidente; WP4: ENEA fornisce il supporto per le formulazioni e le caratterizzazioni necessarie alla realizzazione delle varie applicazioni; WP5: ENEA partecipa alla diffusione e promozione dei risultati delle attività progettuali.



**Coordinatore:** CEA - COMMISSARIAT A L'ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES (Francia)

**N. Partner:**

**Abstract:**

The PUMMA project will define different options for Pu management in Generation-IV systems and evaluate the impact on the whole fuel cycle in addition to safety and performance aspects. Fast neutron reactors with the associated fuel cycle strategy have been chosen to cope with these options because they are flexible: they offer the possibility of isogeneration, burning or breeding of plutonium. A wide range of Pu content (20 to 45%) corresponds to the highest concentration that can be encountered for plutonium multirecycling (~30-35% Pu to compensate degraded isotopic composition) and targeted plutonium burning (40-45%). The fuel cycle scenarios associated with the different strategies will be evaluated at different stages of the cycle in terms of impact on the facilities. These studies will be completed with dissolution tests as there is currently no dissolution data on fuels with very high plutonium contents. Studies to date have been limited to concentrations of less than 30%. Today, knowledge on MOX fuel behavior in Generation-IV reactors comes mainly from feedback on SFRs that have operated in the past in Europe, with Pu contents varying between 15% to 30% and Linear Heat Rate often in the 300 to 450 W/cm range. This knowledge is insufficient to cover future needs, whether in terms of reactor concepts (GFR, LFR, F-SMR ...), Pu management option or operating regime. PUMMA will provide complementary results on fuel properties and characterisations of 45%Pu-fuels irradiated in HFR and Phénix under nominal conditions and overpower. The safety standards will then be extended to this fuel composition as well as the fuel performance code validation. PUMMA will make the link between Europe and others international organisations: the fuel cycle studies at IAEA and OECD, the GEN-IV systems at ESNII and GIF, the fuel material studies at OECD. PUMMA will provide common data in E.U. for Pu management on : fuel cycle, fuel behavior, fuel properties and safety st-

**Anno di stipula:** 2020  
**Tipo progetto:** RIA - Research and Innovation Action  
**Programma UE:** HORIZON 2020 - Euratom  
 Euratom fissione  
**Data inizio:** 01-10-2020  
**Data scadenza:** 30-09-2024

**Contributo totale:** € 3.795.801  
**Costo eleggibile totale:** € 6.749.591  
**Contributo a ENEA:** € 80.625  
**Costo eleggibile ENEA:** € 154.063

**Doc. approvazione:** 063/2020/FSN  
**Codice atto:** PF4AAM  
**Resp. scientifico ENEA:** DEL NEVO  
 ALESSANDRO

**Unità:** FSN-ING-SIS

**Attività ENEA:**

Nell'ambito del progetto PUMMA è assegnato ad ENEA il coordinamento della Task 4.1 "Irradiation in MTR vs FR: comparison of irradiation conditions", ENEA è coinvolta nel progetto come partecipante dei Work Package 2 ("Fuel Pin behaviour in reactor with high Pu content: Nominal and transient"), 3 ("Fuel properties with high PU content: Measurements and modelling"), con anche il compito di organizzare e ospitare un Workshop di progetto, dedicato alle proprietà del combustibile nucleare di interesse, dal punto di vista della sua fabbricazione, misura e modellazione. ENEA è stata proposta per ospitare il quarto Workshop tematico (Task 6.2): Workshop 4 on fuel properties: fabrication & modelling & measurements – Uncertainties reduction and impact on safety margins.

## Reduction of Radiological Consequences of design basis and design extension Accidents

Coordinatore: IRSN INSTITUT DE RADIOPROTECTION ET DE SURETE NUCLEAIRE (Francia) N. Partner:

### Abstract:

The Reduction of Radiological Consequences of design basis and extension Accidents (R2CA) project targets the development of harmonized methodologies and innovative management approach and safety devices for the evaluation and for the reduction of the consequences of DBA and DEC-A accidents in operating and foreseen nuclear power plants in Europe. For both purposes development of methodologies will be conducted with the goal of reassessing the safety margins using less conservative approaches and considering the new risks that rose from the original design or design extension phases. This will reinforce the confidence on these safety margins for conditions up to the extended design domain, will allow the identification of new accident management measures and devices and will support the optimization of the potential associated emergency population protection measures. Improvement of evaluations tools will be supported by the reassessment of the existing experimental and analytical databases. The efficiency of the approach will be demonstrated by comparing at start and then at the end of the project the results of the evaluation of a series of reactor cases selected by a senior expert group among two main categories: loss of coolant accidents and steam generator tube rupture accidents. Detailed analyzes of these reactor cases simulations will suggest the development of harmonized evaluation methodologies. The project will include also innovative actions to estimate the pros and cons of potential new accident management measures and devices, to explore the potential switch of prognosis evaluation tools to the diagnosis of on-going fuel cladding failure and to explore the potentiality for these accidental situations of advanced technological fuels.

Anno di stipula: 2019

Tipo progetto: RIA - Research and Innovation Action

Programma UE: HORIZON 2020 - Euratom  
Euratom fissione

Data inizio: 01-09-2019

Data scadenza: 31-12-2023

Contributo totale: € 3.184.941

Costo eleggibile totale: € 4.156.896

Contributo a ENEA: € 215.178

Costo eleggibile ENEA: € 215.178

Doc. approvazione: 07172019/FSN

Codice atto: PF6AAL

Resp. scientifico ENEA: MASCARI FULVIO

Unità: FSN-SICNUC-SIN

### Attività ENEA:

L'ENEA è coinvolta nei work package 1, 3 e 6. In particolare contribuisce: . Alla revisione degli strumenti computazionali che sono utilizzati nelle analisi (ASTEC, DRACCAR) dei dati sperimentali (e eventuali dati di impianto); . All'analisi dei transitori dovuti a eventi tipo LOCA con ASTEC e DRACCAR per un generico PWR; . Alla revisione dei dati sperimentali disponibili e i modelli matematici esistenti al fine di un ulteriore sviluppo degli strumenti in relazione alla valutazione delle conseguenze radiologiche dovute a un LOCA; . Alla disseminazione dei risultati del progetto, in particolare coordinando il WP6 relativo alle attività di disseminazione dei risultati del progetto.


**Coordinatore:** CERN - EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH (Svizzera)

**N. Partner:**
**Abstract:**

New applications in the industrial sectors of space, automotive, IoT, nuclear dismantling and civil applications, medical and accelerators among others require innovative radiation testing methodologies. As well, for coping with the industrial demand and market timelines, streamlined and coordinated testing becomes highly necessary. Although punctual exceptions exist, Europe does not count with a coordinated network of cost-effective testing facilities helping these purposes. Such a network could enormously help fast innovators such as SMEs who in many cases find difficult to access the required facilities and related test expertise. As well, it will offer a competitive advantage to large Corporations. Novel testing methodologies will also pave the way for generating new standards since the existing ones are mainly restricted to classical space applications and radiation-hardened components. Pan-European and National Research Infrastructures can play a key role for boosting European Industry by taking the first steps in the creation of a sustainable, coordinated and streamlined irradiation testing facilities network. It will also respond to the need of establishing a radiation hardness evaluation based on risk assessment and mitigation rather than on complete risk avoidance. This project aims at increasing and optimizing the access of system developers to irradiation facilities in which representative conditions of their final application are reproduced, and that can serve as a satisfactory validation for the end-users. Such optimization will be based on a network of irradiation facilities with a common entry-point, in which users can define, prepare, carry out and analyze their irradiation campaigns. A key point of such improvement would be that of advancing in the harmonization and standardization of the system level testing methodology, so not to multiply efforts around the same common objective.

**Anno di stipula:** 2021

**Tipo progetto:** RIA - Research and Innovation Action

**Programma UE:** HORIZON 2020  
European Research Infrastructures

**Data inizio:** 01-06-2021

**Data scadenza:** 31-05-2025

**Contributo totale:** € 5.000.000

**Costo eleggibile totale:** € 5.000.000

**Contributo a ENEA:** € 400.938

**Costo eleggibile ENEA:** € 400.938

**Doc. approvazione:** 052/2021FSN

**Codice atto:** PF3AAG

**Resp. scientifico ENEA:** FIORE SALVATORE

**Unità:** FSN-FUSTEC-TEN

**Attività ENEA:**

ENEA sarà coinvolta in misura diversa nei vari work packages del progetto RADNEXT. In generale coordinerà tutte le attività connesse alla gestione del Transnational Access attraverso il progetto, i cui costi costituiscono più della metà del budget complessivo del progetto; svolgerà inoltre attività di irraggiamento con il Frascati Neutron Generator.



Coordinatore: JSI - JOZEF STEFAN INSTITUT (Slovenia)

N. Partner: 9

**Abstract:**

Solid Oxide Electrolysis (SOE) and its possibility to operate in reversible mode (rSOC) can play a major role in H<sub>2</sub> production at low cost and for renewable energies storage. These operating modes with high current and transients can induce degradation that needs to be mitigated for successful system deployment. Federating the cumulated advances built up in preceding collaborative projects, REACTT, with an established expert team, will realize a Monitoring, Diagnostic, Prognostic and Control Tool (MDPC) for SOE and rSOC stacks and systems. Its hardware platform will embed diagnostics and prognostics algorithms, and interact with the system power converters without modification. It contains (a) an innovative excitation module to probe the stack with PRBS (pseudo-random binary signal) or sine stimuli, and (b) a control coordination unit, interfaced with real-time optimisation (RTO). The latter uses on-line measurements with a constraint-adaptive algorithm that drives the system to optimal operation, respecting all safety boundaries. Together, this approach will achieve to supervise and analyse the (reversible) electrolyser system, increase its reliability and extend its stack lifetime. REACTT will demonstrate the effectiveness of this approach by tests on a SOLIDpower (SP) 5 kWe SOE system and on an rSOC x kWe CEA system, both at TRL6. This validation in two different operating modes with two different stack designs will prove the generic character of the developed tools, which can then be extended towards multiple technologies and higher power applications. It will reduce the operation and maintenance costs by 10%; the additional cost of the MDPC tool will not exceed 3% of the overall system manufacturing costs. These ambitious targets will be pursued in close collaboration between 6 R&D (IJS, UNISA, CEA, VTT, EPFL, ENEA and HES-SO) and 3 industry partners (SP, Bitron and AVL) on the whole value chain from tests to systems through hardware and software developments.

Anno di stipula: 2021

Tipo progetto: FCH2-RIA

Programma UE: HORIZON 2020

JTI - Hydrogen

Data inizio: 01-01-2021

Data scadenza: 31-12-2024

Contributo totale: € 2.712.323

Costo eleggibile totale: € 2.712.323

Contributo a ENEA: € 128.125

Costo eleggibile ENEA: € 128.125

Doc. approvazione: 194/2020/TERIN

Codice atto: PK4AAE

Resp. scientifico ENEA: PUMIGLIA DAVIDE

Unità: TERIN-PSU-ABI

**Attività ENEA:**

Le attività che l'ENEA svolgerà all'interno del progetto REACTT verteranno sulla gestione del piano di disseminazione e valorizzazione del know-how e del prodotto generato nel progetto, diffusione nei mercati e promozione del prodotto facendo leva sulle piattaforme dedicate Europee, mediante l'organizzazione di workshop e la pubblicazione di articoli. Proposta di standardizzazione dei protocolli di controllo in ambito normativo internazionale

Coordinatore: FUNDACION CARTIF (Spagna)

N. Partner: 25

#### Abstract:

The main objective of REHOUSE is to develop and demonstrate 8 renovation packages of promising technology innovations until TRL7. The renovation packages are fully designed for a wide range of building renovation actions, including deep renovations, that overcome the main barriers that slow down the current EU renovation ratios, following circularity principles, including multifunctionality through active/passive elements integration, prefabrication and off-site construction of components and respect of buildings aesthetics, architectural and historic value. REHOUSE also implements an inclusive people-centric social engagement strategy to endow the renovation wave with a resident and owner perspective towards affordability, satisfaction and attractiveness of sustainable renovation. The renovation packages will be deployed across 4 locations serving as demonstrators located in Greece, Italy, France and Hungary. These buildings renovations include detailed design, pilot set-up, demonstration and evaluation to validate in operational conditions (social) the prototypes of the 8 renovation packages. REHOUSE proposes solutions that cover together a set of 5 renovation principles offering technically and economically affordable renovation solutions with enough flexibility to tackle almost 100 % of the building renovation challenges at EU level. The aim is to boost market uptake, scalability and replicability of REHOUSE renovation packages, linking its value proposition with critical economic, technical, social, regulatory and data security/protection aspects and barriers and propose practical recommendations on how to overcome them.

Anno di stipula: 2022

Tipo progetto: IA - Innovation Action

Programma UE: HORIZON EUROPE

Cluster 5 - D4 Energy use

Data inizio: 01-10-2022

Data scadenza: 30-09-2026

Contributo totale: € 10.016.536

Costo eleggibile totale: € 12.561.347

Contributo a ENEA: € 313.438

Costo eleggibile ENEA: € 313.438

Doc. approvazione: 31/2022/DUEE-SIST

Codice atto: PW4AAP

Resp. scientifico ENEA: MISCEO MONICA

Unità: DUEE-SIST-SUD

#### Attività ENEA:

Il progetto si inserisce nelle attività di ENEA a supporto alla pubblica amministrazione per la riqualificazione energetica degli edifici, considerando un approccio che parte dalle diagnosi energetiche e arriva al coinvolgimento degli utenti. In particolare nel progetto verranno affrontati i temi di riqualificazione energetica che includeranno l'integrazione tra aspetti energetici e strutturali; l'approccio EU di "Energy Efficiency First" in un percorso di riqualificazione che include gli aspetti sociali; lotta alla povertà energetica lavorando su modelli di integrazione che siano economici e facilmente replicabili; coinvolgimento degli utenti secondo il "Behavioural change". ENEA è coinvolta maggiormente nei WP1 (SOCIAL INNOVATION FOR PEOPLE-CENTRIC RENOVATION PROCESSES) e WP2 (WP4: DEMONSTRATION OF THE 8 RENOVATION PACKAGES: ENEA è responsabile del DEMO Italiano). Parteciperà inoltre a tutti gli altri work package.





## RECYCLABLE MATERIALS DEVELOPMENT at ANALYTICAL RESEARCH INFRASTRUCTURES

Coordinatore: HELMHOLTZ-ZENTRUM DRESDEN-ROSSENDORF EV (Germania)

N. Partner:

### Abstract:

A radical shift to the Circular Economy is urgently needed to cope with the challenge of finite resources decreasing at a frightening pace while the quantity of waste increases alarmingly. The European Commission's (EC) Circular Economy Action Plan (CEAP) adopted in March 2020 has identified seven key product value chains that must rapidly become circular, given their environmental impacts and circularity potentials. This requires substantial research on materials with a very high recycling capability while exhibiting competitive functionalities. In ReMade@ARI, the most significant European analytical research infrastructures join forces to pioneer a support hub for materials research facilitating a step change to the Circular Economy. ReMade@ARI offers coordinated access to more than 50 European analytical research infrastructures, comprising the majority of the facilities that constitute the Analytical Research Infrastructures in Europe (ARIE) network. ReMade@ARI offers comprehensive services suiting any research focusing on the development of new materials for the Circular Economy in the key areas highlighted in the CEAP and plays an important role in the preparation of the common technology roadmap for circular industries. Senior scientist, facility experts and highly trained young researchers contribute scientific knowledge and extensive support to realise a user service of unprecedented quality, making each promising idea a success. Particular attention is attributed to the implementation of attractive formats to support researchers and developers from industry. The comprehensive service catalogue is complemented by an extensive training programme. Communication and dissemination activities are underpinned by a continuous impact assessment, which also enables evidence-based decision-making in the context of the proposal selection. Routes to sustainability of the platform will be explored towards the end of the project.

Anno di stipula: 2022

Tipo progetto: RIA - Research and Innovation Action

Programma UE: HORIZON EUROPE  
Research Infrastructures (2021-2027)

Data inizio: 01-09-2022

Data scadenza: 31-08-2026

Contributo totale: € 13.679.983

Costo eleggibile totale: € 13.728.333

Contributo a ENEA: € 46.872

Costo eleggibile ENEA: € 46.872

Doc. approvazione: 01/2023/FSN

Codice atto: PF2AAM

Resp. scientifico ENEA: CONSOLI FABRIZIO

Unità: FSN-PLAS-PAX

### Attività ENEA:

L'ENEA partecipa al progetto come affiliato del partner Laserlab Europe AISBL. In particolare l'ENEA mette a disposizione una parte del tempo macchina degli impianti di ABC e CETRA.



## Next-generation vaccines and diagnostics to prevent livestock reproductive diseases of worldwide impact

Coordinatore: ENEA (Italia)

N. Partner:

### Abstract:

Endemic and zoonotic infectious reproductive diseases of livestock cause major economic losses globally and threaten both food security and public health. REPRODIVAC will develop new and improved vaccines and diagnostic tools required to better control four priority abortifacient diseases: porcine reproductive and respiratory syndrome (PRRS), Q fever, ovine enzootic abortion (OEA), and porcine brucellosis. The consortium spans academia and industry with complementary expertise including structural biology, microbiology, immunology, plant and veterinary sciences. This enables us to address reproductive disorders with an interdisciplinary approach: (1) applying reverse and structural vaccinology to select and design vaccine and diagnostic candidate antigens; (2) exploiting relevant protein expression systems for the production of these antigens; (3) producing rationally attenuated and viral vectored vaccines; and (4) developing a suite of molecular and immunological diagnostic tests, including point-of-care tests (PoC) to discriminate vaccinated from infected animals (DIVA). We will develop a broadly protective PRRSV vaccine, and a serological ELISA that will reliably correlate with PRRSV neutralising antibody titres. We will identify protective subunit vaccine candidates for Q fever and validate a companion serological DIVA test. We will further refine an OEA vaccine for commercialisation and pursue a complementary approach towards a DIVA-compatible next-generation subunit vaccine and serological and molecular DIVA/PoC tests. We will develop live attenuated Brucella suis vaccines and brucellosis diagnostic tests with improved specificity. These new vaccines and diagnostics will be further developed by our industrial partners and made accessible to users. Thereby by using the latest technologies in vaccine and diagnostic development REPRODIVAC will improve animal health and welfare, productivity and sustainability of the livestock sector, as well as human health.

Anno di stipula: 2022

Tipo progetto: IA - Innovation Action

Programma UE: HORIZON EUROPE

Cluster 6 - Food, Bioeconomy, Natural Resources, Agriculture and Environment

Data inizio: 01-09-2022

Data scadenza: 31-08-2025

Contributo totale: € 3.125.324

Costo eleggibile totale: € 3.136.284

Contributo a ENEA: € 874.526

Costo eleggibile ENEA: € 874.526

Doc. approvazione: 82/2022 e 103/2022/SSPT-BIOAG

Codice atto: PS1ACO

Resp. scientifico ENEA: BASCHIERI SELENE

Unità: SSPT-BIOAG-BIOTEC

### Attività ENEA:

ENEA coordina il progetto e partecipa alle attività dei seguenti work package (WP): WP5 - Stakeholder engagement, dissemination, exploitation, and communication WP6 – Project & IP management WP7 – Ethics requirements Partecipa inoltre alle attività dei seguenti work package (WP): WP1 - Target antigen identification and structure-based vaccine design WP2 - Antigen and antibody production and delivery platforms WP3 - Evaluation of vaccine antigen formulations in vivo WP4- Specific diagnostic tests and DIVA strategies



## Development and maintenance of rescEU CBRN mobile laboratories and rescEU CBRN detection, sampling, identification and monitoring capabilities

Coordinatore: ENEA (Italia)

N. Partner:

### Abstract:

The rescEU-CBRN-DSIM-IT proposal brings together First Responders, National CBRN Authorities, Research Organizations and leading Private Organizations to develop a plurality of CBRN mobile laboratories equipped with the most advanced detection, sampling, identification and monitoring (DSIM) capabilities, placing the EU at the forefront of global efforts to protect citizens, infrastructure and the environment from CBRN incidents and accidents. As CBRN threats grow in scale and sophistication, the rapid mobilization of human and technological resources directly on the crisis area is key to provide data on the nature of the CBRN agents, real-time diffusion and level of hazard. All these pieces of information are instrumental to plan commensurate mitigation and recovery actions. The rescEU-CBRN-DSIM-IT proposal is based on the leading capabilities of various national actors and foresees the development of a modular capacity strategically located in Lombardia, Lazio and Veneto regions, and with the operational management of the Italian Fire Brigades which allows effective mobilization of the capacity on the entire EU territory. Furthermore, the proposed CBRN DSIM capacity is designed to be an added value in the roster of the rescEU and European Civil Protection Pool (ECP) capacities, with all the solutions interoperable and compliant with the applicable international standards. A unique approach to training and testing will complete the capacity with the most advanced Virtual and Augmented Reality training and simulation packages, through development of a dedicated mixed reality CBRN training facility open to all EU MS authorities. The DSIM components will be made available in modular format over thirty-six months, and the full capacity will be operationally tested with an "on-the-job" training at the Winter Olympic Games of Milan-Cortina of 2026, with complementary visibility and outreach activities to underline the value added of the new rescEU capacity.

Anno di stipula: 2023  
 Tipo progetto: UCPM Project Grants  
 Programma UE: Other programmes 2021-2027  
 UCPM - Union Civil Protection Mechanism  
 Data inizio: 30-10-2023  
 Data scadenza: 29-09-2026

Contributo totale: € 26.701.048

Costo eleggibile totale: € 26.701.048

Contributo a ENEA: € 995.804

Costo eleggibile ENEA: € 995.804

Doc. approvazione: 201/2023/FSN

Codice atto: PF7ABW

Resp. scientifico ENEA: DE DOMINICIS LUIGI

Unità: FSN-TECFIS

### Attività ENEA:

L'ENEA coordina il progetto e partecipa a sei dei sette Work package del progetto, svolgendo attività incentrate sullo sviluppo e gestione di una serie di laboratori mobili per la prevenzione e risposta ad eventi CBRN (minacce Chimiche, Batteriologiche, Radiologiche e Nucleari) sia dovuti a cause naturali che ad azioni deliberate.



Coordinatore: ENEA (Italia)

N. Partner:

#### Abstract:

While time is an important factor for successful outcome of the crime investigation, the traditional forensic examinations are usually time consuming. It can be very problematic when investigations are underway and quick results are needed. Traces must be detected on-site as soon as possible before they degrade and lose forensic information important for criminal investigation. Based on the results of the FORLAB project, the aim of the RISEN project is the development of a set of real-time contactless sensors for the optimization of the trace, detection, visualisation, identification and interpretation on site, with a consequent reduction of the time and resources in the laboratory, and for a fast exchange of information among LEAs. The new proposed approach could be applied to the classical forensic investigations and to disaster sites, e.g. after a terrorist attack. The objectives of the RISEN project will be obtained by: -Developing and demonstrating contactless, non-destructive, automated sensors to identify, select and label trace materials; -Processing and sending in real-time acquired in-situ data to a 3D Augmented Crime Scene Investigation system to produce an interactive 3D model of the scene with position and labelling of traces and relative results of the on-site analysis. The recreated 3D model of the scene resorts to augmented reality techniques for sensor data, collected evidence and identified points of interest in order to deliver a realistic and immersive visual environment for investigators, allowing them to conduct highly detailed investigations. The crime scenes, with analytical information from traces, will be digitally frozen: to be available at any time for several purposes in the criminal justice system. The identified traces will be digitally marked and inventoried, and a digitalised Chain of Custody will be established in real-time implementing mechanisms that assure data integrity over its lifecycle.

Anno di stipula: 2020  
 Tipo progetto: RIA - Research and Innovation Action  
 Programma UE: HORIZON 2020  
 Secure societies  
 Data inizio: 01-07-2020  
 Data scadenza: 30-06-2024

Contributo totale: € 6.995.876  
 Costo eleggibile totale: € 6.995.876  
 Contributo a ENEA: € 1.216.961  
 Costo eleggibile ENEA: € 1.216.961

Doc. approvazione: 54/2020/FSN  
 Codice atto: PF7AAW  
 Resp. scientifico ENEA: CHIRICO ROBERTO  
 Unità: FSN-TECFIS-DIM

#### Attività ENEA:

L'ENEA coordina il progetto RISEN con responsabilità diretta nel WP1 (Management) e nel WP7 (System Validation) oltre a partecipare a tutti gli altri WP. In particolare, il laboratorio DIM contribuisce notevolmente al WP5 "Sviluppo di sensori e test di laboratorio" durante i quali DIM svilupperà in sensori basati sulle tecnologie Raman, LIBS LIF e imaging iperspettrale. Nelle attività relative a questo progetto è coinvolto oltremodo il personale tecnico e scientifico del laboratorio DIM oltre alle sue strutture interne quali laboratori laser, chimici e biologici, aree dedicate e la segreteria periferica di sicurezza.



Coordinatore: ENEA (Italia)

N. Partner:

**Abstract:**

Spinal Cord Injury (SCI), a major cause of paralysis, currently has no effective therapies. Every year almost 500.000 people are diagnosed with SCI worldwide. In Europe, the average investment is up to 2 M€ per patient in health care. The difficulty on the neuronal restoration after SCI is based on the complex cascade of events that inexorably cause a degenerative chronic stage mainly favored by the non-permissive environment and limited capacity for axonal regrowth. Multifaceted strategies are considered the unique solution for functional restoration by including cell substitution, neuroprotection and axonal growth promotion. RISEUP proposes to attain neuronal functional regeneration after SCI by an unprecedented and unique bio-hybrid-compatible electro-activated and wireless-rechargeable implantable technology. RISEUP introduces high voltage microsecond electric pulses (micropulses) stimulations and low amplitude direct currents on a combination of stem cells (induced neural stem cells and multipotent stromal cells), whose transplantation is facilitated by an innovative scaffold biomaterial. The RISEUP concept is that micropulses, being able to impose and control cytosolic Calcium oscillations, will facilitate cell maturation, survival and neurotrophic factors secretion. Because Calcium signaling is essential for neuronal activity, endogenous neuronal re-connections will also be favored. RISEUP goal, even if ambitious, is concrete due to the multidisciplinary partners' competences, initiating from TRL1 a radically new line of technology (electro-activated, remotely controlled, biocompatible, biodegradable cell-containing implants for the repair of neuronal lesions) establishing its proof-of-principle (TRL3). The long-term vision of RISEUP is the radical change in SCI treatment modality to assure the cure delivery without any machinery connection, dramatically improving patients' quality of life.

Anno di stipula: 2021  
 Tipo progetto: RIA - Research and Innovation Action  
 Programma UE: HORIZON 2020  
 Future and Emerging Technologies (FET)  
 Data inizio: 01-05-2021  
 Data scadenza: 31-10-2024

Contributo totale: € 2.999.836

Costo eleggibile totale: € 2.999.836

Contributo a ENEA: € 615.535

Costo eleggibile ENEA: € 615.535

Doc. approvazione: 252/2020/SSPT/TECS

Codice atto: PS5AAV

Resp. scientifico ENEA: CONSALES CLAUDIA

Unità: SSPT-TECS-SAM

**Attività ENEA:**

L'ENEA coordina il progetto, occupandosi anche della gestione degli aspetti organizzativi e manageriali del progetto e del consorzio. Dal punto di vista più strettamente sperimentale, invece, l'ENEA studierà, mediante l'esecuzione di test in vitro, effettuati sulle cellule staminali piastrate sia adese ad una superficie piatta, che sullo scaffold, mantenendo così la loro forma tridimensionale, l'analisi della risposta biologica alla stimolazione elettrica. In particolare saranno valutati i seguenti parametri: · Sopravvivenza, proliferazione, morte cellulare · Cambiamenti dell'espressione genica e modulazione dell'epigenoma delle cellule · Meccanismi di attivazione e trasduzione di segnali intracellulari · Valutazione dell'attivazione della risposta infiammatoria



## European facility on Molten SALT technologies TO power and energy system applications

Coordinatore: UNIV. EVORA (Portogallo)

N. Partner:

### Abstract:

The use of Thermal Energy Storage (TES) in combination with the thermal conversion of solar irradiation – Concentrated Solar Power (CSP) – has long been regarded as an important technological solution for the production of dispatchable electricity. Whereas thermal oil based systems have set the standard in the first generation of commercial CSP Plants, the use of Molten Salts as heat transfer and storage media has been gathering research efforts and is regarded, by the industry, as the foregoing standard for new commercial plants. Molten Salt (MS) research has been deployed along the past decade in Germany and Italy, alongside with the erection of dedicated Research Infrastructure (RI) enabling the study and experimental test of e.g. materials, components or O&M procedures suiting this innovative technological approach. With the recent commissioning of a full-fledged Molten Salt Solar system emulating a commercial MS-CSP Plant in Évora, Portugal has joined this research effort with a new outstanding RI in this field. Gathering the unique experience of two non-Widening partners in the development and operation of the most important MS-RI at European level with the incumbent new RI capacity available in a Widening country, the present proposal aims at enhancing the scientific excellence and innovation capacity of the Consortium in the foregoing exploitation of this outstanding RI. SALTOpower has a strong focus on an enhanced capacity building of researchers going beyond purely scientific capacities, strengthening the research management and administration skills of the Widening RI. By means of enhanced cooperation duly framed on a common research strategy aiming at further developing MS technologies, SALTOpower aims at creating the reference European facility for the development and testing of Molten Salt based technologies for energy storage and dispatchable power production solutions, for the integration of different renewable energy sources, power and gas grids.

Anno di stipula: 2022

Tipo progetto: CSA - Coordination and support action

Programma UE: HORIZON EUROPE  
WIDERA - Widening participation and spreading excellence

Data inizio: 01-11-2022

Data scadenza: 31-10-2025

Contributo totale: € 1.499.011

Costo eleggibile totale: € 1.499.011

Contributo a ENEA: € 447.000

Costo eleggibile ENEA: € 447.000

Doc. approvazione: 128/2022/TERIN

Codice atto: PK7AAD

Resp. scientifico ENEA: D'AURIA MARCO

Unità: TERIN-STSN-SCIS

### Attività ENEA:

ENEA è presente in tutti i WPs del progetto ed in particolare avrà la responsabilità del WP2 "Excellence R&D" e del WP4 "Aligned strategy" e dei task 1.3 (Widening Profile); task 2.1 (MS driven Thermo- Electrochemical H<sub>2</sub>/syngas production); task 3.3 (Mentoring); task 4.2 (Scientific alignment) e task 5.1 (quadrupla elica). ENEA è responsabile dei seguenti Deliverable: D1.5 - Widening Profile Report, D2.1 - MS driven energy system management and power/gas grid integration solutions, D5.1 – Relevant Impacts Report e Milestone MS3 - Widening upgrade MS6- Beyond SoA Know-how, MS15 SALTOpower identity established



## Supplying Accurate Nuclear Data for energy and non-energy Applications

**Coordinatore:** CIEMAT - CENTRO DE INVESTIGACIONES ENERGETICAS, MEDIOAMBIENTALES **Partner:** TECNOLOGICAS (Spagna)

### Abstract:

The project will include experimental measurements of new or improved quality data, evaluation, validation and dissemination of the data to produce libraries that can be used by safety authorities, research institutions, the nuclear energy industry, health organizations, other non-energy applications and the EU society at large. The project will also include in smaller fraction support to detector development, facility setups and samples fabrication to prepare important measurements and validations that are not possible in the time framework of the present proposal but that will be required in near future for the safe and efficient use of nuclear technologies. The selection of topics, isotopes, reactions, measurements, experiments and evaluation has been made taking into account the relevance, expected impact and priorities of the resulting data according to the NEA/OECD and IAEA high priority lists and committees as well as the experience of the participants and of previous EU proposals with large participation of the partners for the present proposal (CHANDA, ANDES,...). The impact has been evaluated from the perspective of a safe, efficient and competitive use of nuclear technologies. In comparison with previous projects, the present proposal proposes to concentrate more efforts on delivering actual results than in the preparation for the future, by enhancing the support to evaluations, validations and actual measurements. Also special attention has been paid to make sure that the topics included cover the non-energy application requiring nuclear data as well as it will cover the needs of the nuclear energy sector. Respecting those principles, the proposal has also tried to be as inclusive to the different EU research groups and countries as possible maintaining the manageability of the project, its efficiency and the maximum quality and relevance of the action and involved partners.

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|---------------------------------|--|
| <b>Anno di stipula:</b>         | 2019                                       |
| <b>Tipo progetto:</b>           | RIA - Research and Innovation Action       |
| <b>Programma UE:</b>            | HORIZON 2020 - Euratom<br>Euratom fissione |
| <b>Data inizio:</b>             | 01-09-2019                                 |
| <b>Data scadenza:</b>           | 31-08-2024                                 |
| <b>Contributo totale:</b>       | € 3.499.948                                |
| <b>Costo eleggibile totale:</b> | € 4.666.600                                |
| <b>Contributo a ENEA:</b>       | € 105.000                                  |
| <b>Costo eleggibile ENEA:</b>   | € 105.000                                  |
| <b>Doc. approvazione:</b>       | 691/2019/FSN                               |
| <b>Codice atto:</b>             | PF6AAI                                     |
| <b>Resp. scientifico ENEA:</b>  | MENGONI ALBERTO                            |
| <b>Unità:</b>                   | FSN-SICNUC-PSSN                            |

### Attività ENEA:

L'ENEA è coinvolta nei work package 2 e 5. Nel WP2 'New nuclear data measurements for energy and non-energy applications - coordinerà le misure di cattura neutronica. Nel WP5 'Nuclear data validation and integral experiments' saranno effettuate misure integrali su attinidi minori presso l'impianto TAPIRO in Casaccia.



Coordinatore: ENEA (Italia)

N. Partner:

### Abstract:

Small Modular Reactors (SMR) are one of the key options for the near-term deployment of new nuclear reactors. Currently in Europe there is a growing interest towards the deployment of SMRs, and several activities are underway in many countries preparing for possible licensing needs. In particular, Integral Pressurized Water Reactor (iPWR) are ready to be licensed as new builds because they start from the well-proven and established large Light Water Reactor (LWR) technology, incorporate their operational plant experience/feedback, and include moderate evolutionary design modifications to increase the inherent safety of the plant. However, despite the reinforcement of the first three levels of the Defence-in-Depth (DiD), e.g., with the adoption of passive safety systems, a sound demonstration of iPWR ability to address Severe Accidents (SA) should be carried out (DiD levels 4-5). The main objectives of the project will be to transfer and adapt such knowledge and know-how to iPWR, in view of the European SA and Emergency Planning Zone (EPZ) analyses. The main elements considered are: (i) the identification of plausible SA scenarios for iPWRs with the related conditions in the vessel and in the containment, (ii) the study of the applicability of the existing experimental databases to iPWR and identify new experimental needs, (iii) the assessment of the capability of internationally recognized European and Non-European computational tools (largely used in Europe) to describe the behaviour of the most promising iPWR designs during SA scenarios, and (iv) the prediction of the resulting radiological impact on- and off-site, taking into account special SA mitigation/management strategies. The expected outcomes of the project will help speeding up the licensing of iPWRs in Europe, as well as the siting processes of these reactors in light of their possible use near densely populated areas.

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|--------------------------|--------------------------------------|
| Anno di stipula:         | 2022                                 |
| Tipo progetto:           | RIA - Research and Innovation Action |
| Programma UE:            | Euratom2027<br>Euratom fissione      |
| Data inizio:             | 01-10-2022                           |
| Data scadenza:           | 30-09-2026                           |
| <hr/>                    |                                      |
| Contributo totale:       | € 2.991.694                          |
| Costo eleggibile totale: | € 4.276.039                          |
| Contributo a ENEA:       | € 342.656                            |
| Costo eleggibile ENEA:   | € 456.875                            |
| <hr/>                    |                                      |
| Doc. approvazione:       | 059/2022/FSN                         |
| Codice atto:             | PF6AAT                               |
| Resp. scientifico ENEA:  | MASCARI FULVIO                       |
| Unità:                   | FSN-SICNUC-SIN                       |

### Attività ENEA:

L'ENEA coordina il progetto e partecipa ai seguenti Work Package (WP): WP1: coordinamento del progetto. WP2: sviluppo di input-deck ed analisi di scenari di incidente severo. WP3: analisi del database sperimentale. WP4: analisi della capacità dei codici di simulare e valutare il contenimento del corium nel vessel. WP5: analisi delle capacità dei codici di simulare il contenimento degli iPWR e caratterizzare l'efficacia delle misure di mitigazione. WP6: caratterizzazione dell'Emergency Planning Zone per iPWR. WP7: "communication", "dissemination" ed "exploitation".



## Solutions for CRITICAL Raw materials - a European Expert Network 2



**Coordinatore:** CEA - COMMISSARIAT A L'ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES (Francia)

**N. Partner:**

**Abstract:**

In order to secure the sustainable access to primary and secondary raw materials and particularly Critical Raw Materials (CRMs) in the EU, there is a need for an expert advice to better understand the value chains of the raw materials screened in the CRMs assessment. Making this information freely available, through the SCRREEN knowledge database and the EC Raw Materials Information System, will support decision-making at the EU level on the CRM strategies. In the continuation of SCRREEN, SCRREEN2 will develop and strengthen the SCRREEN expert network in order to cover all raw materials screened in the CRM 2020 assessment. The work was initiated in 2019 to support the EC (validation workshop and creation of an expert database). The SCRREEN network gathers today expertise on primary and secondary resources; production, including exploration, mining, processing, recycling and refining; substitution of CRM; raw materials markets; future demand and supply; materials flows; socio-economic analysis. It covers also strategic value chains and end-use sectors, including batteries, e-mobility, renewable energy, electronics, defence and aerospace. Thanks to clustering and cooperation with other projects/initiatives, SCRREEN2 will develop this network to fill the existing gaps and to mobilize it on two axes through dedicated workshops. First, in order to improve data and knowledge on all screened raw materials, SCRREEN2 will update on a regular basis the raw materials factsheets. It will also publish sector-oriented outlook reports analysing the future supply and demand of raw materials, policy and technology gaps and innovation potential along the raw materials value chains. A work-plan, updated every 6 months, will allow SCRREEN2 to flexibly support the Commission in policy-making related to CRM in general or linked to specific applications or sectors; and to support as well the Commission in the organisation of relevant events.

**Anno di stipula:** 2020

**Tipo progetto:** CSA - Coordination and support action

**Programma UE:** HORIZON 2020  
Climate Action, Environment, Resource Efficiency and Raw Materials

**Data inizio:** 01-11-2020

**Data scadenza:** 31-12-2023

**Contributo totale:** € 2.999.875

**Costo eleggibile totale:** € 2.999.875

**Contributo a ENEA:** € 75.000

**Costo eleggibile ENEA:** € 75.000

**Doc. approvazione:** 171/2020/SSPT-SEC

**Codice atto:** PS0AAU

**Resp. scientifico ENEA:** DE CAROLIS ROBERTA

**Unità:** SSPT-SEC

**Attività ENEA:**

L'ENEA nel progetto svolge le seguenti attività: • Contributor della task 1.1 'Network strategy and animation' •Leader della task 1.2 'Network development and cluster' •Leader della task 6.2 'Contribution to low carbon and green technologies' •Contributor della task 7.3 'Policy' •Contributor della task 7.4 'Technology gaps'



## SEVERE ACCIDENT RESEARCH AND KNOWLEDGE MANAGEMENT FOR LWRS

**Coordinatore:** CIEMAT - CENTRO DE INVESTIGACIONES ENERGETICAS, MEDIOAMBIENTALES **Partner:** TECNOLOGICAS (Spagna)

### Abstract:

Severe Accidents (SA) are known to dominate the risk associated with the commercial production of nuclear energy and a vast amount of research has been done for decades in order to practically eliminate SAs with the potential for large early releases. At present time, when some of the knowledge acquired is at risk of being lost (as many specialists have already retired or are retiring) and new approaches for the SA assessment are being explored, it seems appropriate timing to deeply review and document the sound existing background and project it into the future, including an update on experimental research on SA mitigation tools. By putting in place the best resources possible to conduct any needed additional research and by articulating the most efficient ways possible to bring the young generation on board to face near- and mid-term research challenges, the best use of the current SA background with guarantees to target those issues bearing most uncertainties nowadays might be ensured. Therefore, it is of utmost relevance to conduct a firm assessment of the current State-of-the-Art and to pass this onto the generation who are inheriting such legacy. Management, exploitation, and assessment of this knowledge, are the main objectives of the SEAKNOT project. In addition, new emerging research needs, as those concerning Small Modular Light Water Reactors (SMLWR) and Accident Tolerant Fuels (ATF), will be considered. Meeting SEAKNOT objectives requires entails carrying out a deep, critical assessment of the current state of the art of the experimental infrastructure and analytical tools that would be necessary to efficiently tackle the challenges posed. The main expected outcomes will be: a sound and critical analysis of the current knowledge on SA; an update of the experimental research needs remaining; a strengthening of background and skills of young generations in the field.

|                                 |                                      |
|---------------------------------|--------------------------------------|
| <b>Anno di stipula:</b>         | 2022                                 |
| <b>Tipo progetto:</b>           | RIA - Research and Innovation Action |
| <b>Programma UE:</b>            | Euratom2027<br>Euratom fissione      |
| <b>Data inizio:</b>             | 01-10-2022                           |
| <b>Data scadenza:</b>           | 30-09-2026                           |
| <b>Contributo totale:</b>       | € 2.158.321                          |
| <b>Costo eleggibile totale:</b> | € 2.726.994                          |
| <b>Contributo a ENEA:</b>       | € 79.547                             |
| <b>Costo eleggibile ENEA:</b>   | € 106.063                            |
| <b>Doc. approvazione:</b>       | 071/2022/FSN                         |
| <b>Codice atto:</b>             | PF6AAS                               |
| <b>Resp. scientifico ENEA:</b>  | MASCARI FULVIO                       |
| <b>Unità:</b>                   | FSN-SICNUC-SIN                       |

### Attività ENEA:

ENEA è coinvolta nei seguenti work package: WP1 dedicato allo sviluppo di una Phenomena Identification Ranking Table (PIRT) per incidenti severi. WP2 dedicato alla costruzione di un database di validazione basato sui database esistenti per incidenti severi. WP4 dedicato alla diffusione della conoscenza.



## Scientific-Based Exposure and Risk Assessment of Radiofrequency and mm-Wave Systems from children to elderly (5G and Beyond)

Coordinatore: UNIV. ARISTOTLE OF THESSALONIKI (AUTH) (Grecia)

N. Partner:

### Abstract:

The pervasiveness and social-economic dependence on wireless technology has steadily increased over the last three decades. Currently, the 5th generation (5G) New Radio (NR) cellular system is being deployed to unlock the potential of new applications that require the connection of many more devices (Internet of Things), higher data rates and low latency (autonomous driving, 'Factory of the Future'). 5G operates in two frequency bands, 5G NR FR1 and 5G NR FR2. Many exposure parameters of 5G are similar to those of 2G-4G. However, there are also many differences that lead to major knowledge gaps, all of which will be addressed by the SEAWave project. SEAWave will (i) quantify the differences in exposure patterns between 2G-4G and 5G for the entire population including children; (ii) provide new tools and instruments for reliable exposure evaluation of base stations, local networks in factories, and end-user devices; (iii) provide the means to minimise exposure; (iv) generate important new scientific data for assessing the health risk from exposure to the new frequency bands (FR2), especially with regard to the potential (co-)carcinogenicity of skin exposure and other hazardous effects; and (v) provide knowledge for effective health risk communication and dissemination to various stakeholders. To achieve these ambitious objectives, the interdisciplinary consortium consists of highly experienced partners with leading expertise in the field who ideally complement each other to achieve maximum impact. European citizens, workers, national public health authorities, European Commission services, regulators, and standardisation bodies will all benefit from the SEAWave results as they will support science-based decisions and policies for the safe deployment and use of 5G and future wireless networks. Project SEAWave is part of the European cluster on EMFs and health.

|                          |                                      |
|--------------------------|--------------------------------------|
| Anno di stipula:         | 2022                                 |
| Tipo progetto:           | RIA - Research and Innovation Action |
| Programma UE:            | HORIZON EUROPE<br>Cluster 1 - Health |
| Data inizio:             | 01-06-2022                           |
| Data scadenza:           | 31-05-2025                           |
| Contributo totale:       | € 7.317.777                          |
| Costo eleggibile totale: | € 7.317.782                          |
| Contributo a ENEA:       | € 1.913.358                          |
| Costo eleggibile ENEA:   | € 1.913.358                          |
| Doc. approvazione:       | 218/2022/PRES                        |
| Codice atto:             | PS5ABD                               |
| Resp. scientifico ENEA:  | MANCUSO MARIA TERESA                 |
| Unità:                   | SSPT-TECS-TEB                        |

### Attività ENEA:

L'ENEA riveste il ruolo di leader del WP6 e partecipa anche alle attività dei WP 5,7,8,9 e 11. In particolare sono previste le seguenti fasi: • Utilizzo di due diversi modelli murini per valutare l'impatto dell'esposizione cronica (dall'età neonatale a quella adulta) alla frequenza mm del 5G sulla cancerogenesi cutanea, in particolare valutando le incidenze di basalioma e carcinoma a cellule squamose. • Valutazione dei meccanismi molecolari strettamente correlati al rischio di insorgenza di tumori cutanei. • Valutazione dell'impatto dell'esposizione su altri distretti tissutali potenzialmente a rischio come l'ippocampo, l'occhio e il sistema riproduttivo maschile.



## Strengthening the European Chain of sUpply for next generation medical RadionuclidEs

Coordinatore: NCBJ - NATIONAL CENTER FOR NUCLEAR RESEARCH (Polonia)

N. Partner:

### Abstract:

SECURE project aims to make a major contribution to the sustainability of medical isotope production and its safe application in Europe. It is focusing on promising developments in the design of irradiation targets, production routes for existing and new isotopes in nuclear therapy and diagnostics. Isotopes critical in the success of nuclear medicine are selected and research activities are identified to address some of the major challenges in securing its future availability, with the objectives: 1. to remove critical barriers along the production of its selected alpha and beta emitting isotopes that restrict a sustainable production; 2. to develop a framework of guidance and recommendations that enables exploring the full clinical potential of alpha and beta particle therapy and its safe application; 3. to provide important lessons learned that act as a demonstration case for addressing issues in upscaling and sustained isotope production. At present, Ra-223 is the only radiopharmaceutical which has been granted marketing authorization to treat adults with prostate cancer. This has paved the way for a wider use of other alpha emitters such as Ac-225 or Bi-213. The expected demand of nuclear medicine for novel alpha emitters and beta- emitters requires re-evaluation of their production methods and inventories of target materials and parent radionuclides. The ambition of SECURE consortium is to identify and efficiently use the current resources for new radionuclides, in particular for alpha emitters and the relevant beta emitting theranostic radionuclides. The development of alternative technologies for production of such therapeutic radionuclides for improved patient treatment requires multidisciplinary scientific and technological knowledge including physics, chemistry, material science, machining of target materials, chemistry, biology and radiobiology, radiopharmacy and nuclear medicine. All this chain of expertise is present in SECURE consortium.

Anno di stipula: 2022

Tipo progetto: RIA - Research and Innovation Action

Programma UE: Euratom2027

Euratom fissione

Data inizio: 01-10-2022

Data scadenza: 30-09-2025

Contributo totale: € 3.630.426

Costo eleggibile totale: € 3.657.175

Contributo a ENEA: € 370.719

Costo eleggibile ENEA: € 370.719

Doc. approvazione: 070/2022/FSN

Codice atto: PF1AAL

Resp. scientifico ENEA: CAPOGNI MARCO

Unità: FSN-INMRI

### Attività ENEA:

L'ENEA, oltre a partecipare al WP5, dedicato all'impatto del progetto, partecipa attivamente a 3 dei 4 WPs tecnico-scientifici: WP1: Sviluppo di bersagli di irraggiamento (Target development) WP2: Vie di produzione (Production routes) WP4: Raccomandazioni per sperimentazioni cliniche e radioprotezione



## Support to SET Plan Implementation Working Group and European Technology and Innovation Platform for Ocean Energy

Coordinatore: ASSOCIATION EUROPEENNE DE L (Belgio)

N. Partner:

### Abstract:

SEETIP Ocean's mission is to enhance cooperation and collaboration amongst stakeholders both inside and outside of the European ocean energy sector. This mission is broken down into 6 objectives: 1. Maximise European scientific excellence in ocean energy 2. Make sustainability and the Just Transition an integral part of ocean energy's development 3. Build a deeper understanding of how ocean energy can optimally fit into the wider energy, industrial & infrastructure systems and planning systems, and help realise this integration 4. Empower the SET Plan Ocean Energy Implementation Working Group and other public authorities by monitoring, analysing and reporting annual commentary on the sector's progress 5. Reinforce and expand the ocean energy network through strong outreach actions 6. Continue the work of ETIP Ocean and SET Plan Ocean Energy IWG after the project ends Ocean energy can power European society and economic life with electricity that is renewable, dependable and in harmony with local communities and environments. To reach this potential, sectoral stakeholders must collaborate, share knowledge and avoid duplication of efforts. SEETIP Ocean will do this by supporting the activities of both the European Technology & Innovation Platform for ocean energy (ETIP Ocean) and the SET Plan Ocean Energy Implementation Working Group. The project's objectives will be achieved through coordination actions bringing individuals and organisations together to exchange knowledge, create new knowledge and build more and deeper connections. Widespread knowledge-sharing will be facilitated via webinars and workshops. Based on these exchanges, SEETIP Ocean will publish accessible studies and reports that will be widely disseminated across and beyond the ocean energy sector. The SET Plan Ocean Energy IWG's work will be supported with annual updated information on sector's progress and policy and funding support. Up-to-date and accurate data will inform the IWG's decision-making.

Anno di stipula: 2022

Tipo progetto: CSA - Coordination and support action

Programma UE: HORIZON EUROPE  
Cluster 5 - D3 Energy supply

Data inizio: 01-08-2022

Data scadenza: 31-07-2025

Contributo totale: € 788.254

Costo eleggibile totale: € 788.254

Contributo a ENEA: € 67.410

Costo eleggibile ENEA: € 67.410

Doc. approvazione: 155/2022/SSPT-MET

Codice atto: PS2ACK

Resp. scientifico ENEA: STRUGLIA MARIA VITTORIA

Unità: SSPT-MET-CLIM

### Attività ENEA:

Le attività svolte da ENEA riguardano l'adozione di metriche appropriate ed efficaci per monitorare e valutare i progressi tecnologici e applicativi nel campo dell'energia dal mare. ENEA contribuirà inoltre alla diffusione di competenze tra gli stakeholder del settore e parteciperà alle attività di trasferimento tecnologico del progetto, per stimolare lo sviluppo in ambiti specifici riconosciuti come prioritari.



## Social Energy Renovations: Maximizing social impact and boosting clean energy investments in the non-profit sector through de-risking, aggregation, and capacity building

Coordinatore: GNE - GLOBAL NEW ENERGY FINANCES SL (Spagna)

N. Partner:

### Abstract:

In Europe, the non-profit sector employs 28 million full-time workers engaged in education, research, housing, counselling, workforce training and other social activities. The sector remains underserved by the financial industry, making it challenging to obtain funding to undertake clean energy investments. SER brings together 7 organizations from 4 EU countries to maximise social impact by boosting clean energy investments in the non-profit sector. SER intends to design, set up, and implement an innovative de-risking financing mechanism that entails financing and technical standardisation, project aggregation, social impact assessment and credit enhancement. Under SER's financing scheme, an ESCO raises low-cost long-term capital via a forfaiting contracts to a financing instrument coupled with a de-risking mechanism. Social enterprises gain access to affordable sustainable renovations, coupled with technical assistance, while investors gain access to secure, high impact investments aligned with ESG and impact investment criteria. SER is positioned to strengthen social enterprises and generate more than 500M in clean energy investments over the course of 5 years after the project, translating into nearly 9,000 jobs, 24,633 Co2 emissions saved per year and massive social impact involving energy poverty mitigation, improvements in social inequality, health, wellbeing, productivity, financial literacy, and overall social cohesion. The initial focus is on Italy, with further replication foreseen in Bulgaria and France, and exploratory efforts in Germany, Czech Republic, Slovakia, and Poland. SER Consortium represents an ideal mix of partners including a specialized lender, an ESCO, a financing and de-risking advisory, social impact experts, an energy agency and local replicators in Bulgaria and France. SER strengthens the non-profit sector – a key driver in achieving a just and fair clean energy transition and a post-COVID-19 recovery.

|                          |                                       |
|--------------------------|---------------------------------------|
| Anno di stipula:         | 2021                                  |
| Tipo progetto:           | CSA - Coordination and support action |
| Programma UE:            | HORIZON 2020<br>Energy                |
| Data inizio:             | 01-05-2021                            |
| Data scadenza:           | 30-04-2024                            |
| Contributo totale:       | € 1.794.423                           |
| Costo eleggibile totale: | € 1.794.423                           |
| Contributo a ENEA:       | € 200.280                             |
| Costo eleggibile ENEA:   | € 200.280                             |
| Doc. approvazione:       | 11/2021/DUEE-SPS                      |
| Codice atto:             | PW3AAU                                |
| Resp. scientifico ENEA:  | FIORINI ALESSANDRO                    |
| Unità:                   | DUEE-SPS-MPE                          |

### Attività ENEA:

ENEA partecipa alle attività dei Work Package 1, 2,3,4,5 ed è lead partner del Work Package 3 "Technical Assistance: Training and Community Development". Il WP 3 ha lo scopo di supportare e agevolare le organizzazioni no-profit, ESCO e altri operatori attivi nei settori della finanza etica e verde, nell'effettuare interventi di ristrutturazione sostenibile degli edifici.



## Solar Facilities for the European Research Area - Third Phase

**Coordinatore:** CIEMAT - CENTRO DE INVESTIGACIONES ENERGETICAS, MEDIOAMBIENTALES Y TECNOLOGICAS (Spagna) **Partner:**

**Abstract:**

The overall objective of this project is to carry on with the work done during the past 8 years for the sustainability of the activities of the European advance solar laboratories involved in SFERA and SFERA 2nd phase, and extend these activities to the new solar laboratories which will bring added value to this European Research Infrastructure for Concentrating Solar Power. The specific goal is to contribute to ensure the long-term sustainability of these European advance solar laboratories, supporting Europe as a global leader in solar research infrastructures. Those activities will include (i) networking activities to further develop the cooperation between the research infrastructures, the scientific community, industries and other stakeholders; (ii) transnational access activities aiming at providing access to all European researchers from both academia and industry to singular scientific and technological solar research infrastructures; and (iii) joint research activities whose sole purpose is to improve the integrated services provided by the infrastructure. All this would contribute to achieve the scientific excellence of these research infrastructures (RIs), strength the interaction between the Concentrating Solar Thermal (CST) industry and these RIs, strength innovation further, develop new activities, and also drive the productivity and competitiveness of the European economy contributing to the creation of new jobs in the CST sector. Furthermore, these activities will contribute to the development of new common standards that will support the CST industry in the development of new components and systems and in the building of new commercial installations. At the same time, these standards will also support the European Commission in the development of the European policy for the CST sector.

**Anno di stipula:** 2019  
**Tipo progetto:** RIA - Research and Innovation Action  
**Programma UE:** HORIZON 2020  
 European Research Infrastructures  
**Data inizio:** 01-01-2019  
**Data scadenza:** 31-12-2023

**Contributo totale:** € 9.102.631

**Costo eleggibile totale:** € 9.102.631

**Contributo a ENEA:** € 849.997

**Costo eleggibile ENEA:** € 849.997

**Doc. approvazione:** 67/E/2018/DTE

**Codice atto:** PT6AAH

**Resp. scientifico ENEA:** GAGGIOLI WALTER

**Unità:** DTE-STT-ITES

**Attività ENEA:**

ENEA in SFERA III offre l'accesso agli impianti dimostratori CSP presenti presso il C.R. Casaccia, secondo quanto previsto nel Work package 5. Inoltre i principali contributi forniti da ENEA riguardano: 1) lo sviluppo di un controllo dinamico e la diagnostica di sistemi integrati per la produzione di combustibili solari; 2) supporto alla definizione delle azioni necessarie per lo sviluppo di un'infrastruttura elettronica europea sulle tecnologie CST; 3) contributo alla definizione delle metodologie per calibrazioni e tecniche di sensori per la determinazione accurata dei parametri di prestazione dei prototipi installati nelle infrastrutture di ricerca incluse nel 'Transnational Access' (TA) del progetto; 4) sviluppo e messa a punto di procedure di test per materiali e componenti di sistemi di stoccaggio termico; 5) sviluppo di tecniche di benchmarking e strategie di ottimizzazione per i reattori a combustibile solare; 6) individuazione di protocolli per la creazione di e-infrastrutture al fine di consentire l'accesso remoto ai centri europei di R&S dedicati alle tecnologie CST; 7) supporto alla trasformazione del consorzio in un istituto di riferimento per CST e alle attività esterne orientate a configurare i Centri di Ricerca operanti sul CST come una struttura legale (EU-SOLARIS ESFRI).



## Silicon Alloying Anodes for High Energy Density Batteries comprising Lithium Rich Cathodes and Safe Ionic Liquid based Electrolytes for Enhanced High Voltage Performance

Coordinatore: UNIV. LIMERICK (Irlanda)

N. Partner:

### Abstract:

Si-DRIVE will develop the next generation of rechargeable Li-ion batteries, allowing for cost competitive mass market EVs by transformative materials and cell chemistry innovations, delivering enhanced safety with superior energy density, cycle life and fast charging capability using sustainable and recyclable components. The technology encompasses amorphous Si coated onto a conductive copper silicide network as the anode with polymer/ionic liquid electrolytes and Li-rich high voltage (Co-free) cathodes via processes that are scalable and demonstrably manufacturable within Europe. The components have been demonstrated at TRL3 through preliminary lab-scale analysis, with a clear component improvement strategy to arrive at a TRL5 prototype demonstration by the end of Si-DRIVE. Comprehensive theoretical and experimental studies will probe and control interfacial processes that have heretofore limited Li-ion technologies to incremental gains, guiding materials design and eliminating capacity fade mechanisms. The Si-DRIVE technology will exceed the stringent demands of EV batteries where safety is paramount, by dramatically improving each component within the accepted Li-ion platform and achieving this in a market competitive process with whole of life considerations. The technology will also demonstrate suitability for 2nd life applications at reduced energy density beyond the primary EV lifetime, prior to cost effective materials recycling, consistent with a circular economy. The Si-DRIVE consortium boasts the required academic and industrial partner expertise to deliver this technology and spans material design and synthesis, electrochemical testing, prototype formation and production method validation, life cycle assessment and recycling process development.

|                          |   |
|--------------------------|---|
| Anno di stipula:         | 2019  |
| Tipo progetto:           | RIA - Research and Innovation Action  |
| Programma UE:            | HORIZON 2020<br>NMBP Nanotechn., Adv Materials, Adv Manufacturing and Processing, and Biotech |
| Data inizio:             | 01-01-2019  |
| Data scadenza:           | 31-07-2023  |
| Contributo totale:       | € 7.999.493   |
| Costo eleggibile totale: | € 7.999.493   |
| Contributo a ENEA:       | € 509.748   |
| Costo eleggibile ENEA:   | € 509.748   |
| Doc. approvazione:       | 124/2018/SSPT-PROMAS  |
| Codice atto:             | PS3ABI  |
| Resp. scientifico ENEA:  | APPETECCHI GIOVANNI<br>BATTISTA   |
| Unità:                   | SSPT-PROMAS-MATPRO  |

### Attività ENEA:

ENEA riveste un ruolo centrale nello sviluppo degli elettroliti ed è leader del WP 2 interamente dedicato ai materiali elettrolitici. In particolare, le attività dell'ENEA nell'ambito del progetto prevedono: i) progettazione, sintesi e purificazione di nuovi liquidi ionici per sistemi al silicio; ii) caratterizzazione chimico-fisica ed elettrochimica dei liquidi ionici preparati; iii) preparazione di elettroliti costituiti dai liquidi ionici più promettenti; iv) caratterizzazione chimico-fisica ed elettrochimica degli elettroliti; v) ottimizzazione della formulazione degli elettroliti; vi) selezione degli elettroliti da utilizzare nello sviluppo di membrane polimeriche iono-conduttrici.





Coordinatore: LUKE - NATURAL RESOURCES INSTITUTE FINLAND (Finlandia)

N. Partner:

**Abstract:**

As the world population is continuously increasing, the supply of food with equal accessibility has become a major issue and future challenge. Microbes are unexploited tool to increase food productivity and quality. The objective of SIMBA project is to harness complex soil and marine microbial communities (microbiomes) for the sustainable production of food. SIMBA will focus on two interconnected food chains, i.e. crop production, aquaculture. SIMBA will first launch an in silico phase in order to analyze the further pre-existing microbiome databases and earlier studies, to identify the best microbiome layout capable of supporting food chain quality and productivity. Microbiome-tailored interventions will be specifically developed including soil, plant, fish, aquaculture and food/feed processing towards optimal layout as defined in the modelling step, as follows: i) Identified optimal microbiome consortia will be designed and tested in lab, pot and field trials to improve plant productivity and health; ii) Marine microbiomes will be applied to facilitate sustainable aqua and agriculture; iii) Optimal microbe/microbe consortia will be used to convert raw-materials and residuals to high quality food, feed or finally to energy. In a final intervention step, these interactions will be monitored and tested in field, aqua-culturing, fish feeding and human studies, measuring the impact on microbiome consortia, interactions in association with factors evaluating their efficacy in terms of improving food security, productivity, quality, safety, sustainability, nutritional and health aspects. "Near to market" microbiome applications for sustainable food systems will be provided thanks to the interdisciplinary and cross-sectional nature of the proposal and the active role of small and medium sized enterprises (SMEs).

Anno di stipula: 2018

Tipo progetto: IA - Innovation Action

Programma UE: HORIZON 2020  
Food Security, Sustainable Agriculture and the Bioeconomy

Data inizio: 01-11-2018

Data scadenza: 31-10-2023

Contributo totale: € 10.000.000

Costo eleggibile totale: € 10.373.932

Contributo a ENEA: € 754.000

Costo eleggibile ENEA: € 754.000

Doc. approvazione: 98/2018 - 169/2022 - 222/2022/SSPT-BIOAG

Codice atto: PS1AAQ

Resp. scientifico ENEA: BEVIVINO ANNAMARIA

Unità: SSPT-BIOAG-SOQUAS

**Attività ENEA:**

L'ENEA è responsabile del Work Package 2 e collabora a sette dei nove WP del progetto per l'esecuzione di attività di ricerca, di scaling-up industriale, disseminazione e management. In particolare, nel WP 2 l'ENEA si occupa del coordinamento delle attività delle prove in serra e in campo; analisi dell'effetto di consorzi microbici promotori della crescita delle piante sul microbioma del suolo in relazione a diversi fattori biotici e abiotici.



Solid oxide fuel cell combined heat and power:  
Future-ready Energy

## Solid oxide fuel cell combined heat and power: Future-ready Energy

Coordinatore: ENEA (Italia)

N. Partner: 9

### Abstract:

The overall objective of SO-FREE is the development of a fully future-ready solid oxide fuel cell (SOFC)-based system for combined heat and power (CHP) generation. This means a versatile system concept for efficient, near-zero-emission, fuel-flexible and truly modular power and heat supply to end users in the residential, commercial, municipal and agricultural sectors. Beyond the primary objective required by the call topic – i.e. the delivery of a pre-certified SOFC-CHP system allowing an operation window from zero to 100% H<sub>2</sub> in natural gas and with additions of purified biogas – the SO-FREE project will endeavour the realization of a standardized stack-system interface, allowing full interchangeability of SOFC stack types within a given SOFC-CHP system. This interface design will be taken to the International Electrotechnical Commission (IEC) as a new work item proposal (NWIP) for international standardization. In such a way all commercial barriers to full and free competition between SOFC stack suppliers and system integrators aim to be levelled. Furthermore, this interoperability will be proved by doubling the required demonstration period: two systems will be run for 9 months each, each operating, alternately, two different stacks, which will be exchanged between the two systems. One system will be operated to assess compliance with all applicable certification requirements of a TRL 6 prototype, defining the outstanding pathway to full product certification; the other system will run at TRL7 (demonstration in operational environment) providing combined heat and power with natural gas with injections of hydrogen. As a final proof of robustness and flexibility, the two stacks integrated in each of the two systems (one developed by AVL, the other by ICI Caldaie) will be characteristic of the extreme ends of the spectrum of SOFC operating temperatures: 650°C (Elcogen) and 850°C (Fraunhofer IKTS).

|                          |                                |
|--------------------------|--------------------------------|
| Anno di stipula:         | 2021                           |
| Tipo progetto:           | FCH2-RIA                       |
| Programma UE:            | HORIZON 2020<br>JTI - Hydrogen |
| Data inizio:             | 01-01-2021                     |
| Data scadenza:           | 31-08-2024                     |
| Contributo totale:       | € 2.739.094                    |
| Costo eleggibile totale: | € 3.045.355                    |
| Contributo a ENEA:       | € 324.500                      |
| Costo eleggibile ENEA:   | € 324.500                      |
| Doc. approvazione:       | 201/2020/TERIN                 |
| Codice atto:             | PK4AAF                         |
| Resp. scientifico ENEA:  | MC PHAIL STEPHEN<br>JOHN       |
| Unità:                   | TERIN-PSU-ABI                  |

### Attività ENEA:

L'ENEA coordina il progetto e partecipa ai seguenti Workprogramme (WP): WP1: Coordinamento tecnico del progetto armonizzando le attività di ricerca del consorzio all'interno del progetto e L'ENEA sarà inoltre l'interfaccia tra il consorzio e la Fuel Cells and Hydrogen Joint Undertaking (FCH JU), soggetto . WP2: Attività sperimentali volte a validare le prestazioni dei due tipi di stack operati in condizioni definite dall'architettura dei due sistemi. WP5: Gestione del piano di disseminazione e valorizzazione del know-how e del prodotto generato nel progetto, diffusione nei mercati e promozione del prodotto facendo leva sulle piattaforme dedicate Europee, mediante l'organizzazione di workshop e la pubblicazione di articoli. Proposta di standardizzazione dell'interfaccia stack-sistema in ambito normativo internazionale.



Coordinatore: KIT KARLSRUHER INSTITUT FUER TECHNOLOGIE (Germania)

N. Partner:

#### Abstract:

According to the European Green Deal goals, new energy storage technologies will supply more flexibility and balance in the grid, providing a back-up to intermittent renewable energy and contribute to seasonal energy storage challenges. Above all, the main challenge for energy storage development is economic. In order to achieve more performing, competitive and cost effective energy storage devices, the project fosters a European ecosystem of industry and research organisations on energy storage technologies aimed at developing novel concepts and technologies. StoRIES brings together a consortium of 32 beneficiaries from 17 countries: ESFRI facilities, technology institutes, universities and industrial partners to jointly improve the economic performance of storage technologies. Members of the European Energy Research Alliance and from the industry lead European Association for Storage of Energy are establishing the core of this world-class European ecosystem. The main objectives of StoRIES are linked to the energy storage development by providing access to world-class research infrastructures and services, with a focus on improving materials for devices and optimizing hybrid energy systems with a view to make energy technologies more competitive and reducing costs. In addition, StoRIES focuses on the analysis of socio-technical and environmental aspects of new developments and systems and provides training and education on these issues. By promoting complementary expertise, interdisciplinary cooperation and a broader exchange of knowledge and technologies throughout the academic world and with industry, StoRIES will significantly improve the technological basis for energy storage applications. Furthermore, StoRIES will establish an ecosystem with international peer partners from Research and Industry to foster open science and promote new energy technology standards.

Anno di stipula: 2021

Tipo progetto: RIA - Research and Innovation Action

Programma UE: HORIZON 2020

European Research Infrastructures

Data inizio: 01-11-2021

Data scadenza: 31-10-2025

Contributo totale: € 6.999.980

Costo eleggibile totale: € 7.001.439

Contributo a ENEA: € 413.031

Costo eleggibile ENEA: € 413.031

Doc. approvazione: 217/2021/TERIN

Codice atto: PK4AAM

Resp. scientifico ENEA: PAOLETTI CLAUDIA

Unità: TERIN-PSU-ABI

#### Attività ENEA:

ENEA svolge attività relative a: . gestione dei dati (WP1 - task leader per FAIR Data); . fornire accesso a infrastrutture di livello mondiale (WP2 – 3 Infrastrutture di ricerca); . Sviluppo di strumenti per tecnologie ibride (WP3 – dai materiali ai sistemi); . Definizione della roadmap (WP3); . Attività sulla valutazione della sostenibilità (WP4).



## STAND-OFF DETECTION OF HYBRID THREATS CONTAINING EXPLOSIVES

Coordinatore: FOI SWEDISH DEFENCE RESEARCH AGENCY (Svezia)

N. Partner:

### Abstract:

The project STYX aims at developing and test systems for detecting and identifying explosive threats, such as improvised Explosive Devices (IEDs), fast and from a stand-off distance. Recently, an increased awareness of threats from “grey zone” hybrid warfare has emerged, these threats include the use of IEDs by military or para-military/adversary networks, which can both reside and operate cross border. Such IED threats are a significant challenge for Member States Armed Forces and will be a cause of hazard for civilians. They also have the potential to severely disrupt both military and civilian logistic support, damage critical infrastructures (e.g. military bases, government buildings, air bases/airports, harbours, power plants, chemical industry, oil/fuel depots, ...) and affect strategic lines of communication (e.g. bridges, roads, railways, ferries, ...). In this way, these “grey zone” hybrid threats will be more complex than route clearance threats that Armed Forces have encountered in previous military operations (e.g. Afghanistan or Iraq). Key capabilities, to ensure an enhanced Force Protection, require fast, accurate and safe techniques to detect, identify and defeat/neutralize explosive threat devices. Therefore, the aim of the project is to identify new sensors for fast stand-off detection of existing and new types of explosives embedded in IEDs and other explosive threats. Such sensors should be able not only to detect the explosive but also to identify it, in order to minimize false positive alarms. Stand-off sensors for both trace and bulk explosives will be considered. The STYX project will be a starting point for research and development of novel stand-off detection sensors for explosives applied to hybrid warfare scenarios, aiming to reach TRL 5-6. It will strengthen the European knowledge base for future advanced stand-off detection equipment, materials and their applications. At the end of the project, both technological system development as well as the work done in testing and evaluation, will contribute to the long term goal of increasing the overall capability to tackle explosives used in hybrid warfare.

Anno di stipula: 2021

Tipo progetto: N/A - Non applicabile

Programma UE: Other programmes  
European Defence Agency  
CAPTECH

Data inizio: 15-12-2021

Data scadenza: 14-12-2025

Contributo totale: € 700.000

Costo eleggibile totale: € 1.400.000

Contributo a ENEA: € 350.000

Costo eleggibile ENEA: € 700.000

Doc. approvazione: 491/2021/PRES

Codice atto: PF7ABT

Resp. scientifico ENEA: SANTORO SIMONE

Unità: FSN-TECFIS-DIM

### Attività ENEA:

L'ENEA partecipa in quasi tutte le attività del progetto con particolare contributo nello sviluppo di un sensore per la rivelazione in tracce di sostanze energetiche (esplosivi e loro precursori) che possa operare in tempo reale e a distanza nel WP300. Questo nuovo sensore implementerà una soluzione tecnica innovativa nel rimuovere la fluorescenza emessa dal substrato utilizzando un laser ad impulsi ultra corti con relativa catena elettronica veloce. Sempre nello stesso WP300, il laboratorio DIM collabora con il Fraunhofer ICT ai test sulla tecnica SERS. Una dimostrazione finale è prevista dopo il terzo anno a cui a seguire ci sarà una valutazione dei dati acquisiti.



## An innovative thermochemical cycle based on solid sulphur for integrated long-term storage of solar thermal energy

Coordinatore: DLR - GERMAN AEROSPACE CENTER E.V. (Germania)

N. Partner:

### Abstract:

SULPHURREAL aims at demonstrating and validating a breakthrough approach for next generation, carbon-free, direct conversion of solar energy into chemicals storable for a virtually unlimited time, based on elemental sulphur produced and consumed on-demand via a solar-aided thermochemical cycle. The project is targeted on the one hand to develop disruptive catalytic technologies for the two catalytic steps of this solid sulphur thermochemical cycle, namely the high- (800-850 C) and medium- (600-650 C) temperature catalytic SO<sub>3</sub> splitting to SO<sub>2</sub> and oxygen and the subsequent disproportionation of SO<sub>2</sub> to solid sulphur and sulphuric acid. The research line involves identifying, developing and testing novel catalysts and reactor designs under operating conditions so that these two, less developed steps of the cycle cf. sulphur combustion, can be integrated and performed in sequence with maximum compatibility in a first-of-its kind integrated approach. Innovations to be introduced concern not only novel catalyst compositions but also novel reactor designs and methods of applying and distributing the catalysts within the reactors, to achieve maximum utilisation of the active catalytic materials and optimal combination of improved performance, conversion efficiency and process cost reduction. On the other hand, SULPHURREAL will further develop and upscale a first-of-its-kind sulphur burner operating at power density > 5 MW/ m<sup>3</sup> at ambient pressure and having demonstrated potential for prolonged operation at power densities of > 75 MW/cbm for typical operating pressure of 15 bar by simulations. The proposed combination integrates renewable energy sources (solar energy) with valorisation of non-CRM substances currently produced as industrial by-products from oil and gas (solid sulphur) and steel industries (Fe-containing slags) and industrial-scale chemicals production (sulphuric acid industry) in absolute accordance with a circular economy environment and industrial symbiosis.

Anno di stipula: 2023

Tipo progetto: EIC Grants

Programma UE: HORIZON EUROPE

EIC - European Innovation Council

Data inizio: 01-10-2023

Data scadenza: 30-09-2026

Contributo totale: € 3.982.133

Costo eleggibile totale: € 3.982.134

Contributo a ENEA: € 527.625

Costo eleggibile ENEA: € 527.625

Doc. approvazione: 146/2023/TERIN

Codice atto: PK7AAI

Resp. scientifico ENEA: SAU GIOVANNI SALVATORE

Unità: TERIN-STSN-SCIS

### Attività ENEA:

ENEA è leader dei WP3 "Sulphur dioxide disproportionation catalysts" e WP6 "Sulphur dioxide disproportionation reactor". E' inoltre presente nei seguenti WP: 1 'Project coordination and management; 2 'Sulphur trioxide splitting catalysts'; 4 Advanced materials shaping; 8 System integration, Techno-Economic Analysis and Life Cycle Assessment; 9 Knowledge and innovation management, dissemination and communication.

Coordinatore: ACCADEMIA EUROPEA DI BOLZANO (Italia)

N. Partner: 18

#### Abstract:

The decarbonisation of the energy sector is one of the top priorities at various political levels including at the European level. Photovoltaics (PV) is widely seen as one of the key technologies to drive the energy transition. The difficulties arise when the targets for PV (usually set at national level) needs to be put into practice at regional / local level. Although the PV rooftop potential is extremely large and could potentially contribute to the ambitious targets, the rate of installation of PV rooftop systems will not be fast enough to support a rapid transition. On the other hand, large utility-scale PV installations in open fields are not an option in many regions. It is in this context that the concept of Agrivoltaics is emerging. What several decades of efforts developing Building Integrated PV (BIPV) products and systems for rooftops and facades have taught us is that there are multiple levels of integration and various stakeholders across the value chain which can all generate significant barriers to widespread adoption. Agrivoltaics is in fact in the unique position to learn from the past mistakes made with BIPV which delayed the development of cost-effective BIPV solutions and market acceptance. In SYMBIOSYST we will not develop solutions that are highly customized as this would drive the costs up. We will rather innovate by adapting standardized cost-effective solutions in terms of PV modules, mounting structures and Operation and Maintenance (O&M) practices to the specific needs of various crops in different climates and landscapes. We will also find aesthetically pleasing solutions that can be mass manufactured and integrated with the agricultural land in a harmonious way while maintaining the primary goal of farming. The interdisciplinary consortium in SYMBIOSYST is composed of partners across the value chain with decades of experience in agriculture, precision farming, PV modules and systems, social science and integrated PV applications.

Anno di stipula: 2023

Tipo progetto: IA - Innovation Action

Programma UE: HORIZON EUROPE  
Cluster 5 - D3 Energy supply

Data inizio: 01-01-2023

Data scadenza: 31-12-2026

Contributo totale: € 4.827.668

Costo eleggibile totale: € 5.775.143

Contributo a ENEA: € 242.750

Costo eleggibile ENEA: € 242.750

Doc. approvazione: 226/2022/TERIN

Codice atto: PK2AAE

Resp. scientifico ENEA: SCOGNAMIGLIO  
ALESSANDRA

Unità: TERIN-FSD-DIN

#### Attività ENEA:

Le attività che l'ENEA svolge all'interno del progetto SYMBIOSYST saranno inquadrare nel work package 'Agrophotovoltaics modelling value chain': Strumento di integrazione del paesaggio basato su GIS: l'ENEA guiderà lo sviluppo di un tool transdisciplinare basato su uno strumento GIS che integra una metodologia descrittiva spazialmente centrica, con l'obiettivo di facilitare e valorizzare l'integrazione dell'agrivoltaico nel modello paesaggistico.



## Small Modular Reactor for a European safe and Decarbonized Energy Mix

Coordinatore: CEA - COMMISSARIAT A L'ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES (Francia)

N. Partner:

### Abstract:

Small Modular Reactors (SMRs) can be hybridized with other energy sources, storage systems and energy conversion applications to provide electricity, heat and hydrogen. SMR technology thus has the potential to strongly contribute to the energy decarbonisation in order to achieve climate-neutrality in Europe by 2050. However, the integration of nuclear reactors, particularly SMRs, in hybrid energy systems is a new R&D topic to be investigated. In this context, the TANDEM project aims to provide assessments and tools to facilitate the safe, secure and efficient integration of SMRs into smart low-carbon hybrid energy systems. It proposes to specifically address the safety issues of SMRs related to their integration into hybrid energy systems, involving specific interactions between SMRs and the rest of the hybrid systems; new initiating events will have to be considered in the safety approach. An open-source "TANDEM" model library of hybrid system components will be developed in Modelica language to build a hybrid system simulator which, by coupling, will extend the capabilities of existing tools implemented in the project. TANDEM intends to focus on two main study cases corresponding to hybrid system configurations covering the main trends of the European energy policy and market evolution: a district heating network and power supply in an urban area, and an energy hub serving energy conversion systems, including hydrogen production, in a regional perspective. TANDEM will provide assessments on SMR safety, hybrid system operationality and techno-economics. Societal considerations will also be encased by analyzing the European citizen engagement regarding SMR technology safety. The work will result in technical, economic and societal recommendations and policy briefs on the safety of SMRs and their integration into hybrid energy systems for industry, R&D teams, TSOs, regulators, NGOs and policy makers. The TANDEM consortium will involve 17 partners from 8 countries.

Anno di stipula: 2022

Tipo progetto: RIA - Research and Innovation Action

Programma UE: Euratom2027

Euratom fissione

Data inizio: 01-09-2022

Data scadenza: 31-08-2025

Contributo totale: € 3.372.401

Costo eleggibile totale: € 3.781.490

Contributo a ENEA: € 140.375

Costo eleggibile ENEA: € 159.125

Doc. approvazione: 073/2022/FSN

Codice atto: PF6AAZ

Resp. scientifico ENEA: LOMBARDO CALOGERA

Unità: FSN-SICNUC-SIN

### Attività ENEA:

ENEA sarà coinvolta nei seguenti work package: • WP2: Modelling for the simulation of the hybrid system behaviour, dedicato allo sviluppo dei modelli necessari alla simulazione del comportamento del sistema ibrido di test a effetti separati (SET) e combinati (CET). Task 2.1: si contribuirà a definire la strategia da adottare per la modellazione e per condurre le simulazioni. Task 2.4: ENEA svilupperà il modello CATHARE dell'intero sistema che dovrà essere impiegato per le analisi da condurre nel WP4. • WP4 dedicato ad analisi di transitorio ed incidentali da condurre per dimostrare l'affidabilità e la sicurezza dell'intero sistema.



## Towards EXTreme scale Technologies and Accelerators for euROhpc hw/Sw Supercomputing Applications for exascale

Coordinatore: ENEA (Italia)

N. Partner:

### Abstract:

To achieve high performance and high energy efficiency on near-future exascale computing systems, a technology gap needs to be bridged: increase efficiency of computation with extreme efficiency in HW and new arithmetics, as well as providing methods and tools for seamless integration of reconfigurable accelerators in heterogeneous HPC multi-node platforms. TEXTAROSSA aims at tackling this gap through applying a co-design approach to heterogeneous HPC solutions, supported by the integration and extension of IPs, programming models and tools derived from European research projects, led by TEXTAROSSA partners. The main directions for innovation are towards: Enabling mixed-precision computing, through the definition of IPs, libraries, and compilers supporting novel data types (including Posits), used also to boost the performance of AI accelerators Implementing new multilevel thermal management and two-phase liquid cooling Developing improved data movement and storage tools through compression Ensure secure HPC operation through HW accelerated cryptography Providing RISC-V based IP for fast task scheduling and Ips for low-latency intra/inter-node communication These technologies will be tested on the Integrated Development Vehicles mirroring and extending the European Processor Initiative ARM64-based architecture, and on an OpenSequana testbed. To drive the technology development and assess the impact of the proposed innovations TEXTAROSSA will use a selected but representative number of HPC, HPDA and AI demonstrators covering challenging HPC domains such as general-purpose numerical kernels, High Energy Physics (HEP), Oil & Gas, climate modelling, and emerging domains such as High Performance Data Analytics (HPDA) and High Performance Artificial Intelligence (HPC-AI)

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|--------------------------|--------------------------------------|
| Anno di stipula:         | 2021                                 |
| Tipo progetto:           | RIA - Research and Innovation Action |
| Programma UE:            | HORIZON 2020<br>JTI - EuroHPC        |
| Data inizio:             | 01-04-2021                           |
| Data scadenza:           | 31-03-2024                           |
| Contributo totale:       | € 2.051.376                          |
| Costo eleggibile totale: | € 6.012.709                          |
| Contributo a ENEA:       | € 219.135                            |
| Costo eleggibile ENEA:   | € 795.125                            |
| Doc. approvazione:       | 38/2021/TERIN                        |
| Codice atto:             | PK3AAA                               |
| Resp. scientifico ENEA:  | CELINO MASSIMO                       |
| Unità:                   | TERIN-ICT                            |

### Attività ENEA:

Il contributo di Enea al progetto verte nell'area tecnico-scientifica dell'High Performance Computing con particolare riguardo allo sviluppo di ambienti di programmazione, all'ottimizzazione del processo di raffreddamento e al porting delle applicazioni su architetture parallele. In particolare ENEA è leader di due workpackage, il n. 1 e il n. 8, gestiti da TERIN-ICT. Il laboratorio TERIN-PSU-IPSE è coinvolto nella caratterizzazione e valutazione delle performance di raffreddamento dei sistemi di calcolo.





## NOVEL METHODS OF TESTING FOR MEASUREMENT OF NATURAL GAS AND HYDROGEN MIXTURES

Coordinatore: SNAM SPA (Italia)

N. Partner:

### Abstract:

How maximize hydrogen (H2) blending potential in natural gas (NG) networks, supporting European energy system decarbonisation? The answer lies in the need of a systemic, multi-disciplinary approach to make NG infrastructure resilient to the challenges of tomorrow. Industrial and research players' competences are required. In this framework, THOTH2 consortium focuses on energy measurement value chain and instruments' ability to accurately measure physical parameters of H2NG mixtures with increasing H2 percentages, up to 100%. Including gas TSOs, DSOs, metrological and research institutes and academia, THOTH2 consortium has all competences and skills to reach the goals of i) define standards to evaluate the metrological performances of measuring devices at different H2 blending rates (up to 100%), ii) verify safety and durability of the same devices, and iii) suggest future needs to overcome the observed barriers and limitations. SNAM competences in managing NG assets are essential for the coordination and synergic integration of the 14 partners, recognized as experts in NG and H2 industry (GRTGAZ, GAZ-SYSTEM, Enagás, INRETE), metrology (CESAME, INRIM, METAS), H2 blending technologies and measuring devices design, engineering, and R&D activities (UNIBO, INIG, FBK, ENEA, CSIRO). The communication and dissemination strategy by GERG will give visibility to project's results, including contributions to Mission Innovation 2.0 and EURAMET projects. THOTH2 vision will lead to an acceleration towards H2 economy, contributing to REPowerEU and NextGeneration EU objectives. The project impact potential includes the establishment of a R&D Hub center, including THOTH2 partners and Advisory Board members, to translate into valuable results achieved by the project, aiming to i) the development/update of international standards, ii) foster innovation in the field of H2NG blending measuring devices, and iii) supporting H2 value chain development leveraging on the EU gas infrastructure.

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| Anno di stipula:         | 2023                                 |
| Tipo progetto:           | RIA - Research and Innovation Action |
| Programma UE:            | HORIZON EUROPE<br>Clean Hydrogen JU  |
| Data inizio:             | 01-02-2023                           |
| Data scadenza:           | 01-07-2025                           |
| Contributo totale:       | € 1.997.361                          |
| Costo eleggibile totale: | € 1.997.361                          |
| Contributo a ENEA:       | € 43.125                             |
| Costo eleggibile ENEA:   | € 43.125                             |
| Doc. approvazione:       | 17/2023/TERIN                        |
| Codice atto:             | PK4AAT                               |
| Resp. scientifico ENEA:  | GISLON PAOLA                         |
| Unità:                   | TERIN-PSU-ABI                        |

### Attività ENEA:

L'ENEA partecipa ai seguenti workpackage: WP1: predisposizione del Report Deliverable 1.3 "Normative gaps towards H2NG gas grid" WP4: supporto nella definizione di nuovi standard e nella identificazione delle innovazioni tecnologiche necessarie alla conversione delle reti gas a miscela idrogeno/gas naturale WP5: supporto alla disseminazione dei risultati WP6: supporto alla organizzazione generale del Progetto



## Tritium Impact and Transfer in Advanced Nuclear reactorS

Coordinatore: CEA - COMMISSARIAT A L'ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES (Francia)

N. Partner:

**Abstract:**

The TITANS (Tritium Impact and Transfer in Advanced Nuclear reactorS) multidisciplinary project is built to contribute to Research and Innovation to "improve knowledge on tritium management in fission/fusion facilities" and provide "robust science to EU safety regulators, radiation protection authorities and decision makers". TITANS will answer the main challenges of the call: i) Tritium permeation description and associated modeling, ii) tritium measurement, iii) mitigation of tritium release, iv) gain expertise on dismantling activities, v) improve knowledge in radiotoxicity and radiobiology, both combined to dosimetry specific to each biological model studied. The TITANS work program is established from the results obtained in the former EU TRANSAT project and thanks to scientific discussion within TRANSAT SAC, TITANS members and external experts from EU/broader countries. TITANS will improve modelling tools to assess tritium inventory/migration in nuclear fission/fusion reactors in order to identify where the new barrier concept developed within TITANS are needed to limit the spread of tritium. The tritium release during dismantling of tritium-contaminated setup will be evaluated with the help of innovative tritium inventory measurement techniques developed within TITANS. Finally, to ensure tritium circular economy, a mobile device for tritiated water processing will be developed. At last, human and environmental toxicity impacts after an accidental release of tritiated particles will be assessed through studies on i) the behaviour of aerosols in the environment, ii) biological effects on a mussels population, iii) biokinetics by the skin route and iiiii) genotoxic effects on human lung macrophages. In order to estimate a dose-response relationship, a dosimetric study specific to each organism or cell type will be carried out. This 3 years project with a 3 M€ allocated budget gathers 21 partners from European countries and UK all involved in tritium activities.

Anno di stipula: 2022

Tipo progetto: RIA - Research and Innovation Action

Programma UE: Euratom2027

Euratom fissione

Data inizio: 01-09-2022

Data scadenza: 31-08-2025

Contributo totale: € 2.843.297

Costo eleggibile totale: € 3.854.193

Contributo a ENEA: € 197.225

Costo eleggibile ENEA: € 281.750

Doc. approvazione: 095/2022/FSN

Codice atto: PF3AAH

Resp. scientifico ENEA: TOSTI SILVANO

Unità: FSN-FUSTEC-TEN

**Attività ENEA:**

Il progetto vede il coinvolgimento dell'ENEA nei seguenti Work Packages: - WP1, Proposals for enhancement of barriers against tritium permeation and tritiated waste management, - WP2, Tritium inventory management and modeling - WP4, Dissemination, Communication & Stakeholders Engagement



## Traceability in medical X-ray imaging dosimetry

Coordinatore: STUK RADIATION AND NUCLEAR SAFETY AUTHORITY (Finlandia)

N. Partner:

**Abstract:**

X-ray imaging, covering diagnostic and interventional examinations, is an important part of modern medicine but on the other hand it forms the largest component of exposure to artificial ionizing radiation in Europe. Therefore, accurate and consistent quantification of patient radiation exposure with calibrated dosimetry equipment is essential to comply with Council Directive (2013/59/Euratom) and to ensure safety to patients. Currently, the calibration procedures used by calibration laboratories are based on relevant standards (IEC 61267, IEC 61674, IEC 61676) and international protocols (IAEA TRS-457) however they do not fully consider the recent technical developments within medical X-ray imaging. This project will perform a critical assessment of conditions applied in calibrations compared to those used in clinical practice and will study the performance of different clinical dosimeters and for calibrations. Based on the results, updated and traceable measurement and calibration procedures will be proposed to IEC and IAEA for inclusion into forementioned standards and protocols.

Anno di stipula: 2023

Tipo progetto: RIA - Research and Innovation Action

Programma UE: HORIZON EUROPE  
EPM - European Partnership on Metrology

Data inizio: 01-06-2023

Data scadenza: 31-05-2026

Contributo totale: € 1.098.530

Costo eleggibile totale: € 1.098.530

Contributo a ENEA: € 85.000

Costo eleggibile ENEA: € 85.000

Doc. approvazione: 116/2023/FSN

Codice atto: PF5AAM

Resp. scientifico ENEA: PINTO MASSIMO

Unità: FSN-INMRI

**Attività ENEA:**

L'ENEA partecipa a tutti i work package tecnici del progetto e coordina il Work package 2 "Classification of dosimeters based on their performance".



## PRODUCT DATA TRACEABILITY FROM CRADLE TO CRADLE BY BLOCKCHAINS INTEROPERABILITY AND SUSTAINABILITY SERVICE MARKETPLACE

Coordinatore: FRATELLI PIACENZA SPA (Italia)

N. Partner: 29

### Abstract:

In EU a garment is worn an average of 3 times in its life, with €400 Bln lost a year discarding clothes which can still be worn and 92 Mln tons of waste, 87% of clothes ending up in landfills. But due to growing awareness on ethical and environmental impacts, 66% of consumers are ready to pay more for sustainable products . TRICK will provide a complete, SME affordable and standardised platform to support the adoption of sustainable and circular approaches: it will enable enterprises to collect product data and to access to the necessary services on a dedicated marketplace, open to third party solutions. TRICK demo will be run in 2 highly complex and polluting domains: textile-clothing as main pilot and perishable food for replication. EC estimates that up to 10% of the 88 million tons of food waste generated annually in the EU are linked to date marking, with associated costs estimated at €143 billion. Secured traceability will rely on the data needed for the preferential certification of origin (PCO), used for duty calculation. It will be certified by Customs as member of the consortium, representing anti fraud public forces. The data extracted by the fiscal documents for the PCO will be integrated with the bill of materials, saved in the Blockchains (BC) per each lot of production to grant traceability continuity, and with the additional ones to enable the six services provided by TRICK: traceability, circular assessment, PEF, health and social assessment, A.I. for anti counterfeiting. BC will secure information through the whole process, ending to consumers for informed purchasing. Data confidentiality and privacy will be granted by the exploitation of Blockchains smart contracts while the adoption of different technologies will be solved by the development of Blockchain interoperability connectors between the two BC providers. End users will cover the whole TC value chain, from raw materials to recycling.

Anno di stipula: 2021  
 Tipo progetto: IA - Innovation Action  
 Programma UE: HORIZON 2020  
 Climate Action, Environment, Resource Efficiency and Raw Materials  
 Data inizio: 01-05-2021  
 Data scadenza: 30-04-2024

Contributo totale: € 7.997.854

Costo eleggibile totale: € 9.600.449

Contributo a ENEA: € 374.000

Costo eleggibile ENEA: € 374.000

Doc. approvazione: 113/2021/TERIN

Codice atto: PK5AAF

Resp. scientifico ENEA: CIACCIO GESSICA

Unità: TERIN-SEN-CROSS

### Attività ENEA:

ENEA partecipa ai seguenti work package: . WP1 (Use Case Requirements); . WP2 (Development of TRICK platform); . WP3 (Blockchain design and implementation); . WP4 (B2B marketplace development and service implementation); . WP7 (Communication and dissemination) . WP8 (Management).



Coordinatore: EMPIRICA (Germania)

N. Partner:

**Abstract:**

tunES brings together 7 national Energy Agencies, representing 132 million citizens, who will tackle the common challenge of making building energy efficiency and smartness instruments work. Member States (MS) receive technical assistance, support and consulting from 4 research organisations, forming the Technical Support Team (TST). tunES will impact positively on the shortcomings of implementing EPC, SRI, and linked instruments, by structuring work into five building blocks to better collect, share, implement and replicate good practice: Understanding EPC, Upgrading EPC, Databases & Tools, SRI Development & Deployment, and, as horizontal block, Integration of Instruments to maximise harmonisation, coherence and synergies. Each building block is represented by MS Leaders having implemented good practice. MS Followers design policy options, packages and pathways that will facilitate uptake of good practice. tunES deploys a Technical Support and Assistance Framework based on the EU Better Regulation Guidelines (BRG). For each stage of the policy design process (inception, data collection, analysis, policy options design, prioritisation, impact assessment, iteration, roll-out planning and throughout stakeholder engagement). Simultaneously and across the building blocks, the TST prepares for the Energy Agencies the necessary methods and tools to safeguard consistency within and across MS. From the beginning, results on good practice as well as how to apply BRG methods are publicly shared in a guidance. Other MS are invited to apply all or selective methods in-sync with the project. The core outcome are seven national policy measure packages including extensively vetted policy options, with clear impact, stakeholder reaction, and concise actions for realising full national implementations. On the EU-level, a comprehensive guidance strategy allows other stakeholders not only to access use cases but have all tools readily at hand for effective replication.

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|------------------|----------------------------|
| Anno di stipula: | 2023                       |
| Tipo progetto:   | LIFE ProJect Grants        |
| Programma UE:    | Other programmes 2021-2027 |
|                  | LIFE (2021-2027)           |
| Data inizio:     | 01-09-2023                 |
| Data scadenza:   | 31-08-2025                 |

|                          |             |
|--------------------------|-------------|
| Contributo totale:       | € 1.999.707 |
| Costo eleggibile totale: | € 2.104.954 |
| Contributo a ENEA:       | € 208.942   |
| Costo eleggibile ENEA:   | € 219.939   |

|                         |                  |
|-------------------------|------------------|
| Doc. approvazione:      | 20/2023/DUEE-SPS |
| Codice atto:            | PW3ABF           |
| Resp. scientifico ENEA: | DI PIETRA BIAGIO |
| Unità:                  | DUEE-SPS-SEI     |

**Attività ENEA:**

ENEA è leader del work package n. 1 "Facilitation of cross-border Exchange and external Follower Network" ed è coinvolta in tutti gli altri work package: . WP2 Data Collection and National Stakeholder Engagement . WP3 Policy Development & Ex-ante testing . WP4 Data analysis & Impact Assessment . WP5 Sustainability, Replication and Exploitation of Project Results + Dissemination . WP6 Project Management & Coordination

Coordinatore: ETRA INVESTIGACION Y DESAROLLO SA (Spagna)

N. Partner:

**Abstract:**

USER-CHI aims at unlocking the massive potential of electromobility in Europe. This will be achieved by: (1) integrating different innovative charging technologies with a holistic perspective; (2) putting the user at the centre and empowering it; (3) exploiting the synergies between electromobility and the process of greening and smartification of the grid which is taking place to achieve the energy transition in Europe, (4) integrating the technological tools, business models and regulatory measures which will transform the elements cited above into an actual, working ecosystem which improves the user experience of EV drivers beyond the current levels of ICE vehicles drivers, whilst at the same time makes financially attractive for the relevant private and public actors the large scale deployment of Europe's required user centric charging infrastructure. USER-CHI will boost a large-scale e-mobility market take up in Europe, by means of developing integrated smart solutions, novel business models and new regulatory framework conditions, which will be demonstrated and validated in 5 urban areas all along the European territory: Barcelona metropolitan area (Spain), Rome (Italy), Berlin (Germany), Budapest (Hungary), and Turku (Finland). These 5 sites act as connecting nodes of the key Mediterranean and Scandinavian-Mediterranean TEN-T corridors, while their different sizes, complementary contexts and e-mobility maturity level offer a holistic view of e-mobility in Europe, facilitating the scalability and replicability of the demonstrated solutions. Since large scale replication and transferability of USER-CHI results is one of the cornerstones of the project, a replication city has been included in each of the TEN-T corridors involved in the project: Murcia (Spain) in Mediterranean corridor and Florence (Italy) in Scandinavian-Mediterranean corridor. This, together with the involvement of EUROCITIES will maximise the project impact even after its completion.

Anno di stipula: 2020

Tipo progetto: IA - Innovation Action

Programma UE: HORIZON 2020

Transport

Data inizio: 01-02-2020

Data scadenza: 31-01-2024

Contributo totale: € 14.263.188

Costo eleggibile totale: € 17.486.866

Contributo a ENEA: € 345.375

Costo eleggibile ENEA: € 345.375

Doc. approvazione: 76/E/2019/DTE

Codice atto: PT4AAB

Resp. scientifico ENEA: ANDRENACCI NATASCIA

Unità: DTE-PCU-STMA

**Attività ENEA:**

Within this task detailed EV charging infrastructure models will be designed properly defining and formalizing their flexibility characteristics and their control and response capabilities to be integrated in the smart grid. Modelling activities will tackle all necessary components and will incorporate capacity and flexibility parameters for local grid optimization. On the other hand, this task will deliver algorithms and models for profiling of EV batteries and charging infrastructure for optimal charging and discharging actions. Analysis of battery energy storage system solution dedicated to the peak load shave will be also considered, with a particular attention to the re-use of exhausted EV batteries (second-life). This task will focus mainly on the solutions available in the USER-CHI demo sites, with special attention to the integration of new electric mobility modes



## Virtual Enhanced Reality for inTeroperable training of CBRN military and civilian Operators

Coordinatore: FONDAZIONE SAFE (Italia)

N. Partner: 9

### Abstract:

VERTigO will develop a simulation platform for military CBRN training, which integrates a Virtual Reality headset and a CBRN mask for enhanced realism. The project "Virtual Enhanced Reality for inTeroperable training of CBRN military and civilian Operators" (VERTigO) supports an integrated approach to conflicts and disaster relief by virtualization and simulation of CBRN (chemical, biological, radiological and nuclear) defence training. The project's overall objective is the validation of a European Exercise Simulation Platform (EESP) for virtual reality (VR) applications to CBRN training, complemented by the prototyping of an ad-hoc hardware solution, which integrates a VR headset and CBRN mask for enhanced realism and user experience.

Anno di stipula: 2021  
 Tipo progetto: N/A - Non applicabile  
 Programma UE: Other programmes  
 EDIDP (2019-2020)  
 Data inizio: 01-12-2021  
 Data scadenza: 31-05-2024

Contributo totale: € 2.598.416

Costo eleggibile totale: € 2.736.614

Contributo a ENEA: € 120.236

Costo eleggibile ENEA: € 120.236

Doc. approvazione: 154/2021/FSN

Codice atto: PF7ABR

Resp. scientifico ENEA: GUARNERI  
 MASSIMILIANO

Unità: FSN-TECFIS-DIM

### Attività ENEA:

Nel progetto ENEA con il laboratorio DIM ricoprirà due ruoli di strategica importanza essendo cosviluppatore della piattaforma di virtualizzazione 3D con specifiche competenze, oltre a contribuire con le proprie competenze alla definizione ed individuazione di possibili scenari in cui ambientare gli addestramenti in ambito soprattutto di eventi nucleari. DIM svolgerà anche il ruolo di utilizzatore della piattaforma stessa per addestrare il proprio personale deputato ad interventi in ambito CBRN sul territorio nazionale, come previsto nei piani dell'Ente.

## VIRTUAL CENTRE FOR DISTRIBUTED ATMOSPHERIC SENSING FOR REDUCTION OF POLLUTION PRESSURES

Coordinatore: VINCA INSTITUTE OF NUCLEAR SCIENCES (Serbia)

N. Partner:

### Abstract:

Air quality still poses a challenge to health, ecosystems and climate in Europe, despite decades of positive developments. Since the adoption of the first EU legislation on ambient air, the process knowledge has increased, the remote and in-situ observing technologies have undergone major developments, and new potent ICT infrastructures have emerged. Low cost sensing technologies have enabled a paradigm shift in air quality monitoring, triggering new research needs and opportunities in order to underpin the new capabilities. VIDIS will develop strategic partnership of VINCA Institute (SR) with leading international counterparts known for research on low-cost sensing (ENEA (IT), NILU (NO), Queensland University (AU)). VIDIS will establish scientific collaboration and networking and generate new knowledge that will allow the society to meaningfully utilize the new technologies, e.g., the emerging democratized data collection. VINCA is recognized in atmospheric research and in-situ monitoring including low-cost technologies. In order to fully capitalize on and improve this expertise, there is a need to establish a strategic partnership with institutions excellent in areas VINCA has been pursuing. VIDIS will improve observing capabilities and develop quality systems needed to ensure meaningful data integration. It will develop artificial intelligence and machine learning methods allowing to integrate the new types of data into existing information systems. Building on methods and data collected from ongoing projects of all partners, VIDIS will establish collaborative research, education, training and dissemination activities, early stage researcher training and mobility, and support early stage researcher career development also in research administration and stakeholder contact. This will increase the innovation capacities of VINCA and partners, improve VINCA's collaborative potential, and contribute to excellence of European research and innovation.

Anno di stipula: 2020

Tipo progetto: CSA - Coordination and support action

Programma UE: HORIZON 2020  
Spreading Excellence and Widening Participation - WIDESPREAD

Data inizio: 01-11-2020

Data scadenza: 30-04-2024

Contributo totale: € 899.125

Costo eleggibile totale: € 946.250

Contributo a ENEA: € 194.125

Costo eleggibile ENEA: € 194.125

Doc. approvazione: 95/2020/DTE

Codice atto: PT1AAW

Resp. scientifico ENEA: DE VITO SAVERIO

Unità: TERIN-FSD-SAFS

### Attività ENEA:

ENEA metterà a disposizione i dati rilevati dai sensori MONICA (MONItoraggio Cooperativo della qualità dell'Aria), dotati di strumenti di intelligenza artificiale che hanno permesso di realizzare vere e proprie mappe della qualità dell'aria ad altissima risoluzione spazio-temporale durante le campagne di monitoraggio. L'ENEA è leader del work package 3 nel quale è in particolare responsabile dell'organizzazione di contributi on-line di base per le summer schools coordinando i contributi dei diversi partner. Partecipa inoltre ai work package: ? WP1: sviluppo del centro VIDIS che collegherà le 4 istituzioni partecipanti con competenze complementari integrandole in un Sistema di conoscenze sinergico alla creazione e al supporto di ricerche cooperative (progetti) e di programmi di training e sviluppo competenze per gli early stage researchers; ? WP2: incrementare l'esperienza del partner Widening Country (VINCA) e la leadership dei partecipanti supportando la diffusione delle competenze complementari su atmospheric science and air pollution assessment (QUT), Air Pollution Modeling (NILU) Artificial intelligence and machine learning (ENEA) . Scientific training per early stage researchers.





## Fully connected virtual and physical perovskite photovoltaics lab

**Coordinatore:** HELMHOLTZ-ZENTRUM BERLIN FUR MATERIALIEN UND ENERGIE GMBH (HZB) **N. Partner:** (Germania)

**Abstract:**

VIPERLAB identifies perovskite PV as the key emerging technology that will be the lever for a future market penetration of EU-based PV production with lowest costs and lowest carbon footprint. Therefore, through facilitated and coordinated access to the best EU perovskite infrastructures and the use of advanced data mining approaches, VIPERLAB will stimulate European academic and industrial researchers to work together on the research and development of the next generation of solar cell technology, which will accelerate the perovskite PV technology development in Europe. Top-level material synthesis, state-of-the-art device design and development, as well as standardized testing methods, simulation methods, and databases will be the main services offered in order to validate at lab-scale and at pre-industrial-scale, the technology that will form the backbone for EU PV recovered worldwide leadership all along the value chain. VIPERLAB will boost this ambition for the emerging perovskite community by providing transnational and virtual access aiming to: (1) combine European top-ranked, relevant and complementary perovskite PV infrastructures to foster perovskite solar cells and module development and testing. Facilitate access to these perovskite-focused infrastructures for the community of EU PV academia and industry; (2) connect and support the starting European perovskite community through physical and virtual infrastructures and through targeted networking activities and (3) further develop physical and virtual perovskite infrastructures, build an up-to-date database on materials and devices, on long-term performance and on environmental and economic impact (enabling evidence-based commercial and political decision making. Hence, VIPERLAB will build up a close dialogue with the emerging perovskite industry with the help of new initiatives such as EPKI as well as more established players such as the European solar industry association Solar Power Europe.

**Anno di stipula:** 2021

**Tipo progetto:** RIA - Research and Innovation Action

**Programma UE:** HORIZON 2020  
European Research Infrastructures

**Data inizio:** 01-06-2021

**Data scadenza:** 30-11-2024

**Contributo totale:** € 5.520.125

**Costo eleggibile totale:** € 5.520.125

**Contributo a ENEA:** € 376.610

**Costo eleggibile ENEA:** € 376.610

**Doc. approvazione:** 28/2021/TERIN

**Codice atto:** PK0AAC

**Resp. scientifico ENEA:** ROCA FRANCESCO

**Unità:** TERIN

**Attività ENEA:**

L'ENEA partecipa alle attività del progetto con un ruolo cruciale in quanto: - è responsabile, del WP5-NA2 Communication, dissemination, exchange and training; - ha il ruolo di Communication & dissemination manager per il progetto ed ha sviluppato direttamente procedure e strumenti quali sito il web del progetto, la Knowledge Exchange Platform, e le strategie di comunicazione tramite canali scientifici e media - offre inoltre le infrastrutture Tandem PSK/si Lab e CRESCO computing lab.



Coordinatore: IPP - ISTITUTO POLITECNICO DE PORTALEGRE (Portogallo)

N. Partner: 4

**Abstract:**

The WASTE2H2 proposal field of action is hydrogen as a sustainable energy vector and waste valorization in a circular economy approach. Characteristically, Hydrogen can be produced using diverse resources including fossil fuels, such as natural gas and coal, biomass, non-food crops, nuclear energy and renewable energy sources, such as wind, solar, geothermal, and hydroelectric power to split water. Hydrogen could be produced from waste biomass by thermal gasification processes followed by clean and purification stages of syngas produced. This area has an enormous potential for society decarbonisation and development of circular economy. This diversity of potential supply sources is the most important reason why hydrogen is such a promising energy carrier. WASTE2H2 aims to enhancing the scientific and technological capacity of IPPortalegre in clean and purification of thermal gasification syngas in order to produced hydrogen, and at raising staff's research profile and excellence by twinning with three well established and leading research institutions: Royal Institute of Technology, in Sweden; Italian National Agency for New Technologies, Energy and Sustainable Economic Development, in Italy and; Karlsruhe Institute of Technology, in Germany. This will allow mutual learning and knowledge transfer activities, cross-fertilization and networking opportunities and increased opportunities for research collaborations. The resulting enhanced capabilities and status of IPPortalegre, would in turn contribute to the change of its economic landscape, giving new opportunities for development and job creation, strengthening and enhancing the positioning of Portugal as an important player in applied scientific research in the respective field.

Anno di stipula: 2021

Tipo progetto: CSA - Coordination and support action

Programma UE: HORIZON 2020  
Spreading Excellence and Widening Participation - TWINNING

Data inizio: 01-01-2021

Data scadenza: 31-12-2023

Contributo totale: € 899.719

Costo eleggibile totale: € 899.719

Contributo a ENEA: € 166.500

Costo eleggibile ENEA: € 166.500

Doc. approvazione: 77/2020/DTE

Codice atto: PT4ABD

Resp. scientifico ENEA: MC PHAIL STEPHEN JOHN

Unità: DTE-PCU-SPCT

**Attività ENEA:**

Le attività che l'ENEA svolgerà all'interno del progetto Waste2Watts si possono riassumere e sintetizzare nei seguenti punti: • WP1: definizione di una strategia per la creazione di un network di relazioni professionali e competenze sul tema • WP2: ospitare visite lavorative di breve termine e partecipare ai workshops tematici • WP3: ospitare giovani ricercatori per la formazione per periodi fino a 2 mesi • WP4: ampliare e attivare reti di contatto professionali • WP5: individuare e partecipare a bandi di finanziamento • WP6: organizzazione di una conferenza finale e disseminazione



## Unlocking unused bio-WASTE resources with loW cost cleAning and Thermal inTegration with Solid oxide fuel cells

Coordinatore: ECOLE POLYTECHNIQUE FEDERALE DE LAUSANNE (Svizzera)

N. Partner:

### Abstract:

WASTE2WATTS (W2W) will design and engineer an integrated biogas-Solid Oxide Fuel Cell combined heat and power system with minimal gas pre-processing, focusing on low-cost biogas pollutant removal and optimal thermal system integration. Eleven partners from 4 leading biogas countries join efforts to these objectives: 2 biogas cleaning SMEs, 3 SOFC manufacturing SMEs, a biogas expert SME and 5 leading research and education centres in SOFC characterisation and modelling, and in biogas use as a fuel. Two cleaning approaches and hardware will be developed: one for small scale units (5-50 kWe), where a huge unutilised biogas potential resides (millions of farms, bio-wastes from municipalities) - here sulphur compounds (H<sub>2</sub>S and organic S) are removed by an appropriate solid sorbent matrix; one for medium-to-large scale units (=500 kWe), which is the existing scale of landfill biogas and large bio-waste collection schemes - here sulphur compounds and siloxanes are removed among others by a novel cooling approach. For both cases the hardware will be built and installed on real biogas-sites treating different wastes. Gas analytics will validate the approaches. A 6 kWe SOFC system from a partner will run on a real agro-biogas site connected to the small scale sorbents cleaning unit. Cost projections for high volume production for both the cleaning and SOFC systems will be conducted. A detailed full system model will be implemented, considering the biogas feedstock, composition fluctuations (and dilution) and pollutant signatures, and optimizing thermal integration with biogas-inherent CO<sub>2</sub> (for dry-dominant reforming) and digester heating, with the targets to maximise net electrical efficiency and minimise cost. An Advisory Board consisting of biogas producing SMEs will accompany the project to facilitate market access and support the post-project multiplication of the developed solutions.

Anno di stipula: 2019

Tipo progetto: N/A - Non applicabile

Programma UE: HORIZON 2020

JTI - Hydrogen

Data inizio: 01-01-2019

Data scadenza: 30-09-2023

Contributo totale: € 1.681.603

Costo eleggibile totale: € 1.681.603

Contributo a ENEA: € 155.063

Costo eleggibile ENEA: € 155.063

Doc. approvazione: 71/E/2018/DTE

Codice atto: PT4AAV

Resp. scientifico ENEA: PUMIGLIA DAVIDE

Unità: DTE-PCU-SPCT

### Attività ENEA:

L'ENEA è coinvolta nei seguenti WP: WP2 'Selezione e testing di materiali sorbenti per il clean up dei vari tipi di biogas'; WP3 'Selezione e analisi di catalizzatori commerciali per il preforming del biogas purificato, con particolare attenzione alla reazione di dry reforming ed alla loro selettività, stabilità e resa rispetto a tale reazione. Testing di celle singole SOFC alimentate con biogas diretto e/o pre-reformato, valutando prestazioni, degrado e possibili effetti di contaminazione da residui di specie contaminanti attraverso il set-up dedicato per la misura di gradienti termici e chimici; WP4 'Life Cycle assessment applicato al sistema biogas/clean-up/SOFC e confrontato con sistemi ICE); WP5 'Gestione del piano di disseminazione e valorizzazione del know-how e del prodotto generato nel progetto, diffusione nei mercati e promozione del prodotto facendo leva sulle piattaforme dedicate europee, mediante l'organizzazione di workshop, la pubblicazione di articoli, la produzione di un filmato promozionale'.

ENEA - Servizio Promozione e Comunicazione

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