Clean Energy Transition Partnership

CETPartnership Joint Call 2024

03 May 2024

History of changes	
Date	Changes
2024-05-03	Initial version

The Clean Energy Transition Partnership is a transnational joint programming initiative to boost and ac-celerate the energy transition, building upon regional and national RDI funding programmes. The initia-tive is receiving funding from the European Union's research and innovation programme "Horizon Europe" under grant agreement No 101069750.

Table of Contents

List of Figures

List of Tables

1. Introduction

1.1 Structure of the Call text

This Call text is structured as follows:

- Chapter 1 and 2 introduce the Clean Energy Transition Partnership (CETPartnership), the CETPartnership Joint Call 2024 (Call) and definitions used in this document.
- Chapter 3–6 provides instructions on the Call procedure, including an overview, the eligibility criteria and guidelines, the evaluation criteria and the process of the Call.
- Chapter 7 presents information to be considered at project implementation.
- Chapter 8 presents aims and topics of the Call Modules in the Call.
- Annex A describes the Reporting and Knowledge Community work package that is mandatory for all proposals and projects in the CETPartnership.
- Annex B describes the three dimensions of innovation for system solutions that can be applied to project design, as well as the CETPartnership Knowledge Community that involves projects funded by the Call.
- Annex C presents national/regional requirements of Funding Organisations participating in the Call.
- Annex D presents a matrix of Funding Organisations' participation in the Call Modules.

1.2 Clean Energy Transition Partnership (CETPartnership)

The Clean Energy Transition Partnership (CETPartnership)[1] aims to accelerate the clean energy transition and to contribute the goal of climate neutrality by 2050. It is a transnational and strategic partnership to align research, development and innovation (RDI) strategies, leverage knowledge and experience and foster a system transformation. Around 50 national/regional Funding Organisations from more than 30 countries in Europe and beyond participate in the CETPartnership with co-funding from the European Union (EU) through the Horizon Europe (HE) RDI Framework Programme.

The CETPartnership not only funds transnational RDI projects which will contribute to revolutionising the energy system. It also helps change makers find each other and collaborate, co-create strategic, evidence-based knowledge and impact, and develop transferable solutions, through the CETPartnership Knowledge Community[2] and CETPartnership Impact Network[3]. This will further help policy makers and decision makers

[1] https://cetpartnership.eu/
[2] https://cetpartnership.eu/about/knowledge-community
[3] https://cetpartnership.eu/about/impact-exploitation

in the private and public sector and contribute to further development of the partnership and a clean energy system. All relevant stakeholders are invited to join the CETPartnership community[4].

While building on the achievements of pre-existing European Research Area Networks (ERA-NETs) in different areas of energy technologies and systems, the CETPartnership allows a broader ambition and a larger portfolio of topics and projects. The CETPartnership has developed the Strategic Research and Innovation Agenda (SRIA)[5], describing the common vision and objectives of the CETParternship's transformative, challenge-driven and transdisciplinary approach. Based on thematic challenges identified in SRIA, seven **Transition Initiatives (TRIs)** have been developed as the main acting bodies and configurations of Funding Organisations.

The CETPartnership's annual joint calls cover a wide range of RDI disciplines and welcome interdisciplinary approaches. So far, the CETPartnership has implemented two joint calls in 2022 and 2023 and has contracted €XXX million in funding for XXX projects, bringing together xxx beneficiaries from XX countries in Europe and the world.

1.3 CETPartnership Joint Call 2024 (Call)

The CETPartnership Joint Call 2024 (Call) is the third annual joint call under the CETPartnership. The Call consists of **Call Modules**, addressing different energy technology and system challenges as well as different RDI approaches and thus complementing and completing each other.

Call Modules focusing on enabling technologies (CM2024-02, 03A, 03B, 04, 05, 06 and 07, see Table 1.1 and **Chapter 8**) typically address approaches with reference to the Technology Readiness Levels (TRLs)[6] or Commercial Readiness Index (CRI)[7]. Some distinguish between research-oriented approaches (ROA, CM2024-03A) and innovation-oriented approaches (IOA, CM2024-03B).

Call Modules focusing on system integration (CM2024-01, 02, 08, 09 and 10, see Table 1.1 and **Chapter 8**) typically address holistic, integrated and transdisciplinary approaches with three dimensions: "technologies and infrastructures", "organisation of energy systems" and "transition of energy systems" (see **Annex B**).

[4] https://clean-energy-transition-partnership-2023.cetp.b2match.io/home
[5] https://cetpartnership.eu/sites/default/files/documentation/cetp_sria_1.0.pdf
[6] Definition in Horizon Europe Work Programme 2023-2024 13. General Annexes, https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/wp-call/2023-2024/wp-13-general-annexes_horizon-2023-2024_en.pdf
[7] https://arena.gov.au/assets/2014/02/Commercial-Readiness-Index.pdf

Table 1.1. Call Modules in the CETPartnership Joint Call 2024

No.	Title
CM2024-01	Energy data spaces and interoperability
CM2024-02	Energy system flexibility: renewables production, storage and system integration
CM2024-03A	Advanced renewable energy (RE) technologies for power production (ROA)
CM2024-03B	Advanced renewable energy (RE) technologies for power production (IOA)
CM2024-04	Carbon capture, utilisation and storage (CCUS)
CM2024-05	Hydrogen and renewable fuels
CM2024-06	Heating and cooling technologies
CM2024-07	Geothermal energy technologies
CM2024-08	Integrated regional energy systems
CM2024-09	Integrated industrial energy systems
CM2024-10	Clean energy integration in the built environment

All projects funded by the Call are expected to actively participate in the CETPartnership Knowledge Community[8] and work on topics of relevant Call Modules as well as cross-cutting issues outlined in CETPartnership SRIA[9]. In addition, the projects will be supported in exploitation and impact maximisation with an Impact Library, training and networking. Read more about the mandatory Reporting and Knowledge Community Work Package in **Annex A**, and about the CETPartnership Knowledge Community in **Annex B**.

At the global level, the Call is part of the Mission Innovation (MI)[10] call series. As such, some of the Call Modules are prepared directly in collaboration with MI missions, and all Call Modules are open to applications that directly and/or indirectly contribute to the work of MI missions.

1.4 Participating Funding Organisations

Around 50 national/regional Funding Organisations (see Table 1.2) participate in the Call with budget for funding in different Call Modules (over €xxx million in total). The Funding Organisations will fund eligible costs of Beneficiary Partners based in their country/region according to their budgets and requirements (see **Annex C** and **Annex D**).

Table 1.2. Funding Organisations (TBC= participation to be confirmed)

Country	Region	Organisation name	Acronym
Austria		Austrian Research Promotion Agency	FFG
Belgium	Flanders	Fonds Innoveren en Ondernemen	FIO

[8] https://cetpartnership.eu/index.php/about/knowledge-community
[9] https://cetpartnership.eu/sites/default/files/documentation/cetp_sria_1.0.pdf
[10] http://mission-innovation.net/

	Wallonia	Service public de Wallonie	SPW
Canada	Alberta	Emissions Reduction Alberta	ERA
Cyprus		Research and Innovation Foundation TBC	RIF
Czech Republic		Technology Agency of the Czech Republic	TA CR
Denmark		Energy Technology Development and Demonstration Programme	EUDP
		Innovation Fund Denmark	IFD
Estonia		Estonian Research Council	ETAG
		Ministry of Climate TBC	MoC
France	(Federal)	Agence Nationale de la Recherche	ANR
		Agence de la transition écologique	ADEME
	Pays de la Loire	Pays de la Loire Region Council	RPL
Germany	(Federal)	Projektträger Jülich/Forschungszentrum Jülich GmbH (BMWK)	PtJ (BMWK)
	North Rhine-Westphalia	Projektträger Jülich/Forschungszentrum Jülich GmbH (MWIKE)	PtJ (MWIKE)
	Saxony	Saxon State Ministry for Science, Culture and Tourism	SMWK
Greece		General Secretariat for Research and Innovation TBC	GSRI
Hungary		National Research, Development and Innovation Office	NKFIH
Iceland		The Icelandic Centre for Research	RANNIS
India		Department of Science & Technology, Ministry of Science & Technology, Goverment of India	DST
Ireland		Geological Survey Ireland	GSI
		Sustainable Energy Authority of Ireland	SEAI
Israel		Ministry of Energy	MoE
Italy		Ministero dell'Università e della Ricerca	MUR
Latvia		Latvian Council of Science TBC	LZP
Lithuania		Ministry of Energy of the Republic of Lithuania	ENMIN
		Research Council of Lithuania	LMT
Malta		Malta Council for Science and Technology	MCST
The Netherlands		Dutch Research Council	NWO
		Netherlands Enterprise Agency	RVO
Norway		The Research Council of Norway	RCN
Poland		National Centre for Research and Development	NCBR
Portugal		Fundação para a Ciência e a Tecnologia	FCT
Romania		Executive Agency for Higher Education, Research, Development and Innovation Funding	UEFISCDI
Spain	(Federal)	Agencia Estatal de Investigación	AEI

		Centre for the Development of Technology and Innovation.	CDTI
	Asturias	Fundación para el Fomento en Asturias de la Investigación Científica Aplicada y la Tecnología - Agencia de Ciencia, Competitividad Empresarial e Innovación Asturiana	FICYT-SEKUENS
	Basque	Departmento de Desarrollo Económico, Sostenibilidad y Medio Ambiente. Eusko Jaurlaritza-Gobierno Vasco	EUSKADI
	Cantabria	Regional Development Agency of Cantabria	SODERCAN
Sweden		Swedish Energy Agency	SWEA
Switzerland		Federal Department of the Environment, Transport, Energy and Communications	DETEC
Tunisia		Ministry of Higher Education and Scientific Research	MHESR
Türkiye		The Scientific and Technological Research Council of Türkiye	TUBITAK
The United Kingdom	Scotland	Scottish Enterprise	SE
The United States of America		Department of Energy	DOE

2. Definitions

In the Call, the following definitions apply.

The Call process includes two stages:

- a **pre-proposal** stage (Stage 1)
- a **full proposal** stage (Stage 2)

The term **proposal** refers to both the pre-proposal and the full proposal.

A proposal is submitted by a **Project Consortium** that may consist of the following **Project Consortium Partners**:

- **Coordinator**: A legal entity applying for funding in the Call and responsible for coordinating and managing the proposal. The Coordinator cannot be changed after the deadline for pre-proposal submission (Stage 1) and before the selection of full proposals to be funded (Stage 2) in the Call process.
- **Beneficiary Partners**: All Project Consortium Partners applying for funding in the Call (including the Coordinator).
- **Self-financed Partner(s)**: Project Consortium Partner(s) participating from any country with their costs declared but without applying for funding in the Call. Each Self-financed Partner submits a Letter of Commitment in Stage 2 of the Call process (see **Subsection 6.2.1**).

The **Project Consortium Partners** are legal entities of any organisation type such as:

- Secondary and higher education establishments
- Research organisations
- Private for-profit companies
- Public bodies
- Other entities (e.g. non-profit organisations)

Each **Project Consortium Partner** may have the following persons:

- A **Principal Investigator (PI)**
- Any **Team Members**

3. Call overview

The CETPartnership Joint Call 2024 (Call) is the third annual co-funded call under the CETPartnership and is open for Beneficiary Partners from countries participating in the Call and for Self-financed Partners from all over the world[11]. The Call consists of 11 **Call Modules**, addressing different energy technology and system challenges as well as different RDI approaches (see **Chapter 8**) and thus complementing and completing each other. **All Project Consortia are therefore encouraged to carefully check the coverage and requirements of their intended Call Module.**

Around 50 national/regional Funding Organisations participate in the Call with budget for funding in different Call Modules (over €xxx million in total), for eligible costs of Beneficiary Partners based in their country/region (see **Annex C** and **Annex D**). **All Project Consortia, above all the Beneficiary Partners, are encouraged to carefully check the coverage and requirements of relevant Funding Organisations.**

The Call follows a 2-stage procedure; a pre-proposal stage (Stage 1) and a full proposal stage (Stage 2), see **Table 3.1** and **Chapter 6**. A Project Consortium chooses one Call Module to submit its pre-proposal (Stage 1). If the pre-proposal is selected in Stage 1, the Project Consortium is invited to submit a full proposal to the same Call Module (Stage 2). If the proposal is selected for funding in Stage 2, the eligible Beneficiary Partners will receive funding from their relevant Funding Organisations.

Funding Organisations may additionally require submission according to own submission procedure such as deadlines, portals and templates, see respective national/regional requirements in **Annex C**.

Table 3.1. Call timeline

3Opening for pre-proposal submission (Stage 1)	19 September 2024
Deadline for pre-proposal submission	21 November 2024, 14:00 CET
National/regional deadline for pre-proposal submission	See **Annex C**
Opening for full proposal submission (Stage 2)	29 January 2025
Deadline for full proposal submission	31 March 2025, 14:00 CEST
National/regional deadline for full proposal submission	See **Annex C**
Funding decision communicated	Beginning of July 2025
Project start	1 September–15 December 2025

In both Stage 1 and 2, the proposals will be checked according to eligibility criteria and requirements set for the Call in general (see **Chapter 4**), Call Modules (see **Chapter 8**) and Funding Organisations (see **Annex C**) and will be evaluated according to evaluation criteria (see **Chapter 5**), ranked per Call Module and selected

[11] EU sanctions may apply, see https://www.eeas.europa.eu/eeas/european-union-sanctions_en

according to the available funding. Failing to meet a criterion or requirement can lead to exclusion from the selection in both Stage 1 and 2. **All Project Consortia are therefore encouraged to carefully check all the criteria and requirements, with relevant contacts if necessary.**

In short, for a proposal to be considered for funding, it must:

- have met all the transnational criteria (see **Chapter 4**) and Call Module requirements (see **Chapter 8**), including a Project Consortium including Beneficiary Partners deemed eligible by relevant Funding Organisations participating in the Call Module (see **Annex C** and **Annex D**), and;
- have been selected according to the ranking and available funding.

Questions about the Call in general should be addressed to the CETPartnership Call Management (**Call Management**) (callmanagement@cetpartnership.eu).

Questions about the Call Modules should be addressed to respective Call Module contacts, see **Chapter 8**.

Questions about the national/regional requirements should be addressed to respective Funding Organisations, see **Annex C**.

4. Eligibility criteria and guidelines

The Call includes the following eligibility criteria and requirements:

- **Transnational eligibility criteria**, applicable for all Project Consortia applying to the Call
- **Call Module requirements**, applicable for Project Consortia applying to Call Modules with specific requirements, see also **Chapter 8**
- **National/regional requirements**, applicable for Beneficiary Partners applying for funding from Funding Organisations in the Call, see also **Annex C**

Table 4.1. Summary of transnational eligibility criteria

1	A proposal must be written in English and submitted on the CETPartnership Submission Platform before the deadlines, following mandatory proposal templates.
2	A Project Consortium must consist of a minimum of three Beneficiary Partners (including one Coordinator) adhering to relevant national/regional eligibility criteria, from a minimum of three different countries participating in the selected Call Module. Of these three Beneficiary Partners, at least two must be from EU Member States or HE Associated Countries.
3	The total effort of one Project Consortium Partner in the Project Consortium can be maximum 60% of the total project efforts (measured in person months).
4	The total effort of Project Consortium Partners from one country/region in the Project Consortium can be maximum 75% of the total project efforts (measured in person months).
5	The following individuals are ineligible for proposal submission: CETPartnership Governing Board members, CETPartnership General Assembly members and researchers from the Funding Organisations in the Call.[12]
6	A project must finish in 36 months from the start of the project.
7	A proposal must include a work package called Reporting and Knowledge Community in their work plan.

For a proposal to be considered for funding, it must have met all the transnational criteria (see this chapter) and Call Module requirements (see **Chapter 8**), with a Project Consortium including Beneficiary Partners deemed eligible by relevant Funding Organisations participating in the Call Module (see **Annex C** and **Annex D**). Failing to meet an eligibility criterion or requirement can lead to exclusion from the selection. **All Project Consortia are therefore encouraged to carefully check all the eligibility criteria and requirements.**

Below, **eligibility criteria and requirements** are described in lists (➢) and **guidelines and recommendations** in texts.

[12] Legal entities who are able to provide written proof that their organisational structure is completely separated from those of the Funding Organisation participating in the Call may under these exceptional circumstances submit their proposal to the Call.

4.1 Proposal submission

- A proposal must be written in English and submitted on the CETPartnership Submission Platform[13] before the deadlines, following mandatory proposal templates available for download on the start page of the Submission Platform. To be considered for funding, submission of a pre-proposal is mandatory for each Project Consortium, and submission of a full proposal is mandatory for each invited Project Consortium. Resubmission or revision of a proposal will be denied after the submission deadline unless it is requested by the Call Management. (**Transnational eligibility criterion 1**)
- National/regional Funding Organisations may additionally require submission according to own submission procedure such as deadlines, portals and templates, see respective national/regional requirements in **Annex C**.

4.2 Project Consortium Partners

- A Project Consortium must consist of a minimum of three Beneficiary Partners (including one Coordinator) adhering to relevant national/regional eligibility criteria, from a minimum of three different countries participating in the selected Call Module. Of these three Beneficiary Partners, at least two must be from EU Member States or HE Associated Countries[14]. (**Transnational eligibility criterion 2**)
- The total effort of one Project Consortium Partner in the Project Consortium can be maximum 60% of the total project efforts (measured in person months). (**Transnational eligibility criterion 3**)
- The total effort of Project Consortium Partners from one country/region in the Project Consortium can be maximum 75% of the total project efforts (measured in person months). (**Transnational eligibility criterion 4**)
- The following individuals are ineligible for proposal submission: CETPartnership Governing Board members, CETPartnership General Assembly members or researchers from the Funding Organisations in the Call. However, legal entities who are able to provide written proof that their organisational structure is completely separated from those of the Funding Organisation participating in the Call may under these exceptional circumstances submit their proposal to the Call. (**Transnational eligibility criterion 5**)
- Specific Call Module requirements may apply regarding the Project Consortia, see **Call Module requirements** in respective Call Modules in **Chapter 8**.
- Specific National/regional requirements may apply regarding the Project Consortia, see respective national/regional requirements in **Annex C**.

Each Self-financed Partner is expected to enclose a Letter of Commitment with the full proposal (see **Subsection 6.2.1**).

[13] https://cetp-submission.mur.gov.it/
[14] https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/common/guidance/list-3rd-country-participation_horizon-euratom_en.pdf

No individual involved in a proposal can act as an evaluator in the Call.

4.3 Project duration and budget

- A project must finish in 36 months from the start of the project. (**Transnational eligibility criterion 6**)
- Specific Call Module requirements may apply regarding the project budget, see **Call Module requirements** in respective Call Modules in **Chapter 8**.
- Specific National/regional requirements may apply regarding the project duration and/or budget, see respective national/regional requirements in **Annex C**.

The Call generally aims to support projects with a duration between 12 and 36 months and applying for funding in the Call in the range of (but not limited to) €0.5–5 million, besides possible self-financing.

4.4 Research, development and innovation (RDI) approaches / Technology Readiness Levels (TRLs)[15]

- Specific Call Module requirements may apply regarding the RDI approaches/TRLs, see **Call Module requirements** in respective Call Modules in **Chapter 8**.
- Specific National/regional requirements may apply regarding the RDI approaches/TRIs, see respective national/regional requirements in **Annex C**.

The Call applies the definition of TRLs in the HE Work Programme[16].

Since the CETPartnership aims to accelerate the clean energy transition to achieve the goal of climate neutrality by 2050, the Call generally aims to fund projects increasing their TRL and reaching medium to high TRLs (4–8), in combination between technological and system solutions with societal, commercial, financial, environmental, regulatory and other critical aspects. Projects may include activities at lower or higher TRLs based on specific needs to reach project goals or meet national/regional requirements.

Other frameworks than TRLs may apply as well in some Call Modules. For example, the Commercial Readiness Index (CRI)[17] describes solutions in terms of their commercial value proposition and ability to obtain financing for deployment. The Societal Readiness Level (SRL)[18] is a way of assessing the level of societal adaptation of solutions. In addition, the Smart Readiness Indicator (SRI)[19] is a common EU scheme for rating the smart readiness of buildings.

[15] Horizon Europe Work Programme 2023-2024 13. General Annexes, https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/wp-call/2023-2024/wp-13-general-annexes_horizon-2023-2024_en.pdf
[16] https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/wp-call/2023-2024/wp-13-general-annexes_horizon-2023-2024_en.pdf
[17] https://arena.gov.au/assets/2014/02/Commercial-Readiness-Index.pdf
[18] https://innovationsfonden.dk/sites/default/files/2019-03/societal_readiness_levels_-_srl.pdf
[19] https://energy.ec.europa.eu/topics/energy-efficiency/energy-efficient-buildings/smart-readiness-indicator_en

The CETPartnership Exploitation Guidelines[20] developed by the CETPartnership Impact Network will be of help in planning a project with activities to advance on such scales as well as to exploit outcomes and maximise impact.

4.5 Cross-cutting dimensions

- Specific Call Module requirements may apply regarding the cross-cutting dimensions, see **Call Module requirements** in respective Call Modules in **Chapter 8**.

The cross-cutting dimensions are an integral part of the CETPartnership. They can be transition pathways, circularity, digitalisation as well as policy and social aspects and include different societal stakeholders and innovation ecosystems. Read more about the cross-cutting dimensions in the CETPartnership SRIA[21].

4.6 Reporting and Knowledge Community work package

- A proposal must include a work package called Reporting and Knowledge Community in their work plan (see **Annex A**). (**Transnational eligibility criterion 7**)

When developing a proposal, it is important to consider the concept and content of the CETPartnership Knowledge Community, in which projects funded by the Call are expected to actively participate. Read more about the Knowledge Community in **Annex B** and the CETPartnership's website[22].

4.7 Open science

The CETPartnership promotes and asks Project Consortia to carefully consider open science practices, including the FAIR principles (Findable, Accessible, Interoperable, and Reusable), with a strong emphasis on high accessibility of funded projects' findings (see the evaluation criterion Excellence in **Chapter 5**). Read more about open science in the EU's open science policy[23].

4.8 Gender dimension

The CETPartnership considers eliminating gender inequality and intersecting socioeconomic inequalities throughout research and innovation systems, for example by addressing unconscious bias and systemic structural barriers. The CETPartnership integrates the gender dimension in the research and innovation content of the Joint Calls (see the evaluation criterion Excellence in **Chapter 5**) and promotes gender balance among personnel in a Project Consortium.

[20] Link to the document on the CETPartnership.eu
[21] https://cetpartnership.eu/sites/default/files/documentation/CETP%20SRIA_v1.0_endorsed_compressed_0.pdf
[22] https://cetpartnership.eu/about/knowledge-community
[23] https://research-and-innovation.ec.europa.eu/strategy/strategy-2020-2024/our-digital-future/open-science_en

5. Evaluation criteria

In both Stage 1 and 2, proposals will be evaluated according to the following main evaluation criteria:

- **Excellence**
- **Impact**
- **Quality and efficiency of the implementation**

The following **sub-criteria** will be used in all the Call Modules to determine the scores for the three main evaluation criteria. Sub-criteria with asterisk (*) will be used in Stage 2 only.

Excellence

- Clarity and pertinence of the project's objectives in relation to the Call and Call Module.
- Extent to which the project's objectives are ambitious, and go beyond the state-of-the-art of the proposed work in terms of research/innovation for the clean energy transition.
- Soundness of the proposed methodology, including the underlying concepts, models, assumptions, and interdisciplinary approaches.
- *Appropriate consideration of the diversity and gender dimension in research/innovation content.
- *The quality of open science practices including sharing and management of research/innovation outputs and engagement of citizens, civil society and end users where appropriate.

Impact

- Credibility of the pathways to achieve the expected outcomes and impacts for the clean energy transition specified in the Call and Call Module.
- Likely scale and significance of the contributions due to the project, through appropriate involvement of end-users and other relevant target groups.
- The added value of the transnational collaboration.
- Suitability and quality of the measures to maximise expected outcomes and impacts, as set out in the dissemination and exploitation plan through use of the solutions by target groups where appropriate, including communication activities.

Quality and efficiency of the implementation

- Quality and effectiveness of the work plan.
- *Assessment of risks.
- *Appropriateness of the effort assigned to work packages and the resources overall.
- Capacity and role of each participant, and extent to which the consortium as a whole brings together the necessary expertise.

Gender balance in personnel named in the proposal will be one of the criteria to decide in case of ex aequo proposals.

For proposal evaluation, a full score in the range of 0–5 (see **Table 5.1**) will be awarded at individual evaluations and panel meetings for each of the three main evaluation criteria, not for any sub-criteria. Each main evaluation criterion will be equally weighted.

Table 5.1. Evaluation Scores

Score	Description
0	**Fail/Missing**: The proposal **fails** to address the criterion or cannot be assessed due to **missing** or **incomplete** information (unless the result of an 'obvious clerical error').
1	**Poor**: The criterion is inadequately addressed or there are serious inherent weaknesses.
2	**Fair**: The proposal broadly addresses the criterion but there are significant weaknesses.
3	**Good**: The proposal addresses the criterion well but with a number of shortcomings.
4	**Very good**: The proposal addresses the criterion very well but with a small number of shortcomings.
5	**Excellent**: The proposal successfully addresses all relevant aspects of the criterion. Any shortcomings are minor.

6. Call process

The Call process includes two stages: the pre-proposal stage (Stage 1) and the full proposal stage (Stage 2). **To be considered for funding, a proposal must be submitted on time, complete and concise. Direct submission of a full proposal in Stage 2 is impossible.**

6.1 Pre-proposal stage – Stage 1

6.1.1 Submission of pre-proposals

A pre-proposal must be submitted by a Coordinator (see **Section 4.2** for the eligibility criteria and guidelines on Project Consortia) in reference to a Call Module before **21 November 2024, 14:00 CET** on the CETPartnership Submission Platform[24], in collaboration with the other Project Consortium Partners (including possible Self-financed Partners). On the Submission Platform, the Coordinator must invite all the other Project Consortium Partners. At submission, every Project Consortium Partner invited by the Coordinator must have accepted the invitation and entered its information and budget on the Submission Platform, while any irrelevant partners must have been removed.

The pre-proposal has a draft status until it is submitted. Once it is submitted, it can still be revised and resubmitted as many times as needed before the deadline.

The pre-proposal must include a project description (max 10 pages using the mandatory pre-proposal template available for download on the start page of the Submission Platform and following instructions there) and any possible supporting documents. See **Section 4.1** for the eligibility criteria and guidelines on submission. See **Section 4.2–4.8** for the eligibility criteria and guidelines on how to formulate the pre-proposal.

Please consider that Funding Organisations may additionally require submission according to own submission procedure such as deadlines, portals and templates. See respective national/regional requirements in **Annex C**.

6.1.2 Eligibility check of pre-proposals

Eligibility checks will be performed on a submitted pre-proposal according to:

- Transnational eligibility criteria (see **Chapter 4**) by the Call Management.
- Call Module requirements (see **Chapter 8**) by a relevant TRI.
- National/regional requirements (see **Annex C**) by relevant Funding Organisations.

The TRI deems the pre-proposal:

[24] https://cetp-submission.mur.gov.it/

- Eligible for submitting a full proposal
- Conditionally eligible for submitting a full proposal, requesting more information or requirements to be included in a full proposal
- Ineligible for submitting a full proposal

The Funding Organisations deem the Beneficiary Partners in the pre-proposal:

- Eligible for submitting a full proposal
- Conditionally eligible, for submitting a full proposal, requesting more information or requirements to be included in a full proposal
- Ineligible for submitting a full proposal

Considering any Beneficiary Partner deemed ineligible in this step, please note that requirements to proceed to the next step deviate from **Transnational eligibility criterion 2**, **3** and **4**, namely that a pre-proposal must meet the following requirements in addition to **Transnational eligibility criterion 1, 5, 6 and 7**:

- The Project Consortium consists of a minimum of **two** Beneficiary Partners (including the Coordinator) deemed eligible or conditionally eligible by relevant Funding Organisations from a minimum of **two** different countries participating in the selected Call Module. Of these two Project Consortium Partners, at least **one** must be from EU Member States or HE Associated Countries.
- The total effort of Beneficiary Partners deemed ineligible by relevant Funding Organisations in Stage 1 covers less than 25% of the total project efforts (measured in person months).

Please also note that the final eligibility checks for funding will be performed in Stage 2. To be considered for funding, proposal must then have fully met all the transnational eligibility criteria, including a Project Consortium deemed eligible by relevant Funding Organisations.

6.1.3 Evaluation of pre-proposals

Each pre-proposal will be evaluated according to the evaluation criteria described in **Chapter 5,** by an evaluation panel of at least three independent evaluators[25]. The pre-proposal will receive individual scores from the independent evaluators for each of the three main evaluation criteria in the range of 0–5 and individual total scores in the range of 0–15 from the independent evaluators. This will result in an average score for each of the three main evaluation criteria in the range of 0–5, and a total average score in the range of 0–15. In case of strong disagreement between the individual scores by the independent evaluators (differing 6 or more between the lowest and the highest individual total scores), the evaluation panel will have a meeting to reach a consensus and provide a full score for each of the three main evaluation criteria in the range of 0–5, resulting in a total score in the range of 0–15.

[25] All independent evaluators declare their confidentiality, impartiality and independence prior to the start of the individual evaluation. They assess a conflict of interest prior to access to each proposal. In a conflict of interest, the evaluator will be excluded from the further evaluation process.

A ranking list will be developed for each Call Module with pre-proposals having an average or consensus score at or above 3 for all the three evaluation criteria and a total average or consensus score at or above 10.

6.1.4 Selection of pre-proposals

Following the ranking lists developed in the former step, the Funding Organisations will agree on a list of pre-proposals to be invited to Stage 2, while ensuring that the total funding requested by the invited pre-proposals is maximum four times the available budget for each Funding Organisation.

In case of budgetary constraints, pre-proposals will be selected considering the following **core principles**:

- Maximising the total number of projects funded.
- Maximising the number of countries/regions involved in the projects funded.
- Having a good balance between the Call Modules in terms of the number of projects funded.
- Having similar success rates between the Call Modules.
- Maximising the amount of EU financial contribution generated.

The outcome of Stage 1 will be notified by the Call Management to each Coordinator with a report on the eligibility checks and, if applicable, the evaluation of the pre-proposal, as well as information on the means of redress, see **Section 6.3**.

6.2 Full proposal stage – Stage 2

6.2.1 Submission of full proposal

A full proposal must be submitted by the Coordinator of each invited Project Consortium (see **Section 4.2** for the eligibility criteria and guidelines on Project Consortia) to the same Call Module before **31 March 2025, 14:00 CEST** on the CETPartnership Submission Platform[26], in a similar manner to the pre-proposal, in collaboration with the other Project Consortium Partners (including Self-financed Partners). The difference from the submission of the pre-proposal (**Subsection 6.1.1**) is that the full proposal must include:

- A project description of max 30 pages (instead of max 10 pages).
- A Letter of Commitment by each Self-financed Partner (with information about its active participation and role)

The following changes between the pre-proposal and the full proposal will be allowed.

1. Addition of a Self-financed Partner
2. Replacement of (a) Beneficiary Partner(s) deemed ineligible in Stage 1 with (a) Self-financed Partner(s)

[26] https://cetp-submission.mur.gov.it/

3. Changes (other than the case 1 or 2 stated above) initiated by any relevant Funding Organisation or the Call Management
4. Changes (other than the case 1 or 2 stated above) initiated by a Project Consortium and related to the Project Consortium, duration and budget, only when:
    - the Coordinator stays the same,
    - the changes are well motivated in relation to the project ambition and scope, and
    - the changes are approved by the relevant Funding Organisations and all the Project Consortium Partners.

However, addition of any Beneficiary Partner applying for funding from a Funding Organisation oversubscribed by more than four times its available budget in Stage 1 will be denied.

If any Funding Organisation turns out to be undersubscribed in Stage 1[27], the CETPartnership will encourage Project Consortia to include Beneficiary Partners applying for funding from the undersubscribed Funding Organisations to widen the involvement of Funding Organisations.

Changes in a Project Consortium other than the case 1 or 2 stated above must be notified with written proof from relevant Funding Organisations to the Call Management (callmanagement@cetpartnership.eu) before the panel meeting described in **Section 6.2.3**.

Please again consider that Funding Organisations may additionally require submission according to own submission procedure such as deadlines, portals and templates. See respective national/regional requirements in **Annex C**.

6.2.2 Eligibility check of full proposals

Eligibility checks will be performed on a submitted full proposal according to:

- Transnational eligibility criteria (see **Chapter 4**) by the Call Management.
- Call Module requirements (see **Chapter 8**) by a relevant TRI.
- National/regional requirements (see **Annex C**) by relevant Funding Organisations.

The TRI deems the full proposal:

- Eligible for funding in the Call
- Ineligible for funding in the Call

The Funding Organisations deem the Beneficiary Partners in the full proposal:

- Eligible for funding in the Call
- Ineligible for funding in the Call

[27] Potential Funding Organisations will be found on the start page of the CETPartnership Submission Platform after Stage 1.

A full proposal meeting all the transnational eligibility criteria and Call Module requirements can proceed to the next step. A full proposal with any ineligible Beneficiary Partners may proceed to the next step if the total effort of ineligible Beneficiary Partners only covers less than 25% of the total project efforts (measured in person months).

6.2.3 Evaluation of full proposals

Each full proposal will be individually evaluated according to the evaluation criteria described in **Chapter 5,** by an evaluation panel of at least three independent evaluators[28]. The evaluation panel will then have a meeting to reach a consensus and provide a full score for each of the three main evaluation criteria in the range of 0–5, resulting in a total consensus score in the range of 0–15.

A ranking list will be developed for each Call Module with full proposals having a consensus score at or above 3 for all the three evaluation criteria and a total consensus score at or above 10.

6.2.4 Selection of full proposals

The Funding Organisations will agree on a list of full proposals to be funded following the ranking lists in the former step, the available budgets, and the same core principles as in **Subsection 6.1.4**.

The outcome of Stage 2 will be notified by the Call Management to each Coordinator with a report on the eligibility checks and, if applicable, the evaluation of the full proposal, as well as information about redress, see **Section 6.3**.

6.3 Redress

The Coordinator of a Project Consortium, who considers that the outcome was based on an error in the selection procedure, can submit a written complaint. An eligible complaint must:

- be submitted as a single PDF document, including all relevant documents and written in English, to the Call Management (callmanagement@cetpartnership.eu) within 30 days of receiving the outcome.
- indicate which proposal the complaint applies to by stating the proposal code.
- state in what way the outcome is considered incorrect and what change is requested.
- focus on aspects concerning the outcome on the proposal *(e.g. admissibility or eligibility checks, evaluation procedure, etc.)*, not its merits.
- raise procedural irregularities, factual errors, manifest errors of assessment or abuse of powers *(e.g. lack of coherence between scores and comments, lack or inadequate reasoning of the conclusions, the*

[28] All independent evaluators declare their confidentiality, impartiality and independence prior to the start of the individual evaluation. They assess a conflict of interest prior to access to each proposal. In a conflict of interest, the evaluator will be excluded from the further evaluation process.

existence of a conflict of interests, exceeding the limits of discretion, etc). Mere repetitions of the content of the proposal or disagreements with the result or reasoning of the technical evaluation will not be considered.

Only one request for review per proposal will be considered in Stage 1 and 2 respectively. The request cannot refer to the outcome of proposals submitted by other Project Consortia or under different or previous calls.

An eligible and complete request for review will be referred to a committee convened by the Call Management and comprised of staff who were not involved in the process for eligibility checks or evaluation of the proposal. All requests for review will be treated as confidential but shared with the relevant Funding Organisations.

7. Project implementation

7.1 Funding arrangements and period

Funding arrangements will be made directly between the Project Consortium Partners and their national/regional Funding Organisations according to the Funding Organisations' procedure. The project must start before 15 December 2025 and finish in 36 months. It is highly recommended that all Project Consortium Partners in the Project Consortium synchronise their project start and end dates, even though their national/regional funding arrangements can be desynchronised.

7.2 Consortium Agreement (CA)

Each Project Consortium must have a signed Consortium Agreement (CA) between all the Project Consortium Partners, including intellectual property rights (IPR) issues. It is recommended to have it already at the project start or within 6 months after the project start and to involve the Coordinator's legal department in this process. There are several models for CA in Horizon Europe projects, which can be modified to fit a CETPartnership project (e.g. DESCA, DIGITALEUROPE MCARD-HEU and EUCAR).

7.3 Gender Equality Plans

The Beneficiary Partners must follow HE Guidance on Gender Equality Plans (GEPs)[29]. It means that public bodies as well as public and private higher education establishments and research organisations established in EU Member States and Associated Countries must have a GEP.

7.4 Changes in projects

Any changes in a project selected for funding must be communicated with and approved by relevant Funding Organisations and reported to the CETPartnership Knowledge Community Management (knowledgecommunity@cetpartnership.eu). Such changes may affect the funding from the CETPartnership.

7.5 Project reporting

The Coordinator must submit annual reports and a final report on the transnational level to the CETPartnership, see Task 1 in **Annex A**. The collected data will be used for monitoring purposes.

Specific national/regional requirements may apply regarding the reporting.

[29] https://op.europa.eu/en/publication-detail/-/publication/ffcb06c3-200a-11ec-bd8e-01aa75ed71a1/language-en/format-PDF/source-232129669

7.6 Project communication and dissemination

Each project is expected to acknowledge the CETPartnership, EU and relevant Funding Organisations, have a webpage, to prepare popular scientific summaries and to actively participate in the CETPartnership Knowledge Community (see **Section 1.4**) for increased knowledge sharing and dissemination of results. Read more in **Annex A** and the CETPartnership Communication Guidelines[30].

Specific national/regional requirements may apply regarding the communication and dissemination.

[30] https://cetpartnership.eu/sites/default/files/documentation/CETP_Communication%20Guidelines%20to%20support%20Calls%20beneficiaries_0.pdf

8. Call Modules

The Call consists of 11 Call Modules, addressing different energy technology and system challenges as well as different RDI approaches and thus complementing and completing each other.

In addition to the transnational eligibility criteria (see **Chapter 4**) and national/regional requirements (see **Annex C**), specific Call Module requirements may apply, see **Call Module requirements** in the table below each Call Module title. More information about the Call Module requirements may be described in relevant sections of the Call Module text.

CM2024-01 Data spaces and interoperability

Target RDI approaches/TRLs	Project start: TRL 3 Project end: TRL 6 or higher
Project Consortium Partners	Consortium possessing the necessary expertise across relevant disciplines.
Project budget	Approximately €5 million
Call Module requirements	None
Contact	TRI1 and TRI5

Objectives

This Call Module will fund a pilot of an IT framework consisting of software services which will enable the interoperable connection of data spaces at multi-lateral (i.e. involving different regions or countries) and cross-sector level. The pilot may use experience of multi-lateral interoperability successfully developed in other sectors (e.g. eProcurement, eID, eHealth) and will serve as a blueprint for the architecture and services in the energy sector. This will ensure future cross-sector interoperability.

This Call Module focuses on the development of an IT framework that could be used for the implementation of many different Use Cases at multi-lateral and cross-sector levels. In order to validate the approach and the IT framework, a specific Use Case is proposed, i.e. communication in the **EV-charging infrastructure enabling the provision/request of ancillary services to/from the electricity network through data exchange and integration between energy and mobility**.

Different Use Cases could be proposed, provided that they address multi-lateral and cross-sectoral applications.

In order to achieve the maximum impact, this Call Module is meant to fund **one single project**.

Background

Data spaces are ecosystems in which data is the strategic resource used by data providers, intermediaries, and users. These stakeholders can access them to share data and enable the functionalities of the energy systems (e.g. observability and control of networks, market participation of storage operators, EV charging, etc.).

According to the European Interoperability Framework (EIF)[31], "interoperability is the ability of organisations to interact towards mutually beneficial goals, involving the sharing of information and knowledge between

[31] European Commission, „New European Interoperability Framework – Promoting seamless services and data flows for European public administrations", 2017 – available here

these organisations, through the business processes they support, by means of the exchange of data between their ICT systems".

The energy transition will necessarily make use of multi-lateral data exchange. European data spaces in the energy field should rely on an interoperable IT framework for multi-lateral and cross-sector data exchange, in order to enable energy system integration from local to pan-European dimension.

Multi-lateral rules and opportunities for EU data access are fragmented (e.g. smart meter data in the Member States), making use of data collected in Member States particularly difficult. There are various data spaces in the energy sector that are not always interoperable among each other (e.g. electricity) and, more generally, among sectors (e.g. P2X).

ScopeThis Call Module will fund a pilot of an IT framework consisting of software services, which will enable the interoperable connection of data spaces at multi-lateral and cross-sector level. The concepts of authorisation, authentication and cybersecurity must be considered by design.

The aim of the pilot project is to demonstrate the potential for multi-lateral data exchange and sharing by building on existing solutions, also in other sectors like healthcare or mobility sector, to show the potential benefits and added value of an EU-wide large-scale IT framework. It should build on existing data spaces and initiatives and draw inspiration from best practices in other areas, such as:

- concept of myHealth@EU[32] / eHealth[33]
- concepts like eHealth Digital Service Infrastructure (eHDSI)[34] or Napcore[35]
- CEF[36], CEF building blocks[37]
- Once only principle[38] / Once Only Technical System[39]
- Gaia-X[40]
- SIMPL[41]

The Use Case(s) of this pilot project aims to demonstrate the potential of multi-lateral data sharing by using, where possible, the existing data authorisation bodies or access authorities (i.e. national authorities,

„The European interoperability framework is a commonly agreed approach to the delivery of European public services in an interoperable manner. It defines basic interoperability guidelines in the form of common principles, models and recommendations. https://ec.europa.eu/isa2/sites/default/files/eif_brochure_final.pdf "

[32] Electronic cross-border health services - European Commission (europa.eu)
[33] eHealth : Digital health and care - European Commission (europa.eu)
[34] Electronic cross-border health services - European Commission (europa.eu)
[35] NAPCORE | National Access Point Coordination Organisation for Europe
[36] Connecting Europe Facility - European Commission (europa.eu)
[37] Digital Homepage (europa.eu)
[38] The Once Only Principle System: A breakthrough for the EU's Digital Single Market - European Commission (europa.eu)
[39] Once Only Technical System (europa.eu)
[40] Home - Gaia-X: A Federated Secure Data Infrastructure
[41] SIMPL: Rationalisierung von Cloud-to-Edge-Föderationen für wichtige EU-Datenräume | Gestaltung der digitalen Zukunft Europas

contact or access points) and other EU organisations (e.g. European agencies) and to show the potential benefits and added value of a large-scale IT framework. The funded project shall support the development of interoperable European multi-lateral energy data spaces. It should design, develop, set up and operate a pilot network of nodes (representing different data brokers, holders, consumers, and providing IT services) interconnected by centralised services.

Target topics

Proposals must include the following:

- define and select the Use Case(s) (including necessary energy datasets) for the validation, that builds on energy data made available by the consortium partners to demonstrate added value of multi-lateral standardised data exchange
- define requirements (business, functional and non-functional) for an IT framework to enable EU-wide standardised exchange of energy data
- design the architecture and the specifications for the building blocks necessary for an IT framework based on experience of other sectors (nodes and central services) to enable EU-wide use of energy data; use as much as possible the existing IT infrastructure on EU and national levels e.g. CEF building blocks
- develop, customise or integrate technology to fulfil the agreed requirements, architecture and specifications, as indicated in points above
- test the Use Case(s) before implementation for ensuring effective interoperability. Facilities of the CETPartnership / ERA Net European Collaboration Network of Interoperability Testing are available for interoperability testing
- run the selected Use Case(s) over the implemented IT framework (validation of the process)

The project shall address the scalability of the developed IT framework to the widest possible European geographical context and evidence the added value of multi-lateral use and exchange of energy data.

In order to validate the approach and the IT framework, a specific Use Case is proposed, i.e. **communication in the charging infrastructure for electric vehicles, which enables the provision/request of ancillary services to/from the electricity grid through data exchange and integration, thus enabling a cross-sector connection of energy and mobility.**

This demonstration Use Case should include the multi-lateral identification of the electric vehicle, the communication of the availability or reservation of charging points and the communication for the interaction of the charging point for the provision/request of ancillary services. For the communication, the existing standards and regulations have to be taken into account.

Please note that the scope of the solution for the pilot is the implementation of the communication framework and not the physical processes.

Expected results of this pilot:

- requirements, architecture and specifications for the technological building blocks for an IT and data framework to enable EU-wide use of energy data; following the principles of EIRA[42], which is based on the European Interoperability Framework (EIF)
- demonstrating the pilot of a working framework across at least 5 countries

Specific requirements:

- the use of Connecting Europe Facility (CEF) building blocks and the adoption of open standards should be considered in the definition of specifications
- the use of DCAT Application Profile[43] for data portals in Europe (DCAT-AP) as baseline specification for metadata records should be explored as cornerstone for semantic interoperability with other European data spaces
- ensure open-source results, made available through a public repository under a permissive license
- develop, test, deploy and operate a reusable IT framework for use of energy data with a sufficient number of nodes to demonstrate scalability and flexibility

Additionally, Project consortia shall consider overarching challenges, such as:

- Organisational challenges:
    - Federation of data spaces in the ecosystem
    - Mechanisms for the long-term maintenance of the data space
- Social challenges:
    - Trust
    - Privacy
    - Involvement of end users

Expected impact

Experience in other sectors (particularly the health sector) shows that in the development of such an IT framework it is advisable to start focusing on specific limited Use Case(s) although keeping in mind the overall picture, thus ensuring the modularity of the approach.

Scalability, replicability and maintainability can be achieved more efficiently if interoperability is considered by design. In addition, the transnationality of the CETPartnership provides a good opportunity to create a sustainable and accepted solution.

[42] https://joinup.ec.europa.eu/collection/european-interoperability-reference-architecture-eira
[43] About DCAT-AP: DCAT Application Profile for data portals in Europe | Joinup (europa.eu)

It is expected that the project will work closely with relevant initiatives at European level, exchange ideas and adopt or expand existing approaches, such as the CETP / ERA Net European Collaboration Network of Interoperability Testing, International Data Spaces e. V. or Gaia-X.

Dimensions of innovation

Projects shall drive innovation, lead to findings and create evidence-based knowledge in the three dimensions of innovation as outlined in Annex B as follows:

Dimension 1: Technologies, Infrastructures and System Solutions	Dimension 2: Organisation of Energy Systems	Dimension 3: Transition of Energy Systems
Develop software services	Federation of data spaces in the ecosystem Mechanisms for the long-term maintenance of the data space	Trust Privacy Involvement of end users

Individual proposals have to address the development of technologies, infrastructures and system solutions (Dimension 1) as well as the outlined aspects in the dimensions 2 and 3.

CM2024-02 Energy system flexibility: renewables production, storage and system integration

Target RDI approaches/TRLs	Project start: TRL 3 or higher Project end: TRL increase of 1–2 from project start

Project Consortium Partners	• Secondary and higher education establishments
	• Research organisations
	• Private for-profit companies, bringing in expertise, knowledge, and know-how for the implementation of innovative and breakthrough solutions, such as:
	  ○ system operators
	  ○ SMEs
	  ○ spin-off companies

Project budget	Applied funding from the Call in the range of (but not limited to) €1–2 million.
Call Module requirements	None
Contact	**TRI1 and TRI2**

Objectives

This Call Module, developed in collaboration between the Mission Innovation (MI) Green Powered Future Mission (GPFM) and the CETPartnership TRI1[44] and TRI2[45], aims to increase opportunities for international cooperation and represents the implementation of the GPFM Flagship Project 2 (FP2) "Multilateral Research Programme" to take forward a selection of the identified Innovation Priorities (IP) for the power system de-carbonisation and transformation. FP2 was launched by the GPFM at the Global Clean Energy Action Forum held in Pittsburgh (September 2022) as part of the GPFM Action Plan 2022-2024[46].

The MI GPFM aims to demonstrate that by 2030, power systems in different geographies and climates can effectively integrate up to 100% variable renewable energies (e.g. wind and solar) in their generation mix, and maintain a cost-efficient, secure and resilient system.

Scope

This Call Module addresses key aspects of the clean energy transition ranging from large-scale integration of renewable energy sources into the power grids, considering storage as a possible solution to deal with their intermittent nature, to broad technological and market aspects as well as approaches towards system

[44] https://cetpartnership.eu/tri/1
[45] https://cetpartnership.eu/index.php/tri/2
[46] https://explore.mission-innovation.net/wp-content/uploads/2022/09/Green-Powered-Future-Mission-Action-Plan-2022-2024-1.pdf

integration. Moreover, digitalisation and standardisation, being key enablers for the deployment of innovative system flexibility solutions, need to be duly considered by the submitted proposed projects.

The Innovation Priorities addressed by this Call Module are listed below and have been selected with the help of a task force set up within the GPFM and by joint discussions between the GPFM and the CETPartnership. These challenges are well aligned with the CETPartnership SRIA[47]: funded projects are therefore expected to contribute to reach the targets of both initiatives.

Proposals must address one or more of the following Innovation Priorities:

1. Large-scale renewable energy generation for improving system reliability & stability (GPFM IP 1.3.2)
2. Variable renewable energy flexibility provision & contribution to generation capacity (GPFM IP 2.1.1)
3. Innovation in energy storage technologies (GPFM IP 1.5.3)
4. Utility scale storage systems for innovative flexibility services (GPFM IP 2.4.3)
5. System stability assessment considering high VRE penetration (GPFM IP 2.3.1)
6. Enhanced TSO-DSO coordination platform for flexibility markets optimisation (GPFM IP 2.3.2)
7. Flexibility markets for innovative ancillary services by VRE and storage (GPFM IP 2.7.1)
8. Unlocking commercial and residential buildings flexibility potential (GPFM IP 2.5.2)
9. Connected data platforms for enhanced forecasting and flexible operation (GPFM IP 3.3.2)
10. Standardisation of devices and control platforms (GPFM IP 3.1.2)
11. Identify priority dataset for system security (GPFM IP 3.2.2)
12. Grid supporting technologies from inverter-based resources (GPFM IP 1.6.2)
13. Tools and solution for DSO flexibility management (GPFM IP 2.3.4)
14. Demand response, EV services and grid impact assessment (GPFM IP 2.5.4)

The Call Module mainly focuses on research and development, while demonstration and implementation are considered as subordinate. Nevertheless, it is expected to possibly involve industry, bringing in expertise, knowledge, and know-how for the implementation of innovative and breakthrough solutions.

The proper involvement in the consortia of Research Performing Organisations (RPO) and private sector actors such as system operators, SMEs, spin-off companies, will be key to submit sound project proposals. Projects should preferably be designed building on top of existing initiatives or assets and propose replicable and scalable solutions.

[47] https://cetpartnership.eu/sites/default/files/documentation/cetp_sria_1.0.pdf

The Call Module expects mainly international consortia, as it aims to engage with GPFM country member organisations, among which are included extra-European countries (countries outside the EU and not associated to Horizon Europe), contributing to foster the CETPartnership approach worldwide and link the MI GPFM Innovation platform[48] to the CETPartnership Knowledge Community.

Target topics

All the Innovation Priorities listed above are clustered into 5 main R&I topics, and proposals must cover at least one or more of them:

1. Large-scale renewable generation and system stability and reliability
2. Energy storage technologies and systems for flexibility services
3. System stability and flexible operations
4. Innovative flexibility sources and demand side for flexibility markets
5. System digitalisation and related tools & technologies, including AI and digital twin

Expected impact

This Call Module is intended to concentrate efforts and financial resources to accelerate the deployment of key innovations thus enabling the realisation of clean energy solutions in the near future.

The Call Module, coherently with CETPartnership and GPFM objectives, has the goal of demonstrating that power systems, regardless of geography or climates, can effectively integrate up to 100% variable renewable energy in their generation mix by 2030 while ensuring the system is cost-efficient, secure and resilient.

The expected impact of this Call Module is that by supporting projects involving partners outside of Europe, the Call Module will facilitate the dissemination of this approach globally. Consequently, this may prompt more countries to embrace clean energy technologies and practices.

[48] https://mission-innovation.net/platform/

CM2024-03A/03B Advanced renewable energy (RE) technologies for power production

Target RDI approaches/TRLs	CM2024-03A: TRL 3–5 Project start: TRL 3 or higher Project end: TRL 4 or higher CM2024-03B: TRL 5–7 Project start: TRL 5 or higher Project end: TRL 6 or higher
Project Consortium Partners	• Secondary and higher education establishments • Research organisations • Private for-profit companies such as: o SMEs o Spin-off companies o Large companies o Technology providers
Project budget	CM2024-03A: in the range of (but not limited to) €1–2 million CM2024-03B: in the range of (but not limited to) €2.5–5 million including possible self-financing.
Call Module requirements	Projects applying as IOA shall comprise at least one industry partner / private for-profit companies
Contact	TRI2

The following RDI approaches, Research-oriented approach (ROA) and Innovation-oriented approach (IOA), apply to CM2024-03A/03B respectively:

- **Research-oriented approach (ROA)** aims to create knowledge or explore the feasibility of a new or improved technology, product, process, service or solution and includes applied research, technology development and integration, testing, demonstration and validation of a small-scale prototype in a laboratory or simulated environment.
- **Innovation-oriented approach (IOA)** aims to develop plans and arrangements or designs for new or improved products, processes or services and includes prototyping, testing, demonstrating, piloting, large-scale product validation in an operational environment, and market replication.

Objectives

These Call Modules, following the challenge of the CETPartnership TRI2[49], aims to contribute to global leadership in renewables, with specific reference to the key actions 1 and 2 of the SET Plan[50]. See also the relevant IWGs' Implementation Plans in the section Expected impact below.

Building on the CETPartnership SRIA[51], the Call Modules address critical gaps in R&I and push the boundaries of renewable energy technologies in order to bring onto the market more efficient, reliable, cost-effective and sustainable solutions for a net zero-emission power system.

The Call Modules target innovative projects in order to have a balanced portfolio of RE technologies for power production at different TRL stages. CM2024-03A calls for ROA (Research-Oriented Approach) projects, and CM2024-03B calls for IOA (Innovation-Oriented Approach) projects. Projects can apply for either CM2024-03A (ROA) or CM2024-03B (IOA), according to the targeted TRL at the end of the project.

Scope

The Call Modules are open to all the broad portfolio of RE zero-emission power technologies. Specific focus is on RE technologies for power generation on a utility scale such as: onshore and offshore wind, ocean energy (tidal, wave, OTEC, osmotic energy etc.) and other offshore renewables, and solar energy (PV and CSP/STE). Bioenergy for power generation (with negative carbon emissions) is also in scope. Please note that bioenergy applications dedicated to fuel production are considered in CM2024-05.

Projects are expected to contribute to one or more of the following challenges:

- Integration of generation facilities and technologies combining different renewable energy sources (RES) and/or storage on the same site/point of connection to the grid.
- Hybridisation: Producing power together with other energy vectors (PV-T, PV-Hydrogen, CSP-STE power and heat, biomass power and heat, power and H2 or other energy vectors).
- Advancing technologies and improving performance: Improving the efficiency and performance of renewable technologies through innovative/improved components, materials and technologies.
- Improving operational efficiency: Developing advanced monitoring and predictive analytics, real-time monitoring of renewable energy assets for early detection of issues to prevent system failures and maximise energy generation.
- Next generation RES: New breakthrough and emerging technologies: exploring innovative approaches to increase efficiency or sustainability of RE technologies.
- Site-specific marine/atmospheric modelling and forecasting: Developing marine / meteorological models on a sub-regional scale to improve performance, reliability, availability of RES.

[49] https://cetpartnership.eu/index.php/tri/2
[50] https://energy.ec.europa.eu/topics/research-and-technology/strategic-energy-technology-plan_en
[51] https://cetpartnership.eu/sites/default/files/documentation/cetp_sria_1.0.pdf

- Digitalisation and digital twins: Design, development and application of digital twins for renewable energy technologies, such as wind turbines and solar panels.

Target topics

Projects shall address one or more of the following topics:

BIOENERGY FOR POWER GENERATION

- High efficiency biomass (co)generation of power with improved performance and higher share of power production ratio, using residues / wastes as feedstocks, with negative carbon emissions
- Integrated cogeneration/CHP (combined heat and power) systems enhancing annual total efficiency and power capacity factor, with negative carbon emissions

CONCENTRATED SOLAR POWER (CSP) / SOLAR THERMAL ENERGY (STE)

- Line-focus solar power plants technology: Component development; process innovation and cost optimisation for molten salts systems; solar collector fields with silicone oil as a heat transfer fluid (HTF)
- Central Receiver power plants technology: Innovative concepts, materials and components for central receiver molten salt technology; quality characterisation and standardisation of receivers for tower power plants; particle receiver technology; solar thermal chemical receiver
- Reliable and cost-effective heat transfer media to innovative high-temperature thermal storage systems; next generation of thermal energy storage (TES) technologies for CSP/STE applications; quality characterisation and standardisation of heat transfer media
- Digitalisation of CSP plants for a more efficient flexibility, monitoring, operation maintenance and control, including interfaces for remote control
- Materials: Innovative coatings for mirrors and absorbers; quality characterisation and standardisation of reflectors (fouling and degradation)
- Integration of meteorological forecasts: Yield determination and standardisation of hybrid power plants (PV+CSP)

OCEAN ENERGY

- Direct Generation Wave Energy Converter design and development: Direct generation technologies that can directly transfer wave motion into electricity through the properties of electroactive metamaterials, e.g. Dielectric Elastomer Generators (DEGs) and dielectric fluid generators
- Dry-testing of power take-off for wave energy devices to debug, improve, stabilise, fine-tune and optimise wave energy devices before offshore operations
- Tidal stream power take-off: Improving the survivability and efficiency of tidal blades/drivetrains to enhance performance and reliability of the device

OFFSHORE RENEWABLES (ocean/marine renewables, floating wind/PV, etc.)

- Critical technologies for arrays: Intra-array cabling, subsea hubs or other subsea electrical architecture etc. applicable to multiple device types
- Materials for moorings, foundations and components: Materials with improved fatigue, damping, stiffness, bio-fouling management or other cost-reducing characteristics
- Mooring and foundations: Advanced mooring and connection systems for floating ocean/offshore energy devices; innovative foundations for bottom-fixed devices integrating biodiversity and sustainability aspects
- Connections and cabling systems: Solutions to reduce the cost of connection and cabling systems, maintenance requirements and costs, dynamic cable repair solutions
- Operation and maintenance (O&M): Innovative solutions to reduce costs of maintenance and optimise operations, including data analytics and predictive maintenance; instrumentation for condition monitoring; autonomous solutions and vehicles; self-healing materials
- Site-specific marine observation, modelling and forecasting: marine / meteorological data to improve performance, reliability, availability of offshore renewables

SOLAR PHOTOVOLTAICS

- Performance enhancement and cost reduction through advanced PV technologies
- Lifetime, reliability and sustainability: Advanced PV technologies and applications; low environmental impact materials, processes, products
- Digitalisation for O&M: Advanced data analytics; digital twin of assets and components; predictive maintenance
- New applications through integration of PV: Agro-voltaic and landscape integration; floating PV; infrastructure integrated PV (IIPV)

WIND ENERGY (OFFSHORE AND ONSHORE)

- Next generation of wind turbine technology: New technology solutions in rotor, drive train, support structures and electrical system; smart rotor technology to reduce loads; adaptive blade and turbine control
- Digital solutions and digital twins for turbine and optimised wind energy applications, big data analytics and AI combined with system modelling for control and performance optimisation
- O&M: Digital solutions for wind energy operation, maintenance and installation, optimisation tools for operational efficiency
- Lifetime extension: Solutions for control and monitoring of the degradation; self-diagnostic systems and multi-sensor constructions; innovative solutions to extend the lifetime of wind farms

- Sustainable wind farms: Modelling of wind farm impacts and cumulative environmental impacts on ecosystems; mitigation and deterrent technologies preventing collision of birds and bats with the wind turbine rotor; nature-inclusive design
- Site allocation and public acceptance: Tools to map stakeholder concerns; new ways, practices and tools for increasing public dialogue, enhancing social acceptance and facilitating deployment

HYBRIDISATION AND INTEGRATION

- Site and system integration of co-located RES (onshore and offshore) and/or with storage: Site and technology integration of multiple RES and/or with energy storage and power-to-X
- Hybrid systems: Combined electricity generation with heat or other energy carriers in hybrid systems (PV-T, PV-Wind-Hydrogen, PV + CSP-STE etc.)

Expected impact

Projects shall address one or more of the following outcomes:

- Increase the **energy conversion efficiency**, contributing to zero-emission power production
- Increase **technology performance** (with reference to SET Plan Implementation Plans52) and/or lifetime
- Increase **system efficiency** by new modelling approaches, tools and methodologies
- Decrease **investment cost and LCOE** and/or improve the overall economics of the technology
- Optimise and **decrease cost by coupling** different power production technologies on the same site

Projects shall also contribute to sustainability:

- Reduce **environmental impact** (e. g. land use, effects landscape, on biodiversity and animal life) or significantly improve multiple use of occupied land surface / or maritime space
- Minimise the use of **critical raw materials** (CRM)
- Consider extension of the **end of life** and apply **circularity-by-design** approaches

The following SET Plan Implementation Plans shall be considered as references concerning impact KPIs:

- CSP/STE: Initiative for Global Leadership in Concentrated Solar Thermal Technologies – Updated Implementation Plan (2023)
- Ocean Energy: Ocean Energy – Implementation Plan (2021)
- PV: Implementation Working Group (IWG) on Photovoltaics (PV) Implementation Plan (2023 revision)
- Wind : 2nd SET Plan Implementation Plan for offshore wind (2022)

[52] https://setis.ec.europa.eu/implementing-actions/set-plan-documents_en#implementation-plans

CM2024-04 Carbon capture, utilisation and storage (CCUS)

Target RDI approaches/TRLs	Project end: TRL 5 or higher Activities at lower TRLs may be included if they contribute to the higher TRL goal of the overall project. See additional information under Scope in the text below.
Project Consortium Partners	• Secondary and higher education establishments • Research organisations • Private for-profit companies • Public bodies (local/regional governments) • Non-profit organisations Proposals must demonstrate the interest of industry partner(s) by actively involving them in the project
Project budget	Applied funding from the Call in the range of (but not limited to) €1–4 million.
Call Module requirements	Proposals targeting lower TRL than indicated above are ineligible. Active industrial involvement in research and innovation activities.
Contact	TRI3

Objectives

This Call Module, following the challenge of the CETPartnership TRI3[53], aims to contribute to global decarbonisation efforts and accelerate development and implementation of capture, utilisation and storage (CCUS) technologies by supporting targeted research and innovation activities. It will support global efforts to reduce CO_2 emissions by more than 50 percent by 2030 compared to 1990 and further efforts for climate neutrality.

Scope

The Call Module supports projects to develop and implement CCUS technologies, primarily in the industrial and energy sector.

To accelerate the time to market for the CCUS technologies, projects require cost-shared participation from the industrial sector, especially from energy intensive and heavy industries, which will benefit strongly from implementing the technologies.

[53] https://cetpartnership.eu/index.php/tri/3

Proposals must illustrate the potential for upscaling to industrial size either in a demonstration phase or an early-commercial phase. Proposals focusing on developing new pilot and demonstration facilities are of special interest.

In addition to technological solutions, proposals should also address environmental, social, and economic implications that might impact industrial application of the proposed technology. Proposals addressing only environmental, social or economic implications of existing and commercial ready technologies are outside the scope of the Call Module.

The term CCUS refers to all areas of the CCU and CCS chains. It encompasses a wide spectrum of technologies to capture CO_2 from point sources or directly from the air, transport captured CO_2 through multi-modal approaches and either store it in porous geological formations that are typically located several kilometres under the earth's surface, onshore or offshore (CCS), or use the CO_2 to produce valuable products like fuels or energy, chemicals, and other materials (CCU). Under this call, CCU does not include the use of CO_2 as a non-reactive working fluid, unless it is combined with other renewable systems (such as geothermal) to constitute a CCUS system.

This Call Module complements CM2024-09. In case of uncertainty about where to best propose your project, consult with relevant Funding Organisations or TRIs.

The acceleration of CCU/CCS technology deployment also depends on costs, markets and supporting frameworks. The Australian Renewable Energy Agency (ARENA) has developed and applied the concept of a Commercial Readiness Index, CRI, as shown in the figure below. The CRI casts technologies in terms of their commercial value proposition and ability to obtain financing for deployment.

Proposals must illustrate how their projects will help accelerate the time to market of affordable, cost-effective, low environmental impact and resource efficient CCU/CCS technologies. References to CRI and TRL should be included in applications (as seen in the figure below).

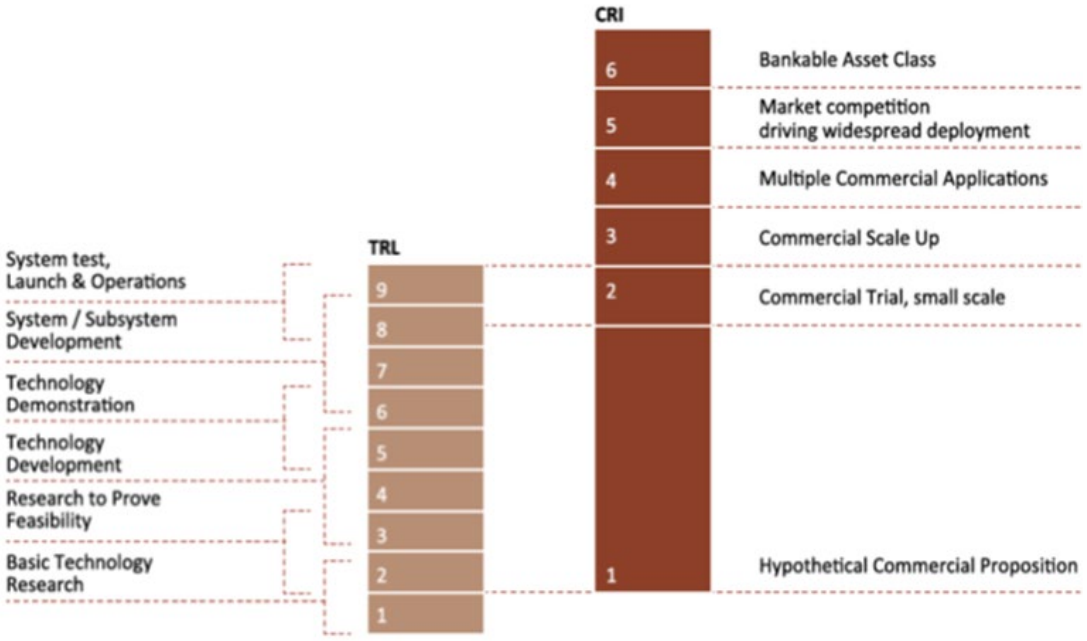

Figure 8.1. Technology Readiness level (TRL) and the Commercial Readiness Index (CRI)

Target topics

Projects must address one or more of the research and innovation activities described by the CCUS Roadmap to 2030 of the SET Plan IWG9[54] and the Mission Innovation Research Priorities[55], with special emphasis on the following topics:

- CO_2 capture from energy intensive or heavy industry sectors (waste to energy, cement, iron/steel, aluminium, other metals, etc.), power generation, maritime transport, and hydrogen production from natural gas.
- Advancing lower cost CO_2 capture technologies that can effectively remove 95-100% of CO_2 from flue gases with dilute CO2 concentrations.
- CO_2 transport and storage infrastructure (pipelines, ships and other non-pipeline transport, intermodal options, monitoring and metering within CO_2 networks, temporary storage, well integrity and well technology).
- Developing commercial CO_2 storage sites effective sites, including elements that are needed for screening and characterisation, safe management, and low-cost effective monitoring.
- Enabling CCUS technologies, including the CO_2 capture, conversion, and utilization value chain.

[54] https://www.ccus-setplan.eu/wp-content/uploads/2021/11/CCUS-SET-Plan_CCUS-Roadmap-2030.pdf
[55] https://www.energy.gov/fecm/articles/accelerating-breakthrough-innovation-carbon-capture-utilization-and-storage

- Negative emission technologies: carbon dioxide removal (CDR), reactive capture (RC), direct air capture (DAC), biomass with CCS (BECCS), and biomass carbon removal and storage (BiCRS).

Proposals must also address at least one of the following topics:

- Improvement of the cost-efficiency and energy-efficiency along the value chain (scale-up, storage at basin-scale including hubs, by digital tools, or by effective collaboration among the stakeholders etc.).
- Faster scale-up of CCU/CCS technologies at lower risk (by design, demonstration, development of legal framework, measures to strengthen the innovation system, knowledge sharing from full-scale operations, integration into the energy system, etc.).
- Development of lower cost solutions for efficient CO_2 capture from hydrogen produced using natural gas, and new technologies for processing, shipping, transport, and storage of hydrogen.
- Design and manufacturing of new materials that can make CCU/CCS more affordable.
- Development of CCU/CCS market and business case.
- Assessments of risks to the environment and human health throughout the CCU/CCS life cycle and development of mitigation approaches and strategies.
- Development of circular economy strategies to reduce CO_2 footprint throughout the CCU/CCS life cycle.
- Development of best practices and strategies for educating the general public about the benefits and risks of CCU/CCS.
- Development of strategies for engagement between CCU/CCS project developers and communities that lead to projects with mutual benefits and social acceptance.
- Development of a robust life-cycle assessment (LCA) and techno-economic analysis (TEA) for full CCU/CCS value chains and life cycles. Alternatively, development of a more complex sustainability assessment addressing social sciences and humanities (SSH) disciplines (e.g., sociology, social psychology and economics).
- Develop net negative CO_2 emission solutions, such as direct air carbon capture and storage (DACCS) or Biomass Carbon Removal and Storage (BiCRS).
- Development of technologies and approaches for monitoring and managing basin-wide effects and impacts from multiple CCS projects within a basin.

Access to top class research infrastructure is key for reaching the objectives of this call. Project proposals should, if relevant, seek to maximise synergies with existing infrastructures, such as, for example ECCSEL[56], members of the International Test Centre Network[57], the Alberta Carbon Conversion Centre (ACCTC[58]) or similar world class infrastructures.

[56] ECCSEL -Carbon dioxide research facilities
[57] International Test Centre network
[58] Alberta Carbon Conversion Technology Centre

Expected impact

Funded projects must advance the state-of-the art for CCU/CCS technologies and contribute new knowledge and competence that bring CCU/CCS closer to commercialisation by bridging the gap between technology development and its implementation by the industry.

Funded projects are expected to lead to at least one of the following:

- CO_2 capture on an industrial scale by early 2030s.
- CO_2 storage on megaton scale by early 2030s and gigaton scale by 2050.
- Pave way for deployment of large-scale infrastructure for CO_2 capture from multiple sources, cross-border CO_2 transport, and CO_2 storage of ten million tons of CO_2 annually by mid 2030s.
- Be a bridge to implementation of CO_2 utilisation projects on an industrial scale by early 2030s that will have a sustainable and significant effect on reducing CO_2 emissions.
- Pave way for net zero or negative CO_2 emission technologies implemented on an industrial scale by mid 2030s.

CM2024-05 Hydrogen & renewable fuels

Target RDI approaches/TRLs	Project end: TRL 5 or higher Activities at lower TRLs may be included if they contribute to the higher TRL goal of the overall project. The Social Readiness Level (SRL) is also relevant to consider when evaluating opportunities for deployment and commercialisation.
Project consortia partners	• Higher education establishments • Research organisations • Private for-profit companies • Public bodies (local/regional governments) • Non-profit organisations
Project budget	See **Section 4.3**.
Call Module requirements	Industrial involvement in research and innovation activities
Contact	TRI3

Objectives

This Call Module, following the challenge of the CETPartnership TRI3[59], aims to accelerate the substitution of fossil fuels by facilitating the development and implementation of technologies for effective and efficient production, distribution, storage and end-use of hydrogen (blue and green)[60], and renewable and advanced fuels[61], including aspects related to security of supply, through support to research and innovation activities.

Background

Hydrogen plays a key role in the clean energy transition, since it can be used for many essential chemical processes, as a fuel to power gas turbines and fuel cells, and as an input to produce electrofuels (e-fuels)[62], biofuels and other hydrogen carriers like ammonia. Further development of hydrogen technologies is necessary to facilitate process integration and cost reduction.

Hydrogen can be produced from fossil fuels, *i.e.* natural gas with CCS (so-called blue hydrogen), or from biomass or renewable electricity (so-called green hydrogen). High purity (>99.9%) of hydrogen can be achieved by water electrolysis, by natural gas reforming, and by gasification of biomass and other solid feedstocks

[59] https://cetpartnership.eu/index.php/tri/3
[60] Produced with maximum emission of 3 kg CO_2eq/kg H_2 (EU taxonomy).
[61] Biofuels, bioliquids, biomass fuels and renewable fuels of non-biological origin (Directive (EU) 2023/2413)
[62] Electrofuels or e-fuels are a class of synthetic fuels and drop-in replacement fuels that are made by storing energy from renewable sources in the chemical bonds of liquid or gas fuels, aiming to be a carbon-neutral fuel. The primary targets are butanol, biodiesel, and hydrogen, but include other alcohols and carbon-containing gases such as methane and butane.

(coal, waste plastics and municipal solid waste) through further hydrogen separation or purification. Integration of hydrogen production with CCS offers significant opportunities for cost reduction and needs to be implemented in a large scale. Hydrogen production with bio-CCS can be done through anaerobic digestion, fermentation, gasification or pyrolysis and is attractive as it would deliver negative emissions, although it would compete with other sources of demand for biomass.

Renewable fuels are environmentally friendly energy carriers and can offer important, flexible and cost-effective options required to achieve a sustainable, net-zero energy system, particularly when they are produced with surplus electric power (*i.e.* power-to-X) and CCUS. Example of renewable fuels are thermo-, photo- and electrochemical solar fuels, as well as advanced biofuels from sustainable biomass[63], *e.g.* produced in biorefineries. The provision of such renewable fuels is crucial for sectors that are difficult to electrify: the industrial, residential and especially transport sectors, with heavy-duty road transport, shipping, and aviation.

The use of renewable ammonia is expected to increase for both fertiliser and e-fuels. The advantage of renewable ammonia is that its production does not require a CO_2 source, it is easy to transport, and it is an established commodity. Thus, ammonia can be produced at remote locations with access to cheap renewable electricity.

Advanced fuels with reduced emissions are expected to impact aviation and shipping in all countries, most likely as sustainable fuels for aviation and as ammonia or methanol for marine applications. For short distance ferries, batteries or hydrogen will be an option.

Scope

The Call Module supports projects to develop and implement technologies for effective and efficient production, distribution, storage and end-use of hydrogen (blue and green) and renewable fuels. To accelerate the time to market for the technologies, the Call Module seeks innovative projects which have industrial involvement and can support new or already existing pilot or demonstration facilities.

The Call Module also addresses environmental, societal and economic challenges requiring solutions. It means that proposals must illustrate how the projects will help accelerate the time to develop and implement environmentally friendly, resource- and cost-efficient technologies to produce, distribute, store and use hydrogen and renewable fuels along the whole value chain.

The Call Module is in line with the SET Plan priorities and its new directions[64] and strives to complement the Horizon Europe work programmes and other funding opportunities including the national and regional programmes of the Funding Organisations in the CETPartnership.

[63] Advanced biofuels mean biofuels that are produced from the feedstock listed in Part A of Annex IX, Directive (EU)2018/2001.
[64] COM/2023/634 final, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2023:634:FIN

Target topics

Projects must address one or more of the following research and innovation topics described by the SET Plan IWG8 on Renewable Fuels and Bioenergy and Renewable Fuels for Sustainable Transport[65], the ERA pilot on Green Hydrogen[66] and the Research Priorities (Houston 2017)[67] :

- Hydrogen and renewable fuel production using new and improved processes
- Reliable and low-cost production technologies of new and advanced fuels
- Hydrogen and renewable fuel distribution using new and adapted infrastructures, and in the case of hydrogen considering different types of carriers
- Secure and safe fuel storage, in the case of hydrogen including geological storage, and using solid and liquid carriers
- New and adapted end-use technologies, including the industrial, residential and transport (e.g. heavy-duty vehicles, off-road and agricultural machinery, and including aviation and maritime) sectors

Projects are also required to consider one or several of cross-cutting dimensions, such as:

- Consumer attitudes, risk perception and levers which could influence technology acceptance
- Life cycle, techno-economic and environmental impact analyses
- Barriers, opportunities, and solutions in scaling up and market uptake
- System analysis and process integration considering continuity/intermittence
- Infrastructure and distribution aspects, including pipelines considering reuse and cost competitive materials
- Monitoring and safety aspects
- Digitalisation

Expected impact

Projects are expected to have a significant impact on accelerating the development and implementation of hydrogen, advanced and renewable fuels technologies and provide results that will lead to significant CO_2 reduction by 2030. Projects must contribute to new knowledge and new competences for cost-effective and cleaner technological solutions to substitute fossil fuels.

[65] Action 8 Implementation Plan (europa.eu) https://setis.ec.europa.eu/system/files/2021-07/setplan_bioenergy_implementation-plan.pdf
[66] https://research-and-innovation.ec.europa.eu/research-area/energy/hydrogen_en#set-plan-and-era-pilot-on-green-hydrogen
[67] Mission Innovation research priorities

CM2024-06 Heating and cooling technologies

Target RDI approaches/TRLs	Project start: TRL 3 or higher Project end: TRL 4 or higher Applied research and development projects (achieving TRL4, 5 or 6 after project completion) must have a valid proof-of-concept before starting, for all Work Packages.
Project Consortium Partners	Partners from a broad geographic spectrum. • Private for-profit companies (small, middle-sized, and large companies) • Research organisations • Secondary and higher education establishments • Non-profit organisations
Project budget	Applied funding from the Call in the range of (but not limited to) €1.5–5 million.
Call Module requirements	Industrial involvement in project activities.
Contact	TRI4

Objectives

This Call Module, following the challenge of the CETPartnership TRI4[68, 69], aims to contribute to efficient zero-emission heating and cooling solutions", as formulated in the CETPartnership SRIA.

Background

The overarching goals are to provide enhanced and improved heating and cooling technologies and systems for all major parts or climate zones of Europe around 2030 and to enable 100% climate-neutral heating and cooling by 2050. The energy crisis caused by the war in Ukraine has clearly shown that Europe needs to repower and rethink its heating and cooling policy (ref. REPowerEU[70]), and the revised Renewable Energy Directive[71] (RED III) increases focus on the heating transition. Better, cheaper, easier applicable and climate-neutral heating and cooling technologies are needed to provide thermal comfort while phasing out fossil fuel-fired dependence.

Scope

The Call Module supports 1. pilot and demo projects and 2. applied research and development projects that will develop technologies, methods, knowledge or innovations for heating and cooling:

[68] https://cetpartnership.eu/tri/4
[69] See Challenge 4 in CETP SRIA v1.0-endorsed (cetpartnership.eu)
[70] https://ec.europa.eu/commission/presscorner/detail/en/IP_22_3131
[71] https://energy.ec.europa.eu/topics/renewable-energy/renewable-energy-directive-targets-and-rules/renewable-energy-directive_en

1. Pilot and demo projects (achieving TRL 7, 8 or 9 after project completion) must be realised in real-life operational environments and address at least one of the following compared to state-of-the-art today:
    - cost reduction
    - increase in competitive market opportunities
    - increase in environmental protection.

    In addition, projects could address innovations impacting societal acceptability, safety, and/or circularity.
2. Applied research and development projects (achieving TRL 4, 5 or 6 after project completion) must have a valid proof-of-concept before starting, typically develop the innovation in detail in a laboratory or similar setting, and address at least one of the following compared to state-of-the-art today:
    - significant cost reduction
    - significant increase in competitive market opportunities
    - significant increase in environmental protection
    - better tools and methodologies.

    In addition, projects could address innovations significantly impacting societal acceptability, knowledge development, experience sharing, safety, and/or circularity.

Proposals are expected to explain their contribution to the objectives of the Call Module and **quantify this contribution** to the extent that this is possible.

Proposals are encouraged to consider cross-cutting issues such as economic modelling, social aspects, environmental concerns, etc. However, applicants must ensure that their proposed work meets national funding instruments. Proposals that exclusively consider research on sustainability or social acceptance cannot be funded.

This Call Module complements various Call modules in the CETPartnership joint Call. In case of uncertainty about where to best propose your project, consult with relevant Funding Organisations or TRIs.

- PV/T is covered in CM2024-03.
- Concentrated solar power is covered in CM2024-03, while concentrated solar for thermal applications in the industry is covered by this Call module (CM2023-06).
- Geothermal energy technologies are covered in Call module CM2024-07.
- Thermal storage technologies to be integrated into the built environment or industrial applications are covered in this Call module, whereas thermal storage technologies with a focus on subsurface utilisation are referred to in Call module CM2024-07.
- Projects focusing on integrating heating and cooling in regional or industrial energy systems or the built environment are referred to CM2024-08, 09, and 10, respectively.

Target topics

Projects should address one or more of the following topics to develop a secure, sustainable, competitive and affordable climate-neutral heating and cooling supply:

Heat and cold sources, Innovative approaches for solar thermal, local and regional excess resources, renewable cooling technologies, concentrated solar for (industrial) thermal energy purposes, ambient heat and cold from the air, surface water, sewers etc., shallow geothermal[72] biomass and organic waste and excess heat from industry.

Thermal storage, new storage technologies and storage-related innovations aiming at, e.g. small-scale hour-to-day thermal storage in industry and the built environment, smart systems balancing supply and demand, excess power to thermal energy, seasonal thermal storage integrated into a building or DHC (District heating and cooling) system.

Heating and cooling networks, conversion, and integration, including but not limited to innovations for more cost-efficient heating and/or cooling networks and their operation, retrofit of heating and/or cooling networks, conversion technologies such as heat pumping technologies, in the built environment and industry.

End-use systems: innovative distribution systems within the end-user system (typically a building or a home) are relevant to the heating and/or cooling system because the temperature level matters.

This Call Module is expected to encompass projects both relating to the built environment or industrial end-users. For the built environment, the projects may focus on district heating and/or cooling systems and other collective systems, but also on individual solutions.

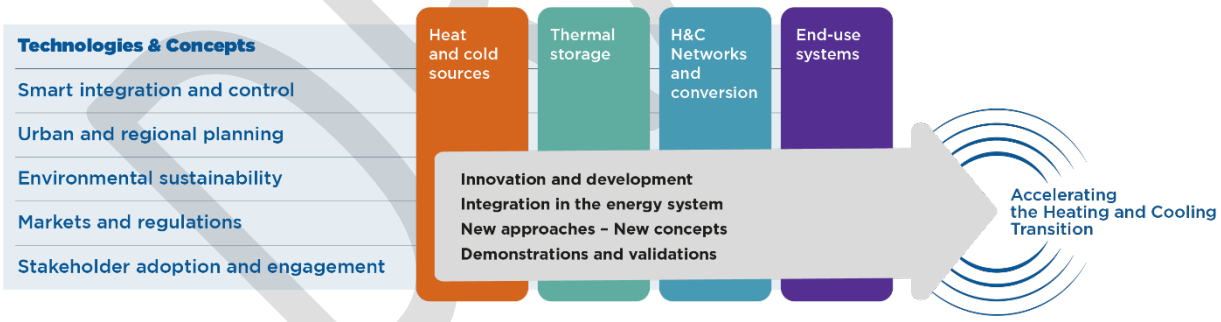

Figure 8.2, Heating and cooling technologies and concepts

The vertical bars in Fig. 8.2 indicate the technological scope. The horizontal bars indicate the dimensions which successful projects could address. The arrow in the figure symbolises the forward and future-oriented approach that builds on these various aspects.

[72] For shallow geothermal inclusion, contact your funding agency to determine the relevant Call Module, as national descriptions may vary.

Successful projects in the Call Module should address technologies or concepts, and should contribute to one or more relevant **cross-cutting**, non-technological dimensions whenever appropriate. Fig. 8.2 highlights the central role of 'Technologies and concepts', and also indicates the cross-cutting, non-technological themes in the horizontal bars. A close interconnection between sources and their temperature level, conversion and distribution technologies, flexibility for the energy system and end-user requirements should be sought for heating and thermal storage operations. Projects should demonstrate their market relevance and potential impact.

Proposals are encouraged to describe how the project will support the energy transition with a view on circularity, resource efficiency and recovery, recycling, and substitution of critical raw materials. Projects that aim at technologies with little or no critical raw materials[73] may identify this as a project quality in their project plan.

Applicants must ensure that their proposed work agrees with the funding instrument of their relevant Funding Organisation – consult Annex C to the Call.

Expected impact

Projects funded in this Call Module should improve business cases and/or increase the competitive market opportunities and environmental protection, compared to state-of-the-art today, through research and innovation. The projects' results must emphasise market-driven innovation activities, aimed to be ready for large-scale implementation around 2030. However, projects may include lower TRLs depending on national funding rules.

Project outcomes are expected to help accelerate the time to market of secure, sustainable, competitive, affordable and climate-neutral heating and/or cooling solutions. Projects can also focus on bringing upcoming technologies to a level of validation in a relevant environment or integrating their activities into already viable and ongoing demonstration or piloting projects.

[73] See Critical raw materials - European Commission (europa.eu), and including copper and nickel, in line with the Critical Raw Materials act

CM2024-07 Geothermal energy technologies

Target RDI approaches/TRLs	Project start: TRL 3 or higher Project end: TRL 4 or higher Applied research and development projects (achieving TRL4, 5 or 6 after project completion) must have a valid proof-of-concept before starting, for all Work Packages.
Project Consortium Partners	Partners from a broad geographic spectrum. • Private for-profit companies (small, middle-sized, and large companies) • Research organisations • Secondary and higher education establishments • Non-profit organisations
Project budget	Applied funding from the Call in the range of (but not limited to) €1.5–5 million
Call Module requirements	Industrial involvement in project activities
Contact	TRI4

Objectives

This Call Module, following the challenges of the CETPartnership TRI4[74] and TRI2[75], addresses various geothermal energy technologies and aims to contribute to Challenges zero emission heating and cooling solutions (Challenge 4) and zero emission power technologies (Challenge 2) described in the CETPartnership SRIA[76].

Scope

This Call module targets research, development and innovation in how geothermal energy is developed, supplied and integrated into Europe's future energy system. The scope includes:

- Geothermal energy for heating and cooling.
- Geothermal energy for power generation.
- Underground thermal energy storage (UTES).
- Geothermal energy with the co-production of minerals.

The Call Module supports 1. pilot and demo projects and 2. applied research and development projects that will develop technologies, methods, knowledge or innovations for geothermal energy:

[74] https://cetpartnership.eu/tri/4
[75] https://cetpartnership.eu/tri/2
[76] https://cetpartnership.eu/sites/default/files/documentation/CETP%20SRIA_v1.0_endorsed_compressed_0.pdf

1. Pilot and demo projects (achieving TRL7, 8 or 9 after project completion) must be realised in real-life operation environments and enable at least one of the following compared to state-of-the-art today:
    - cost reduction
    - increase in competitive market opportunities
    - increase in environmental protection.

    In addition, projects could address innovations significantly impacting societal acceptability, safety, and/or circularity.
2. Applied research and development projects (achieving TRL4, 5 or 6 after project completion) must have a valid proof-of-concept before starting, typically work in a laboratory or similar setting and address at least one of the following compared to state-of-the-art today:
    - significant cost reduction
    - significant increase in competitive market opportunities
    - significant increase in environmental protection and/or reduction of risks associated with the development or operation of a geothermal installation
    - better tools and methodologies.

    In addition, project output could significantly impact societal acceptability, knowledge development, experience sharing, safety, and/or circularity.

The Call Module considers all geological depth levels.

Proposals are expected to explain their contribution to the objectives of this Call Module and quantify this contribution to the extent that this is possible.

Proposals are encouraged to consider cross-cutting issues such as economic modelling, social aspects, environmental concerns, etc. However, applicants must ensure that their proposed work meets national funding rules. Proposals that exclusively consider research on sustainability or social acceptance cannot be funded.

This Call module complements other Call Modules in this Call. In case of uncertainty about where to best propose your project, consult with relevant Funding Organisations or TRIs.

- Thermal storage focusing on geological storage is covered in this Call Module (CM2024-07), while CM2024-06 focuses more broadly on thermal storage technologies.
- Projects focusing on integrating geothermal energy and thermal storage in regional or industrial energy systems or the built environment are referred to CM2024-08, 09, and 10, respectively.

Target topics

Successful projects should address one or more of the three topics shown in Fig. 8.3, which cover all stages in the development cycle of a secure, sustainable, competitive, and affordable geothermal installation.

Identifying and assessing geothermal and underground thermal energy storage (UTES) resources, reserves and reservoirs: Innovative and improved prospecting and exploration techniques and modelling methods to identify and assess geothermal resources at all depth levels.

Geothermal & underground thermal energy storage (UTES) resource development: New drilling and well completion technologies, reservoir optimisation, stimulation and innovative systems to manage induced seismicity.

Geothermal operation and integration into the energy system: Innovative concepts with geothermal energy as part of the energy system; geothermal reservoirs for heating, cooling and storage; innovative power cycles; novel revenue streams from additional side benefits from geothermal utilisation (such as mineral extraction); innovative applications in the built environment and industry. For operation, novel approaches to improve well injectivity and reliability and availability of injection operations; novel equipment, materials and methods for lowering and optimising operating expenses; disruptive smart reservoir management technologies; and innovative approaches to managing induced seismicity during production.

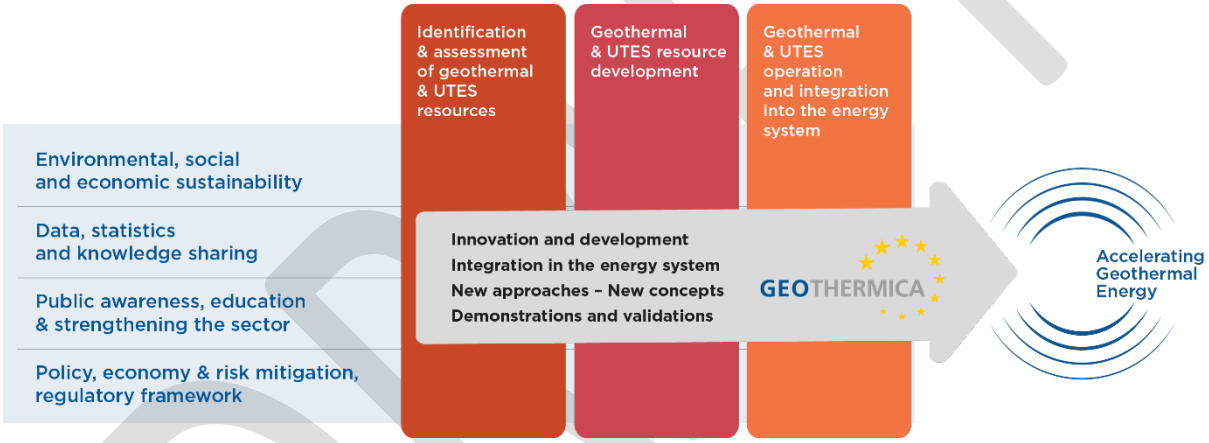

Figure 8.3. Geothermal energy technologies

The vertical bars in Fig. 8.3 indicate the technological scope. The horizontal bars indicate the cross-cutting, non-technological dimensions that are relevant for geothermal energy technologies: sustainability and safety, knowledge sharing, enhancing public awareness and the sector's strength, and activities related to policies and regulations (Fig. 8.3).

Successful projects in this Call Module should contribute to one or more relevant cross-cutting, non-technological dimensions. A close interconnection between sources and their temperature level, conversion and distribution technologies, flexibility for the energy system and end-user requirements should be sought for heating and thermal storage operations. Projects should demonstrate their market relevance and potential impact.

Proposals are encouraged to describe how the project will support the energy transition with a view on circularity, resource efficiency and recovery, recycling, and substitution of critical raw materials. Projects that aim at technologies with little or no critical raw materials[77] may identify this as a project quality in their project plan.

Project Consortium Partners must ensure that their proposed work agrees with the funding instrument of their relevant Funding Organisation – consult Annex C.

Expected impact

Projects funded in this Call Module should improve business cases and/or increase the competitive market opportunities and/or improve tools and methodologies and/or environmental protection, social acceptability, strategic knowledge, safety and/or circularity for geothermal energy. The projects' results must emphasise market-driven innovation activities, aimed to be ready for large-scale implementation around 2030. However, projects may include lower TRLs depending on national funding rules.

Project outcomes are expected to help accelerate and implement geothermal energy solutions. Projects can also focus on bringing upcoming technologies to a level of validation in a relevant environment or integrating their activities into already viable and ongoing demonstration or piloting projects.

[77] See Critical raw materials - European Commission (europa.eu), and including copper and nickel, in line with the Critical Raw Materials act

CM2024-08 Integrated regional energy systems

Target RDI approaches/TRLs	Project start: TRL 4–6 Project end: TRL 7 or higher
Project Consortium Partners	Participation of public and private organisations or networks and clusters or existing initiatives is encouraged. • Private for-profit companies • Public bodies (municipalities, local and regional governments) • Innovation clusters • Infrastructure providers and operators • Interregional and transnational innovation ecosystems such as • Cluster networks • Start-ups networks • Secondary and higher education establishments • Research organisations
Project budget	Applied funding from the Call in the range of (but not limited to) €1.5–5 million
Call Module requirements	None
Contact	TRI5

Objectives

This Call Module, following the challenge of the CETPartnership TRI5[78], aims to contribute to the regional challenges of the energy transition by supporting need owners[79] in a regional/geographical context to develop model system solutions that can be transferred to other regions. These solutions should provide opportunities and synergies for active participation in the energy system and have a high potential for implementation. Solutions should be replicable, i.e. there should be a high probability that the solution can be replicated in similar environments across Europe. As the impact of the projects is central for this Call Module, it is preferable if they target regions and sectors with high potential for improvement.

[78] https://cetpartnership.eu/tri/5

[79] "Need-owner" refers to the role of an entity (e.g. public agency, local/regional authority, energy grid manager/owner, company, building owner etc.), that seek a solution to a specified need (problem) within its area of operation. The "need-owner" has practical insights into what the actual need is and an interest to be involved in the development of a solution. This ensures the development of an optimal solution and facilitates the "need-owner(s)" acceptance and implementation of the solution. There can be more than one "need-owner" to the same need.

Scope

This Call Module supports projects to demonstrate how local stakeholders, regulations and markets enable various technologies on different levels to work together in an integrated system to address the regional challenges of the energy transition.

It follows the implementation of the SET Plan Action 4: Increase the resilience and security of the energy system[80]. Funded projects in this Call Module should contribute to this by addressing specific regional aspects that can be transferred to other European regions, following Challenge 5 in the CETPartnership SRIA[81].

Therefore, proposals must define measurable Key Performance Indicators (KPIs) to prove and quantify their approach. This can be done, for example, by referring to existing local/regional climate, energy and implementation plans or roadmaps and describing their contribution to these plans.

The following are some examples of regional challenges for the energy transition, even though applicants can also choose their own challenge covering a relevant solution approach.

- Increase the share of renewables among all energy sectors and / or the holistic energy efficiency in the region by smart solutions
- Increase sustainability and circularity along the whole value chain of renewables
- Increase the seasonal shift of renewable energy in the targeted region
- Increase the hosting capacity of the system to reduce energy dependence and improve the added value in the region
- Increase resilience in the regional energy system
- Demonstrate and validate solutions to overcome energy poverty and contribute to a just energy transition
- Enable citizens, need-owners and other stakeholders to take part in the related value chains

As one of the Call Modules for systems integration, funded projects should have focus on appropriate systems approaches in a specific local and regional context, rather than primarily on the technological development of individual solutions, which should then only be one aspect of a wider framework. The project's starting point will ideally build on existing results and initiatives and combine them together into an integrated systems approach that offers a solution for a well-defined need in the region involved in the project. Addressing the needs of a region requires the involvement of regional or locally anchored transition ecosystems with the need owners of the region at the centre. Projects funded in this Call Module are expected to have greater relevance to the energy system as they focus on demonstration rather than development. Projects shall drive

[80] https://setis.ec.europa.eu/system/files/2022-02/SET%20Plan%20ENERGY%20SYSTEMS%20Implementation%20plan.pdf
[81] https://cetpartnership.eu/sites/default/files/documentation/CETP%20SRIA_v1.0_endorsed_compressed_0.pdf

innovation, lead to findings and create evidence-based knowledge in the three dimensions of innovation described in the **Integrative Innovation Model** (see Annex B).

The Call Module supports a portfolio of projects dealing with solutions for different regional characteristics and bring them together on a European level. The characteristic can be freely described by the consortium, according to their perception of what is relevant in their specific geographical context e.g. industrial or agricultural setting, wind or solar dominated system, and may or may not include geographical terrain (e.g. plains or mountain valleys), specific infrastructure such as heating grid, etc.

Examples of possible starting points of potential projects:

- Refer to existing local/regional climate, energy and implementation plans or roadmaps
- In order to increase the regional relevance of the projects, they should build on the knowledge, experience and networks developed in the framework of ongoing or recently completed projects
- Use of flexibility of locally and regionally available energy sources for meeting the individual local and regional requirements in terms of generation, demand and goals
- Increase participation of regional need owning private and public companies and utilities, institutions, and people, intending to implement innovative solutions in order to take an active role in the future energy supply and energy system (producing energy, providing flexibility, etc.)
- Design the structure around integrated approaches, involving cross-sectoral and interdisciplinary research and innovation

This Call Module does not support the singular technological development of individual solutions, although technological development can be part of the project. To achieve better evaluation results, applications should build on ongoing or recently completed demonstration projects, and make use of existing test infrastructure, knowledge, collaboration of key demos, transfer of results, openness, etc. We encourage consortia to further develop already existing regional initiatives by adding either new aspects/objectives or new partners.

For this reason, we recommend that applicants carefully check the national requirements for consortia of the respective funding organisations. This can be decisive for the composition of applicant consortia and their eligibility for funding.

Target topics

In order to meet the challenges on the regional level of the energy transition, proposals should cover aspects like listed below.

Examples of specific regional aspects covered by the projects:

- Develop integrated regional and local energy systems that enable a secure, resilient, and fossil free regional energy supply, up to and beyond 100% in the dynamic local or regional supply

- Include regional infrastructures as well as the user and consumer structures driven by local municipalities, communities, industry, and stakeholders from different sectors
- Develop a replicable model for a region that can either be dominated by large urban systems, the integration of municipalities or smart energy communities, or have a focus on the integration of, for example industry, agriculture or the tourism sector
- Leverage synergies and utilise flexibilities in locally and regionally available energy sources (including aspects of heating, cooling, electricity and local fuels)
- Involve cross-sectoral integration of multiple (economic) sectors like transport, industry, trade, etc.
- Coordinate and link research activities with e.g. living labs to facilitate the development and field-testing of prototypes

Examples for contributions to a secure and resilient European energy system:

- Contribute to inter-regional exchange of energy
- Demonstrate the ability of providing management of flexibility by cross-energy vector coupling, and by efficiently integrating different energy carriers as a blueprint for other regions in Europe
- Work on harmonised business processes for solutions by developing interoperable solutions
- Development of regional climate strategies and Key Performance Indicators (KPI's) for climate neutral energy systems that can guide policy makers and actors when adopting market design on European level

Expectations for regions through transnational collaboration:

- Building transnational projects will contribute to a deeper understanding of the different infrastructural and socio-economic contexts and provide the opportunity to involve regional actors with sufficient capacity to take up the results of the funded projects
- Knowledge transfer and the transfer of solutions to other regions with similar conditions, gain in larger markets for solution providers and more efficient use of resources and will speed up the co-transition of regional energy systems
- The benefit for addressing also cross-cutting issues in a transnational approach is that good practice and learnings can be shared across Europe to make the transition pathways robust across Europe

Expected impact

Projects shall drive innovation, lead to findings and create evidence-based knowledge in the **"Three Dimensions of Innovation for System Solutions"** (see Annex B) and by that achieve impacts in the three dimensions. Projects shall use the three dimensions of innovation as a framework for the description of their expected outcomes. Projects funded in this call module are not intended to cover only the technology level. For integrated solutions we expect that in the best case all layers are covered within the project.

The projects must clearly describe how the results will subsequently be utilised to have an impact in the regions concerned or in other, similar regions. The chances of achieving this impact must be assessed, taking into consideration that projects based on previous or ongoing transnational projects have a better chance to roll out solutions at the regional level as well as to transfer solutions to other regions. Furthermore, it must be specified which stakeholders will implement the actions. If these are not part of the consortium, it must be explained how they are to be reached. Proposals should have integrated the local or regional public authorities as partners or via Letter of Intent (LoI).

Projects should reflect the needs of a region of interest and cover as many local target groups as possible. Furthermore, the consortium should be able to implement the outlined exploitation plan successfully and independently after the end of the project.

For proposals that intend to work with former ERA-Net Projects, Interreg transnational Projects, Demonstration, Real-Lab or Living-Lab approach, it is recommended to consider the JPP SES Living Lab and Test Bed Network[82] when looking for partners. For Matchmaking opportunities please register at CETPartnership's B2Match[83] site.

For proposals that intend to work with data service solutions, it is recommended to consider the JPP SES network of Digital Platform Providers[84] when looking for partners.

To help in developing proposals building on suitable transnational projects, the keep.eu[85] database can be used.

Dimensions of innovation

Projects shall drive innovation, lead to findings and create evidence-based knowledge in the three dimensions of innovation described in Annex B. Individual proposals have to address aspects at least in 2 of the three dimensions. In order to realise this, they are encouraged to consider the project design options described in Annex B. Here some examples, how different aspects connect with the three dimensions.

[82] https://www.eranet-smartenergysystems.eu/Partners/Living_Labs
[83] Clean Energy Transition Partnership (CETPartnership) - Home (b2match.io)
[84] https://www.eranet-smartenergysystems.eu/Partners/Digital_Platform_Providers
[85] https://keep.eu/

CM2024-09 Integrated industrial energy systems

Target RDI approaches/TRLs	Project start: TRL 3 or higher Project end: TRL 8 or lower
Project Consortium Partners	• Secondary and higher education establishments (social science, humanities, technology, economic and science disciplines) • Research organisations • Private for-profit companies (such as industrial companies, suppliers of technology and services) • Public bodies (may include municipal companies)
Project budget	Applied funding from the Call in the range of (but not limited to) €1.5–5 million
Call Module requirements	At least one industrial end-user must participate in the Project Consortium
Contact	TRI6

Objectives

This Call Module, following the challenge of CETPartnership TRI6[86], **aims to develop and demonstrate a set of technical solutions for integrated industrial energy systems that enables efficient carbon-neutral industrial production sites and takes industrial energy systems into development as part of the entire energy system**. It focuses specifically on integrated solutions across industries, across energy sectors and across public and private sectors[87].

Special emphasis in the Call Module is placed on solutions for system- and process-level integrations for efficient industrial power, heating, and cooling. The main industries that are considered include iron & steel, cement, pulp & paper, chemical, and food and beverage industries.

The Call Module will contribute to an innovation-based growth of the European economy and the European energy transition by supporting projects that accelerate the development of clean technologies by capitalising on synergies between programmes, both nationally and internationally, as well as by addressing key cross-cutting issues, lead to faster market uptake, upscaling, and increase EU's technological independence and global competitiveness[88]. Projects are expected to increase their Technology Readiness Level (TRL) up to TRL 8 throughout the duration of the project so that they move closer to commercial readiness.

[86] https://cetpartnership.eu/tri/6
[87] https://cetpartnership.eu/sites/default/files/documentation/cetp_sria_1.0.pdf
[88] https://setis.ec.europa.eu/set-plan-progress-report-2022_en

The Call Module will address topics such as sustainability, circularity, environmental impact, integration with local and regional energy systems, energy storage, CCUS and digitalisation and Artificial Intelligence. There are synergies with TRI3[89] andTRI4[90] within the CETPartnership.

Background

In the future, electricity will play a significant role as a "primary" energy source for the industries, and new innovations are needed to accomplish the transformation of industrial electrification. Further, a large share of the industrial energy supply shall be based on renewable sources. Where carbon emissions cannot be avoided, CO_2 shall be captured, utilised for production of preferably long-lifetime products, or permanently stored. To produce negative emissions, capture, utilisation in long-lifetime products and storage of biogenic CO_2 from the exhaust gases, i.e., bio-CCUS, is an option.

While the energy transition of industries advances, industrial energy systems shall integrate with local, regional, and national heat and power networks and systems. Moreover, the energy and industrial systems shall together integrate as renewable power will also be used to produce hydrogen which can be utilised as energy carrier or raw materials in industrial processes or with CO_2 utilisation (CCU) to synthesise electroproducts for the replacement of fossil-based fuels and chemicals.

The integration of industrial energy systems with local, regional, or trans-regional energy systems supports national and European goals for carbon neutrality. As research, development, and innovation activities (RDI) for industrial carbon-neutrality are already funded at a national level in many countries, a broader experience and knowledge sharing at an international level will be an advantage. Transnational co-operation will boost efficient technology transfer and leverage complementarities for building competitive European value chains.

Scope

This Call Module is in line with the REPowerEU Plan[91] and has a focus on the need for reducing energy consumption, substituting fossil fuels, and accelerating Europe's clean energy transition to bring down emissions and dependencies[92]. Therefore, the Call Module welcomes proposals for research, development and innovation projects that address one or more of the following challenges:

Challenge 1 – Reducing emissions from the industrial energy system

This challenge is addressed to projects that will contribute to reducing the industry's process-related greenhouse gas emissions and other emissions such as certain combustion emissions and diffuse emissions linked

[89] https://cetpartnership.eu/index.php/tri/3
[90] https://cetpartnership.eu/index.php/tri/4
[91] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2022:230:FIN
[92] https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal/repowereu-affordable-secure-and-sustainable-energy-europe_en

to process-related emissions. The objective is to support technological leaps and industry's ambitions to change to more sustainable production by integrated industrial energy systems.

Process-related emissions refer to emissions directly from industrial processes according to environmental reporting as well as to emissions that occur during the combustion of residual products from fossil raw materials in production processes, such as flaring of industrial residual gases. Emissions with an indirect connection to industrial processes are, for example, combustion emissions from on-site power and heat production.

Projects that focus on reduction of indirect emissions from industry can only be supported in cases where a reduction in direct emissions from processes is also included in the project or when they involve a technological leap for the industry. Therefore, projects that only involve conventional fuel changes will not be funded.

Challenge 2 – Integrating energy and resource efficient industrial energy systems

This challenge is addressed to projects that will contribute to increasing knowledge and develop new and innovative processes and system integrations that will improve sector coupling in an energy and resource efficient way between industrial energy systems and the energy system in general. System-level integrations across sectoral boundaries will provide support for a more flexible and robust European energy system based on a high degree of variable renewable energy sources.

The projects in this area can include the role of industry in a larger perspective, i.e., integration between different industries or integration between an industrial site and the surrounding local or regional energy system, to create an energy- and resource-efficient system from a holistic perspective. The area thus comprises industrial and cross-sectoral symbiosis, including new industrial and system-integrated structures, i.e., projects that study physical exchanges of energy, material or residual streams in the form of, for example, excess heating or cooling, operational and municipal wastes, and residual materials and flows. This area can thus help create circular economy solutions for industry and local communities and regions.

Challenge 3 – Removing carbon emissions from industrial energy systems

This challenge is addressed to projects that will contribute to removing industrial greenhouse gas from the carbon cycle through emission separation combined with long lifetime utilisation or long-term storage of carbon. It is also addressed to projects that will enable industries to implement CCU to produce energy products/synthetic fuels from their CO_2 emissions. Such chemical energy carriers should serve as energy storages and support balancing of the renewable-based future energy system. CCU production pathways might involve bioprocesses, e.g. with algae, or synthesis processes with clean hydrogen. Implementation of CCU, hence, might open new business opportunities beyond today's industrial production.

Special emphasis is put on greenhouse gas of biogenic origin and on CO_2 removed from the atmosphere so that effective long-term removal of carbon from the carbon cycle can be achieved.

Target topics

Following are examples of topics that proposals could cover to meet the above challenges:

Challenge 1 – Reducing emissions from the industrial energy system

- Energy and resource efficient process technologies
- CO_2 logistics improving emission reductions from industry
- Solar CSP[93]/STE[94] for reducing emissions from heat demand in industries

Challenge 2 – Integrating energy and resource efficient industrial energy systems

- Industrial electrification
- Power-to-X
- Production, transport, storage and integration of e-fuels

Challenge 3 – Removing carbon emissions from industrial energy systems

- Industrial Bio-CCUS
- Clean hydrogen for energy-intensive industrial applications

Cross-cutting issues:

- Circular industry, industrial symbioses and infrastructure
- Digitalisation and Artificial Intelligence

This Call Module complements other Call Modules in the Call:

- Concentrated solar for thermal applications in the industry is covered by CM2024-06, while it is covered by this Call Module if linked to industry application and energy system integration.
- CCU/S technology is covered by CM2024-04, while it is covered by this Call Module if linked to industry symbiosis and energy system integration.

In case of uncertainty about where to best propose your project, consult with relevant Funding Organisations or TRIs.

Expected impact

The expected impact from projects funded in the Call Module are that they contribute to making European industry a part of a climate-neutral economy. Funded projects will strive to:

- increase European industry's competitiveness.

[93] Concentrated solar power (CSP)
[94] Solar thermal energy (STE)

- support the development and pre-commercialisation of future disruptive technologies.
- support a wider use of renewables and alternative energy sources as well as emission control technologies for reducing industrial emissions.
- integrate renewable energy into the industrial energy system to aid increased industrial electrification.
- Increase resource -and energy efficiency of industrial energy systems through novel process and system integrations.
- increase circularity through, for example CCU or the reuse of waste heat.
- Increase the use of Bio-CCUS in industrial processes.
- develop sustainable bioenergy and biofuels.
- develop and integrate hydrogen-based technologies into the industrial energy system and infrastructures.

Projects that are funded are expected to provide solutions to the challenges in the call module through new knowledge, skills, and technologies. The funded projects will also be expected to include need-owners, industrial advisory boards and/or a challenge driven approach to improve fit with industrial needs, to foster industrial acceptance and to boost exploitation of research results. Projects shall participate in CETP's working groups and workshops to share information, knowledge, ideas, and results to strengthen national and regional research, development and innovation policies.

Involvement of industry either directly as a partner or partners in the project consortium or in an industrial advisory or steering board is an advantage.

Projects are encouraged to advance solution development towards TRL 7 by the end of the project so that the consortium members are ready to apply for follow-up funding for piloting or demonstration projects from other funding programs like EU´s Innovation fund[95]. This drives clean energy solutions faster towards commercial readiness and contributes to a more competitive European industry and a sustainable and de-carbonised European energy system based on renewable energy sources.

Dimensions of innovation

Projects shall drive innovation, lead to findings and create evidence-based knowledge in the three dimensions of innovation as outlined in the Integrative Innovation Model as follows:

Topics	Dimension 1: Technologies, Infrastructures and System Solutions	Dimension 2: Organisation of Energy Systems	Dimension 3: Transition of Energy Systems

[95] https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/programmes/innovfund

Challenge 1 – Reducing emissions from the industrial energy system	X		
Challenge 2 – Integrating energy and resource efficient industrial energy systems	X	X	X
Challenge 3 – Removing carbon emissions from the carbon cycle in industrial energy systems	X	X	

Individual projects are expected to have a strong focus on the technology dimension (Dimension 1). However, some challenges require to additionally consider aspects that address dimensions 2 and 3.

CM2024-10 Clean energy integration in the built environment

Target RDI approaches/TRLs	Pstarting TRL of 3 or higher Project end: TRL 5 or higher

Project Consortium Partners	• Private for-profit companies (small and medium-sized enterprises (SMEs))
	• Public bodies (municipalities, local and regional governments)
	• Innovation clusters
	• Ecosystems and programmes
	• Infrastructure providers and operators
	• Interregional and transnational innovation ecosystems such as
	  ○ Cluster networks
	  ○ Start-ups networks
	• Secondary and higher education establishments
	• Research organisations

Project budget	Applied funding from the Call in the range of (but not limited to) €1–5 million
Call Module requirements	Proposals targeting lower TRL than described above are ineligible
Contact	TRI7

Objectives

This Call Module, following the challenge of the CETPartnership TRI7[96], aims at enabling transnational projects to provide new solutions for the built environment and develop from a pure energy consumer into a prosumer (producer-consumer) of renewable energy and from a passive into an active and integrated role in the future energy landscape.

Scope

Proposals applying to this Call Module should clearly include integration aspects to demonstrate their expected role in the built environment, reflecting integrated approaches used in the New European Bauhaus[97]. This should be achieved by focusing on the physical, technical and, where applicable, aesthetical integration of clean energy conversion and storage technologies for power, heating and cooling as well as mobility concepts into buildings and more generally into the built infrastructure. The proposals should also demonstrate their contribution to technology improvements through new solutions and capabilities, proof of concepts or optimisations including formalised test and validations.

Three challenges are defined in this Call Module, namely:

[96] https://cetpartnership.eu/index.php/tri/7
[97] https://new-european-bauhaus.europa.eu/

- Challenge 1: Transformation of the building / built environment to an active part within the energy system
- Challenge 2: Digitalisation of the whole life cycle of a building (planning, construction, commissioning, operation, decommissioning and disposal)
- Challenge 3: Development of new concepts and technologies to renovate and refurbish the built environment

Proposals should identify any foreseen application of the developments in different building contexts:

- Existing and new buildings
- Residential (urban, rural and isolated) and non-residential buildings (large public and private buildings, commercial malls, service and mobility infrastructures, logistics platforms such as ports, airports, railway terminals, roads, large parking areas)
- Old, historical and special buildings (cultural and built heritage)
- Different climate and geographical areas

Proposals should also include a perspective for technology transfer including plans for verification and validation, data management and exploitation.

Target topics

The following are examples of target topics that proposals should cover to meet the challenges listed under the Scope.

Challenge 1:

- Production of renewable energy within the building / built environment
- Seamless integration of renewable energy technologies like PV, small wind etc. in the urban environment
- Integration of electrical and thermal storage to increase self-supply and efficiency in buildings
- Integration of e- mobility concepts to reduce emissions
- Building-to-building energy and Active Buildings concepts
- New air-conditioning and ventilation concepts
- New active building elements like facades, windows, switchable thermal insulation and their building integration

Challenge 2:

- Digitalisation of in-building energy management
- Increase of self-consumption and energy efficiency during operation through digitalisation
- Active energy production and storage management within buildings through digitalisation

- Digitalisation of networks for heating and cooling
- Building Information Modelling (BIM) from the cradle to the grave
- New circular-oriented services at different levels of the Construction and Demolition Waste (CDW) supply/value chain

Challenge 3:

- Prefabricated elements to boost the renovation processes
- New planning tools for efficient renovation pathways
- Novel holistic plus economically viable renovation concepts including demonstration, LCA, etc.
- Serial renovation
- Specific renovation concepts and solutions for heritage buildings
- LCA including grey energy of renovation
- ”User” acceptance and economic viability of renovation

In addition to proposing technological solutions, proposals should also address the environmental, social, and economic implications that might impact the adoption of the proposed technology into the built environment. Proposals addressing only environmental, social, and economic aspects of existing and commercially-ready technologies are not eligible for funding.

Expected impact

Projects funded in this Call Module should develop technologies and methodologies to raise energy production and energy storage capacities within the built environment and to increase the overall energy efficiency compared to state-of-the-art today. These developments need to focus on the integration aspect into the existing or new built environment. Projects are expected to provide results to lower the environmental footprint of the built environment and to accelerate the transformation from being only consumers to prosumers and from an exclusive passive role to an active role in the overall energy system.

Project outcomes are expected to help accelerate the time to market of sustainable, competitive and affordable solutions for new buildings and the renovation of the existing built environment. Projects should also focus on upcoming validation and standardization of newly developed technologies.

Annex A. Reporting and Knowledge Community Work Package

A proposal must foresee a **Reporting and Knowledge Community Work Package** with necessary resources (efforts (measured in person months) and budgets). Appropriate resources depend on the Project Consortium composition, project duration, etc. As a general guideline, the work package should include reporting (Task 1, covering 10 days/year/project), and contribution to the CETPartnership Knowledge Community (**Knowledge Community**) co-creation activities (Task 2, covering 3% of the total project efforts (measured in person months)).

The Knowledge Community activities mostly take place online, with the support of a dedicated management team (CETPartnership Knowledge Community Management, **KCM**, knowledgecommunity@cetpartnership.eu) and the Digital Information-System for Communication and Collaboration, DISCCO[98].

Task 1. Reporting

The Coordinator must submit annual reports and a final report on the transnational level to the CETPartnership. For a project with a duration of 36 months, the first annual report will cover the initial year, the second report the first two years, and the third and final report the entire project duration. The reporting includes a publishable factsheet and deliverables.

Task 2. Contribution to the CETPartnership Knowledge Community co-creation activities

The Knowledge Community offers various activities for collaboration and discussion on different topics and formats. Participation of funded projects depends on the Project Consortium Participants' objectives, target topics, RDI approaches, etc. Considering the expected benefits, a Project Consortium should plan the participation with appropriate Project Consortium Partners and resources.

Since the Knowledge Community will annually decide its topics, and since a Project Consortium will decide its participation in specific activities throughout the project duration, please be referred to a tentative portfolio in Table A1 and estimate efforts of the Project Consortium Partners.

[98] https://discco.eu/SitePages/Home.aspx

Please note that certain types of Project Consortium Partners may be more appropriate to carry out some activities than others, e.g. some national/regional funding programme can only support public organisations in dissemination activities. Consult with relevant Funding Organisations in case of uncertainty.

Table A1. Subtasks in Task 2: Contribution to the CETPartnership Knowledge Community co-creation activities

Sub-task	Description	Indicative effort (%)*
2.1	**Participation in CETPartnership Knowledge Community events (4–5 events/year)** Annual CETPartnership Conference (online and voluntary) Thematic webinars/workshops for knowledge sharing on topics of relevant Call Module(s) (onsite/hybrid, 1–2 sessions/year/project) Working group meetings on cross-cutting issues (2 sessions)	40
2.2	**Peer-to-peer exchange on project progress** Peer-to-peer feedback exchange among projects, Funding Organisations, TRI leading experts and KCM (online and mandatory)	25
2.3	**Collaboration on specific topics** For example working on a joint document, deep-diving in working groups interested in your project outcomes, or organising joint events (e.g. webinars/seminars) on a thematic topic	25
2.4	**Representing the Knowledge Community externally** For example on social media or at external events such as the European Sustainable Energy Week	10

* As a general guideline, Task 2 should cover 3% of the total project efforts (measured in person months)..

Annex B. Three dimensions of innovation for system solutions

The transition of our energy system requires the further development of clean technologies to convert, store and transport energy. It further requires a clear vision of the future design of our energy systems to make the best use of new technologies and to seamlessly integrate them into a highly performant and efficient technology–service ecosystem. This however imposes investigation into how different technologies and infrastructures can interoperate seamlessly across single energy vectors and sectors. Moreover it also requires investigation into how the interplay of the different actors and technologies in the whole network, from production to end-use, can be organised in a way so that the various forms of renewable energy can be combined for a continuous and flexible supply of services and processes. On top of all that, it is necessary to consider how a controlled and well-regulated "Just Transition" from established energy systems to the new, clean energy systems can be facilitated. This concerns organisations and companies as well as individuals, citizens and communities, in short all parts of society. We need to answer the question about how the new solutions finally become part of our everyday businesses and lives, how and by whom decisions are taken to adopt a new solution and how we can involve the responsible stakeholders in the innovation process. Not to forget that we always need to keep the implications on nature, ecology and resources in focus, with CO_2 and the climate crisis as a leading motive.

The CETPartnership **Integrative Innovation Model** as described below is meant as a framework that facilitates a structured approach for fostering different dimensions of innovation in project design. The three dimensions have been designed to classify activities in groups with similar character, which also require a common set of skills and quality assuring guidelines. In all three dimensions, barriers can be identified for approaches with the research, development and innovation (RDI) toolbox. The systematic can be applied as well to the RDI activities, as to the crosscutting issues that have been described in the CETPartnership SRIA[99]. It can be used to better describe the research questions, activities and planned outcomes as well as intended impacts of a project. It can also be used to cluster projects e.g. for the work in the knowledge community.

Dimension 1: Technologies, infrastructures and system solutions

"Which technologies, infrastructures and their combination into technical system solutions do we need and how can we provide them?"

The focus is here on the design and production of technologies to convert, store and transport clean energy. This includes, how different technologies and infrastructures can technically interoperate seamlessly across single energy vectors and sectors, achieving flexibility and sector coupling. It also comprises technical aspects

[99] https://cetpartnership.eu/sites/default/files/documentation/cetp_sria_1.0.pdf

of CO_2 management systems and circularity. Moreover it concerns aspects of operation and maintenance of infrastructures and components.

Dimension 2: Organisation of energy systems

"How do we organise the interaction of players from different sectors in the operation of energy systems".

This concerns how the interplay of the different actors and their related system elements in the whole network, from production to end-use, can be organised in a way, so that the various forms of renewable energy can be combined for a continuous and flexible supply of services and processes. This includes aspects of the exchange of values between the actors (with their related system elements) – like market and business models or communities. It also includes aspects of the legal and regulatory framework. Moreover it also considers the interaction related to CO_2 management. Interactions of players to assemble and disassemble the systems are also considered to be part of their operation, including organisational aspects of circularity.

Dimension 3: Transition of energy systems

"How do the new solutions become an integral part of the daily lives and businesses of citizens, communities and regions, companies and infrastructure providers?"

This comprises the nurture and facilitation of innovation ecosystems as well as the design of systems, technologies and services at the human-technology interface. But it also affects the change in companies with their personnel and organizational structures, aspects of social acceptance, the change in values and user behaviour as well as cultural discourse (e.g. spatial planning), and other socio-technical aspects. The sustainable provision of materials, components and systems in global supply chains is an essential prerequisite for the successful energy transition. In the course of the transition, impacts on the climate (with a focus on the CO_2 effect and climate crisis as a leading motivation), nature and ecology as well as resources in general must be kept in view.

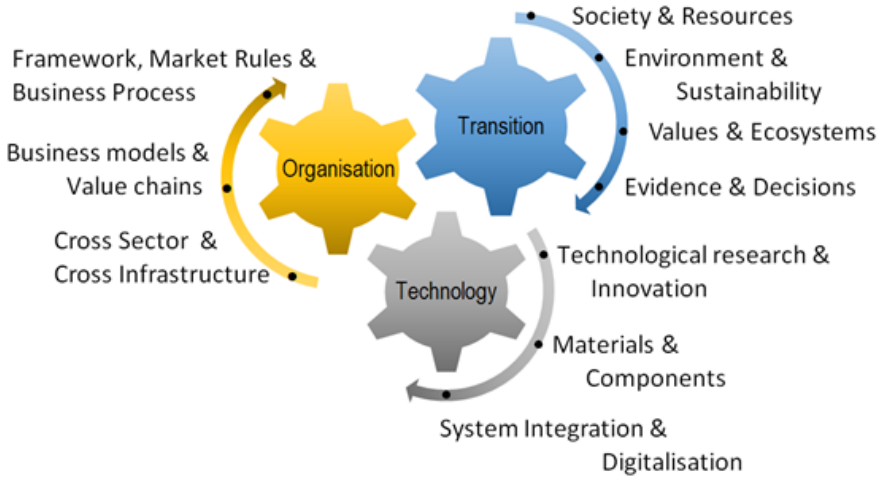

Figure B.1. Integrated Innovation Model – three dimensions of innovation for system solutions

Three dimensions in CETPartnership projects

The methods and approaches used to create project outcomes in the different dimensions could be clearly defined. According to the aspects considered and particularly in case that more than one dimension is addressed, inter- or transdisciplinary teams with partners and/or experts from different backgrounds can be of great value to the project. E.g. already in the technological dimension, when it comes to the integration of technologies and infrastructures, expertise from different technology and infrastructure sectors is required. If a project intends to address aspects in the second or third dimension, expertise in economics, market design, management and organisation, social sciences, communication, industrial design, co-creation, etc. may be required. In case a proposal covers more than one of the dimensions, it is also important that the risk assessments for the project fully consider all dimensions involved in that project and not just potential aspects of one dimension.

While different Call Modules of the Call could ask a funded project to cover more than one of the dimensions, every part and work package of the project doesn't necessarily address all the required dimensions. This would also help to cope with different funding schemes and instruments that relevant Funding Organisations provide. Some Funding Organisations may be able to fund project parts that concentrate on or include a non-technological dimension, others may not. The Project Consortium Partners need to make sure that their relevant Funding Organisations can support their specific work packages or tasks.

Thus a project could address one (see P1 in Figure B1) or more (P2, P3 and P4) of the three dimensions. Project Consortium Partners could be specialised and implement a particular work package, addressing only one of the dimensions which relevant Funding Organisations are able to support. Alternatively, they could combine technological aspects which are required by the funding scheme of their Funding Organisations with non-technical aspects, so that their parts of the project can be funded.

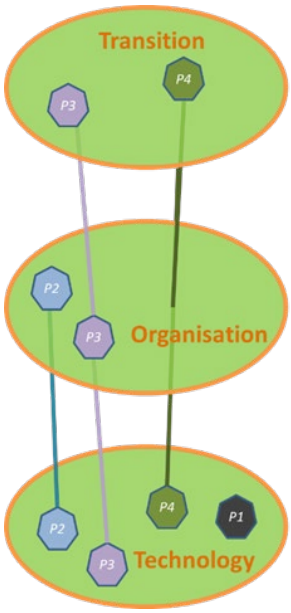

Figure B.2. Examples of projects addressing the three dimensions of innovation

CETPartnership Knowledge Community

The CETPartnership Knowledge Community[100] is an integral part of the CETPartnership and aims to leverage exchange and co-create knowledge involving CETPartnership funded projects, RDI experts and other national, transnational and international stakeholders. It is intended to act as an information platform, to develop and present state-of-the-art knowledge, to lead discussions and to strengthen multilateral collaboration between research, industry, policy and society in the field of the clean energy transition. Through strategic knowledge management, outcomes of RDI will provide an evidence and fact base for policymaking to support the clean energy transition in domains of innovation, market entry and diffusion as well as regulation and procurement.

The Knowledge Community is committed to enhancing collaboration and knowledge co-creation in thematic challenges addressed by TRIs and in cross-cutting dimensions aligned with the CETPartnership SRIA[2]. We have implemented a robust monitoring and reporting framework that not only evaluates the progress of the funded projects and the effectiveness of the entire community, but also integrates these insights directly into the knowledge creation processes of the partnership. Above all, joint knowledge generation and dissemination shall help the funded projects to improve their efficiency, results, and outreach. The Knowledge Community will also relate to the Impact Network partners of the CETPartnership who can contribute to dissemination and exploitation of knowledge.

[100] https://cetpartnership.eu/about/knowledge-community
[2] https://cetpartnership.eu/sites/default/files/documentation/CETP%20SRIA_v1.0_endorsed_compressed_0.pdf

The CETPartnership Impact Network[101] is a resource for reaching out to end-users and other stakeholder groups that are relevant for the implementation of clean energy solutions in countries, regions and local communities. It includes Living Labs, validation test beds, industry associations, innovation clusters, and networks of SMEs and start-ups across Europe.

Projects shall use the Knowledge Community as their main contact to the CETPartnership. To ease reporting and monitoring as well as knowledge management and access to the impact network, CETPartnership operates a Digital Information-System for Communication and Collaboration (DISCCO)[102]. Projects will be invited to exchange with each other and the CETPartnership management entities in well protected workspaces.

[101] https://cetpartnership.eu/about/impact-exploitation
[102] https://discco.eu/SitePages/Home.aspx

Annex C. National/regional requirements