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CETPartnership Joint Call 2022 (modules TRI 7.1&7.2)

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What is a TRI?

The Transition Initiatives (TRIs) are **thematic configurations** of CETPartnership funding partners in order to work together on a specific **Strategic Research and Innovation Agenda (SRIA)** Challenge. (https://cetpartnership.eu/sites/default/files/documentation/cetp_sria_1.0.pdf)

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TRI 7

TRI 7: Integration in the Built Environment

TRI 7 mission is to **provide solutions and technologies for existing and new buildings to become an active element in the energy system**, with enhanced capability to produce, store and efficiently use energy in the residential and non-residential sector, comprising public and commercial buildings, service and mobility infrastructure buildings, etc.

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TRI 7: Integration in the Built Environment (CH 1 and 2)

TRI 7 should become a main link between TRIs focused **on technology, real users and policy makers**. The TRI will put in place solutions coming from other TRIs and generate own solutions for **specific building technologies**. Participation in knowledge co- creation, impact networks and call definition with these TRIs will be part of the daily work.

- Integrate renewable *energy conversion technologies* for power, heat and cold in buildings. *Connect the buildings in networks*. Integrate energy storage, zero emission fuel, and activate building parts as energy storage. (Measures contribution to CO2 reduction, and renovation of building rates).
- Digitalization for planning, construction phase, commissioning, operation and disposal. **Methods of building performance assessment.**
- Application and *demonstration of outstanding concepts* for transfer intensification. Organise experimental facilities and low regulation zones. Power-to-X , sharing infrastructures, novel concepts.
- Integrated approach, societal, economy, architectural, urban planning and transport sector issues. Synergies with *widespread of energy communities*, positive energy districts and climate neutral cities policies. New markets for active windows, façade elements, roof tiles, sun-shading units, etc.

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TRI 7: Integration in the Built Environment

Approach

Challenges covered by the SRIA

2 Call modules per expected TRLs at the end of the project

- 1 - RIA (Research and Innovation Action) TRL 3-6: R&I in clean energy integration in the built environment
- 2 - IDA (Innovation and Demonstration Action) TRL 5-9: Solutions to energy transition in the built environment

Integration in the built environment / focus on application

Inclusive regarding areas 1 and 2 + Cross cutting issues

Different building contexts

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

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TRI 7: Integration in the Built Environment

1 - R&I in clean energy integration in the built environment **2 – Solutions to energy transition in the built environment**

Technical content / scope

- Two challenges (developments in integration, storage and conversion of renewable energy in the built environment and digitalization in all the building life cycle) and cross cutting issues.
- *Proposals shall cover solutions for one or several points in the two proposed challenges. The challenges are non-exclusive. Solutions can address parts of one challenge or parts of both challenges.*
- All the proposals shall analyse the cross-cutting issues, identify which are applicable and elaborate the inclusion of those in the proposal.

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TRI 7: Integration in the Built Environment

Technical content / scope („műszaki tartalom”)

- **Challenge 1 -** Integrate renewable energy conversion technologies for power, heat and cold in buildings. Connect the buildings in networks. Integrate energy storage, zero emission fuel, and activate building parts as energy storage. (Measures contribution to CO2 reduction, and renovation of building rates)
  - PV integration in buildings (including semi-fabricates): module installation, structural, thermal and functional integration, aesthetics solutions, power management, safety, operations and management, maintenance, decommissioning
  - Integration of solar thermal in buildings and nZEB/Passive-house concepts, combination with other solutions in hybrid products and the use of enablers of sector coupling including improvements at component level.
  - Integration/use of Biomass and bio-derived energy vectors (even the generation of biomass within the building skin …
  - Solutions for optimization and integration/use of local thermal resources like geothermal resources or excess/waste industrial heat in buildings
  - Integration of new methods for the energy exchange with the electrical grid, including in-building energy generation, storage and active-buildings concept

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TRI 7: Integration in the Built Environment

Technical content / scope („műszaki tartalom”)

- **Challenge 1 -** Integrate renewable energy conversion technologies for power, heat and cold in buildings. Connect the buildings in networks. Integrate energy storage, zero emission fuel, and activate building parts as energy storage. (Measures contribution to CO2 reduction, and renovation of building rates)
  - Active facades: solar thermal, BIPV, hybrid PV, switchable windows, switchable thermal insulation and their system integration
  - Seamless integration of renewable energy technologies in the urban environment, building integrated PV, several types of storage solutions, CHP technologies on fossil-free gaseous fuels (H or synthetic gases, thermochemical Solar fuels, electrochemical Solar fuels) for historic integration districts or hard-to-retrofit buildings in the energy systems.
  - Create climate-neutral buildings or building environment blocks that generate integrated electric and thermal energy systems, with increased use of local renewables, as well as generate local support (citizens and professional stakeholders) to reach sustainability in the long term.
  - Include not conventional low temperature sources (data centres)

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TRI 7: Integration in the Built Environment

Technical content / scope („műszaki tartalom”)

- **Challenge 1 -** Integrate renewable energy conversion technologies for power, heat and cold in buildings. Connect the buildings in networks. Integrate energy storage, zero emission fuel, and activate building parts as energy storage. (Measures contribution to CO2 reduction, and renovation of building rates)
  - Decentralized storage tanks in buildings for thermal flexibility.
  - technologies for non-residential air-conditioning and ventilation
  - “Sector coupling “by means of combined heat and power plants, fuel cell heating and powering, heat pumps, Power-to-X etc.
  - Large building (malls, terminals, parking area, building services) energy production and storage systems integration for efficient energy production and uses.
  - Grid-serving operation; Tapping the flexibility potential of buildings
  - Integration of electricity and heat storages; integration of mobility concepts
  - Building-to-Building energy and active buildings concepts. Aggregation of energy services and energy traceability

TRI 7: Integration in the Built Environment

Technical content / scope („műszaki tartalom”)

- **Challenge 2 -** Digitalization for planning, construction phase, commissioning and operation. Methods of building performance assessment. (Measure carbon-neutral building stock).
  - Smart decision tools to evaluate the optimal technology choices in energy generation and management
  - Active management of energy consumption and production in buildings and energy flows between buildings and the energy system (span across energy vectors, increase flexibility and reduce peak loads)
  - Flexible energy planning tools and standardized packages for policy making regarding energy choices taking into account local factors, sector coupling, etc.
  - Development of solar cadastres to assess the generation potential of solar energy from the scale of single buildings to energy districts and metropolitan/regional areas. The cadastre might also be linked to a database of suitable technologies to be ranked according to the specifications of the installation site..

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TRI 7: Integration in the Built Environment

Technical content / scope („műszaki tartalom”)

- **Challenge 2 -** Digitalization for planning, construction phase, commissioning and operation. Methods of building performance assessment. (Measure carbon-neutral building stock).

  - Digitalization of in-building energy management by considering internal energy production and storage as well energy traceability for building-to-building energy flows and active buildings by smart contracts (span across energy vectors, increase flexibility and reduce peak loads).
  - Flexible energy planning tools and standardized packages for policy making regarding energy choices taking into account local factors, sector coupling, etc. Regulatory sand-boxes for testing proof concepts for the next generation energy market.
  - Development of solar cadastres to assess the generation potential of solar energy from the scale of single buildings to energy districts and metropolitan/regional areas. The cadastre might also be linked to a database of suitable technologies to be ranked according to the specifications of the installation site.

TRI 7: Integration in the Built Environment

Technical content / scope („műszaki tartalom”)

- **Challenge 2 -** Digitalization for planning, construction phase, commissioning and operation. Methods of building performance assessment. (Measure carbon-neutral building stock).

  - Digitalisation in district heating and cooling networks: large scale collection data located throughout the DHC production, transport, distribution and users chain, machine learning for optimal control of the network and support the analytics intended to maximize use of RES and residual heat to reduce the operational costs.
  - Built infrastructure as part of a local/regional decentralised energy system with consumer, prosumer and energy communities.
  - Contribution to open platforms for sharing data and models in support of the energy transition for research-based knowledge.

TRI 7: Integration in the Built Environment

Technical content / scope („műszaki tartalom")

- **Challenge 2 -** Digitalization for planning, construction phase, commissioning and operation. Methods of building performance assessment. (Measure carbon-neutral building stock).
  - Building Information Modelling (BIM) from the cradle to the grave including life cycle analysis. Offer circular-oriented services at different levels of the Construction and Demolition Waste (CDW) supply/value chain. Against the background of rising ecological pressure and threatening scarcity of primary raw materials, demolition has a fundamental role to play in the circular economy (CE) and global decarbonization of the Construction sector, as a source of valuable CDW-originated materials and components that can be effectively recycled or reused into new built structures
  - Open source, standardized open interfaces for easy data exchange; big data and open databases
  - Smart tools for Smart Homes + smart buildings with the aim that buildings become active elements in the power supply system (and maybe also in a heat network – if present)

TRI 7: Integration in the Built Environment

Technical content / scope

- **Cross cutting issues („átfogó tartalmak”)**
  - Integrated approach considering societal, economy, architectural, urban planning and transport sector issues.
  - Synergies with widespread of energy communities, positive energy districts and climate neutral cities policies.
  - Needs of users have to be taken account for: issues of acceptance, participatory approaches to support the complex transformation processes, new ways of living and working, demography, urban-suburban relationships and sustainable mobility etc. Furthermore, the impact on rent pricing, affordable construction prices, comfort or also user data privacy have to be considered.
  - Safety and security (cybersecurity, privacy, data protection, data rights) by design intended to generate trust in society and must be included in the proposals
  - Need of adaptation to meet urban planning regulations and specifically preserve cultural heritage landscape (e.g. building, complex of buildings)
  - Increase the smartness of various building systems (heating, ventilation, lighting, information,…) and evaluate it through objective indexes (Smart Readiness Indicator (SRI),..).

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TRI 7: Integration in the Built Environment

Technical content / scope

- **Cross cutting issues („átfogó tartalmak")**
  - Indoor Environmental Quality (IEQ)— indoor air quality (temperature, humidity, CO2, Radon,…), lighting, noise, ergonomics—and their effects on occupants or residents comfort must be taken into account. Strategies for addressing IEQ include those that protect human health, improve quality of life, and reduce stress and potential injuries. Contribute to co-create and reinforce local regional stakeholder innovation ecosystems.
  - Contribute to co-create and reinforce local regional stakeholder innovation ecosystems
  - Contribute to SRL (System Readiness Level) - TRL assessment framework
  - Contribution to networks of energy transition demonstration site and activities.
  - Solutions have to consider different economies of scale and climate context.
  - Standardisation of solutions, components and modules taking into account EU regulations.
  - Knowledge diffusion (specifically for historical and special buildings where the EU market is crucial)

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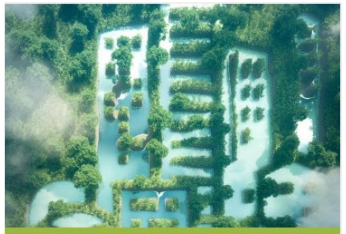

TRI 7: Integration in the Built Environment

Call Module: TRI7 R&I in clean energy integration in the built environment

Objectives - call module 7.1

- **Develop capabilities** for integration of energy technologies and digitalization.
- Results intended to become building blocks and elements for the building supply chain with capabilities in energy conversion, storage or harvesting.
- Integration schemas should be part of the solutions.
- Interfaces of non-homogeneous components and interoperability among them are key points to be considered by design. Digitalisation and tools solutions are supporting design, implementation, performance assessment and validation

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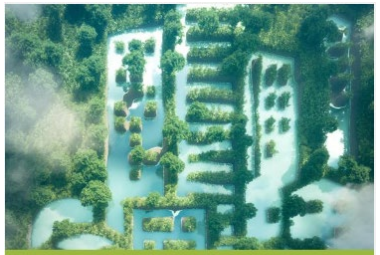

TRI 7: Integration in the Built Environment

Call Module: TRI7 R&I in clean energy integration in the built environment

Expected Impact

- At scientific and technological level **to provide validated solutions** ready to be included in new research and innovation processes intended to improvements and/or base for new developments. Valuable infrastructures in this environment should be visible and accessible to the RDTI community.
- At industrial stakeholders' level**, participation** of need-owners from the energy, building and installer industry is expected. Their participation should provide requirements in the projects intended to reinforce local industry and drive developments to affordable solutions.
- It is expected to yield improved access and higher use of research results, innovation and knowledge. Presented solutions should drive new technologies towards commercial readiness by reinforcing connection with multipliers (architects, civil engineers, craftsmen, engineering offices, manufacturers), creating high-quality new knowledge and skills in the complete built environment.

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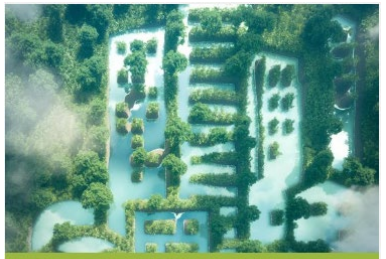

TRI 7: Integration in the Built Environment

Call Module: TRI7 R&I in clean energy integration in the built environment

Expected Impact

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- Proof methods of building energy performance assessment will support transition to carbon-neutral housing stock.
- The prospect of standardized solutions, components and modules will benefit from larger markets and contribute to the efficient use of the funding. The increase of utilisation and sharing of research infrastructures is foreseen to mobilise innovation community.
- A wide EU and international market supported by the diffusion of knowledge is the base of efficient responses in the integration of zero emission energy in existing, historical and special buildings as well as in mobility infrastructure.
- In addition to the dissemination and experience sharing within the CETP Knowledge Community, the projects are invited to participate in the activities and events organised by other partnership programs like Built4People.

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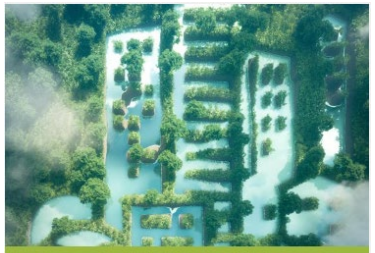

TRI 7: Integration in the Built Environment

Call Module: TRI7 R&I in clean energy integration in the built environment

Target groups

- It is expected that project consortia including RDTI community (academia, RDI centres), laboratories and test facilities and industry (energy, installers, building industry, etc) will submit proposals.
- Multipliers, energy, building and installer industry can participate as partners or need-owners at this level. Need-owner can contribute providing requirements and as observers in test and formal validation processes

Indicative targeted TRL

- Projects applying to this Call module are expected to achieve TRL 3-6. In the same project, different technologies can reach different TRLs

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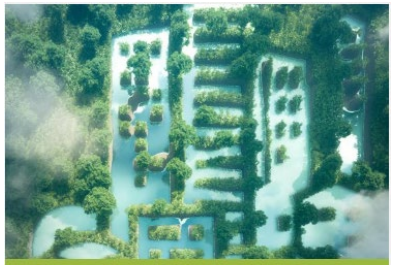

TRI 7: Integration in the Built Environment

Call Module: TRI7 R&I in clean energy integration in the built environment

Additional project requirements

The projects shall include a perspective for technological transfer including:

- Verification and Validation Plan
- Data management plan
- Results management and exploitation plan

At the pre-proposal stage, a clear mention of the corresponding planning should appear in the 3 sections, a) excellence, supporting project goals, b) impact, as part of the expected outcome and impact and c) Implementation, identifying deliverables in the work plan.

At the proposal stage, an outline of the plans and references to the content should be included. Specifically, the versions/deliverables over the project implementation shall be included in the Implementation section

The Call Module aims to support projects with an expected requested grant (but not limited to) in the range of 0,5 to 5 M€

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TRI 7: Integration in the Built Environment

Call Module: TRI7 Solutions to energy transition in the built environment

Objectives - call module 7.2

- The projects will cover the challenges for massive integration of **clean energy technologies in buildings** identified in the SRIA. Proposals should demonstrate capabilities for integration of energy technologies and digitalization.
- The Call module should provide integrated energy solutions covering the complexity of the energy system of high importance for the building sector. Pilot projects including demonstration and validation of implementable solutions should be part of the portfolio.
- Multipliers (architects, building owners, civil engineers, craftsmen, engineering offices, manufacturers, municipalities, the public sector, etc.) should become part of the projects to lead new technologies towards commercial readiness.
- A good set of approaches for cross-cutting dimensions inclusion shall be obtained from this call. The same applies to IPRs where suitable frameworks should be established in the projects.
- In addition to the dissemination and experience sharing within the CETP Knowledge Community, the projects are invited to participate in the activities and events organised by other partnership programs like Built4People.

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TRI 7: Integration in the Built Environment

Call Module: TRI7 Solutions to energy transition in the built environment

Expected Impact

- At scientific and technological level, the portfolio of **projects will provide validated solutions** ready to be included in new research and innovation processes intended to improvements and/or base for new developments. Valuable infrastructures in this environment should be visible and accessible to the RDI community.
- At industrial stakeholders' level, participation of need-owners from the energy, building and installer industry is expected. Their participation should provide requirements in the projects intended to reinforce local industry and drive developments to affordable solutions.
- At societal level, participation of regional/local authorities representing need-owners will improve trust in society. It is critical to include policy makers in the built environment where regulations are crucial. Regional/local authorities can play a very important role in impact creation.
- It is expected to yield improved access and higher use of research results, innovation, services and knowledge. Presented solutions should drive new technologies towards commercial readiness by reinforcing connection with multipliers (architects, civil engineers, craftsmen, engineering offices, manufacturers), creating high-quality new knowledge and skills in the complete built environment.

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TRI 7: Integration in the Built Environment

Call Module: TRI7 Solutions to energy transition in the built environment

Expected Impact

- Proof methods of building energy **performance assessment** will support transition to carbon- neutral housing stock.
- The prospect of standardized solutions, components and modules will benefit from larger markets and contribute to the efficient use of the funding. The increase of utilisation and sharing of research infrastructures is foreseen to mobilise innovation community.
- Particular solutions shall contribute to the European target to renovate 25 Mio building units by 2030.
- Collaboration among national programs support fast-track development of energy integration in buildings and guarantee economies of scale while also considering different climate context. The prospects of standardized solutions, components and modules will benefit from larger markets and contribute to the efficient use of member state funding. Furthermore, the diffusion of knowledge is the base of efficient responses in the integration of zero emission energy in existing, historical and special buildings as well as in mobility infrastructure (port, airport, railway station) where the possibility of a wide UE and international market is crucial.

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TRI 7: Integration in the Built Environment

Call Module: TRI7 Solutions to energy transition in the built environment

Target groups

- It is expected that project consortia including RDTI community (academia and RDI centres), laboratories and test facilities, industry in several fields and end-users (platforms or specific users) will submit proposals.
- Large projects (budget > 2M€ and/or more than 10 partners) should include the use of infrastructures for tests and contribution of regional/local authorities or installers in the proposal (as partners or with a specific role in outputs' deployments).
- Part of the industry and end-users will act as need-owners in the project participating as partners or committed to support deployments and validation. Multipliers, energy, building, equipment manufacturer and installer industry participate as partners. Need-owners can contribute providing requirements and as observers in test and formal validation processes.

Indicative targeted TRL

- Projects applying to this Call module are expected to achieve TRL 5-9. In the same project, different technologies can reach different TRLs.

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TRI 7: Integration in the Built Environment

Call Module: TRI7 Solutions to energy transition in the built environment

Additional project requirements

The projects shall include a perspective for technological transfer to the marketplace including:

- Validation and Qualification Plan
- Data management plan
- Business model plan

At the pre-proposal stage, a clear mention of the corresponding planning should appear in the 3 sections, a) excellence, supporting project goals, b) impact ,as part of the expected outcome and impact and c) Implementation, identifying deliverables in the work plan.

At the proposal stage, an outline of the plans and references to the content should be included. Specifically, the versions/deliverables over the project implementation shall be included in the Implementation section.

The Call Module aims to support projects with an expected requested grant (but not limited to) in the range of 1 to 5 MEUR

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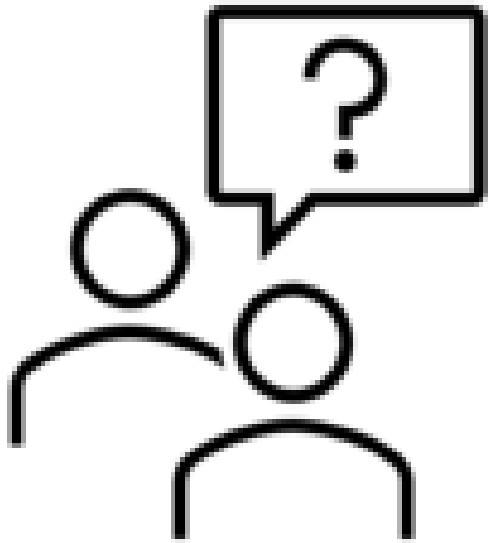
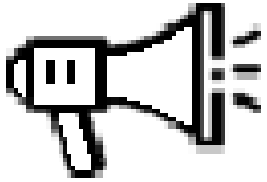
Q&A





More information and link to match making and Electronic Submission system at

https://cetpartnership.eu

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