

Overview of calls relevant for solar thermal

Horizon Europe

Work Programme 2021-2022

8. Climate, Energy and Mobility

Solar Heat Europe (SHE) strongly supports the European Commission initiative for the revision of the energy performance of buildings ((EU) 2010/31/EU ([consolidated version](#))).

In this document we shall address the calls that will be launched in 2021. Some of these will have a deadline in 2021 but there are also some that have a deadline in early 2022.

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HORIZON-CL5-2021-D4-01-05: Industrial excess (waste) Heat-to-Power conversion based on organic Rankine cycles **Error! Bookmark not defined.**

HORIZON-CL5-2021-D3-02-02: Sustainability and educational aspects for renewable energy and renewable fuel technologies **Error! Bookmark not defined.**

Topics covered in the 2021 call

HORIZON-CL5-2021-D3-02-03: Market Uptake Measures of renewable energy systems

<i>Segment</i>	<i>Type of Action</i>	<i>Indicative budget</i>	<i>Expected EU contribution per project</i>	<i>No. of expected projects approved</i>	<i>TRL</i>	<i>Opening tbc</i>	<i>Closing tbc</i>
Market barriers	CSA	EUR 10 million	EUR 2 million	5	8	24/06/21	05/01/22

Expected Outcome: Project results are expected to contribute to some of the following expected outcomes:

- Facilitate the wider uptake of renewable energy systems in the energy, industrial and residential sectors leading to an increased share of renewable energy in the final energy consumption by 2030 and beyond.
- Contribute to provide a basis for policy-makers and stakeholders for developing more informed RES policy and for analysing about the market dynamics when including all renewable energies.
- Contribute to the development of markets and respective financial frameworks that can operate efficiently and incentive-compatible while accommodating massive shares of renewables.
- Increase societal acceptance of renewable energy facilities and installations through science-based evidence and tools addressing misperception phenomena from citizens.

HORIZON-CL5-2021-D4-01-04: Full-scale demonstration of heat upgrade technologies with supply temperature in the range 90 - 160°C

<i>Segment</i>	<i>Type of Action</i>	<i>Indicative budget</i>	<i>Expected EU contribution per project</i>	<i>No. of expected projects approved</i>	<i>TRL</i>	<i>Opening tbc</i>	<i>Closing tbc</i>
SHIP	Innovation Actions	EUR 16 million	EUR 8 million	2	7-8	24/06/21	19/10/21

Expected Outcome: Project results are expected to contribute to all of the following expected outcomes:

- Demonstration at full scale (0.5 – 10 MWth) of industrial heat upgrade systems to supply various industrial processes with useful heat in the (sink) temperature range of 90 – 160 °C, extracted from renewable heat sources (e.g. solar thermal), ambient heat or industrial waste heat.
- Scaling up and improvement of the economic and technical performances of heat upgrade in order to cover more industrial processes with special attention to integration and adaptation to existing/improved processes.
- Demonstration of business models and contractual agreements in the cases of use of the upgraded heat within the industrial plant, in other neighbouring plants or heating networks, as part of the Hubs4circularity approach, identifying also potential regulatory barriers.
- Better awareness of the challenges and benefits of heat upgrade in the relevant industrial sectors.

HORIZON-CL5-2021-D3-03-02: Next generation of renewable energy technologies

<i>Segment</i>	<i>Type of Action</i>	<i>Indicative budget</i>	<i>Expected EU contribution per project</i>	<i>No. of expected projects approved</i>	<i>TRL</i>	<i>Opening tbc</i>	<i>Closing tbc</i>
ST tech / Storage	Research & Innov. Actions	EUR 33 million	EUR 3 million	11	3-4	02/09/21	23/02/22

Expected Outcome: Project results are expected to contribute to all of the following expected outcomes:

- Available breakthrough and game changing renewable energy technologies enabling a faster transition to a net-zero greenhouse gas emissions EU economy by 2050.
- Knowledge and scientific proofs of the technological feasibility of the concept including the environmental, social and economic benefits to contribute to R&I strategy and policy forecast.

- Establishing a solid long term dependable European innovation base.

HORIZON-CL5-2021-D4-01-02: Industrialisation of deep renovation workflows for energy-efficient buildings

<i>Segment</i>	<i>Type of Action</i>	<i>Indicative budget</i>	<i>Expected EU contribution per project</i>	<i>No. of expected projects approved</i>	<i>TRL</i>	<i>Opening tbc</i>	<i>Closing tbc</i>
Buildings	Innovation Actions	EUR 16 million	EUR 5 to 8 million	2-3	8	24/06/21	19/10/21

Expected Outcome: Project results are expected to contribute to some of the following expected outcomes:

- Significant improvement in productivity of construction and renovation processes for energy-efficient buildings, supporting an increase in scale in the renovation process and streamlining resource efficient nearly zero-energy performance renovation: 30 % waste reduction; improved quality of renovation; at least 30% and towards 50% reduction of on-site construction / renovation work time and 25% costs reduction.
- More affordable renovation projects for owners, for all building types but with a specific focus on residential buildings.
- Enhanced quality of construction, backed up by post-occupancy evaluations, also supporting a better integration of design and construction activities, streamlining commissioning of buildings, in particular in relation to energy management but also taking into account cross-cutting issues such as accessibility of buildings.
- Reduced performance gap between as-built and as-designed (difference between theoretical and measured performance), allowing tracking performance across the life cycle.
- Increased trust towards construction and renovation processes, by allowing tracking energy performance across the life-cycle.
- Upskilled workforce for industrialised renovation workflows, including automated and robotised construction / renovation, relying on interoperable digital modelling data.
- Enhanced safety of the construction workforce and increased acceptance of robotic support for deep renovation.

- Innovative, tailored business models for deep renovation allowing increased scale of renovation, generating economies of scale and increasing the potential for attractive and affordable packages for end users including financing.
- Tailored access to building information across the life cycle for relevant stakeholders (owners, facility managers, contractors, public authorities).
- Integration with distributed renewable energy sources in neighbourhoods and districts, favouring the emergence of related initiatives (e.g. renewable energy communities).
- Enhanced synergies of renovation with local resources, e.g. district heating & cooling networks.

HORIZON-CL5-2021-D4-02-02: Cost-effective, sustainable multi-functional and/or prefabricated holistic renovation packages, integrating RES and including re-used and recycled materials (Built4People)

<i>Segment</i>	<i>Type of Action</i>	<i>Indicative budget</i>	<i>Expected EU contribution per project</i>	<i>No. of expected projects approved</i>	<i>TRL</i>	<i>Opening tbc</i>	<i>Closing tbc</i>
Buildings	Innovation Actions	EUR 22 million	EUR 9 to 11 million	2-3	7	02/09/21	25/01/22

Expected Outcome: Project results are expected to contribute to all of the following expected outcomes:

- Increased scale and productivity in the renovation process: demonstrated and quantified decrease of on-site construction / renovation work time (at least 30% and towards 50%).
- Benchmarked and quantified improvement of insulation and air-tightness compared to standard renovation solutions.
- Demonstrated improvement of indoor environment and user comfort and satisfaction, as well as accessibility, increasing attractiveness of renovation for buildings owners and users.
- Improved affordability of sustainable renovation and RES systems in buildings, in particular for households experiencing energy poverty issues.
- Demonstrated reduction of embodied energy and CO₂ of renovation, and emission of air pollutants over the life cycle.

- Increased deployment of built-in renewable energy generation solutions for on-site multi-purpose (heating, cooling, electricity) renewable energy generation.
- Increased share of reused and /or recycled and/or biosourced construction materials / products used in building renovation to contribute to circular economy.
- Faster uptake of EU-wide standards or certification of reused and / or recycled construction materials / products.

HORIZON-CL5-2021-D3-03-08: Cost-effective micro-CHP and hybrid heating systems

<i>Segment</i>	<i>Type of Action</i>	<i>Indicative budget</i>	<i>Expected EU contribution per project</i>	<i>No. of expected projects approved</i>	<i>TRL</i>	<i>Opening tbc</i>	<i>Closing tbc</i>
Heat Hybrids	Research & Innov. Actions	EUR 10 million	EUR 3 to 5 million	2	5	02/09/21	23/02/22

Expected Outcome: Project results are expected to contribute to some of the following expected outcomes:

- Increased technical performance, robustness, feasibility and penetration of renewables at household level
- Increase technology leadership and competitiveness of European industry
- Increased production share of renewables at consumer level
- Increased socioeconomic and environmental sustainability of renewables based energy systems at household level.

HORIZON-CL5-2021-D3-03-01: AU-EU Water Energy Food Nexus

<i>Segment</i>	<i>Type of Action</i>	<i>Indicative budget</i>	<i>Expected EU contribution per project</i>	<i>No. of expected projects approved</i>	<i>TRL</i>	<i>Opening tbc</i>	<i>Closing tbc</i>
SHIP	Innovation Actions	EUR 5 million	EUR 2.5 million	2	4	02/09/21	23/02/22

Expected Outcome: Project results are expected to contribute to all of the following expected outcomes:

- Reinforce the activities in the long term the AU-EU HLPD CCSE Partnership.
- Provide knowledge and scientific modelling as evidence base of the water-energy-food-nexus including the environmental, social and economic trade-offs to contribute to R&I strategy and policy making.
- Increase clean energy generation in the African energy systems.
- A sustained network of African experts and expertise in this area.
- Improve in the long-term governance to advance knowledge and scientific modelling of the water energy food nexus including the environmental, social and economic trade-offs (governance aspects should be included since they are under-represented in the current research works).

HORIZON-CL5-2022-D3-01-11: Demonstration of innovative forms of storage and their successful operation and integration into innovative energy systems and grid architectures

<i>Segment</i>	<i>Type of Action</i>	<i>Indicative budget</i>	<i>Expected EU contribution per project</i>	<i>No. of expected projects approved</i>	<i>TRL</i>	<i>Opening tbc</i>	<i>Closing tbc</i>
Thermal Storage / Energy system	Innovation Actions	EUR 30 million	EUR 7-8 million	4	6-7	14/10/21	26/04/22

Expected Outcome: Project results are expected to contribute to most of the following expected outcomes:

- Demonstration of innovative storage technologies which go beyond the state-of-the art of existing storage solutions in respect of sustainability, technical performance, lifetime, non-dependency on location geographical particularities and cost.
- Increased availability, robustness and safety of sustainable and efficient choices for energy storage to reduce energy losses and improve the environmental footprint of the energy system.
- Demonstrated availability and functionality of innovative energy storage systems developed for specific system designs and applications.
- Improvement of the already established European storage value chain able to contribute to the EU climate neutrality objectives.

- Creation and improvement of European technological value chains with the potential for international cooperation and market exploration
- Demonstration of successful business cases and systems designs for energy storage integration solutions in innovative and 'green' energy systems at different scales and timeframes.
- Demonstration of effective integration of innovative energy storage systems and value chains at the interface of renewable energies and specific demand sectors
- Ensuring the compatibility of systems and standards of distributed energy storage for participation in flexibility markets.

HORIZON-CL5-2022-D3-01-05: Demonstration of innovative plug-and play solutions for system management and renewables storage in off-grid applications

<i>Segment</i>	<i>Type of Action</i>	<i>Indicative budget</i>	<i>Expected EU contribution per project</i>	<i>No. of expected projects approved</i>	<i>TRL</i>	<i>Opening tbc</i>	<i>Closing tbc</i>
Off-grid / Storage	Innovation Actions	EUR 10 million	EUR 10 million	1	8	14/10/21	26/04/22

Expected Outcome: Project results are expected to contribute to some of the following expected outcomes:

- Advance the European innovative knowledge basis, technology base, technology leadership in the area of renewable energy-based off-grid energy systems, while creating evidence for policy making in the context of off-grid energy systems.
- Improve environmental and socio-economic sustainability of the renewable-energy off-grid systems, particularly on geographic energy islands and/or in Africa and/or Central Asia.
- Technology de-risk through prototype demonstration tested and validated in operational environment as a necessary step before scaling up at commercial level.
- Reinforce the European scientific and innovation basis through international collaboration on off-grid energy systems while increasing the potential to export European renewable energy technologies and ensuring political priorities.

HORIZON-CL5-2021-D4-01-03: Advanced data-driven monitoring of building stock energy performance

<i>Segment</i>	<i>Type of Action</i>	<i>Indicative budget</i>	<i>Expected EU contribution per project</i>	<i>No. of expected projects approved</i>	<i>TRL</i>	<i>Opening tbc</i>	<i>Closing tbc</i>
Buildings	Innovation Actions	EUR 10 million	EUR 3 to 5 million	2-3	8	24/06/21	19/10/21

Expected Outcome: Project results are expected to contribute to all of the following expected outcomes:

- More robust, improved and consistent monitoring of performance (energy and other relevant aspects, such as indoor environment quality and life cycle) of buildings across the European sectors and through the whole value chain.
- Better informed planning of building infrastructure (e.g. renovation roadmaps, heating & cooling systems, district heating networks, mobility infrastructures (EV charging, parking facilities, communication networks, strategies for whole life carbon reduction etc.) and better informed investment decision-making for designing future buildings and building processes.
- Successfully tested smart energy services on the basis of advanced, high-quality building stock performance data.
- Significant and measurable increase in the use of open, real-time and reliable building data from multiple sources.
- Development of accurate methods that facilitate collection of data from the building stock (e.g. to support policy making and policy impact assessment or to substantiate performance guarantee schemes and contribute to de-risking investments in a climate neutral building stock over the full life cycle).
- Better availability of big data and big data analysis facilities for real-life scale research, simulation and policy-making.
- More effective implementation of EU policies that drive the transition to a green, digital and sustainable economy, and contribute to enhance the quality of the building stock across the board (e.g. quality of life and working, inclusiveness and accessibility, etc.).

HORIZON-CL5-2021-D3-02-05: Energy Sector Integration: Integrating and combining energy systems to a cost-optimised and flexible energy system of systems

<i>Segment</i>	<i>Type of Action</i>	<i>Indicative budget</i>	<i>Expected EU contribution per project</i>	<i>No. of expected projects approved</i>	<i>TRL</i>	<i>Opening tbc</i>	<i>Closing tbc</i>
Energy system	Innovation Actions	EUR 30 million	EUR 9-10 million	3	6-8	24/06/21	5/01/22

Expected Outcome: Project results are expected to contribute to most of the following expected outcomes:

- Demonstrated benefits of sector integration in different geographic, climate and economic conditions.
- Improved planning of integration of power, heat, gas, industry with a production site(s) of renewable energy.
- Optimised operations of coupled networks (e.g. electricity vs. heating).
- Validated tools and platforms enabling effective sector coupling as tested in large demonstration projects.
- Consolidated methodology to evaluate the impacts on OPEX, CAPEX and overall value creation connected to the integration of flexibility from storage and other energy flexibility solutions.

Topics covered in the 2022 call

In addition, there are also several other topics that shall be launched in 2022 that might be of interest. Some of the potentially relevant ones for solar thermal stakeholders include:

- HORIZON-CL5-2022-D4-01-04: Development and pilot demonstration of heat upgrade technologies with supply temperature in the range 150-250°C
- HORIZON-CL5-2022-D3-03-01: Innovative components and/or sub-systems for CSP plants and/or concentrating solar thermal installations
- HORIZON-CL5-2022-D4-01-02: Renewable-intensive, energy positive homes
- HORIZON-CL5-2022-D4-01-03: Smarter buildings for better energy performance
- HORIZON-CL5-2022-D4-01-05: Development of high temperature thermal storage for industrial applications
- HORIZON-CL5-2022-D3-01-13: Energy system modelling, optimisation and planning tools
- HORIZON-CL5-2022-D3-01-14: Thermal energy storage solutions
- HORIZON-CL5-2022-D4-02-04: Smart-grid ready and smart-network ready buildings, acting as active utility nodes (Built4People)
- HORIZON-CL5-2022-D3-02-03: Innovative renewable energy carrier production for heating from renewable energies
- HORIZON-CL5-2022-D3-02-07: Renewable energy incorporation in agriculture and forestry
- HORIZON-CL5-2022-D3-01-13: Energy system modelling, optimisation and planning tools