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|  | **IEA SHC Task Proposal** |  |  |
| ***Proposed Project Tile***  | **Solar Envelope Systems for Heating and Cooling** |
| ***Date*** | 18.2.2015 |
| ***Provide a brief description of the proposed project and the objectives****.*In the residential sector, solar systems are typically mounted on building roofs with no attempt to incorporate them into the building envelope, creating aesthetic challenges and space availability problems. In the non-residential one, most of the time, the roof is again the only surface devoted to the installation of solar technologies. On the contrary, the use of facades is highly unexplored.**This Task will focus on the critical analysis, simulation and laboratory test of envelope systems entailing solar thermal and/or photovoltaic elements** that have one or more of the following uses:1. To **deliver renewable thermal or/and electric energy to systems** providing heating and cooling to buildings
2. To **reduce heating and cooling demands** of buildings, while **control daylight**
3. To **induce natural ventilation fluxes** in the facade for heating and **overheating control** of buildings.

**Residential and non-residential buildings** (offices, schools, hospitals, factories) are addressed.Despite factories are considered in terms of useful building envelope, **heating and cooling for process heat are not in the scope of the present Task**.**Techniques for new-built and renovated constructions are analysed**, accounting for the specificity of the tackled intervention.Apart for the technical challenge of integrating solar active elements into buildings’ envelopes, the BIPV and BIST markets are depressed by the high investment costs. This produces bankability problems both for private and public investors.**The Task will pose the attention on best practices, which provide the lowest cost to benefit ratio** by:* Optimising the installation and maintenance costs
* Entailing optimised control and continuous monitoring
* Ensuring that more than one function is covered among the ones stated above (multifunctional systems)
* Substituting part of the backup system, instead of adding functionalities to it
* Maximising the yearly solar energy harvest.

***The key objectives of the project are:*** **The strategic objective** of the Task is to **coordinate the research and innovation effort taking place within the scientific community and the private sector** towards the utilization of envelope integrated ST and PV technologies.**Specific objectives** of the Tasks are:* To develop **test methods** for the performance characterization of BIST and BIPV elements (thermal and daylighting performance characterization)
* To develop **simulation models** for the performance characterization of BIST and BIPV elements (thermal and daylighting performance characterization)
* To **gather relevant information on installed** multifunctional solar façade **systems** both in terms of performance and costs
* To develop **design, manufacturing and installation guidelines** (no tools development) for prefabricated multifunctional solar façade systems
* To develop **business and bankability guidelines**
* To **enhance** **awareness of the public and private sector** on the treated technologies.
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| ***Who is the intended target audience for each outcome of the project?*** The Task target audience is composed of **solar manufacturers**, **envelope manufacturers** and the **H&C industry sector** that serves the end-users.In addition, **architects, engineering offices and ESCO’s** are also addressed.Public and private, small and large investors are targeted: **housing companies and building owners, banks and public bodies, such as municipalities**, playing the role of the adopters of the technologies analysed.Finally, the **scientific community** is also tackled, being the first line of innovation support to industry and results’ dissemination. |
| ***How does the proposed project relate to the current Solar Heating and Cooling Strategic Plan:*** *http://www.iea-shc.org/about/strategicplan/index.html*The task activities and objectives are well in line with the strategic plan of the SHC programme, in terms of Vision, Mission and Objectives:**Vision**Turning solar thermal into a major energy resource for heating and cooling by 2050 is an ambitious, but a realistic goal. It is achievable – provided that the right mix of research & development, industrial growth, consistent market deployment measures and adequate political framework conditions are applied.This Task can play a major role in reaching this goal:* by promoting the elaboration of simulation models and laboratory test methods, towards the entry into market of products with reliable, deemed performance
* by developing construction, installation, business and bankability models, towards the fast and reliable replication of best practice systems.
* by fostering awareness of the public and private sector towards a regulated market (standardization of the solutions and of the market).

**Mission**The Solar Heating and Cooling Agreement’s mission assumes a systematic approach to the application of solar technologies and designs to whole buildings, and industrial and agricultural process heat. (…). Through international collaborative activities, the Agreement will support market expansion by providing access to reliable information on solar system performance, design guidelines and tools, data and market approaches, and by developing and integrating advanced solar energy technologies and design strategies for the built environment, and for industrial and agricultural process heat applications.By concentrating on the built environment, the Task addresses all the mentioned support actions:* providing access to reliable information on solar system performance
* delivering design guidelines and tools
* delivering data and market approaches
* developing and integrating advanced solar energy technologies and design strategies

**Objectives**In particular the following strategic objectives are pursued:* To be the primary source of high quality technical information and analysis on solar heating and cooling and daylighting technologies, designs and applications
* To enhance cooperation with industry on increasing the market share of solar heating and cooling technologies and designs
* To contribute to cost reduction of solar thermal components and systems in order to increase their market competitiveness.
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| ***How does the proposed project relate to ongoing or previous SHC Tasks?***A number of past and ongoing SHC Tasks related to the one in object:**Past**Task 21 Daylight in BuildingsTask 27 Performance of Solar Facade ComponentsTask 28 Solar Sustainable HousingTask 31 Daylighting Buildings in the 21st CenturyTask 41 Solar Energy and ArchitectureTask 44 Solar and Heat Pump Systems**Ongoing**Task 50 Advanced Lighting Solutions for Retrofitting BuildingsTask 53 [New Generation Solar Cooling and Heating Systems](http://task53.iea-shc.org/)***Is there any expected overlap with projects of the EU or other international organizations?***An overlap of activities is foreseen with the **e-Cost action TU 1205**: Building integration of solar thermal systems. That entails a large scientific community, with researchers from around Europe, involved at different levels and in different ways to the design and analysis of BIST technologies.**A strong collaboration with this Action will be sought from the very beginning, in order to profit of the results already obtained (avoiding replication) and optimising the effort**.A certain overlap is also encountered with the activities of the **e-Cost action TU 1403**: Adaptive Façades Network. The chair of the Action will be contacted to verify synergies.A number of research projects at European level are active in elaborating and analysing envelope integrated solar active technologies:**EC-FP7** – iNSPiRe, CommonEnergy, Solar bankability, …At **national level**, the following projects (past and ongoing) can be reported:Austria – MPPS, …Germany – …Italy – …To add |
| ***Describe any cross-cutting to ongoing Tasks/Annexes in other implementing agreements******EBC Annexes******Annex 67 Energy Flexible Buildings -*** The aim of this Annex is to demonstrate how energy flexibility in buildings can provide generating capacity for energy grids, and to identify critical aspects and possible solutions to manage such flexibility.***PVPS******Task 15 – Building integrated PV –*** The main objective of this Task is to facilitate the acceleration of BIPV application in the built environment, by identifying and breaching the most important process and policy thresholds, in combination with the development of business and marketing strategies for BIPV application worldwide. |

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| ***State any expertise or skills the project will require.***Building stock featuresBuilding/Energy grids interactionBuilding façade technology, ST, PVComprehensive modelling including several physicsLab testing arrangementPrototyping and manufacturingFinancial mechanisms |
| ***What is your initial estimate for the duration of*:** *- The preparation phase (up to one year****)?* 10 months***- The working phase?* **3 years** |

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| **Name of Task initiator** | Roberto Fedrizzi – EURAC |
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| **Will you be able to:** |  |
| Lead development of the proposal (“Task Organizer”)?  | Yes |
| If approved by the Executive Committee, act as the project manager (“Operating Agent”)?  | Yes |
| **Name of your national SHC Executive Committee member** | Giovanni Puglisi |
| **Has your Executive Committee member approved this proposal?** | Yes |
| **Within SHC member countries, which institutions and companies do you propose to collaborate with on this project**  |  |

**Instructions**: *Please complete no later than 4 weeks before the Executive Committee Meeting at which the proposal will be presented (June or November each year) and forward to the Chairman and Executive Secretary of the Executive Committee*

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