Bracket 1

Applicant Information

If you are submitting on behalf of a team or organization, please submit the information for your team lead.

First Name

Vitalii

Last Name

Strashko

Organization (if applicable)

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Street Address

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City

Dnipro

State or Province

Dnipropetrovskay

Zip or Post Code

49130

Country

Ukraine

Applicant's date of birth

01 FEB 1960

Educational and professional background including publications, patents, projects, etc.

Education: Physico-Technical Faculty. Dnipropetrovsk National University. Specialty: production of aircraft.
The main job:
Design Bureau 'South'
Experimental Design Bureau 'Photon'
Research Institute of Energy at Dnipropetrovsk National University
At this time - independent inventor
Since 1988, working in the field of solar energy
The inventors 'helioprofil' and concepts of: 'energy active building' and 'seasonal thermal thyristor'

Project Information

Title of Application

ELEKTROHELIOPROFIL FOTON-E. ENERGY ACTIVE BUILDING

Executive Summary: Describe the project and make clear its primary objective.

Project goal: heat supply of places of sustainable human presence on the long-term historical perspective without using the fossil energy sources.
Project objectives: creation of assembly production of elektrohelioprofil Photon-E for the purpose of its widespread introduction into the structures of energy active buildings with solar heating and solar power generation.
Elektrohelioprofil is a “3 in 1” product: a structural building material; a heat solar collector with air and liquid loops of heat transfer fluids; a solar panel. Production of “solar” electricity increases due to the partial cooling of photoelectric converters, composing the elektrohelioprofil.
Design characteristics of the elektrohelioprofil option: 1) electric power of 45 W; 2) thermal power up to 350 W; 3) length of 3.1 m; 4) mounting width of 0.175 m; 5) effective area of 0.51 m².
The concept of an “energy active building”: Solar radiation that falls on a roof and facades of energy active buildings throughout the year is absorbed and heats the heat transfer fluid. Heat transfer fluid transfers heat to a network of plastic heat-exchanging tubes of a soil heat storage unit and heats it up. The accumulated heat is transferred to a low temperature (+35 °C) heating system of a building during the heating season. The temperature of a soil heat storage unit changes during the year within the range of +40 °C - +60 °C in the steady-state mode. Some solar radiation is converted into electricity.

Describe how the research, project, technology or program will contribute to achieving 100% renewable energy.

The elektrohelioprofil is a major component of energy active buildings. Construction of and reconstruction buildings in accordance with the concept of an “energy active building” will: 1) resolve an issue of heat supply of sustainable human presence on long-term historical perspective without fossil energy sources; 2) significantly increase generation of “solar” energy, which in combination with other renewable energy sources will allot, to a large extent, to abandon the use of fossil energy sources. In conjunction with CHP units, running on bio- and generator gases, energy active buildings will form the basis of energy autonomous human communities.The widespread introduction of the concept of an “energy active building” with the elektrohelioprofil will be similar to the introduction of a “peaceful atom” by its civilizational consequences, but a priori safe for the mankind.

Describe its applicability and short- and long-term transformative impact, e.g. how many people reached, how many installations planned or completed or secured, how has access to energy services been improved, estimate MWh generated, etc.

Short-term transformative impact will appear in the reduction of dependence on external heat

distribution networks and consumption of fossil fuels. Long-term transformative impact, in addition, appears in the refusal to use district heating and related heat loss, steady heat and electric power supply in a time perspective. Operational safety - energy is generated and consumed at the same place. Raw material resource base allows us to organize the mass production of the elektrohelioprofil. In case of the ratio of 2 m² of a roof or facades made of the elektrohelioprofil for 1 person, up to 2*108 MWh of electricity and 7*108 MWh of heat per year can be received for 1 billion people living in the climatic conditions of Central Europe.

Describe its implementation plan.

Implementation of the introduction plan comprises the following steps: 1) development of the elektrohelioprofil design, the production technology and production of a pilot; 2) full-scale testing and improving of the elektrohelioprofil; 3) development of installation and operating technologies of the elektrohelioprofil and systems therewith; 4) establishment of companies for the elektrohelioprofil production; 5) development of a simulation model of an energy active building; 6) construction of demonstration energy active buildings; 7) creation of training and production centres for the design, construction (reconstruction) and operation of energy active buildings; 8) mass construction (appropriate reconstruction) of energy active buildings.

Demonstrate its replicability and scalability, e.g. how it can or will be used in different countries or cultural contexts, how it can be scaled to different groups.

The elektrohelioprofil is a relatively small-sized structural unit for the construction of roofs and facades of buildings. Other elements of the power supply system of an energy active building are located inside and underneath. Accordingly, scalability of the system capacity depends mainly on the size and architecture of buildings, and their number. Also, a roof and facades of energy active buildings can be designed according to the architectural and cultural traditions of the country or region.

Describe the technical aspects including details of technologies utilized or new technologies proposed.

Elektrohelioprofil is a “3 in 1” innovative product: a structural building material; a heat solar collector with air and liquid loops of heat transfer fluids; a solar panel (protected by the Patent for Invention of Ukraine). The use of the elektrohelioprofil in the energy supply system, including a heat pump and a seasonal soil heat storage unit, stipulates energy autonomy of an energy active building.

Describe of methods and strategies, including the individuals/organizations responsible for completing the work necessary.

The concept implementation strategy requires resolution of issues by technical, and administrative and financial aspects.Technical - involving cooperation with scientific and industrial companies to address the following issues: 1) development of the design, the production technology and

production of a pilot batch of the elektrohelioprofil; 2) full-scale testing and improving of the elektrohelioprofil; 3) development of installation and operating technologies of the elektrohelioprofil and systems therewith.Administrative and financial: 1) search for investors to establish appropriate industrial and building capacities; 2) legislative creation of appropriate tax preferences, compensatory mechanisms, incentive mechanisms, and so on.

Describe the operational aspects.

Operational aspects of the performance of work are associated primarily with addressing the design and engineering issues of the elektrohelioprofil production. Second, this is the design development of the power supply system of an energy active building and an energy active building in general. Third, the construction of a demonstration energy active building, addressing the technical and technological issues of installation and construction. And fourth, scientific and technical support of operation of the demonstration energy active building and elaboration of proposals to improve the technical and operational solutions and parameters of the project.

Describe the social & economic short- and long-term transformative impact. Being affordable for use in developing countries is a plus.

Introduction of energy active buildings using the elektrohelioprofil will have a short-term social and economic impact associated with the increase in economic activity in the construction and related industries in the region. A long-term impact will be associated with low operating costs of buildings, confidence in the sustainability of energy supply and an increase in the environmental attractiveness of the area. In the long term, there is a possibility to conserve fossil energy production. These effects are also attractive for developing countries or countries that have insufficient domestic energy resources. These factors will also have a positive impact on reducing the migration level and flow of refugees related to economic factors.

Describe the environmental impact.

Mass building of energy active buildings using solar heating and solar power generation would lead to a significant reduction in harmful emissions to the atmosphere by corresponding replacement of fossil fuel. When generating 2*108 MWh of electricity and 7*108 MWh of heat per year (calculated for 1 billion people in the climatic conditions of Central Europe), the use of fuel/oil equivalent (TOE) will be reduced by 52 million tons for power generation (without heat generation) and 60 million tons for heat generation per year. Overall 112 (TOE) million tons. 250 million tons of carbon dioxide and up to 9 million tons of other compounds enter the atmosphere during the combustion of such amount of fuel.

Proof of innovation and creativity

Helioprofil “TEPS” (base profile) is protected by patents for invention of Ukraine and Russia. It is recognized as the best invention of 2005 in the energy sector in Ukraine.Elektrohelioprofil “Photon-E” is protected by the Patent for Invention of Ukraine.The results of experimental studies of the helioprofil “TEPS”, the concept of an “energy active building” and the “seasonal thermal thyristor”

have been published in scientific publications.

Budget - If you win the award, how will the prize money be used?

In case of winning the award, the prize money will be mainly used for the following:1) Production of a pilot batch of the elektrohelioprofil “Photon-E”;2) Updating the methods of calculating an energy active building with solar heating and solar power generation.

Disclosure of competing interests

The main groups of competitive products:1) PVT panels. Shortcomings: no air loop of heating medium; less resistant to mechanical impact.2) Rheinzink roofing panels. Shortcomings: there is either a photoelectric loop or a loop of heat transfer fluid; no transparent heat-insulation; less resistant to mechanical impact.3) SolarWall facing systems. Shortcomings: no photoelectric loop; no loop of heat transfer fluid; no transparent heat-insulation.

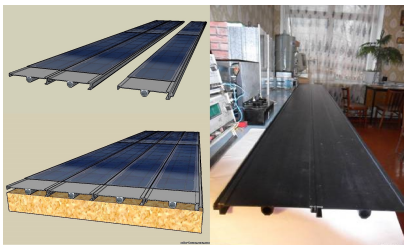
Acknowledgement and Acceptance of Renewable Transformation Challenge Rules

I have read and accept the terms of the Renewable Transformation Challenge Official Rules.

I Agree

Supporting Documentation

Please upload an image to represent your entry.



Elektrohelioprofil RTC.jpg

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