Technology Offer

Automatic guidance device for solar energy collectors

Summary

A Romanian research team has invented a mechanism addressed to solar photovoltaic panels or hot water panels, with the purpose of their guidance towards sun during daylight. The mechanism is in the concept stage, but it has many advantages, such as capturing solar energy to a value close to maximum during the day. The Romanian researchers are looking for partners in the field of research and production in order to develop the product and for technological transfer.

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Reference	TORO20151217002

Details

Description

A Romanian research team has developed a guidance mechanism of the solar panels, that consists of a metal frame horizontally fixed on the ground or on the roof of a house, which has two bearings aligned along an axis inclined at a 55° angle relative to the horizontal line. A panel can rotate around the axis due to the actuation of a mechanism made up of a crown, a pinion and a worm gear driven by a direct current (DC) electric motor controlled by a photocell located in a black box that is illuminated by the sun through a directional slot, only if another photocell detects that the sun is in the sky. The rotation angle from East to West is determined by two stroke limiting devices, adjustable in position, according to the season.
On the metal frame, two holes are positioned symmetrically in relation to the South, where two stroke limiting devices can be fitted successively to correlate the total rotation angle of the panel with the sun's path in the sky, according to the season. The first stroke limiter orders the turning of the panel facing East while the second limiter orders its stop at stroke start.
The presently used guidance mechanisms have electric or hydraulic motors to rotate the panels around one or two axes; for reduction, there is typically used worm and wheel mechanism or motion screw, and the electric motors are stepper motors. The actuation of the motors can be done in 2 versions: by means of sensors or of an algorithm. The automatic guidance mechanism of 2nd class developed by the Romanian researchers uses for motors controlling a mathematical algorithm that takes into account the day time, time of year and geographic location. Based on this algorithm, a control software for controlling the two stepper motors has been developed, which determines the orientation on two directions.
The problem solved by the automatic guidance device consists in capturing solar energy to a value close to maximum during the course of a day, in order to obtain the maximum amount of heat energy from the conversion of solar energy into heat energy.
The Romanian research team is looking for EU partners (universities, institutes and SMEs), for research or technical cooperation agreements.

Advantages and Innovations

- simple and compact design, that comprises cheap and widely spread control and actuation parts;
- high efficiency (close to the maximum possible) of the solar panels that are mounted on the automatic guidance device, regardless of season throughout a sunny day.

Stage of Development

Concept stage

IPR Status

Patents granted

Comment Regarding IPR status

Patent applied for at the State Office for Inventions and Trademarks. IP rights on national level - Romania

Keywords

Technology

04005004	Photovoltaics
04005005	Solar/Thermal energy

Market

06003001	Solar/thermal energy
06003002	Photovoltaics

NACE

M.72.1.9	Other research and experimental development on natural sciences and engineering

Network Contact

Issuing Partner

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Open for EOI : Yes

Dissemination

Send to Sector Group

Intelligent Energy

Client

Type and Size of Organisation Behind the Profile

R&D Institution

Year Established

0

Already Engaged in Trans-National Cooperation

No.

Languages Spoken

English

Client Country

Romania

Partner Sought

Type and Role of Partner Sought

The partners sought are, on the one hand, research institutes and universities, willing to develop new applications for the product, to test it in laboratory and in real conditions and finally, on the other hand, SMEs willing to introduce it in the manufacturing process.

Type and Size of Partner Sought

SME 11-50,University,R&D Institution,SME 51-250

Type of Partnership Considered

Technical cooperation agreement
Research cooperation agreement