ARCHIMEDE SOLAR ENERGY

The Company
Archimede Solar Energy (ASE), in partnership with Siemens Renewable, is a subsidiary of Angelantoni Group headquartered in Italy, Massa - Martana (Perugia).

Archimede produces receiver tubes for thermodynamic solar power plants (CSP) licensed by ENEA (The Italian National Agency for New Technologies, Energy and Environment). In 1932 ‘Angelantoni Industrie’ started its activity in the refrigeration sector, and over the years, became renowned in three main industrial fields one of which is testing.

Since 1952 under the ACS brand, Angelantoni Industrie has introduced world-wide environmental test chambers for all types of tests on materials, components, and finished products. ACS brand has now a strong leadership in the aerospace sector, the most challenging environment for simulation.

After the first space simulator in 1988, Angelantoni Industrie became one of the three leading international manufacturers, and a supplier for the most important Space Research Centers testing satellites and satellite parts.

In 2000 thanks to an international tender committed by ENEA for the production of a Cermet thin film coating sputtering Machine, Angelantoni started a new activity in the renewable energy field.

The vacuum experience achieved in space simulation, combined with the coating know how, permitted to Angelantoni Industrie to develop a revolutionary receiver tube, core business of Archimede Solar Energy.

Archimede Solar Energy is the world’s sole company using molten salts as heat transfer fluid in its solar receivers for parabolic trough power plants. Compared to plants using the customary thermo oil the efficiency of solar thermal power plants can be significantly enhanced. Molten salts can also be used as a heat store, with the stored energy being used in solar thermal power plants to also produce electricity at night.

Solar thermal power plants work on the same principle as conventional steam power plants - with the difference that the heat for steam generation is not produced by combusting fossil fuels but with the aid of solar energy. To this end parabolic mirrors bundle the incident solar radiation and reflect it onto receiver tubes, through which a heat transfer fluid flows. The salt used exclusively by ASE is heated to temperatures up to 550 degrees Celsius and then flows through a heat exchanger, in which the steam is produced to drive a steam turbine-generator.

The receiver tube
ASE’s HEMS08 is the world’s most advanced solar receiver tube, designed for thermodynamic solar power plants, operating at high temperature with molten salts as Heat Transfer Fluid (HTF). ASE produces also Parabolic Trough Receiver Tubes (HEOI09) using ordinary mineral oil.

In 2008 Archimede has been achieving major developments:

In 2008, Archimede Solar Energy furnished HEMS08 receiver tubes for the first Solar power plant in the world using Molten Salts technology (ENEL – Priolo Gargallo (SR), ITALY - Integrated Solar Combined Cycle Plants (ISCC)).

In 2009 and following the strategic alliance with Siemens which acquired 28% of Archimede Solar Energy, the company invested in:

- Building new manufacturing facility
- Establishment of a Demo Plant (Operational in October 2009): A complete Stand Alone CSP Demo Plant using molten salts with storage system and turbine.

In 2010 the Factory will increase the production of Solar tubes to 50,000 a year.

In 2011 the production will be of 100,000 tubes a year.

ARCHIMEDE SOLAR ENERGY
SOLAR RECEIVER TUBES: THE NEW FRONTIERS OF MOLTEN SALTS

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Thanks to a revolutionary patented coating process (CERMET) the solar receiver tubes have an absorbance equal or higher to 95%, an emissivity lower than 10% at 400°C and 14% at 580°C. Kept in a vacuum, Archimede tubes ensure the maximum sunlight yield and thus they are the most technologically advanced solar receivers available for high temperature range. The surface coating deposited on the tube is constituted of a thin film multilayer structure including an inferior layer of metal, reflecting in the infrared, and a superior layer of antireflective ceramic material.

The external glass has an antireflective coating on both surfaces with a solar transmittance higher or equal to 96.5%.

The metal bellows adjust the difference in thermal expansion between the hot absorber tube and the cooler external glass envelope during operating conditions. In order to achieve outstanding vacuum tight enclosure, each bellow is welded on one side to the absorber tube and to the glass on the other side by glass-to-metal junction. Innovative glass-to-metal junctions are made by a special machined and vacuum heat treated stainless steel rings.

The internal shields have been dimensioned to optimize the thermal characteristics and reliability of the tube with an irradiated surface/total surface ratio equal to 0.95. In order to ensure the designed vacuum conditions, inside the glass enclosure during the entire working life of the tube, a quantity of getter strip is wrapped around each shield.

HEMS08 has an expected lifetime of more than 25 years at working temperature (of up to 550°C) under normal installation, operating and maintenance conditions.

Archimede Solar Energy will be present at The European Future Energy Summit, Bilbao: Pavilion 2, D49.

The Angelantoni Industrie Group was established in 1932 and has a workforce of 7,500 employees at eight manufacturing plants in Italy, France, Germany, India and China. It posts annual revenues totaling EUR 1.3 billion. The two traditional core business are biomedical and laboratory equipment, and test equipment for automotive, electronics and aerospace applications. The test equipment includes environmental test chambers, space simulators for satellites, car and car component test benches, and electrodynamic shakers.

www.angelantoni.it

“By acquiring a stake in Archimede Solar Energy Siemens is underlining its intention to become the leading provider of solutions for solar thermal power plants.”

The Siemens Energy Sector is the world’s leading supplier of a complete spectrum of products, services and solutions for the generation, transmission and distribution of power and for the extraction, conversion and transport of oil and gas. In fiscal 2008 (ended September 30), the Energy Sector had revenues of approximately EUR 22.6 billion and received new orders totaling approximately EUR 33.4 billion, and posted a profit of EUR 1.4 billion. On September 30, 2008, the Energy Sector had a workforce of approximately 83,500.

www.siemens.com/energy

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