Solar co-generation of electricity and water with concentrated thermal

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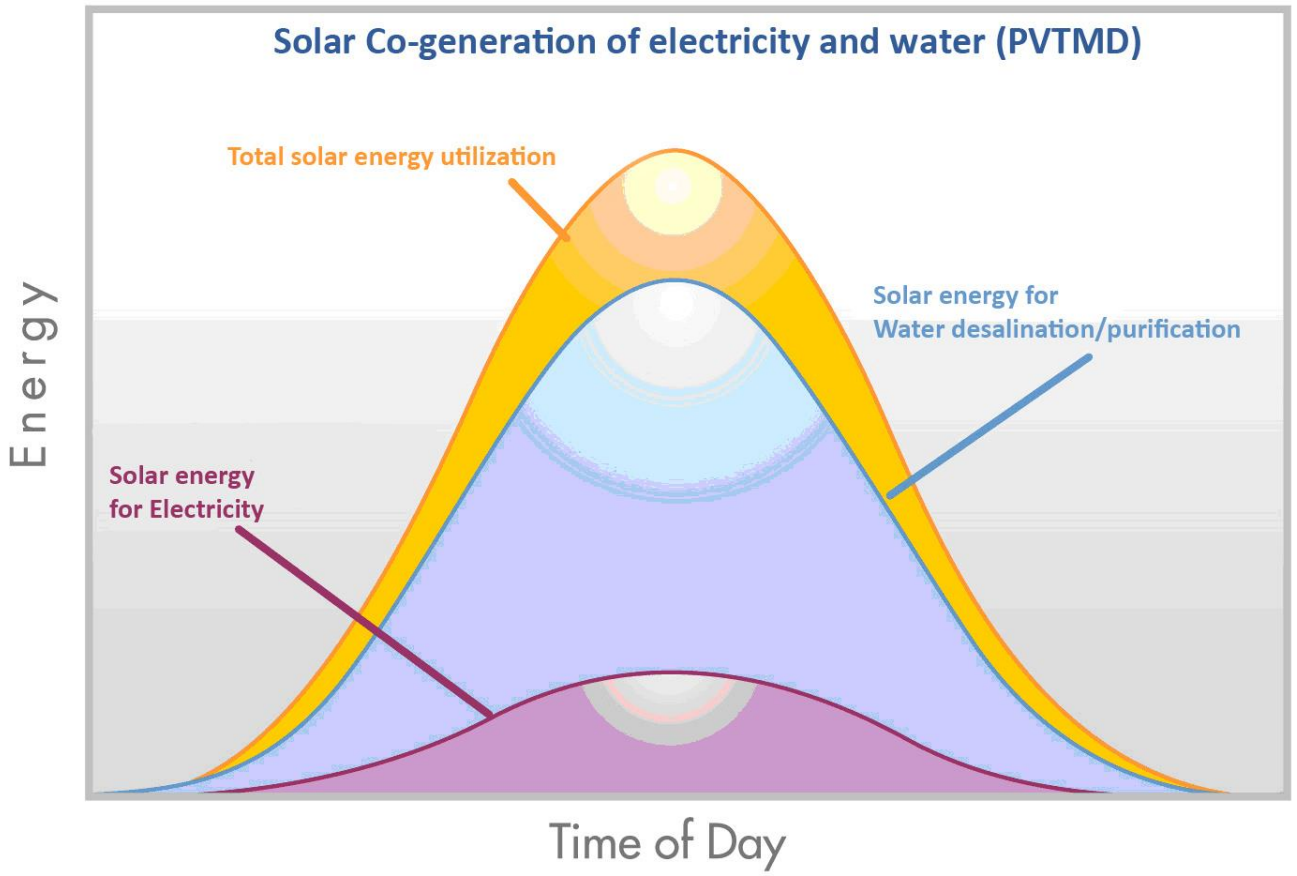
Solar Co-generation of electricity and water (PVTMD)
Total solar energy utilization
Solar energy for
Water desalination/purification
Solar energy
for Electricity
Energy
Time of Day

PROPOSITION

Concentrated solar produces both electricity and heat

The heat can be used for desalination in Low Temperature Distillation equipment

BUSINESS IDEA

A company that builds or supplies technology for large scale solar co-generation plants for electricity and water

TARGET

To co-generate large amounts of electricity and desalinated water at competitive costs

CONCENTRATED SOLAR

Steam is generated to power turbines

Cooling from the turbines power Low Temperature Distillation

MEMBRANE DISTILLATION

Water at 50 – 100 ^{o}C is contacted with a hydrophobic membrane and only vapor passes through. The vapor is condensed on the other side of the membrane

TECHNOLOGY

Scarab has a world lead in MD-technology

Four patents for MD system efficiency and for pumping the water with solar heat have been granted in 2008

DEVELOPMENT STATUS

Concentrated Solar is a mature technology

Membrane Distillation is in demonstration stage

MARKET STRUCTURE

Customers

Infrastructural projects, especially in arid areas

Partners

Manufacturers of concentrated solar equipment, water industry integrators

Distribution

Consortiums with electrical companies, water utilities and construction companies

BUSINESS MODEL

Develop and propose large infrastructural projects

Assemble consortiums to build these projects

Sell or own and operate

THREATS

Dependency on government contracts, permissions and regulations

Dependence on long distance electricity transmissions

Strong competitors are promoting state-of-the-art technologies, for instance Nuclear Reactors could be combined with Reverse Osmosis

IP-PROTECTION

Accumulated know-how in desalination in general and Low Temperature Distillation, especially Membrane Distillation, in particular

Four patents approved in 2008 for system efficiency in Membrane Distillation

Successive know-how about integration of MD with Concentrated Solar will be protected

Continuous development of membranes and modules will be protected

TIME LINE

First year –
- demonstration of smaller units
- establishment of management team

Second year –
- demonstration of larger units, establishment of manufacturing capacity and marketing agreements in Egypt, Abu Dhabi, Saudi-Arabia, India, Spain, Australia, Singapore, the US and China

Third year –
- first full scale commercial contract

Fourth year –
- aggressive market development

Fifth year –
- break-even

MARKET ENTRY

Market entry requires large sums of capital

Contacts with sufficient capital established in Spain, Germany, Egypt, Saudi-Arabia, India, the US and China.

RESEARCH PARTNERS

National Research Council - Institute on Membrane Technology, Italy
Stanford Synchrotron Radiation Light Source, US
Quantum Chemistry, Stockholm University, Sweden
Micro technology and Nano science, Chalmers, Sweden
Industrial Ecology, Royal Institute of Technology, Sweden
Heat and Power Technology, Royal Institute of Technology, Sweden

IMPLEMENTATION PARTNERS

Deutsches Zentrum für Luft- und Raumfahrt (DLR), Germany
Bushnak Group, Saudi-Arabia
Sujana Energy, India
The Energy and Resources Institute (Teri), India
Grameen Shakti, Bangladesh
Veolia Water, France
Coway International Tech Trans, China
Orascom Hotels & Development, Egypt

VENTURE FINANCE

Kleiner, Perkins, Caufield and Byers, USA
Abu Dhabi Future Energy Company, Abu Dhabi
Orascom Group, Egypt