SHAP
Solar Heat And Power S.p.A.

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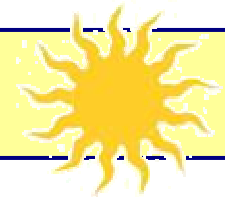

SHAP SPA

Presented by

Stefano Bisceglia

Solar Heat And Power

SHAP SpA is an Italian company that aims to deliver knowledge and experience from R&D projects into innovative electric power stations, fueled by alternative and renewable sources.

Our activities are focused on:

1. **Solar Concentrating Systems**: solar towers, linear parabolic concentrators, concentrating photovoltaic modules.
2. **Fluidized Bed Combustor** (Bubbling Bed Type) for biomass and waste combustion.
3. **Trigenerating plants** (electricity, heating and cooling) integrating internal combustion engines and steam turbines fed by pure vegetable oil.

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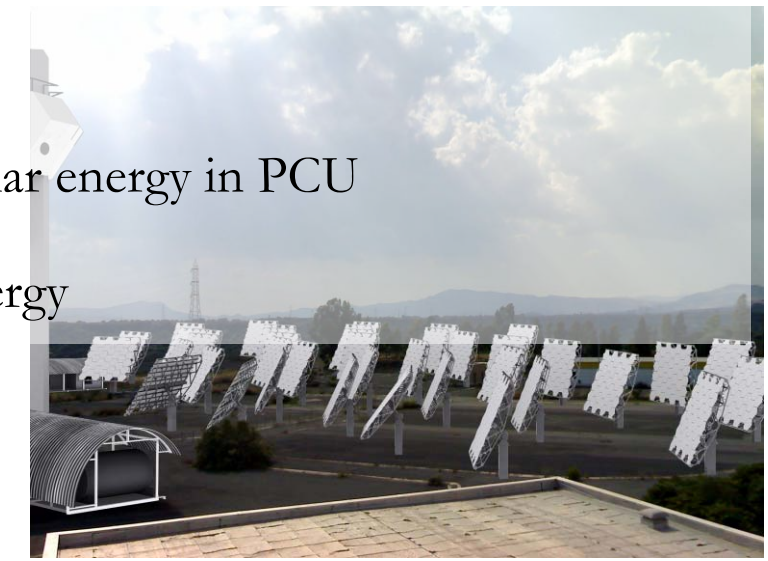
I. Solar Concentrating Systems: Solar Tower

In the past years, **SHAP** carried out several project on the Solar Tower, acquiring knowledge on:

- ✓ **Solar trackers** (heliostats)
- ✓ **Layout** of the plant
- ✓ **Integration** between vegetable oil and solar energy in PCU
- ✓ **Reforming process** assisted by Solar Energy



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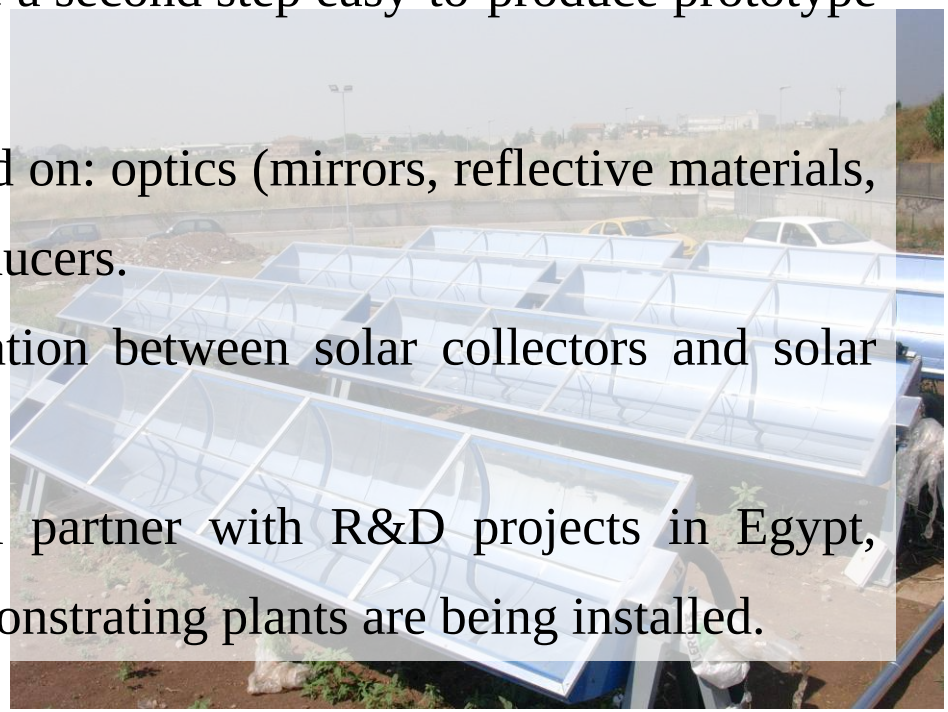
I. Solar Concentrating Systems: Collectors

- ✓ **SHAP** developed and realized a first prototype system based on **Linear Parabolic Collector**; at this time a second step easy-to-produce prototype is under development.
- ✓ Internal skills have been acquired on: optics (mirrors, reflective materials, etc.), selective coatings, solar reducers.
- ✓ **SHAP** is testing system integration between solar collectors and solar cooling prototype plants.
- ✓ **SHAP** is engaged as industrial partner with R&D projects in Egypt, Morocco and Jordan, where demonstrating plants are being installed.



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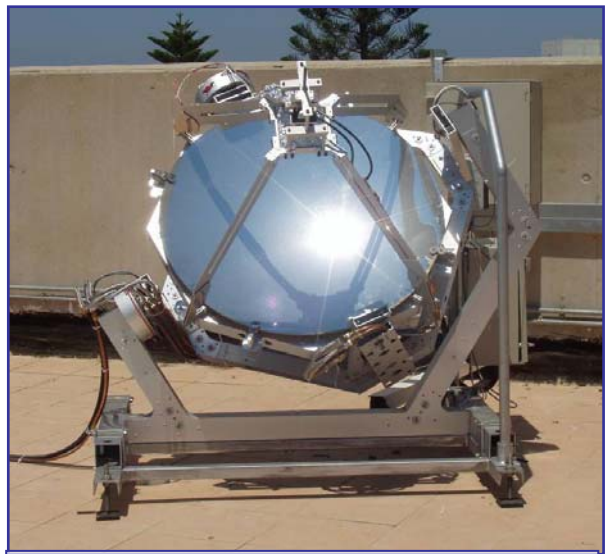
I. Solar Concentrating Systems: Collectors

BISC

Building **I**ntegrated **S**olar **C**ollectors



DISP

DIstributed **S**olar **P**ower

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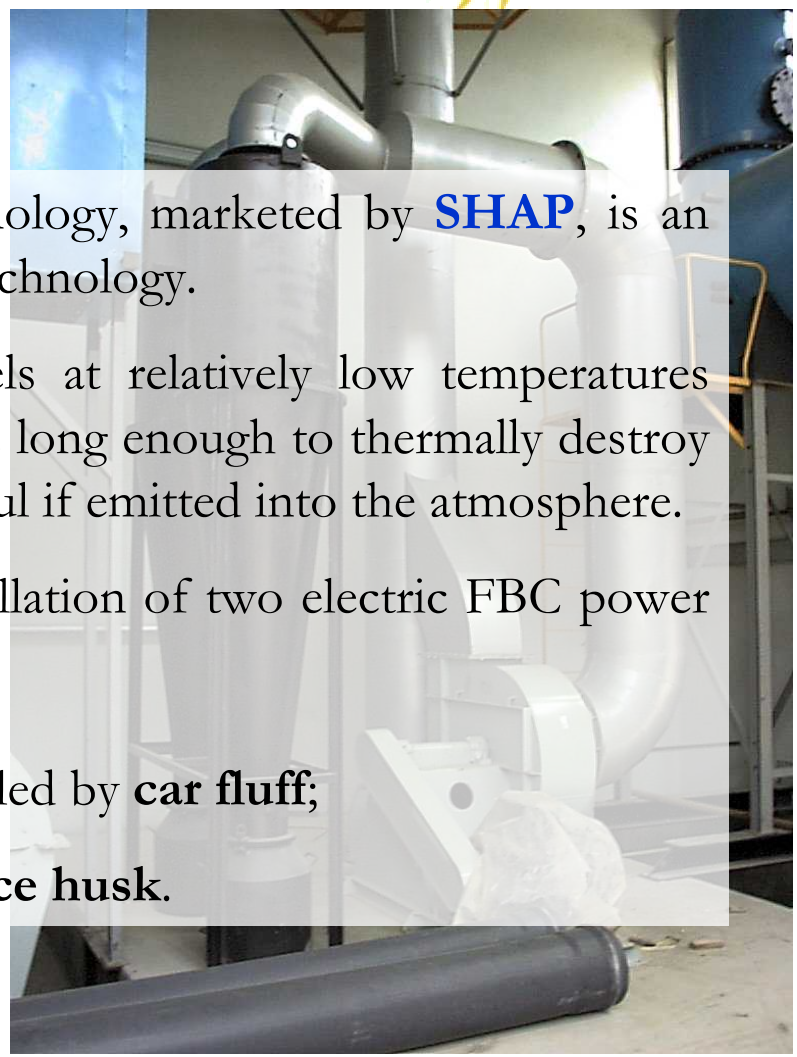
II. Fluidized Bed Combustor



Bubbling Fluidized Bed Combustor technology, marketed by **SHAP**, is an efficient, reliable and low-pollution solution technology.

Owing to these characteristics, it burns fuels at relatively low temperatures (average value ~ **850°C**) with a residence time long enough to thermally destroy several organic compounds, considered harmful if emitted into the atmosphere.

SHAP is analyzing the feasibility for the installation of two electric FBC power stations:

-Electric power station based on FBC fueled by **car fluff**;

-Electric power station based fueled by **rice husk**.

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III. Trigenerating Plants

The technology involved is based on the integration of internal combustion engines, fueled by pure vegetable oil, and steam turbines for electric energy purpose. This kind of plant may include a solar concentrating system for heating and cooling demand.

A tipical a plant configuration:

- ✓ Nominal Power of 4,700 kWe;
- ✓ N° 3 Internal Combustion Engine, 1400 kWe per engine;
- ✓ N° 1 Steam Turbine of 500 kWe;
- ✓ Solar field, by means of linear parabolic concentrators connected to absorption chillers.

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Thank You !