GENERAL INFORMATION

PLATAFORMA SOLAR DE ALMERÍA

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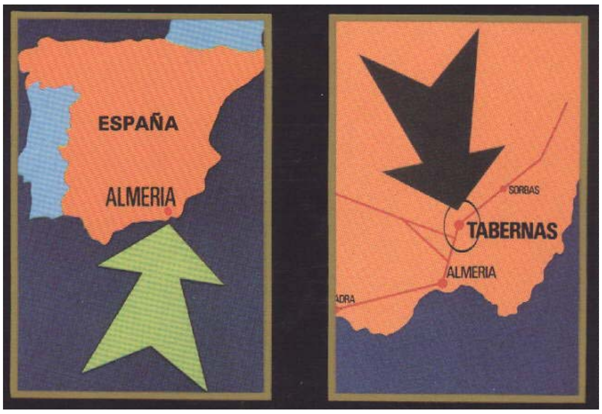
BASIC DESCRIPTION OF THE INFRASTRUCTURE

Name: Plataforma Solar de Almería (PSA), located in Tabernas, a village in the province of Almería, in the southeast corner of Spain.



Name and location of the operator of the infrastructure: The owner and operator of the infrastructure is the Spanish 'Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas' (CIEMAT). The CIEMAT is a Public Research Institution pertaining to the Ministry of Industry and Energy through the State Secretariat for Energy and Mineral Resources.

Web-site address: http://www.psa.es

General Description of the Infrastructure

The Plataforma Solar de Almería (CIEMAT-PSA) is an installation which belongs to the Spanish Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas (CIEMAT) of the Ministry of Industry and Energy. The CIEMAT-PSA is the largest solar test centre in Europe and is recognised as one of the 3 foremost such centres in the world. The accumulated experience and sophisticated installations offered to European researchers in the solar energy R&D fields are unequaled by any other facility. For over ten years, the Plataforma Solar de Almería (CIEMAT-PSA) served the 9 countries of the International Energy Agency (IEA) as its solar test centre. During that first stage of its development, at the beginning of the 80's, the main objective was electricity production with Solar Energy, for which two demonstration plants were built: the SSPS (Small Solar Power Systems) and CESA-1 (Central Electro Solar de Almería).

The SSPS consists, in turn, of two 500 kWe-capacity plants, each based on a different concept, the tower plant or **Central Receiver System (CRS)** and the **Distributed Collector System (DCS).** The CRS plants have only one receiver located at the top of a tower on which all the collected sunlight is concentrated by a field of surrounding heliostats. In the DCS plants, the solar energy is concentrated along a tube by parabolic-trough mirrors and accumulated in a carrier fluid which is progressively heated as it circulates through the tube. The larger 1-MWe CESA-1 plant is also a CRS.

The feasibility of generating electricity with these first plants was evaluated until 1984. Until 1987, the CESA-1 plant was used as a test bed for different CRS components, such as receivers, heliostats, etc., under the Spanish-German GAST project. In 1986, the first CIEMAT-DLR agreement for the joint operation of the Plataforma Solar de Almería was signed, agreement which continued to the end of 1998, and which, besides reinforcing the already established international character of the CIEMAT-PSA also brought with it diversification of the research undertaken, initiating activities in **solar chemistry, thermal testing of advanced materials, industrial thermal processes and bioclimatic architecture**, as well as continuing development of advanced components and **systems for solar electricity generation**.

The diversification of activities involves an increase in facilities. The growing interest in Solar Chemistry, was consolidated in the construction of the **‘Photocatalytic Detoxification Loop’** with its complementary chemical laboratory. In this loop, experiments in eliminating the polluting compounds in waste water by means of the ultra-violet band of the solar spectrum may be carried out in a modified DCS collector. A second aspect of the PSA solar chemistry experience began with construction of the **'SOLFIN'** CPC facility for the solar photoproduction of fine chemicals.

The CESA-1 tower was also the scene of CIEMAT-PSA collaboration with the **European Space Agency (ESA)** for high-temperature thermal testing of parts of the HERMES space shuttle’s outer protective shell from 1988 to 1994, and clearly demonstrated the usefulness of highly concentrated solar energy as a tool in advanced materials research. In 1991, the CIEMAT-PSA 60-kW **‘Solar Furnace’** was built for that purpose.

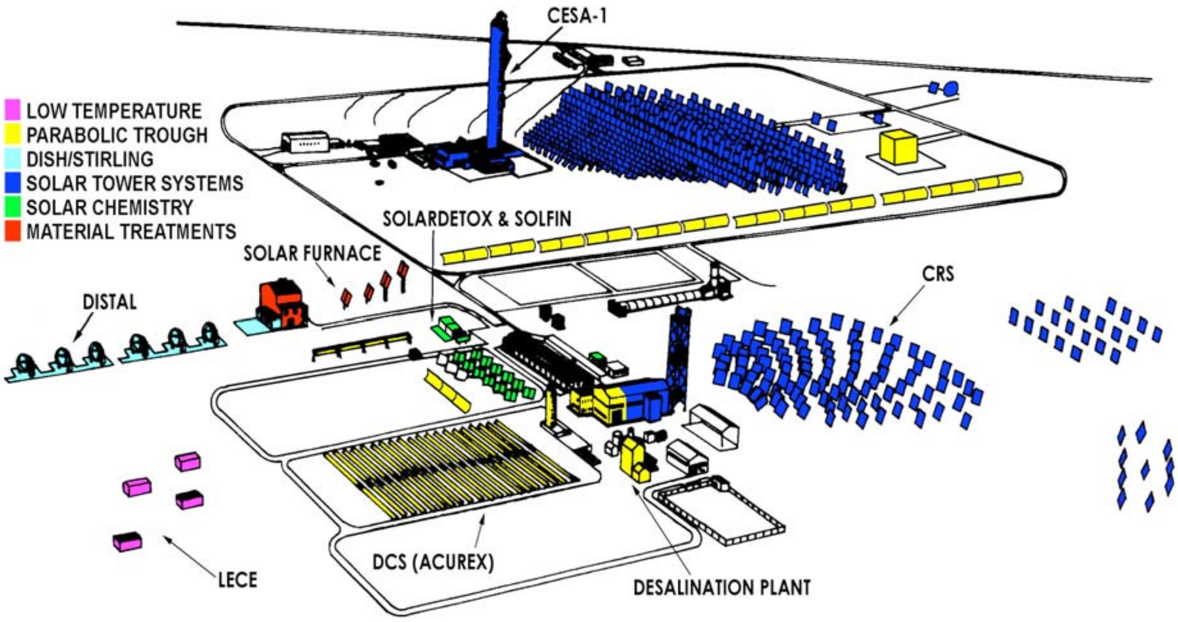
In the field of **process heat**, a ‘**Desalination Plant’** hooked up to a DCS field was built to study the feasibility of sea-water desalination using the process heat supplied by an associated solar plant. This concept is of enormous interest to countries in the Mediterranean basin, which generally have both a shortage of water and abundant hours of sunlight. **Bioclimatic architecture** is emerging forcefully because of its immediate market potential. The CIEMAT-PSA is involved through its **LECE-Laboratory for Energy Testing of Building Components**.

The development of **advanced components for electricity generation** continues on the SSPS-CRS and CESA-1 towers, while the incorporation of direct generation of electricity in parabolic dish concentrators with Stirling motors has led to the installation of the '**Distal'** facility.

Today, the PSA installations, both varied and flexible, are a vehicle for precision testing of the entire range of concentrating solar test applications. The major facilities are:

- 2.7 MW, SSPS-CRS Central Receiver Test Facility
- 7 MWth, CESA-1 Central Receiver Test Facility
- 0.6 MWth High-Flux Solar Furnace
- 1.3 MWth ACUREX Parabolic Trough Test Facility with storage and desalination
- 174 kWth LS-3 Loop Parabolic Trough Test Facility
- 1.8 MWth DISS Loop
- 3 x 40 kWth DISTAL I Parabolic Dish Test Facility
- 3 x 50 kWth DISTAL II Parabolic Dish Test Facility
- Solar Detoxification Loop
- Compound Parabolic Concentrator (CPC) Photoreactor
- SOLFIN (Solar Fine Chemicals Synthesis) Test Facility
- LECE (Laboratory for Energy Testing of Building Components) Facility

Aerial view of the Plataforma Solar de Almería facilities, spread over 100 hectares of the Tabernas desert



PSA Facilities offered for the IHP-ARI Programme

Selection of users

Each year, during a period established for collection of proposals, a 'Call for Proposals' shall be published and the applications received shall be classified by facility. Users shall be selected on a year-by-year basis by an independent Selection Panel composed of experts in all the related research areas, especially energy. The panel shall be made up of 10 experts, of whom at least 6 may not be from CIEMAT, and none of whom may be from the PSA. Special effort shall be made to select experts from other European countries.

Following each call for proposals, the User Selection Panel shall meet to review the research proposals of the applicants and recommend a short-list of users (or user groups) that would benefit under the contract. The experts shall receive advance copies of all proposals, each of which shall include a short technical feasibility report by a PSA project manager evaluating the feasibility of the proposed work to be done at PSA. The main qualification criteria for the proposals shall be the fulfilment of the Commission goals, the scientific quality of the proposals, their technical feasibility in the PSA facilities, the innovative nature of the proposals and the interest shown by the applicants.

Furthermore, priority shall be given to users who have not been at the PSA previously and would not normally have access to a similar facility.

After the selection round, all applicants, successful or not, shall receive official notification of the results of the selection process. If a proposal should not be selected, a short report explaining the reasons for that decision shall be given by the PSA project leader.

QUALITY OF THE INFRASTRUCTURE

A brief description of the facilities follows, highlighting the research activities that can be carried out in them to demonstrate their uniqueness in Europe.

CESA-1 Central Receiver System.

From the beginning of its existence, receiver testing to optimise the process for obtaining electricity from the sun’s energy has been one of the principal activities at the PSA.

An array of solar-tracking mirrors (heliostats) are used to collect the sun’s rays. The incident sunlight is reflected and concentrated onto the solar receiver situated at the top of a tower where the radiant energy is absorbed and converted into sensible heat. A heat-transfer medium is used to transport the energy to a conventional power conversion system (e.g. steam or gas turbine + electric generator). A heat storage subsystem guarantees constant output to the power conversion system during operation regardless of the instability of the solar input. Some of the lines of research related to the receivers are, a more appropriate heat-transfer medium (molten salt, air, water/steam, etc.), the choice of the most efficient geometry of the reactor (tubular, volumetric, panel, etc.), design of an optimum storage system (rocks, oil, molten salt, etc.), secondary concentrator systems to increase the energy flux density on the receiver, and so forth.

Initially conceived as an electricity generation plant, CESA-1 is now also a very flexible testing facility. Consisting of a 300-heliostat field, it can generate up to 7 MW_{th} with flux densities up to 3.5 MW/m^2. Moreover, with test rooms at different levels, its 80-m-high tower may be used for several projects at once. The recently implemented Control System, which has considerably improved its test capacity, together with a new control computer, makes CESA-1 a very suitable facility for the testing of large receivers. It can generate the desired energy-time profiles with several aiming-points and four different safety paths from "stow" to "stand by" available.

The activities possible at the CESA-1 Facility include the development and test of components such as heliostats, receivers etc., as well as the simulation, investigation and assessment of power tower plant concepts. Its large heliostat field, together with the clear desert skies and high-altitude of the site, make the CESA-1 facility also suitable for astronomical experiments, such as gamma-ray astronomy.

Development of Advanced Control Algorithms. The 'ACUREX' field.

This field of study basically consists of the use of a distributed solar collector field (DCS) called "ACUREX" as a test bed for advanced control algorithms, and develop accurate models of the dynamic field behaviour. The distributed collector field consists of a series of parabolic mirrors that reflect solar radiation onto a tube, heating the oil circulating through it. The parabolic collector surface concentrates a direct normal beam onto the receiver tube, which is located at the focal point of the parabola. The heat transfer fluid is pumped through the receiver tube, which transfers the heat to the fluid through the tube walls. This highly non-linear process is very similar to others very common in the heating-and-cooling industry, thus making this facility suitable for testing advanced control algorithms. The objective of the experiments is to maintain the field outlet oil temperature as close as possible to a desirable value, despite the changes in weather conditions, by varying the rate of oil flow through the pipes.

A wide range of advanced control strategies have been tested in this field, Fuzzy Logic, Resonance Cancelator. Self-tuning algorithms, MUSMAR, GPC (Generalised Predictive Control).

Electricity Generation by Autonomous Units. The Dish/Stirling Facility.

Among the concentrating solar systems for generating electricity, the parabolic concentrator with Stirling engine is distinguished by its high efficiency and the ease with which it can be adapted to specific consumption structures. Overall solar to electrical conversion efficiencies of up to 30% have been demonstrated. Due to their small system sizes ranging from 3 to 50 kW_{el}, power generation plants containing several units can be clustered and easily extended to meet the local off-grid demand.

Since May, 1992, successful sunrise-to-sunset testing of three dish/Stirling systems has been underway at the PSA. The systems have already demonstrated peak efficiency (solar irradiation to net electric output) of more than 19% and system availability of over 85%. The concentrator, a 7.5-m-diameter stretched-membrane parabolic mirror, focuses concentrated sunlight onto the receiver aperture of a Stirling engine, which generates 9 KW_e with helium as the working gas. These dishes may be used for testing optimised receivers for direct electricity generation with a view to verifying system performance, obtaining data on reliability and maintenance requirements, and at the same time train personnel in the operation of these systems.

Solar Chemistry

The main objective of Solar Chemistry is to use the Sun's energy, either thermochemically or photochemically, for chemical reactions. In the first case, the Sun's heat causes the chemical reaction, the product of which may then be used as fuels or chemicals, which, in effect, store and transport the solar energy. In the second case, solar photons cause a chemical reaction, either directly or with a catalyst.

Solar Detoxification Loop (SDL) for Industrial Waste-Water Detoxification

The Detoxification Loop consists of 12 two-axis solar-tracking parabolic-trough collectors, originally designed to concentrate and transform solar radiation into thermal energy by heating thermal oil up to 290°C, which have been modified for solar chemical applications. The concentration factor is 10.5 Suns and the energetic efficiency achieved in the UV solar spectrum is 58%, which indicates the rate between UV photonic irradiation existing over the collector aperture area and available inside the absorber tube in which the reaction takes place. The solar collector used consists of a turret on which there is a platform supporting 4 parabolic trough collectors with the absorber in the focus.

Compound Parabolic Concentrator (CPC) for Synthesis of Fine Chemicals (SOLFIN)

This low-concentration photoreactor consists of eight 48-mm-diameter Teflon tubes mounted in compound parabolic concentrators (CPC). Each CPC reflector is 152 mm wide and 1.0 m long. The bank of tubes is tilted approximately 37 degrees south. According to the manufacturer, the acceptance angle for the CPC is 60 degrees either side of the normal. This wide acceptance angle allows the reflector to direct both direct-normal and diffuse sunlight onto the receiver tube. The PSA facility has 48 reflectors. Among the chemical applications of solar energy, the photochemical production of fine chemicals has good prospects for industrialisation in the near future due to their high added value. Photochemical synthesis is usually very efficient and selective, and it is the only reasonable way some compounds of interest may be produced.

Thermal Treatment of Materials in the Solar Furnace

Sunlight reflected by four heliostats, regulated by a louvered shutter, onto a fixed 100-m^2 dish concentrator, is focused onto a test table, movable on three axes, where experiments are mounted. The concentrator, test table and shutter are located inside the solar furnace building. The mirrored dish concentrator has a 60-kW thermal capacity in a 20-cm diameter (the focus). This highly concentrated energy rapidly raises the temperature on the sample surface to above 2000°C producing thermal shock. This method is especially suitable for surface modification of materials, where it is entirely competitive with lasers. The necessary instrumentation for monitoring experiments is available, including infrared camera, flux measurement devices as well as a vacuum chamber for treatment in controlled atmospheres.

Process Heat Applications.

Laboratory for Energy Testing of Building Components (LECE)

This laboratory consists of a series of 16-m^3 thermally insulated test cells. For any given test, one of the walls, the roof, a window or shading can be substituted by the element to be tested. Measurement of thermal loss (in heating as well as cooling) in the component, measurement of possible filtrations or transmittance of luminosity in a given component, such as windows, etc., may be tested. In the LECE, either in the cells or in real buildings, any type of element used in construction may be tested under real outdoor conditions. These may be elements which are later integrated into walls or roofs, the complete walls or roofs themselves, or entire buildings. The components to be tested do not have to be innovative. They can be classic closures, since at the present time, the thermal behaviour of almost all buildings and their components is unknown. All the corresponding test procedures have already been developed and verified. The latest improvement in the test laboratory has been the installation of heating foils in the walls and ceilings of one of the cells in the PAS project. With this modification heat exchange with the outside is avoided except through the element to be tested. This eliminates an initial, normally necessary period, in which the cell has to be studied with a reference wall and thus considerably shortening the time required for testing.

Solar Thermal Sea-Water Desalination

The Solar Desalination System, inaugurated in 1988, and used for this project, is composed of a 14-effect Multi-Effect Desalination (MED) plant, a parabolic-trough solar collector field (the ACUREX field, above) and a thermocline thermal energy storage tank

The solar energy, converted into thermal energy in the form of the sensible heat of the oil, is stored in the thermal oil tank. Hot oil from the storage system provides the MED plant with the thermal energy required. The system was improved with the addition of an absorption heat pump and the substitution of the vacuum system by steam hydro-ejection. This improved system has already proven its suitability with a water production cost per cubic meter of water of 1.56 Euro. The entire system as well as the pilot heat pump or the desalination plant as separate units are available for both training and technological improvement of real-case solar desalination or heating and cooling applications.

QUALITY OF RESEARCH

A Unique Facility.

The CIEMAT-PSA is the largest solar thermal test centre in Europe and is recognised as one of the three foremost such centres in the World. The accumulated experience and sophisticated installations offered to European researchers are unequalled by any other facility in the solar energy R&D fields.

The possible lines of research in solar energy applications which can be undertaken at the CIEMAT-PSA cover a broad range: from the low temperatures of bioclimatic architecture to the very high temperatures of ceramic materials testing in the Solar Furnace, the medium temperatures of the trough collectors or the high temperatures of the tower receivers for electricity generation. It is the only centre in Europe with such wide possibilities. This wealth of possibilities makes the CIEMAT-PSA a centre of interest for European researchers who are working in any field of applied solar energy. Due to social concern for the degradation of the environment and the destruction of natural resources, the number of researchers in this area of technology attempting to use "clean" production processes and reduce dependency on fossil fuels as much as possible has grown considerably in recent years. The training of this generation of researchers is therefore a patent necessary in order to have access to the state-of-the-art "clean" technologies. This training can be acquired through access to installations with highly developed technology, and with specialised personal with a high degree of know-how in each of the several areas. The CIEMAT-PSA, a truly completely international European center since the moment of its conception, as well as a "host facility" to investigators from all over Europe for more than six years, combines all the above conditions and, furthermore, has progressively adapted in order to cover their requirements.

Main Scientific and Technological Highlights.

One of the main R&D activities at the Plataforma Solar since its origin has been, and continues to be today, the development and testing of solar concentrating technologies for electricity production. Current research at the PSA is being carried out in the three main solar concentrating technologies: Central Receiver, Parabolic Trough and Dish/Stirling.

In CRS, ongoing field work in an effort to increase the reliability of receivers, heliostats, control loops and mirror concepts, as well as to lower their cost to make them marketable, is continuous. The most promising topics of research in this field currently concern tower plants (CRS systems):

- Development of advanced high-temperature air-cooled receivers for tower plants (REFOS Project)
- Development of autonomous, radio-controlled and heliostats self supplied with energy from a solar cell.
- Implementation of sophisticated control software that keeps energy distribution on the receiver through automatic operation of the heliostat field.

In distributed collector systems (DCS or parabolic trough) the most relevant initiatives are:

- The DISS (DIrect Solar Steam) Project, which is a complete R+TD program aimed at developing a new generation of Solar Thermal Power Plants with parabolic-trough collectors. This R+TD program has three primary goals:
  - i) Develop improved components for parabolic-trough collectors
  - ii) Develop Direct Steam Generation (DSG) in the solar collector absorber pipes, eliminating the thermal oil presently used as a heat carrier medium, thereby increasing system efficiency and reducing investment cost.
  - iii) Optimise overall plant design to improve solar-field power-block integration and O&M to shorten start-up and shutdown times.

  The final goal of DISS is a 20% increase in performance and 15% reduction in direct investment cost over state-of-the-art parabolic-trough collector solar power plant technology. This would lead to a 30% reduction in the kWh cost of electricity generation with this type of solar thermal power plant.
- Development of new control strategies, as the outlet temperature is a highly non-linear function of many variables including solar radiation and the flow rate of the transfer fluid. Of special interest are tests of a switching controller tuned by predictive adaptive methods and a Linguistic Equation Controller for the first time in an industrial environment at the PSA.

And finally, in the field of dish/Stirling, the third option for electricity generation, a parabolic dish with a Stirling engine electricity generator, the main breakthroughs have been:

- A tracking system able to compensate the tracking failures caused by elastic deformations of the support structure under its own weight and under wind loads.
- Implementation of a new tube-type receiver with higher efficiency (the receiver is the non-standard part of the Stirling engine).

Even though in the late 80's some successful experiments were carried out on methane reforming and synthesis of hydrogen with solar energy, only since 1991 has **Solar Chemistry** been established at the PSA as an area of research, with waste-water detoxification in the spotlight. Since 1994, a facility for synthesis of fine chemicals has also been open to researchers. The main achievements are:

- Demonstration of the feasibility of complete mineralization of some industrial effluents and photocatalytic reduction of heavy metals at the same time as organic oxidation. Comparative testing of the degradation of DCA in two different CPCs (PVDF and Pyrex).
- Degradation of phenol in CPCs and Solar Pond

- Five different Solar Collectors have been successfully tested and compared: (i)Two axis parabolic, (ii) CPCs (PVDF tubes), (iii) CPCs (pyrex tubes), (iv) Thin-Film Fixed-Bed Reactor, (v) Solar Pond.
- Degradation of TOC and phenol content in the olive-mill waste water (alpechín) with TiO_2 as the catalyst. This is *very* important for the Andalusia region where the PSA is located, because it is one of the main pollutants of its rivers.

A third line of activity is **Materials Treatment at High Temperatures**. From 1988 to 1994 various pieces of the outer protective shell of the HERMES space shuttle were tested by thermal shock with concentrated solar energy. These tests were carried out under contract to the French aerospace company Dassault Aviation for the European Space Agency (ESA) in the CESA-1 tower test rooms. The pieces were submitted to controlled thermal cycles at maximum temperatures of 1600°C in compliance with the strict quality control standards of the aerospace industry. Since 1991, a new Solar Furnace is in use for thermal materials testing at the PSA. The Solar Furnace concentrates sunlight more than 3000 times and reaches maximum controlled temperatures of over 2000°C. The successful results have been obtained in hardening of steels, sintering of ceramics, surface densification of sintered steels, surface alloying, etc.

Finally, the **Laboratory for Energy Testing of Building Components** **(LECE)** deals with the effect of different materials or innovative designs on the energetic behaviour of buildings, to see how energy can be saved in the heating, cooling and natural illumination of buildings. The latest improvement in the test laboratory has been the installation of heating foils in the walls and ceilings of one of the cells in the PAS project. With this modification, heat exchange with the outside is avoided except through the element to be tested. This eliminates an initial, previously necessary period, in which the cell had to be studied with a reference wall and thus considerably shortening the time required for testing.

Some publications by the PSA staff

95 publications were issued under the LIP program, 30 under the HCM and for the TMR (1996-1998), about 150 publications are expected and 50 user groups have visited the PSA.

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QUALITY OF THE SUPPORT TO USERS

The research activities at the Plataforma Solar de Almería (PSA) are organised into four Projects: '*Central Receiver Systems*' (CRS), '*Distributed Collector Systems*' (DCS), '*Solar Chemistry*' and '*Training and Access to PSA*'.

For each, there is a Project Leader who is responsible to the PSA Director for all aspects of project progress, including, in addition to the purely technical aspects, PSA Project-User relations, Project's budget management and keeping up with the international state-of-the-art in his area of research.

The logistics necessary to the operation and user support of such a centre are provided by:

- An '*Engineering Dept.*', giving support regarding instrumentation and measurement systems, civil engineering and drafting,
- A '*Computer Service*' assists with use of computer equipment and access to communication infrastructure (intranet and internet resources), etc.
- A '*Facility Operating Team*', with personnel devoted exclusively to systems operation and specialised in the particularities of solar concentrating systems through years of experience,
- An on-site '*Maintenance Team* ',
- A '*Reference Library*' with a large collection of solar energy-related publications and reports, with on-line access to the vast bibliographical resources of CIEMAT on energy and related topics
- An '*Administration Department* ' and ,
- Services such as power supply (including UPS in every facility), water, telephone, fax, e-mail and several workshops, stores, and a chemistry laboratory.

External Users are the direct responsibility of the PSA Project Leader corresponding to their line of work. This Project Leader requests and co-ordinates support from other departments, as well as helping the User to design and carry out the experiments in such a way as to make the most advantageous use of the facilities.

Project Leaders are also responsible for scheduling their users into the facility program of work and keeping the facility in good operating condition during the User's visit. As solar testing is strongly dependent on weather conditions, both Project Leader and the User must be very flexible with regard to the dates of the visit.

In addition, the '*Training and Access to PSA*' Project Leader and the secretary of the program activities at PSA will act as their host caring for such details as travel arrangements, transportation to and from Almería, lodging, office availability, and any bureaucratic matters, serving as the User's contact for solving any trouble or difficulty.

An annual General Users Meeting will be arranged at PSA so that users selected may make their first contact with the facilities, with their Project Leaders on-site and with the other users, encouraging the scientific exchange of ideas and projects.

On the other hand, at the end of the yearly access period, a two-day workshop will be organised in a closed environment for exchange of experiences and results. All users will be expected to present a paper or technical report at that workshop, all the material being collected and later published as proceedings by the CIEMAT as a part of its own publication series. In addition to that report, the PSA project management shall give the User a questionnaire in which his opinion regarding technical and organisational aspects of the service must be expressed. The summary of each year's campaign is to be sent to Brussels with the corresponding progress report. All users are requested to communicate any publication resulting from their experiments within the access program to PSA, as well as to acknowledge both EC support and the use of the PSA facilities.

This opportunity for access will be widely published throughout Europe, not only in the EU countries as usual, but also in countries recently associated to the program. This will be done mainly by Internet, that is, with e-mail distribution lists and a web site, but also in international symposiums, congresses, scientific magazines and professional associations.

In spite of being located in the Desert of Tabernas, communications are excellent, 1/2 hour by car to Almería, which has an international airport with two daily connecting flights to and from Madrid and one to and from Barcelona. A bus is provided for daily transport of personnel and students between Almería and the PSA. In case of saturation, additional means of transport are arranged (an extra bus or a van, depending on the number of the visitors).

COMMUNITY INTEREST IN THE FACILITY

A major indicative of the interest of the European research community in accessing PSA facilities is the long-lasting participation of PSA as host facility within the framework of the EC 'Large-Scale Facilities' programs since 1990. Since that date, the PSA has been a European centre of diffusion of the possibilities of solar thermal industrial applications, with a total of 77 user groups hosted by the end of 1998 through these contracts. This interest is stressed by the fact that no other similar facility exists in Europe.

The industry is also showing increased interest in the program and their results. This is demonstrated by the increasing number of companies becoming users: none in the LIP, one in the HCM and nine in the TMR. The table below describes the PSA record in 'Access' programs, including the amount of access given in weeks, and the number of groups:

PROGRAM	LIP	HCM	TMR
Contract nº	ERBGE1-CT000019	CHGE-CT93-0038	ERBFMGECT950023
Period (from/to)	01.01.90-30.06.93	01.01.94-31.12.95	01.01.96-31.12.98
Level of access	3 facilities, 231 weeks	5 facilities, 290 weeks	8 facilities, 157 weeks
Program users	12, from 7 countries	15, from 9 countries	50, from 15 countries
% of access	20%	15%	20%