

SOLAR PANELS IN ALMERÍA



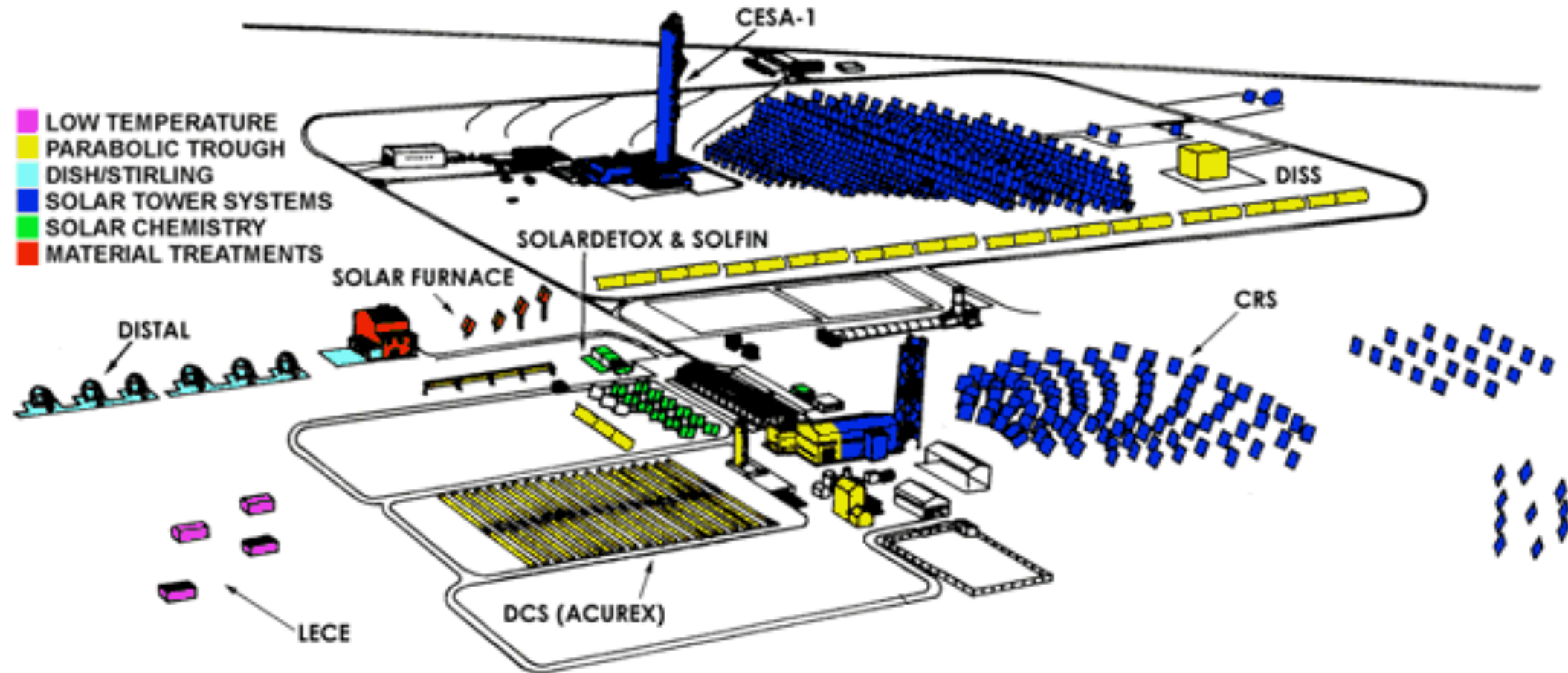
KEEP ON SHINING: A
PROJECT ON LIGHTHOUSES

The Plataforma Solar de Almería (PSA), a dependency of the Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas (CIEMAT), is the largest concentrating solar technology research, development and test center in Europe.

PSA activities are integrated in the CIEMAT organization as an R&D division of the Department of Energy.



KEEP ON SHINING: A PROJECT ON LIGHTHOUSES





KEEP ON SHINING: A
PROJECT ON LIGHTHOUSES

THREE MAIN COURSES OF ACTION ARE DEVELOPED TO TAKE ADVANTAGE OF THE SOLAR ENERGY TO TAKE BENEFIT OF THE SOLAR ENERGY.

- ENERGY PRODUCTION:
 - SOLAR TOWERS SYSTEM
 - SOLAR POWER PLANT WITH PARABOLIC COLLECTORS
 - STIRLING ENGINES
- DESALINATION OF WATER
- FILTERING OF WASTE WATER

PRODUCCIÓN DE ENERGÍA: CENTRAL RECEIVER FACILITIES



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The CESA-I project, was inaugurated in May 1983 to demonstrate the feasibility of central receiver solar plants and enable the development of the necessary technology.

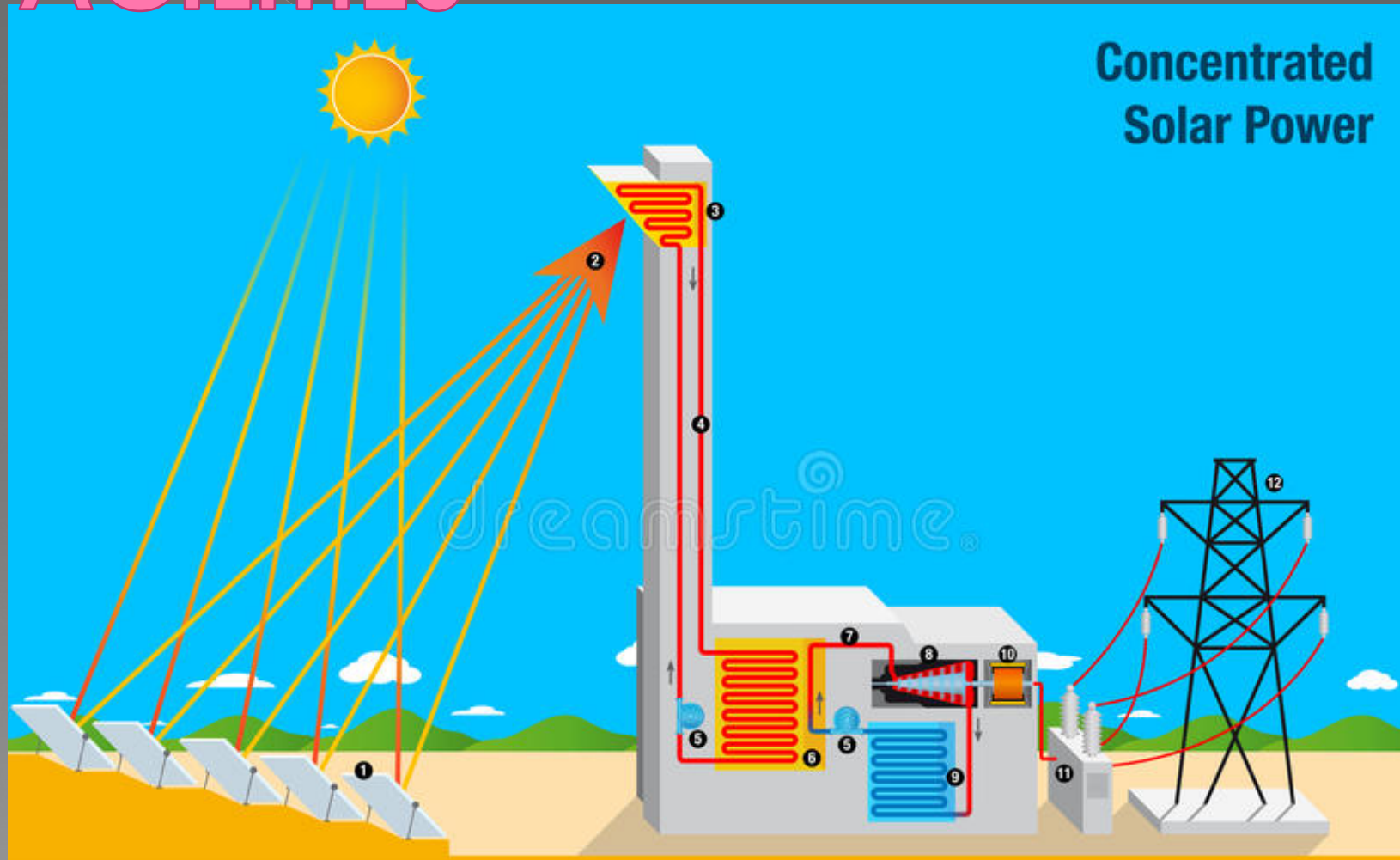
At present, the CESA-1 **does not produce electricity**, but is a very flexible facility operated for testing subsystems and components such as heliostats, solar receivers, thermal storage, solarized gas turbines, control systems and concentrated high flux solar radiation measurement instrumentation. It is also used for other applications that require high photon concentrations on relatively large surfaces, such as in chemical or high-temperature processes, surface treatment of materials or astrophysics experiments.



PRODUCCIÓN DE ENERGÍA: CENTRAL RECEIVER FACILITIES



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**Concentrated
Solar Power**

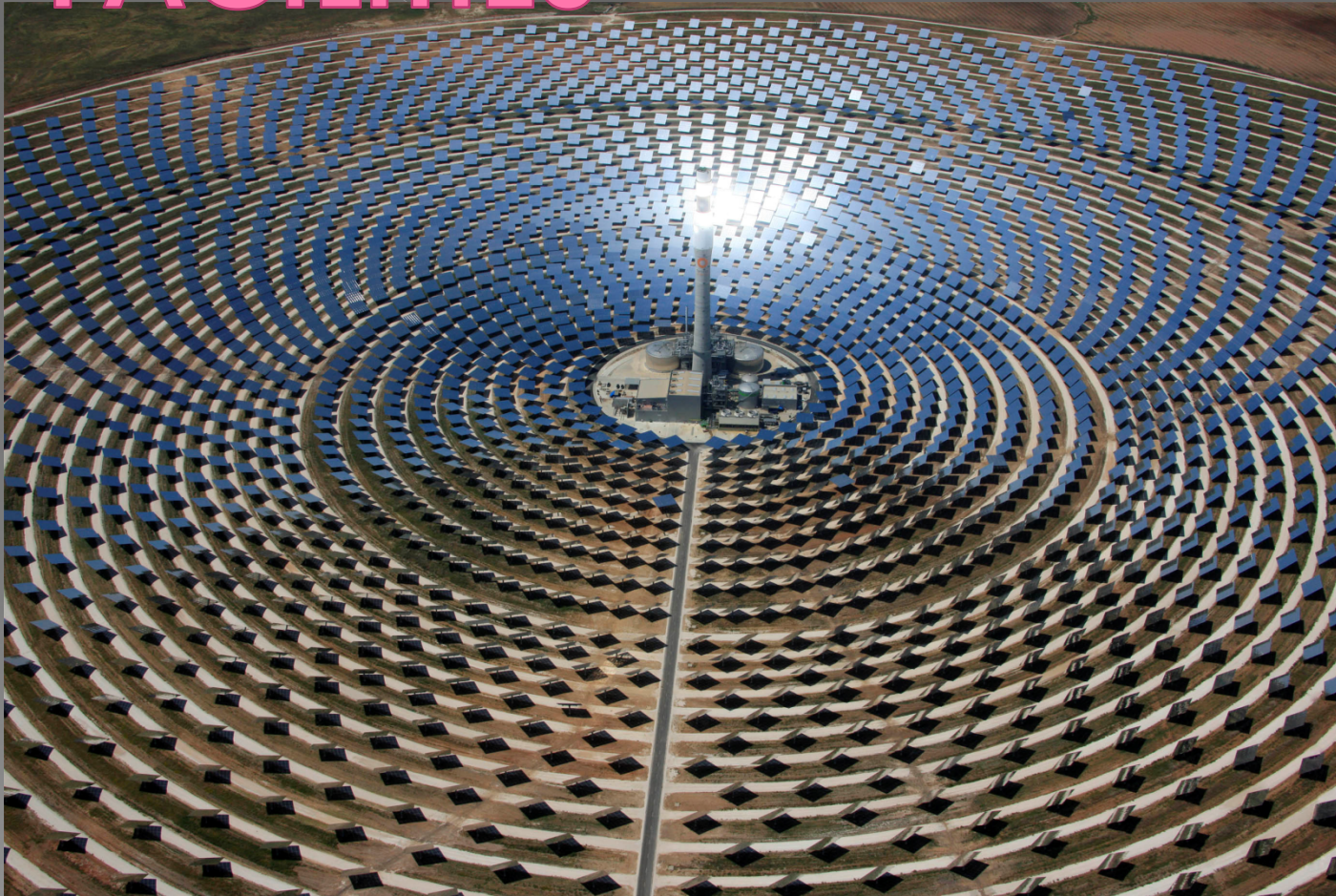
**SOLAR CENTRAL
OF CENTRAL TOWER**

- | | | |
|--------------------------|----------------------|--------------------|
| 1. Heliostat | 5. Pump | 9. Condenser |
| 2. Reflected Sunlight | 6. Steam generator | 10. Generator |
| 3. Solar Furnace | 7. Pressurized steam | 11. Transformer |
| 4. Heat conducting fluid | 8. Turbine | 12. Electric mains |

PRODUCCIÓN DE ENERGÍA: CENTRAL RECEIVER FACILITIES



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EEUU

Las instalaciones más importantes a nivel mundial se basan en tecnologías españolas.

PRODUCCIÓN DE ENERGÍA: CENTRAL RECEIVER FACILITIES



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EEUU
California
The biggest
in the world.
300.000
heliostats

PRODUCCIÓN DE ENERGÍA: MEDIUM-CONCENTRATION SOLAR TECHNOLOGY



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The Medium-Concentration Solar systems group is part of the Concentrating Solar Systems Unit of the Plataforma Solar de Almería. The activities carried out by the researchers and technicians can be included in some of the following areas of work:

Research, development and/or evaluation of line-focus solar collectors (parabolic troughs and linear Fresnel concentrators) and their components. LENTES FRESNEL COMO LA DE LOS FAROS

Research, development and/or evaluation of thermal applications in the temperature range 120 to 500°C (electricity generation or process heat) with line-focus solar collectors.

New heat transfer fluids for line-focus collectors (direct steam generation, pressurized gases, and alternative fluids).

PRODUCCIÓN DE ENERGÍA: MEDIUM-CONCENTRATION SOLAR TECHNOLOGY



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The PSA has several linear-focusing solar collector facilities, both parabolic-trough and Fresnel. Many of these experimental installations, such as the innovative fluids test loop or the DISS plant, are the only one of their kind, and place the PSA in a privileged worldwide position for research and development of new parabolic-trough collector applications.

El estudio con más repercusión a nivel mundial son los cilindro parabólicos. Las instalaciones más importantes a nivel mundial se basan en tecnologías españolas (ver siguientes diapositivas)

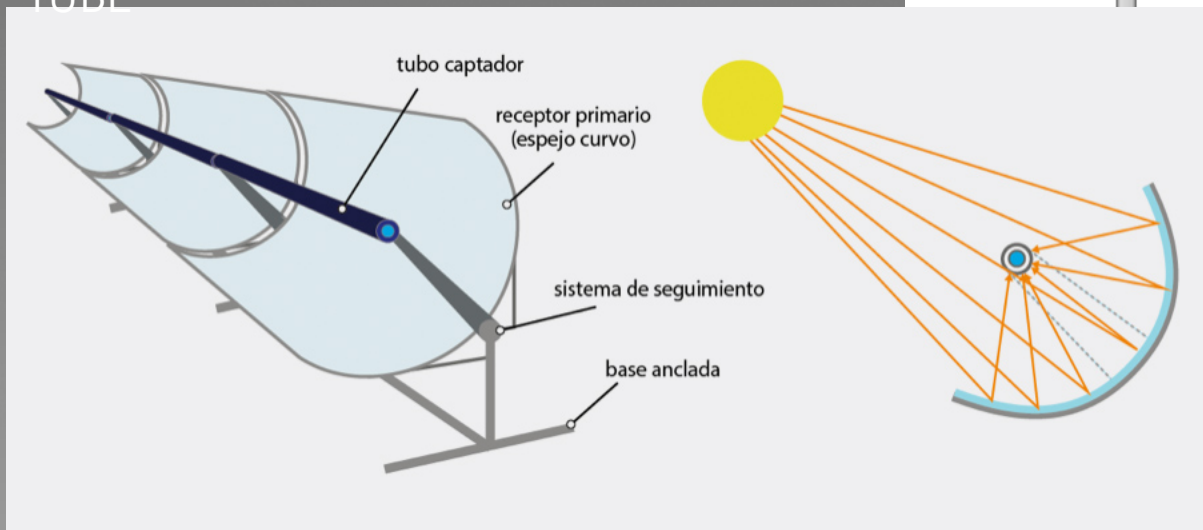
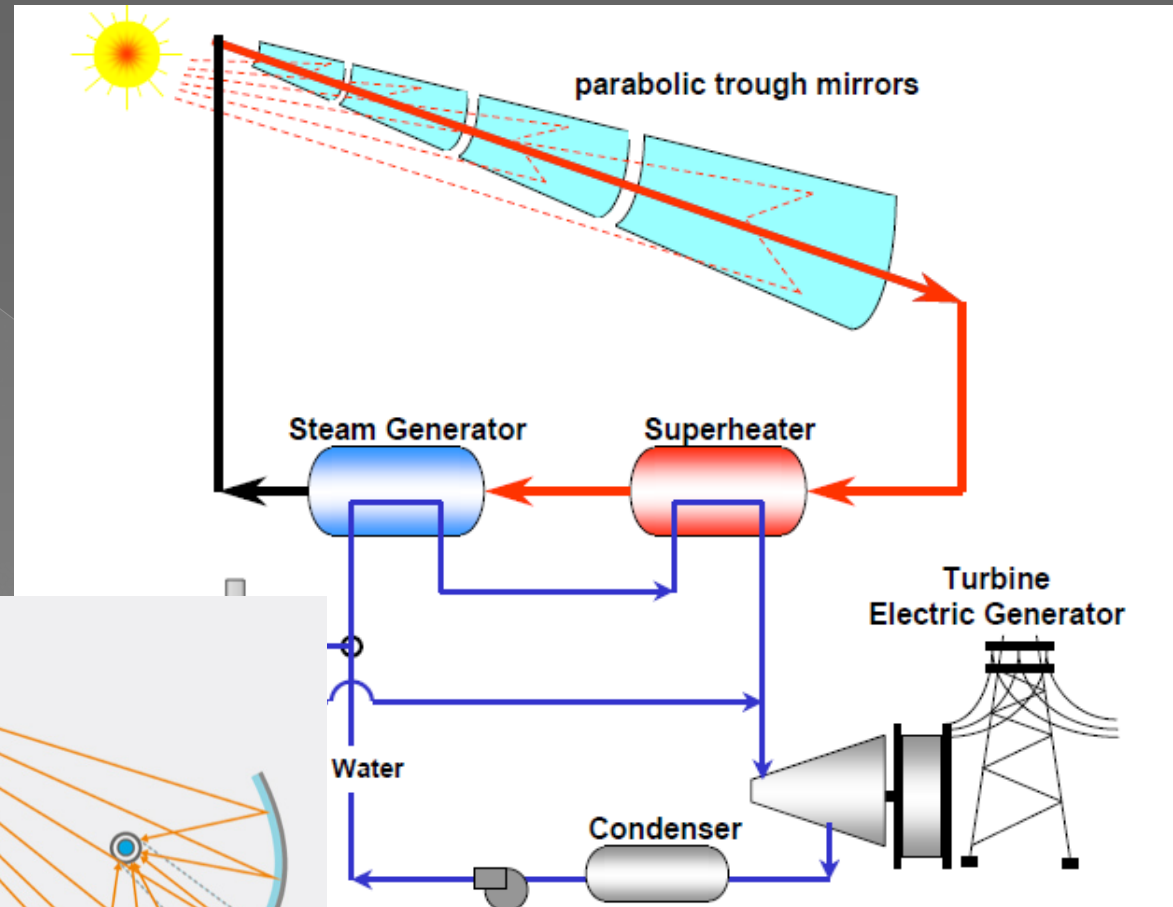


PRODUCCIÓN DE ENERGÍA: MEDIUM-CONCENTRATION SOLAR TECHNOLOGY



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IT DOES NOT MATTER
WHERE THE SUN IS, THE
PARABOLA MAKES THE SUN
FALLS UPON THE CENTRAL
TUBE



PRODUCCIÓN DE ENERGÍA: MEDIUM-CONCENTRATION SOLAR TECHNOLOGY



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IT WORKS AS A THERMAL
POWER PLANT, BUT IT
DOESN'T BURN FOSSILISED
FUEL, IT MAKES THE MOST
OF THE LIMITLESS SUN
ENERGY. (ALSO AT NIGHT
BECAUSE IT TESTS WITH
MELTED SALT, WHICH
STORES THE HEAT.



PRODUCCIÓN DE ENERGÍA: Linear-focusing solar collector facilities: parabolic-trough



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PRODUCCIÓN DE ENERGÍA:

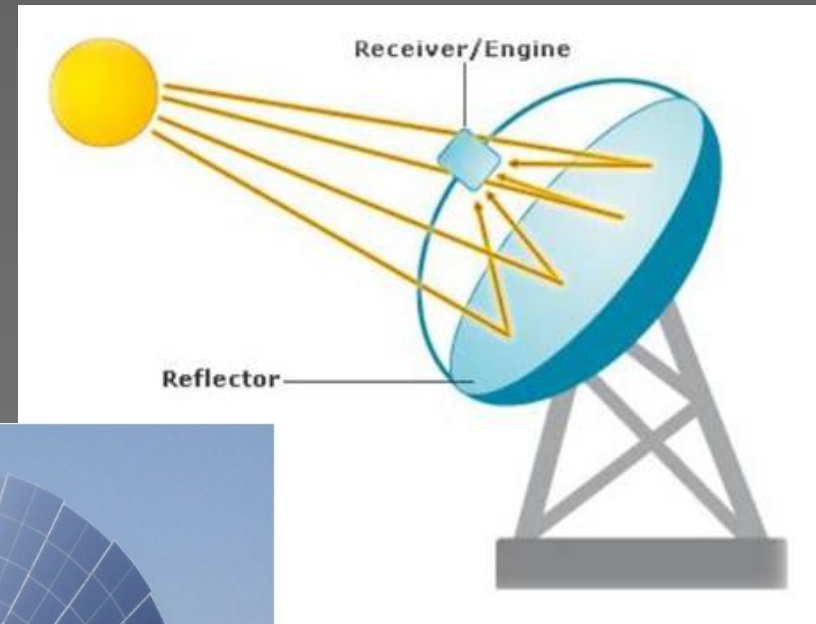
DISH STIRLING SYSTEMS

THE STIRLING ENGINE TURNS HEAT INTO ELECTRICITY.

THE PARABOLIC CAN FOCUS THE SOLAR LIGHT UP TO 12.000 TIMES.



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HIGH-CONCENTRATION SOLAR TECHNOLOGY



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SOLAR FURNACE

USED TO TEST MATERIALS SUCH AS THERMAL SHIELDS
SPACE SHUTTLE



The activities of the Thermal Storage Group deal with all the required aspects for the development, verification and optimization of efficient TESS:

- Proposing new storage media and characterizing some of their mechanical, chemical and thermophysical properties.
- Testing components for molten salt loops (valves, pressure gauges, vertical pumps, heat tracing, etc.).
- Designing new heat storage concepts with known storage media.
- Testing novel modules for energy storage, both sensible and latent, even in real solar conditions.
- Modelling the behavior of TESS, with own and commercial programs.
- Optimizing the operation strategies of TESS in order to get as much advantage as possible of the stored energy.



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SOLAR DESALINATION UNIT



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The Solar Desalination Unit (UDeS in its Spanish acronym) has the objective of new scientific and technological knowledge development in the field of desalination and thermal separation processes powered by solar energy.

Hay que recordar que el acceso al agua potable será el mayor problema mundial en el 2050.



SOLAR TREATMENT OF WATER FACILITIES



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The facilities of solar detoxification and disinfection unit consist of several solar CPC (compound parabolic collector) pilot plants, and pilot reactors for biological treatment, ozonation, and nanofiltration for water treatment, an UV-disinfection system and a test facility for photocatalytic production of hydrogen based on solar energy.



Mil gracias campeones

SOLAR PANELS IN ALMERÍA



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