

R<sup>+</sup>D<sub>+</sub>i

 **TSK**

*Growth through innovation*



# I+D+i

For TSK, the need to innovate in its products, processes and services is beyond doubt, and for this reason we are constantly challenged to improve through innovation and applied research as one of our development opportunities, in the search for greater competitiveness both at national level and in the global market, where innovation is the differentiating factor that allows us to provide greater added value to everything we do.

This is reflected in the main investment R&D+I figures:

**Thermosolar energy:** 11,427,000 €

**Industrial plants:** 7,734,000 €

**Material handling:** 6,031,000 €

**Information Technology:** 5,923,000 €

In total we are talking about ongoing projects for more than 31 M€.

The evolution for that last years of our investments in R+D+i has been the following:

**2014:** 5,302,000 €

**2015:** 7,709,000 €

**2016:** 12,218,000 €

**2017:** 13,640,000 €

This adds up to a total of approximately 40,000,000 € in the last 4 years.

Our deep-rooted identification with innovation is part of our long-term strategy, embodied in strong investments in R&D+i, in collaboration with technology centers, universities and companies within the framework of local, national and European programs. The great diversity of projects and technological areas in which TSK participates forces us to be continuously innovating and developing in the daily performance of all our activities, since a very significant part of our innovations is produced as a result of the multidisciplinary nature of our projects.

As a result of this intense R&D+i activity, during 2017 the following projects were implemented:

PROJECTS FINANCED BY THE EU IN THE  
FRAMEWORK OF THE LIFE+ PROGRAM



EUCALYPTUS WOOD PROCESSING PROJECT\_LIFE12 ENV/  
ES/000913

LIFE EUCALYPTUS ENERGY is an R&D+i project, framed within the LIFE+ policies and program with the objective that

demonstrates and innovates the design and construction of a pilot plant for energy recovery of forest biomass. The waste of *Eucalyptus globulus* forest use will be shredded and pyrolyzed to obtain electric energy. As a sub-product of the process biochar is obtained, with an elevated capacity of improving the ground and atmospheric carbon fixation, contributing to the fight against climate change.

Besides the electric generation (100kW), the project has as an objective, the improvement of the ground after the application of biochar; to do this applied tests will be developed on *Eucalyptus globulus* saplings (due to their fast growth) with regular measurements to check growth, analysis of the ground before and after application with indicators such as pH, conductivity, organic carbon and the presence of nutrients (N, P, K).

The plant, located in Tineo, first in Europe and pioneer in pyrolysis of forest waste, will pose as a clear reference in the sector of biomass as well as a perfect example of small scale and semiportable energy production with negative emissions, with a great potential to provide energy for example to developing communities.

in which pressure reduction is carried out by means of a hydraulic turbine.

This system will generate 700,000 kWh of electrical energy, a savings of 188.3 t of CO<sub>2</sub> and the non-emission of 403.2 kg of SO<sub>2</sub> and 284.9 kg of NO<sub>x</sub> and will contribute to compliance with the agreements of the European Commission as regards the increase in the use of renewable energy sources, thereby contributing to the reduction of greenhouse gas emissions and, therefore, in compliance with the Kyoto Protocol and the Government of Spain's Renewable Energies Plan (PER 2011- 2020) which sets the target of reaching 268 MW in facilities of less than 1 MW.



HYDRAULIC CO-GENERATION SYSTEM IN WATER ABDUCTION AND DISTRIBUTION NETWORK (HYGENET) \_LIFE12 ENV/ES/000695

The overall aim of the project is to generate clean electric energy from the utilization of the kinetic and potential energy currently wasted in the drinking water distribution and supply networks. This will be achieved through a modular electric power generator system built at pilot plant level,

PROJECTS CO-FINANCED BY THE  
MINISTRY OF ECONOMY, INDUSTRY  
AND COMPETITIVITY AND THE EU-  
ROPEAN UNION WITH FEDER FUNDS



RECOVERY OF CO<sub>2</sub> FROM WASTE INCINERATOR EMISSIONS AND USE FOR THE PRODUCTION OF MICROALGAE (ReCO<sub>2</sub>very) \_RTC-2014-2109-5

The ReCO<sub>2</sub>very project proposes the use of CO<sub>2</sub> emissions from a waste incineration plant and contaminated water to grow microalgae suitable for later use as raw material for the production of biofuels and / or biogas production. It poses the challenge of integrating a real incineration system with a microalgae culture system through a CO<sub>2</sub> separation and concentration system of the flue gases. In addition, the culture system will receive residual effluents from waste treatment

facilities (leachate, permeate, drained) as a feed source for microalgae.

#### ENERGY EFFICIENCY THROUGH REHABILITATION, SUN AND GEOTHERMAL (REHABILITAGEOSOL)\_RTC-2016-5004-3

Started in 2016, this project arises from the need to have effective, easy to access and use design tools, that enable the implementation of energy saving measures, the use of renewable energy sources and clean, safe and efficient sources of heat and cold in the different autonomous Regions of Spain and the companies that constitute this "RehabilitaGeoSol". By obtaining a "marketable end product" that can be exported to other Autonomous Regions, as well as to different countries, this will make the internationalization of the companies and the organizations involved possible, thus allowing considerable technological and business development for this Consortium, and consequently for the economy of the regions and the country. The Project "REHABILITAGEOSOL. Energy efficiency through rehabilitation, sun and geothermal" (RTC-2016-5004-3) is a Project financed by the State Program of Research, Development and Innovation oriented to the Challenges of Society, in the Framework of State Plan of Scientific and Technological Research and Innovation 2013-2016 of the State Agency of Research (Ministry of Economy, Industry and Competitiveness) co-financed with FEDER Funds.

PROJECTS CO-FINANCED BY THE  
CDTI AND THE EUROPEAN UNION  
THROUGH FEDER FUNDS



#### NEW THERMOSOLAR TOWER CONCEPT WITH OPEN RECEIVER (TERRA) \_ITC-20151145

The aim of this project is the development of a thermosolar tower plant with an open receiver, where air is heated as a heat transfer fluid, allowing electricity to be obtained by means of a combined cycle. With this new plant design it will be possible to obtain temperatures much higher than in current plants, allowing the use of a gas turbine, which at these temperatures is more efficient.

This project also studies and reassesses all elements of the plant: heat storage, heliostats, central tower or receiver and gas turbine, studying and overcoming the current limitations of solar tower technology to achieve a new optimized concept of central receiver thermosolar plant.

#### EARLY DETECTION OF WATER EROSION THROUGH AUTOMATIC GENERATION OF INDICATORS (DETER) \_IDI-20150519

The aim of this project has consisted in designing and developing an intelligent, autonomous system for the supervision of oil pipelines and gas pipelines that allows the early detection of possible erosion problems that endanger the stability of the conduit causing its failure. An implementation of the system was carried out in pilot sites in areas of special risk of water erosion in order to validate it, obtaining promising results.

#### SUPERVISION OF INDUSTRIAL AND ENERGY SYSTEMS BASED ON CLOUD COMPUTING (SIS CLOUD) \_IDI-20160691

SIS CLOUD is a project the aim of which is the development of a unified monitoring and analysis tool that allows the remote monitoring of renewable energy sources. This tool will be designed and developed based on independent modular components built on cloud technologies, facilitating integration with third parties and ensuring flexibility and adaptability. The solution will incorporate real-time data processing (CEP system) combined with advanced machine-learning techniques and historical data processing. The solution will have interactive visualization and analysis utilities such as dashboards in real time.

Last but not least, all services of the solution (intake, storage, processing, visualization, etc.) are individually secured and monitored, ensuring traceability of data and service level agreement (SLA). The inclusion of Information technologies within the industrial world involves the development and application of new functionalities at various levels.

#### AUTOMATION PLATFORM FOR SOLAR COLLECTOR ASSEMBLY LINES IN REAL TIME AND REJECTION ESTIMATE (SIGMA) \_ IDI-20170751

The SIGMA Project aims to develop an IT platform that allows to automate the treatment and interpretation of large volumes of information during the process of assembly of collectors (SCE) for thermosolar parabolic trough plants, so that it allows for the correct estimate of rejections beforehand in the assembly line as well as facilitate efficient decision making during the assembly phase of the SCE assembly that makes up the solar field from the monitoring of the information as well as afterwards obtaining the conclusions about the level of efficiency reached and the deviations regarding the initial planning.

#### NEW DESIGN OF SUPPORTS OF THE HCE IN PARABOLIC TROUGH THERMOSOLAR PLANTS (DAHCE) \_ IDI-20171059

In the DAHCE Project a new model support of HCE (Heat Collector Element) is being developed on the parabolic trough collectors of thermosolar plants, which will include a new concept of support tube clamp that prevents breakage of the metallic tube during installation as well as its lifespan. This new support will allow for the use of thinner HCE tubes with the corresponding increase in heat transmission.

#### INDUSTRIAL INSPECTION AND MAINTENANCE OF COMPLEX OR UNATTENDED FACILITIES (INSPECTOR) \_ IDI-20170947

The objective of this Project, approved by the CDTI within the CIEN Strategic Program calling, is the research on technologies to carry out inspection and maintenance on extreme surroundings in an unassisted manner. Through this project the aim is to push the competitiveness of the companies through fomenting business innovation in the industrial engineering area of extreme, complex and offshore installations, in design, manufacturing and commissioning as well as operation and maintenance. In addition, the costs associated to the interventions of extreme operation will be reduced and this will contribute to strengthening the capabilities of the business network that supports the industrial sector.

PROJECTS FINANCED BY MINETUR AND THE EU



#### MONITORING AND PERFORMANCE SYSTEM FOR THE OPERATION AND MAINTENANCE OF INDUSTRIAL PLANTS (SISPLANT) \_TSI-100804-2016-1

Since September 2016 TSK has been implementing the SISPLANT project, the main aim of which is to develop a system based on the IIoT concept for the monitoring of industrial plants with the possibility of acting on the plant elements. To this end, the adoption of standards that allow an interaction with the plant elements (monitoring and actuation) will be carried out. In addition, Big Data technologies will be adopted to allow the processing of all plant information, guaranteeing the integrity and security of the processed data. The SISPLANT solution is intended as a generic display platform, "adaptable" to different industrial processes.

This project is financed by the European Regional Development Fund (ERDF) through the Pluri-regional Operational Program for Intelligent Growth 2014-2020 and the Ministry of Energy, Tourism and Digital Agenda, within the Scientific and Technical Research and Innovation Plan 2013-2016 in the framework of the Strategic Economy and Digital Society Action (AEESD).

#### RESEARCH AND DEVELOPMENT OF ADVANCED COMPUTER TECHNOLOGIES DESTINED FOR CYBER SECURITY IN INDUSTRY 4.0 (CS4) \_TSI-100200-2017-9

CS4 has the ambitious objective to develop a tool that allows for centralizing and improving cyber security in Industry 4.0, allowing the incorporation and Access in real time and in a simple manner. To do this an ecosystem/architecture of Cyber security will be created that allows to take on all sources of possible vulnerability to those that are exposed to the digital developments of Industry 4.0 and that are being unattended to at present. The new model of cyber security that is intended to be developed during execution of this project will be based on technologies for security of technologies enabling Big Data and IoT, as well as to microservice structures and infrastructures DevOps, from design and construction of flexible, modular and extendible hardware and software that allows for adaptation to possible technological changes and that increases the levels of efficiency and performance of security of Industry 4.0 in a substantial way. This project

counts on the funding of the European Regional Development Fund (ERDF) through the “Multiregional Operational Program of Intelligent Growth 2014-2020” and the Ministry of Energy, Tourism and Digital Agenda, within the Scientific and Technical and Innovation Research Plan 2013-2016 in the framework of Strategic Action of Economy and Digital Society (AEESD).

PROJECTS COFINANCED BY THE GOVERNMENT OF THE PRINCIPALITY OF ASTURIAS THROUGH IDEPA AND THE SCIENCE, TECHNOLOGY AND INNOVATION PLAN (PCTI) 2013-2017, AND THE EUROPEAN UNION THROUGH ERDF FUNDS



NEW WATER TREATMENT SYSTEM BASED ON DIRECT OSMOSIS\_IDE-2015-000719

This project aims to develop a pilot plant using Direct Osmosis (OD) technology, which will allow filtering of a feed solution to obtain purified water on the one hand and a concentrated feed solution on the other. The OD process offers a number of advantages: it does not require external hydraulic pressures, produces almost complete rejection of a wide range of contaminants, and there is less membrane fouling. This opens up a new development path for water treatment systems, as a substitute or complement to reverse osmosis. Direct osmosis (DO) is a “green” technology, capable of solving many of the problems associated with water filtration and recycling.

STUDY OF A SYSTEM FOR AUTOMATED REMOTE MANAGEMENT OF OPERATIONAL AND INDUSTRIAL MAINTENANCE TASKS THROUGH THE AUTOMATIC GENERATION OF AERIAL MISSIONS (UAVInspection) \_IDE-2016-000184

This project aims to integrate the aerial data obtained by the UAV into the Big Data platform, along with the data obtained via other sensors, with the aim of improving the results ob-

tained with regard to the detection of incidents and the visualization of the state of photovoltaic plants, as well as the automatic generation of new flight missions and monitoring. In this way it is intended to achieve an autonomous, intelligent use of UAV technology, adapted in real time to the specific needs of each installation, with minimal need for operator intervention.

METHODOLOGY FOR PREDICTION OF RISK EVENTS IN INDUSTRIAL ENVIRONMENTS (EventRisk) \_IDE-2016-000181

The general aim of the project is the design of a methodology that allows the prediction of risk events in industrial environments through the incorporation of sensors at critical points, with the support of the Emergencies Service of the Principality of Asturias (SEPA) who will take an active part in the project. To achieve this, the construction is proposed of a comprehensive system of analysis of dispersion of pollutants by combining off-line models to create patterns and sensors installed in the field for real time monitoring supported by Big Data technologies and mass data analysis techniques.

RESEARCH AND DESIGN OF INTEGRAL MANAGEMENT IN THE INDUSTRIAL INTERNET OF THINGS ECOSYSTEM (GestorIIoT) \_IDE-2016-000178

Through this project, research is centered on a comprehensive system for the management of IoT architectures deployed in industrial systems, which will serve as a fundamental architectural element to take advantage of the new possibilities of interconnection and exploitation of information generated in 4.0 industries. Organized as a modular solution, the IIoT Manager system will be stratified into 5 large functional groups, with which it is intended to solve the complexity and lack of robustness of current systems (acquisition framework, remote management, ecosystem monitoring, simulation and cybersecurity).

SUPERVISION SYSTEM FOR ELECTRICAL SUBSTATION BUSBARS BASED ON AUTOMATIC THERMOGRAPHIC ANALYSIS (SISTER) \_IDE-2016-000652

This project aims to address preventive maintenance of the busbars in electrical substations via the automatic analysis of thermographic images. To achieve this, the system will

use, on the one hand, image processing algorithms for the detection of hot spots and, on the other hand, it will communicate with the SCADA to obtain the control system data in order to characterize the process and subsequently send the analysis results. In addition, the images will be sent to a remote monitoring system, thus creating a historical knowledge base.

#### 4.0 TECHNICIAN IN THE FOURTH INDUSTRIAL REVOLUTION: AN AUGMENTED, VIRTUAL, SECURE ENVIRONMENT \_IDE-2016-000834

The overall objective of the project is the use of new technologies to improve the work of the 4.0 technician. Research will center on the development of innovative support and help tools that make it possible to improve the execution of the technicians' work while guaranteeing their safety. Research will explore the creation of an augmented, virtual, secure environment throughout the entire value chain of industry.

#### STUDY OF WIND-DERIVED PROBLEMS AND METHODS FOR MITIGATION IN THERMOSOLAR PLANTS LOCATED IN DESERT AREAS (EOLO) \_IDE-2016-000179

The overall aim of the EOLO project is the development of an expert system to optimize the design, efficiency, performance and durability of a solar thermal plant in desert environments, where solar radiation in these areas is optimal for the location of this type of plants, but where sand, dust and high wind speeds cause the components to fail.

#### SIMULATOR OF WORKING MODES OF THERMOSOLAR PLANTS (TOPSOL) \_IDE-2016-000637

The TOPSOL project proposes to develop a software tool that allows a simple visualization of the different modes of operation of thermosolar plants, in order to detect errors or propose new modes by adding connections or equipment. The goal is to be able to do everything in a fast and intuitive fashion that serves to facilitate plant control.

#### NEW MATERIALS FOR THERMOSOLAR PLANTS WITH SALTS AS HEAT TRANSFER FLUID (MATSAL) \_IDE-2016-000650

This project proposes to study a mixture of ternary salts known as HITEC, which has a freezing temperature of 142° C. This low temperature would facilitate the operation of the plant, and drastically reduce the costs of solar field tracing. However, the thermal stability of this salt mixture at an elevated temperature and the corrosive effect of these salts are unclear. It is proposed to test these salts for 6 months in order to compare the results with binary salts and the HITEC XL ternary salt mixture. The behavior and resistance to corrosion of two types of coatings in contact with HITEC salts will also be tested in this project.

#### NEW SYSTEM OF STORAGE AND INTELLIGENT ANALYSIS OF CONTROL VALUES FOR BULK HANDLING MACHINES (REHANDA) \_IDE-2016-000635

The main objective of this project is to address the development of a new generation of bulk handling machines, incorporating a system of data capture and storage, which, through Big Data technologies and data analysis, makes it possible to boost the competitiveness of a subsector that so far has had a low rate of implementation of these technologies. This means developing a database in the electronic control of each machine, thus enabling the option of storing performance data periodically as from the moment of commissioning.

This database must be unalterable by the client in order to ensure the traceability and usefulness of the data captured. Once this database is created, it will be necessary to develop a virtual platform for access to it, from which intelligent analysis of the data will be possible and its application to the development of new technologies that improve the equipment manufactured by PHB.

#### NEW ENVIRONMENTALLY SUSTAINABLE SYSTEM FOR THE TREATMENT OF VINASSE BY DIRECT OSMOSIS IN THE SUGAR-ALCOHOL INDUSTRY (BIOETHANOL) \_IDE-2016-000182

The general objective of the BIOETHANOL project is the development of technological solutions capable of industrial scaling for the treatment of the vinasses generated in the sugar-alcohol industry by concentration, as well as the rest of the waste generated in the treatment, via an innovative process based on the complementarity of direct osmosis with other treatment



alternatives, such as reverse osmosis, forced evaporation and dumping diluted brine into the sea in coastal areas.

#### AUTOMATIC HYDRAULIC EMERGENCY SYSTEM FOR THERMOSOLAR PLANTS (HIDRA)\_IDE/2017/000705

HIDRA project's aim is the development of an automatic hydraulic emergency system that carries out the unfocusing of the collectors of a thermosolar plant. HIDRA system will allow the elimination of the SAI of the thermosolar plant, with the consequent cost savings.

#### RESEARCH FOR THE USAGE OF A WASTE TREATMENT COMPLEX FOR THE PRODUCTION OF MICRO-ALGAE WITH PHARMACEUTICAL AND FARM USES (LandFill4Health)\_IDE/2017/000700

The global objective of the Landfill4Health Project is to research and demonstrate the usage of a non-hazardous waste disposal site and its auxiliary installations to house industrial cultivation of micro-algae intended to produce high-valued active ingredients in the field of nutraceuticals, health and cosmetics. To do this, INGEMAS will be in charge of the design and development of the pilot plant.



#### RESEARCH AND DESIGN OF A NEW METHODOLOGY FOR THE DESIGN, DEVELOPMENT AND DISPLAY OF ANALYSIS TECHNIQUES OF BIG DATA INFORMATION ORIENTED TO PHOTOVOLTAIC PLANTS (PHOTOANALYTICS)\_IDE/2017/709

For the last few years, TSK has worked on the monitoring of photovoltaic plants through the use of technologies characteristic of the Internet paradigms of things and Big Data. This bet, aligned with the 4.0 Industry initiative, allows TSK to currently have a vast and diverse amount of "plant" information that is being used for remote supervision and monitoring of the installations.

The PhotoAnalytics project comes with the objective to delve into this information, investigating the applicability of advanced modern analytical techniques about extensive IoT/BigData/I4.0 data sets.

#### PROJECTS FINANCED BY THE GERMAN MINISTRY OF ECONOMY AND ENERGY (BMW I)



#### SILICONE TEST FACILITY (SITEF)

In the SITEF project, a new heat transfer fluid will be tested for solar thermal power plants using parabolic-cylinder technology. This new fluid is based on silicon, as opposed to that which is currently employed with a carbon base. The introduction of this innovative fluid would allow a higher operating temperature (up to 450 °C) which would lead to an improvement in plant performance. In addition, it would reduce the environmental damage and the risk to health, by not producing benzene. The project will consist of a trial to study its long-term behavior in a test loop at the Almeria Solar Platform, as well as laboratory analysis.

#### DEMONSTRATION OF A SOLAR THERMAL PARABOLIC TROUGH POWER PLANT AND STEAM GENERATION SYSTEM USING MOLTEN SALT AS THE HEAT TRANSFER FLUID (HPS-2)

The use of molten salts as a heat transfer fluid has important advantages. The operating temperature can be increased substantially to 500 °C, and the plant is considerably simplified by

using the same fluid for storage and as heat transfer fluid. To validate the technology and identify possible problems during the operation, a test loop will be built in Évora (Portugal), where the TSK-FLAGSOL Heliotrough 2.0 collector will be installed.

#### OPERATING STRATEGIES BASED ON CLOUD CAMERAS FOR THERMOSOLAR PLANTS (WOBAS)

The aim of the Wobas project is to develop a tool which, using cloud cameras, can predict the direct radiation that a solar thermal plant will receive in a very short term. Cameras record the sky and detect the presence of clouds and their movement to determine when and to what extent they will reach the plant. This very short term prediction will optimize the operation strategy at any given time. During the project, a prototype will be installed in the "La Africana" solar thermal plant to test the system in a real plant.

#### SILICONE FLUID MAINTENANCE AND OPERATION (SIMON)

The purpose of SIMON is to test the applicability of new heat transfer silicon based fluids to higher temperatures with which are being operated with at present in parabolic trough thermosolar plants and with a faster market introduction by reducing all the obstacles that have been identified. The Project will consist of laboratory testing, fire assessment and testing phases in the loop of the PROMETEO test refurbished in the SITEF project at the Solar Platform in Almeria. Also a viscosity sensor appropriate for these applications and temperatures will be developed, as well as an efficient maintenance concept for separating compounds such as hydrogen, methane and silanes.

PROJECT FINANCED BY THE EUROPEAN AEROSPACE AGENCY (ESA)



#### CONCENTRATING SOLAR POWER FORECAST SYSTEM FOR PARTICIPATION IN THE SPANISH ELECTRICITY MARKET USING EO AND COM TECHNOLOGIES (CSP-FOSYS)

In the CSP-FoSYS project, a new meteorological prediction system based on satellite images is developed. The system consists of software that receives the images obtained by orbital satellites and predicts the direct radiation that the plant will receive in the medium term, for the next hours and days.

PROJECT FINANCED BY THE EUROPEAN UNION (H2020)



#### COMPETITIVE SOLAR POWER TOWERS (CAPTURE)

The main objective of the CAPTURE project is to reduce the costs of solar thermal plants by implementing an innovative plant configuration. The configuration is based on several independent towers operating with air at 1100 ° C, each coupled to a Brayton cycle. The residual heat of these cycles is used to store thermal energy, which will feed a Rankine cycle.

A prototype will be built at the Almería Solar Platform to test the validity of the system. Throughout the project, all the necessary components for the operation of the plant will be developed: receiver, regenerators and heliostat.

#### SOLVING WATER ISSUES FOR CSP PLANTS (SOLWATT)



The SOLWATT project, SOLving WATER issues for CSP plans, aims to reduce water consumption in solar thermal power plants (35% for plants with wet cooling and 90% for plants with dry cooling). For this purpose, it is intended to develop, implement and demonstrate a series of technologies that entail a reduction in water consumption and operating costs, while guaranteeing a high overall performance of the plant. The solutions proposed in the project are the following:

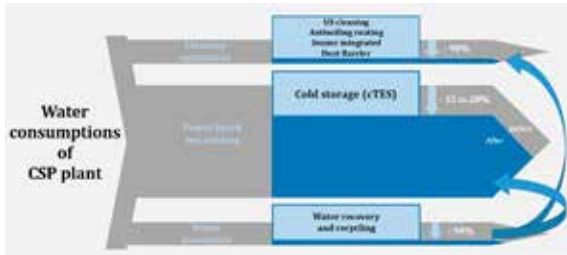
- Ultrasonic cleaning.
- Anti-fouling coatings on mirrors and receivers.

- Sand barriers.
- Integrated cleaning of heliostats.
- Dirt sensors integrated in mirrors.
- O&M Optimizer with prediction of soiling.
- Cold thermal storage at night.
- Water recovery and recycling system



## OPTIMAL HELIOSTAT FIELDS FOR SOLAR TOWER POWER PLANTS (SOLFIEOPT)

The SolFieOpt project proposes to develop software to design the layout of heliostats in the solar field for a tower plant. The optimization of the layout of all the heliostats will save costs in the solar field and increase the efficiency of the plant. The tool will take into account the configuration of the plant and the mirror cleaning strategy to optimize the route of cleaning trucks.



The technologies will be validated in the cylindrical-parabolic “La Africana” plant, located in Córdoba and in the “SEDC” tower plant, located in Israel, with the aim of bringing them closer to the market and making CSP plants more profitable. All solutions can be implemented separately and adapted to any existing or future plant, parabolic trough or tower and both wet and dry cooling, to meet the requirements of each site. The project will also focus on improving the social acceptance of this type of plant through a detailed analysis of different case studies and the promotion of education in the local population.

The results of this project will increase the competitiveness of solar thermal energy compared to other energy sources, as well as the acceptance of these plants in local communities, thus representing an important step towards the goals established in the European strategic plan for energy. The SOLWATT consortium, led by TSK, is made up of 14 partners from 5 European countries and Israel, including 6 industrial partners, 2 SMEs, 5 technology centers and one university. The budget is €12.6 million, of which €10.8 million is contributed by the European Union and has an expected duration of 4 years.

[www.solwatt.eu](http://www.solwatt.eu)

This project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement no. 792103, project SOLWATT.

 **TSK**

*Growth through innovation*