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Group ITER

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Group ITER










ITER Instituto Tecnológico y de Energías Renovables S.A.


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Group ITER

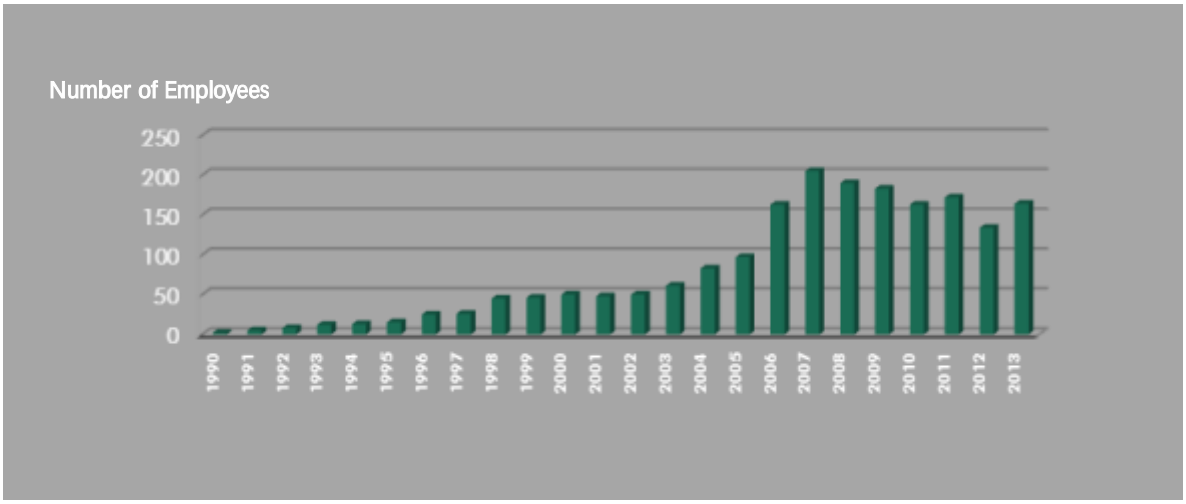
In 1990 the Cabildo Insular de Tenerife creates ITER as a solution to the island´s need of having a Research Centre of Renewable Energies and New Technologies. During its development, the Institute has not only grown in number of facilities and staff, but has branched into a group of entities which enables the attainment of the activities entrusted within its corporate purpose. These entities make up Group ITER.

Among the activities developed by these entities we can highlight the implementation and promotion of research applied to renewable energies and everything dealing with them, the infrastructure needed for the development of research, engineering and the local industry, and of the export of know-how to other countries and archipelagoes.

The ITER Group is made up of ITER and the following companies listed in the table bellow:

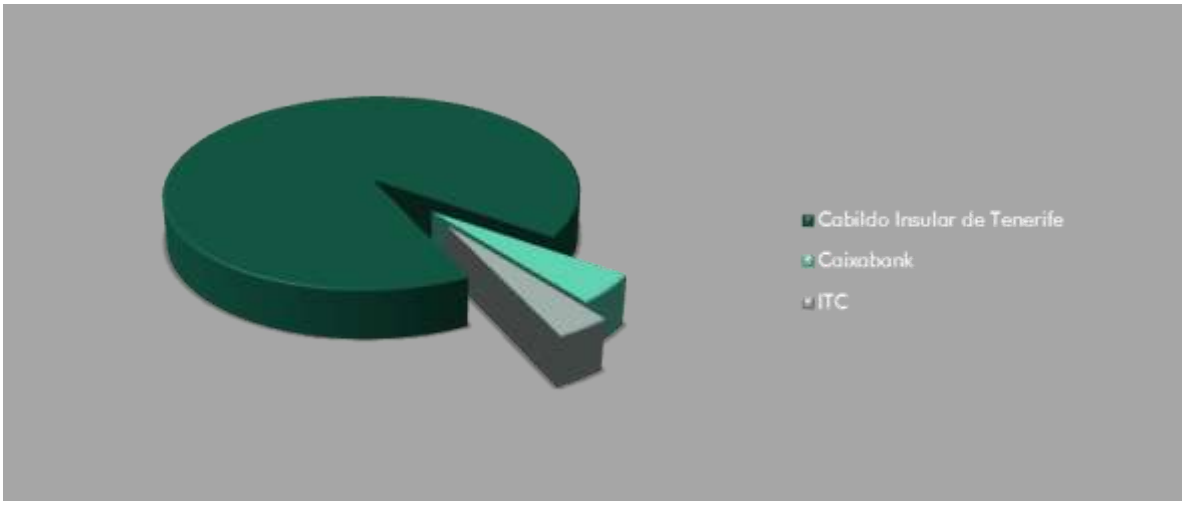
	Entidades de Grupo ITER	Participación ITER
Renewable Energies	Eólicas de Tenerife, AIE	50%
	Energía Verde de la Macaronesia S.L.	39,94%
	EVM2 Energías Renovables S.L.	30%
	Agencia Insular de Energía de Tenerife, Fundación Canaria	23,53%
	Solten II Granadilla, S.A.	21,55%
	Parques Eólicos Granadilla	30%
Telecommunications	Instituto Tecnológico y de Telecomunicaciones de Tenerife S.L.U	100%
Other	Instituto Volcanológico de Canarias.	100%

The ITER Group relies on a multidisciplinary team of 164 professionals which work coordinately in the different activities carried out by the group



Instituto Tecnológico y de Energías Renovables, SA

Public limited company constituted on December 27th, 1990. The Cabildo Insular de Tenerife is the main shareholder and after several incorporations, ITER´s share is distributed in the following way:



Research activities and technological development related with the use of renewable energies were meant to be promoted with the creation of the Institute. Other interesting aspects for the regional social and economic development of the island such as the groundwater resources, seismic-volcanic prediction and surveillance, environmental control, and development of communication and information technologies are also promoted nowadays.

Since the beginning, the Institute follows two main action lines: electricity generation with renewable energies and the execution of investigation projects related with renewable energies, environment and engineering.

The activities developed in the Institute can be classified within these action lines and are specially entrusted in its social purpose:

To implement and promote renewable energies applied research.

To develop technological systems for renewable energy uses.

To coordinate energy R & D projects in the Canary Islands.

To create the needed infrastructure for the development of local research activities, engineering and industry.

To develop results for the local industry and export the know-how to other countries and archipelagos.

To promote the relation with the scientific community at national and international level.

Scientific personnel training in all renewable energy fields.

Eólicas de Tenerife, AIE

Economic Interest Association established on November 27th, 1995 and registered in the Company House of Santa Cruz de Tenerife.

It is integrated by Unelco Participadas SA, el Instituto Tecnológico de Energías Renovables SA and Made Energías Renovables SA. The social purpose of the Association is the cooperation between the shareholders for the development and research in the field of wind energy, by means of the promotion, construction, exploitation and management of the resources of Tenerife, increasing therefore the wind energy exploitation in the island.

Eólicas de Tenerife owns the 4.8 MW Wind Farm installed in ITER lands, which consists of 8 MADE AE-46 wind turbines, each one with 600 kW power. It has an annual energy production of 14 GWh.

Energía Verde de la Macaronesia, SL

Trading company established the 10th of October, 2007 and shared by Sumitomo Corporation, ITER, Cerco Tenerife SL, Feralon Canarias SL, and two private investors.

As established in its social purpose, the limited company Energía Verde de la Macaronesía is aimed to promote, design, construct and manage all kinds of renewable energy plants, as well as to implement and promote any type of applied research in the field of renewable energies and develop systems or techniques for the use of them.

EVM2 Energías Renovables, SL

Trading company established the 10th of October, 2007. It is a limited company whose main shareholders are Proparsa 2000 SA, ITER SA, Cerco Tenerife SL and Feralon Canarias SL.

The social purpose is the promotion, design, construction and exploitation of all kinds of renewable energy plants as well as the implementation and promotion of any type of applied research in the field of renewable energies and the development of systems or techniques that allow the use of them.

Parques Eólicos de Granadilla, AIE

Economic Interest Association constituted on January 4th, 2005. The partners of this group are Instituto Tecnológico y de Energías Renovables SA, Polígono Industrial de Granadilla Parque Tecnológico de Tenerife SA and the company Granadilla SueloSur SL

The social purpose of the Group is:

Cooperation among the partners for the development and research in the area of wind power.

Promotion, construction, exploitation and administration of the wind resources of the island of Tenerife.

Increase the use of Wind Energy in the island

Instituto Tecnológico y de Telecomunicaciones de Tenerife, SLU

Trading company established the 20th of April, 2009. It is totally shared by Instituto Tecnológico de Energías Renovables SA.

As established in its social purpose, this limited company has as aim the construction, exploitation, installation, management and maintenance of all types of networks and telecommunications infrastructures including the wiring through the seabed and / or land bed as well as the promotion, provision and marketing of services and / or products of electronic communications, telecommunications, information society services, multimedia and added value.

Furthermore, among its objectives there is the promotion of free competition in the market for telecommunications networks and services on the island of Tenerife, Canary Islands and West Africa.

Solten II Granadilla, SA

Trading company established the 26th of October 2007 and shared by private investors and ITER.

Solten II Granadilla SA deals with the acquisition, promotion, management, development and exploitation of PV solar platforms, as well as with the production, transport and distribution of electricity from solar photovoltaic platforms.

Private investors interested in the production of PV solar energy connected to the grid have, this way, the opportunity to participate by means of the purchase of shares in sustainable initiatives for the economic and industrial development of the island, contributing to increase the participation of renewable energy in the primary energy balance of the Canary Islands.

Agencia Insular de Energía de Tenerife, Fundación Canaria

By the end of the year 2013, AIET Fundacion Canaria and Fundacion Canaria ITER –both entities related, linked and dependent on the Cabildo Insular de Tenerife as stipulated in the Regulation that establishes the European system of national and regional accounts (ESA 95) - started the merger by absorption process as envisaged in the Law 2/1998 of April 6th, of Canary Foundations, and other applicable regulations.

By December 31, 2013, the merger agreements of the Boards of Trustees of the two Foundations have been adopted and the remedy defects process granted by the public administration has been accomplished

AIET Fundacion Canaria and Fundacion Canaria ITER are waiting to the notification of the Registry of Canarian Foundations informing about the pretending inscription. In any case, the merger resolutions adopted by the initial Board of Trustees are binding and enforceable against third parties. The resulting Board of Trustees could and should act with regard to legal matters using the full powers and duties that are recognized by law.

The social aim of the Foundation is:

Develop, in collaboration with other local entities, the application of outreach programs, promotion and implementation of activities related to renewable energies and energy saving and efficiency, providing the users with the guidelines to modify their energy consumption patterns.

Develop publications related to the different aspects of the energy subsectors, especially on energy saving and efficiency and the use of renewable energies.

Conduct and promote the research, development and demonstration in the field of renewable energy and other scientific areas.

Develop technical systems that allow the use of renewable energy.

Coordinate the R+ D projects carried out in the Canary Islands in the field of energy and study the interrelations with related topics.

Create the necessary infrastructure for the development of the engineering, the local industry and the research.

Establish training programs on energy matters for different sectors and levels. Educate and train scientific and technical personnel in all the fields related to renewable energies and in other scientific-technological fields.

Assist local authorities in the development of energy plans.

Give advice to small and medium companies with the aim of improving the energy efficiency in their processes and facilities.

Promote and support the participation of companies and local institutions in national and international energy programs.

Establish experiences transfer and know-how exportation systems by means of the cooperation with other entities at regional, national and international level and promote the exploitation of the results by the local industry.

Foster the relationships with the national and international scientific community.

Instituto Volcanológico de Canarias, SAU

Public limited company constituted on June 29th, 2010. It is entirely shared by the Instituto Tecnológico y de Energías Renovables SA.

The institute works to improve the knowledge the population has on the volcanic phenomenon present in the Canary Islands. The Institute works to improve the management of the volcanic risk as well as the advantages of living in an active volcanic area in other to contribute to the sustainable development of the cities located in volcanic territories.

The following activities are specially entrusted within the corporate purpose among others:

Cooperation and coordination among public administrations to carry out and promote the volcanic research, with special emphasis in the reduction of the volcanic risk.

To help to improve and optimize the knowledge on the volcanic phenomenon to improve the management and to contribute to the sustainable development of the societies established in volcanic territories.

To promote training of scientific and technical staff in all the fields concerning volcanoes.

To help improve the response before volcanic phenomena.

To promote and to stimulate scientist and technical collaboration and the creation of a network of knowledge on the volcanic phenomenon.

To collaborate with the Canarian Universities in the subjects related with volcanic matters.

To promote the dissemination of science in volcanic matters to contribute to a better education and culture on and about the volcanic phenomenon.

To develop research, technical projects, advising, technical assistance, work direction, and training in environmental matters.

Recognitions and awards received by the ITER Group

Through many years of experience, the ITER Group has received numerous awards. These recognitions have contributed to the consolidation and expansion of the group and state the usefulness of the social work carried out.

Appointed Centre of Excellence for the Development and Dissemination of the Renewable Energies by UNESCO. (Special session of the General Assembly of United Nations in 1999).

Award " TEIDE DE ORO " 2001 of Radio Club Tenerife.

Award SOL y PAZ to the managerial work 2005 within the frame of the Solar Meeting celebrated in the same year.

Award FECITEN 2009 of the Centres of Initiatives and Tourism´s Federation of Tenerife.

Data Centre Leaders Award in the category of "Innovation in an Outsourced Environment" in the International Contest Datacenter Dynamic Awards 2010.

Award **Mundo Empresarial Europeo 2011** which recognizes the Institute of Technology and Renewable Energies as **the best organization of the Canary Islands** in the edition XIV of the prizes.

Infrastructures

ITER Instituto Tecnológico y de Energías Renovables S.A.

ITER´s Headquarters

Engineering Warehouse

DATA CENTER of the ALIX project: D-ALiX

Wind Tunnel

Generation Control Centre CCG-ITER

Electric Substation

Photovoltaic Module Factory

Chemistry, Gas Isotope and Groundwater Lab

Electronics Laboratory

Photovoltaic Laboratory

Operation and Maintenance Centre for Renewable Energy Facilities

ITER´s Bioclimátic Houses

Visitors Centre

Technological Walkway

Infrastructures

ITER is located in the Industrial Estate of Granadilla, in the southern coast of the island of Tenerife, covering a total of 400.000m^2. ITER was designed as an experimental and dissemination area. Following this premise ITER gathers several installations resultant from the projects carried out.

ITER is in continuous growth to support and encourage the R & D activities it develops. The results of the demonstrative projects executed have added new facilities to the infrastructures of the Institute.

ITER's Headquarters

Se The main Office of the Institute is a bioclimatic building designed by the team of architects constituted by Ana Maria Zurita Exposito and Jose Fco Arnau Diaz-Llanos.

The headquarters were planned on the basis of the latest bioclimatic design criteria so as to reduce the energy consumption required to ensure the habitability and comfort of the facilities of the company.

It is a triangular construction based on two wings that contain the various offices and installations. The director's office on the 1st floor and the meeting room at the bottom floor, are situated in the vertex.

Engineering Warehouse

The Engineering Warehouse is a new building of 800 m^2 that hosts ITER's engineering division. It consists of a diaphanous area with capacity for 80 workstations, along with a manager's office and a meeting room. A photovoltaic plant has been installed on the building, which belongs to part of the 2 MW installation of SOLTEN II project.

This building is also headquarter of the companies Instituto Tecnológico y de Telecomunicaciones de Tenerife, NAP of Western Africa and Canary Islands and Canalink's local office.

DATA CENTER of the ALIX project : D-ALiX

This high availability datacentre, framed within the ALIX initiative and instigated by the Cabildo Insular of Tenerife, is the infrastructure that stands as a site for ICT equipment. This equipment is required so that Tenerife can host technological enterprises that offer services both within the archipelago and Europe, Africa and America.

The building of the datacentre is a simple and modular structure that will allow its construction to take place in 4 phases replicating the initial model. At present, the first phase is finished. Phase one has a constructed surface of 4,498.87m2, from which 1,500m2 correspond to space assigned for technical floor where the ICT equipment will be located, and the rest for auxiliary facilities.

This infrastructure provides service levels comparable to the ones established in a TIER IV categorized facility. The TIER classification, established by the TIA (Telecommunications Industry Association), is based in the high availability infrastructure of the datacentre, due to its N+1 and 2N+1 redundancy levels in its electrical supply and air-conditioning infrastructures, and in the access to communication with the outside. Furthermore, and in line with the environmental awareness of the ITER, the datacentre's roof implements 400 kW of photovoltaic plants. .

Wind Tunnel

The Wind Tunnel is an installation provided with a test section in which a rectilinear uniform flow of air with a constant speed can be obtained. Inside the Wind Tunnel's test section, real objects and scaled models are located and instrumented with suitable sensors to measure and study the real effect of wind on them. The test section has been built in a modular and exchangeable manner, so that it can be perfectly adapted to the requirements of each and every test.

The innovations in its construction, power plant and control system, makes the tunnel extremely competitive in terms of costs, quality and performance, as well as suitable for a wide range of applications, such us: Agricultural R+D, Civil Engineering, Architecture, Renewable Energies and Sports Training. Furthermore, the tunnel has recently been modified by laminarizing its flow in order to carry out aeronautical tests.

With the aim of carrying out different tests of the solar plane prototype model, such as the aerodynamic features, the quality of the flow in the aerodynamic tunnel has been improved with the installation of a metallic mesh in the settling chamber. Also for this solar plane prototype, ITER has designed, manufactured and calibrated a Pitot tube in order to measure the fluid flow reference velocity of the tunnel.

Among the most outstanding features of the aerodynamic tunnel for civil tests we find: the closed circuit, test section of 2x2 m2 and 3m long, 56 m/s of maximum operation speed and nine fans of 22 kW each one, controlled by a frequency converter.

Generation Control Centre GCC-ITER

The Royal Decree 1565/2010 published on the 19th November, regulates and modifies certain aspects of the activity of electricity production with renewable sources, requiring that all the special regime facilities with nominal power higher than 10 MW, as well as those with power below the 10 MW but forming part of a group whose total power results to be higher than 10 MW, to be integrated into a Generation Control Centre. Also, such power limit is reduced to 1 MW for the Insular and Extra-peninsular Electricity Systems.

The large number of facilities and the necessary both security and system efficiency requirements, rise to the interlocution between CECRE and generators will take place through enabling Generation Control Centers (hereinafter CCG), distributed by the country. They must be provided with an adequate connection with CECRE and must have sufficient control capacity, command and monitoring over the generating installations ascribed to them. The CCG, to which an actual power station is subscribed, acts as its delegated dispatch office and interlocutor with REE.

Every CCG must be connected with the System Operator Control Centres and have been previously approved by REE, following the Procedure for the qualification of control centres in the Canary Islands. Through this procedure the CCG must demonstrate, by means of the corresponding tests, its capacity to satisfy the requirements established, including the equipment as well as the information requirements to be submitted to Red Eléctrica's Control Centres on the Canary Islands, both in its content and its timing and precision

In June of 2011 and as a root of the publication of the mentioned Royal Decree, Instituto Tecnológico y de Energías Renovables, S.A. (hereinafter ITER, eng. Insitute of Technology and Renewable Energies) constructed and authorised in front of REE a Generation Control Centre in its installations, named CCG-ITER.

In short, a control centre is a high capacity informatics and telecommunications resources support system, which is able to carry out functioning on real time of the installations assigned to it. This way the necessary connections y equipment is provided in order to act on and control the energy generation installations.

Through the corresponding communication tests, CCG-ITER accredited its ability to control, command and monitoring of these generators. It fulfills the technical and functional requirements which allow an suitable connection with the System Operator's Control Centres of the Canary Islands. This liaison allows REE to supervise and control the special regime production over the installations assigned to CCG-ITER, and also it is able to issue in real time the instructions necessary to control their production.

CCG-ITER executes the received instructions taking actions directly over the installations or transmitting these instructions to the different owners, watching over their fulfillment, according to what is stated in the contract of assignment.

CCG-ITER is provided with all the human resources necessary to guarantee its functioning during 24 hours a day, 365 days a year. It also is equipped with the technical infrastructure adequate to obtain information, in real time, about the main electrical variables of each generating installation, and also to guarantee the secure and efficient communication with REE. Moreover, necessary attention is provided so that any problem that would affect to a critical function system could be approached in maximum 1 hour.

The operation protocol should be two directional to carry out the communication between the CCG-ITER and the Control Centre of the System Operator in the Canary Islands.

This way, the CCG-ITER sends information of every installation or group of facilities in real time to the system which includes: real power, reactive power, the state of connection between the generator and the distribution grid and potential. To fulfill it, the Control Centre collects and provides the information and measurements of every assigned generator.

The System Operator in Canary Islands sends action instructions for the assigned generators to the CCG-ITER and the Control Centre should assure their fulfillment and maintenance. The GCC-ITER offers its services to ITER's installations and to the installations of third parties. At present, the following installations are assigned to the GCC-ITER:

Wind farms: Made, Enercon and Experimental Platform

PV farms: 13 MW Solten I, 11 MW Solten II, 9 MW Finca Verde, 5 MW Finca Roja

Electric Substation

ITER is finishing the transformer substation of 20/66KV of access to the transport grid. Its construction has been necessary to overcome the limitations in the available capacity of the electric company's distribution lines and enable the evacuation of the energy generated, not only by ITER's photovoltaic plants, but also by the new wind parks to be installed in the area. This electric substation will be used by future projects that will develop in the territory as well as by some previous ones.

The transformer substation of 66/20kV, initially of 50 MVA, will be enlarged with a second transformer until reaching a power of 100 MVA. This transformer substation will be connected by an underground line of 66 kV to the future substation of Abona, as planned by Red Electrica de España, although nowadays it is still in process to be connected temporarily to the substation in the Industrial Estate of Granadilla.

Photovoltaic Module Factory

The creation project of a PV module factory in ITER installations was originated by the need of covering all the PV module requirements of the Institute and to continue and extend the investigations that have been going on in this area through the past years.

The Project included a warehouse 125 meters long and 20 meters wide divided in three sections, one assigned to the storage of raw material, the second one assigned to module manufacturing and the third one assigned to the storage of PV modules. It covers a total area of 2500 square meters in which1500 are dedicated to store raw materials and finished modules and 1000 are dedicated to the manufacturing zone with two assembly lines.

Each line consists of two cell soldering machines (Stringer machines), one cell positioning robot, layout glasses tables, module checking tables and one laminator to shape the modules. Both lines converge in a module testing and classifying machine. After that, modules go through the frame assembly tables and packing zone.

In 2008, this PV module factory was brought into operation in ITER facilities. The operator's experience and the familiarization with the machines have allowed an increase in the production to 200 kW each month.

Later on, ITER officially certified its modules after being tested in Italian laboratories. In these tests, not only did the modules pass every exam they were subjected to, but also passed with excellent results the demanding tests of power output capability against thermal cycles tests, temporal tests and aggressive atmospheric tests. Nowadays, ITER has the capability to produce 30 MW of PV modules with full quality warranties not only in its production lines, but also in the final product.

Chemistry, Gas Isotope and Groundwater Lab

This lab carries out the chemical and isotopic characterization of gases and water underground along with other environmental matrixes, the lab is provided with:

Atomic absorption spectrophotometer (AAS)
Induced-coupled plasma atomic emission spectrophotometer (ICP-AES)
Gas chromatograph (GC)
Gas micro-chromatograph
Mass / gas chromatograph (GC/MS)
Quadruple mass spectrometer (QMS)
Ionic and liquid chromatograph (IC and LC)

Electronics Laboratory

The electronics laboratory is located in one of the warehouses on which the photovoltaic platform of 2M has been installed.

Equipped for the design, development and manufacture of prototypes and electronic system, it is provided with:

SMT manufacturing line (screen printing machine, automatic pick and place and air convection oven for SMD soldering).

Machinery for the development of prototypes and small electronic circuits (solder paste dispenser, manual Pick and Place, milling machine for the fast development of double side and high frequency prototypes, exposure unit and PCB processing tank).

Likewise, it has an area destined for checks and testing during the design phase, both for the analogical and the digital part, equipped with instruments such as logic analyser, oscilloscopes, wave generators, frequency meters, power supplies, thermo-graphic camera, infra-red thermometer, multimeters, etc.

The laboratory has electronic components for general use and development systems for microprocessors as well as stock of high power elements (IGBT modules, radioactive elements, etc.) that are used in the development of equipment such as inverters, chargers, frequency converters, etc. It also has power analyzers that allow carrying out grid quality diagnosis and determining relevant parameters of the equipment (performance, signal quality…).

Finally, the lab has also an area for the integration of large-scale equipment, as in the case of the TEIDE 100 inverters that are manufactured by the Department of Electronics.

Photovoltaic laboratory

The photovoltaic laboratory has been co-financed by the Ministry of Industry, Tourism and Trade through the National Program of Applied Research 2008 and by the Ministry of Economy and Competiveness through the Calls INNPLANTA 2011 and INNPLANTA 2012 for the acquisition of scientific-technical equipment for R+D and results transfers activities in the entities located in Scientific and Technological Parks.

The Silicon PV Cell laboratory is a state of the art scientific facility located at ITER's engineering building complex. Occupying 390 m2, the laboratory was conceived for the research and development of silicon based PV cells, in order to increase their energy efficiency and reliability, but also taking into consideration the necessary reduction on their manufacturing costs.

The laboratory is divided in the following areas:

Solar Cell Fabrication Laboratory—Clean Room

Clean Room ISO 7 (class 10,000) for producing PV cells. With a total area of 65m², it has the following equipment:

Chemical Bench

Wafer Spinner

Rapid Thermal Process (RTP) Diffusion Furnace

Plasma Enhanced Chemical Vapour Deposition (PECVD) System

Screen Printer

Infrared Fast Firing Belt Furnace

Characterization Facility

Controlled environment for PV Cell characterization (110 m^2)

Pulsed Laser

Photovoltaic Spectral Response System

Modular Fluorimeter

Ellipsometer

Semiconductor Characterization System

Microwave Photoconductance Decay (MWPCD) System

Auxiliary Facilities

Water Purification Facility.

De-ionized water storage and recirculation system.

Air filtering and climate control system.

Water cooling close circuit.

Drainage system for evacuating corrosive liquids.

Compressed Clean Dry Air line.

Gas cabin with 2% Silane/nitrogen gas line.

Ammonia, Nitrogen and Nitrous oxide gas lines.

Tetrafluoromethane/20% oxygen gas line.

Control system for the detection of toxic, oxygen level and Ex hazards.

Gas Reactor Column for poisonous gas abatement.

High temperature fumes ready exhaust evacuation system.

Operation and Maintenance Centre for Renewable Energy Facilities

ITER has developed the tools and methodology for the continuously monitoring, operation and maintenance of photovoltaic plants and wind farms (own or third party), ensuring the optimal operation of all components.

This is possible by means of the monitoring system developed by ITER and applied in all of its installations. It is based on a SCADA (Supervisory Control And Data Acquisition) system, which allows to read the operational parameters in real time and to communicate them to a centralized database server for its storage, in order to ensure that all facilities operated in accordance with the required specifications. The system has the following features:

A data acquisition system that is capable to measure the operating parameters of each facility at inverter level.

A central server that storages and recovers the operating and production data.

A communication system that links the different elements. In our case there has been installed the protocol with RS 485 connection for short distances and communication between elements and the Ethernet protocol over fiber optic cable for longer distances.

The data acquisition of the system allows the personnel of the Generation Control Centre (GCC) and the operator of the installations to check the actual state of them in real-time as well as their evolution in time. This information is necessary to be able to react quickly and appropriately to any incident on site.

The operation of the GCC-ITER during 24 hours a day throughout the year allows to immediate detect any incident on the generation installations that are attached to this GCC. In these cases, the GCC-ITER informs the responsible technician as soon as possible, and the rapid resolution of these incidents, minimize the production losses.

At the same time, this operability has been used to obtain other benefits such as the centralization of the monitoring system of the installations that optimizes the available resources, the reduction of the operation and maintenance costs, the control and register of the preventive and corrective maintenance activities, the improvement of the availability and of the grid integration and the increasing of the efficiency of the generating installations.

Finally, since each photovoltaic system has its own singularities, ITER has designed preventive maintenance protocols for each of them, optimizing their requirements with the available resources. ITER is currently responsible for the operation, maintenance and monitoring of 41 MW of photovoltaic installations and over 12 MW of wind power installations.

ITER's Bioclimatic Houses

This urban development was carried out using bioclimatic architecture criteria where the adaptation to the environment and to the climate reduces their effects and the energy consumption used in the conditioning.

The 24 houses that make up the development are energetically self-sufficient due to the use of PV and solar thermal panels. It is, therefore, an autonomous, not pollutant complex provided with open spaces and inspired by ecological principles.

The houses are under constant research. Both the everyday monitoring and the different implementation of systems and materials used in each house are observed regularly.

The development is organized in 3 blocks separated by four streets which branch from the main that come down from the Visitors Centre. The development also has small squares and open spaces where the visitors can relax.

The averaged built surface of each house is between 110-120 m2, with a kitchen, a lounge, 1 or 2 bathrooms and 3 or 4 bedrooms, distributed in one or two floors. All of the designs are different and count with contrasting aesthetic concepts. This makes the development a perfect place for the dissemination of the bioclimatic principles and to raise awareness about the importance of making this principles part of the actual buildings .

Visitors Centre

The Visitors Centre is a project of the architect César Ruiz Larrea, winner of the 25 Bioclimatic Dwelling contest which is, together with the Technological Walkway, part of ITER's dissemination's facilities.

The architect was entrusted to design this bioclimatic building to welcome the visitors to the complex and host some of the projects of the International Contest of the 25 Bioclimatic Dwellings for the Island of Tenerife, along with their monitored results.

The Visitor's Centre expects to draw the visitor's attention to energy matters; the sun as an energy source, traditional energy sources, consequences in the environment, their limited nature, the alternatives existing such as the renewable energies. This information complements those of the Technological Walkway and the ones resulting from the motorization of the Bioclimatic Houses.

The Centre has a conference room with 200 seats with two simultaneous translation cabins and one projection room, two multipurpose rooms, a small gift shop and a cafeteria

Technological Walkway

This installation is an initiative designed, promoted and executed by ITER and the Cabildo of Tenerife which was inaugurated in 1998. The Walkway is an outdoor equipment integrated in a small valley that crosses the Industrial Estate of Granadilla, next to the headquarters.

The Walkway aims to inform the visitors a little more about renewable energies and concepts related to them, such as energy saving, and the rational use of the resources all this framed within ITER´s installations and being an example of real application of this type of energies. This outdoor equipment is provided with practical small scaled elements of the different types of renewable energies. Being outdoors brings the opportunity to interact with the natural resources which are the motor of the renewable energies explained.

The Walkway is located in a small valley, around an artificial stream that starts in a small pond in the head and ends in another one at the bottom. The stream helps to mitigate the climate inconveniences in the valley, reducing the strong winds and the high temperatures by the evaporation effect of the bodies of water and the surrounding vegetation.

The path is a one way tour that runs along the stream allowing everyone to see the different units that compound the walkway without the need of a guide, although guided visits are also available.

The Technological Walkway is organized in separate thematic areas or units. The reason for this distribution is only didactic starting the visit with a general introduction to the energetic problem and the consequences of consuming determined energy resources. The visit continues through specific displays on each renewable energy source and ends with a display aimed at how everyone can participate and get involved in order to contribute to solve the problem

Photovoltaic Installations

ITER Instituto Tecnológico y de Energías Renovables S.A.

Grid connected installations

Isolated installations

Installations in third countries

Photovoltaic Installations

Since its foundation in 1990, the Instituto Tecnológico y de Energías Renovables, S.A. (ITER) has been devoted to the technologic development towards promoting the Renewable Energies in the island of Tenerife (Canary Islands, Spain), fulfilling the directive of the island's government, the Cabildo de Tenerife, who is its main shareholder. Thus, in the field of Photovoltaics, ITER has being installing, operating, maintaining and promoting grid-connected PV plants on a commercial basis in various parts of the island, having installed a total power which nowadays exceeds 42 MW. This is an outstanding engineering and resource management accomplishment which has also caused two very important benefits for the island: On the one hand, it has helped to increase the weight of renewables in the energy balance of the island, thus helping to reduce its external dependence, while on the other has produced a new economic engine, capable of generating wealth and employment in times of crisis.

In order to ensure that these plants are correctly functioning and all their components are performing accordingly with their specifications and, as consequence, guaranteeing the continuity of this type of initiatives in the future, ITER has compromised an important part of its resources in their operation and maintenance.

Grid connected installations

The share of renewables in the primary energy balance in Spain, and in the Canary Islands in particular, is much lower than that the one recorded for in the rest of Europe, mainly due to the great weight that biomass and hydropower have over there. In 2011 the renewable energy resources contributed only 13.0% to the overall energy supply so, if they have to reach a significant contribution, it is necessary to achieve very high rates of growth.

To locally help accomplish this, ITER began in 2005 the installation of photovoltaic plants connected to the grid (either directly owned by ITER itself or acting as an EPC and O&M contractor for third parties) under the philosophy that a large-scale penetration of photovoltaic solar energy, instead of subjecting the grid to undesirable fluctuations, will help stabilize and flatten the consumption curves of the island.

In addition, ITER has focused on the development of an integral management frame by taking into consideration new and more efficient techniques for fabrication, installation and operation, which have reduced the related costs while maintaining the quality standards. Such achievement has brought small investors in the renewable energies market. Thus, for instance, for connecting the PV plants to the grid, the inverters used are of the TEIDE 100 model, a 100kW rated inverter, designed and manufactured by ITER, which have an electronic control system specifically designed to allow the maximum penetration of renewables into the grid, enabling its regulation and stabilization. Thus TEIDE 100 inverters in compliance with the Royal Decree 1565/2010, have achieved the Conformity Certificate of Response to voltage dips, issued by AENOR.

Also, the support structures for the modules have been designed by and produced for ITER. They consist of totally modular and detachable aluminum structures, consisting essentially of pillars, girders and straps, which are bounded either to the ground via reinforced concrete foundations or to any type of roof via bolted-in galvanized steel profiles. The structures are installed adapting the pillars to the topography of the terrain in order to minimize earth moving works. Furthermore, the installations are done minimizing the height required, observing the actual regulation for landscape integration.

Finally, in order to ensure that the PV plants are correctly functioning and all their components are performing accordingly with their specifications, ITER has developed and deployed an automated SCADA (Supervisory Control and Data Acquisition) system, which allows to know their status and, therefore, to react quickly and properly to an eventual malfunction. Since July 1st 2011, the monitoring tasks for all the plants have been centralized at the Generation Control Center (GCC-ITER), a service located at the ITER premises which operates 24x7.

Among the most important projects are:

- The platform SOLTEN I is a solar platform located in the terrains of Granadilla's Industrial Estate. This platform consists of 130 photovoltaic plants of 100kW rated power, connected independently to a low voltage electric grid. Each 100kW plant is owned by different holders and ITER acts as the EPC and O&M party.

- Another success story has been the installation of a 7 MW and a 4 MW plant, both property of Solten II Granadilla, SA, a corporation owned by 308 shareholders, in which ITER, besides being co-owner, acts as the EPC and O&M party.

Grid connected installations owned by ITER

Name	Rated power	Location	Inverter	Puesta en Marcha	Module manufacturers	No. of modules
SOLTEN I	13 MW	Granadilla	Iter Teide 100	April 2006	Kyocera, Starworld, Iter, Sharp, Yingli y Deiko	82.206
SOLTEN II	11 MW	Granadilla	Iter Teide 100	By phases: December 2007, June 2008, August 2008	Kyocera, Starworld, Isofotón, Sharp, Yingli y Deiko	69.087
Finca Verde	9 MW	Arico	Iter Teide 100	July 2008	Sharp	53.380
Finca Roja Fase	5 MW	Arico	Iter Teide 100	September 2008, May 2012	Sharp	30.030
Edifico D-ALiX	400 kW	Granadilla	Iter Teide 100	2013	ITER	2.520
Bodega Comarcal Tacoronte	200 kW	Tacoronte	Iter Teide 100	December 2012	ITER	1.218
Mercatenerife	100 kW	Santa Cruz	Iter Teide 100	September 2008	Kyocera	616
Planta Piloto	100 kW	Granadilla	Iter Teide 100	January 2006	Kyocera	646

Third parties installations

Name	Rated power	Location	Inverter	Puesta en Marcha	Module manufacturers	No. de modules
Loro Parque Fase II	1 MW	Arico	Iter Teide 100	March 2011	Conergy	5.106
Metropolitano	880 kW	La Laguna	Iter Teide 100	September2008, January 2009	ITER y Chaory	5.432
Mercasa	100 kW	Santa Cruz	Iter Teide 100	September 2008	Kyocera	616
Orquidario	80 kW	La Laguna	Iter Teide 100	September 2008	ITER	504
Casa del Ganadero	17 kW	La Laguna	Iter Teide 100	September 2008	Solarworld	114
Helechos de Cuero Tenerife	20 KW	La Laguna	SMA STP 10000TL	September 2012	ITER	144
Vivienda Los Realejos	9 kW	Los Realejos	SMA SB 3000TL	March 2012	ITER	60
Vivienda Radazul II	4,6 kW	El Rosario	SMA SB 5000TL	December 2012	ITER	30
Vivienda Radazul I	2,7 kW	El Rosario	SMA SB 3000TL	May 2008	Kyocera	18
Vivienda La Laguna I	2,7 kW	La Laguna	SMA SB 2500	September 2008	Solarworld	20

Isolated installations

ITER's Photovoltaic department has developed a series of photovoltaic kits for the electricity supply in isolated installations. These kits are designed to meet the needs of domestic consumption at three levels: basic, moderate and intensive. Thus, the market segment of homes without access to the distribution grid or customers that require independent and autonomous energy supply has been covered.

The main characteristics of these kits are:

- The kits are Pre-assembled in ITER, so that its installation is very simple and can be performed in a short period of time. The support structure is also made by ITER ensuring their maximum reliability and performance.
- They are custom designed according to the specific needs that are to be must be met. The kits can include both photovoltaic and wind generation.
- For the energy storage, the kits use GEL or AGM batteries to minimize their maintenance.
- The kits are optimized to obtain the maximum utilization of solar energy, equipped both with maximizers and state of the art inverters.

Third party isolated installations

Name	Rated power	Location	Inverter	Accumulation	Autonomy	Module manufacturers	No. of modules
Home installation and farm La Laguna	1,4 kW	La Laguna	Xantre X XW4024	24 V / 786 Ah	2 days	ITER	8
Home installation Adeje	1 kW	Adeje	Victro N3024	24 V / 400 Ah	2 days	ITER	6
Home installation Santa Úrsula	0,7 kW	Santa Úrsula	Victro N1200	24 V / 140 Ah	1,5 days	ITER	4

Installations in third countries

As part of its international cooperation projects, ITER has executed several renewable energy installations, mainly photovoltaic ones, in other countries. In most of these projects, ITER has been is responsible for the onsite technical assessment, the design of the installation, the provision of the necessary materials and the development of the educational and training materials for the local companies that were selected for the final installation tasks. Subsequently, ITER performed the validation and monitoring of the installations. These facilities were designed specifically considering the peculiarities of the energy supply and consumption in each country / region.

Installations in third countries

Name	Type	Rated power	Location	Inverter	Accumulation	Autonomy	Photovoltaic modules
Civil registry Sor	Self-consumption and backup	3,465 kW	Saint Louis - Senegal	SMA SB - 3000 TL + SI 5048	48V/465Ah	1 day	21xITER
Civil registry Engalele	Self-consumption and backup	3,465 kW	Saint Louis - Senegal	SMA SB - 3000 TL + SI 5048	24 V / 400 Ah	1 day	21xITER
MACSEN-PV project	Grid connection and backup	3,15 kW	Dakar - Senegal	SMA SB - 3000 TL + SMA SBU	24V/875Ah	4.2 h	18xITER
Ranerou project (Fordou)	Isolated system	1,17 kW	Ranerou - Senegal	Studer	12V/730Ah	3 days	9xITER
HYRESS project	FV-eólica Mini-grid	7,6 kW	Ksar Ghilène - Túnez	2xSMA SB3300 + SMA WB2500 + SMA SI5048	48V/3000Ah	1 day	36xKyocera

Wind Installations

ITER Instituto Tecnológico y de Energías Renovables S.A.

2,83MW Experimental Platform

4,8 MW Wind Park

5,5 MW Wind Park

New Wind Parks

Monitoring, Operation and Maintenance of Wind Parks

Wind installations

At present, ITER has three active wind parks: the Experimental Platform of 2,86 MW, the Made Park of 4,8 MW, and that of Enercon of 5,5 MW. All of them are to be repowered and three new wind parks that obtained power in the last contest summoned by the Government of the Canary Islands will be installed shortly

2,83 MW Experimental Platform

The Experimental Platform has produced a total of 74 GWh since its installation in 1990.

The experimental Platform was financed with the cooperation of several organizations (Cabildo de Tenerife, the Canary Islands Government, UNELCO and the European Union). It was installed with the aim of testing the performance of different wind turbines, regarding their origin, manufacture and technology. In total the Platform has 2.83MW of nominal power. The park consists of 9 wind turbines, installed between 1990 and 1993, with powers that go from 150 - 500 kW. Each wind turbine uses different technologies: horizontal and vertical axis turbines, fixed and variable pitches, synchronous and asynchronous generators. They show outstanding differences in diameter and height as well: diameters between 25 and 40 meters and heights between 25 and 42 meters. Nowadays, the rated power of the platform is of 1,8MW.

As provided in the Order of October 6th, 2004 of the Industry, Commerce and New Technologies regional Ministry of the Canarian Government, which establishes the technical and administrative conditions for the repowering of the current parks, ITER and ECYR have signed a cooperation agreement for the repowering of the above mentioned wind turbines. The repowering will allow the maximization of the wind's potential in the area by substituting the obsolete technology for new one, installing one single Enercon wind turbine of 200 kW, type E-70.

4,8 MW Wind Park

The MADE Wind Park has produced a total of 165 GWh since its installation in 1996.

The 4.8 MW wind park was installed in 1996 by the association of Economic Interest "EÓLICAS DE TENERIFE", a partnership shared by ITER (50%), MADE and UNELCO and subsidized by MINER. At the beginning, the park consisted of sixteen MADE AE-30 wind turbines, each one with 300 kW nominal power, that were replaced in 1999 by eight wind turbines MADE AE-46 of 600kW each.

As provided in the Order of November 15th, 2006 of the Industry, Commerce and New Technologies regional ministry of the Canarian Government, which establishes the technical and administrative conditions for the repowering of the current parks, Eólicas de Tenerife has requested the administrative authorization and approval of the project for the repowering of the Granadilla III Wind Park, by means of replacing the existing wind turbines by four wind Enercon turbines type E-82 .

5,5 MW Wind Park

The Enercon Wind Park has produced a total of 175 GWh since its installation in 1998.

This 5,5MW park was an ITER's self-financed project that was installed in 1998. It consists of eleven ENERCON E-40 turbines with 500 kW of nominal power. The estimated annual energy production is of 16, 5 Gwh.

The Art. 7 of the Decree 53/2003 of 30 April, which regulates the installation and operation of wind parks in the area of the Canary Islands, allows the unit capacity increase of wind turbines by replacing them by new ones, This increase is allowed up to a limit of 50% of the total power of the wind turbines replaced.

Within this frame, the current park will be repowered and substituted by a 9,75 MW (5 ENERCON E-70 of 2 MW each) in the Granadilla industrial estate

New wind parks

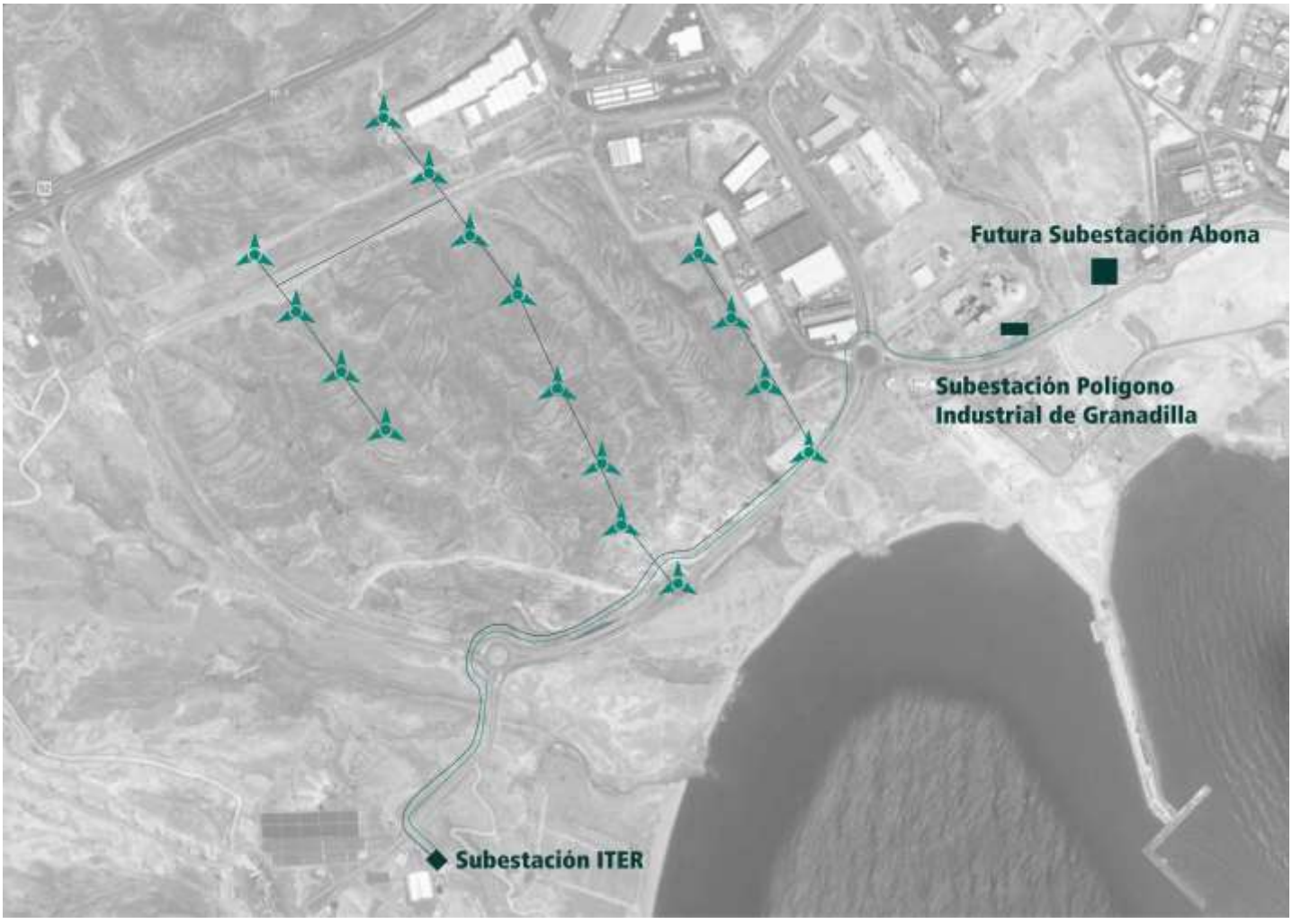
The Order of April 27th of the General Directorate of Industry published in the BOC Nr. 89, announced on May 4th 2007, a public contest to assign power in the category of new wind park installations appointed to inject all their energy in the insular electric systems.

The wind parks allocated to ITER are:

Wind Park of the Complejo Medioambiental de Arico, with a power of 18.4 MW, to be installed in the Municipal Term of Arico and promoted by ITER.

La Roca Wind Park with 18.4 MW, to be installed in the Municipal Term of Granadilla, promoted by the Economic Interest Group "Parques Eólicos de Granadilla", of which ITER is part.

Areté Wind Park, with 18.4MW, to be installed in the Municipal Term of Granadilla, also promoted by the Economic Interest Group "Parques Eólicos de Granadilla".



Monitoring, Operation and Maintenance of Wind Parks

During the year 2013 the ticketing system was implemented permanently with support of ITER´s control center. This system is a mechanism that records any event observed in the monitoring screens. It is based in the Wondeware software which offers a flexible tool to centralize the monitoring of several facilities at a time such as the wind parks. This way all the electric generating plants are monitored 24 hours a day minimizing the time of action in case of failure and offering a history of incidents.

With the entry into force of the Royal Decree 1/2012 which establishes the end of the efficiency compensations and the complements for reactive power, the Made 4.8 MW Wind Park needed a reform of its reactive power compensation system. Condensers with a higher capacity were installed to reduce the generation of reactive power, avoiding the economic penalty. Furthermore, new maintenance ranges were applied to the 4.8 MW Wind Park. Preventive maintenance was updated paying particular attention to those elements that are most likely to break down over time.

Improvements were made regarding the management of the hazardous waste generated at the wind parks, increasing the security level regarding their handling and storage.

Renewables

ITER Instituto Tecnológico y de Energías Renovables S.A.

Project Drafting of Renewable Energy Installations

ITER's Photovoltaic Module

Testing Ground for Prototypes

Solar Plane Power plant tests in the Wind Tunnel

HELIODRON Project

PRONTAS Project

Collaboration with the University of La Laguna for Smart Grids

UVSiTE Project

QuatumOrg Project

Wind Tunnel tests of the PERIGEO project

ISLA RENOVABLE Project

Fotosil Project

Design and Development of a Renewable Energies Demonstration Technology Unit

MACSEN-PV Project

Island 100 Concept

Meteorological Stations

Weather Forecast

Euro-Solar Programme

Renewables

One of the main activities of the ITER group is the development of R&D projects in the area of Renewable Energies.

Most part of the projects aim to improve the technologies and processes to obtain energy from the most important renewable energy sources. The accomplishment of projects focused in international cooperation is worth being mentioned. These projects seek to introduce renewable technologies in electrification systems in isolated regions, contributing to improve the living conditions of the local population in developing countries .

Project Drafting of Renewable Energy Installations

The experience in renewable energy facilities acquired in the past two decades makes ITER an expert in project drafting and subsequent implementation.

ITER elaborates projects both for PV installations, as for wind farms, counting with three executed wind farms, the approval of several projects to repower the parks and more recently the approval of three projects submitted to the last contest of power allocation of the Canary Islands Government.

In the area of photovoltaic energy, ITER has been responsible for the installation of over 41MW in the last six years.

Enhance renewable energy installations on the islands, and therefore increase the increase the share of electricity generated from renewable energies, is one of the main objectives of ITER

ITER's Photovoltaic Module

ITER manufactures photovoltaic modules both for its own use and on request. The technology used by ITER makes possible the production of mono and multi crystalline solar panels with an energy conversion efficiency of 13,5%. To offer the maximum protection in the worst environmental operation conditions, the cells are capsuled between a tempered glass and EVA, and a TPT back sheet.

The laminated end product is fitted into an anodized aluminium structure to provide structural resistance and to make its installation easier.

The characteristics of this module give great versatility, being the ideal candidate for grid-connected photovoltaic applications, as well as isolated photovoltaic installations.

These photovoltaic modules are designed and certified according to rules IEC61215, IEC61730-1, IEC61730-2, CE.

Testing Ground for Prototypes

ITER has a test area attached to the engineering warehouses, which is dedicated to the study of the performance and the validation of photovoltaic prototypes in normal working conditions. This area is available for research and development projects that can either be from the institute or not. This area is specially prepared for the installation of different types of structures, power outlets to both supply and evacuate energy from and to the grid and a communication network that enables the take in and storage of data of the performance of the prototypes.

Thus, in this area, performance tests for PV modules of crystalline silicon cells, amorphous silicon, cadmium telluride and CIS has been carried out by installing them on fixed structures or with single or dual axis tracking systems. Also, optical concentration systems have been tested. During 2014 this area will be used to test a concentration photovoltaic prototype sheet for standard modules.

Solar Plane Power plant tests in the Wind Tunnel

ITER´s wind tunnel has held solar aircraft powertrains tests. The aim has been to design a suitable test methodology propeller and engine assembly, in order to characterize their behaviour as well as the influence of the wake of the propeller on the wing. Four configurations of the helix, with different angles of attack, and various wind speeds were tested. The results were quantified using the pressure coefficient and the power coefficient as a function of the advance ratio and the Reynolds number (Re), having the rope sections of the wing as the characteristic length.

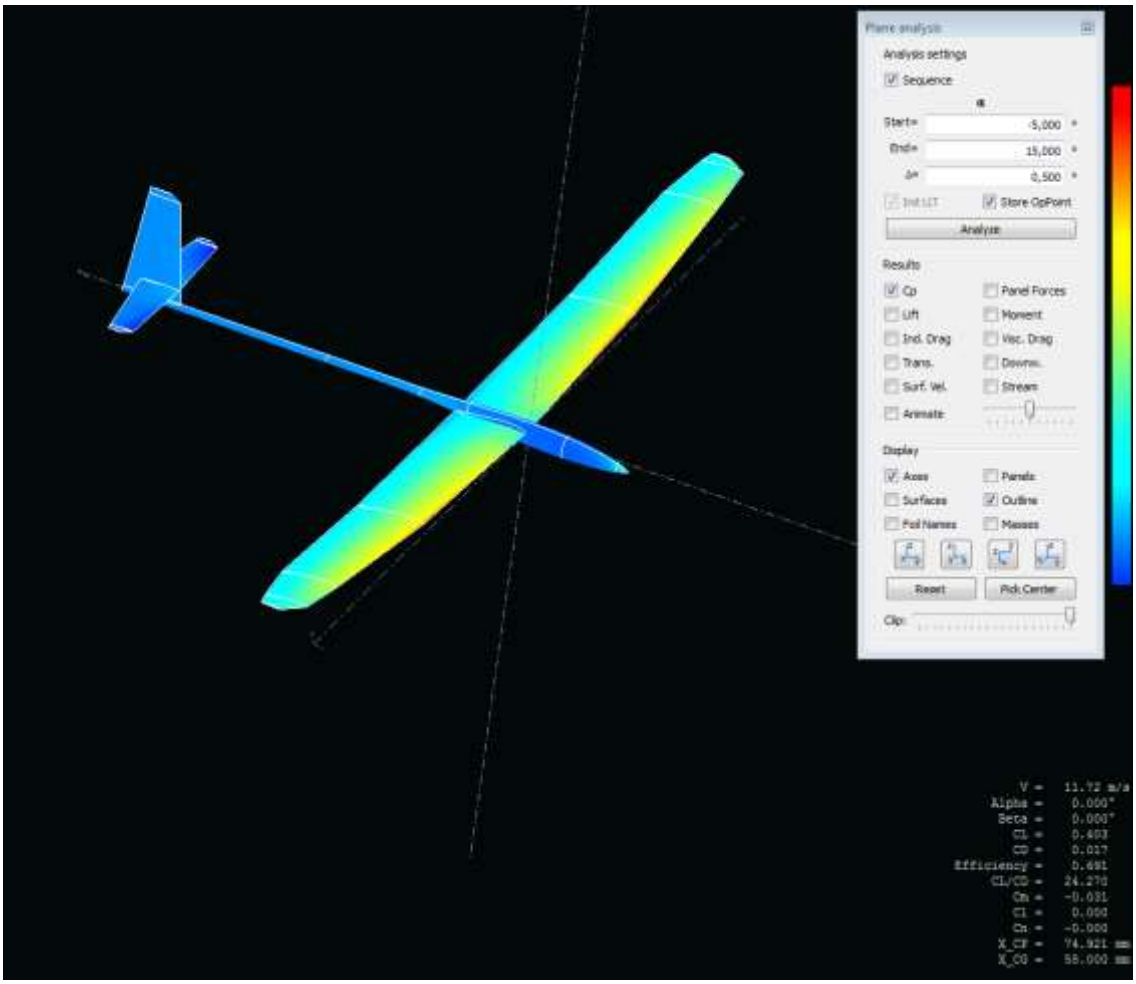
HELIODRON Project

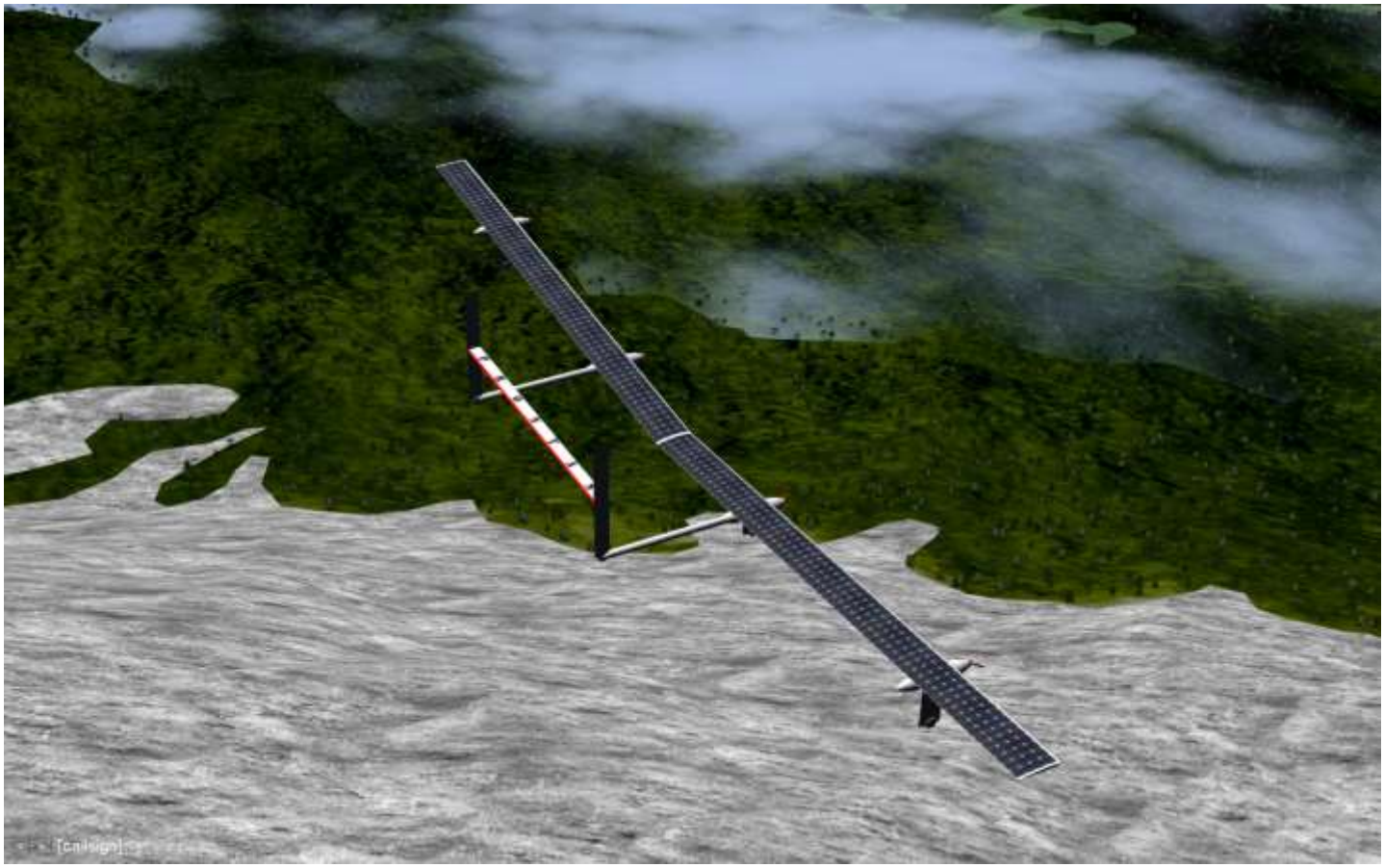
This project is the continuation of the PROAVISOL project funded by the Canary Islands Agency of Research, Innovation and Society of the Information (ACIISI) in 2009. The result of this project was a prototype of a solar plane with a 6.4 m wingspan.

Continuing this line of research, ITER is involved in the design and manufacture of a small solar-powered aircraft called HELIODRON developed and financed with own funds. Its small size, 3 meter wingspan, is a limiting factor by which their autonomy is not unlimited and can only fly about three hours after sunset. Its functionality is similar to those of a larger aircraft but with sensors with less performance, size and weight. The advantage of using this smaller aircraft lies in the rapid deployment and portability that speeds decision-making in case of disaster, and the preliminary low cost analysis of in the case of collecting scientific data.

The main obstacle of these projects has been obtaining the required permissions to perform test flights in height, and therefore the aircraft has only been tested in prototype conditions. The Experimental Special Airworthiness Certificate process has been suspended by the Directorate General of Civil Aviation until specific regulations for remotely piloted aircrafts is developed, which is expected to be published in the first half of 2014.

However, test flights below 300 meters have continued to be conducted allowing improvements in the autonomous navigation system, which is now fully implemented and operational. This navigation system is the same as that used in the PRONTAS project currently underway.





PRONTAS Project

This project is the continuation of the Study of Viability for the Development of a Solar Plane, financed by the Ministry of Industry, Tourism and Trade within the frame of the National Plan of R+D+I 2008-2011; and of the construction of a smaller prototype financed by the Canary Islands Agency of Research, Innovation and Society of the Information. After the success of these two previous steps, the Ministry of Science and Innovation has awarded a grant to ITER, the Technical University of Madrid and the company Aernnova Engineering Solutions for the development of the solar plane. The total cost of the project is 1.400.000 Euros and it will be co-financed by the Ministry with 1.000.000 €. ITER acts as leader of the project.

The aim of the project is to build a solar plane, capable of flying autonomously and for indefinite time, using only solar energy, and developing different types of predefined scientific, institutional or commercial missions. This plane is thought to carry out vigilance tasks, rescues, environmental protection, communications in case of emergencies, materials research or urban development and geographical control.

The project started in 2011 and lasted 3 years. During the year 2013 the final configuration of the aircraft was defined and the production of the three prototypes could start. The solar panels that will cover the wings have been laminated using the same technique as in the previous projects and are ready for their assembly when the first prototype is received. Similarly, the energy storage system of the aircraft has also been developed, including the four battery modules with the wiring and chargers required for each of them. These modules have also been developed and manufactured by ITER. Throughout this year, the power system of the aircraft has been assembled. This system is made up of four groups each consisting of an engine, a propeller and a drive and have been tested in ITER´s wind tunnel to observe their behaviour and measure the thrust developed by the system.

This year, the solar aircraft PRONTAS has performed its first virtual flight with a flight simulator developed by the Polytechnic University of Madrid (UPM) work group. This simulator allows the aircraft to be tested in different scenarios, such as unfavourable weather conditions, as an essential previous step to the real flight.

Collaboration with the University of La Laguna for Smart Grids

Durante During 2013 ITER has signed a collaboration agreement with the Department of Systems Engineering and Automation and Architecture and Computer Technology of the Higher Technical School of Industrial and Civil Engineering of the University of La Laguna (ULL) for the preparation of projects' proposals. Within this agreement, ITER and ULL submitted the proposal "Modelling and Simulation of the existing actors in a Smart Grid" to the call for proposal 2013 of FECYT.

The main objective of this collaboration is to develop a tool for modelling and simulation of intelligent electric grids (Smart Grids), where ITER's wind energy department acts as technical adviser on renewable energy. A second collaboration between ULL and ITER is expected for the use of computational hours of the supercomputer Teide HPC.

UVSiTE Project

Based upon results obtained in previous projects, the UVSiTE Project, funded by the 2013 Call for Research Projects by CajaCanarias Foundation, involves manufacturing conventional silicon cells and modules, integrating a new down converting photo-layer for UV radiation, instead of incorporating it in the semiconductor structure.

The project UVSiTE is financed by the 2013 Call for research projects of the CajaCanarias Foundation. Based on the results obtained in previous projects, this project aims to manufacture and integrate in cells and in conventional silicon-based photovoltaic modules, a new type of downconverting photolayer for UV radiation, rather than a UV downconverting photolayer in the semiconducting structure.

This process will allow the capture of high energy photons, in order to increase the quantum efficiency at certain wavelengths. Of course, this will be done considering the production costs, the product durability and the waste generation, both during its manufacture and at the end of its life.

This three-year long project is being carried out in collaboration with the University of La Lagun and will end in December 2016.

QuatumOrg Project

The Quatumorg Project "Development and application of new manufacturing process of third generation photovoltaic cells by means of nanocrystals and organic molecules", is financed by the Ministry of Economy and Competitiveness, within the National Scientific Research, Development and Technological Innovation Plan, 2008-2011, Subprogram of Scientific-technological Actions in the Scientific and Technological Parks (IMPLANTA 2012).

Among the possibilities for the improvement of photovoltaic cells based on silicon, ITER researchers are conducting a series of analyzes on the concepts of third generation photovoltaic cells manufacturing.

In order to improve the efficiency of the photovoltaic cells, there exist new concepts to manufacture more efficient low cost silicon PV cells. These concepts are included in what it has been called third generation solar cells, among which we could highlight the modification of the distribution of the photon energy before the absorption in a solar cell by means of photo luminescent ions. As result of these investigations, new ways and manufacturing processes have been found that can be very interesting in order to reduce the ratio cost/efficiency.

The general aim of the project is to manufacture more efficient low cost silicon PV cells therefore it will deepen in the manufacturing concepts of the third generation cells, in order to improve the absorption of photons and obtain more efficient emitters.

Also, the application of new concepts of the union of nanostructures with organic polymeric materials that some authors have begun to call "Fourth generation cells" will be one of the priority areas that will be addressed in this project.

Wind Tunnel tests of the PERIGEO project

Several tests of the PERIGEO project were carried on in the wind tunnel during the year 2013. This project focuses its research on solving technological challenges of four scenarios of space missions such as Earth observation, interplanetary flight close to celestial bodies (asteroids, comets ...), atmospheric flight and safe and accurate descent and landing for planetary exploration.

The tests that have been developed in ITER´s wind tunnel have been aimed at the study of the behavior of advanced aerodynamic configurations for missions on celestial bodies in atmospheric conditions.

ISLA RENOVABLE Project

This project is funded by the Spanish Foundation for Science and Technology and has the participation of the Tenerife Energy Agency. The aim of this project is to spread the importance that renewable energies have in island territories due to the singularities associated with the isolated electric systems, which make them completely different from those territories which are electrically interconnected. The energy management is of vital importance in any electric system, but especially in isolated systems where the connection with other electric system cannot be used to enhance the stability of the system.

Isla Renovable aims to bring the technologies associated with the renewable energy generation closer to the non-specialized population, as well as the factors that determine their maximum penetration level in the electric system and the environmental and economic benefits that their use has on island territories.

To achieve this goal, an interactive simulation game will be designed and implemented as a mobile application with versions in Spanish and English. This application will be available for both Android and iOS devices, thus reaching the 90% of the mobile market share.

FotoSil Project

The FOTOSIL project is financed within the Subprogram of Scientific - technological Actions in the Scientific and Technological Parks (IMPLANTA) of the Ministry of Science and Innovation. The project began in 2011 and finished in 2013.

In order to improve the efficiency of photovoltaic cells, there are new concepts to perform more efficient cells. These concepts are included in what has been called third generation photovoltaic cells, among which we would highlight the changes in the distribution of photon energy by absorption in a solar cell, by using photoluminescent ions.

As a result of these investigations, new ways and processes regarding the reduction in the cost / efficiency ratio have been found.

Third generation cells technology has been used in this project in order to enhance the absorption of photons and to obtain more efficient emitters. This has been done developing manufacturing processes for high efficiency solar cells that simultaneously reduce the production costs, studying the behavior of photoluminescent materials such as rare earth elements and silicon nanostructures to act together as photoconverters. The following research areas will be studied in the frame of this project:

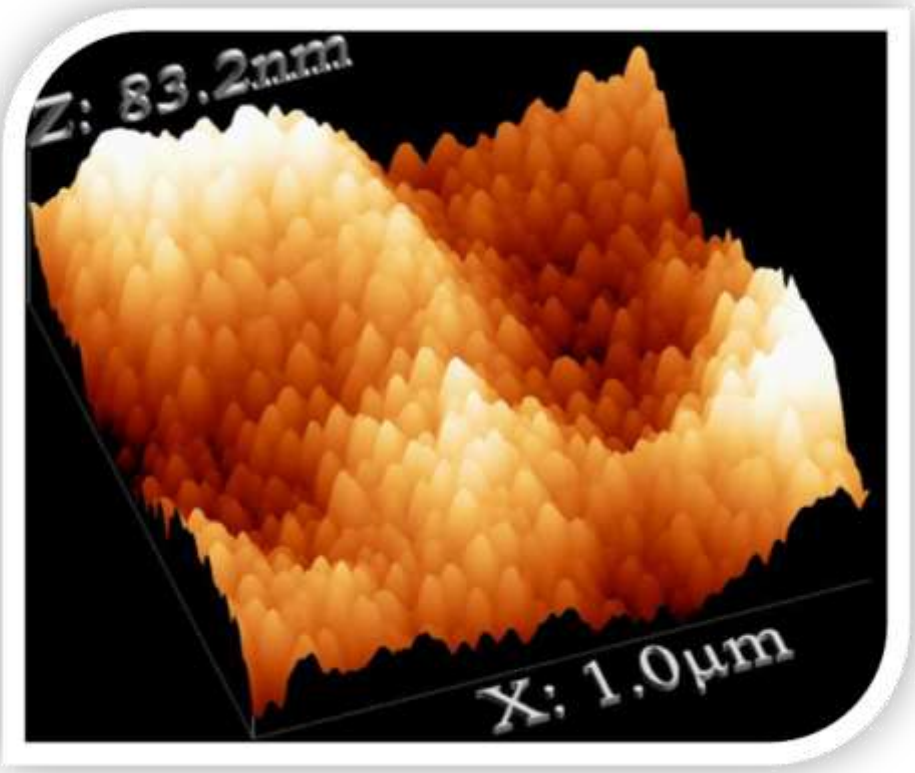
The change in the distribution of the photon energy before the absorption in a solar cell: "Down shifting", "Down conversión" and "Up-Conversion "processes.

The use of materials or cellular structures that incorporate different band-gap.

The reduction of losses due to thermalization

Hot carrier solar cells.

The impact ionization of solar cells.



Design and development of a Technology Unit for renewable energy Demonstration

ITER, aware of the importance of the dissemination of renewable energies and the role that technological infrastructures can play in the training field, it has designed and developed a Technology Unit for Renewable Energy Demonstrations. This unit is intended to be a teaching tool to help teachers in the theoretical and practical training in the field of renewable energies.

The Renewable Energy Technology Unit is used as a didactic equipment for the demonstration of different types of renewable energies in isolated and / or integrated to the network conditions. It includes the following components:

Photovoltaic solar energy module.

Small wind energy module.

Mini-hydraulic energy module.

Energy consumption module.

This unit is equipped with all the necessary control devices to help students learn during the demonstration. The unit allows to experiment, at small scale, multiple operation scenarios, thereby, allowing a big range of practices in a short period of time.

MACSEN-PV Project

This project, financed by the European Programme MAC 2007-2013, was conceived as a platform for technical cooperation between the Canary Islands and Senegal in the field of the integration of renewable energies in the power supply. The project started in October 2010 and finalized in June 2013. Its main objective was to improve the capacity of public authorities and local technicians to support the implementation of renewable energies as part of the power supply in these regions. Its milestone was the installation of the first PV system connected to the grid in Senegal. The project was leaded by the ITER and had the following partners, the Tenerife Energy Agency (AIET), the Senegalese Agency for Rural Electrification (ASER) and the Centre for Studies and Research on Renewable Energy (CERER).

During the first stage of the project, a series of sectorial evaluations were carried out along concluding in 12 energy system analysis reports. This work allowed to identify the availability of resources, the forecasts of the energy demand, the existing legislation, the main needs and the training lacks existing in the RES field in Tenerife and in Senegal. As a result of the findings of these previous reports, various capacity building actions were carried out, such as the elaboration of materials and tools aimed at public-sector managers and technicians and also at teachers. In particular, the materials developed were: the handbook "Guide for energy planners about RES integration into the grid", a collection of 16 "Teaching supporting materials for secondary and university teachers", and a Teaching Supporting Video for teachers "Training itineraries of ITER's RES installations". These materials were specifically distributed among the beneficiaries during the technical workshops organized in Tenerife and Senegal for public-sector managers/ technicians and for teachers. In addition, one online Advisory Office, containing the collection of elaborated materials, together with other documents, links and tools of interest, was developed in the Web page of the project: http://macsen-pv.iter.es.

The main outcome of the project is the 3 kWp PV mixed plant installed in CERER´s headquarters in Dakar. This installation, inaugurated by Senegalese and Tenerife Island government's officials on December 2012, was connected to the conventional Senegalese electricity grid on April 2013, being a milestone in the development of RES in Senegal, being the first renewable facility to be connected. Beside this, the project promoted the creation of a "National Scientific Committee for Renewable Energy Systems integration into the Senegalese Grid", headed by the Senegalese Ministry of Energy. This Committee defined the required procedures needed to connect this PV installation to the grid, but it's intended to be a permanent. The Committee will be decisive for the development of effective regulatory and legislative frameworks for renewable sources in Senegal, and it will have ITER´s support and advice.

The PV installation is nowadays being used as a demonstration platform and internship for local technicians managed by CERER. For this reason, its design was adapted specifically taking into account the peculiarities of the Senegalese grid, and in order to maximize its demonstrative and educational use.

The enormous visibility and recognition reached by the project must be highlighted, appearing in more than 200 media releases and presented in more than 45 international events. Furthermore, the project´s results have been published in 3 international scientific publications.

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Island 100 Concept

The Island 100 computer model developed by ITER some years ago has continued with gradual modifications to include other renewable supply sources as well as storage. Furthermore the model has been standardized allowing the addition of any energetically isolated scene for its analysis.

Besides improving the model to refine its operation and increase its speed, new variables (including conventional minimums and areas with different renewable potential) have been introduced.

A specific model for the island of Tenerife has been developed that includes all the conventional power installed in order to model and verify the operation of the model with the actual results of the energetic behavior of the island.

Meteorological Stations

ITER has several meteorological stations located in different parts of its facilities, from which ITER obtains important information required for the wind resource and solar radiation studies. In order to have a proper historical weather data recompilation, constant maintenance efforts are made to have the stations and sensors working properly.

During 2013 the webpage http://www.climatenerife.iter.es was made available to the public, having access from ITER´s website. This website shows the instantaneous values measured by the weather stations, as well as graphs with the values measured in the last 24 hours and other details of ITER´s weather stations. Works are also going on to make historical weather data gathered by ITER´s Tower Station available to the public.

Weather Forecast

Weather forecasting is a very important tool when dealing with renewables; therefore, ITER has continued working to improve the Institute's weather forecasting system. Changes were made so that now the forecasting is done with the WRF model ("Weather Research and Forecasting Model") that has updated applications with more efficient tools for the selection of domains, wind prediction, graphical outputs, etc.

Having successfully implemented the WRF weather prediction model to obtain predictions of local wind and other meteorological variables, preparatory works have been going on to move the model to the new supercomputer installed at the end of 2013, resulting in more storage capacity for the resulting data and greater computing power for meteorological model simulations. Parallel studies were performed to compare the data obtained with the prediction model and actual data gathered from several of ITER´s weather stations to tune the model. Moreover, with the help of the IT department, an internal-use interface called Argestes has been developed to manage and easily access the park´s generation prediction data.

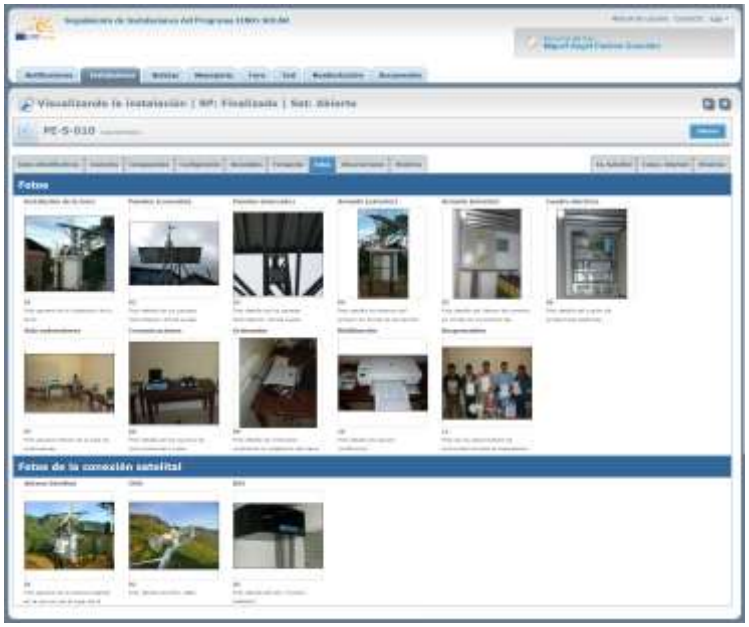
Euro-Solar Programme

This project involves the installation of 600 electricity generation kits using 100% renewable energy sources in eight South American countries: Guatemala, El Salvador, Honduras, Nicaragua, Ecuador, Peru, Bolivia and Paraguay. The objective of the programme is to contribute to the sustainable development of isolated communities by the use of renewable energies. ITER has participated in the activities of the project from the start.

Using the web application developed in the previous years, ITER has supervised both the installation of the kits as well as the internet connection systems in the communities involved in the program. The administrative closure of the EURO-SOLAR Programme was done during the year 2013 although the management web application is still active (http://eurosolar.iter.es).

In addition, in June, ITER presented the lessons learned during the development of the activities of the EURO-SOLAR Programme on the 3rd symposium on small power photovoltaic applications and rural electrification. The event, organized by the Institute for Technology Transfer in the region of Bavaria (OTTI), was held on the 17th and 18th of June in the city of Ulm in Germany and was attended by over 150 experts and representatives from each one of the continents. Also, the presence at the symposium was also used to make contacts and promote synergies with projects of interest to both ITER and future collaborations.

ITER conducts an ongoing work with the visibility of the programme, locally, nationally and internationally. ITER has an area dedicated specifically to the EURO-SOLAR programme where the prototype facilities can be visited and learn in detail about their designed and implementation.



Sustainable Architecture

ITER Instituto Tecnológico y de Energías Renovables S.A.

Renewable Energy Integration in Buildings

Design Patterns: Contrasted Comfort

Monitoring, Management and Control System of the Bioclimatic Houses

Sustainable Architecture

Continuing with the existing research lines, ITER has encouraged the sustainable building, conscious of the importance of developing architectural technologies that allow to design and to construct buildings in tune with the climate, the local geomorphology, the vegetation and the water, so that the energetic consumption is reduced and the thermal comfort increases. In a parallel way, the group also takes part in projects that promote the energy saving at home and help to obtain a more sustainable island

Renewable Energy Integration in Buildings

Following this line, ITER works mainly in two fields: the evaluation of buildings energy performance and the design of renewable energy installations.

The evaluations of buildings energy performance are made by simulations or real working conditions throughout the implementation of inside and outside sensors for its later monitoring and interpretation. Once the evaluation has been made, we will proceed to disclose the energetic functioning of the different buildings to contribute in the users and group consciousness.

A new research line has begun in coordination with different Universities to implement the energetic evaluation also in the urban space, uniting comfort, urban geography, social development and I design.

The design of renewable energies includes their integration in buildings optimizing designs, energy models and elements used in buildings, defining models to integrate passive and active solar energy strategies in small and big scale. A new line has been implemented to integrate these kind of installations in historic town centres without interfering or decreasing their cultural value. Research is also going on regarding big renewable energy installations, optimizing the integration techniques, planning and building.

Design patterns project: Contrasted comfort

The project "Design Patterns to optimize energy consumption and sustainable energy generation in single-family housings in warm climates" that aimed to create exportable design pattern, which could be used in other regions with similar climate, was developed with the co-financing of the Department of Science and Innovation within the National Program of Applied Research Projects. The results of this project are now being contrasted in real situations.

Design patterns are compared taking into account the basic parameters in conjunction with other factors that influence the perception of comfort such as: the circumstantial parameters such as the activity, the clothing and the average time spent in the environment; the physiological parameters such as the age, the gender and other personal characteristics; and the psychological and sociological parameters such as the expectations, the social status and the nationality.

Thus, the project demonstrates the feasibility of creating a competitive product based on sustainable architecture solutions. Collaboration and valid results for the investigation are achieved through the continuous occupation of short tourist stays and promoting an interest in energy efficiency in users with availability, based on:

* The variety in the type of users therefore nationality marking usage habits and comfort requirements such as age and family unity. Demonstrating the relationship between the thermal comfort feeling and the psychological expectations for certain thermal environment or climate in which the user lives.

* Results' increased exportability by being parameterized for a wide range of users.

* The inflexibility showed by tourist users regarding the comfort conditions.

* The concept of energy efficiency not as a mechanism that reduces comfort but as a set of systems that properly applied and adjusted provide a greater comfort which adapts to the tourist demands.

Environmental Area

ITER Instituto Tecnológico y de Energías Renovables S.A.

CHALPATAN Project

Ocean Island Basalt-CO2 Project

BIOKO Project

Makavol Project

HELIO Project

OVCV-UNICV Project

GEOTHERCAN Project

HELIO-EXPLORA Project

KAZAN-GAS Project

MUONES Project

CUEVA DEL VIENTO-RADON Project

Environmental Area

The scientific works developed within this field are basically related with the reduction of the volcanic risk, the research of underground water resources in volcanic islands, analysis and evaluation of atmospheric pollutants using optical remote sensors, exploration of geothermal resources using and applying geochemical methods, and the prediction of earthquakes by means of geochemical and hydrological methods.

CHALPATAN project

A volcanic, geological and geochemical exploration study for the geothermal prospecting in Ecuador was carry out in the frame of this project. These works are part of the "Pre-feasibility study of the integral geothermal model of the Chalpatán caldera (Ecuador)" that the Republic of Ecuador has recently granted to the company Compañía General de Ingeniería y Sondeos, S.A. (CGS), through the National Institute of Pre-investment and under the specific agreement signed between INVOLCAN and GCS, by which INVOLCAN leads and performs the work of geology, volcanology and geochemistry for the future geothermal exploration of the Chalpatán caldera. The aim of this project is to test the existence of this potential energy resource, through the development of the geothermal conceptual model of Chalpatán to later identify the location of the most suitable areas for conducting temperature gradient drills. These studies imply complementing the geologic study and the analysis of the geochemical, geophysical and hydrogeological characteristics to define the model and the location of the exploration wells. As from the year 2008, the Government of the Republic of Ecuador resumed the researches related to this energy resource by means of the "Geothermal Utilization Plan" elaborated by the Ministry of Electricity and Renewable Energy (MEER) in order to produce clean and renewable energy to lower the dependence on fossil fuels, reduce the environmental vulnerability and change the actual Ecuadorian energy mix. Some important areas for geothermal exploration were identified in the frame of this plan, including the area of Chalpatán.

Ocean Island Basalt-CO_2 project

The purpose of this project, financed by the Canary Islands Agency for Research, Innovation and the Information Society (ACIISI; 2010-2013) is to evaluate the CO_2 diffuse emission as a scientific-technical tool to enhance the surveillance of the volcanic phenomenon. To achieve this, it has been carried out researches on CO_2 diffuse emission from active basaltic volcanic systems in subduction zones (Cerro Negro, Nicaragua) as well as in insular areas (Pico do Fogo in Cape Verde; Teide, El Hierro and Cumbre Vieja in the Canary Islands; Fayal, Furnas, Fogo and Sete Cidades in Azores). The relevance of researching and comparing the CO_2 diffuse emission measurements between these basaltic volcanic systems is due to (1) its location in different volcanic-tectonic environments, and (2) the different eruptive cycles of these volcanic systems. The results of this project will have important consequences for the improvement and optimization of the volcanic surveillance in the Canary Islands.

BIOKO project

The purpose of this project is the improvement of the volcanic risk management in Equatorial Guinea. A scientific and technical cooperation program in the field of the geological risks in Equatorial Guinea will be promoted in the frame of this project funded by the Ministry of Mines, Industry and Energy and INVOLCAN. The Atlantic oceanic islands of São Tomé and Principe, Bioko and Annobon (the latter two belonging to the Republic of Equatorial Guinea) are part of the Cameroon Volcanic Line (CVL), a volcanic belt of more than 1,600 kilometers that extends from the island of Annobón in the Atlantic Ocean along the border region of eastern Nigeria and western Cameroon. Bioko (2,007 km^2), the largest of the islands that make up the Cameroon Volcanic Line (CVL), is located 35 km from the mainland on the continental shelf of Central Africa, and has 3 main volcanic systems: Luba (formerly San Carlos; 2,260 m), Pico Biao or Moka (2,009 m) in the south and Pico Basile (3,008 m) in the north. According to the Smithsonian Global Volcanism Network Bioko Island has been the site of three historic eruptions in 1898, 1903 and 1923; all associated with the volcano Pico Basile.

Makavol project

The Project MAKAVOL is financed by the Transnational Cooperation Program of the European Union MAC 2007-2013 and its main aim is to strengthen the R+D+I capacities for contributing to the reduction of the volcanic risk in the Macaronesia Region. In the frame of this project there have been carried out several actions in the Canary Islands, Cape Verde and Azores that have contribute to evaluate and analyze the volcanic risk in the Macaronesia Region and have provide relevant information for the volcanic surveillance program in Azores. Furthermore, information and educational products have been also elaborated in the frame of this project with the aim of contributing to increase public awareness about volcanic risks.

HELIO project

This Project is financed by the Canary Islands Agency for Research, Innovation and the Information Society (ACIISI), and its main objectives are to contribute to a better knowledge of the structural-volcanic features of the Cumbre Vieja Volcano (La Palma Island) and the Island of El Hierro, together with the improvement and optimization of the volcanic surveillance programme in these islands. These objectives are pursued by means of the evaluation of the space-time variations of the Helium diffuse emission through the surface of the Cumbre Vieja volcano (La Palma Island) and the Island of El Hierro. For achieving these objectives, diffuse degassing studies of Helium gas are carried out through the surface of both volcanic systems. The presence of Helium gas deviances in the surface is mainly linked by the volcanic fluids migration (due to the Helium geochemist features), controlled by the tectonic characteristics of the area. Furthermore, the studies about the Helium isotopic composition in the gases presents in the surface of El Hierro and La Palma are excellent indicators of the contribution of gases from the mantle of these volcanic systems.

OVCV-UNICV project

The aim of this project is to contribute to the strengthen the capabilities of the Volcano Observatory in Cape Verde (Cabo Verde University, 2010-2014), which is a subsidiary unit of the University of Cape Verde (UniCV), in order to contribute to the improvement and optimization of the volcanic early warning system (volcanic eruptions and seismic-volcanic crisis) in Cape Verde.

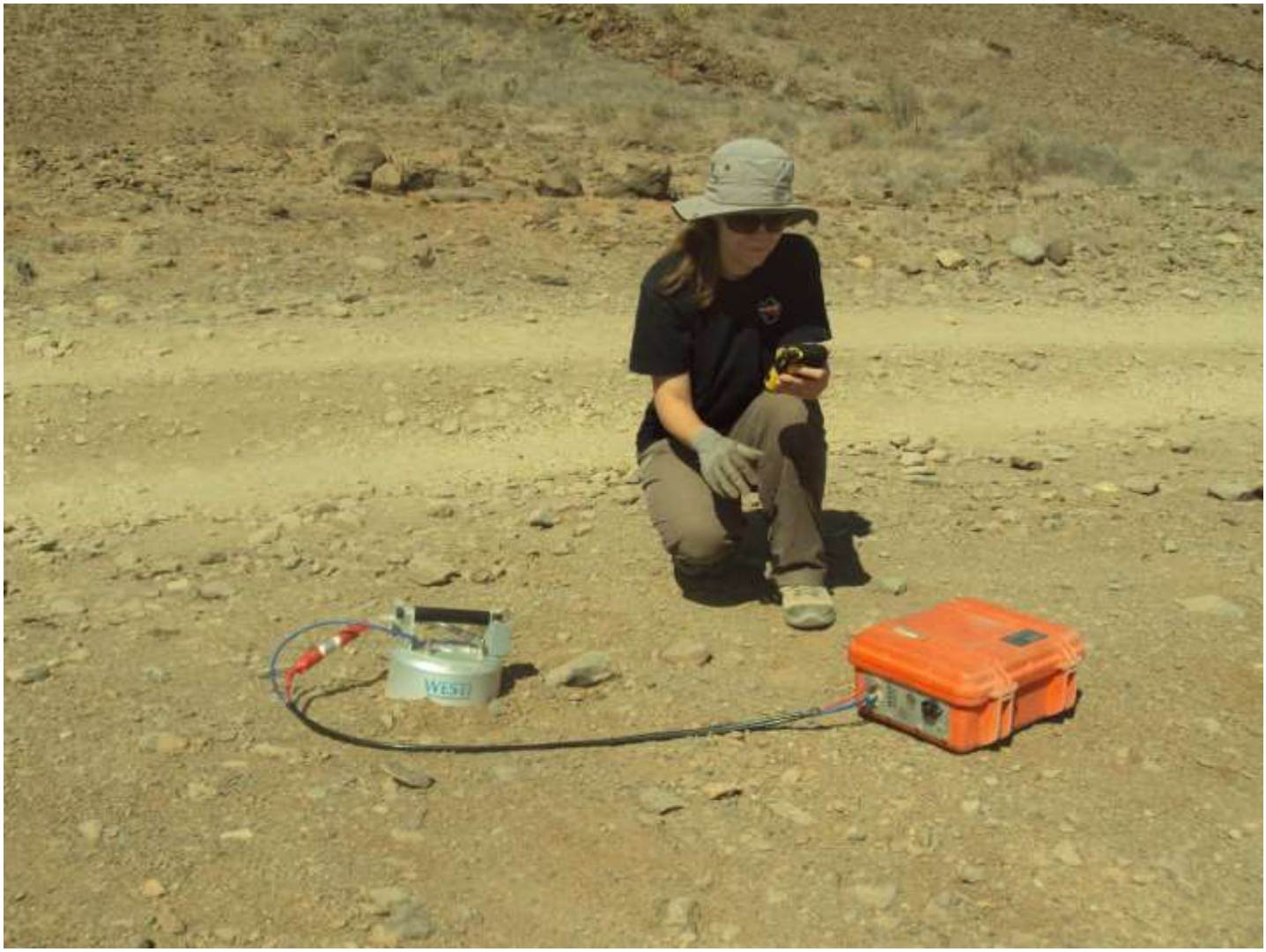
GEOTHERCAN project

Experimental development of 3D models for the characterization of geothermal reservoirs in the subsurface of the Canary Islands by means of the use and the combined application of geophysical, geochemical and geological methods. The main aim of this project is to contribute to the subsequent development of geothermal energy in the archipelago.

At present, over 95% of the energy supply in the Canary Islands depends on fossil fuels. Therefore, the geothermal research is a strategic action for the Canary Islands that could help significantly to reduce their energy dependence and their CO_2 emission levels.

The research lines proposed in this project have unique character, as it is the first time that they are developed in the way they are raised in this project. At present, geothermal energy is still a renewable energy in a very nascent stage in Spain and its development will largely depend on the proper definition of the geothermal resources by means of innovative technology that until now has not been applied in Spain.

Thus, this project aims to use innovative geothermal exploration methodologies in those areas with surface and deep temperature anomalies in the territory of the Canary Islands. The proposed methodologies will be applied prior to the geothermal drilling and will greatly help to their optimal localization and to evaluate the geothermal potential of the selected areas.



HELIO-EXPLORA project

The main objective of this project is to conduct a technical feasibility study on the implementation and use of near-surface gas geochemistry in the islands of Tenerife and Gran Canaria as a novel geochemical technique for geothermal exploration. Geochemical and geophysical studies are key when selecting suitable areas for exploratory wells. The intended purpose with the development of this project is to use new low-cost methodologies with simple implementation for the development of the previous works to the geothermal exploration in those potential areas that show surface and deep thermal and gas anomalies. The proposed methodologies are based on near-surface gas geochemical prospecting studies (helium) in the selected areas, northwest sector of Tenerife and southeast sector of Gran Canaria. Helium gas, due to its physical properties (light, inert) is an ideal gas to investigate and define the existence of zones of higher permeability and with deep-originated fluids ascent to the surface, one of the most interesting aspects for the geothermal exploitation. The results of this project will allow advancing in the geothermal exploitation feasibility study of the selected study areas and to progress in researches that could imply the development of geochemical techniques for the geothermal exploration in other areas of the world (TORRES QUEVEDO-María Asensio Programme, Ministry of Economy and Competitiveness, MINECO; 2013-2016).

CUEVA DEL VIENTO-RADON project

This project aimed to evaluate the radon gas levels in the interior atmosphere of Cueva del Viento, Tenerife (IDECO; 2012-2013). Radon is a radioactive, colorless, odorless, tasteless noble gas, occurring naturally as an indirect decay product of uranium or thorium. Basic Standards for health protection against the dangers arising from exposure to ionizing radiation was revised by the Directive 96/29/Euratom. Among the most significant changes introduced in this directive is the extension of the scope of protection to the professional activities that involve the exposure of workers or members of the public to natural sources of radiation.

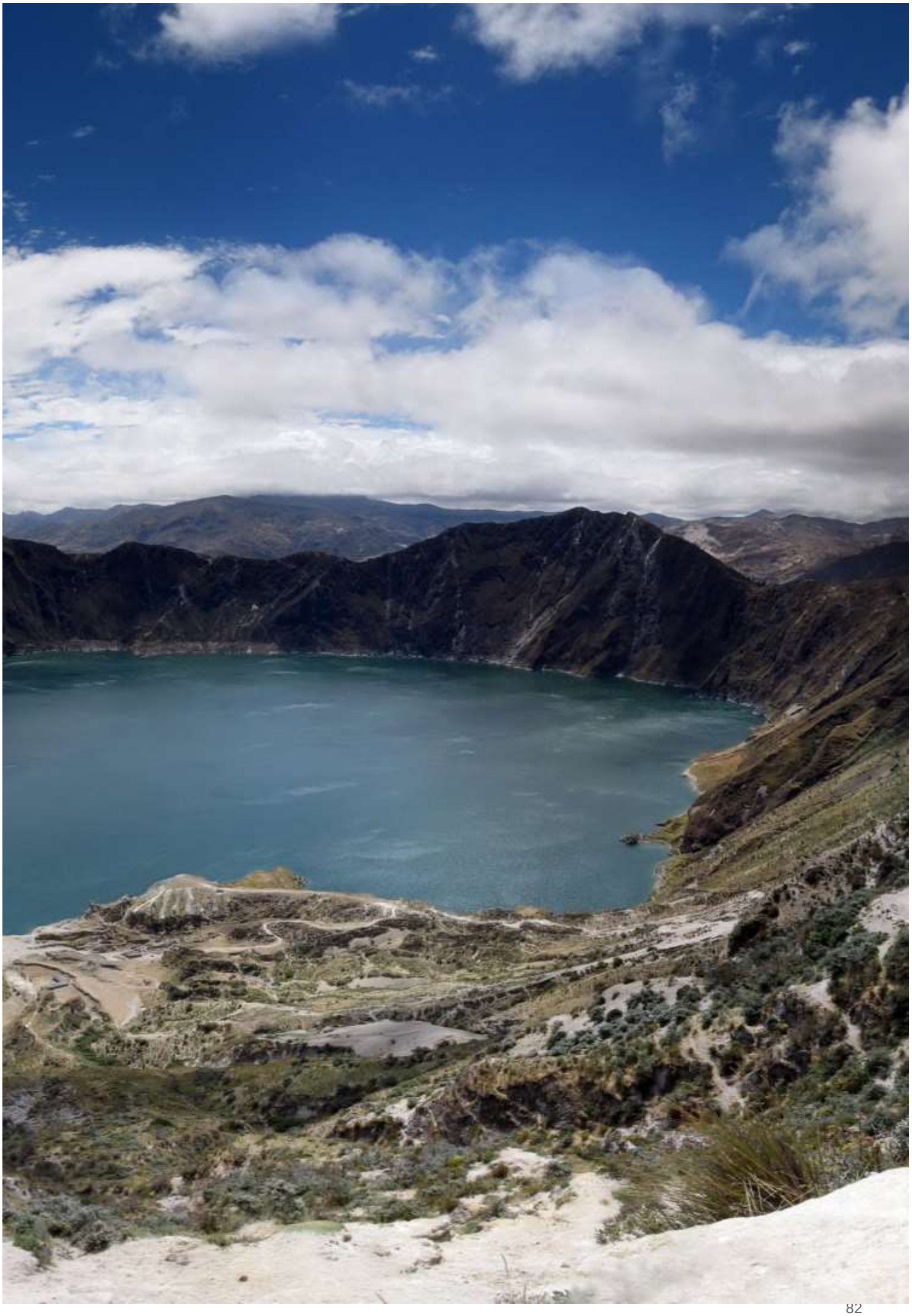
KAZAN-GAS project

This scientific collaboration project between INVOLCAN, the Universities of Tokio and Shizuoka and the Technological Institute of Tokio aims to evaluate the diffuse emission of carbon dioxide (CO_2) from the Japanese volcanoes of Izu-Oshima, Higashi-Izu and Kusatu-Shirane. The works within this scientific collaboration project have been financed by the Japanese Society for the Promotion of Science (JSPS) and the University of Shizuoka and were developed during the month of June, July and August 2013. The specific objectives of the project where: to continue the research on the evaluation of the spatio-temporal distribution of the diffuse emission of carbon dioxide (CO_2) in the Izu-Oshima volcano, to quantify the amount of carbon dioxide (CO_2) emitted to the atmosphere by Kusatsu-Shirane volcano through its crater lake about 300 meters in diameter and whose waters have a high level of acidity (pH = 1,2), and finally to carry out gas geochemical profiles in the monogenetic volcanic complex of Higashi-Izu in order to detect endogenous emissions through existing fractures or faults.

Proyecto MUONES

This Project is financed by the Canary Islands Agency for Research, Innovation and the Information Society (ACIISI; 2011-2014) and its principal aim is the application of Muon Cosmic Rays Radiography to know the density distribution in a volcanic building and its application in the study and forecast of its mechanical and eruptive behavior in case of collapse of one of its flank.

The volcanoes under study are the following: Teide and Cumbre Vieja in the Canary Islands and Unzen in Japan. This innovative technique has been successfully used recently in Japanese volcanoes in order to access in a visual way to the internal density distribution in volcanoes, and therefore, to its internal structure. This technique is based in the measurement of the cosmic-ray Muon flow and its reduction when it goes through the rock. Muon absorption radiography is an ideal technique to get direct information about the density distribution in geologic bodies such as volcanoes. Likewise, muon tomography allows researching the density variations associated to the fluids movements inside volcanoes.



Engineering and Information Technologies

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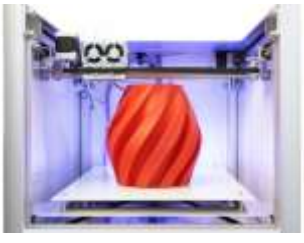
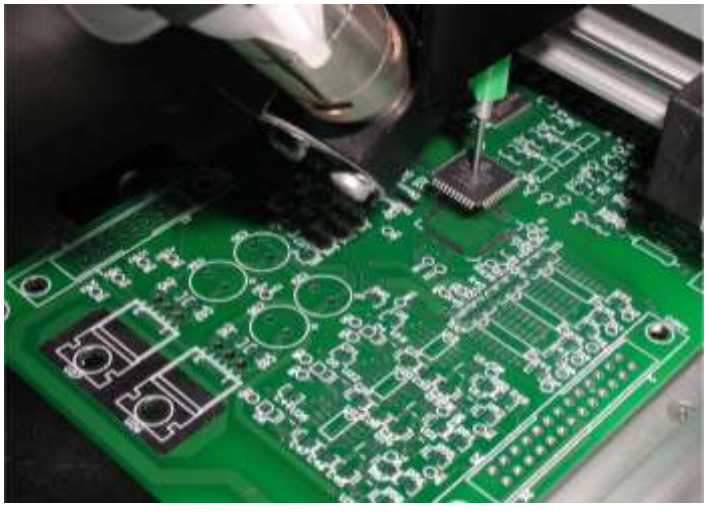




High Performance Computer

Tango: H project

PROMISE project

Talking Night Mode project

Fade: fall detector for Android

ITER 2.0 project

GIS TURISMO DE TENERIFE project

Cooperation Agreements with the Town Hall of Vilaflor de Chasna to develop a new website

ITER´s Incident management system

Monitoring, Management and control system of ITER´s Bioclimatic Houses

Weather Station Monitoring System: meteo ITER

Management System of the assets of the ALiX projects

SCADA Monitoring System, control and supervision of the ALiX project, BMS 2.

Design and development of a I/V curve meter for solar cells

Design and Development of single phased Inverters

Design and Development of a charger for electric vehicles

Design and Development of a high efficiency charger for solar planes

Design and development of an energy storage system

Verdino project

Engineering and Information Technologies

ITER works in IT development offering services related to New Technologies and focused in the development of Web communications, mobile applications, SCADA platforms, applications related to the health sector and the development of global software solutions. In this field, ITER carries out several projects and agreements in order to improve the technical capacity of the company, providing solutions that can be beneficial for society.

On the other hand, ITER designs and develops electronic systems that allow the integration of technological systems which feed on renewable energies.

Finally, the supercomputing infrastructure Teide-HPC constitutes a key piece of the ALiX project, allowing the introduction of infrastructures orientated towards the creation of an industrial network linked to the Information and the Communication Technologies (TICs) in Tenerife.

High performance computing infrastructure

This infrastructure is framed within the ALiX project, which aims to implement infrastructures orientated towards the creation of an industrial network linked to the Information and the Communication Technologies (TICs) in Tenerife.

This initiative is financed within the frame of the INNPLANTA program, leaded by the Ministry of Economy and Competitiveness, supported by funds from FEDER for the acquisition of the technological-scientific infrastructures appointed for R&D.

During the year 2013, the installation and startup of the high performance computing infrastructure Teide HPC was carried out, as well as the first weather simulations run tests. This supercomputer, which was inaugurated on October 24th, 2013, is the second most powerful in Spain and occupies number 138 in the overall worldwide top 500 supercomputer ranking (as of November 2013).

The equipment of the supercomputer is distributed in 1100 Fujitsu CX250 compute nodes grouped into platforms of 4 nodes CX400. These nodes are interconnected by multiple Ethernet networks and an Infiniband QDR low latency network.

A supercomputer is a complex IT equipment capable of solving a problem several thousand times faster than a new generation conventional computer. The use of new generation process chips will be an important leap that will make the difference in power and speed with the supercomputers installed at the present in Spain.

At the commissioning phase, the system recorded a peak computational capability of 273.97 TFlops. Moreover, the performance in terms of energy efficiency for this test was of 764.22 Mflop / watt which, interestedly, puts the computer in the same 138th position of the Green500 list of the most efficient computers.

A machine with these characteristics has innumerable applications. The calculating power available will be a significant improvement allowing a huge precision in the simulation of processes covering areas such as: weather forecast, climatic analysis, aerodynamic simulations, geological models, molecule interaction modeling in medicines, DNA analysis, etc.

This supercomputer or HPC –"High Performance Computing" offers researchers, companies of the Technological and Scientific Park of Tenerife and the University of La Laguna a high-process capacity to improve and extend both the national and international scope of their researches.

Tango: H project

Tango:H (Tangible Goals: Health) is a social platform for motor and cognitive rehabilitation of motor and cognitive that uses the Kinect device of Microsoft ©. This device, by means of a RGB camera and a depth sensor, is capable of recognizing the human body and its environment interacting with the information systems without physical contact with the traditional control systems (http://tangoh.iter.es).

The power of Tango: H lies in its ability to generate exercises. It is not a static platform where exercises or games are fully defined and integrated, but it allows the implementation of these by means of a configurator that makes this task dead easy. This feature offers the possibility to create exercised adapted to the needs of the users and serve as a tool for improving life quality of people with functional diversity. The exercises' configurator is named Tango: H Designer.

This platform was developed by means of a collaboration agreement between the Institute of Technology and Renewable Energies (ITER) and the research group of interaction, technology and education (i-TED) of the Department of System Engineering and Automation and Architecture of the University of La Laguna and framed within the SALUD-in project, "Platform for virtual interactive rehabilitation based on natural interaction techniques and on social video games for health and education".

Furthermore, given the power and versatility of this platform, it was incorporated into the VIDEM project, "Developing healthy habits and physical education by means of Educational Video Engines for hospitalized Children and Adolescents", which is funded by the Ministry of Science and innovation of Spain, and deployed in the SAVEH Project "Hospital Virtual Educational Support Service", financed with FEDER funds (PCT-MAC 2007-2013).

During 2013, the platform was designed, developed and deployed and it was evaluated in:

School San Fernando Duggi de Santa Cruz de Tenerife.

Aula Hospitalaria del Hospital Universitario de Canarias.

Aula Hospitalaria del Hospital General de Lanzarote.

PROMISE project

The application for smartphones Eco-Calc is one of the main innovations developed by ITER for the Tenerife Energy (AIET) within the PROMISE project. This app has been designed as a support tool for people who want a more sustainable household (http://ecocalc.iter.es).

The application for Android smartphones is presented as a virtual tour that identifies saving measures applicable in each of the household rooms. These measures are designed to imply in a change in lifestyle habits rather than a financial effort. During the virtual tour the user answers a few simple questions about the aforementioned changes: easy actions that the user is willing to do in order to achieve energy savings.

During 2013 and after the development phase, the application was launched in Google Play and it can be downloaded for free at (https://play.google.com/store/apps/details?id=com.promise.ecocalc).

Modo Nocturno project

During 2013, ITER considered developing a simple application for Android mobile devices with a view of interacting with the sensors integrated in last generation smartphones.

From this idea the Night Mode project materialized. The primary purpose of this app is to convert the device into a night clock where the time can be easily seen by the user without disrupting its rest. Moving the phone or pressing the on/off button activates the automatic reading of the time and the clock is nicely presented in the screen, decreasing its brightness automatically.

Fall detection system and early warning emergency for Android mobile devices, Fade

Currently, most smartphones available in the market incorporate a set of sensors which provide relevant information for the detection of certain activities; GPS, accelerometers, gyroscopes, magnetometers amongst others. These elements, integrated in a great number of mobiles devices, could have an important social function improving substantially the quality of life of their users.

Using mathematical algorithms and based on the real-time reading of the sensors available on Smartphones, ITER has created this Android app that can detect and alert a fall.

Once a possible fall is detected, Fade (which runs on the background) emits an alarm signal that the user can disable if everything is fine. Otherwise, the application issues a warning message to a predefined contact, reporting the time and place where the incident has taken place. The warning message can be sent through SMS, MMS, phone call, e-mail to the chosen contact, even though push-mail applications (such as WhatsApp). The system sends also the location of the device by GPS or by antennae traingulation (http://fade.iter.es).

Fade was designed, developed and launched in Google Play during 2013, achieving high media coverage and interest from some mobile companies (https://play.google.com/store/apps/details?id=com.iter.falldetector).

ITER 2.0 project

The project ITER 2.0 arose from the need to unite all the administrative environments of ITER in one single application that allows the interconnection between the daily tasks of the wordforce and the Administration and Human Resources departments in order to optimize the resources of the company.

The core of the new platform is the Microsoft Dynamics NAV ERP to which the development web platform gesITER is connected. gesITER manages ITER's projects and all the administrative activities related to them and centralizes all information that can be useful for the workers. Moreover, the platform ITER 2.0 includes the Alfresco document management platform and the PentaHo, a Business Intelligence system for creating dashboards and reports, which simplifies the work of ITER's staff.

The first phase of this platform has been designed, developed and deployed during 2013, which includes some of the most common operations of ITER.

GIS TURISMO DE TENERIFE project

During 2013 this application was designed and developed to be included within the "Volcanoes" project of Tourism of Tenerife. The aim of the application is the storage and categorization of establishments of the island of Tenerife along with a geo-referenced visualization on a map. The foundation when designing the application was that these establishments could be managed by a single BackEnd by the own staff of Tourism of Tenerife (http://www.webtenerife.com/actividades/volcanes/mapa.htm).

The application can be summarized as follows:

Manages volcanic areas.

Manages different types of establishments: Accommodation, traditional events, tourist information, viewpoints, restaurants, etc.

Is fully integrated into the web of Tourism of Tenerife.

Collaboration agreements with the City council of Vilaflor de Chasna to develop a new website

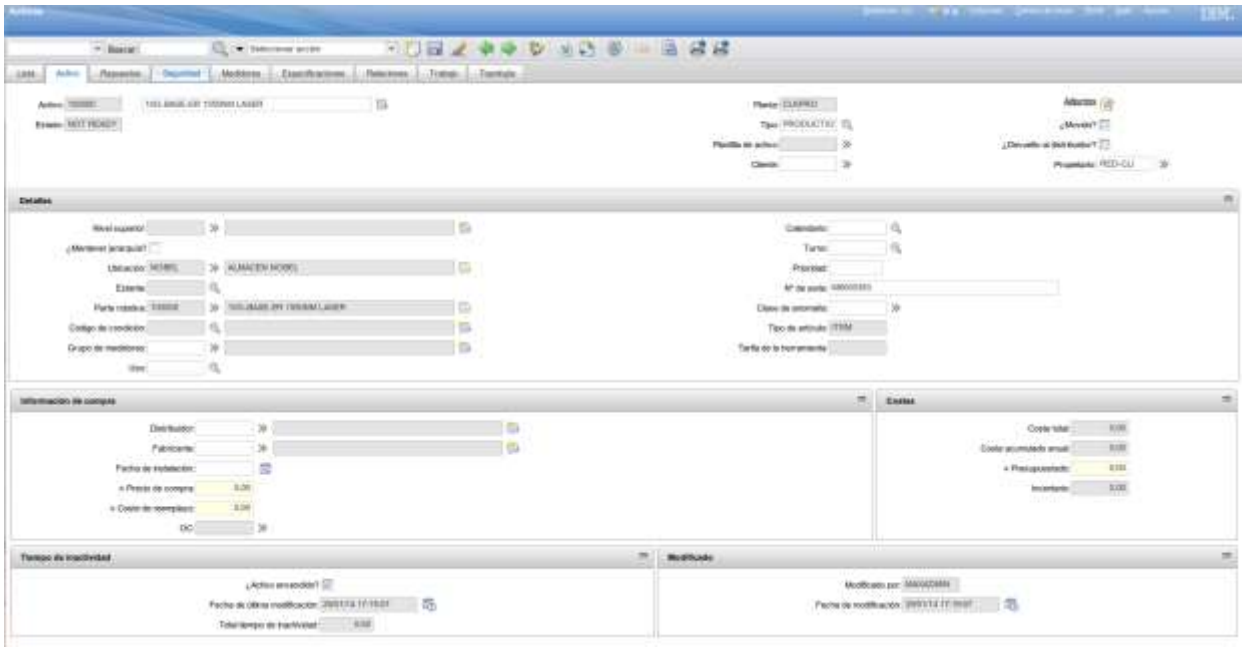
The aim of this project is to improve and modernize the internet visibility plan of the City Council of Vilaflor de Chasna.

Within the collaboration frame of this project, ITER provides the municipality with hosting, maintenance and development for the new website www.vilafordechasna.es, as well as guidance on how to use the social networks.

ITER's incidences Management System

During 2013 Maximo IBM was deployed, a platform for the management of incidences and the control of assets (along with the tracking and ticketing of these). This platform is used to control the incidences that occur in the different areas of the companies belonging to the ITER group.

The aim of this management system is to increase the efficiency of the resources and assets of ITER, as well as improve the identification, management and resolution of recurring problems.



Management, monitoring and control system of the Bioclimatic Houses

At the ITER facilities, there are a set of Bioclimatic houses comprising a non-pollutant urbanization inspired by ecological principles. Each of the houses are different in design, materials, the integration of natural resources and in architectural integration thermal and photovoltaic solar energy.

Due to the importance of this project, several lines have been developed for the control and presentation of the environmental data gathered in the houses, as well as for their public promotion:

Web page. Aimed to promote the bioclimatic houses and favour their rental. Web page of the bioclimatic houses http://casas.iter.es/

Management application. Designed as hotel management application, the application controls reservations and the occupancy of the bioclimatic houses.

Remote monitoring. Real-time monitoring and the storage of the environmental variables registered by the sensors installed in each of the bioclimatic houses.

Information panel. TV screen located in ITER's Visitors Centre that gives information and a real-time representation of the environmental variables monitored in each of the houses.

IP Television. An interface for the use of TDT (freeview) televisions in the bioclimatic houses. It provides access to the Internet, real-time monitoring of the environmental sensors, internal communication, online press, etc.

The user interaction with the different interfaces of the bioclimatic houses have been improved during 2013 by adapting all the systems for a better versatility between them. In addition, new features have been added to the management application and web portal of the houses in order to increase the efficiency of the work of staff of the bioclimatic houses.

Monitoring system for ITER's meteorological stations, meteo ITER

Meteo ITER was born due to the need to optimize the different photovoltaic and wind production systems of ITER, S.A. This is achieved though the real-time monitoring of weather variables from the areas surrounding these different energy production plants.

The SCADA (Supervisory Control & Data Acquisition) system developed arises from another broader project, called meters, which tries to establish access (adopting the same read / write protocol) to different monitoring devices. In this acquisition system, the read / write and data storage processes present a completely customizable interface.

Clima Tenerife is the public web interface of meteo ITER. It displays general information from some of ITER's stations along with the real-time values of their sensors and graphs presenting the last 24-hour data (http://climatenerife.iter.es).

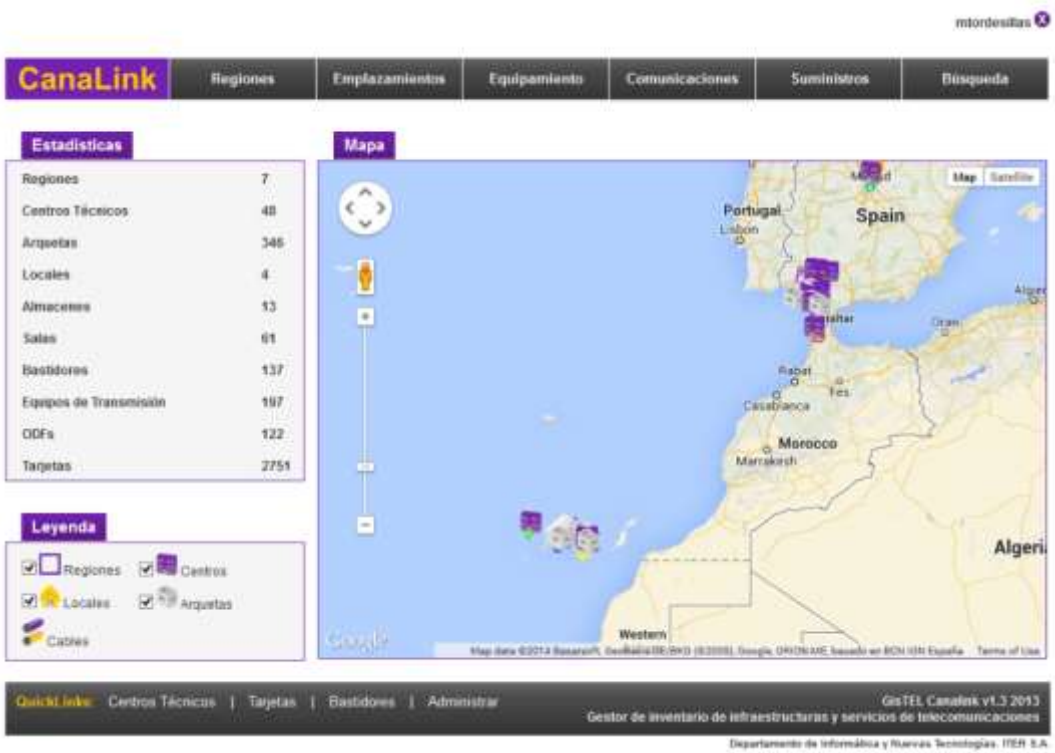
In 2013 new meteorological stations have been incorporated to meteo ITER, bringing up the number of total displayed stations to six. Furthermore, within this project work has begun with Argestes, a system which manages weather forecasts generated by the supercomputer Teide HPC with the aim to predict wind speed and wind energy production injected to the power grid.

Assets management system for the ALiX project.

The telecommunications infrastructures contained in the deployment of the optic fiber of the ALiX project and the companies that are part of it require a precise control of its assets and an inventory through an optimized computer system. From this need emerged the globaal solution gisTel, "inventory manager of infrastructures and telecommunications services," which is an application for the management of CanaLink, D-ALiX and IT3 (the three companies that comprise the axes of the ALiX project).

Some of the main characteristics of gisTel are the logic organization of components following a physical scheme and the geolocation of map elements. It also has an application for mobile devices, gisTel mobile.

During 2013, this tool has been mainly developed and deployed for the company Canalink given the specific and priority needs of its specific work niche.



Sistema SCADA de monitorización, control y supervisión del Proyecto ALiX, BMS 2.

During 2013, a SCADA system to allow the monitoring, control, supervision and management of alarms for the ALiX Project has been fully developed. The project BMS 2 was born with the aim of integrating, under the same environment, the monitoring of equipment and devices of the D-ALiX datacenter along with the infrastructures and telecommunication networks of Canalink.

In addition to the real-time reading and registration of the monitored variables, the alarms reported by the systems' devices are supervised, controlled, managed and thee alarms logical association levels defined for a greater control of the system.

Currently, more than 160 devices belonging to all operational centers of the ALiX project are being monitored in real-time. These operational centers are geographically at a far distance between each other; Cadiz, Gran Canaria, La Palma, Tenerife, etc.

The supervision information presented on screen is displayed in different ways:

Control and incidences monitoring.

Summary of activities.

Networks' synoptics.

Temporal evolution of variables.

Alarm logical integration system.

At present, BMS 2 is practically controlling all the alarms of the devices of the NAP, the technical Centres of Canalink and the photovoltaic plants Finca Verde and Finca Roja, becoming a crucial work tool at ITER's Network Operation Centre.

Design and development of a I/V curve meter for solar cells

ITER has designed and manufactured the electronics needed to measure and record I / V curves for individual solar cells in the frame of the project "Capa FV". The record of the I-V curves of these cells allows obtaining the maximum power available at each instant in order to compare its generation capacity. The cells are mounted in the same rack so that they are illuminated under identical conditions throughout the day.

The specific design circuit is responsible for generating the excitation current of the solar cell under test and recording this magnitude and the voltage of the cell. This way, it can be reconstructed the I-V curve of the cell. The registration is performed periodically and is stored in a database for further analysis.

Moreover, the Department of Electronics developed a specific circuit for three cells and a generic control card that manages control the acquisition and the connection to the Ethernet network of ITER, and implemented the acquisition, control and communications firmware needed for the control card.

Single-phase inverters design and development

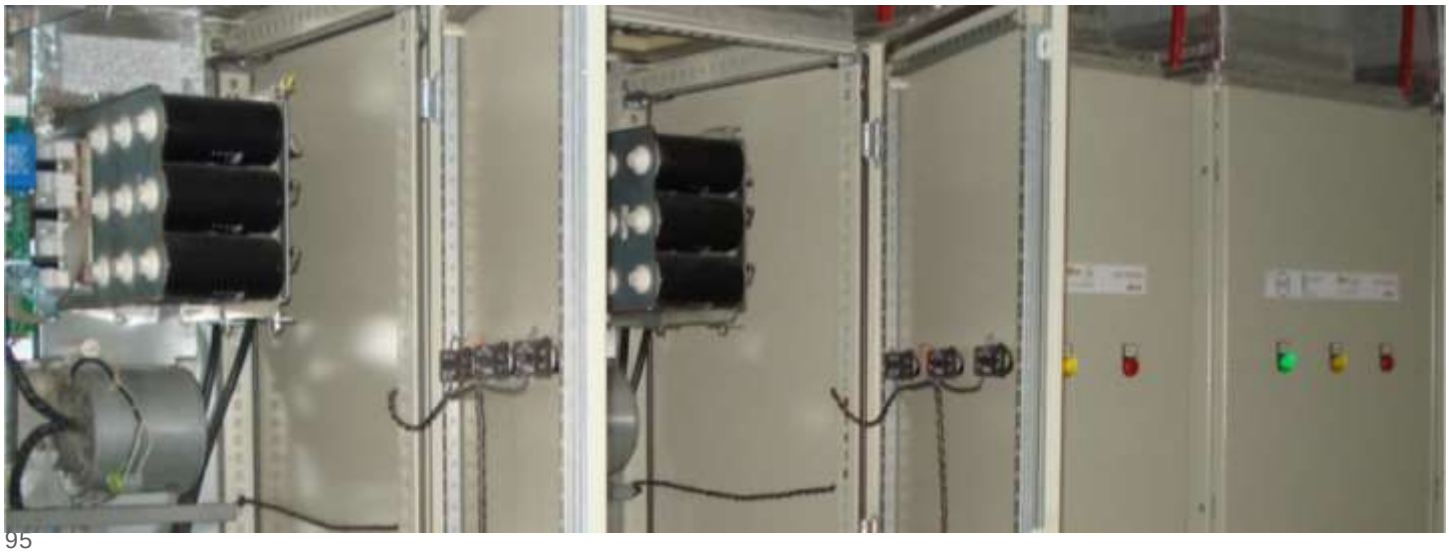
Design and development of small power inverters to be installed in the ITER's Bioclimatic Houses. These single-phase inverters for small PV roof plants have been developed following the succeeding objectives: reduced size and weight and high efficiency.

This project has started some years ago and has involved a great effort in hardware, prototypes and firmware / software development. After having developed several typologies and algorithms and tested different types of transistors, the final design is ready and available for its implementation.

For being a single-phase inverter for small power it has a very high efficiency peak (> 97.5%), and a very low weight and volume. The box of the inverter has been designed using CAD-3D and will be soon manufactured in ITER.

The inverters are scalable to different powers by setting certain components. For example, a power reduction allows a reduction of costs by using cheaper components in the power stage. The design does not change, only the components involved.

The inverters can be monitored through the connection RS-485 and that will also allow the installed inverters to be integrated in the bioclimatic houses monitoring system.



Design and Development of a charger for electric vehicles

A first phase of preliminary studies and trials for the development of load circuits for electric vehicles has been completed with the design and development of an electric car charger, which is now fully operational.

The charger that has been designed is used for vehicles with charging interface based on IEC 61851 and makes the connection protocol using microcontroller and built-in charger auxiliary electronics.

The charger also has a Bluetooth transmitter for remote monitoring and control, allowing the connection from a Smartphone or pc. This connectivity opens up new lines of work in the field of development of applications for the remote management of the charger.

The criteria for the design of the charger have been the optimization of weight, size and costs.

The manufactured prototype integrates the electronics in the own vehicle charging connector. This enables to lighten the charger (some commercial models integrate the electronics in a heavy box located along the cable) and results in a reduction of manufacturing costs.

There has been used the standard connector for electric vehicles SAE J1772.

Design and development of a high efficiency charger for solar planes

ITER has designed and developed the "hardware + firmware" of a battery charger for solar planes controlled by microcontroller with CAN bus communication module within the frame of the PRONTAS project.

The designed device governs the batteries charge and provides the measurement of a number of parameters such as current, voltage and battery temperature (internal and external), current and voltage of the photovoltaic panels and temperature of the charger itself. It will also enable remote load cutting and setting of MPP parameters via the communications module.

While the charger has been designed for a specific configuration of Lithium-Ion batteries, it could be used for other configurations with minimal changes.

The charger has been designed to achieve the maximum efficiency to maximize the flight hours of the solar plane. The components have been carefully selected taking into account the low losses criteria, so that the designed charger is suitable for any application that requires high loading efficiency.

Design and development of an air quality meter

Several units of the electronics to measure humidity, temperature, dust and smoke have been designed and developed. These registers are connected using the 485 bus and through a gateway to the Ethernet network of ITER, being able to be real-time monitored and recording the data in a database.

For temperature and humidity, there have been used similar meters to the ones that are already operating in the bioclimatic houses with some modification and adding an infrared sensor that can detect the concentration of particles in air. The concentration of particles is an important data that should be monitored in different areas of the solar cells laboratory.

These meters will also be used for the detection of calima in the meteorological stations that ITER has in its photovoltaic installations.

Design and development of an energy storage system

This Project, which counted initially with a grant of the Ministry of Tourism and Trade, aims to help renewable energies penetrate in the electrical system, which implies a very high capacity accumulation system. This project constitutes the first step to evaluate the capacities and costs of this type of storage systems for its later large-scale implementation.

Regarding the energy storage systems, finally there were used conventional lead batteries (Pb-acid) and lithium-ion batteries (Li-Ion). The choice of these second batteries was motivated by cost's reasons, specific energy (Wh/kg), power density (W/m^3) and future expectations.

Current activity has focused on improvements to the charging system. For high power loads it is necessary that the system has power factor correction. To do this, it has been use a reversible inverter that has been designed entirely in ITER.

This inverter is able to transfer energy between the DC and the AC sides in both directions by using suitable control algorithms, that is, two functions can be perform with the same hardware: grid battery charging and feeding into the grid the power generated by the battery. However, during the first phase of the project the functions of inverter and charger were performed using separate units, and later both functions were integrated on a single unit (reversible inverter).

The inverter has been designed in modules of approximately 160kW. The baseline project aimed a cluster of 6 units to obtain an inverter of 1MW. Nonetheless, there are still not enough batteries to implement this arrangement.

For the extraction / injection of energy into the grid, there is a 2MW transformer station located outside of the hangar where the inverter-accumulator unit is.

The operation management of the inverter-charger modules and the battery banks in a complex system, which may consist of several banks with different battery technologies and several inverters, opens a future line of work. The aim would be to optimize the way in which each unit comes into operation according the demand, considering that this can affect the overall efficiency. For example, an inverter module is more efficient operating at 100kW than two modules at 50kW.

Verdino project

This Project consists of an electric vehicle, electronically and mechanically adapted for computer control, aimed for people transportation within a bioclimatic housing development.

The vehicle Verdino has been designed in cooperation with the Group of Robotics of the Department of Engineering, Systems and Automatic and Architecture and Technology of Computers of the University of La Laguna (GRULL).

Verdino is an ecological low-cost electric vehicle, such as the ones used in golf courses, but mechanically and electronically adapted in order to make its steering, braking and traction systems able to receive commands from a computer (while maintaining the possibility of being manually driven).

To be able to self-drive, Verdino needs to gather information about the surroundings and needs to know its geographic position and orientation all the time. Therefore, it has been equipped with a set of sensors that provide this vital information for its autonomous navigation. At this point, work is underway to provide the vehicle with new functionalities and the ability to self-drive without any user intervention. In order to achieve this, Verdino is able to determine its location by comparing the information it receives from the environment with a database of identified circuits in combination with its location system, so that the vehicle is able to react to obstacles on the road. It is also capable of detecting and tracking of an unstructured road (i.e. one that lacks of all type of road signalling), only using information from one of its equipped cameras.

Telecommunications

ITER Instituto Tecnológico y de Energías Renovables S.A.

ALIX Initiative

Telecommunications Insular Ring

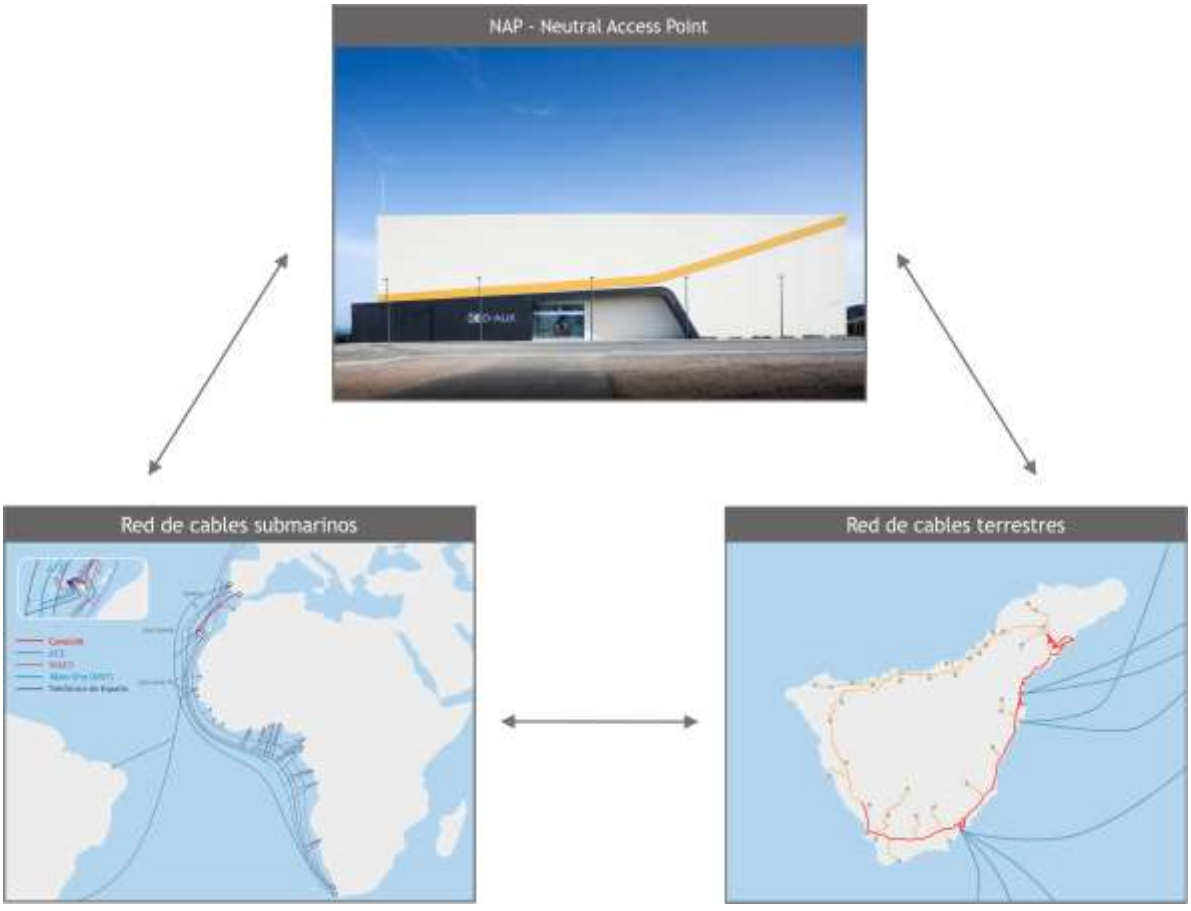
CanaLink

Datacentre D-ALiX

Telecommunications

The Group ITER participates in the project ALIX, an initiative of the Cabildo Insular de Tenerife led by ITER in order to promote the competitiveness of the island of Tenerife in the face of global ICT market by eliminating the structural weaknesses in the sector of Information and Communications Technology in the Canaries.

As part of this initiative, the business unit specializing in communications infrastructure on which they depend both the Data Processing Center D-ALiX as different projects subsea connectivity (CanaLink) and terrestrial (Institute of Telecommunications is included Tenerife, SL).



Island Telecommunications Ring of Tenerife

The Telecommunications Technology Institute of Tenerife (IT3), is a neutral telecommunications operator created by ITER with the mission of promoting and developing the internal and external connectivity of the island of Tenerife by means of its participation in several local and international projects aimed at the expansion and promotion of the Information Society in the island of Tenerife and by extension, in the rest of the Canary islands.

During the year 2013, IT3 has participated in plenty of projects regarding the expansion of the telecommunication infrastructures of the Island Telecommunications Ring of Tenerife (AITT) to provide this infrastructure with the connectivity needed to offer its connectivity services to the wholesale operators.

To this end, IT3 has intense its commercial activity offering its services to several operators and has carried out the studies, projects, implementation and installation of the fibre optic required to provide such connectivity.

In this regard:

IT3 has carried out an active commercial work for the commercialization of its dark fiber services, which resulted in the signature of two contracts with two wholesale operators;

New deployments have been initiated in order to adapt the network of to provide connectivity services to one of its new customers that entered into service in January 2014.

CanaLink

CanaLink is a submarine cable consortium between the Telecommunications Technology Institute of Tenerife (IT3) and the company Islalink, whose mission consists in developing the alternative telecommunications core network between the Canary Islands and mainland Spain. In mid-2013 the company Canalink became a 100% shared by IT3.

The CanaLink cables system connects Tenerife with mainland Spain, Gran Canaria and La Palma. This infrastructure has been deployed following the highest quality procedures and a solid network design responding to the technical and service needs demanded by international telecommunications operators and required to break down the digital barrier that currently exists between the Canary Islands and the rest of European regions.

In Tenerife, the removal of these entry barriers and, therefore, the appeal for ICT enterprises (telecoms and others) will be even more significant due to the presence of the NAP as connectivity hub and to the deployment of the terrestrial core network to all of the island's towns, which has been developed by the local government.

During 2013, ITER has worked and served for the correct operation of the system:

Support the works for the expansion of the network, including the receipt of equipment in the technical centres, design and development of the network engineering and configuration and register of communication circuits.

Active participation in the project's operation and maintenance (O & M), including continuous training of the O & M staff of the CanaLink system

Analysis and parameterization of the ticketing tool, putting into operation a new tool with new features and options.

Monitoring service of the control variables of the technical centres and network traffic through control centre 24x7 with specialized technicians.

Maintenance and management of the DCN network for the interconnection of the technical centres of CanaLink

Financial and accounting management of the company

Active participation in the delivery of services to customers that have increased capacity during the year.

Assistance and support in international projects: Canlink's new commitment to attract international systems requires the collaboration of ITER for the follow-up of these projects and the commercial activity.

Datacenter D-ALiX

D-ALiX (www.d-alix.com) is a datacentre providing TIER III+ category facilities framed within the Alix initiative. This infrastructure has more than 4500 m^2 of installations, with more than 2000 m^2 intended for IT equipment. It is also a base station of submarine cables, with beach manholes (BMH) and all the infrastructures needed to offer these services.

The main aim of the data centre D-ALiX (punto de acceso neutro de África Occidental-Islas Canarias SL) is to serve as basic infrastructure for its clients to develop their business model without having to make big investments, offering a rental model which will allow them a flexible growth while they benefit from the scale economies transmitted by ITER, promoter of the infrastructure. As an added value, D-Alix has a neutral Meet-Me-Room, where customers can freely choose their service / communications provider.

The aim is to offer customers high availability hosting services and a competitive environment of high-end communications with the outside world, prevailing by the following three concepts as the main characteristics to be offered to the information and communications technology (ICT) market:

- Highest levels of logical and physical security (24x7)
- High levels of energy availability, according to TIER IV
- Total equipment redundancy and distribution of the refrigeration
- Resistance to weather inclemencies and autonomy in case of environmental disasters.
- Provide high connectivity and quality levels of communications based on the neutrality regarding the selection of the operator
- Total monitoring and control of the facilities 24x7

The establishment of clients in the datacenter D-ALiX has continued during 2013. Yoigo, ACENS, ONO and Telefónica Soluciones have been added to the already existing in 2012 (Insular Institute of Information and Communications, Cabildo Insular de Tenerife and CanaLink). Among this clients, Telefonica Soluciones are the most active in terms of the expansion of services and own customers. D-ALiX has provided support for the installation and maintenance of critical services of 5 large companies and many SMEs.

Furthermore, there have been satisfactorily adequate the space and infrastructure necessary for the implementation of the supercomputer Teide-HPC, that was inaugurated in October 2013.

At the same time, ITER has been in charge of the development of the datacentre's corporative identity: logo, marketing materials and website, which has been developed with Pista Local Plus creating a custom and adapted template.

Dissemination and Training

ITER Instituto Tecnológico y de Energías Renovables S.A.

Dissemination and Educational Facilities

Professional Practices "Assembly and maintenance of thermal and photovoltaic solar installations"

Master's Degree in Renewable Energies

Dissemination Programmes

VOLCANO TURISMO Project

Documentary "Teneguía, the friendly volcano"

The Night of the Volcanoes project

Visibility plan of the Bioclimatic Houses

Visibility plan of the ALiX project

Webpages and Social Networks

Open Door Days

Conferences and Scientific Events

Communications and Spreading/Scientific Publications

International Conferences organized

Doctoral and Master's Thesis defended

Dissemination and Training

ITER strives to make a good dissemination of its projects and investigation lines of work, carrying out dissemination tasks in energy, new technologies and environment so that the local population along with ITER´s visitors are informed about the researches carried out to promote renewable energy technologies and systems.

Furthermore, being one of the ITER's main goals the contribution to the social awareness as for supporting a more sustainable development, it carries out also education and social awareness tasks. It uses a variety of dissemination tools, giving priority to those related to new Technologies, such us the Web Pages and Social Networks.

On the one hand, ITER has one of the first educational equipment dedicated to Renewable Energies in Spain, which was launched in 1998, and it has been gradually extended with other installations, as the Visitors Centre and the Bioclimatic Dwellings. On the other hand, ITER participates in training activities, such us the Master Degree in Renewable Energies of the University of La Laguna, and also collaborate in the development of training practices, as well in Courses and Conferences. It develops specific dissemination programmes for its own projects or for contributing to the General Dissemination of Science contents, as the Radio Program Planeta Vivo Radio or the TV Program Teleplaneta.

ITER carries out Open door days and participates in both scientific and educational fairs and conferences. The Institute uses all the dissemination tools available, especially those based in new technologies such as websites and social networks.

Dissemination and Educational Facilities

The educational-dissemination facilities of ITER are part of a very ambitious project called "Renewable Awareness". The principal aim of this project is to show the research activities related to renewable energies, environment and new technologies, fostering a social ant touristic awareness that brings together the concepts of clean energies and new technology developments, with a maximum respect with the environment, contributing to a sustainable development and to a zero CO_2 future.

To execute this project, three educational equipments have been developed for the society awareness about the importance of the individually responsibility in the energy sector. Each one of the equipments suggests a different way of approaching the concepts, all being compatible and nonexclusive. The technological walkway introduces the concepts visually and very easily to understand. The Visitors Centre encourages a second thought on what has been learnt. The Bioclimatic Dwellings is where the ideas translate into actions, where the concepts learned are applied and are there to experiment and prove that Zero CO2 emissions does not mean less comfort.

Technological Walkway

The equipment is working since 1998, becoming a leading installation in Spain in this field where visitors could experiment how renewable sources transformed into useful energy. The Walkway greatly contributed to the approach of the population to energy generating systems that used renewable resources and helped in their social integration. This equipment is a useful complement for all stages of the education system (elementary, middle school, high school, university, professional associations, etc.), because it allows to the educational centres to make a complementary activity for the curriculum development in this field. The Technological Walkway receives yearly about 8.500 visitors, including students and other guided visits.

Visitors Centre

Inaugurated in year 2004, it is a bioclimatic building mainly characterized by its integration with the environment. The Visitors Centre counts with a circuit of displays which encourages the visitor to learn about energy matters such as their most common sources, their impact in the environment, their limited characteristics, as well as the alternative use of the renewable energies. As well as dealing with contents related to the energetic problem, climate change and bioclimatism, the Visitor's Centre has access to the monitoring system that controls each house. It's a space where different activities both of technical and scientific nature can coexist and offer the local and the foreign visitor a way to participate actively. For this reason, the Centre also counts with a 200 seats auditorium, several multipurpose rooms, a gift store and a cafeteria. In addition, two new exhibitions have been incorporated during 2013 to the Visitors Centre: "Energy moves us" exhibition, developed by CSIC for the International Year of Sustainable Energy for All (2012) and the "D- ALIX connection, the future is present" exhibition with samples of real submarine and terrestrial fiber cable and explanatory panels about the ALIX project.

In addition to being the starting point for ITER's guided visits, during 2013 the Visitors Center has hosted several events organized by others or by the own Institute; among them are:

The technical visit conducted by a delegation of the Government of Morocco (Souss Massa Draa Region) coordinated by the Cabildo of Tenerife in the framework of the project Recicla (May 14th, 2013) for the training and exchange of experience in the waste management.

"HPC Users Group" event, organized by Fujitsu (October 2nd-4th, 2013).

The intensive course in systematic innovation "Innovation, Leadership and Communication", organized by the Cabildo Insular de Tenerife, through the Scientific and Technological Park (PCTT) and sponsored by ITER (July 20th-28th, 2013).

Supercomputer Teide - HPC (High Performance Computing) inauguration ceremony. Spain´s second most powerful computer located in the Data Centre of the ALiX project (October 24th, 2013).

Bioclimatic Houses

This equipment, inaugurated in year 2010, is one of the most useful as a training resource. The Development comprises 24 different models of Bioclimatic Homes energetically self-sufficient (through the use of its own thermal and photovoltaic panels integrated in each house), in a zero CO2 emission scenario. The development offers a wide exhibition of real and replicability solutions (both for the building sector as well as for the integration of renewable energies) that allows the visitor to check that is possible to choose more sustainable solutions without sacrificing aesthetic criteria and of course without giving up the comfort.

The uniqueness of this equipment is also increased for the fact that these houses are offered as accommodation, so that the visitors have the option to experience, in a more direct way, the comfort and singularity of living in these kinds of houses. Each house is like a small-scale laboratory equipped with different sensors that allows its monitoring and to show in real time its thermal behaviour; thus, the tenant can experience how small changes in the use of some of the elements presented in the house, can change that behaviour.

The bioclimatic houses hosted the students enrolled in the intensive course in systematic innovation "Innovation, Leadership and Communication" organized by the Cabildo Insular de Tenerife in July 2013 through the Scientific and Technological Park (PCTT) and sponsored by the ITER.

The houses also welcomed the students of the summer campaign of ITER's Environmental Area. In this campaign, which was held from July 1st to September 30th, participated students to collect data for the Cumbre Vieja 2013, Pico Teide 2013/Cañadas 2013, El Hierro 2013 and DNO and DNE 2013 Campaigns.

During 2013, ITER has also started a program of guided tours for the guests of the bioclimatic houses, so that once a week the people who are staying in Bioclimatic houses have the possibility to join a guided visit to know the origin and aims of this project and the bioclimatic techniques applied in them (www.casas.iter.es).

Professional Practices “Assembly and maintenance of thermal and photovoltaic solar installations”

ITER collaborates with the Training Centre of the Labour Building Foundation of Tenerife hosting students for the development of non-labour professional practices. These practices were part of one of the Modules of the Certificate of Professional Standards “Assembly and maintenance of Thermal and Photovoltaic Solar Installations”. This initiative was organized by the Training Centre “Labour Building Foundation” of Tenerife and it is co-financed by the European Social Fund, the Spanish Ministry of Labour and Immigration and the Canary Islands Employment Service.

The 120 hours of practices carried out in the photovoltaic installations situated in ITER’s facilities, were carried out for the capacity building of the students in works related to the assembly and maintenance of Thermal and Photovoltaic Solar Installations. The Certificates of Professional Standards give a labour accreditation that assures the employers that the worker is competent in the specific qualification that the Certificate accredits. So these Certificates helps the insertion in the labour market and the personnel selection tasks, because it shows clearly what each worker does best. They also bring the possibility to the educational community to validate the competence units that fit in with the Professional Training Titles and they make easier to get a lifelong learning, because they can be done gradually, by Training Modules and Competence Units.

Also during 2013, ITER signed a cooperation agreement with the Development Society of Santa Cruz de Tenerife in the framework of project "Experimenta”. Experience to Improve Employability", in which four students performed 100 hours of training on the maintenance of photovoltaic installations.

Master's Degree in Renewable Energies

ITER started in year 2006 the collaboration with the University of La Laguna for the delivery of the Master's Degree in renewable Energies. This Master has reached a recognized standing, together with a great success in the labour market insertion of its graduates. Besides this, the great demand that the Master has had in all its editions, shows the need of this kind of specialized training in the Canary Islands, but also in the rest of Spain and in Latin America. In fact, the number of pre-registered students for each Edition has exceeded the number of offered places.

Moreover, during 2013 ITER has started to collaborate with the Master in Renewable energies that the European University (UEC) offers in the Canary Islands. In this master, ITER is in charge of the lessons of the wind energy module. ITER has also signed a collaboration agreement with the UEC to receive students of the Master for the development of their practices at ITER after the completion of the theoretical modules.

Dissemination Programmes

ITER carries out specific programmes for achieving more visibility for its own projects and also for contributing to the general dissemination of Science.

Planeta Vivo Radio

Planeta Vivo Radio is a scientific dissemination programme of both, ITER and RNE in the Canary Islands, which is coordinated by the Division of Environment of ITER. This radio programme is 50 minutes long and is broadcasted weekly on Radio 5 for the Canary Islands and Radio Exterior de España (REE) for the rest of the world. This initiative promoted by ITER and RNE was born in a very special year (2008), the International Year of Planet Earth, and intends to contribute in the dissemination and accomplishment of the purposes of this important international statement proclaimed by the General Assembly of the United Nations in the session of December 22nd, 2005. The main objective of this statement is to make the society aware of the relationship between the Humankind and Planet Earth, and to stand out the importance that Earth Sciences have in the consecution of a sustainable and balanced future in order to increase the quality of life and safeguard the planetary dynamic. PLANETA VIVO RADIO is co-financed by the Spanish Foundation for the Science and Technology (FECYT) and the Insular Authority Cabildo Insular de Tenerife. All the programs are available in the website of the programme http://www.planetavivoradio.es

“Canary Islands: A volcanic window in the Atlantic Ocean"

It is a dissemination program about the volcanic phenomena and the management of the volcanic risk. Since its 1st edition in the year 2008, this programme has toured around the 88 municipalities of the Canary Islands, including the island of La Graciosa, and has registered a high participation rate with a total of 15.195 assistants. More specifically, during its 6th edition in 2013, this has experienced an increase of 35.93% in the participation rate compared with the 2012. Therefore, "Canarias: A window volcanic window in the Atlantic Ocean" is experiencing each year a significant growth in participation.

With the aim of awarding and recognizing those municipalities that registered the highest participation in this edition in their island got Recognition Diplomas. The following municipalities were awarded: La Frontera (El Hierro), Yaiza (Lanzarote), Pájara (Fuerteventura), San Bartolomé de Tirajana (Gran Canaria), Villa de Hermigua (La Gomera), Tazacorte (La Palma) and Puerto de la Cruz (Tenerife).

The educational Programme “Canary Islands: A volcanic window in the Atlantic Ocean" arises from the need to inform and train the citizens of the Canary Islands about the volcanic risks, which is one of the priorities of the Contingency Plans for volcanic hazards and one of the activities that the Basic Guideline for the Civil Protection Planning against Volcanic Risks in Spain considers necessary for the maintenance of the Civil Protection Special Plan for Volcanic Risk in the Autonomous Community of the Canary Islands (PEVOLCA). In parallel, and through this Programme, citizens can also get to know the actions that the society - both Administrations and citizens - must materialize for the reduction of the volcanic risk. Therefore, the final aim of this Programme is to contribute to make the Canary Islands a better informed and organized community against the volcanic risk, managing the hazards that surround it and reducing its own vulnerability to these hazards.

TELEPLANETA

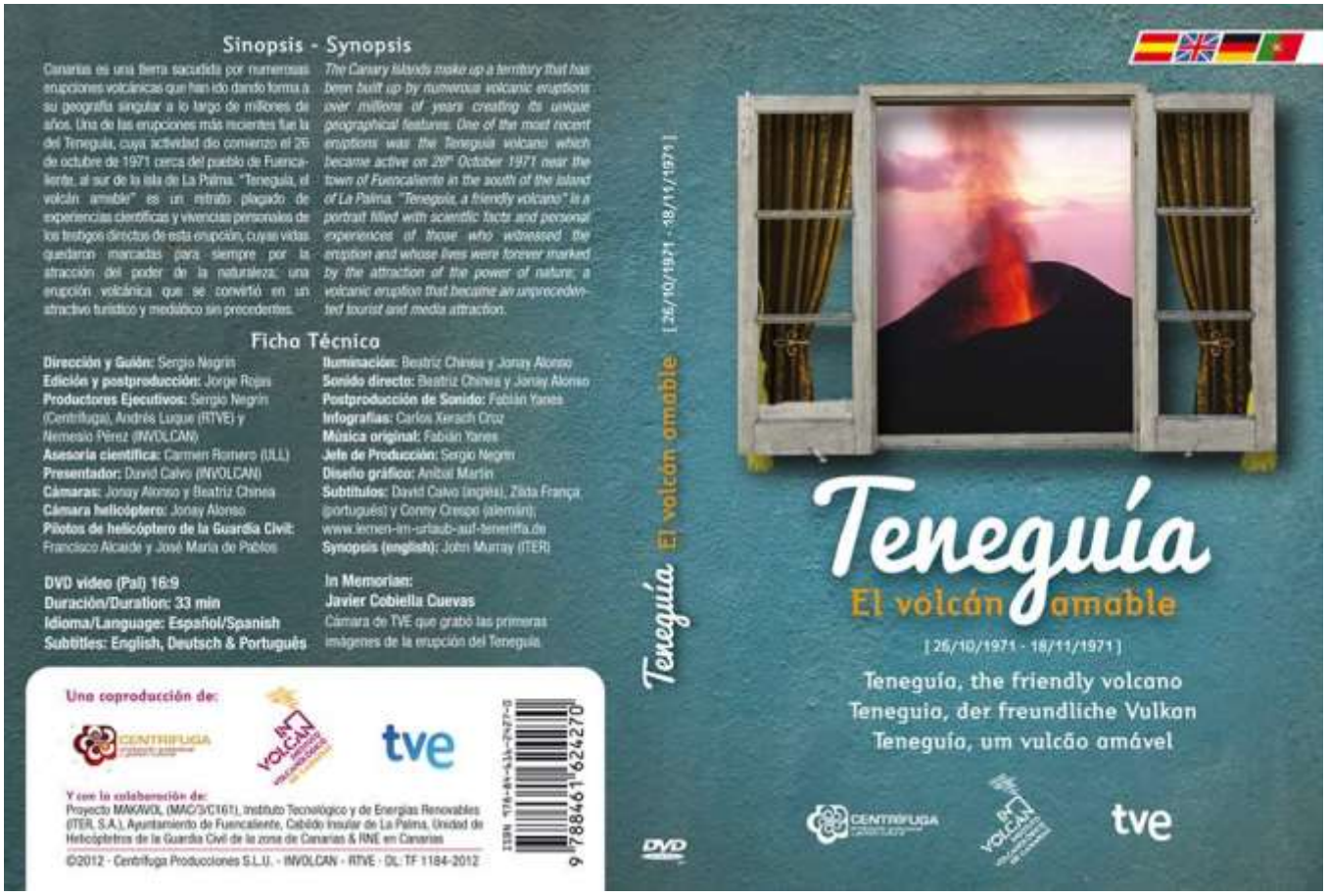
TELEPLANETA is a weekly television program performed thanks to the collaboration of TVE in the Canary Islands. This program aims to educate viewers about the dynamism of the planet we inhabit; a living planet that sometimes threatens not only the lives of individuals but the very sustainability of communities and entire populations. Every Saturday morning, TELEPLANETA addresses the summary of the most important news that natural phenomena have left across the globe, making the aesthetics and the spectacular of the images prevail.

The program TELEPLANETA, presented by one of ITERs geologist David Calvo, and cofinanced by the Spanish Foundation for the Science and Technology, is a product elaborated entirely in the Canaries and for the world thanks to its broadcast every Saturday in Channel 24 hours of TVE. The aim is to steady itself as a "public service" RTVE classified program that helps to raise awareness about the existing relation between Humanity and Planet Earth.

VOLCANO TURISMO Project

VOLCANO TURISMO is a training program framed within the new tourism product "Tenerife volcanoes of life," promoted by Turismo de Tenerife, that is integrated into the Competitiveness Plan "Canary Islands, a volcanic experience" in which the participate the local governments (Cabildos) of Tenerife, La Gomera, Lanzarote and Gran Canaria, along with the General State Administration, the Autonomous Community of the Canary Islands and the Archipelago's hotel associations.

The aim of this comprehensive training program on volcanoes is to provide the different actors involved in the tourism sector of Tenerife with the basic knowledge about the volcanic phenomena and it's potential as a tourism resource. The scenic beauty of the volcanic territories, the possibility of close experiencing the force of nature, the security transmitted when knowing about the existence of actions aimed at reducing the risk in active areas as well as the spiritual and cultural richness of those communities that live in such areas make volcanoes very popular and a growing tourist destination. Tenerife has all these ingredients, and the enhancement of the cultural and volcanological heritage will contribute to the strengthening of the new tourism product "Tenerife volcanoes of life."



Documentary "Teneguía, the friendly volcano"

This new 33 minutes long documentary in Spanish, subtitled in English, German and Portuguese, aims to remind the residents of the Canary Islands about the beauty expressed by the force of nature represented by the volcanic phenomenon. It also brings an insight to the importance of having a good knowledge about the volcanoes in order to reduce the risks and maximize the opportunities that living in such a volcanic region can bring to its population.

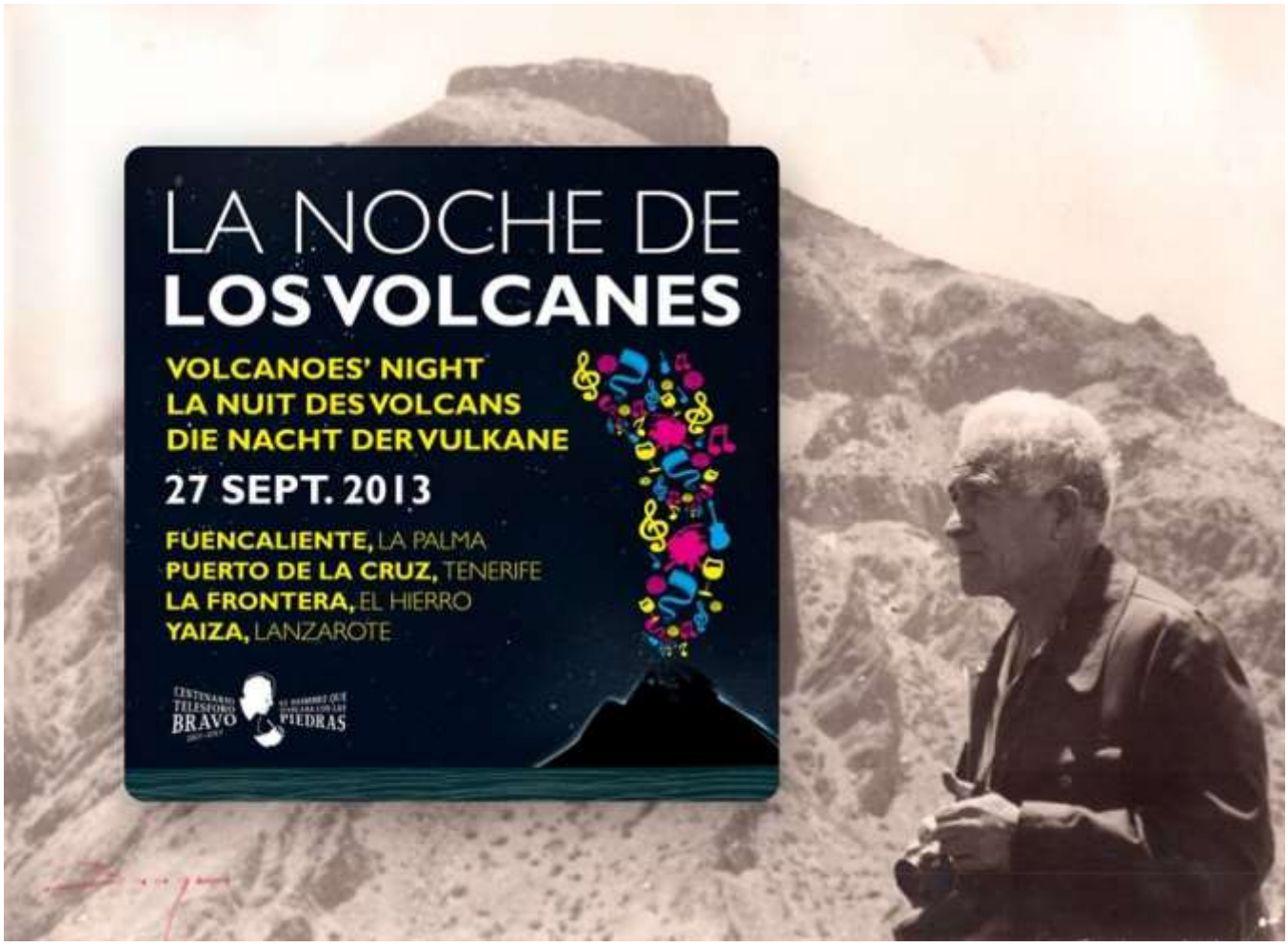
On the other hand, this new documentary aims to contribute to the enrichment of the Competitiveness Plan "Canary Islands, a volcanic experience", and in consequence, strengthen the economic and business environment in the Canary Islands with the promotion of the volcanic phenomenon as a touristic attraction. The Canary Islands make up a territory that has been built up by numerous volcanic eruptions over millions of years creating its unique geographical features. One of the most recent eruptions was the Teneguía volcano which became active on the 26th of October 1971 near the town of Fuencaliente in the south of the island of La Palma.

"Teneguía, a friendly volcano" is a portrait filled with scientific facts and personal experiences of those who witnessed the eruption and whose lives were forever marked by the attraction of the power of nature; a volcanic eruption that became an unprecedented tourist and media attraction. A spectacle of nature worthy of being enjoyed day and night from nearby observation points without apparent danger. But it was also an idyllic setting for scientists; a living laboratory that allowed them to learn for the future.

The Night of the Volcanoes project

The main objective of THE NIGHT OF THE VOLCANOES is to bring the public closer to the researchers that work on the volcanic phenomena allowing the direct interaction meetings and the development of several activities. This celebration gives the attendees, and especially young students, the opportunity to meet researchers in a relaxed and festive setting, which include many activities and will be used to highlight the attractiveness of the volcanic phenomena, as well as a research career on one of the most attractive natural phenomena and rationale of our islands. The second edition of THE NIGHT OF THE VOLCANOES tried to contribute to the commemoration of the birth centenary of Telesforo Bravo (1913-2013), a Canarian volcanologist winner of the Research Award of the Canary Islands in 1989 and the First Gold Medal of the Association for the Science Education " Viera y Clavijo " of the Canary Islands among other several honors. This second edition of NIGHT OF THE VOLCANOES http://www.nochedevolcanes.es/ is one of the 4 projects approved by the European Union to celebrate the "Night of the researchers" for this year 2013 in Spain. The other 3 selected projects will be developed in Zaragoza, Gerona and Madrid.

THE NIGHT OF THE VOLCANOES is part of the activity known as "the night of the researchers," which is always held on the last Friday of September in many European cities, and is organized within the Marie Curie actions that belong to the Seventh Framework Programme for Research and Technological Development of the European Union program.



Visibility plan of the Bioclimatic Houses

ITER has continued with the development of publications about the project and the bioclimatic techniques and continues offering technical guided visits to the bioclimatic houses, as well as guided tours for the general public and for the clients who are staying in them.

A close collaboration with national and international media has been maintained for the dissemination of the project on a larger scale. The project has also been presented at conferences related to energy efficiency in buildings, sustainable architecture, integration of renewable energies and sustainable holiday accommodation and is a good practice benchmark at national and international level, thanks to the recognition of the Habitat Committee of United Nations.

The Overnight stays in the houses have increased from 1610 in 2011 to 3936 in 2013, implying a consistent improvement of the database of the users' bioclimatic satisfaction and a greater knowledge of the project both nationally and internationally.

The official webpage of the bioclimatic houses http://casas.iter.es/ which includes the stay conditions, available services and bookings, received 23,602 visits during 2013. The Facebook page remains as one of the visible aspects of the project by means of the publication of easy-to-apply eco-advices and trying to be an informative and reference point.

Visibility plan of the ALiX project

The visibility plan of the ALiX project has been carried out within the frame of the D-AliX project, which has allowed equipping the Island with the necessary infrastructure to implement the municipal e-government as a citizens' service. This itinerant activity aimed to bring the project closer to the local population in a simple and interactive way, presenting the possibilities that new technologies offer to improve the connectivity by means of the implementation of the NAP's Data Centre.

During 2013, the exhibition "Connection D-ALiX" travelled around twelve municipalities of the island of Tenerife, where the public could see the practical applications of the fiber optic as well as other different educational workshops that show the importance and daily usefulness of the information and communication technologies.

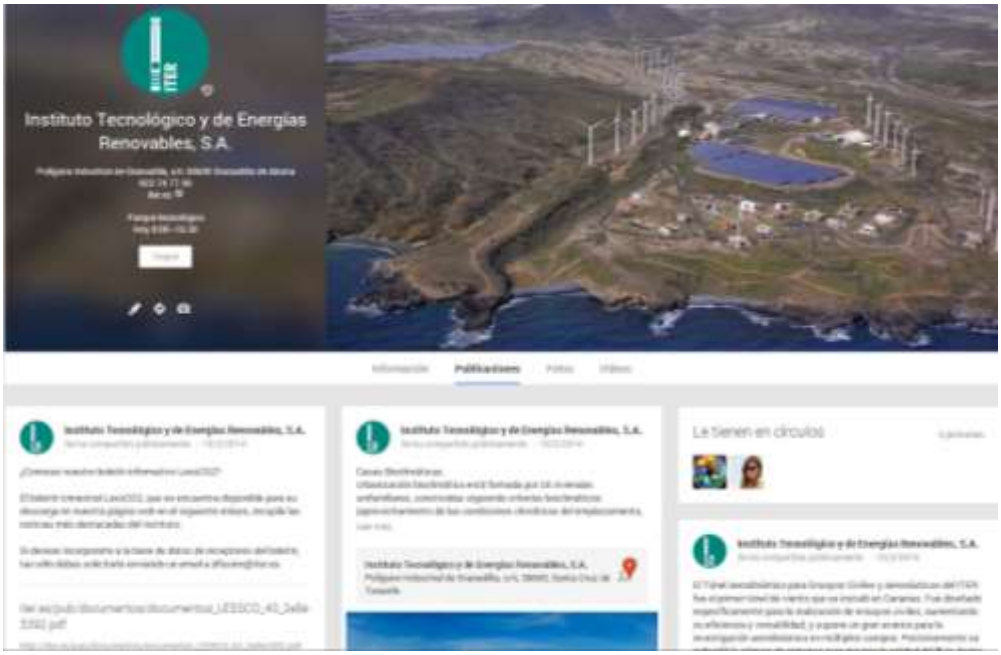
Webpages and Social Networks

Aiming to increase the visibility not only of the Institution but also of some specific projects, several webpages have been created along with their Facebook YouTube channel.

Web Pages

www.iter.es is ITER´s webpage. ITER works to develop and update the web page content, improving navigation and accessibility. Works are still going on to improve the page and get a more dynamic and easier site. The page, available in both English and Spanish, offers a tour explaining the main tasks and projects carried out by the individual departments as well as offering news updates of the activities conducted at the Institute and the possibility of downloading different ITER´s media publications such as the trimester bulletin LessCO2 , and the Activities Report. ITER´s webpage has had 40.157 visits during the year 2013.

Other web pages for specific projects have been developed as well. Among them there is: **D-ALIX** (www.d-alix.com) and **Bioclimatic Houses** (www.casas.iter.es).



Social Networks

Aware of the importance that social media have become and with the aim of providing with the broadest possible coverage to the dissemination of activities and projects, ITER has created official profiles in several social media as Facebook, Twitter, Google +, LinkedIn and YouTube.

Facebook: www.facebook.com/itertenerife.

Twitter: twitter.com/ITERtenerife

Google +: google.com/+ITERtenerife

LinkedIn: www.linkedin.com/company/instituto-tecnl-gico-y-de-energ-as-renovables

YouTube: www.youtube.com/itertenerife

Open Door Days

ITER knows the importance of promoting the scientific culture among the population and therefore periodically celebrates "ITER´s Dissemination Days". During these days the visitors can go into facilities that are normally closed to the public and learn and participate in activities and projects that are being carried out.

As in previous year, ITER has continued disseminating and participating in the ENERGY DAYS initiatives in 2013, both in the European Sustainable Energy Week (EUSEW) and in the European Solar Day.

Within the EUSEW 2013, ITER organized Guided Visits to the Technological Walkway and the Bioclimatic Houses in collaboration the Tenerife Energy Agency. The EUSEW was launched by the European Commission in 2005 as a key event for

the promotion of renewable energy and energy efficiency within the European Campaign "Sustainable Energy for all". Therefore, to participate in this event is a recognition to the role of this equipment and its promoters in achieving a sustainable energy future for the island of Tenerife.

The main objective of this event was to make the population aware of the importance of the bioclimatic techniques and the integration of renewable energies by mean s of ITER's educational and informative equipment. As in previous editions, this event was very well received.

ITER participated for sixth year in a row in the European Solar Days. This event is an initiative within the Intelligent Europe

Program of the European Commission, which is coordinated by the European Federation of the Thermal Solar Industry (ESTIF) in collaboration with European Photovoltaic Industry Association (EPIA). The aim of this event is to stimulate the population's awareness about the importance of the use of solar energy.

ITER participated in this event in 2013 with the organization in collaboration with the Tenerife Energy Agency of open days to show the different technologies for the use of solar energy and its integration in buildings. The Open days for this year included guided visits to the Pilot photovoltaic plant of the solar platform SOLTEN, to the Technological walkway and to ITER's Bioclimatic Houses. The Open days lasted four days and received more than 200 people.

In addition to promoting the participation in European events, ITER is also committed to the popularization of science at national level. To that end, apart from participating in other events within the Science Weeks promoted by the FECYT, ITER hosted in November 2013 the activity "Guided visits to a sustainable house: PROMISE project" organized by the Tenerife Energy Agency. During the guided visits, which attracted 220 participants, energy experts showed the energy saving and energy efficiency solutions implemented in the house and explained the importance of energy efficient habits, so that visitors can implement similar energy saving solutions and measures in their own house (http://www.ieepromise.eu/).

Seminar "Efectos del Cambio Climático en los Recursos Naturales del Área de Cooperación Territorial del Atlántico". March 6th and 7th, 2013. La Laguna, Tenerife.

Organized by the project CLIMATIQUE, a cooperation project between the Canary island and the Souss Massa Drâa region (Morroco). In this seminar, top level speakers explained the Climate Change adaptation and mitigation policies that are currently being developed, both at European, national (Spain-Morocco) and regional level (Souss Massa Draa and Canary Islands).

Participatory workshops on Climate Change Adaptation and Mitigation in the Area of the Atlantic Territorial Cooperation. March 7th, 2013. La Laguna, Tenerife.

Organized by the project CLIMATIQUE, a cooperation project between the Canary island and the Souss Massa Drâa region (Morroco).In these workshops, top level experts of institutions form Europe, Spain, Canary Islands, Morroco and Souss Massa Drâa shared their views, experiences and studies on Climate Change and participated in several participatory workshops in order to find possible consensual solutions to mitigate Climate Change.

Innovation Forum Fi2(IV Foro de InnovAcción-IV Foro TF Invierte). March 21st, 2013. TEA Tenereife Espacio de las Artes, Santa Cruz de Tenerife.

Organized by the TF Innova programme and the Scientific and Technological Park of Tenerife. ITER had a stand in the institutional area and another one in the exhibition area where samples of fiber optic cable was shown as well as an experiment to explain how information is transmitted through the fiber optic.

Technical meeting with the service for Sub-Saharan Africa of the Ministry of Economy and Competitiveness. June 11th, 2013. Madrid

ITER technicians met with Ms. Nuria Santos Morais, the Head of the Service for Sub-Saharan Africa of the Ministry of Economy and Competitiveness (MINECO) of the Government of Spain. Part of the meeting was devoted to presenting the project Macsen-PV and some of the results/materials developed within this project.

15th edition of the International Forum "Africa Energy Forum". June 18th-20th, 2013. Barcelona.

ITER participated in the institutional stand of the Canary Islands, Canary Islands - Energy partner for Africa, coordinated by Casa Africa. With this slogan and grouped into a single stand, the institutions for the promotion of the Canary Islands as a logistics platform to Africa and the institutions specialized in technology that work in the archipelago were jointly promoted in this Forum, the largest event on energy issues held in Africa. With the participation in this Forum, ITER promoted the strategic geographical position of the Canary Islands and its expertise in renewable energies as a reference when establishing energy relations with the African continent both from Europe and from America.

Roundtable on environmental sustainability, energy, water, R & D and ICT of the project AFRICAN. July 4th, 2013. Tenerife, Spain.

The roundtable brought together representatives of entities related to this sector in the Canary Islands together with representatives of the governments of Mauritania, Senegal, Cape Verde and Morocco with the aim of achieving a common strategy for the operational program 2014-2020. ITER participated in this roundtable with an oral presentation about the major cooperation projects that ITER is carrying out and the possibilities for future collaborations for the development of projects in the field of renewable energies and sustainability. In addition, representatives of the governments of Mauritania, Cape Verde and Morocco visited ITER's facilities and installations.

X Seminar of the working group of the Ministry of Environment and Rural and Marine: "Respuestas desde la comunicación y la educación frente al cambio climático". October 14th-16th, 2013. Segovia, Spain.

This seminar provides a forum for reflection, work and experiences' exchange between the people and institutions that work on the development of programs and awareness campaigns, education and citizens' participation on Climate Change. ITER presented the application "Eco-Calc", a smartphone application for home energy saving that has been developed by ITER for AIET within the frame of the PROMISE project.

2º 2nd Congress "Pi ESPECIAL" on interactive platforms for special education. October 16th-17th, 2013. Tenerife, Spain.

This conference organized by the Municipality of Candelaria was held as part of the project "PIESPECIAL" for the promotion of research, technological development, innovation and information society that is framed within the Transnational Cooperation Programme Madeira-Azores-Canary Islands 2007 - 2013 and co-financed by the European Regional Development Fund . ITER presented in this conference the projects TICa, DiLO, adapro and ADVANT.

Canary Islands Science and Innovation Weeks 2013. November 7th-24th, 2013. La Laguna, La Orotava and Granadilla, Tenerife.

ITER organized and participated together with the Tenerife Energy Agency (AIET) and the Volcanology Institute of the Canary Islands (INVOLCAN) in several events during the celebration of the Science Weeks 2013.

The institute participated in the X Science Fair of La Orotava, which took place on the 3rd of November in La Orotava. Some of the activities carried out in this fair were: workshops on energy saving for households, projection of several documentaries and of the TELEPLANETA programs and an experiment on the data transmission through fiber optics. Furthermore, ITER showed graphic information about the D-ALiX initiative as the brochure about the deployment of the fiber optic ring in the island of Tenerife.

ITER also collaborated with AIET in the activity "Guided visits to a sustainable house: PROMISE project" that where organized at ITER's facilities on November 2013 within the frame of the PROMISE project, "Promoting best practices to support energy efficient consumer behavior on European islands"

Finally, ITER participated in the R + D Minifairs, which took place in Santa Cruz de Tenerife on November 21-23, 2013 and where one of the solar plane's prototypes that ITER has developed in the frame of the project "PRONTAS - Unmanned Solar Plane prototype" was exhibited. Besides, he documentaries produced by INVOLCAN were projected and a workshop on energy saving for households framed within the PROMISE project was carried out.

Communications and Spreading/Scientific Publications

CORPORATIVE PUBLICATIONS

ITER's trimester bulletin "LessCO_2". This bulletin is published on ITER's webpage and is sent by email to more than 400 organizations.

ITER's annual activities report. The report is available on ITER's webpage and includes the most important projects and activities carried out throughout the year.

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SPREADING PUBLICATIONS

Including Gamification Techniques in the Design of TANGO:H Platform. Carina S. González-González, Pedro Toledo-Delgado, Miguel Padrón, Elena Santos, Mariana Cairos: Jurnal Teknologi (Sciences & Engineering). 63:3 pp 77–84. eISSN 2180–3722. ISSN 0127–9696.

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Diseño e implementación de un prototipo de comunicador para dispositivos móviles orientado a personas con diversidad funcional. Revista: Revista Iberoamericana de Sistemas, Cibernética e Informática RISCI, volumen 9 - número 1 - año 2012, páginas: 65-70, ISSN: 1690-8627. International Institute of Informatics and Cybernetics.

Caso en Detalle: Microrredes Fotovoltaicas en Senegal y el proyecto MACSEN-PV. Libro: Energías Renovables en África Occidental: estado, experiencias y tendencias (2013). ECREEE, Casa África e ITC. Editado en cuatro idiomas: español, francés, inglés y portugués. (versión española incluida en el capítulo 2 "Potencial y Tecnologías de EERR en África Occidental", páginas 280 – 291. ISBN: 978-84-8198-1).

TANGO :H: Creating active educational games for hospitalized children. Autores: Carina S. González, Pedro Toledo, Miguel Padrón, Elena Santos, Mariana Cairos. Management Intelligent Systems. Advances in Intelligent Systems and Computing Volume 220, 2013, pp 135-142. Print ISBN: 978-3-319-00568-3, Online ISBN: 978-3-319-00569-0, Series ISSN: 2194-5357. Springer International Publishing.

International Conferences organized

International Meeting on Island Volcano Risk Management - MAKAVOL 2012 EL HIERRO (El Pinar, October 10th-15th, 2012). This conference was organized to commemorate the 1st Anniversary of the submarine eruption of El Hierro 2011-2012 (125 attendees from 20 countries).

Doctoral and Master's Thesis defended

Detection and measure of anthropogenic and natural air pollution emissions by means of optical remote sensors. Physics Faculty, University of La Laguna (ULL). PhD student: José Barrancos (ITER). Directors of the doctoral thesis: Dr. Nemesio M. Pérez (ITER), Dr. Pedro A. Hernandez (ITER) and Dr. Susana Briz (Univ. Carlos III).

Diffuse He emission from of São Miguel volcanic systems, Azores. Faculty of Chemistry, University of La Laguna (ULL). Master Student: Iñigo Hernandez (ITER). Directors of the research for the Master Thesis: Dr. Nemesio M. Pérez (ITER) and Dr. Pedro A. Hernandez (ITER).

Energy Production

Photovoltaic Installations

SOLTEN I

SOLTEN II

Finca Verde

Finca Roja

Mercatenerife 1

Pilot Plant

Bodega Comarcal de Tacoronte

Wind Energy Installations

Experimental Platform

4,8MW Wind Park

5,5MW Wind Park

Energy Production

ITER Group executes projects both of photovoltaic plants and of wind parks.

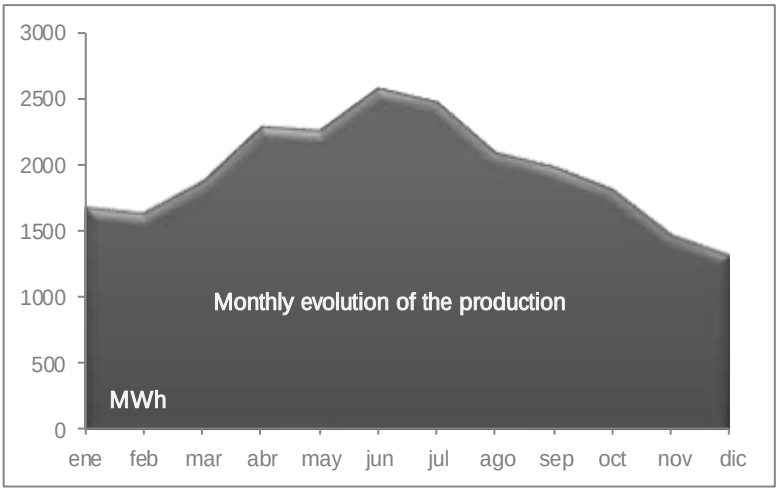
In the photovoltaic field, the Group has carried out the installation of 41MW, which corresponds to 46 % of the total photovoltaic power installed in the island.

As for the wind power, the Group owns 13,16MW distributed in three wind parks and, after the power appointment in the last wind energy contest, ITER will install three new wind parks that will add up to a total of 53,6MW of wind power installed in Tenerife.

Below is the energy production information regarding the year 2013 and all the installations of Group ITER.

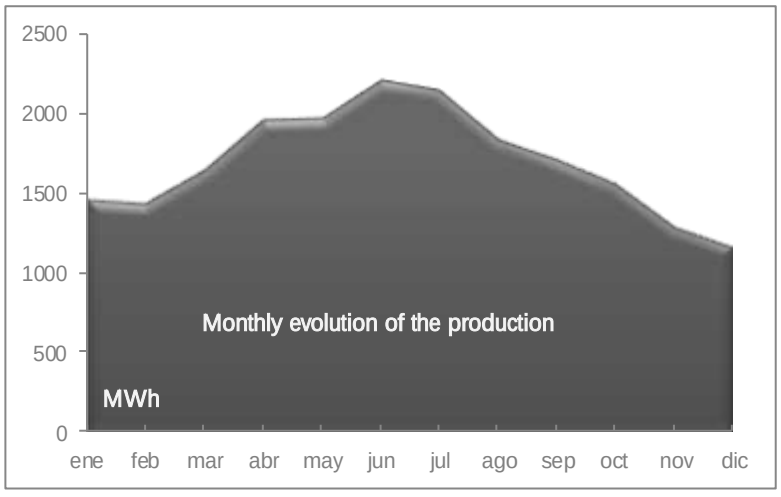
Photovoltaic Installations

SOLTEN I



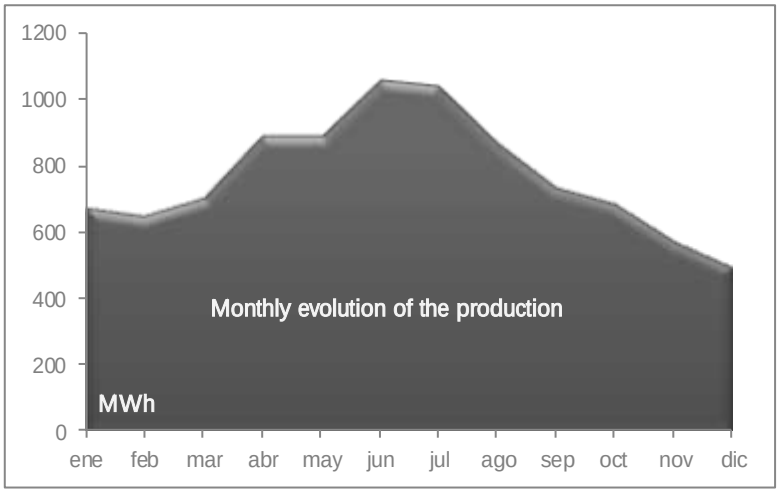
Installed power 13.000 kW
Generated Energy 23.649 MWh
ITER´s participation 400 kW
Equivalent consumption 27.995 persons
Tons of CO_2 emissions avoided 13.133 tons

SOLTEN II



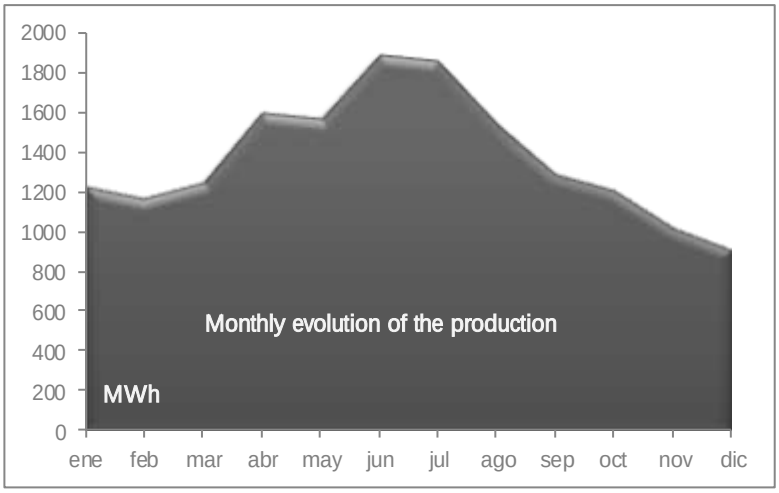
Installed power 11.000 kW
Generated Energy 20.387 MWh
ITER´s participation 20,75 %
Equivalent consumption 24.133 persons
Tons of CO_2 emissions avoided 11.321 tons

Finca Roja



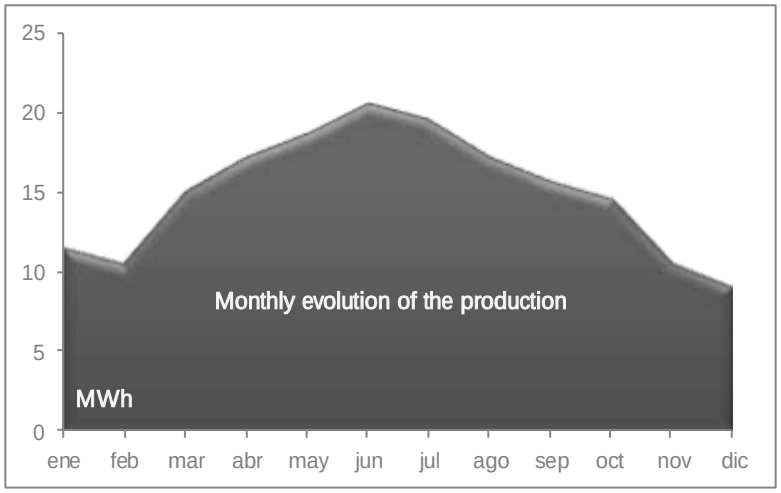
Installed power 5.000 kW
Generated Energy 9.284 Mwh
ITER´s participation 39,94 %
Equivalent consumption 10.990 persons
Tons of CO_2 emissions avoided 5.156 tons

Finca Verde



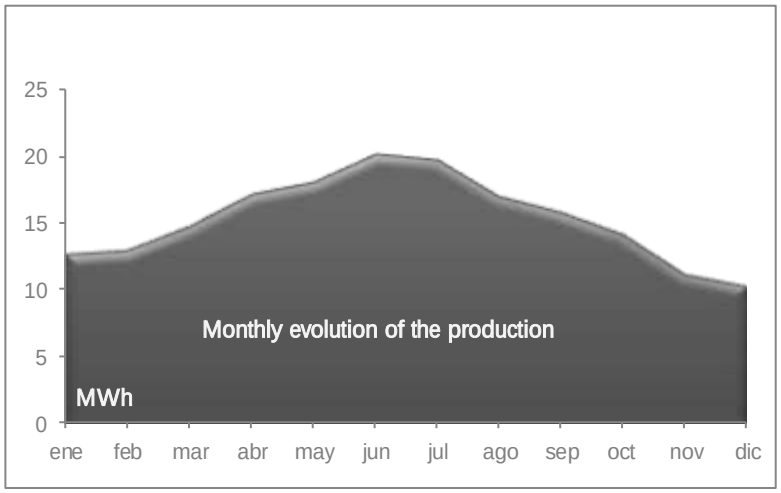
Installed power 9.000 kW
Generated Energy 16.564 MWh
ITER´s participation 30 %
Equivalent consumption 19.607 persons
Tons of CO_2 emissions avoided 9.198 tons

Mercatenerife 1



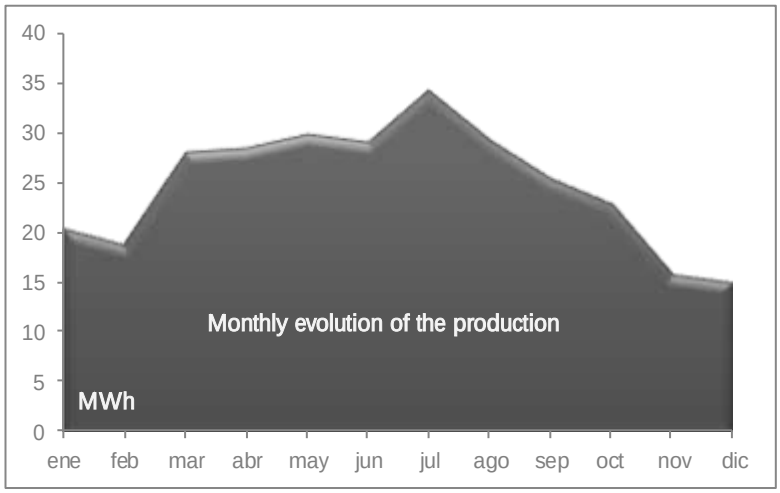
Installed power 100 kW
Generated Energy 180 Mwh
ITER´s participation 100 %
Equivalent consumption 213 persons
Tons of CO_2 emissions avoided 100 tons

Pilot Plant



Installed power 5.500 kW
Generated Energy 185 MWh
ITER´s participation 100 %
Equivalent consumption 219 persons
Tons of CO_2 emissions avoided 103 tons

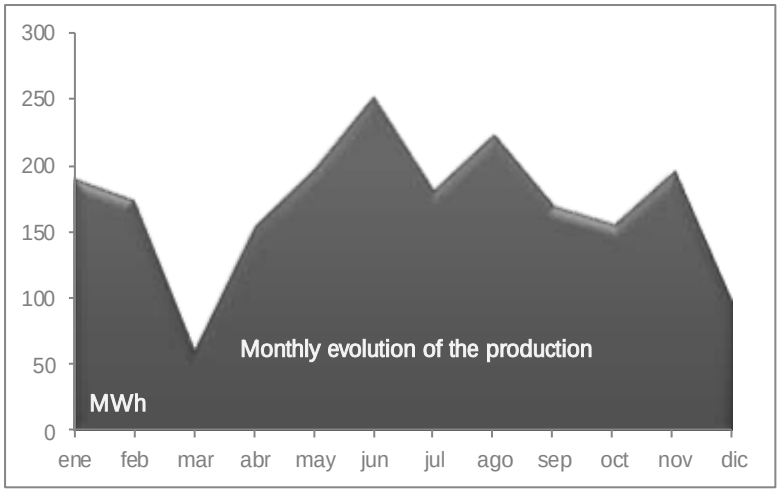
Bodega Comarcal de Tacoronte



Installed power 200 kW
Generated Energy 297 MWh
ITER´s participation 100 %
Equivalent consumption 352 persons
Tons of CO_2 emissions avoided 165 tons

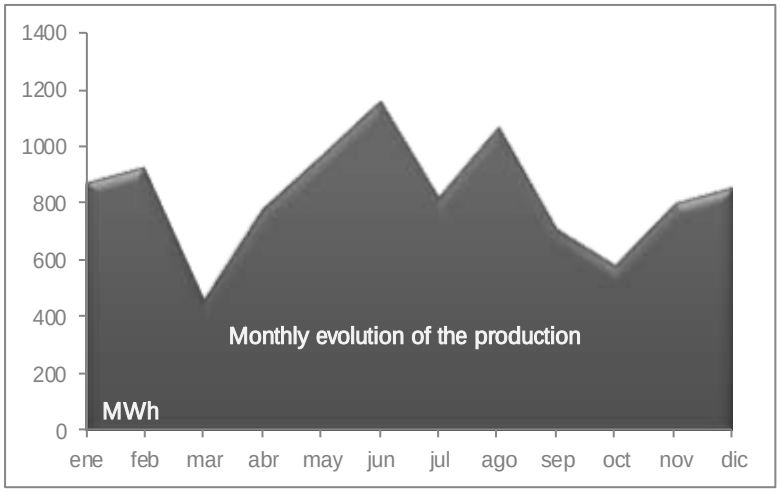
Wind Energy Installations

Experimental Platform



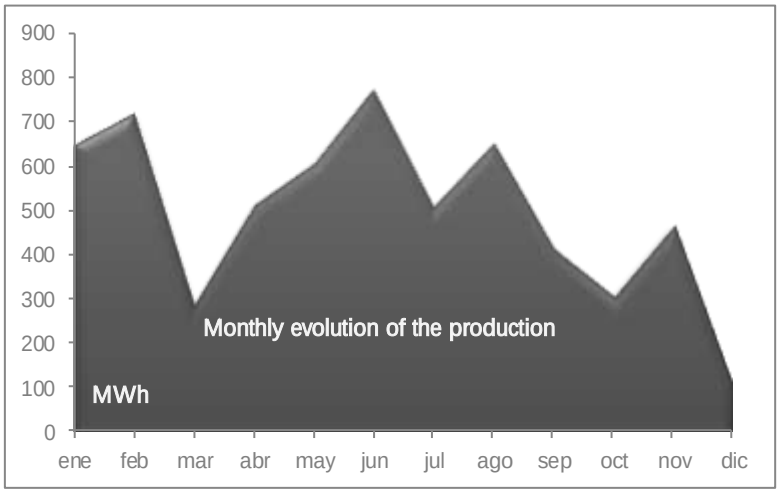
Installed power 1.800 kW
Generated Energy 2.052 Mwh
ITER´s participation 75,26 %
Equivalent consumption 2.429 persons
Tons of CO_2 emissions avoided 1.139 tons

4,8MW Wind Park



Installed power 4.800 kW
Generated Energy 10.004 Mwh
ITER´s participation 50 %
Equivalent consumption 11.842 persons
Tons of CO_2 emissions avoided 5.555 tons

5,5MW Wind Park



Installed power 5.500kW
Generated Energy 6008 MWh
ITER´s participation 100 %
Equivalent consumption 7.112 persons
Tons of CO_2 emissions avoided 3.336 tons

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