
21
ANNUAL
REPORT
TSK


TSK

"Solutions for a sustainable world"

INDICE

LETTER FROM THE CHAIRMAN

Sabino García Vallina

In my capacity as Chairman of TSK, it is a pleasure for me to present to you the 2021 Annual Report, which includes a summary of our activities, business, strategies and corporate policies during the year, thanking you once again for the recognition and trust of our customers, partners, suppliers and collaborators.

I would also like to begin this year's letter of presentation by congratulating the TSK team for the achievements made and thanking them for their commitment, effort and dedication, which has enabled us to position ourselves as a benchmark in the sector.

In a once again complex and demanding environment, especially in our sector, TSK has once again demonstrated its capacity to adapt. We closed the financial year 2021 with a positive balance, based on the recovery of all the business lines. We have achieved sales of 568 million euros, slightly higher than in 2020, and in 2022 we will return to figures similar to those prior to the pandemic.

We are all inevitably immersed in and influenced by our environment, but as far as TSK is concerned, we have once again ended the year with a historic figure for contracting, 965 million euros, and we have started 2022 with important commercial success, which positions us with a portfolio of more than 2,500 million euros.

Despite these good results, we have been exceptionally and non-recurringly affected for the second consecutive year by the impact of the pandemic, which has penalised us in a very significant way by incurring very significant cost overruns in the execution of projects, cost overruns that fortunately will no longer occur during the 2022 financial year.

I am particularly proud to be able to point out that during 2021 we increased the workforce and we will fortunately continue to do so during the current financial year thanks to the workload we currently have. I would also like to highlight that in these two years of pandemic we have been able to overcome a difficult economic environment, affected by restrictions, cost increases and global geopolitical tensions, with 2021 being a crucial year for TSK from a strategic, operational and financial point of view, satisfactorily solved as shown by the results obtained and where our values and our vision have served as a guide. Vision and values that are still more valid today than ever. Innovation is a fundamental pillar of TSK's identity and corporate culture, for everyone who forms part of this company, innovation is the guiding thread of our activity. Excellence, we understand that in the global

ATINKOU 420MW Combined Cycle Power Plant (Ivory Coast)

world in which we find ourselves, we can only cope with the challenges we face by seeking excellence in our actions at all times. Commitment, collaboration, respect, enthusiasm and passion, values that are reflected in every aspect of our business and throughout the organisation.

In short, we are very well positioned to continue to create sustainable value for our customers. Over the next few years, we will continue to benefit from the growth of the global energy market, both renewable and gas-fired, the development of sustainable infrastructures and the digitalisation of the economy. In 2021, despite economic uncertainties, we will record very significant growth. To this end, we have excellent technical resources, a solid financial structure and, above all, more than 1,000 people who work every day with the greatest enthusiasm to meet all our challenges around the world, with a profile of an innovative, global and responsible company.

"IN 2022 WE WILL RECOVER THE PREVIOUS SALES LEVEL PRIOR THE PANDEMIC"

CORPORATE STRATEGY

Joaquín García Rico - CEO

We will all agree that 2021 has once again been a very demanding and complicated year to manage. A hard, strange and difficult year that has reaffirmed that the real strength and the greatest value of TSK are the people who make it possible with their work and daily commitment.

During 2021 we have updated our Strategic Plan once again to adapt it to this devilishly changing reality, which tests us every day. The axes that have been defined speak about the search for an increasingly technological company profile that allows us to differentiate ourselves from our competitors and at the same time be more selective in the projects to be executed, focusing on industry decarbonisation, renewable energies, energy storage and digitalisation at a global level.

During the last financial year we have reached a record contracting of 965 million euros, with very significant awards due to their relevance from a geographical, economic or technological point of view.

In the energy sector, we have returned to Mexico and Mozambique. In Mexico, we are currently participating in the execution of seven combined cycle plants in consortium with companies such as Siemens Energy, Mitshubishi Power and Técnicas Reunidas. These new combined cycle plants will contribute to a substantial improvement in the energy matrix of the Mexican electricity system, as they will allow it to continue to reduce the contribution of the most polluting electricity generation plants, such as heavy liquid fuels, thus helping to decarbonise the Mexican electricity sector.

In the case of Mozambique, after completing the O&M of the Ressano Garcia generation plant after 7 years, we returned to the country to develop another combined cycle plant with a capacity of 400 MW.

With these new contracts, the combined cycle plant backlog currently under execution exceeds 5 GW between plants in Mozambique, Togo, Ivory Coast and Mexico.

Furthermore, ENEL Green Power, a world leader in the renewable energy sector and one of the most important photovoltaic energy producers in the world, has signed a Framework Agreement with TSK for the construction of up to 2,000 MW of photovoltaic plants in Spain over the next 3 years as part of the pipeline of short to medium-term projects currently in ENEL Green Power's backlog.

TSK becomes part of the small and select list of Spanish companies to sign this type of agreement with the Italian group,

"WE HAVE STARTED 2022 REACHING € 800 M IN NEW CONTRACTS, 85% OF OUR TARGET FOR THE WHOLE YEAR"

which has been reached after a long and thorough certification process completed in October 2021.

With regard to Handling and Mining, our subsidiary PHB Weserhütte continues to execute world reference projects such as the project awarded by Real Madrid for the design and supply of the facilities for the movement and storage of the pitch of the new Santiago Bernabeu stadium, which consists of a complex transport system that allows the pitch to be stored in 35-metre deep pits where the grass is maintained, this in turn allows the stadium to be used for other sporting or cultural events without damaging the pitch, all with a fully digitalised system that allows variables such as the humidity and temperature of the grass to be controlled at all times.

Also in 2021 PHB Weserhütte has been awarded a contract for the material transport facilities at a copper smelting plant in Southeast Asia comprising a ship unloader, ship loader and conveyor belt system within the port as well as the material handling system that will connect the port facilities to the new smelting plant.

It is also important to highlight that in 2021 a Syndicated and committed Line of Guarantees has been signed for 520 Million Euros, where a syndicate of 9 Spanish financial institutions formed by Banco Santander, Caixabank, ICO, BBVA, Banco Sabadell, Abanca, Cajamar, Bankinter and Unicaja, coordinated by Banco Santander as Sole-Bookrunner and with Caixabank and Banco Santander as Lead Entities, which reaffirms the support, once again, of the financial sector to our company.

After a successful 2021, we have started 2022 with important commercial successes that mean that as of 31 March this year we have reached a contracting of more than 800 million euros, 85% of our target for the whole year, with an increasingly diversified activity both geographically and by sector, which allows us to face the coming years with guarantee and confidence.

Today we have projects underway in renewable energy, conventional energy, energy storage, hydrogen, environment, electricity infrastructure, steel, food, mining, ports and digitalisation, which protects us from potential regional or sectoral crises and with a record backlog of EUR 2.5 billion.

All of the above makes TSK a company of world reference, prepared to shape the future without being conditioned by the particular circumstances of each moment, seeking to be more efficient, committed to more sustainable development and reinforcing our social aspect. We are going to dedicate ourselves to all of this with our maximum effort and enthusiasm.

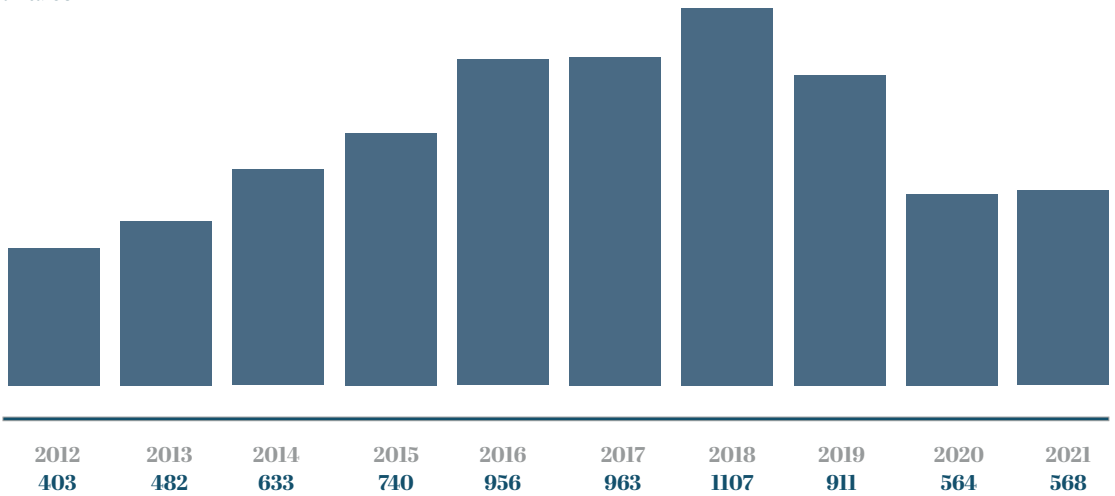

Highview
Power


TSK

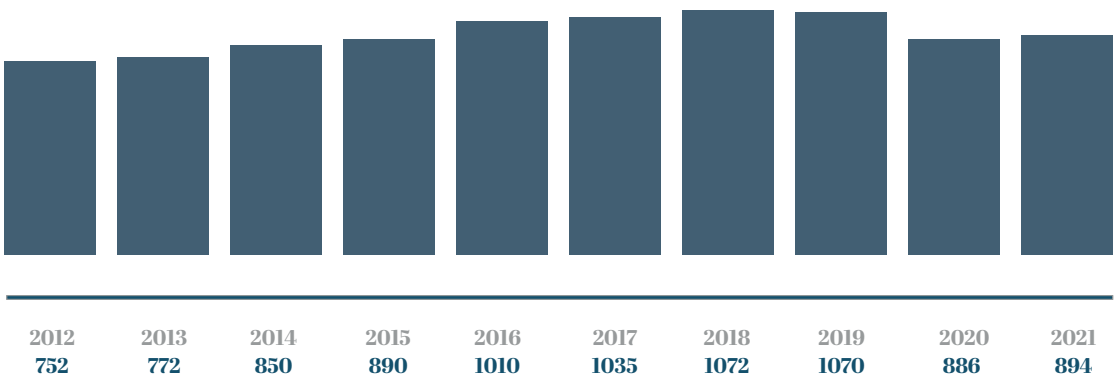
MAIN FIGURES

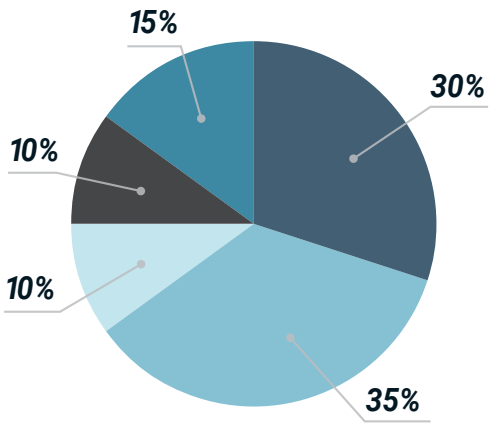
TURNOVER

#Million Euros



NUMBER OF EMPLOYEES



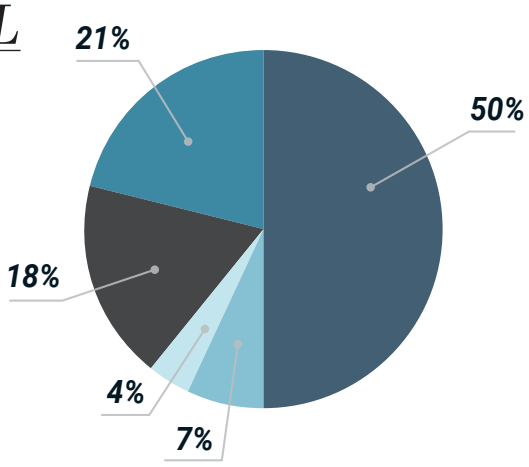


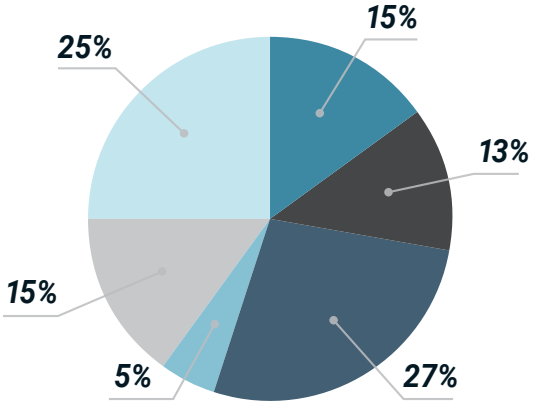
SALES BY SECTORS

- Conventional Power
- Industry
- Electrical Infrastructures
- Handling
- Renewable energy

DISTRIBUTION OF PERSONNEL

- Technology
- R+D+i
- Corporate Services
- Project Management
- Production





SALES BY MARKET

- Europe
- North America
- Latin America
- Asia
- Middle East
- Africa

4 KEY FEATURES

Over 35 years of experience in the industrial and energy sector

One of the international companies with more references in projects in energy, industrial, handling, electrical infrastructures and environment sectors

Adequate financial capacity to handle large projects

Proven technical capacity and highly qualified personnel

Proven experience in O & M. (Operations and Maintenance) of industrial and energy plants

Balanced growth and compensation between business lines

Agreements with the leading industrial technologists

Own technology in various fields

OUR MANAGEMENT´S ESSENTIAL IDEAS

CUSTOMER ORIENTED AND FOCUSSED

MANAGEMENT COMMITMENT AND LEADERSHIP

PERSONAL DEVELOPMENT OF OUR EMPLOYEES

STRATEGIC PLANNING

PERSONNEL INVOLVEMENT

HEALTH AND SAFETY AT WORK

R&D+i

KNOWLEDGE MANAGEMENT

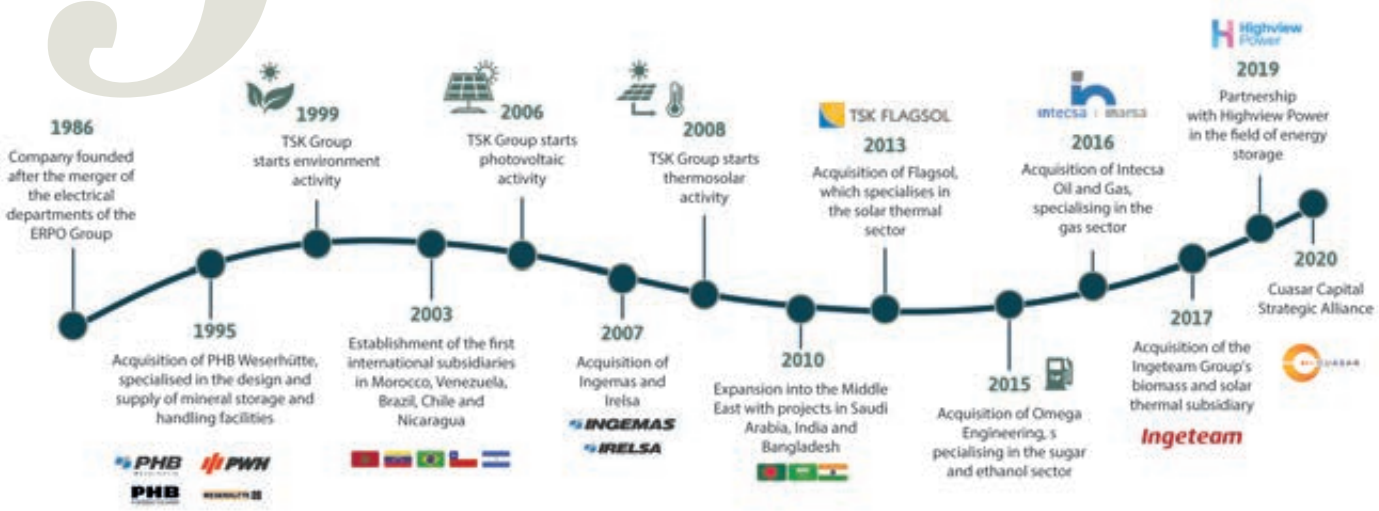
RESPECT FOR THE ENVIRONMENT

COMMITMENT TO QUALITY

CONTINUOUS IMPROVEMENT

ORURO 100 MW Solar Park. ORURO I y II PV Plants (Bolivia)

5 MOST SIGNIFICANT MILESTONES



The accumulated experience of the companies incorporated into TSK totals ***more than 200 years.***

Lider in renewable energy
wind, solar, green hydrogen, geothermal, hydro and biomass

In-house ***hybrid plants*** *and* ***energy storage technology.***

More than 1,000 projects *executed in* ***more than 50 countries.***

+ ***25.000 MW*** *executed.*

Driving ***Digital transformation*** *and* ***sustainable development.***

Presence in the ***main industrial sectors:***
steel, cement, fertilisers, mining, gas to power, food, paper, ports

CARRASCO 230 / 500 kV Substation (Bolivia)

6 CORPORATE STRUCTURE

TSK

CORPORATE SERVICES

Economic - Financial Management

Talent and Organisation Management

Legal Services Directorate

Digitisation Management

Commercial Management

R&D+i Management

Purchasing and Subcontracting Management

Business Development Management

TSK

HYDROGEN
ELECTRICAL INFRASTRUCTURES
DIGITAL INNOVATION
POWER
INDUSTRY
ENVIRONMENT
GAS TO POWER

PHB Weserhütte

HANDLING AND MINING

ESERSA CUASAR

CONCESSIONS

7 MANAGEMENT

Sabino García Vallina
Chairman

Joaquín García Rico
CEO

Andrés Cuesta Larré
Managing Director Power & Industrial Plants

Carlos Ruiz Manso
Managing Director Electrical Infrastructures

Pedro Suárez lópez
Managing Director Technology & Proposals

Arturo Betegón Biempica
PHB Weserhütte CEO

Ricardo González Martínez
Managing Director Digital Innovation

Beatríz García Rico
TSK Chief Financial Officer

Sara Fernández - Ahuja
Talent and Organization Managing Director

Ana Isabel Bernardo Pérez
Managing Director Audit and Project Control

Santiago del Valle
Business Development Managing Director

Alfonso Targhetta Codes
Managing Director Purchasing, Subcontracting and Logistic

Ignacio De La Puente
Managing Director Risk Management

Diego Fente Vázquez
Corporate Managing Director

Alan Cortizo Suárez
Chief Commercial Officer AMEA

Pablo García Fernandez
Chief Commercial Officer America

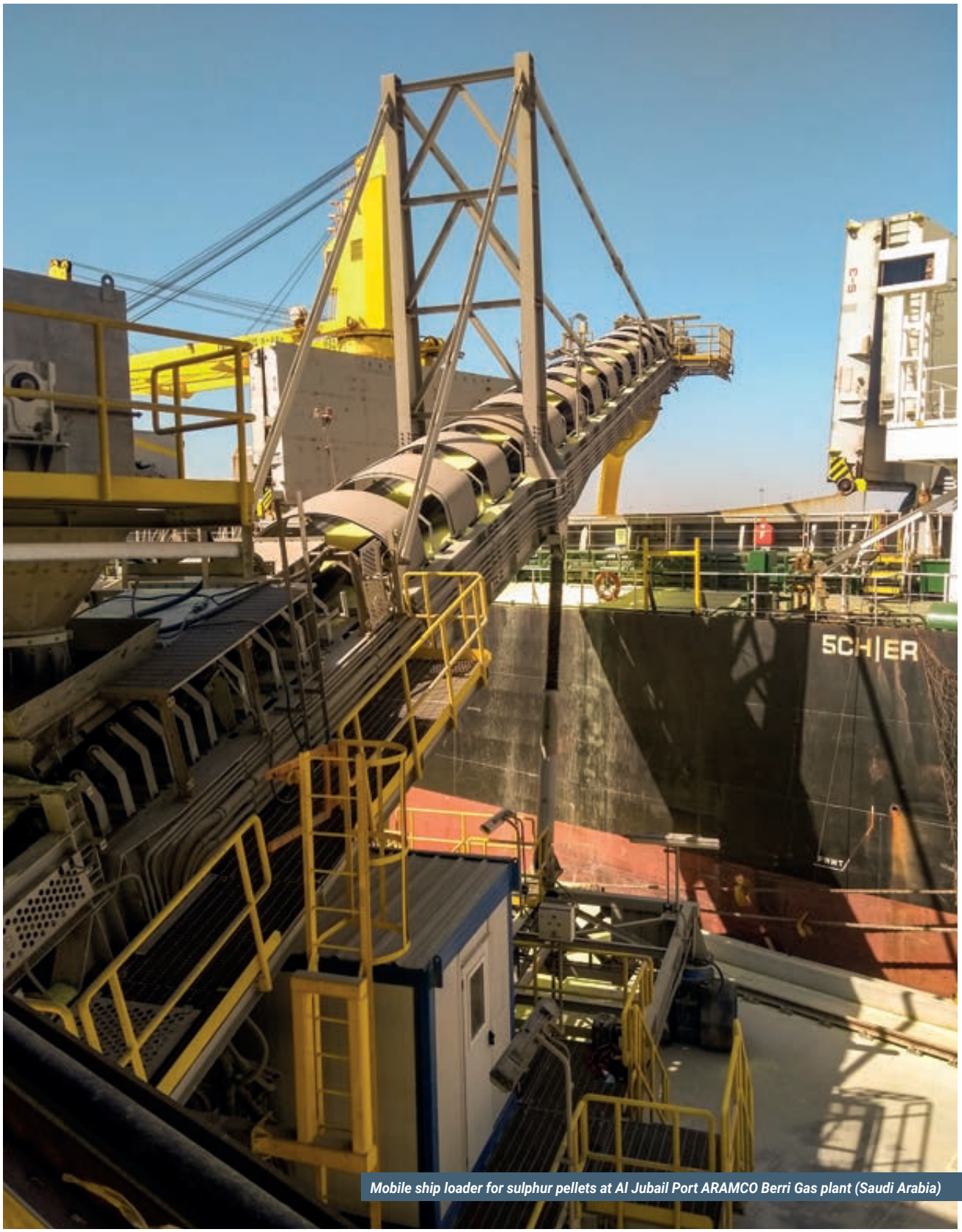
José María González Fernández
Managing Director Chairman´s Office

Raúl Nodal Monar
Secretary General

Carmen Rodríguez López
Compliance Manager

MAIN PROJECTS IN PROGRESS

200 MW IVIRIZU Hydroelectric Power Plant	ENDE Valle Hermoso	Bolivia
BETA 280MW Wind Farm	EDP Renovaveis	Colombia
ALPHA 212MW Wind Farm	EDP Renovaveis	Colombia
SANTANASOL 65MW Photovoltaic Plant	AES DOMINICANA	Dominican Republic
ATINKOU 420MW Combined Cycle Power Plant	ERANOVE	Ivory Coast
Sistema cintas transportadoras. Planta de fertilizantes OCP	Jacobs	Morocco
EL SAUZ 300 MW Combined Cycle Power Plant	CFE	Mexico
GONZÁLEZ ORTEGA 650 MW Combined Cycle Power Plant	CFE	Mexico
MERIDA 500 MW Combined Cycle Power Plant	CFE	Mexico
SALAMANCA 1000 MW Combined Cycle Power Plant	CFE	Mexico
SAN LUIS DE POTOSI 450 MW Combined Cycle Power Plant	CFE	Mexico
SAN LUIS RÍO COLORADO 650 MW Combined Cycle Power Plant	CFE	Mexico
VALLADOLID 1000 MW Combined Cycle Power Plant	CFE	Mexico
CUAMBA 18 MW Hybrid Solar Power Plant	GLOBELEQ	Mozambique
TEMANE 450MW Combined Cycle Power Plant	GLOBELEQ-SASOL-EDM	Mozambique
Coke and sulphur handling system Duqm Refinery	Petrofac	Oman
Pitch Automation System Santiago Bernabéu Stadium	Real Madrid Futbol Club	Spain
Bulk solids system Alicante Port	Eiffage	Spain
Photovoltaic Plants	Enel Green Power	Spain
KILOMBERO Sugar Project	Illovo Sugar Company (British Sugar – ABF)	Tanzania
KEKELI EFFICIENT POWER PLANT 65 MW Combined Cycle Power Plant	ERANOVE	Togo
Maritime bulk terminal for the export of bulk aggregate	Port of Fujairah	UAE



Mobile ship loader for sulphur pellets at Al Jubail Port ARAMCO Berri Gas plant (Saudi Arabia)

2 ACTIVITIES BY BUSINESS LINES

ELECTRICAL INFRASTRUCTURES

With a track record of over 35 years, TSK has become a leading company in the engineering and electrical equipment sector.

We develop power and control projects associated with new industrial installations, as well as innovations in existing installations.

Throughout all these years we have accumulated proven experience in the development of turnkey electrical projects in the sectors of power, telecommunications, iron and steel, metallurgy, food, paper, petrochemicals, cement, environment, fertilizers, ports and industrial plants in general.

The combination of quality, technical capacity and dedication to our customers has allowed us to achieve a leading position in all sectors in which we are present. We have a large number of highly qualified professionals and are equipped with the most advanced technical means for the design, calculation, assembly and commissioning of all types of electrical installations.

INTEGRATED MANAGEMENT OF ELECTRICAL PROJECTS

Design and engineering, planning, procurement management, manufacturing and supply of equipment, installation and assembly, quality control, training, commissioning and operation and maintenance.

- Transformer substations up to 500 kV.
- Electrical installations for thermal power stations, solar plants, wind farms, cogeneration and industrial plants in general.
- Automation of industrial installations, control and regulation of processes.
- Environment and waste treatment facilities.
- Infrastructure and building.

ENGINEERING

- H.V., M.V. AND L.V. Electrical Engineering
- Automation, control and regulation of processes.

ASSEMBLY

- H.V., M.V. and L.V. Electrical assemblies.
- Instrumentation.
- Assembly supervision.
- Testing and commissioning.

SANTIVAÑEZ 500 kV Substation (Bolivia)

MANUFACTURING

- M.V. Cells.
- L.V. distribution panels.
- Motor control centers.
- Automation and control panels.

OPERATIONS AND MAINTENANCE

- Corrective, preventive, predictive, condition-based and/or risk-based maintenance.
- Plant optimization.
- Personnel training.
- Tech nical assistance.
- Operation.

DIGITAL INNOVATION

We are increasingly aware of the need to digitally transform the industrial processes that our clients manage and, as TSK is well aware of the enabling technologies and solutions for this purpose, the undertaking has been clear and decisive. Thus, a new specialized department has been created, capable of designing, proposing and carrying out projects of this nature that allow our clients to reduce their operating costs and therefore improve their performance.

From TSK we take our experience to other industrial sectors to help our customers be more efficient in their production processes. This work ranges from the digitalization of the client's assets to the digital transformation of the productive processes that use those assets. Through new processes, we manage to reduce losses, production times, energy consumption, minimise stoppages, increase the life of the assets, as well as to ensure the traceability and quality flows of the manufactured products.

In order to do so, we rely on two lines of work:

- Service projects: where, as a result of industrial process consultancy, the best technological solutions are designed and proposed to enable the improvement of processes that directly affect our clients' profit and loss accounts. For this purpose, solutions of the MES (Manufacturing Executing Systems), MOM (Manufacturing Operations Management), Energy Efficiency, CMMS (Computerized Maintenance Management System), BPM (Business Process Management), BI (business intelligence) type are implemented, which allow and address the digital transformation of the entire Operation and Maintenance process of the plants.

- Solutions: where we make available to our customers the set of tools that our R+D+i teams have been developing and testing in our own plants and where we can find today packaged solutions such as:

SISREM: Remote monitoring system for industrial plants. Solution that allows optimizing the supervision of industrial plants through a unified technological architecture and a web platform for remote visualization.

SISDRON: Aerial system for the supervision of industrial plants. Through aerial missions carried out automatically by means of drones and intelligent algorithms for image and data analysis, specific inspection tasks can be carried out.

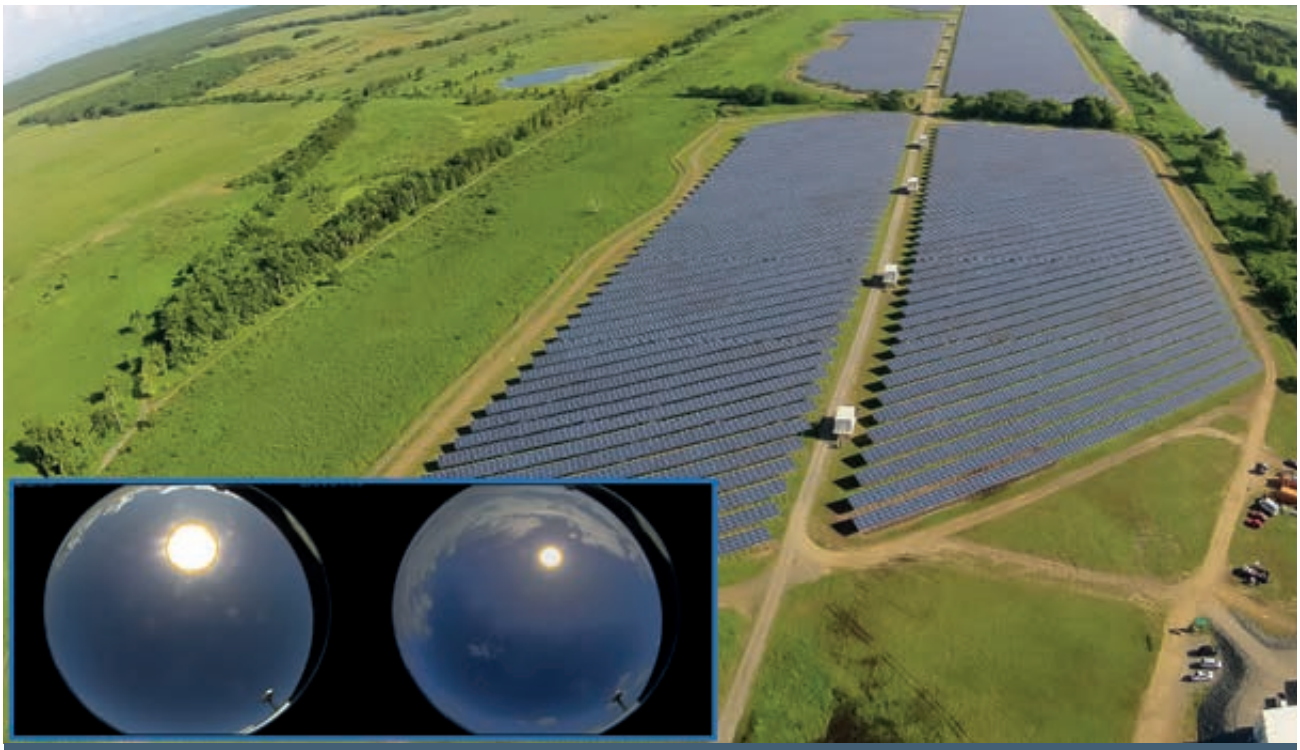
SISTER: Electrical substation busbar supervision system based on automatic thermography analysis. By means of real time thermographic analysis, the supervision and monitoring of the state of electrical substations is carried out.

SISMETER: Analogue sensor digitizing system based on automatic image analysis. This tool is specifically designed for the digitalization, supervision and monitoring of analogical sensors of diverse nature existing in any industrial installation.

SIXPERIENCE: Intelligent supervision and training system based on virtual and/or augmented reality. This new set of technologies is used to create immersive virtual and augmented reality experiences from which to carry out everything from training and coaching tasks to the operation of the plant itself.

IP INFRASTRUCTURES

From the Information Technology project team, we have specialized in the design and implementation of technological solutions that respond to the contractual technical requirements of our clients. Our experience backs us up as specialists in the execution of turnkey projects that range from the deployment of



Short-term production prediction motor by visually analyzing the behavior of clouds. (Puerto Rico)

structured cabling networks and wireless networks to the integration of different technologies such as unified communications systems, public address and industrial intercom systems, VMS (Virtual Management System) solutions for the monitoring and control of production processes, access control systems for people or vehicles, and acoustic warning systems for the population for the sounding of areas affected by disasters.

At the same time, and pursuing a cycle of continuous improvement that responds to the current demand of the industrial technology market, we have specialized in the design, implementation and maintenance of perimeter security systems based on thermal vision technology and temperature control in critical equipment with thermographic vision technology.

It is also important to note that for this type of project, not only do we undertake the design, execution and start-up phases, but we also have a specific area to offer operation and maintenance services.

CYBER SECURITY

All these new challenges mentioned imply functional, technical, regulatory and even physical protection requirements, but it is worth highlighting a new challenge that concerns all of them in a transversal way and that is none other than the safeguarding of the data in terms of its confidentiality, integrity and availability.

The current reality of the union of the worlds of Information Technology and Operation Technology implies new risks and given the context in which they occur, such as the industry, with a specific and different need and way of addressing them.

The Information Technology team of TSK has been actively participating for several years in pioneering work groups in industrial cyber security, carrying out cyber security assessments in industrial infrastructures and of course attending to our own needs. Cybersecurity has become part of the DNA of the business, both out of conviction and obligation, in order to be able to continue executing our projects with excellence as an objective.

We model cybersecurity from the gestation of the projects, including and / or responding to their requirements from the base design, detail, procurement process, engineering, tes-

ting, etc. Likewise, we are continuously improving the state of existing plants in terms of cyber security, auditing them and applying measures and procedures aligned with our continuous improvement processes, which in no other technique are as important as in cyber security, where going one step behind can be an unbearable risk.

DATA ANALYTICS

As we face new technological challenges, we are also confronted with the constant, growing and inevitable need to work with heterogeneous data sources, as well as the integration of process and business information that, among other things, will make it possible to optimize costs, improve processes, extend the useful life of industrial plants, and even make them safer.

Using all the enabling technologies that we know for this purpose, we are able to execute data and image analysis projects by means of technologies or concepts, such as: big data, machine learning, deep learning, edge computing, virtual reality, augmented reality or digital twin, which together offer our customers dashboards and solutions that accompany them throughout the entire life cycle.

POWER AND INDUSTRIAL PLANTS

As an industrial engineering and construction company, TSK offers a comprehensive technical service that ranges from consulting and design activities to the construction and commissioning of turnkey installations for different sectors such as:

POWER

The experience acquired in the variety of projects in which TSK has participated, as main contractor or in consortium with the most prestigious technologists in the world, allows us to offer the most appropriate technical, economic and financial solution for each client.

- Gas-fired power plants (simple or combined cycle).
- Cogeneration plants
- Incineration plants
- Biomass
- Waste
- Wind energy
- Solar energy
- Geothermal
- Hydraulic energy
- Hydrogen

#INDUSTRIAL PLANTS

The experience and knowledge accumulated during all these years in the most varied technical disciplines (civil works, structural, mechanical, electrical, instrumentation,...), together with the use of the most advanced computer support, allows TSK to tackle industrial projects from process engineering to the installation and commissioning of the different process plants in the Food, Paper, Mining, Steelworks or Cement sectors.

GAS TO POWER

After the purchase of Intecsa Oil&Gas engineering, with more than 50 years of experience, TSK has acquired the necessary experience and references in the oil and gas sector to execute projects from conceptual engineering to installation and commissioning of complete plants.

- Oil pipelines and gas pipelines.
- Collectors and distribution networks for oil and gas.
- Oil pumping stations.
- Gas compression stations.
- Metering stations (oil and gas)

Of particular note are the references in compression stations where, in Spain, it has participated in more than 70% of the stations currently in operation and in more than 4,000 km of gas and oil pipelines.

TSK develops complete projects of hydrocarbon storage terminals, in addition to their corresponding oil tanker berthing terminals and the port-refinery interconnections. Likewise, it has the necessary knowledge and experience to design both LNG tanks and regasification terminals.

TSK's references include, for example, the port facilities for berthing methane carriers at the LNG plant in the port of Bar-

DUMAT AL JANDAL 400 MW Wind Farm (Saudi Arabia)

celona, the expansion of the LNG Quintero regasification plant in Chile, the storage tank for Skangas in Finland or the Yela underground gas storage in Guadalajara.

- Oil and gas reception and loading terminals
- Underground gas storage.
- LNG tanks and regasification plants
- Hydrocarbon storage plants.

In order to unify our brands, from 2017 Intecsa Oil&Gas has been renamed TSK Oil&Gas Engineering.

ENVIRONMENT

TSK is aware that society demands, with increasing insistence, a better quality of life and, therefore, the conservation and preservation of the multiple and valuable natural resources of our planet.

We are convinced that the protection and investment in the environment, water, air and soil, is not a hinderance on development, but the best strategy to achieve economic and social growth in a sustainable way by ensuring the conservation of the most valuable heritage of humanity: Planet Earth.

For various reasons (scarcity of economic resources, water shortages, disasters, etc.), many populations lack clean water to cover their basic needs, which has a serious impact on the population's own health. Aware of this problem, TSK has a series of products of its own which, based on various treatment technologies, make it possible to cover the needs of drinking water supply to populations.

• Containerized DWTPs (Drinking Water Treatment Plants)
With a flow rate of up to 200 m^3/h and a surface area of 200 m^2, they are capable of supplying towns of more than 25,000 inhabitants. Its design in containerized structures allows the installation of several DWTPs together. Easy to transport, install and operate, they are the ideal solution for the urgent supply or for the supply of drinking water to populations with various problems.

• Modular DWTPs
For flows of up to 10,000 m^3/h, designed for minimum civil works requirements, they are suitable for the supply of drin-

king water to medium and large populations that, due to various circumstances, cannot carry out civil works.

• Conventional DWTPs
Designed in civil works, they are the most widely used water treatment plants to date, given the lack of other satisfactory technical alternatives.

• Upgrade DWTPs
These are redesigns of existing water treatment plants, in which, with minimal modifications, it is possible to extend the treatment flows or improve the quality of the treated water if it is insufficient.

• TSK containerized WWTPs (Waste Water Treatment Plants)
They are included in containment structures, aimed at the treatment of domestic or urban wastewater from population centres of up to approximately 5,000 inhabitants or equivalent wastewater flows.

• Modular WWTPS
They are designed with prefabricated tanks and minimum civil works requirements, aimed at population centres of up to around 100,000 inhabitants or equivalent industrial wastewater flows.

• Conventional WWTPs
They are designed in civil works for the treatment of wastewater from large population centres.

• Upgrade WWTPs
This is an application of great interest for existing WWTPs which, for various reasons, function incorrectly, not achieving the results in terms of treated water quality for which they were designed (increase in flow, increase in polluting water, etc.). With the moving bed technology and with the introduction of small modifications it is possible to tune these WWTPs.

Water supply and purification facilities are common elements of any production process. Therefore, the sludge generated in these processes are only by-products of these production cycles. Sludge is not, however, a non-valuable by-product; on the contrary, properly treated and following the well-known and current policy of the 3Rs on waste (Reduction, Recycling and Reuse), sludge is a recoverable by-product in today's society.

HANDLING & MINING

In 1980 PHB, A.G. and Weserhütte A.G. reach a merger agreement in Germany forming the PHB Weserhütte A.G. Group or PWH. That same year PHB, S.A. and Weserhütte S.A. also merged in Spain, forming PHB Weserhütte S.A.

In 1988 the parent company is taken over by another German industrial group which modifies the structure of PHB Weserhütte A.G., leading to the independence of the Spanish subsidiary, which retains all the technology, references and brand of the German group, remaining a Spanish-German company with a majority of Spanish capital.

In 1995, TSK acquired all the shares of PHB Weserhütte S.A., leaving the latter integrated in this group.

As port system specialists, our facilities operate with the highest degree of efficiency in many ports around the world, handling all types of solid bulks, such as coal, iron ore, bauxite, fertilizers, clinker, cement and cereals, offering different solutions for sea or river ports.

• Terminals for storage and handling of bulk solids.
• Unloaders.
• Loaders.
• Cranes.
• Ecological hoppers.

In PHB Weserhütte we also design circular or longitudinal storage yards with a wide range of collecting and combining machines that allow a high degree of homogenization in any type of solid bulk.

• Longitudinal and Circular Stockyards.
• Stackers.
• Scrapers.
• Blenders.
• Bucket Wheel Stacker-reclaimers.
• Conveyors.

Bulk materials reception, storage, transport and ship loading system EIFAGGE (Spain)

10 TSK'S COMMITMENT

TSK'S MISSION

TSK's mission is focused on being a highly competitive organization in the execution of technological solutions in the infrastructure, energy, industrial and environmental sectors, pursuing the satisfaction of the client and the people who make up TSK at all times, in a commitment to their personal and professional development.

TSK'S VISION

The Group's vision is to be a cutting-edge company, leader in terms of human resources, technology and profitability, in order to offer efficient solutions that contribute to a more sustainable development, ensuring the satisfaction and confidence of our customers, partners, employees and society in general.

TSK'S VALUESS

COMPETITIVENESS:

As an inherent value of the company for the successful achievement of our vision.

INNOVATION:

TSK is committed to innovation in its processes and ways of working, offering the customer the most innovative services on the market. We maintain a vigilant and proactive attitude towards opportunities, in a process of continuous development.

EXCELLENCE:

Quality is an intrinsic value of the company, which aims to offer products and services that aspire to excellence. Our companies must be perceived by the customer as companies that offer solutions and installations of the highest quality.

COLLABORATION:

This value is always present in the organisation and culture of TSK, extending to daily relations with customers, suppliers, employees and society in general. Our spirit of collaboration is reflected in our daily actions.

COMMITMENT AND RESPECT:

These are values that are deeply rooted in the organisation. Commitment must be a sign of identity in all our actions, as well as respect for all groups with which we have a relationship.

FLEXIBILITY:

The activity of our companies is framed within the services to the industry, so flexibility is a fundamental factor to compete with larger companies and resources. We want to transmit this flexibility in all our companies, being able to adapt to the changes that may occur.

ENTHUSIASM AND PASSION:

Only through the enthusiasm and passion we put into our projects, behaviour and actions is it possible to achieve our common goal, to make TSK the leading company and a reference in the market..

KEKELI EFFICIENT POWER PLANT 65 MW Combined Cycle Power Plant (Togo)

11 TALENT AND ORGANISATION

 # HUMAN RESOURCES, KEY TO OUR GROWTH

The most important aspect about a company with our history is the people who make it up. For this reason, people management has been, and always will be, a key aspect of our business strategy.

TSK considers people as the fundamental pillar of its development and therefore implements policies to promote employment stability and equality policies, career plans and social benefits.

TSK has the best professionals in the sector, with levels of qualification and specialization of recognized prestige. At the end of 2019, TSK had more than 1000 employees. An important group within this staff is the expatriate professionals in the projects; ensuring their commitment and maintaining the sense of belonging is a key aspect for TSK. The company extends to these professionals all the measures it implements in terms of human resources.

The workforce average age is 45,51 years, with an average length of service in the company of around 10,28 years. 92 percent of employees have a permanent contract, 76% are men and 24% are women.

DIVERSITY AND EQUAL OPPORTUNITIES

At TSK we promote a working environment that allows equal opportunities and the possibility of making the professional and personal lives of our staff compatible. TSK has established an Equality Committee in order to ensure respect for diversity and equality

TSK has an Equality policy which reflects the clear commitment of the organisation to the people who work for TSK and with society.

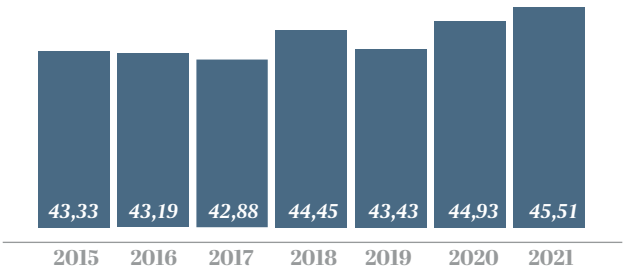
In its efforts to promote and implement equality policies in the organization, the management of TSK signed a commitment that establishes:

- Equal opportunities between men and women as a strategic principle
- The promotion and encouragement of measures to achieve effective equality.
- Special attention to situations of indirect discrimination that may occur through the management of human resources policies.

Maritime bulk terminal for the export of bulk aggregates Port of Fujairah, Dibba Bulk Handling Terminal (UAE)

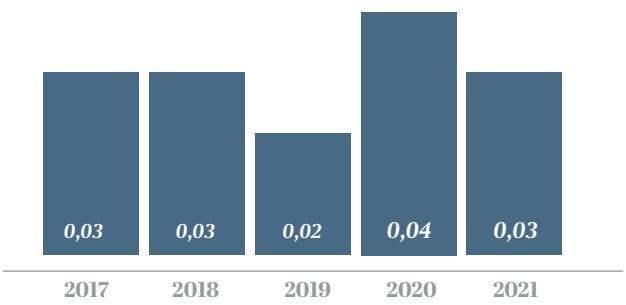
AVERAGE AGE

Years



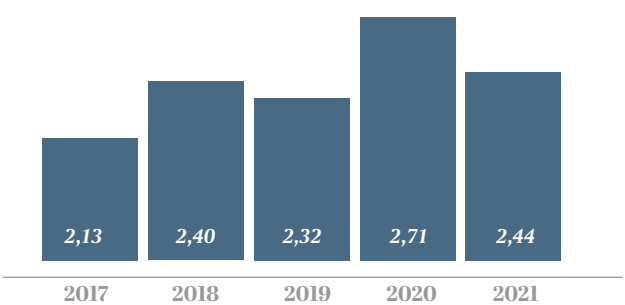
SEVERITY RATE

(Lost days / Worked hours) x 1.000



FRECUENCY RATE

(LTI / Worked hours) x 1.000.000



• The projection of a company image in line with this commitment.

To do this, TSK has drawn up its Equality Plan which is intended to be the framework for establishing the strategy and lines of work of the organisation where positive actions aimed at ensuring effective equality between men and women are included.

TALENT MANAGEMENT AND CONSERVATION

In the current context, the human resources function needs to be flexible, adaptable and capable of driving change, and it must provide a rapid and efficient response to business needs and priorities.

TSK promotes the professional and human development of its staff and encourages the exchange of ideas at a global level, with the conviction that this way new concepts are created, especially when professionals from different disciplines and with different backgrounds meet. This unity, guarantees the long term success as the best team, counting on the potentials of each one of the different members of the team.

Another key aspect of preserving and improving the company's human capital is to provide professionals with the necessary training resources and knowledge.

KNOWLEDGE MANAGEMENT AND DISSEMINATION

TSK has different tools for information management that facilitate internal communication and the exchange of knowledge and experiences:

• Project database, which makes information and documents on TSK projects available to employees
• Document management tools that allow the coordination of independent working groups for projects. Thanks to these tools it is possible to store and manage documentation, establish permissions, control the versions of documents and allow the immediate use or consultation of them, in the appropriate safety conditions.
• Requesting services through the intranet. This tool allows requests to be made regardless of where people are physical-

ly located, such as requests for holidays, permits, advances, computer equipment, incidents or other general services.

Regarding training, at TSK we have training programs to cover the needs of employees:

• Tech nical training, provided by external suppliers or by company specialists, who transmit knowledge and experience to the team.
• Language training -English, French, German and Italian- through free programs
• Training in management skills.
• Training in information technology with the aim of improving knowledge of computer tools, both generic and specific to the company.

TALENT APPEAL AND RECRUITMENT

The objective in terms of attracting talent and selecting personnel is to identify and incorporate the best talent available, both great professionals committed to the TSK project who have the necessary skills, and young talent with development potential.

We want to be an attractive company for our employees and we compete for the most qualified, offering a wide range of incentives. The key to success is attractive benefits, performance-related pay and opportunities for international development. We give particular importance to a company culture that is oriented towards dialogue and teamwork. Our selection processes are carried out according to the following criteria: equal opportunities and non-discrimination, respect for the person, honesty, professional ethics and confidentiality.

The TSK wage system includes fixed and variable components. On the other hand, we encourage mobility and promote the filling of vacancies through internal promotion, facilitating the voluntary movement of staff to enhance the development of their professional careers, talent management and the better matching of people to positions. This process allows employees to apply for those positions they find attractive, advising and supporting candidates who show interest in a particular position.

In relation to social benefits, TSK is committed to the continuous improvement of the quality of life of its employees. It makes a special effort to ensure and guarantee their lives, support the integration of the disabled and implement best practices to facilitate the combination of professional and personal life, such as flexible working hours, splitting of holiday periods and reduction of working hours, amongst others.

 # MANAGEMENT SYSTEMS

At TSK we define ourselves as a company guided by ethical behaviour and committed to Health and Safety at Work, Quality and the Environment. In accordance with our strategic framework, we have evolved based on a process of continuous improvement in all areas of our activity, with a firm commitment to proactively promote an ethical culture, paying special attention to people's safety, the quality of projects, and the protection and conservation of the Environment.

This commitment has materialized in our Integrated Management System, which is externally certified under the ISO 9001:2015, ISO 14001:2015, ISO 45001:2018, ISO 37001:2017, UNE:19601:2017, SR10, ISO/IEC 27001:2013 and UNE 166002:2014 standards and which covers all phases of the project life cycle, extending to our suppliers and subcontractors.

Regarding the current management structure and organization, TSK has a management systems department that designs, measures and evaluates the different process indicators; manages an integrated quality, environmental, occupational health and safety, information security and R&D&I system; and maintains and complies with the legal and regulatory requirements of each project.

In TSK we ensure Quality in the execution of our own projects as well as those of suppliers and subcontractors, which allows customers to have full guarantee of the proper functioning of their plants in accordance with regulatory and contractual requirements.

TSK has an excellent team that allows the Company to overcome the challenges it faces and achieve its objectives in a

sustainable, responsible manner and with the quality standards required by the market.

OUR PRIORITY: HEALTH AND SAFETY MANAGEMENT

At TSK we understand that health and safety is a fundamental and priority issue due to the nature of the activity we develop and therefore we work to maximize health and safety throughout the life cycle of our projects.

We have had an Occupational Health and Safety Management System since 2007, which we are currently certified under ISO 45001:2018, which considers all phases of the project life cycle, from design to construction and commissioning.

Our goal is always "zero accidents" and the guidelines for action are transmitted from the highest levels of the organization. This objective is applicable to all the people involved in our projects (employees and subcontractors), collaborators, suppliers and visitors to our facilities and projects.

TSK has a preventive organisation based on a joint prevention service - made up of professionals covering the preventive specialities of safety in the workplace, industrial hygiene and ergonomics and applied psychosociology - complemented by an external prevention service covering health surveillance. Workers who travel from Spain to international projects are given the necessary medical examinations, explorations and actions.

Within the preventive organisation of TSK, the prevention delegates of the different companies of the group are effectively integrated in representation of the workers, and a health and safety committee has been set up to provide information, participation and consultation on all matters relating to health and safety.

As part of our management system, TSK prepares specific health and safety plans in which the scope of work and the necessary preventive measures in the projects are defined.

So that safety is fully implemented in all our projects, from TSK we work for the standardization of health and safety procedures with the aim of increasing efficiency in the dissemination and assimilation of corporate policies.

Our commitment to health and wellness is a priority and one of the basic pillars of our employee value proposition. We establish programs that focus on three main areas of action: physical activity, emotional well-being and healthy habits and diet.

ENVIRONMENT

TSK, aware of the responsibility we have with the environment, contributes to sustainable development and to the prevention and protection of the environment. This is a priority integrated in the strategy marked by the Management.

In TSK we offer our clients our technical capacity and know-how to include sustainability criteria in the design, construction and operation of projects.

TSK's environmental strategy is structured around a commitment to combating climate change, the responsible use of resources, effective waste management, pollution prevention and the protection of the natural environment and biodiversity.

TSK has an Environmental Management System implemented and certified in accordance with the ISO 14001:2015 standard, conceived to maintain an adequate level of environmental management in all our projects. In this way, we guarantee respect for the applicable environmental legislation.

COMPLIANCE

TSK promotes a culture of ethics and compliance in its activity which encourages and strengthens the principles and values established internally. For this reason, we are firmly committed to promoting the ethical behaviour of all our stakeholders, regardless of where we carry out our activity, through the use of the necessary resources in the control of business processes that allow us to differentiate ourselves in the market and ensure competitiveness. In this regard, it has published its own Compliance Policy and Code of Ethics, in addition to the implementation, since 2013, of a Crime Prevention Plan, which establishes the principles and values that must govern all business relationships and whose review and updating is the responsibility of the Ethics Committee. For the resolution of any

Observations at CARRASCO substation, Bolivia

doubts in this regard, it has an open communication channel, where any irregular conduct or conduct contrary to the internally established principles and values can also be reported.

The Criminal Compliance Management System is certified in accordance with the UNE 19601 "Criminal Compliance Management Systems" and UNE-ISO 37001 "Anti-bribery Management Systems", the first and most demanding certifiable international standard for developing and implementing management systems in this field. In this way, we guarantee our commitment to strengthening the ethical and compliance culture in the development of our activity.

12 R&D+i

For us, the need to innovate in projects, processes and services is beyond any doubt, understanding innovation as the differentiating factor that allows us to provide greater added value to everything we do.

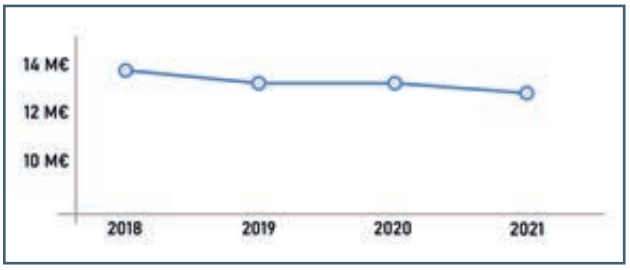
The great diversity of projects and technological areas in which TSK participates obliges the company to be continuously innovating. That is why, with a plan to bringing together all these initiatives, as well as differentiating itself in the market and placing value on innovation as a strategic line of action, TSK INNOVATION was created.

This concept encompasses all R&D+i initiatives and projects developed by the company, and incorporates actions aimed at involving all market agents in its internal innovation process, fostering knowledge management and technology transference and establishing synergies for the identification and development of R&D+i activities.

INVESTMENT

Over the last 4 years, our investment figures in R&D+i projects amount to a total of 23,198,860 €, to which the investment in innovation carried out directly in the works developed by TSK must be added, which amounts to 27,861,399 €. Our current commitment translates into an average annual investment of 1.64% of sales, accumulating 65 M€ in recent years, with 90 of our best technicians involved in these projects.

"Our target for 2025 is to reach an investment 2% of sales"



INTERNATIONAL RECOGNITION

For 3 consecutive years we have been awarded with the Quality Innovation Award (QIA), an award created in Finland in 2007 by Excellence Finland, with the aim of promoting and encouraging highly innovative projects between companies and organisations, thus increasing the competitiveness of the participating organisations and countries. Over the years, this association has been gathering partners from different countries, acquiring more and more relevance in the promotion of quality, excellence and innovation.

In 2021, we received the International Quality Innovation Award in the Large Company category for the first time, competing with multinationals such as DELL, which was a finalist.

Complete wood chips and pellets handling system Teesside Biomass Plant MGT (UK)

R&D+I PROJECTS

Our profound identity with innovation is part of our long-term strategy, materialised in strong investments in R&D+i, collaborating with technology centres, universities and companies within the framework of local, national and European programmes. As a result of this intense R&D+i activity, the following projects were carried out in 2021:

PROJECTS CO-FINANCED BY THE CDTI AND THE EUROPEAN UNION THROUGH THE ERDF

INDUSTRIAL INSPECTION AND MAINTENANCE OF COMPLEX OR UNATTENDED FACILITIES (INSPECTOR) _IDI-20170947

The aim of this project, approved by the CDTI as part of the CIEN Strategic Programme call, is research into technologies for carrying out inspection and maintenance in extreme environments in an unassisted manner. The aim of this project is to boost the competitiveness of companies by promoting business innovation in the field of industrial engineering of extreme, complex and offshore installations, both in their design, manufacture and commissioning, as well as their operation and maintenance. In addition, it will reduce the costs associated with extreme operation interventions and contribute to strengthening the capacities of the business fabric that supports the industrial sector.

DEVELOPMENT OF A LARGE METAL SILO FOR BIOMASS EXPLOSIVE CONDITIONS (EXSILOS) _IDI-20191151

The overall objective of the project is to develop a proprietary model of a large (>10,000 m3) core flow metal silo for biomass storage that is safe from the risk of dust explosion in the absence of regulations governing the protection of biomass and which is economically efficient, i.e. uses the minimum amount of steel or metal necessary and minimises the need for venting.

DEVELOPMENT OF AN EFFICIENT SALT HEATER USING SOLAR HYBRID TECHNOLOGY (BELENOS) _IDI-20190681

The general objective of the project is to design and model a new electric salt heater system for hybrid solar technology power plants, as well as to propose an efficient layout of the heaters in the configuration of these plants, depending on their size.

The main technological challenge of the BELENOS project will be to achieve a modelling of the new heater that guarantees that it is efficient. To this end, the iterative development of the pilot plant tests with CFD modelling will be considered, in order to obtain an adjusted model that will allow subsequent extrapolation to a real-size plant. The technological leap of the project in relation to existing technology is given by the fact that the final design of the heater will guarantee the homogeneous heating of the salts, and that the maximum temperature at which the salts degrade is not exceeded under any operating assumption.

RESEARCH AND DEVELOPMENT OF OPERATION AND MAINTENANCE TECHNOLOGIES FOR THE MANAGEMENT OF PHOTOVOLTAIC PLANTS (PVOLTAI4.0) _IDI-20190759

The overall objective of the PVoltai4.0 project is to design and develop an advanced system to assist the operation and maintenance tasks of a photovoltaic plant with the ultimate goal of improving its performance and optimising its operation, which will ultimately result in an increase in the reliability and lifetime of the plant. This system will be developed according to the principles of the Industry 4.0 paradigm, especially regarding the integration of Industrial Internet of Things (IIoT), Big Data analytics and advanced visualisation.

RESEARCH IN EMERGING TECHNOLOGIES TO ACHIEVE INNOVATIVE SOLUTIONS FOR DIGITAL TWINS (READY TWIN) _IDI-20190974

The READY TWIN project will facilitate the adoption of technological solutions capable of generating accurate Digital Twins in an automated manner through the use of 3D and IoT modelling technologies; as well as improving Digital Twin Asset Management through the use of Artificial Intelligence, Visualisation Technologies, Virtual Reality and Augmented Reality Simulation Technologies and Blockchain. All of them are disruptive technologies in the international and national technological panorama.

UAVS-BASED MODULAR SOLUTION FOR DECISION MAKING AND DIAGNOSTIC TASK SUPPORT OF PHOTOVOLTAIC PLANTS USING ELECTROLUMINESCENCE IMAGING, THERMOGRAPHY AND RGB-VISION CAMERAS, ELECTRICAL ANALYSIS AND GEOVISUALISATION (AID4PV) _IDI-20210170

The AID4PV project aims to research, develop and demonstrate in an operational environment a modular solution based on unmanned aerial vehicles (UAVs) for PV plant monitoring and advanced diagnostics. The autonomous UAV platform will capture photographic (RGB), thermographic (IRT) and electroluminescence (EL) images to enable near real-time fault detection, leading to PV plant diagnostics in time and cost.The results will be presented in an advanced reporting and geovisualisation presentation platform including geos-

patial analysis and visualisation tools. Decision support capabilities will also be researched, adding the possibility to perform some kind of predefined action from the UAV platform, minimising the time from detection of an anomaly to corrective actions.

TOWARDS PREDICTING THE OPERATIONAL LIFETIME OF PEROVSKITE PHOTOVOLTAIC CELLS: ACCELERATION FACTORS IN THE STUDY OF STABILITY BY APPLYING MACHINE LEARNING (PROPERPHOTOMILE) _IDI-20210171

The overall objective of the project is to develop an automated scheme to analyse the stability data of Perovskite Halide Solar Cells (PSCs) generated by standardised accelerated tests. This analysis will determine the most relevant accelerated test for normal operating conditions, as well as the acceleration factor (which relates the measured stability parameters to the operational lifetime of the PSC) and the expected lifetime.

HYBRID PLANT CONTROLLER (HYPER) _IDI-20210809

The overall objective of the project is to develop a novel tool for the real-time control of hybrid technology power plants that allows the operation of this type of plant as a single equivalent plant.

PARAMETERISATION OF THE FACTORS INVOLVED IN THE DEGRADATION OF SOLAR SALT AT HIGH TEMPERATURE (LUG) _IDI-20211041

The aim of the project is to determine the degradation equilibrium values of molten salts used in power generation plants where an operating temperature of 565ºC is required. The aim is to determine these equilibrium values depending on parameters such as temperature, partial pressure of oxygen, surface/volume ratio, gas volume/molten salt volume, etc.).

PROJECTS CO-FINANCED BY THE GOVERNMENT OF THE PRINCIPALITY OF ASTURIAS THROUGH THE IDEPA AND THE SCIENCE, TECHNOLOGY AND INNOVATION PLAN (PCTI), AND THE EUROPEAN UNION THROUGH THE ERDF FUNDS.

RESEARCH FOR THE USAGE OF A WASTE TREATMENT COMPLEX FOR THE PRODUCTION OF MICROALGAE FOR PHARMACEUTICAL AND AGRICULTURAL PURPOSES (LANDFILL4HEALTH) _IDE/2017/000700

The overall objective of the Landfill4Health project is to research and demonstrate the use of a non-hazardous waste landfill and its complementary facilities to house an industrial microalgae culture to produce high-value active ingredients

in the field of nutraceutics, health and cosmetics. To do this, INGEMAS will be in charge of the design and development of the pilot plant.

EVALUATION OF AIR POLLUTION MITIGATION MEASURES AND PREDICTION OF HIGH-RESOLUTION AIR QUALITY LEVELS USING A MULTISCALE METHODOLOGY (EVAIR) _IDE/2018/000423

The general purpose of this project is the design of a methodology for the evaluation of the dispersion of atmospheric pollutants in areas close to industrial environments that integrates different spatial scales of analysis and allows the simulation of the implementation of mitigation measures.

RESEARCH ON IOT AND BIG DATA TECHNOLOGIES FOR MONITORING AND TRACKING MATERIALS IN THE CONTEXT OF LOGISTICS 4.0 (LOGOS) _ IDE/2018/000427

In this project, research will be carried out on different technologies to provide a solution that allows the tracking of goods during the entire journey from origin to destination, collecting, in addition, various sensor information to characterize the conditions under which the goods were during the entire journey. For this purpose, an IoT, sensor and processing device will be researched and built to be placed on the goods to be tracked, so that it will capture information about

the route - GPS, sensor: humidity, temperature, vibrations, etc (pending research) - that will make it possible to know, in real time, both the location of the goods and their status. For this purpose, the data captured by the devices will be sent to a Big Data platform where they will be analyzed to extract metrics, indicators and results that will allow to obtain analytics related to the state of the goods, their geopositioning and other information in the context of Logistics 4.0 based on all the sensors installed in the devices.

NEW EFFICIENT WATER TREATMENT SOLUTIONS USING OSMOTIC ASSISTED REVERSE OSMOSIS (OARO) _IDE/2019/000353

The OARO project arises in response to the current limitations detected in the field of brine regeneration and in water desalination processes using Reverse Osmosis (RO). These limitations are the maximum concentration admitted by the membranes and the high pressure required for their operation.

INVESTIGATION OF METHODS OF ADSORPTION OF POLLUTANTS BY REGENERATED ACTIVATED CARBON AND BIOCHAR (RE-CARBON) _IDE/2019/000585

The RE-Carbon project seeks to investigate innovative solutions for the decontamination of liquid and gaseous effluents, based on the use of carbonaceous materials. The research is developed around three main axes: the development of dynamic units of adsorption with activated carbon optimized for the adsorption of target compounds in gas phase and aqueous phase that incorporate sensors that allow the monitoring of the process in real time, the analysis of technical and economic viability of the use of biochar for the purification of fluids and the analysis of technical and economic viability of the regeneration of activated carbon from the adaptation of an experimental plant of pyrolysis of forest residues for its energetic recovery, suitably modified to implement the stages of drying and gasification. The ultimate aim is to take advantage of the environmental opportunity that the industrial use of activated carbon for fluid purification represents, using the competitive advantage that the regeneration of coals in environments close to their use, reducing the costs associated with transport.

RESEARCH INTO TECHNIQUES FOR THE DETECTION, CLASSIFICATION AND MONITORING OF OBJECTS FOR INSPECTION AND SECURITY PURPOSES IN INDUSTRIAL SETTINGS (SISPECTION) _ IDE/2019/000268

The general objective of the project is to research in Artificial Intelligence (AI) algorithms to process images, in a flexible processing architecture, and adding a layer of interoperability, achieving a significant advance in the state of the art of object detection, recognition and tracking systems in industrial scenarios with the ultimate aim of improving security.

RESEARCH IN AUGMENTED AND VIRTUAL REALITY TECHNOLOGIES FOR MONITORING, OPERATION AND MAINTENANCE ASSISTANCE IN PHOTOVOLTAIC PLANTS (PHOTOASSISTED) _ IDE/2019/000270

The general objective of this project is to research and develop a monitoring, operation and maintenance assistance tool based on augmented reality and virtual reality systems specifically designed for application in a photovoltaic scenario.

DEVELOPMENT OF DISRUPTIVE MULTI-METAL PRODUCTS FOR THE RAILWAY AND SOLAR THERMAL INDUSTRY (BISOLRRAIL) _ IDE/2019/000582

The main objective of the project is to explore the feasibility of developing new bimetallic products processed by hot rolling, for specific applications with high corrosion and wear resistance requirements, in the energy and transport sectors, respectively, with lower manufacturing, installation, maintenance and/or improved properties costs.

With regard to the application of renewable energy, the objective is to manufacture a flat bimetallic product resistant to the operating conditions of salt tanks in solar thermal power plants, mainly corrosion due to exposure to molten salts, and high temperature (565ºC).

DESIGN OF AN INTEGRAL RESIDENTIAL MONITORING SOLUTION ORIENTED TOWARDS EFFICIENCY AND WELL-BEING (SISHOME) _IDE/2020/000326

The general objective of the SISHOME project is to build a modular solution that allows the integral monitoring of all existing sources of information that influence the home and that allows the extraction and definition of indicators and policies both in terms of energy efficiency and people's well-being and quality of life.

INDUSTRIAL RESEARCH STUDY FOR THE CONSTRUCTION OF RESILIENT SOLAR TRACKERS (RETRACK) _ IDE/2020/000345

Due to structural developments in the pursuit of optimisation, the PV tracker structures currently being built are extremely slender. Although the mono-axis design used today is correctly calculated, dynamic failures are beginning to occur in installations around the world. In particular, the type of breakage associated with aeroelastic instabilities, under the effects of moderate wind speeds. Due to the novelty and complexity of this phenomenon, Eurocode and other international standards do not, at present, contain any valid formulation to cover these problematic events. This fact implies a high economic risk when it comes to providing energy security in production. For the correct calculation of this type of structures, a greater and deeper knowledge of aeroelastic phenomena is required, normally complemented with wind tunnel studies by means of a detailed theoretical and experimental study of the parameters involved in this type of instabilities. This is how the RETRACK project came about, the purpose of which includes experimental studies of various models of solar tracker such as those that TSK frequently incorporates in its plants and which are subjected to adverse weather phenomena that must be considered for their correct operation, once at the final site. Likewise, the methodologies of control and monitoring of characteristic plant parameters will be studied, seeking maximum efficiency.

NEW SAFETY SYSTEM FOR OIL LEAKAGE IN HEAT EXCHANGERS FOR HYBRID SOLAR POWER PLANTS (LEAK) _IDE/2020/000384

The main objective of the LEAK project is to determine a new safety system for oil leaks in heat exchangers in hybrid photovoltaic-solar plants and/or in independent energy storage plants, guaranteeing efficient, reliable and safe energy production and storage. This type of plant presents a new risk that did not exist in previous solar thermal or photovoltaic plants. Conventional solar thermal plants work with oil in the solar field up to 400ºC and the salts are stored at the same temperature. The salt tanks are inertised with nitrogen to prevent fires in the event of HTF and to protect the plant. In the new plants, the oil in the solar field is also heated up to 400ºC. However, in this case the salts are heated up to 565°C by electric heaters after being heated by the oil. At this storage temperature, the degradation is much higher and therefore the use of an air atmosphere is recommended. On the other hand, in case of a puncture in the HTF-salt exchangers, the HTF could reach the salt tanks, posing a safety hazard.

PROJECT CO-FINANCED BY THE "PORTS 4.0" FUND OF STATE PORTS

PARVAMAP 3D: UNTHRESHED GRAIN MAPPING SYSTEM AND INTERFACE DEVELOPMENT FOR THE OPERATION (PROJECT 245)

The overall objective of this project is to achieve the complete automation of bulk solids storage facilities on a real scale and in a real working environment, by developing an innovative system for handling the unthreshed grain based on two new technological tools, such as equipment for fully automated 3D mapping of the unthreshed grain and a communication interface with the material handling equipment that will enable their coordination and operation from the control room itself. This saves operators from having to go to the work area to position the machines and generates significant time savings by eliminating the need for manual handling.

PROJECT CO-FUNDED BY THE BASQUE GOVERNMENT AND THE EUROPEAN UNION THROUGH THE EUROPEAN REGIONAL DEVELOPMENT FUND 2014-2020 (ERDF)

ACHIEVING A CIRCULAR ECONOMY IN THE BASQUE PAPER SECTOR: RECOVERY AND USE OF HIGH ADDED VALUE COMPOUNDS PRESENT IN INDUSTRIAL PULP AND PAPER MANUFACTURING PROCESSES (REPAPEL) _ZE-2021-00013

The main objective of the REPAPEL proposal is the recovery and use of high added value compounds present in the industrial flows of pulp and paper manufacturing, seeking the cir-

cular economy in the Basque paper sector. The technologies developed here will serve as a basis for their implementation in other industries at national and international level, as well as in other industrial sectors where the application of waste recovery technologies and the concept of circular economy is also necessary.

The implementation of this project will define different technical, economic and environmentally viable solutions that provide a global solution to waste reduction, process improvement and the manufacture of products with better and more sustainable performance.

PROJECTS FINANCED BY THE GERMAN MINISTRY OF ECONOMY AND ENERGY (BMWI)

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

The use of molten salt as a fluid carrier has important advantages. The operating temperature can be substantially increased, up to 500°C, and the plant is considerably simplified, as the same fluid is used for storage and as a heat transfer fluid. To validate the technology and identify possible problems during operation, a test loop will be built in Évora (Portugal), where the collector developed by TSK-FLAGSOL Heliotrough 2.0 will be installed.

TRANSTES

The aim of this project is to study the possibility of using a single tank for storing solar salt in solar thermal plants in order to reduce costs.

SILICONE FLUID MAINTENANCE AND OPERATION (SIMON)

The purpose of SIMON is to test the applicability of new silicon-based heat transfer fluids at higher temperatures than those currently operated in parabolic trough technology solar thermal power plants and to accelerate market introduction by reducing all the obstacles that have been identified. The project will consist of laboratory tests, fire assessments and tests on the reconditioned PROMETEO test loop in the SITEF project at the Solar platform of Almeria. A viscosity sensor suitable for these applications and temperatures will also be developed, as well as an efficient maintenance concept to separate compounds such as hydrogen, methane and silanes.

MOVING BARRIER THERMOCLINE (MOBACLINE)

The aim of this project is to study the use of a single tank for energy storage in solar thermal plants.

AVUSPRO

The aim of this project is to develop a method for predicting the soiling of photovoltaic panels and parabolic trough collectors.

HIGHER TEMPERATURE AND LIFETIME FOR NITRATE SALTS (VENITE)

The aim of this project is to study the physico-chemical behaviour of molten salts at 565ºC in order to reduce risks in future projects.

SUPEREAF

The aim of this project is to develop a system for recovering heat from an electric arc furnace and storing it in solar salt for its reuse later.

PROJECTS FINANCED BY THE EUROPEAN UNION (H2020)

SOLVING WATER ISSUES FOR CSP (SOLWARIS)

The SOLWARIS project is a European project led by TSK and in cooperation with 13 other organizations that seeks to reduce water consumption in solar thermal power plants through various innovations in mirror cleaning, power cycle cooling and wastewater recovery. With this project, TSK will be able to offer innovative solutions to its clients to face one of the recurrent problems in new plants, in order to continue consolidating itself as a leader in the solar thermal sector.

www.solwatt.eu (Nº Exp. 792103)

18 INTERNATIONAL EXPERIENCE

The knowledge acquired in the wide variety of projects carried out in more than 50 countries allows us to adapt to the technical and cultural features of each country and successfully complete our international projects. Our international strategy is based on close cooperation with local companies, enabling us to add value for all the countries in which we work, combining technology, experience and resources.

AMERICA
Mexico
Cuba
Venezuela
Argentina
Chile
Colombia
Brazil
Peru
Honduras
Nicaragua
Panama
USA
Bolivia
Ecuador
Jamaica
Guatemala
El Salvador
Canada

ASIA
Barhein
Kuwait
Jordan
Turkey
India
Iran
Saudí Arabia
Syria
Bangladesh
UAE

EUROPA
Germany
Spain
France
Italy
Portugal
Greece
Poland
UK
Romania
Holand
Finland

AFRICA
Guinea Konakri
Tanzania
Morocco
Algeria
Tunisia
Togo
Yvory coast
Egypt
Senegal
Angola
Libya
Sudan
South Africa
Mozambique
Uganda

"Projects in 50 countries"

296,25 MW Steam Tailing C.T. LAS FLORES (Peru)

14 SUSTAINABILITY

In TSK we wanted to take a further step in integrating the criteria of social responsibility, both economic, environmental, social, ethical management, good governance and transparency, through the development and implementation of a Management System certified by AENOR, based on the standard IQNET SR10. This System helps us to systematize, and integrate with other systems in our organization, the criteria and requirements contained in this standard, as well as those contained in the international standard ISO 26000, a guide that provides guidance on the principles underlying social responsibility, recognition of social responsibility and stakeholder involvement, identification of risks and material aspects, and how to integrate socially responsible behavior in the organization, emphasizing the importance of results and improvements in the performance of social responsibility.

Key actions such as the identification, prioritisation and advanced dialogue with our Stakeholders, the identification of our sustainability risks, in the areas of ethics, the community, the environment or people, have allowed us to draw up a Policy, a Code of Ethics, and a Plan of Objectives and Actions, coherent and aligned with our priorities and with the concerns of our stakeholders, aimed at improving our social, economic and environmental performance.

Social progress, environmental balance and economic growth must always go hand in hand.

Our commitment to sustainability is a commitment to our vision, mission and values, incorporating in our Corporate Social Responsibility and business policy the Sustainable Development Goals (SDGs) approved by the UN, whose purpose is to promote economic growth, work for social inclusion, fight against climate change and protect the environment.

In order to identify those SDGs that are relevant to our organisation, we have carried out a materiality analysis, which takes into account both the interests of the organisation and the concerns of stakeholders and the communities where we operate, identifying four improvement plans or main initiatives on which the objectives and actions to achieve them are based, framed within our strategic plan: Talent Engagement and Loyalty Plan, Transparency and Good Governance Plan, Innovation and New Technologies Plan and Environmental Impact Improvement Plan. These Improvement Plans are related to 5 of the 17 SUSTAINABLE DEVELOPMENT GOALS

SOCIAL ACTION

At TSK we are convinced that social commitment is inherent in business activity, to which the growing level of prosperity and well-being of society is largely attributable. Our main responsibility is to be able to provide a better service to our customers every day. This is what allows us to create value, generate quality jobs, invest in research and development and get involved in activities that benefit society.

Within this social management, we highlight the following activities:

Community Relations. We maintain a constant dialogue with authorities and community representatives during the execution of our projects.

Social impact. Although the company's impacts are mostly positive, TSK analyzes local regulations in order to offer mechanisms for information, complaints and restoration of negative social impacts.

PROJECT IMPLEMENTATION

Depending on the needs and expectations of the community where we are, we offer the possibility of carrying out projects to support it.

During the past year we have developed a local project for the improvement of the indigenous community in Ancotanga (Bolivia), located near Oruro, where we have developed a photovoltaic plant. This is a community with very few houses and minimal resources, and several premises abandoned by the migration of the population to the cities. TSK installed a photovoltaic system for pumping water to achieve an efficient irrigation system. This mechanism was also used to place a domestic water supply connection. In this same village, we have started to rehabilitate a small abandoned school, which will be used as a community social centre as well as a small library. In this same town, we have started to rehabilitate a small abandoned school, which will be used as a social community center as well as a small library.

COLLABORATIONS WITH OTHER ENTITIES

In TSK we consider that it is also our responsibility to support organizations that work for the improvement of society. For this reason, we collaborate with different associations and organizations related to the environment, culture, research, education and corporate social responsibility with the aim of sharing their business experiences and acquiring the most appropriate and innovative practices. Among the most noteworthy are:

- Sponsorship of cultural exhibitions.
- Collaboration with the University of Oviedo.
- Commitment to Asturian industry and the development of the region.
- Collaboration with the Asturian Quality Club, Asturian Innovation Club, Femetal, Asturian Family Business Association, Ademi, Sercobe and Prodintec.

SPONSORSHIPS

TSK has sponsored the TSK Roces Sports Club for over twelve years, with a group of over 500 children. In addition, every year TSK sponsors various events and sports clubs, in order to promote sport among the youngest and employees of TSK.

DONATIONS TO SOCIAL ACTION ENTITIES

Each year TSK allocates a portion of its budget to donations to entities that promote projects and actions related to education, health, culture, sports and international cooperation. Among other institutions, TSK supports the Princess of Asturias Foundation, the Lo que de Verdad Importa Foundation, the Foundation for Biosanitary Research of the Principality of Asturias (FINBA), Caritas, Unicef, the Red Cross and the Global Health Institute Foundation for child vaccination.

Head Office
Parque Científico y Tecnológico de Gijón
C/ Ada Byron, 220
33203 Gijón - Spain
Tel. +34 985 13 41 71

Paseo de la Castellana, 149 - 1º izda.
28046 Madrid - Spain
Tel. +34 911 25 02 58

Parque Científico Tecnológico
Ada Byron, 220
33203 Gijón (SPAIN)
Tel. +34 984 495 500

WWW.GRUPOTSK.COM