ENERGY DIVISION

Active agents of the
energy transition

Solving the energy constraints of society and industry. Our future lies in becoming a national benchmark for integrated energy solutions in any scenario

So far, conceptual, basic and detailed project engineering activities have been carried out.

Land-based photovoltaic, solar thermoelectric, desalination, reversible pumping and floating photovoltaic projects.

In the field of EPC, solar photovoltaic and medium-temperature solar thermal plants, while in energy efficiency, industrial PV self-consumption and street lighting initiatives have come to fruition.

In terms of installations and services, small self-consumption projects, LV, MV and HV installations, photovoltaic O&M and MV have been carried out.

> Engineering

- Basic and detailed conceptual engineering
- Technical management, consultancy and technical advice

> EPC

- Photovoltaic (terrestrial/floating)
- Solar thermal
- Reversible hydro
- Offshore/onshore wind
- Desalination
- Green hydrogen
- Biomass
- Biogas
- Energy transformation, transport and distribution infrastructures
- Tech hybridisation

> Systems and services

- HV, MV and LV installations
- Lines and substations
- Singular infrastructures
- Operation, monitoring and control
- Predictive, preventive and corrective maintenance:
  - Networks
  - Industry
  - Generation infrastructures

> Energy efficiency

- Industrial photovoltaic and thermal self-consumption
- LED street lighting
- Air conditioning
- Thermal envelope
- Smart energy management
- Shared self-consumption and energy communities
- Infrastructures for sustainable mobility

Our experience

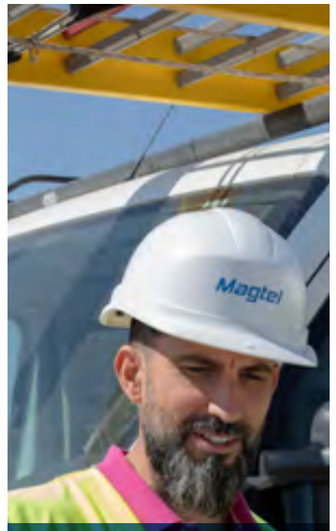
We have over 15 years of experience in the renewable energy sector

> Project Engineering

We carry out all phases of the project in a comprehensive manner: From advice, consultancy and feasibility analyses, to the management and supervision of works and the implementation of technical development plans.

> Inspection and self-monitoring

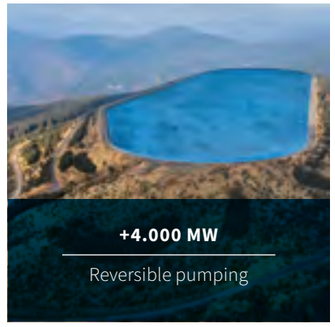
Our Magtel Joint Prevention Service (SPM) performs intense inspection and self-monitoring activities of the projects developed. We have a specific security review system following the IPAL (Occupational Accident Prevention Indicator) method.

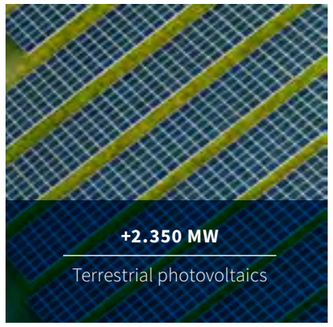


> Management and planning

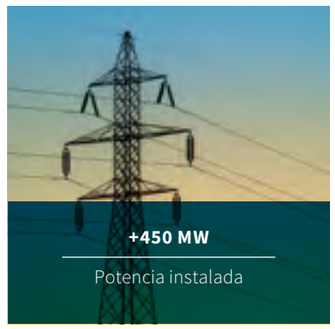
We have a specific area exclusively dedicated to the supply of the materials and equipment required for the correct development of the project. This ensures that we are competitive and offer better prices and quality, as well as to optimise planning periods.

PROJECT DEVELOPMENT AND ENGINEERING

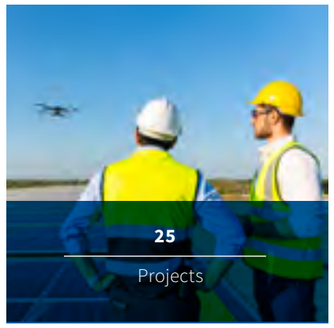




DETAIL ENGINEERING & CONSTRUCTION



OPERATIONS & MAINTENANCE



Reversible Hydraulic Power Plants

Development of 28 projects with a total capacity of more than 4 GW

Reversible pumped-storage power plants are key to ensuring the transition to an emission-neutral economy and the effective integration of non-manageable renewable energies into the electricity system. This also brings flexibility to the system and stability to the network.

Magtel is developing the BlueStorage project, which consists of a distributed storage system based on reversible pumping stations. During 2022, an important milestone was reached with the award of the hydroelectric concession by Augas de Galicia for reversible pumping in As Pontes (250 MW).

Renewable desalination

Infrastructures for the generation of resources to correct the water deficit in Andalusia

Since 2020, we have been conducting the processing, coordination of collaborators and engineering tasks and fieldwork necessary to develop four seawater desalination plants in Andalusia, with a total capacity of 200 hm^3 per year.

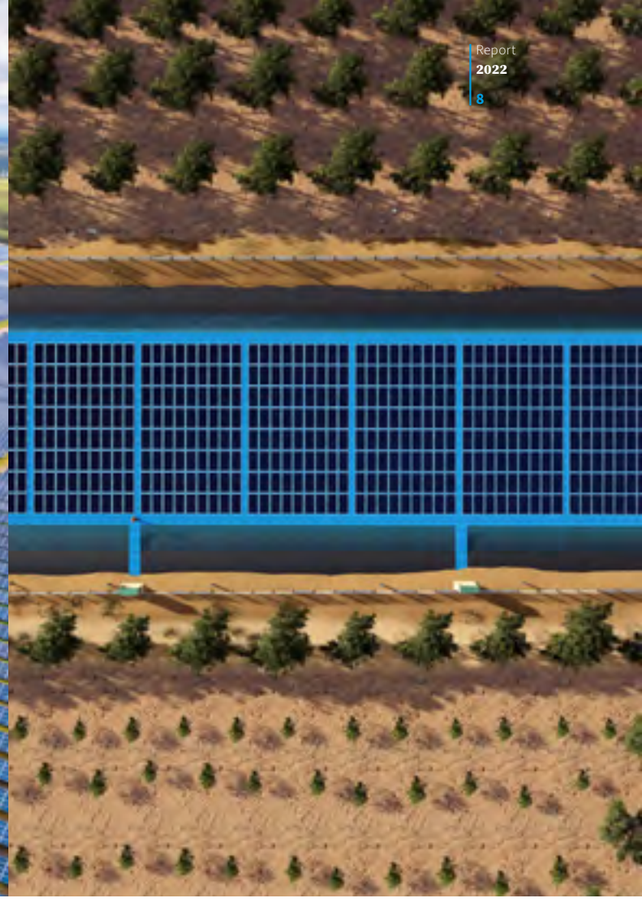
In this context, the basic project was delivered for the seawater desalination plant in the municipality of Velez-Malaga (Malaga) with a production capacity of 40 hm3 and future expansion to 60 hm3. The project is currently in the competition phase.

Seawater desalination will generate the additional water resources necessary to correct the water deficit situation in Andalusia, recover the good state of its bodies of water and guarantee long-term ecosystems.

Terrestrial photovoltaics

Detailed engineering for renewable energy projects

In 2022, a team of 30 plus professionals with specific profiles in civil works, hydraulics, electricity, industry, environment and instrumentation and control, undertook the engineering of lines, substations and the construction of terrestrial photovoltaic plants for renewable energies, accumulating 2,350 MW in the projects developed.



Floating photovoltaics

Engineering for the development of 18 projects to integrate 1.1 GW into the system

These projects are part of the energy transition towards a decarbonised model, in line with the National Integrated Energy and Climate Plan (PNIEC), contributing to the objectives of reducing greenhouse gas emissions, increasing the share of renewable energies and improving energy efficiency.

One more step forward in renewable energies through storage

The aim is to couple their generation with consumption

Our Renewables Division had promoted and developed 1,400 MW of photovoltaic installations by 2022

Of these, 558 MW of grid-scale photovoltaic projects successfully advanced to a ready-to-build status, obtaining Environmental Impact Statements for the rest in order to continue with the development and processing of the mandatory administrative authorisations, with a forecast investment of more than 800 million euros.

Currently, 330 MW of solar thermal power plant projects are under development with thermal storage. This new generation of solar thermal plants are designed as hybrids with photovoltaic plants to take advantage of the synergies of both technologies, thus achieving better production costs with the capacity to store and produce during the night that solar thermal offers and to compete in new emerging markets.

> El Carrascal project

Meriting mention is El Carrascal project, in the municipality of Hornachuelos, with 110 MW of electrical power and 6 hours of storage, which will provide electricity from renewable sources even when there is no solar resource. This project will create some 500 jobs during the construction phase and then another 50 stable jobs during the lifetime of the facility for its operation and maintenance.

The penetration of renewable energy sources is accompanied by the inherent intermittency of this type of resource, and there is therefore a decoupling between the time of its generation and its consumption. The storage and subsequent dispatch of energy when it is really needed is the solution that will allow the definitive accommodation of renewable energies in our lives.

> Sun2Store project

The Sun2Store project promotes the storage of electrical energy by means of heat pumps in molten salt tanks, and the subsequent delivery of this energy to the grid for more than 10 hours at an output of 100 MWe.

This grid-scale installation will be able to provide renewable energy during periods when there is no solar or wind resource available, thus contributing to the coupling between production and demand and consequently leading to a greater penetration of renewable energy sources in the generation mix.

> Construction of a photovoltaic park at Covap facilities for its new circular economy model

Magtel has contributed to the new circular economy model that Covap will start operating in 2024, building a photovoltaic park on the premises of the Valle de los Pedroches Livestock Cooperative. The objective is to cover 80% of its energy needs from renewable sources from that year onwards.

This project is an example of the contribution of advanced tech solutions in energy and environmental sustainability for industry, applying the innovation that characterises Magtel.

In addition to the 6 MW photovoltaic plant with an output of 11,000 Mw/year, a 7 MW biogas plant to be developed by Genia Bioenergy, which will supply 40,000 MW/year, and the biomass plant of 13.4 MW with thermal storage. This new generation of solar thermal plants are deployed by Veolia that will generate 80,000 MW/year.

This commitment to sustainability has led Covap to invest 25 million euros in an extensive renewable energy programme with which it intends to establish a 360º management system in which, using solar energy, waste and by-products from the members' livestock farms and manufacturing processes and organic material of forestry origin, it will generate the electricity and steam needed by its five industrial plants.

> Larral and La Peñaza 3 solar photovoltaic plants

Construction of photovoltaic park located in Zaragoza for the company Opdenergy.

The project includes the construction of two photovoltaic plants, Larral and La Peñaza 3, with an access capacity of 54.99 MWp and 15.73 MWp, respectively, as well as a 30/132 kV medium and high voltage electrical substation, which will transform the energy evacuated by the two plants. An overhead high voltage line will also be constructed.

The aim of the project is to supply approximately 35,000 households with clean energy, thereby contributing to the decarbonisation process towards which society is moving. These figures are equivalent to the planting of 140,000 trees.

The project will involve these actions:

> Earthworks:

- » Execution of ditches and drains

> Structures:

- » Driving of profiles
- » Installation of the structure
- » Assembly of panels

> Electrical installation:

- » Installation of concentrator boxes
- » Cable laying and wiring
- » Control and monitoring system installations (weather stations, CCTV, SCADA)
- » Electricity substation
- » Evacuation line

> Elvisa solar photovoltaic plant

58 MW photovoltaic plant project for the generation and connection of renewable energy to Red Eléctrica de España (REE) through the Don Rodrigo 400 kV electrical substation.

The initiative is being entirely developed by Magtel, taking on the full scope of EPC (Engineering, Procurement and Construction). Thus, the company is responsible for the engineering, equipment procurement, site management, legalisation and commissioning of the project. Its activity is expected to reduce CO2 emissions by 12,000 tonnes.

The project is being developed in Alcalá de Guadaíra (Seville) for Solarpack Ingeniería SL.

> Cartago II – Marchamorón

Substation and high voltage line

Execution of the Marchamorón substation, which includes two 225MVA 220/30kV power transformers and a high voltage line for interconnection.

The project also includes the construction of the building and installation of the transformers and other HV/MV electrical equipment, as well as the erection of supports and cable laying.

The project is being developed in Alcalá de Guadaíra (Seville) for Solarpack Ingeniería SL.

> Project for the evacuation of the Mercuria power infrastructure

Magtel executes for the company Mercuria Sostenible the complete EPC project of two electrical substations and two overhead high voltage lines of 220 and 400 KV.

The Campos substation has two 220kV-100MVA power transformers, and the Matallana substation has a 400kV-450 MVA power transformer.

The corresponding evacuation lines are also being built, as well as a metering enclosure at the Don Rodrigo substation.

This project, located in the municipalities of Carmona, Alcalá de Guadaíra, El Viso del Alcor and Mairena del Alcor (Seville), will enable the evacuation of several photovoltaic solar plants to be built in the future to the transmission grid of Red Eléctrica de España (REE).

> HV, MV and LV installations

Supervision and installation of MV by Imasa Ingeniería

The inspection and review was done for the MV installations executed by Imasa in photovoltaic plants under construction in Toro (Zamora).

Reform of the electrical installation of schools

Adaptation of electrical wiring in twelve public schools in Cordoba for the Cordoba City Council.

Work began in May 2022 and is scheduled for completion in the first half of 2023.

The aim is to increase the power of the schools to be able to supply the new air-conditioning machines as well as the usual facilities at a school.

LV installations in the Guadalmedina station of the Malaga Metro

Low-voltage installation including protection panels, distribution conductors and lighting.

This project, developed for the joint venture formed by the companies Sando and Acciona, is being carried out on the Malaga Metro infrastructures.

> Lines and substations

Splitting line in Puente Genil (Cordoba)

Execution of the connection for a new concrete part manufacturing line and its general protection panels for the client Pavimentos del Genil SA.

> Unique facilities

LV and HV maintenance for the JV Presas Jaén 2022

Preventive maintenance of transformer substations and checking of LV earthing installations.

> Predictive, preventive and corrective maintenance

Maintenance for Gestión Integral de Aguas de Huelva (Giahsa)

Maintenance of some 460 MV/LV electrical installations and 24-hour breakdown service in the province of Huelva.

The work includes the repair of the electrical component of the infrastructures, as well as the maintenance of the electrical equipment and the execution of the necessary civil works.

Cellnex site maintenance

Preventive maintenance of transformer substations and MV lines of approximately 163 electrical installations owned by Cellnex throughout Andalusia. 44 authorised inspections for MV, corrective and 24h breakdown services were done.

Emacsa electrical workshop

Inspection, repair and execution of electrical installations integrated in drinking water and wastewater treatment facilities.

Systems and services

> Operation and maintenance of photovoltaic plants

We guarantee the operation of photovoltaic infrastructures through comprehensive operation and maintenance services

We carry out the following tasks:

- > Predictive maintenance
- > Corrective maintenance
- > Monthly profitability reports
- > Photo reports
- > Thermography of electrical panels
- > Thermography of modules and inverters
- > IV Curve analysis
- > Plant control
- > Monitoring from the control centre
- > Face-to-face security or from CMS

Our current clients include MTB Ren, La Castilleja Energía, Sol de Moguer, Sando, Comunidad de Regantes Virgen del Rocío, Covap, EDP, etc.

Energy efficiency

> Industrial thermal and photovoltaic self-consumption

Photovoltaic installation for self-consumption of 252 kWp in Plasencia for Sovena

Project carried out for EDP at the Sovena Group factory in Plasencia (Cáceres), which includes the installation of the fixed life line and roof access staircase.

Photovoltaic self-consumption installation for Factor Energia

Installation of photovoltaic self-consumption in Andalusia and Ciudad Real. Specifically, a car park in Chiclana was equipped with of 3 charging stations and several of the Colegios Mayores group of photovoltaic installations with about 80 kWp in total.

Self-consumption photovoltaic installations and preventive maintenance for EDP

Photovoltaic installations for self-consumption and preventive and/or corrective maintenance were executed for EDP at various sites. Specifically, self-consumption (780 kWp) was implemented in Andalusia and Extremadura, and maintenance (around 80 interventions) in Andalusia, Castilla la Mancha and Madrid.

> LED street lighting

Upgrading of outdoor lighting and lighting of sports facilities by changing LED technology in Villa del Río (Cordoba)

Replacement of existing light fixtures in the town centre, as well as the floodlights of the sports facilities in the town centre, with similar fixtures but with LED technology, which represent a saving of up to 70% compared to the consumption of the current light fixtures.

New public lighting in Posadas with the aim of reducing electricity consumption and the emission of polluting gases

The actions belong to the programme of subsidies for the singular projects of local entities that favour the transition to a low-carbon economy in the framework of the ERDF operational programme for sustainable growth.

Replacement of existing sodium vapour, mercury vapour and metal halide light fixtures with new energy-saving LED technology fixtures with improved performance. New ornamental columns with LED fixtures were also installed in the Plaza de los Reverend Padres Salesianos.

This project has made it possible to reduce final energy consumption by 30%. As a result of this reduction, greenhouse gas emissions will be reduced by 333.09 t CO2eq/year.

> HVAC and thermal envelope

Energy modernisation of the thermal envelope and overhaul of installations for the thermal use of biomass

Work carried out for various projects undertaken in preschool and primary schools located in the province of Cordoba: Torrecampo, Villaralto, Algallarín and San Sebastián de los Ballesteros.

The latest technologies were applied to systems for refurbishment and improvement of the building envelopes and the adaptation of installations to optimise energy performance to the maximum.

Specifically, we did the following actions:

> Renovation of the thermal envelope

> Replacement of diesel boiler with a biomass boiler

> Replacement of carpentry for others with better thermal resistance

> Replacement of outdoor carpentry with thermal break and double glazing

> Energy upgrading of roof and façade

> Replacement of electric underfloor heating with biomass boiler and installation of pipes and radiators

> Construction of boiler house and pellet storage silo

Likewise, in this area, the replacement of the roof and thermal improvement of the tile roof, as well as the enclosure and replacement of exterior joinery of the multi-purpose building in Villaharta, also in the province of Cordoba, were also implemented.

All these interventions, within the framework of the Energy Efficiency Section of the Energy Division, have achieved:

> Reduction of energy consumption and greenhouse gases

> Improved efficiency and energy savings compared to the baseline scenario

> Adaptation of the installations to current legislation

> Shared self-consumption and energy communities

Installation of self-consumption photovoltaic plants for the Virgen del Rocío Irrigation Community in Villamanrique de la Condesa (Seville)

Execution of the construction works for five 100 kW photovoltaic plants for self-consumption of electricity from five boreholes of the Virgen del Rocío Irrigation Community in Villamanrique de la Condesa (Seville).

In particular, the most important aspect of the project is the construction of three floors with a raised structure for the use of roads, due to the expansion of the estate, and for full use of the area.

Modernisation of the irrigation installations of the Irrigation Community of the Nacimiento de Coín Llanos a Juntillas (Malaga)

This project involved the installation of pipes and the transformer station, the execution of the water pumping system and the remote management of the irrigation system.

Magtel's Infrastructure Division was responsible for the installation and supply of pipes for the irrigation network, some 180km long in the municipality of Coín; the pumping of water from the existing underground catchment; the remote management of the irrigation system; and the installation of the transformer substation. The project will supply nearly 2500 plots with meters and outlets.

The main objective of the modernisation is to replace a gravity irrigation system with a localised irrigation system. This change will achieve an overall irrigation system efficiency of 86% and an effective water saving of 40.7%.

Regarding the water catchment in the Nacimiento River Gap, the parties have agreed to replace the pumping units with more efficient ones.

A flow meter will also be installed at the outlet of the pumping station. Finally, an electrical installation will be built that includes a 400 kVA transformer station, a low-voltage connection, a protection and control panel, and the low-voltage lines to each of the receivers .

Photovoltaic plant installations in the province of Huelva for the El Fresno Montemayor Irrigation Community in Moguer, Lucena del Puerto and Valdemaría to optimise their activity

The first action consisted of the installation of a 408 kWp photovoltaic plant in Moguer that will serve two 160 kW solar inverters. These elements will allow the hydraulic pumps used for the crops to be used directly by the solar panels.

In this way, the irrigation community will be able to use solar energy as much as possible for the correct supply of its plantations.

Specifically, it is a photovoltaic solar power plant of2109 KWp for self-consumption using HV. The installation is shaped as a structure driven into consolidated ground, a structure driven into the slope of a basin, and another part on a roof.

The Energy Division also executed another installation, in this case with a capacity of 700 kW in Lucena del Puerto, also in the province of Huelva. In this case, it consists of a 522 kWp solar photovoltaic plant, of which 60 kWp are roof-mounted and the rest ground-mounted.

Magtel also executed the Valdemaría photovoltaic installation, also deployed in the Huelva municipality of Moguer, which will supply 550 hectares of crops. The plant, with a surface area of 1955 m2, has an output of 409 kWp, serving two 160 kW solar inverters. It will save 90 TOE/year of CO2 (tonnes of oil not used) and 22 t/year of final electrical energy.

This type of project makes it possible to reduce energy dependence, as the pumping for which the photovoltaic installation is allocated consumes less energy from the grid. They will guarantee the storage and supply of a larger quantity of water, saving costs and allowing daytime pumping.

> Energy efficiency for the Andalusian countryside

JUAN MANUEL VIZCAÍNO GARCÍA

Director of the Energy Division

At Magtel, we are firmly committed to applying our energy efficiency solutions to the agri-food sector, and to the agriculture in general, solutions that we have been developing for various production sectors since 2006.

Among the projects we have executed is one for the Fresno Irrigation Community in Huelva, which supplies water to the El Diamante reservoir, watering more than 550 hectares of crops through a 409 kW photovoltaic plant that feeds the Valdemaría pumping station. A project that, by incorporating two hybrid frequency inverters, allows pumping to be carried out during the day using exclusively solar energy.

The results have been excellent because, in fact, the Irrigation Community has noted an economic saving of 95 per cent since its implementation.

At our company we always use suppliers of the highest quality on our projects. In this installation, for example, the 765 photovoltaic modules used are from Longi, the world's leading manufacturer of monocrystalline solar panels. In this case, the model used was the LR5-72HBD-535M, with 535 Wp of power and one of the highest efficiencies on the market. For variable frequency drives for pumping, the SD700SP option was selected from Power Electronics, a company with recognised prestige in this field.

In this sense, projects were also implemented, such as the 2109 kWp photovoltaic plant for the El Fresno-Camino de Montemayor Irrigation Community, as well as the Lucena del Puerto plant (both in Huelva), an installation with a power of 700 kW.

Another example is the modernisation works of the Irrigation Community of the Nacimiento de Coín Llanos a Juntillas, a project that affects more than 1600 farmers in the area.

> Potential for improvement

Magtel has executed many projects in the agricultural and agri-food sector, from photovoltaic and thermal self-consumption solutions to optimising the use of self-produced energy. With the latter for irrigation communities, the potential for improvement shown to be enormous.

We cannot ignore the fact that photovoltaic power has reached full maturity. Today, its components offer guarantees of up to 25 or even 30 years and their efficiency has evolved tremendously. In parallel, this technology has become cheaper at a dizzying rate in recent years and is one of the safest and most sustainable options for electricity generation.

It should also be noted that these installations can be carried out both on land and in irrigation basins, using floating structures. Floating photovoltaic technology has historically found its niche in locations where there were problems with available land, for example in Japan, where this type of installation has been present since 2013 and brings with it, among other advantages, the reduction of water evaporation and eutrophication, which in turn counteracts the proliferation of algae and other invasive species.

Andalusia is a leading exporter of agri-food products and a benchmark for quality. Undoubtedly, this latest commitment by the sector is also positioning our community as a leader and model in innovation and sustainability. Sustainability from a social and environmental viewpoint, but also from the economic perspective and profitability.

Our offices

> ANDALUCÍA

> ALMERÍA
c/ Sierra de Lújar nº 6,
04240 Viator, Almería
info.almeria@magtel.es

> CÁDIZ
P.I. El Palmar
c/ Matías Balsera, nº 14
11500 El Puerto
de Santa María, Cádiz
T. +34 956 309 821
info.cadiz@magtel.es

> CÓRDOBA
P.E. Las Quemadas
c/ Gabriel Ramos Bejarano,
nº 114, 14014 Córdoba
T. +34 957 429 060
info.cordoba@magtel.es

c/ Imprenta de la Alborada,
nº 114, 14014 Córdoba
T. +34 957 429 060
info.cordoba@magtel.es

P.I. San Carlos ctra.- Cádiz
km 398, Madrid 14015 Córdoba
T. +34 957 326 466
info.cordoba@magtel.es

> SEVILLA
Parque Aeronáutico
Aerópolis
c/ Juan Olivert, nº 9
41300 La Rinconada, Sevilla
T. +34 955 337 633
F. +34 955 337 632
info.sevilla@magtel.es

Centro de empresas
Pabellón de Italia
c/ Isaac Newton, nº 4
41092 Sevilla
info.sevilla@magtel.es

Avda. Edificio Centris II,
Glorieta Aníbal González,
Módulo 110, 41940
Tomares, Sevilla
info.sevilla@magtel.es

> GRANADA
P.I. Sierra Elvira
c/ Raja Santa, Naves 3 y 4
18230 Atarfe, Granada
T. +34 958 439 492
info.granada@magtel.es

> HUELVA
P.E. La Raya
c/ Industria, nº 21
21110 Aljaraque, Huelva
info.huelva@magtel.es

> JAÉN
P.I. La Zarzuela,
Nave 1, 23700
Linares, Jaén
info.jaen@magtel.es

> MÁLAGA
P.I. La Huertecilla
c/ Estado, nº 16-18
29196 Málaga
T. +34 952 179 901
info.malaga@magtel.es

> EXTREMADURA

P.I. Dehesa del Rey
Parque Isaac Newton nº 2,
nave 81, 06810
Calamonte, Badajoz
T. +34 924 324 915
info.badajoz@magtel.es

c/ Pedro Henlein, nº 38
10600 Plasencia, Cáceres
T. +34 927 904 549
info.caceres@magtel.es

> MADRID

c/ Velázquez, nº 106
1ª planta, 28006 Madrid
T. +34 910 574 185
info.madrid@magtel.es

c/ de la Plata, nº 4
28850 Torrejón de Ardoz,
Madrid
T. +34 910 861 042
info.madrid@magtel.es

> SEDES INTERNACIONALES

> ALEMANIA
Fürstenrieder Straße 279a
81377 Múnich, Alemania

> MARRUECOS
Centre NREA 183,
Avenue Prince Heritier
Nº Oficina 25, Planta Baja
90000 Tánger, Marruecos
info.marruecos@magtel.es

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Magtel