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The use of digital mapping and electronic tools has increased significantly in recent times, particularly for the purpose of town planning, information collection and land management. As a result, many types of information may be geographically referenced and directly associated with the spatial framework to which they refer. Thus, information can be read either directly from a land map or as associated alphanumeric data. Charts, diagrams and thematic maps can also be created to facilitate the interpretation of the collected data. This applies not only to traditional geographical information, represented in a graphical vector format: geographical and geo-morphological characteristics, administrative borders, existing and planned infrastructures, environmental protection constraints such as natural park borders, road maps, city centres, industrial areas, presence of locally available services and functional poles, etc.; but also to social and economic data; population related data, settled enterprises, manufacturing sectors and industrial districts, farming activities and all data usually considered by public authorities and by chambers of commerce for census

certain area. If the same principles are applied to the planning of a technologically and environmentally equipped industrial area (TEEA) or to the transformation of an already existing area into a technologically and environmentally equipped industrial area (TEEA), the following can be achieved:

- Assessment of the suitability of a new area, or an existing site, to be transformed into a technologically and environmentally equipped industrial area (TEEA).
- Assessment of the development of technological networks, services and infrastructure required, which will lead to a second-generation industrial area.
- Assessment of the current manufacturing sectors and identification of the economic and manufacturing ability of the area referenced where the technologically and environmentally equipped industrial area is going to be developed.

A further benefit of this analysis is the immediate assessment of the types of enterprises, which will be attracted to the area. Therefore, the use of GIS is considered a relevant territorial marketing tools, in terms of identifying the marketing strategies utilised to target specific enterprises and to advertise the



and manages the new industrial site. This Authority may perform different important functions, such as:

- Monitoring of the area's environmental performance.
- Liaison between the local authorities and the settled enterprises.
- Management of industrial waste, creating a closed-cycle within local manufacturing activities.
- Setting up networks with neighbouring industrial areas, providing services and recycling industrial waste.
- Technologically equipped site sale management.
- Infrastructure maintenance and service management of the technologically and environmentally equipped industrial areas (TEEA).

Hence, the Management Authority must have a thorough knowledge of the infrastructure, the social and economic features of the industrial area and of the Wide Area as a whole where the technologically and environmentally equipped industrial area (TEEA) is developed. A GIS, containing all the data concerning the above-mentioned services, could serve as a modern and useful tool to meet these needs. Thus, the Management Authority could receive all the necessary updated information required, concerning services and obligations, for which it is responsible, at any time.



purposes. The data available in an alphanumeric, graphical or textual format can also be associated with spatial references. The same spatial criterion must, of course, apply to research and filing methods of all information collected using GIS. A further advantage is that Geographical Information Systems allow immediate comparisons and cross-evaluation of data, all of which is geographically referenced within the same, digitised map. Furthermore, the variation dynamics can be easily established, thus making it possible to easily identify the strengths and weaknesses of a

benefits of settling in a technologically and environmentally equipped industrial area (TEEA) as well as in relation to the characteristics of the so-called "Wide Area" of reference.

The Ecoland project also enhances the presence of a "Management Authority" in a technologically and environmentally equipped industrial area (TEEA), such as an entity that may be set up by settled enterprises or alternatively by the local regulatory framework (such as in the case of Italian law), which represents

## The importance of information in the diffusion of renewable energy sources: the case of geothermal energy

Eurobic Toscana Sud decided to use a part of ECOLAND's financial resources to determine the possibility of creating an industrial area, which uses geothermal energy, within the municipality of Pomarance.

This project has favoured the analysis of the possible uses of this energy source. Literature and studies on the argument are plentiful and require careful consideration.

Results of geothermal research carried out during the last year nationally, have displayed a vast energy source at an economically viable depth.

In addition to electricity production, the geothermal heat may be used in direct applications to ensure energy savings, exploiting water with temperatures between 20 and 150 Celsius degrees.

In addition to spas and swimming pools, warm geothermal water is also utilised to heat greenhouses for floriculture and horticulture purposes, fish tanks, milk pasteurisation, drying onions and wood, washing wool and warming buildings. Heat pumps are another innovative use, used to warm buildings in winter and cool them in summer with a very low consumption of energy, by exploiting different soil temperatures.

On the basis of the previous considerations it must be established if there are barriers to the diffusion of geothermal energy.

In the past, environmental complains from citizens living near geothermal power stations were justified, particularly in relation to the emission of unpleasant odours. Using new technologies, which reduce emissions and reinject geothermal fluids, this problem has been rectified, also preventing a high risk of subsidence in these areas.

Currently, due to technological advances, the production of electrical energy is one of the most ecologically sustainable methods. This is also observed in the small scale of such plants in comparison to previously developed power sources, such as gas and fossil fuel power stations.

In relation to geothermal fluids used to obtain thermal energy, there is no comparison with any other technology. These thermal energy systems also surpass thermo-solar energy because they do not have the visual impact of thermo-solar panels.

As regards economic aspects, the cost per kWh obtained using a geothermal power station is in the range of 0,07 to 0,09 €, similar to the cost of combined cycle methane power stations. Currently the lowest cost equals approx. 0,06-0,07 € (ENEL source, ex public corporation for the production of electric energy). It is necessary to consider that costs are calculated for plants with a 20 year life span. Geothermal power stations have a longer life span, some plants lasting longer than 50 years. Also geothermal power stations do not contain boilers, as opposed to current thermoelectric power stations. These boilers



reduce the life span of conventional plants and increases maintenance and relative expenditure.

Today, geothermal energy exploitation techniques are consolidated with high performance and reliability.

Political-legislative obstacles are not an issue in the Tuscany Region, which has been supporting the development of geothermal energy, in particular through financial incentives, for quite some time. In the past, the element delaying the exploitation of geothermal energy has been perhaps ENEL's behaviour, due to the negligence of environmental aspects and certain territories interested only in increasing short-term profits. Recently, the behaviour of this corporation appears to have changed, concentrating on new exploitation strategies, exploration programs and attention to environmental aspects including sustainability and substantial elimination of pollution and unpleasant odours. The ENEL investment foreseen for the geothermal sector, amounts to 300 million Euro over the next 5 years and is clear evidence of the company's interest in the geothermal sector.

The only real barrier to the diffusion and greater exploitation of this energy source is the insufficient information available, particularly in relation to opportunities and the low environmental impacts caused in the territories involved, due to modern-day technologies.

It is necessary to recreate consensus and credibility within local populations, in order to include geothermal sources in local development policies. The role of information is crucial and ECOLAND represents a valuable tool in promoting sector opportunities, displaying how Tuscany is a world leader in this field.

## Analysis of the supply of industrial land in the province of Granada

The provision of industrial land by municipalities, is considered an essential requirement in order to improve production in this region.

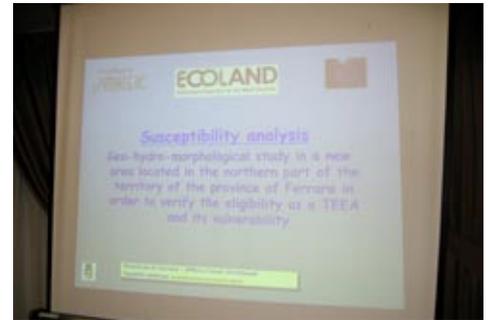
The supply of industrial land is considered a prerequisite for the development of new economic initiatives. It is the municipalities responsibility to promote the provision of industrial land, which has been adapted to the needs of companies, including the services they require, in specific industrial areas.

This article intends to examine the supply of industrial areas in the province. The information, provided by the Granada Chamber of Commerce, allows the analysis of industrial areas of the province as follows:

- a.- Developed industrial areas: areas that have been completely developed.
- b.- Developing industrial areas: industrial areas currently being developed.
- c.- Areas due to be developed in the future.

The following table highlights the current situation in the province of Granada:

Developed industrial areas	56	51,85%
Developing industrial areas	12	11,11%
Areas due to be developed	40	37,04%
<b>TOTAL</b>	<b>108</b>	<b>100%</b>



### GENERAL CHARACTERISTICS

The zones, established as industrial areas in the province, will be supplied with street lighting, refuse collection, water supply, electricity and telephone lines.

Depending on the characteristics and location of each industrial area, the promoters may offer more competitive rates for industrial water supply, although initially this water may not be available for human consumption.

These types of basic services have not been made available in certain industrial areas to date.

The non-existence of maps and plans of these areas has, on occasion, created problems relating to maintenance and organisational matters.

Finally, the characteristics that traditionally have existed in industrial areas include asphalt roads which have facilitated heavy vehicular traffic and provided easier overall access. Also considered of benefit in industrial areas is easy access to motorways.

### TECHNOLOGICAL INFRASTRUCTURES

The available data relates to telephone installations on each industrial estate as well as information pertaining to internet connectivity and telecommunication networks.

The following information was obtained:

94,12% of the industrial areas have telephone installations in each zone.  
70% of the industrial areas have installed the internet and a network of telecommunications.

### ENVIRONMENTAL INFRASTRUCTURES

Industrial areas can decide on different types of environmental management: Purifying Residual Water Station, Manager of inert remainders and controlled Garbage dump of remainders.

33% of industrial areas contain a Garbage dump of remainders.  
4% of industrial areas have a Manager of inert remainders.  
17,65% of industrial areas use a Purifying Residual Water Station.



## The advanced industrial park of Castilla-La Mancha: challenges and possibilities

The City Council of Ciudad Real, conscious of the need to openly embrace the Spanish business sector, suggested the idea of developing an Advanced Industrial Park in the region in 1999. This park aimed to be a well supported, harmonic space dedicated to innovative businesses and industries that provide added value to the region's resources. Currently, five years later, 60% of the park is occupied and 40% of the area will be sold during the next three months.

It is an urban area, very well equipped with the finest infrastructure, which facilitates activities of R+D and the entire integration of the economic environment of Castilla-La Mancha and Ciudad Real itself.

However, its location in close proximity to the train station of the "High Speed Train"-AVE, near the "Carretera de Carrión de Calatrava" on the outskirts of the city, results in industrial activities taking precedence over environmental issues.

The Advanced Industrial Park of Castilla-La Mancha (PIACM) is comprised of a potentially important economic area, including excellent conditions for the installation of scientific and technological enterprises, which also respect the environment. The key factors are as follows:

### STRATEGIC LOCATION

Ciudad Real enjoys a strategic location, in the national context, that adds to the development of business interests in the area. This location is considered the crossroads of major European Routes such as the National Highway IV, connecting Andalusia with northern Spain and the National Highway N-430 which traverses the peninsula from East to West, connecting Albacete with the Mediterranean Sea, Badajoz and Portugal. This makes Ciudad Real the ideal place for constructing an industrial park with these characteristics.

### GOOD COMUNICATIONS

Ciudad Real relies on transportation by motorway. This has been improved considerably by the construction of a highway connecting Ciudad Real with the National N-IV. Also included is the future construction of the City Airport and the pre-existing connection with the High Speed Train between Madrid and Seville-Cordoba.

### LOGISTIC AND STRATEGICAL SUPPORT

All businesses situated in the Industrial Park will obtain the full support of the City Council of Ciudad Real, to assist them in implementing all procedures put in place. The City Council of Ciudad Real will also advise about regional, national and European funds as well as regional incentives available, thus facilitating easier implementation of each enterprise.

### PRIVILEGED RELATIONSHIP WITH THE UNIVERSITY AND OTHER RESEARCH CENTRES

One of the objectives of the City Council of Ciudad Real is to promote greater entrepreneurial co-operation between the University and other research centres with which it is

planned to sign agreements, not only in the investigative and analytical areas, but also in the provision of work-placements for students, resulting in highly qualified employees within the industrial park.

### ENVIRONMENTAL CONTROL

Environmental factors will be taken into consideration after the selection of the businesses to be installed in the PIACM is decided. During the implementation of the project special attention has been paid to the provision of environmental infrastructure such as the purification of sewage and landscaped areas. 32,000 square metres consist of gardens and forestry, amounting to 16% of the total park, resulting in an ecological industrial estate. In the future, rational species of trees will be introduced to ensure that the park has a distinctive environment, typical of the Mediterranean zone, making it characteristic of other existing parks world-wide.

### THE CITY WHERE IT IS ESTABLISHED: CIUDAD REAL

Ciudad Real offers various advantages which make it an attractive city to inhabit and in which to develop as an entrepreneur. In Ciudad Real, there is a perfect combination between a medieval city and a modern dynamic city environment in a constant state of growth and transformation. Its natural resources, including two National parks, provide an important focus of attraction for outdoor activities such as hunting, air-sports and the enjoyment of areas with environmental and historical interest. An added advantage includes the facilities offered by the University as well as the ability to obtain a higher standard of affordable housing in comparison to similar but more expensive property in Madrid.

### ADEQUATE INSTALLATION

The park is equipped with high quality infrastructure, meeting all requirements and comparable to the best technological parks in the world in terms of installation costs and competitive pricing. The philosophy of PIACM is based on offering infrastructure as a shared resource that contributes to generating an appropriate environment for the installation of enterprises, due to innovative research and development, in competition with the foreign market.

Thus, it contains the following requirements:

- Supply of gas and water
  - Supply of electrical energy
  - Advanced sound and data telecommunications via fibre optic
  - Perimeter closure and security control of the entire area
  - Integral security and fire control
  - Green areas of expansion and recreational facilities, including parks, gardens and trees
- In general, all these services of which the park consists, is situated in the forefront of the industrial area.

### INDUSTRIAL AND ADVANCED

The physical infrastructure of the PIACM



includes a new synergic concept that provides a solution to the most advanced expectations. It aims to integrate Ciudad Real and Castilla-La Mancha into the European economy, a competitive environment where the provisions of support infrastructure for industrial activities constitute the success of each enterprise.

The City Council of Ciudad Real prioritises each enterprise willing to cooperate in the area of research and development, in conjunction with the research centres with which the University of Castilla-La Mancha plays an active role.

A Park is described as follows:

- "Industrial", because we act as if production and manufacturing industries are installed on site
  - "and advanced", because it offers a collection of services that will facilitate processes of research and development, innovation and incorporation of the most modern information technologies
- The City Council of Ciudad Real will assign priority to the enterprises that contribute added value to local products of Castilla-La Mancha and to the development of enterprises relating to modern technology, favouring progressive new types of industrial activities. However, there is no difficulty with any other type of project that, as well as respecting the environment, contributes to the following objectives:

- Creation of employment
- Creation of wealth
- Launch of local resources
- Promotion of research, development and innovation

Throughout the 109.639 square meters of industrial areas, industries are being established. In general, they are medium sized enterprises that will enrich the industrial network and contribute to the improvement of industrial turnover in the province. The Technological Park of Ciudad Real, forms a key factor in the dynamics of the industrial sector. The services are not only for the city and the surroundings alone, but also for the entire region of Castilla-La Mancha.

