Tarragona's petrochemical industry. Status and transformations

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Tarragona and its privileged location are well-known for their tourist appeal and history, but perhaps less so for their petrochemical industry, which is very active in the region. This petrochemical industry is an important part of the material foundations and systems of our society where – regarding volume – cement, steel, fertilisers, plastics, energy and water stand out, the latter two omnipresent across all areas.

Chemistry permeates all of them. Europe is currently the second largest producer of chemical products in the world after China, which has three times Europe's capacity. China's predominance has heightened in recent years. In 2002 the European chemical industry accounted for 27% of the global market, while today it stands at 14%.

Spain has a significant chemical sector, as demonstrated by the following facts and figures:

- It accounts for 6.1% of GDP, with a turnover of 82,493 million euros.
- It employs 5.8% of the active salaried population, with 792,200 jobs (direct and indirect), 94% permanent contracts and an average salary per worker of 40,000 euros per year.
- It is the second largest exporter in the Spanish economy and accounts for 19.3% of Spain's industrial exports.
- It is the leading investor in R&D&I among all industries, with 26.7% of the total and 21.4% of researchers under contracts.

The geographical distribution of Spain's chemical sector is centred on the main regions of Tarragona, Huelva and Barcelona, although it also has significant presence in Castellón, Valencia, Cartagena, Algeciras, Puertollano, Madrid, Aragon, the Basque Country, Cantabria and Asturias.

The chemical industry was classified as an "essential" sector during COVID-19, and its products serve as the foundation for 96% of other industrial sectors. The vast majority of products we use come primarily from olefins (especially ethylene and propylene), which are produced in crackers using naphtha from petroleum or natural gas. Chemicals are also important in the production of chlorine, among other substances. It is important to note that these products will continue to be necessary in the future, but current production causes CO_2 emissions, and just like other industries, the entire chemical sector is currently undergoing a transformation to become sustainable by lowering CO_2 emissions in pursuit of carbon neutrality, following European Union targets.

The sector in Catalonia accounts for approximately 50% of Spain's entire industry, and Tarragona is home to half of Catalonia's chemical product production, that is, 25% of the national total.

Tarragona's chemical industry is the most important chemical complex in southern Europe. It provides 12,000 direct and indirect jobs, which generate a further 36,000 jobs, and it accounts for more than 50% of exports from the province of Tarragona and 67% of movements in the port of Tarragona.

The chemical industry in Tarragona is primarily concentrated in the North Industrial Park, the South Industrial Park and the port. The interconnections between these industrial parks and the port via pipe racks are also extremely important, carrying different raw materials and products.

Tarragona's chemical complex comprises 34 companies belonging to the Associació Empresarial Química de Tarragona (Chemical Business Association of Tarragona, AEQT). The majority of them belong to large chemical and petrochemical multinationals, which also own auxiliary or similar companies in fields like logistics and energy.

Tarragona chemical complex has plants whose cumulative investment is valued at 20 billion euros. These factories produce a total of 20 million tonnes of chemical products every year, with 100 different products, including 60% of plastics in Spain. Some of the particularly important factories include an oil refinery and two associated olefin crackers integrated in it. Spain has eight refineries and three olefin crackers, and there are a total of 45 crackers in Europe as a whole. If we examine capacity, the two crackers in Tarragona account for 94% of Spain's ethylene and propylene production. Tarragona also has production plants for chlorine and its by-products. All of this makes it a strategic chemical complex in both Spain and Europe.

When discussing the chemical industry, we also have to consider other inherent factors that come with it, like safety, the environment, energy and water, among others, in addition to its interactions with society and the region. I cannot delve into the details due to time limitations, but I should note that the chemical industry handles products, processes and conditions that are or may be dangerous and require totally reliable operation. It also needs industrial and human systems to prevent accidents and possible unwanted impacts on people, the environment and the surrounding areas. In this respect, the chemical industry is somewhat parallel to aviation, which also operates under potentially dangerous conditions. The positive side is that both chemistry and aeronautics are sciences and technologies with many years of thoroughly proven knowledge and experience. They have become highly safe, as demonstrated on a daily basis, when operated correctly by responsible companies, teams and people with the required systems. However, these aspects are fundamental and top-priority in operations at all times, with no room for compromise.

To provide a strategic overview of the sector, below is a list of its strengths, weaknesses, opportunities and threats (SWOT) which highlight some of the unique aspects related specifically to Tarragona's chemical industry:

Strengths

- Diversified, competitive and (relatively) profitable leading companies.
- Essential, strategic, necessary sector.
- Integrated petrochemical complex (refinery and two crackers) with a deep-water port.
- Strategic location.
- Integration of the industrial parks and the port of Tarragona.
- Waste-water recycling involving partial re-use.
- Natural gas supply guaranteed through gas pipelines and the liquified natural gas terminal in Barcelona.
- Specialised universities and training centres in Tarragona and Barcelona.
- Ecosystem of specialised service companies.
- Quality of life.

Weaknesses

- Headquarters outside Catalonia/Spain – major decisions made outside Catalonia.
- Medium-sized plants, and some more than 40 years old, which have to compete with larger and more modern facilities.
- Commodities with limited added value.
- International competition for new investment.
- Dependence on energy, raw materials and technologies that are not locally produced.
- Activities with inherent risks (common to all chemical industries around the world).

Opportunities

- European Union Next Generation funds, Strategic Projects for Recovery and Economic Transformation (PERTES) and national grants.
- Developments with universities and technology centres: e.g., Universitat Rovira i Virgili, Eurecat Centre Tecnològic (Eurecat Technology Centre), Institut Català d'Investigació Química (Institute of Chemical Research of Catalonia), etc.
- Potential for new investment.

Threats

- Higher energy and raw material prices than other competitors located in the United States and the Middle East.
- Delay in rolling out renewable energies, especially in Catalonia.
- Urgency of climate change and fossil fuel decarbonisation.
- More restrictive and complex regulations compared to global competitors.
- Strong competition from countries outside the European Union.
- Potential ban on treating waste locally.
- Lack of support for carbon capture and storage.
- Perception and image of the sector: sensitivity and increasing demands.
- Hostility towards the chemical industry and its products.
- Possible offshoring.

In conclusion, some of the most important points regarding Tarragona's chemical industry can be summarised as follows. It is the second most important industrial sector in Catalonia – thereby making it essential and strategic – and the most important in Tarragona. It brings high added value, particularly through exports, quality jobs, and research and development. It has to deal with international competition from countries and corporations, as well as internal competition among corporations operating across multiple countries. It is an industry in which integration with society and the region is important. Finally, it is facing the challenges of decarbonisation and the circular economy, with the need for reliable, competitive renewable energies, which are key transformations for its future. This is why, in addition to its assets and strengths, it also needs cooperation and commitment from public authorities, as well as collaboration with society and the region.