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Oil in Spain: in the Spirit of the Banned Corrida

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Abstract
The past, current status and future of the oil sector of Spain are considered and analyzed. The author uses methods of comparative and systematic analyses, which are implemented for assessing the Spanish oil in the context of the world, Europe and the EU. The article mainly concludes the Covid-19 pandemic has seriously hit the Spanish oil market, however, the pandemic has made inland oil demand and petroleum imports of Spain lower but the domestic crude oil production, which is currently close to zero, will unlikely increase in the near term

Key words: Crude oil; Condensate; History; Production; Petroleum companies; Repsol; CAMPSA; CEPSA; Oil refining; Consumption; Bio-energy; Foreign trade; Spain

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Reserves. In line with the omnipresent Energy Information Administration of the USA's Minenergo (EIA/DoE) data, proven oil and lease condensate reserves (of the only oil-producing field) in Spain were estimated at the end of 2021 at 150 mln bbl [1].

Crude oil was mainly discovered in the north of the Spain and off north-east off the country (Fig. 1). The main offshore deposits lie between Lanzarote, in the Canary Islands, and Morocco, and in the Bay of Valencia, close to Ibiza. As both the Canaries and Ibiza are places of great natural beauty whose principal industry is tourism, there is intense opposition to any petroleum plans.

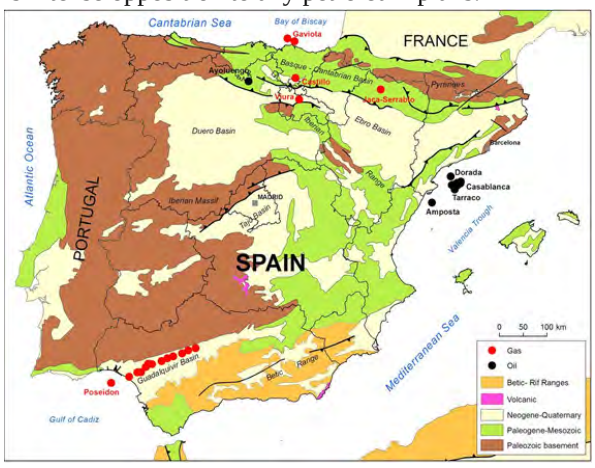


Figure 1
Main Hydrocarbon Areas of Spain

Production. The *Ayoluengo* field was the first commercial oil discovery in Spain and almost 60 years later remains the only onshore oilfield in the Iberian Peninsula.

The field was discovered in 1964 and is still producing. It is located about 300 kilometers north of Madrid in the southern part of the Basque-Cantabrian Basin, a geological region where natural oil seeps, tar sands and asphalt have been recognized in outcrops since the early 20th century. This region was considered highly promising and most of the hydrocarbon exploration efforts in Spain during the 1940s and 1950s were focused here.

The *Compañía Arrendataria del Monopolio de Petróleos Sociedad Anonima* (CAMPSA), the Spanish-government petroleum monopoly created in 1927 (*see below*), in 1946 the company was granted the hydrocarbon exploration rights for a 2,800 square-kilometer area north of Burgos. With light rigs, CAMPSA drilled some shallow stratigraphic wells, all based on surface geological surveys, as no reflection seismic was available then, resulting in many of the outcropping anticlines being pierced.

Later exploration by CAMPSA was focused in the Zamanzas Valley, along the eroded axis of a large surface anticline with outcropping Cretaceous tar sands in its core. The shallow wells typically found heavy black oil while drilling the Cretaceous section; traces of gas and very small amounts of lighter oil (26-28°API) along with salt water were occasionally recovered from the Jurassic carbonates, but no commercial flow was established [2].

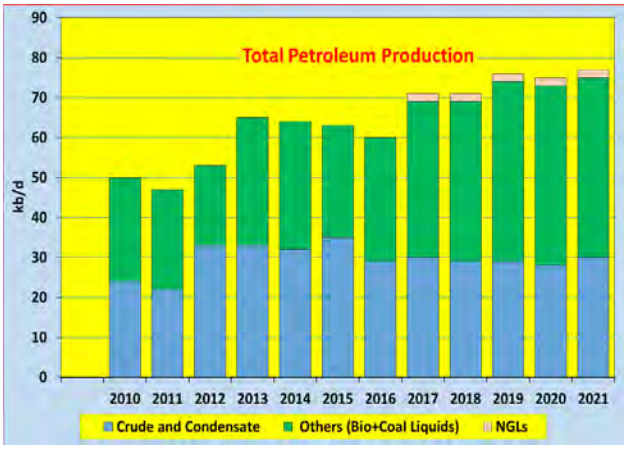
According to the USA's Energy Information Administration of the US Min-energo (EIA/DoE), crude oil produced in Spain was very unstable – it went from 33 kb/d in 1980, reached annual oil peak (of 58 kb/d) in 1983, declined down to 2.3 kb/d in 2009 and amounted to 7.3 kb/d in 2013[3]. By July of 2021 (as well as since November of that year) monthly crude oil output in Spain was practically zero (*Fig. 2*).

Source: https://tradingeconomics.com [4]

Figure 2
Monthly Crude Oil Production in Spain in 2017-2021 (according to the EIA), in kb/d

In the whole of 2021, in line with national statistics, Spain produced only around 5.8 thousand metric tonnes of crude oil.

This quite a sad situation is partly "saved" by domestic production of *bio* and (before 2019) *coal liquids* (*see below*), which, according to the EIA, stood in recent years around 45 kb/d [5] (Fig. 3)



Source: drawn by the author based on https://www.eia.gov/ international/ data/world/petroleum-and-other-liquids/annual-petroleum-and-other-liquids-production [5]

Figure 3
Total Petroleum Production in Spain in 2010-2021 (according to the EIA), in kb/d

Companies. At present (2022) there are up to nearly 30 foreign and local oil-related companies, including such world-famous giants like Shell (RDS), BP, Total, ENI, and Q8, operating mainly in downstream sector of Spain. The Spanish retail oil market is now dominated by the five leading companies – Repsol, Cepsa, BP, the local Disa and Portugal's Galp –, which control around three-quarters of refined product supply.

There is no officially appointed national oil (petroleum) company in Spain but *Repsol* is un-doubtedly the Spanish largest petroleum com-pany that carries out all types of activities re-lated to oil and gas. Repsol conducts oil and gas production in 30 countries; it owns 6 oil refineries (including 5 in Spain – *see below*). The Repsol Group contains more than 300 companies incorporated in more than 40 countries (first of all, in Spain, the Netherlands, Canada, and the USA) and employed over 24 thousand people. As of May 2022 Repsol has a market cap of $23.04 bln [6]. The company is based (has its HQs) in Madrid.

It is noteworthy that Repsol is the latest big European energy group to anno-unce long-term spending cuts and disposals after a fall in oil prices caused by a US supply glut, weaker Chinese demand and Opec's decision not to reduce output.

A couple of words about Repsol's history.

In the midst of political turbulence in Spain, *Campsa* (*Compañía Arrendataria del Monopolio de Petróleos S.A.*) was created on October 17th, 1927, in order to manage the state petroleum monopoly. Originally, Camp-sa was a mixed company, with the State holding only a minority stake, but it was awarded the concession in 1927. The creation of Campsa had a profound effect on Spain's industrial growth, especially the refining industry. The company was dissolved, as the EU requested, with its assets going to Repsol, at the beginning of 1993.

Actually by mid-1992 CAMPSA primarily became a transport company. In January 1993, when the monopoly was abolished, CAMPSA was renamed *CLH* (*La Compañía Logística de Hidrocarburos*). At the end of 1993, Shell took over a 5% stake from Repsol. CLH is currently a joint venture among the oil companies that have refineries in Spain plus Shell. Its current share-holding is structured as follows: Repsol, 61.46%; Cepsa, 25.1%; BP, 7.61%; Shell, 5% and others, 0.83%. Together the oil refiners controlled, through different kinds of contracts, over 85% of the service stations in Spain was controlled in mid-1997 by CLH (*see below*) [7].

While Europe was immersed in World War II, on September 30th, 1941, the National Institute of Industry (INI – *Instituto Nacional de Industria*) was established to promote and finance Spanish industries.

Instituto Nacional de Industria was setup in 1941, by Law on September 25th, as the answer to the need to rebuild and develop the Spanish production capacity, two years after the end of the Spanish civil war. INI should face the required level of investment which the private sector could not, on the basis of an autarkic economy, for which received a 50 mln pesetas as an endowment from the State.

During this period, Campsa drilled an appraisal well in Cantabria, an early mile-stone for exploration in the Iberian Peninsula.

A year later, in 1942, control of the monopoly was transferred to the INI, and the state consolidated its stakes in hydrocarbon companies. In November of that year, the company ENCASO (*Empresa Nacional Calvo Sotelo de Combustibles Líquidos y Lubricantes*) was established as a stock corporation and began operations in Puerto-llano and Levante, where it set about constructing the Cartagena refinery.

In 1944, Campsa's first research center was built in Madrid in association with ENCASO, with the aim of keeping Spain from depending on foreign suppliers and technology. During this period, the research center worked on projects related to shale distillation and fertilizer production, advancing towards the optimization of processes based on the shale oils produced in Puertollano. The center underwent significant expansions and acquired a new testing station for lubricants and fuels, as well as an experimental refinery. Over time the company diversified its activities, making particular headway into the field of petrochemicals.

In 1947, a few years after the end of the war in Europe, the Spanish oil industry witnessed some important changes. The 20-year contract between the state and Campsa came to a close, and the petroleum monopoly was reorganized by law on July 17th, 1947. The old leasing contract was terminated and replaced by a program aimed at decentralizing services, which simultaneously reinforced the state's intervention in the petroleum monopoly (CAMPSA). The new law established that the state would recover from the petroleum monopoly the ability to award concessions for nearly all hydrocarbon activities, except those related to distribution and commercialization, which remained under the exclusive control of CAMPSA.

In 1948, the company REPESA (*Refinería de Petróleos de Escombreras*) was established with the purpose of installing a refinery in the Escombreras Valley in Cartagena. Opened in 1951, REPESA's facilities included a lubricants and asphalts production plant, a cogeneration plant, marine facilities at the Port of Escombreras, and a research center. Repsol was REPESA's star brand. At that time the history behind the Repsol brand began to take shape – since 1951, when the company REPESA launched a new range of lubricants called Repsol, which soon became one of the most popular brands in Spain.

In 1961, the Spanish Ministry of Industry authorized the Marathon Oil Company and *Petroliber* (*Compañía Ibérica de Petróleos, S.A.*) to form a stock corporation that would build and operate an oil refinery with an initial annual capacity of 1.2 mln t. In May 1964, CAMPSA collaborated with Chevron and Texaco to drill an appraisal well in Burgos, which would reach production levels of 85 barrels per day.

Hispanoil (*La Sociedad Hispánica de Petróleos S.A.*) was founded on May 5th, 1965, with the aim of carrying out exploration and production activities beyond Spain. Its first operation took place one year later in the Sirte basin in the Libyan desert. [FYI: In 1985 the absorption of ENIEPSA by Hispanoil was agreed. The company would end up serving as the basis for the creation of a new company, *Repsol Exploración*, a subsidiary of the Repsol group that was constituted in 1987 from the assets controlled by the INH].

In 1966, ENCASO opened the Puer-tollano refinery in Ciudad Real, the first in inland Spain. It covered 320 hectares, and it was connected by an oil pipeline to the Malaga marine terminal.

While large parts of Europe were rocked by the May 1968 protests in France, Spain saw operations begin at ASESA's heavy crude oil refinery (*Asfaltos Españoles*). Located in Francolí in the Spanish province of Tarragona, the refinery covered 340 ha and was equipped with a fully integrated basic petrochemicals facility, another for cogeneration, and its own maritime terminal.

REPESA saw an ideal testing ground in the world of motorsports, and in late 1968 it laid the foundations for what would one day become the Repsol Team. In 1971, motorcycle racing experienced a complete revival in Spain with Angel Nieto winning his first World Championship in the 125cc class. This was also the first time the Derbi motorbike bore the Repsol logo, representing a REPESA product brand.

In October of 1987, as a result of the reorganization of the Spanish energy sector the National Hydrocarbons Institute (*Instituto Nacional de Hidrocarburos, INH*), which existed from the end of 1980 until the mid-1995, created Repsol, S.A. The company was organized into five subsidiaries in order to carry out its main activities: *Exploración* (formerly Hispanoil), *Petróleo* (formerly ENPETROL), *Butano* (formerly *Butano, S.A.*), CAMPSA and *Petronor*.

In 1989, the first step was taken toward the company's *privatization*, a process that lasted eight years. This first step was signing a contract between INH, Repsol and BBV. The process wasn't finalized until April 1997, when it culminated in a last IPO.

In June 16th, 1995 the *Agencia Industrial del Estado* (*AIE*) was created, as was the case of SEPI, by the Royal Law Decree 5/1995, on June 16th, later transformed into Law 5/1996, on January 10th, for the creation of certain public law entities attached to the Ministry of Industry and Energy. Its activity was subject to private law.

The AIE replaced, together with SEPI (*see above*), the historical *Instituto Nacio-nal de Industria* (INI – *see above*) with the goal of implementing the Government's guidelines on industrial reorganization and rationalization, special regimes, and partial derogation of the Community norms on competition.

The main functions conferred on the AIE were those of determining the strategy, overviewing the planning, and promoting, leading, coordinating, and controlling the activity of the companies in which it had a majority shareholding participation, either directly or indirectly, making the follow-up of its implementation and making sure of the fulfillment of the goals which had been set for the companies. It was also responsible for managing the privatization of the companies whose shares it held.

Agencia Industrial del Estado was granted as its portfolio of shareholdings INI's loss-making companies, which depended on the State General Budgets for their ope-rating: *Astilleros Españoles, Astano, H. J. Barreras, Santa Bárbara, Bazán, Hunosa, Minas de Figaredo, Presur, Productos Tubulares, Corporación Siderúrgica Integral, Sidenor, AHV-Ensi-Desa Capital, Altos Hornos del Mediterráneo* and *Postasas de Navarra*.

On September 5th, 1997, the Council of Ministers resolved to authorize the taking over by *Sociedad Estatal de Participaciones Industriales* (SEPI) of AIE's companies, as well as of all their rights and liabilities; thus the *Agencia Industrial del Estado* was dissolved by the Royal Law Decree 15/1997.

The opening to the international market comes with the acquisition of Argentinian national petroleum company YPF in 1999, gaining better positioning and leverage as a global company. This synergy has resulted in a company with global reach and stronger strategic positio-ning. By the end of 1999, Repsol has purchased 97.81% of YPF's shares for over 15 bln of euros and since then the new company was officially called *Repsol-YPF*

SA with small changes in the Repsol's logo. As a result, there was created a large private integrated transnational oil and gas company, working in over 30 coun-tries and employing over 37,000 people of various nationalities. In 2007-2010 Argentinian business conglomerate Petersen Group has bought some shares of YPF SA. Besides, in April of 2012 Argentina's President *Cristina Fernández de Kirchner* stated that a certain part of Repsol's stake in YPF should be expropriated as 51% of the national petroleum company's assets were subject to immediate nationalization. Furthermore, Pemex, the Mexican national oil company, which held 9.3% of Repsol's shares, by June of 2014 has quitted its three-year attempts to obtain some control over Repsol. As a result, by the end of 2011 has become an owner of 25.46% of YPF while Repsol's stake in the company has de-creased down to 57.43% (the remaining 17.09% were held by other private investors). In their turn, at December 31, 2021 Repsol's significant shareholders were (in **%** of total voting): BlackRock, Inc. – 5.305, *Banco Santander, S.A.* – 3.829, Norges Bank – 3.192, *Sacyr, S.A.* – 3.094, and *Amundi, S.A.* – 3.288 [8].

Repsol's chief executive Josu Jon Imaz warned in mid-October 2015, when the company started to sell its assets, of "challenging times" ahead. "The growth history of Repsol is over. Now we will be focusing on efficiency", he told analysts. "We can't be everywhere doing everything" [9].

CEPSA (*Compañía Española de Petróleos S.A.*) is a Spanish major petro-chemical corporation. The company's HQs are located in Madrid.

Its history began in 1929, with the founding of the company (from the name of which, later, the CEPSA trademark appeared) and with the launch of the construction of an oil refinery on the island of Tenerife (Canary Islands).

Currently, CEPSA brings together about 80 companies with over 11,000 emp-loyees in Europe, Asia, Africa and America. CEPSA is the third largest manufactu-ring group in Spain.

Russia, Greece, Albania, Ireland, Bulgaria, Malta, Hungary, Cyprus, Belarus, Italy, Lithuania, Ukraine, Portugal, Spain, England, Bangladesh, Taiwan, Peru, Argentina, Dominican Republic, Costa Rica, Lebanon, Mexico, Israel, Thailand, Tunisia, Yemen, Qatar, Sudan, Panama, Pakistan, Morocco, Philippines, Nigeria and others are the countries in which the company's official distributors are currently located, representing a wide range of CEPSA products.

Nowadays CEPSA develops its activities in the petrochemical market, sells products and offers service. On the territory of Spain, Portugal, Andorra and Gib-raltar there are more than 1700 CEPSA filling stations, equipped with the most modern equipment.

In addition, certain funds are spent on the search for new and the development of already known oil fields.

Thus, studies conducted by CEPSA in the early 90s of land plots located in the Sahara Desert (Algerian territory) confirmed the existence of two large oil fields, called RKF and Koubba. Since 1992, the development of these oil fields has been carried out: drilling 17 wells, installation and adjustment of equipment for oil production, construction of 120 km of highway and oil pipeline.

In 1997, oil production from RKF fields reached 20,000 barrels per day, Koubba - 230,000. To date, the total volume of oil deposits is RKF - 240,000,000 barrels, Koubba - 1,000,000,000 barrels.

Oil refining is one of the components of CEPSA's activities. Gibraltar (San Roque), La Rábida, and Tenerife are three large refineries with a total production capacity of about 21.5 mln t per year (*see below*).

CEPSA is a pioneer in the Spanish market for the production of aviation and marine fuels. Almost all airports located in the Canary Islands, as well as the largest seaports in Las Palmas, Santa Cruz de Tenerife, Algeciras, Cueta, and Gibraltar are regular customers of CEPSA.

Roads and Car Fueling Stations. The Spanish motorway (highway) network is the third largest in the world, by length. As of 2019, there are 17,228 km (10,705 mi) of High Capacity Roads (*Vías de Gran Capaci-dad*) in the country [10]. All of them are paved and are really good – no worse than the famous German autobahns.

With permanent inhabitants of 46.73 million in January 2022, the country exploits 23.95 registered passenger car (almost 513 vehicles per 1,000 people), which is much higher than the world's average (some 120 units per 1,000 persons) and even higher than an average of nearly 470 passenger cars in the G7 countries [11-12], not to mention the world's highest motorization in small European countries of San Marino and Andorra (over 1,200 units per 1,000) [13].

Unsurprisingly, Spain boast high number of car-filling stations – up to 11,650 petrol stations (the third place in the EU [after Italy and Germany]) plus almost 880 retail points selling alternative car fuels.

There are several fuels on offer in Spain, with usual diesel and unleaded gaso-line being the most popular. The most used unleaded petrol is *95 Octane Gasolina* (*sin Plomo* [meaning "w/o lead"]) and the superior version, usually *98 Octane Gasolina* (*sin Plomo*) both are distributed from the green pumps.

Over 40% of Spanish cars are now petrol-driven vehicles, nearly 60% run on diesel, and only few percents – on alternative fuels.

Still, the number of vehicles that drive on alternative fuels (electricity, natural gas, LPG, ethanol and its mixtures with mogas, and even hydrogen) and the number of outlets that sell the alternative stuff in Spain (*see also below*) are increasing.

Though the penetration of *electricity* to the roads of Spain is regarded slow by the EU's standards, at the start of February of 2021 Repsol has teamed up with the Japanese automobile giant Nissan to promote EVs in the country. Repsol's charging network currently boasts more than 2,000 operational charging points. Of these, more than 370 are available to the public, including over 100 fast charging points, most of which are located at service stations – thus positioning the multi-energy company as the leading provider of fast charging services at service stations in Spain. In addition to these more than 370 public-access points, there will be more than 350 fast charging points already installed at the company's service stations and the first two ultra-fast charging locations in the Iberian Peninsula (in Spain and Portugal), capable of charging the batteries of compatible vehicles in five to ten minutes. All Repsol's electric charging points guarantee the supply of 100% renewable electricity.

Additionally, Repsol is working on an ambitious plan to deploy additional public-access charging infrastructure, reaching a total of over 1,000 fast and ultra-fast charging points by the end of 2022. This will translate into one charging point every 50 kilometers.

To date, Repsol has 11 public charging points in the Community of Valencia, 9 of which are at service stations. In addition to these public-access points, there will be 47 fast charging points already installed at the company's service stations, with more than 50 further points, included in the expansion plan, by the end of 2022.

Repsol currently has more than 250 charging points in pub-lic spaces, including 70 fast charging points, the majority of which are located at service stations.

The city of Madrid has 1,000 private terminals installed both at company facilities and in homes [14].

In the early February, 2021, a con-sortium, consisting of the Spanish Enagás, Toyota Spain, Urbaser, Carburos Metálicos, Sumitomo Corporation Spain, and the Spanish Confederation of Service Station Entrepreneurs (CEEES), has built a car station for hydrogen-driven long-range fuel cell electric vehicles in Spain.

The first refueling station, located in the San Antonio Service Station in Mad-rid, will allow to fuel a fleet of 12 Toyota Mirai hydrogen-driven cars that will be used by the companies behind this pioneering project, thus promoting the use of hydrogen as a clean and sustainable energy [15].

In Spain the development of the compressed natural gas (CNG) refueling stations network has been slow compared to other neighboring countries, but nowadays the presence on high traffic roads is beginning to be noticeable. In the beginning the development was carried out by new players in the refueling station business, but it was when the big companies in the sector started to develop their supply network that the presence of CNG vehicles on Spanish roads started to be considerable.

Repsol, a local energy company, already has the largest autogas retail network in the country, but they don't mean to stop where they are with 500 LPG car service stations. According to Jaime Fernández Cuesta, Repsol's LPG executive director, announced that by the year 2020 the number will expand to 1,500, thus making it possible to serve five times the number of vehicles serviced today [16]. As of the start of May, 2022, there were in Spain almost 840 working fueling stations that sold LPG [17].

And the quite underdeveloped car fuel in Spain is currently ethanol – as of the beginning of May, 2022, there were only 5 service stations offering Bioethanol E85 or E100 [18].

Pipelines. There are over 20 oil-related pipelines with inner diameters ranging from 8 to 22 inches (primarily oil product lines, servicing existing oil refineries – *see below*) in Spain, with the main (crude oil, 22") pipeline running 285 km from the deep-water port of Cartagena to the Puertollano Refinery in the province of Ciudad Real (*Fig. 4*).

Figure 4
Oil Pipelines in the Iberian Peninsula (as of the start of 2022)

Compañía Logística de Hidrocarburos SA (*CLH*) owns the main oil pipeline net-work and storage facilities in Spain.

Refineries. There are twelve working oil refineries with their com-bined intake capacity of nearly 1.6 mln b/d in Spain (Table 1).

Table 1
Oil Refineries in Spain as of the Start of 2022

Refinery name	Location (city and province, *etc.*)	Year Started	Design Intake Capacity, kb/d	Owner/ Manager
Bilbao (Muskiz) Refinery	Bilbao, Biscay	1970	220	Petronor (Repsol's subsidiary)
Puertollano Refinery	Puertollano, Ciudad Real	1965	140	Repsol
Tarragona Refinery	Tarragona, Catalonia	1975	186	
Coruña Refinery	the Bens Valley, near the city of A Coruña, Galicia	1964	125	
Cartagena Refinery	Cartagena, Murcia	2011	220	
Tenerife Refinery	Santa Cruz, Tenerife Island	1930 (1)	90	
Palos de la Frontera Refinery	Palos de la Frontera, Huelva	…	200	CEPSA
San Roque Refinery	San Roque, Cadiz; northern coast of the Bay of Gibral-tar	1967	240	
Rábida Refinery	Palos de la Frontera, Huelva	1967	19	
Castellon Refinery (2)	Castellón de la Plana, Castellón	1967	108	BP
Tarragona Asphalt Refinery	Tarragona, Catalonia	1966 (?)	20	Asfaltos Españoles (ASESA)
Barcelona Refinery	Barcelona, Catalonia	…	14	LIPSA
Total	Spain	1965-2011	1,582	Various

To be closed in 2030. (2) Nelson complexity index reaches 10.58
Source: compiled by the author based on various sources, including http://abarrelfull.wikidot.com [19].

The La Rábida Refinery, which came into operation in 1967, concentrates its activity on oil refining and produces a wide range of energy products, asphalt, petrochemmicals and other petroleum derivatives. This refinery also has a biodiesel plant that came into operation in 2008, which supplies it with this biofuel; this favors diversification in the supply of Cepsa's refineries and responds to the Company's interest in complying with the recommendations on its use.

The plant is located in the municipality of Palos de la Frontera, occupies an area of 2.4 million square m and has a distillation capacity of 9.5 mln t per year (19 kb/d). Its facilities enable it to store and distribute products for industries and consu-mers: petrol, butane, propane, diesel and asphalts, among others. The most recently built units produce middle distillates, which are highly deficient in Spain, thus helping to reduce imports of these fuels and, therefore, dependence on external sources. Its continuous investments have made it an industrial benchmark in Europe, capable of meeting the demands and requirements of an increasingly demanding market.

With a modest refining capacity of more than 700,000 tonnes per year and a strategic geographic position for the export and import of raw materials, the Barcelona oil refinery, which is located in the Santiga district of the Catalonian capital city and is managed by the leading Spanish "green" group LIPSA, serves dozens of customers around the world by meeting their needs for fats and oils.

The CEO of Repsol, Josu Jon Imaz, on the 15th of June, 2020, presented a pioneering industrial decarbonization project that the company will undertake with the participation of prominent Spanish and international partners. The facility, to be located in the port of Bilbao and its surrounding area as a first option, will represent a combined initial investment of approximately 80 mln euros.

The project, in which 60 million euros will initially be invested, involves building one of the largest net-zero emissions synthetic fuel production plants in the world, based on green hydrogen generated with renewable energy. The main feature of these new fuels is that they are produced using water and CO2 as the only raw materials. They can be used in the combustion engines that are currently installed in automobiles in Spain and the rest of the world, as well as in airplanes, trucks, and other machinery.

Repsol's partners include Petronor, one of Spain's principal industrial centers; and the Energy Agency of the Basque Government (EVE), a public-sector leader in the energy transition [20].

In May of 2014, the Extremadura regional government has pushed (or rather renewed) a project to build both an oil refinery in Los Santos de Maimona and as well as a related distribution infrastructure (a 200-km long oil pipeline that would go from the refinery to the Huelva port). The company which was going to build the refinery was a Spanish Grupo Alfonso Gallardo. The refinery was aimed to be the biggest in-dustrial project in Extremadura. It aimed to produce petroleum-derivated products such as diesel oil, kerosene or coke. The project planning started in 2005 and was abandoned in 2012, after receiving a negative EIA. The oil pipeline project was to cross Natural Parks, environmentally protected areas by EU legislation, and important bird habitats. From 2005 onwards, several groups emerged opposing the project and a platform against the refinery was created. They wrote reports detailing the negative impacts and organised several protests against the refinery. They also published books and brought experts from different fields to run workshops and eventually mobilized thousands of people against the project. They made massive demonstrations, in which some activists were arrested. The Platform also brought the Regional government be-fore the Highest Court of Justice for violating Constitutional rights. They won the court case in 2009. Most of the opposition was concerned with the severe environ-mental impact that the refinery would imply in Extremadura, primarily an agricultural area. Portugal, which was also affected by the project, was also against it. In 2013 the project was not approved by the Spanish Ministry of Environment and was cancelled then [21].

According to BP's statistics, actual refinery throughput has dropped in 2020 by almost 16.2%: from 1,318 kb/d in 2019 down to 1,105 kb/d in 2020 [22] – while refinery's utilization – down to less than 70% of its total design capacity (*see above*).

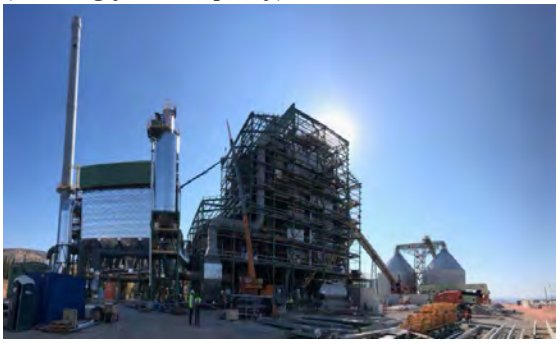
In Spain there is a strong interest in bio-refineries – up to the point that the country has now a dedicated and clear-cut national bio-stra-tegy. Several existing oil refineries, including Cartagena, Huelva, San Roque (Gibraltar), Bilbao, and Tarragona plants (*see above*) have (already partly realized) plans to install their own bio-facilities and even to be fully converted to biorefineries.

Thus, at the early March, 2022, Repsol's Chairman, Antonio Brufau, visited the facilities of the Cartagena refinery where construction work has begun on Spain's first advanced biofuels plant. Repsol will invest a total of €200 mln in this project, which will have the capacity to produce 250,000 tonnes per year of advanced biofuels such as biodiesel, bio-jet, bio-naphtha, and bio-propane to be used in airplanes, trucks, or cars, allowing a reduction of 900,000 tons of CO_2 per year.

The new facilities should have come into operation in the first half of 2023 [23].

Also, at the start of 2016, a consortium headed by Navarre's research center CENER has unveiled a biorefinery concept developed for Navarre (North of Spain) to be 50% co-financed by the EU's fund.

The proposed advance biorefinery is to use herbaceous biomass availability in Navarra from crops (straw of different cereals, cauliflower and broccoli residues, alfalfa, triticale and sorghum) and agroalimentary industries wastes (tomato, sweet corn, cruciferous, pepper, cardoon and artichoke). Its products should include ethanol (18,500 tonnes/year), furfural (14,000 tonnes/year) and lycopene (3,850 kg/year, 8% purity).



Along with the definition of the concept, economic feasibility data from the preliminary project (investment, business plan, scenarios and markets) were provided. The total budget for the facility would be €80 mln [24].

The biorefinery was opened at the begin-ning of 2020.

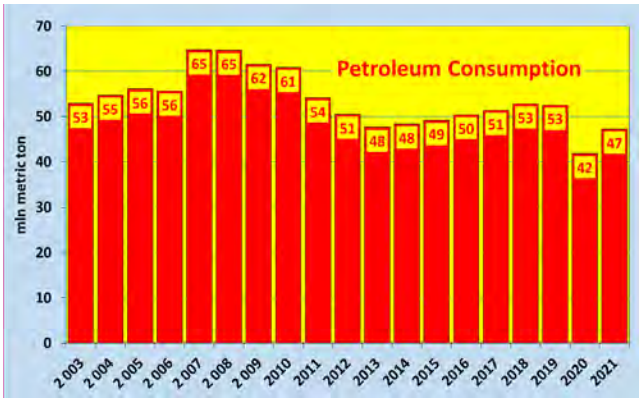
Bio-energy. Biofuel liquids (ethanol and bio-diesel) play an important (though somewhat diminishing in recent years) role in the Spanish economy.

In 2021, Spain's production of fuel ethanol, according to the USA's Depart-ment of Agriculture based on the EU's statistics, amounted to 480 mln liters – com-pared to 454 mln liters in 2014 and 547 mln l in 2019 – while its consumption in the Iberian country was 195 mln l as against 371 mln and 256 mln l in those years respec-tively. As for bio-diesel, in 2021 Spain produced 1,450 mln l of fatty acid methyl esters (FAME) and 460 mln l of "green" or hydrogenation-derived renewable diesel (HDRD) while their inland production in 2012 was only 538 mln and 73 mln l re-spectively. In turn, production of FAME was more than enough to cover indigenous use of FAME while consumption of HDRD in Spain in 2021 amounted to1,920 mln liters as compared to 2,563 mln l in 2012 [25].

Coal Liquids. Currently, in line with the national coal phase-out energy policy, coal is no longer domestically produced as the country's all coal mines were closed in 2019. But in the first half of the 2010s there were two coal-to-liquids plants built in Teruel, in the area of Aragon, and near Puertollano (both in the Province Ciudad Real).

These plants used two-stage version of the famous Fischer-Tropsch technology proposed by German scientists in in the mid-1920s and had a combined intake daily capacity of some 5,000 tonnes of subbituminous coal and coke (chark).

Consumption. According to the German Hamburg-based Statista, probably the best statistical consultancy processing statistical data from the US Energy Infor-mation Administration, BP, and more than other 22,500 sources, annual use of refined oil products (including bio liquids) in Spain has reached its maximum of nearly 65 mln tonnes in 2007 and has declined in the period of 2007-2019 by more than 23% before it has dropped – under the coronavirus pandemic – by over 20% in 2020: down to 41.83 mln mt from 52.61 mln mt in 2019. In 2021 Spanish total petroleum use has noticeably (by more than 13%) recovered (up to almost 47.3 mln mt) (*Fig. 5*).



Source: drawn by the author based on https://www.statista.com/statistics/1235159 [26]

Figure 5
Annual Total Petroleum Consumption in Spain in 2003-2021, in mln mt

The bulk of inland oil use (some 80%) is accounted for by Spain's transpor-tation sector though some parts of oil products are consumed in the Spanish industry (12%) and in house hold, where LPG is widely used (almost 8%) [27].

Highly developed is consumption of domestically produced biofuels (*see above*).

The main policy instrument aimed at fostering the consumption of advanced motor fuels in Spain is the biofuel quota obligation. Wholesale and retail operators (as well as consumers of fuels not supplied by wholesale or retail operators) are obliged to sell/consume a minimal quota of biofuels. Each obligated subject has to present a number of certificates to a national certification entity to prove compliance. The Na-tional Markets and Competition Commission (CNMC), Spain's independent regulator of the energy markets, was entitled as the certification entity. Certificates have a value of 1 tonne of oil equivalent (1 toe). They can be carried over to the following year (up to 30% of the annual obligation) and can also be traded. In case of non-compliance with the targets, a penalty fee applies. In case of over-compliance (some parties selling or consuming more than they are obliged to), the amounts collected from the penalty fees are redistributed by the certification entity proportionally to the subjects that sold/consumed biofuels exceeding their set quota obligation. Mandatory targets for sale or consumption were established in Royal Decree 1085/2015, on the promotion of biofuels. The target (in energy content) for 2020 was 8.5%. In 2019, double counting of some biofuels entered into force.

In 2020, the CNMC issued a regulation Circular 5/2020, which develops provisions intended to manage the certification mechanism. It establishes the require-ments to be fulfilled by obligated parties and sets a maximum limit of 7.2% for bio-fuels produced from food and feed crops as well as an indicative target of 0.1% for advanced biofuels (according to the definition established in the related Directive of the EU on the promotion of the use of energy from renewable sources).

The CNMC also published in 2020 a document including the list of feedstocks which can be used to produce biofuels that can be accounted for the obligation. The list specifies whether a feedstock will be single counted or double counted as well as the information requirements regarding the mandatory sustainability criteria that operators have to meet.

A draft Royal Decree to modify Royal Decree 1085/2015 was published in 2020 by the Ministry for Ecological Transition and Demographic Challenge. It aimed at responding to the needs to implement the measures and achieve the ambitious objectives established in the integrated National Energy and Climate Plan 2021-2030, in accordance with its Objective Scenario and with the share of renewable energy in transport for the year 2030 established by the Directive (EU) 2018/2001. It was released after a public consultation which included questions related to the level of the mandatory targets, the possibility to introduce specific targets for aviation or maritime biofuels, the obligated parties, the double counting feedstocks, the maximum limits for some biofuels, the sustainability criteria, the National Sustainability Verification System and complementary options to reduce GHG emissions, among others. The draft Royal Decree proposed mandatory targets for biofuels (in energy content and including double counting for some biofuels) of 9.5% in 2021 and 10% in 2022.

In 2020, the Spanish Government approved the "Hydrogen Roadmap: a commitment to renewable hydrogen". It is intended to identify the challenges and opportunities for the full development of renewable hydrogen in Spain, providing a series of measures aimed at boosting investment action, taking advantage of the European consensus on the role that this energy vector should play in the context of green recovery. The Roadmap provides a Vision 2030 and 2050, establishing ambi-tious country targets in 2030. In particular, regarding transport, the following mile-stones are envisaged by 2030:

A fleet of at least 150-200 buses with renewable hydrogen fuel cells;

At least 5,000-7,500 light and heavy hydrogen fuel cell vehicles for the transport of goods;

A network of at least 100-150 hydrogen stations distributed all over the country with a maximum distance of 250 km between them;

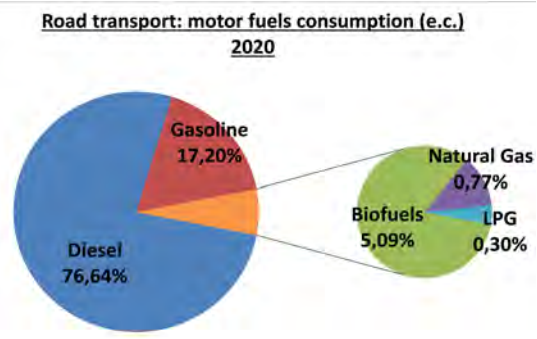
Use of hydrogen-powered trains on a continuous basis on at least two commercial medium- and long-distance routes on lines (that are not yet electrified);

Introduction of handling machinery using renewable hydrogen fuel cells and supply points at the top five ports and airports by volume of goods and passengers.

Furthermore, the Spanish Alternative Energy Vehicle Incentive Strategy 2014-2020 is the framework for

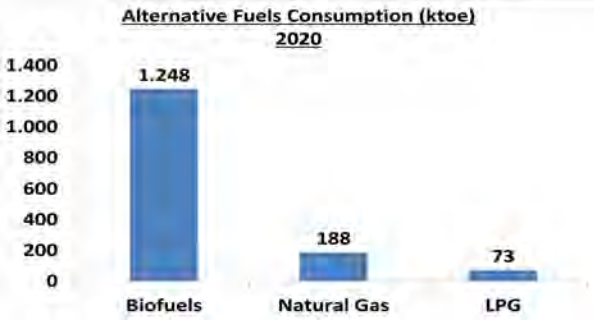
programs intended to promote the purchase of electric, liquefied petroleum gas (LPG), natural gas, and bifuel vehicles (*see above*).

Biofuels (*see above*) account for the largest part of alternative transportation fuel in Spain. The main contribution corresponds to biodiesel (FAME), the second most used biofuel is HVO and the third one is bioethanol. Other alternative fuels consu-med in Spain are natural gas and LPG. The below figures 6 and 7 show how much of fuels (in energy content) was consumed by Spanish road transport in 2020.



Source: https://iea-amf.org/content/publications/country_reports/spain [28]

Figure 6
Patterns of Motor Fuels Consumption in Spain in 2020, in %% based on coal equvalent

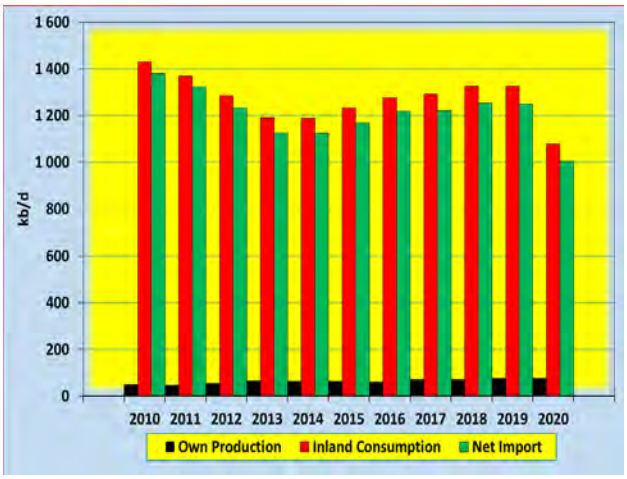


Source: https://iea-amf.org/content/publications/country reports/spain [28]

Figure 7
Patterns of Alternative Fuels Consumption in Spain in 2020 (according to the IEA), in ktoe

According to the Spanish Corporation on Strategic Stocks (CORES), in 2019 only 0.07% of final oil products for consumption were produced domestically [29].

Petroleum Balance. Generally speaking, Spanish petroleum balance is very typical of a major oil-importing country – inland comsumption dominates the petro-leum picture while own production (even when taking into account production of bio-energy) does not play any noticiable role (*Fig. 8*). By 2020 petroleum self-sufficiency of Spain was around 7% – not to far away from 3.5% in 2010.



Source: drawn by the author based on https://www.bp.com/content/dam/bp/ business-sites/en/global/corporate/pdfs/energy-economics/statistical-review/bp-stats-review-2021-full-report [22] and https://www.eia.gov/international/data/world/petroleum-and-other-liquids/annual-petroleum-and-other-liquids-production [5]

Figure 8
Petroleum Balance of Spain in 2010-2020 (according to BP and EIA), in kb/d

The Covid-19's Impacts and Prospects. The coronavirus pandemic has seriously hit the Spanish oil market. Annual use of refined oil products (including bio liquids) in Spain has dropped in 2020 by over 20% (*see above*). In line with the EU's *Biofuels Annual Report* released in the mid-2021, in 2020, the COVID-19 outbreak cut gasoline and diesel use in Spain by 13.0 and 9.4% respectively. Bioethanol and biodiesel consumption, however, fell by a lower percentage (10.1 and 3.5% respec-tively) because biofuels use was supported by the ten-percent blending target for transport fuels in 2020 [30].

In turn, actual refinery throughput has dropped in 2020 by almost 16.2% while refinery's utilization – down to less than 70% of its total design capacity (*see above*).

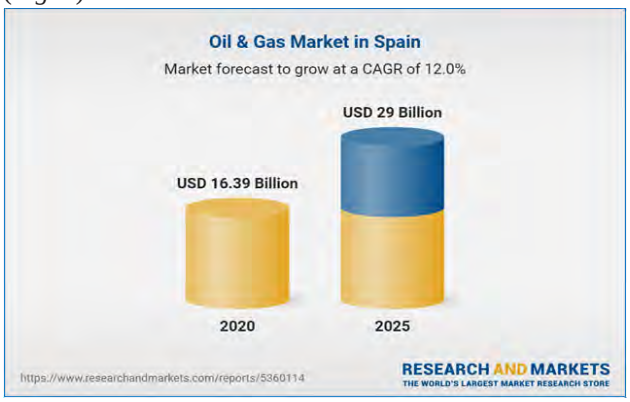
And, according to conducted polls, Spanish consumers are less optimistic about the recovery than other Europeans [31].

In line with CEPSA's latest energy outlook, inland oil products demand should shrink down to 60 mln tonnes in 2020 and 51 mln t in 2030 as compared to 75 mln t in 2005 [32].

According to the Hyderabad-based Mordor Intelligence international consul-tancy, in 2020, the COVID-19 outbreak resulted in a major decline in the usage of the existing vehicle fleets in the country, in turn causing a drop in engine oil consumption by 12.5% compared to 2019. During 2021-2026, engine oil consumption in Spain is forecast to grow at a lower annual average rate of 2.15%, as compared to other pro-duct types. The primary reason for the lower growth rate is engine downsizing, which is further decreasing the average engine oil volumes [33].

In line with the recent (June 2021) report of the Dublin-based consultancy, market value of Spanish

petroleum (oil+gas) market, growing at a CAGR of 12%, should reach US$29 bln against US$16.39 bln in 2020 (*Fig. 9*) [34].



Source: https://www. researchandmarkets.com/reports/5360114 [34]

Figure 9
Market Value of Spain's Petroleum Market in 2020 and 2025

Foreign Trade. Spain's imports of crude oil have been growing since 1985.

As a typical oil-importing country, Spain imports a lot of crude, though the country's raw petroleum imports are quite unstable. For instance, according to the OPEC Secretariat, Spain imported almost 1,104.6 kb/d in December 2020 compared with 1,338.8 kb/d at the end of 2019 as well as with 1,364.7 kb/d and 825.7 kb/d in the last month of respectively 2018 and 1984, which established all-time high and low records since 1980) [35].

At present, crude oil is the most imported product amongst all imported by Spain goods. In 2020 its share was over 5% of a value of the country's merchandise imports compared with more than 4.9% in 1995 [36].

In particular, in 2021 Spain imported nearly 56.2 mln tonnes of crude oil – from many continents and countries but mainly from Africa (almost 21.3 mln t) and such countries as Nigeria (18.3%), Mexico (13.6%), and Libya (11.2%) [37].

Spain also exported some crude oil. Thus, in 2020 it was for a value of US$396 mln (0.13% of the country's merchandise exports) – mainly to Europe's France (US$147 mln) and Italy (US$95.7 mln) [36].

In the 1980s Spain started exporting over 10 million tonnes of refined petro-leum products annually. The oil refinery capacities in Spain (*see above*) can accommo-date 1,000 barrels daily. Some of the products include refined petrol products like fuel oils, gas oils, lubricants, kerosene and asphalt among others [38].

In 2020, the country exported refined oil products for a value US$7.77 or 2.6% of a value of the country's merchandise exports. It was the fourth most exported Spanish product. Importers of refined oil from Spain in 2020 were France (US$1.2 bln), Morocco (US$799 mln), the USA (US$744 mln), Gibraltar (US$673 mln), and the Netherlands (US$627 mln) [36] Exports; Imports [Available in the Internet at: https://oec.world/en/profile/country/esp] (Accessed 28 April 2022).

Summa summarum, the Covid-19 pandemic has seriously hit the Spanish oil market, however, the pandemic has made inland oil demand and petroleum imports of Spain lower but the domestic crude oil production, which is currently close to zero, will unlikely increase in the near term.

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