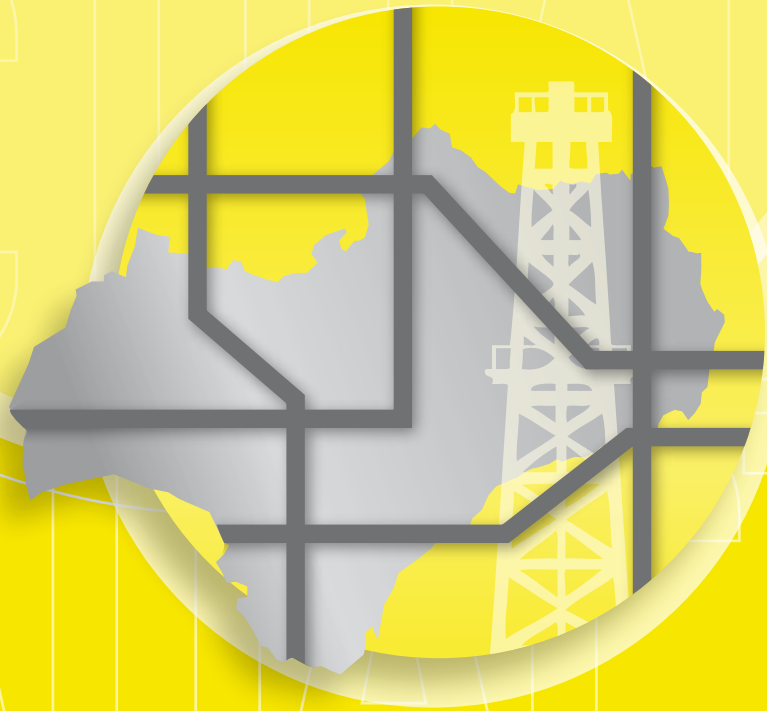


94  
2020

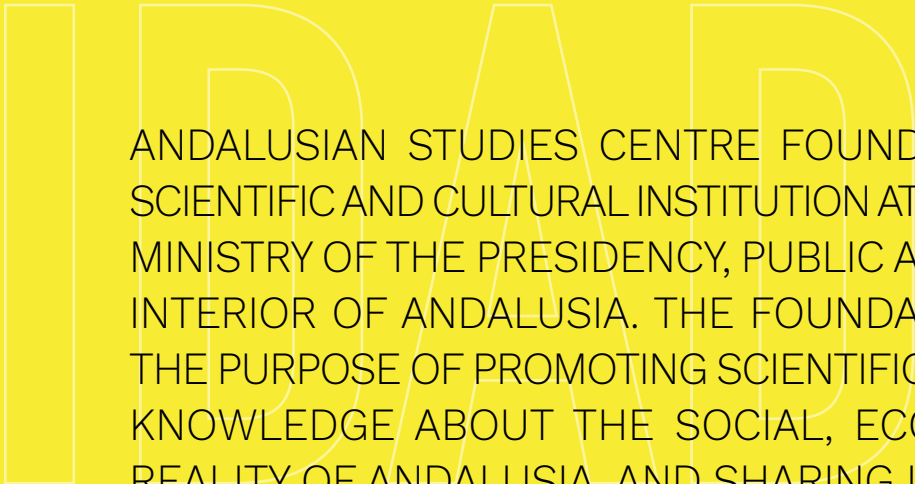
# Andalusia's geo-energy relevance for Spain and Europe



Junta  
de Andalucía

Consejería de la Presidencia,  
Administración Pública e Interior

Centro de Estudios  
Andaluces



ANDALUSIAN STUDIES CENTRE FOUNDATION IS A NON-PROFIT SCIENTIFIC AND CULTURAL INSTITUTION ATTACHED TO THE REGIONAL MINISTRY OF THE PRESIDENCY, PUBLIC ADMINISTRATION AND THE INTERIOR OF ANDALUSIA. THE FOUNDATION WAS CREATED FOR THE PURPOSE OF PROMOTING SCIENTIFIC RESEARCH, GENERATING KNOWLEDGE ABOUT THE SOCIAL, ECONOMIC AND CULTURAL REALITY OF ANDALUSIA, AND SHARING ITS FINDINGS TO BENEFIT SOCIETY AS A WHOLE.

OUR COMMITMENT TO THE ADVANCEMENT OF ANDALUSIA INSPIRES US TO CREATE OPPORTUNITIES FOR SHARING KNOWLEDGE WITH THE SCIENTIFIC AND ACADEMIC COMMUNITY AND WITH ALL CITIZENS, AS WELL AS TO ACTIVELY SUPPORT AND WORK WITH PUBLIC AND PRIVATE INSTITUTIONS THAT CONTRIBUTE TO THE DEVELOPMENT OF OUR REGION.

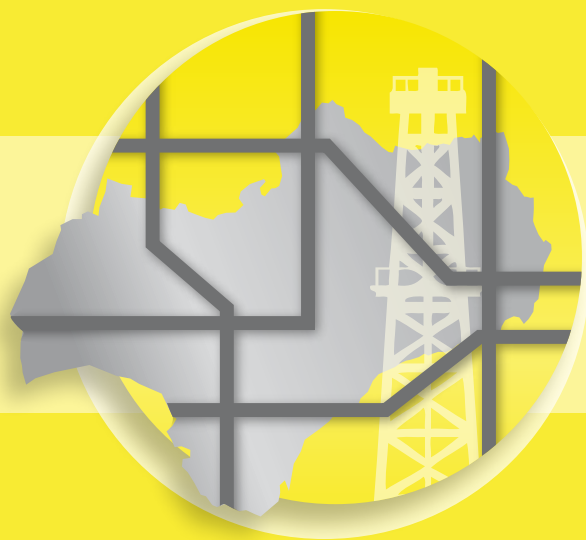
THE *ACTUALIDAD* COLLECTION, PART OF THE FOUNDATION'S CATALOGUE OF SCIENTIFIC PUBLICATIONS, IS A SERIES THAT CATERS FOR EXPERT READERS AS WELL AS THE GENERAL PUBLIC. EACH ISSUE IS STRUCTURED AS A MONOGRAPHIC REPORT AND OFFERS A THOUGHT-PROVOKING ANALYSIS OF A TOPIC RELEVANT TO ANDALUSIAN SOCIETY IN THE TWENTY-FIRST CENTURY.

THE VIEWS EXPRESSED IN THIS COLLECTION ARE THOSE OF THE AUTHORS AND DO NOT NECESSARILY REFLECT THE PUBLISHER'S OPINIONS.

© Of the text: its authors, 2020  
© Of this edition: Fundación Pública Andaluza  
Centro de Estudios Andaluces, June 2021  
Bailén 50, 41001 Seville, Spain  
Tel.: +34 955 055 210. Fax: +34 955 055 211  
[www.centrodeestudiosandaluces.es](http://www.centrodeestudiosandaluces.es)

Legal Deposit: SE-1688-05  
I.S.S.N.: 1699-8294

Free publication. Non-commercial distribution only.



## Andalusia's geo-energy relevance for Spain and Europe

Dmitri Amirov-Belova  
University of Pablo de Olavide

José Antonio Peña Ramos  
University of Granada

### **Abstract**

Andalusia is a strategic key region for hydrocarbon's entrance into the Iberian Peninsula. Its relevance in gas and oil pipelines is matchless with other regions of Spain and Portugal, given the international connections of the Medgaz and the Maghreb-Europe gas pipelines, although it is also relevant for the entry of Liquid Natural Gas, the own production of natural gas, as well as in oil terms. This paper will show up the geo-energy relevance of Andalusia for Spain and Europe.

# INDEX

|   |    |
|---|----|
| 1. Introduction: the importance of gas, oil and pipelines ..... | 5  |
| 2. Europe's energy problem: external dependence .....           | 6  |
| 3. The role of Andalusia .....                                  | 9  |
| 3.1 Andalusia and the gas pipelines .....                       | 9  |
| 3.2. Andalusia and oil pipelines.....                           | 14 |
| 4. Conclusions.....   | 16 |
| 5. Bibliography.....  | 17 |

# 1. Introduction: the importance of gas, oil and pipelines

Energy is one of the key strategic planning issues for any government. Its origins, means of transport and processing, as well as its locations on the globe, are different variables that affect multiple elements of the daily life of a country, such as the price of energy itself, the existence of infrastructures and industry and the jobs required to maintain them etc.

Since the Industrial Revolution, but especially during the 20th century, three energy sources have been solidified as the main sources in the global energy mix: coal, oil (or crude oil) and natural gas. In 2018, the sum of the three accounted for more than 80 % of the world's energy supply (Figure 1).

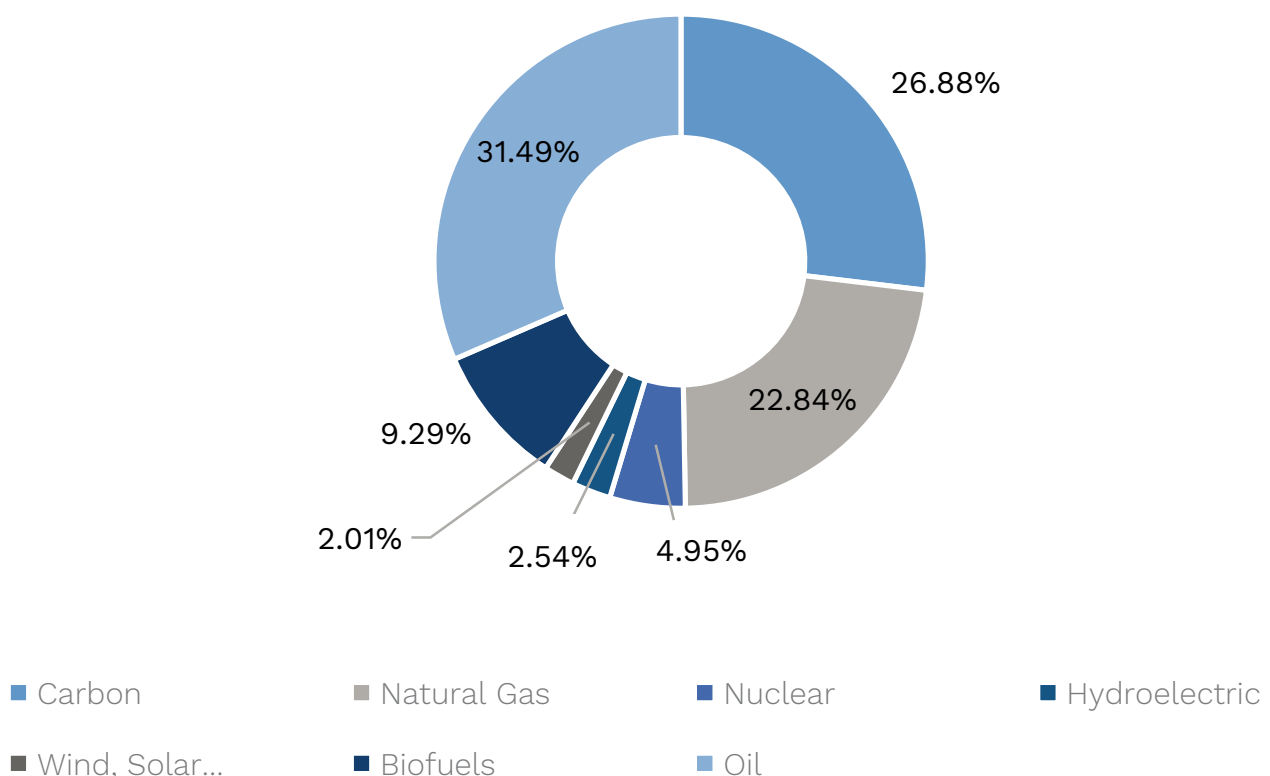
Although renewable energies are gradually beginning to gain ground in the electricity supply of many countries, most notably in the West, the demands of the industry still require large quantities of oil and gas, especially the latter, which is the least polluting source of hydrocarbons (EIA, 2020).

However, the distribution of oil and gas is not consistent across the globe, some countries have larger reserves or easier access to them, especially in the case of natural gas.

In both cases, hydrocarbon transport is carried out by pipelines (gas or oil pipelines), or by tanker ships, which in the case of gas involves the transport of Liquefied Natural Gas (LNG) and usually requires higher costs. The price of LNG is also affected by the regasification process.

It is therefore understandable that both energy resources have been politically

**Graphic 1. World energy supply (2018)**



Source: Own elaboration based on IEA (2020)

instrumentalised, as they flow through pipelines, by countries with reserves and by producers (but also by transit countries). A clear example is Russian energy power in Europe. As Yves Lacoste (2008: 324) points out:

Intercontinental transport of gas by LNG tankers is relatively dangerous and costly, as it is necessary to mobilise significant resources to feed the gas coolers that keep the gas at a very low temperature in order to avoid explosions (...). The growing need for gas has given Russia a new geopolitical importance.

However, the political instrumentalisation of oil decreased as the twentieth century progressed, since “the oil transport procedure, where the use of tankers is the main means of transporting crude oil” endows it with “great flexibility” (Sánchez Ortega, 2014: 16).

The case of gas differs, among other factors, due to the few sources of supply, the notable benefit of transporting it through pipelines (and with this the transit of pipelines becomes relevant) and the state control - in many cases - of exports of the resource. As Sánchez Ortega (2014: 16) points out:

In the case of gas, on the other hand, bilateral supply relations are still very present, with hardly any open markets and with gas pipelines dominating as a means of transport, which imposes great rigidity on the gas trade and makes it more capable of being instrumentalised in the service of power.

The territory through which pipelines run is therefore crucial for the main form of natural gas transport.

Although Spain is not a purely oil or gas exporting country, we ask ourselves: What is the importance of Andalusia in geo-energy terms? What value does the autonomous community have in terms of pipelines? And in other energy terms? This document will explain this relevance.

## 2. Europe's energy problem: external dependence

The European Union (EU), despite being an economic giant, is not at the forefront of world reserves of natural gas or oil, and even so, it needs a constant supply of both to maintain its economy. This has meant that, overall, it needs to import hydrocarbons from third countries, including Russia, Iran, Azerbaijan, Norway and, finally, Algeria as exporters of natural gas. Gas is still supplied mainly through pipelines (although LNG is gaining more and more strength), which generates dynamics of dependence and soft power over the European Union (and other European countries), especially on Russia's part.

In fact, up to a third of the gas and oil consumed by the EU comes from Russia, which thus enjoys a significant element of soft power over the Union due to its lack of energy cohesion and the fact that several gas and oil pipelines run from Russia, underlining its importance, particularly in the case of gas, for the cheap supply of this energy (Peña-Ramos and Amirov, 2018: 489; Peña-Ramos, 2017: 2).

This has led EU leaders to look for supply alternatives, not only to reduce the influence of a third country, but also because of the danger of being overly dependent on a supply line that could be affected by conflict, as happened in the case of Ukraine in 2014 (and in other previous crises). According to professional opinions collected by Rivas (2018):

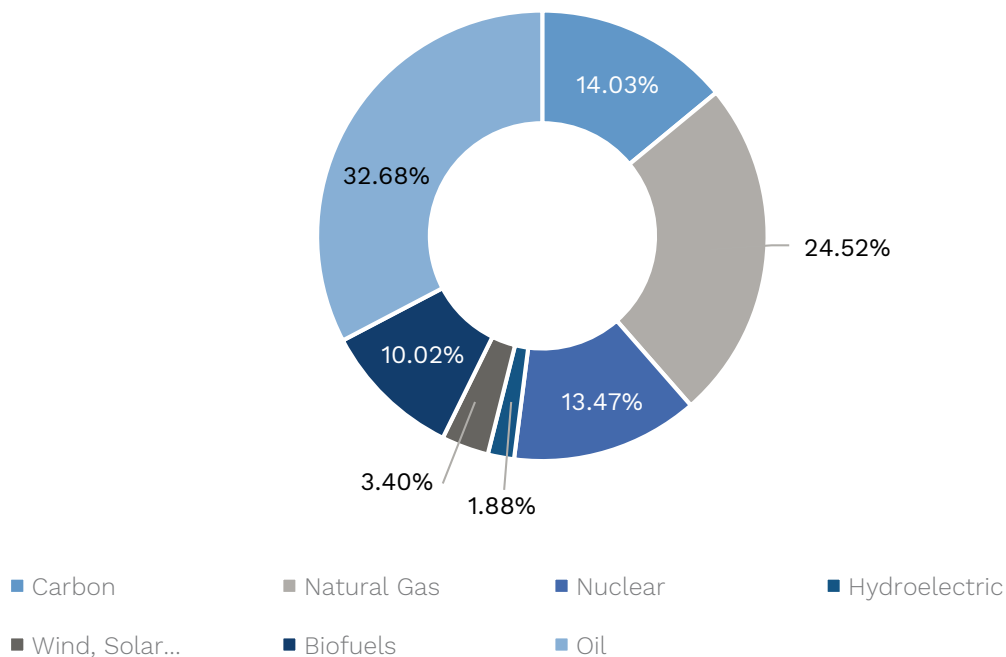
Dependence on a single source can pose a danger to supply that can be affected by political and economic conflicts, such as those between Russia and Ukraine in 2006 and 2009. As a result, the EU strengthened its security of gas supply rules in 2010. Almost eight years after this reinforcement, projects such as Nord Stream 2, a gas pipeline that will connect Russia under the Baltic Sea with Germany, avoiding crossing the Eastern Europe countries and doubling Germany's dependence on Russian gas, are on the agenda.

### Map 1. Gas supply to Europe - Gas supply to Europe, Main supply routes



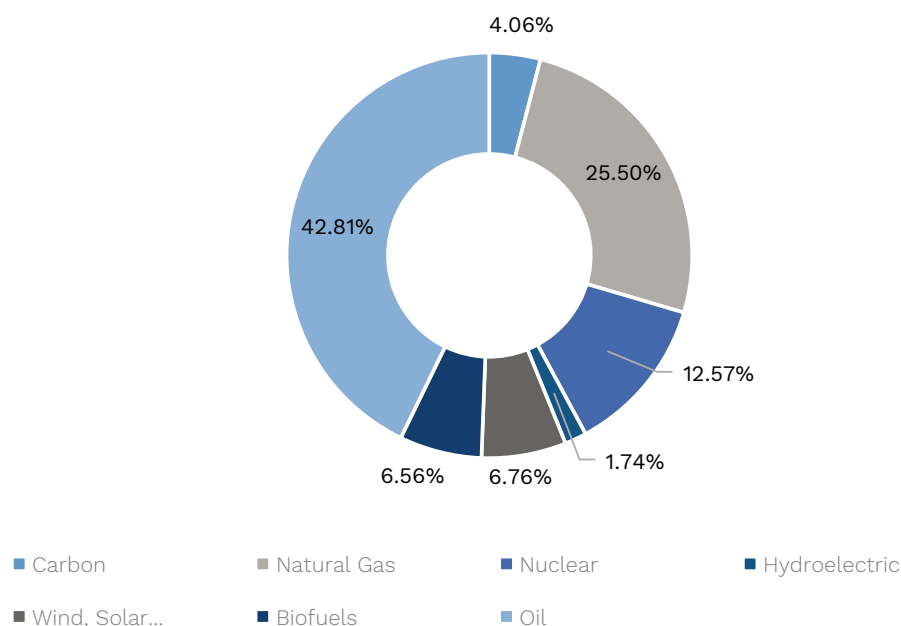
Source: The World Order, 2018

### Figure 2. European Union energy supply (2018)



Source: own elaboration based on IEA (2020)

While Norway, and to a lesser extent the Netherlands, are partners in this regard, one of the major alternatives for the Union to provide itself with a continuous gas supply, without losing geopolitical power or depending on politically unstable countries or countries with a difficult gas connection (Azerbaijan, Egypt or Libya) has been Algeria.

**Figure 3. Spain's energy supply (2018)**

Source: own elaboration based on IEA (2020)

Spain, on the other hand, although it has a low presence of coal in its energy mix, favoured by an aggressive decarbonisation policy (Montes, 2020), the importance of hydrocarbons is very significant, as they contribute more than half of the Spanish energy supply (graph 3).

All this presents us with a geo-energetic picture from which we can extract the following premises:

- Europe (in particular the European Union) is highly dependent on the supply of hydrocarbons, especially natural gas, which is an indispensable part of the energy used by both households and industry.
- Spain also has a strong leadership of hydrocarbons, as well as dependence on foreign imports of both oil and natural gas.
- Algeria is one of the major alternatives (or complementary sources) to Russia as a gas supplier to the EU, along with Norway and, to a lesser extent, the Netherlands.
- So, what role can Andalusia play in the Eurasian context? What value can this autonomous community have?



### 3. The role of Andalusia

Andalusia enjoys a privileged geographical location as the most southerly Spanish region. Indeed, it is very close to North Africa and has access to both the Atlantic Ocean and the Mediterranean Sea.

This location makes Andalusia an ideal location to import hydrocarbons through pipelines from Africa; mainly natural gas from Algeria, whose supply has never failed due to the strategic importance of the resource for the country (Rivas, 2018). Furthermore, the region is equally important for the arrival of Liquid Natural Gas and crude oil by sea.

This document will emphasise that Andalusia is an important region in terms of gas; it is home to two of the most important gas pipelines in the western Mediterranean region. Furthermore, this paper will briefly analyse Andalusia's relevance as a zone for gasification and the extraction of gas. Finally, the document will touch upon the possible future benefits of the trans-Saharan African project.

Equally, the paper will highlight the role of Andalusia in the overall Spanish pipeline system and will seek to draw conclusions.

#### 3.1 Andalusia and the gas pipelines

Andalusia is a strategic location for the arrival of natural gas into the European and Spanish gas network. Indeed, two important gas pipelines transporting gas from Algeria pass through Andalusia, although this is not the only source of gas for Spain or the EU.

##### 3.1.1 Maghreb-Europe gas pipeline

Also known as the Pere Duran Farell pipeline, the Maghreb-Europe pipeline was the first pipeline to connect Africa and Spain. This line transports natural gas from the Hassi R'Mel gas field, one of the largest in the world and

the most important in Algeria, to Spain. Firstly, the pipeline passes through Morocco (which is a source of soft power for this country) and then crosses the strait of Gibraltar before entering Spain in Tarifa, although the receiving terminal is in Zahara de los Atunes, in the province of Cadiz (Andalusia Energy Department, 2019: 36).

When it opened in 1996 the initial capacity of the Maghreb-Europe pipeline was 8.5 billion cubic metres of natural gas per year (8.5 bcm). However, thanks to the installation of additional compression stations in Algeria, the capacity has increased to 12 bcm. (GALP, 2010).

Its total length is 1620 km, including 530 km in Algeria and 525 km in Morocco, which runs into the 45 km maritime (underwater) section in the Strait of Gibraltar. It is important to mention the pipeline from Al-Andalus in Tarifa to Cordoba (as well as other subsequent lines in Andalusia) after which the main pipeline heads towards Badajoz (Extremadura pipeline) and thereafter supplies a large part of Portugal's gas pipeline before ending up in Galicia (maps 3 and 4).

It should be emphasised that not all of the gas passes through the Extremadura pipeline, given that one branch breaks off to support the Spanish national gas network via the Tarifa-Cordoba pipeline. Indeed, the Spanish network of up to 11,000 km of gas pipelines (ENGÁS, 2015: 6) is largely supplied by this pipeline and the one mentioned below.

**Map 2. Route of the Maghreb-Europe gas pipeline**



Source: GALP (2010).

**Map 3. Sub-route of the Maghreb-Europe gas pipeline into Spain**



Source: Shaban (2015)

**Map 4. National Gas infrastructure system (simplified)**



Source: ENGÁS (2015:11)

### Map 5. Medgaz gas pipeline route



Source: J. G. N. (2020).

The shareholders of Europe Maghreb Pipeline Limited (EMPL) are the following; the Spanish Naturgy Energy Group Co. with 77.2% and the Portuguese Galp Energy SGPS Co. with 22.8%. Furthermore, Metragaz, the company which runs the Moroccan stretch of the pipeline, belongs to the aforementioned companies in similar proportions; alongside a small holding (0.68%) by the Moroccan National Office for Hydrocarbons and Mines (EMPL, 2020).

#### 3.1.2. The Medgaz Pipeline

The gas reception facility in Almería opened in 2009 (capital of the region of the same name) and became the second link between Andalusia and the international network of gas coming from the Hassi R'Mel gas fields in Algeria.

In this case, the undersea pipeline crosses a large part of Algeria in order to reach the Andalusian provincial capital, without passing through Morocco. The export of gas through this pipeline began in 2011 and has provided gas to the Spanish gas network ever since.

This gas pipeline improved the supply security to Spain and Europe, seeing that it added 8 bcm per year to the gas network; an increase of 11.2% on the official capacity of natural gas entering the peninsula (Andalusia energy department, 2019: 36).

The official capacity of a pipeline, as tested by the relevant administration, coincides with the 'design capacity available during normal operation, not including emergency or reserve equipment, and without considering the potential operating margins and restrictions of subsequent connected facilities'; (Reganosa, 2020). This is in contrast to the design capacity (of whoever builds the pipeline) and the transport capacity (indicated by the operator).

It will be the verified capacity by the appropriate body in the relevant administrative authorization of the facility. This will coincide with the usable design capacity during normal operation, not including emergency or reserve equipment, and without considering the potential operating margins and restrictions of subsequent connected facilities.

The stretch of pipeline along the seafloor is over 210 km long and over 750 km in total. It transports natural gas at over 2000 metres below sea level making it a cutting edge western Mediterranean project. Furthermore, it was considered a Project of Common Interest for the EU, not only because it secures the safety of the supply from Algeria and does not need to cross Moroccan territory, but because the Medgaz pipeline is the most efficient way to transport gas to Spain. This justifies the investment of up to 900 million euros in the project (CEPSA, 2018).

The majority shareholder in the project is the Algerian state-owned gas company Sonatrach with a 51% share (originally 43%). The remaining 49% share belongs to Medina Partnership; a consortium with an equal share (50% of the 49%, or 24.50% each) belonging to the aforementioned Naturgy Energy Group Ltd and the U.S company BlackRock (Medgaz, 2020b; Reuters Staff, 2020).

The expansion of the Beni Saf compression station (where the underground pipeline starts) will lead to a 25% annual increase in the nominal capacity of the the Medgaz pipeline; from 8 bcm to 10 bcm of natural gas in the coming years. 68 million euros have been earmarked for the expansion of the pipeline (Medgaz, 2020a).

In conclusion, almost 40% of Algerian gas exported to Europe arrives in Andalusia via Medgaz and the Maghreb-Europe pipeline; the other major source is the Trans-Mediterranean pipeline, which arrives in Italy.

Furthermore, up to eight countries receive their gas supplies through the Spanish natural gas network, fed in part by Andalusian infrastructure. (ENAGÁS, 2015: 11).

Almost 40% of Algerian gas exported to Europe arrives in Andalusia via Medgaz and the Maghreb-Europe pipeline; the other major source is the trans-Mediterranean pipeline, which arrives in Italy

### 3.1.3. Liquefied Natural Gas and the Poseidon Gas Deposit

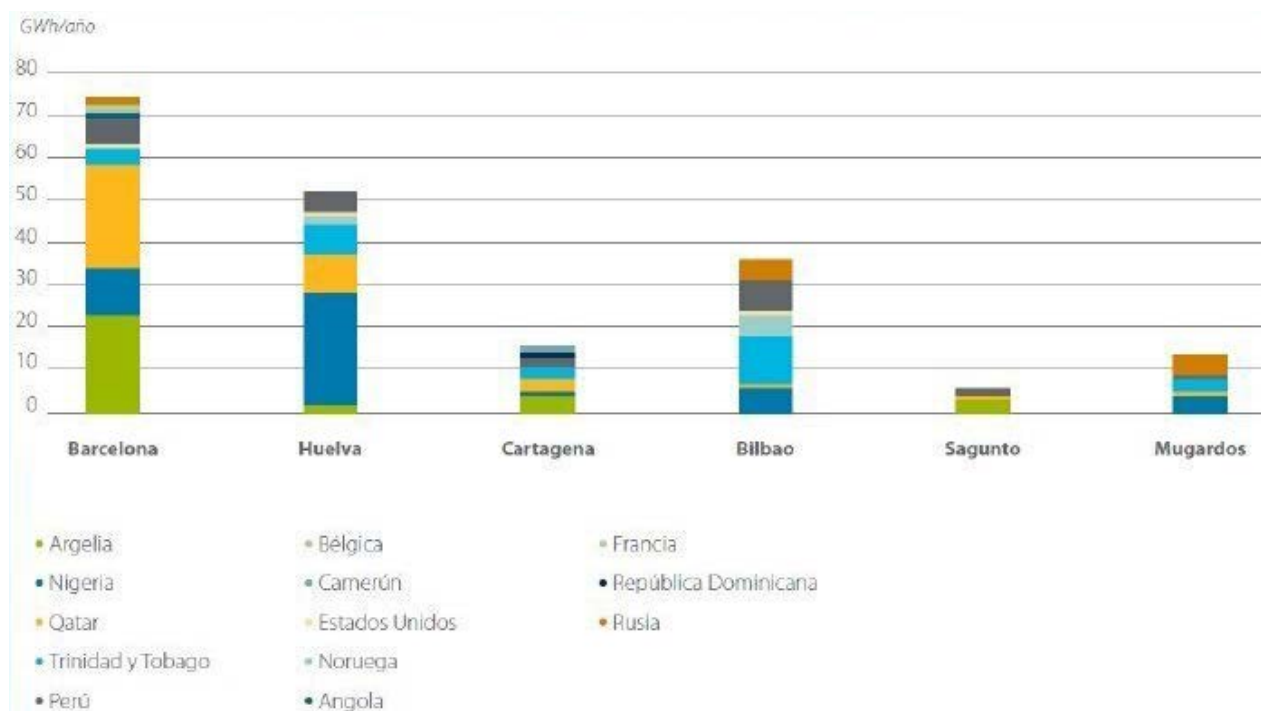
In terms of gas, Andalusia is not just relevant because it is the arrival point for gas pipelines. In fact, Andalusia has one of the most important ports for the arrival of Liquefied Natural Gas in Europe.

Spain has the largest regasification capacity in the EU; that's to say, the conversion of LNG into gas form. Indeed, seven of the twenty-two European regasification facilities are located in Spanish territory. The variety of origins of hydrocarbons allows 'the Spanish national gas system to reach an appropriate level of supply security, especially considering that domestic gas production accounts for less than 1% of total demand' (UFG, 2020).

Graph 6 shows the unloadings, separated by origin, in each of the six regasification plants in Spain. The Huelva plant, which is the most important in Andalusia and the second most important in Spain, received gas from seven separate sources in 2017: Algeria, Nigeria, USA, Norway, Peru, Qatar and the T&T Company. This has contributed strongly to the operational security of the national gas system. (Andalusia Energy Department, 2019: 35).

Indeed, LNG is slowly making up a larger proportion of natural gas imports into Spain. Between 2015 and 2018, LNG accounted for slightly less than half of gas imports, but in 2019 it exceeded 50% (UFG, 2020). The fact that Andalusia has the second most important regasification plant in Spain reinforces its strategic importance in terms of energy.

Furthermore, the Poseidon marine gas field is located in the Gulf of Cadiz, 30 km from the Mazagón coast (Huelva); there are two licences; Poseidon North and Poseidon South. This meant that Andalusia was the only natural gas producing region for years (Revilla, 2009) until extraction began in the Viura gas field project (La Rioja).

**Figure 6: Distribution of origins per regasification plant**

Source: Andalusian Energy Agency (2019: 35)

### 3.1.4. The TransSaharan pipeline: an impossible project?

The project, while it is still in the early stages of conceptualisation and construction, has a great potential for the construction of a gas supply line from the Warray field in Nigeria to the Algerian community of Hassi R'Mel. (Woellwarth, 2020). In other words, a project which could connect the Algerian gas pipeline network, which supplies Europe, with the Niger delta in the Gulf of Guinea. It should be noted that Nigeria has the ninth largest proven reserves of natural gas, with over 5200 bcm, even more than Algeria which has 4400 bcm (ENERGY.EU, 2010).

If fully developed, the Trans-Saharan pipeline would entail close collaboration between Nigeria, Niger and Algeria, as well as the strategic international involvement that a project of this scale tends to encourage.

The French hydrocarbon company Total S.A and the Anglo-Dutch company Royal Dutch Shell have expressed their intention to invest in the project. Meanwhile Russia's Gazprom confirmed its participation in 2009, together with the Nigerian National Petroleum

Company NNPC, through an investment of 2.5 billion dollars in the project. India also expressed its interest in the project through the Gas Authority of India or GAIL (Business Standard, 2013).

Algeria's Sonatrach and Nigeria's NNPC are running the project currently, with a small contribution from Niger. According to the Infrastructure 100 report by KPMG (2014: 30):

If built, the \$20 billion trans-Saharan natural gas project would be one of the world's most expensive energy export programs. By providing a critical link between the resource-rich areas of Africa and the attractive markets of Western Europe, the pipeline would help Europe diversify its natural gas supply by sourcing natural gas from Nigeria, through Niger, to Algeria and then on towards Spain and Europe.

This project could add up to 30 bcm annually to the supply coming from Algeria (Fabi, 2009) and if all these supplies were supplied to Europe, it would represent a 50% increase in that supply.



## Map 6: Trans-Saharan Gas Pipeline Route Projections



Source: Egbe et al. (2016: 144)

However, the embryonic stage of the project is not only due to the lack of funds, but also because of conflict over the control over the Niger Delta, which poses a threat to safe transit across the Sahara. This long route is not a particularly safe option, owing to, among other factors, the limited control Niger has over its territory, as well as possible interceptions by jihadist groups.

## 3.2. Andalusia and oil pipelines

In terms of oil pipelines, Andalusia's network is the longest in Spain with over 1100 km throughout Huelva, Seville, Cádiz and Córdoba; 870 km of which are managed by the CLH company (Europapress, 2016).

Andalusia has two petrol refineries. The first is the Gibraltar refinery - San Roque (Cádiz) - which has a storage capacity of 1.2 million m<sup>3</sup> of oil and 900,000 m<sup>3</sup> of storage for oil-bearing products. Secondly, the Rábida refinery in Palos de la Frontera (Huelva) has an even larger capacity of over 1.4 million m<sup>3</sup> of crude

oil and 1.1 million m<sup>3</sup> of oil-bearing products. Together, the refineries distil up to 22.5 million tonnes of crude oil per year. (Andalusia Energy Department, 2019: 40).

Map 7 shows the San Roque and Huelva refineries (managed by CESPAS) as crucial entry points, although the ports of Huelva, Rota, Algeciras and Motril should be mentioned. Also noteworthy is Aráhal (Seville) which is a crucial location, that links all of the storage facilities.

Furthermore, it should be noted that there are six airports with some storage capacity, almost all of them operated by CLH: Seville (4758 m<sup>3</sup>), Almería (1550 m<sup>3</sup>), Jerez de la Frontera (1270 m<sup>3</sup>), Granada (225 m<sup>3</sup>, the only one managed by MITRASA), Málaga (180 m<sup>3</sup>) and Córdoba (131 m<sup>3</sup>). The total capacity of the Andalusian airports is 8114 m<sup>3</sup> of crude oil (Andalusia Energy Department, 2019: 40).

Andalusia has a further twelve storage facilities in addition to the airports already mentioned, with varying ownership and capacity, although the role of CLH in the oil framework of Andalusia and Spain is crucial. Of these twelve facilities, nine are run by CLH, and the others are shared between Secicar, Decal España and VOPAK. Those belonging to the main company (CLH) are in, Palos de la Frontera which is the most important with a capacity of over 560,000 m<sup>3</sup> of crude, followed by Córdoba (over 223,000 m<sup>3</sup>), Aráhal (224,000 m<sup>3</sup>), Algeciras (192,500 m<sup>3</sup>), Málaga (131,000 m<sup>3</sup>), Motril (123,000 m<sup>3</sup>) and Rota (118,000 m<sup>3</sup>). Meanwhile, the lower capacity facilities are in Seville (almost 84,000 m<sup>3</sup>) and San Roque (just over 13,500 m<sup>3</sup>).

Three other companies own the remaining facilities: one in Motril, run by Secicar, with a capacity of over 106,000 m<sup>3</sup> of crude; another in Palos de la Frontera, run by Decal España, with almost 600,000 m<sup>3</sup> of capacity and which surpasses that belonging to CLH in the same town; and finally, VOPAK runs a facility in Algeciras with a capacity of over 400,000 m<sup>3</sup> of crude, and which also has a greater capacity than the CLH facility in the same town. The reserve capacity of the twelve facilities (run by CLH and the others) is 2,779,759 m<sup>3</sup> of crude oil (Andalusia Energy Department, 2019: 40).

### Map 7. Andalusia oil pipeline network



Source: CLH (2020)

Observation of the entire network of oil pipelines in Spain (map 8) reveals once again the importance of Andalusia as an entry point for hydrocarbons. This relevance is constant because, thanks to the pipeline connecting Córdoba with the centre of Spain (Rota-Zaragoza pipeline) - and by extension with Aragon, Catalonia and the north of the country - the whole of Spain, particularly the centre (Europapress, 2016) benefits from oil arriving in the aforementioned port facilities, as well as the product of its two refineries in Huelva and San Roque.

### Map 8. Spanish oil pipeline



Source: CLH (2020)

## 4. Conclusions

This document has shown the relevance of Andalusia in geo-energy terms, given its strategic position close to the African continent and the gateway to Europe. With regard to natural gas, the following conclusions can be drawn:

- Andalusia, and more specifically Tarifa, is the gateway to the Maghreb-Europe (or Pere Duran Farell) gas pipeline, which comes from the Algerian field of Hassi R'Mel and transits through Morocco, thanks to which 12 bcm of natural gas is transported annually. This line in turn feeds the Al-Andalus pipeline, the Extremadura pipeline and the national gas line in Portugal, as well as the Spanish line.
- Also in Andalusia, is the entry point for the Medgaz gas pipeline (Almeria), which also comes from the aforementioned Algerian field and connects both countries directly, supplying 8 bcm to the national gas system. Furthermore, the nominal capacity of this line is expected to increase to 10 bcm in the coming years.
- In total, almost 40 % of the natural gas exported by Algeria to Europe via pipelines enters the old continent via Andalusia. This means that up to 8 countries are supplied with gas thanks to the national network, which is largely supplied by these lines.
- Andalusia has the second largest regasification plant in Spain in Huelva, the EU country with the greatest capacity for this process. LNG accounted for more than 50% of gas imports in 2019.
- In the Gulf of Cadiz are the two terminals of the Poseidon field, which have kept Andalusia as the only gas-producing region in Spain for years.
- As a possibility for the future, the development of the trans-Saharan gas pipeline, which would connect the Warray field (Nigeria) with Hassi R'Mel, could add up to 30 bcm per year to the supply of natural gas exported by Algeria, to be divided between the entry routes to Andalusia and Italy.

Andalusia is therefore fundamental in geo-energy terms for Spain and for Europe, as it is the gateway to the only two gas pipelines entering Spain from Algeria, and because of the natural gas regasification plant in Huelva, as well as, to a lesser extent, the Poseidon field.

With regard to crude oil, we can conclude the following:

- The Andalusian oil pipeline network is the most extensive in Spain: it is over 1,100 km long and crosses the provinces of Huelva, Seville, Cadiz and Cordoba.
- Andalusia has two oil refineries that distil up to 22.5 million tonnes of crude oil per year, located in San Roque (Cadiz) and Palos de la Frontera (Huelva).
- Thanks to its location on the shores of the Mediterranean Sea and the Atlantic Ocean, the region has port facilities through which crude oil enters, in Huelva, Rota, Algeciras and Motril.
- There are twelve crude oil storage facilities in Andalusia, as well as six airports with storage capacity. Their total capacity is 2,779,759 m<sup>3</sup> and 8,114 m<sup>3</sup> respectively.

Through Andalusia, oil is supplied not only to the region itself, but also, in particular, via the line from Córdoba, to the centre of the peninsula (via the Rota-Zaragoza pipeline) and, by extension, to Aragon, Catalonia and the north of the peninsula. Thus, Spain benefits from all the maritime inflows provided by Andalusia, and from its two refineries.

This shows the special importance of Andalusia as a strategic region for Spain in geo-energy terms, in the case of both natural gas and oil.



# 5. Bibliography

## ANDALUSIAN ENERGY AGENCY (2019):

Energy Infrastructure Report. Andalusia [https://www.agenciaandaluzade-laenergia.es/sites/default/files/Documentos/informe\\_andaluz\\_miea\\_2019\\_12\\_31.pdf](https://www.agenciaandaluzade-laenergia.es/sites/default/files/Documentos/informe_andaluz_miea_2019_12_31.pdf) [accessed on 12-11-2020].

## BUSINESS STANDARD (JANUARY 2013):

"Algeria ambassador urges for Indian embassy", in *Business Standard* [https://www.business-standard.com/article/economy-policy/algeria-ambassador-urges-for-indian-embassy-108042001001\\_1.html](https://www.business-standard.com/article/economy-policy/algeria-ambassador-urges-for-indian-embassy-108042001001_1.html) [accessed 12-11-2020].

## CEPSA (2018):

"Medgaz, a strategic and pioneering gas pipeline", on *CEPSA.com* <https://www.cepasa.com/en/technology/projects/medgaz-submarine-natural-gas-pipeline> [accessed 12-11-2020].

## CLH (2020):

"Mapa de infraestructuras", in *CLH.es* <https://www.clh.es/section.cfm?id=2&side=134&lang=sp> [accessed on 12-11-2020].

## EGBE, JEROME ET AL. (MARCH 2016):

"Design Approach for Trans-Sahara Gas Pipeline Transmission", in *International Journal of Engineering Research & Science*, vol. 2 (3), pp. 143-152.

## EIA (SEPTEMBER 2020):

"Natural gas explained. Natural gas and the environment", in *U.S. Energy Information Administration* <https://www.eia.gov/energyexplained/natural-gas/natural-gas/natural-gas-and-the-environment.php> [accessed 12-11-2020].

## THE WORLD ORDER (APRIL 2018):

"Europe's energy dependence", in *The World Order* <https://elordenmundial.com/maps/energy-dependence-europe/> [accessed 12-11-2020].

## EMPL (2020):

"Europe Maghreb Pipeline Limited", en *emplpipeline.com* <http://www.emplpipeline.com/empl/> [accessed 12-11-2020].

## ENAGÁS (2015):

Leader in natural gas infrastructures LNG, transmission and underground storage services [https://www.enagas.es/stfls/ENAGAS/Transporte %20de %20Gas/Documentos/CAT\\_English.pdf](https://www.enagas.es/stfls/ENAGAS/Transporte%20de%20Gas/Documentos/CAT_English.pdf), Madrid.

## ENERGY.EU (2010):

"Natural gas reserves by country by the end of 2011", in *Energy.eu* <https://www.energy.eu/stats/energy-natural-gas-reserves.html> [accessed 12-11-2020].

## EUROPAPRESS (NOVEMBER 2016):

"La Junta conoce proyectos de CLH en Andalucía, donde tiene 870 kilómetros en oleoductos", in *Europapress.es* <https://www.europapress.es/esandalucia/sevilla/noticia-jun-ta-conoce-proyectos-clh-andalucia-donde-tiene-870-kilometros-oleoductos-20161108152231.html> [accessed 12-11-2020].

## FABI, RANDY (JULY 2009):

"UPDATE 2-Nigeria, Algeria agree to build Sahara gas link", in *Reuters* <https://uk.reuters.com/article/idUKL345766620090703?sp=true> [accessed 12-11-2020].

## GALP (JUNE 2010):

"Ductos internacionales", in *Galpenergia.com* <https://www.galpenergia.com/ES/agal-penergia/Os-nossos-negocios/Gas-Power/Gas-Natural/Aprovisionamento/Paginas/Ductos-internacionales.aspx>.

## IEA (NOVEMBER 2020):

"Data and statistics", in *International Energy Agency* [www.iea.org/data-and-statistics](http://www.iea.org/data-and-statistics) [accessed 12-11-2020].

## J. G. N. (MARCH 2020):

"Naturgy allies with BlackRock to jointly control 49% of the Medgaz pipeline", in *ABC* <https://www.abc.es/economia/abci-naturgy-alia-blackrock-para-controlar-juntos-49-por-ciento-gasoducto-medgaz-20200303060138-noticia.html> [accessed on 12-11-2020].

## KPMG (2014):

*Infrastructure 100.World Markets Report* [en línea] <https://assets.kpmg/content/dam/kpmg/pdf/2014/11/infrastructure-100-world-markets-report.pdf> [accessed 12-11-2020].

**LACOSTE, YVES (2008):**

*Geopolitics. La larga historia del presente.*  
Madrid: Editorial Síntesis.

**MEDGAZ (2020A):**

"Medgaz to expand its natural gas transport capacity between Algeria and Europe by 25%", on Medgaz.com <https://www.med-gaz.com/medgaz/doc/nota35.pdf> [accessed 12-11-2020].

**MEDGAZ (2020B):**

"Partners", on Medgaz.com <https://www.med-gaz.com/medgaz/pages/partners.htm> [accessed 12-11-2020].

**MONTES, LIDIA (JUNE 2020):**

"Spain says goodbye today to half of its coal-fired power plants", in *Business Insider* <https://www.businessinsider.es/espana-dice-adios-hoy-mitad-centrales-carbon-668993> [accessed on. 12-11-2020].

**PEÑA-RAMOS, JOSÉ ANTONIO (JULY 2017):**

"The impact of Russian intervention in the post-Soviet secessionist conflict in the South Caucasus on Russian geo-energy interests", in *International Journal of Conflict and Violence (IJCV)*, vol. 11, pp. 1-17. doi:10.4119/UNIBI/ijcv.464.

**PEÑA-RAMOS, JOSÉ ANTONIO AND AMIROV, DMITRY SERGEYEVICH (JULY 2018):**

"The role of Russia's geoenergy interests in secessionist conflicts in Eastern Europe", in *International Journal of Oil, Gas and Coal Technology*, vol. 18, no. 3-4, pp. 485-511.

**REGANOSA (2020):**

"NGTS-01 General Concepts", in *Reganosa.com* [http://www.reganosa.com/sites/default/files/ngts\\_01.pdf](http://www.reganosa.com/sites/default/files/ngts_01.pdf) [accessed 12-11-2020].

**REUTERS STAFF (MAY 2020):**

"Algeria's Sonatrach becomes majority shareholder in Medgaz pipeline", in *Reuters* <https://in.reuters.com/article/algeria-spain-medgaz/algerias-sonatrach-becomes-majority-shareholder-in-medgaz-pipeline-idINL8N2DC0FS> [accessed on 12-11-2020].

**REVILLA, BEATRIZ (MAY 2009):**

"Repsol reopens the subsea gas field in the Gulf of Cadiz", in *El Diario de Sevilla* [https://www.diariodesevilla.es/andalucia/Repsol-yacimiento-submarino-Golfo-Cadiz\\_0\\_255875121.html](https://www.diariodesevilla.es/andalucia/Repsol-yacimiento-submarino-Golfo-Cadiz_0_255875121.html) [accessed on 12-11-2020].

**RIVAS, SARA (OCTOBER 2018):**

"España, puerta de Europa para un gas natural que no dependa de Rusia", in *El Confidencial* [https://www.elconfidencial.com/economia/2018-10-30/espana-energia-gas-natural-exportar-bra\\_1637371/](https://www.elconfidencial.com/economia/2018-10-30/espana-energia-gas-natural-exportar-bra_1637371/) [accessed on 12-11-2020].

**SÁNCHEZ-ORTEGA, ANTONIO (2014):**

*Rusia, el poder y la energía.* Madrid: Plaza y Valdés.

**SHABAN, ILHAM (JUNE 2015):**

"France, Spain and Portugal look to unlock Algeria gas exports", in *CaspianBarrel* <http://caspianbarrel.org/az/2015/06/france-spain-and-portugal-look-to-unlock-algeria-gas-exports/> [accessed 12-11-2020].

**UFG (FEBRUARY 2020):**

"Gas supply in Spain. ¿Cómo y de dónde nos llega?", in *Unión Fenosa Gas* <https://www.unionfeno-sagas.com/en/Newsletter/NoticiaNews-letter/aprovisionamiento-gas-natural-espana?p=FEBRERO2020> [accessed on 12-11-2020].

**WOELLWARTH, LYDIA (JANUARY 2020):**

"Nigeria to start building 11 pipelines by 2023", in *World Pipelines* <https://www.worldpipelines.com/business-news/08012020/nigeria-to-start-building-11-pipelines-by-2023/> [accessed 12-11-2020].

## PUBLISHED EDITIONS

- ...
- 60: Immigration in Andalusia: An Analysis with 2009 Social Security Statistics
  - 61: The Perception of Inequality and the Demand for Redistribution Policies in Andalusia
  - 62: Male Violence and Preventing Violence against Women
  - 62: Male Violence and Preventing Violence against Women
  - 63: Children and New Information Technology: A Look at the Reality of Andalusian Digital Natives
  - 64: Contact between Citizens and Local Councils as a Form of Political Engagement in Andalusia
  - 65: Towards a Sustainable Urban Mobility Model
  - 66: Transitioning towards Employment for Andalusian Youth
  - 67: The Organic Food Industry in Andalusia: Diagnosis, Challenges and Strategies
  - 68: How Spaniards and Andalusians Perceive Poverty
  - 69: Women in Local Government in Andalusia (1979–2011)
  - 70: A Story about Identity and the Good Life in Andalusia
  - 71: Wellbeing, Inequality and Poverty in Andalusia: A Comparative Study with the Rest of Spain Based on the 2006 and 2012 Living Conditions Surveys
  - 72: Regional Responsibilities and Management of the Guadalquivir Basin
  - 73: Legislative Reform, Violations of the European Social Charter and Appeals to the Charter in the Judicial System
  - 74: Constitutional Reform and the New Paradigm of the Welfare State: From Contingent Legislation to Conscious Welfare Organization
  - 75: Bullying, Cyberbullying and Dating Violence: A Study of How Primary and Secondary Students in Andalusia Manage Their Social Life
  - 76: Do We Hate Politics?
  - 77: Social Determinants of Health in Andalusia
  - 78: Political Leaders and the Electoral Calendar: An Analysis of the Andalusian Population's Perception
  - 79: Guaranteed Minimum Income in Andalusia: Scope and Limitations
  - 80: Independent Publishing in Andalusia
  - 81: Gender and Social Mobility: New Statistics for Andalusia
  - 82: Changes in Electoral Behaviour in Andalusia: Analysis of the 2018–2019 Elections (Regional, National and Local)
  - 83: Territorial Cohesion through National Identity: Wellbeing as a Unifying Factor in Spain
  - 84: Gender Gaps and Biases in the Choice of STEM Studies: Why They Exist and How to Eliminate Them
  - 85: The Challenge of Longevity in Andalusia: Causes, Evolution and Consequences
  - 86: New Trends in the Structure of Andalusia: Territory, Population and Family in the 21st Century
  - 87: Democracy vs. Disinformation: Proposals for Protecting Open Societies
  - 88: The coronavirus crisis and the Andalusian economy. Impact, trends and recommendations
  - 89: The European response to the crisis? Is Spain protected?
  - 90: The political response to the crisis in Andalusia and Spain
  - 91: Forgiveness in the face of school bullying and cyberbullying. Why is it so important to instil this in adolescence?
  - 92: The decoding of the COVID-19 agenda in Andalusia
  - 93: Electoral freedom in the world (2018-2020). Spain and Andalusia. Principal Recommendations
  - 94: The geo-energetic relevancy of Andalusia for Spain and Europe

ACTUALIDAD  
ACTUALIDAD  
ACTUALIDAD  
ACTUALIDAD