Empirical Analysis of the Iberian Electricity Price Cap (Version I/II)

Lessons Learned from the Price Reduction Mechanism in Spain and Portugal

WORKING PAPER

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1 Introduction

Since summer 2021, European energy markets have been experiencing an unprecedented price rally, which has intensified further since February 2022 due to the Russian war of aggression on Ukraine and the resulting concerns about security of supply, especially with regard to natural gas. The recent development of wholesale prices in the electricity market can essentially be attributed to the strong rise in prices for natural gas (and also price increases for substitute fuels such as coal). The correlation between the development of electricity and gas prices can be graphically illustrated using the cost development of a fictitious gas-fired power plant on the basis of current gas and CO2 future price quotations in comparison with simultaneous actual future electricity prices.

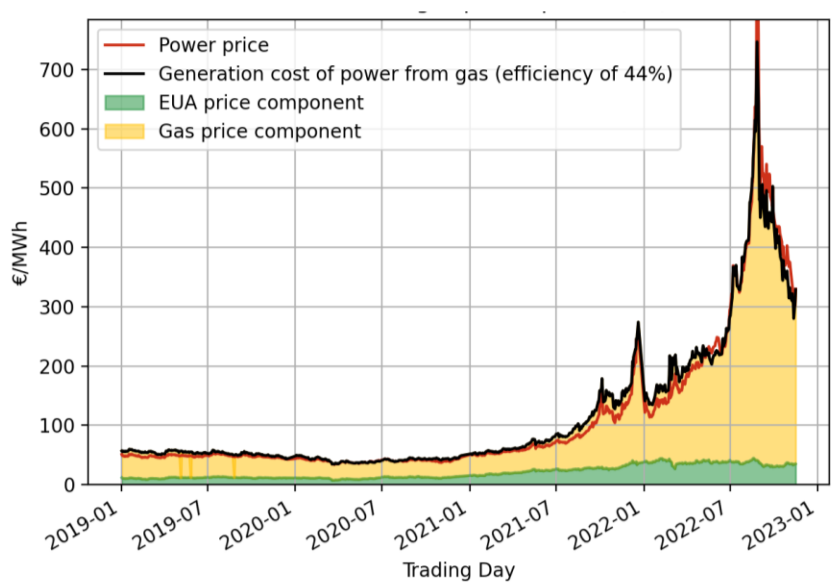

Figure 1: Description of power future prices by means of gas and CO2 future prices (own depiction, data: EEX)

During recent months various ideas regarding the limitation of price increases have been developed and proposed. In September 2022, the Austrian Energy Agency has released a (German) Policy Paper in which nine of the most prominent ideas to lower electricity wholesale prices have been described and evaluated regarding their overall advantages and disadvantages (Austrian Energy Agency 2022). One of the mechanisms that have recently been discussed for adoption on an European level is the so-called Iberian Price Cap, or Iberian Model, which was first implemented in Spain and Portugal in June 2022.

The Austrian Federal Chamber of Labour (AK) has commissioned the Austrian Energy Agency to analyse and monitor the first months of market results under the Iberian Price Cap, with a dedicated focus on electricity price and gas consumption effects. This first version of a working paper presents the results of said investigation, covering the timeframe since the mechanism's inception until 30 September

2022. An extension of this paper is planned to be published in December 2022, focusing on EU electricity interconnections to non-EU neighbours.

How does the Iberian Price Cap Work?

The Iberian Price Cap follows the idea of decoupling electricity and gas prices consistently and was put into law within Real Decreto-ley 10/2022 for Spain (Spanish Government 2022) and Decreto-Lei 33/2022 (Portuguese Government 2022) for Portugal.

The aim is to lower the bids of fossil power plants in the national electricity supply curves of the electricity auctions. To ensure that the order of deployment of power plants of the so-called "merit order" (MO) does not change, all fossil power plants (in particular natural gas, coal and oil-fired power plants) are obliged to include a fixed price discount in their bid that is the same for all these power plants. The obligation of all fossil generation technologies has the consequence that the order of the domestic producing power plants in the MO does not change. The price discount to be applied is determined by a predefined formula based on the current gas price P_{Gas} provided online by the local gas market operator Mibgas:

$$P_{New\ bid} = P_{Old\ bid} - \frac{P_{Gas} - 40\ €/MWh}{55\%}$$

Both the gas price and the resulting bid reduction price are fixed by the market operator ahead of the day-ahead auction. Consequently, the bid has to be adjusted by the difference between the current gas price and a target fuel price (in the beginning 40 €/MWh, with a monthly price increase of 5 €/MWh starting after six months), divided by an assumed average efficiency of electricity generation from the fossil power plants of 55 %. The higher the gas price in the market, the higher the price discount on the electricity bids. The aim is thus to stabilise the electricity price level, even if the gas price continues to rise – electricity and gas prices are decoupled. Possible unwanted side effects of the obtained electricity price reduction are an increase in electricity generation from fossil (i.e. gas) power plants due to higher electricity demand or increasing electricity exports due to the domestic subsidisation of electricity.

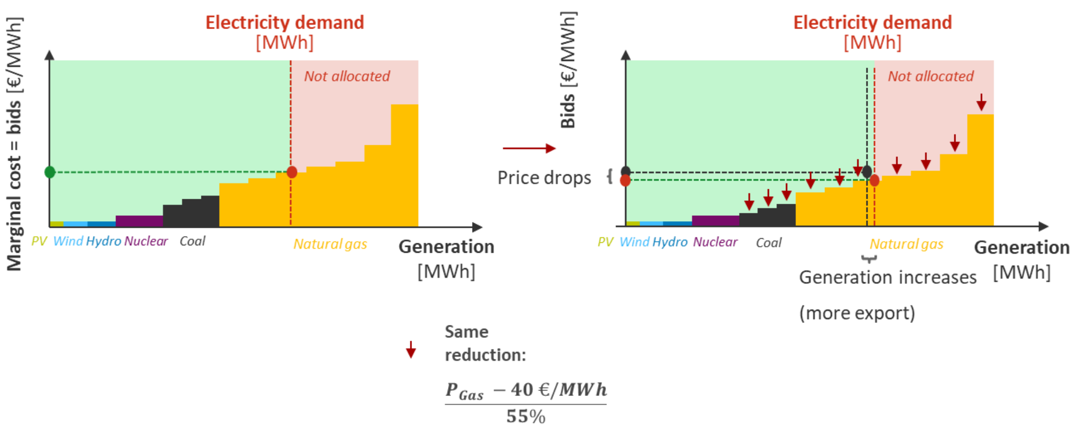

Figure 2: Visualisation of the effect of the Iberian price cap on the merit order curve (own depiction)

2 Findings on the effects of the cap in Spain and Portugal

In the next sections, the historical results of the Iberian Price Cap model are investigated, starting with the cap's inception on 15 June 2022 and ending on 30 September 2022. Hereby, supposed effects (i.e. electricity price decrease) as well as side effects of the cap (i.e. gas consumption increase from electricity production) and statistical evidence are compared. For contrast, data prior to the cap's introduction since the beginning of the year 2022 are used. The data sources used for the following analyses[1] are:

- for day-ahead electricity prices: data published by the market operator OMIE (OMIE 2022)
- for electricity generation, load and physical cross-border exchanges between France and Spain: data published by the Entso-E Transparency Platform (European Network of Transmission System Operators for Electricity (Entso-E) 2022)

2.1 Regression analysis 1: Price effects of the Iberian Cap

For the investigation of the price effect of the Iberian Cap, the given electricity price data are analysed by means of an ordinary least squares (OLS) linear regression model on hourly data of the following form:

$$y_i = \beta_0 + \beta_1 x_{i1} + \cdots + \beta_8 x_{i8}$$

With:

y_i: day-ahead electricity price of hour i

β_0: constant

β_{1-8}: regression coefficients

x_{i1}: binary value indicating the operation of the Iberian Cap Model (is 1, if date of hour i is later than 14.06.2022)

[1] For the following regression analyses, the available data timeseries for 2022 (as of 10 October 2022), were downloaded and postprocessed to fit an hourly time resolution. In case of a given quarter-hourly time resolution of the raw data, hourly data values were computed as the mean value of available data entries, usually given in MW (for load, generation and physical cross-border exchange), or €/MWh (for day-ahead prices). Double data entries were removed from the dataset. In the case of missing data for one or more relevant data categories, timesteps were excluded from the respective regression analysis.

x_{i2}: binary value indicating peak hours (is 1, if i is a peak hour[2])

x_{i3-8}: binary value indicating day of week, i.e. 3: Monday, …, 8: Saturday (is 1, if day of week of hour i is Monday, …, Saturday)

The regression was performed separately on Spanish and Portuguese price data, achieving an adjusted R-squared of 0.320 for Spain and 0.308 for Portugal, indicating that this simplified linear regression model, while not perfect, depicts price dependencies reasonably well considering that only binary variables are used. The regression shows good results with regard to the significance of the resulting coefficients. These are summarised in Table 1.

Table 1: Computed coefficients for price effects [€/MWh] 01.01.–30.09.2022 (significance level: *< 10%, **< 5%, ***< 1%, own calculations based on data from (OMIE 2022))

Coefficent	Spain [€/MWh]	Portugal [€/MWh]
Constant	188.38***	191.93***
Iberian Cap	**-68.27*** **	**-66.79*** **
Peak hour	-8.52***	-4.73***
Monday	32.10***	26.28***
Tuesday	37.91***	31.85***
Wednesday	32.83***	27.34***
Thursday	36.38***	30.69***
Friday	31.95***	26.25***
Saturday	14.84***	10.86***

The regression results indicate that the price-lowering effect of the Iberian Cap is significant for both countries and amounts to about **66–68 €/MWh** compared to the period before its introduction.

Besides a comparison with historical price levels prior to cap introduction, the spot price effects can also be measured against the counterfactual of not introducing the price cap. The Portuguese Direção-Geral de Energia e Geologia publishes the result of the cap mechanism on its website (Direção-Geral de Energia e Geologia 2022) with daily updates. Between the mechanism's inception and 30 September, the average spot price difference with and without the mechanism was estimated at 173.34 €/MWh or 54% of the computed counterfactual spot price. If the adjustment costs (the levy

[2] Peak hours are the hours of the day between 8:00 and 20:00 between Monday and Friday (60 hours of the week in total). The remaing 108 hours of the week are often denoted as off-peak hours.

paid by electricity consumers to compensate the subsidy of fossil plants) are also taken into account, the average price difference amounts to 54.16 €/MWh, or 17% between 15 June and 30 September. The difference between these price differences results from the share of generation that is coming from subsidised fossil power plants – the more fossil plants are producing, the higher the levy and the lower the resulting price difference. Thus, in times of reduced renewable generation or high demand, more fossil power plants are needed and the price reduction effect of the cap for customers decreases.

2.2 Regression analysis 2: Gas consumption effects of the Iberian Cap

The additional gas consumption effect is analysed with two different regressions. First, a regression approach equivalent to the price regression described in 2.1 is applied to electricity generation from natural gas in Spain and Portugal, as a supposed surplus gas consumption in times of scarcity is one of the key arguments against the implementation of the Iberian Cap Mechanism.

The data on given electricity generation from natural gas are analysed by means of a similar ordinary least squares (OLS) linear regression model on hourly data of the following form:

$$y_i = \beta_0 + b_1 x_{i1} + \dots + \beta_8 x_{i8}$$

With:

y_i: electricity generation from natural gas of hour i

β_0: constant

β_{1-8}: regression coefficients

x_{i1}: binary value indicating the operation of the Iberian Cap Model (is 1, if date of hour i is later than 14.06.2022)

x_{i2}: binary value indicating peak hours (is 1, if i is a peak hour[3])

x_{i3-8}: binary value indicating day of week, i.e. 3: Monday, …, 8: Saturday (is 1, if day of week of hour i is Monday, …, Saturday)

The regression was performed separately on Spanish and Portuguese generation data and on the sum of both countries, achieving an adjusted R-squared of 0.246 for Spain, 0.342 for Portugal and 0.299 for the combined model, indicating that this simplified linear regression model, while not perfect, depicts gas consumption patterns reasonably well considering that only binary variables are used. Again, the regression shows good results with regard to the significance of the resulting coefficients. These are summarised in Table 2.

[3] cf. footnote 2

Table 2: Computed coefficients for gas consumption effects [MW] 01.01.–30.09.2022 (significance level: *< 10%, **< 5%, ***< 1%, own calculations based on data from (European Network of Transmission System Operators for Electricity (Entso-E) 2022))

Coefficient	Spain (ES) [MW]	Portugal (PT) [MW]	ES + PT [MW]
Constant	5,735.56***	1,104.83***	6,816.49***
Iberian Cap	**3,293.08*** **	**298.84*** **	**3,586.78*** **
Peak hour	-376.82***	107.94***	449.34***
Monday	2,660.45***	737.55***	2,881.35***
Tuesday	3,501.15***	923.26***	4,242.47***
Wednesday	4,008.89***	1,015.80***	4,245.11***
Thursday	3,119.17***	928.81***	3,642.66***
Friday	2,281.95***	812.77***	2,895.01***
Saturday	552.59***	316.49***	945.09***

The regression results indicate that the effect of the Iberian Cap on gas consumption for electricity generation is highly significant for both countries and amounts to about **3,600 MW** of additional electricity produced from natural gas between 15 June and 30 September compared to the period before introduction of the price cap (1 January until 14 June) – with a 5% confidence interval of [3,402.19 , 3,771.37] MW. These results illustrate that gas consumption in the electricity sector has grown significantly. However, this regression alone is not sufficient to determine the reasons for this development.

Therefore, Section 2.4 intends to identify and explain possible reasons of this increase. The following section, however, first focuses on the stability of the obtained results over time.

2.3 Development of regression results over time

In the previous sections, the regression analyses were conducted for all days since the start of the Iberian Cap until and including 30 September 2022. Figure 3 describes the development of the estimated coefficients for electricity price reduction (cf. Section 2.1) and gas consumption increase (cf. Section 2.2) over time. Note that the value of a coefficient of a certain day in this figure represents the coefficient of the respective regression performed on the entire dataset available until and including this day. For example, the coefficient values for 1 August were extracted from the regression including data from 1 January until 1 August. This means that earlier values contain a smaller number of observations *with* the implemented Iberian Cap than later values, which explains the smoothing of the curve for later dates.

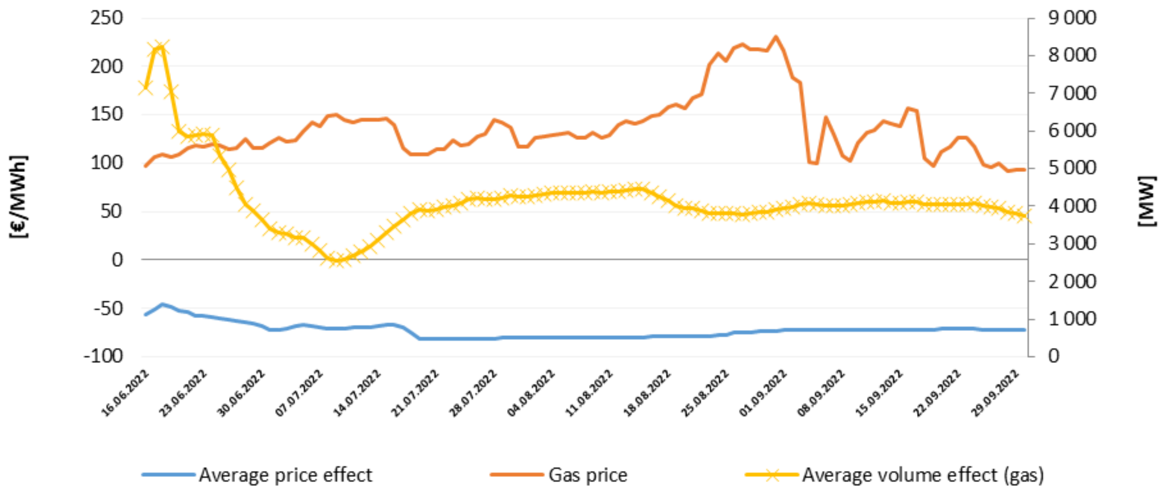

Figure 3: Regression parameter development of electricity price reduction (blue, primary axis) and gas consumption increase (yellow, secondary axis) over time; own calculations, based on data from (OMIE 2022) and (European Network of Transmission System Operators for Electricity (Entso-E) 2022); gas price development in [€/MWh] from (Mibgas 2022) given for reference.

While gas consumption patterns have differed especially at the beginning of the Iberian Cap, with a huge increase in gas consumption in the second half of June followed by a consumption dip in July, the long-term trend in both price and volume effects seems to be rather stable until 30 September. This underlines that the results in sections 2.1 and 2.2 are representative of the available dataset and are not due to an insufficient number of observations.

2.4 Regression analysis 3: Which influences drive gas consumption in the electricity sector?

The Iberian Price Cap with its decoupling effect of gas and electricity prices has one obvious and intended effect – a decrease in the spot market electricity price, as shown in 2.1. However, the reason behind the observed increase in electricity production from gas shown in 2.2 could in theory be attributed to various reasons – some resulting from the Iberian Cap, others not. As the Iberian Price Cap is designed in a manner that all fossil power plants are subsidised for lowering their electricity market bids by the same value in €/MWh, a fuel switch from coal or oil plants to natural gas due to the mechanism may be excluded as a possible explanation.

Fundamental influences that may affect gas consumption patterns for electricity generation, but that are not dependent on the Iberian Cap, include:

- Reduction of electricity production in renewable power plants (e.g. due to decreased availability because of droughts and other weather effects), such as hydro, solar and wind power, and
- Reduction of electricity production in nuclear power plants (e.g. due to decreased availability of cooling water because of droughts).

For both technology groups, marginal costs of production can still be assumed to be lower than for the subsidised fossil power plants – a substitution of these technologies by natural gas *due to the Iberian Cap* can be ruled out. A substitution of generation by fossil technologies due to a change in the merit order can be ruled out as well, as every fossil plant gets paid the same subsidy.

Fundamental influences that may affect gas consumption patterns and could be considered to be (at least partly) stemming from the Iberian Cap include:

- Load increases due to demand effects (e.g. switching from natural gas to subsidised electricity as energy source for heating processes). However, load increases may also result due to other reasons than the Iberian Cap, such as external demand effects like heat waves that result in a higher electricity demand for cooling devices and air-conditioning.
- Increases in cross-border electricity exports, as subsidised electricity is more likely to be exported to more expensive neighbouring market zones. In the case of the Iberian Peninsula, this could affect exports to France and Morocco in particular. The increased export opportunities due to the subsidy lead to a surge in domestic electricity generation and thus to an increase of electricity generation from the price-setting technology, i.e. electricity generation from natural gas power plants.

In order to identify all major influences on electricity generation from natural gas, another linear regression analysis is perfomed on the combined generation data from Spain and Portugal:

The data on given electricity generation from natural gas are analysed by means of an ordinary least squares (OLS) linear regression model on hourly data of the following form:

$$y_i = \beta_1 x_{i1} + \cdots + \beta_6 x_{i6}$$

With:

y_i: electricity generation from natural gas of hour i

β_{1-6}: regression coefficients

x_{i1}: electricity generation from run-of–river and pondage hydro power of hour i

x_{i2}: electricity generation from solar power of hour i

x_{i3}: electricity generation from wind power of hour i

x_{i4}: electricity generation from nuclear power of hour i

x_{i5}: electricity demand (load) of hour i

x_{i6}: electricity cross-border export from Spain to France of hour i

The regression is performed for the whole year as well as for the split time periods before and since the inception of the Iberian Cap up to 30 September. Table 3 below states the coefficients of the individual explanatory variables and their devlopment over time.

Table 3: Computed coefficients for gas consumption explanatory variables [MW] (significance level: *< 10%, **< 5%, ***< 1%, own calculations based on data from (European Network of Transmission System Operators for Electricity (Entso-E) 2022))

Coefficient	Year 2022 [MW]	1 January – 14 June [MW]	15 June – 30 September [MW]
Hydro	-1.7375***	-0.9444***	**-2.7635*** **
Solar	-0.5294***	-0.4413***	**-0.6903*** **
Wind	-0.7042***	-0.6384***	**-0.7645*** **
Nuclear	0.4760***	0.7376***	**-0.7549*** **
Load	0.5154***	0.4000***	**0.8095*** **
Export to France	0.7234***	0.5881***	**1.1447*** **

All computed coefficients are significant. While the correlation between renewable generation and electricity generation from natural gas is negative (the more renewable generation, the less electricity is generated from gas), the effects of load and export to France clearly have a positive sign (the higher the demand and exports, the higher the electricity generation from natural gas). The effect of nuclear production is more ambiguous – the sign of the coefficient changes from positive to negative during the investigated timeframe, meaning that nuclear production historically used to be connected to a higher electricity generation from natural gas and is now seemingly contributing to lower the natural gas electricity output.

Another interesting finding is that the absolute value of almost all coefficients has increased since the Iberian Cap has been introduced – meaning that existing relations have been amplified since 15 June. It is especially interesting that the coefficient describing the influence of exports has climbed to a value greater than 1 – which indicates that an increase in exports by 1 MW is on average accompanied by an increase in Iberian electricity production from gas by more than 1 MW since 15 June.

All regression variants show a particularly high R-squared value (between 0.955 and 0.993), which indicates that most likely all relevant explaining factors for electricity production from natural gas have been included in the regression.

These regressions (like all regressions), however, can only deliver information about correlation, not causation. Thus, they do not definitvely prove that existing gas consumption increases in the electricity sector are caused by the Iberian Cap – but there is a clear indication that a structural break has been induced in the data on 15 June and that consumption has gone up. In order to quantify the observed relationships, a volume analysis is presented in the following section.

2.5 Quantification of volume effects since the start of the Iberian Price Cap

For the following analysis, the mean changes of the aforementioned generation, load and exchange patterns after the introduction of the Iberian Cap are computed as mean hourly changes compared to the first months of the year. The resulting waterfall diagramm, which is depicted in Figure 4, contrasts how much of the average generation increase of natural gas and other fossil fuels can be attributed to other factors, including the significant factors identified in Section 2.4.

The data from Entso-E (European Network of Transmission System Operators for Electricity (Entso-E) 2022) show that the increase of electricity generation from fossil fuels of on average 3.9 GW (of which 3.7 GW have been produced with natural gas) has been accompanied by a generation increase of a few other generation technologies like nuclear power plants and solar, but also by a sharp decline in generation from other technologies, especially hydro (due to this summer's drought) and wind power plants (which may be explained by a hot summer with stable high-pressure areas). If all non-fossil generation technologies are netted, **about 1.3 GW**, roughly one third of the increase of electricity generation from fossil fuels, can thus be attributed to a **lower generation from other energy sources**.

About **350 MW** can be attributed to a **higher average load** – an effect, which might or might not be connected to the Iberian Cap. It should be mentioned in that context that a historic heat wave coincided with load peaks in the second half of June and first half of July, whereby a higher-than-usual electricity demand and thus electricity production from natural gas could be observed (Reuters 2022), presumably resulting from cooling and air conditioning applications. Nonetheless, an influence of lower electricity prices due to the Iberian Model cannot be ruled out.

About 1.6 GW are linked to a **higher average (physical) electricity export from the Iberian Peninsula to France** – before 15 June, Spain on average imported electricity from France and now exports electricity, often at full available capacity. In general, lowering electricity prices increases the attractivity of electricity imports for neighbouring countries, at least if their price level exceeds the subsidised electricity price. Therefore, it seems intuitive to attribute this enormous additional average export effect to the Iberian Price Cap. However, it appears likely that at least some of this volume shift would have happened without the price cap as well – the French electricity price has risen in recent months due to a high share of non-available nuclear power plants, which account for about half of the total installed capacity in France (Reuters 2022).

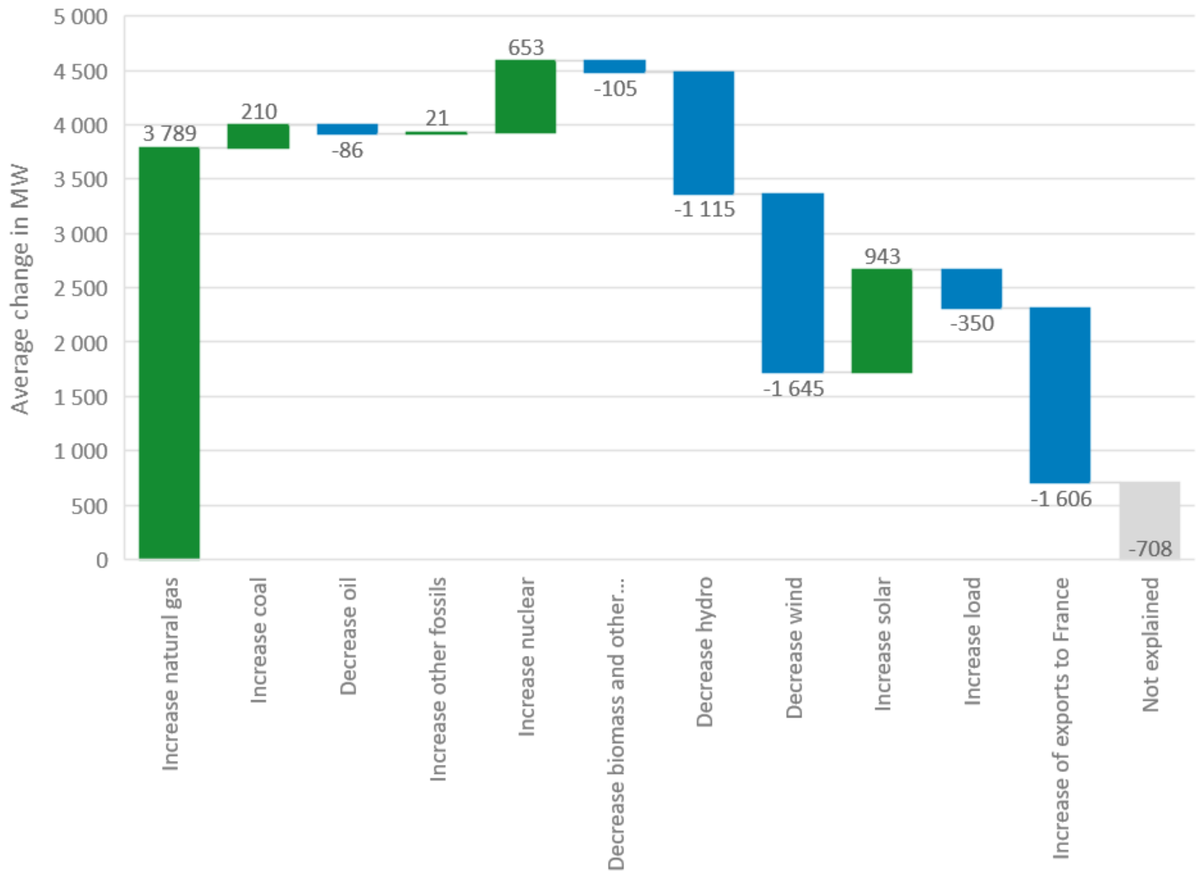

Figure 4: Average energy volume changes on the Iberian Peninsula since 15 June 2022 (until 30 September 2022, own calculations based on data from (European Network of Transmission System Operators for Electricity (Entso-E) 2022)), colour code: green: generation increase, blue: generation decrease or demand increase, grey: not accounted for

Finally, about **700 MW** of additional production **cannot be attributed** unequivocally to any of the aforementioned effects. One puzzle piece obviously missing is the export from the Iberian Peninsula (from Spain) to Morocco, which is not included in Entso-E data. However, partly preliminary data from the Spanish grid operator REE (Red Electrica 2022) indicate that "only" **about 250 MW** of the additional average production increase can be directly attributed to an increase in electricity **exports from Spain to Morocco** during the investigated timeframe. The remainder of this position cannot be fully explained with the given dataset.

Taken together, **additional electricity exports to France and Morocco** seem to **amount to about 1.850 MW**, which corresponds to roughly half of the increase observed in electricity production from fossil fuels such as natural gas.

2.6 Limitations

The analysis provided in this paper has limitations that should be recognised for all conclusions drawn from its results. The quality and completeness of the used data provided by the mentioned sources cannot be guaranteed by the authors.

Other institutions have suggested alternative comparison periods for individual factors under investigation, such as using data from 15 June and following months of the previous years 2017–2021 instead of using 2022 data. For example, a recent study by the Spanish government (Spanish Government 2022) has indicated a drop in electricity demand (instead of the demand increase found in this paper) if demand is compared to previous years, leading to different results regarding the volume effects attributed to the Iberian Cap.

As a further aspect, generation distribution effects between Spain and Portugal have been neglected due to fairly similar observed price patterns and generation fleets of these two countries.

It should especially be noted for Section 2.5 that the high electricity export from the Iberian Peninsula to France is most likely not solely a product of the Iberian Cap. Clearly, not only the subsidised Spanish but also the prevailing high French electricity price levels due to scarce production capacity in Central Europe have played an important role in this question over the summer. Put simply, even without the Iberian Cap, electricity prices in France might have often been higher than in Spain – and thus exports and an increased production from Iberian fossil power plants might have resulted in any case. However, an hourly price differential analysis of the Iberian Peninsula and Central Europe was beyond the scope of this analysis.

2.7 Theoretical considerations regarding the effectiveness of the Iberian Price Cap

Finally, it should be noted that a decoupling of natural gas and electricity prices is much less likely to succeed if the underlying assumption of a high dependency of electricity and natural gas prices (through the merit order) loses significance. This can happen in various ways. An obvious, unproblematic example is that electricity generation from fossil fuels such as natural gas can at times be displaced by cheaper generation technologies (i.e. renewable energies) – for these hours, the subsidy is not paid out and there should also be no price effect.

However, the opposite effect is also possible – and much more troubling. A subsidised natural gas plant group can still become inframarginal if another, more expensive technology group, sets the price. In the current market environment, this may happen mainly in two cases:

- Incomplete coverage: If not all fossil fuels in the electricity mix get paid the subsidy (for example, only natural gas power plants are covered), fossil power plants may switch their position in the merit order. In case a non-subsidised plant sets the price, the price reduction effect becomes smaller than the subsidy that is paid out. As a result, the net benefit of the measure could become negative, as levies covering the subsidy could be higher than the reduction in wholesale electricity market prices. It should be noted that this is not the case for the Iberian Price Cap, as all fossil plants are equally covered by the regime.

A similar effect is at play if imported electricity that is not covered by the domestic subsidy sets the price.

- Electricity scarcity: If there is not enough generation capacity (and/or fuel) available to cover demand, electricity prices rise sharply due to so-called scarcity pricing. In this case, either the demand side of the electricity market, i.e. the willingness of electricity customers to pay, determines the price or the administratively set maximum price level of the electricity market (at the moment 4,000 €/MWh in the day-ahead auction) defines the price.

The intended price-lowering effect of the Iberian Cap on electricity prices may vanish in these cases, while side-effects such as high gas consumption for electricity production may still prevail. Electricity and gas prices would indeed be decoupled – but not in the direction that is intended.

As a result, a careful consideration of likely outcomes should always be made, before a market intervention is decided. Rules preventing unwanted side-effects should be considered before, rather than after, any such market intervention is implemented. These include exit rules that allow a suspension of the cap model in case of prolonged electricity emergencies.

3 Conclusions

The results obtained in this paper regarding the historical results of the Iberian Price Cap show some clear tendencies:

- Under the premise of high natural gas prices, the Iberian Model reduces electricity spot price levels significantly.
- On the Iberian Peninsula, the price cap has been accompanied by a significant increase of electricity production from natural gas. However, a more detailed analysis of this effect is necessary.
- About one third of this increase needs to be counted towards generation unavailabilities during the 2022 summer period.
- About half of this increase can be attributed to a surge in electricity exports to France and Morocco. However, it is not definitive that all these additional exports can be solely linked to the Iberian Price Cap, as electricity prices might have been higher in Central Europe even without the Cap.
- About one tenth of this increase can be attributed to a higher electricity demand, which at least partly could be linked to high temperatures during the investigated time period.
- Electricity price drops only partly materialise for electricity customers, as the subsidy costs need to be paid by means of a levy by market participants. The relative impact of said levy was increased by a low renewable generation output and a higher electricity export during the investigated time period.

Despite ocurring under local market circumstances, the historical observations in Spain and Portugal may still give an indication of what might happen in other market areas if the Iberian Cap were applied across Europe. Still, observed effects do not have to occur in the same manner everywhere. Not all countries border non-EU-countries; for these, the mentioned export and generation effects are likely to be much lower – but not zero, as the Portuguese example shows.

The generation structure in the Iberian Peninsula differs from the generation structure in other European countries, meaning that the share of subsidised electricity would differ greatly from country to country. Maybe even more importantly, other countries in Europe have higher interconnection rates (see Figure 5) and export effects could be much more pronounced. Therefore, an EU-wide application of an Iberian Price Cap is the preferred option to national implementations of similar measures, as this is necessary to achieve consistent results within the Union.

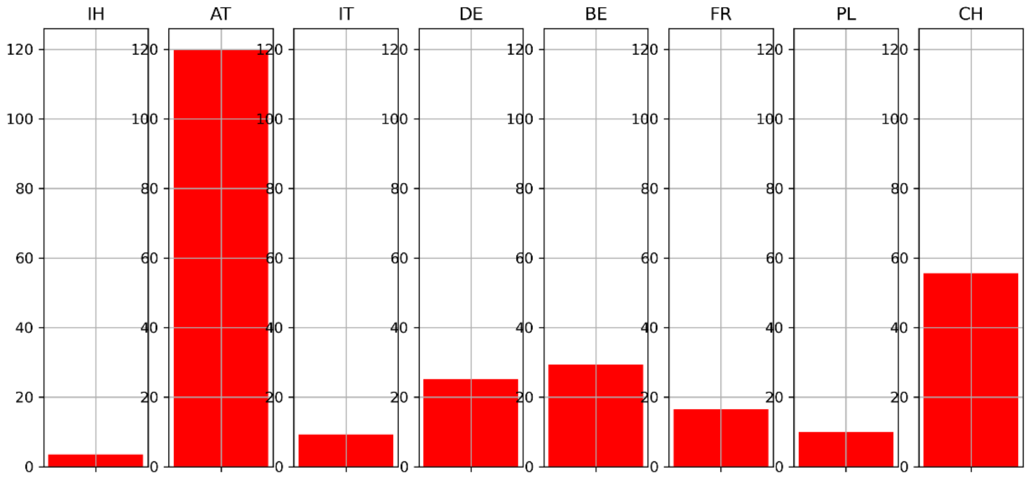

Figure 5: Interconnection rates of the Iberian Peninsula (IH) in [%] compared to other countries (from (Austrian Energy Agency 2022)), country codes: AT: Austria, IT: Italy, DE: Germany, BE: Belgium, FR: France, PL: Poland; CH: Switzerland

Thus, the Iberian example should be observed with caution and without overinterpreting every effect of the Iberian Cap. This requires a more profound analysis across Europe. The Austrian Energy Agency aims to contribute as a first step by examining cross-border capacities between EU and non-EU countries. The update of this paper is thus envisaged by Mid-December.

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ABOUT THE AUSTRIAN FEDERAL CHAMBER OF LABOUR (AK)

The Austrian Federal Chamber of Labour (AK) represents by law the interests of about 3.8 million employees and consumers in Austria. It acts on behalf of its members in fields of social-, educational-, economical-, and consumer issues both on the national and on the EU-level in Brussels. Furthermore, the Austrian Federal Chamber of Labour is a part of the Austrian social partnership. The Austrian Federal Chamber of Labour is registered at the EU Transparency Register under the number 23869471911-54.

www.arbeiterkammer.at www.akeuropa.eu

ABOUT THE AUSTRIAN ENERGY AGENCY (AEA)

The Austrian Energy Agency offers answers for a climate-neutral future. The aim is to organise our lives and economic activities in such a way as to no longer affect our climate. New technologies, efficiency and the use of natural resources, such as sun, water, wind and forests, lie at the heart of the solutions. This ensures that we and our children can live in an intact environment and that ecological diversity is preserved without being dependent on coal, oil, natural gas or nuclear power. This is the missionzero of the Austrian Energy Agency.

More than 80 employees from a wide range of disciplines advise decision-makers in politics, business, administration and international organisations on a scientific basis and provide support in reconstructing the energy system and implementing measures to tackle the climate crisis.

On behalf of the federal government, the Austrian Energy Agency manages and coordinates the climate protection initiative klima**aktiv**. The federal government, all federal states, leading companies in the energy and transport sectors, interest groups and scientific organisations are members of this Agency.

www.energyagency.at

AUSTRIAN ENERGY AGENCY