The gas cap in Spain under examination

Since its implementation on 15 June, the so-called Iberian «gas cap» mechanism has brought about a major shift in the way the Spanish electricity system operates. In this article we analyse the effect it has had on electricity prices and some externalities it has introduced.

The gas cap mechanism has imposed a ceiling of €40/MWh on the gas supply costs which gas-fired power plants (mainly combined-cycle plants) can recover in the price at which they sell their energy in the wholesale market.[1] The ceiling is accompanied by compensation for such plants, which covers the difference between the actual supply cost (the MIBGAS gas price is used as a benchmark) and the cap imposed by the mechanism. This compensation is charged directly in the electricity bills of the consumers who benefit from the system – primarily, although not exclusively, retail consumers on a regulated electricity tariff (known as the PVPC tariff).

The impact of the gas cap on electricity prices

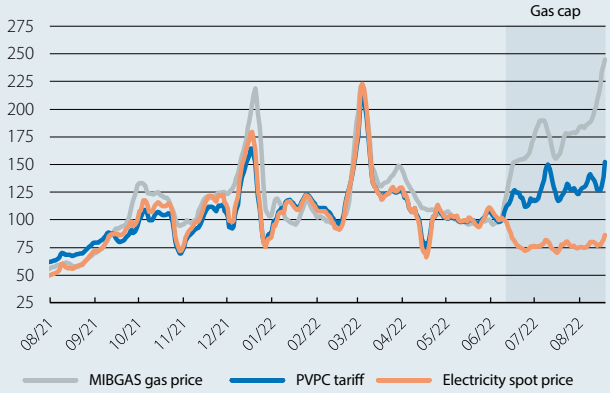
The mechanism has proved very effective in containing the wholesale electricity price (spot price), by imposing a more stable and moderate price for the electricity sold by combined-cycle plants, which is the technology that usually sets the market's marginal price.[2] In July and August, the spot price remained steady at around €140/MWh, 22% below the average price in May. However, the mechanism has not avoided further escalation in the PVPC tariff, because consumers have also faced the cost of the compensation provided to combined-cycle plants. Thus, in July and August the PVPC tariff was 26% higher than the average rate in May.

The charge applied to the PVPC tariff as a result of the combined-cycle compensation depends on two factors: (i) the amount of energy generated by combined-cycle plants and (ii) the gas price. Coinciding with the introduction of the gas cap, wind and hydraulic power generation fell significantly due to weather conditions, resulting in an increase in generation at combined-cycle plants. In addition, mid-way through the month there was a rally in the MIBGAS gas price (the benchmark used for setting the compensation). These two dynamics have persisted throughout the summer months: in July and August on average, combined-cycle plants accounted for 29% of electricity generation (11% on average in May) while the average gas price was 74% higher than in May. This has driven up the compensation payable to combined-cycle plants, causing the PVPC tariff to rise at a time when the spot price was falling.

Although the PVPC tariff has increased compared to the period immediately preceding the gas cap, the cap has had a clear impact in weakening the correlation between the PVPC tariff itself and the benchmark gas price. As the first chart shows, historically, the evolution of the PVPC tariff has been closely linked to that of the price of gas. Since the introduction of the gas cap, its price swings have continued to be transmitted to the PVPC tariff, but to a much lesser extent. According to a simple regression analysis, between 1 January and 14 June 2022, a 10% monthly increase in gas prices was linked to a 6.3%

Spain: benchmark electricity and gas prices

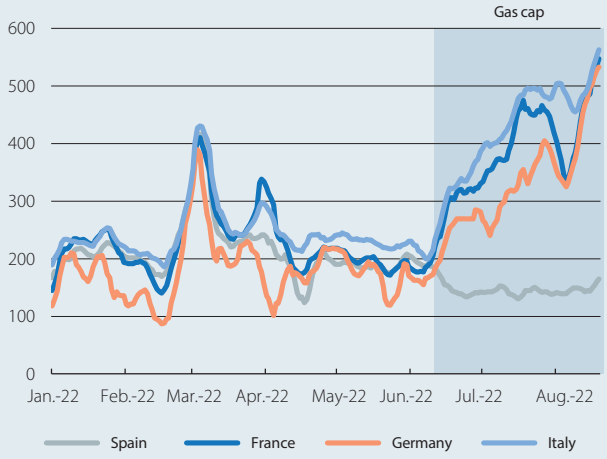
Index (100 = May 2022), 7-day moving average



Notes: *The PVPC tariff is the regulated electricity rate applicable to small consumers. The electricity spot price is the wholesale price of electricity.*
Source: *CaixaBank Research, based on data from OMIE, REE and Bloomberg.*

Electricity market spot prices by country

(€/MWh) 7-day moving average



Source: *CaixaBank Research, based on data from REE.*

1. The cap has been set at €40/MWh until November 2022. Between December 2022 and May 2023, it will be increased by €5/MWh each month, bringing it to €70/MWh in the last month of the mechanism's application.
2. Wholesale electricity market prices in all EU Member States are governed by a marginal pricing system. This means that the market price is set by the most expensive energy that is sold.

monthly increase in the PVPC tariff, whereas from 15 June onwards this ratio moderated to less than half (2.9%).[3] On this basis, we can infer that the mechanism is proving effective in containing prices. A slightly more sophisticated exercise suggests a similar result. Specifically, if we simulate the spot and PVPC prices which we would have seen in the Spanish market in the absence of the gas cap, based on the evolution of prices in other European countries where no such measure was implemented, we estimate that the gas cap has reduced the spot price by 61% and the PVPC price by 35%.

If we compare the evolution of the Spanish spot price with that of other EU countries, the gap resulting from the gas cap mechanism becomes evident. The average prices for August compared to May increased by 2.2 times in Germany and France, and by 2.1 in Italy, while the spot price in Spain fell 23% in the same period.

Negative externalities of the system

Although the mechanism is managing to contain the rise in electricity prices, it is generating negative externalities that are driving the Iberian market to generate more energy from gas and more inefficiently.

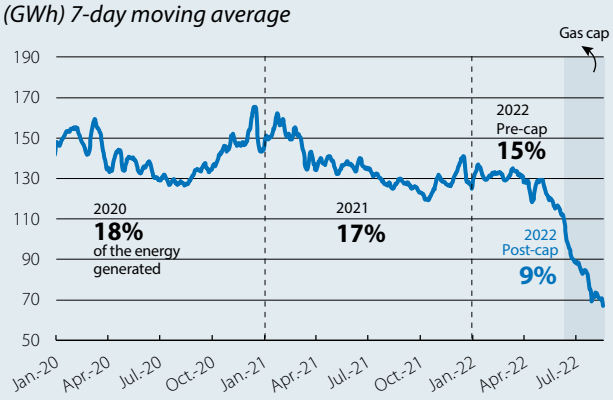
Firstly, the mechanism has driven a large portion of cogeneration power plants out of the market. These plants, which are more efficient than combined-cycle plants, also generate energy using natural gas, so their production costs have increased substantially. However, up until the end of August they had been left out of the compensation system, so the spot price that was being paid by the market, moderated by the gas cap, was too low for their operations to be profitable. As a result, electricity production at cogeneration plants in 2022 has gone from representing 15% of the total before the gas cap to just 9% after its introduction.

On the other hand, exports of electricity to France have surged. The price gap between the two markets has resulted in these exports persistently reaching the maximum levels allowed by the interconnection between the two countries, day after day. Since the gas cap was introduced, net exports to France have accounted for 4% of the total energy produced in Spain, whereas between 1 January and 14 June (before the gas cap) they accounted for just 0.3% of the total. This is also resulting in incomes being transferred to the French electricity system, since the price at which that system is purchasing the energy is subsidised by consumers on the Iberian peninsula.

3. The following regression is estimated using OLS: $PVPC_t = \alpha + \beta MIBGAS_t + \mu_t$, where $PVPC_t$ and $MIBGAS_t$ are the month-on-month rates of change of the PVPC tariff and of the MIBGAS gas price on day t.

Spain: energy production from cogeneration plants

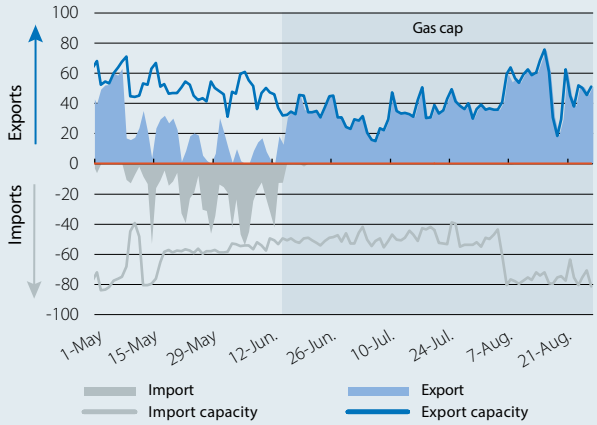
(GWh) 7-day moving average



Note: *The labels show what portion of the total electricity generation has come from cogeneration plants.*
Source: *CaixaBank Research, based on data from OMIE.*

Spain: energy trade balance with France

(GWh)



Source: *CaixaBank Research, based on data from OMIE.*

In conclusion, the measure is achieving its objective: to cushion the rise in electricity prices. However, among other effects, the externalities of the system are causing more energy to be produced by combined-cycle plants (which use gas), as it is a more flexible form of generation than nuclear and renewables. Thus, it is likely that the need to compensate the reduced levels of power generation by cogeneration plants and the higher demand from France has been met by combined-cycle plants. With this, the gas cap mechanism has led the Spanish energy mix to become more dependent on combined-cycle plants in a context in which the market forces are pushing in the opposite direction.

Javier Ibánez de Aldecoa Fuster