The Gas Price Impact of the Iberian Instrument: A Back-of-the-Envelop Calculation

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Rolling out the Iberian instrument will increase gas consumption and hence the wholesale price for gas. Based on empirical observations, we estimate the impact to be large. The TTF price could go up by 100 €/MWh or more.

- The export-corrected increase in gas-fired power generation in Spain was about 37%.
- If that happened in Central Europe (DK, NL, DE, CZ, CH, AT), gas consumption would go up by about 110 TWh.
- Historically, we have seen a 1 TWh demand reduction to be associate with a 1 €/MWh increase in the TTF price.
- So the increase in gas consumption could inflate the TTF price by about 100 €/MWh, from just below 200 €/MWh today to about 300 €/MWh.
- To the extent that the intervention inflates net exports out of the EU, the price effect would be even larger.
- These are very rough estimates, but they show what is at stake. The real effect could be small, but it also could be larger.

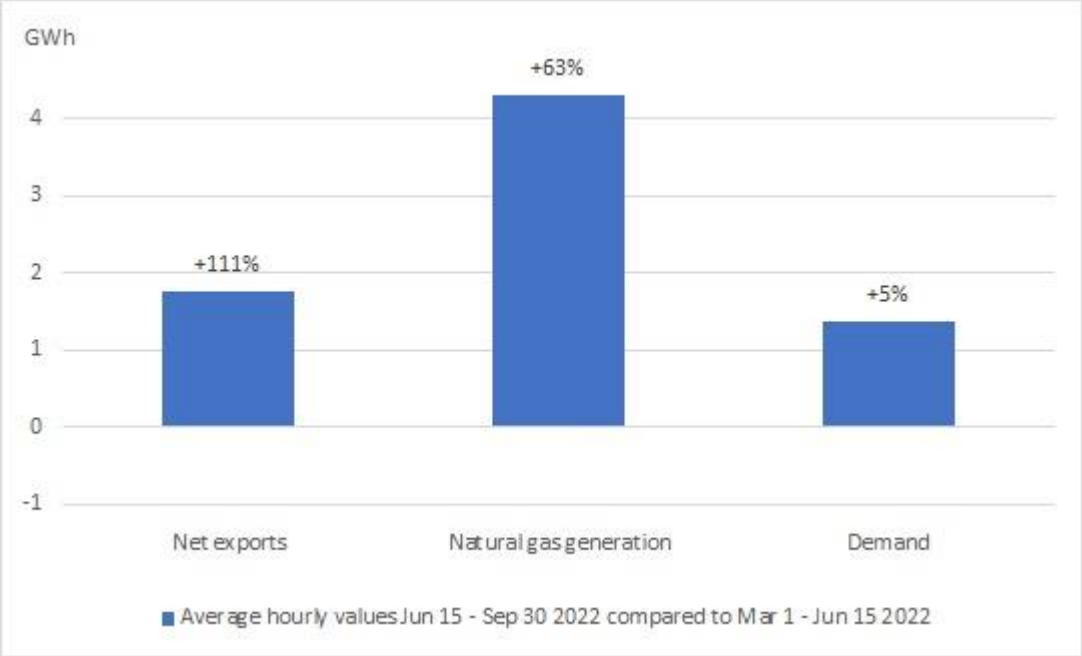
The Iberian instrument drives up the gas prices through at least five independent mechanisms

- Electricity wholesale and hence retail prices are depressed, making energy savings less attractive. Paper factories and other electricity-intensive firms that have curtailed consumption will reverse action, driving up power and hence gas consumption.
- The level and the variability of power prices will be artificially depressed. Hence less storage and other flexibility options will be available to take up surplus renewable energy.
- In Spain, we have seen a decline in efficient gas-fired cogeneration plants (because they do not receive the subsidy, as they receive another kind of subsidy) while the production of less efficient condensing plants surged.
- If cogeneration plants are included, they will substitute heat-only boilers since only the former receive the subsidy.
- The intervention is temporary. Energy-constrained power generators – such as biomass and hydroelectric reservoirs – could save energy for future times, when power prices are higher.

Step 1: How much was the gas consumption increased in Spain?

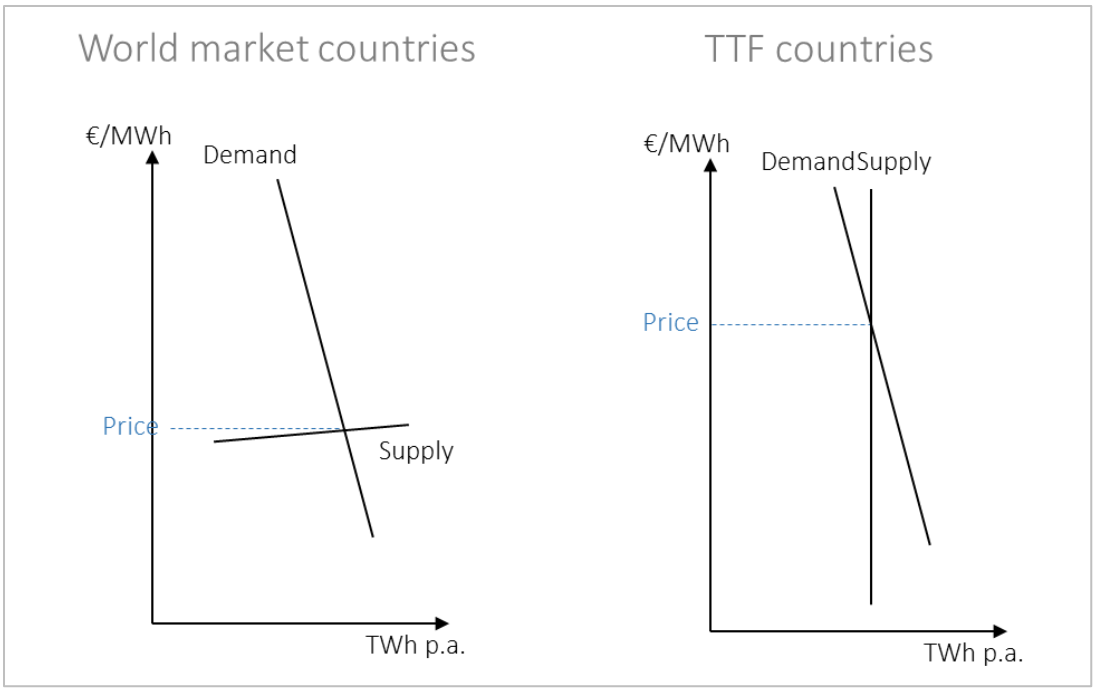
- Using empirical hour-by-hour data from Spain, we find power generation in gas-fired plants to have increased by more than 60%, or 4 GW, during the 3.5 months the instrument is in place compared to the 3.5 months before the introduction.
- Exports increased as well, but even if the increase was entirely due to the intervention (in reality, French nuclear was an additional pulling factor), it can only explain 40% of the gas surge. (First chart)

- If we conservatively attribute all export growth to the instrument, export-corrected gas generation increased by 37%.



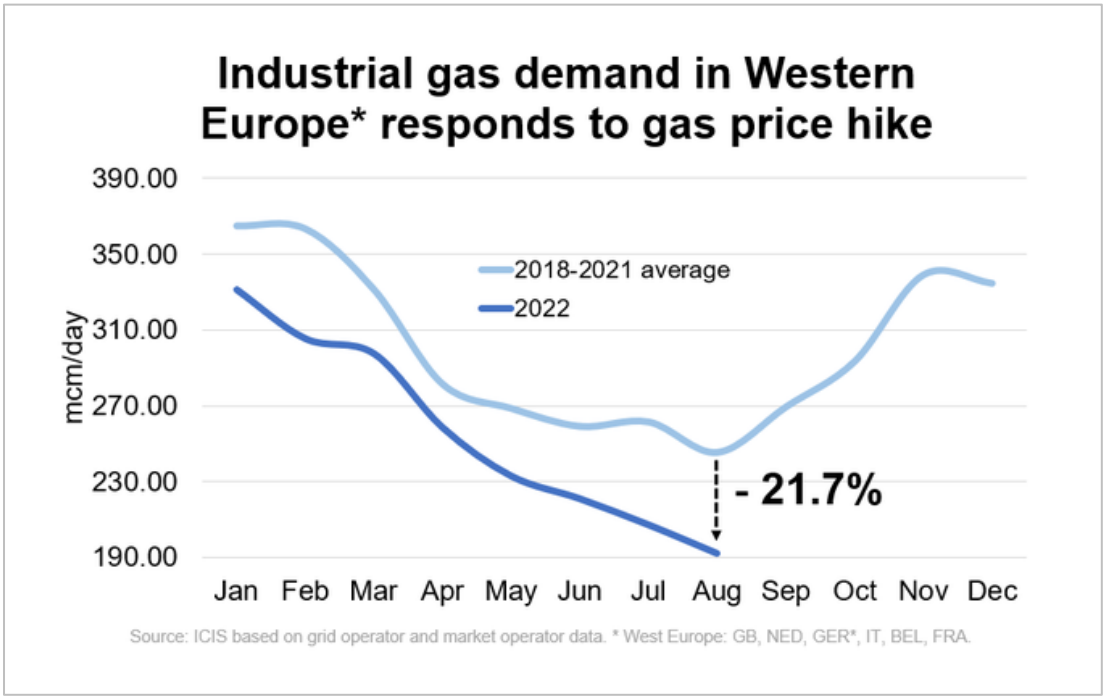
Step 2: How much would gas consumption increase in Europe?

- The problematic area is the region of The Netherlands, Denmark, Germany, Czech Republic, Switzerland, Austria (and possibly Italy). This region is currently import-constraint. Here gas prices increase, increase, increase until enough industry consumers drop out to match demand with the existing supply. This price setting mechanism is fundamentally different from other countries that can still import (figure).
- These countries (excluding Italy) produce about 150 TWh of electricity from gas. If we include Italy in the group, the effect would be much larger.
- If that output increase by 37% as in Spain (ignoring and increase in exports), the increase in gas-fired electricity would be 55 TWh.
- The increase in gas consumption would be about 110 TWh, assuming a 50% average conversion efficiency.



Step 3: How much would the TTF price change?

- Gas prices had to increase from 20 to 200 €/MWh to reduce European industrial gas demand by 210 TWh annually. (see figure)
- That's just below 1 €/MWh for each TWh.
- If that relationship remains the same, the increase in gas consumption by 110 TWh would hence drive up the TTF price by about 100 €/MWh.
- The price increase in other regions would be much smaller, since those can import additional LNG volumes at world market prices.

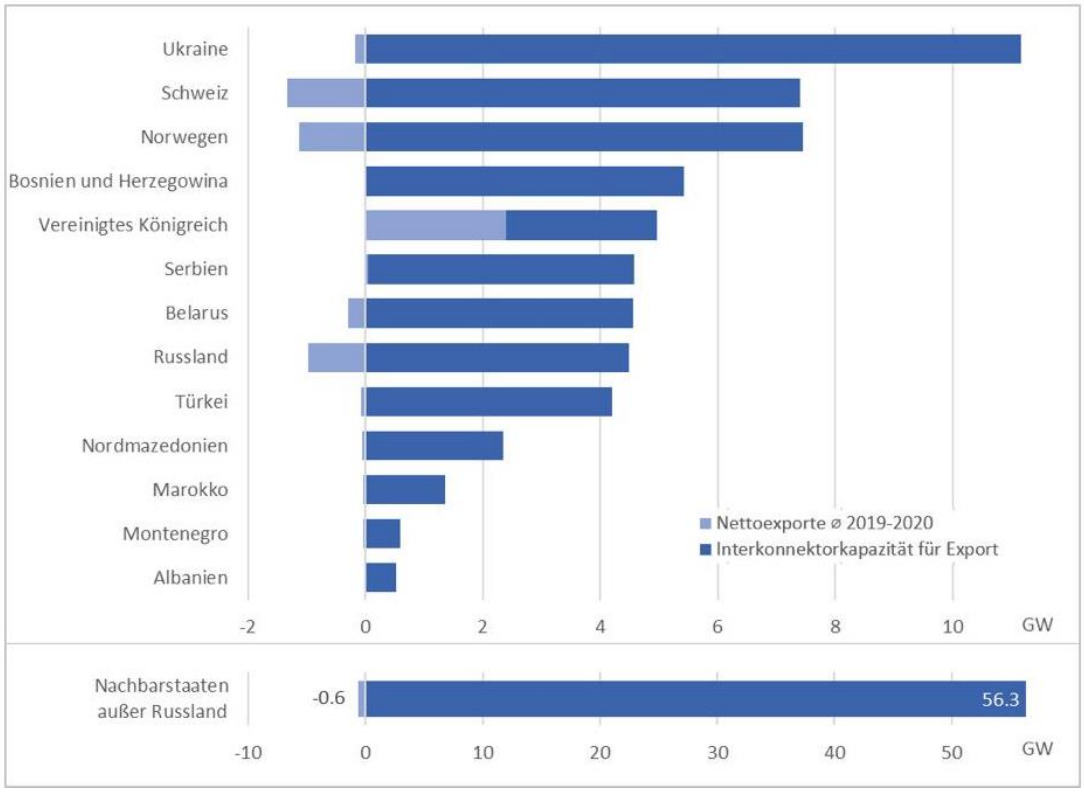


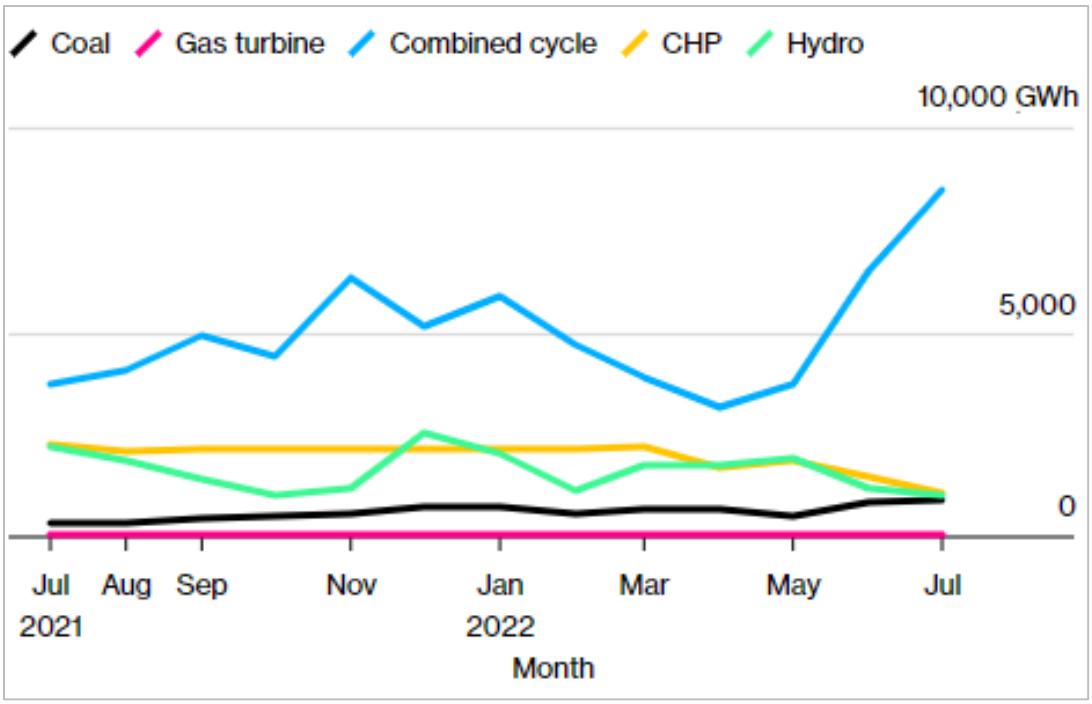
Limitations

This is an extremely rough estimation with important limitations. But the uncertainty goes both ways: the effect could be smaller, but it could also be larger. And even if the price effect would be only half the above estimate, adverse consequences would be dramatic.

This is what we see as the three most important limitations:

- Smaller effect: A massive draught has decreased Iberian hydropower yield. This drives gas-fired power generation.
- Larger effect: Depressing the European wholesale electricity price will inflate exports out of the EU. The size of this effect is hard to estimate. Total interconnector capacity is just above 56 GW (see figure below). If those would be fully used, an additional 500 TWh (!) of electricity would be exported. If power exports from TTF countries is just 10% of this figure, we would see another 50 €/MWh jump in the TTF price
- Larger effect: We don't account for the substitution within gas-fired plants from cogeneration to condensing combined cycle (second chart). This could potentially inflate gas consumption, because cogeneration is more fuel-efficient. Both The Netherlands and Germany have huge cogeneration fleets.




Coal
Gas turbine
Combined cycle
CHP
Hydro
10,000 GWh
5,000
0
Jul
2021
Aug
Sep
Nov
Jan
2022
Mar
May
Jul
Month