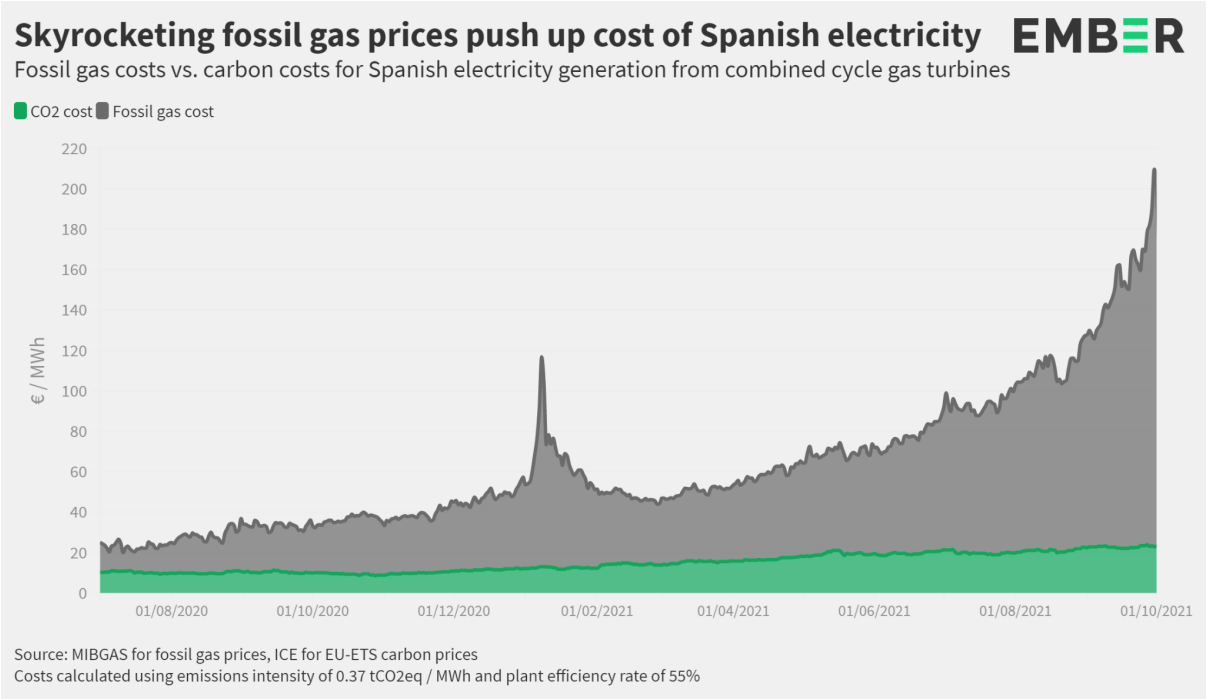
Soaring fossil gas costs drive up Spanish electricity prices

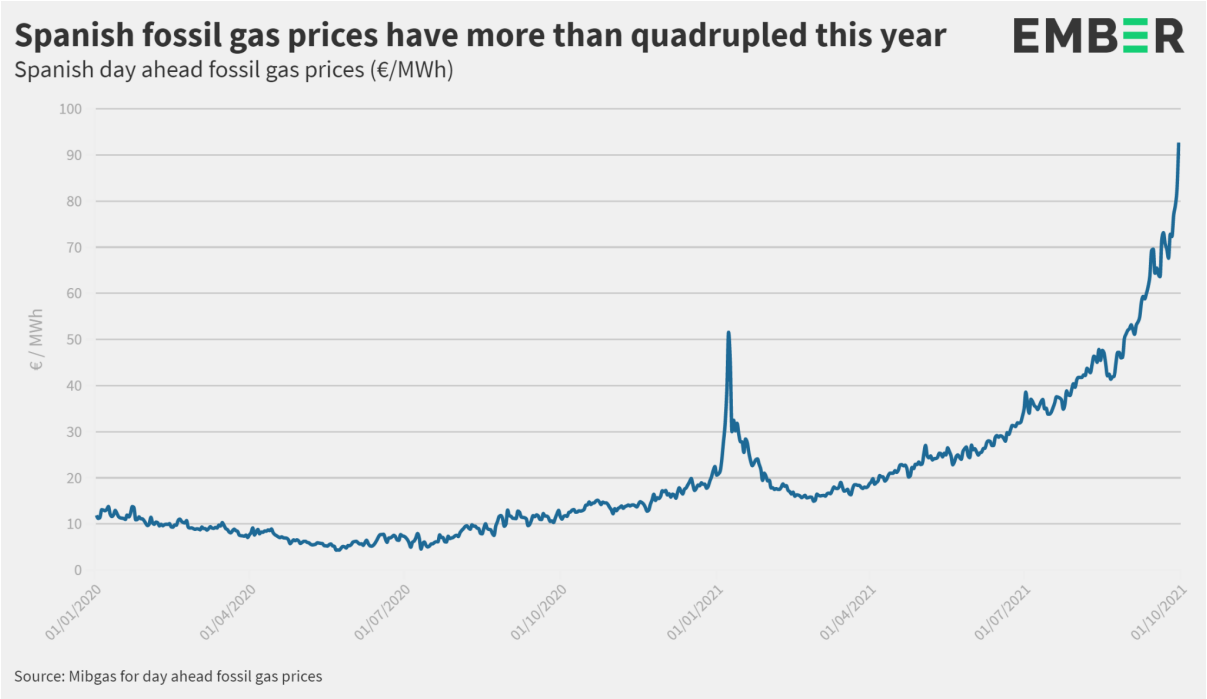
Key findings

- Spanish wholesale electricity prices have quadrupled in the last twelve months, with most of the increase caused by soaring fossil gas prices
- Fossil gas prices have skyrocketed by over 340% since January due to global supply and demand factors
- Accelerating domestic wind and solar deployment will insulate Spain from future imported fossil gas price volatility



Soaring fossil gas costs

Spanish fossil gas prices have skyrocketed since the start of 2021, with the day ahead price more than quadrupling from €21/MWh on 1 January to €93/MWh on 30 September (+€72/MWh / 343%). The highest recorded day ahead settlement price was on 5 October at €113.77/MWh

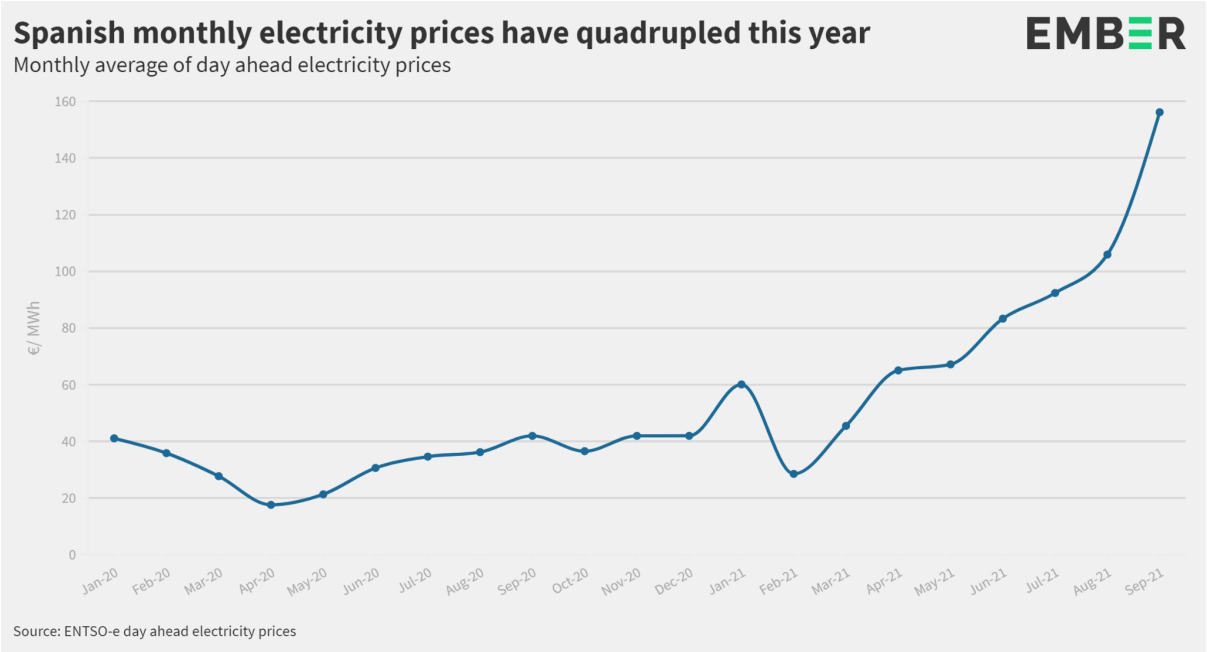


The soaring prices are due to a combination of factors: a cold northern hemisphere winter depleted fossil gas storage levels; increased demand and prices in Asia and Latin America resulted in liquefied natural gas (LNG) shipments being delivered there rather than to Europe; global demand has risen as Covid-19 restrictions have been lifted; fossil gas imports from Russia have not stepped up to meet the increase in European demand. This highlights the risks associated with continued dependence on volatile imported fossil gas that is highly susceptible to geopolitics and global events.

Fossil gas pushes up Spanish electricity prices

This extreme fossil gas price volatility has significantly contributed to the electricity price hike. The Spanish day ahead electricity price jumped from €42/MWh to €190/MWh (+€148/MWh / 350%) between 1 January and 30 September 2021.

The average monthly Spanish wholesale electricity prices quadrupled (+272%) from September 2020 to September 2021 - increasing by €114/MWh from €42/MWh to €156/MWh. From August to September alone the monthly average price soared by €50/MWh (+50%).

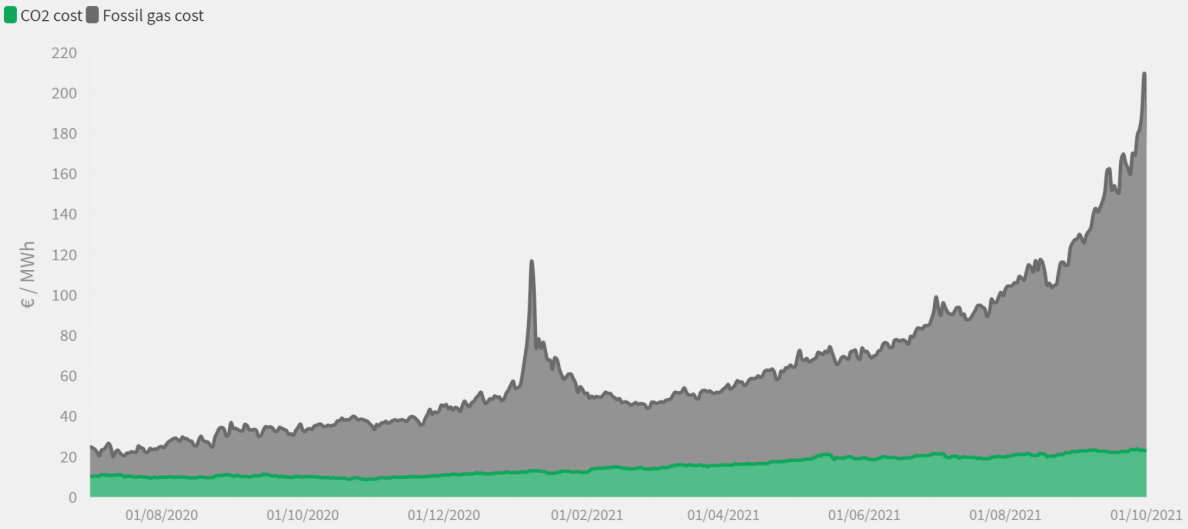


The cost of generating electricity from fossil gas, including the associated carbon allowance costs, has increased fivefold to €154/MWh (September 2021) from €33/MWh (September 2020).[1] And while the price of carbon allowances has also risen over the same period from €28/tonne to €61/tonne, its contribution to the increased cost of electricity generation is minimal when compared to the fossil gas price.[2] Analysing the fossil gas cost component alone, it has surged by a huge €109/MWh (from €23/MWh to €132/MWh) in twelve months.

[1] Fossil gas and CO2 cost calculations based on a carbon intensity factor of 0.37 tCO2eq / MWh electricity and a fossil gas plant efficiency rate of 55% (Lower Heat Value). They do not include operating and maintenance costs.
[2] This equates to a carbon cost increase of €12/MWh for a fossil gas plant with carbon intensity factor of 0.37 tCO2eq / MWh.

Skyrocketing fossil gas prices push up cost of Spanish electricity

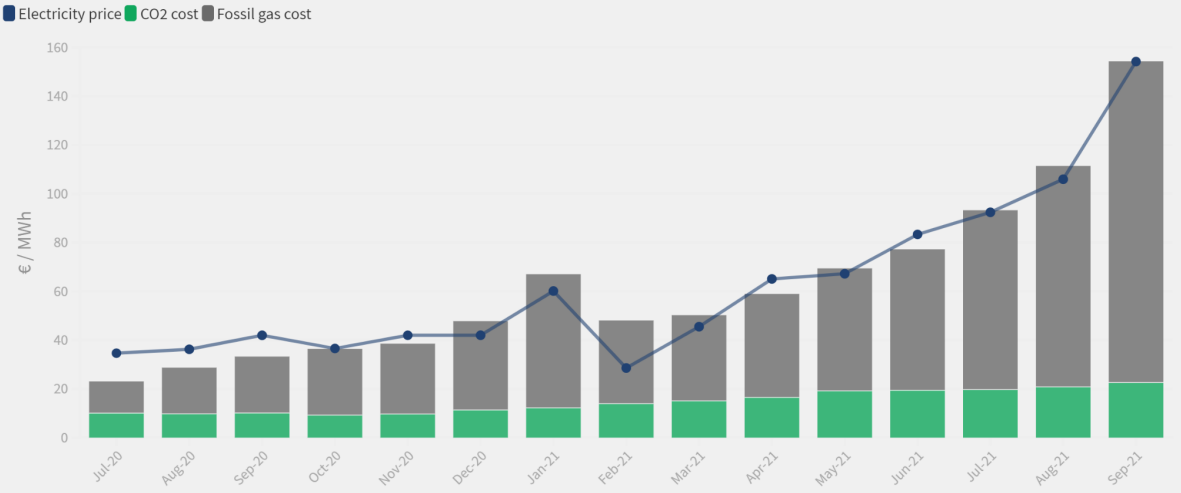
Fossil gas costs vs. carbon costs for Spanish electricity generation from combined cycle gas turbines



Source: MIBGAS for fossil gas prices, ICE for EU-ETS carbon prices
Costs calculated using emissions intensity of 0.37 tCO2eq / MWh and plant efficiency rate of 55%

Soaring fossil gas generation costs push up Spanish electricity prices

Electricity prices with fossil gas and carbon costs for electricity generation

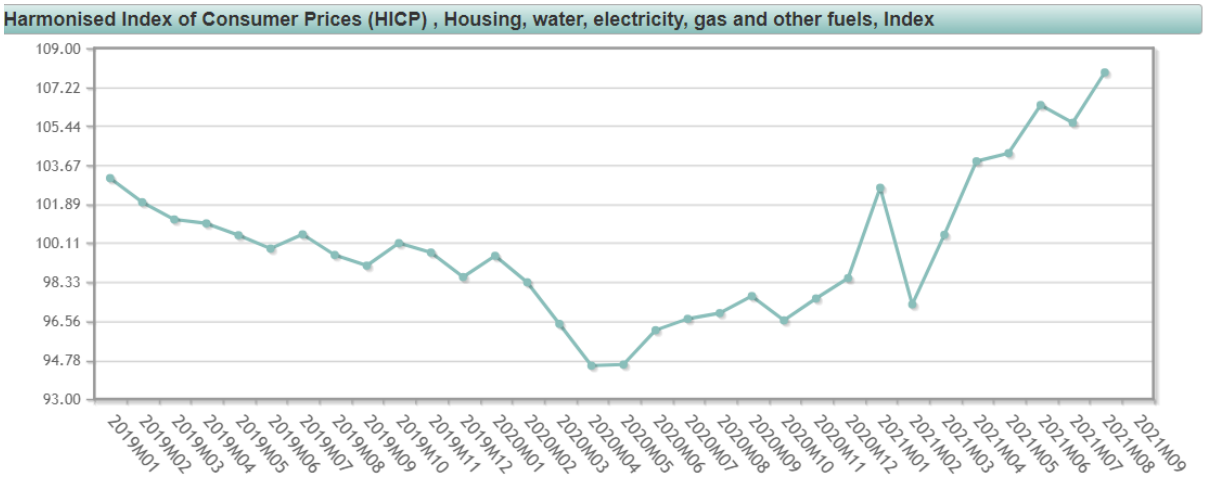


Source: MIBGAS for fossil gas prices, ICE for EU-ETS carbon prices, ENTSO-e for electricity prices
Costs calculated using emissions intensity of 0.37 tCO2eq / MWh and plant efficiency rate of 55%

Electricity and gas prices impact inflation rates

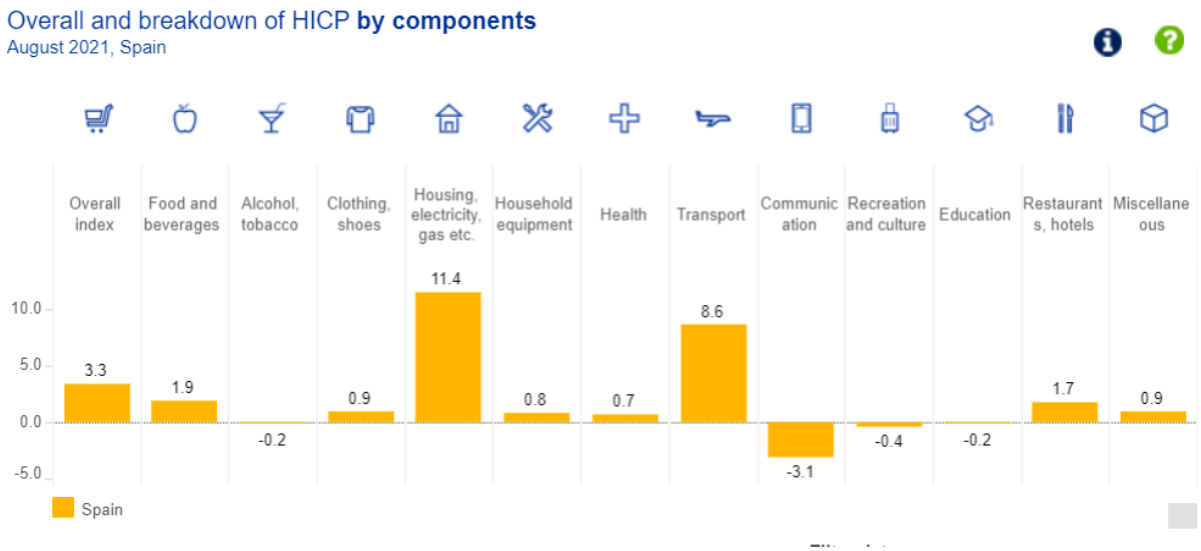
A paper released by the Bank of Spain in August assessing the impact of the higher gas, power and emissions prices stated that the electricity price was responsible for 30% of Spain's inflation rate increase over the first six months of 2021.[3] Spain's annual inflation rate has continued to rise reaching 4% in September, a thirteen-year high. This has predominantly been attributed to the continued surge in energy prices.

Spain's Harmonised Consumer Price Index (HCIP) for Housing, water, electricity, gas and other fuels reached a record high of 107.91 in August, an increase of 2.2% month-on-month (July = 105.61) and 11.4% year-on-year (August 2020 = 96.91).[4]

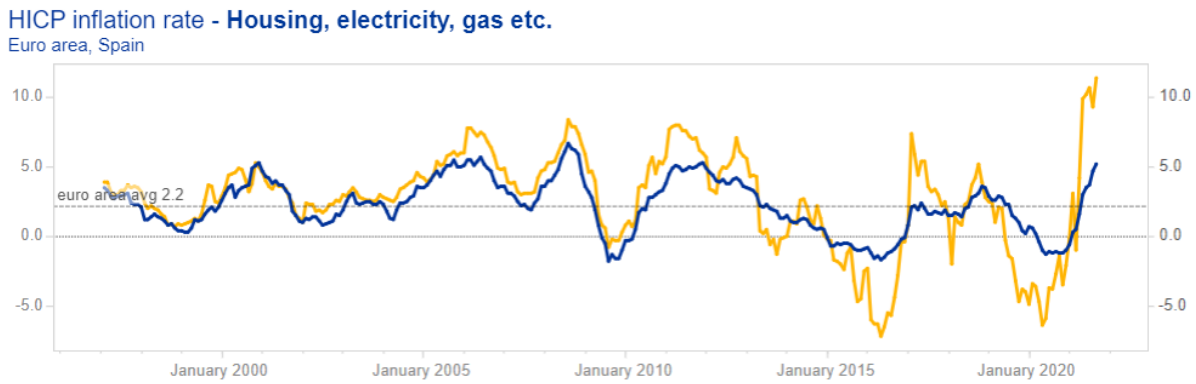


[3] El papel del coste de los derechos de emisión de CO2 y del encarecimiento del gas en la evolución reciente de los precios minoristas de la electricidad en España - Banco de España, Agosto 2021
[4] HICP data from EUROSTAT

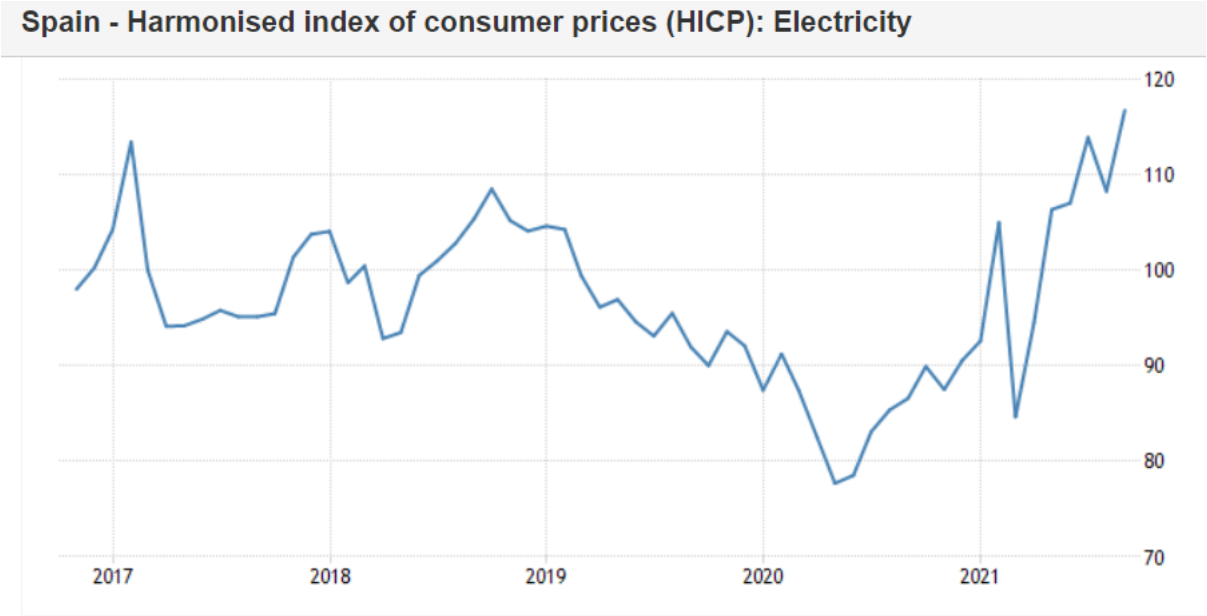
Housing, water, electricity, gas and other fuels is the component that has seen the greatest annual increase - just ahead of transport at 8.6%.



And it is more than double the Euro area average.



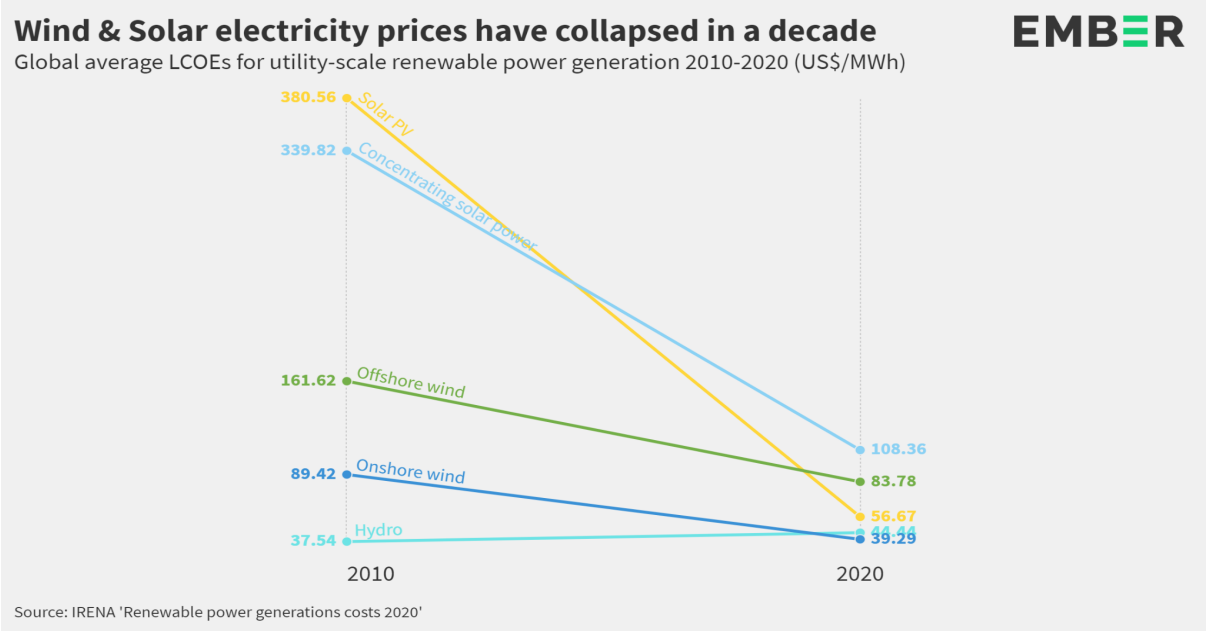
According to EUROSTAT, Spain's HICP just for electricity also hit a high in August 2021 at 116.77.



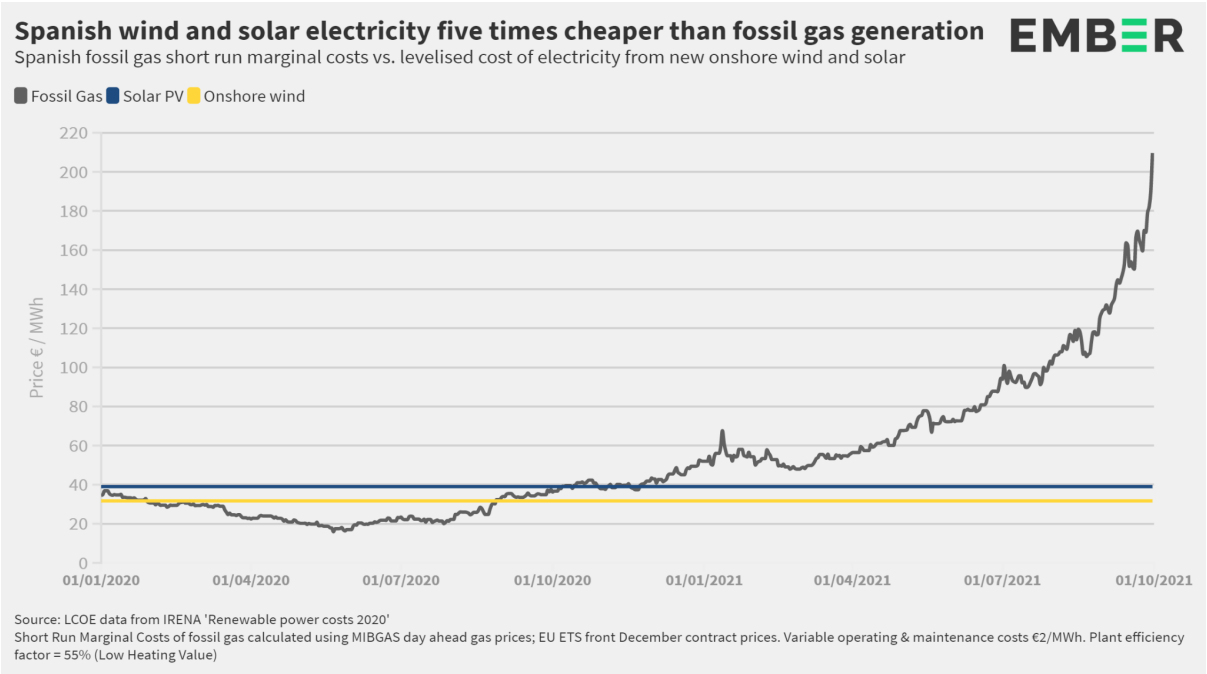
The surge in fossil gas prices is having a knock-on effect across the economy, for both retail and industrial consumers.

Renewables are key to lower electricity prices

The way to avoid the volatility of fossil gas is to accelerate the transition to clean electricity, in particular wind and solar, so that the power price is set by gas for fewer hours. Wind and solar are not exposed to variable fuel prices and the cost of generating electricity from these sources has collapsed in recent years.



Due to the fall in the levelised costs of electricity (LCOE) from renewables, the cost of generating electricity from existing fossil gas plants is currently five times as expensive as that from new onshore wind and solar.

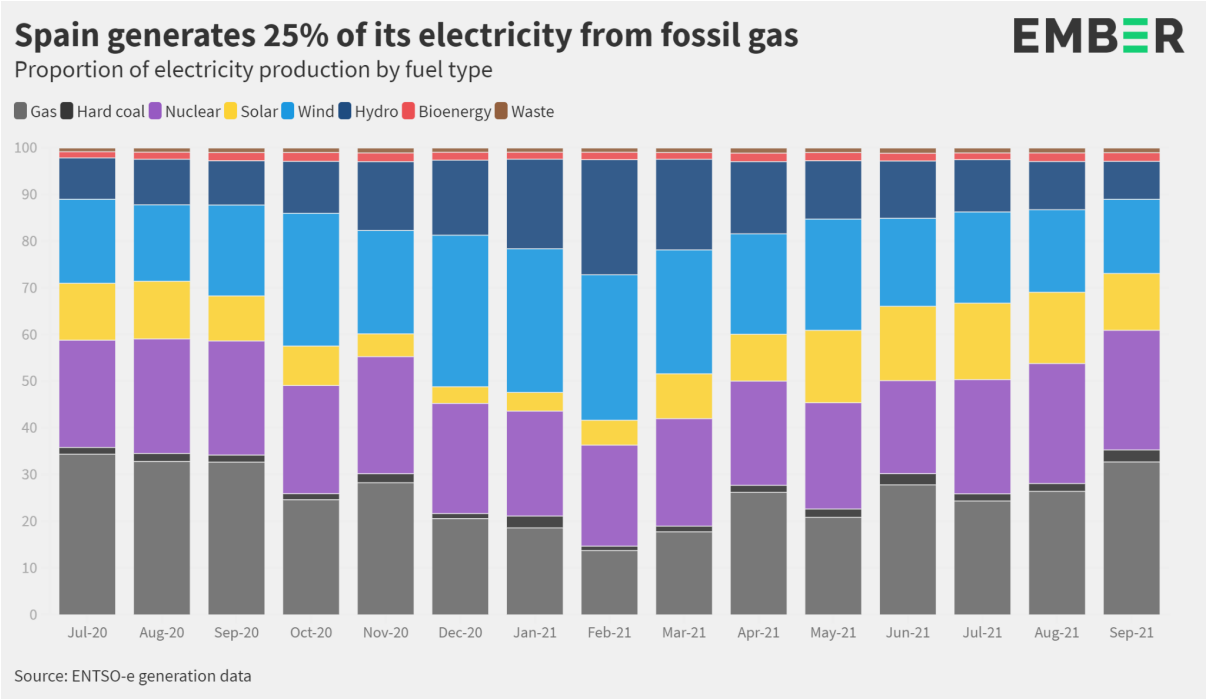


Technological advances mean that variable renewables are rapidly becoming much more reliable energy sources. And a new report by the Centre for Research on Energy and Clean Air (CREA) reveals that wind and solar accounted for 31% of peak Spanish electricity from July to September - so they have not been 'unreliable'. Fossil gas generated ~28% of peak electricity, nuclear 25% and hydro only ~10% The report estimates that zero-carbon power generation resulted in Spain avoiding €3.5 billion in gas costs over the last three months.[5] €1.6 billion of this cost saving was due to wind and solar and €1.3 billion due to nuclear generation.

Wider wind and solar deployment will lead to greater diversity of supply and ownership, reducing the risks of market manipulation. Domestic wind and solar also provide local employment and just transition opportunities, which imported fossil gas does not.

Spain's energy transition is underway

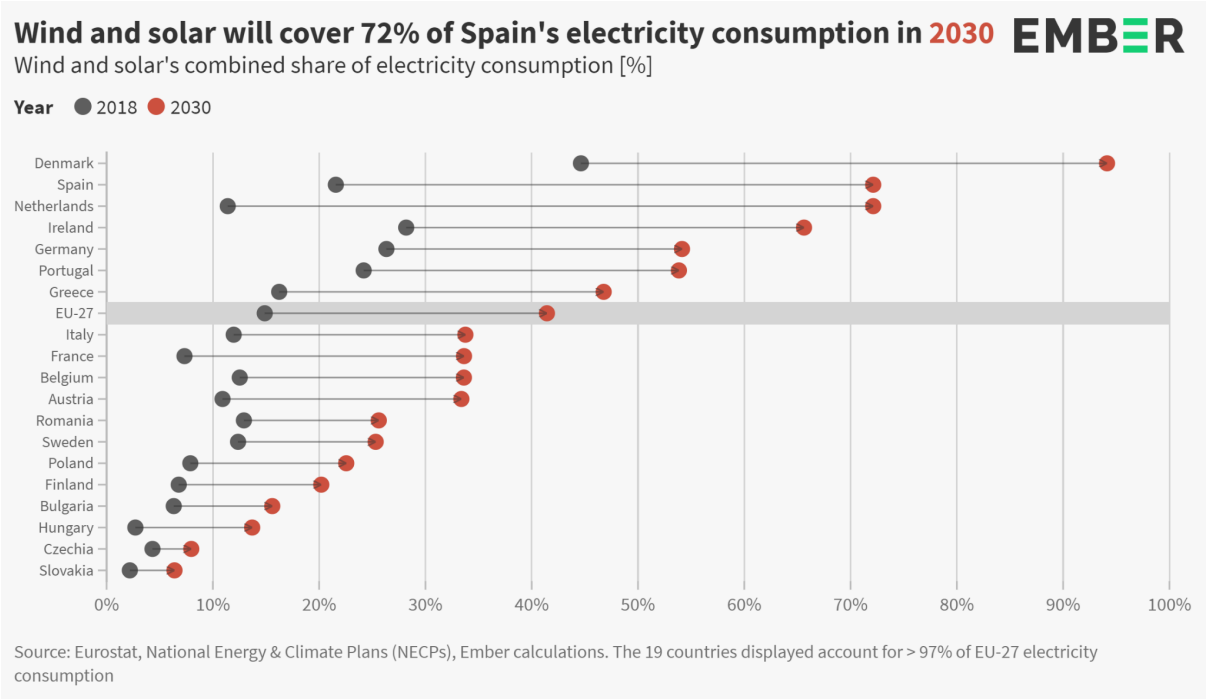
Fossil gas currently accounts for 25% of Spain's electricity production. Nuclear and wind generation are also around 25% and hydro makes up approximately 15% of the electricity mix and solar ~10%. In September, gas generation was 32% of total electricity production.



According to its National Energy and Climate Plan (NECP), Spain plans to have an impressive 86% of its electricity consumption provided by renewable energy sources by 2030. This places it third in the EU behind Denmark and Austria and is an increase of 51

[5] Zero-carbon power is defined as hydro, nuclear, solar, wind and other renewables

percentage points from 2018 levels. The plan also stipulates that 72% of this electricity demand will be covered by wind and solar. Only Denmark has a higher target with 94%.



However, unlike many other countries, the NECP does not include specific targets for offshore wind. This is most likely due to the extreme depths of the Spanish waters available for offshore wind development. One feasible solution to this problem is floating offshore wind. A report on Spanish offshore wind published in July estimates that for each additional MWh of floating offshore wind energy integrated into the Iberian electricity system, there would be a market cost reduction of €45. The report concludes that these potential savings should serve as a reference for regulators to adjust their policy framework and boost investment in floating wind offshore generation.

Spain still intends to produce 14% (47 TWh) of its electricity from fossil gas in 2030. However, with the projected additional wind and solar capacity, this should only be required for a minimal number of peak hours electricity generation. And by 2030 the power plants will, hopefully, be fuelled by green hydrogen with no exposure to imported fossil gas price shocks.

Spain needs to accelerate its transition from fossil fuels by increasing investment in domestic wind and solar deployment, energy efficiency, system flexibility, renewable energy storage and green hydrogen solutions.

With winter approaching and supply issues remaining, the volatility of fossil gas prices looks set to continue. The need to switch from imported fossil gas to domestic renewable generation has never been more apparent or urgent.

About Ember

Ember is an energy think tank that is focused on accelerating the global transition to fossil-free electricity. www.ember-climate.org