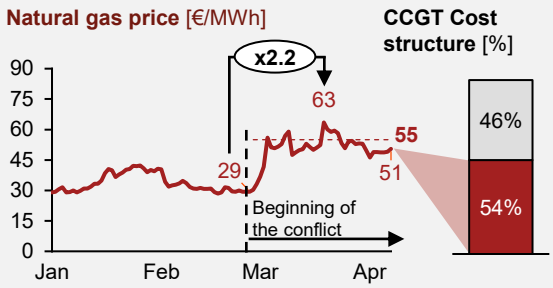
Nuclear energy, a key pillar of the power system during geopolitical conflicts

The conflict in the Middle East has once again put pressure on natural gas and fossil fuel markets, driving up electricity prices. Nuclear energy provides relief to the system and protects consumers from a further increase in their electricity bills

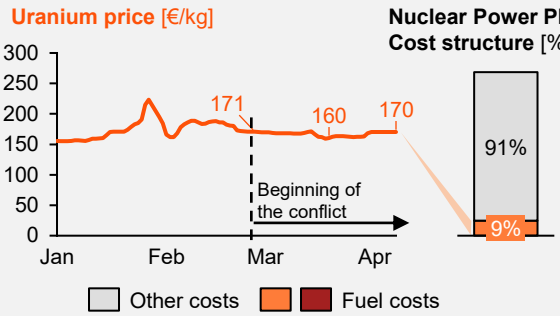
Impact of the conflict in the Middle East on commodity prices

- On February 27, **conflict erupted in the Middle East**, involving the US, Israel and Iran, which had an immediate effect on fossil fuel prices.
- The **price of natural gas nearly doubled**, which in turn **drove up electricity prices** as the variable **costs of combined-cycle plants increased.**
- The **stability of uranium prices** allows nuclear plants to cushion this volatility compared with gas imports

Natural gas prices have surged following the conflict in the Middle East, while nuclear fuel prices have remained stable in the face of this type of geopolitical tension

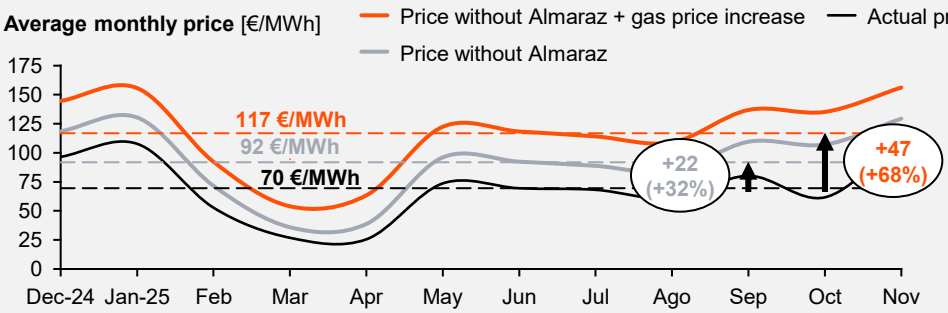


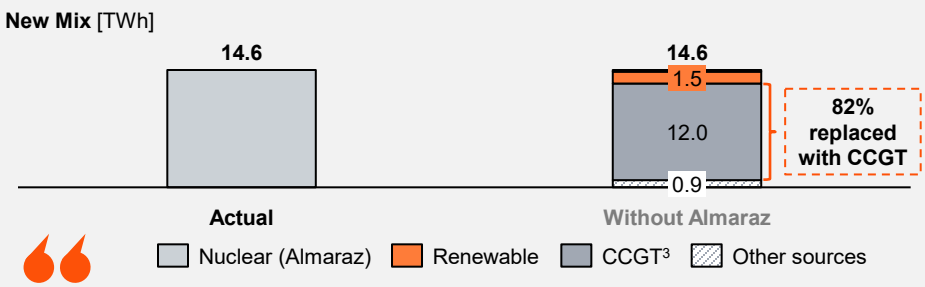
Natural gas prices have risen again amid the conflict involving Iran. In addition, **gas accounts for 54% of a CCGT's total cost**, passing this volatility through to electricity market prices.



By contrast, **nuclear fuel prices have remained stable**, even in conflicts such as the one involving Iran. In addition, nuclear fuel **accounts for less than 10% of a nuclear power plant's total costs.**

Impact on the day-ahead market. Gas price increase scenario[1]. 2025[2]





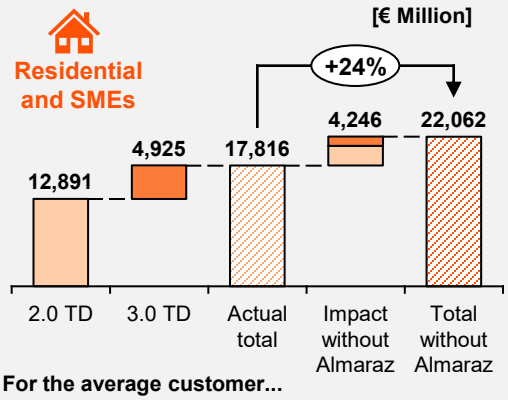
- In a higher gas price scenario (~€50/MWh, comparable to current conditions), assuming Almaraz had been shut down in 2025 would have **increased the day-ahead market price by €47/MWh.**
- This impact is explained by the fact that nuclear generation (which is emissions-free) would be replaced mainly by combined-cycle plants.
- **CCGT generation would have increased by up to 12 TWh,** with a corresponding rise in emissions of up to **4.9 $MtCO_2$** (~€364 million in emission allowance costs).
- In the future, the ability of renewables to cover the demand currently met by nuclear will increase as storage develops.

In a high gas price environment such as the current one, without Almaraz in 2025 **the day-ahead electricity market price would have increased by €47/MWh**, while emissions would also have risen by up to 4.9 $MtCO_2$

Sources: REE, OMIE, MIBGAS, Trading Economics (uranium) and PwC Analysis. Notes: [1]Increase in the offer price of the marginal technology by €30/MWh (similar to an increase in the average gas price from €35/MWh to €50/MWh). [2]December 2024 to November 2025. [3]The new hydropower bids would ultimately translate into combined-cycle generation, since hydropower resources would not be sufficient to cover that volume of energy over the year as a whole.

Savings on electricity bills thanks to Almaraz[1]. Gas price increase scenario. 2025[2]

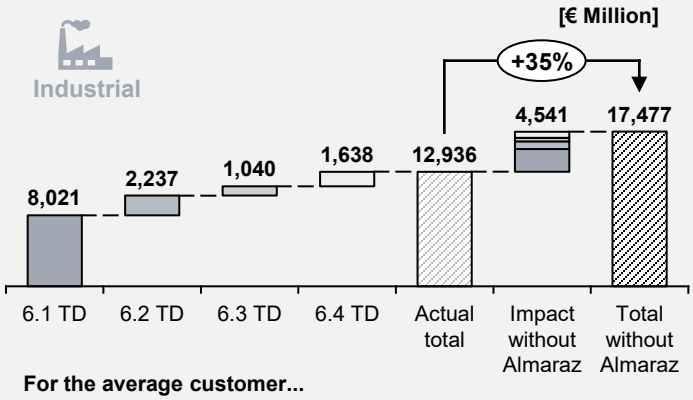
In this higher gas price scenario, the closure of Almaraz would have a significant impact on consumers' bills as a result of the increase in day-ahead market prices[3]...



For the average customer...

Domestic	**+ 144 €** per year
SMEs	**+ €1,656** per year

+€4,246 million per year in total for residential consumers and SMEs



For the average customer...

Industrial	**+ €38,922 per year**

+€4,541 million per year in total for industrial consumers

In this scenario, in 2025 the electricity bill would have increased by **24% for the residential sector and SMEs and by 35% for industry**, with an impact of almost **€8.800 million per year which**, for a residential consumer, would translate into an increase of around **€144 per year in their bill**

Future impact of nuclear closure. Gas price increase scenario. 2035

In the future, the closure of the nuclear fleet will make the system more vulnerable to gas price fluctuations. Even if the PNIEC targets are met, **not having nuclear power will mean greater exposure to future geopolitical conflicts and crises**, with an impact on consumers...

Natural gas	30 €/MWh	**55 €/MWh**	80 €/MWh
CO_2	100 €/tCO_2	**100 €/tCO_2**	120 €/tCO_2
Impact on the day-ahead market price (2035)	+13 €/MWh	**+22 €/MWh**	+30 €/MWh

Without nuclear power, the system will be more vulnerable to gas price volatility, with the market price increasing by €22/MWh in 2035 in a scenario where gas prices remain at current levels as a result of the conflict in the Middle East

Conclusions

- Natural gas prices have surged following the conflict in the Middle East, while nuclear fuel prices have remained stable in the face of this type of geopolitical tension.
- In a high gas price environment such as the current one, without Almaraz in 2025 **the day-ahead electricity market price would have increased by €47/MWh**, while emissions would also have risen by up to 4.9 MtCO_2.
- In this scenario, in 2025 the electricity bill would have increased by **24% for the residential sector and SMEs and by 35% for industry**, with an impact of almost **€8.800 million per year which, for a residential consumer**, would translate into an increase of around **€144 per year in their bill.**
- **Without nuclear power, the system will be more vulnerable to gas price volatility**, with the market price increasing by €22/MWh in 2035 in a scenario where gas prices remain at current levels as a result of the conflict in the Middle East.

Sources: CNMC and PwC Analysis. Notes: [1]Excludes taxes and supplier margin. [2]December 2024 to November 2025. [3]Impact calculated on the basis of a €47/MWh increase in the day-ahead market price and an €8/MWh reduction in technical constraint costs, due to combined-cycle generation that would no longer need to be dispatched through technical constraints, as it would already be matched in the day-ahead market.