

Understanding the gas market

To optimise your
energy purchases



The logo for ENGIE, featuring a blue curved line above the word "ENGIE" in a blue, lowercase, sans-serif font.

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Introduction

The very least one can say is that **the energy markets have undergone major upheavals** in recent years.

With the need to reduce CO₂ emissions, gas will play a certain role in **the energy transition**. As a relatively flexible energy source, it can not only help solve the intermittency problem of renewable energies, but also constitute an appealing alternative to coal for electricity production.

Another factor influencing the markets is **geopolitical tensions**. The Covid-19 pandemic and the war in Ukraine, for example, have had significant effects on gas prices in Europe, forcing member states to quickly find alternative sources of supply to Russia.

In this e-book, we will focus on **decrypting and explaining the mechanics and factors influencing prices and market volatility**. Our aim is to help you, as a business owner or buyer, to get on top of this volatility and get the best out of it.





The different gas markets

Following the liberalisation of the energy markets in the early 2000s, strict separation was established between the management of gas infrastructures (transport, storage, distribution, etc.) and the supply of gas itself.

Although the Dutch market is now the most active and serves as a benchmark, each European country has its own place in the market. This is where sellers (producers and importers) and buyers - gas suppliers such as ENGIE or large industrial consumers - come together.

The role of these wholesale markets is to:

- **give a price signal** that reflects the balance between supply and demand;
- **provide reliable and transparent information** to guide future investments;
- **make gas exchanges between countries more fluid and secure**, by offering suppliers the possibility of managing their imbalances on a day-to-day basis.

In Europe, natural gas and electricity were historically traded OTC (Over The Counter) through bilateral agreements, generally with adaptable conditions (volume profile, delivery points, etc.), but not without credit risk.

Large trading platforms (e.g. ICE) have rapidly emerged with standard products (flat profile, hub delivery), transparent price reporting and solutions to cover counterparty risk through collateral and margin calls.

As with electricity, there are different types of gas markets

Forward market

As the name suggests, the forward market **allows you to buy gas for deferred delivery**. The price is then negotiated on the date of the contract and determined on the forward market. This is a win-win situation for both the consumer and the distributor: the purchase price is clearly defined and the supplier knows the precise quantity of gas to be supplied.

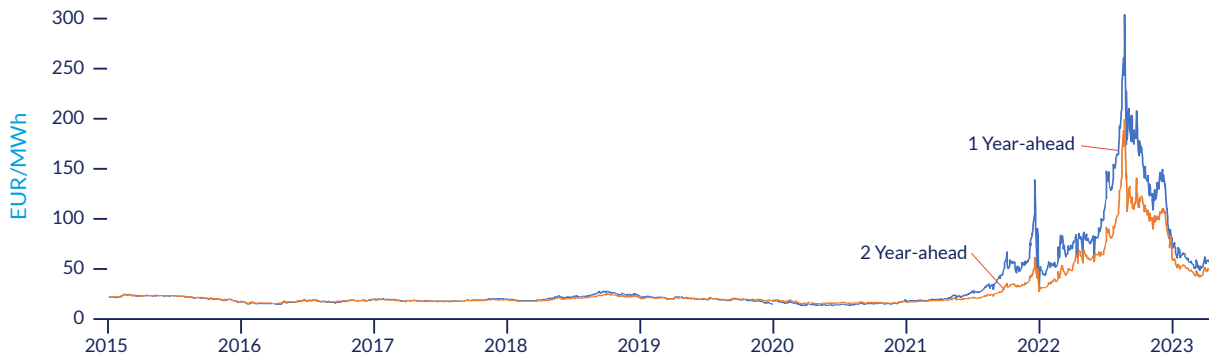
The European gas price index, which is used as a reference on the stock markets, is called the “**TTF ICE Endex**”. It shows the price that different players are willing to pay to buy or sell gas on a specific delivery date.

Short-term: spot

It is also possible to buy gas on the spot market - **the short-term market - also known as the “day-ahead market”**. It is then delivered on the same day or the next day.

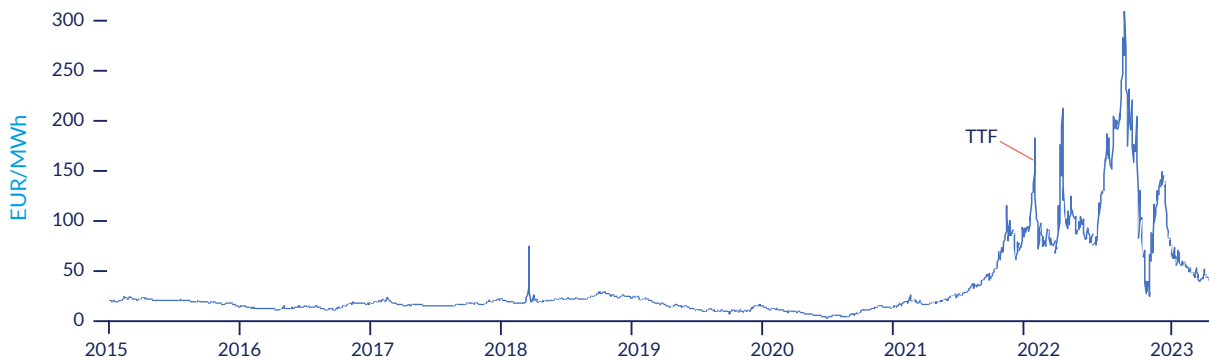
Prices are set in the same way as on the forward market, the only difference being the very short time between purchase and delivery of the gas.

EVOLUTION OF THE GAS PRICE IN EUROPE, 2015 TO 2023 - TFT FORWARD MARKET CAL+1 AND CAL+2



SOURCE : ENGIE-ENERGYSCAN

EVOLUTION OF THE GAS PRICE IN EUROPE, 2015 TO 2023 - SPOT TTF MARKET (Day-ahead)



SOURCE : ENGIE-ENERGYSCAN

Gas supply and demand

Where does gas in Europe come from?

Production in Europe

Only one third of the natural gas consumed in Europe is produced on the continent:

- in the United Kingdom or in the Netherlands, although this production has decreased;
- in Norway, which remains a reliable and stable producer.

Production outside Europe

Two thirds of the gas we consume in Europe comes from imports. This is far from negligible when you consider that the gas market, unlike the electricity market, is global. International factors, such as geopolitical tensions, rising gas demand in China or falling production in the United States, for example, can therefore have a direct influence on market prices in Europe.



LNG site on the island of Hammerfest, the world's most northerly town, in Troms and Finnmark County, Norway

Transport by pipeline

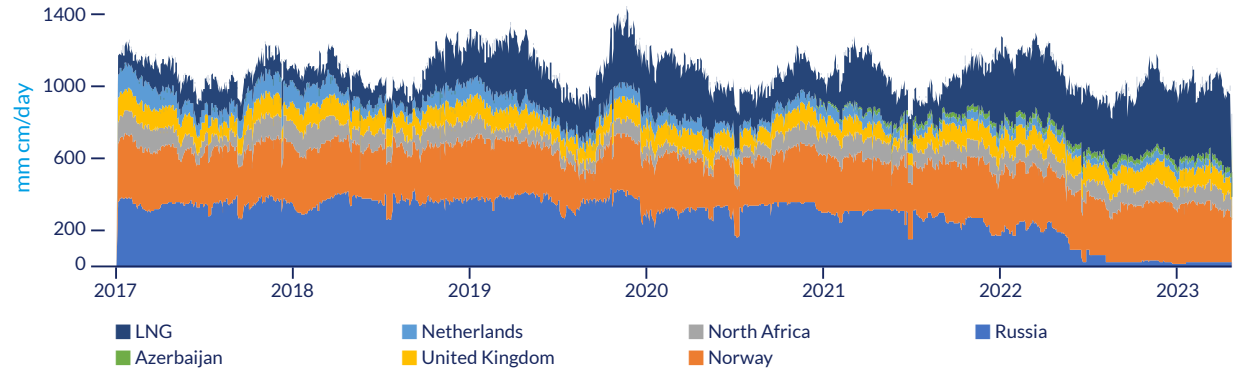
Gas, in gaseous form, is extracted from production sites in Norway and North Africa and then sent directly into the system. It flows through pipelines at 90 bar to supply the countries of Europe.

LNG

Liquefied natural gas (LNG) is the condensation of natural gas into a liquid state, which allows it to be transported by sea. In 2022 LNG, mainly from the United States, Qatar and Russia, represented 36 % of the total European gas supply.

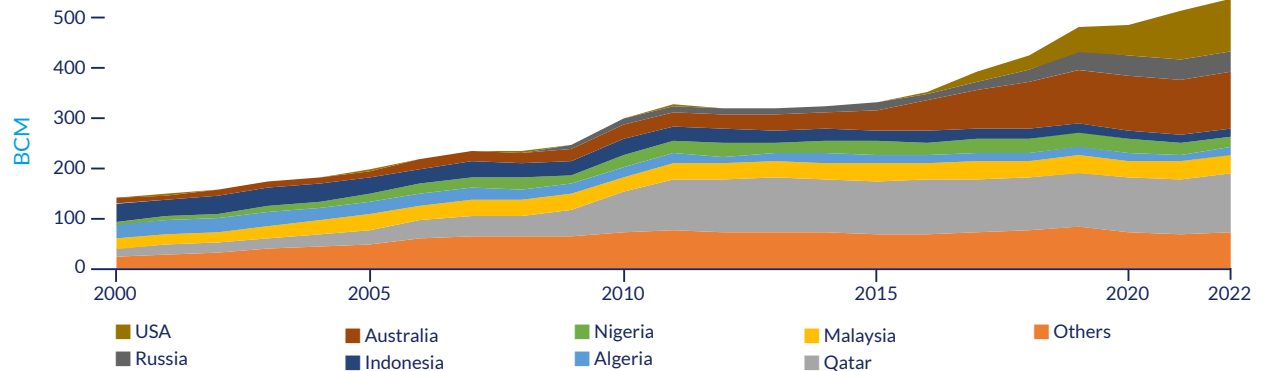
Thanks to the development of LNG transported by ship, Europe has access to more gas production and can now **diversify its sources of supply**.

NATURAL GAS SUPPLY EVOLUTION FROM 2017 TO 2023



SOURCE : ENGIE-ENERGYSCAN

ANNUAL LNG EXPORTS BY COUNTRY



SOURCE : ENGIE-ENERGYSCAN

Storage

Unlike electricity, natural gas can be stored in large volumes. This makes it an ideal source of energy for dealing with peak consumption in winter.

The tanks are filled in the summer, when demand - and therefore prices - are normally at their lowest. The stored gas is then fed back into the grid for the heating period.



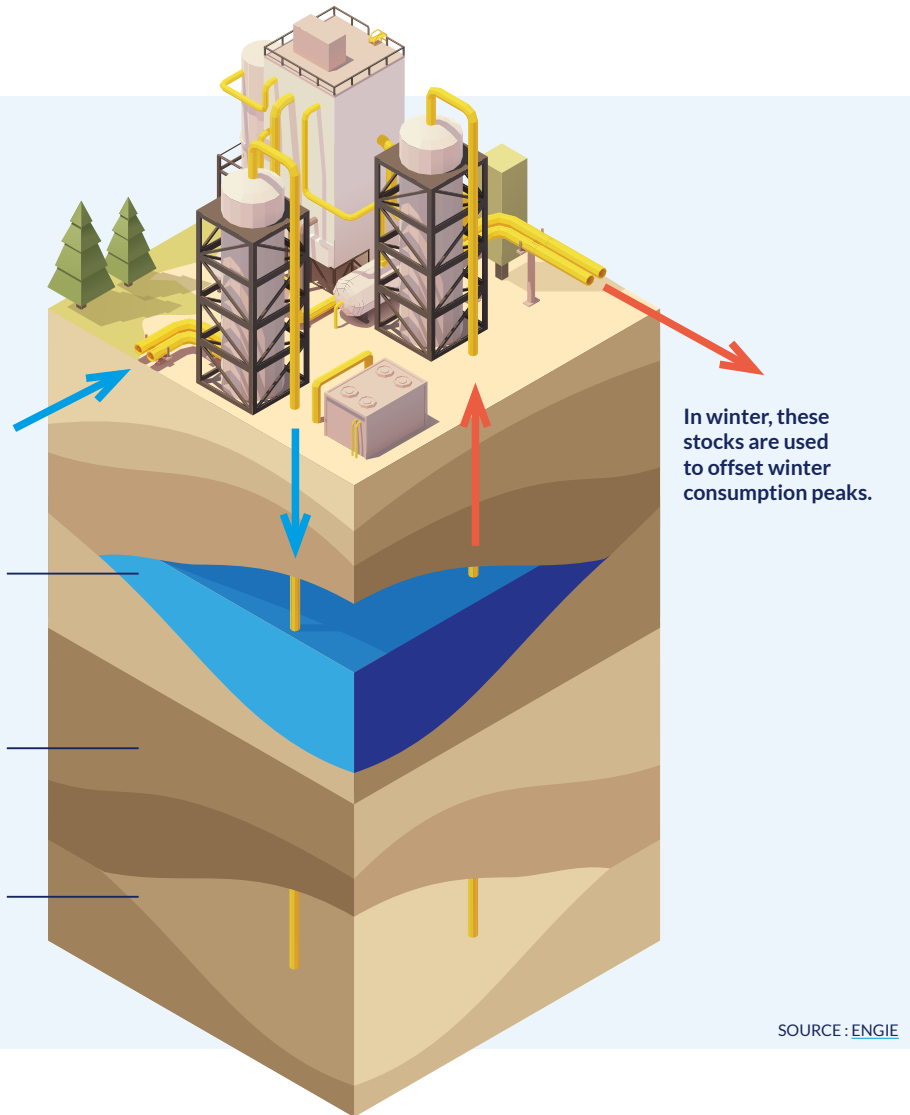
UNDERGROUND STORAGE

In summer, prices are generally lower, and gas is stored by compression in the ground.

It is then stored in
aquifers
(porous rock filled
with water)

salt caves
(layers of salt)

depleted deposits
(unused old gas
deposits)



Who are the gas consumers?

A. Households and businesses

For heating and domestic consumption.

B. Electricity producers

For power plant supply.

Natural gas, in combination with other energy sources, is used to power the power plant's turbine, which in turn drives an alternator **to produce electricity**. With the development of new generation power plants, the proportion of electricity produced using this method has greatly increased.

There are two reasons for this:

- natural gas emits half as much CO₂ as coal;
- it guarantees stability of the electricity network in the event of consumption peaks or renewable energy insufficiencies.

As a major player in the energy transition, ENGIE has chosen to gradually replace its conventional power plants, which are largely coal-fired, with combined-cycle gas plants and cogeneration units.

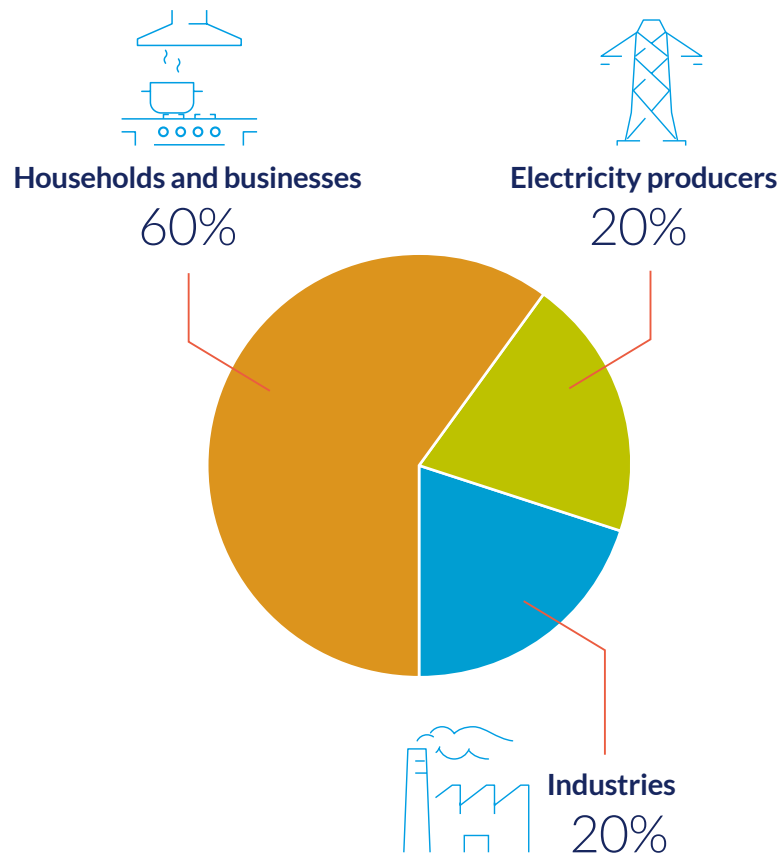
C. Manufacturers

Depending on the sector of activity, natural gas is used for different purposes:

- for heating or combustion, in the food industry for example;
- as a raw material in the chemical and petrochemical industries.

As manufacturers only have a few alternative production technologies, they are particularly vulnerable to the volatility of market prices.

DIVISION OF GAS DEMAND IN 2022



SOURCE: ENGIE-ENERGYSCAN

What determines the market price?

Factors influencing the demand for gas

1. Renewable generation

As solar or wind generation decreases, the demand for gas to produce electricity increases. Find out more on page 11: The Merit order.

2. The price of raw materials used to produce electricity

The lower the price of coal relative to gas, the more it will be used in preference.

3. Climate and the weather

The lower the temperature, the higher the need for heating.

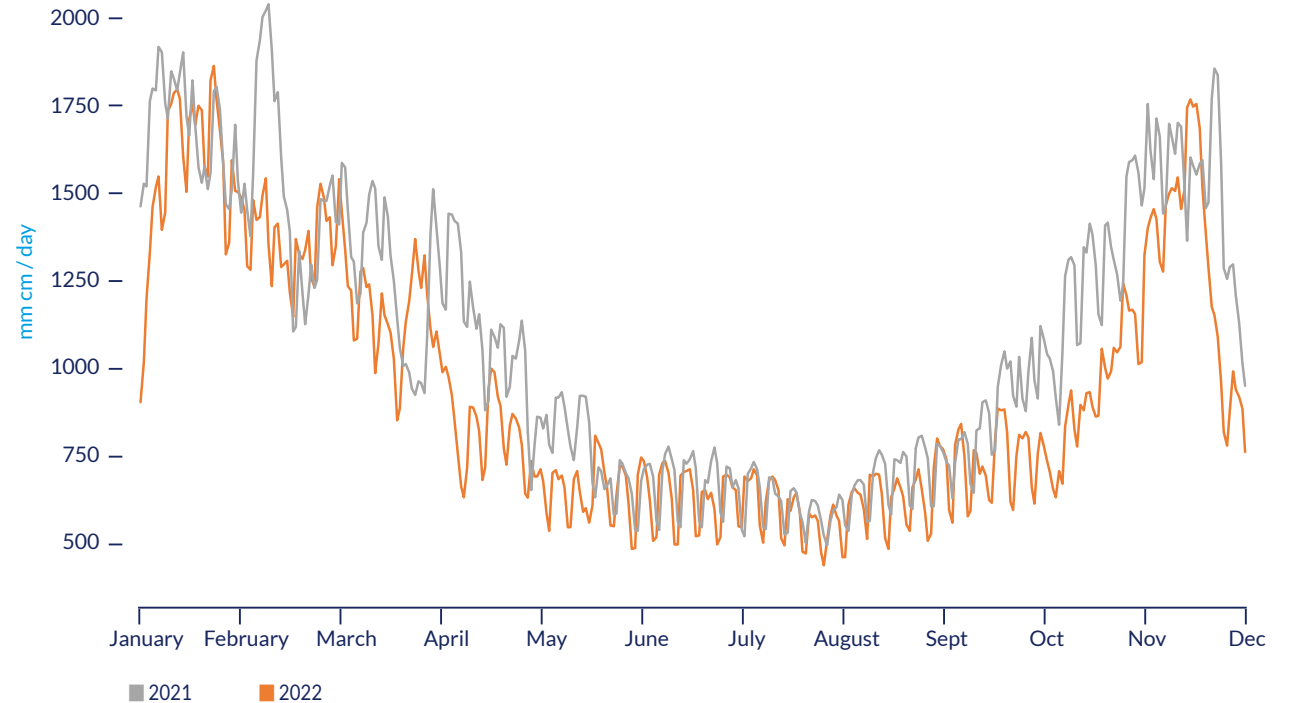
4. Demand for electricity

As the two markets are closely linked, an increase in demand for electricity automatically leads to an increase in demand for gas.

5. The price of gas

The higher the price of gas, the lower the demand.

EVOLUTION OF NATURAL GAS DEMAND IN EUROPE IN 2021 AND 2022



SOURCE : ENGIE-ENERGYSCAN

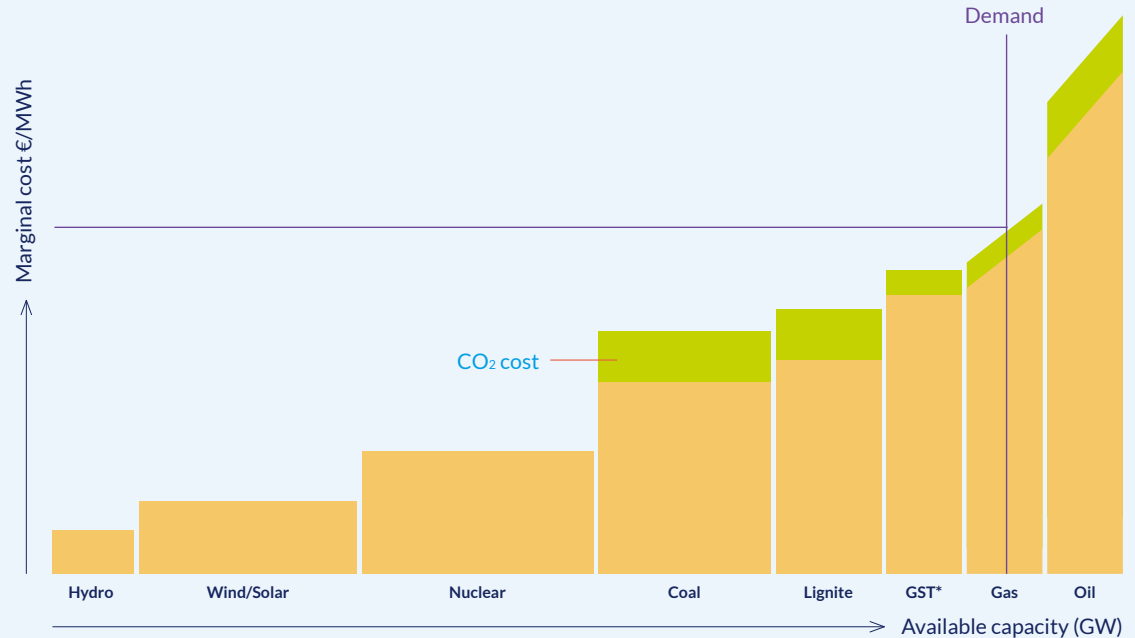
Merit order

As gas is widely used to produce electricity, demand is very closely linked to movements in the electricity market. A change in demand for electricity will have a direct impact on demand for the raw materials used to produce it, and therefore on demand for gas, but in a specific order. This is called : The order of merit.

These graphs illustrate the impact of an increase in electricity demand on the demand for generation feedstock as a function of CO₂ output and marginal cost. This unit price, expressed in €/MWh produced, is ranked from lowest to highest and constitutes the merit order, which can be described as the “electricity supply curve”.

As we can see, hydroelectric and nuclear power plants, as well as wind turbines, produce relatively cheap, green electricity, whereas gas and oil-fired power plants are much more expensive and produce more CO₂ emissions.

A BALANCED ELECTRICITY MARKET

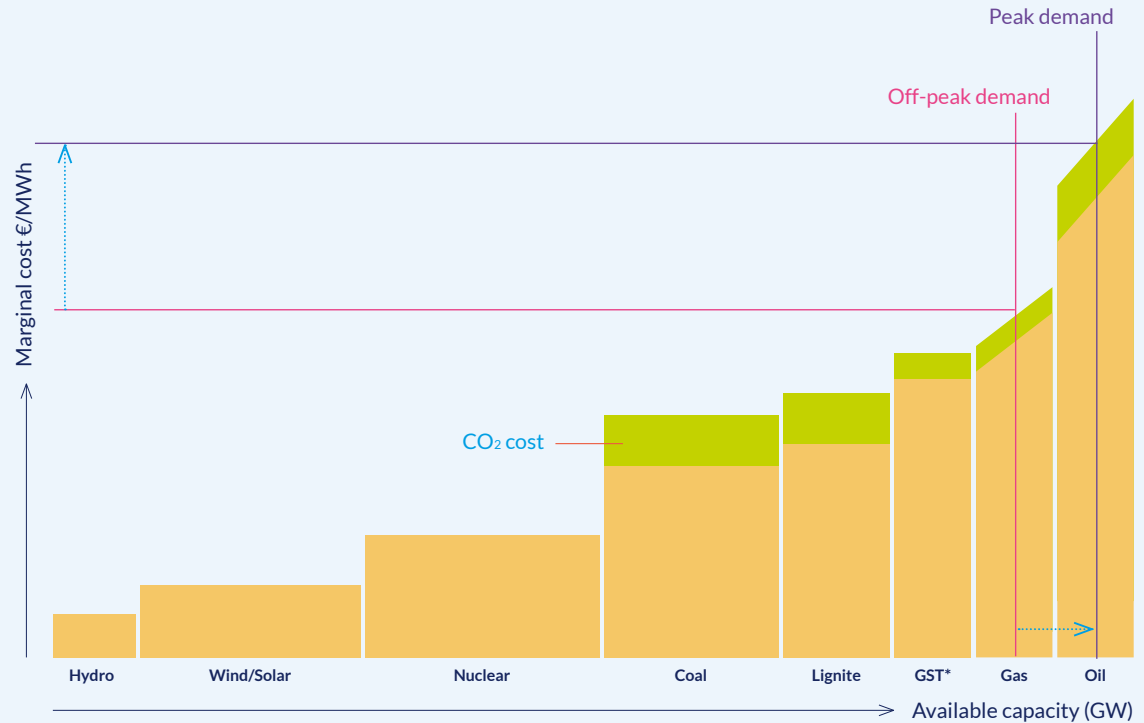


*Gas Steam Turbine
SOURCE : ENGIE

When demand is high (e.g. early in the morning when people are getting up and industrial processes start), the demand curve shifts to the right of the graph from “off-peak demand” to “peak demand”. If, on the other hand, demand decreases (e.g. at night), the curve shifts to the left again (as shown here in graph). In order to respond to these fluctuations correctly, we need flexible power plants with scalable capacity.

Gas-fired power plants are a good example of this. In order to cover demand, the market goes back through the merit order and gives precedence to the most economical power assets. The assets will be kept in overproduction until demand is met and the power grid has reached equilibrium. When demand decreases (e.g. after 10pm), the market will reverse the movement: the most expensive plants will be deactivated until the excess in supply is cleared and the balance between supply and demand is restored.

INFLUENCE OF FLUCTUATING DEMAND



*Gas Steam Turbine
SOURCE: ENGIE

Factors influencing the supply of gas

1. The macro-economic and geopolitical situation

The war in Ukraine, for example, has interrupted gas deliveries via pipelines to Europe.

2. Availability of pipelines and LNG ports

An incident such as the explosion at the Freeport LNG terminal in the US disrupted supplies to Europe.

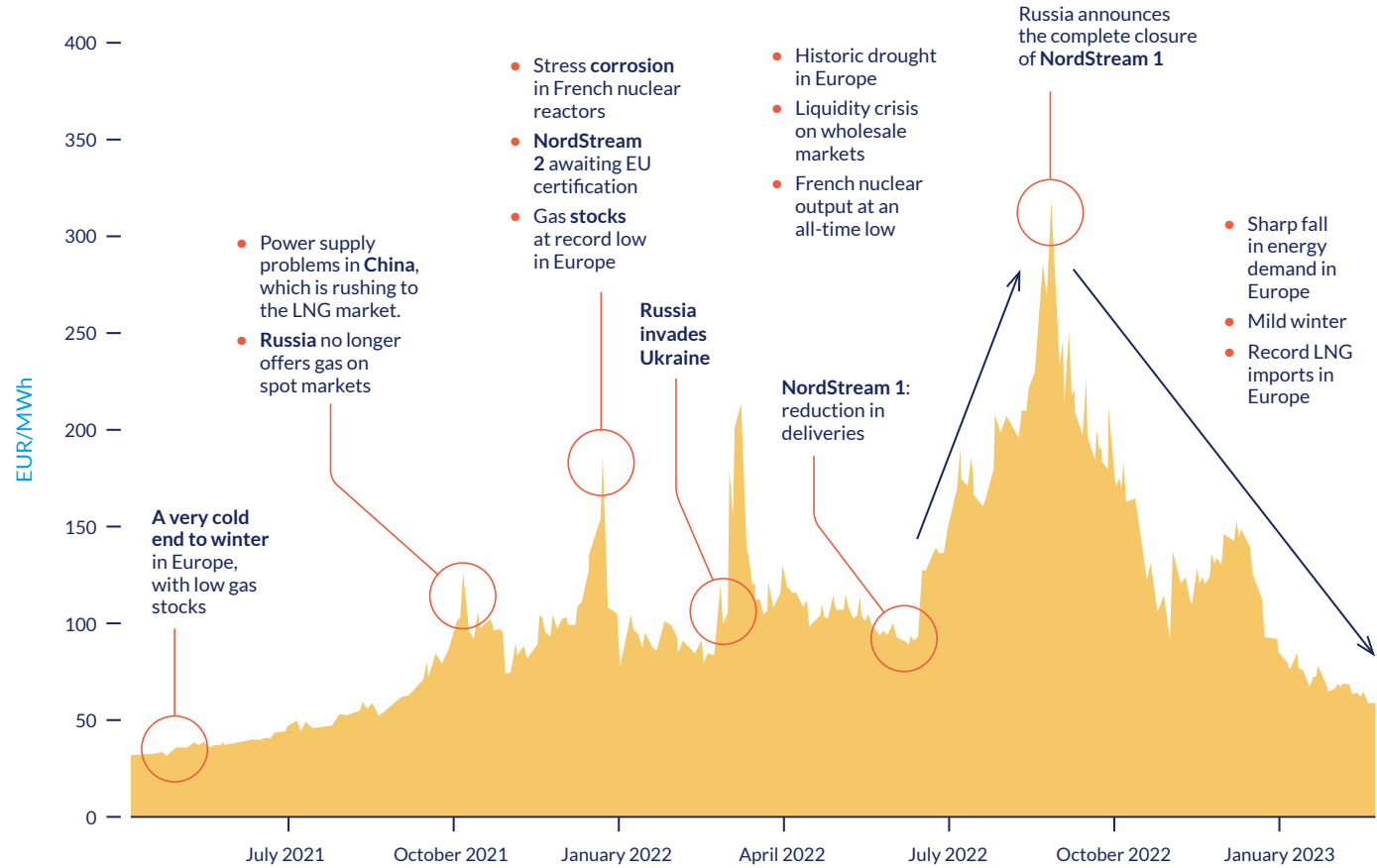
3. Global competition for LNG cargoes

Asia is the world's largest importer of LNG. The more demand from Asia increases, the less supply is available for Europe.

4. The level of stocks

Stocks built up in spring and summer

VARIATION IN GAS PRICES IN EUROPE



SOURCE : ENGIE-ENERGYSCAN

The price of gas, expressed in megawatt-hours (MWh), is the result of gas supply and demand on the wholesale market. It therefore depends on a number of factors, such as the level of production, the availability of infrastructure, economic dynamism, weather variations, etc.

But the gas price does not depend solely on the wholesale market price. Other costs, such as the cost of transport and use of gas infrastructures, and taxes, are also added to it.



Follow market trends

Once you have a clear energy strategy, follow market and gas prices closely. Like financial investments, a strategy is only useful if you take advantage of all the opportunities that arise later.

How do you monitor market trends?

1. **Keep an eye on macro-economic trends and geopolitical developments:** this will allow you to anticipate and understand changes in the financial markets, as well as in the energy markets (mainly for oil).
2. **Follow the financial markets.** They are an indicator of economic activity, and therefore of energy demand.
3. **Watch oil prices.** Their price variation influences gas prices. When the price of oil rises, demand for gas, which will have become relatively cheaper, rises - as does its price.
4. **Save time with expert analysis.** At ENGIE, we make sure we share our expertise with you to help you detect opportunities for your business. We have set up a number of free tools for this purpose.



ENERGYSCAN

Access to comprehensive market insights is essential to monitor risks and optimize energy supply.



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Conclusion



A well thought-out purchasing strategy and careful monitoring of market prices are crucial.

It is therefore very important to understand how the gas market works and what factors influence prices, as well as which events have had a major impact on prices in the past (so that you can better anticipate them in the future).

Regular monitoring of the market allows you to make informed decisions in line with your buying strategy. It is also essential to understand the movements of the electricity market, as natural gas is a key energy source in electricity production.

Energy is a major expense for many companies. In addition to the energy price you pay, the way you manage your energy plays an important role.

Let's build a low carbon energy landscape together!

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