

Companies coping with rising energy prices: contrasting situations and reactions

In November 2022, in its business tendency surveys, INSEE questioned companies in the industry sector (with more than 20 employees) and the services sector (regardless of their size) on the nature of their energy contracts (electricity and gas), on past and expected change in the energy prices they are facing, and on their reactions to these price increases.

The impact of the energy crisis depends mainly on the type of contract that each company has signed and its expiry date. In industry, 44% of the companies surveyed said they get their electricity via a fixed-price contract over a contractual period. Of these, almost half said that this contract expires at the end of 2022, and for almost a third their contract expires during 2023, which therefore potentially exposes them to a considerable increase in market prices. If we add the 21% of companies whose contracts are indexed to the market price, then more than half (56%) of industrial businesses are particularly exposed to the rise in electricity prices. With regard to gas, this proportion is about two-thirds of those industrial companies using gas (i.e. about three-quarters of all companies). For those companies whose contracts expired in H2 2022, they have already been affected by market conditions.

It is more common for service companies to have an electricity supply contract at a regulated tariff, or indexed to this tariff (around 45% of these companies). Nevertheless, 27% would seem to be particularly exposed to the electricity price rise. In services, far fewer companies use gas than in industry and they are concentrated in accommodation-catering and real estate services.

Because of these differences in contracts, price rises would necessarily be very varied. For example, 42% of industrial companies expect their unit price for the purchase of electricity to at least double in 2023 compared to 2022, while a quarter of them did not expect any particular price rise over the same period. The average increase expected by business leaders is 132% for electricity (after +75% estimated by companies in 2022). However, these price rises that companies have declared may not take into account all the available aid schemes.

While the majority of companies (65% in industry, 31% in services) say that they intend to pass on at least some of this energy price increase on to their own sale price, a significant proportion expect to see a reduction in their margins, and a smaller proportion (8% in industry, 3% in services) expect to reduce their activity as a result of this rise. All in all, the decline in industrial production linked to the rise in energy prices is expected to be of the order of -1.5%. In addition, INSEE's Avionic model based on these survey results suggests that the distribution of the energy price shock in 2023 could result in an increase in producer prices of almost 4% in industry.

The surge in market prices does not immediately or fully have an impact on the energy prices that companies pay

Energy prices (gas and electricity) have increased considerably on the markets since 2021, and especially since the outbreak of the war in Ukraine. However, the scale of the price increase that French companies faced in 2022 was much more contained. While the producer price index in industry for electricity sold wholesale at the spot price (IPPI spot) rose by 564% between August 2021 and August 2022 (its historic peak), the producer price index in industry for electricity sold to companies¹ (IPPI B-to-B) increased by “only” 13% over this same period (► **Figure 1**). For gas, over the same month of August, the year-on-year variation in the producer price index for gas sold wholesale increased by 331%, against +101% for the price index for gas sold to companies as final consumers.

Regarding electricity, the sharp increase in its market price can be explained in particular by the specific features of the European electricity market, whose operation was developed in the 2000s and which fixes the final price in relation to the marginal cost of production proposed by the last power plant called on, often gas. In the current context of gas supply chain tensions in the European countries, the explosion in the price of gas during summer 2022 led to particularly high market prices for electricity. Conversely, the Regulated Access to Historic Nuclear Electricity (*Accès Régulé à l'Électricité Nucléaire Historique - ARENH*), a mechanism specific to France and which ensures a fixed electricity purchase price for alternative suppliers, partly protects businesses from increases in market price (► **Box 1**).

The electricity supply contracts of more than half of industrial companies are likely to be very exposed to the current explosion in energy prices

Beyond these market mechanisms, the price increase ultimately experienced by each company depends on both the type of contract that ties it to its energy suppliers and its renewal period.

In this respect, in November 2022, INSEE introduced into its business tendency surveys questions about the energy prices (electricity and gas) that companies in industry and services were having to cope with (► **electronic appendix** for detailed

results). In the tendency surveys in industry, only companies with 20 or more employees are questioned. In services, all companies are questioned, with no size criterion (► [Appendix 1](#)).

First, the share of companies with an electricity contract indexed to the wholesale market price (and whose prices have therefore already increased sharply) is a minority, but quite a sizeable one: the companies concerned represent 21% of the turnover for industry and 9% of that for services² (► [Figure 2a](#)). This type of contract particularly concerns the transport equipment manufacture branch (37%).

Unlike electricity, not all companies consume gas. Within the scope of the business tendency surveys, 75% of industrial companies have a gas³ supply contract and only 22% of services companies. Among the companies supplied with gas, about a quarter are bound by a contract indexed on the wholesale market price (27% in industry, 24% in services, ► [Figure 2b](#)). These proportions are higher for the manufacture of transport equipment (32%) and also in the chemical industry (39%).

Box 1: how the wholesale electricity market operates

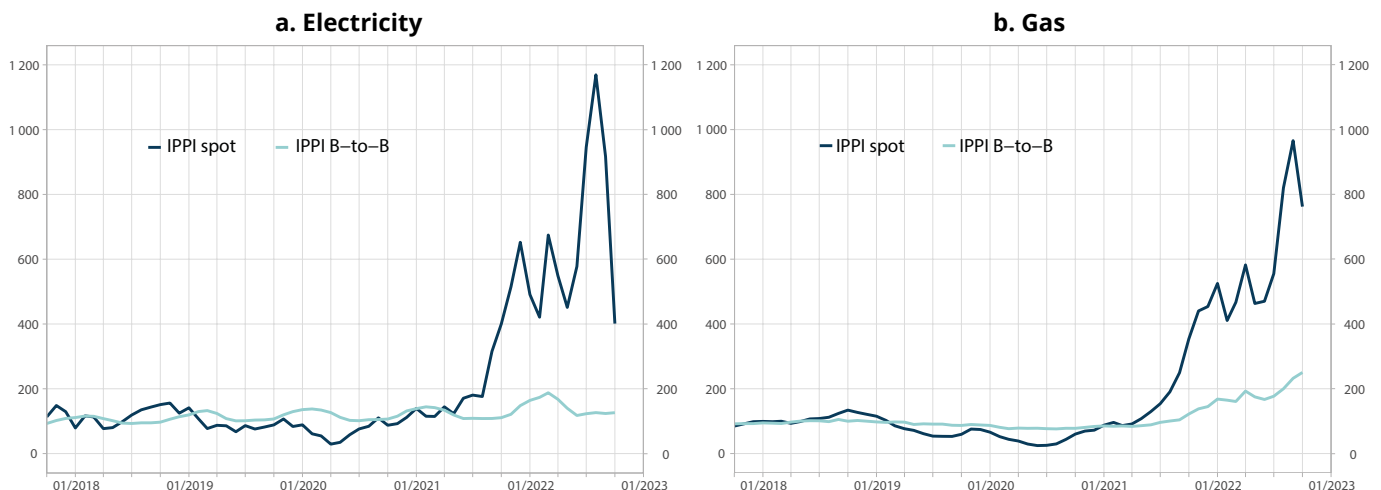
Since the liberalisation and creation of a European electricity market in the 2000s, the wholesale price of electricity is fixed on the marginal cost of production of the last power plant called on in the order that is known as “economic precedence” –i.e. from the cheapest power plant to the most expensive, whether domestic or foreign. Thus, the demand for electricity is first satisfied by renewable energies (wind power, solar power, etc.) whose marginal production costs are virtually zero. Next come nuclear plants, then thermal power stations (coal, gas, fuel oil).

Given the surge in gas prices in the context of the war in Ukraine and the supply chain problems European countries are encountering, production costs at gas power plants have increased considerably. As these power plants are among those that are called on as a last resort in France, i.e. those that “determine” the price of electricity sold on the markets, the wholesale market price of electricity also rose sharply. In addition to this geopolitically based factor, electricity production in France has also been eroded by the shutdown of a number of nuclear reactors, and even more so by the drought during the summer which reduced the possibilities of producing hydroelectric power. These reductions in domestic production meant that electricity had to be imported at a high price.

In France, the Regulated Access to Historic Nuclear Electricity mechanism (Accès Régulé à l'Électricité Nucléaire Historique - ARENH) helps to mitigate the impact of these shocks on the prices that companies have to pay. The ARENH makes the historic producer EDF sell some of the electricity from its nuclear plants to alternative⁸ suppliers at a fixed price of €42/MWh, a very favourable price in the present climate. ●

► 1. Monthly change in the price of electricity and gas exchanged on the markets and sold to companies in France

base 100 in 2015



Last point: October 2022.

Note: IPPI spot designates the industrial production price index for electricity (or gas) sold wholesale at the spot price. The IPPI B-to-B for electricity designates the industrial production price index for electricity sold to companies that have signed a contract for power greater than or equal to 36 kVA. For gas, it designates the production price index for trade in gas by pipeline to end-user companies.

Source: INSEE, industrial producer price index

French economic outlook

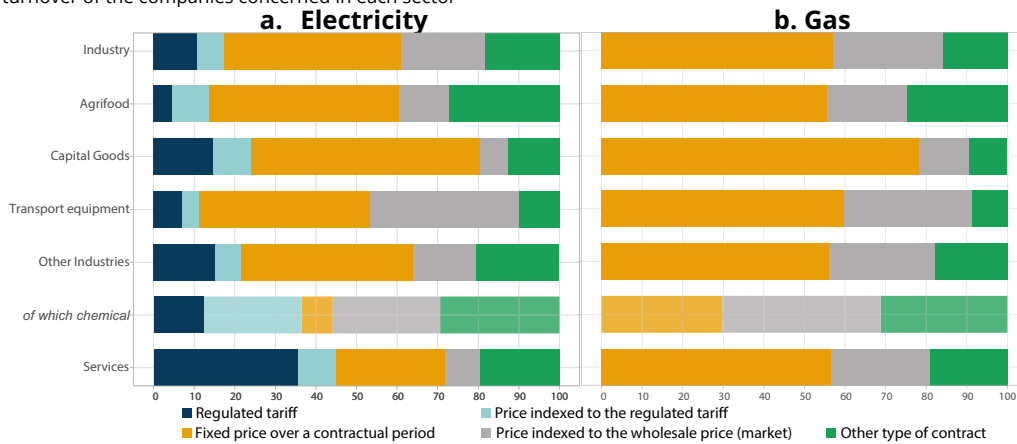
In services⁴, almost 45% of companies have an electricity contract at the regulated sales tariff (TRV) or at a price indexed to it. There are far fewer in industry⁵ (17%). In fact, very small businesses that are not very electricity-intensive can benefit in the same way as households from the TRV for electricity –unlike gas where access to the TRV for small businesses was abolished in 2020. These companies, which are mostly services companies, given the eligibility criteria, therefore benefit from the “tariff shield” which limited the increase in TRV for electricity to 4% for 2022.

The results of the business tendency surveys also show that many companies have opted for a fixed-price electricity contract over a set period: this seems to represent 44% of industrial companies and 27% of services companies. The proportions are even greater for gas (almost 60% in both sectors). For these companies, the duration of the contract is a determining factor in future developments in the cost of energy. For example, a company that signed a fixed-price multi-year contract at the beginning of 2021 (before the surge in energy prices) for three years will in principle benefit from a much lower energy price in 2023 than a company with the same economic characteristics (sector, size, etc.) but whose contract expired in summer 2022.

In addition, 48% of current fixed-price electricity contracts over a set period in industry and 33% in services are expected to expire before the end of 2022. These figures are likely to be slightly lower for gas: 36% of fixed-price contracts in industry and 17% in services respectively will probably expire before the end of 2022 (► **Figure 3a** for electricity and ► **Figure 3b** for gas).

► 2. Type of company energy contracts according to sector of activity at the end of 2022

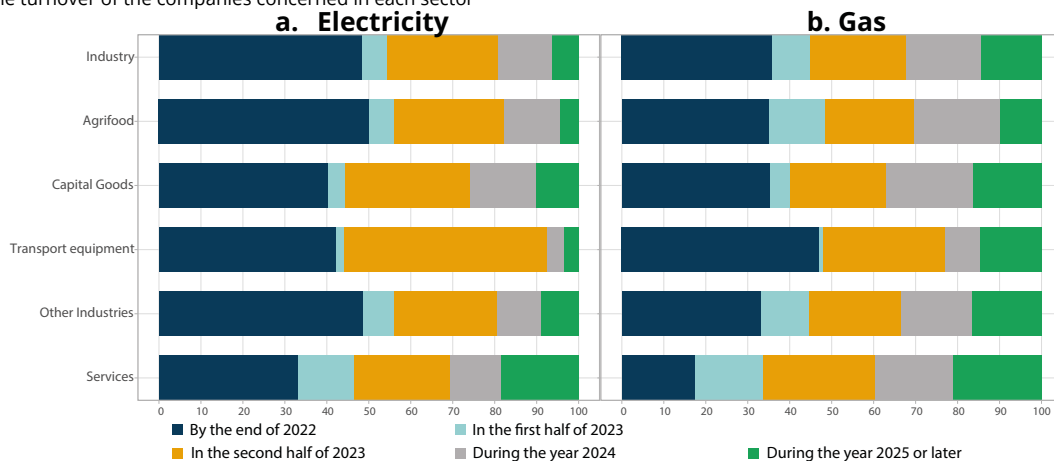
- (a) as a % of sector turnover
- (b) as a % of the turnover of the companies concerned in each sector



(a) How to read it: 11% of companies in the industry sector say they have an electricity contract at the regulated tariff.
 (b) How to read it: among the companies in the industry sector with a gas contract, 57% say they have a contract that supplies gas at a fixed price over a contractual period.
 Note: results are weighted according to turnover of the companies questioned. The services sector represented here does not include rail and air transport services, as they are not included in the business tendency surveys.
 Source: INSEE, business surveys in industry and services

► 3. Expiration of fixed-price multi-year contracts

- (a) as a % of sector turnover
- (b) as a % of the turnover of the companies concerned in each sector



(a) How to read it: 48% of companies in the industry sector have an electricity supply contract that expires before the end of 2022.
 (b) How to read it: of the companies in the industry sector that have a gas supply contract, 36% of them have a contract that expires before the end of 2022.
 Note: results are weighted by turnover of the companies questioned. The services sector represented here does not include rail transport services as they are not questioned in the business tendency surveys.
 Source: INSEE, business surveys in industry and services

If we consider as particularly exposed any contract where prices are either indexed to the market, or fixed but which expire before the end of 2023, the business tendency surveys suggest that this applies to almost 56% of electricity contracts in industry, against 27% in services. Concerning gas, the figures are likely to be similar in industry, with 66% of gas contracts particularly exposed.

The energy price rises estimated by companies in 2022 and expected for 2023 are very varied

This wide variety in contracts, both in terms of type (fixed price, regulated price, price indexed to the market, etc.) and expiry date, suggests variations in energy prices for 2022 and 2023 which will also be very contrasted between companies. Given the questions asked and the data collection schedule, it is possible that companies did not all incorporate the entire range of available support schemes in their replies.

Companies' responses (► [Figure 4a](#) for industry and ► [Figure 4b](#) for services) suggest first of all that the rise in electricity prices over 2023 is expected to be more pronounced in industry, where contracts are more often particularly exposed (i.e. indexed to the market price or due for renewal before the end of 2023), than in services. In industry, the median variation⁶ in electricity prices is expected to be +40% in 2022 and +90% forecast by companies in 2023⁷. The average rise weighted by turnover, on the other hand, is likely to be +75% in 2022 and +132% in 2023. In services, the median variation in the price of electricity is likely to be around +20% in 2022 according to the companies questioned, and the same in 2023 (however, the average rise weighted by turnover will probably increase from +29% in 2022 to +56% in 2023).

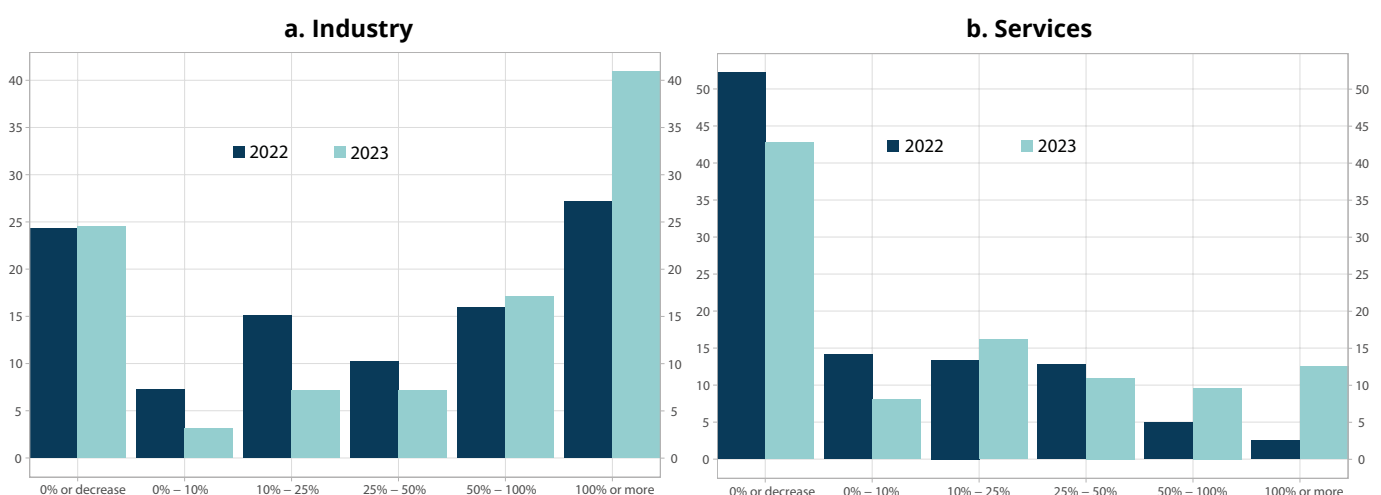
In addition, within each sector, expectations can vary considerably from one company to another. For 2023, a quarter of industrial companies did not anticipate the rise in electricity prices, while 42% did forecast at least a doubling of the price of electricity. In services, 43% of companies did not foresee price rises for 2023, while for the same period, 12% anticipated at least a doubling of the price of electricity.

Many more companies are planning to pass on at least part of the energy price rise to their own sale price rather than consider reducing their production

In the November 2022 business tendency surveys, INSEE also asked companies about their reactions given the current context of rising gas and electricity prices (► [Figure 5](#)). They could give several types of reaction simultaneously. The results suggest that more than 66% of industrial businesses plan to increase their sale price in order to cope with the soaring price of energy inputs, against 31% in services. In addition, more than one third of industrial companies (against a little under 20% of services companies) said they would react to the increase in energy prices by squeezing margins.

Finally, rising energy prices could have a direct effect on economic activity. While a total cessation of activity seems to be a relatively marginal reaction according to company declarations (less than 1% envisage this solution), about 7% of industrial companies and 3% of services nevertheless plan to reduce their activity to cope with the increase in energy prices.

► 4. Distribution of the variation in electricity prices estimated in 2022 and expected for 2023 in % of sector turnover



How to read it: in industry, 42% of companies expect an increase of 100% or more in the price they will pay for their electricity in 2023. Note: results are weighted by turnover of the companies questioned. The services sector represented here does not include rail transport services as they are not questioned in the business tendency surveys. Source: INSEE, business surveys in industry and services

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All in all, taking all companies into account (whether or not they plan to reduce their activity), the expected average drop in activity (weighted for turnover) in connection with the energy price increases is likely to be around -1.5% in industry (► **electronic appendix**). This expected decline is particularly strong in energy-intensive industries like metallurgy (-4.5%) or the wood and paper industry (-3.8%). Services companies, on the other hand, anticipate a more moderate decline in activity in connection with the energy price increases (-0.7%), but with more marked effects in road freight transport (-2.3%).

The increase in the price of energy inputs forecast by companies in 2023 is expected to lead to an increase in production prices of almost 4% in industry

In the light of these survey results, using a calibration of INSEE’s Avionic model, it is possible to describe at macroeconomic level the distribution of the increase in the cost of energy inputs (gas and electricity) on the production prices of the different branches of activity (► **Box 2**). Companies’ production prices are affected by the rise in energy prices both directly and indirectly, with companies mobilising intermediate consumptions which are themselves sometimes energy-intensive. For example, to the extent that metal products are inputs for the automotive industry, the rise in energy prices could increase production prices in the automotive industry due both to the direct effect (energy inputs used by the automotive industry) and the indirect effect (rising metal product prices). The Avionic model used here enables us to take into account these direct and indirect effects.

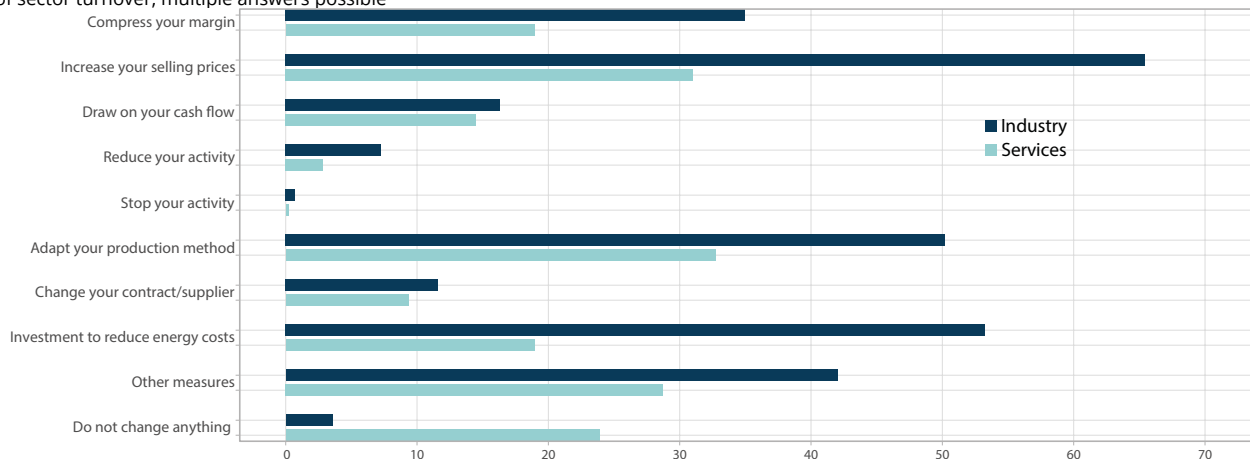
The results from the model suggest that the additional energy shock (gas and electricity) in 2023, all other things being equal, could push up production prices by +2.6 percentage points on average across the economy, of which 2 points would be attributable to the direct effect and 0.6 points to the indirect distribution effects (► **Figure 6**). Production prices in the manufacturing industry are expected to increase more sharply than those in services: +3.7 percentage points (58% from a direct effect) against +0.6 points in services (45% from a direct effect).

At a detailed sectoral level, the steel industry, metallurgy, manufacture of glass or chemical products sectors, which are very energy-intensive (► **Simon, 2022**), could experience some particularly high additional production prices, of at least 9 percentage points. ●

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► 5. Companies’ reactions to the increase in energy prices

as % of sector turnover, multiple answers possible



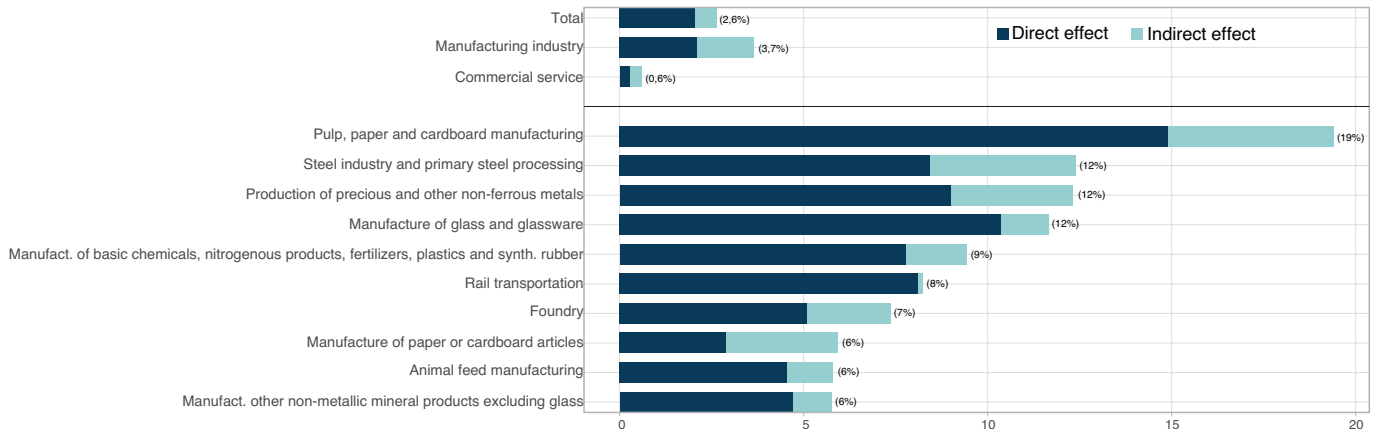
How to read it: in industry, more than 66% of companies plan to increase their sales prices.

Note: results are weighted by turnover of the companies questioned. The services sector represented here does not include rail transport services as they are not questioned in the business tendency surveys.

Source: INSEE, business surveys in industry and services

► 6. Impact on production prices of the variation in electricity and gas prices expected by companies in 2023 (10 most affected sectors)

in % point



How to read it: the expected rise in electricity and gas prices for companies could generate a rise in production prices of 2.6 percentage points in the economy. Source: INSEE, Avionic model calibrated with business survey results

Box 2: modelling the distribution of the energy crisis across production prices

In the *Avionic* model (► Bourgeois et Briand, 2019 and Bourgeois et Lafrogne-Joussier, 2022), calibrated here at a very detailed sectoral level (NAF level A138 on 2018 data), the variation in the price of a product is passed on to others through the intermediate consumption used to produce it: when energy becomes more expensive, it has the effect of causing a supply shock that spreads into the downstream sectors of the economy.

The model assumes that companies do not pass on in their prices all of the cost variations that they record. Thus the model incorporates a rigidity Y_j into the price adjustment (because of the staggering of contracts, menu costs, lack of coordination, etc.) in each sector j (an alternative hypothesis would be to assume a perfect transmission of prices, i.e. no margin compression, in which case the impact of the energy shock on production prices would be greater).

Let a_{ij} be the quantity of products i needed for production in branch j :

$$a_{ij} = C_{ij} / P_j$$

We can then estimate the impact of a rise in energy prices Δp_{gas}^j and Δp_{elec}^j on the price of product j :

$$\Delta p_j = \underbrace{\Delta p_{elec}^j a_{elec,j} + \Delta p_{gas}^j a_{gas,j}}_{direct\ effet} + \underbrace{\sum_{k \neq gas, elec} Y_k \Delta p_k a_{kj}}_{indirect\ effet}$$

Results from the business tendency surveys suggest, however, that exogenous shocks on the price of gas and electricity and the direct transmission of these shocks would probably differ between sectors. Thus for each sector j of the economy, we calibrate the energy shocks as the averages (weighted by turnover) of the price variation expected for 2023 by companies declaring that they will pass on the increase in energy prices in their sales prices, according to the business tendency surveys.

Let ω_f be the weight of company f in sector j , then $\Delta p_{elec,f}$ and $\Delta p_{gas,f}$ are the variation in price expected by f in 2023 for electricity and gas and $\mathbf{1}_{f \in increase}$ is a dummy equal to 1 if f says it will pass on the energy price rise to its sales prices according to the business tendency surveys. The exogenous energy shocks for a given sector j are calibrated as:

$$\Delta p_{elec}^j = \sum_f \omega_f \times \Delta p_{elec,f} \times \mathbf{1}_{f \in increase}; \Delta p_{gas}^j = \sum_f \omega_f \times \Delta p_{gas,f} \times \mathbf{1}_{f \in increase} \bullet$$

Appendix 1: characteristics of business tendency surveys of companies

The data exploited in this study derive from a dedicated module of questions added in November 2022 to INSEE's monthly business tendency surveys of companies in industry and services. Detailed information on the methodology of these surveys, the results of which are used each month to calculate the business climate in France, is available in the Data Sources and Indicators section on the INSEE website.¹⁰ The questionnaire used for the dedicated module can be found in the electronic appendix.

Monthly tendency survey in industry

The survey of industry covers a sample of about 4,000 companies (in the sense of legal units or profiled units) mainly in the manufacturing industry, or divisions 10 to 33 in the French classification of activities (NAF rev. 2) (excluding the tobacco industry div. 12, manufacture of coke div. 19.10Z and the construction of military combat vehicles div. 30.40Z). Observations on extractive industries are not included in this analysis.

Only companies with 20 or more employees are questioned in this survey.

Monthly tendency survey in services

The survey of services covers a sample of about 4,500 companies (in the sense of legal units or profiled units) in the following sectors: accommodation and catering (NAF codes 55.10Z, 55.20Z, 56.10A, 56.10B, 56.10C, 56.21Z, 56.30Z); information and communication (divisions 58 to 63); real estate activities (division 68 of NAF, excluding 68.32B); specialist, scientific and technical activities (divisions 69, 70, 71, 73 and 74, excluding 70.10Z); administrative and support service activities (divisions 77 to 82, excluding 81.30Z); other service activities (divisions 95 and 96). Concerning transport services, the survey covers only road freight transport and thus does not include the rail freight transport or passenger transport sectors.

Unlike the survey in industry, there is no size criterion (turnover or number of employees) for companies questioned in this survey and therefore some very small businesses are included. ●

Bibliography

Bourgeois A. and Briand, A. (2019), "AVIONIC (Variational Input/Output Analysis, National Imported and Content): The Input/Output Model of National Accounts", *Document de travail*, n° G2019/02, INSEE, April 2019

Bourgeois A. and Lafrogne-Joussier R. (2022) "Soaring energy prices: its effect on inflation halved by the "tariff shield"", *INSEE Analyses* n°75, September 2022

Simon O. (2022) "Which are the branches of activity where production is most dependent on energy?", *Economic outlook Focus*, 6 October 2022. ●

Notes

1 This is the sale price index for companies that have taken out a contract for power greater than or equal to 36kVA. INSEE publishes numerous electricity market price indicators, in particular a sale price index at the EPEX (European power exchange) market price and two indices of sale price to companies according to the power selected for subscription (for sites supplied with subscribed power of less than 36kVA – residential customers, artisans, etc. – and sites supplied with subscribed power greater than or equal to 36kVA).

2 All of the statistics from questions on energy prices introduced in November 2022 in the business tendency surveys are weighted according to company turnover. The proportions of companies presented in this Focus must therefore be interpreted as proportions of the turnover of the sectors considered, even if they are inaccurately described as proportions of companies.

3 This result is consistent with figures from INSEE's Annual Survey on Industrial Energy Consumption (EACEI).

4 Rail transport services, which are particularly electricity-intensive, are however not included in the surveys.

5 It should be noted that, for industry, the business tendency surveys are intended to be representative of companies with at least 20 employees, which automatically excludes the majority of industrial companies eligible for the TRV.

6 In other words, there are as many companies that would be facing a price increase of under 40% as a price increase of over 40%.

7 These results are aggregates at sectoral level; a given company may experience different price trends in 2022 and 2023

8 The ARENH ceiling is normally 100 TWh; it was raised exceptionally in 2022 to 120 TWh in the context of the "tariff shield" scheme (at a price of €46.2/MWh for the extra 20 TWh).

9 For the sectors of activity not represented in the business tendency surveys in industry and services (notably agriculture, rail transport, trade and construction) we impute these shocks from the average shocks in the economy.

10 Industry survey: <https://www.insee.fr/en/metadonnees/source/operation/s2061/processus-statistique>
Services survey: <https://www.insee.fr/en/metadonnees/source/operation/s2065/processus-statistique> ●