

Research on the Italian gas market

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I. The characteristics of natural gas

Natural gas has been defined as 'a combustible mixture of hydrocarbon gases.' Geologically, it is associated with oil hydrocarbons. It is mostly used to heat interiors and generate electricity, whilst in different combinations its components can also go to various industrial applications, including fertilisers and some plastics. As extracted from the ground, the gas is called 'wet gas' and is typically composed of between 60 and 90 per cent methane together with significant volumes of ethane, propane and butane and smaller amounts of carbon dioxide, oxygen, nitrogen, hydrogen sulphide and other gases.¹ Before it can be sent down a pipeline and put on the market, as much as possible of these other gases has to be removed, some of them being taken as by-products for such industrial uses.² In this form it is called pipeline-quality, consumer-grade or 'dry' gas.

In economic terms natural gas is described as a primary commodity because it is extracted directly from the ground and, after some processing, used either for itself or as an input in an industrial, or 'secondary,' process. Primary commodities are relatively simple and they can generally be priced with reference to an agreed standardised form, thus facilitating competition.

However, the fact of being a gas, as well as being inflammable and poisonous, makes this product different from other commodities since it cannot be carried on roads, trains, ships or aircraft but has to be delivered through pipelines; or alternatively, the gas is converted into liquid form, to be shipped as liquefied natural gas (LNG). Whether the product is in gaseous or liquid form, expensive fixed infrastructure is required, resulting in inflexibility of supply. This also provides its purveyors, as well as the owners of pipelines and liquefaction and regasification plants, with a ready source of economic 'rent,' which means they can profit not only from producing or transporting the gas and selling it on the market but by generating income from the possession of these assets. This last characteristic implies the assets' exploitation as part of the financialisation process; we shall see more of it below.

The lack of any substantial differentiation of most primary products generally makes one supplier's output easy to substitute with another's, leading to competitive markets. However, in the case of gas the large physical volumes, inflexibility of supply and high fixed costs reduce the possibilities of competition to such an extent that it becomes a natural monopoly, and the sector is therefore state-owned in many countries. Alternatively, when traded under private ownership it risks being controlled by large, quasi-monopolistic private companies. Major West European examples of the latter include British Gas, Gaz De France and ENI. Some of them, such as British Gas (now owned by Centrica) and ENI, are previously state-owned companies which have been partially or wholly privatised.

All of the above can also give gas supplies, pipelines and prices a high degree of political sensitivity, especially under the exigencies of climate change.

2. Italy's gas supplies and consumption

Italy is the second largest consumer of gas in the European Union, with consumption of 39.1 billion m³ (bcm) in the first half of 2022, compared with 46.2 bcm in Germany and 21.1 bcm in France, the third largest consumer.³ With only limited domestic production, Italy is also a large net importer. Total annual gas supply in 2021 broke down as in Table 1, which shows imports by their points of entry into

¹ Croft Production Systems (2022).

² Moneyterms.co.uk (undated). © Graeme Pietersz.

³ European Commission (2022B), p. 6.

Italy (see below). The largest national source historically is from Russia, from where the gas arrives via Ukraine and Austria at Tarvisio, followed by Algerian gas at Mazara del Vallo in Sicily.

BILANCIO MENSILE DEL GAS NATURALE								
ITALIA (1)								
(Milioni di Standard metri cubi a 38,1 MJ/mc)								
			Dicembre			Gennaio-Dicembre		
			2021	2020	Variaz. %	2021	2020	Variaz. %
a)	PRODUZIONE NAZIONALE (2)		287	327	-12.2%	3,343	4,107	-18.6%
b)	IMPORTAZIONI		7,126	5,868	21.5%	72,728	66,130	10.0%
	per punto di ingresso	MAZARA DEL VALLO	1,943	2,055	-5.4%	21,169	12,023	76.1%
		GELA	208	271	-23.4%	3,231	4,460	-27.6%
		TARVISIO	2,930	2,748	6.6%	29,061	28,420	2.3%
		PASSO GRIES	612	80	667.3%	2,170	8,592	-74.7%
		MELENDUGNO	787	-	-	7,214	-	-
		PANIGAGLIA (2)	-	131	-100.0%	1,072	2,509	-57.3%
		CAVARZERE (2)	628	490	28.3%	7,316	6,806	7.5%
		LIVORNO (2)	-	80	-100.0%	1,437	3,273	-56.1%
		GORIZIA	18	-	-	39	3	1348.2%
	Altri	0	2	-85.7%	19	33	-42.0%	
c)	Esportazioni		249	37	577.2%	1,543	316	389.1%
d)	Variazione delle scorte (2)		- 2,545	- 2,671	-4.7%	- 1,591	- 1,076	47.9%
e) = a)+b)-c)-d)	Consumo Interno Lordo		9,711	8,829	10.0%	76,118	70,998	7.2%

Fonte: Ministero della transizione ecologica - DGISSEG

(1) Preconsuntivi al netto dei transiti
(2) comprende consumi e perdite

Table 1: Monthly natural gas balance for Italy, millions of m³

Source: Ministero della Transizione Ecologica

BILANCIO MENSILE DEL GAS NATURALE								
ITALIA (1)								
(Milioni di Standard metri cubi a 38,1 MJ/mc)								
			Agosto			Gennaio-Agosto		
			2022	2021	Variaz. %	2022	2021	Variaz. %
a)	PRODUZIONE NAZIONALE (2)		281	281	0.3%	2,208	2,218	-0.4%
b)	IMPORTAZIONI		5,567	5,412	2.9%	50,210	48,309	3.9%
	per punto di ingresso	MAZARA DEL VALLO	1,951	1,336	46.0%	15,182	14,150	7.3%
		GELA	194	290	-33.1%	1,583	2,216	-28.6%
		TARVISIO	1,108	2,321	-52.3%	11,658	19,381	-39.9%
		PASSO GRIES	688	9	7209.0%	5,881	1,149	412.1%
		MELENDUGNO	837	773	8.2%	6,785	4,207	61.3%
		PANIGAGLIA (2)	262	74	253.6%	1,385	971	42.7%
		CAVARZERE (2)	92	519	-82.3%	5,090	4,878	4.3%
		LIVORNO (2)	433	86	401.9%	2,617	1,329	96.9%
		GORIZIA	0	1	-100.0%	16	12	26.2%
	Altri	3	2	89.2%	13	15	-16.2%	
c)	Esportazioni		281	243	16.0%	2,332	689	238.3%
d)	Variazione delle scorte (2)		1,757	1,626	8.1%	2,750	1,638	67.9%
e) = a)+b)-c)-d)	Consumo Interno Lordo		3,810	3,824	-0.4%	47,335	48,199	-1.8%

Fonte: Ministero della transizione ecologica - Dipartimento Energia - DGIS

(1) Preconsuntivi al netto dei transiti
(2) comprende consumi e perdite

Table 2: Monthly natural gas balance for Italy, millions of m³

Source: Ministero della Transizione Ecologica

As a result of the Ukrainian war, by August 2022 gas sent via Mazara del Vallo had become the largest source, with monthly supply via Tarvisio under a half of that in August 2021, as shown in Table 2.⁴

Most of the Italian market is supplied through natural gas pipelines from origins in Algeria, Azerbaijan, Libya, the Netherlands, Norway and Russia (see Figure 1). The most important until now was the TAG (Trans Austria Gasleitung GmbH) pipeline, which crosses from Austria into Italy at Tarvisio to form one end of the South Stream pipeline from Russia. While the TAG company, which owns the Austrian pipeline, is 84.47 per cent owned by Italy's SNAM SpA,⁵ the contract for supplying 80 per cent of the gas flowing through it was passed from ENI's hands into those of Russia's Gazprom in 2018.⁶ Meanwhile, the Transmed pipeline arrives from Algeria at Mazara del Vello and the Greenstream pipeline from Libya at Gela (both of them in Sicily), and the Transitgas pipeline across Switzerland brings gas to Italy from North European suppliers in Norway and, to a lesser extent, the Netherlands and sometimes the UK.



Figure 1: Gas routes in and into Italy

Source: Business.it⁷ https://www.business.it/wp-content/uploads/2018/12/Vie_gas_italia-768x472.jpg

The total volumes of natural gas imported to Italy from different countries in 2021 are shown in Figure 2. Azerbaijan had become the third largest supplier after Russia and Algeria, while supplies of LNG from Qatar occupied the fourth place. Within the LNG market, in the second quarter of 2022 Qatar supplied 42 per cent of Italy's imports, the USA 32 per cent and Algeria 17 per cent.⁸ The changes in supply volumes in the first half of 2022 are indicated in Figure 3. In the wake of the Ukraine war, supplies from Russia fell behind those from Algeria, while LNG supplies taken together remained in third place, alongside other rapid increases from Azerbaijan and North European countries.

⁴ Ministero della Transizione Ecologica (2022).

⁵ Gas Connect Austria and Trans Austria Gasleitung (2019).

⁶ S&P Global Platts, 2020, 'Italy's Gas Market.'

⁷ Business.it (undated).

⁸ European Commission (2022B), p. 17.

	2021	%
Russia	28.988	39,86
Algeria	22.584	31,05
Azerbaijan	7.214	9,92
Qatar	6.877	9,46
Libia	3.231	4,44
Norvegia	1.937	2,66
Stati Uniti	806	1,11
Nigeria	456	0,63
Olanda	312	0,43
Egitto	184	0,25
Spagna	88	0,12
Francia	32	0,04
Croazia	19	0,03

Creazione: 5 aprile 2022

Grafico: Dott. Luca Fusaro - Fonte: Ministero della Transizione Ecologica - Creato con [Datwrapper](#)

Figure 2. Italian natural gas imports by country of origin, 2021 (billions of cubic metres or bcm)

Source: Meteoweb, citing provisional figures from the Ministry of Ecological Transition⁹

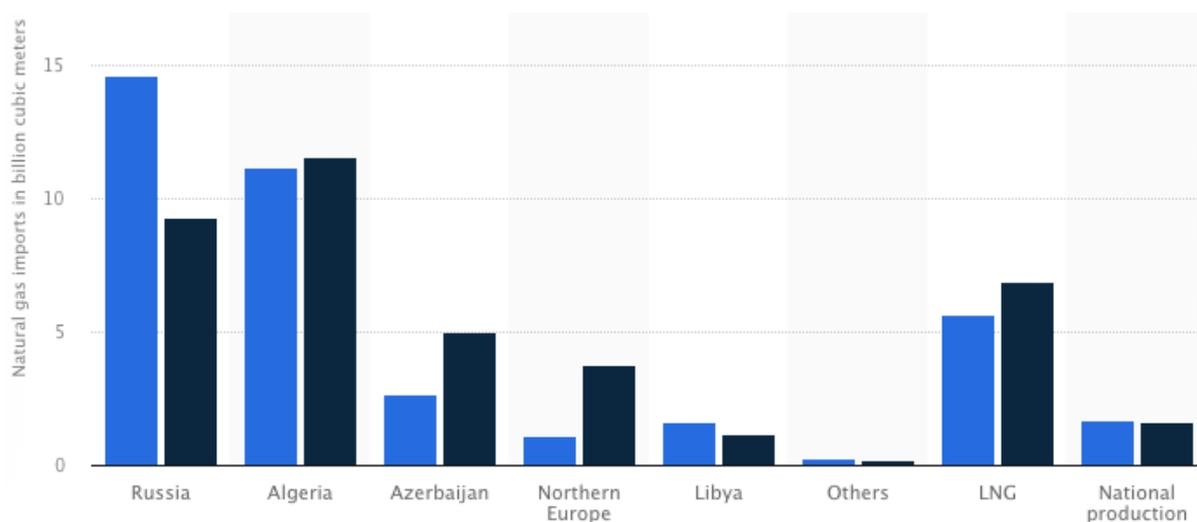


Figure 3. Natural gas supply by origin in Italy, first halves of 2021 (light blue) and 2022 (dark blue), in bcm

Source: Statista.¹⁰ © Statista.

⁹ Meteoweb (2022).

¹⁰ Statista (2022).

The breakdown of Italian gas consumption by economic sector in 2021 is shown in Table 3 below. The largest share of consumption was for domestic use (mainly heating), followed by electricity generation and then industrial uses.¹¹

Sector	Volume (bcm)	Percentage of total
Domestic (civile)	33.3	43.8
Industry	14.1	18.4
Electricity generation	26.0	34.1
Residual (unspecified)	2.8	3.7
Total	76.2	100

Table 3: Italian gas consumption by economic sector in 2021

Source: Teleborsa, citing Snam Rete Gas

3. Price determination, forms of trade and where the profits arise

- Wholesale and retail

The gas market is very complicated and includes a variety of pricing systems. This is due to the numerous physical sources and their lack of easy interchangeability, as well as the difference between natural gas in its original gaseous form and when liquefied as LNG. In other circumstances the commodified nature of the product would make it widely traded and priced on exchanges, but the fixed physical nature of supplies has militated against this until recently. Most international supplies are instead based on long-term contracts. Unlike most modern commodity markets, the gas market is also segmented geographically and lacks uniform global prices. This is for the technical reasons given above. Thus, US gas prices have risen in 2022 considerably less than those in Europe.

There are quite distinct wholesale and retail gas markets. Wholesale prices are determined on ‘spot’ markets and on long-term contracts, where they are specified in various ways. Historically, long-term contracts for international supplies along pipelines have generally been based, or ‘indexed,’ on oil prices and this remains the case with Italy’s import prices from Algeria and Libya. However, in 2014 ENI persuaded the Russian supplier, Gazprom, to set up a new contract linked to spot gas prices, which generally brought a reduction in price.¹² A legal dispute launched by Gazprom was resolved in 2018 but there does not appear to have been any fundamental change in the price basis after it.¹³ Recent import prices from Russia have clearly been well above those from Algeria.

Retail prices are determined by the retailer on the basis of the wholesale price. ‘Retail’ includes sales to industry and institutions, as well as domestic consumers.

The wholesale markets tend to be quite opaque, with limited transparency on prices, contracts and methods of price formation. Very big profits are currently made by gas (and oil) producers, serving the wholesale market, due to the shortage of gas supplies in Europe, largely but not wholly on account of the war in Ukraine and the political responses to it. Retail suppliers are squeezed by these high wholesale prices.

With the international gas market so splintered between countries, there are numerous organised markets for on-the-spot and futures trading, mostly on a national basis. These are often referred to as hub markets. The most important in Europe is the Title Transfer Facility (TTF) in Rotterdam, while there is also a Punto di Scambio Virtuale (PSV) in Italy and a National Balancing Point (NBP) market in the UK. The US exchange in New York is called Henry Hub. The Rotterdam and New York exchanges

¹¹ Teleborsa (2022). This was preliminary data; later figures show the total volume was 76.118 bcm.

¹² Reuters (2014).

¹³ Reuters (2021).

are run by CME Group of the United States, NBP by UK electricity's National Grid company for spot trading and ICE Futures Europe for futures, and PSV by Snam Rete Gas. The quality standard for gas traded on the EU's spot markets is high calorific value ('high cal') gas,¹⁴ while the NBP market uses the Wobbe Number/Index (which measures the energy of gas within a given volume).¹⁵

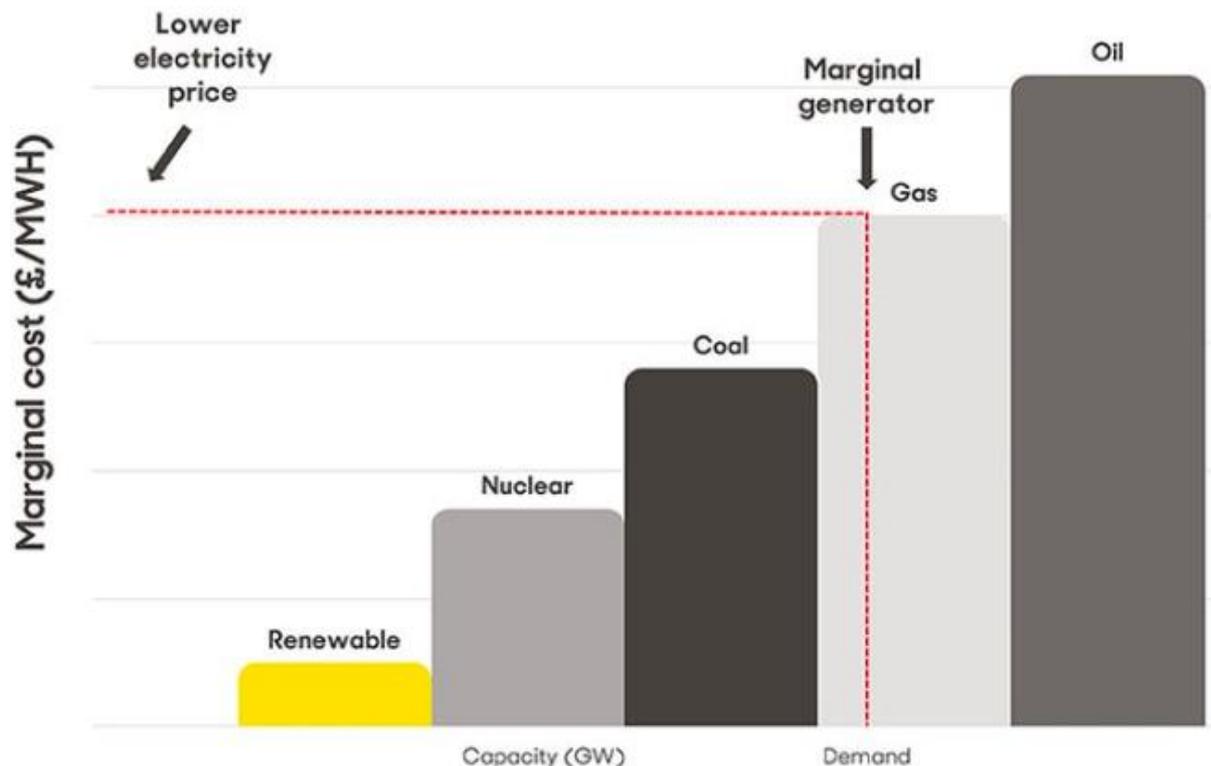


Figure 4: Illustrative merit order for UK electricity prices (using the EU's system)

Source: Good Energy¹⁶

Throughout the EU (and still in the UK) the wholesale price of gas has a strong, and often determining, influence on retail electricity prices. This is because of what is called the 'merit order' under the EU's Internal Energy Market regime. Based on the economic concept of marginal-cost pricing, this takes the form of a frequently repeated digital auction in which offers of electricity from all generators are aligned in order of price. The cheapest is taken, then the next cheapest and so on until all demand is met. The price for the electricity is then determined by the price of the final, most expensive offer. This is illustrated in Figure 4, in which the horizontal dotted line shows the resulting price.¹⁷ This method can create large profits for electricity suppliers from renewable sources, the costs of which are generally the lowest, but much less for high-cost sources such as gas. However, it means that in the short term gas-fired power stations cannot be undercut competitively by other, cheaper sources, including renewables. This has been the basis of the Russian firm Gazprom's power in European energy markets as well as ENI's within Italy. Over the years, however, it has facilitated a slow transfer from fossil fuels towards renewables (as well as nuclear power), but in present circumstances it is making all electricity very expensive for consumers in any country where gas-fuelled electricity generation is widespread, including Italy.

¹⁴ S&P Global (2022), pp. 9-10.

¹⁵ National Grid (undated).

¹⁶ Good Energy (2022), p. 3.

¹⁷ This is clearly explained by one electricity supplier for its customers at Good Energy (2022) and in more technical detail in Deane, P., and others (2015).

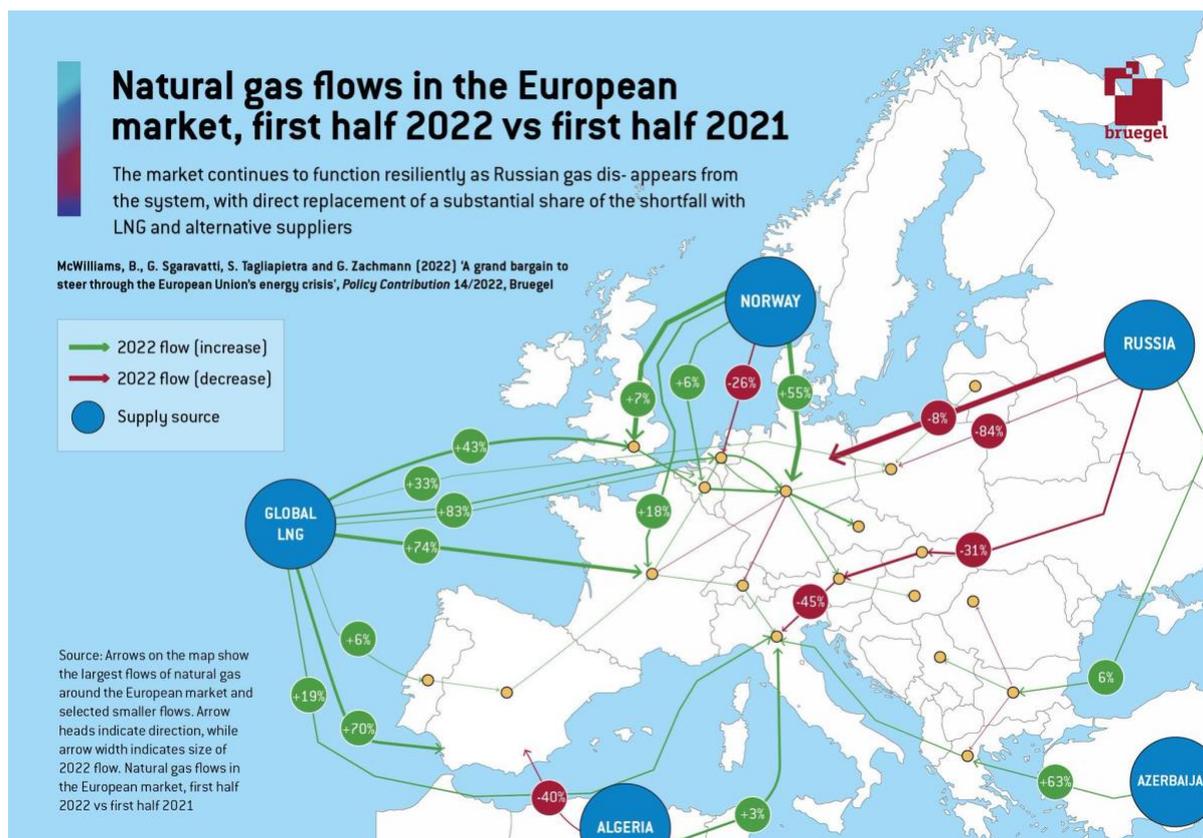


Figure 5: Percentage changes in European gas flows from first half of 2021 to first half of 2022

Source: Bruegel¹⁸

Thus, in the second quarter of 2022 Italy's household electricity was estimated to be the fourth most expensive in the EU after Denmark, Germany and Belgium, with an average price of 37.01 c€/kWh, compared with an EU average of 28.62 c€/kWh. Industrial electricity prices were the second highest after Greece at 29.06 c€/kWh (EU average: 17.46 c€/kWh). The increase in Rome's electricity prices between August 2021 and August 2022 was also the third highest among European capital cities outside Russia, after Amsterdam and London.¹⁹

The TTF gas hub in Rotterdam is the largest and most liquid in Europe with 69 per cent of the total market (and 84 per cent of the EU market) in the second quarter of 2022. The TTF price is regarded as the European reference price. The British NBP market is the next largest with 18 per cent while PSV has only a 1.9 per cent share of the European trade.²⁰ The PSV market has a fairly limited role for non-commercial or 'financial' participants and is therefore relatively illiquid, as indicated here:

'According to the ARERA report, Italy's PSV gas hub has seen its churn rate increase over the past ten years and reaching 3.3 in 2019 from about 2.5 in 2015. Churn rate indicates the number of times a commodity is exchanged on the hub before being physically delivered. ARERA said the 2019 increase was mostly due to increased LNG deliveries at the PSV, and also the creation of a balancing market in 2016. But Italy is still far from a churn rate of 10, at which a gas market is considered liquid and mature.'²¹

¹⁸ McWilliams, B., and others (2022), p. 3.

¹⁹ European Commission (2022A), pp. 43-46, Figures 53, 54 and 56.

²⁰ European Commission (2022A), p. 37.

²¹ S&P Global Platts (2020), citing ARERA, <https://www.spglobal.com/en/research-insights/articles/italy-s-gas-market-an-ecosystem-where-price-takers-thrive>.

We shall see some implications of this later.

- Futures markets

The first organised market for future and forward trading in primary commodities appeared in the 19th century when the railways got as far as Chicago, and merchants in other parts of the United States wanted to secure firm prices several months in advance for their purchases of cereals and other produce in the agricultural states around that city. The London Metal Exchange (LME) was founded a few years later, to enable physical trade in several non-ferrous metals as well as contracts to buy and sell them three months before delivery, that being the time required in that era for a shipment of copper to reach London from the big mines in Chile.

In both cases, the markets satisfied the desire to allay the commercial risk that arises from the instability of many primary commodity prices. A merchant in New York could buy a contract with a firm price for wheat three, six or 12 months in advance of delivery, with a 'counterparty' to take the other side of the deal. The advance purchaser was said to have acquired a 'long' position – a new asset consisting in the right to future possession of the commodity – while the seller had a 'short' position – the obligation to supply it later at the agreed price. Through the futures exchange, either could buy or sell their side of this contract at any time to others who were represented on it.

ENI has illustrated the practical consequences of this system for its gas production business thus:

'The Company is relatively insulated from movements in natural gas prices because a large part of our equity gas volumes are sold on a fixed basis and due to the forward sale executed of a portion of equity gas amounting to about 4.5 BCM (otherwise indexed to spot prices) at prices current in the last months of 2021 ranging between 800 and 400 €/KCM [76.43 and 38.22 €/mWh].'²²

This meant the company was safe from significant *declines* in gas prices, which might have been expected at the time when that was written.

The volatility of futures prices also generated a type of broker who was willing to take on the price risk by buying and selling such contracts without ever intending to take physical delivery, recognising that they would at times lose money by misreading a price trend but that at other times they could make large profits. These people – speculators, sometimes called 'financial traders' – provide the liquidity that the exchanges require to enable them to operate at all times.

It further turned out that the commercial traders on either side of the market would generally not take the contract to its term either, to avoid having to deliver or receive physical product on that market itself. For them too, it was a 'paper' contract, serving the purpose of avoiding price risk only. (The LME was a partial exception, as a 'forward' market – not a futures market – which maintained warehouses of metal to enable physical deposit or offtake.) For those involved in the physical production and use of a commodity, or the purchase of it for industrial purposes or resale, these markets serve as places to 'hedge' risk by fixing a price in the future while they conduct their actual physical trade elsewhere. This is often described as insurance against that risk and it made futures contracts the first 'derivative' instruments – so called because they *derive* from commerce in actual commodities. Most often, a short position is 'closed out' by buying contracts for the same volume back on the market shortly before delivery is due; likewise in the other direction with a long one. The process is called 'hedging.' It was well explained recently with this example from electricity futures:

'Power generators often hedge their sales to households and businesses by taking short positions in future markets prior to selling the physical electricity. In normal times if electricity prices rise the money they lose on their paper positions is offset by their gains in the physical market, and vice versa.'²³

²² ENI (2022C), p. 48.

²³ *Financial Times* (2022B).

In due course, the openness of trading, with supply and demand meeting each other in public and finding a price, led many of the prices found on futures and forward exchanges to be accepted as standard or ‘reference’ prices for a commodity, on which physical contracts would be based. The most influential markets are generally those with the greatest volumes of trade or liquidity, which also implies the largest speculative input to take on the risks that hedgers wish to dispose of. In the European natural gas market, this is the TTF market in Rotterdam – achieving that dominance by virtue of being at a leading delivery point for *physical* commerce, as Chicago was in US agricultural markets and London was in metal markets in the late 19th century.

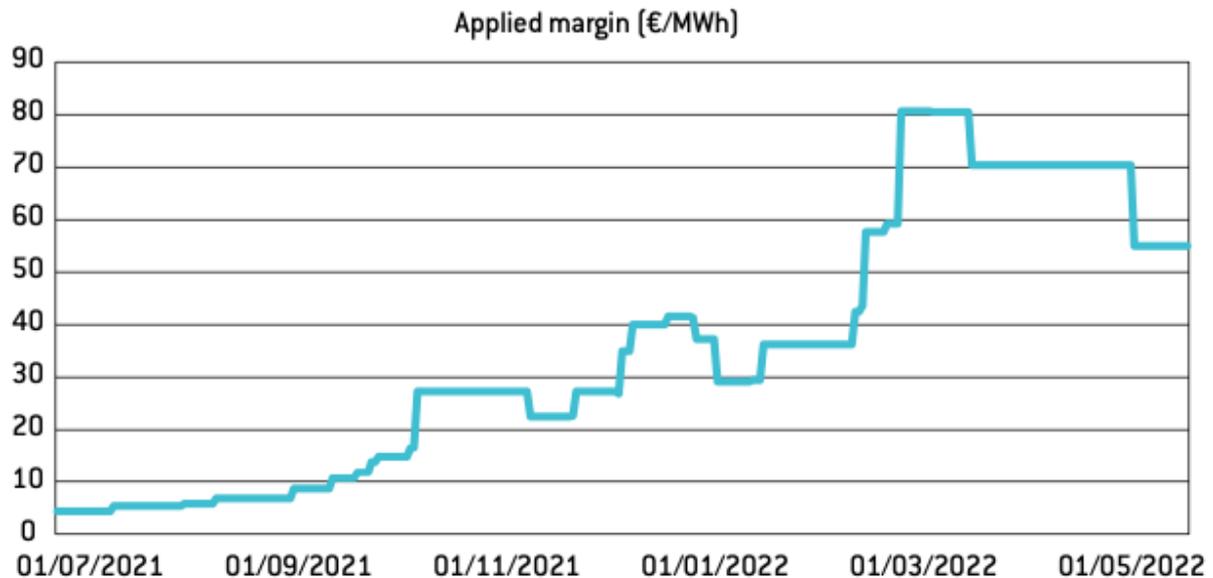


Figure 6. Trading margins applied in TTF natural gas futures since July 2021

Source: Bruegel (based on ECB *Financial Stability Review*, May 2022, Chart 2.9, p. 50)²⁴

However, in the second half of 2021, but exacerbated in 2022, the cost of commercial hedging on the gas futures markets suddenly increased sharply due to a huge rise in the margins, or deposits, which the exchanges require of their clients. See Figure 6. This was occasioned by the greater risk of defaults on contracts which was created by exceptional price volatility, which margins are in place to cover. They are like the deposit you pay in a shop for something to be delivered later. As prices rose the percentage of a contract’s value that was required as a margin payment also increased, doubling the impact of this. Companies’ liquidity was then squeezed by growing demands for the collateral which banks require as security for short-term finance to pay for these margins. This became a major cost for retailers of gas and electricity, on top of the big increase in wholesale prices which they also faced, and it led a number of them around Europe into financial difficulty. The companies that rely on gas generation of electricity have struggled the most.²⁵

In the US version of its annual report, ENI commented on the negative effect this had on it in 2021:

‘The spike in commodity prices caused financial tensions at European energy players, like Eni, which are making use of commodity forward sale contracts and commodity financial derivatives to hedge commercial margins or also for speculative objectives due to the requirements of margining payments envisaged by contracts.’²⁶

²⁴ McWilliams, B., and others (2022), p. 11.

²⁵ *Financial Times* (2022B).

²⁶ ENI (2022B), p. 7. This is well explained in the following paragraphs. The financial implications for ENI are also described in ENI (2022B), p. 49.

(Note the company's open acknowledgment – required under US law but not as strongly in Europe – of sometimes harbouring 'speculative objectives.')

The increase in gas margin calls going into 2022 explains the first half of this paradox:

'On Sunday Finland warned that the energy sector was facing a potential "Lehman Brothers" moment if governments did not provide emergency funding to help providers meet spiralling collateral requirements caused by soaring wholesale prices.

'But on the same day Germany announced a windfall tax on many of the same electricity generators, saying those not reliant on burning gas to create power were enjoying "excessive profits".'²⁷

The second half of it refers back to the high profits made by generators that use cheaper sources, such as renewables.

(A similar crisis of margin calls occurred in the British government bond market in September 2022, when a sudden loss of confidence in the government's debt management led to a spike in margins on the derivatives used to hedge holdings of the bonds, leading to a scramble among private pension funds for cash to pay for margin calls.)

4. The Italian gas market

- Wholesale and retail

Italy has a large number of gas suppliers, none of them big enough to dominate the market at any level, although ENI is the most powerful by virtue of being the largest in most market segments. In 2019 it accounted for 47 per cent of Italy's gas imports. However, although the largest participant, ENI's share of the Italian wholesale market in 2019 was no more than 14 per cent, plus another 10 per cent held by its trading arm, Eni Trading & Shipping. Engie Global Markets was second with a 10.3 per cent market share and Enel third with 8 per cent.²⁸

Recently there has been a complicated and rapidly changing relationship between wholesale purchase and sale prices on the wholesale gas market. ENI reports:

'Due to the competitive nature of the business, sales [profit] margins tend to be small. In 2021, despite natural gas prices surging to record levels, our wholesale margins were negatively affected by narrowing spreads between prices at continental hubs [such as TTF and Henry Hub], to which our gas procurement costs [including those from Gazprom] are indexed, and spot prices for the main Italian benchmark [PSV] to which our selling prices are indexed.'²⁹

But the first half of 2022 brought an opposite trend of 'price decorrelation,' with the price spreads between various hubs increasing, in some cases quite dramatically, as a result of the crisis in supplies from Russia and the various responses to it. The International Energy Agency (IEA) explained this trend:

'Price decorrelation across key European gas hubs continued during Q3 [the third quarter of 2022], as the record high LNG imports resulted in pipeline bottlenecks. Markets with remaining spare regasification capacity displayed significant discounts compared to TTF. For example, during Q3 the United Kingdom's NBP averaged EUR 60/MWh below TTF and Spain's PVB averaged EUR 55/MWh below. In contrast, certain Central and Eastern Europe markets – which have limited access to LNG supply – continue to display a premium compared to TTF.'³⁰

²⁷ *Financial Times* (2022B).

²⁸ S&P Global Platts (2020), citing ARERA, <https://www.spglobal.com/en/research-insights/articles/italy-s-gas-market-an-ecosystem-where-price-takers-thrive>.

²⁹ ENI (2022B), p. 5.

³⁰ International Energy Agency (2022), p. 70.

See Figure 7. However, the various prices came back together by August, except for very large discounts to TTF prices on the French TRF and UK markets. This will all have provided opportunities for arbitrage trades, in addition to speculative profits on some of the futures markets themselves.

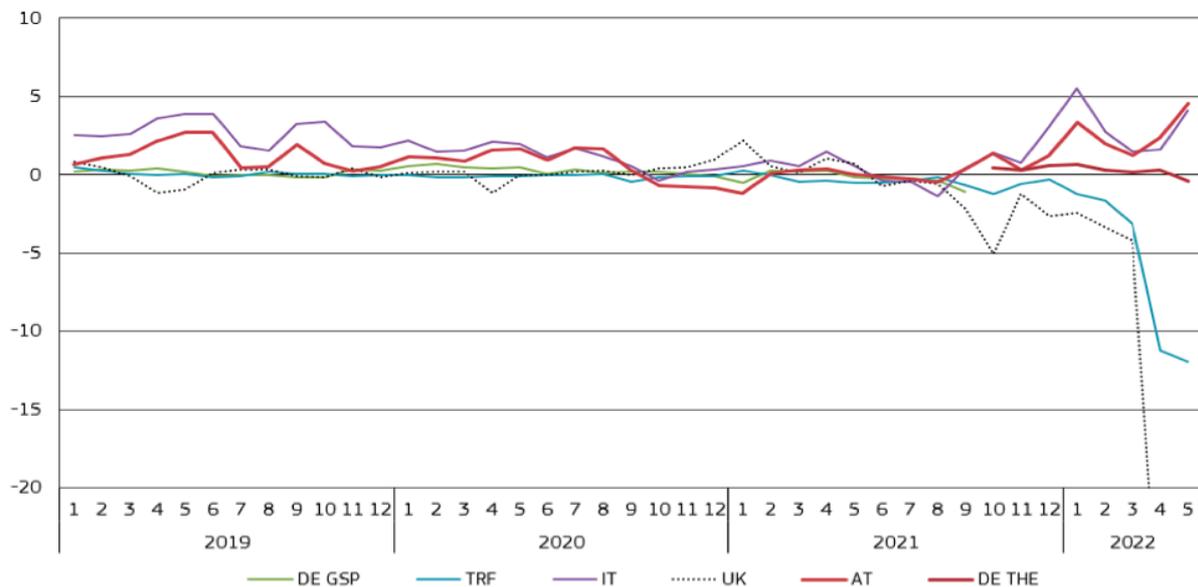


Figure 7: Premiums of gas prices at selected hubs compared to TTF, up to May 2022 (€/MWh)

Source: European Commission, citing S&P Global Platts and its own computations³¹

- High prices generally

Italy's gas prices are generally among the highest in Europe, but the reasons for this are somewhat complicated.³² In summary, it has been explained thus:

'Illiquidity and control over supply routes are the main factors that kept the premium of the Italian gas spot contract to the Dutch TTF equivalent at an average of Eur2.70/MWh during 2019.'

We have already come across the illiquidity, as seen in the low churn rate on the PSV market.

On the supply routes, the most influential factor is the Transitgas pipeline through Switzerland, which in practice determines the Italian price on most days. The domestic reference price is the PSV price, for which the merit order system is used, as described above for European electricity markets. To help it to work for wholesale gas markets within a member state, EU rules require that a certain amount of a pipeline's capacity must be kept available for spot trades, even where there is a long-term contract for most of its use. However, that does not apply to Transitgas since it is not on EU territory. Instead, Italian purchasers pay the spot prices that apply at the northern entry points into Switzerland, and then have to request transit across Switzerland (which may or may not be available) for whatever it costs on the day. The fee for that is additional to the spot price at the northern entry point.³³ Since Transitgas delivers 10 per cent or more of Italian supplies, on most days this higher total price will not only be part of the merit order but its most expensive element; it therefore determines the general Italian price. No other EU member state imports gas from another via a non-member state in this way – hence Italy's high prices.

³¹ European Commission (2022B), p. 33.

³² This is fully discussed in S&P Global Platts (2020).

³³ S&P Global Platts (2020), pp. 6-8.

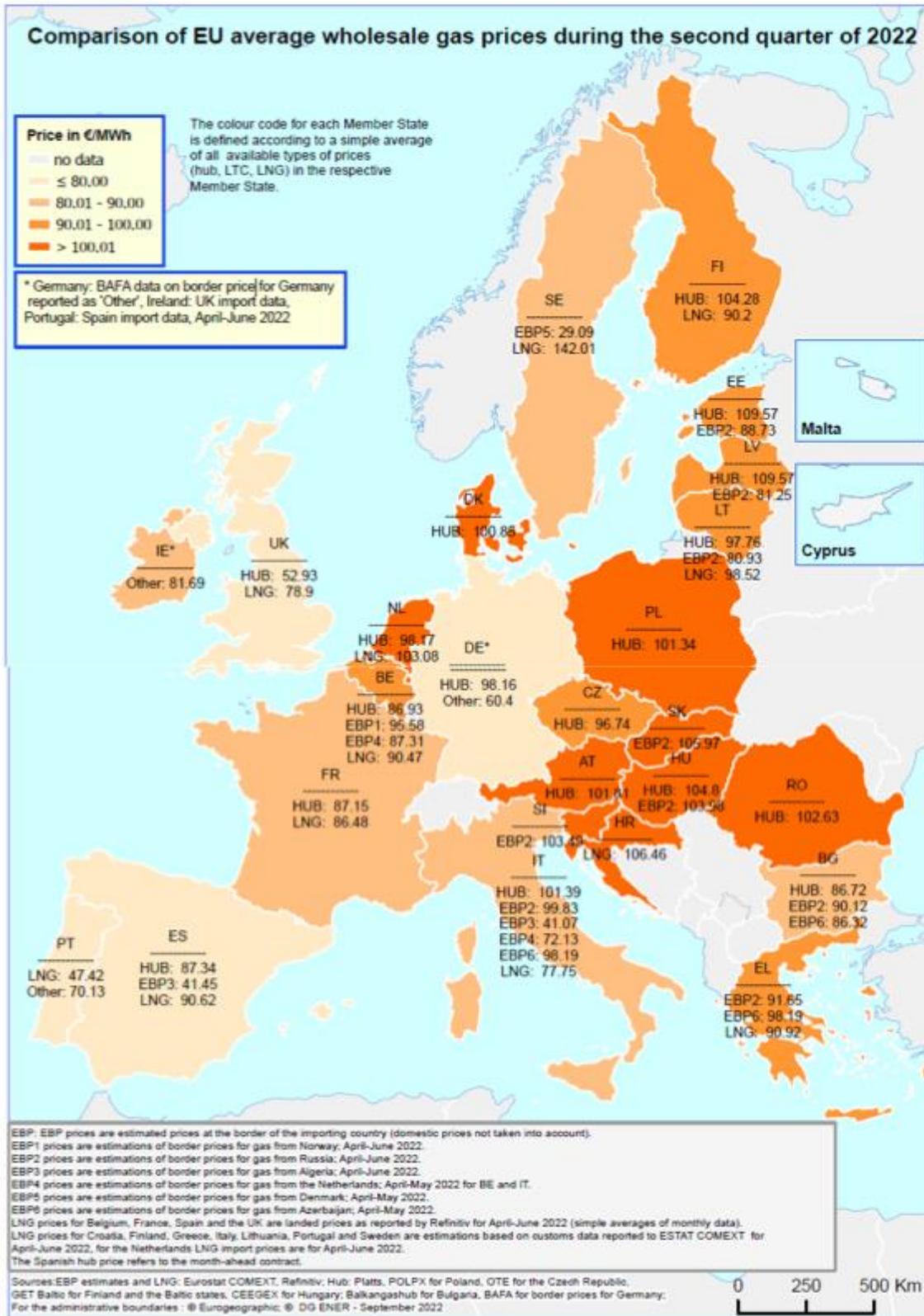


Figure 8: Comparison of EU wholesale gas prices in the second quarter of 2022 (€/MWh)

Source: European Commission³⁴

³⁴ European Commission (2022B), p. 36.

Figure 8 shows the average second-quarter 2022 wholesale prices in many European countries. Italy's PSV had the highest average hub price outside the Baltic region at €101.39 per MWh, compared with €98.17 at the TTF hub in the Netherlands, €87.15 in France and €52.93 in the UK. Italy's import (or border) prices were all lower than on the PSV, with the €41.07 price for Algerian imports, which are indexed to oil prices, being the lowest price on the map (all prices in €/MWh).³⁵

5. ENI's oil and gas operations

- Corporate structure and profitability

For reporting purposes, ENI is made up of five 'segments,' which it defines as follows:

- **'Exploration & Production:** research, development and production of oil, condensates and natural gas, forestry conservation (REDD+) and CO₂ capture and storage projects.
- **'Global Gas & LNG Portfolio (GGP):** supply and sale of wholesale natural gas by pipeline, international transport and purchase and marketing of LNG. It includes gas trading activities finalized to hedging and stabilizing the trade margins, as well as optimising the gas asset portfolio.
- **'Refining & Marketing and Chemicals:** supply, processing, distribution and marketing of fuels and chemicals. The results of the Chemicals segment were aggregated with the Refining & Marketing performance in a single reportable segment...
- **'Plenitude & Power:** retail sales of gas, electricity... wholesale sales of electricity... forward sale of electricity with a view to hedging/optimizing [sic] the margins of the electricity.
- **'Corporate and Other activities:** includes the main business support functions...'³⁶

ENI has extractive operations in oil and gas, some of them wholly owned, some in joint ventures; in some of them ENI is the operator while in others it is not. Its Exploration & Production (E&P) segment operates in 42 countries, the largest three regions for both oil and gas production being Egypt and then North and Sub-Saharan Africa (including Angola, Congo, Côte d'Ivoire, Gabon, Mozambique and Nigeria), which together account for 55.0 per cent of its oil production and 59.6 per cent of its gas production.³⁷ The company has operated in Egypt since 1954 but continues to make new discoveries there (in spite of climate change) and add to its reserves. As of the end of 2020, the largest shares of ENI's gas reserves were in the same three regions while its largest oil reserves were in Kazakhstan, Sub-Saharan Africa and the rest of Asia.³⁸ ENI also has oil refineries and sells their products, it purchases wholesale gas and sells it on, including directly to consumers, it generates electricity for sale to consumers and is developing renewable sources of energy.

Roughly half of the company's gas sales are in Italy, where ENI sold 16.3 bcm of gas in the first half of 2022, most of it going to wholesalers, the PSV exchange and spot markets. In other countries it sold 15.4 bcm. The largest foreign sales by volume were in Turkey (27.6 per cent of the worldwide total and 30.5 per cent of that for Europe outside Italy), followed by France and then, roughly equally, the Iberian peninsula and Benelux.³⁹ So ENI is a true transnational corporation. For example, it produces gas in UK offshore waters which is mostly if not entirely sold in the UK. In the first half of 2022 its sourcing of gas in the UK was 1.12 bcm and its sales were 1.13 bcm; UK sales were 7.4 per cent by volume of ENI's non-Italian total.⁴⁰

³⁵ European Commission (2022), p. 35.

³⁶ ENI (2022C), pp. 91-92.

³⁷ ENI (2022B), p. 27 and ENI (2022B), p. 13.

³⁸ ENI (2022B), pp. 160 and 164.

³⁹ ENI (2022B), pp. 57 and 76-77.

⁴⁰ ENI (2022C), pp. 14 and 15.

E&P is where most of ENI's huge surge in profits has been found since 2021, due to the increase in oil and gas prices. ENI has profited from the increase in wholesale prices as a *gas producer*, but not so much as a *buyer and seller* of, for example, Russian gas. Table 4 shows that in 2021 its E&P segment accounted for 28.0 per cent of the group's revenue but 81.6 per cent of operating profits. Put another way, the segment kept an extraordinary 46.3 per cent of its revenue as operating profit, compared with a more normal 4.1 per cent for the whole group taken together. The picture was not very different in the first half of 2022, although at much higher rates of revenue and profit. While the segment received 25.2 per cent of ENI's revenue, its gross operating profits were 81.7 per cent of the total. Expressed as a share of its own revenue, E&P's operating profits went up even further to 57.1 per cent.

Nevertheless, although it is much less profitable, the turnover (or revenue) of the GGP segment has become 41.0 per cent more than that of E&P, to reach a larger sum in the first half of 2022 than the whole of 2021.

		2022 (first half)			2021 (whole year)		
		€ billion	% of total	As % of revenue	€ billion	% of total	As % of revenue
Revenue	Total	64.3	100	100	77.8	100	100
	E & P	16.2	25.2	100	21.7	28.0	100
	GGP	22.8	35.5	100	20.8	26.8	100
Operating profits	Total	11.3	100	4.4	12.3	100	4.1
	E & P	9.2	81.7	57.1	10.1	81.6	46.3
	GGP	0.917	8.1	4.0	0.899	7.3	4.3

Table 4: ENI group's consolidated results for the first half of 2022 and all of 2021

Source: ENI company reports for 2021 and the first half of 2022

ENI's sales of its own natural gas and LNG in the first half of 2022, at €1.8 billion, were worth almost as much as those of crude oil (€1.7 billion) and oil products (€378 million) combined, and helped to produce operating profits of €9.2 billion for the E&P segment in the first half of 2022, compared with €3.2 billion in first half 2021. By way of comparison, the GGP segment had a €917 million operating profit and a €6 million loss, respectively.⁴¹

- Portfolio optimisation, hedging and trading activity

ENI exhibits a remarkable mismatch between where most of its own gas is produced and where its final gas markets are. Thus, 92.1 per cent of the company's gas sales in 2021 were in Europe (of which 52.3 per cent in Italy itself) but only 9.6 per cent of the gas produced by the company and its wholly owned subsidiaries was sold in that continent. The greatest part of the group's own production was in Egypt, with 41.3 per cent of the total, whilst North Africa produced 17.8 per cent and Sub-Saharan Africa 10.3 per cent. But Egypt does not supply gas to Europe while ENI imports gas from Algeria not only from its own wells but mostly from that country's producer, Sonatrach. ENI has depended mainly on producers in Russia, Azerbaijan and Qatar, as well as Algeria, to supply its customers in Italy.

This is related to the difficulties of transporting gas which were described earlier. The gasfields in Egypt are principally offshore and are no further from Italy than those in Russia, but with no pipeline and without conversion to LNG they cannot be used to supply Italy. If this was oil, there would be no such difficulty and any reliance on Russian supplies in 2022 would have been much more easily dealt with. This is all part of the complexity of the gas market, and it also explains a considerable part of ENI's

⁴¹ ENI (2022C), (p. 23).

corporate complexity as well as its recent gas strategy, which we come to here. The group's portfolio of assets and markets in the natural gas sector is very diverse and complicated.

ENI's GGP segment now operates very differently from E&P, engaging in 'gas trading activities targeting both hedging and stabilizing the Group's commercial margins and optimizing the gas asset portfolio'⁴² besides obtaining wholesale gas, transport and selling it on. This needs to be explained – and at some length because of the abstractness and complexity of these terms. GGP's profit margins always tend to be lower and it is no doubt partly for this reason that ENI introduced the system of portfolio management, sometimes called portfolio optimisation, to enable it to operate in a more 'flexible' way, more like a large trading company than a traditional integrated corporation. Thus, while E&P's profits have increased because of higher prices, GGP's did so mainly because of 'continuous initiatives of portfolio optimization and contract renegotiations, as well as a higher value of gas held inventory ... due to rising commodity prices.' The renegotiation of long-term gas supply and sale contracts to bring their prices closer to prevailing market levels is listed as the first of three 'drivers' of GGP's current strategy. The second is 'To effectively manage our portfolio of assets (supply and sales contracts, their flexibilities and optionality and logistics availability) in order to extract value from portfolio flexibilities through continuing optimizations' while 'We make use of commodity and financial derivatives to hedge us against the risks of different indexation formulas in our gas procurement costs vs. selling prices in relation to contracted sales or highly-probable sales.' The third driver is to grow GGP's LNG marketing business and integrate it better with E&P.⁴³

Portfolio optimisation is well explained in a consultancy paper published by McKinsey in 2021,⁴⁴ which argues that many participants in the gas market have recently aspired 'to capture incremental margins from global arbitrage opportunities and better manage the risks of market disruptions.' This in turn is connected with employing 'a portfolio optimization business model, which focuses on optimizing flows across the overall asset portfolio to capture the best opportunities and minimize transport costs.' The contrast between portfolio-optimising companies and those following a traditional 'marketing' approach is:

'...that the portfolio optimizers use their assets to capture opportunities across a wide variety of markets and can monetize their optionality, whereas the marketers supplied a steady flow into a few end markets.'

McKinsey defines portfolio optimisation thus:

'A portfolio optimization business model ... focuses on optimizing flows across the overall asset portfolio to capture the best opportunities and minimize transportation cost. Scale and optionality to manage both equity production [that produced by the firm itself] and third-party volumes [bought in from others] through advanced trading and optimization capabilities are also priorities.'

McKinsey's report is specifically about the LNG sector, but the principles it describes apply broadly. It recommends:

'Integrated LNG players that want to pursue a portfolio-optimization business model should focus their efforts in three areas: understanding strengths and weaknesses in the current market, exploring moves to expand and strengthen the portfolio, and developing advanced LNG optimization and risk-management capabilities.'

The implementation of this strategy is illustrated in six 'tactics' pursued by a hypothetical portfolio optimiser in LNG (as viewed when the paper was written in the early months of 2021):

- '*Practicing price arbitrage across regional gas markets, such as between the United States (Henry Hub), Europe (TTF), and Asia and global LNG (JKM and oil-linked contracts)*...

⁴² ENI (2022B), p. 76.

⁴³ ENI (2022B), pp. 122 and 135.

⁴⁴ McKinsey & Co (2021). Various passages from this are extensively quoted below. Where emphasis is shown (in italics), it is there in the original.

- ‘Securing an integrated spread through the entire gas value chain; for instance, monetizing price differentials between gas and electricity for European positions
- ‘Practicing time arbitrage [in other words, futures or forward contracts], or using regasification storage – occasionally floating LNG storage – to its advantage in Europe when selling gas for more than the spot price
- ‘Pursuing volume flexibilities by reallocating cargoes from spot-lifting regions (such as the United States and Australia) to some higher-priced, oil-linked sale and purchase agreements (SPAs), and exercising downward volume ... options across the entire SPA portfolio
- ‘Optimizing shipping through time-charter positions – that is, reallocating charters between routes and revising strategies for where to reposition ships after spot commitments are met
- ‘Finding market opportunities for other market players by extracting value from medium-term commitment options by, for instance, offering call options (for two to five years) on cargoes...’

Although this example is hypothetical, it seems useful as it is more concrete and specific than what ENI writes about its own optimisation methods. In addition to the hypothetical case, McKinsey ‘analyzed the actual LNG flows from two liquefaction assets,’ one of them using a traditional marketing model and the other using portfolio optimisation. This is what it found:

‘We tracked flows from both players’ liquefaction plants and found that the portfolio optimizer shipped to 31 separate markets in 2019, whereas the marketer served only five markets... Flows from the optimizer also changed cargo destinations much more often... the portfolio optimizers use their assets to capture opportunities across a wide variety of markets and can monetize their optionality, whereas the marketers supplied a steady flow into a few end markets.’

While McKinsey’s paper is about companies with LNG operations in particular, it broadly echoes two previous papers about the oil and gas industry more generally, one of them published by Boston Consulting Group (BCG) in 2015⁴⁵ and the other sponsored by Deloitte in 2019.⁴⁶ And all of these analyses reflect the recent behaviour of some of the largest oil and gas groups, notably Shell, BP and Total,⁴⁷ as well as major trading firms in the same sector.

McKinsey illustrates its argument with the chart reproduced in Figure 9. It shows four types of LNG business, the first being a traditional company which produces and liquefies the gas and then sells it on to the next stage in the supply chain. On the second row, the portfolio optimisers have a greater range of activities going further downstream than that, providing them with arbitrage opportunities and greater flexibility. As we have seen, ENI is involved in the natural gas supply chain all the way from exploration and extraction to electricity generation, but in a discontinuous line involving several different chains. This gives it even more arbitrage opportunities than the ‘portfolio optimizers’ in Figure 9.

It is not only McKinsey that has made claims of significant increases in profits from this approach. ‘We have determined, for example, that SOCAR, the State Oil Company of Azerbaijan Republic, increased its [oil] revenues by \$1.70 per barrel by shifting its emphasis from marketing to trading,’⁴⁸ BCG wrote. Both BCG and McKinsey indicate that it is especially suitable to enable large companies with diverse activities and geographical bases to squeeze out extra profits, especially when the oil and gas prices are weak; as BCG pointed out in 2015, ‘Today’s oil-price environment continues to pose a significant hardship for the upstream oil sector.’

⁴⁵ Boston Consulting Group (2015).

⁴⁶ Basteviken, M., and N. Pearson-Woodd (2019).

⁴⁷ Financial Times (2022C).

⁴⁸ Boston Consulting Group (2015), p. 5.

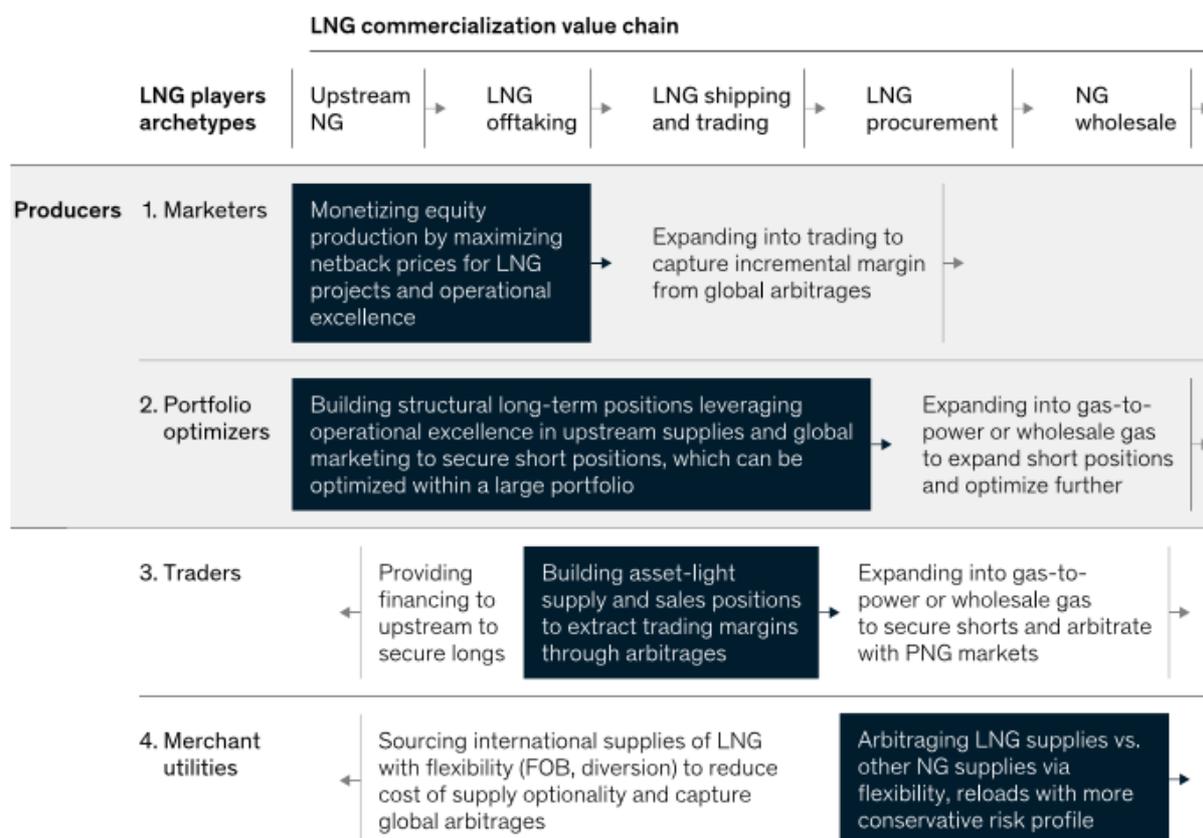


Figure 9: LNG value chain dynamics by archetype

Source: McKinsey

However, this business approach has also played a role in the tight gas market of 2022, according to the International Energy Agency (IEA) – again with respect specifically to LNG but potentially applying more generally:

‘Portfolio players procure a mix of LNG supplies from multiple sources and resell to customers according to their requirements via term contracts and spot market sales. They are an important source of flexibility in a global market and for this reason have been playing a major role in providing volumes to Europe in the recent tight and uncertain market context.’⁴⁹

Within some of the major oil corporations ‘trading’ activities of a comparable sort have become a major part of the business in recent years. BP, Shell and Total are said to ‘have an edge’ in particular.⁵⁰ The definition of trading activity here has to be quite broad. In the first instance it naturally includes selling oil, gas and hydrocarbon products that a company has produced. But according to the *Financial Times*, the trading teams of these three oil majors were ‘not only placing the company’s production with customers. They also buy and sell third-party volumes of oil, gas and other commodities for profit, making them significant revenue generators in their own right.’ As it points out, ‘the companies generally insist they do not take speculative positions.’ But the term ‘speculative positions’ is open to interpretation here, since the word ‘position’ might be taken in the narrow technical sense of a contract or net set of contracts outstanding on a futures exchange.⁵¹ To deny ‘taking speculative positions’ in that restrictive sense does not necessarily deny any pursuit of speculation at all.

⁴⁹ International Energy Agency (2022), p. 44.

⁵⁰ *Financial Times* (2022C).

⁵¹ *Financial Times* (2022C).

The role of this approach can be understood after a close examination of ENI's recent accounts. What the company calls 'adjusted' operating profit (which excludes such things as revisions of asset values due to price changes, and gains and losses from what amount to speculative derivative positions – apparently those used in 'flow hedging' – see below) in 2021 was €9,664m for the group as a whole and €580m (6.0 per cent of the total) for the GGP segment. The latter was explained as arising from 'portfolio optimizations and contract renegotiations.' It was a significant turnaround from a €6m adjusted operating loss to GGP in the first half of 2021, implying a second-half profit of €586m, and it increased further to €917m in the first half of 2022.⁵²

Using the rather abstract language of business communications, ENI defines the 'portfolio of assets' that is at issue in its GGP segment as 'supply and sales contracts, their flexibilities and optionality and logistics availability.' In practice this looks similar to the priority identified in the bullet point immediately above it on the same page: 'To continuously renegotiate our long-term gas supply and sale contracts to align pricing terms to current market conditions and dynamics as they evolve.'⁵³ That would also comply with descriptions elsewhere of what ENI is actually doing, in an attempt to reduce the mismatches between contract prices in different parts of the supply chain. It involves reducing the reliance on long-term contracts and, especially, *selling* short-term at spot market prices. This desire was already evident in the conversion of ENI's long-term contract with Gazprom in 2014 to the use of gas spot markets as the price basis.

For all these operations in the gas market, GGP uses its EGEM and ETB trading subsidiaries, which were set up at the beginning of 2021. ENI's annual report for 2021 says:

'Eni manages the commodity risk through the trading units (Eni Trade & Biofuels SpA [ETB] and Eni Global Energy Markets SpA [EGEM]) and the exposure to commodity prices through the Group's finance departments by using financial derivatives traded on the regulated markets MTF, OTF and financial derivatives traded over the counter (swaps, forward, contracts for differences and options on commodities) with the underlying commodities being crude oil, gas, refined products, power or emission certificates.'⁵⁴

EGEM says it 'is mainly engaged in:

- 'trading operations, on both physical and financial energy commodity markets (mainly gas, power, LNG and CO2 emissions);
- 'the use of portfolio flexibility in Asset Backed Hedging⁵⁵ activities;
- 'the provision of services for the management of commodity price risk to the divisions and companies of the Eni Group;
- 'the trading of CO2 certificates to meet the needs of Eni Group companies.'

The company's purpose is stated clearly here:

'Starting from 1st January 2021 EGEM acts in the international trading of gas, power, CO₂ (as a single interface between Eni and the markets), LNG and Oil derivatives. It is a global, integrated approach designed to make the most of Eni's network of contacts and wide asset portfolio. In turn, EGEM helps to optimise the management of Eni's assets, promoting collaboration within the organisation and devising advanced risk-management solutions. EGEM enhances Eni's unique position as a European leader in the gas sector, acting as a specialized hub for trading and commodity risk management.'⁵⁶

In line with all this, the IEA has pointed out that 'portfolio players' have greatly reduced the share of term contracts in their LNG sales since 2017. Their contracted ratio (the proportion of purchases under contract which are sold on under contract) reduced from 66 per cent in 2017 to 52 per cent

⁵² ENI (2022B), p. 116; ENI (2022A), p. 18; and ENI (2022C), p. 10.

⁵³ ENI (2022B), p. 135.

⁵⁴ ENI (2022A), p. 290.

⁵⁵ In Italian: 'ottimizzazione delle flessibilità di portafoglio Eni in attività di Asset Backed Hedging.' See www.eni.com/it-IT/chi-siamo/societa-controllate-partecipate/eni-global-energy-markets.html.

⁵⁶ ENI (undated).

by 2021. As the IEA argued, ‘With the extreme rise in gas prices since late 2021, sellers are likely to want to sell their LNG volumes on the spot market to make an additional profit... The current situation is financially attractive for short-term sellers.’ A consequence of this on the wider market is predicted here:

‘As a result of expiring contracts (and in the absence of new SPAs), Europe’s contracted LNG supply would decline by almost 40% by 2025 compared to 2021 levels, leaving the region at a greater exposure to spot market volatility.’⁵⁷

With portfolio optimisation, the anomalies and inconsistencies in ENI’s operational basis for gas can be turned to the firm’s advantage, as it increases the opportunities to seek out different sources and markets for gas on the best terms available at a given time. However, in the commodities trade it is readily observable that those markets where prices are referenced to spot or futures prices are more volatile than those based on long-term corporate contracts.

- Asset-backed trading

ENI’s portfolio flexibility goes hand-in-hand with the practice of asset-backed trading (ABT), which by 2019 was said to have become ‘prevalent in the energy and resources sector.’⁵⁸ This is explained thus: ‘The best traders use an agile business model that allows them to systematically identify and exploit pricing imperfections where they occur. The current market backdrop is rife with such imperfections, translating into significant arbitrage opportunities.’ BCG also says volatile prices lead to an increase in temporary ‘pricing imperfections’ across markets and ‘provide greater opportunity for arbitrage.’⁵⁹ The complexity of the gas market in general, with its variety of types and physical sources and the lack of easy interchangeability between them, leads to a range of pricing systems and plenty of opportunities for arbitrage (profiting from price differences) – especially for participants who are involved in several elements of the market at once.

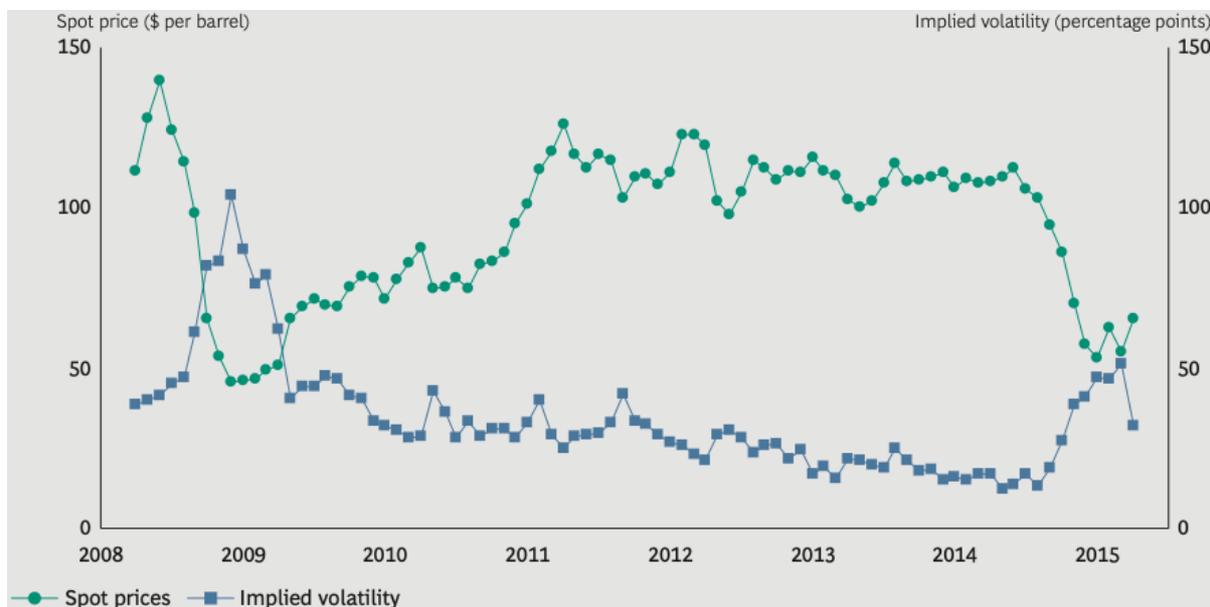


Figure 10: Monthly historical spot prices and spot-price volatility for Brent crude oil

Source: Boston Consulting Group⁶⁰

⁵⁷ International Energy Agency (2022), p. 46.

⁵⁸ Basteviken, M., and N. Pearson-Woodd (2019).

⁵⁹ Boston Consulting Group (2015), pp. 2 and 1 respectively.

⁶⁰ Boston Consulting Group (2015), p. 2, Exhibit 1.

It is clear from BCG’s graph copied in Figure 10 that over the years shown (2008-15), the lower the oil price, the higher was the price volatility. However, that does not apply to the wholesale gas prices of the last 12 months, which have been exceptionally high but also volatile, and these extra profits were therefore available in this later period too, even if there was less of an incentive for oil and gas producers to seek them out. The CME Group, which runs the TTF and NBP gas exchanges as well as Henry Hub in New York, has found that in the final quarter of 2021 and the first quarter of 2022 the natural gas market was more volatile than that of bitcoins (Figure 11).⁶¹ Despite a recent fall in prices, the implied volatility of the gas market remains high, with a figure of 82.2008 on October 24th, 2022, based on Henry Hub prices.⁶²

ENI’s use of this asset-backed method in the portfolio optimisation strategy, and its links with derivatives trading, comes out in this paragraph of its US annual report:

‘Finally, we make use of derivatives to improve margins by leveraging on market volatility and availability of assets like the flexibilities associated with our take-or-pay gas contracts, LNG contracts, transport rights to capture arbitrage opportunities (for example the winter vs summer spread, the [gas] spot vs. the Brent [oil] indexation spread) and time lags in contracts indexation formulae. Those derivatives are of speculative nature with gains and losses recognized through profit.’⁶³

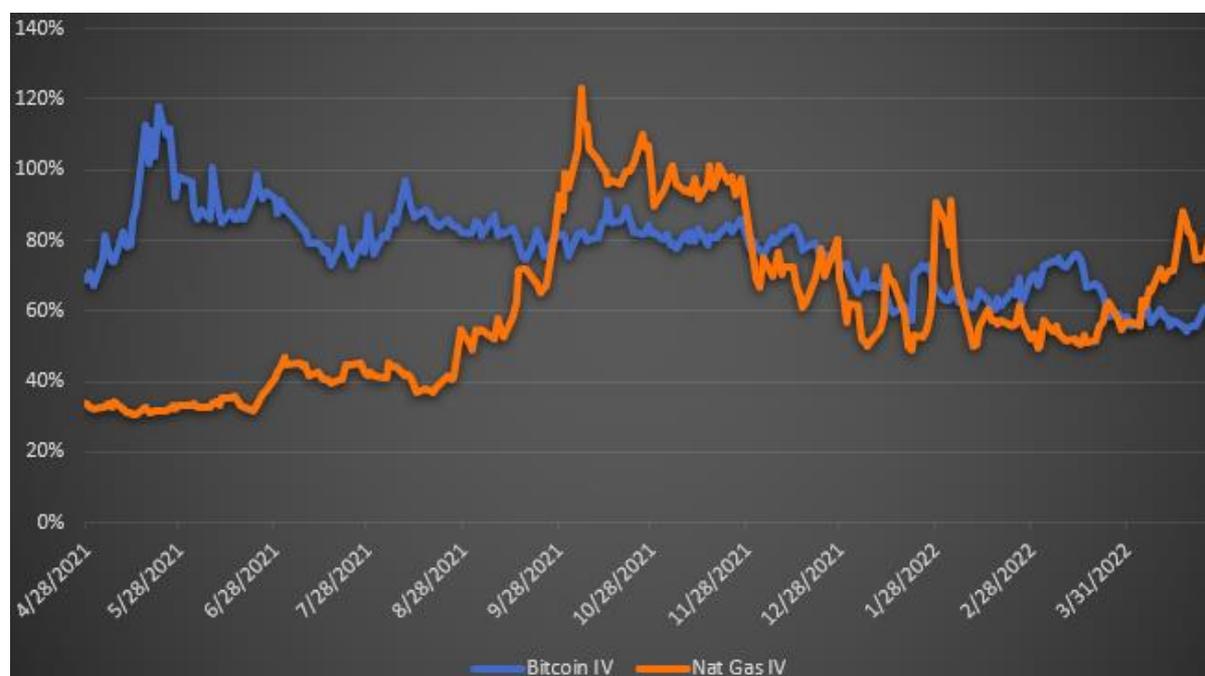


Figure 11: Bitcoin vs natural gas 30-day implied volatility

Source: CME Group

The company uses ‘commodity and financial derivatives’ to hedge against the risks involved in different formulas for price indexation in its purchase and sale contracts, as mentioned above. The variations in them can be extraordinarily large, as seen in the border prices for imports from various sources in Table 5. Some of those derivatives – apparently those used for the ‘flow hedging’ described below – ‘are not accounted as hedges’ under international accounting standards, which adds complexity and

⁶¹ CME Group (undated, C).

⁶² CME Group (undated, B) and CME Group (undated, A).

⁶³ ENI (2022B), p. 135.

volatility to the profit-and-loss accounts, according to ENI. Where not accounted as hedges, they have to be described as speculative under US law.

Import origin of gas	Price at Italian border (€/MWh)
Russia	99.83
Algeria	41.07
Netherlands (April-May only)	72.13
Azerbaijan	98.19
LNG	77.75

Table 5: Border prices of gas imported to Italy, second quarter of 2022 unless shown

Source: European Commission⁶⁴

In discussing the market risks it faces, ENI lists four ‘risk reducing purposes’ for which financial instruments are ‘allowed’ to be used. These purposes are:

- **Back-to-back hedging.** This is simple conventional hedging, normally of a single asset or contract, whether on an organised market or over the counter, and carries limited risk.
- **Flow hedging.** This ‘seeks to optimize Group hedging requirements by pooling different positions retained by the business units and then by entering derivative instruments to hedge net exposures’ resulting in ‘the maximization of integration across the whole of the Group assets portfolio and the related netting potential, avoiding unnecessary derivatives, thus reducing costs and aggregated notional amounts of hedging programs.’ Importantly, ‘Those derivatives are recorded in profit and loss[,] as the hedging of net exposures does not qualify as hedges’ under the International Financial Reporting Standards (IFRS) – as was hinted above.
- **Asset-backed hedging.** Here is ENI’s interpretation of this term: ‘a portfolio-based activity performed to enhance [assets’] extrinsic value which is the fair value that a third party would potentially pay to buy the flexibility associated with assets available to the Group’ (such as a futures option contract as an alternative to a fixed contractual arrangement with a *second* party). These bring ‘a maximum level of market risk,’ at least in part because they ‘entail large use of proxies’ – such as price indices as opposed to the actual price shown on a specific futures contract.

To this end, ‘a business unit may transfer to a central entity part or the whole of an asset flexibility or a portfolio of flexibilities and the central entity will hedge such flexibility on financial markets so [as] to lock its value by monetizing it via derivatives.’ These hedging strategies are ‘normally portfolio-based’ and ‘very dynamic.’

It is all very complicated and ‘may lead to gains as well as losses which in each case may be significant’ and, again, cannot be counted as legitimate hedges under IFRS rules. It operates by ‘continuously adjusting relevant hedging ratios buying and selling the same financial products several times, since the underlying asset flexibility to be hedged is changing depending on price level, price volatility, time to delivery, etc.’

- **Portfolio management.** This is defined as ‘performed on a combination of underlying positions’ and aiming ‘to optimize managed assets’ base by running quantitative models’ which ‘determine the optimal configuration in terms of volume, price and flexibility.’ The results are then hedged with financial derivatives.⁶⁵

⁶⁴ European Commission (2022B), p. 36.

⁶⁵ ENI (2022B), p. 183.

- Proprietary trading

On financial and commodity markets, proprietary trading means discrete trading on a business' own account, rather than hedging other aspects of its business or acting as an agent for clients. In other words, it is essentially speculative. Proprietary trading is placed in the GGP segment of ENI, but separately from asset-backed trading. It is defined as 'an ancillary activity not related to industrial assets that makes use of financial derivatives which are entered into with the objective to obtain an uncertain profit, if favorable market expectations occur,'⁶⁶ and more fully as:

'transactions carried out autonomously for speculative purposes in the short term and normally not aimed at delivery with the intention of exploiting favorable price movements, spreads and/or volatility implemented autonomously and carried out regardless of the exposures of the commercial portfolio or physical and contractual assets. They are usually carried out in the short term,... using financial or similar instruments in accordance with specific limits of authorized risk ([Value at Risk], stop loss).'

⁶⁷

ENI engages in proprietary trading on both financial and commodity futures markets, and this work – like portfolio management and ABT – is undertaken by EGEM and ETB.

6. A brief assessment

What this amounts to in general is profiting from market inconsistencies and volatility, not production and sale. The words 'portfolio' and 'asset' come from the world of finance and this is part of the financialisation process. By its very nature it seems to be a sophisticated speculator's business, not that of a producing company. It can only be substantially exploited by large and diverse businesses, using their market power and their very diversity to do so. That was implicitly recognised by BCG in 2015 when it wrote of ABT on the oil market:

'Many refiners, however, continue to manage their crude inventories as if oil were purely a manufacturing input *rather than a financial commodity*. They strive to carry the smallest inventory possible – in the process leaving a considerable amount of potential value, at virtually zero risk, on the table.'

⁶⁸

This emphasis on maximally exploiting the value of corporate assets recalls a phrase that was used by advocates of debt 'leveraging' in the run-up to the banking crisis: 'mobilise the balance sheet,' by using assets identified on it to the maximum as collateral for obtaining loans. The same attitude can apply to trades on derivatives markets. This activity also implies the intensive use of algorithms, just as in the 'algo trading' (which also makes great use of indices as market proxies) that has become influential in recent years on the stock markets.

While portfolio optimisation in the oil and gas sector is a recent development, the general approach adopted in it is not. As I was finishing this draft, I came across a 15-year-old cutting from the *Financial Times*. It was an article dated October 19th, 2007 by Gillian Tett, who was named Business Journalist of the Year of 2008 and then Journalist of the Year of 2009 in the British Press Awards in recognition of her work on the role of derivatives in the financial crash. This article looked back at previous financial crises in 1907, 1997 and, most significantly, 1987, commenting about that year:

'One of the key features of 1987 ... was that, in the months before the crash, a new fashion hit the finance industry: the use of "portfolio insurance", or computerised hedging strategies that were supposed to protect investors from downside losses.'

⁶⁹

Portfolio insurance is a strictly financial instrument, not the same as portfolio optimisation, but there is a wider lesson there.

⁶⁶ ENI (2022B), p. 184.

⁶⁷ ENI (2022B), p. F-87.

⁶⁸ Boston Consulting Group (2015), p. 3 (emphasis added).

⁶⁹ *Financial Times* (2007).

In this case, it is hard to say whether or to what extent these activities had any great influence over the volatile spike in natural gas prices that appeared in the second half of 2021. It is clear, from ENI's accounts as much as anywhere else, that the main influence was the sharp operation of supply-and-demand effects, arising from a sudden reduction in supplies in what had previously been a fairly predictable and stable market. However, a newspaper appraisal of another crisis which suddenly blew up on the British government bond market in September 2022 provided further food for thought by, again, drawing parallels with the origins of the financial crash of 2007-08. The issue here arose from the use by British pension funds of a practice known as 'liability-driven investment strategies' (LDIs) at a time when 'The gilts⁷⁰ and bonds of these funds were not returning enough to match the schemes' liabilities.' The article made this comparison, which might also apply to asset-backed hedging and possibly the whole strategy of portfolio optimisation:

'Years of low interest rates in the run-up to 2008 had encouraged a debt-fuelled "search for yield" that took investors into high-risk assets... LDI, based on borrowing (or "repo-ing") against the collateral of low-yielding gilts, became an increasingly popular way for schemes to offset the shortfall. But what started as a hedge in some cases became a leveraged bet — an irresistible way to "juice" otherwise low returns.'⁷¹

Much the same might be said about ABT as well as many other forms of derivative and futures trading. Gillian Tett wrote it in this way in 2007, recalling 1987:

'More specifically, when investors rushed to hedge themselves as prices fell, they exacerbated the slide – effectively turning a crunch into a full-blown crisis. Risk management tools, in other words, ended up making the world a riskier place.'

In 2015 BCG quoted this widespread attitude towards those oil and gas strategies that lean more towards trading methods:

'In recent years, oil trading has suffered from a bad reputation in some circles, largely stemming from a number of related financial scandals, including the Enron debacle of the early years of the twenty-first century. Many executives still consider trading an unnecessary source of risk and volatility; some view it as, essentially, gambling.'

At what point and under what conditions does commercial hedging veer into speculation or gambling? The boundary lines are never precisely drawn, and probably never *can* be, but the danger of gradually and inadvertently slipping from one into the other is ever present.

The details of the actual sources of profit and loss from these practices in a large corporate group are also generally obscure. In 2015 BCG commented:

'It can be hard to know precisely how much revenue companies derive from their trading activities. Independent traders, such as Vitol, Trafigura, and Gunvor, are usually private companies that keep a low profile on their financials, while large integrated oil companies that have trading divisions (for example, Shell's Stasco, BP's IST, and Total's Totsa) often consolidate the results generated by those divisions with the results of other business units.'⁷²

Seven years later, the *Financial Times* made a similar observation:

'Beyond these qualitative statements [about business performance] none of the three [BP, Shell and Total] provided any further breakdown of the financial performance of their various trading units or their contribution to overall group profits.'⁷³

Nevertheless, the paper also reported, 'Some of the privately owned traders provide greater transparency on their trading activities than either Shell or BP.'⁷⁴ While ENI's 2021 report for the

⁷⁰ 'Gilts' is the usual name for British government bonds. It is short for 'gilt-edged stocks,' going back to former times when the bond certificates were edged with gold leaf.

⁷¹ *Financial Times* (2022A).

⁷² Boston Consulting Group (2015), p. 5, footnote 1.

⁷³ *Financial Times* (2022C).

⁷⁴ *Financial Times* (2022C).

Securities and Exchange Commission goes into considerable detail about how it operates, if one searches hard enough and correctly interprets the opaque financial jargon, it nevertheless provides no data at all on just what profits and losses have been incurred in which aspects of this activity. And without examining ENI's algorithms themselves, it might be rather hard to find out more. And that is regrettable, in view of Ms Tett's concluding paragraph in October 2007:

'But if there is one lesson to be learnt from the "curse of the sevens" it is that whenever the financial industry gets overexcited about innovation, there is probably a nasty new risk building somewhere. Modern risk-management tools, in other words, do not remove risk from the system – but displace it somewhere else, where it can be harder to track. If financiers start getting too creative again in 2016, investors had better be on their guard.'

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