



The Evolution of Natural Gas Price Review Arbitrations

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Price review arbitrations are, as a collection of cases, the highest-value commercial disputes in the world today. The amounts at stake begin in the hundreds of millions of dollars and often climb into the billions. Yet despite the staggering amounts that hang in the balance, price review arbitration has only recently emerged from relative obscurity to become the subject of disputation in the wider energy arbitration arena.

The authors of this chapter have been involved in price review arbitrations since their inception. During this time, the field has evolved in exciting and unexpected ways. This chapter seeks to map that evolution by providing an overview of the past, the present and the future of price review arbitration.

As this chapter makes clear, the twists and turns in the evolution of price review arbitrations have generally not been driven by changes in contractual provisions, legal rights or the acts or omissions of the parties involved. Rather, it has been external events – such as the liberalisation of national gas markets, the global economic crisis and the maturation of certain gas hubs – that have paved the evolutionary path.

Parties to long-term gas supply contracts have therefore been forced to react – availing themselves of the ‘price review’ provisions in long-term contracts to recalibrate their price formulas to reflect changed market conditions. The margin for error, however, is razor thin.

Changing just a few cents per unit of gas can shift hundreds of millions of dollars between the parties because of the very substantial volumes delivered during the life of a long-term gas contract.

Arbitrators deciding these disputes therefore have a weighty and difficult task. Price revision provisions imbue the arbitrators with exceedingly broad authority to modify the pricing formula with strangely little direction on how to do so. Yet despite this awesome power and frequent lack of direction, arbitrators have – by and large – done a laudable job of getting it right.

As discussed below, the story of natural gas price reviews has been, until recently, largely a European one. While this chapter starts at the beginning of that story, it is by looking back that we see the positive and important role that international arbitration has played in the development of gas pricing during the past 20 years or so in Europe. And it is by reflecting on the past that we are able to make predictions for the future.

Those predictions are particularly important for Asia, where the gas markets today largely resemble the European ones of two decades ago: markets in transition, where pricing is still largely tied to oil products. Earlier editions of this chapter predicted that, just as price review arbitrations emerged in Europe to address changes in the gas markets not reflected in contract prices, Asia would soon experience its first wave of price review arbitrations. As this article explains, those predictions, while slow to be realised, have now proven true.

The dramatis personæ

The parties to price review arbitrations tend to be repeat players. The sellers are typically the producers of natural gas and entities that are government-owned, or formerly government-owned, with strong state participation. For example, there are only a handful of producers around the world who regularly sell to the continental European

markets: Gazprom (Russia), Sonatrach (Algeria), Qatargas and RasGas (Qatar), Nigeria LNG (Nigeria), Statoil (Norway), and Atlantic LNG (Trinidad and Tobago).

The buyers, by contrast, are often formerly state-owned companies in countries that do not produce significant gas domestically, but have the infrastructure in their countries to accept delivery of the gas, transport it through an existing transmission network and distribute it to wholesalers or end-user consumers in the downstream market. Before the liberalisation of the European gas markets, these companies were predominantly state-owned monopolists, which purchased from the suppliers and had the pipeline infrastructure to deliver the gas to end users.

Examples of former state-owned monopolists include Eni in Italy, Enagas in Spain and Geoplin in Slovenia. When the European gas markets were liberalised during the 2000s, competitors entered these markets and the list of buyers grew. Edison in Italy, for example, was not a market incumbent but has become a major buyer in the liberalised Italian market.

These, then, were historically the usual parties to gas price review arbitrations. They signed with each other a very particular type of contract: a long-term, 'take-or-pay' contract for pipeline gas or liquefied natural gas (LNG). And it is in this type of contract that the price review clause is typically found.

The price review clause

The history of the price review clause can be traced back to the early days of the North Sea gas industry. The upstream suppliers – the sellers under long-term contracts – often needed financing for the investment necessary to bring the gas to commercial production. To ensure that the producers would be able to repay the money borrowed, the sources of financing required the producers to obtain a guaranteed, long-term revenue stream from downstream buyers.

Producers did so by signing long-term, 'take-or-pay' contracts with buyers, which obliged the buyers to pay for a pre-determined volume of natural gas, whether or not the buyers actually take that volume. This volume commitment – often worth tens of billions of dollars over the life of the contract – gives the sellers the guaranteed revenue stream, providing long-term cash flow to support the project economics even at a relatively low contract price.

The buyers were willing to undertake the volume commitment, but they needed to be assured that the price paid to the sellers would remain viable in the long term – even as changed market conditions affect the price that they can obtain when on-selling downstream in the end-user markets.

The problem is simple: if, for example, the price that the buyer is paying upstream to the supplier is more than the price that the buyer can receive downstream from the end users, then a price decrease is required because otherwise there is no margin, there are losses and the buyer will quickly go out of business. Conversely, if the price that the buyer is paying upstream to the supplier is sufficiently lower than the price that the buyer can receive downstream from end users, the seller may not be enjoying the benefit of its bargain.

The parties, therefore, must reach a balance. That balance is achieved when the contract price is defined by reference to the price that end users pay for natural gas in the market where the gas is delivered. The objective is that the contract price the buyers pay to the sellers will self-adjust, according to a formula, as end-user prices evolve over time.

And here is the crux of the issue: how do sellers and buyers arrive at a contract price, which will govern for decades to come, such that it will adequately track the changing value of gas in the end-user market? The answer, in general terms, is through a netback formula.

A netback formula references a reliable natural gas price marker (such as a hub price, a reliable published price, or a portfolio evaluation) and then deducts certain costs and allows for a margin. For example, gas sold to the US gas market has been sold at a price tied to US traded gas prices – such as Henry Hub – thereby ensuring that the price remains aligned with the conditions under which the gas can be sold into the downstream market.

Historically, however, this option was not available in many gas markets. When European and Asian importers began contracting for natural gas supplies, there were no developed natural gas markets in their countries. The importers – the buyers (typically government-owned monopolists) – were creating demand downstream by importing gas and selling it to consumers in competition not with other natural gas (because they were the monopolist gas companies and there was no gas-to-gas competition) but, rather, with other competing fuel products – primarily oil products.

To gain market share, therefore, gas needed to be priced at a discount to those competing fuels. Prices for gas were commonly defined by the government on the basis of supply costs – that is, the price that the buyers paid the sellers under long-term contracts. As a result, there was no independent gas price reference in the destination market. When the buyer and the seller were at the negotiation table discussing what price the buyer would pay to the seller during the life of the contract, they could not simply put into the price formula a gas price reference; there was none. Instead, they often included a reference to the price of competing oil products. In this monopolist market, displacement of oil and other competing fuels would allow the monopolist to sell the gas downstream.

In short, pricing by reference to these competing fuels was the best option to track the competitive dynamics of the downstream natural gas market. As reflected in these contract price formulas, oil and oil-derived products served as a proxy for the ‘value’ of natural gas.

To establish this proxy pricing, buyers and sellers often agreed to a contract price with two fundamental components: first, a fixed base value referred to as 'P₀'; and second, an indexation component tied to the evolution of oil-derived products. This latter component, called an 'escalator clause', is a multiplier to the base value that allows the contract price to fluctuate during the term of the contract in accordance with the price movement of the oil products.

Proxies, however, are necessarily imperfect. Commodity markets do not remain static, and there will be changes in the gas market that will not be reflected in, and therefore not captured by, the imperfect oil proxy in the price formula.

Thus was born the price review clause. It allows either party to seek revision of the contract price if the conditions underlying the commercial bargain significantly change over time. This is the fundamental trade-off between the take-or-pay commitment of the buyer and the right to realign the contract price periodically to conditions in the destination market.

Although the terms of specific price review clauses differ, they often:

- specify a certain number of regular price reviews, which can be initiated at the request of either party on specified dates;
- specify a certain number of 'wildcard' price reviews, which can be initiated by either party at any time;
- require that a price review be initiated by filing a price review notice with the other party;
- provide that the price review notice starts a mandatory negotiation period (usually three, four or six months);
- impose certain requirements that must be satisfied before the price formula can be modified, often a significant change in the market of the buyer that occurred since the current price formula last became effective and that:
 - affects the value of natural gas;
 - is non-temporary in nature; and

- requires an adjustment to the contract price (i.e., the economic effect of the change is not already reflected in the current price formula);
- if these preconditions are satisfied, specify that the price formula should be revised in accordance with certain requirements, namely the revision:
 - should take into account the economic effect of the changes that gave rise to the price review;
 - must allow the gas to be sold competitively in the market, at a reasonable marketing margin, or such that the buyer may market the gas economically in its end-user market; and
 - should assume sound marketing and efficient management by the buyer;
- specify that the revision is retroactive to the date of the price review notice;
- specify that the parties must calculate the difference between the revision and the former price (already paid by the buyer) for that period;
- if the revision results in a price reduction, provide that the seller owes the difference to the buyer for that period;
- if the revision results in a price increase, provide that the buyer owes the difference to the seller for that period; and
- if the parties cannot reach agreement within the mandatory negotiation period, provide that either party may submit the matter to international arbitration.

Contracts that include price review clauses typically include arbitration provisions of the International Chamber of Commerce, the Arbitration Institute of the Stockholm Chamber of Commerce or the United Nations Commission on International Trade Law, and provide for three arbitrators. The seat of arbitration is often New York, London, Geneva, Paris, Stockholm or Singapore. Arbitral awards revising a contract price or rejecting a request for revision are enforceable under the New York Convention – although enforcement is rarely required because of the parties’ ongoing commercial relationship.

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These price review clauses started to become standardised in the 1980s, when contracts were signed concerning the Norwegian Troll gas field. These ‘Troll contracts’ were organised through a centralised process,

by which all producers (and the Norwegian government) and all the buyers (which operated through a consortium) were involved in the negotiations. As a result, a standardised agreement was used, which included the price review language. In the decade that followed, other buyers and sellers adopted the same or similar language in other long-term supply contracts – and the price review clause became more or less an industry standard in Europe.

These price review clauses – now in place in long-term gas contracts across Europe – set the stage for what happened next.

The first wave of price reviews

On 22 June 1998, the European Commission – following years of preparation – promulgated Directive 98/30/EC relating to the liberalisation and deregulation of the natural gas markets of EU Member States. The Directive sought to encourage competition in the then largely monopolistic European gas markets. It sought to do so by (1) allowing third parties open access to natural gas transmission facilities, and (2) permitting consumers to choose their natural gas supplier and to negotiate prices. The European Commission stated that the liberalisation of the European natural gas markets would lead to increased competition and that, '[a]s competition increases with the progressive development of the internal market for gas, prices are expected to fall'.^[3]

In the years that followed, Member States took a variety of measures in their national legal orders to implement the Directive. In many countries, the national legislation sought to achieve 'unbundling' – the process of functionally segregating gas marketers from operators of gas delivery and storage facilities, which enabled competition by giving competitors non-discriminatory access to the gas system. Liberalisation proceeded at a different pace in each Member State.

The second wave of price reviews

Change was afoot. The liberalisation efforts started to move the EU gas markets from a system with only one monopolistic buyer in each country selling downstream, to a system in which numerous competitors would participate in the market, sign contracts with suppliers such as Gazprom and Sonatrach, and compete with other buyers to sell to the downstream market, underbidding each other to gain market share. The aim was that the downstream price paid by the end users would not be set by the supply price but, rather, by the competitive dynamics in the end-user market itself.

There also was another, more subtle change. Whereas buyers had previously sold gas downstream in the competition with oil-based fuel products, they were now selling the same gas downstream in competition with other natural gas suppliers (i.e., gas-to-gas competition). This caused a problem for the buyers. With the barriers to competition crumbling, competitors could enter the market for the first time and offer prices at a discount on what the monopolist incumbent had been charging. At the same time, the price that buyers were paying to sellers under the long-term contracts were still tied to oil prices set at a level before gas-to-gas competition existed. This disconnect between what the buyers were paying upstream and what the buyers were receiving downstream created the archetypical situation that the price review provisions were intended to address.

Arbitration commenced. The authors represented the winning party in the first price review arbitration in the world. Filed in the early 2000s, the claim was that the liberalisation of the relevant European gas market broke up the importer's monopoly and, for the first time, created gas-to-gas competition when new competitors entered the market and began offering prices at a discount to the previously prevailing prices. We therefore sought the addition of a new component to the pricing formula to reflect the development of competition in the relevant gas market.

The third wave of price reviews

The tribunal agreed. It significantly lowered the contract price formula by introducing a 'correction' factor, to correct for the decrease in the market gas price that the oil-linked contract price did not track. Importantly, however, the tribunal left the pricing formula tied to oil products because, at that time, there was still no liquid gas index in the relevant market that could reliably represent the price for natural gas. The tribunal therefore left the price formula tied to oil products, but changed the price level to reflect the gas-to-gas competition price in the market.

Other arbitrations followed, most resulting in significant price decreases for the buyer.

A second wave of price reviews was initiated – again primarily by buyers – in the wake of what many described as a 'perfect storm' of price-depressing events that occurred from 2008 to 2010. Two events in particular converged to create this situation.

First, the sudden impact of the global economic crisis swept across Europe and was fully brought to bear on the gas markets. The economic effects of the crisis caused gas demand to decline relative to projected growth and expanded import capacity, leaving gas companies under take-or-pay obligations to compete fiercely with each other in a desperate attempt to sell their volumes.

Second, new and unexpected volumes flooded the European market. One of the key contributors to this increased supply was the US shale gas boom, which resulted in LNG destined for the US market being diverted to Europe. Based on higher prices in Europe and transportation limitations, companies – under take-or-pay obligations – began unloading volumes in Europe, which became a 'sink' market. This supply–demand imbalance led to a gas glut.

New European pricing trends

Asia: the future is now

These market changes had an important effect. The influx of new quantities of natural gas being unloaded in Europe increased liquidity in the European natural gas hubs. And with the influx of gas being traded at these European hubs, the hubs began to mature rapidly.

Despite this increasing maturation of European gas hubs, the market prices in many European markets still remained largely tied to oil products. As a result, most (although not all) of the price reviews in this second wave resulted in a decrease in the contract prices to reflect the reduced level of gas prices, but still left the prices tied to oil products.

This was no small event. The buyers that achieved downward revisions to their supply prices included Bulgargaz (Bulgaria), Centrex (Austria), Conef Energy (Romania), DONG (Denmark), EconGas (Austria), Edison (Italy), Eni (Italy), E-On (Italy), Gas Natural (Spain), GasTerra (Netherlands), GDF Suez (France), PGNiG (Poland), RWE (Germany), Shell Energy (Netherlands), WIEH (Germany) and WINGAS (Germany).

Each of these buyers obtained price reductions in their long-term contracts based on the evolution of the European markets. The prices paid by end users were now no longer set by supply costs. Rather, the reverse had happened: the supply costs were set by the end-user prices through the price reviews.

Several years later, the buyers argued that the gas hubs had developed and matured in much of Europe to the point that they had significant traded volumes and transparent prices. This allowed several European hubs to act as a price-setting mechanism in the markets that they serve.

As a general principle, the more significant the volumes traded on a hub, the more 'liquid' – and reliable and transparent – its price reference becomes. A 'liquid' price is one that is not easily influenced by a small number of trades because of the large overall volumes traded. An

'illiquid' hub, by contrast, is more prone to price volatility because of the ability of a small number of trades to influence the average price more quickly. The growth of liquidity at a trading hub also facilitates increasingly transparent prices because of the higher number of trades made at the hub.

The Title Transfer Facility (TTF) in the Netherlands became the most liquid continental European hub during this period. By 2009, traded volumes at the TTF had grown to the extent that the TTF was regarded as an open and liquid gas trading hub. Since 2012, the price formation mechanism for many gas contracts in the Netherlands and elsewhere has been the TTF price.

Many buyers in this third wave of price reviews therefore asked for the proxy of oil products in the formulas to be replaced by gas hub indexation. It is a matter of public record that suppliers such as the Norwegian producer Statoil and Gazprom have increasingly agreed to include gas hub indexation or reflect gas hub price levels in their supply contracts.^[4] Indeed, the two largest supply contracts into Europe – which are contracts that Eni and E-On have with Gazprom – were revised to include gas hub indexation (it is public information that the Eni contract is now 100 per cent hub-indexed). Further, 100 per cent of Statoil's contracts to north-west Europe have some level of hub indexation.^[5]

The result of this third wave of price reviews was that, in many cases, parties and tribunals either partially or entirely replaced oil indexation with hub indexation in the pricing formulas. Most western European gas contracts are now partially or entirely hub-indexed.

As the foregoing shows, the evolutionary path of price review arbitration has been marked by three epochs. During this time, the European gas markets have experienced growing pains, and players in the field have struggled to cope with the evolving energy landscape. International arbitration has played an important part in that evolution.

Focus now turns to the future. Perhaps the most interesting question is whether price review arbitrations in Europe will continue or will slowly die out (which would be sad news for price review lawyers). As European hubs continue to mature, hub indexation will be, through party agreement or arbitral awards, increasingly substituted for the proxy of oil products. And that means that, as a general rule, the supply price formulas will better react in real time to natural gas prices in downstream markets, and capture market changes in a way that the oil prices could not, and the need for price reviews will be reduced. In other words, hub indexation will significantly diminish the need for the very mechanism that played an important part in the emergence of hub indexation in the first place: the price review clause.

In these circumstances, the question must be asked: is there still a reason to include a price review clause if the formula is wholly tied to a gas hub index? Those who say 'no' believe that the hub indexation is the cure for everything – and that the market prices will stay in alignment with contract prices that are tied exclusively to hub indexation. There is, however, a more nuanced view: price review clauses may still be important because there is no guarantee that hub pricing will reflect market prices – particularly if the destination market is different from the hub reference.

A simple hypothetical illustrates the point. Suppose companies contracting for the German market wish to include in the contract price a 100 per cent hub reference to the TTF in the Netherlands. They wish to do so because they believe the TTF is sending the price signal for market prices in Germany. The parties may therefore change the contract price formula to include 100 per cent TTF hub indexation.

Is there a need for a price review clause in this hypothetical? The answer may be 'yes', because the TTF may not always remain a reasonable measure of market

prices in Germany. Rather, it may be that the TTF ceases being a price signal for market prices in Germany at some point in the future and that the German hub becomes the new sender of the price signal. In that case, the parties would be wise to have the contractual mechanism – a price review provision, albeit perhaps worded differently – to deal with this change in market conditions.

In any event, the European price review story is far from over. Price reviews under the remaining fully or partially oil-linked contracts continue – particularly in central and eastern Europe, which are often overlooked in the price review discourse (and, in limited circumstances, still in western Europe as well). The most recent example is an award issued in March 2020, in which PGNiG, the Polish state gas utility, was awarded US\$1.5 billion in a price review arbitration against Gazprom.^[6] International arbitration thus will continue to play an important part in the evolution of the central and eastern European gas markets.

More generally, the traditional European pricing model described above – which gave rise to the three waves of price reviews – is changing. Those changes are being caused by different global LNG contracting practices, and they will affect the future evolution of price review disputes in Europe.

First, the United States – as a relatively new exporter of gas – is now offering significant destination flexibility, with few, if any, restrictions on where the gas can be delivered. As a result, it is increasingly difficult for traditional suppliers for delivery to Europe to continue to demand destination restrictions. It is also increasingly difficult for suppliers to demand destination restrictions because government bodies, such as the European Commission, have stated that destination restrictions violate applicable competition law. In addition, liberalisation efforts in markets around the world, which

make re-gas facilities more accessible, mean that the buyer now has more options for where the gas can be delivered.

Second, and equally important, is the corollary pricing implication. With the United States now exporting LNG, European buyers are now contracting with US suppliers, with the price tied to Henry Hub. Notice the change. It is no longer the traditional European approach, which was to set the price based on destination. Rather, in these new contracts, the price is now set by point of origin. This dynamic puts pressure on the traditional suppliers to rethink the traditional European models, because now European buyers purchase LNG from the United States and have greater freedom in the destination to which they will deliver the gas, paying a US price.

Third, certain European contracts are now being signed with 100 per cent volume flexibility (although there is still a take-or-pay obligation for the liquefaction fee). This dramatic reduction in take-or-pay liability offers significantly more flexibility than the traditional models.

Fourth, much like the US practice, there is a move towards shorter-term and more flexible contract structures. For example, Europe has seen an increase in portfolio sales, rather than anchor contracts, for location-specific sources. Traditional European contracts often specify the exact gas field from which the gas must be supplied. Many of the newer contracts, by contrast, impose no requirement concerning the source of supply. Under these portfolio contracts, the sellers simply commit to deliver X quantities of gas to Y location, without specifying the source. This, too, differs from the traditional European model.

These shorter contracts reduce, or may altogether eliminate, the need for price reviews. Under the traditional European model, price reviews often were available every three years. Under the new paradigm, however, if gas contracts are for only three years (or shorter), the interval during which the parties will be

'stuck' with the contract price is roughly the same (or less) – and the parties may not need a price review clause at all.

In conclusion, these changes in global LNG contracting practices, primarily from the United States, are having a significant effect on the traditional European model that spawned the three waves of price reviews. Certain elements of the traditional risk-reward balance are changing, because the contracts on which that risk-reward balance is based are changing. Nevertheless, while there are new contracts that have these new features, there are many historical European contracts that do not. Indeed, the International Gas Union reports that, while 41 per cent of LNG global pricing is now 'gas-on-gas', the remaining 59 per cent remains oil-based.^[2] Those oil-based contracts, signed years ago, live on and are still being performed. If history is our guide, price reviews under these legacy contracts will continue for many years to come.

In earlier editions of this chapter, the authors had predicted that Asia would be the next battleground for LNG price review arbitrations. Asia is home to the world's largest importers of LNG and natural gas. The region includes China, Japan and South Korea, which are the world's three largest LNG importers.

The history of LNG imports into Asia began in the late 1960s and 1970s, when importers signed long-term contracts for delivery of LNG into Japan. China and South Korea first entered the market in the late 1980s and early 1990s. From the outset, oil-indexed pricing was, and remains, the dominant pricing model for LNG in Asia.

When we wrote the first edition of this article, it was our belief that, although the number of European price reviews was diminishing, all hope for price reviews was not lost – because Asia would become the next Europe. Our prediction was borne of good reason: the Asian markets today are where European markets were two decades ago – markets in transition, where pricing is still

largely tied to oil products. For this reason, we predicted that the next major battleground in price review arbitration would be Asia, which was and remains largely unliberalised and where end-user prices are largely set by the supply costs.

In the years following our initial prediction, however, price reviews in Asia failed to take off. Only a small handful of buyers commenced arbitrations, rather than the droves that many expected. Some speculated that the lack of new cases was borne of a business culture that eschewed contentious dispute resolution. Others explained the inactivity by noting that some Asian gas contracts do not contain a price review clause, and those that do provide for price reviews less frequently (for example, once every five years, rather than once every three years as typically seen in European contracts). Subsequent editions of this chapter nonetheless continued to make the same prediction that, while price reviews in Asia were slowly advancing in fits and starts, at some point the price review revolution would begin in full force. We are happy to report in this fourth edition that the price review revolution in Asia has now commenced.

At the time of writing, price review arbitrations have officially launched in Asia – not just one case, but an entire collection of cases. From Japan to China to South Korea, many buyers under long-term, take-or-pay contracts are now moving forward with price reviews in arbitration – just as the early European pioneers did in the early 2000s. The authors are now involved in several of these new arbitrations. These new price reviews sit at the crest of a new wave of arbitrations in Asia. And, indeed, if the Asian gas markets are to progress and mature as the European markets have done in the past two decades, international arbitration must again play an important role.

Conclusion

Although the evolution of price review arbitration in Europe has been marked by three periods of increased activity, it has been – with the exception of a few twists and turns – a more or less linear evolution, as gas markets have matured away from oil indexation and towards hub indexation. International arbitration has been one of the primary vehicles by which pricing disputes have followed that evolutionary path. Now, a new frontier for price reviews has emerged in Asia. As we reflect on the European journey and make predictions for the future in Asia, the road forward appears to be one of similar battles but with new challenges.

Notes

- ^[1] Stephen P Anway and George M von Mehren are partners at Squire Patton Boggs (US) LLP. The authors thank Douglas Pilawa, associate at Squire Patton Boggs, for his assistance with this edition of the chapter.
- ^[2] One notable exception is *Gas Natural Aproveisionamientos, SDG, S.A. v. Atlantiz LNG Company of Trinidad and Tobago* [2008 WL 4344525 S.D.N.Y.], in which the authors successfully represented the enforcing party.
- ^[3] European Commission, *Opening Up to Choice: Launching the Single European Gas Market*, p. 17.
- ^[4] Jason Bordoff and Trevor Houser, 'American gas to the rescue? The impact of us LNG exports on European security and Russian foreign policy', Columbia SIPA, Center on Global Energy Policy (September 2014), p. 17.
- ^[5] Gazprom, 'Management Report: OAO Gazprom, 2012'; Jonathan Stern, 'The Dynamics of a Liberalised European Gas Market – Key determinants of hub prices, and roles and risks of major players', The Oxford Institute for Energy Studies (December 2014), p. 19; Bordoff and Houser (footnote 4, above), p. 17.
- ^[6] 'Polish-Russian gas pricing dispute reaches award', *Global Arbitration Review*, Cosmo Sanderson (31 March 2020).

[\[7\]](#) International Gas Union, 'Wholesale Gas Price Survey', 2020 Edition, p. 16.

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