

Natural gas as a commodity and its financialisation

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1. Europe as a battleground for the definition of the global gas market to come

Contrary to the case of oil, a global market for natural gas, with its own interconnected physical and market infrastructure, does not exist nowadays. Just regional markets do exist or are in the making, primarily in the following regions: North America, Europe+Russia+North Africa, Middle East, Japan-Pacific, India-China. Each market region has its own dynamics and features, including fuel import dependence, which determines price formation.

Unlike other internationally traded commodity markets, natural gas has several regional benchmark prices. The dominant mechanism for the international gas trade, however, remains *oil indexation*, which originated in Europe in the 1960s and spread to Asia. Given the growing tensions in the oil market, and the need to develop a stand alone gas market dynamics in order to guarantee safety of supply and investors' interests, several governments have been working to build a separate gas market physical and financial infrastructure in the last years for de-link it from the oil market. Thus a contrasting mechanism based on “hub pricing” and traded markets (*spot market model*, including its related *futures market*) developed in the United States and has spread to continental Europe via the UK. Today, Europe is witnessing an unprecedented collision between these two pricing mechanisms and gas industry cultures. According to the International Energy Agency, one of the most essential questions related to global energy supplies and security is whether the traditional link between oil and gas prices will survive.

The two models manage gas market infrastructure, its balance and price formation between supply and demand quite differently: for the oil-indexation model, storage access and use is regulated to fulfil strategic reserve needs, balance is centred primarily on storage and related long-term import contracts, and wholesale price is only partially negotiated in open markets; on the contrary in the case of the spot market model, storage are open to all operators, including speculators, balance functions according to a pure market logic, and price formation is changable at any time possibly within a gas exchange.

As said, this second approach, which does require a significant transformation in many of existing physical market infrastructures in order to make the gas commodity tradable at any time and any place, has been prioritised in the United States. The spot market creation is also a *sine qua non* condition for the development of a financial market built on the physical market of natural gas regarded as a commodity. In short this second approach is opening the way for the “financialisation” of gas as a commodity.

Regarding the European Union, this regional block is still split between the two different approaches and a two-tier pricing system has now emerged: about half the gas consumed in Europe comes at market or hub prices, and the remainder, covered by long-term contracts, is still linked to oil. In particular the United Kingdom, the Netherlands and Belgium started developing in a more consistent way a proper natural gas market in which price is set in gas stock exchanges or other trading platforms of the spot market. On the contrary Southern Europe has been so far more closed to the idea of a market where price tends to be set by regulators based on long-term import contracts negotiated with third countries (primarily Russia, the North East and Liquefied Natural Gas exporters). These contracts made sense when they were essentially deals between monopoly producers and distributors. However they do not look so good now that customers can shop around for better prices and other supplies.

At the moment the EU third energy package, approved in 2009 and focused on building a more integrated internal European market for gas and electricity, is being implemented by Member States, despite some resistance and outstanding problems. European law aims to decouple gas pricing from oil, thus opening the way for the construction of a spot – and related futures – market integrated all over Europe. The model of gas pricing will be ultimately chosen in the EU by 2014. Based on specific physical and financial infrastructure will be developed in order to make the new integrated regional market work at best.

While Europe is currently the battleground, the implications of which pricing model will be chosen for this regional market stretch beyond Europe's borders because once isolated regional gas markets are now interconnected through the rising trade in liquefied natural gas. If the spot market model gains the upper hand in Europe, Asia will be the last remaining stronghold of oil-indexed pricing, possibly making it unsustainable. Alternatively, if oil indexation re-exerts its predominance, there is the prospect that spot prices in North America will be influenced by this model. Furthermore, given the impetuous development of shale gas in North America, a potential surge of gas exports from the United States would add to the pressures on the oil-indexed system.

Though the outcomes are far from certain, the stakes are high. Any modifications to existing contractual arrangements will directly impact exporters that depend on gas revenue—including Russia, Algeria, Indonesia, and Malaysia. And these changes will enhance or exacerbate energy security and dictate the sustainability of future supply. Gas pricing will impact the competitiveness of industry and the potential to achieve environmental targets around the world.

Many still argue whether or not at one point it will be possible to build a fully integrated gas market. This for sure would require to use regional blocks, which adopt a “financialised model”, as the basis for further integration. A gigantic effort, aimed at interconnected both the physical and the financial infrastructure, as it happened for the oil market. The existence of a more multipolar world to some extent and different financial centres today does potentially make such effort harder given conflicting interests might emerge at different levels.

Keeping aside for the time being the global implications, it is worth having a closer look to the US and European region markets as they are today, before drawing some preliminary conclusions about the implications that policy choices at European level will have in the end in terms of environmental sustainability and social justice for the long due energy transition functional to a socio-ecological transformation of society as a whole.

2. The US “financialised” natural gas market

Natural gas marketing is a relatively new addition to the natural gas industry, beginning in the mid-1980's. Prior to the deregulation of the natural gas commodity market and the introduction of open access for everyone to natural gas pipelines, there was no role for natural gas marketers. Producers sold to pipelines, who sold to local distribution companies and other large volume natural gas users. Local distribution companies sold the natural gas purchased from the pipelines to retail end users, including commercial and residential customers. Price regulation at all levels of this supply chain left no place for others to buy and sell natural gas. However, with the newly accessible competitive markets introduced gradually over the past fifteen years, natural gas marketing has become an integral component of the natural gas industry.

Natural gas as a commodity

Natural gas is sold as a commodity, much like pork bellies, corn, copper, and oil. The basic characteristic of a commodity is that it is essentially the same product no matter where it is located. Natural gas, after processing, fits this description. Commodity markets are inherently volatile,

meaning the price of commodities can change often, and at times drastically. Natural gas is no exception; in fact, it is one of the most volatile commodities currently on the market.

There are two distinct markets for natural gas: the spot market, and the futures market. Essentially, the spot market is the daily market, where natural gas is bought and sold 'right now'. To get the price of natural gas on a specific day, it is the spot market price that is most informative. The futures market consists of buying and selling natural gas under contract at least one month, and up to 36 months, in advance. For example, under a simplified futures contract, one could enter into an agreement today, for delivery of the physical gas in two months. Natural gas futures are traded on the New York Mercantile Exchange (NYMEX). Futures contracts are but one of an increasing number of derivatives contracts used in commodities markets, and can be quite complex.

Natural gas is priced and traded at different locations throughout the US. These locations, referred to as 'market hubs', exist across the country and are located at the intersection of major pipeline systems. There are over 30 major market hubs in the U.S., the principle of which is known as the Henry Hub, located in Louisiana. The futures contracts that are traded on the NYMEX are Henry Hub contracts, meaning they reflect the price of natural gas for physical delivery at this hub. The price at which natural gas trades differs across the major hubs, depending on the supply and demand for natural gas at that particular point. The difference between the Henry Hub price and another hub is called the location differential. In addition to market hubs, other major pricing locations include "citygates". Citygates are the locations at which distribution companies receive gas from a pipeline. Citygates at major metropolitan centers can offer another point at which natural gas is priced.

Physical and Financial Trading

There are two primary types of natural gas marketing and trading: physical trading and financial trading. Physical natural gas marketing is the most basic type, which involves buying and selling the physical commodity. Financial trading, on the other hand, involves derivatives and sophisticated financial instruments in which the buyer and seller never take physical delivery of the natural gas.

Like all commodity markets, the inherent volatility of the price of natural gas requires the use of financial derivatives to hedge against the risk of price movement. Buyers and sellers of natural gas hedge using derivatives to reduce price risk. Speculators, on the other hand, assume greater risk in order to profit off of changes in the price of natural gas. Some marketers who actively buy and sell in either the physical or financial markets are referred to as natural gas 'traders'; trading natural gas on the spot market to earn as high a return as possible, and trading financial derivatives and other complex contracts to either hedge risk associated with this physical trading, or speculate about market movements. Most marketing companies have elaborate trading floors.

The daily spot market for natural gas is active, and trading can occur 24 hours a day, seven days a week. However, in the natural gas market, the largest volume of trading occurs in the last week of every month. Known as 'bid week', this is when producers are trying to sell their core production and consumers are trying to buy for their core natural gas needs for the upcoming month. The core natural gas supply or demand is not expected to change; producers know they will have that much natural gas over the next month, and consumers know that they will require that much natural gas over the next month. The average prices set during bid week are commonly the prices used in physical contracts.

In addition to trading physical natural gas, there is a significant market for natural gas derivatives and financial instruments in the United States. In fact, it has been estimated that the value of trading that occurs on the financial market is 10 to 12 times greater than the value of physical natural gas trading.

Derivatives are financial instruments that 'derive' their value from an underlying fundamental; in this case the price of natural gas. Derivatives can range from being quite simple, to being exceedingly complex. Traditionally, most derivatives are traded on the over-the-counter (OTC) market, which is essentially a group of market players interested in exchanging certain derivatives

among themselves, as opposed to through a market like the NYMEX. Basic types of derivatives include futures, options, and financial swaps.

There are two possible objectives to trading in financial natural gas markets: hedging and speculation. Trading in the physical market involves a certain degree of risk. Price volatility in the natural gas markets can result in financial exposure for marketers and other market players as the price changes over time. Trading financial derivatives can help to mitigate, or 'hedge' this risk. A hedging strategy is created to reduce the risk of losing money. Purchasing homeowner's insurance is a common hedging activity. Similarly, a marketer who plans on selling natural gas in the spot market for the next month may be worried about falling prices, and can use a variety of financial instruments to hedge against the possibility of natural gas being worth less in the future. Countless strategies exist to hedge against price risk in the natural gas market, including natural gas futures, derivatives based on weather conditions to mitigate the risk of weather affecting the supply of natural gas (and thus its market price), etc.

Financial natural gas markets may also be used by market participants who wish to speculate about price movements or related events that may come about in the future. The main difference between speculation and hedging is that the objective of hedging is to reduce risk, whereas the objective of speculation is to take on risk in the hope of earning a financial return. Speculators hope to forecast future events or price movements correctly, and profit through these forecasts using financial derivatives. Trading in the financial markets for speculative purpose is essentially making an investment in financial markets tied to natural gas, and financial speculators need not have any vested interest in the buying or selling of natural gas itself, only in the inherent underlying value that is represented in financial derivatives. While great profits may be made if the expectations of a speculator prove correct, great losses may also be incurred if these expectations are wrong. While the instruments used for hedging and speculation are the same, the way in which they are used determines whether or not they in fact reduce, or increase, the risk of losing money.

3. The European gas market in the making

The landscape began to change in Europe in the 1990s. The United Kingdom decided to introduce a liberalized market in natural gas and the industry began developing traded markets based loosely on the U.S. model. And in 1998, the UK gas network was linked to Belgium, causing commodity markets to spread into continental Europe. The European gas market split, with oil indexation dominating the continent while competitive hub pricing—centered in the UK—made inroads into northwestern Europe.

Natural gas prices

Natural gas prices generally fall into three categories depending on the degree of regulation, the competitiveness of the market, and market liquidity:

- Government-regulated prices, usually based on cost of service;
- Price indexation to competing fuels (commonly known as oil-indexed pricing);
- Spot market pricing in competitive gas markets.

At the retail level in Europe there remain a number of countries where end-user gas prices are capped, restricted, or regulated under close scrutiny of the national regulator. However, at the producer/wholesaler interface, there remain no significant areas within the EU where gas prices are subject to direct government intervention to cap prices. In other words, new gas supplies in Europe may be sold to the highest bidder.

Price terms of wholesale Gas Sale & Purchase Agreements (GSAs) are often dependent on the prevailing price structure of gas in the market into which the gas is sold. In countries where gas prices are already linked to an alternative fuel, the most common price indexation is to crude oil or

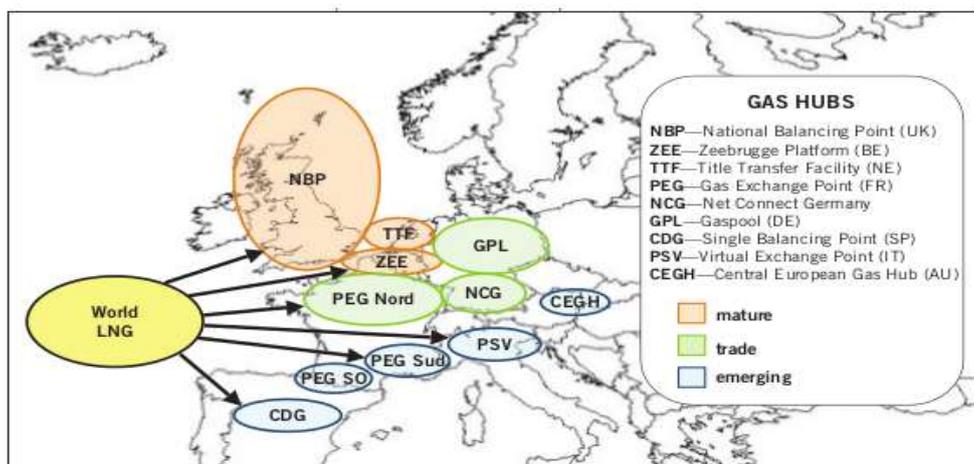
petroleum products. This methodology is known as oil-indexed pricing. Such price provisions are common in continental European, North African, and Asian GSAs. Under oil-indexed gas pricing the underlying principle is one of price competition with alternative fuels “at the burner tip.” For example, gas used for the home heating market is often priced relative to gasoil (known as light fuel oil in Germany or heating oil in the United States) and gas used for industrial and power generation purposes is usually priced relative to one or more types of heavy fuel oil, with low sulfur heavy fuel oil (1 percent) being the most common.

The United States and northwestern Europe provide the best examples of natural gas spot and futures markets and the development of short-, medium-, and long-term GSAs indexed to market gas prices. These price provisions within contracts are common in both the pipeline gas and liquefied natural gas (LNG) businesses, and through the growing international gas trade are increasingly impacting gas pricing terms worldwide.

The spread of spot gas markets in Europe

Traded wholesale markets began in the mid-1990s in the UK with the development of the National Balancing Point (NBP), still the only European marketplace considered mature by the gas industry. Thanks to its liquidity and to the construction of two gas lines connecting the British market to continental Europe (Interconnector and Balgzand Bacton Line), the NBP strongly influences the continental hubs. Zeebrugge (Belgium) and the Title Transfer Facility (Netherlands) are the two dominant marketplaces on the continent. Other hubs are emerging, but their development is hindered, sometimes by lack of supply liquidity, and sometimes by obstacles to infrastructure liquidity at key transit points, such as border crossings within the EU.

Spot market volumes are still predominantly traded around a physical supply to the UK market, but are beginning to make deeper inroads into the Belgian, Dutch, German, and French markets. The French- and particularly the German-traded gas markets stand out as the success stories of 2009. From January 1, 2009, the Northern PEG sub-areas were combined into a single PEG Nord area , connecting the Montoir LNG import terminal with all of the major import pipelines and the bulk of French gas demand under a single trading area. In Germany, the parallel processes of increased liberalization and transparency were given a significant boost by the Gasunie purchase of the former BEB network, and the aggregation of multiple pipeline networks under single trading platforms such as NCG and Gaspool. Liquidity in both France and Germany has significantly improved from 2009 to date.



Furthermore, the development of hubs in Austria and Italy is progressing. Gas release obligations, plus new LNG imports into Italy, may create a surge in

spot gas availability there, accelerating the erosion of ENI's market share. While diminished Take-or-Pay obligations to Russia, Norway, the Netherlands, and Algeria remain in place, conditions in Italy may still point toward a potential market revolution.

The link with the Liquefied Natural Gas international market

Enhanced interconnectivity was not restricted to Europe in the following decade. Isolated regional markets became increasingly interconnected both physically and commercially by LNG, which today comprises 28 percent of the international gas trade, and is nearing 10 percent of world gas supply. As a result, supply surpluses or shortfalls precipitate rapid shifts in LNG flows from one region to another—in pursuit of a higher price.

At first, wholesalers skillfully exploited differences in long-term contract and spot prices, diverted LNG cargoes as needed, and effectively managed the market balance in Europe, using flexibility embedded in their oil-indexed contracts. Starting in late 2008, however, a number of forces converged, undermining this balance. Gas demand fell sharply due to recession just as gas supply availability increased, sharply intensifying competition between the two pricing systems. While spot market prices in Europe have traditionally been above oil-indexed prices, spot prices dropped well below oil-indexed prices and have remained there. Exploiting liberalized regulations governing the transportation of gas, market-priced gas surged onto the continent, stealing market share from wholesalers supplied with oil-indexed gas.

With European demand down an estimated 7 percent in 2009, LNG sales nevertheless increased dramatically at the expense of pipeline gas supplies under traditional oil-indexed contracts. Wholesalers under contract to purchase gas from producers at oil-indexed prices had too much overpriced gas, and competitors with access to market-priced supplies cherry-picked their customers. While major utilities faced billions of dollars in penalties for failure to take agreed amounts of gas, producers' revenues fell sharply below expectations. Suddenly, gas exporters were pressured to reduce the oil-indexed prices in their long-term contracts with European wholesalers.

Winners and losers

This dramatic collision of two industry cultures with competing pricing structures has persisted. In 2010, the downward spiral has been slowed with a moderate economic recovery, cold winter, and contract concessions by several gas exporters. But the prospect of continued nervous markets and relentless new gas supply has raised the prospect of radical change, including calls from traditionally conservative pro-oil indexation quarters for the "modernization" of existing contracts or decoupling of gas prices from oil.

The clash of the two pricing paradigms in Europe has created obvious winners and losers. Broadly speaking, there are three sets of players: incumbent wholesalers, second-tier buyers, and gas producers. Incumbent wholesalers, despite their enormous power to renegotiate prices, are the obvious losers as they are squeezed by lower demand, oversupply, and greater competition. Second-tier players, with a variety of supply options, and unencumbered by long-term oil-indexed contracts, are the principal beneficiaries as they can take advantage of differences in prices. And gas producers may benefit in the long term as they ultimately control the supply of gas.

Which infrastructures to build?

With the gas pricing mechanism uncertain and future revenues clouded, it is unclear how and which necessary investments to ensure market integration and supply and transit security will be made.

The choice of the market model to follow – still oil-indexed or instead hub-based spot market – will inevitably impact the kind of investment to be made into the gas infrastructure, in particular as concerns the use of European public finance. At the moment the European Union is encouraging the financing of both new gas pipelines, whose gas supply will probably still be based on long-term contracts, as well as the creation of several storage plants and new LNG regassification plants which are more directly functional to the development of an integrated gas spot market.

Similarly the power sector, which likely drives gas demand growth worldwide, is impacted too by the opportunities and challenges of gas pricing uncertainty, so that more widely fuel switch and energy transition in Europe will be impacted by policy choices about the gas pricing system.

4. Implications for environmental sustainability and social justice

The price of gas in Europe - and the mechanism used to determine it - will not only impact European companies and customers, but also have profound implications for energy markets around the world. Energy security, geopolitics, and the shift to greener forms of fuel that will be critical for combating climate change will also depend on how gas pricing evolves.

The pricing system in Europe should be agreed in the next months in the context of the implementation of provisions already included in the third EU energy package. The spread of spot and related futures markets for gas in Europe is quite problematic, because it aims at consolidating the vision of gas as a commodity and its financialisation. This will imply that gas market integration will obey primarily to the need to allow few private operators to extract extra profits from the physical gas market, so that energy security will be guaranteed according to pure market-based and often speculative logic.

At the same time the existing oil-indexed model, primarily centred on renegotiating long-term supply contracts through pipelines from Eastern Europe, Central Asia and Northern Africa is problematic too because it will similarly fuel further extraction of natural gas and delay a zero carbon transition. In both cases most of gas used in Europe will be imported from highly problematic regions of the world, in terms of environment, social and human rights impacts where gas extraction and transportation operations take place.

The financialisation of gas and its market poses a further urgency to critical social forces to question gas as a transition fuel within the energy transition debate, in order to open up a new political space to advance thorough proposals decommodifying energy and thus advancing an authentic socio-ecological transformation of the economy and society as a whole in Europe.

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