energy analysis

European gas markets:
From oil indexation prices to spot prices?

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Ludovico Grandi

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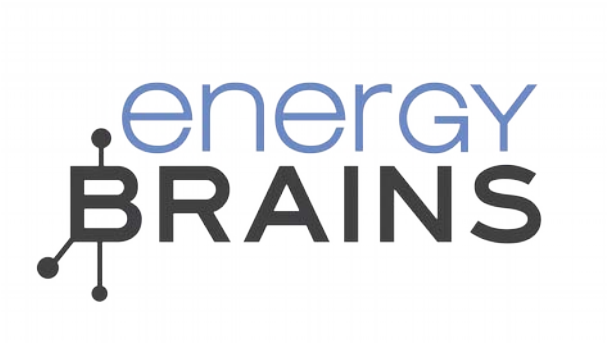

Energy Analysis

European gas markets: From oil indexation prices to spot prices?

Ludovico Grandi

June 2014

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1. Introduction

In the last thirty years, due to a significant expansion of the Asian and South American economies, global gas demand has risen more than that of oil. This expanding trend is accompanied by a revolution related to a mechanism by which natural gas is traded internationally.

While in the United States gas is traded according to local market prices (regulated by the Federal Energy Regulatory Commission, FERC), in Asia gas prices are indexed to that of oil. Europe is currently shifting from one model to the other. In the event that Europe ultimately turns towards the American model, Asia would remain the only market applying oil-indexed prices to its market, making this model unsustainable in the long term. Should this shift fail, the American market would have to reconsider its pricing mechanisms. Energy utilities and final consumers are those who are likely to be affected the most by this shift: In the last five years oil prices have doubled, compared to those of natural gas, which have fluctuated very little in the same period[1].

Following this introduction, the second chapter reviews the historical evolution of Europe's gas markets, from their foundation to the present day. The third chapter outlines the main provisions implemented by the European Commission to foster the formation of regional gas markets. The fourth chapter analyzes the challenges of the changing markets for gas exporters. The fifth chapter is dedicated to the evolution of markets from one mechanism to the other, followed by a particular focus on the Italian situation in chapter six. In the final remarks, a consideration on the eroding negotiating power of gas exporters suggests the direction impressed by this fundamental shift.

2. Historical background

In the energy market there are two main pricing mechanisms for natural gas: The first was created in the US and later on spread to the UK. It became known as "hub", or local market, pricing. Prices are thus changing from one local market to the other. The other system, conceived by the Netherlands in the early 1960s and broadly preferred by natural gas producers, is that of "oil indexing". This mechanism consists in linking the price of natural gas to its closest substitute (traditionally gasoline of heavy oil). The practice of oil indexation was exported to Asia from continental Europe and is now considered to be the most common pricing formula for natural gas.

Historically, natural gas has always been priced differently from one macro area to another, because of the low quantities exchanged. Since, unlike oil, gas was not a fungible good, there was no need to link one price to the other. Liquefied Natural Gas (LNG) technologies, allowing the liquefaction of gas in order to move it without pipes, were still to expensive in the 1960s. Realization costs were still to high for this technology to spread at the pace we are witnessing today. Exchanges were mainly conducted through gas pipelines. Therefore, markets could operate according to their own independent mechanisms.

The natural gas market started to evolve in the 1950s, when the giant Groningen field[2] was discovered in the Netherlands, followed by the new fields in the North Sea. In 1962 the Dutch began to export natural gas to France, Belgium and Germany. The pricing formula that was

[1] Data available for Henry Hub is accessible at: http://www.eia.gov/dnav/ng/hist/rngwhhdm.htm

chosen became known as the "*Nota de Pous*", named after the Dutch Ministry of Economic Affairs Jan Willem de Pous, the main architect of the newborn continental market[3]. The functioning of the new system, called MVA (Market Value Analysis), was very simple: A market price was set according to inter-fuel competition in every sector of the market. In those years the whole continent was in a process of "energy substitution" between coal and gasoline for domestic heating. Gasoline was thus chosen as the reference price for natural gas. Prices were renegotiated periodically and were affected by the distance of the end users from the Dutch border, as well as by the storage capacity of each country[4]. Dutch producers were held responsible for the transmission from their wells to the national border[5] in order to guarantee supplies for peak demand.

This pricing mechanism will later become famous as the "take or pay" clause, necessary to cover the costs of longer distances and huge investments in pipeline transmission systems (USSR, Algeria and Norway became net exporters of natural gas soon after the Dutch "gas boom"). Today this clause obliges buyers to withdraw the entire amount of purchased gas, or pay for the undesired quantity. At the same time, the first LNG supply contract between Algeria, France and the UK[6] in 1964, introduced this new technology to the market, still with prices linked to oil with long term contracts. It would take time for LNG technology to help natural markets becoming more flexible and liquid (globally, liquefied gas supplies grew from 3 billion cubic meters, bcm, in 1970 to 331 bcm in 2011)[7].

While the continental market was developing, in the 1960s another pricing mechanism gained support in the United Kingdom. Soon after the North Sea gas discoveries, contention over the pricing indexation formula to adopt emerged between British gas producers and British Gas (BG), which held a monopoly in Britain until 1986. The former were in favor of maintaining oil indexation, while the latter pressed for a mechanism based on inflation. Negotiations between counterparts resulted on a price partly indexed to oil, partly to inflation and Producer Parity Indexes[8].

When Margaret Thatcher gained power in 1979, the British gas market underwent a serious reform: BG was divided into several divisions, separating distribution from trading and granting equal access to the transmission network[9]. Increasing competition in an oversupplied market pushed gas prices down, while BG's profits simultaneously plummeted, precipitating the decision to renegotiate its long term contracts with North Sea gas producers[10]. At the same time, to facilitate commodity trading, it was decided that a virtual trading point had to be created. The

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[2] For a detailed overview of technical aspects related to the Groeningen gas field, visit: http://www-static.shell.com/content/dam/shell/static/nam-en/downloads/pdf/flyer-namg50eng.pdf

[3] To review the history of Dutch gas industry, visit: http://www.gashistory.org/Dutch.html

[4] Storage capacity started to evolve since the 1970s.

[5] Anthony J. Melling, "Natural Gas Pricing and Its Future: Europe as the Battleground", *Carnegie Endowement for Peace*, 2010, p. 19, available at: http://carnegieendowment.org/files/gas_pricing_europe.pdf

[6] For more informations related to this deal, visit the offical website of the Algerian Embassy in London: http://www.algerianembassy.org.uk/index.php/algeria-uk-relations.html

[7] "LNG: A Liquid Market", *The Economist*, 14 July 2012, http://www.economist.com/node/21558456

[8] Melling, *op. cit.*, 2010, p. 23.

[9] Calliope Weller, "The Evolution of the Gas Industry in the UK", *International Gas*, April 2010, p. 200, available at: http://www.igu.org/gas-knowhow/publications/igu-publications/publications/mag/april10/pages%20198-220.pdf

National Balancing Point (NBP) was introduced in order to encourage the consolidation of a reference price for exchanges. Spot contracts finally emerged, turning natural gas into a short-term commodity like oil. As a consequence, between 1970 and 2004 natural gas increased its share in the British energy balance from 5.4% to 40%[11]. However, the liberalization process might have gone differently if, instead of the domestic obstructionism to reforms, the government had to face the pressure of foreign producers. In fact, the exploitation of British fields was mainly intended for the internal market. The North Sea wells were insufficient for the establishment of long term exports and imports were accounting for a small share of gas consumed in the UK.

The natural gas associated to North Sea oil wells was thus priced independently from oil indexes. This price model started spreading in the continent when the National Balancing Point was applied to the Belgian and Dutch markets following the construction of the Balgzand Bacton Line in 1998[12]. Finally, European gas producers could trade on the British market, taking that price as a reference[13] for the Belgian (Zeebrugge, ZEE) and Dutch (Title Transfer Facility, TTF) hubs, which soon became the two main continental hubs for natural gas with locally-indexed prices.

Today, other local hubs are emerging throughout the whole continent, with prices based on a supply/demand rationale. Energy utilities and European governments are encouraging this gradual shift. Energy utilities in fact have lost several billion euros because of the discrepancy between the price of natural gas and oil and a fall in national consumption (resulting in a period of renegotiation of "take or pay" and long term contracts with natural gas producers)[14]. For utilities, long term agreements have locked the purchase of certain volumes of gas at oil-indexed prices. With hub prices spreading in European markets, utilities can now trade natural gas that is 20% to 30% cheaper on average[15]. At the same time, this mechanism allows governments to ensure lower energy bills for their citizens. Hub prices in fact are sensibly lower then those indexed on oil[16]. Furthermore, the fall of demand and consumption has translated into further costs for those utilities who have signed long term contract with "take or pay" clauses.

As this process accelerates, hub prices are diverging from oil indexes, generating a phenomenon called "decoupling"[17]. As shown in Figure 1 below, since the mid-2000s, natural gas traded at European and American hubs constantly diverged from the price of oil. Japan on the

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[10] "Economic Report" , *Oil&Gas UK*, 2011, available at: http://www.oilandgasuk.co.uk/economic_report/gas_prices_delink_from_oil.cfm

[11] Weller, *op. Cit.*, 2010, p. 202.

[12] "Statutory Security of Supply Report", *UK Department of Energy & Climate Change*, November 2012, p. 28.

[13] M. Bosman, "BBL Reinforces the European Network", *23rd World Gas Conference Report*, 2006, available at: http://www.igu.org/html/wgc2006/pdf/paper/add10452.pdf

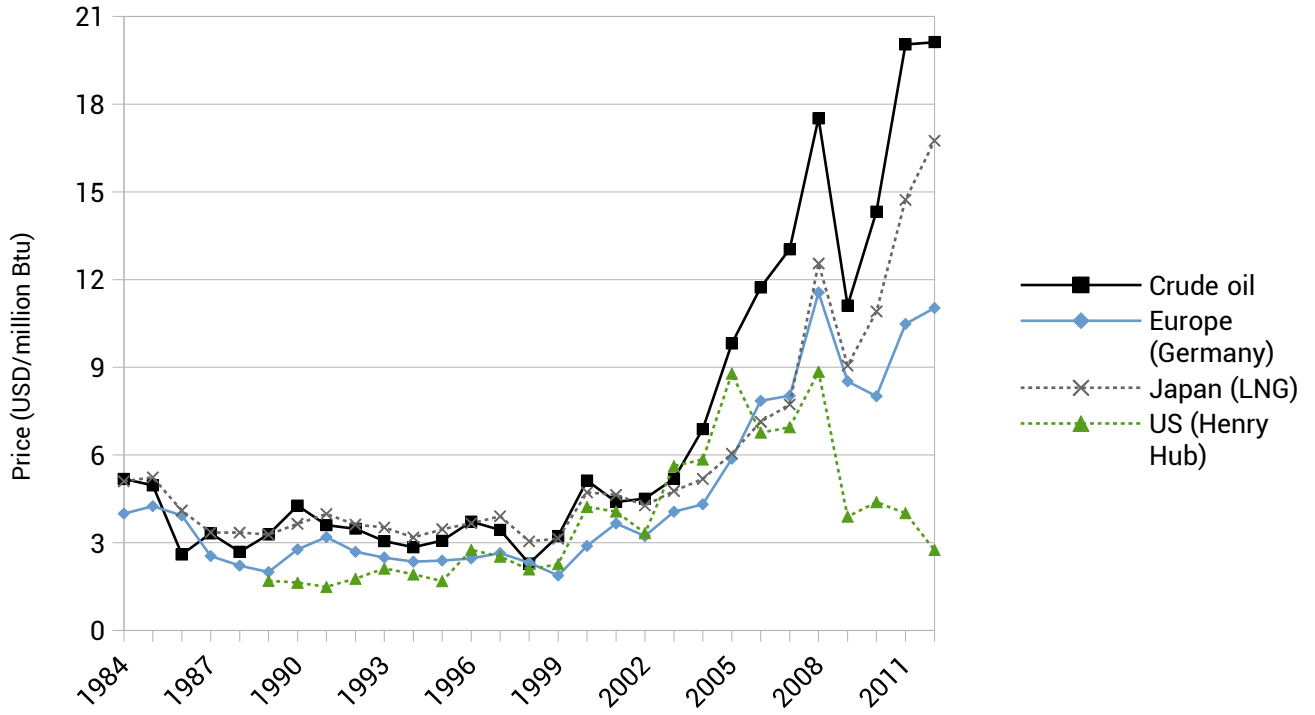
[14] Anna Shiryaevskaya, "Eni Seeks Third Revision to Gazprom Natural Gas Supply Contract", *Bloomberg*, 20 February 2013, available at: http://www.bloomberg.com/news/2013-02-20/eni-seeks-third-revision-to-gazprom-natural-gas-supply-contract.html

[15] Jonathan Stern and Howard Rogers, "The Transition to Hub-Based Pricing in Continental Europe: A Response to Sergei Komlov of Gazprom Export", *Oxford Institute for Energy Studies*, February 2013, p. 5, available at: http://www.oxfordenergy.org/wpcms/wp-content/uploads/2013/02/Hub-based-Pricing-in-Europe-A-Response-to-Sergei-Komlev-of-Gazprom-Export.pdf

[16] "The Balgzand-Bacton Line: Interconnector Between UK And Dutch Gas Market", *Dutch Ministry of Economic Development*, February 2007, available at: http://www.encharter.org/fileadmin/user_upload/document/BBL.pdf

other hand is still tied to oil indexation, thus paying a higher energy bill for the same amount of natural gas (the blue line represents an average of European prices). This radical change is taking place in Europe and it will probably spread in Asia. When the shift will be complete, natural gas will become a fungible commodity like oil, with its own international price[18].

Figure 1: Global natural gas prices



source: energybrains.org elaboration on BP Statistical Data

3. The Gas Market Revolution: Europe as the main battlefield

After years of pressure by the national governments, since 2001 the European Commission (EC) has implemented three waves of reform. The most relevant is the 2009 "Third Energy Package", which aims at liberalizing Europe's energy markets. Since then, Europe entered a period of reforms similar to that witnessed by the UK in the 1990s. One of the major structural changes conceived by the EC became know as the "unbundling" package, which came into force in 2011. In order to foster gas-to-gas competition within EU internal markets, this reform ruled that vertically integrated companies should give up control of Transmission System Operators (TSO) in order to enhance transparency and access to gas transmission networks. At

[17] For a detailed account of decoupling in Europe, Péter Erdos has applied several econometric models in order to analyse the correlation between oil and gas prices in Europe, Asia and the U.S. *Cfr*: Péter Erdos, "Have Oil and Gas Prices Got Separated?", *Energy Policy*, vol. 49, October 2012, p. 717.

[18] Already in 2005, before the first signs of decoupling appeared internationally, OPEC commissioned a study on the eventual emergence of an international gas price. *Cfr*: Ahmed El Hachemi Mazighi, "Henry Hub and National Balancing Point Prices: What Will Be the International Gas Price Reference?", *Organization of the Petroleum Exporting Countries*, September 2005, pp. 228-229.

the same time, the creation of national regulators would assure the transparency of operations in the national markets[19].

It is important to note that the amount of exchanges on local hubs depends on a functioning market, which determines the amount of natural gas available in the network. An easy access to gas markets is necessary for an increase of traded volumes. For this reason, the EC introduced the "Third Party Access" (TPA) clause in the Third Energy Package. According to this rule, all operators of transmission and distribution infrastructures must grant non-discriminatory access to gas networks. The only exception is accorded to new cross-border gas pipelines and LNG terminals, in such cases TPA and unbundling are considered as concretes obstacle for the construction of these infrastructures[20]. The Third Energy Package aimed to ensure coordination between the various TSOs in the Union. ENTSO-G, the organization of the EU network of TSOs, is moving steadily towards the creation of a common European gas network through both the implementation of network codes, crucial for the establishment of a capacity allocation mechanism between different gas markets and the monitoring of transparency in gas markets by functioning as the reference point for information (on prices, tariffs, and gas flow volumes) exchange between TSOs[21].

When this set of proposal emerged, energy utilities initially rejected its provisions, particularly in relation with the unbundling clause[22]. Ultimately, France decided to unbundle its two national TSO in 2005 (the Transport Network Management, GRT Gaz, and Gas France Transport Infrastructure, TIGF), previously owned by GDF Suez and Total Spa. Eni decided to unbundle Snam Rete Gas in 2012[23]. Germany, followed the same path, although its gas distribution network is far more complex in relation to the number of TSO involved.

The sharp fall in gas consumption which resulted from the 2008 financial crisis, paired with decoupling, convinced many major EU utilities to renegotiate long term contracts with traditional gas exporters such as Russia, Algeria, and the Gulf Emirates. Essentially, now the European gas market is oversupplied. The American shale gas revolution, which eroded Washington's demand for imported gas, redirected LNG shipping towards Europe. At the same time, several international LNG projects went online (Sakhalin in Russia, Tanggun in Indonesia, and Balhaf in Yemen), expanding world supply even further[24]. The mismatch between the increasing amount of natural gas available on the markets and a shrinking European demand pushed

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[19] "Effective Unbundling of Energy Transmission Networks: Lessons form the Energy Sector Inquiry", *European Commission Competition Policy Newsletter*, n. 1, 2007, p. 30, available at: http://ec.europa.eu/competition/publications/cpn/2007_1_23.pdf

[20] For more details related to TPA see the Directive 2009/73/EC, available at: http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32009L0073

[21] "Securing Europe's Energy Future", ENTSO-G Annual Report, 2013 available at: http://www.entsog.eu/public/uploads/files/publications/AWP%20&%20Annual%20Report/2014/entsog_annual_report_2013_lo.pdf

[22] "GDF Opposes Unbundling of Energy Networks", Reuters, 12 September 2007, available at: http://uk.reuters.com/article/2007/09/12/gdf-unbundling-idUKL1267109520070912

[23] However, 100% of Snam Rete Gas' shares are still under Snam's control, with Eni 20% and the Italian Treasury 30% as main shareholders (for a complete review of the shareholders visit the offical website: http://reports.snam.it/2012/ar/managementreport/corporategovernanceandownershipstructure/sharecapitalandownershipstructure.html, last accessed: 5 May 2014). In addition, 75% of GRT Gaz is owned by GDF Suez. TIGF on the other hand has been acquired by a consortium led by Snam (45%) Electricité de France (20%) and the sovereign fund of Singapore (35%). For more details related to the purchase of TIGF, visit: http://press.edf.com/press-releases/all-press-releases/2013/tigf-snam-gic-and-edf-have-completed-the-acquisition-283032.html (last accessed: 5 May 2014).

prices down. This element had serious repercussions on long term contracts stipulated by energy utilities (and governments owning the majority of their stakes).

As a result, Gazprom is under constant pressure for price reductions and hub indexation. The Russian giant is accountable for roughly 30% of natural gas imports in Europe. In 2010, it conceded to link 15% of its exported gas to spot prices for three years. In 2012, it issued a 10% discount for its gas during negotiations with GDF Suez (France), Wintershall (Germany), and Botas (Turkey)[25]. More negotiations are ongoing with Electricité de France, E.on, and RWE (Germany). Furthermore, all energy utilities are asking for a revision of "take or pay" contracts. In May 2014 Eni successfully negotiated a deal with Gazprom, paving the way for market pricing and more flexibility on its long term gas supplies[26]. Recently, a new clause has been included in gas contracts with Russia, whereby in case of "significant discrepancy" between contract and hub prices, the buyer would receive a refund[27]. Gazprom gave green light for these concessions in order to maintain its European market share, which is threatened by the consequences of cheap US shale gas, LNG coming from the Gulf Emirates, and the sudden change of market fundamentals described above. One of the main consequences coming from these years of renegotiations is that, between 2005 and 2012, the amount of oil-indexed natural gas consumed in Europe dropped from 80 to 51%[28].

4. New conditions for gas exporters

While all these developments are taking place in Europe, a new potential competitor to Gazprom's natural gas dominance is about to enter the market.

Azerbaijan has just concluded a round of negotiations with several major European utilities on the conditions of gas exports, which is supposed to reach Europe in 2019. In April 2014, GDF Suez has negotiated a long term contract with British Petroleum (the company leading the consortium that operates the giant Shah Deniz gas field) for the purchase of 2.6 bcm of natural gas indexed to West European prices[29]. The signing of this contract encouraged other utilities to follow the same path: Eni and Enel are trying to obtain the same conditions while negotiating with the Shah Deniz consortium, pushed by the Italian government.

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[24] Patrick Heater, "Continental European Gas Hubs: Are They Fit for the Purpose?", *Oxford Institute for Energy Studies*, June 2012, p. 26, available at: http://www.oxfordenergy.org/wpcms/wp-content/uploads/2012/06/NG-63.pdf

[25] For a detailed review of negotiations, see Guy Chazan, "Gazprom bows to demand with gas price cut", *Financial Times*, 16 February 2012, available at: http://www.ft.com/cms/s/0/2e57f4c4-58ad-11e1-9f28-00144feabdc0.html

[26] Guy Chazan, "Eni in Spot Market Gas Deal with Gazprom" *Financial Times*, 23 May 2014, available at: http://www.ft.com/cms/s/0/3b79b0e4-e284-11e3-a829-00144feabdc0.html

[27] Jonathan Stern, "International Gas Pricing in Europe and Asia: A Crisis of Fundamentals", *Oxford Institute for Energy Studies*, May 2013, p. 46.

[28] "European Commission Quarterly Report on European Gas Markets", *DG Energy*, vol. 6, n. 1, 2013, p. 16, available at: http://ec.europa.eu/energy/observatory/gas/doc/20130611_q1_quarterly_report_on_european_gas_markets.pdf

[29] For a detaled account of the GDF Suez-BP deal, see Tara Patel, "International Gas Pricing in Europe and Asia: A Crisis of Fundamentals", *Bloomberg*, 10 April 2014, available at: http://www.bloomberg.com/news/2014-04-10/natural-gas-loses-decades-old-tie-to-oil-in-landmark-deal.html

Azerbaijan has decided to apply this price formula to acquire EU market shares from Gazprom, Statoil (Norway) and Sonatrach (the Algerian energy giant). From 2019 onwards, 10 bcm of Azeri gas will be flowing to Europe via Turkey through the Southern Gas Corridor (the entire route is outlined in the map in Figure 2 below).

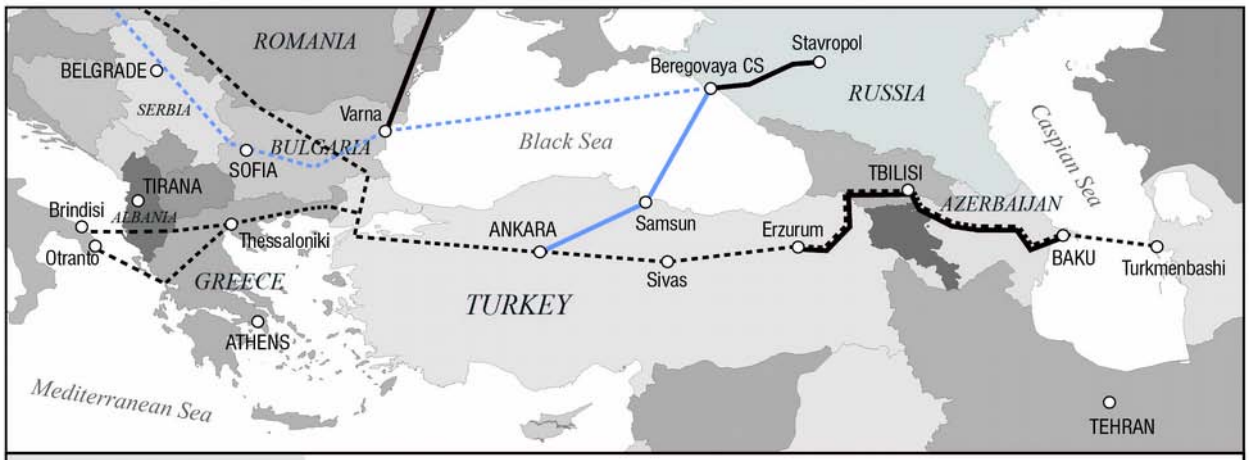

Figure 2
The Southern Gas Corridor – and its competitors

Source: energybrains.org

Trans-Caspian Pipeline	**South Caucasus Pipeline**	**Blue Stream**
Turkmenbashi-Baku Proposed: 1999 Capacity: 30 bcm	Baku-Tbilisi-Erzurum Length: 692 km Capacity: 20 bcm Operational since 2006	Beregovaya-Ankara Length: 1,213 km Capacity: 16 bcm Completed: 2003 Commercial Deliveries: 2005
Trans-Anatolian Gas Pipeline	**Trans-Adriatic Pipeline**	**Nabucco West**	**South Stream**
Ardahan-Kapıkule Length: 1,841 km Capacity: 16 bcm Construction starts: 2014	Greece-Albania-Italy Length: 867 km Capacity: 10 bcm Proposed: 2003	Bulgaria-Austria Length: 1,329 km Capacity: 10 bcm Proposed: 2012	Beregovaya-Arnoldstein Length: 2,380 km Capacity: 63 bcm Proposed: 2007 Construction started in 2012

This volume however is neither sufficient to undermine Gazprom's share in the European market, nor to alter the EU energy balance significantly. For this reason, since 2011 the EU Council is negotiating with Azerbaijan and Turkmenistan on the prospect of building a Trans-Caspian Pipeline[30]. Turkmenistan in fact has the largest natural gas reserve in Central Asia and is already supplying China and Russia with its gas. Despite statements by the Turkmen President in favor of this project, Iran and Russia (who are direct competitors of Ashgabat) strongly oppose its realization[31].

Although both Moscow and Tehran claim that any project in the Caspian Sea should be negotiated with all littoral countries, Russia and Kazakhstan have already closed bilateral agreements on the exploitation of Caspian resources. Ashgabat could use this precedent to promote a constructive dialogue, but at the same it is holding negotiations to build the Turk-

[30] Marat Gurt, "Turkmenistan to Seek Partners to Build EU Gas Link", *Reuters*, 17 November 2011, available at: http://www.reuters.com/article/2011/11/17/gas-turkmenistan-idUSL5E7MH1I520111117

[31] Victoria Panfilova, "Trans Caspian Alternative", *Vestnik Kavkaza*, 15 April 2014, available at: http://vestnikkavkaza.net/analysis/economy/53993.html

menistan-Afghanistan-Pakistan-India gas pipeline (TAPI). It thus appears that Turkmenistan's main objective is to foster project competition in order to secure better terms for its supply contracts[32].

If some producers are adapting to access the new EU market, others prove reluctant to adopt a different pricing mechanism. In a ruling issued by the International Chamber of Commerce in 2012, the Qatari LNG company RasGas had to renegotiate its LNG long term contract with Edison. Soon after this ruling, RasGas conceded the same conditions to Distrigas (owned by Eni since 2008), fixing prices on the ZEE hub as soon as it became credible enough to allow hub indexation. Before meeting the threshold, Qatari LNG was exchanged at oil-indexed prices[33].

5. Measuring the credibility of European hubs

Ever since the initial consolidation of local gas markets, the need to affirm their "trustworthiness" emerged. The "churn rate" was thus invented in order to estimate the credibility of local hubs. This rate is obtained by dividing the total traded volume by the delivered volume in a determined time period. This unit considers the degree of liquidity at local hubs, and it is measured from 0 (the least credible market) up to 23 (scored by the UK hub, which is the most credible in Europe), with 10 considered as the threshold unit for credibility[34]. By considering the "churn rate", the Oxford Institute for Energy Studies has grouped European gas markets in three categories: Trading Hubs (those with the highest trading volumes, such as NBP and TFF), Transit Hubs (ZEE and CEGH, very important for transit volumes but not for traded volumes) and Transition Hubs (GPL, NCG, PEGs, and PSV). Transition Hubs still have to fully confirm their performances. The challenge towards decoupling is currently evolving in these hubs, and Italy has a good chance to emerge as a prominent Southern European hub, able to gather high volumes of transit (coming from North Africa and the Caspian Region) and trade volumes.

GDF Suez was the first company to obtain a fully hub-indexed contract for natural gas. The tree hubs composing the French network (PEG Nord, PEG Sud, and TIGF - the latter two recently attempted to merger) arranged a virtual spread between the two main prices in the separate exchange zones (PEG Nord and PEG Sud), thus increasing liquidity. Germany has just completed the reform of its system, merging its network into two main hubs: NetConnect Germany (NCG) and GasPool (GPL). Germany needs to unify its two hubs before being able to challenge more competitive markets like ZEE or CEGH[35].

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[32] Michael Ratner, "Europe's Energy Security: Options and Challenges to Natural Gas Supply Diversification", *US Congressional Research Service*, August 2013, p. 22, available at: http://www.fas.org/sgp/crs/row/R42405.pdf

[33] In relation with these international disputes, check the IMF and ICC Arbitration Price Review reports: http://www.standardandpoors.com/spf/upload/Ratings_EMEA/DoRecentRulingsHeraldTheDivorce.pdf?elq=00000000000000000000000000000000 (last accessed: 8 May 2014). http://www.mcnairchambers.com/media/documents/201209/ICC_Arbitration_-_Qatar_LNG_Price_Review_-_September_2012.pdf (last accessed: 8 May 2014).

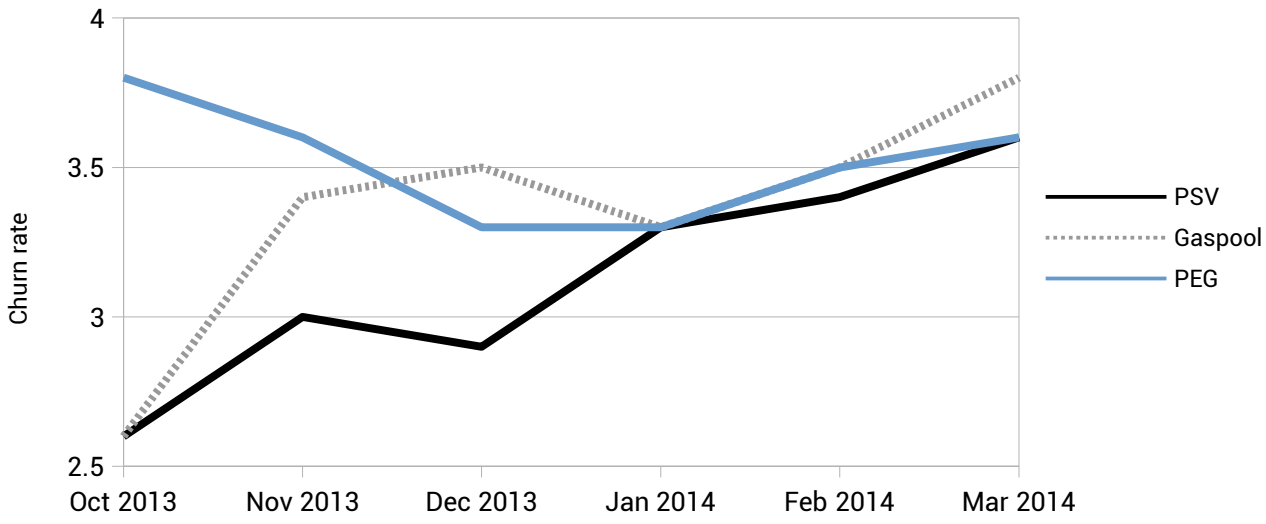
[34] For more informations related to the churn rate and its status in Italian market, see "Italian gas deals with Azerbaijan to break systemic oil-link", *Reuters*, 29 April 2014, available at:: http://www.reuters.com/article/2014/04/29/italy-gas-azerbaijan-idUSL6N0N942A20140429

[35] Heater, *op. cit.*, 2012, p. 17.

6. Witnessing the Shift: The Italian Case

Italy still has to find the liquidity and implement certain market reforms, necessary to turn the PSV (Virtual Exchange Point) into a credible trading point. Until the second semester of 2012, the majority of PSV transactions were still indexed at oil prices. However, from the first quarter of 2012, initial signals of decoupling led to a complete convergence between PSV and TFF (Dutch) prices. Now the two prices are almost coinciding, and the trend is unlikely to revert[36]. Nevertheless, hub prices are still diverging from LNG or pipeline traded gas. This difference is the result of a high amount of imported gas which is sold under long term contracts. Signed before the restructuring of the market, these contracts still involve the majority of gas flowing through the Italian network, despite several contract renegotiations with producers. Such a discrepancy between the PSV prices and the values at which natural gas is sold at physical points is the main obstacle towards a full fledged supply and demand market[37]. In 2013 Italy has reached three points in the "churn rate". Figure 3 below outlines "churn ratio" trends for the three main European transition hubs. Noticeably, the PSV has roughly the same value of the PEG and a slightly smaller value compared to the GasPool.

Figure 3: Churn rates in three developing European hubs



Source: energybrains.org elaboration on www.smart.grtgaz.com; www.gaspool.com; and www.snam.it data

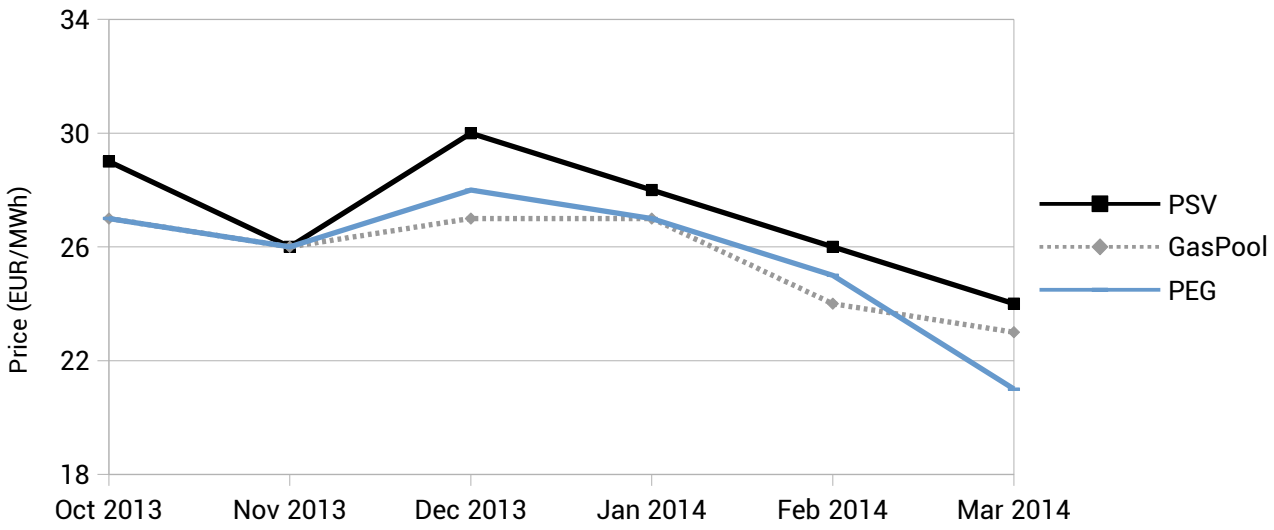
Enel Spa, Hera and Fluxys (Switzerland) together have purchased 5 bcm of gas from the Shah Deniz II project. With these supplies coming into force, Italian traders will have a significant amount of new gas traded at PSV prices. However, the PSV still has to confirm as a sufficiently liquid market. In the next five years the amount of trades has to grow, before the Azeri

[36] Anouk Honoré, "The Italian Gas Market: Challenges and Opportunities", *Oxford Institute for Energy Studies*, June 2013, p. 98, available at: http://www.oxfordenergy.org/wpcms/wp-content/uploads/2013/06/NG-76.pdf

[37] Leen Dickx, Caterina Miriello and Michele Polo, "Balancing Systems and Flexibility Tools in European Gas Market", *IEFE, Centre for Research on Energy and Environmental,* Bocconi University, February 2014, p. 66, available at: http://www.iefe.unibocconi.it/wps/wcm/connect/dfdb3e33-daae-416f-af7e-1886cc32507a/Report_IEFE_14.pdf?MOD=AJPERES

gas can reach the Italian network. In the meanwhile, the Eni-Gazprom price deal negotiated in May 2014 provides the PSV with large volumes of spot traded natural gas. In case the "churn ratio" fails to reach the threshold value of 10, a mixed pricing formula could be adopted for Azeri gas, with a certain percentage of the amount indexed at European hub prices and the rest to oil prices. This would entail more expensive bills for end consumers (see Figure 4 below for the most recent price trends in three developing European hubs).

Figure 4: Prices in three developing European hubs



Source: energybrains.org elaboration on www.smart.grtgaz.com; www.gaspool.com; and www.snam.it data

7. Conclusions and Future Scenarios

If we consider that prices, in the absence of supply/demand dynamics, are the result of negotiations between counterparts, their value is always the outcome of a power equilibrium. Natural gas producers exporting to Europe historically had the upper hand in these negotiations. These players set prices taking advantage of more expensive oil and locking buyers and consumers to long-term prices that were exempt from market rules.

The energy relationship connecting Russia to Europe is self evident. Europe is unable to substitute the 160 bcm[38] that it imports from Russia. This allows Moscow to apply different prices to different countries (Ukraine has paid undervalued prices for years, until its political class became unfit for Russian interests)[39]. On this particular point, EU Commissioner for Ener-

[38] The reference year is 2013, see: Elena Mazneva and Anna Shiryaevskaya, "Gazprom's European Gas Exports Rise to Record as Price Reduced", *Bloomberg*, 30 December 2013, available at: http://www.bloomberg.com/news/2013-12-30/gazprom-s-european-gas-exports-rise-to-record-as-price-reduced.html

[39] Full account of Ukraine's economical malfunctions between 1991 and the pre-crisis period is available here: Pekka Sutela, "The Underachiever: Ukraine's Economy Since 1991", *Carnegie Endowment for Peace*, March 2012, available at: http://carnegieendowment.org/2012/03/09/underachiever-ukraine-s-economy-since-1991/a1nf?reloadFlag=1. Russian gas in Ukraine has been under priced until President

gy, Günther Oettinger called Russia to issue a single price for its natural gas.[40]. In this tug-of-war between energy producers and energy importers, end consumers have been the net losers, and this is particularly true for Italy, whose residents are paying one of the highest energy bills in Europe[41].

However, as this paper outlines, there are several signals that a major shift is on the horizon: the creation of a unified European gas market, the consolidation of local hubs and, most importantly, the progressive indexation of gas prices to hub markets. Furthermore, the recent decision by the U.S. Energy Department to implement the necessary measures to allow the export of American LNG in Europe is likely to reinforce this long term trend[42]. Southern Europe is the battleground of this continental shift. So far, each of the steps forward towards a repetition of the British model has been taken. At the same time, higher volumes of hub-indexed gas are expected to reach the continent in the near future. Italy has an important role to play in this dynamic. Its geographical position and its infrastructures are a good starting point for the creation of a North-South gas corridor (as advocated by the Italian government)[43], crucial for the consolidation of Europe internal market. The complete affirmation of hub markets will finally depend on wholesalers and traders, whose operations determines the volume of exchanges and the liquidity available on markets.

The EC is constantly scrutinizing the situation on international markets, trying to encourage the affirmation of gas hubs as the main trading point for this commodity. In the latest communication to the EU Parliament and Council on energy security, the Commission asserts that: "Well-developed trading mechanisms and liquid spot markets can provide an effective hedge against abuses of the market or political power by individual suppliers"[44]. Although in these strategic communications the Commission stresses the supply security factor rather than the economic advantages of such a shift, several studies underline that virtual trading hubs are more reflective of gas prices, compared to traditional physical exchange points[45]. Brussels plans to implement the following interventions in order to foster the emergence of an integrated, hub based cross border internal market:

Viktor Yanukovich had been ousted from the Government and the country. In April Ukraine failed to pay for March supplies and President Putin warned that Russia could not maintain supplies in light of Kiev's gas debt (2 billion USD): Alexei Snishchuk, "Russia Warns Europe of Gas Supply Debt", *Reuters*, 10 April 2014, available at: http://www.reuters.com/article/2014/04/10/us-ukraine-crisis-russia-gas-idUSBREA3913C20140410

[40] "EU Wants the Same Price for Russian Gas for All Its Members: Oettinger", *EurActiv*, 2 May 2014, available at: http://www.euractiv.com/sections/energy/eu-wants-same-price-russian-gas-all-its-members-oettinger-301890

[41] Honoré, *op. cit.*, 2013.

[42] The debate within the U.S. Administration on whether to allow gas for export or to keep all the gas for its internal market seems to be at a turning point: Keith Johnson, "Gassing Up", *Foreign Policy Magazine*, 29 May 2014, available at: http://www.foreignpolicy.com/articles/2014/05/29/gassing_up?wp_login_redirect=0

[43] " Snam, Fluxys to Pool Assets in European Gas Pipeline Drive", *Reuters*, 31 March 2014, available at: http://www.reuters.com/article/2014/03/31/snam-fluxys-belgium-idUSL5N0MS1AO20140331

[44] COM(2014) 330 final, "European Energy Security Strategy", EU Commission, 28 May 2014 , http://ec.europa.eu/energy/doc/20140528_energy_security_communication.pdf

[45] Emma Schultz and John Swieringa have applied two statistical models to underline that European gas hubs (NBP day ahead and futures) are better suited than physical hubs for the formation of a demand/supply price. *Cfr:* Emma Schultz and John Swieringa, "Price Discovery in European Natural Gas Markets", *Energy Policy*, vol. 61, October 2013, pp. 628-634.

- The improvement of the PRISMA platform, a transparent and uniform auctioning system for tranfer capacity in the whole Continent (created in 2013).
- A particular set of interventions aimed at promoting hub exchanges in those areas where dependency from single gas producers is particularly strong (Eastern Europe and the Balkans).
- The reinforcement of antitrust and merger control rules to face non-competitive behaviours by energy companies.

According to the arguments presented in this paper, national governments are the ones that have the power to pressure energy utilities to negotiate better terms with natural gas producers, as well as to reform and promote their national hubs. Several billion euros are at stake, together with the political independence stemming from the freedom of choosing where and in what terms natural gas should be traded, according to a supply/demand rationale.

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