The Italian Gas Market:
Challenges and Opportunities

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Anouk Honore, May 2013

PREFACE

The Italian gas market is the third largest in Europe with strong demand growth especially in the power generation sector up to the mid 2000s. But projections of demand growth from that era have not been realised. Clearly the impact of the financial crisis and subsequent recession has had a significant impact, exacerbated by the growth in wind and solar generation capacity.

Market liberalisation in the 2000s failed to achieve levels of competition in the mid and downstream sectors to the extent seen in North West European markets. This resulted not only in some of the highest European end-user gas prices, but also delayed development of a liquid trading hub. Only in late 2012 did PSV prices align with the TTF and other North West European hubs after capacity availability issues in linking infrastructure were resolved.

Anouk Honore concludes that outlook for gas demand in Italy is not optimistic. With no nuclear power to phase out, and only 2 GW of coal and oil plant potentially impacted by the Large Combustion Plant Directive, any upward trend in gas consumption will ultimately rely on future economic activity, tempered by the growth of renewable capacity.

Italy's contracted supply commitments considerably exceed current and envisaged gas consumption levels. Provided that sufficient export capacity can be secured, this could enable Italy to become a transit market supplying adjacent market zones. If import sources remain suitably diverse, the role of PSV will become more significant with spreads to TTF responding to trans-European fundamentals.

Anouk Honore's paper forms part of an OIES Gas Programme research theme focussing on the most important national gas markets in Europe (and elsewhere). The rationale behind these papers is that individual markets have specific characteristics which are essential to understand in order to look at future trends. Research which attempts to describe and project trends in "European" gas markets misses these essential complexities and is therefore of limited value. This paper follows our previous publications on the UK and Spain, and later this year we shall publish research on the German market.

Howard Rogers, May 2013

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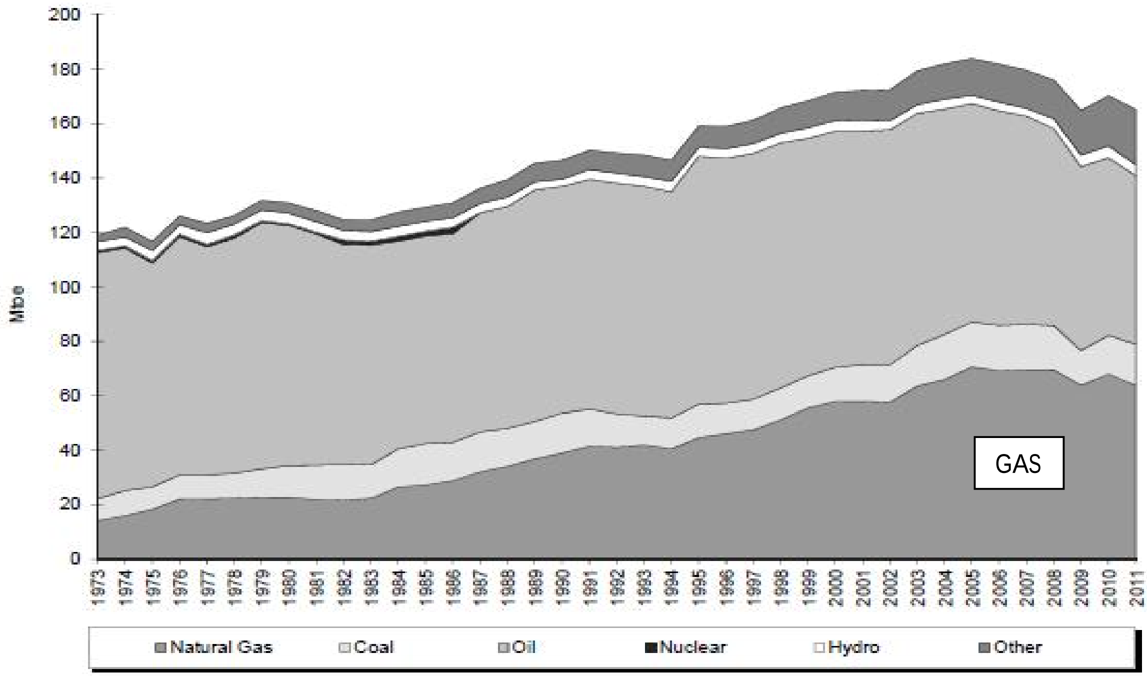
INTRODUCTION

CONTEXT AND PURPOSE OF THE PAPER

Italy is among Europe's largest energy consumers, with Total Primary Energy Supply (TPES) standing at 165 Million tonnes of oil equivalent (MMtoe) in 2011 (about 9.4% of the European TPES).[1] About three quarters of the supply mix come from oil and natural gas (only slightly down from 88% in 1973). However, this split hides a shift away from oil to natural gas over the past 40 years as shown in Figure 1. In 2011, the oil share had been reduced to 37.5% (down from 75.8%) while natural gas was Italy's most important energy source with a share of 38.6% (up from 11.9%) and the remaining shares were split between coal (9.2%), hydro (2.4%) and other energies, such as renewable energy (12.3%), which is also rising rapidly.[2]

Figure 1: Evolution of TPES by energy (MMtoe)



Source: IEA (2012b), p.IV.232

Italy is one of the three largest gas markets in Europe with the UK and Germany, but is often seen as somewhat different from the other major markets of the region. For instance, its largest single supplier has been not Russia but Algeria (although this changed in 2012), there is a high reliance on gas in electricity generation despite the country's dependence on imported gas, end-user gas prices are among the highest in Europe (partly explained by taxes) and while gas-to-gas competition is transforming the landscape of the gas industry in North West Europe, such evolutions seem to be slower and more complicated in Italy. Despite the slightly different story about the Italian gas

[1] Europe here is 'OECD Europe'. Source: IEA (2012a), p.II.100
[2] IEA (2012b), p.IV.232

market, it is going through important changes both in terms of structure and regulatory framework, supply dynamics and demand trends as is the rest of Europe.

The gas industry in Italy developed after World War II around the vertically-integrated state-owned company ENI, which was involved in the gas chain from production to retail sale, either as a monopolist or as the dominant player. This structure made the success story of gas possible. At the beginning of the 2000s, Italy started the liberalisation process of its energy markets following in the steps of the European Directives. Ten years later, the gas industry is fully liberalised, but competition has yet to reach its full potential with a few players still dominating the upstream and wholesale sectors. And while the retail sector is more fragmented, market concentration is still significant. As in the rest of Europe, the way gas is sold and traded is also evolving. The *Punto di Scambio Virtuale* (PSV), the virtual hub, was created in 2003 and a Gas Exchange with spot gas (day-ahead, intraday) and balancing gas platforms was launched in 2010 and 2011. Initial steps have also been taken since 2012 for the creation of a physical forward market to be launched in October 2013. Traded volumes are fast increasing and PSV day-ahead prices have started to track spot prices of North West European hubs since the end of 2012 thanks to governmental measures to improve liquidity and access to the market to new entrants. The creation of the spot and balancing markets, and the future forward market, cast a brighter light on the possible development of gas trading in the country.

Italy is highly dependent on imports which represent about 84% of its energy needs, while the European average is much lower at 53%. Indigenous production from renewables, gas and crude oil covers only 10%, 4% and 3% respectively of the national primary energy needs.[3] Imports also cover 90% of the country's gas needs. Gas imports are delivered mostly via long-term oil-indexed contracts, which have come under pressure since 2008. The - at times significant - discount of spot prices to long term contract prices has created some financial discomfort for importers of gas contractually required to buy oil-indexed gas but forced to sell to their wholesale/retail customers at prices linked to the spot market. As in the rest of Europe, renegotiations of prices and take or pay (TOP) volumes have started. Despite the (still) long duration of these contracts and the 'bubble' of over-contracted gas in the early 2010s, additional imports are already under consideration, both in the form of pipeline gas and LNG. It is uncertain how the balance of supply and demand will evolve but with security of gas supply issues high on the government's agenda, diversification of routes and sources and better interconnections with neighbouring European countries are priorities. Additional infrastructure is also seen as a way to develop further competition, add flexibility to the system and transform the country into a Southern European gas hub.

The need for additional gas supply will depend on the evolution of demand. Italy was still one of the fastest growing gas markets in Europe up to the mid 2000s, especially thanks to the power sector and the construction of Combined Cycle Gas Turbines (CCGTs). But since 2008, the country has been facing the impact of the economic recession, and both the industry and power sectors have been hard hit. Whether there has been demand destruction or a more temporary demand reduction is debatable, however, the rapid development of renewable energy, especially solar photovoltaic (PV), seems to have created long-term changes in the role of gas in the energy mix. The transition toward

[3] MSE (2013), p.18

a low carbon economy, initiated at the European level, is fully backed-up by Italy's energy and environmental policies, including in its National Energy Strategy adopted in an inter-ministerial Decree signed by the Ministry of Environment and the Ministry of Economic Development (MSE) on March 8, 2013. The first strategic document for over 15 years focuses on energy costs and the environment, two objectives that will shape the future of the gas industry and will certainly contribute to further the uncertainty on the future of gas-fired generation in Italy in the 2010s.

This paper takes these issues into consideration, and offers some insights regarding the challenges but also the opportunities that will arise in the Italian gas industry up to 2020.

STRUCTURE OF THE PAPER

Following this introduction, the first section examines the progress of liberalisation and competition in the Italian gas industry, focusing on the regulatory framework, the structure of the market and the development of gas trading. The second section focuses on the supply challenges, from the evolution of the long-term contracts to the development of new infrastructure, both for imports and for the national market in order to adapt to market changes. The third section analyses the possible trends for future gas demand in view of the pessimistic economic climate, growing share of renewable energy and competitiveness of gas versus other fuels, especially in the power sector. This section includes gas demand scenarios and an analysis of market fundamentals around the supply and demand balances up to 2020. The final part draws together the paper's conclusions.

I/ PROGRESS OF LIBERALISATION AND COMPETITION

This first section looks at the structure of the Italian gas market and how it has evolved since the start of its journey towards liberalisation. The first sub-section gives an overview of the development of the national gas industry since its early days, which is important to understand the regulatory framework and the role of gas in the energy mix. The second sub-section focuses on the main elements of the liberalisation process initiated by the European Directives in the early 2000s and takes a closer look at the first results in terms of market structure and development of competition. The third sub-section then turns to gas prices and the development of gas trading, both crucial for the future of gas supply and demand in Italy.

1.1. THE DEVELOPMENT OF THE ITALIAN GAS INDUSTRY

Early days: local production and demand

While searching for oil during World War II, the state company Agip found large quantities of gas in the Po Valley region, in Northern Italy, where the most promising oil and gas fields were located. After the war, Agip developed the gas resources as a substitute for imported coal and eventually oil. A pipeline network was created to reach the large factories in the northern part of the country. Thanks to this relatively cheap domestic energy source, local manufacturing industry expanded rapidly in the 1950s and 1960s. The profits from natural gas sales were reinvested into exploration and production activities and the expansion of pipelines in order to reach new customers. In 1948, the pipeline network was 257 km long, two years later, there were already 700 km and by 1952, the network had reached 2,000 km.[4]

Law n. 136 of February 10, 1953 created the state-owned energy company *Ente Nazionale Idrocarburi* (ENI).[5] The mission of the company was to provide energy to the rapidly growing Italian economy. Agip's drilling and production operations were absorbed and became a subsidiary of ENI. In Italy, ENI was responsible for exploration, production and transport of natural gas. It was granted exclusive rights by law for these activities in the Po Valley and the upper Adriatic region.[6] These rights were confirmed and expanded in additional Laws in 1957, 1967 and 1974.[7] As a result, ENI (and the companies controlled by ENI) had a monopoly (de jure or de facto) in all segments of the gas chain.[8]

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[4] Snam Rete Gas's website: http://www.snamretegas.it/it/chi-siamo/storia/1941-60.html
[5] ENI's website: http://www.eni.com/en_IT/governance/governance-model-policies/model-policies-by-laws/by-laws-sections/sections.shtml
[6] In the other areas, access to the market was possible via permits and concessions governed by the Mining Law (Royal Decree No.1443 of July 19, 1927)
[7] Laws no. 6/1957, no. 613/1967, and no. 170/1974
[8] Di Porto (2011), p.109

By 1960, Italy was the largest gas producer and consumer in Europe.[9] The vertical integration and the monopolistic position of ENI contributed to the expansion of the gas network to other parts of the country, even in the Southern regions where investment was not considered to be profitable (low residential demand due to warmer climate, low industrial demand due to slower economic development, higher distribution costs, etc.).[10] In 1960, there were 4,600 km of pipelines, almost all in the Po Valley, but by 1970, this had been extended to 8,000 km including two major pipelines to the central and southern regions, creating a national network dimension.[11] Consequently, natural gas started to replace town gas and demand grew rapidly in the residential and commercial sectors. Gas consumption at the national level was also boosted by rapid economic growth (+5.9%/y on average in the 1960s and 3.6%/y in the 1970s).[12]

1970s: The beginning of foreign supplies

The oil shocks in the 1970s reinforced the emphasis on gas rather than oil in the country, especially via the national programme to lessen the dependence on oil imports. With a rapid increase in gas consumption in the industrial, and the residential and commercial sectors, it became apparent that indigenous resources would not be sufficient to meet this growing demand. ENI started a programme of investments in import infrastructure in order to secure foreign supplies. The first imports to Italy were registered in 1971, when the Liquefied Natural Gas (LNG) import terminal at Panigaglia started operations (it is one of the oldest in Europe). From 1974, pipeline gas started to be imported from Russia and the Netherlands.[13]

By 1980, the national network had reached 15,000 km and covered almost the entire country.[14] In 1983, the construction of the first line from Algeria called Transmed[15] was completed (a second line was built in 1997).[16]

Since the early 1990s, the length of the Italian gas network has tripled. The development of the gas network in the southern regions contributed to sustained gas demand in Italy, but the most remarkable characteristic of the 1990s was the growth in power generation from gas. The development of the combined cycle technology, the abandonment of nuclear power in 1987, the phasing out of fuel oil in the power sector, and environmental pressures contributed to the rapid success of gas-fired power plants in Italy. As a result of these market dynamics, imports grew

[9] IEA (2012a), pp.II.157 & II.171

[10] Before liberalisation, household gas prices were all regulated and prices for industrial users were the result of negotiations between ENI and trade associations. Price controls and legal monopoly in the wholesale market allowed for cross subsidies between consumers. Source: Cavaliere (2007), p.4

[11] Snam Rete Gas's website, http://www.snamretegas.it/it/chi-siamo/storia/1961-99.html

[12] IEA (2012a), p.II.100, calculated by the author from the table 'key indicators', data on 'GDP – billions 2005 $'

[13] AEEG (2012a), table on '*Importazioni di combustibili fossili*'

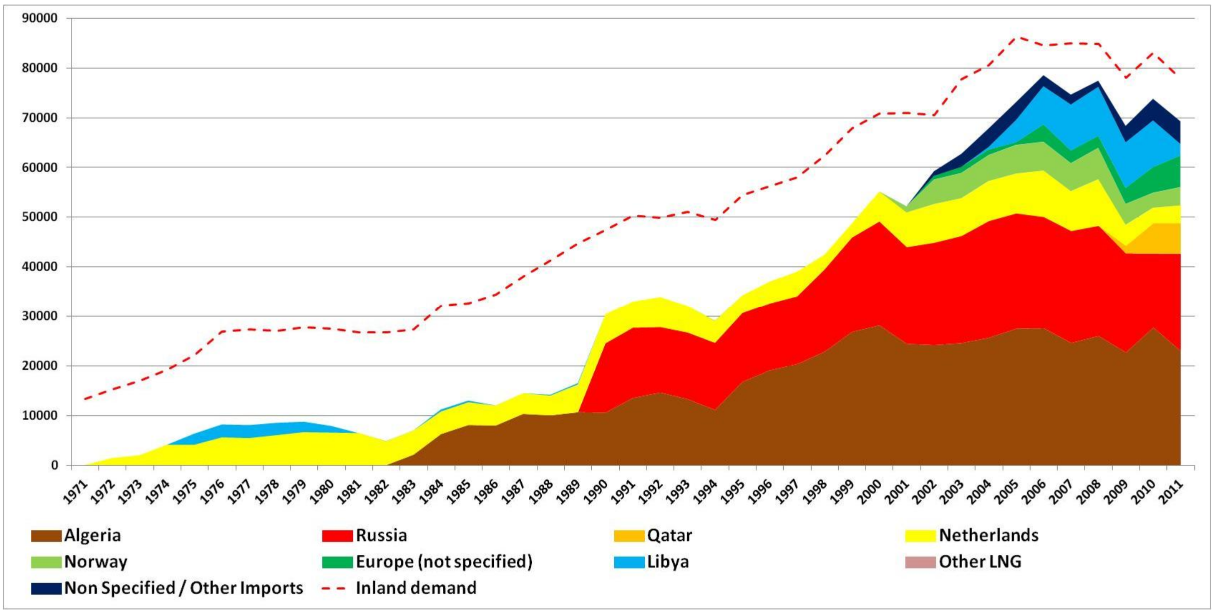
[14] Snam Rete Gas's website, http://www.snamretegas.it/it/chi-siamo/storia/1961-99.html

[15] The Trans-Mediterranean pipeline ('Transmed') was subsequently renamed Enrico Mattei, in honour of his role in the foundation of Eni

[16] ENI's website: http://www.eni.com/en_IT/innovation-technology/eni-projects/transmed/transmed-project.shtml

quickly. The construction of the Greenstream pipeline from Libya was initiated and first gas was delivered in 2004. A second LNG terminal also started operation in 2009 [Figure 2].

Figure 2: Gas imports and sources, 1971 -2011 (MMcm)



Source: IEA, *Natural gas information*, various issues

2000s: A major gas market highly dependent on imports

As Figure 3 shows, gas imports have grown rapidly since 1970. Strong gas demand growth continued in the early 2000s, but has come to a halt since 2005 as a consequence of slowing Gross Domestic Product (GDP) growth combined with high (oil-linked) gas prices that made gas less competitive both in the power and the industry sectors, and the rise of renewable energy and efficiency measures. Gas consumption remained relatively flat until 2008, and then fell significantly due to economic recession. Demand recovered in 2010 thanks mainly to economic recovery (real GDP increased by +1.7%) and partly to cold temperatures, but the decline resumed in 2011 and 2012.

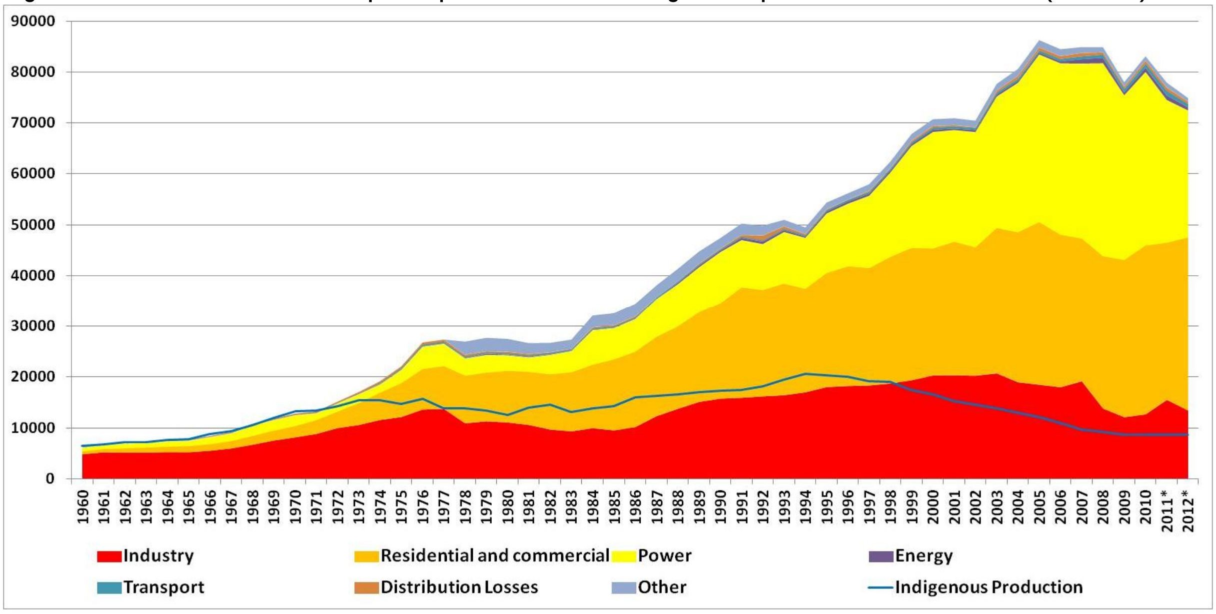
In 2011, IEA data put Italy as the second largest gas market in Europe, with a gross consumption of 77.9 Bcm.[17] The data produced by the Ministry for Economic Development (*Ministero dello Sviluppo Economico,* MSE) gives the following split: the residential and commercial sector was the biggest consumer with a share of 39.8%, followed by power 35.9% and industry 19.9%.[18] Provisional demand for 2012 registered a -3.9% decline of total demand, which was down to 74.9 Bcm.[19][20]

[17] In 2011, the UK was the largest market with 82.6 Bcm of gas consumed, Italy was the second market with 77.9 Bcm and Germany followed closely behind with 77.6 Bcm according to the IEA data. Source: IEA (2012b), p. II.8, table 3

[18] This is the provisional data for gross annual demand. Source: the MSE website: http://dgerm.sviluppoeconomico.gov.it/dgerm/consumigas.asp, data from '*Vendite di gas naturale in Italia, Anno 2011*'

[19] For 2012, provisional data from Snam on the gas transported on its network show total gas consumption at 74.25 Bcm, with 45.6% to the residential and commercial (R&C) sector, 33.2% for power and 17.9% to the industry sector. Source: Snam website:

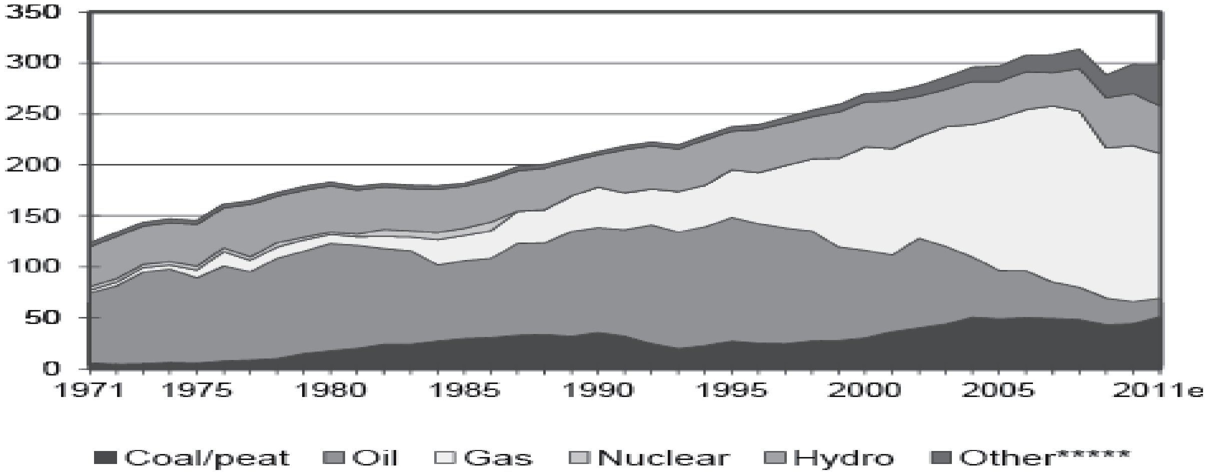
Figure 3: Gross inland consumption per sector and indigenous production, 1960-2012 (MMcm)



Source: IEA, *Natural gas information*, various issues and author's estimates for 2011 and 2012

A dash-for-gas in the 1990s and 2000s reduced dependence on oil-fired power plants, and increased dependence on gas-fired generation, most of which was supplied with gas under long-term oil-linked contracts. With limited coal-fired power plants and no nuclear energy, the power sector relies on gas for more than 50% of its needs, and as a consequence, is very exposed to international gas prices. The rapid development of renewables since the early 2000s is providing some diversification for electricity generation in Italy [Figure 4].

Figure 4: Electricity generation by fuel, 1971-2011 (TWh)



Source: IEA (2012a), p.II.101

http://www.snamretegas.it/en/services/Thermal_Year_2012_2013/Gas_transportation/2.html?formindex=1&archive_year=2013 .

[20] Note: data from Snam Rete Gas data and from the MSE may differ due to small differences in the calculations. For instance, Snam data takes the exit point, while the Ministry data refer to the end use of gas. As a result, some small firms are classified as industrial consumers by the Ministry and as in the residential and commercial sector by Snam.

Gas can enter the national network at seven entry points, five of which are pipelines (Mazara, Gela, Tarvisio, Passo Gries and Gorizia) and two are LNG terminals as shown in Table 1 (see also Map 1).[21] Two pipeline entry points (Tarvisio and Mazara) account for almost two-thirds of Italy's gas imports. Italy's largest entry point is the TAG pipeline interconnection through Tarvisio in the north-east of the country (maximum capacity of 4.99 MMcm/h) that brings gas from Russia. The Trans-Tunisian Pipeline Company (TTPC) and Trans-Mediterranean Pipeline Company (TMPC) interconnection from Algeria through Tunisia and across the Mediterranean to *Mazara del Vallo* in Sicily is also significant, (maximum capacity of 4.40 MMcm/h).[22] The entry points are distributed around the borders and coasts and offer the possibility of diversification of both routes and sources of imports to the Italian market.

Table 1: Italian pipeline and LNG infrastructure: capacity at entry points (December 2012) and gas flows (2012)

Name	Origin of the gas	Transit / border	Point of entry on the Italian network	Capacity (Bcm/y)	Flow in 2012 (Bcm)
Trans-European pipeline (TENP) + Transitgas	Netherlands + Norway	Switzerland	Passo Gries	21.5	9
TAG pipeline	Russia	Austria	Tarvisio	39	23.9
		Slovenia	Gorizia	0.7	0.2
Transmed/Enrico Mattei	Algeria	Tunisia	Mazara del Vallo (Sicily)	36.1	20.6
Greenstream	Libya		Gela (Sicily)	11.5	6.5
LNG terminal - Panigaglia	Various	-	Panigaglia - Ligurian Sea	3.3	1.1
LNG terminal - Rovigo	Various	-	Rovigo - Adriatic Sea / Cavarzere	8.4	6.2

Sources:

1/ For pipeline capacity at entry points: Snam Rete Gas, '*Capacità di Trasporto*', December 2012

2/ For LNG terminals capacity: GIIGNL (2012), p.31

3/ For 2012 gas flows: MSE (December 2012)

In 2012, Italy had a total import capacity of 120.5 Bcm, which was 62% more than the level of gas consumption (74.3 Bcm). The country was mostly supplied via long-term contracts, which represented about 110 Bcm[23] (48% above gas demand). The fast rising supply and the decline in gas consumption since the mid 2000s led to a situation of oversupply in the Italian gas market. Paradoxically, the country is at risk of periodic gas shortages in times of cold temperatures due to its

[21] See Appendix 1 for a detailed Map of the Italian gas network and import infrastructure
[22] IEA (2010)
[23] Author's research

high dependence on gas for the residential and power generation sectors and complex access to gas in storage.

The storage system is composed of ten depleted reservoirs, mostly located in the North [Map 1]. During the gas year 2011-2012,[24] they accounted for 15.6 Bcm of working gas capacity,[25] representing 20% of 2011 annual gas consumption (which is higher than the European average at about 14%[26]). According to Gas Storage Europe, Italy has not used 50% of its storage volumes in 2010, 2011 and 2012.[27] On the face of this, one can expect no major problem in terms of seasonal fluctuations of gas demand. However, only 10.5 Bcm were available for commercial activities as 5.1 Bcm were reserved for strategic storage, whose utilisation is at the sole discretion of the Energy Minister.[28] In addition, withdrawal rates were not very high compared to markets such as Germany.[29] Storage operators offer four basic types of services: modulation storage, storage for TSO balancing purposes, storage for production purposes and strategic storage.[30]

Map 1: Locations of gas stores (2012)

Source: Snam's website: http://www.snam.it/en/gas-system/scenario_OLD/ (accessed in January 2013)

[24] Gas year: a period of time that runs from October 1 to September 30 of the following year
[25] AEEG (2012b), p.142
[26] Calculated from IEA (2012b), table 29, pp.II-61-64
[27] GSE's website: http://transparency.gie.eu.com/chart_storage.php?r=24
[28] The strategic volumes were decreased to 4.6 Bcm in 2012. See Chapter 2 for more details on storage.
[29] Just as a comparison, in 2011, Italy and Germany both consumed about 77 Bcm of gas. Gas storage in Germany amounted to 20.7 Bcm of working gas capacity with a peak output of 518.6 mcm/d, while Italy had 15.1 Bcm of working gas capacity with a peak output of 292.2 mcm/d. Source: IEA (2012b), Table 3 p.II.8 and Table 29 p.II.63-64
[30] Storage companies' websites: Stogit: http://www.stogit.it/en/about-us/company/ and Edison Stoccaggio; http://www.edisonstoccaggio.it/stoccaggio/content/offerta-servizi

By 2011, the gas transmission network extended over 34,000 km across Italy.[31] As shown in Table 2, all but a few pipelines were owned and operated by Snam Rete Gas (32,000 km), the others belonged to smaller operators such as *Societa Gasdotti Italia* (about 1,300 km) and eight others with small sections of the regional network.[32] Since 2001, transmission activities have been based on an entry-exit model, and the regulator *Autorità per l'Energia Elettrica e il Gas* (AEEG) defines transportation tariffs.[33] The regulator also approves the framework of access to the grid where Third Party Access (TPA) to the transmission network is governed by a regulated network code, with similar arrangements in place for storage services and LNG facilities.[34]

Table 2: Transmission System Operators (TSOs) in 2011 (km)

	National	Regional	Total
Snam Rete Gas	9080	22930	32010
Società Gasdotti Italia	307	1052	1359
Edison Stoccaggio	83	-	83
Retragas	-	407	407
Gas Plus Trasporto	-	41	41
Netenergy Service	-	36	36
Italcogim Trasporto	-	15	15
Metanodotto Alpino	-	76	76
Energie	-	67	67
Consorzio della Media Valtellina per il trasporto del gas	-	41	41
Total	9470	24665	34135

Source: AEEG (2012b), table 3.5, p.139

The distribution network expanded over more than 248,000 km in 2011.[35] Ownership remains fragmented with 229 active operators (750 in 1999[36]), but Snam is still the biggest player thanks to its Italgas subsidiary which manages over 50,000 km of gas distribution networks and serves about 5.8 million customers (out of about 22 million).[37] The AEEG establishes the criteria for access to the distribution of natural gas, based on which the distribution companies prepare their network codes.[38] In 2011, about 6,500 Italian cities and towns set their own rules for tenders to award gas distribution service concessions, which sometimes translate into a complicated regulatory framework for sector operators and new entrants.[39]

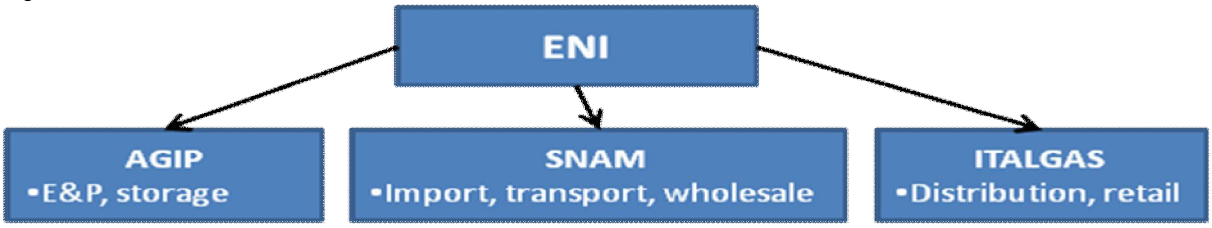
[31] Offshore pipelines are considered part of production facilities. Source: IEA (2012b), p.VI.38
[32] AEEG (2012b), p.138
[33] For more information on tariffs and the ones applicable in 2012, see AEEG (2012b), pp.184-188
[34] IEA (2009), p.119
[35] AEEG (2012b), p.159 and p.149
[36] AEEG's website : http://www.autorita.energia.it/allegati/relaz_ann/05/05_Cap_4_2005.pdf, p.261
[37] Snam Rete Gas's website : http://www.italgas.it/it/chi-siamo/dove-siamo/le-nostre-reti.html
[38] Legislative Decree no.164/00, article 24, paragraph 5
[39] Reuters, March 1, 2011, 'GDF Suez looks to sell Italian gas grid', http://uk.reuters.com/article/2011/03/01/uk-gdf-suez-idUKLNE72002K20110301

1.2. FIRST RESULTS OF THE LIBERALISATION PROCESS

The structure of the Italian gas market before liberalisation

As a result of its historical development, the natural gas industry in Italy until the late 1990s was characterized by vertical integration with the state-owned company ENI involved all along the gas chain either as a monopolist or as the dominant player. ENI was awarded a legal monopoly over gas exploration, production and transportation in the most important market area (the Po Valley); AGIP (subsidiary of ENI) controlled E&P and gas storage; the national gas transmission system and all supplies to the wholesale market were a *de facto* monopoly for Snam (subsidiary of ENI); and Italgas (subsidiary of ENI) was in charge of the distribution and retail activities, as shown in Figure 5. The downstream segment of the chain (gas distribution and retail sales) had a more fragmented market structure with nearly 800 companies of various sizes.[40] The local gas distribution companies included small private firms with local concessions granted by municipalities and municipal companies acted as local natural monopolies together with ENI subsidiaries. Nonetheless, Italgas, a subsidiary of ENI, could be considered as the dominant player with about 30% of the distribution and retail market.[41]

Figure 5: ENI's structure before liberalisation



Source: Author

Snam also had stakes in international transmission pipelines via joint ventures with foreign companies. ENI started natural gas imports in 1971. Imports were based on long term contracts with gas prices linked to crude oil and product prices. The near monopoly of ENI in the wholesale market made it possible to price its gas through competition with oil products or by bilateral agreements between ENI subsidiaries and associations of industrial consumers. As a result, the pricing formulae for end-users were linked to oil products (some of them still used in 2013). Distribution margins were subject to government regulation and price increases to follow the changes in import prices were not automatic (several price hikes, which would have been justified by higher import prices, were not authorised).[42]

National laws introduced some changes in the Italian gas industry even before the implementation of the European directives in the 2000s. Law no. 142 in 1990 was a first effort to bring in some competitiveness in local public services, including gas distribution, by allowing local authorities to manage the distribution services differently. Law no. 9 in 1991 allowed TPA in limited circumstances

[40] Ascari (2012)
[41] Cavaliere (2007), p.6
[42] Ascari (2012)

and as a result, some companies entered the market.[43] In 1992 and 1994, Law no. 359 and 474 respectively started the privatisation of ENI.[44] Between 1995 and 1998, the Ministry of the Treasury placed four offerings on the market accounting for 64.6% of ENI's share capital, and changed its corporate mission to profit-making. State ownership was reduced to about 30%, in part through shares held by the *Cassa Depositi e Prestiti* (CDP).[45]

The Competition Authority (*Autorità Garante della Concorrenza e del Mercato*, (AGCM)) also known as the Antitrust Authority, which oversees all sectors of the economy including energy, was established in 1990.[46] The independent Regulatory Authority for electricity and gas, AEEG, was established in 1995.[47]

The European Directive 94/22/EC was transposed in the Legislative Decree no. 625 in 1996. The decree liberalised the extraction activities of natural gas, and as a result, ended ENI's exclusive rights from January 1, 1997.[48]

From the late 1990s, the state has not had direct control of pricing,[49] and as the IEA noted, 'the government moved from a 'command and control' system where national companies where in charge of implementing government policies to a market-based economy'.[50] A quick overview of the liberalisation process is provided below.

Overview of the liberalisation process

The real stimulus for the liberalization process came from the European Commission with the EU Gas Directives, which were designed to create an internal market for gas by breaking up vertically integrated national companies, allowing entry on the supply side and consumer switching on the demand side.

The first EU Gas Directive (Directive 98/30/EC of June 22, 1998) established common rules for the transmission, distribution, supply and storage of natural gas and defines the rules relating to the

[43] IEA (1999), p.92
[44] Di Porto (2011), pp.110-111
[45] The Ministry of Economy and Finance kept control of ENI thanks to the shares directly and indirectly owned through *Cassa Depositi e Prestiti* (CDP) that is under the control of the Ministry which owns 70% of CDP's shares. In early 2013, the Ministry of Economy and Finance held, directly or indirectly through CDP, 30.1% of ENI's share capital while the market owned 69.9%. Source: ENI's website : http://www.eni.com/en_IT/investor-relation/eni-stock-markets/shareholders/shareholder-structure/shereholder-structure.shtml (last update on February 7, 2013)
[46] Autorità Garante della Concorrenza e del Mercato (AGCM, the Italian Competition Authority)'s website: http://www.agcm.it/en/
[47] The AEEG is the independent body which regulates, controls and monitors the electricity and gas markets in Italy. It has been established by the law of November 14, 1995, n.481. and became fully operational in April 1997. AEEG's mission includes defining and maintaining a reliable and transparent tariff system, reconciling the economic goals of operators with general social objectives, and promoting environmental protection and the efficient use of energy. Source: AEEG's website: http://www.autorita.energia.it/it/inglese/index.htm
[48] Legislative Decree n.625 of November 25, 1996, in Roggenkamp & Hammer (2004), p.316. See also Di Porto (2011), p.112
[49] Ascari (2012)
[50] IEA (1999), p.91

organisation and functioning of the natural gas sector, including LNG, access to the market, the operation of systems, and the criteria and procedures applicable to the granting of authorisations for transmission, distribution, supply and storage of natural gas (art 1).[51] More specifically, it mandated unbundling of accounts and some functions; regulated or negotiated TPA to transportation and distribution networks, storage facilities and the free choice of suppliers (eligibility) for large customers (power producers and others consuming more than 15 MMcm/y). The Directive establishes essential principals but the individual states are free to decide the means to implement them.

The Directive was transposed into Italian law by Legislative Decree no. 164/2000 of May 23, 2000,[52] known as the 'Letta Decree', which was inspired by the British experience and in some cases, went further than the basic requirements of the first directive.[53] The key provisions included:[54]

- Regulated third party access to transmission networks, storage and LNG facilities with access tariffs subject to price cap regulation is entrusted with the independent regulator AEEG (art. 8.2, art. 12.2 and art. 23.2). Access to transmission systems needs to be granted as long as it is technically and economically feasible. Gas companies may only refuse access to their gas systems in specific cases of insufficient capacities, interference with public service obligations or when access would cause serious economic or financial difficulties (art. 24.2). Third party access to the distribution system is regulated, with tariffs set by the regulator (art. 14.1 and art. 23.2).
- Two antitrust ceilings limit market share.[55] The first on gas sales, with effect from January 1, 2002 until December 31, 2010, whereby no company, either directly or through subsidiaries, can input volumes of imported or domestically produced gas in the domestic transmission network in excess of 75% of domestic consumption of natural gas on an annual basis (this percentage decreases by 2 percentage points per year until it reaches 61% in 2009) (art. 19.3); and the second one on the gas injected in the national territory by which no gas company (including directly or indirectly controlled subsidiaries) can sell gas to final customers in excess of 50% of national gas consumption from January 1, 2003 until December 31, 2010 (art. 19.2). This was implemented by ENI mostly by selling gas to competitors abroad.[56] In addition, importers of gas sourced outside the EU have to obtain authorization from the MSE, while EU imports must only be known to the Ministry.
- All customers became eligible to purchase gas from any supplier on the market from January 1, 2003 (art. 22.2).[57]

[51] Directive 98/30/EC of the European parliament and of the council of June 22, 1998 concerning common rules for the internal market in natural gas. Source: European Union's website: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:1998:204:0001:0012:EN:PDF

[52] AEEG's website: http://www.autorita.energia.it/it/docs/riferimenti/00164dl.htm. See also 'Reference normative general for gas' (1996-2012) on AEEG's website: http://www.autorita.energia.it/it/docs/riferimenti/gas_2012.htm

[53] Ascari (2012)

[54] The Letta Decree (named after the Minister of Industry at the time: Enrico Letta) can be found on the AEEG's website: http://www.autorita.energia.it/it/docs/riferimenti/00164dl.htm

[55] In practice, this only concerned the incumbent ENI

[56] Ascari (2012)

[57] This resulted in two markets: the users who did not choose to buy gas on the open market and/or did not change their supplier belonged to the 'protected market' for which the Authority set the economic and contractual conditions and quality of service (Art. 23.2).

- Legal and accounting unbundling is imposed. By January 1, 2002, transport activities have to be separated from all other activities of the natural gas supply chain (with the exception of storage) (art.22.1); distribution activities have to be separated from all other activities of the natural gas supply chain (art. 22.2).[58]

As a consequence of the Legislative Decree no. 164/2000, the structure of ENI was changed, as described below and shown in Figure 6:

- Italy opted for legal unbundling of the transmission network from the former integrated gas utility. In 2001, Snam was transformed into Snam Rete Gas. The new TSO was initially totally controlled by ENI, but was then partially privatised.[59] In March 2012, ENI still owned 55.53% of Snam, but in October 2012, ENI sold 30% less one share of Snam to CDP in order to comply with government-ordered divestment designed to separate gas production from distribution.[60]
- On July 2001, GNL Italia S.p.A, wholly controlled by Snam Rete Gas S.p.A., was established in order to manage the regasification of liquefied natural gas in Italy.[61]
- Gas imports and sales to the wholesale market were dealt with by a subsidiary of the former integrated utility, ENI Gas & Power.
- In 2001, ENI created a subsidiary, Italgas Più, to handle the resale of gas for domestic use. At the beginning of 2005, its activities were absorbed by ENI's Gas and Power Division.[62]
- Italy also legally unbundled storage facilities from gas production and transmission activities. In November 2001, ENI created Stoccaggi Gas Italia S.p.A (Stogit Spa) to manage natural gas storage activities. In February 2009, Snam Rete Gas purchased 100% of Stogit and Italgas.[63]

[58] Distribution remained on the basis of a local concession (i.e. legal monopoly) but the gas is sold by companies operating throughout the country and authorized by the MSE (art. 17.1). The distribution system operators are appointed by tenders for not more than 12 years (art. 14.1).

[59] In December 2001 when about 40% shares were listed on the stock exchange. In 2004, an additional 9% of the shares were placed on the market. By January 2013, ENI retained an interest in Snam of 20.23%, CDP held 29.97%, Snam 0.09% while the remaining 49.71% was listed on the Italian stock exchange.
Sources: Malacarne (2003), p.1 ; Staffetta News, February 24, 2005, 'Government introduces golden share in Snam Rete Gas privatization', http://www.staffettaonline.com/staffetta_news/articolo.aspx?ID=4242 ; and Snam's website: http://www.snam.it/en/Investor_Relations/FAQ/Institutionals/

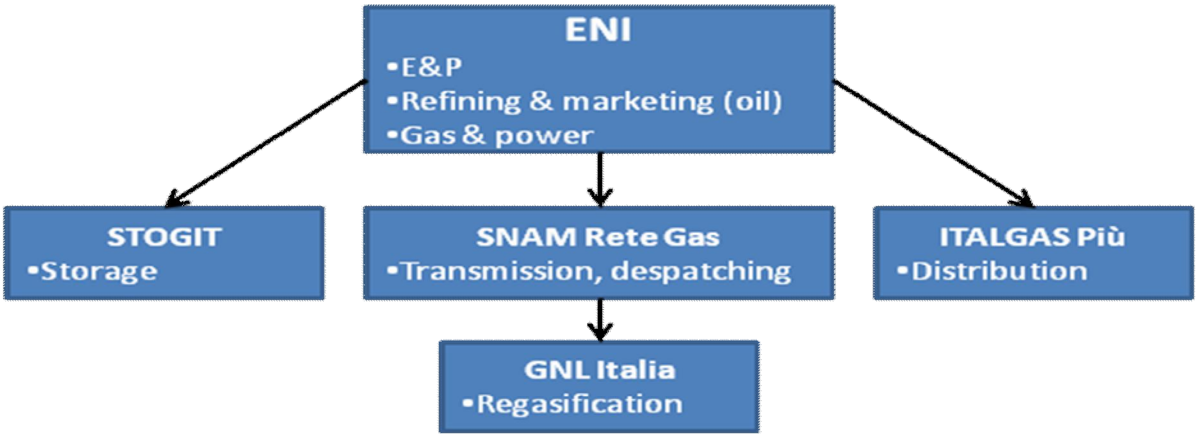
[60] Sources: Oil and Gas Journal, July 18, 2012, 'ENI sells 5% of Snam as part of divestment', http://www.ogj.com/articles/2012/07/eni-sells-5-of-snam-as-part-of-divestment.html and Oil and Gas Journal, October 16, 2012, 'Eni sells 30% of Snam to financial firm', http://www.ogj.com/articles/2012/10/eni-sells-30-of-snam-to-financial-firm.html

[61] Snam's website: http://www.snamretegas.it/en/about-us/history/2000-03.html

[62] Di Porto (2011)

[63] Snam's website: http://www.snamretegas.it/en/about-us/history/2004-today.html

Figure 6: ENI's structure after unbundling in 2002



Source: Author

The obligations of the 2nd EU package (Directive 2003/55 of June 26, 2003[64] and Regulation 1775/2005 of September 28, 2005[65]) had been already almost implemented in Italy by Decree 164. All customers were free to choose their supplier, legal unbundling and regulated third party access had already been implemented, but this had not been sufficient to introduce effective competition.

The Third Energy Package (Directive 2009/73/EC in July 2009) was implemented in Italy by the Legislative Decree no. 93 of June 1, 2011.[66] As noted by AEEG in its annual report 2012, the main measures concerned:

- The unbundling of transmission systems and transmission system operators: the Independent Transmission Operator model was applied to the main transmission system operator (Snam Rete Gas) but it left the choice between the remaining models to the other smaller network operators.
- Priority access to modulation storage is given to suppliers of vulnerable customers and non-household customers with consumption below 50,000 cm/y. The obligation to maintain strategic storage (so far imposed only to importers from third countries) was extended to all producers and importers.
- Introduction of a definition of vulnerable customers; the Authority temporarily determines reference prices for vulnerable customers, i.e., the prices that gas suppliers or distributors must include among their commercial offers.[67]

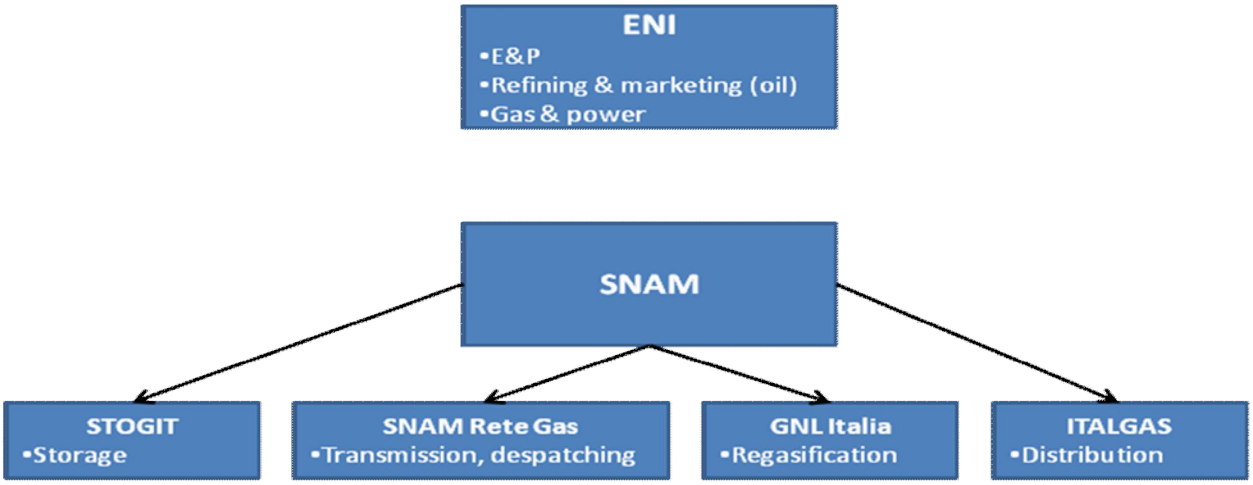
Legislative Decree No. 130 of August 2010 ('New measures to improve competitiveness in the natural gas market and to ensure the transfer of economic benefits to final customers') replaced the previous system of antitrust threshold defined by the Letta Decree in 2000. The new provisions aim

[64] Directive 2003/55/EC of the European parliament and of the council of June 26, 2003 concerning common rules for the internal market in natural gas and repealing Directive 98/30/EC, EU's website: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2003:176:0057:0078:EN:PDF
[65] Regulation (EC) no 1775/2005 of the European parliament and of the council of September 28, 2005 on conditions for access to the natural gas transmission networks, EU's website: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2005:289:0001:0013:EN:PDF
[66] The Legislative Decree no.93 can be found on http://www.normattiva.it/uri-res/N2Ls?urn:nir:stato:decreto.legislativo:2011;093
[67] AEEG (2012c), pp.9-10

to increase competition by the development of storage infrastructure in favour of industrial and gas plant operators. The new Decree introduced a 40% ceiling to the wholesale market share of each gas operator with gas input into the Italian national network.[68] The ceiling can be raised to 55% if the operator commits itself to building new storage capacity in Italy for a total of 4 Bcm within five years from the enactment of the Decree. If the operator does not comply, it must execute gas release at regulated prices for up to 4 Bcm over a two year-period.[69]

Other major changes were prompted by the Liberalisation Decree ('Grow Italy Decree') in March 2012 (Law 27/2012). While the previous government had allowed ENI to retain ownership of Snam along the lines of an Independent Transmission Operator (ITO), the Decree required ENI to sell its entire 52% stake in gas network operator Snam, including its storage, distribution and LNG terminal assets in order to boost competition and cut prices. In other words, it reviewed the model chosen for Snam Rete Gas in favour of the ownership unbundling regime.[70] The Decree gave ENI 18 months (until September 2013) to reduce its stake in Snam by at least 25.1%, with the rest sold at an unspecified date in the future. Snam Rete Gas achieved the status of independent TSO in October 2012 when ENI sold a 30% less one share stake in Snam to the CDP for €3.52 billion.[71] As a result, ENI became a more upstream-focused business with lower debts, while Snam includes pipeline operator Snam Rete Gas, storage operator Stogit, LNG operator GNL Italia and distributor Italgas. The new structure for ENI and Snam after the ownership unbundling in October 2012 is detailed in Figure 7.

Figure 7: ENI's and Snam's structure after ownership unbundling in October 2012



Source: Author, companies' websites

[68] Legislative Decree 130/2010 and the Letta Decree 164/2000 have different definitions of market shares used to evaluate the compliance to the antitrust ceilings (see article 3 of Decree 130/2010 and article 19 of Decree 164/2000). The Letta Decree 164/2000 was more probably more favorable because the market shares didn't include gas sales before the Italian border and 'auto-consumptions' (up to a maximum of 10% of the national demand) as shown by some of the mandatory gas release programmes set up by the antitrust authority, like the '*vendite innovative*' from Libya and the Gas Release 2004. On the other hand, the Legislative Decree 130/2010 includes both of them and therefore leads to a lower market share of the internal market.

[69] ENI (2012a), p.99

[70] AEEG (2012c), p.65

[71] The AEEG has expressed concerns about possible anticompetitive connections between companies reporting to CDP. Source: ICIS Heren, June 26, 2012, 'Competition at Italy's PSV hub is still lacking – antitrust body, http://www.icis.com/heren/articles/2012/06/26/9572819/competition-at-italys-psv-hub-is-still-lacking--antitrust-body.html

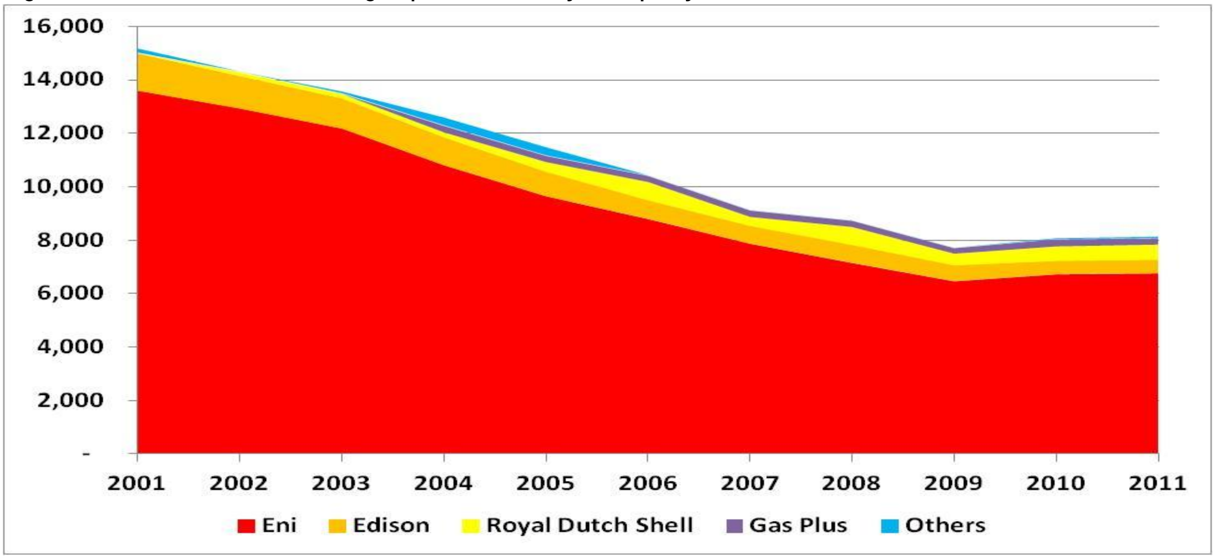
While ownership unbundling is an important step, it can also be argued that access to national transmission is already heavily regulated and transparent and the main problem shippers face is to get access to capacity in import pipelines, preventing additional suppliers of gas from entering the market and competition from developing.
The government has undertaken various mandatory changes to the structure of the gas market in order to improve competition in supply, help cut gas prices and guarantee fair access to the network. The following section analyses the first results.

First results: market structure and competition

The liberalization process has engendered many changes in the industry. The new regulatory framework created favourable conditions for the arrival of new companies into the gas market. While all the segments of the gas chain are liberalised, competition can still be improved in some of its segments.

The upstream sector is still dominated by ENI, which accounted for 83% of the gas produced in Italy in 2011. Other producers include Royal Dutch Shell, Edison, Gas Plus and others [Figure 8].

Figure 8: Evolution of natural gas production by company, 2001-2011



Source: AEEG (2012d)

Imports represented 90% of the gas supplied in Italy in 2011.[72] After years of enforcement of antitrust ceilings set by Legislative Decree no. 164 of May 23, 2000, ENI's share in total imported gas declined progressively. However, this measure was no longer effective from 2011, and ENI's share slightly increased from 39.2% in 2010 to 41.4% in 2011. Its principal competitor was Edison, lagging behind with a 17.3% share of total imported volumes. The first three largest importers (ENI, Edison and Enel Trade) together covered 72.3% of imported gas volumes [Table 3]. Other importers had shares equal to, or below, 2%.

[72] AEEG (2012b), calculated from the data on p.133

Table 3: Imports of natural gas by importing company in 2011 (MMcm and %)

	Imports	Share of total (%)
ENI	28158	41.4%
Edison	11781	17.3%
Enel Trade	9278	13.6%
Sonatrach Gas Italia	1375	2.0%
Sinergie Italiane	1347	2.0%
Enoi	1210	1.8%
Plurigas	1122	1.7%
Gas Plus Italiana	1010	1.5%
Egl Italia	1005	1.5%
Shell Italia	978	1.4%
PremiumGas	945	1.4%
BP Italia	844	1.4%
Speia	931	1.4%
E.On Ruhrgas - Sede secondaria	853	1.3%
Vitol	687	1.0%
Others	6468	9.3%
Total	67992	100%

Source: AEEG (2012b), p.134

Storage activity is also highly concentrated both geographically and operationally: eight out of ten facilities were owned and operated by Stogit (a Snam subsidiary). The remaining two accounted for only 2% of the working gas capacity and were owned and operated by Edison Stoccaggio.

Of the 380 gas operators that replied to the regulator's survey in 2011,[73] 40 sold gas only in wholesale market ('pure wholesalers'), 205 sold gas exclusively to the retail market ('pure retailers'), 103 sold gas to other suppliers as well as directly to the retail market (mixed operator) and 32 said they were not active.

Sales in the wholesale market totalled 98.4 Bcm in 2011, of these, 28% was sold by pure wholesalers and 72% by mixed operators, totalling 143 companies active in the wholesale market. The gas sold by ENI represented 14.8% of the total, a fairly low share compared to the company's predominance in the upstream sectors, but a share double that of its next competitor Edison [Table 4]. The share of the top three companies (Eni, Edison, Sinergie Italiane) was 28.1%, while the five major sellers accounted for 38.7% (the first three plus Enel Trade and GdF Suez). The wholesale market appears to be moving in the direction of competition (the share of top-five operators was above 50% in 2009). The Herfindahl index calculated only on the wholesale market in 2011 was equal to 0.049 (a value well below the 0.1 which is considered a signal of low concentration).[74]

[73] Out of 431 accredited sellers, 380 replied to the regulator's survey in 2011. Source: AEEG (2012c), p.85
[74] AEEG (2012c), pp.85-86

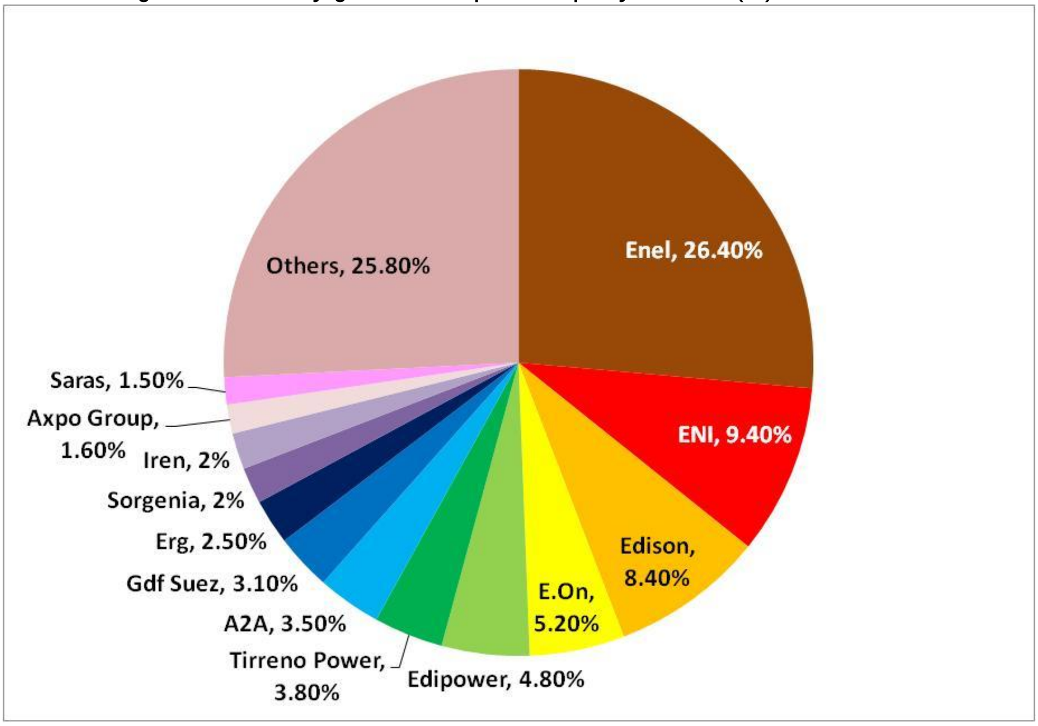
Table 4: Suppliers to wholesale markets in 2011 (MMcm and %)

	Sale to wholesalers	Sale to final customers	Total	Share of wholesale sector (%)
ENI	14586	17444	32030	14.8%
Edison	7012	5400	12412	7.1%
Sinergie Italiane	6103	191	6294	6.2%
Enel Trade	5827	3859	9686	5.9%
Gdf Suez	4646	0	4646	4.7%
Gdf Suez Energia Italia	3994	1220	5214	4.1%
Gdf Suez Gas Supply and Sales	3697	0	3697	3.8%
Plurigas	3484	1292	4776	3.5%
Spigas	3229	265	3494	3.3%
A2A Trading	2969	124	3093	3.0%
Hera Trading	2715	33	2748	2.8%
Shell Italia	2705	1647	4352	2.7%
Enoi	2471	21	2492	2.5%
Hb Trading	2213	0	2213	2.2%
Gas Plus Italiana	2135	0	2135	2.2%
Energy.Com	1936	0	1936	2.0%
Sonatrach Gas Italia	1929	0	1929	2.0%
Others (share <2%)	26737	21224	47961	27.2%
Total	98388	52720	151108	100%
Average price (c€/cm)	30.71	37.59	33.02	-

Source: AEEG (2012b), p.162 and table 3.29

The major gas importers and wholesalers are also active in the electricity generation sector, a position that can further their market power in the gas market by securing sales of gas for power generation. As seen in Figure 9, Enel, ENI and Edison were the top three electricity generators in 2011 with shares of 26.4%, 9.4% and 8.4% respectively. Unsurprisingly, these companies were also in the top three of electricity generation from gas [Table 5]

Figure 9: Share of gross electricity generation per company in 2011 (%)



Source: AEEG (2012b), p.54, figure 2.1

Table 5: Companies' share of thermoelectric generation by fuel in 2011 (%)

	Coal	Oil	Gas	Others
Enel	74.8%	22.2%	13.4%	0.6%
ENI	0.0%	15.4%	17.1%	17.6%
Edison	0.0%	0.0%	12.7%	21.1%
E.On	9.6%	4.7%	6.4%	0.0%
Edipower	3.1%	37.7%	6.2%	0.0%
Tirreno Power	8.2%	0.0%	5.3%	0.0%
Gdf Suez	0.0%	0.0%	6.4%	0.0%
Erg	0.0%	4.0%	2.1%	18.4%
A2A	4.3%	0.0%	3.1%	0.0%
Sorgenia	0.0%	0.0%	4.4%	0.0%
Iren	0.0%	0.4%	3.6%	0.1%
Others	0.0%	15.4%	19.4%	42.2%
Total	100%	100%	100%	100%

Source: AEEG (2012b), p.57, table 2.4

This group of three major companies also played an active role in the retail markets. In 2011, retail sales totalled 68 Bcm, 22% of which came from pure wholesalers and 78% from mixed operators. There were a total of 308 companies active, but despite the high numbers of operators, the retail market remains very concentrated. ENI alone accounted for 26.8% of the gas sold, with a spread of about 15% with its first competitor (Enel) [Table 6]. The companies with the three largest market shares (ENI, Enel, Edison) controlled almost half of the market (49.5%). The share of the five largest operators (the first three plus Gdf Suez and A2A) represented 60.9%, denoting a much higher concentration than in the wholesale market.[75]

Table 6: Suppliers to retail markets in 2011 (MMcm and %)

	Sales	Share (%)
ENI	18237	26.8%
Enel	8035	11.7%
Edison	7403	10.9%
Gdf Suez	4847	7.1%
A2A	2915	4.3%
E.On	2708	4.0%
Hera	2607	3.8%
Iren	2317	3.4%
Royal Dutch Shell Plc	1647	2.4%
Ascopiave	1167	1.7%
Gas Plus	687	1.0%
Others (share <1%)	15444	22.9%
Total	68014	100%

Source: AEEG (2012b), p.157 and table 3.22 in 2012

Liberalization measures failed to change ENI's exclusive transmission rights in transit pipelines located outside Italy (which it helped to build when it was a vertically integrated monopolist). Consequently, ownership unbundling of ENI and Snam was not sufficient to introduce competition.[76] To conclude, despite several measures to restrain its dominant position, ENI remains important throughout the gas chain. ENI's market share fell thanks to the antitrust ceilings and gas releases,[77] but it retained control of storage (at least until late 2012),[78] as well as the majority of production and import infrastructures, limiting competition in the Italian natural gas sector [Table 7].

[75] AEEG (2012c), p.94

[76] See Section 2.3, 'Access to import infrastructure' for more information

[77] Gas releases:

- In 2004, according to agreements with the Antitrust Authority, ENI released 9.2 Bcm over four years (2.3 Bcm/y between October 1, 2004 and September 30, 2008) and the related transport capacity.
- In 2007 there was a new gas release program involving 4 Bcm to be sold at the virtual exchange point (PSV) in a two-year period (from October 1, 2007 and September 30, 2009).
- In 2009, Law No. 99/09 obliged ENI to release 5 Bcm at the PSV for the gas year 2009/2010, in yearly and half-yearly amounts. ENI filed a claim for discrimination regarding the gas price set by the MSE and 1.1 Bcm were removed from the 5 Bcm. Source: ENI (2010), p.39

[78] After the ownership unbundling of ENI and Snam in October 2012, ENI lost its dominant position in the storage sector.

Table 7: ENI's share in the gas chain, 2000-2011

	2000	2004	2007	2009	2011
Domestic production	90%	83%	87%	86%	84%
Import flows	90%	62%	64%	49%	41%
Import infrastructure	100%	100%	100%	98%	92%
Transmission network	96%	97%	94%	94%	94%
Storage	99%	98%	98%	97%	97%
Distribution network	24%	24%	24%	23%	23%
Sales to final customers	55%	37%	44%	32%	27%

n.b. see Section 2.3, 'Access to import infrastructure' for more information

Source: Ascari (2012) (original sources: AEEG, Annual reports)

In addition to the regulatory measures on market shares, the surge in spot gas availability is also accelerating competition and the erosion of ENI's (and the other major players') market shares.

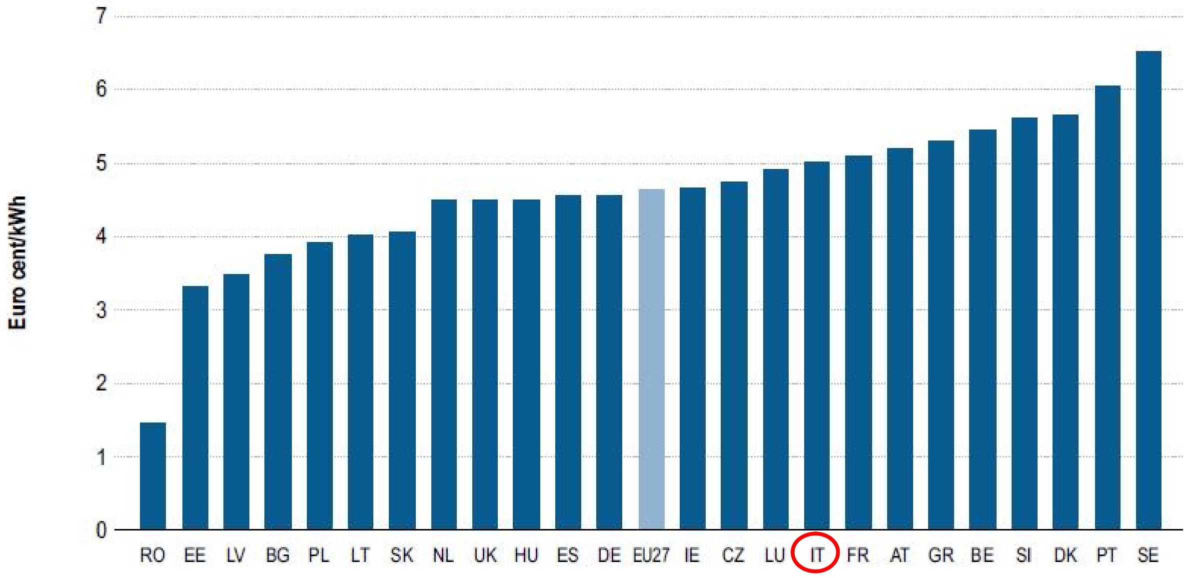
1.3. GAS COMPETITION AND PRICES

High gas prices compared to the rest of Europe

In the 2000s, energy prices in Italy have been on average higher than in the rest of Europe, leading to concerns about the competitiveness of Italian industry, especially since 2008. Actually, gas prices before taxes compare rather more favourably with prices in other European markets than prices after taxes as shown in Figure 10 and Figure 11. While countries in northern Europe (Germany, Belgium, the Netherlands and Scandinavia) are known to tax final consumption of energy heavily, countries in Southern Europe usually have a lower tax rate. However, Italy constitutes the main exception with the share of energy taxes in the total price significantly higher than in other southern European nations.[79] Italy applies different rates of value-added tax[80] and excise tax to natural gas, which is also subject to additional taxes at the regional level.[81] As a result, the country has high gas taxes in comparison to other European markets, a problem that already existed before the liberalisation process in the 2000s.[82]

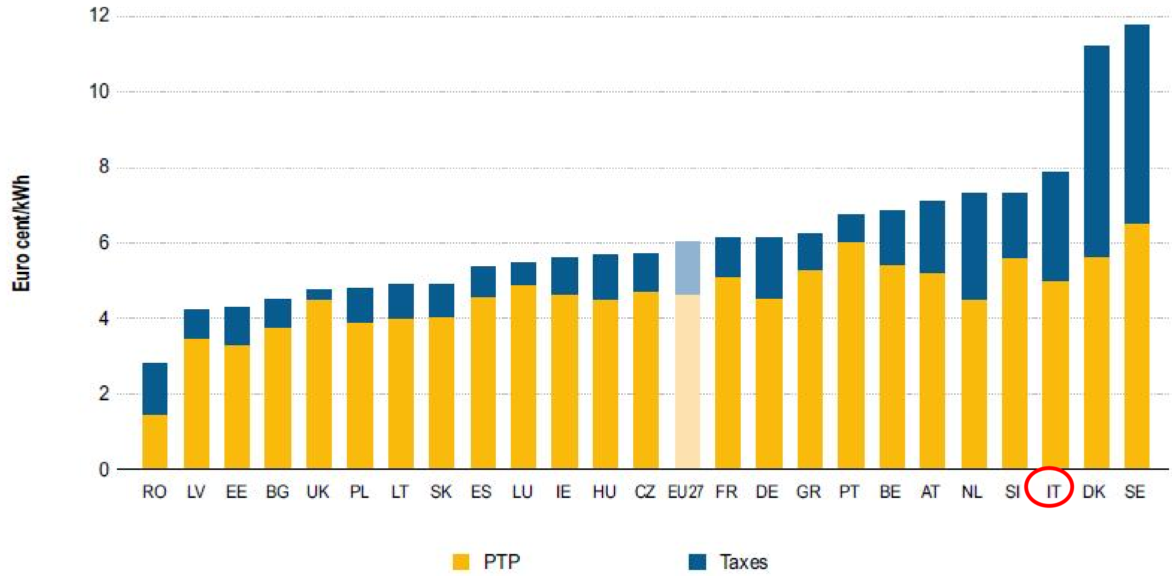
[79] ACER/CEER (2012), p.110
[80] The VAT is 10% up to 480 cm/y of consumption, 21% for all other consumption levels
[81] OECD (2013), p.227
[82] IEA (1999), p.91

Figure 10: Natural gas pre-tax total price in EU-27 in 2011 (c€/kWh)



Source: Eurostat data in ACER/CEER (2012), p.111

Figure 11: Natural gas post-tax total price in EU-27 in 2011 (c€/kWh)



n.b. PTP = pre-tax price
Source: Eurostat data in ACER/CEER (2012), p.111

In early 2013, a tax reform to improve the competitiveness of energy intensive industries was on its way. The Decree providing a definition for ‘energy intensive industries’ was signed on April 5, 2013. Further developments were expected in the following weeks.[83]

[83] The Decree and additional information can be found on the MSE’s website: http://www.sviluppoeconomico.gov.it/?option=com_content&view=article&idmenu=806&idarea2=0&sectionid=4&andor=AND&idarea3=0&andorcat=AND&partebassaType=4&MvediT=1&showMenu=1&showCat=1&idarea1=0&idarea4=0&idareaCalendario1=0&showArchiveNewsBotton=1&directionidUser=0&id=2027307&viewType=0

Limited impact of competition in the retail market

Italy is one of the European countries that still features regulated end-user prices. In effect, the Letta Decree created two markets: the unregulated and the regulated ones. In 2011, the natural gas retail market counted 20.6 millions of clients (92.5% households, 1.2% central heating, 5.1% trade and services sector, 1.2% industry and less than 0.5% thermoelectric generation). About 89.6% of households were under regulated prices.[84] In terms of volumes, the gas sold at a regulated price represented 28.5% of the total, and 71.5% of the gas was sold on the unregulated market [Table 8]. As customers tend to move to the unregulated market as their consumption volumes increase, the share of natural gas volume acquired on the unregulated market was 96.7% for industry, 72% for trade and services, and 64.4% for thermoelectric generation (the latter value includes self-consumption), 38% for central heating, and only 11.4% for the household sector.[85]

Table 8: Gas sold in the retail market, by size of customers using regulated prices or unregulated prices in 2011 (MMcm)

	Yearly consumption						
	< 5 000	5 000 - 50 000	50 000 - 200 000	200 000 - 2 000 000	2 000 000 - 20 000 000	> 20 000 000	Total
Market with regulated prices	15129	3508	590	127	46	0	19400
Residential	14211	679	25	5	4	0	14923
Central heating	230	1496	222	31	0	0	1979
Trade and services	551	992	203	67	17	0	1830
Industry	139	341	138	24	19	0	660
Power generation	0	0	2	1	6	0	9
Market with unregulated prices	2337	2863	2162	5143	8323	27786	48613
Residential	1680	152	45	35	18	0	1930
Central heating	47	681	380	102	5	0	1216
Trade and services	517	1438	896	1121	717	8	4695
Industry	94	591	833	3693	6669	7578	19458
Power generation	0	1	7	191	915	20200	21314
Total	17467	6371	2751	5270	8369	27786	68014

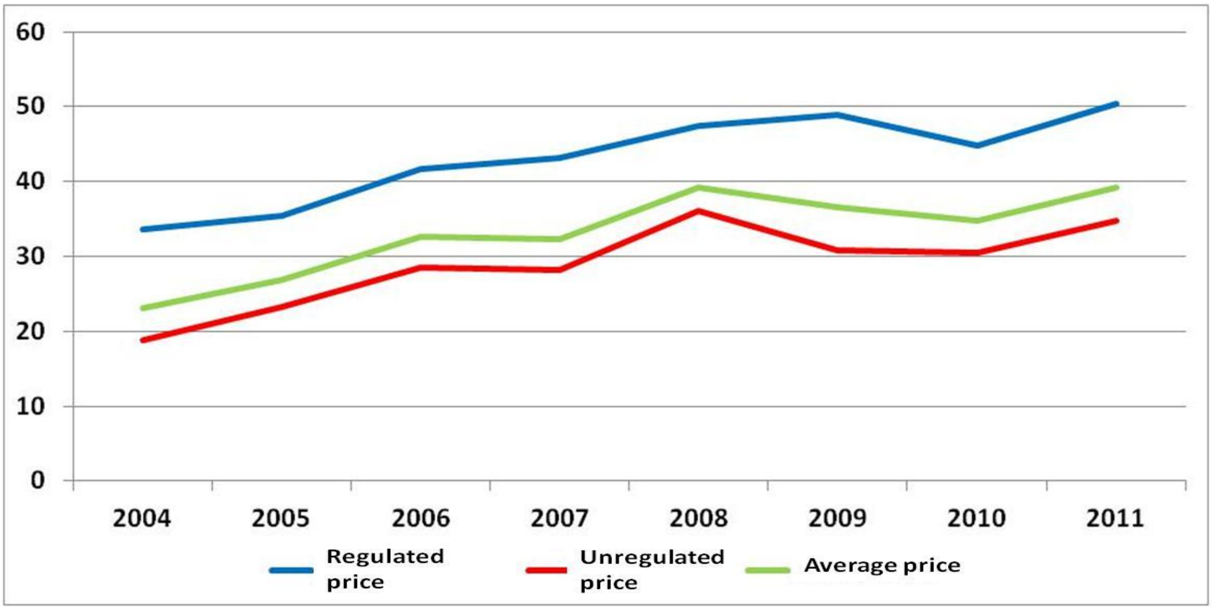
Source: AEEG (2012c), p.97

In the regulated price market, the cost of gas represents only about 40% of the price paid by domestic customers. Taxes account for about 33%, network costs for 18% (13% for distribution alone, 3.8% for transport and 1.4% for storage) and the rest being costs for sales on the wholesale or retail markets.[86]

[84] ACER/CEER (2012), p.101
[85] AEEG (2012c), p.95
[86] Percentage breakdown of the average reference natural gas price for domestic customer for January-March 2013. Source: AEEG's website, http://www.autorita.energia.it/it/dati/gs3.htm

With only about 10% of the households buying their gas in the unregulated market, it appears this category of customers still considers that the expected savings from switching to the unregulated market, and therefore the benefit from competition, are rather low, even if the differential between the regulated price and the unregulated price (before tax) shows a consistent advantage to the unregulated prices between 2004 and 2011 [Figure 12]. Large consumers tend to be more active to take advantage of the competition as higher gas volumes imply higher expenditure and hence the potential to make major savings. As a total, about 5.3% of all final customers changed supplier in 2011 (29.9% of total gas consumed). Interestingly, the percentage of households that switched supplier has risen slowly, to 5.2% in 2011 (up from 4.4% in 2010, 1.8% in 2009 and 1.1% in 2008). In volume terms, the percentage was slightly higher at 5.7% in 2011 (4.8% in 2010, 2.4% in 2009 and 1.3% in 2008).

Figure 12: Comparison between the average regulated price, the average unregulated price and the total average price (before tax) in the retail market, 2004-2011 (c€/cm)



Source: AEEG, *Relazione annuale sullo stato dei servizi e sull'attività svolta*, various reports (tables on 'Prezzi medi di vendita al netto delle imposte sul mercato finale')

In 2011, the average price of gas charged by retailers or wholesalers operating in the retail market (net of taxes and weighted by volumes sold) was c€39.24/cm (for comparison, the price was c€30.71/cm in the wholesale market). This showed an increase of about 12.6% from 2008, but with significant differences between unregulated and regulated prices. Customers on regulated prices paid an average of c€50.43/cm, compared with c€34.78/cm for unregulated market customers, a different of about c€16/cm (i.e. about 31%)[Table 9].[87]

[87] AEEG (2012c), p.86 and p.98

Table 9: Retail prices net of taxes by type of market, sector of consumption and customer size in 2011 (c€/cm)

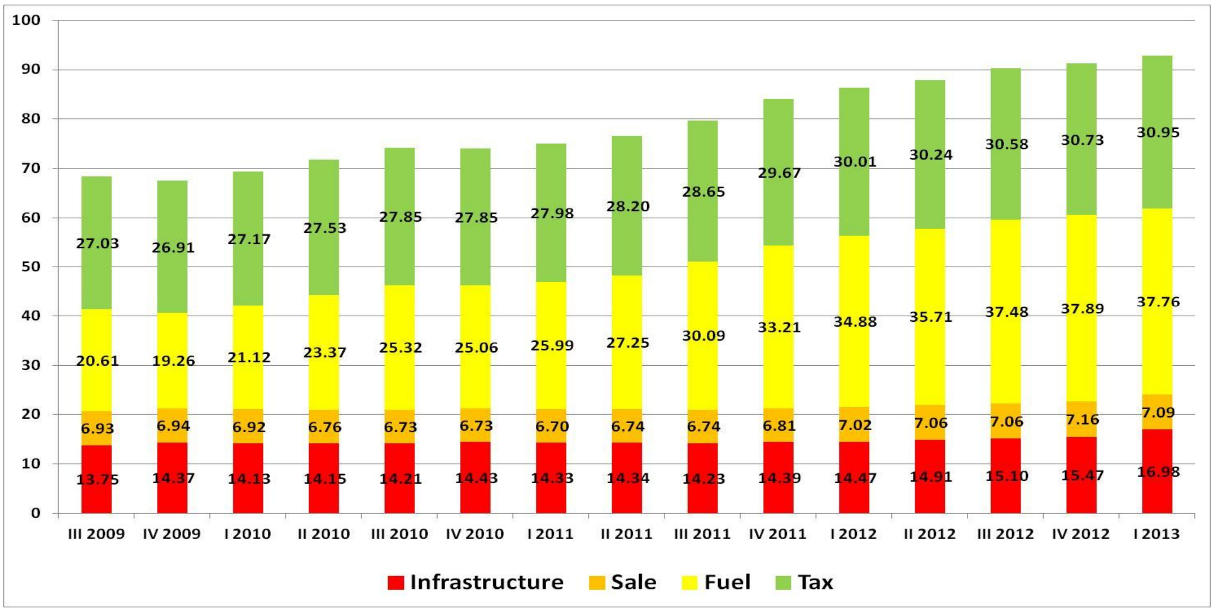
	Yearly consumption						
	< 5 000	5 000 - 50 000	50 000 - 200 000	200 000 - 2 000 000	2 000 000 - 20 000 000	> 20 000 000	Total
Market with regulated prices	52.59	43.14	42.63	37.87	30.66	-	50.43
Residential	52.74	39.47	41.24	36.85	31.67	-	52.11
Central heating	51.03	44.95	43.98	39.74	49.81	-	45.56
Trade and services	49.76	42.23	41.28	38.24	32.16	-	44.15
Industry	50.96	45.13	42.72	34.74	29.92	-	45.04
Power generation	30.03	44.44	39.23	34.57	27.64	-	31.31
Market with unregulated prices	53.08	44.78	40.55	34.38	30.67	33.06	34.78
Residential	53.95	42.83	41.26	37.10	36.53	-	52.31
Central heating	51.37	46.74	43.54	41.34	37.32	-	45.42
Trade and services	51.00	44.70	40.76	35.71	31.65	35.12	40.49
Industry	49.59	43.21	38.93	33.70	30.08	32.03	32.40
Power generation	45.42	44.51	40.89	35.50	34.06	33.45	33.50
Total	52.65	43.88	41.00	34.47	30.67	33.06	39.24

(A) The data exclude a very high price but insignificant volumes relative to the total.
Source: AEEG (2012b), p.161

The cost of gas in the regulated prices is determined by the Authority under a formula that used to link it to oil prices, but the AEEG has started a process to phase out the linkage to oil. From April 1 to September 30, 2013, spot indexation will rise from 5% to 20%. The formula will initially be based on Dutch TTF hub gas prices, but the long-term objective is to take Italian exchange prices as a benchmark (from October 1, 2013). As a result, regulated prices will show some correlation between wholesale and retail prices.[88] The regulator expects a reduction in final gas bills as a consequence of the reform (gas tariffs increased by 1.1% for the last quarter of 2012 instead of 1.7% thanks to this measure). The AEEG said further changes may be necessary due to ongoing developments of the market both on the regulatory side. Since 2009, the cost of the fuel itself has been rising rapidly. Between the third quarter of 2009 and the first quarter of 2013, the regulated price has grown by 35.8% while the fuel cost rose by 83.5% [Figure 13].

[88] ACER/CEER (2012), p.116 and Argus Gas Connections, February 27, 2013, Italy's AEEG to amend price formula, p.10
The cost for the gas used to be updated quarterly based on the prices of petroleum products in international markets. However, the Liberalisation Decree stated that the regulated tariff would be linked to European wholesale gas markets rather than oil indexation. This move was decided in the hope that lower gas prices would result, although spot prices do not necessarily mean lower gas prices, as they will be determined by supply/demand balances. From October 1, 2014, instruments should be introduced to protect customers against price spikes.

Figure 13: Percentage breakdown of the average reference natural gas price for domestic customers, 2009-2013 (c€/cm)



Source: AEEG's website : http://www.autorita.energia.it/it/dati/gp27new.htm

Wholesale market: slow development of gas trading

In the wholesale market, gas operators can trade volumes of gas injected into the national network at the virtual trading point '*Punto di Scambio Virtuale*' (PSV), which was created in 2003.[89] Transactions for the exchange of capacity and quantities of gas at the PSV have been conducted under bilateral over-the-counter contracts.[90] This secondary market provided an important commercial balancing tool enabling users to exchange and trade gas on a daily basis.[91] However, it was not a gas exchange.

In order to promote competition, the AEEG proposed the introduction of a regulated gas exchange in 2009. The main goal of the exchange is to develop liquidity in the market by 'providing a neutral, save, fair and orderly market, facilitate the trading of standardized products, promote market information such as transparent price formation mechanisms and enhance competition by reducing barriers for new entrants, being non discriminatory towards all members and give efficient price signals for new investment.'[92] As a result, the energy market operator GME (*Gestore Mercati Energetici*) launched three platforms: a gas trading platform for monthly and yearly products (P-GAS); a spot market for day-ahead & intraday transactions (M-GAS); and a balancing platform (PB-

[89] The virtual trading point does not correspond to any physical entry or exit point, and enables gas buyers and sellers to buy and sell gas without booking any capacity. The hub is a virtual point at which gas can be traded within the market area after entry and before exit. The gas title transfer facility is managed by Snam Rete Gas.
[90] Because the transactions were bilateral, limited information was available. A joint investigation published in 2005 by the AGCM and the AEEG showed that gas prices in the wholesale market were determined on a cost-plus basis (specific cost for each customer plus a profit margin), with lower prices offered by ENI to new industrial customers and power stations. Source: AGCM and AEEG (2005)
[91] The primary market includes gas from domestic production, imports or storage.
[92] Carboni (2012)

GAS).[93] The new platform for balancing (PB-GAS) created at the end of 2011 allows for a gradual transition from balancing 'with storage' in a more consistent mechanism with European gas market integration that is 'market balancing' (although the Italian system remains much different from the European framework). A development in the liquidity of the regulated platforms came in with the inception of the PB-gas, even if shippers have only been allowed to trade stored gas since April 2012.[94] Volumes traded on PB-gas are increasing and PB-gas shows average prices in line with the day-ahead price on the PSV. All transactions on the three platforms are carried out and recorded via the PSV.

It is an understatement to say that the volume of gas traded at PSV has not increased as quickly as some of its European counterparts,[95] but it is on an upward trend nonetheless [Figure 14].

---

[93] P-Gas: The trading platform was launched on May 10, 2010. GME (Gestore Mercati Energetici) only acts as a 'broker', with no counterpart role. P-GAS is composed of:

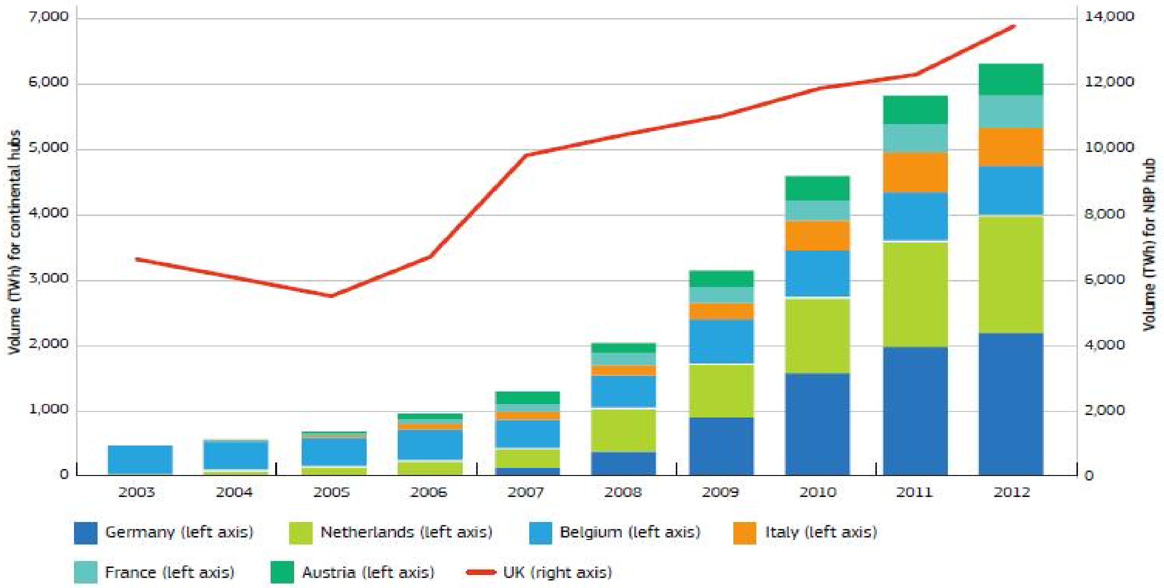
- Imports segment: launched on May 2010, there is continuous trading. The platform was set up for the market players that have an obligation to offer part of their imported gas (for new importers) at the PSV (according to the obligations in Decree Law 7 of January 2007 which established the obligation for importers, to offer a quota of imported gas on the regulated capacity market organised by the GME from May 10, 2010)
- Royalties segment: launched in August 2010, trades are by auction. It was set up the producers of Italian gas to convert royalties into gas and sell it on the PSV (Decree Law 7 of January 2007 also established the obligation for holders of natural gas concessions to transfer quotas of indigenous production due to the state to offer a quota of imported gas on the regulated capacity market organised by the GME)
- Investments segment: launched on May 2012 for investors to bid the volumes of gas made available to them as part of the virtual storage service

Spot market (M-Gas) was launched on December 10, 2010. It consists of the Day-Ahead Market, (MGP-GAS), and of the Intra-Day Market (MI-GAS). In this market, participants may purchase and sell volumes of gas pertaining to each gas-day. GME is a central counterpart; there is continuous trading and closing auction on MGP-GAS and continuous trading on MI-GAS. Trades are delivered to the PSV.
The Gas Balancing Platform (PB-GAS) was launched on November 8, 2011. On this Platform, the balancing mechanism for natural gas is based on economic merit. The authorised users (users of storage services, except for transmission companies and for users of the strategic storage service alone) enter mandatory daily demand bids and supply offers concerning their storage resources. The system is done via auctions and Snam is the central counterpart. Imbalances are cashed out at balancing market prices. Trades are delivered to PSV and GME manages and operates the trading platform (IT, market participants).
Snam Rete Gas is responsible for both physical balancing (adequate level of pressure in the national network, providing a balance between injections and withdrawals) and commercial balancing (tracking the transactions of each user and pricing the imbalances). The system used to rely on a daily balancing regime with storage and line pack as the main balancing tools before the balancing platform was launched.
Sources: AEEG (2012c), pp.66-67 and IEA (2009), p.110

[94] AEEG (2012c), p.89

[95] See Heather (2012), pp.20-21

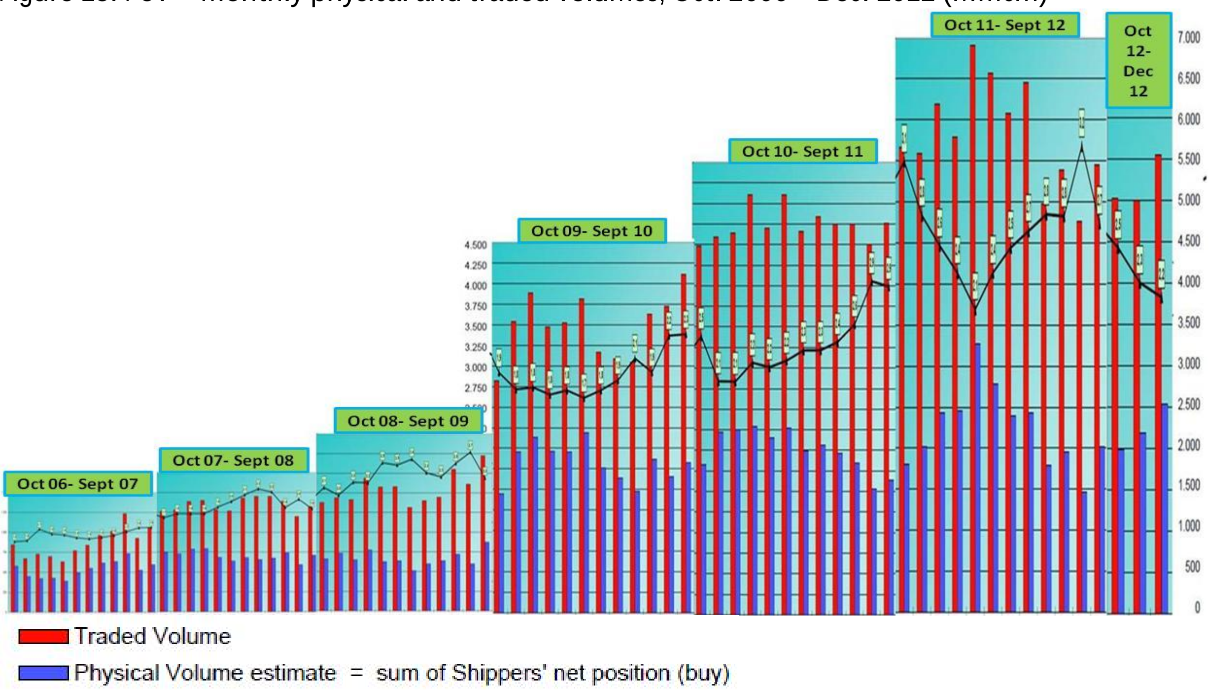
Figure 14: Natural gas traded volumes at European hubs, 1999-2012 (Bcm)



Source: European Commission, Quarterly Reports of European Gas Markets, Volume 5, Issue 4: Fourth quarter 2012, p.6 (original source: IEA)

Figure 15 shows the monthly physical and traded volumes between October 2006 and December 2012 as reported by Snam Rete Gas. The evidence of increase in OTC and exchange trading is clear.[96]

Figure 15: PSV – Monthly physical and traded volumes, Oct. 2006 – Dec. 2012 (MMcm)



Source: Snam Rete Gas, PSV's statistics, several reports

[96] There are several ways to measure liquidity such as volumes traded, churn or re-trading ratios, and the narrowness of the bid/offer spread. Commodity markets are deemed to have reached maturity and be liquid hubs when the churn ratio is in excess of 10. See Heather (2012), pp.32-33 for more explanations on churn, churn ratio and re-trading ratio and for information on other hubs' churn ratios.

More and more spot transactions are being moved to the PSV from the other entry points of the national transmission network, which were the main transaction points in the earlier stages of the new market. The breakdown of volumes traded on national entry points and the PSV showed that, for the thermal year 2010-2011, PSV-GME accounted for 65% of the volumes traded, PSV GNL for 12% (since 2005, all gas volumes from LNG regasification transit through the PSV), Tarvisio 17%, Passo Gries 3% and the others totalled 3%.[97] The increase of volumes traded at PSV and PSV-GNL casts an optimistic light on the possible development on the Gas Exchange and its ability to produce price signals for Italian and European gas players.

While there has been limited activity compared to other continental hubs, PSV accounted for 28.7% of wholesalers' gas procurements in 2011 [Table 10]. Some 5% of the gas procured on the wholesale market was produced domestically, while direct imports accounted for 42.1% and 23.9% was purchased from other traders (at the border or at the city gate). The small and medium size operators were the most active on PSV. By contrast, ENI bought only 1.9% of its supply on PSV.

Table 10: Supply to the wholesale market, share by operators (organised by the size of their sales), 2011 (%)

	ENI	> 10 Bcm	1 Bcm - 10 Bcm	0.1 Bcm - 1 Bcm	< 0.1 Bcm	Total
National production	14.0%	3.1%	0.2%	10.0%	5.5%	5.0%
Imports	76.9%	73.7%	28.8%	16.1%	1.6%	42.1%
Supply from the national market	5.9%	5.1%	25.3%	46.5%	54.4%	22.1%
Supply from storage	1.3%	0.9%	1.6%	3.3%	6.7%	1.8%
Supply from PSV	1.9%	17.2%	43.6%	23.9%	31.7%	28.7%
Supply from exchange	0.0%	0.0%	0.4%	0.2%	0.0%	0.2%
Total	100%	100%	100%	100%	100%	100

Source: AEEG (2012b), p.161

Wholesalers chose to sell 59.9% of their gas to other operators on the national market, about half of which via PSV (28.8% of total), and 32.2% to end-users [Table 11]. The smaller scale operators were the most active on the PSV (62.4% of their gas) while ENI used the platform to sell just under half of its supply (47.3%).

[97] AEEG (2012c), p.89
As a matter of comparison, trading at the PSV accounted for 28% of the total amount of gas trades within the transmission network in 2005 (AEEG (2006), p.99).

Table 11: Sales of the wholesale market, share by operators (organised by the size of their sales), 2011 (%)

	ENI	> 10 Bcm	1 Bcm - 10 Bcm	0.1 Bcm - 1 Bcm	< 0.1 Bcm	Total
Sales to another seller on the national market	38.2%	43.9%	74.1%	54.0%	45.7%	59.9%
- that will sell to storage	4.3%	1.0%	2.9%	2.3%	0.9%	1.7%
- that will sell to PSV	47.3%	43.7%	49.6%	41.5%	62.4%	28.8%
Sales to exchange	0.6%	0.1%	0.2%	0.1%	0.1%	0.3%
Sales to final customer	46.5%	33.9%	23.1%	41.8%	41.8%	32.2%
Own use	14.7%	22.0%	2.6%	4.1%	12.5%	7.6%
Total	100%	100%	100%	100%	100%	100%

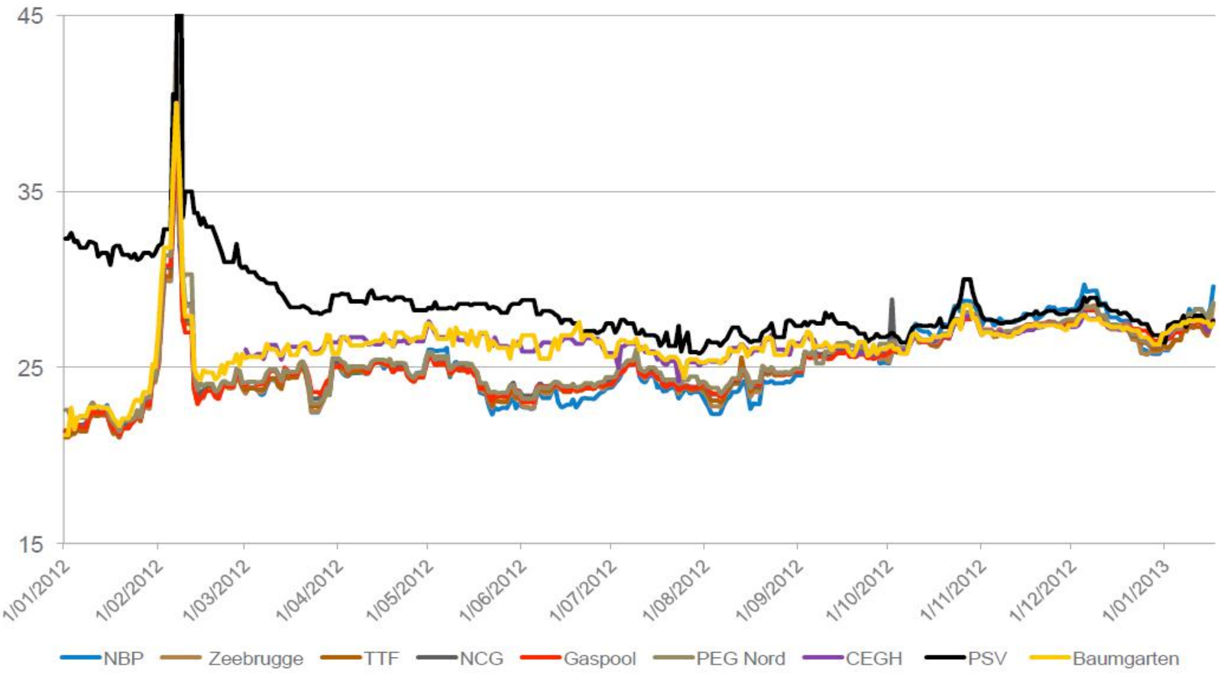
Source: AEEG (2012b), p.161

Despite an oversupply of gas in the country, there has been a persistent lack of liquidity at the hub due to various reasons, among which were: the difficulty of accessing capacity in the main pipelines into Italy (i.e. Transitgas and TAG); the complexity of most of the rules governing the gas market including the balancing rules and the fact that they were not available in English (unlike in most north-west European markets); and finally ENI's dominant position as the incumbent supplier in accessing transport and flexibility infrastructure while at the same time having little commercial interest in improving liquidity at the hub. Several measures have been taken in order to try and improve the liquidity at PSV. These have included two Release Gas programmes[98] (2007 and 2009), the authorisation of traders to use the hub even if they were not users of the transport system (since 2006), but also more recently, additional capacity of gas storage as stipulated in the 'Gas Decree' of August 2010 and the introduction of a gas balancing platform .[99] However, in 2012, the net re-trading ratio calculated by Snam Rete Gas, which compares traded volumes on PSV to the physical volume (calculated as the sum of shippers' net positions), oscillated between 3.2 (August) and 2.1 (February). The gross market churn, which compares the total traded volume to the net delivered total amount, was 0.2.[100] As a matter of comparison, for the first quarter of 2012, the gross market churn at the NBP was 21.35, and 14.25 at the TTF, the two most liquid hubs in Europe.[101] In 2011, 112 operators exchanged, sold and purchase gas on PSV (82 in 2009[102]), 27 of which were pure traders (i.e. they were not users of the transport system).[103] Illiquid gas hubs offer considerable potential for suppliers to withhold or provide supplies in order to manipulate prices. As PSV gains more participants, the scope for manipulation by any single player will diminish.

[98] The 2004 gas release programme had gas exchanged before the Italian border and not at the PSV, contrary to the 2007 and 2009 gas release programmes.
[99] Until the introduction of the balancing market at the end of 2011, pure traders were allowed to trade only if another gas company with a transport contract (the so-called 'soggetto compensatore') were provided a physical guarantee for them.
[100] This was calculated with 15.57 Bcm of traded volume and 74.2 Bcm of gas delivered by Snam.
[101] Heather (2012), p.33
[102] AEEG (2011), p.67
[103] AEEG (2012c), p.86

Spot gas prices in Italy have historically been high, consistently trading at an important premium compared to other European gas prices. Crude oil prices have been the main driver of the PSV price, which has at times been above the BAFA oil-indexed price.[104] The high Italian spot price reflected the lack of liquidity and competition as well as transportation constraints.[105] For most of 2012, prices were still decoupled from north-west European hubs and the gap between day-ahead spot gas prices on the Italian PSV and the Dutch TTF was around €10.00/MWh. However, there has been substantial price convergence since the first quarter of 2012 as shown in Figure 16, and by the end of the year, the spread was almost non-existent. Also contrary to other hub prices, where prices increased in 2012, spot prices at the PSV were down from the previous year.

Figure 16: Gas prices at European hubs, day-ahead contracts, January 2012 – January 2013 (€/MWh)



Sources: Fluxys (2013)

The high degree of convergence between European hubs shows that any potential price difference between the hubs will be equalised through trading arbitrage thanks to the increased ability to transport gas. Bringing gas to PSV for new entrants has been fairly complicated due to difficult access to pipeline capacity, which was booked on existing contracts with Italian incumbents. The capacity upgrade of the TAG pipeline in 2009 (30% of Italy's gas imports), has been supplemented with additional release of capacity at the Austrian-Italian TAG entry point at Tarvisio-Arnoldstein via day-ahead capacity auctions since March 2012.[106] Higher import capacity availability allowed gas flows to follow price signals, and explains the almost total elimination of the premium of PSV over

[104] ACER/CEER (2012), p.128
BAFA: *Bundesamt für Wirtschaft und Ausfuhrkontrolle*. It is the German Federal Office of Economics and Export Control. Website: http://www.bafa.de/bafa/en/index.html
[105] IGU (2012), p.21
[106] The high degree of convergence between European hubs shows that any potential price difference between the hubs will be equalised through trading arbitrage thanks to the ability to move gas easily. Source: Trans Austria Gasleitung GmbH's website: www.taggmbh.at

TTF since the end of 2012 and even a negative spread at the beginning of 2013. Wholesale suppliers have been able to get physical supply directly from north European hubs and used TTF spot indexation in supply contracts with industrial players.[107] As a result, TTF prices have become the main driver of the PSV at the expense of Brent crude. And if the reasons given for the convergence are correct, we can expect PSV to continue to trade at a tighter spread to north-west European hubs.

The great majority of the trading at PSV is still OTC but an increase in gas exchange trading is expected. In addition to the three platforms, GME plans to introduce a physical forward trading platform (MT-GAS) to be launched in October 2013.[108] The development of an integrated gas exchange was included in the National Energy Strategy adopted in March 2013.[109] The Platform MT-GAS will be integrated with the wholesale market (MGAS), so as to achieve a new market configuration consisting of the spot market (day-ahead market and intra-day market) and of the physical forward market. The platform will offer trading on the two front seasons, four front quarters, three front months and balance of month (BoM).[110] A new session taking place the day before delivery (D-1)will be added to the PB-Gas balancing platform to ensure the security of the system when gas in storage is insufficient (Snam Rete Gas will then be able to use LNG and gas imports to balance the system).[111]

As seen in the markets of north-west Europe in the early 2010s, the development of a functioning hub in Italy will trigger changes in the way gas is sold and priced in the market. The section below analyses the supply challenges in the 2010s.

[107] ICIS Heren, January 30, 2013, Outlook 2013: European natural gas markets, http://img.en25.com/Web/ICIS/gas-20130130.pdf?cmpid=EMC%7cCHEM%7cCHLEG-2013-01-30-Free-Content_Gas_email1_P1%7c&sfid=701200000008rMp

[108] The rules have been approved by the MSE in the Ministerial Decree dated March 6, 2013: 'Approvazione della Disciplina del gas naturale ai sensi dell'art. 30, comma 1, della legge n. 99/09', which can found at: http://www.sviluppoeconomico.gov.it/index.php?option=com_content&view=article&viewType=1&idarea1=593&idarea2=0&idarea3=0&idarea4=0&andor=AND&sectionid=0&andorcat=AND&partebassaType=0&idareaCalendario1=0&MvediT=1&showMenu=1&showCat=1&showArchiveNewsBotton=0&idmenu=2263&id=2026995. A copy of the rules in English can be found on GME's website: http://www.mercatoelettrico.org/En/MenuBiblioteca/documenti/20130322TestoIntegratoGAS_en.pdf

[109] MSE (2013), p.69

[110] 1/ half-yearly contracts (seasonal): the winter half-year (from October to March) and the summer half-year (from April to September); 2/ quarterly contracts: the first, second, third and fourth quarter of each year; 3/ monthly contracts: each of the calendar months; and 4/ BoM (Balance-of-Month) contracts: the set of the gas-days of a single month in respect of which delivery has not yet taken place. Transactions on the MT-gas will take place under the continuous-trading mechanism. Gas volumes will be measured in MWh/day and priced in MWh/hour. Source: GME (2012), p.8

[111] ICIS Heren, January 30, 2013, Outlook 2013: European natural gas markets,

II/ SUPPLY OPTIONS AND CHALLENGES

Over the past 50 years, the Italian gas market has been transformed from a nationally supplied industry to a heavily import-dependent market. While the market finds itself in a supply bubble in the early 2010s (i.e. buyers of gas under long-term contracts continue to have difficulty meeting take-or-pay commitments),[112] it is unclear how the supply situation will evolve, both in terms of contracted and traded volumes, sources or routes of supply. This section explores the complexities of the situation and sheds some light on the possible evolutions and challenges in the coming years. First, we consider the evolution of the long-term contracts following the wide disparities between oil-indexed prices and spot prices since 2008 and the negotiations between the main importers and exporters. Second, we evaluate the impact for future additional supplies to the country: which source, route or form will they take? New imports will need to be adapted to the changing needs of the gas sector. In the third section, we take a closer look at the challenges for the national market, both in terms of security of supply issues, which are still high on the government's agenda, and system flexibility and/or improvement of the national infrastructure to meet changing demand patterns.

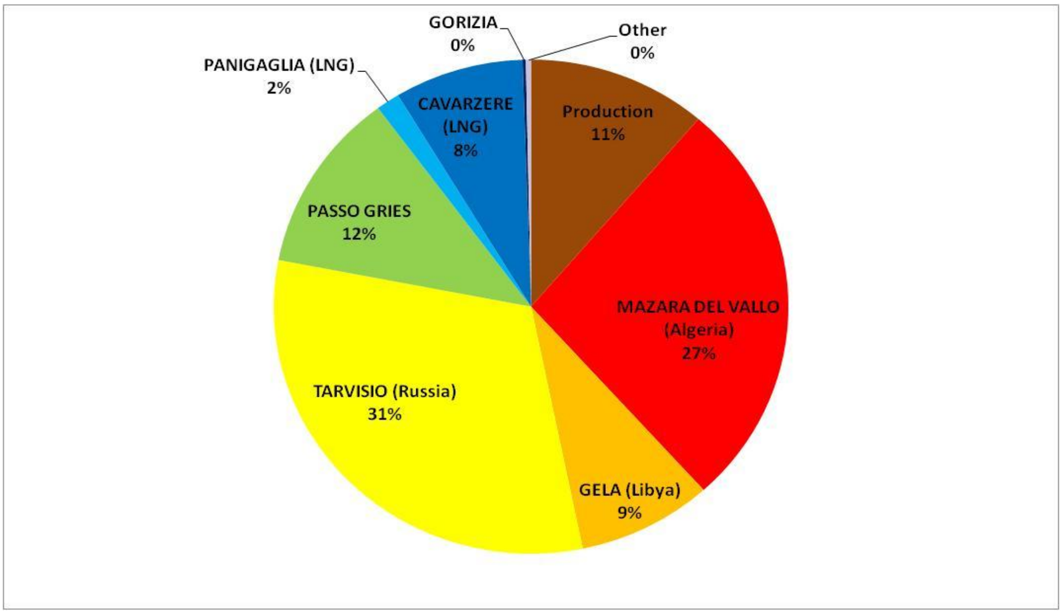
2.1. DEPENDENCE LONG-TERM TAKE-OR-PAY CONTRACTS

Gas imports

For the fourth consecutive year, indigenous production remained above 8 Bcm in 2012 after years of steady decline. Nonetheless Italy depended on imports for 90.4% of its supplies - 67.4 Bcm.[113] The vast majority was pipeline gas (88.8% or 60.1 Bcm), while LNG accounted for 7.3 Bcm.[114] Algeria accounted for 29% (pipeline gas at Mazara del Vallo and LNG at the Panigaglia LNG terminal), Russia for 31% (pipeline gas at Tarvisio and Gorizia), Libya for 9%, Qatar for 8% and Northern Europe for 12% (via the Passo Gries entry point) [Figure 17].[115] While most Italian gas is linked to oil, the AEEG noted that 5% of the total imported gas in 2011 was purchased from the European Gas Exchange.[116]

[112] The 'gas bubble' is explained further in sub-section 3.3, p.92.
[113] MSE (December 2012)
[114] See Appendix 2 for a map with import flows in 2011
[115] MSE (December 2012)
For a time series, see also MSE, Table 'Importazioni di gas naturale per paese di origine', monthly data of gas imports to Italy from origins, http://dgerm.sviluppoeconomico.gov.it/dgerm/importazionigas.asp
[116] The data for 2012 was not available at the time of writing. Source: AEEG (2012c), p.82

Figure 17: Gas imports to Italy by source and delivery point in 2012 (%)



Source: MSE (December 2012)

One of the possible reasons for Russia's being the main gas source in 2012 may lie in the long term take or pay (TOP) contract renegotiations carried out with a number of importing companies (ENI in 2011, Edison and Synergie Italia in 2010). Renegotiations with Sonatrach are at a less advanced stage and are more complicated due to the many counterparties and problems with Algeria's gas balance due to delays in the development of new fields and fast rising indigenous gas demand. The balance is expected to remain tight until at least the late 2010s and the start of production of new gas fields.[117]

Libyan exports rose from 2011. Political unrest in Libya resulted in deliveries being curtailed between February and October 2011. The impact of the shutdown on ENI's ability to meet its customers' gas needs was negligible as more gas came from Russia to make up for a shortfall. As a result, Italian gas imports from Russia in 2011 are estimated to have exceeded 26 Bcm, up from 14 Bcm the year before and around 20 Bcm in 2009, probably helping ENI to manage its TOP obligations with Gazprom. Libyan gas exports to Italy in 2012 were evaluated at 6.4 Bcm (about 70% of the 2010 volumes).[118]

Most of the import activity is conducted on the basis of long-term take-or-pay contracts. In 2011, about two thirds of the contracts had a total duration of 20 years or more while only 9% were contracts of one year or less. The contracts in force continued to have long residual durations, 20% will expire in more than 20 years and 24% between 10 and 20 years. About a quarter will expire in the next five years and half of them within ten years, potentially setting the country on the path to important changes in its contracted gas supply.[119]

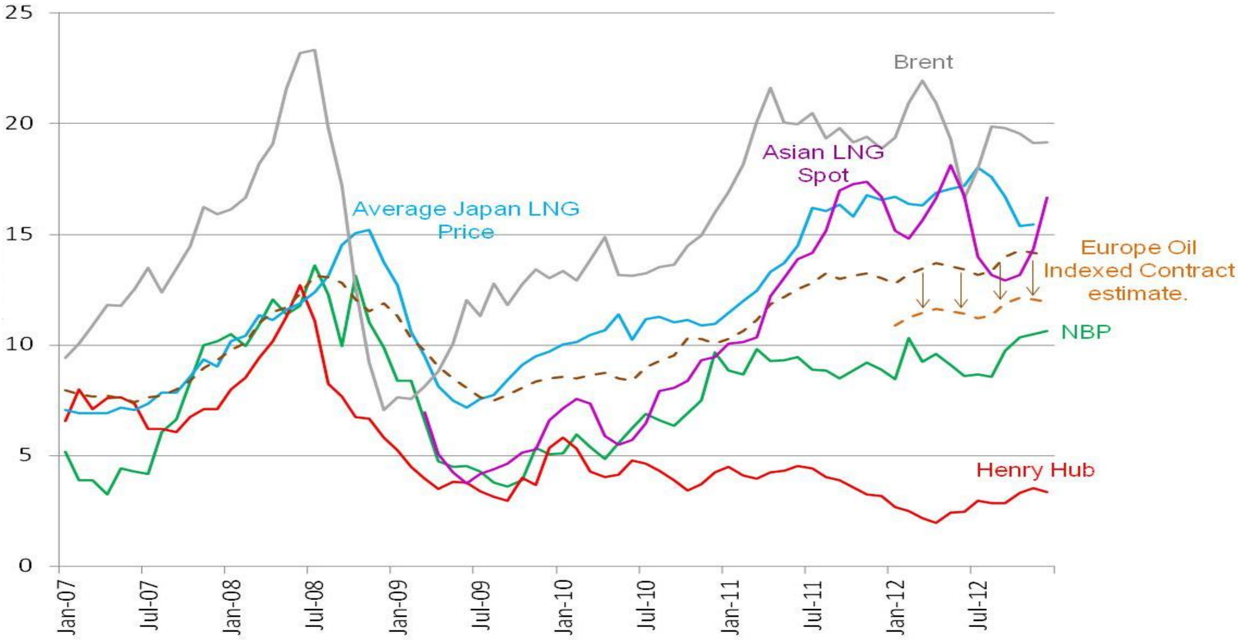
[117] For more information, see Darbouche (2011)
[118] MSE (December 2010), MSE (December 2011) and MSE (December 2012)
[119] Note: The AEEG stipulates that 'these contracts exclude (by an estimate) the Annual Contract Quantity of spot contracts that didn't lead to imports since the Italian operator purchasing the gas then sold it abroad directly.' Source: AEEG (2012b), p.135

Prices in long term contracts vs spot prices

Major natural gas exporters to continental Europe, including Russia, Norway, Algeria and Qatar, sell their gas mostly under long-term contracts based on the traditional Continental European price mechanisms developed in the 1960s, including the Italian ones. In other words, gas prices are indexed on oil product prices with TOP.[120/121] In Italy, the development of gas-to-gas competition should have helped to decouple gas prices from oil prices, but not only have spot gas prices remained more closely linked to oil prices than in the rest of Europe, they have also remained much higher than in the rest of Europe, at least until the mid/end of 2012. The average price of gas on the PSV spot market in 2011 was about 25% higher than on the principal north-European hubs, and the price of long-term Italian TOP contracts was expected to have also been higher, on average, than similar European TOP contracts.[122]

Oil prices have remained high despite the weak global economy, and as a result, major European gas importers have been suffering since the global financial crisis of 2008. The important divergence as seen in Figure 18 between high oil-linked prices sealed in long-term gas purchase contracts and the spot gas market prices at which they sell to their own customers has created major financial problems for many European utilities.

Figure 18: Brent, long-term gas prices in Europe (at the border) vs NBP day-ahead price, 2007-2012 ($/MMBtu)



Source: Platts, Argus, EIA, and for the oil indexed estimate: H. Rogers (OIES)

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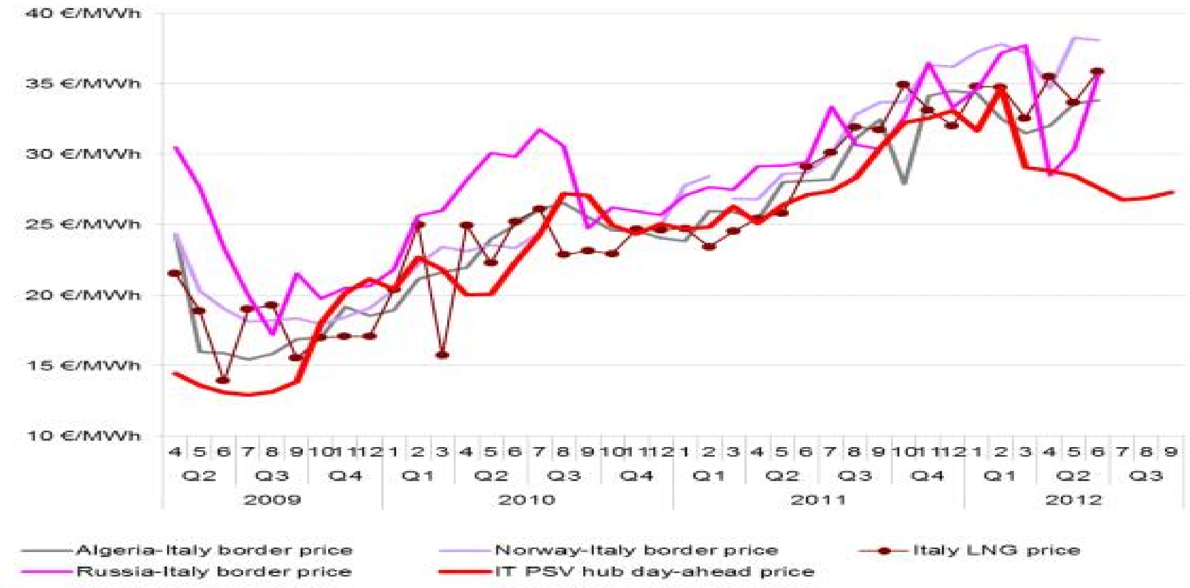
[120] For more information on long-term contracts development in Europe, see Energy Charter Secretariat (2007)

[121] Interestingly, IGU noted in 2011 that domestic production in Italy was still largely sold on an oil price escalation (oil indexation) basis. Source: IGU (2011), p.5

[122] Appendix 3 provides a comparison for the first half of 2012 between European countries (spot and long-term contract prices)

At least until towards the end of 2012, the divergence between oil-indexed and spot prices at the PSV was less important in Italy than in the rest of Europe, and as a consequence, moving to hub pricing from oil indexation would have translated into less financial relief for midstream buyers. Nonetheless, since 2009, the price of spot gas traded at the PSV and the prices in the wholesale market have been below the price paid under long-term procurement contracts [Figure 19]. The difference was less pronounced in 2011 due to supply constraints, but things changed quickly in 2012 with the drop in PSV prices and convergence with other European hub prices.

Figure 19: Import prices at the border vs PSV day-ahead price in Italy, 2009-2012 (€/MWh)



Source: European Commission, Quarterly Report on European Gas Markets, Volume 5, Issues 2 & 3 : April 2012 – September 2012, p.23

As a result of the squeeze on profits –if not huge losses - many utilities have sought to renegotiate their contracts with suppliers, seeking a higher share of spot-market indexation in their supply deals. Since 2008, the major markets of north-west Europe appear to be moving away from oil indexation and getting closer to spot pricing.[123] This evolution seems to be slower in Southern and Eastern Europe.

Renegotiation of long-term contracts

Until the end of 2012, PSV spot prices were far above other European spot prices, and could be the reason why renegotiations happened later in Italy than in north-west Europe. With PSV spot prices in line with its European counterparts, there is a good reason to expect renegotiations in contract prices in the country.

Dutch incumbent Gasterra was one of the first movers to offer spot indexation in its long-term contracts, but the relations have been more complicated with its Italian customer ENI. In 2007,

[123] For a more detailed analysis on the evolution of oil-index contracts vs hub prices in Europe, see Stern & Rogers (2012)

GasTerra requested arbitration following failed negotiations with ENI. GasTerra thought that it was entitled to increase its prices for gas supplied from 2006 based on market trends for the period from 2003 to 2006.[124] In September 2012, ENI lost the arbitration case covering volumes received between 2003 and 2006. Another arbitration case relating to the period 2005-2012 had not yet been adjudicated as of April 2013.[125] Thanks to changing market conditions and improved market pricing, ENI can have more favourable expectations on the outcome of this case. From late 2012, it appears that renegotiations, this time initiated by ENI, for a price reduction on the two contracts due to changed market conditions were under way.[126]

Norway's Statoil also adapted its pricing policies early on and showed some flexibility with its long term contracts to reflect customer demands for cheaper gas. In October 2011, around three quarters of its volumes were exposed to price reviews. By January 2013, this had fallen to less than 20%.[127] Statoil has said it will move more of its gas contracts to flexible pricing and as a result give up more oil price-linkage. Eldar Saetre, executive vice president marketing, processing and renewable energy, was reported saying that around 45% of the company's gas was sold via oil-linked contracts in February 2013, but he expected this to fall below 25% by 2015.[128] The price negotiations have been settled privately with its customers. To be a first mover appears to have paid off with record volumes sold, gaining market share from Gazprom and higher profits in 2012.[129] ENI opened supply contract renegotiations with Statoil in October 2012 in order to try and obtain a new deal on gas.[130]

In 2010, Gazprom agreed to allow up to 15% of its sales to be linked to spot prices for three years.[131] In 2011, agreements for price adaptation were achieved with several European customers, including Italian companies Edison (supplied through Promgaz JV) and Sinergie Italiane.

- Edison buys around 2 Bcm/y from Promgas (joint venture between Gazprom and ENI). Talks to review the price began at the end of 2008, at Edison's request. When negotiations failed to achieve, Edison –like other energy companies- took the contract for arbitration to the Stockholm Arbitration Tribunal and asked for a ruling on the contract. In its opinion, the contract price no longer reflected the market prices and as a result, it asked for a ruling on what the Tribunal thought the market price was. In July 2011, the court action ended when Promgas and Edison reached an agreement to review prices taking into account the fact that 'market conditions have changed', in other words, taking into consideration the price at which Edison could have bought gas if it had not

[124] GasTerra (2012), p.31
[125]The pricing dispute initiated by Gas Terra dates to 2005 when GasTerra started to renegotiate contracts because it believed the prices paid by ENI did not reflect market conditions at the time. Source: ICIS Heren, September 21, 2012, ENI loses arbitration with GasTerra for 2003-2006 natural gas supply
[126] ENI (2012b), p.1
[127] Platts European Gas Daily, February 12, 2013, Statoil 'takes market share from Gazprom', pp.2-3
[128] Reuters, February 7, 2013, 'Statoil to squeeze Gazprom further in gas market', http://www.reuters.com/article/2013/02/07/statoil-gas-idUSL4N0B76DU20130207
[129] Platts European Gas Daily, February 12, 2013, Statoil 'takes market share from Gazprom', pp.2-3
[130] Gas Matters Monthly, April 2012, ENI seeks upstream antidote to European market ills, pp.18-21, and ENI (2012b), p.1
[131] Financial Times, February 6, 2012, Gazprom bows to demand with gas price cut, http://www.ft.com/cms/s/0/2e57f4c4-58ad-11e1-9f28-00144feabdc0.html#axzz2K70PjyPE

been constrained by the contract prices.[132] Both parties declined to disclose the terms of the deal, but the price revision was expected to save Edison about €200 million for 2011.[133]

- In 2011, Gazprom and Sinergie Italiane[134] agreed to lower gas prices while the volumes did not appear to have been changed (1.5 Bcm/y until 2021).[135]

In the first set of adjustments, Gazprom agreed to include spot indexation, while in the second set of adjustments, Gazprom refused to use spot prices but agreed to bring contract prices closer to spot. In 2012, Gazprom agreed to adjust prices in other long-term contracts in order to bring the prices in line with trends on spot markets. The agreement with ENI was finalized in March.[136] Gazprom said that 'based on the underlying principles and terms of the existing long-term contracts,' the price adjustments took into account the situation of the gas market in Europe, of the economy and of the energy sector of certain European states.[137] The concessions to European consumers did not include a 'substantial increase in the share of spot trading in contracts as the talks were unrelated to a higher proportion of spot sales in those contracts', but it did include 'a retroactive element' to the revised contracts that requires Gazprom to refund an unknown proportion of the difference between what customers have paid and the spot price. It appears that the length of the review cycle was reduced.[138] Gazprom said that the contracts with oil indexation remain relevant, but 'price formulas with oil indexation were adjusted' in order to increase the competitiveness of Russian natural gas in the European market.[139] In other words, Gazprom resisted calls to move away from oil-linked prices and replace it with a larger spot price component in the formula. Instead, the company chose to reduce the base price and retain both oil indexation and TOP clauses, although with a reduction in TOP volumes perhaps to 60% from 80-85%. It seems that the contract revision granted to ENI also included some unspecified flexibility on volumes.[140] Since the beginning of the financial crisis in 2008, Gazprom and ENI have twice managed to agree on a revision of the contract (March 2010 and March 2012).[141] Both times the base price of gas was lowered and the minimum TOP annual volume reduced. The changes were made retroactively. Gazprom's contracts with ENI cover 27 Bcm/y and are set to expire in 2035. In February 2013, ENI initiated a third renegotiation on the terms of its long-term contracts with Gazprom.

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132 Interfax, Russia & CIS Oil and Gas Weekly, July 28 - August 3, 2011, E.On to ask tribunal to review gas price, p.34

133 Interfax, Russia & CIS Oil and Gas Weekly, July 21 - July 27, 2011, Edison to save $200 mln under revised Russian gas import contract, p.39

134 Sinergie Italiane groups together Italian energy companies Iren , Ascopiave, Blugas and some small unlisted energy companies from the northern Italian region of Lombardy

135 Reuters, January 17, 2012, Gazprom adjusts gas prices for European companies, http://www.reuters.com/article/2012/01/17/gazprom-europe-prices-idUSL6E8CH47920120117

136 See Gazprom's website for the list of all agreements: http://www.gazprom.com/about/marketing/europe/

137 Interfax, Russia & CIS Oil and Gas Weekly, January 12 – January 18, 2012, Gazprom adjusts prices for European buyers to market conditions, pp.45-46

138 Declaration by Sergei Komlev, Gazprom Export's Head of Contract Structuring and Price Formation, during a conference call, reported in Interfax, Russia & CIS Oil and Gas Weekly, January 26 – February 1, 2012, Gazprom concessions to EU consumers unrelated to higher spot sales, p.44

139 Gazprom's website: http://www.gazprom.com/about/marketing/europe/

140 Reuters, March 2, 2012, ENI Russian gas price cut worth $700 mln, http://www.reuters.com/article/2012/03/02/gazprom-eni-citi-idUSL5E8E20NY20120302

141 Reuters, October 15, 2012, ENI wants to get rid of Gazprom's 'take or pay' rule in gas supply, http://rt.com/business/news/eni-gazprom-contract-revise-440/

As a general rule, none of the companies disclosed the terms of the agreements with Gaprom, but it is believed that some companies got an increased share of spot. According to Interfax, GDF Suez and Wingas ended up with a 16% share of spot in their contract portfolios in previous contract reviews, others received discounts on the base price (SPP, Sinergie Italiane and Econgas and others).[142] In mid-February 2012, the Financial Times reported that Gazprom adjusted the parameters of its formula its long-term contracts with European customers, which led to a relative price reduction of 10% on average.[143] Societe Generale estimated that Gazprom's discount for gas supply to ENI amounted to around 6%.[144]

Edison's arbitration with Qatari LNG supplier Rasgas started in March 2011. Edison signed a 25-year contract in 2009 with Rasgas for 6.4 Bcm/y of LNG to be delivered to the offshore regasification terminal of Rovigo. In 2012, the Court of Arbitration of the International Chamber of Commerce (ICC) concluded that Rasgas should compensate Edison for overpayments made for gas deliveries over the previous few years due to changed economic circumstances. The Court of Arbitration calculated a €450 million gap between the long-term contract prices and market prices during 2011-2012, which may be repaid to Edison either through a discount on future LNG imports or an increase in the amount of gas delivered.[145] The general terms of the contract remain valid.

Algeria has often repeated its preference for oil-indexation,[146] and higher rents on lower volumes seem to be a more logical choice considering the country's tight supply/demand balances in the 2010s.[147] In 2009, it appears that Sonatrach allowed two of its clients (Gas Natural and Transgas) to import less than the minimum TOP volumes stipulated in their long-term contracts without incurring payment liabilities. Gas Natural imported just about 77% of its Annual Contract Quantity (ACQ) and Transgas about 56% of the ACQ (well below the assumed 85% TOP volume).[148] As a consequence, if Sonatrach were to agree on long-term contract revision, it would most likely be on more flexible TOP volumes rather than agreeing on lower price.

ENI has said that its Libyan contract has already been renegotiated and that it was cheaper gas than in the other contracts in its portfolio (at least before the renegotiations with Gazprom).[149] In October 2012, the Court of Arbitration of the ICC notified Edison of the positive conclusion of the arbitration with ENI to review the price of its long-term gas contract from Libya, its second gas arbitration

[142] Interfax, Russia & CIS Oil and Gas Weekly, January 26 – February 1, 2012, Gazprom concessions to EU consumers unrelated to higher spot sales, p.44
[143] Financial Times, February 6, 2012, Gazprom bows to demand with gas price cut, http://www.ft.com/cms/s/0/2e57f4c4-58ad-11e1-9f28-00144feabdc0.html#axzz2K70PjyPE
[144] Reuters, March 2, 2012, ENI Russian gas price cut worth $700 mln, http://www.reuters.com/article/2012/03/02/gazprom-eni-citi-idUSL5E8E20NY20120302
[145] Platts International Gas Report, September 24, 2012, issue 707, Court cuts Qatar contract price, p.20
[146] Platts International Gas Report, November 5, 2012, issue 170, Agreeing the price in Europe, pp.16-17
[147] See Darbouche (2011)
[148] Darbouche (2011), pp.5-6. Apparently, ENI also negotiated a revision in its agreements with Sonatrach in 'recent' years. Source: Gas Matters Monthly, April 2012, ENI seeks upstream antidote to European market ills, pp.18-21
[149] Gas Matters Monthly, September 2011, Winds of change in Italy, pp.22-26

victory in less than a month after the Rasgas one.[150] It is estimated that Edison's accounts for 2012 will be better off of more than €250 million.

Unsurprisingly, the major two importers ENI (41% of imported gas in 2011) and Edison (17%) have been very active in the renegotiation processes with their suppliers. ENI's TOP obligations had a negative impact on the company's gas and power unit in 2012 due to falling gas demand and stronger competition from other suppliers thanks to increased liquidity on the hubs, including PSV. It is believed that ENI also had to pay Gazprom about $1.5 billion per year between 2009 and 2011 under TOP clauses for gas it hadn't used.[151] After the 2012 agreement with Gazprom, ENI had re-priced 70% of its procurement portfolio. [152] In October 2012, ENI CEO Paolo Scaroni said that the company would be seeking to move away from the TOP format of its current contracts with countries such as Russia, Algeria and Norway and pay per use of gas.[153] He also said that new contracts should be indexed to spot gas prices.[154] At that time ENI had expected to renegotiate only 40% of its supply contracts in 2013.[155] In fact ENI renegotiated 30% of its natural gas contracts with suppliers in 2012 and a further 40% in 2013, according to Chief Financial Officer Alessandro Bernini.[156] The renegotiations aim at realigning the price of gas purchased with prices at the prevailing hubs, aiming also at obtaining more flexibility in the volumes of the take or pay contracts. In February 2013, ENI said it expected to renegotiate all of its remaining gas supply contracts after a decline in its sales in 2012.[157]

ENI's contracts are much larger than Edison's and with different target markets: Edison mainly sells to power generators whereas ENI serves the retail and industrial sectors. Like a number of utilities Edison has been renegotiating its gas contracts, filing for arbitration in most cases. On October 1 2012, the Court of Arbitration of the ICC notified Edison that in relation to the dispute between Edison and ENI for the revision of the price of the long term gas contract from Libya, the Court recognized the price review requested by Edison in 2010 as 'formally and substantially valid'.[158]. On April 23, 2013, the Court of Arbitration of the ICC concluded the arbitration between Edison and Sonatrach for the revision of the price of the long term gas contract from Algeria. Limited

[150] Reuters, October 1, 2012, Edison wins Libya gas arbitration with Eni, Edison EBITDA gets 250 mln euro boost from arbitration, http://www.reuters.com/article/2012/10/01/edison-eni-libya-idUSL6E8L1KYD20121001
[151] Reuters, October 15, 2012, ENI wants to get rid of Gazprom's 'take or pay' rule in gas supply, http://rt.com/business/news/eni-gazprom-contract-revise-440/
[152] Gas Matters Monthly, April 2012, ENI seeks upstream antidote to European market ills, pp.18-21
[153] NaturalGasEurope, October 17, 2012, Italian Government Presses for Russian Contract Renegotiations, http://www.naturalgaseurope.com/italy-presses-for-contract-renegotiations
[154] Upstream, October 17, 2012, Italy plans to double domestic output by 2020, http://www.upstreamonline.com/live/article1267824.ece
[155] Argus, ENI to renegotiate all gas supply contracts in 2013, February 15, 2013, http://www.argusmedia.com/pages/NewsBody.aspx?id=834968&menu=yes
[156] Bloomberg, October 30, 2012, ENI Renegotiating 30% of Gas Contracts This Year, 40% in 2013, http://www.bloomberg.com/news/2012-10-30/eni-renegotiating-30-of-gas-contracts-this-year-40-in-2013.html
[157] Argus, February 25, 2013, ENI asks Gazprom for gas price concessions, http://www.argusmedia.com/News/Article?id=836124&sector=22020&region=22001
[158] Edison, October 1, 2012, press release, Edison: positive conclusion of the arbitration with ENI for the review of the price of the Libyan long term gas contract, http://www.edison.it/en/media/press-releases/2012-10-01-edison-positive-conclusion-of-the-arbitration-with-eni-for-the-review-of-the-price-of-the-libyan-long-term-gas-contract.shtml

information was available at the time of writing (May 2013), but it seems that the Court evaluated the price review requested by Edison in August 2011 to be 'formally and substantially valid'.[159]

Enel has also been renegotiating its gas contracts, with apparently already some positive impact on gas prices in long-term contracts with Gazprom and more flexibility in TOP conditions. [160] In March 2013, the company announced that it had renegotiated its gas supply contracts reducing TOP volumes and had plans to keep on trying to move the price of its gas supply in line with PSV spot gas prices instead of oil indexation in order to improve the competitiveness of its CCGTs in Italy.[161]

The Italian government recognised the role of long-term import contracts in ensuring security of supply in its National Energy Strategy.[162] Long term contracts have helped build the supply infrastructure, but the context has changed, including the reason for oil indexation. The government aims at reaching a balance between the spot market and more flexible long-term contracts. Consequently, the government encourages a more prominent role in supply for spot gas and also the inclusion of indexation clauses linked to hub prices in long term contracts.[163]

During 2009-2012, the big non-European gas producers appear to have resisted major pricing formula changes and kept attractive rents provided by high oil-linked gas prices albeit on lower volumes of gas sold. If hub prices are to be used as comparisons for judging the fairness of oil indexed prices, it would be simpler –at least in theory- to move contract pricing to hub indexation, especially if this process of price renegotiation is expected to continue, but PSV would need to perform and stay aligned to other hubs for a long period (maybe a year or more) before the players become confident in using it as a benchmark. Having said that, the fact the formula for regulated retail prices is expected to use the Italian exchange prices as a benchmark from October 1, 2013 could have some relevance for future renegotiation. Important renegotiations of long-term contracts clauses have already taken place in the past, such as the settlement reached by the European Commission's competition authorities with Gazprom and ENI regarding destination clauses and other restrictive practices in their contracts in October 2003. The renegotiations and arbitrations Europe is going through in the early 2010s will also change the European markets and possibly, accelerate the end of oil-indexation even if, contrary to general beliefs, this does not necessarily mean lower gas prices as these will depend on supply-demand balances.

This climate of ongoing economic weakness, stagnant gas demand (if not even decline) and growing requests for spot prices create significant uncertainties for the suppliers to Europe and in consequence, on future additional gas supplies to Italy. The following section looks at the future challenges and opportunities for gas supply to the peninsula.

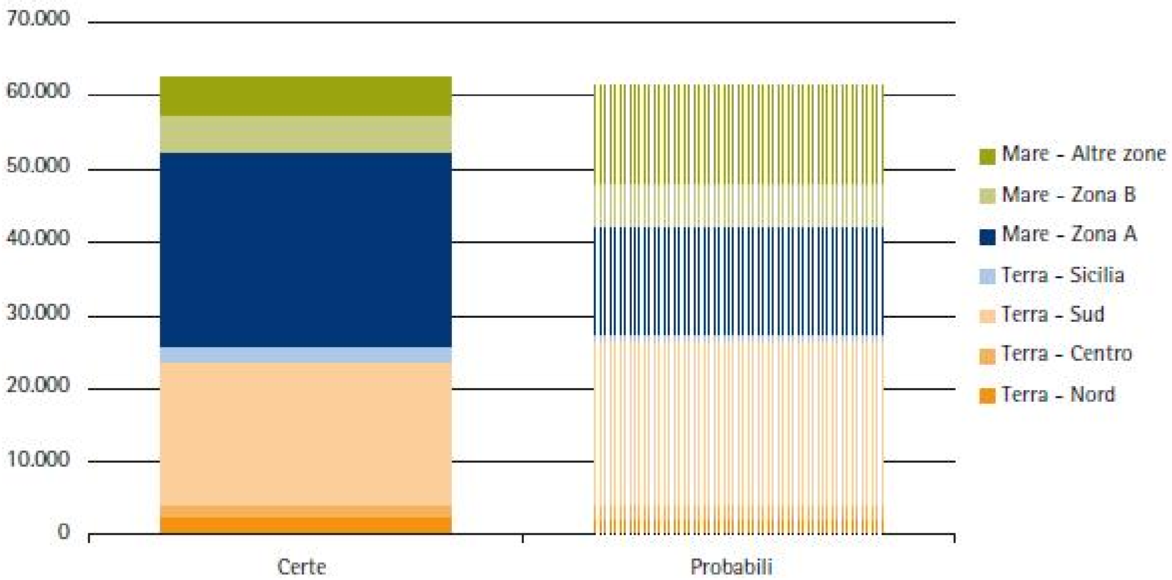
[159] Edison, April 30, 2013, Edison concluded the arbitration with Sonatrach for the review of the price of the Algerian long term gas contract, http://www.edison.it/media/PR_Arbitration_with_Sonatrach30aprile2013.pdf
[160] Platts Power In Europe, November 26, 2012, issue 639, Enel leans on coal, p.4-5
[161] Argus, March 13, 2013, New contracts to make Enel CCGTs more competitive, http://www.argusmedia.com/News/Article?id=838596&sector=22015&region=22001
[162] MSE (2013), p.62
[163] MSE (2012), p.60

2.2. FUTURE SUPPLIES

Reserves and production

Italy's indigenous gas reserves are limited with proven reserves estimated at 61.5 Bcm at the end of 2011 [Figure 20], despite a small number of new natural gas discoveries in the northern, central and southern regions and offshore in the northern Adriatic Sea and in the Tyrrhenian Sea, west of Sicily.[164] Around two-thirds of Italy's gas reserves are located offshore.[165] Apart from limited prospectivity, Italian hydrocarbon resources do not attract a lot of international operators due to difficulties in obtaining authorisation and the revised environmental code introduced in 2010 in response to BP's Gulf of Mexico oil spill, which effectively banned offshore drilling, and stalled a number of planned exploration and development projects, mainly in the Adriatic Sea.[166] In 2012, the parliament approved important changes to the offshore drilling ban, which could encourage some additional E&P activities in the future.

Figure 20: Natural gas reserves and resources in Italy in 2011 (MMcm)



Source: AEEG (2012b), from *Ministero dello sviluppo económico UNMIG* (Ministry of Economic Development, department for energy), p.132

While the country was the third largest gas producer in the world in 1960 it peaked in 1994 at 20 bcm/y (or about a third of national demand at the time), and has dropped by about 10% per year since then.[167] Annual gas production halved between 2000 and 2012 and the future outlook appears

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[164] UNMIG (*Ministro dello sviluppo economico*, *Direzione Generale per le Risorse Minerarie ed Energetiche*) in AEEG (2012b), p.132

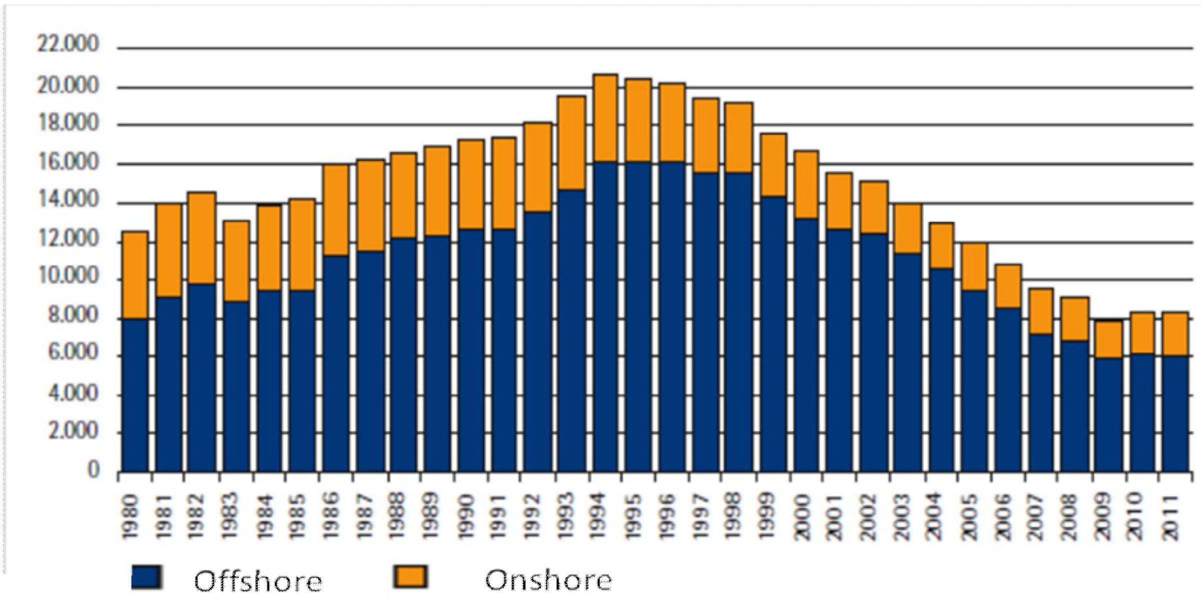
[165] See Appendix 4 for a map

[166] Italy banned the drilling of wells within 8 km of its coastline and 19 km of protected areas. In June 2012, the government decided to extend the limit for all offshore operations to 12 miles but exempted all concessions – and applications for concessions – issued before June 2010. Source: Platts International Gas Report, August 13, 2012, issue 705, Italy attracts the upstream again, p.19

[167] Ascari (2012)

limited.[168] E&P activities have been hampered by the length of time from exploration activities to commercial exploitation, which can take almost three times as long as in the rest of Europe,[169] and the complexity of the rules that often vary from one region to the next. However, after years of continuous decline, production of natural gas held steady at a level around 8 Bcm between 2009 and 2012 [Figure 21].[170]

Figure 21: Natural gas production in Italy, 1980-2011 (MMcm)



Source: AEEG (2012b), from UNMIG, p.131

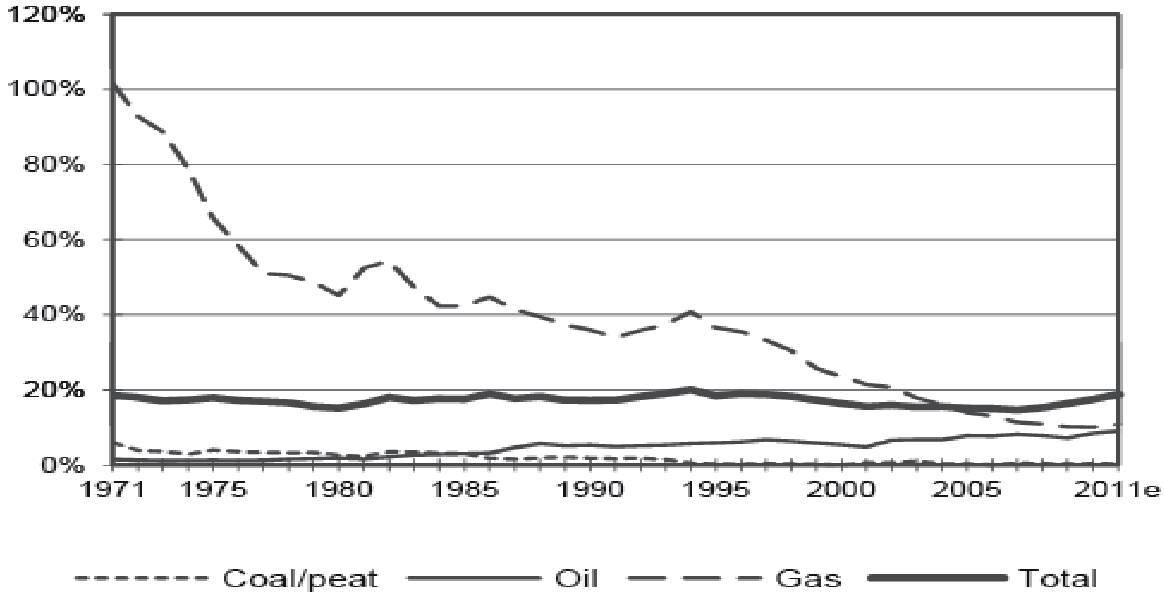
Because the country depends heavily on energy imports due to scarce natural resources and feeds more than 50% of its power stations with natural gas, Italy looks at various ways to expand its reserves and production. Stefano Saglia, State Secretary, MSE, was reported saying in 2011 that 'Shale gas could open new ways of energy supplies in a particularly delicate moment on the global level. Italy is in favour of looking into it.'[171] However, according to the National Energy Strategy, drilling for oil and gas in 'sensitive' areas both offshore and onshore will not be allowed and neither will the development of shale gas.[172] As a whole, increasing domestic gas production will continue to be challenging because of environmental opposition.

Italy has limited indigenous energy resources, and has long been dependent on imports for oil and coal [Figure 22]. According to the National Energy Strategy[173] Italy intends to double its domestic production of oil and gas by 2020 and boost renewable energy power generation as it moves to cut consumers' energy costs and boost flagging economic growth. This optimistic scenario assumes a reduction of import dependence to 67%of the country's energy needs (from 84% in 2011), while also cutting €14 billion per year off its €62 billion energy import bill. Gas production itself is expected to

[168] IEA, *Natural gas information*, several editions
[169] IEA (2009), p.16
[170] MSE (December 2012)
[171] NaturalGasEurope, April 4, 2011, Italy Favors Shale Gas Development, http://www.naturalgaseurope.com/italy-favors-shale-gas-development
[172] MSE (2013), p.115
[173] MSE (2013), p.110

grow by 46%, which would bring the indigenous production to about 12.2 Bcm, or just about 16% of the country's gas demand in 2012.[174] Whether such a level of production can be achieved technically and economically remains to be seen (and will probably be a challenge), but more importantly, whether indigenous production will be cheaper than imported fuels is also a major question.

Figure 22: Energy self sufficiency in Italy, 1971-2011 (MMtoe)



Source: IEA (2012a), p.II.101

One of the main objectives of the National Energy Strategy is to increase and diversify gas import capacity,[175] but many projects have been delayed or even abandoned due to the complicated process involving local, regional and national laws. Nonetheless, several projects are still being evaluated, both pipeline diversification and development of new LNG terminals.

Pipeline projects

The Caspian region is seen as a key source of supply diversification and a source for the so-called Fourth Corridor to Europe.[176] There are several proposed pipeline projects to bring gas from the Caspian sources, one of which is expected to terminate in Italy, as seen on Map 2 and Table 12.

[174] MSE (2013), p.35 and p.110
[175] MSE (2013), p.63
[176] The so-called 'fourth' or 'southern' gas corridor will connect the Caspian and Gulf regions and the Middle East to Europe (the other three corridors running to EU member states are from Russia, Northern Europe (Norway) and North Africa).

Map 2: Proposed Southern Corridor pipeline projects

Source: Gas Matters Monthly, March 2012, The Southern Corridor: destination unknown, pp.15-20

Table 12: Proposed Southern Corridor pipeline projects

	Capacity (Bcm)	Length (km)	Cost ($ billion)	Shareholders / proponents	Year proposed
Trans-Anatolian Pipeline (TANAP)	16+	2500	5-6	Socar, Botas	2011
Nabucco (base case)	31	3900	11-19	OMV, MOL, Transgaz, BEH, Botas (and previously RWE)	2002
Nabucco West	10+	1300	not disclosed	OMV, MOL, Transgaz, BEH, Botas (and previously RWE)	2012
Trans-Adriatic Pipeline (TAP)	10-20	800	2	Axpo, Statoil, E.ON Ruhrgas	2003
Interconnector Turkey-Greece-Italy (ITGI)	10-24	1400	2-3	Edison, DEPA, Botas	2003
South East Europe Pipeline (SEEP)	10	1300	not disclosed	BP	2011

Source: Gas Matters Monthly, March 2012, The Southern Corridor: destination unknown, pp.15-20 and author's update

As of early 2013, three pipeline projects competing for gas from phase two of the Shah Deniz project had already been rejected: the Interconnector Turkey-Greece-Italy (ITGI) and the South East Europe Pipeline (SEEP). The European Commission's long-backed Nabucco project, which was supposed to transport 31 Bcm/y of gas from the Turkey/Georgia border across Turkey, Bulgaria and Hungary to

Austria, was abandoned after Azerbaijan said it would build transport capacity across Turkey with the new standalone Trans-Anatolian Pipeline (TANAP) in November 2011.[177]
The capacity of the TANAP is expected to be 16 Bcm/year and more if possible from 2017-18 (construction is now expected to begin on the link by the beginning of 2014).[178] BP, along with fellow Shah Deniz consortium members Statoil and Total have expressed interest to join BOTAS and Azerbaijan's state-owned SOCAR in constructing TANAP.[179] The Nabucco West project was then selected by the Shah Deniz consortium for the western export route in preference to BP's SEEP proposal.[180] Nabucco West follows the western route of the original Nabucco pipeline and would take the gas through Bulgaria, Romania and Hungary to Austria.

Nabucco West is in competition for the European export route with the Trans-Adriatic Pipeline (TAP) project, which would bring gas from the Turkish border across Greece and Albania to Italy (the Turkey-Greece section was inaugurated in late 2007 with an initial capacity of 3.5 Bcm/y, rising to 11.5 Bcm in 2011).[181] TAP is designed to carry an initial 10 Bcm/y, enough for the expected gas supply from Shah Deniz to Europe by the late 2010s,[182] but with the possibility of being doubled at a later stage. In August 2012, four of the Shah Deniz partners (Socar, BP, Statoil and Total) agreed an option to take 50% of the equity of TAP, whose shareholders are Swiss EGL (42.5%), Norway's Statoil (42.5%) and Germany's E.ON Ruhrgas (15%).[183]

The final investment decision (FID) on TANAP is expected in the first half of 2013, prior to FID on phase 2 of the Shah Deniz project itself.[184] Once FID is taken, only two transport options will remain to bring the gas from Shah Deniz II to Europe: the Nabucco West pipeline to Bulgaria and northwest to Baumgarten in Austria or TAP via Greece to Italy, and as a result, the Italian route for Caspian gas may be abandoned in favour of a route to Southern and Central Europe.

Gazprom plans to build the South Stream pipeline, a 63 Bcm/y pipeline that should deliver gas from Russia under the Black Sea to Bulgaria, where it will split into two lines: a northern route via Hungary entering from Serbia and then on to Austria and Northern Italy and a southern route which runs from Bulgaria and Serbia leaving Hungary via Slovenia, in other words, the very countries that are seen as prime marketing prospects for Shah Deniz II.[185] In November 2012, Gazprom confirmed the cancellation of plans to build natural gas lines within the South Stream project to southern Italy

[177] The SCP (South Caucasus Pipeline) already takes Caspian gas to Turkey.
[178] Turkey and Azerbaijan agreed on October 2011 to allow 10 Bcm/y of Shah Deniz gas to transit Turkey to Europe with 6 Bcm/y for the Turkish market.
[179] Gas Matters Monthly, March 2012, The Southern Corridor: destination unknown, pp.15-20
[180] The SEEP project was proposed by BP and targeted Greece, Bulgaria, Romania and the countries of the former Yugoslavia, mainly by upgrading existing pipelines, and eventually connecting with the Baumgarten gas hub in Austria. Source: Gas Matters, October 2011, BP springs last-minute surprise as bids come in for Shah Deniz transportation, p.4
[181] Sources: IEA (2009), p.116 and Platts International Gas Report, October 8, 2012, issue 708, Pipeline states sign TAP MoU, pp.6-7
[182] Azerbaijan could export around 11-14 Bcm/y of gas supplies additional to its existing export commitments, starting from 2015, which means only enough gas for one project. Source: Pirani (2009), p.404
[183] The Interconnector Turkey-Greece-Italy has already been rejected. Source: Platts International Gas Report, January 14, 2013, issue 715, Baku keeps export options open, pp.1-2
[184] Gas Matters Monthly, September 2012, The Southern Corridor: the road narrows, pp.32-33
[185] There is also a third option via Croatia (i.e. bypassing Hungary). Source: Platts International Gas Report, October 22, 2012, issue 709, EU gas policy is a 'car wreck', pp.12-14

through Greece because of a lack of any additional demand for Russian gas in Italy in the future. 'Italy has contracted volumes of gas it needs for its southern regions from other sources. They don't need our gas,' Leonid Chugunov, head of Gazprom's project management department, said.[186] Gazprom confirmed in December 2012 that the South Stream gas pipeline would not go to the Austrian Baumgarten hub.[187] The final investment decision for the subsea section of the South Stream gas pipeline project was taken on November 2012, and the construction started the following month.[188] The first gas is due to be delivered in December 2015. Gazprom expects to build the second and third lines by the end of 2016, and a fourth line is scheduled to follow by the end of 2017. Gazprom owns a 50% stake in the South Stream subsea section. The other stakeholders are Italy's ENI (20%), France's EDF (15%) and Germany's Wintershall (15%).[189]

The GALSI pipeline project was planned to connect Algeria to Italy via Sardinia, with a final throughput of 16 Bcm/y, raising Algeria's export capacity to over 100 Bcm/y. The consortium is Algeria's Sonatrach 41.6%, Edison 20.8%, Enel 15.6%, Sfirs 11.6% and Hera Trading 10.4%. The pipeline would take only two years to build, but Sonatrach has put back its final investment decision and is awaiting 'favourable economic and technical conditions'.[190] The fate of this project may however rest on Algeria's ability to develop sufficient future production in excess of its domestic and other export commitments. At present this appears questionable.[191]

Nordstream line 3 and 4 would add additional volumes of gas to Northern Europe, which could end up in Italy thanks to improved European interconnections and access to infrastructure. The existing interconnections include theTrans Europa Naturgas Pipeline (TENP) across Germany bringing gas from the Netherlands; the Italian-Austrian Trans Austria Gasleitung (TAG) pipeline crossing Austria bringing Russian gas; and the Transitgas pipeline crossing Switzerland and connected both to TENP and to the French network in order to import gas from both the Netherlands and Norway.

Other projects are being developed, notably via the South-South East region initiative coordinated by the AEEG and the Austrian regulator and including Italy along with Austria, Bulgaria, Croatia, Greece, Hungary, Romania, Slovakia and Slovenia. The main areas of concern are security of supply and capacity allocation. The Italian and Austrian regulators have identified the need to create common rules for daily capacity allocation and congestion management to be included in the European network codes being developed between the Baumgarten and PSV hubs.[192] In 2012, Snam Rete Gas published its Gas Regional Investment Plan (GRIP) for the 'Southern Corridor' region for 2012-2021. It also published the first Gas Regional Investment Plan (GRIP) for the 'South-North Corridor' region for 2012-2021, covering Italy and four other countries: France, Germany, Belgium and Switzerland. The report includes proposals for infrastructure enhancements for the national networks and increased market integration achieved by enhancing cross-border bi-directional flow

[186] Platts International Gas Report, November 19, 2012, issue 711, Greece offers energy shares, pp.7-8
[187] One of the explanations for this decision is the fact that the European Commission has kept Gazprom from taking a strategically important share in the hub. Source: ICIS Heren, European Gas Markets, December 19, 2012, issue 1922, South Stream to end in Italy, exclude Austria, p.3
[188] Platts International Gas Report, November 19, 2012, issue 711, Partners take S Stream FID, p.23
[189] Platts International Gas Report, October 8, 2012, issue 708, Pipeline states sign TAP MoU, pp.6-7
[190] Gas Matters Monthly, March 2012, Italy's winter gas crisis brings liberalisation decree into sharp focus, p.21
[191] For more information, see Darbouche (2011), pp.12-47
[192] AEEG (2012c), pp.78-80

interconnections in order to increase flexibility of the European Grid and improve security of supply.[193]

The National Energy Strategy confirmed plans to exploit Italy's geographical position and turn Italy into a transit country for gas flows and into a Southern Europe gas trading hub and transit country by 2020.[194] In order to reach this objective and diversify its supply, Snam is constructing a new line up the Adriatic coast and will have an extra 9.6 Bcm/year entry capacity in the south by 2014 as well as 8 Bcm/year reverse flow to northern pipelines TAG and TENP by 2016.

In 2012, Italian transmission system operator Snam and its Belgian counterpart Fluxys finalised the joint acquisition of the equity interests held by ENI in Interconnector UK, Interconnector Zeebrugge Terminal and Huberator and signed a memorandum of understanding to develop reverse flow capacities from Italy to the UK. The two companies are expected to make a final investment decision in 2013 on reverse flow capacities from south to north from Italy through the Swiss Transitgas and into Germany and France and through the TENP link in Germany into Belgium and to the UK. This will create a fully bi-directional north/south transmission axis enabling south to north flows between Italy and the UK. These will enable shippers to transport gas in both directions between the North Sea and the Mediterranean, where significant gas import capacity exists (both LNG and pipeline). If the project goes ahead, Snam Rete Gas aims to complete a reverse flow system between Italy and northern Europe by 2016, which would allow Italy to export about 40 MMcm/d.[195]

In the longer term, the export capacity to central Europe will increase to 19 Bcm/y and the transmission system will be further expanded by as much as 36 Bcm/y.[196] New connections with Europe will be evaluated, such as the *Tauern Gas Leitung* (TGL, Italy-Austria-Germany) pipeline, which is expected to link the German network to the Italian one via Austria with a capacity of 11.4 Bcm from 2015.[197]

Additional LNG

Because of the existing bottlenecks (chiefly of a competitive/regulatory nature described below in section 2.3) in accessing pipeline import capacity, operators considered using LNG terminals to by-pass these constraints and access the Italian market. However, due to the complexity of the approval processes necessary to obtain authorisation to build, there have been many delays in developing LNG import infrastructure in Italy. LNG represented 12% of gas imports in 2012 from two main sources: Algeria and Qatar.[198]

[193] Snam Rete Gas (2012), Gas Regional Investment Plan (GRIP) for the 'South-North Corridor' region for 2012-2021 and Snam Rete Gas (2012), Gas Regional Investment Plan (GRIP) for the 'Southern Corridor' region for 2012-2021
[194] MSE (2013), p.52
[195] Platts International Gas Report, January 14, 2013, issue 715, Fluxys near FID on S-N flows, pp.27-28
[196] Gas Matters Monthly, September 2011, Winds of change in Italy, pp.22-26
[197] Scarpa (2012)
[198] MSE (December 2012)

Most of the LNG arriving in Italy comes through term LNG from Algeria into the Panigaglia LNG terminal and through term LNG from Qatar into Rovigo. The Rovigo LNG terminal, the second LNG terminal in Italy, is situated off the coast near Rovigo in the Northern Adriatic Sea and was commissioned in 2009. It improved the potential for supply diversification, even if 80% of the new 8 Bcm/y of capacity is reserved for deliveries from the company that financed the project (Qatargas = QP and ExxonMobil) for 25 years. LNG is imported are on a long-term oil-indexed TOP contract, which in turn is likely to prevent price competition in wholesale and retail markets, and as a result only a small fraction of new import flows are likely to be sold within a liquid spot market. However, the Edison arbitration success will change this in the future.

The start of commercial activities at the offshore Livorno LNG terminal has been delayed until the third quarter of 2013 (TPA waiver[199]). The project is a joint venture between Germany's E.ON Ruhrgas (46.79%), Italy's Iren Group (46.79%), Golar Offshore Toscana (3.73%) and OLT Energy Toscana (2.69%). The 3.75 Bcm/y terminal was originally to start operation in 2011, but has been deferred several times by delays in the finalization of the floating, storage and regasification unit at the shipyard in Dubai and local opposition due to environmental concerns in Italy, but finally received approval from the environment Ministry. The terminal is expected to reach Italy in the second or third quarter of 2013.[200]

Building terminals in Italy has been no easy matter in the past, but things have worsened since 2008. All regasification projects are on standby and at best delayed even if some have received authorisations. BG Group's Brindisi project in the southern region of Puglia, which failed to obtain all the necessary permits for eleven years and that was shelved in March 2012,[201] is a perfect example. In addition to facing local opposition and delays in permitting, new projects are also facing bearish market conditions since 2008. As a consequence, several companies have withdrawn their offer on new capacity investments. For instance, just in December 2012, Italian ERG and Anglo-Dutch Shell abandoned their 8 Bcm/y Priolo project in Southern Italy, which was followed by the decision of French Gdf Suez to put the 5 Bcm/y Tritone LNG project in central Italy on hold for one year.[202]

Another important project still on-going (and which had started construction in early 2013) was the 8 Bcm/year Porto Empedocle LNG terminal onshore Sicily (Nuove Energia, which is owned by Enel), which is planned to come into operation in 2015 (TPA waiver). Two new LNG terminals at Falconara (4 Bcm/y) and Gioia Tauro (12 Bcm/y planned for 2017) received authorisations after the February 2012 supply crisis.[203] The MSE listed seven other projects in 2012, but at less advanced stages.[204/205] Additional LNG volumes to Italy would increase the liquidity at PSV as all gas volumes from LNG regasification must transit through the PSV since October 2005.

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[199] Exemption from third party access has been granted.

[200] Platts International Gas Report, December 17, 2012, issue 713-714,Livorno delays to mid-2013, p.33 and Platts International Gas Report, April 22, 2013, issue 722, Italy okays one, rejects other, p.30

[201] LNG World News, March 6, 2012, Italy: BG Shelves Brindisi LNG Project , http://www.lngworldnews.com/italy-bg-shelves-brindisi-lng-project/

[202] ICIS Heren, European Gas Markets, December 19, 2012, issue 1922, News brief, p.11

[203] Gas Matters Monthly, March 2012, Italy's winter gas crisis brings liberalisation decree into sharp focus, p.21

[204] See the full list in AEEG (2012b), pp.146-7

[205] Map 8 and Map 9 in Appendix 5 provide a summary of the existing and planned import capacity to Italy as of end 2012

The gas shortage crisis of February 2012 caused by temperatures plummeting to 10-12 degrees Celsius below zero and, as a result, an all-time high daily gas demand, has drawn attention to a need for more gas infrastructure, and probably higher priority, more efficient use of existing infrastructure. The following section focuses on the developments in terms of competition, flexibility and security of supply.

2.3. COMPETITION, FLEXIBILITY AND SECURITY OF SUPPLY

Access to import infrastructure

While the gas sector has been open to competition since 2003, AEEG reported little competition on the supply side in 2011 due to a lack of access to gas import and storage capacity to new entrants. Access to national transmission is regulated and transparent but shippers find it hard to get capacity in import pipelines with a few operators controlling most of the capacity and not all available capacity used. As is often the case in Europe, the problem is not actually the existence of sufficient infrastructure capacity, but the access to it.

According to the Legislative Decree no.164/00, firm capacity at entry points interconnected to import pipelines is to be granted in relation to import contracts on a multi-year basis (up to 5 years) and firm capacity at other entry points (and exit points) is to be granted on a yearly basis. On a total of 116 Bcm of import capacity in 2011, 103 Bcm of gas were reserved for priority access for long term contracts, leaving only 13 Bcm of unreserved access [Table 13]. Since 2002, total import capacity has increased by 32 Bcm, but unreserved capacity by less than 9 Bcm on the grounds that projects have been developed with long term contract commitments, resulting in reservation of available pipeline capacity and, as a consequence, preventing others from using that capacity.

Table 13: Priority access of import capacity, 2002-2011 (Bcm/y)

	Total import capacity	Priority access for transit [1]	Priority access for LT contracts	Unreserved access
2002	84.0	0.5	77.3	4.2
2003	84.8	0.5	78.8	3.1
2004	88.7	0.5	84.6	2.1
2005	90.6	0.5	73.5	16.7
2006	92.3	0.5	74.5	17.3
2007	98.4	0.5	86.1	11.8
2008	100.3	0.5	96.1	3.7
2009	110.9	0.3	102.6	8.0
2010	116.0	0.3	103.1	12.6
2011	116.3	0.2	103.0	13.0

[1] Values refer to a transit contract with priority access under a long-term contract
Source: AEEG (2012c), p.83

If we look at the import capacity booked at interconnection entry points to the Italian transmission networks for the gas year 2010-2011, it appears that there is a high degree of long term capacity reservation especially in the Northern connections and, as a result, limited availability of spare capacity [Table 14]. The Southern connections with Algeria and Libya show some availability.

Table 14: Existing, awarded and available capacity on import pipelines and LNG terminals during the gas year 2010-2011 (MMcm/d and %)

	Existing	Awarded	Available	Reserved
Entry points				
Passo Gries	59.0	58.0	1.0	98.2%
Tarvisio	107.0	107.0	0.0	100.0%
Mazara del Vallo	99.0	88.2	10.8	89.1%
Gorizia	2.0	0.3	1.7	15.8%
Gela	31.6	21.9	9.7	69.3%
Total	298.6	275.4	23.2	92.2%
LNG terminals				
Panigaglia	13.0	11.4	1.6	87.7%
Rovigo	26.4	26.4	0.0	100%

Source: AEEG (2012b), p.141

Over the years, capacity is expected to be freed up by the termination of long-term contracts. In gas year 2012-2013, about 50 MMcm/d of capacity is unreserved and therefore potentially available to any shippers. By 2017-18, the AEEG expects about 138 MMcm/d of unreserved capacity (as of 2012) [Table 15]. At the time of writing, the latest update from the AEEG estimated 300 MMcm/d of unreserved capacity for the gas year 2018-2019 (as of October 2012).[206]

[206] AEEG's website: http://www.autorita.energia.it/it/dati/gm18.htm

Table 15: Expected existing, awarded and available capacity on import pipelines and LNG terminals during the gas years 2012-2013 to 2017-2018 (MMcm/d and %)

	Tarvisio	Mazara del Vallo	Passo Gries	Gela	Gorizia	Rovigo
2012-2013						
Existing capacity	107.0	99.0	59.0	31.6	2.0	26.4
Capacity awarded	90.9	86.7	48.8	21.9	0.0	26.4
Available capacity	16.1	12.3	10.2	9.7	2.0	0.0
2013-2014						
Existing capacity	107.0	99.0	59.0	31.6	2.0	26.4
Capacity awarded	82.0	86.7	45.1	21.9	0.0	26.4
Available capacity	25.0	12.3	13.9	9.7	2.0	0.0
2014-2015						
Existing capacity	107.0	99.0	59.0	31.6	2.0	26.4
Capacity awarded	81.7	86.5	21.2	21.9	0.0	21.0
Available capacity	25.3	12.5	37.8	9.7	2.0	5.4
2015-2016						
Existing capacity	107.0	99.0	59.0	31.6	2.0	26.4
Capacity awarded	80.8	86.5	7.3	21.9	0.0	21.0
Available capacity	26.2	12.5	51.7	9.7	2.0	5.4
2016-2017						
Existing capacity	107.0	99.0	59.0	31.6	2.0	26.4
Capacity awarded	80.5	83.9	7.3	21.9	0.0	21.0
Available capacity	26.5	15.1	51.7	9.7	2.0	5.4
2017-2018						
Existing capacity	107.0	99.0	59.0	31.6	2.0	26.4
Capacity awarded	80.5	66.9	7.3	11.0	0.0	21.0
Available capacity	26.5	32.1	51.7	20.6	2.0	5.4

Source: Snam Rete Gas in AEEG (2012b), p.142

ACER/CEER noted that the limitations of available capacity in the corridor between Slovakia, Austria and North East Italy (including a part from Austria into Slovenia) had been associated with decoupled, and generally higher, prices at Italian (and Austrian) gas hubs with respect to German spot prices.[207]

Improving access to, and flexibility of, cross-border interconnections is imperative for the development of competition and diversification. ENI has been under increasing pressure from the European Commission, the Italian Competition Authority (AGCM) and the regulator AEEG since the 2000s due to its perceived anticompetitive practices and accusations of using its ownership of pipelines to limit investment and exclude competition. The new EU capacity allocation network code coming into force in 2015 will end this practice.[208]

[207] ACER/CEER (2012), p.142
[208] See Yafimava (2013)

For instance, in 2002, the AGCM concluded that ENI was abusing its dominant position in the gas market by selling gas abroad to selected new entrants with proportional capacity reservation in international (transit) pipelines, and, as a result, excluding competitors from directly supplying the Italian gas market with independent imports.[209] ENI had to come up with proposals for a gas release programme, specifically with regard to TPA to the Transitgas, Trans Tunisian pipeline (TTPC) and TAG pipelines [see Map 3], in which ENI had majority stakes. ENI was later fined €4.5 million by AGCM for failing to comply with the judgement in time. Italy's gas release programme finally went into operation in September 2004 with 37 companies each receiving 62 MMcm, a pro-rata allocation from a total of 23 Bcm that was due to be released annually during 2004-2008.[210]

Map 3: Gas import infrastructure: pipelines at the border, 2011

Source: AEEG's website: http://eegas.com/TAG-Italy-2011-04e.htm

In March 2007, the AGCM closed a 4-month investigation into ENI's alleged abuse of a dominant position in its management and use of the Panigaglia regasification plant in exchange for ENI's commitment to sell 4 Bcm/y of gas at below market prices starting from October 2007. At the time Panigaglia was the only ItalianLNG regasification terminal.[211]

The European Commission (EC) also investigated certain practices by ENI. In 2007, the EC started antitrust proceedings against ENI for distorting gas prices by blocking access to pipelines through

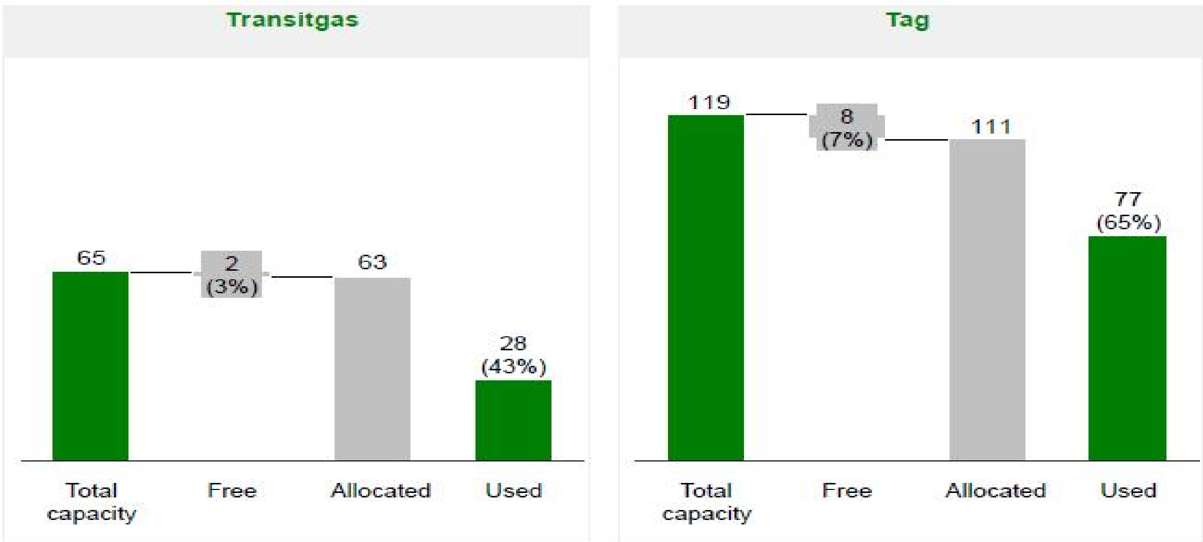
[209] AGCM (2002)
[210] ICIS Heren, October 16, 2004, ENI faces fine over reluctance to act on Snam Blugas judgement
[211] AGCM (2007)

capacity hoarding and strategic under-investment in the transmission system and therefore potentially excluding new entrants from the gas market.[212] After about three years of investigation, the EC concluded that ENI may have infringed Article 102 of the Treaty on the Functioning of the European Union (TFEU) because of its 'constructive refusal' to supply transportation capacity. Consequently, ENI, which controlled TENP, Transitgas and TAG, offered to divest its shareholdings in the companies connected with these pipelines to a purchaser approved by the EC. The Commission ended its investigation in September 2010.[213]

By early 2013, ENI had completed the EU-enforced sale of its ownership stakes in the TENP, TAG and Transitgas pipelines to comply with EU antitrust laws. ENI sold off its ownership in TAG to CDP, and its stakes in TENP and Transitgas to Belgian infrastructure operator Fluxys. CDP and Fluxys G have introduced new measures in order to monitor capacity usage and facilitate trading further ahead.[214] Since March 2012, the Trans Austria Gasleitung company, which operates the TAG pipeline, has started to auction day-ahead capacity on its website. In February and October 2009, ENI also completed the two expansions of TAG (+3 Bcm[215]) as agreed with the EC after an inquiry on destination clauses in the contracts between ENI and Gazprom.[216] These expansions increased the total capacity to 37.4 Bcm/y.

The National Energy Strategy also mentions the problem of utilisation issues in cross-border pipelines especially where a significant share of contracted transport capacity has been allocated but not fully utilised as shown in Figure 23 and well-functioning secondary capacity markets or alternative mechanisms have not yet properly developed.

Figure 23: Transitgas and Tag pipelines, free, allocated and used capacity for the Gas Year 2011-2012, average October-March (MMcm/day)



Source: MSE (2013), p.59

212 IEA (2009), p.120
213 For more information and analyses on the proceedings and results, see Maier-Rigaud, Manca & von Koppenfels (2011)
214 Gas Matters Monthly, March 2012, Italy's winter gas crisis brings liberalisation decree into sharp focus, p.21
215 Scarpa (2012)
216 Global Legal Group (2011)

Despite those divestments, ENI continued to use the bulk of the pipelines capacity thanks to its long-term ship-or-pay contracts (ENI has long-term contracts to use 85%-95% of Transitgas and TAG capacity and 67% of TENP capacity).[217] Following a report submitted by Gas Intensive, a consortium of industrial gas buyers, that from April 2011 and for the entire gas year 2011-2012, ENI had failed to auction spare import capacity on the Transitgas and TAG pipelines, in March 2012, the AGCM launched an antitrust competition investigation for possible abuse of a dominant position in the international transport of gas. [218] Gas Intensive argued that the non-auction of unused capacity stopped industrial customers from importing cheaper gas from other European gas hubs into Italy. An improvement in TPA to transport capacity came through ENI's offer to make available at least 5 Bcm/y of secondary transport capacity on pipelines to northern Europe, namely the TAG pipeline (1.6 Bcm/y) and the Transitgas/TENP (3.4 Bcm/y) from September 2012 until October 2017.[219] In September 2012, AGCM accepted ENI's proposals and closed its investigation. These developments have potentially important consequences for the competition and liquidity at PSV in the years to come. TAG already has been holding day-ahead auctions, but the Transitgas pipeline runs through Switzerland, where European rules are not applicable, although the Italian and Swiss governments have agreed to implement measures to provide better access to the Transitgas pipeline.[220] The freed capacity will enable additional operators to buy gas on foreign hubs, such as TTF, NCG, Gaspool CEGH, Zeebrugge or the PEGs, even if only by buying cheap gas in the summer and storing it for later use. Thanks to this capacity release, we can expect PSV to continue to trade at a tighter spread to northwest European hubs in the 2010s compared to the 2000s (see section 1.3).

Outside Europe, ENI controls the TTPC and the connected TMPC offshore pipeline that crosses the Mediterranean Sea and reaches Sicily bringing gas from Algeria. The lack of capacity and of separate access to TTPC prevents additional imports via Tunisia.[221] ENI also controls the Greenstream pipeline that crosses the Mediterranean and connects Libya with Sicily. During 2002/2003, ENI decided to add new transport capacity from Algeria via the TTPC pipeline. Four independent shippers concluded agreements with suppliers with the objective of entering the Italian gas market. However, ENI decided not to proceed with the expansion due to changed market conditions from 2007 and the potential oversupply of the national gas market in the event that four new shippers were to import gas from 2007 to 2008. This would have compromised ENI's ability to meet the TOP obligations in its own gas supply agreements. The AGCM decided to investigate whether ENI's refusal to approve the import capacity expansion could be interpreted as a commercial measure to prevent entry into the

[217] ICIS Heren, September 7, 2012, Italy's ENI ups natural gas transport capacity offer to head off antitrust inquiry, http://www.icis.com/heren/articles/2012/09/07/9593924/italys-eni-ups-natural-gas-transport-capacity-offer-to-head-off-antitrust.html

[218] Gas Matters Monthly, April 2012, ENI seeks upstream antidote to European market ills, pp.18-21

[219] This was 1 Bcm/y more than ENI's initial proposal in April. The capacity will be split into 4 Bcm/y for physical transport auctioned with a marginal price mechanism (all the winning bidders pay the lowest-price bid), and 1 Bcm/y for a swap service. Source: AGCM (2012)

[220] Platts International Gas Report, January 14, 2013, issue 715, Fluxys near FID on S-N flows, pp.27-28. According to the agreement, Italy and Switzerland would also coordinate in a more efficient way to manage gas emergencies, such as peaks in demand or issues with import infrastructure, in both countries. Source: Platts European Gas Daily, December 18, 2012, Italy, Switzerland sign MoU on Transitgas use, p.6

[221] Shippers have the obligation to conclude importing contracts with Sonatrach to get access to the TTPC, therefore preventing separate access to the pipeline. See the warning by the AGCM to the Italian Government: AGCM (2006)

Italian wholesale market, and if yes, whether it amounted to exclusionary abuse of ENI's dominant position under article 82 of the EC Treaty. Following the inquiry, several small players were awarded capacity in the pipeline, including Sonatrach,[222] and the pipeline capacity was increased by 3 Bcm/y in 2012.[223]

As explained earlier, the regulator AEEG sets transportation tariffs on the national network based on full entry-exit capacity, separately bookable, with no restrictions. However, it is interesting to note that cross-border tariffs are designed independently from domestic ones. As a result, their level and even structure can vary between the various entry points into the Italian system. For instance, ACER/CEER noted that entry points from Algeria/Tunisia and Libya into Sicily were priced at three to four times the European average and exit pipeline points at Northern Italian borders to Switzerland and Austria were priced at two to three times the European average.[224] This is because countries with directional preferences can agree to discriminate between entry and exit tariffs, for instance, at the borders between Italy and Austria/Switzerland. Interruptible day-ahead capacity auctions could solve this problem as shown between Austria and Italy since 2012.[225] In addition, mandatory bundling is embedded in the Capacity Allocation Mechanism (CAM) network code, which is set to be implemented in November 2015, and will be the first EU gas network code.[226]

Better integration with the rest of Europe and additional LNG supplies are expected to increase the system's security margin in emergency situations of exceptional peaks in demand. Although the import capacity is much higher than the annual demand (120 Bcm/y vs 74 Bcm/y in 2012), the margin of security for daily cover is lower. Because about half of the country's electricity is generated from gas-fired plants, a gas supply crisis could have enormous consequences for the country. With the rapid development of renewable energy, gas-fired plants are also more and more used to back-up intermittent generation, and as a result, gas demand is becoming even more volatile, which will necessitate significantly increased flexibility of the system.

Development of commercial storage

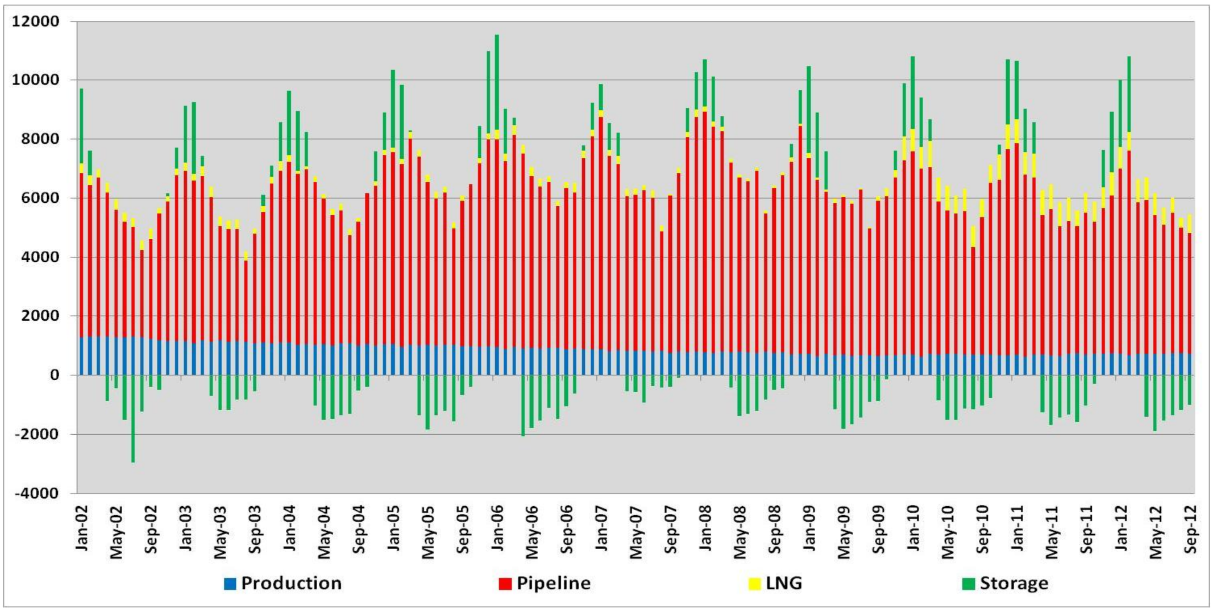
In addition to a well-connected gas market and higher nominations on import contracts in times of tight supply/demand balances, storage provides another way to get access to flexible supplies or alternative supply in case of interruption of imports in order to meet gas demand fluctuations (annual, seasonal, peaks, etc.). With indigenous production flat throughout the year, gas storage also provides the means to avoid building pipelines solely to meet peak demand.

Flexibility in the Italian system is provided first by pipeline gas, but also by LNG deliveries and of course commercial storage [Figure 24]. Seasonal fluctuations in gas consumption exist, with about 60% of the sales in the six winter months. Sales to industry and power plants are relatively flat

[222] AGCM (2004). See also Faul & Nikpay (2007), paragraphs 12.410 – 12.413 for more information on the case.
[223] Scarpa (2012)
[224] ACER/CEER (2012), p.147
[225] ACER/CEER (2012), p.155
[226] ENTSOG (2012)

throughout the year. Sales to the residential and commercial sectors are highly dependent on temperature in winter months, and the requirement for air conditioning equipment has started to induce small peaks in summer months.[227]

Figure 24: Monthly gas supply: production, pipeline, LNG and storage, 2002-2012 (MMcm)

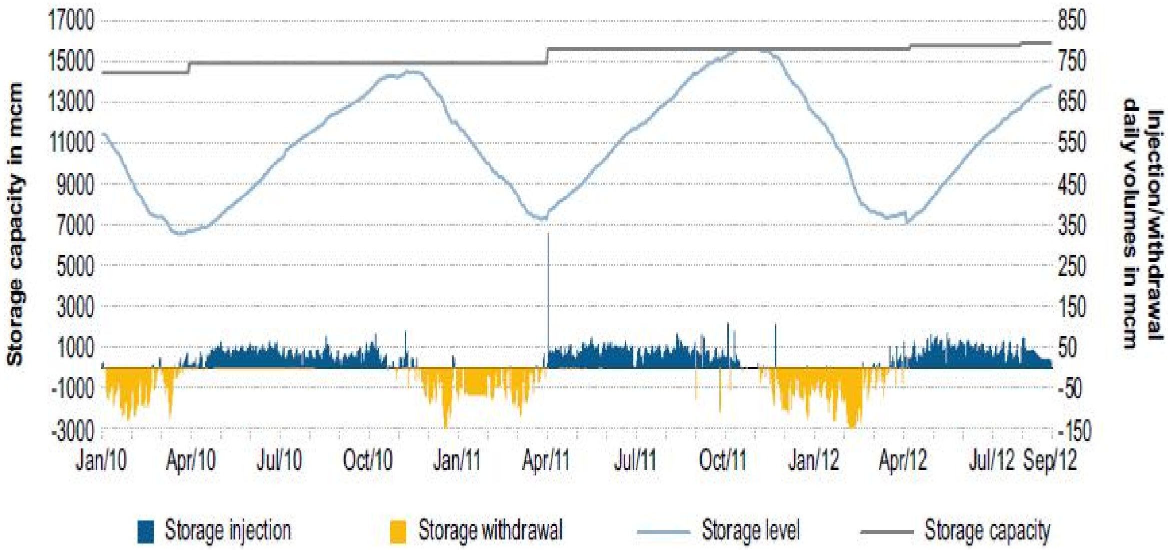


Source: IEA, Monthly data service

The 15.6 Bcm of storage facilities are replenished between April and September and are used to meet seasonal demand during the winter months. The delivery capacity varies from 239 MMcm/d at the start of winter (maximum pressure)[228] to the contractual level of 150 MMcm/d, which under the regulations must be guaranteed at the end of the delivery campaign on March 31.[229] Looking at the period 2010-2012, working gas volumes in storage remain relatively high and never reached the minimum levels of strategic storage (5.1 Bcm in 2011-2012, later reduced to 4.6 Bcm) [Figure 25].

[227] Honore (2010), p.356
[228] Italy imposes some regulatory obligations on shippers to maintain a certain level of gas volume at the beginning of the winter season. Source: ACER/CEER (2012), p.137
[229] MSE (2013), p.61
According to Cavaliere (2007), there is a minimum amount of gas that should be kept in storage in order to ensure the adequate gas pressure even in the event of an exceptional peak day. As a result, about 4.5 Bcm of 'working gas' should not be considered as available, which reduces the amount of capacity available to wholesalers for commercial purposes. Source: Cavaliere (2007), pp.19-24

Figure 25: Underground storage utilisation levels (MMcm)

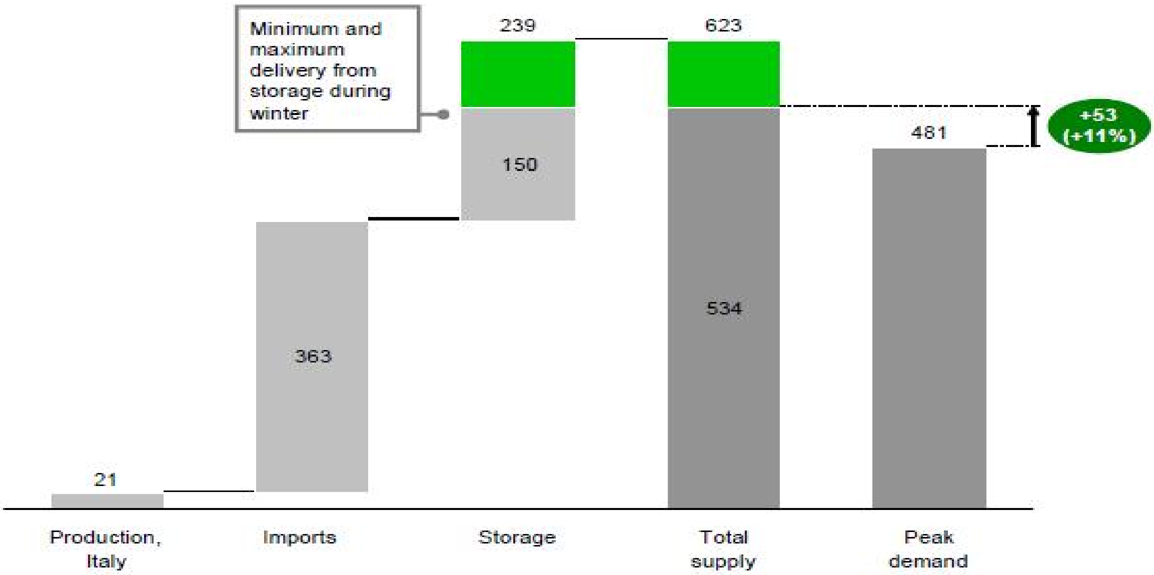


Source: ACER/CEER (2012), p.228

Despite this relatively high level of gas storage capacity, the National Energy Strategy warns of the limited possibility that gas will be able to provide an adequate level of reply in the case of emergency peak conditions.[230] There was an example during the 2005–2006 winter. Supply problems from Russia through Ukraine were worsened by large withdrawals of gas from storage for power generation (for export to the then higher priced French market). In order to maintain enough gas storage to supply the residential sector, where gas was needed for space heating, industrial demand was cut, a switch to fuel oil for power plants was decided and withdrawals from strategic storage were necessary at the beginning of February 2006.[231] The rapid decline of gas volumes in storage at times when cold temperatures persisted raised concerns about the potential ability of storage to deliver enough gas in the event of a sudden peak in daily demand. As shown in Figure 26, under the assumption of a peak demand of about 480 MMcm/d during extreme weather conditions,[232] the reserve margins (before any demand management measures) would only be at about 50 MMcm/d, with potentially even worse scenarios at the end of the winter, when working gas volumes in storage can be expected to be low. As a matter of comparison, daily gas demand reached the all-time high of 466 MMcm/d during the cold snap of February 2012. At this level of demand, storage could have theoretically covered about 55% of the peak demand for storage using its maximum withdrawal capacity (at the beginning of the winter, assuming perfect interconnectivity) and only about 35% at the end of the winter. Additional storage projects could play a significant part in alleviating this potential fragility of the system at times of peak demand and as a result, increase security.

[230] MSE (2013), pp.61-62
[231] Cavaliere (2007), pp.27-31
[232] During the cold snap of February 2012, daily gas demand reached the all-time high of 466 mcm/d.

Figure 26: Energy/gas system fragility at peak times (MMcm/d)



Source: MSE (2013), p.53

Gas in storage is largely used for seasonal swing of the residential and commercial sector.[233] The rules on access to storage defined in the Legislative Decree no. 93/11 give priority access to operators which supply gas to vulnerable customers (i.e. household customers, public service activities and/or assistance services) and non-household customers with a consumption below 50,000 cm/y.[234] In other words, storage in winters must be used for household customers and not to produce electricity or for industrial use. Because of these restrictions, storage is not used for trading opportunities and many industry and power generators have been constrained to buy from ENI. New storage capacity should help to give more freedom to these customers (with the Snam balancing platform setting prices).[235]

The long authorisation process, with environmental impact assessments, and macroeconomic conditions since 2008 have become major barriers to the creation of new storage capacity. Still, the AEEG listed nine projects at various development stages in its 2012 annual report.[236] These projects were mostly planned long before market opening and the gas supply crises since 2005, mainly in response to security of supply issues. Two projects have been authorised, Cornegliano in the North and Cugno-Ferrandina in the South for a total capacity of 2 Bcm/y or 36 MMcm/d, however, uncertainties remain on their starting dates of operation due to strong opposition from local communities.[237]

[233] IEA (2009), p.118
[234] AEEG (2012c), p.10
[235] Gas Matters Monthly, September 2011, Winds of change in Italy, pp.22-26
[236] See AEEG (2012b), pp.144-145, and GSE website for additional information.
[237] The Italian environment ministry has rejected a request for authorization to carry out the appraisal phase for the Rivara gas storage project. The proposed site was one of the areas worst-hit by several earthquakes and numerous aftershocks in May-June 2012. On April 27 the local government of the Emilia-Romagna region had formally turned down permission for the project's appraisal phase, warning of a possible risk of earth tremors. Source: Platts International Gas Report, June 4, 2012, issue 700, Quake stops Rivara storage, p.22

New measures were also taken in 2010 (Legislative Decree no.130 of August 2010[238]) in order to increase storage capacity in Italy, and more specifically, help increase competition in the natural gas market, especially in the industrial and power market. A supplier injecting gas into the national transmission network may increase its market share up to a threshold of 55%, on the condition that it agrees to build new (or upgrade existing) storage capacity and to make available at least 4 Bcm of it (or if it undertakes to allow investors to participate in infrastructure development initiatives). The Decree establishes that the investors in the storage projects are entitled to the economic benefits of the new capacity under construction immediately (and until the completion of the new storage capacity). In other words, since April 2012 and for the following storage years,[239] the investors may obtain access to certain virtual gas storage sites where they can deliver volumes of gas during the summer and then off-take the same volumes during the winter at PSV for a maximum of five years. Since May 2012, investors can also bid on the 'investments segment' of the P-Gas trading platform and volumes of gas can be made available to them as part of the virtual storage service.

ENI, through Stogit (i.e. before the ownership unbundling), committed to build 4 Bcm of new storage capacity by 2014 (in return the limit on ENI's imports will be raised to 55%) and requested industrial customers, consortia of final customers and electricity producers to collaborate on new storage projects or upgrade existing ones. The rights to access this new 4 Bcm storage are allocated 1 Bcm to power generators and 3 Bcm to industrials, of which 1 Bcm should be for small-medium industry.[240] Gas that shippers and industrial parties deliver to the PSV in winter will be resold on the gas exchanges (Day-ahead market, month ahead, seasonal), aiming to increase liquidity.[241]

The draft of the National Energy Strategy (published in 2012) envisaged a development of 18 new storage projects by 2020 (expansion of seven existing facilities and the creation of 11 new facilities). This would lead to an increase in national storage capacity to 26 Bcm/y by 2020 (an increase of 73% on current available capacity). Access to storage by operators would also be liberalized through a market-based system of capacity allocation. The allocation of gas storage capacity was already modified in early 2013 as part of the government package of reforms designed to liberalize the sector. About half of the commercial existing capacity (i.e. 4.2 Bcm) will be auctioned and the remaining storage capacity will continue to be allocated under existing procedures.[242]

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[238] GSE (2010)

[239] There were transitory financial measures for 2010-2011 and 2011-2012, where GSE gave the investors the difference between prices of natural gas in the winter period and those in the summer period of the same thermal year, in relation to their own share of capacity storage financed, and not yet available. Source: AEEG (2012c), p.92

[240] See GSE website: http://www.gse.it/en/gasandenergyservices/VirtualGasStorage/Pages/default.aspx

[241] ICIS Heren, March 5, 2012, Italy's natural gas virtual storage scheme to use exchange, not PSV, http://www.icis.com/heren/articles/2012/03/05/9538332/italys-natural-gas-virtual-storage-scheme-to-use-exchange-not.html

[242] ICIS Heren, February 19, 2013, Half Italian natural gas storage to be sold by auction from this year, http://www.icis.com/heren/articles/2013/02/19/9642482/half-italian-natural-gas-storage-to-be-sold-by-auction-from-this.html
In addition, the ministry will assign 500 MMcm of storage capacity from the country's strategic stocks to industrial companies and regasifiers, in order to ensure a more uninterrupted supply of natural gas into the system. Source: Platts European Gas Daily, February 19, 2013, Volume 18, issue 35, Italy passes two gas decrees, pp.1-2

The final National Energy Strategy published in March 2013 confirmed the need for additional storage and notes that an increase of about 75 MMcm/d of additional supply capacity for peak (already under construction or authorized) and about 5 Bcm of storage capacity overall, which represents an increase of almost 50% of the existing commercial capacity, would be sufficient to improve security of supply in the country at times of crisis such as those experienced in February 2012.[243] As a result, it would also reduce the need for measures of demand management in the industrial sector and the activation of reserve power plants fuelled by fuel oil, and provides additional storage capacity for modulation purposes.

The development of hub trading thanks to better access to import infrastructure and storage will add some much needed flexibility to the system which, combined with the development of strategic import infrastructure, of parameters for storage use in winter, and of a day-ahead balancing session will also improve supply security.

Security of supply measures

Despite its oversupply both in terms of import capacity and contracted gas in long-term contracts compared to the level of gas demand, Italy is potentially at risk of periodic gas shortages in times of unexpected high consumption due to a sudden drop of temperatures in winter. Its power generation system is over 50% reliant on natural gas, of which 80% has to be imported. Because a gas shortage therefore risks creating an electricity shortage, security of supply is high on the government's agenda after several crises –or perceived potential crises- in recent years.

At times of peak demand in recent winters, or because of interruptions in supplies from Russia or Libya, the system has come close to collapse.[244] In winters 2004/2005 and 2005/2006, Italy faced shortages related to a conjunction of low temperatures, high electricity demand and reduced imports of Russian gas through Ukraine. The system had to resort to strategic storage (1.5 Bcm was released in 2005) and demand restrictions. In the following winters of 2006/2007 and 2007/2008, emergency was avoided thanks to preventive measures and mild temperatures while gas supplies from the Brotherhood pipeline from Russia were disrupted.[245] In January 2009, Italy lost almost 1.2 Bcm of gas supply due to the Ukraine-Russia dispute, which was replaced by stock withdrawals from storage, increased LNG imports and pipeline imports from Libya.[246] The Transitgas pipeline was closed from July to December 2010 following a landslide in Switzerland. In 2011, geopolitical events in Libya led to the closure of Greenstream between February and October.[247] The shortage was made up by additional Russian gas and lower gas demand due to the economic crisis and mild temperatures.

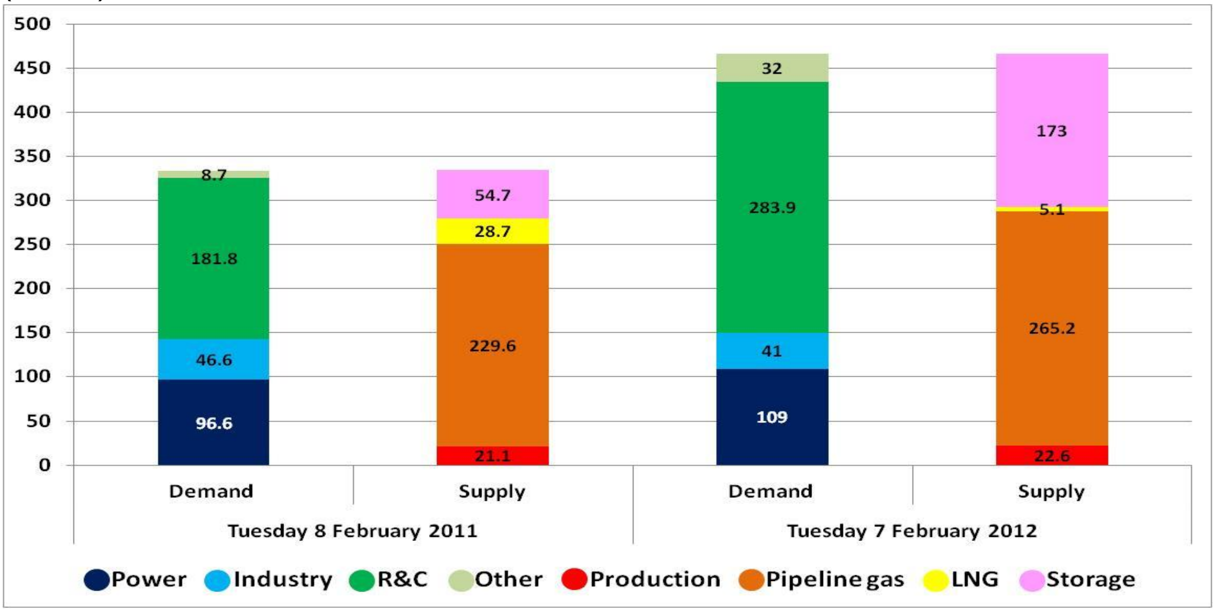
[243] MSE (2013), p.65
[244] Platts Power In Europe, December 10, 2012, Issue 640-641, Italy's energy strategy – a viewpoint, p.7
[245] IEA (2009), p.117
[246] IEA (2009), p.114
[247] Following a complicated national situation in Libya, Greenstream flows were again stopped for a few days in March 2013 but without any major impact on the Italian market.

But the question of security of supply was put back on the agenda when for about two weeks in February 2012, Italy (like the rest of Europe) was hit by temperatures plummeting to -10 to -12 degrees Celsius. On February 7, 2012, daily gas demand reached the all-time high of 466 MMcm/d [Figure 27]. Gas demand for heating in the residential and commercial sector increased by 56% compared to the same time in 2011, gas demand for power rose by 12%, while industry consumption fell following the activation of emergency procedures as defined by Ministerial Decree 26/9/2001.

The shortage was due to a number of factors. First, there was also a drop in temperatures in Russia which led to an increase in its internal gas demand (+14%), preventing the supplier meeting increased demand from European countries, including Italy (although Russian exports did not fall below obligations). Imports from Northern Europe and Algeria increased to full capacity, but high waves prevented LNG carriers from berthing at Rovigo LNG, and Greenstream deliveries were still at half capacity. The import capacity itself would have been sufficient to cover the peak if it had been fully utilised (330 MMcm/d of import capacity via pipeline and LNG, 23 MMcm/d of domestic production and 150 MMcm/d storage at the end of winter), but there was not enough gas supply to meet the all time high Italian demand.

The conditions were so critical that the government declared a state of emergency on February 6, which lasted ten days. Emergency measures included the activation of the interruption clauses in industrial interruptible contracts, and the re-start of 4.8 GW of oil-fired thermoelectric power plant in order to save gas (about 20 MMcm/d).[248] Interestingly, strategic gas storage was not needed to balance supply and demand volumes. However, increased demand, lower supplies and persisting cold weather led Italian (and European) hub gas prices to spike (PSV jumped to €65/MWh).

Figure 27: Gas demand and supply on Tuesday February 7, 2012 vs Tuesday February 6, 2011 (MMcm)

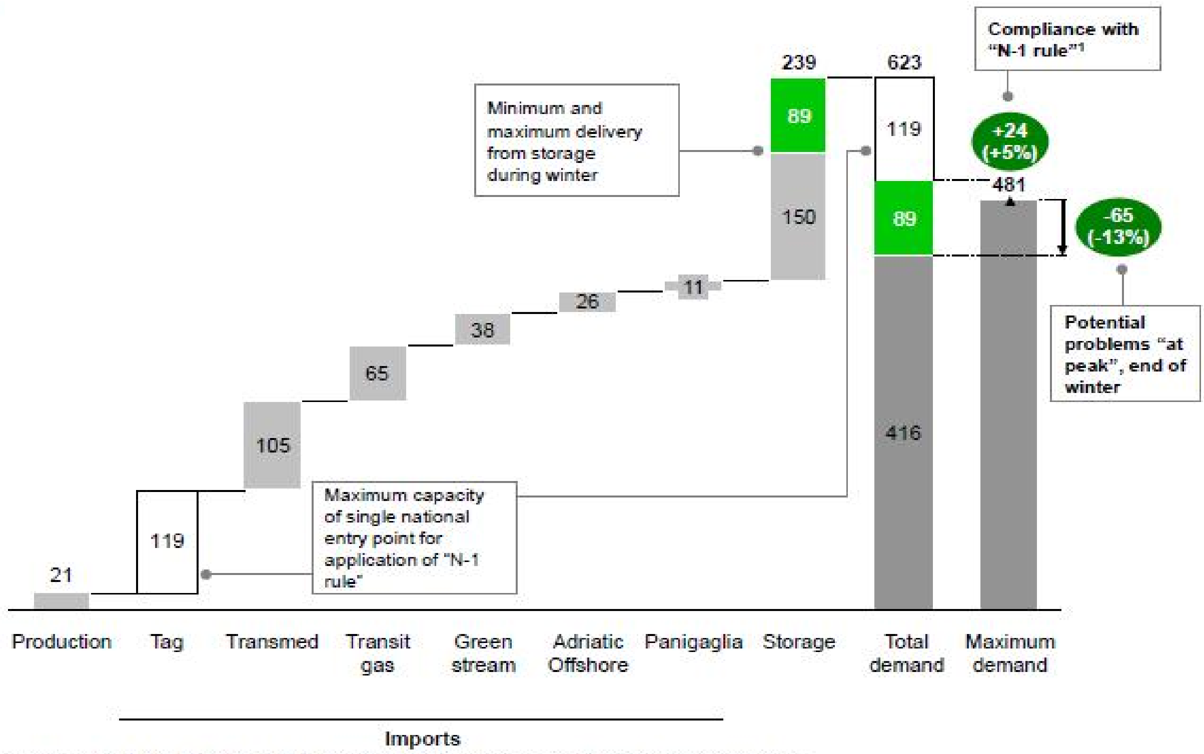


Source: From Snam Rete Gas data

[248] Gas Matters Monthly, March 2012, Italy's winter gas crisis brings liberalisation decree into sharp focus, p.21

While the Italian system has been able to manage the loss of an individual supply source, it may struggle if any of the other sources/points of entry were out of service at the same time. The European Commission set an infrastructure security standard of the 'N-1' principle, which requires that each member state must be able to guarantee supply to vulnerable customers in the most severe conditions of winter demand thanks to enough flexibility in the system to survive a failure of a major source of supply (losing the TAG pipeline for Italy), for a given time period.[249] The National Energy Strategy shows that with the 'N-1 European rule' at the end of winter 2012 [Figure 28], the system appears to have some fragility during peak demand, especially at the end of winter.

Figure 28: System fragility 'at peak' end of winter 2012 (MMcm/day)



Note: In the application of 'N-1 rule', maximum delivery capacity from storage at start of winter is assumed
Source: MES (2013), p.62

After the disruption of gas supplies over the winter of 2005-2006, an emergency response policy was established with mandatory security measures such as strategic gas storage (allocated by the energy minister) to be used once commercial stocks have been exhausted. The strategic storage obligation has been redefined by the Legislative Decree no. 93/11 and an additional 500 MMcm are available for modulation purposes (decreasing the level of strategic storage from 5.1 Bcm to 4.6 Bcm). The obligation to keep strategic storage, so far imposed only on importers from third countries, has been extended to all producers and importers.[250] The Decree also establishes that the quota of strategic storage is determined annually on the basis of the volume imported and the infrastructure used to procure gas (but on a non-linear basis). Household suppliers need to ensure supply in case of extreme one in twenty winters (as seen earlier, they get priority access to commercial storage).

[249] MSE (2013), p.61
[250] AEEG (2012c), p.10

Finally, since May 2000, gas import contracts must have a flexibility of at least 10% (possibility to import a daily gas volume at least 10% higher than the daily average import volume over the whole year at times of cold temperatures).[251]

Other emergency measures concern the use of alternative fuels in dual-fired plants and the maximisation of use of non-gas-fired plants. In case of gas emergency situations and risks of black-outs it is possible to call back into service oil-fired power plants with a capacity over 300 MW...which would be allowed to operate without any emissions restrictions.[252] For instance, during the cold snap of February 2012 the industry ministry sanctioned the use of six Enel operated oil-fired power plants to reduce gas use.[253] However, only about 6% of gas-fired power generation can also run on oil, and while dual fuel plants are obligated to have oil stocks, the quantity is not linked to a predetermined number of days, and like in the rest of Europe, CCGTs have progressively replaced dual-fired electricity plants.[254] In the industrial sector, fuel-switching abilities are limited as only 0.5% of the industrial load can operate on fuels other than gas and large industrial facilities are not required to have alternative fuel available.[255]

Demand response is limited because most gas contracts are firm and there are relatively few interruptible contracts. The IEA reported that at the beginning of the 2000s, these represented only 9% of the sales, and only in the industrial sector.[256] A decree passed in September 2007 by the MSE aimed at increasing this flexible demand response. Industrial customers adhering to the flexibility scheme must reduce their gas consumption if the TSO requests it. If the total decrease in demand of voluntarily adhering customers is lower than necessary, the scheme can impose penalties and incentives on all customers connected to transport infrastructure. [257/258]

Fast rising gas demand and security of supply were addressed by the development of gas infrastructure. But the situation has changed, and Italy is facing an oversupply of gas in the early 2010s. The country has even started re-exporting LNG cargoes to Spain.[259] The major uncertainties have shifted toward gas consumption and the future role of gas in the energy mix. The following section looks at demand trends and gas supply and demand balances in the 2010s.

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[251] IEA (2010)
[252] Platts Power In Europe, August 6, 2012, issue 632, News Italy, p.5
[253] Bloomberg News, February 8, 2012, Italy Turns to Oil-Fired Power Plants as Russia Trims Supply , http://www.businessweek.com/news/2012-02-08/italy-turns-to-oil-fired-power-plants-as-russia-trims-supply.html
[254] IEA (2010)
[255] IEA (2009), p.119
[256] IEA (2002), p.187
[257] IEA (2010)
[258] The Decree passed in September 2007 rules that while every kind of gas consumer must contribute to the security of gas supplies through a specific component of its tariff, non-industrial consumers are never allowed to benefit from the incentives in exchange for a reduction in their gas consumptions.
[259] The shipping schedules of Qatari tankers which have to return to Ras Laffan to load LNG on specific dates are restricting the re-exports to countries which are geographically close, such as Spain (and as a result, they exclude Northern Europe destinations such as Belgium, the Netherlands or the UK). Source: Argus, March 6, 2013, Italy diverts Qatari LNG cargo to Spain, http://www.argusmedia.com/News/Article?id=837563&sector=22020&region=22001

III/ FUTURE GAS DEMAND TRENDS

In 2010, the TPES was expected to grow by 40% over the next two decades, mainly driven by growth in gas demand in the electricity sector.[260] This scenario has been called into question following the economic recession that started in 2008 and the rapid development of renewable energy. The following sections offer an analysis of the main drivers of gas consumption and what consequences can be expected. First, we take a closer look at energy policies and environmental measures, including a focus on the renewable energy schemes and the New Energy Policy. Second, we focus on the power generation sector, the fastest growing market in the 2000s, but in the early 2010s, probably the most uncertain sector for additional gas demand growth. Third, we consider scenarios for additional gas demand and how these scenarios compare with the supply side.

3.1. ENERGY AND ENVIRONMENTAL POLICIES

Main objectives

The energy policy in Italy focuses on security of supply and the protection of the environment. The main objectives are to reduce energy dependence and reach the European 20/20/20 targets of reduction of the emissions of CO_2, greater energy savings and energy efficiency, and growing renewable energy.[261] While the country has had comparatively low energy intensity[262] [Figure 29], improving energy efficiency has been one of the main priorities of the Italian energy policy to reduce its emissions and its energy dependence. The white certificates scheme was established in 2004, but was mostly successful in the residential sector and less in other sectors such as transport and industry especially in the 1990s. Tax credits were also established for energy efficiency refurbishment works in the building sector. In 2007, the administration proposed the first National Energy Efficiency Action Plan (NEEAP), which introduced an overall [increase in] energy efficiency target of 9.6% to 2016. Italy also has a non-binding target of 20% reduction by 2020 according to the EU agreements. In 2011, Italy submitted its second NEEAP, with ambitious national indicative energy savings targets [Figure 30], especially in the heating and cooling sectors. It shows that the targets for 2010 estimated in NEEAP 2007 were exceeded (3.6% instead of 3% which were planned), and 70% of the savings in 2010 came from the residential sector only.[263] However, various measures were updated and even if uncertainty remains regarding the ability of the country to meet its ambitious targets, efficiency remains one of the cornerstones of the Italian energy policy.

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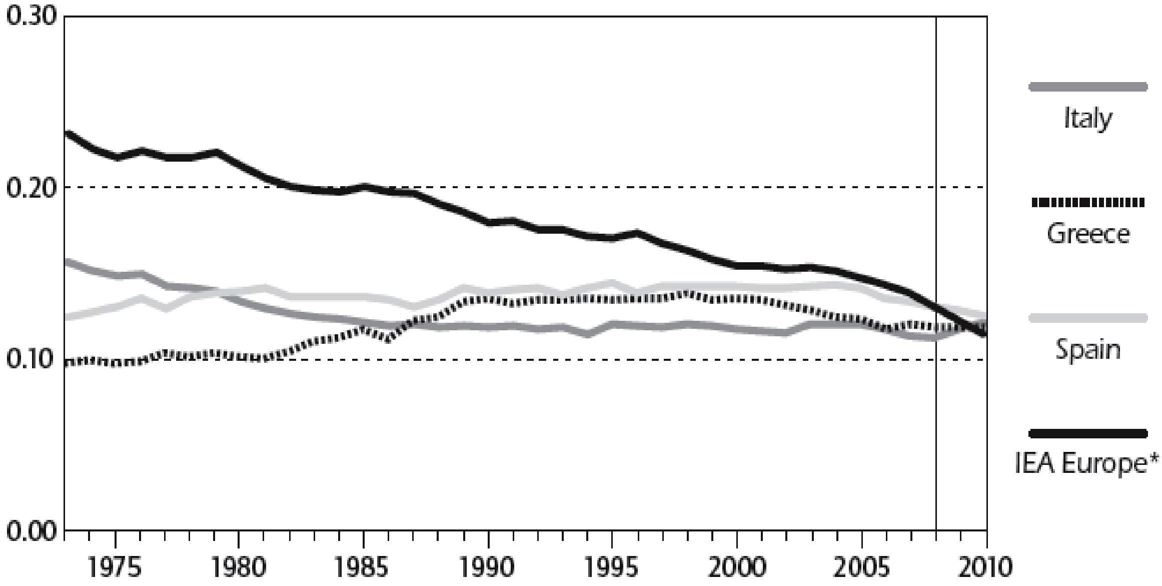
[260] The TPES of Italy was expected to reach 232 MMtoe by 2030. Source: IEA (2010)
[261] For more information, see: the website of the Italian parliament, especially January 9, 2012, Energy, http://www.camera.it/292?area=17&Energia (accessed October 24, 2012)
[262] Energy intensity: the ratio between overall energy demand and GDP
[263] MSE (2011), p.16

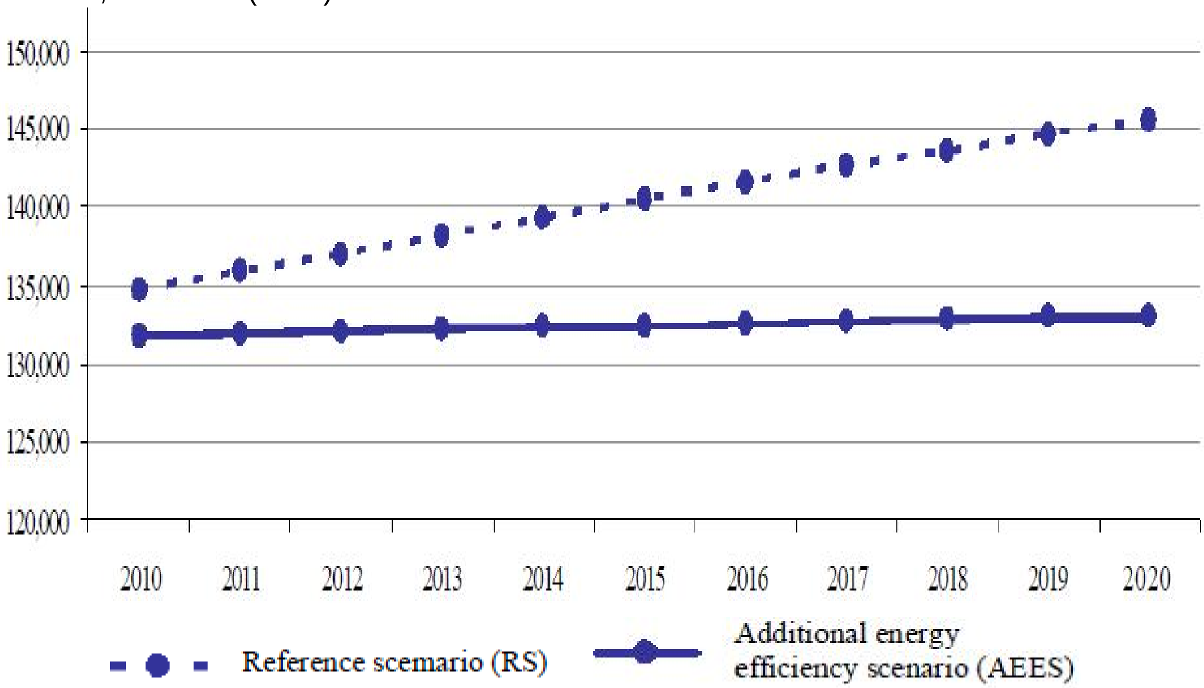
Figure 29: Energy intensity in Italy and other selected countries, 1973-2010 (toe/$000 at 2000 prices and PPP)



* Excluding Luxembourg and Norway

Source: IEA, *Energy Balances of OECD Countries*; OECD, *National Accounts of OECD Countries and* IEA (2009), p.41

Figure 30: Gross final energy consumption: reference scenario vs additional energy efficiency scenario, 2010-2020 (Mtoe)



Source: MSE (2011), p.12

Reducing GHG emissions is also a major objective of Italy's environmental policies. Unlike most of its European counterparts, Italy has made efforts in the transport sector in order to reduce the use of oil. Over the last 30 years, it has successfully promoted the use of compressed natural gas (CNG) vehicles as a result of a very active retrofit conversion industry and the ready availability of CNG versions of most of the popular Fiat small and medium-sized cars. In early 2012, there were 785,000 CNG vehicles (the highest number in Europe), with a fleet mainly composed of private cars and vans that can be refuelled in any of the 850 CNG stations.[264] At the end of the first half of 2012, the natural gas vehicles market share grew to 3.56% (up from 1.94% a year before) thanks to users looking to save money on fuel consumption: the saving in fuel costs per kilometre for a medium duty car running on natural gas is about 60% compared with an equivalent petrol engine. In the commercial sector, Italy counted some 1,200 CNG trucks (mainly for use in garbage collection) and 2,300 buses.[265]

In another step toward reducing emissions, as well as fighting the country's growing dependence on expensive imported fossil fuels, on imported electricity and to diversify the energy mix away from gas, Italy revived its nuclear energy programme in a Law in 2009 allowing the construction of a number of nuclear power plants after a moratorium of more than twenty years. Italy had one of the earliest nuclear programmes in Europe but abandoned it in 1987 following a referendum after the Chernobyl accident (although nuclear power in Italy had always been limited to a few percent of total power generation). In 2008, the new government announced its intention to re-start a nuclear programme (the objective was to start building a plant by 2013 with 6.4 GW to start operation in 2020).[266] However, three months after the disaster of the Fukushima Daiichi nuclear power plant in Japan in March 2011, a referendum was held in which 94% of the electorate voted in favour of a construction ban. Following the failure of the nuclear referendum, attention refocused on renewables.

In March 2007, European countries agreed on binding targets to increase the share of renewables in the EU's final energy consumption to 20% by 2020 (8.5% in 2005).[267] Italy has a target of 17% (5% in 2005, 14.7% in 2011[268]). National Renewable Energy Action Plans (NREAPs) were published by all Member States of the European Union in 2010, including Italy. The NREAP states that the energy mix needs to be changed to be less dependent on imported fossil fuels. The evolution focused on three main sectors to reach the targets: the electricity, heating and cooling and transport sectors,[269] and at the time, it was going to involve the creation of new-generation nuclear power. In electricity, the ratio between renewable 'normalised' generation[270] and gross electricity generation was set to 26.4% in 2020.[271] Regional Energy Plans were also developed to reduce energy consumption and

[264] Platts International Gas Report, June 18, 2012, issue 701, EU's interest in NGVs grows, p.24
[265] Natural and bio gas vehicle association's website: http://www.ngvaeurope.eu/italy
[266] IEA (2009), p.10.
The original version of the 'National Energy Strategy' of 2008 mentioned nuclear among different sources of energy to focus on. Source: see the website of the Italian parliament, especially May 8, 2012, Nulear energy, http://www.camera.it/465?area=5&tema=130&Energia+nucleare
[267] The renewable target represents the share of renewable consumption in gross final energy consumption, and renewables include the direct use of renewables plus the share of electricity and heat produced from renewables. See Directive 2009/28/EC.
[268] IEA (2012c)
[269] MSE (2010)
[270] Renewable energy generation reflects source variability year by year, and to take this into account, Directive 2009/28/EC requires Member States to normalise generation. See the Directive for more information and equations.
[271] GSE (2012), p.13

develop renewables.[272] The government's objective is to reach 12.7 GW of wind capacity by 2020, with offshore wind the next step [273] and 23 GW of solar photovoltaic (PV) by 2016.[274]

Support schemes for renewable energy

With the country's hydro and geothermal potential largely realized, Italy turned to solar, wind, and biomass to increase its renewable contribution. Several support schemes for renewable generation have been implemented by GSE, which include a 'feed-in premium tariff (*conto energia*), tradable green certificates (*GCs*) and all-inclusive feed-in tariff (*tariff onnicomprensiva*), indirect sale of electricity through GSE (*ritiro dedicato*), net metering (*scambio sul posto*) and feed-in tariff (*CIP6*)'.[275]

The green certificates were a market-based incentive. Since 2001, all the producers and importers of electricity in Italy are forced to produce a quota of electricity from renewable sources or to buy GCs from another company with a surplus of renewable electricity produced by plants which entered into operation after April 1, 1999. From 2011, the minimum renewable energy obligation was also imposed on electricity traders according to Law n.99/2009. The green certificate scheme will end in 2015. The green certificates for renewable energy plants that entered into operation before December 31, 2012 will continue to be awarded until end-2015, when they will be phased out with conversion to a feed-in tariff (FiT) regime. The government approved the new incentive regimes for renewable sources in July 2012. From January 2013, Italy has a new FiT regime, for which the annual support budget has been increased from €3.5 billion/y to €5.5 billion/y to December 31, 2014.[276] The FiT will be paid by GSE and be fixed for a longer period than the GCs: if selected via auction, the wind farms entering operation from 2013 will benefit from a new 20-year FIT. However, there is an upper limit on the total volume of installed capacity through a system of auctions for larger plants and registries for smaller plants. GSE announced the first tender for wind capacity to be assigned a FiT in September 2012. In 2013 the GSE is to auction incentives for the following total capacity: 500 MW for onshore wind; 650 MW for offshore wind; 50 MW for hydro; 40 MW for geothermal; 120 MW for biogas and 350 MW for biomass.[277] The new €5.8 billion/y scheme came into effect from January 1, 2013 and will remain in place until the programmed budget cap for 2020 is reached.

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[272] IEA (2009), p.35

[273] Wind power monthly, March 18, 2011, Europe 2020 targets – Italy, http://www.windpowermonthly.com/news/1060700/Europe-2020-targets---Italy/?DCMP=ILC-SEARCH

[274] Platts Power In Europe, September 17, 2012, issue 634, Potenza wind farm approved, p.58

[275] For more information on each of the measures, see GSE (2012), pp.51-56

[276] In the new system, tariffs vary with the type and size of the plant and a reverse auction takes place electronically once a year. GSE determines the MW quota available for each year to be put up for auction (including any outstanding quotas from previous years) and bidders offer percentage reductions to the relevant tariff. The results of the first auction were published in January 2013: the quotas for offshore wind were for 2013 and for 2013-2015 for the other technologies. The average reduction across the technologies was about 7.81%). Source: Platts Power In Europe, January 21, 2013, issue 643, Italian FiT auction undershoots, pp.3-4

[277] Platts Power In Europe, July 23, 2012, issue 631, Italy forces PV to parity, pp.6-7 and Wind power monthly, September 26, 2012, Tough FIT tender heralds fall in new capacity, http://www.windpowermonthly.com/news/indepth/1151616/Tough-FIT-tender-heralds-fall-new-capacity/

The green certificate scheme promoted renewable energy in addition to the specific FiTs for solar energy and small-scale generation from other renewable energy sources.[278] The feed-in premium (*Conto Energia*) is the main support scheme for solar power generation and has been in place from November 1, 2005. The country's fifth guidelines for PV subsidies, *Conto Energia V*, were also approved in July 2012 and have been in place since August 2012. Successful solar PVs, like other renewable projects, are granted incentives for 20 years.[279] Like for other renewable projects, there is also a cap on total installed capacity. The new PV subsidy rates are below former levels due to falling costs in the sector (PV technology costs have fallen by about 70% between 2008 and 2012[280]). This latest phase is designed to run to the end of the first half of 2013, when the government forecasts that PV will have reached grid parity (the point where the cost of generating renewables is equal to or less than buying electricity from the grid) in Italy. Funds have drained away quickly as projects raced to complete before the end of the year.[281] Although installed capacity is expected to increase from around 17 GW in 2013 to 25 GW in 2016, it should slow down after that.

High FiTs, which guarantee returns to investors, are becoming increasingly unsustainable in a time of fiscal austerity. The Italian support schemes for renewables have been among the highest in Europe. In January 2012, Italian incentives per PV unit were double or triple the levels in Germany or France, and those for wind about 50% higher. As a consequence, there was a strong impact on energy costs with about 20% of the electricity bill (taxes excluded) used to cover incentives for renewable [Table 16].[282]

Table 16: Electricity bill (excluding taxes) in 2011 (€ billion)

Sales	1
Networks	7
Dispatch	2
Energy	21
Renewable incentives	9
Other system operating expenses	1
TOTAL	42

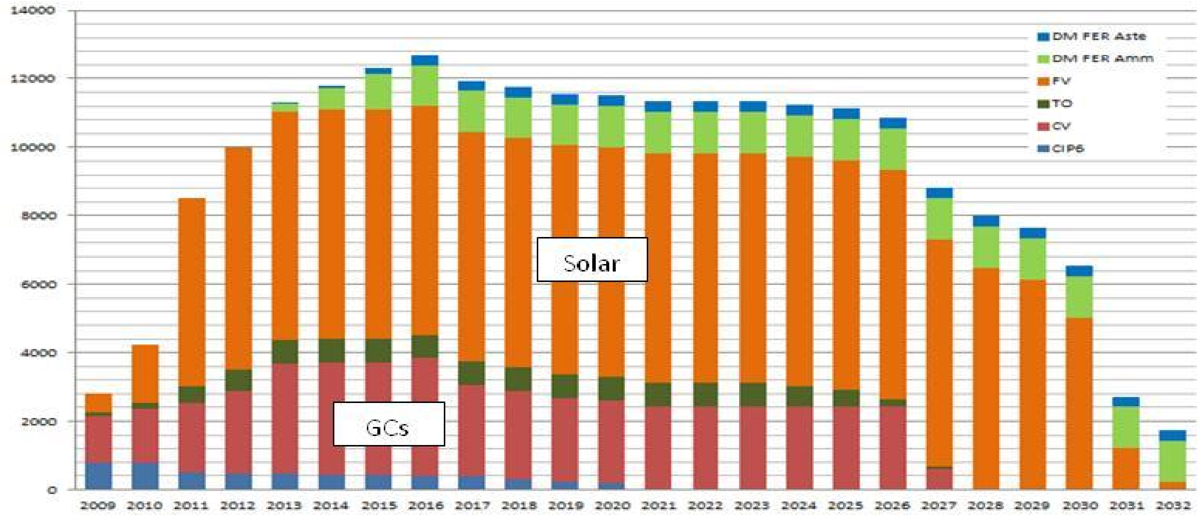
Source: MSE

At the end of 2012, subsidies to renewable sources of electricity amounted to about €10 billion/y, with over €6 billion/y just for PV, which was the technology that most benefited from incentives. In July 2012, the government approved new incentive regimes and agreed to increase the incentive pot by €200 million/y for solar PV from €6.5 billion/y (but tightened the rate of the FiT). Once the €6.7 billion/y ceiling is reached, new plants will not be supported. By end 2012, there was less than €400 million left, which is a budget for about 1.5 GW of capacity. [283] The budget was increased by €300

[278] OECD (2008)
[279] At the same time the government approved a second decree on incentives for all other renewables, establishing a system of auctions for plants with a capacity higher than 10 MW for hydro, 20 MW for geothermal and 5 MW for all other sources. For smaller plants, it establishes a system of registers and an all-inclusive feed-in tariff. Source: Platts Power In Europe, July 23, 2012, issue 631, Italy forces PV to parity, pp.6-7
[280] MSE (2013), p.74
[281] As energy prices continue to rise, grid parity is getting closer and closer.
[282] MSE (2013), p.67 and p.17
[283] Platts Power In Europe, October 15, 2012, issue 636, Yingli warns on PV grid parity, p.8

million/y for all other renewable sources from €5.5 billion/y.[284] As a result, about €200 billion will be spent over the next 20 years (between 2013 and 2032) with peak expenditure in 2016 when incentives will exceed €12.5 billion according to electricity association Assoelettrica. The subsidies to solar PV and the green certificates represent the lion's share of the subsidies [Figure 31]. The government expects grid parity for solar PV by 2016 and to close down the subsidies for good after that when there is to be a switch in favour of thermal renewable sources, mostly biomass for heating, with a yearly expenditure of €0.9 billion to be charged to gas consumers in the residential and industrial sectors.[285]

Figure 31: Cost of the renewable energy support schemes, 2009-2032 (€ million)



Source : Assoelettrica, *Rinnovabili : il conto, per ora, e di 200 miliardi nei prossimi 20 anni*, http://www.assoelettrica.it/rinnovabili-il-conto-per-ora-e-di-200-miliardi-nei-prossimi-20-anni-5/

With the important additions of renewable capacity and no signs of improvement of the macroeconomics conditions, the government is reducing its support schemes for renewable and is now looking to subsidise gas-fired generation instead.[286]

The National Energy Strategy (2013)

In 2009, the Law no.99/2009[287] provided the legislative basis for a new policy with the main objectives of diversification of energy and supply sources, increased competition, development of infrastructure, growth of renewable energy, improved energy efficiency, re-launch of the nuclear programme and investments in R&D. Italy's National Energy Strategy: for a more competitive and sustainable energy was submitted for public consultation on October 16, 2012. It was adopted in an

[284] For larger ground-based solar farms of 5 MW and above, the new all-in rate is to be €113/MWh from January 1, 2013, decreasing every six months thereafter – to €106, €99, €95 and €92/MWh. Source: Platts Power In Europe, July 23, 2012, issue 631, Italy forces PV to parity, pp.6-7
[285] Platts Power In Europe, December 10, 2012, Issue 640-641, Italy's energy strategy – a viewpoint, p.7
[286] Gas Matters Monthly, September 2012, Is gas losing out to renewables in Europe?, pp4-8
[287] Law no.99 of July 23, 2009 'Provisions for the development and the internationalisation of enterprises, and in the field of Energy' published in the Official Journal of the Italian Republic n.176 of July 31, 2009 – Ordinary supplement no.136

inter-ministerial Decree signed by the Ministry of Environment and the MSE on March 8, 2013.[288] At the time this paper was being finished (May 2013), it was unclear if the change of government that shortly followed the adoption of the Strategy and the political difficulties that ensued will have an impact on the implementation of -all or part of- the measures and targets detailed in the document.[289] This Strategy is Italy's fourth following those of 1975, 1981 and 1988. [290]

The main timeframe of National Energy Strategy is set to 2020 and the energy policy addresses seven major issues relating to energy efficiency, competition in the gas market and creation of the Southern European hub, development of renewables above EU targets but at limited cost, regional integration of the electricity market, restructure of the refining industry, expansion of indigenous hydrocarbon production and modernisation of the governance system. There is no mention of nuclear, which was removed from the draft after the referendum in 2011. There is also no explicit mention of coal, whose share remains flat both in the TPES and electricity generation.

The MSE is responsible for energy policy but the Ministry for the Environment, Land and Sea is responsible for overall climate policy co-ordination, and legislative powers are divided between the State and the regions, potentially creating conflicting powers. The modernization of the governance system represents a clear intention to bring the energy sector under more central control by reversing the 2001 ruling and amending Article 5 of the Italian constitution in order to transfer to the state the full power to decide on energy matters. [291]

The main targets by 2020 include the alignment of wholesale prices to European levels for all energy sources; cutting around €14 billion/year of energy imports (a 75% decline from the €62 billion bill in 2011); a 21% reduction of greenhouse gas emissions compared with 2005 emissions (Italy's EU target is 'only' -18%); a 24% reduction in primary consumption thanks to energy-efficiency measures (above the EU target of 20%); a 23% share of renewable energy in TPES [Figure 32] and 35-38% in electricity generation (slightly overtaking gas) [Figure 33]. As a consequence of improved energy efficiency, increased production from renewables, lower electricity imports and higher production from national resources, dependency on foreign energy supplies is expected to fall from 84% to 67%.[292] As a consequence, according to the National Energy Strategy, gas demand should drop by 12.5 - 19.8% between 2010 and 2020, or from about 75.2 Bcm in 2010 to 60.3 - 65.8 Bcm in 2020.[293]

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[288] The Decree and additional documents including the text of the National Energy Strategy can be found on the MSE's website:
http://www.sviluppoeconomico.gov.it/index.php?option=com_content&view=article&viewType=1&idarea1=593&idarea2=0&idarea3=0&idarea4=0&andor=AND&sectionid=0&andorcat=AND&partebassaType=0&idareaCalendario1=0&MvediT=1&showMenu=1&showCat=1&showArchiveNewsBotton=0&idmenu=2263&id=2027043

[289] The National Energy Strategy was adopted shortly before the elections of February 24-25, 2013. The results of the elections were inconclusive and left the country in a political deadlock for two months until a three-party coalition was sworn in on April 28, 2013. For more information, see several articles by the Financial Times in its section 'Italy Politics': http://www.ft.com/indepth/italy-politics

[290] Platts Power In Europe, December 10, 2012, Issue 640-641, Italy's energy strategy – a viewpoint, p.7

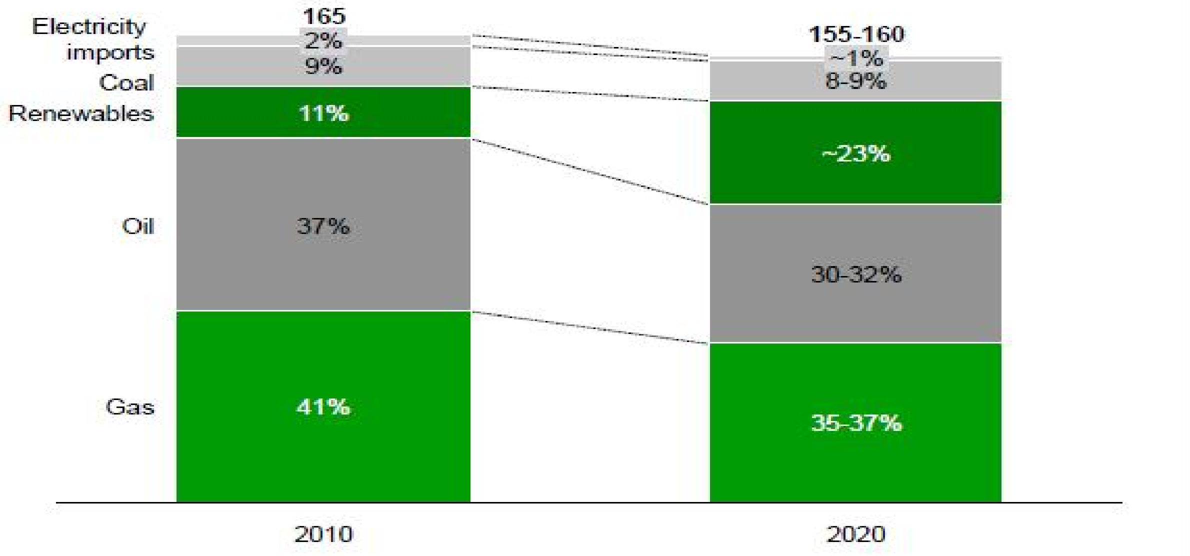
[291] Platts Power In Europe, October 15, 2012, issue 636, State control draft approved, p.15

[292] MSE (2013), p.5

[293] In 2010, gas was 41% of 165 MMtoe, or 67.25 MMtoe (75.2 Bcm, using the conversion factor of 1.111). In 2020, gas represents 35-37% of 155-160 MMtoe, so the minimum would be 54.25 MMtoe (60.3 Bcm) and the maximum 59.20 MMtoe (65.8 Bcm). Source for the conversion factor: BP's website: http://www.bp.com/conversionfactors.jsp

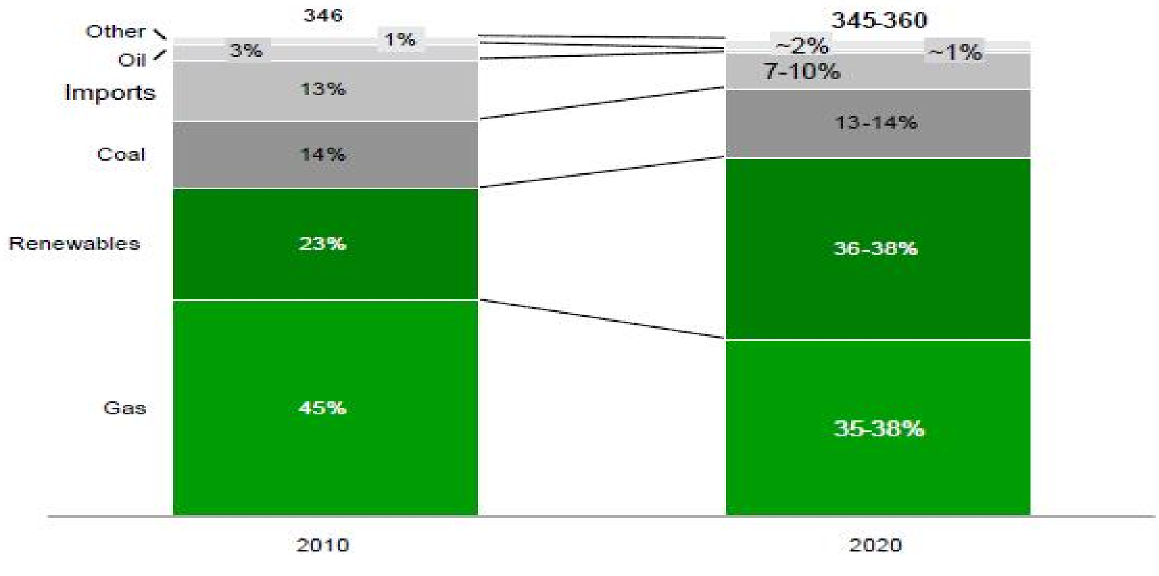
As for the electricity sector, gas is expected to go from producing 155 TWh of electricity in 2010 to generating only 120 – 136.8 TWh in 2020, a drop of 11.7 – 22.6%.

Figure 32: Development of gross primary energy consumption and source mix (MMtoe)



Source: MSE (2013), p.31

Figure 33: Development of gross electricity consumption mix (TWh, %)



Source: MSE (2013), p.32

The assumptions used in the model assumed an economic recovery starting in 2014, with an average annual growth rate of 1.1% up to 2020, crude price at $110-120/bbl, coal price at $100-110/t, gas price at $8-10/MMbtu and more interestingly a CO_2 price in the EU ETS at €20-25/t (it was €4-5/t at the beginning of 2013).[294] If any of the assumptions is not met, there probably would need to be a substantial reduction in the TPES and electricity intensity in order to meet the targets, which can only be achieved by a sharp economic downturn or a de-industrialization of the economy. Additional

[294] MSE (2013), p.30

information may only be available in late 2013 when the impact of elections may be clearer. As for the longer term (2030-2050), additional efficiency measures and renewable energy can be expected as Italy subscribes to the spirit of the European Roadmap 2050 for a low-carbon economy and reduction of emissions by up to 80%.

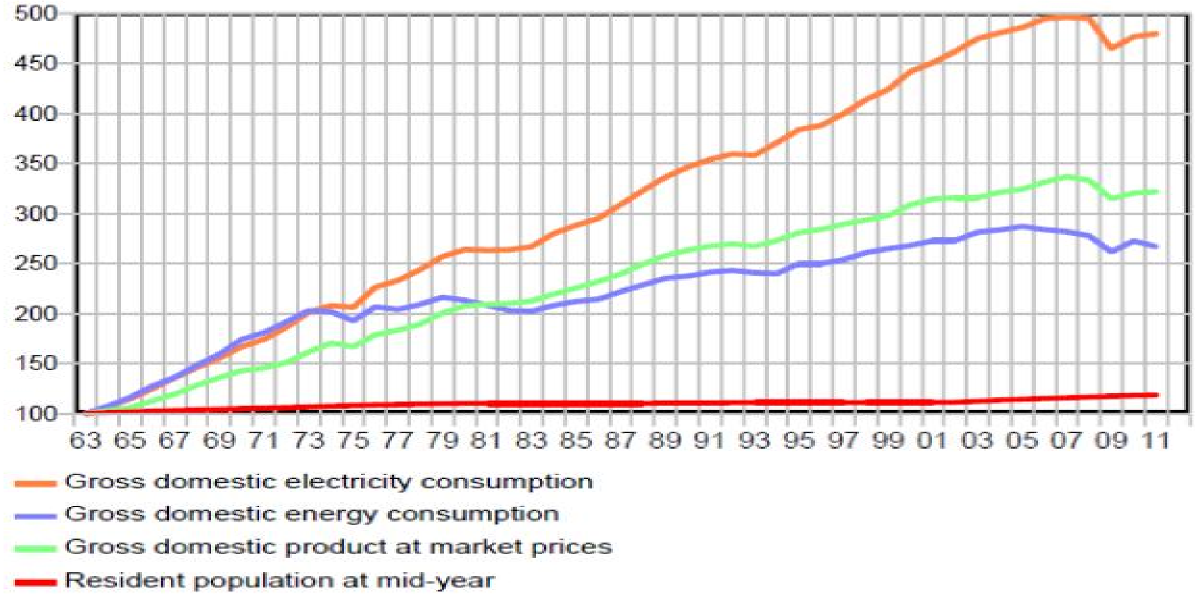
One of the main cornerstones of the Strategy is the power generation sector, but as in other European countries, uncertainties in this sector are growing.

3.2. CHALLENGES IN THE POWER GENERATION SECTOR

Rapid changes in the installed capacity

Italy is the fourth largest electricity consumer in Europe, behind Germany, France and the UK.[295] Electricity consumption has increased five-fold since the 1960s, with a rapid growth up until the mid 2000s following the economic development of the country [Figure 34]. The industry sector has been the main consumer with a share of 63% of the total demand in the early 1970s. In 2010, industry consumed 43%, followed by commerce and public services at 29%, residential at 23%, and other sectors accounted for 6%.[296]

Figure 34: Gross domestic electricity consumption, 1963-2011 (index base 1963=100)



Source: Terna, Statistical data 2011, general statistics,
http://www.terna.it/default/home_en/electric_system/statistical_data.aspx

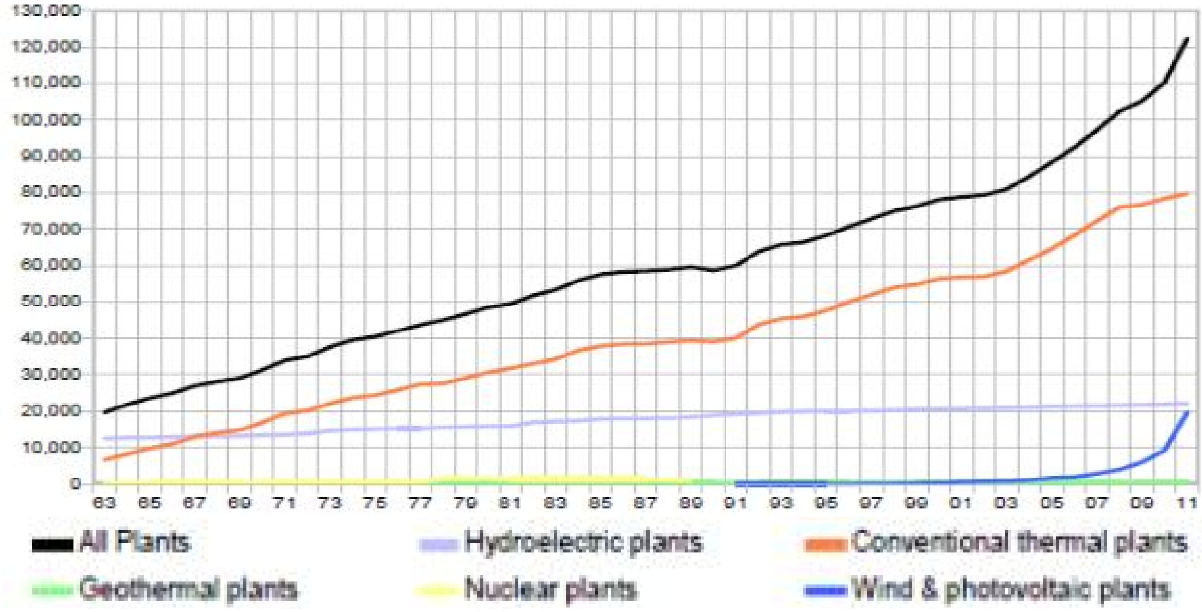
Since the mid 2000s, the growth of electricity consumption has slowed down mainly as a consequence of lower GDP growth in Italy. Demand in 2007 reached its highest point at 340 TWh,

[295] IEA (2012c), p.III.4
[296] IEA (2012c), p.IV.419

but then declined following the economic crisis. In 2009, it slumped by 5.7% to 320 TWh. By 2012, electricity demand was back at the 2004 level at 325 TWh.[297]

The rapid growth of electricity demand since the 1960s was largely met with fossil fuel-powered plants [Figure 35]. However, following the 1970s oil crisis, Enel started to consider other options such as nuclear and also imports from France. The rejection of nuclear in 1987 and environmental policies made natural gas the primary fuel for power generation investments in the 1990s and, to a lesser extent, the 2000s.

Figure 35: Gross maximum generation capacity (MW)



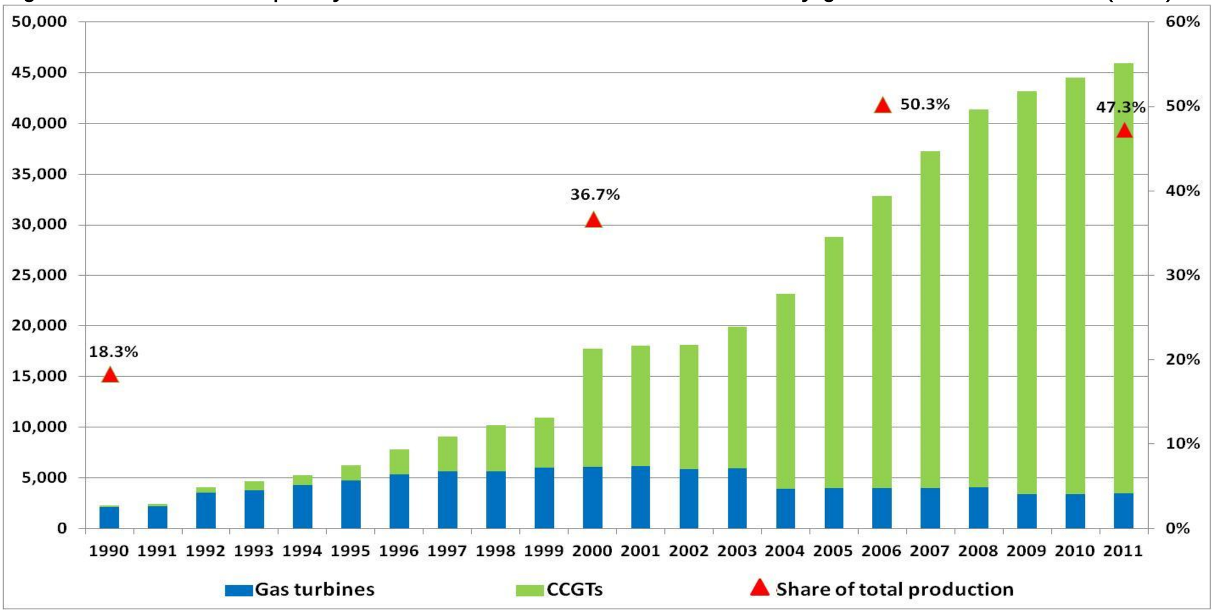
Source: Terna, Statistical data 2011, power plants, http://www.terna.it/default/home_en/electric_system/statistical_data.aspx

As in other European countries, the liberalisation process led to investments in new CCGTs, the cheapest and least risky option for profit-driven private companies in a competitive context. The dependency on fuel oil of the 1980s gave way to a new dependency on gas.[298] The dash for gas in Italy happened in the 1990s and the 2000s. Law 55/02 in 2002 aimed at accelerating the long authorisation procedure to build new power plants (over 300 MW), by which projects were meant to get full permits in less than six months, and resulted in significant changes in the power sector. Although the six months were not always respected, about 30 GW of new gas-fired capacity (essentially CCGTs, both repowered existing plants and greenfields) were commissioned between 2003 and 2012 [Figure 36].

[297] Terna (2013)

[298] See the website of the Ministry of Foreign Affairs: http://www.esteri.it/MAE/EN/Politica_Estera/Temi_Globali/Energia/Interventi_Importanti.htm

Figure 36: Gas-fired capacity additions and share of total electricity generation, 1990-2011 (MW)

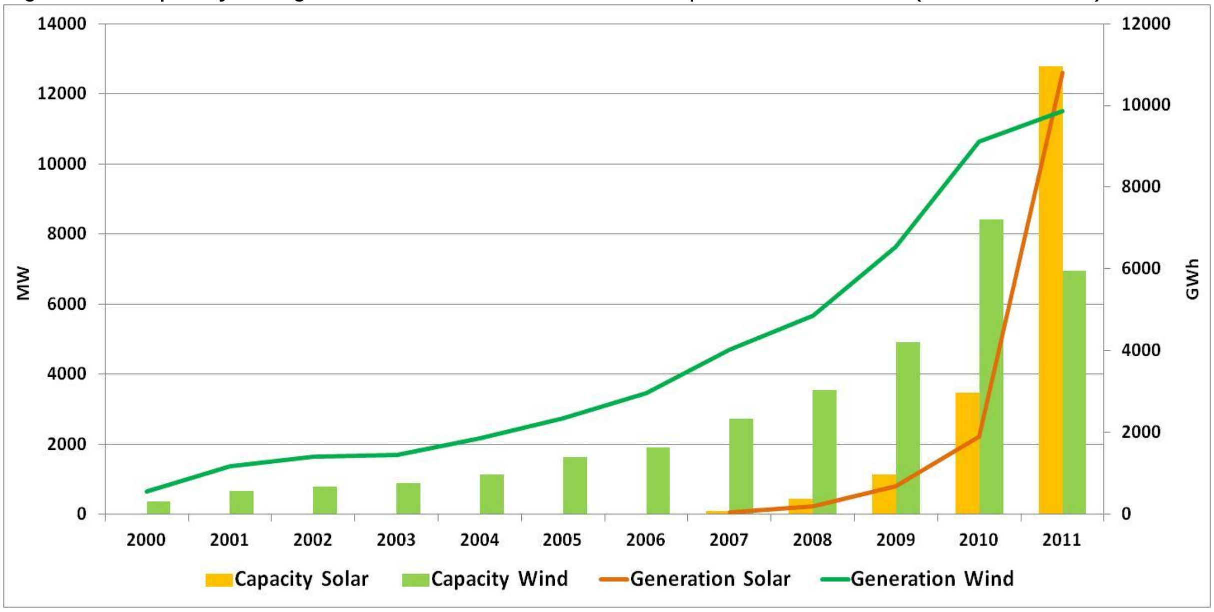


Source: Eurostat data (capacity) and IEA, *Electricity information*, various issues, Italy, table 3 (share of total production)

Italy has then tried to diversify its energy portfolio to reduce the heavy dependence on imports of fossil fuels, especially natural gas in power generation, and also to reduce emission levels. Energy from renewable sources has increased significantly since 1990, thanks to high buy-backs tariffs for electricity, as renewable energy was seen as one of the best ways of reducing CO_2 emissions.[299] The complex local authorisation procedures for plant construction and grid reinforcement have delayed the development of renewable in the 2000s,[300] but nonetheless, there has been an impressive rise in renewable generation capacity. The main renewable source in the country is hydro power (91% of the installed renewable capacity in 2000[301]), but wind and PV capacity have grown a lot [Figure 37]. According to wind energy association ANEV, Italy's installed wind generation capacity reached 8,144 MW at the end of 2012 (only onshore, no offshore capacity) after additions of 1,272 MW during the year, placing the country in fourth place in Europe for installed wind capacity.[302] The installed capacity represents roughly half of the country's wind energy potential (16,500 MW). The Italian government aims for 12,500 MW installed wind capacity by 2020 and hopes offshore wind capacity could reach 2,000 MW by 2020.[303] The solar PV industry has also responded rapidly to government incentives. The installed solar PV capacity tripled in 2010 compared to the previous year, and almost quadrupled in 2011 (+9.3 GW). The additions slowed down in 2012. Solar PV reached 16.2 GW of installed capacity at end-2012. [304] Italy is well on course for its 23 GW target deadline in 2016.[305]

[299] IEA (1999), p.92
[300] IEA (2009), p.61
[301] Platts Power In Europe, May 14, 2012, issue 623, PV at 13,161 MW in May, pp.18-19
[302] Platts Power In Europe, February 4, 2013, issue 644, Italian renewables round-up, pp.18-19
[303]Platts Power In Europe, November 26, 2012, issue 639, Italian wind at 7.3 GW, p.16 and Wind power monthly, September 26, 2012, Tough FIT tender heralds fall in new capacity, http://www.windpowermonthly.com/news/indepth/1151616/Tough-FIT-tender-heralds-fall-new-capacity/
[304] Platts Power In Europe, February 18, 2013, issue 645, PV adds dip in 2012 – to 16.6 GW, p.13
[305] Platts Power In Europe, July 23, 2012, issue 631, Italy forces PV to parity, pp.6-7

Figure 37: Capacity and generation of wind and solar PV plants, 2000-2011 (MW and GWh)



Source: GSE (2012), pp.19-20 and 25-26

On December 31, 2011, the maximum net installed generating capacity of all kinds was equal to 118.4 GW,[306] of which 64% were thermal plants, 18% hydro and 17% solar and wind and 1% geothermal capacity. Of the 76 GW of thermal plants, CCGTs represented 56% and gas turbines 4% (both for power and power & heat production). The rest were steam plants (29%), repowered plants (7%) and internal combustion (4%). While the total capacity reached 118 GW, the net available capacity (for at least 50% of the time) was only 95 GW, creating some particular challenges for the generation mix.[307]

Fluctuations of the generation mix

In 2011, the Italian generation mix was very different from the European mix.[308] Gas was the predominant primary source for electricity production in Italy, accounting for 48% of total power production, followed by 27% from renewables (including hydro at 18%), only 15% from coal and 2.6% from old oil plants and 7.4% others. The national generation mix can also fluctuate largely from year to another due to the large share of hydro.

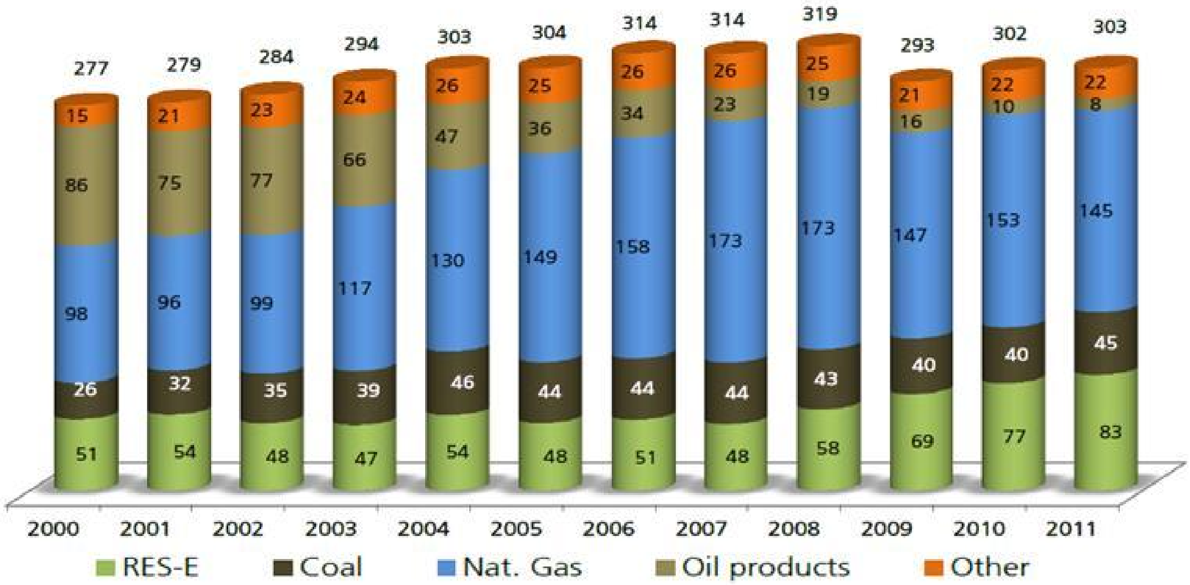
The generation mix has changed significantly in the last 10 years. The increase of natural gas happened at the expense of oil generation, which fell by 90% between 2000 and 2011 [Figure 38]. Similarly, the development of renewables together with the impact of the economic crisis on electricity demand seems to be eroding primarily the share of gas, especially since 2009. Electricity from coal, while limited, remained steady, and even increased in 2011.

[306] The net generating capacity is measured at the plant's busbars. The maximum gross generation capacity, i.e. including the power absorbed by the plant auxiliary services and the losses in the transformers, was 122.3 TWh. Source: Terna, statistical data for 2011, power plants section, p.23, www.terna.it

[307] AEEG (2012c), p.7

[308] See Appendix 6

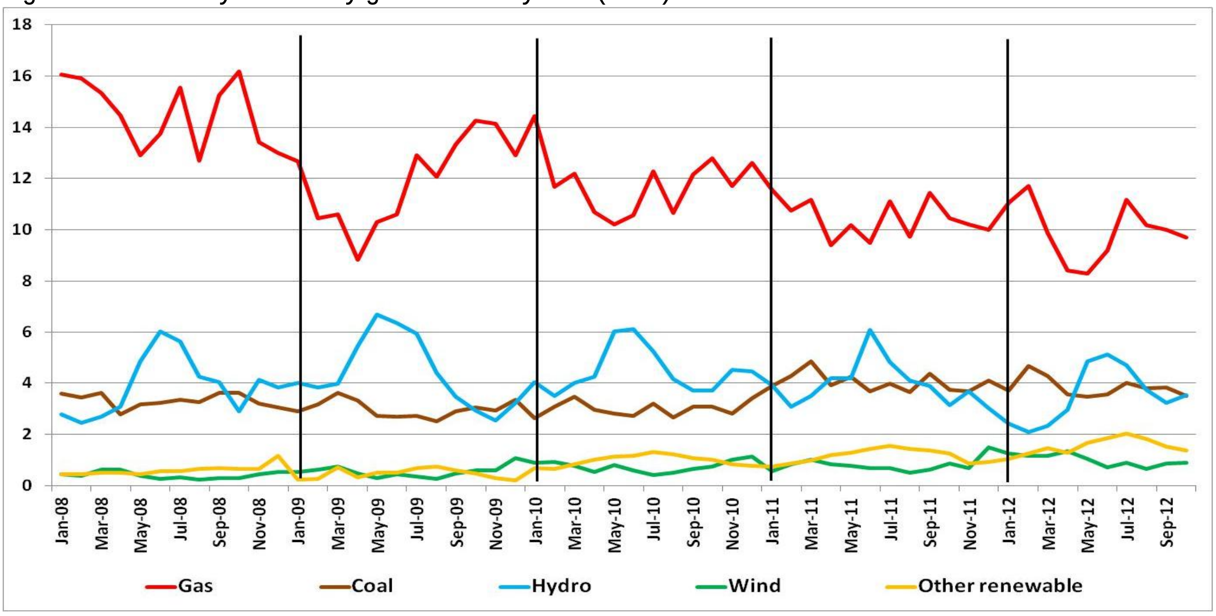
Figure 38: Gross electricity generation per fuel, 2000-2011 (TWh)



Source: GSE (2012), p.12

As seen in Figure 39, there has been a downward trend in electricity produced from gas since 2008 because of limited electricity demand growth, hydro availability and growing renewable (especially wind and solar) generation.[309] In 2012, Italy was already on track to meet its European target of sourcing 26% of total electricity output from renewable sources by 2020. As important (maybe even more?), gas has lost a higher market share while coal has gained market share, especially in 2011-2012.

Figure 39: Monthly electricity generation by fuel (TWh)

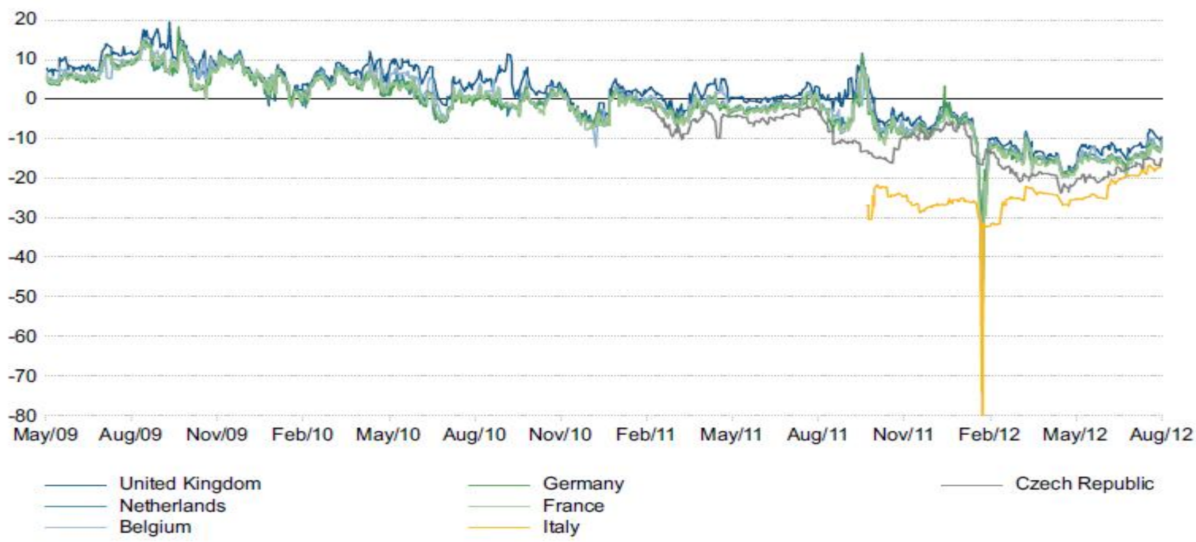


Source: Author's calculations from ENTSOE's and Terna's data.

[309] Electricity generated from Solar PV increased by 463% in 2011.

As in the rest of Europe, gas prices have been high relative to cheap coal prices (and low CO_2 prices) since 2011, and losing the competition with coal for baseload generation has put further pressure on the use of gas for power generation Italy. Despite wholesale power prices among Europe's highest,[310] margins have shrunk for gas-fired plants, and clean spark spread (gas plant profit margin[311]) compared to clean dark spread (coal plant profit margin) have come under pressure in 2011-2012 like in the rest of Europe [Figure 40]. The average spark spread dropped below zero to €-0.9/MWh in the first half of 2012, a much different situation from the same period in 2011 when the spark spread was about €9.90/MWh.[312] As a result, companies with a diversified portfolio have preferred coal to gas plants in order to minimize spark spread losses and maximize dark spread gains. For instance, Enel declared that in the first nine months of 2012, nearly half of its electricity generation in Italy came from its coal-fired plants, producing over three times as much electricity as its CCGTs while the company's CCGTs and coal installed capacities are fairly similar (6,746 MW coal and 5,916 MW CCGTs).[313] The company also indicated that its clean spark spread at end-September 2012 was about €3-4/MWh (still a better figure than in most Western European countries), and that it expected a spark spread close to zero 'in the near future'. With decline of PSV prices and its persistent convergence to other European hubs, clean spark spread in Italy may look slightly better than anticipated when spot gas prices start to be gradually reflected in power prices, but probably not enough to compete with clean dark spreads without lower gas prices and/or higher coal prices and/or much higher CO_2 prices.[314]

Figure 40: Ratio between clean spark spreads and clean dark spreads in selected EU countries, 2009-2012 and Italy, 2011-2012 (€/MWh)



Source: ACER/CEER (2012), p.135[315]

[310] See Appendix 7

[311] Spark spreads measure the financial margin between the price of electricity and the cost of buying gas to generate the power. Clean spark spreads also take into account the cost of carbon. It is a measure of profit margins for gas-fired plants.

[312] Platts Power In Europe, September 3, 2012, issue 633, Perfect storm settles over Europe, pp.7-9

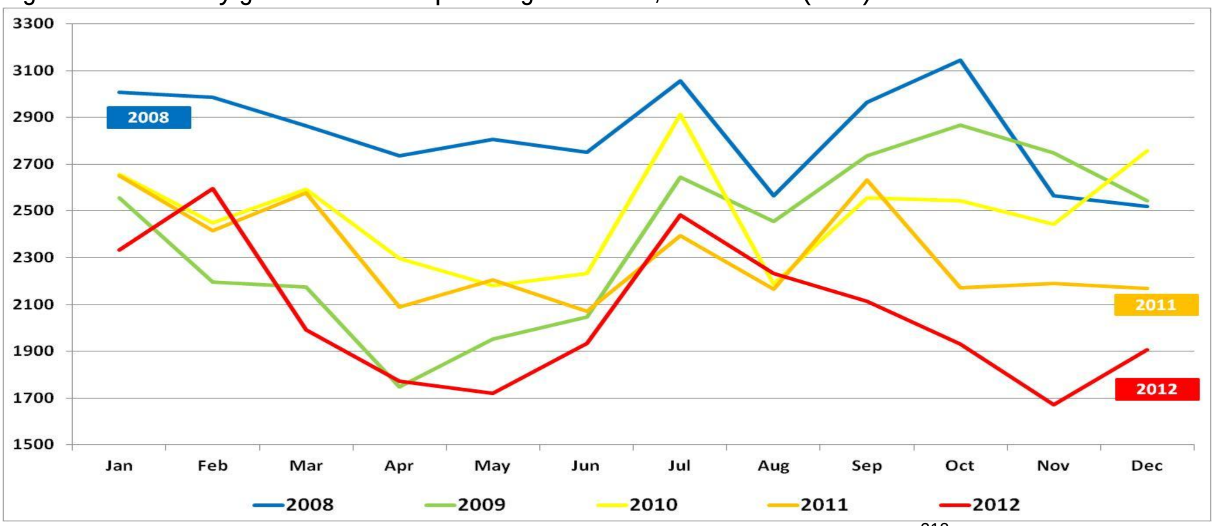
[313] Platts Power In Europe, November 26, 2012, issue 639, Enel leans on coal, p.4-5

[314] The growth in renewables capacity on the grid has contributed to the fall in carbon prices, further eroding gas's competitiveness against coal.

[315] *Note: 'In the calculation of gas/coal spreads, the following assumptions were made regarding the efficiency and operation and maintenance costs of the respective representative plant: thermal efficiency (gas) = 49%;*

However, the possibilities to switch from gas to coal plants in order to benefit from higher dark spreads are lower than in most European countries due to limited coal-fired capacity, and coal plants are already running at full capacity. In reality, only Enel can really benefit from fuel switching because the company generates about three quarters of the coal-fired production in Italy. Other generators have a higher concentration of gas plants in their portfolio. As a result, the switch to coal has been relatively limited compared to other European markets, but it has come in addition to limited electricity demand growth and additional renewable capacity on the grid, which has pushed gas plants further down the merit order (subsidised wind and solar have almost no operating costs and are in a position to offer low-cost electricity to power purchasers when they dispatch). In addition, electricity from renewables is granted both priority access and priority dispatching, and non-programmable (variable) renewables such as wind and solar even have priority over other renewable energy (except for security reasons, when curtailment is needed).[316] Consequently, the load factors of gas-fired capacity have gone down from 62% in 2000, 58.6% in 2005 to 47% in 2008 just before the economic slowdown and even to only 36.8% in 2011 due to the additional factor of intense competition from coal plants and the exponential rise (+468%) in solar capacity.[317] This downward rate is also partially explained by the rapid increase in gas-fired capacity in Italy, but not only, as gas consumption in the power generation sector has also gone down as shown in Figure 41.

Figure 41: Monthly gas demand for power generation, 2008-2012 (Bcm)



Source: Snam, Gas Transportation - Definitive monthly reports, several issues[318]

Additional renewable, cheap coal, low CO_2 prices and high oil-indexed gas prices have hit gas-fired power sector hard, with a lot of under-used capacity in the relatively new and efficient fleet of CCGT power stations. So what can be expected for the future of gas for power in Italy?

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thermal efficiency (coal) = 36%; O&M cost (gas) = 0.40 GB pence/therm; O&M cost (coal) = 2 $/t; Transportation cost (gas) = 2 GB pence/therm; Transportation cost (coal) = 10 $/t. CO_2 prices are considered. The outlier for 6 Feb 2012 in Italy is probably due to the February 5-10, 2012 cold spell, prompting an over-reaction in the Italian market when Russian gas for power stations was curtailed/diverted to domestic usage and the government ordered previously mothballed heavy fuel-oil power plants to step in for a few days.'
Source: ACER/CEER (2012), p.135

316 Zane, Bruchmann and Bauknecht (2012), p.134

317 Author's calculations from GSE data for generation and Eurostat for capacity.

318 Unit of measurement: MMcm gross calorific value = 38.1 mega joules

The future of gas-fired power plants

In other European markets where gas plants are also suffering, there is some hope brought by the nuclear phase-out and the closing of coal plants due to EU environmental policy, namely the Large Combustion Plant Directive (LCPD) and later the Industrial Emissions Directive (IED).[319] Part of this baseload capacity is expected to be replaced by gas, which should provide some relief for power generators with a large fleet of gas-fired capacity. However, Italy does not have any nuclear plant to shut down and the impacts of the LCPD should be limited. The 2 GW[320] of coal (and oil) plants that have opted out of the LCPD should be easily covered by existing and potential additional future renewable capacity with most probably a relatively small near-term impact, if any, on gas generation. Just as a matter of comparison, if the 2 GW of coal (and oil) capacity were replaced only by gas plants and providing these plants were running on baseload (70%) –which they all most probably did not, especially the oil plant, it would mean roughly 2 Bcm/y more gas if produced by CCGTs (58% efficiency).[321] The only good news for coal-gas competition is that delays in the development of new coal capacity are expected to continue, whether for the conversion of oil-fired to coal-fired electricity plants or the construction of new coal plants, due to strong regional opposition and the nearly impossible process for obtaining authorisations.[322] Until the arrival of commercial carbon capture and storage (CCS) technology, there will be only (very) limited additions to the coal fleet and as a result, limited gas/coal competition. At the time of writing, Italy had not transposed IED into national law. As a result, generators were delaying decisions about whether they would comply or opt out their plants.[323]

Italy's 20-20-20 climate change targets amount to 17% of all energy from renewables and 26% of electricity from renewables, corresponding to 100 TWh/y by 2020.[324] The more renewables, the less the annual average load factor of thermal generation, especially if electricity demand growth does not pick up again. Gas plants will continue to provide some baseload generation, but they should also more and more expect to be used to back up the intermittency of renewable energy. The rapid rise in capacity in solar and wind adds uncertainty to the electricity supply. The future is going to be very different with more inflexible and unpredictable supply (i.e. when the wind blows and when the sun shines). As shown in Figure 42, apart from geothermal and even biomass, the utilisation rates of renewable energies are not great. Solar has the largest challenge with less than 1,500 hours/y (17%),

[319] The Large Combustion Plant Directive (LCPD) is a European Union Directive that aims to reduce acidification, ground level ozone and particulates by controlling the emissions of sulphur dioxide, oxides of nitrogen and dust from large combustion plant. All combustion plant built after 1987 with a thermal output of 50 MW or more must comply with the emission limits in LCPD. Those power stations in operation before 1987 are defined as 'existing plant' and can either comply with the LCPD through installing emission abatement (Flue Gas Desulphurisation) equipment or 'opt-out' of the directive. An existing plant that chooses to 'opt-out' has been restricted in its operation since 2007 and must close by the end of 2015. For more information, see the European Commission's website:
http://ec.europa.eu/environment/air/pollutants/stationary/lcp/legislation.htm

[320] Author's calculations

[321] For additional conversion factors, see Honore (2010), p.278

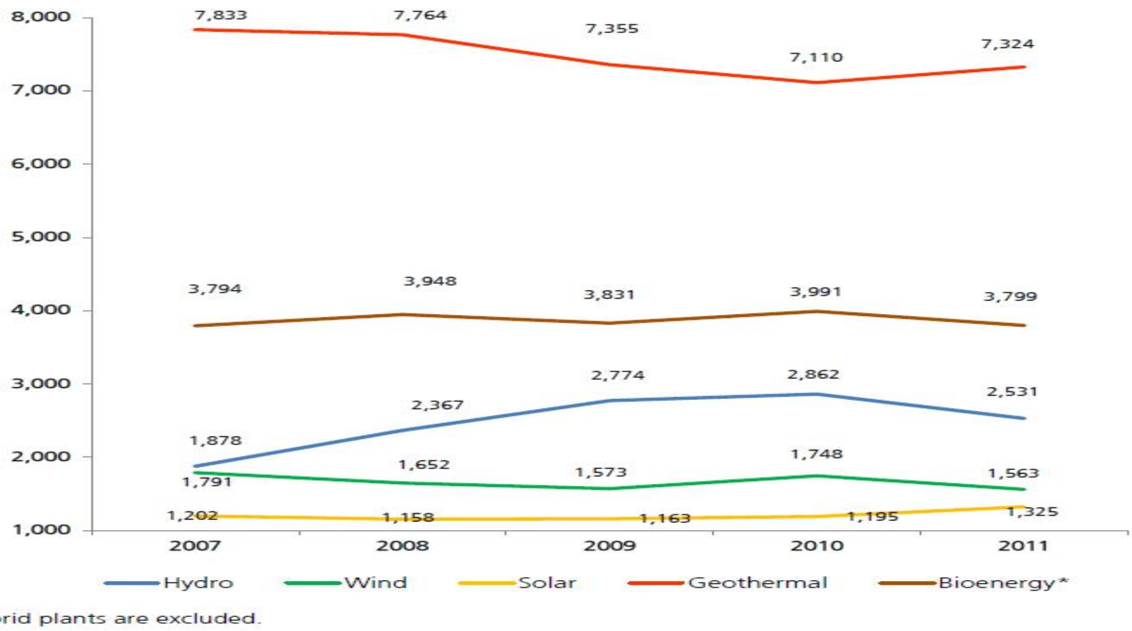
[322] IEA (2009), p.25 and Honore (2010)

[323] The IED is the successor tothe LCPD and imposes additional restrictions on emissions, especially on nitrogen oxide (NOx). For more information, see the European Commission's website:
http://ec.europa.eu/environment/air/pollutants/stationary/ied/legislation.htm

[324] GSE (2012), p.13

followed by wind with less than 2,000 hours/y (22.8%). Indeed, according to Terna, in 2012, out of a total generation of 284.8 TWh, solar PV produced only 18.3 TWh (6.4%) and wind 13.1 TWh (4.6%).[325]

Figure 42: Annual utilisation per renewable energy, 2007-2011 (hours)



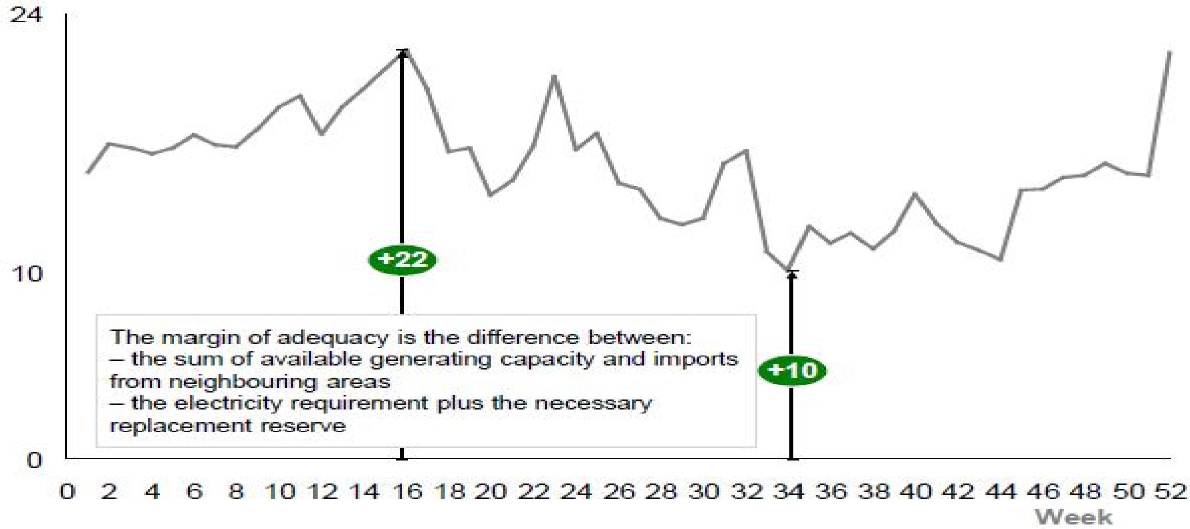
Source: GSE (2012), p.10

Reduced operating hours and an increasing number of plant start-ups and shut-downs in order to balance renewable energy supply is something new for the Italian gas-fired power fleet. Power generators with gas-fired capacity will need to adapt to the new role of gas in power generation - more peaking, more starts and at times shut-downs. For instance, Enel has already started to upgrade its CCGTs. The plants are expected to become more flexible and as a result, more competitive. The company has reduced the minimum generation of CCGTs by 20% and decreased the ramp up time of CCGTs by 50% thanks to new low NOx burners with improved flame stability.[326] One of Enel's objectives is to take full advantage of future European market integration and export its flexibility to neighbouring markets as a way to diversify its commercial opportunities. Indeed, the flexible power generation potential of the Italian CCGTs could become an attractive asset to some of its neighbours, especially ones trying to integrate a large amount of intermittent generation in their energy mix. For instance, the German TSO TransnetBW contacted Terna in November 2012 on potential Italian reserve capacity in order to improve grid stability in its southern Lander.[327] Further integration of its electricity grid with the rest of Europe and adaptation of certain rules will make such exports a reality in the near future and offer a future for the use of gas in the power generation sector.[328]

325 Platts Power In Europe, January 21, 2013, issue 643, New plant stuck in recessionary rut, pp.7-10
326 Hawkins (2013), slide 12 and Gas to Power journal, October 19, 2012, Enel takes action to boost competitiveness of CCGT fleet, http://www.gastopowerjournal.com/technologyainnovation/item/1014-enel-takes-action-to-boost-competitiveness-of-ccgt-fleet
327 Platts Power In Europe, December 10, 2012, Issue 640-641, Italy's energy strategy – a viewpoint, p.7
328 Italy has 22 interconnection lines – four with France, 12 with Switzerland, one with Austria, two with Slovenia, two DC connections, one cable with Greece, one cable connecting Sardinia to the mainland through

Italy is the third biggest European wind energy producer. In order to maintain the security of the power system, Terna may need to curtail generation in wind power plants on some occasions.[329] In 2010, Italy had the one of the highest level of wind curtailments due to significant network congestion in some areas (especially in the centre and south), but curtailed wind energy declined in 2011 thanks to network expansions made in the most critical areas.[330] The improvement of the national grid will help to integrate renewable energy into the system, but there will still be a need to back up the power generation from the increasing amount of intermittent renewable capacity. The generation system also needs some back up in the form of reserve capacity, such as gas plants (and eventually oil-fired plants).[331] Because of the rapid growth of CCGTs and depressed annual electricity consumption trends, Italy finds itself in a situation of over-capacity, with no margins of adequacy problems (at least for mainland Italy) [Figure 43], but persistent overcapacity could force a restructuring/downsizing of the gas-fired power plant fleet.

Figure 43: Weekly minimum operating margins on the mainland, estimate for 2012 (GW)



Source: MSE (2013), p.79 from Terna data

Italy has a relatively young fleet of gas-fired plants, and most of its gas capacity will not have to be shut down due to old age, but most likely for commercial reasons if the situation of gas for power does not improve - keeping plants online to generate only peak load and flexible load is not as

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Corsica (SACOI) and one additional AC cable between Sardinia and Corsica. Interconnection developments include a line to Montenegro; a new Italy-France link; and the Sorgente-Rizziconi link to Sicily. Source: Scarpa (2012). An adaptation of the power spot market will be needed in order to be able to send electricity to the TSOs who need it (intra-day, balancing).

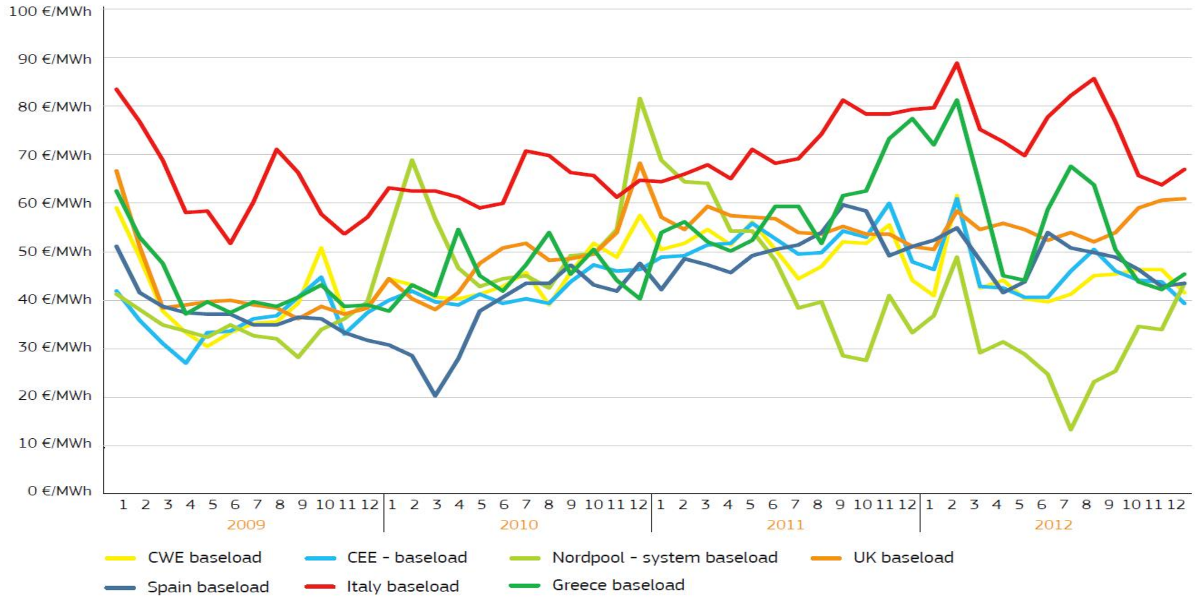
[329] The dispatching procedures for non-schedulable renewable-energy generating units are defined in AEEG's Decision ARG/elt 5/10, see AEEG's website: http://www.autorita.energia.it/it/inglese/enlex/10.htm

[330] ACER/CEER (2012), p.89

[331] The Italian TSO Terna is looking for energy storage solutions to support renewable integration and has announced plans to develop 130 megawatts of batteries to store electricity by 2014. Source: Reuters, July 15, 2011, Italy power grid to develop 130 MW storage systems, http://www.reuters.com/article/2011/07/15/terna-power-idAFLDE76E1AZ20110715
The private sector is also looking for additional solutions to manage renewable intermittency and fluctuations, such as the pilot project to develop a high power Li-ion battery Source: Bloomberg, April 4, 2013. Saft to deliver high power Li-ion energy storage system to SAET to support renewable integration in Enel's Italian, http://www.bloomberg.com/article/2013-04-04/arsi2xd3t6lY.html

attractive an investment prospect as baseload or mid merit production. Profit margins for gas-fired power plants are expected to remain poor in the 2010s due to poor macroeconomics conditions. With low electricity demand, high renewable capacity and cheap coal, the 40+ GW of installed CCGT capacity face intense competition, bringing profit margins down. Also, due to an oversupply of gas in the Italian market, gas plants with oil-linked supply contracts have not been profitable and this led to contract renegotiations by a number of Italian companies in 2011-2012 (see section 2.1). The lower price for gas has resulted in a downward pressure on wholesale electricity prices by the end of 2012 [Figure 44], which in turn has lowered clean spark spreads despite the fall in the gas supply cost.[332]

Figure 44: Comparisons of monthly electricity baseload prices in regional electricity markets (€/MWh)



Source: European Commission, Quarterly report on European Electricity Markets, Volume 5, Issues 3 & 4, Third and Fourth Quarters 2012, p.10

While the market signal is for retirements, standby plants may still be needed at times. As a result, gas-fired plants may need to be supported in order to stay online, especially in the South where the grid is weak. The National Energy Strategy recognises that in the 'medium-long term, a (new[333]) well-

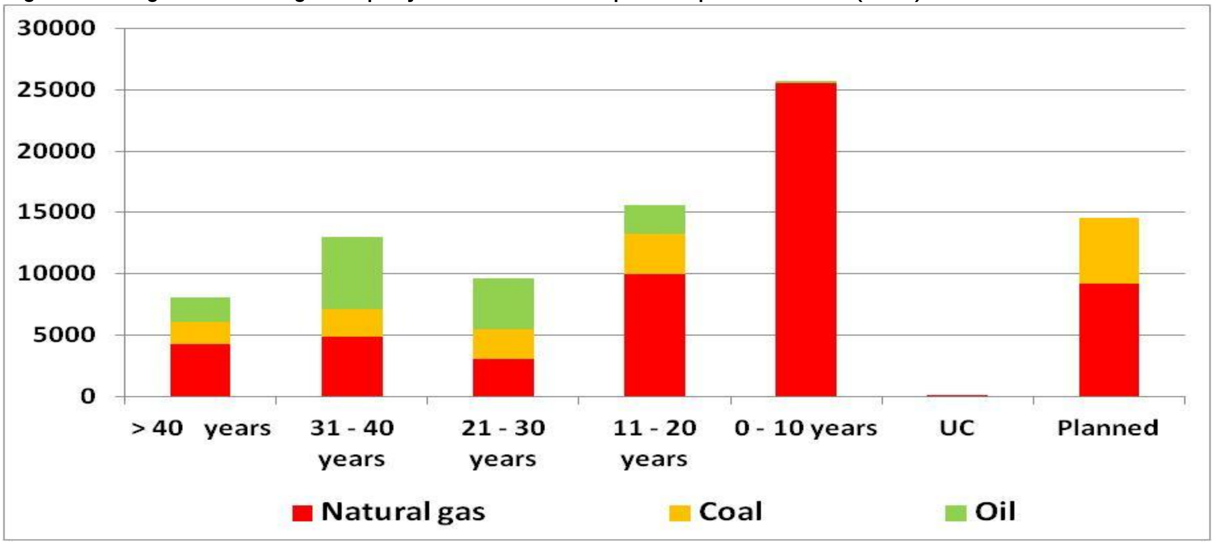
[332] In the fourth quarter of 2012, the average baseload power price was down by 16% compared to the same period in 2011. In addition to lower gas prices, power generation costs also fell due to the lower share of gas-fired generation (53% in 201 1 vs 45% in 2012), while the share of renewable energy increased from 22% to 29% in the same period, Source: European Commission, Quarterly report on European Electricity Markets, Volume 5, Issues 3 & 4, Third and Fourth Quarters 2012, p.16, http://ec.europa.eu/energy/observatory/electricity/electricity_en.htm
The end of the green certificates is also expected to bring another discount on electricity prices by 2015. Source: ICIS Heren, December 28, 2012, Italian spark spreads face swathe of bearish drivers, http://www.icis.com/heren/articles/2012/12/28/9627326/power/edem/italian-spark-spreads-face-swathe-of-bearish-drivers.html

[333]Italy already has minor payments through an existing capacity payment system introduced in 2004, which compensates producers according to the tightness of supply for each hour of the day. The country carried out a public consultation in 2010 on the introduction of a capacity market. The choice was based on reliability options and the result was published in July 2011. Source: ICIS Heren, September 26, 2011, Italian electricity

calibrated and stable capacity payment mechanism should be introduced, in the absence of adequate price signals on the energy market, to guarantee the necessary reserve ('generation') margins.' [334] Under the scheme drafted by AEEG, capacity payments in the form of an annual sum of money will be made to producers for every megawatt of back-up capacity they guarantee to generate. The incentive tariff would be paid by transmission system operator Terna. In mid 2012, the Italian Senate approved capacity payments to remunerate eligible gas-fired power plants based on their availability and flexibility as back-up capacity for the intermittency of renewable energy generation. The auctions will start in 2013 and the first payments are expected to be implemented by 2017 for both existing and new capacity.[335]

By early 2013, as seen in Figure 45, there was understandably very little new gas capacity under construction and the plants with full authorisation were not starting construction, as it was difficult to plan conventional capacity when the load factors are uncertain and price forecasts for 2020 range from €30-80/MWh.[336] In addition, the fast development of solar and wind capacity has started to distort electricity prices. High solar generation in the summer has narrowed the baseload-peakload ratio. The midday opportunities for gas peaking plants have been eroded by solar PV and its flattening effect on midday prices, depriving the gas fleet of a key source of income. Like in Germany, peak prices at noon have even started to be lower than baseload prices.[337] Capacity payments will help gas-fired capacity to stay on line or maybe new ones being built, but it will only impact the capacity, not the generation. In other words, this may not necessarily result in a simultaneous growth of gas consumption.

Figure 45: Age of existing and projected fossil fuel power plants, 2013 (MW)



Source: Chalmers University (data for 2011), courtesy of Jan Karjstad and author's research for under construction and planned projects

industry calls for interim capacity payment, http://www.icis.com/heren/articles/2011/09/26/9495176/italian-electricity-industry-calls-for-interim-capacity.html

[334] MSE (2013), p.102

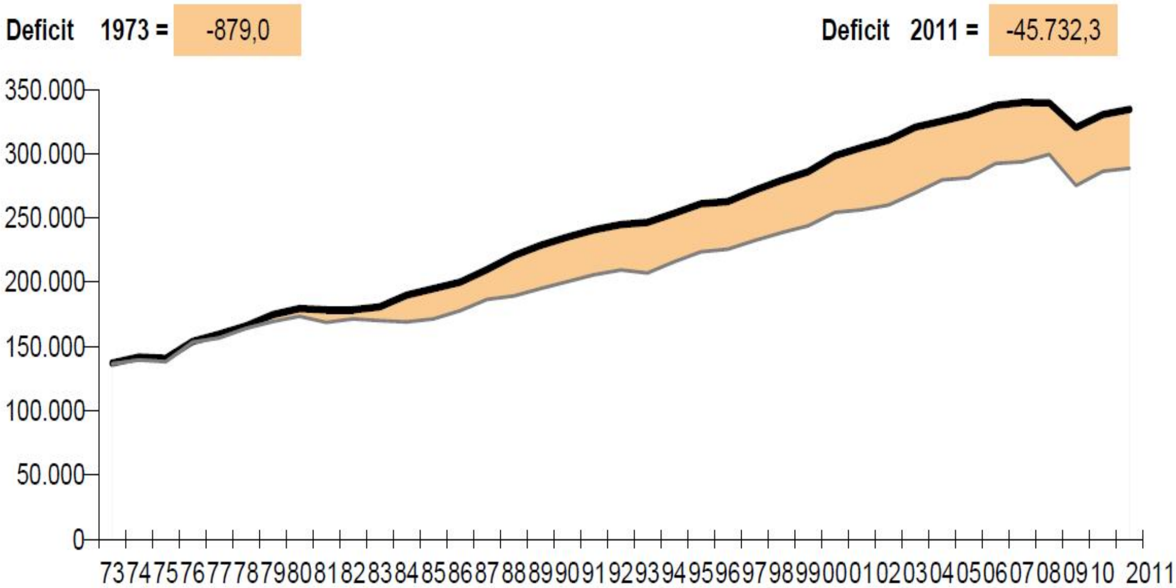
[335] ICIS Heren, September 26, 2011, Italian electricity industry calls for interim capacity payment, http://www.icis.com/heren/articles/2011/09/26/9495176/italian-electricity-industry-calls-for-interim-capacity.html

[336] Platts Power In Europe, May 14, 2012, issue 623, European power's 'lost decade', pp.4-8

[337] Platts Power In Europe, May 14, 2012, issue 6, European power's 'lost decade', pp.4-8

We've seen that gas for power generation is being hit by competition from renewables and coal. There is a third element, which concerns the very significant imports of electricity to Italy and creates an additional competition to indigenous electricity generation from gas. In 2011, the gross production of electricity was equal to roughly 300.3 TWh.[338] Despite the rapid growth in the power plant fleet in the 1990s and 2000s, imports are still important to balance the system, and the gap between domestic demand and supply has not narrowed following the CCGT and renewable construction booms [Figure 46]. In 2011, national production covered 86.3% of total demand and imports from Switzerland (25 TWh), France (14 TWh), Slovenia (4.7 TWh), Greece and Austria covered the rest. Net imports amounted to 45 TWh, the highest level of electricity imports in the world.[339] Utilities find it cheaper to buy from neighbouring markets rather than run gas-fired power stations. Lower gas prices would certainly improve the competitiveness of indigenous electricity generation. To give an example, if the 45 TWh of imports were covered by the gas-fired plants only, it would mean about 8 Bcm/y of additional gas demand.[340]

Figure 46: Gap between electricity production and electricity need, 1974-2011 (GWh)



Source: Terna, Statistics for 2011, General data, p.10, www.terna.it

Lower gas prices could also benefit electricity demand as gas sets the marginal price for the majority of the year (60.4% of the year in 2012).[341] Italian forward power prices were already seeing the impacts of falling spot prices and the convergence of Italian gas prices on PSV with western European hubs gas price levels in the last few months of 2012.

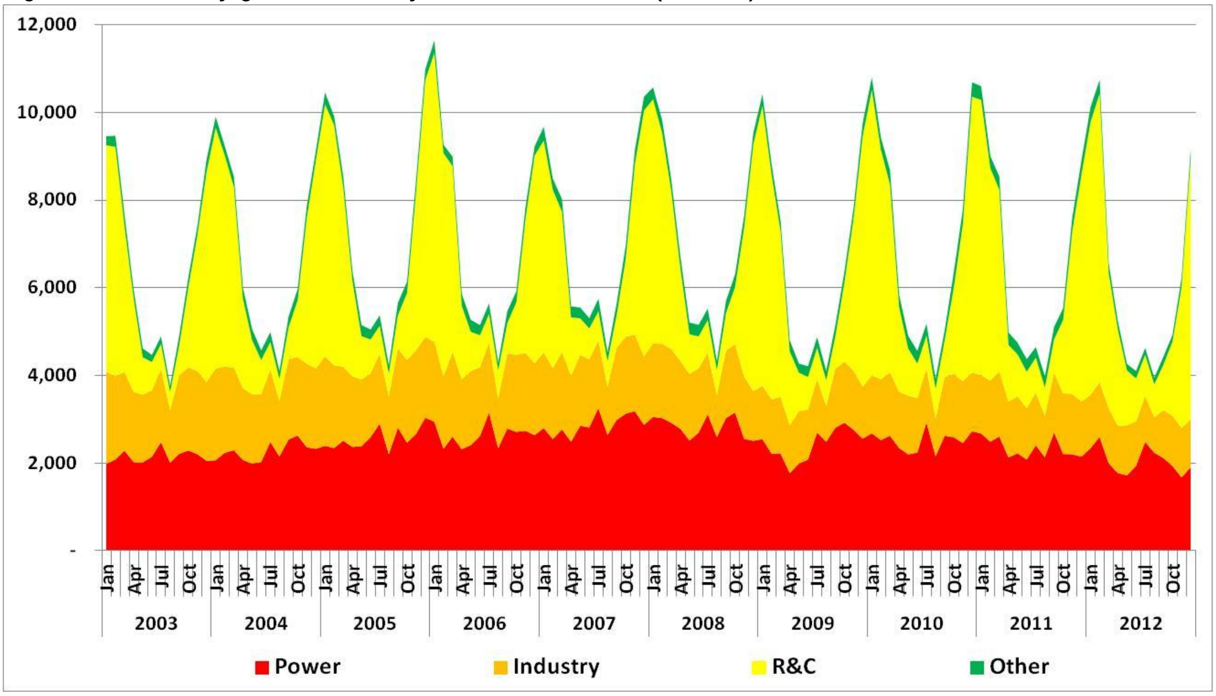
338 AEEG (2012c), p.37
339 Terna, Statistics for 2011, general data, p.14 and IEA (2012c), pp.III.4-7, table 1.1
340 Author's calculation with the following assumptions: CCGTs 58% efficient running at 70% load factor.
341 Platts Power In Europe, February 18, 2013, issue 645, Italy's gas balloon still buoyant, pp.9-10.
See also GME, Electricity markets, Annual data, Excel sheet 'ITM-MTI' for hourly details on the technology fixing the price in each zones, http://www.mercatoelettrico.org/

3.3. MARKET FUNDAMENTALS SCENARIOS

Focus on main developments since the early 2000s

On the supply side, as already mentioned, Algeria and Russia remained the two major suppliers of gas to the Italian market in the 2000s, but the emergence of pipeline gas from Libya and LNG from Qatar helped to diversify the supply mix. Indigenous production declined by about half between 2000 and 2010/2012. Contrary to the flexible production in the Northern Europe (Netherlands, Norway and the UK in its time), Italian gas production is flat throughout the year. The seasonality of the gas demand, due to large variations in the residential and commercial sector [Figure 47], has been covered by pipeline imports and gas in commercial storage, while LNG volumes covered shorter term demand fluctuations [Figure 48].

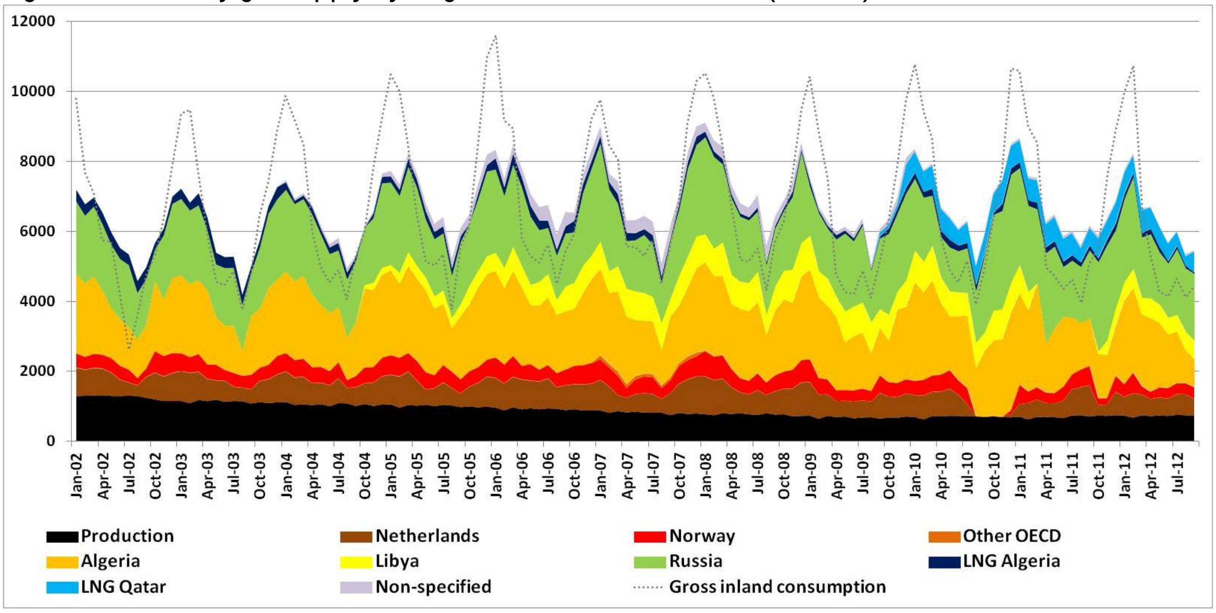
Figure 47: Monthly gas demand by sector, 2003-2012 (MMcm)



Sources: MSE (2003-2011), Snam Rete Gas (2012) and author
Notes: Data for October – December 2011 were provisional; data from Snam only covers the gas transported by the Snam network, and some discrepancies exist between the definitions of the sectors as explained earlier (see Footnote 20).

Despite this major evolution of the supply mix, the most interesting story concerns the demand side with new trends observed in the 2000s, and even more so since 2008. What will the impacts of these changes mean for the future of the gas industry in Italy?

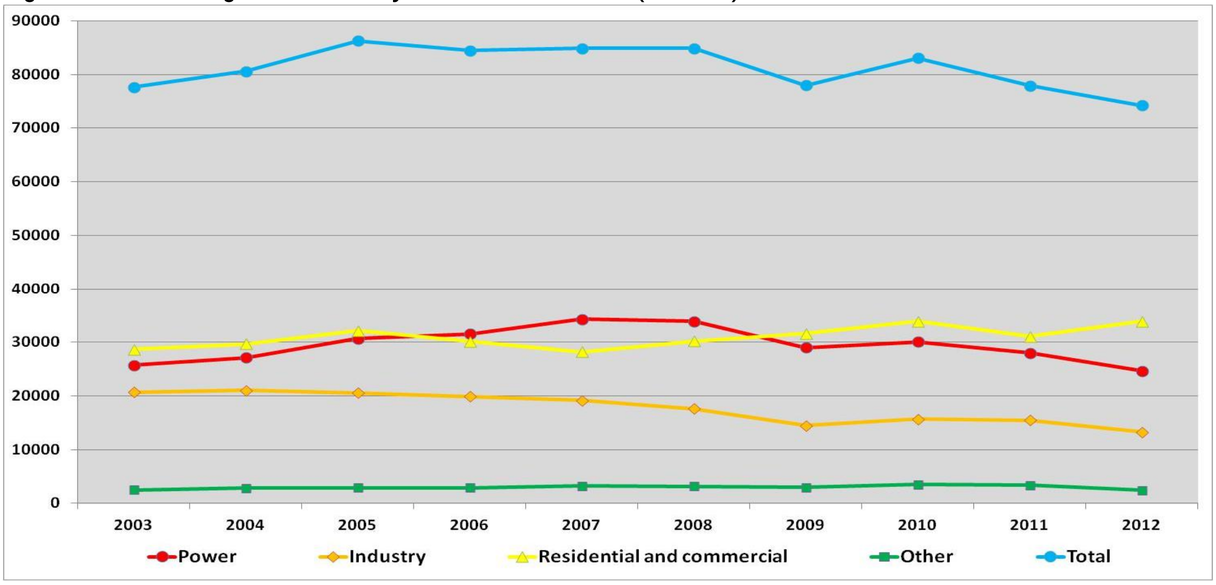
Figure 48: Monthly gas supply by origin vs demand, 2002-2012 (MMcm)



Source: IEA, Monthly data service

After the 1990s, during which consumption rose at 4%/y on average, gas demand growth came to a halt in the middle of the following decade. In the 2000s, annual average gas demand growth was down to 1.6%. The slowdown happened even before the world economic downturn of 2008 due to reduced GDP growth in Italy and as a result, a slow decline of industrial consumption from 2004 (-4.3%/y on average in 2004-2008) and milder temperatures which maintained a weak demand in the residential and commercial sector. The increase in the power sector (+5.7%/y on average in 2004-2008) was not enough to compensate the loss in the industrial sector. Gas demand peaked at 86 Bcm in 2005, and then remained fairly flat until 2008 when the effects of the economic recession started to be felt [Figure 49].

Figure 49: Annual gas demand by sector, 2003-2012 (MMcm)



Note: data from Snam only covers the gas transported by the Snam network, and some discrepancies exist between the definitions of the sectors as explained earlier

Sources: MSE (2003-2011), Snam Rete Gas (2012)

In 2008, Italy consumed 83.4 Bcm. As detailed in Table 17, gas demand dropped by 8.4% in 2009 due to the economic recession. Consumption in the industrial and the thermoelectric sectors fell by double digit percentages while the cold winter increased gas use for homes and offices for heating purposes. In 2010, demand for gas recovered and rose back to 2008 levels with growth in the three major sectors. However, by 2011, the encouraging signs of recovery in 2010 had stopped and natural gas demand experienced an important drop to 78 Bcm (-6.2%) as a consequence of the mild climatic conditions, the economic difficulties, expansion in the use of renewable sources and a shift to coal in thermoelectric production due to cost advantage and all the main sectors went down.[342] In 2012, gas demand was estimated at 74.25 Bcm.

Table 17: Evolution of gas demand by sector, 2008-2012 (% and Bcm)

	Annual change (%)				Volume (Bcm)
	Power	Industry	R&C	Total	Total
2008	-	-	-	-	83.4
2009	-16.8%	-14.4%	5.4%	-8.4%	76.7
2010	4.4%	7.1%	7.1%	8.2%	83.0
2011*	-7.0%	-1.1%	-8.4%	-6.2%	78.0
2012*	-11.1%	-13.5%	10.1%	-4.7%	74.3

Source: IEA, *Natural gas information*, various issues (*2011 and 2012: author's estimates)

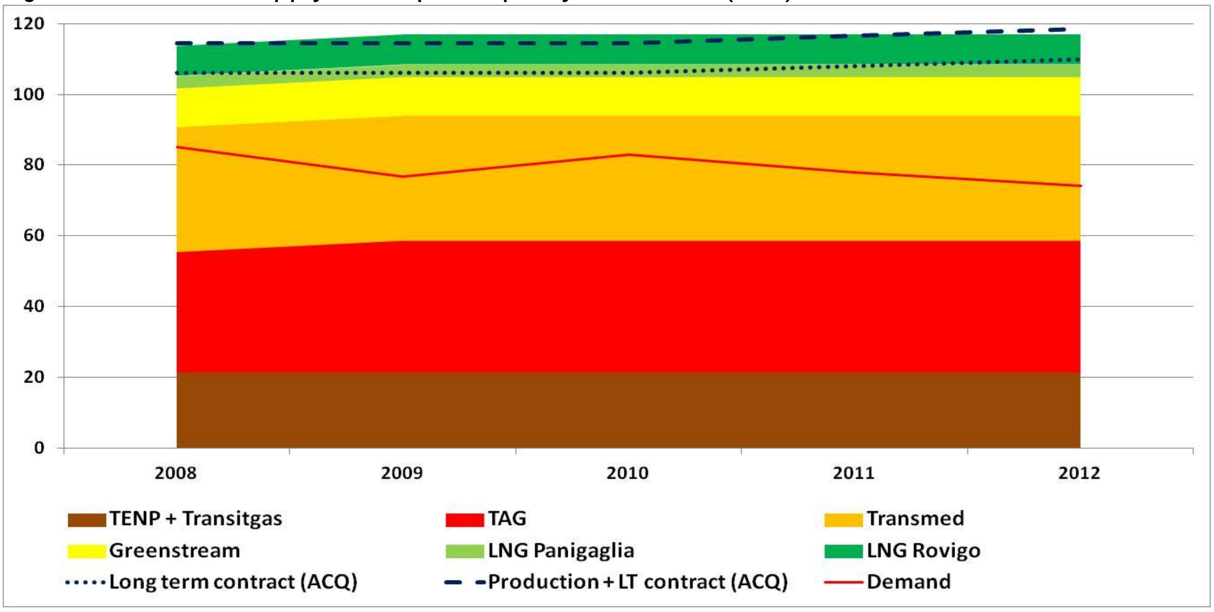
To summarise the 2008-2012 period, total demand declined by -3.4%/y on average. Gas used in the industrial sector fell on average by 6.8%/y in consequence of the economic difficulties, low rates of industrial growth, high gas prices and an already high gas penetration in the industrial sector. The major sub-sectors impacted were iron and steel, chemicals, pulp paper and printing.[343] Gas for power demand also fell by 7.6%/y on average due to low electricity demand, higher renewable energy and competition with coal, all of which have eroded the use of gas to generate electricity, as seen in section 3.2. As a result, the share of the power sector in total gas demand declined from 44.6% in 2008 to 33.5% in 2012. The only brighter trend came from the residential and commercial sector with average growth of 2.9%/y. While the demand variations in the residential and commercial sector follow primarily the fluctuations of temperature, there is also a clear trend upward thanks to market substitution of oil-fuelled heating appliances in old buildings, and to natural gas being one of the preferred choices for domestic use in new buildings[344] in addition to renewable energy used for heating and cooling.[345] Despite the economic crisis, the expansion in road transport consumption continued as a result of high and continuous growth in fuel prices, which favoured the increased use of methane-fuelled vehicles. From 2006 to 2010, the transport sector grew by about 10%/y on average, but the growth was limited to 2.6% in 2011[346] as austerity

[342] AEEG (2012c), pp. 81-82
[343] IEA, *Natural gas information*, various editions
[344] IEA (2010)
[345] For more information, see the MSE's website:
http://www.sviluppoeconomico.gov.it/index.php?option=com_content&view=article&viewType=1&idarea1=593&idarea2=0&idarea3=0&idarea4=0&andor=AND&sectionid=0&andorcat=AND&partebassaType=0&idareaCalendario1=0&MvediT=1&showMenu=1&showCat=1&showArchiveNewsBotton=0&idmenu=2263&id=2025269
[346] AEEG (2012c), pp.81-85

measures hit consumers. Despite this rapid growth, the sector still represents only about 1% of the country's gas demand.

In 2012, gas demand in Italy was well below both import capacity and contracted gas in long term contracts, as shown in Figure 50. The Italian market had prepared for a much faster growth of gas consumption. But by the early 2010s, there were major uncertainties in the future of gas demand.

Figure 50: Demand, supply and import capacity, 2008-2012 (Bcm)



Source: AEEG, annual reports (capacity, demand and production), several issues; and author's research (contracted gas volumes)

Demand trends in the 2010s

The outlook for the years through 2020 is uncertain with opinions diverging between modest growth and further reduction, depending on assumptions on economic recovery, the role of renewables, efficiency measures and gas price evolution. The following paragraphs highlight various scenarios.

The latest scenarios published on Snam's website[347] show an average growth of approximately 2.6%/y in the period 2011-2014 driven by consumption in the power generation sector which is expected to average an annual growth of around 5%. We already know that total demand declined by 6% in 2011 and 4.9% in 2012 and the power sector by 7% and 11.8%. As a result, the short-medium term assumptions will probably not be realised. For the 2010-2020 period an average annual growth in gas demand of 1.8% was expected, driven mainly by demand in the power sector (+3.0% annual average). This assumption appeared to be overly optimistic, even before the impacts of the economic crisis and the introduction of renewables were well understood. For instance, in a scenario calculated in early 2010, this author had expected an annual growth of only 0.98% between

[347] Snam's website, scenarios webpage: http://www.snamretegas.it/en/activities/Scenario-and-strategy/strategie.html (retrieved in January 2013)

2010 and 2020, (1% for power).[348] Following its expectations, Snam is developing the gas infrastructure in Italy in order not only to meet the forecast growth in demand for gas, but also to increase the flexibility of the system in order to improve the supply source diversification and the transit of gas to foreign countries, making Italy a gas hub for southern continental Europe.

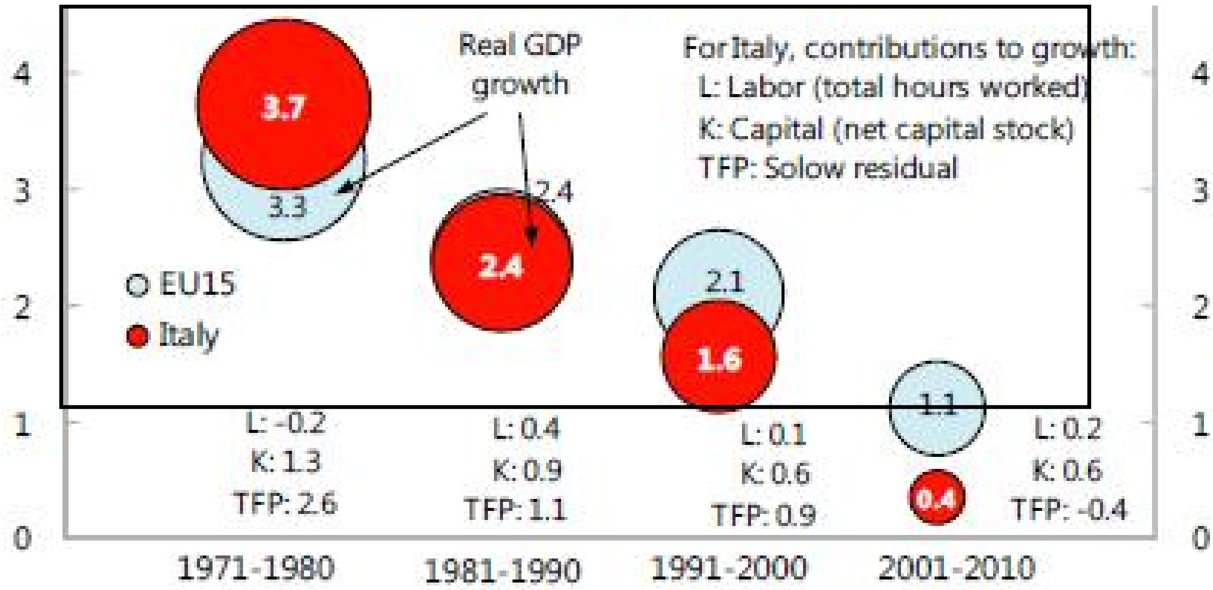
Scenarios in the National Energy Strategy show a decline of gas demand by 12.5% - 19.8% between 2010 and 2020, or from about 75.2 Bcm in 2010 to 60.3 - 65.8 Bcm in 2020.[349] Production for gas-fired plants is expected to fall from 155 TWh in 2010 to only 120 – 136.8 TWh in 2020, or a drop of 11.7 – 22.6%. In terms of gas used in the power sector, this would represent a fall from 30 Bcm in 2010 down to 22.8 Bcm – 25.9 Bcm by 2020.[350]

This scenario seems to be more in line with the changes witnessed between 2008 and 2012. Indeed, low GDP growth, low power sector demand, high renewable installed capacity, low coal and CO_2 prices and increasing energy efficiency will be the main driver for Italian gas consumption in the 2010s (and maybe beyond). None of these factors suggest an optimistic story of high gas demand growth.

Since the 1990s, economic growth in Italy has lagged behind other European countries. In the 2000s, the average GDP growth rate was less than half of 1% [Figure 51]. The economic situation is both difficult and uncertain. The impact of the economic crisis of 2008 has reduced Italian GDP by more than 5%. By the fourth quarter of 2012, the Eurozone's third largest economy had suffered six consecutive quarters of GDP contraction.[351] The November 2012 OECD Economic Outlook shows a decline of 2.2% of GDP variation at market price for 2012. Recovery was only expected in 2014 with a decline of 1% in 2013 and a growth of 0.6% in 2014. [352]

[348] Honore (2010), p.288 and p.293
[349] In 2010, gas represented 41% of 165 MMtoe, or 67.25 MMtoe (75.2 Bcm using a conversion factor of 1.111). In 2020, gas represents 35-37% of 155-160 MMtoe, a minimum of 54.25 MMtoe (60.3 Bcm) and a maximum of 59.20 MMtoe (65.8 Bcm). Source for the conversion factor: BP's website: http://www.bp.com/conversionfactors.jsp
[350] Author's calculations
[351] GDP declined by 0.9% in the fourth quarter of 2012. Source: Reuters & le Figaro, March 11, 2013, Italie: le PIB recule de 0.9% fin 2012, http://www.lefigaro.fr/flash-eco/2013/03/11/97002-20130311FILWWW00317-italie-le-pib-recule-de-28-en-2012.php
[352] For more information on drivers and constraints to GDP growth in Italy, see OECD (2012) and regular updates

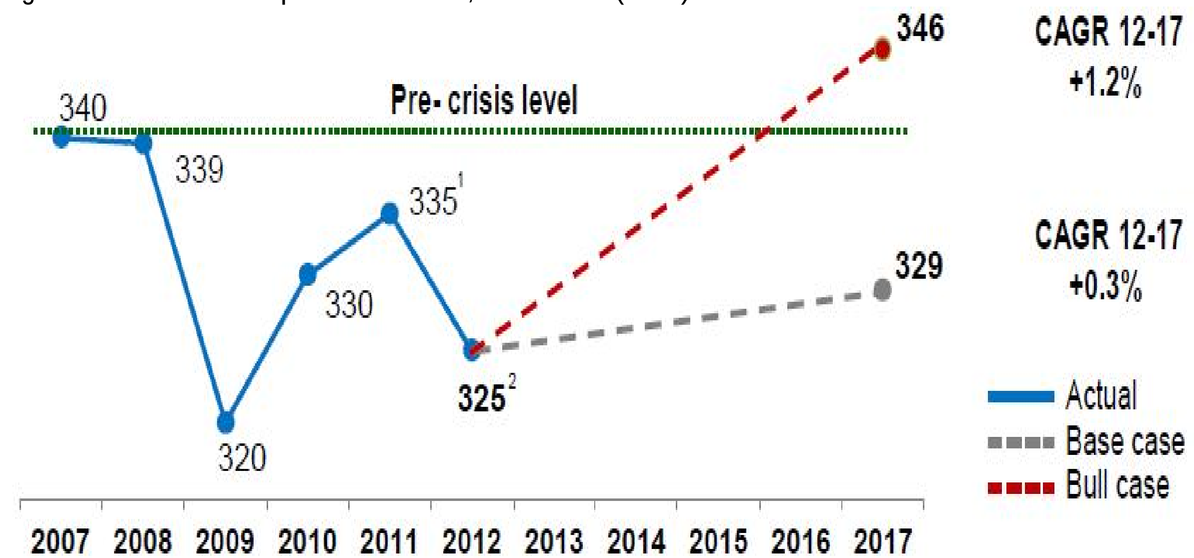
Figure 51: Average GDP growth rate per decade (%)



Source: IMF (2012), p.4

For electricity demand, Eureletric expects an annual average growth rate of 1.2% between 2010 and 2020.[353] For comparison, electricity demand grew by 1.7%/y on average between 2000-08 while the mean annual growth of GDP was 0.9%. Taking into account a slightly lower economic performance and energy savings / energy efficiency measures, the rates proposed by Eurelectric are possible. However, in its strategic plan for the period 2013-2017 published in February 2013, Terna presents the 1.2% annual average growth rates as the optimistic scenario, and considers 0.3% as a base case [Figure 52].[354]

Figure 52: Scenario for power demand, 2007-2017 (TWh)

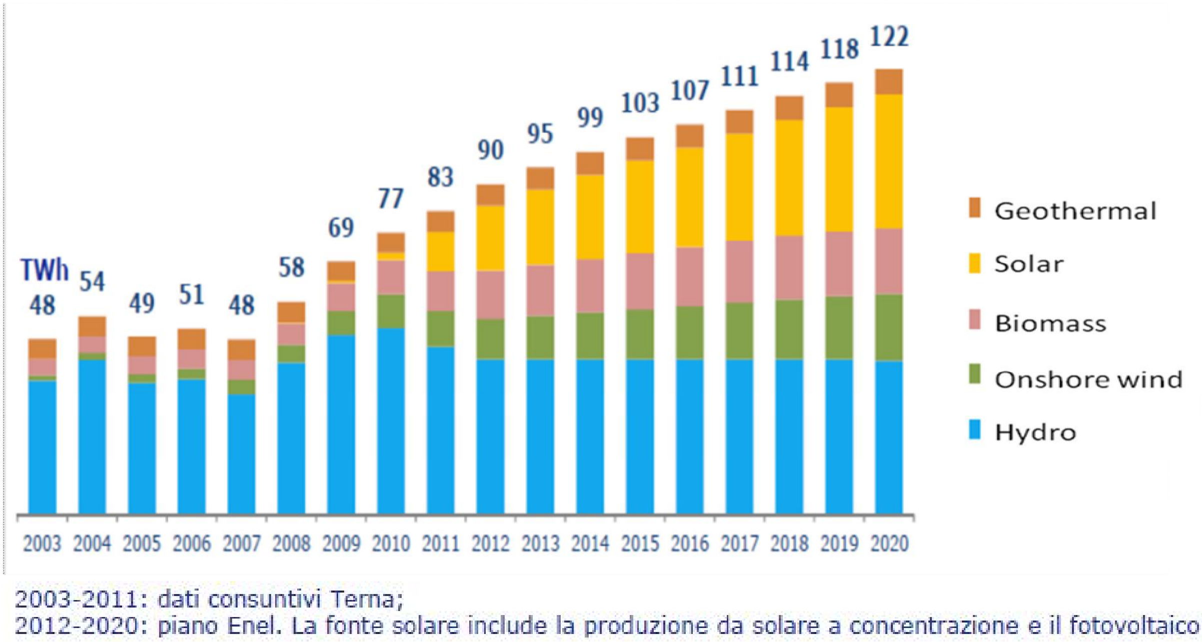


Notes: 1/ Actual figures, 2/ 2012 provisional figures
Source: Terna (2013), slide 20

353 Eurelectric (2012)
354 The demand forecasts have been halved to 0.3%/y for the period 2013-17, from a base case of 0.7%/y for 2012-16. Source: Platts Power In Europe, February 18, 2013, issue 645, Italy's gas balloon still buoyant, pp.9-10

Of course, this small additional electricity consumption could be met by renewable energy, which is expected to continue rising albeit at lower rates than in the 2000s to reach Italy's target of 26.4% of gross electricity generation from renewables in 2020. Indeed, Enel expects electricity generation from renewables to grow by 4.3%/y on average between 2011 and 2020 [Figure 53].

Figure 53: Renewable energy by fuel, 2003-2020 (TWh)



Source: Hawkins (2013), slide 8

In addition to renewables, additional electricity demand could also be met by coal plants. In 2011, the 10 GW of coal plants ran at 51.3% load factor (12% share of the electricity generation). If we take the assumptions of 1.2% of annual growth for electricity generated from coal plants (in line with total demand growth in the high case scenario) and the loss of 2 GW due to the LCPD by the end of 2015 (not all will be coal plants, some will be oil plants that do not run baseload already), the remaining plants would need to run at a maximum of 82.6% in 2020. This shouldn't pose any problem for coal plants used to generate baseload, especially thanks to the high efficiency of the Italian plants that have an average efficiency of 39% (with peaks of 46% in the case of the Torrevaldaliga plant (Enel)).[355]

Clean dark spreads have been higher than clear spark spreads in 2011-2012. According to the IEA,[356] CO_2 prices would need to increase to €38/tCO_2 to make it economically worthwhile to switch to gas plants (at January 2013 prices).[357] Considering the downward trend of CO_2 prices since 2011 (from

[355] Platts Power In Europe, November 26, 2012, issue 639, Enel leans on coal, p.4-5.
The two projects in Porto Tolle (Enel) and the SEI project fueled by coal dust should have efficiencies of more than 45%. See Assocarboni's website: Coal plants in Italy, http://www.assocarboni.it/index.php/en/the-coal/coal-plants-in-italy
[356] IEA (2013), slide 19
[357] This author's calculations show a slightly higher number at €44/ tCO_2, probably accounting for the Italian specificities of higher efficiencies in both gas and coal plants compared to the European level. The calculations

almost €20/tCO_2 mid 2011 to less than €5/tCO_2 February 2013[358]), it seems very unlikely that CO_2 price will reach €38/tCO_2 without important measures taken such as a reform of the EU Emissions Trading System (ETS).

As a result, in a scenario of electricity demand growth of 1.2%/y on average, we expect the electricity produced from gas to remain flat. In an alternative scenario where the electricity demand growth would only be 0.3%/y on average, the electricity produced from gas can be expected to fall by an annual average of 2% up to 2020. In this scenario, the gas consumed by the transformation sector would drop below 23 Bcm (compared to almost 28 Bcm in 2011).

In the case of the industrial sector, high energy costs have prompted some companies to consider relocating abroad.[359] If gas does not become less expensive, the future role of gas in the industry will become even more problematic. Despite the downward trend of PSV spot prices in 2012, we expect at best a flat growth rate by the end of the decade, but a decline is more probable. However, after an annual average decline of 3.4% in the period 2000-2012, we expect a smaller average decline of 1.5%. In the residential and commercial sectors, there is evidence that consumption is not falling. However, despite the preference for gas in new buildings, the increase will be limited due to energy savings measures (if anything, at least as an impact of the economic crisis with consumers trying to keep energy bills as low as possible). Increasing use of renewable energy for heating and cooling and the arrival of smart meters is expected to make the control of consumption easier. This is the reason why despite annual growth rates of 2.5% in 2000-2012, this author only expects future growth of 1% per annum. The other sectors remain flat as a whole, even if we take into account the potential for strong increase in transport, because even if annual growth rates return to 10% between 2012 and 2020, the gas use for transportation would only still amount to less than 1.5 Bcm/y. As a consequence, under these assumptions, gas demand in Italy would go from 74.3 Bcm in 2012 to about 71.9 Bcm in 2020 (-0.4%/y on average). In conclusion and without any major changes, it seems that a return to pre-recession levels remains a distant and probably unachievable prospect.

Supply and demand balances up to 2020/2030

In order to look at supply and demand balances, we have taken several consumption scenarios for illustrative purposes: flat demand, +1%/y, -1%/y, +2.5%/y and -2.5%/y.

First, we compare the import infrastructure at different levels of demand. In Figure 54, we have taken into account only the most advanced import projects: Livorno and Porto Empedocle LNG

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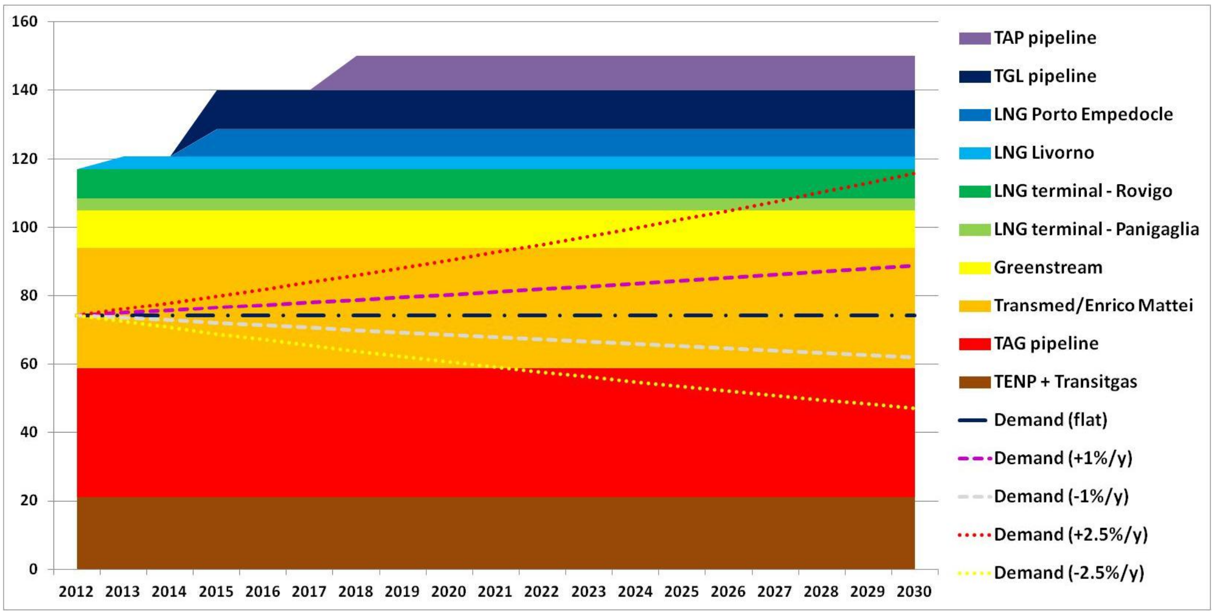
were made with a gas price at $10.5/MMBtu (average day-ahead spot price for January 2013 as stated in Platts, European Gas daily Monthly Averages, January 2013, p.3) and $89.9/t for coal (December price as stated in Argus Global LNG, January 2013, p.22).

[358] Platts Power In Europe, issue 646, March 4, 2013, p.7

[359] For example, aluminium group Alcoa has decided to shut its aluminium smelter in Sardinia, blaming high power prices for undermining its competitiveness. In 2011, Italy used gas to fuel more than half of its power plants. The country's 90% reliance on imported natural gas, much of it brought in under expensive take-or-pay contracts, means end-user prices remain high. Source: Reuters, October 16, 2012, Italy plans to double its oil, gas production by 2020, http://www.reuters.com/article/2012/10/16/italy-energy-idUSL5E8LGO0W20121016

terminals, the TGL pipeline and the TAP pipeline (set to start operation in the last 2010s). The first conclusion is that the import capacity (without even considering any indigenous gas production) will be more than enough to cover gas consumption up to 2030, even in the case of fairly high demand growth (+2.5%/y). Just the installed capacity at the end of 2012 seems to be able to cover this scenario up to 2030. This simply shows that, on paper, Italy will not be short of import capacity if the full capacity of the infrastructure is available. Of course, additional import capacity will provide better flexibility into the system, and better diversification in terms of sources and supply routes.

Figure 54: Import capacity vs consumption at five different annual growth rates, 2012-2030 (Bcm)

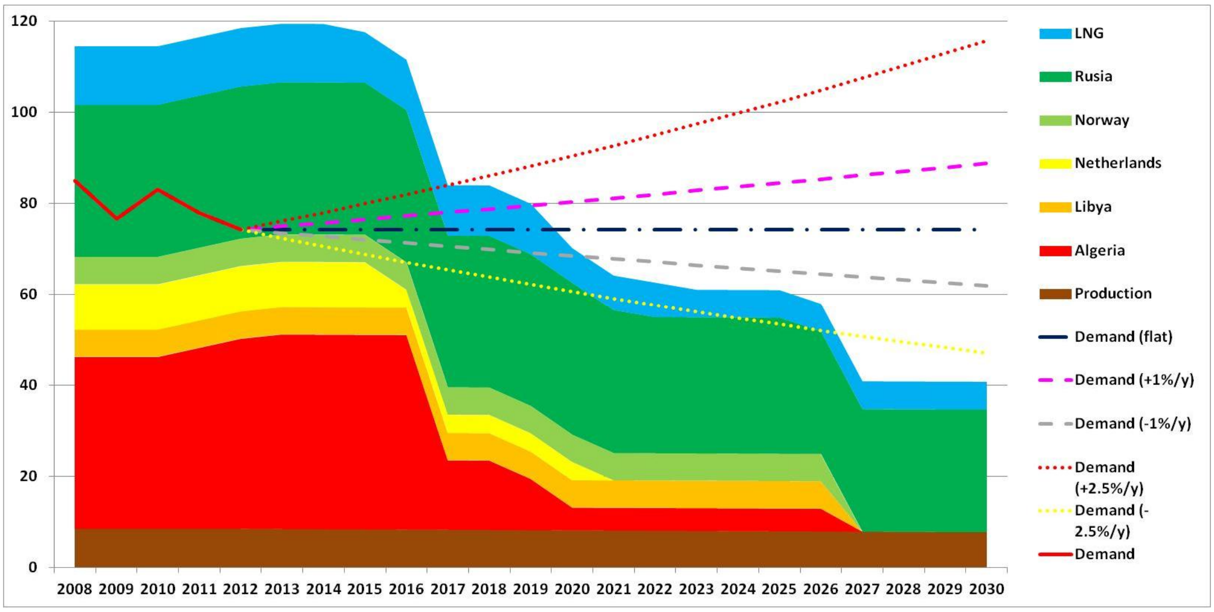


Source: Author's research

Second, we compare the demand scenarios with the already contracted levels of gas supply. For the supply side, we have added the expected levels of indigenous production and the ACQ level of long-term contracts that were in place at the end of 2012. In 2012, long-term contracts represented about 110 Bcm, well above the inland consumption which only reached 74.3 Bcm. According to Figure 55 and taking into account an indigenous production of about 8 Bcm/y of gas,[360] it appears that the country can expect to be over-contracted until at least 2017 in the case of gas demand rising by 2.5%/y, when about two thirds of the volumes imported from Algeria will reach contract expiry. If demand remains flat, contracted gas should be enough to cover annual demand until the end of the 2010s. If demand declines by 2.5%/y, there will be no need to secure additional gas before 2027.

[360] In this scenario, indigenous production starts at 8.5 Bcm in 2008 and declines slowly to 7.7 Bcm in 2030 (or about -0.5%/y).

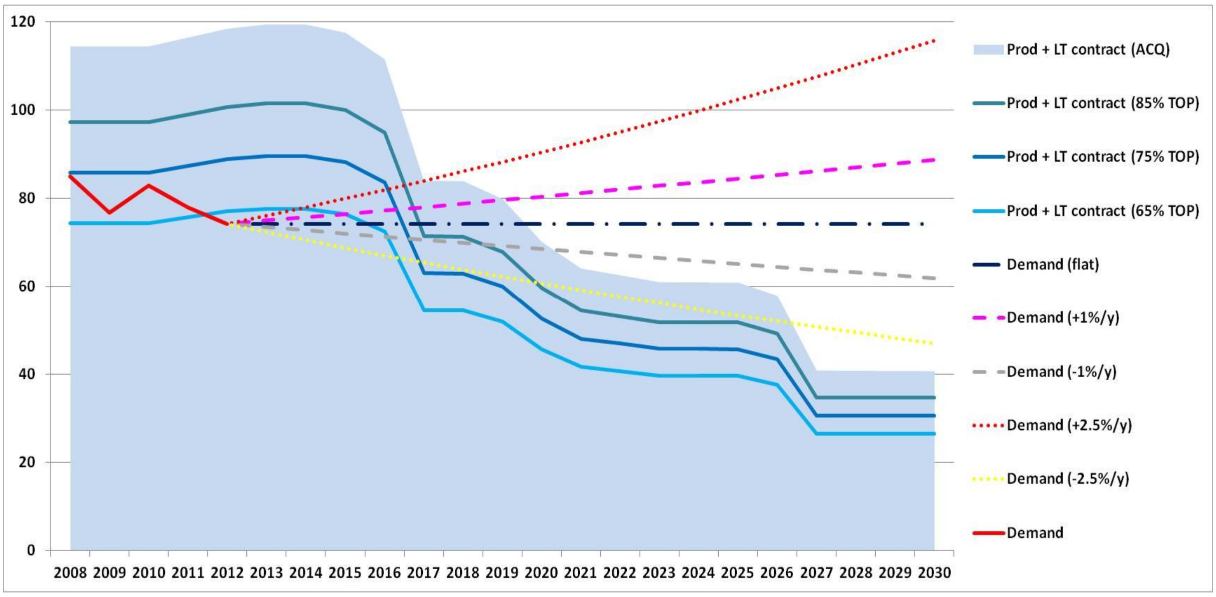
Figure 55: Supply and demand balances: level of production, imports from long-term contracts (ACQ levels) vs consumption at five different annual growth rates, 2008-2030 (Bcm)



Source: Author's research

In Figure 56, we propose various levels of contracted gas in order to understand the level of TOP necessary to remove oversupply in the 2010s. The assumed level of TOP before renegotiations in traditional long-term contracts is 85%. If demand remains flat, TOP levels would need to reduce to 65% until 2015, then rise progressively to 75% in 2016, above 85% in 2017 and ACQ by 2020. In the case of fast growing demand (+2.5%/y), 65% TOP only covers annual demand until 2014, 75% TOP until 2016, and ACQ until 2017. In a scenario of fast declining demand (-2.5%/y), 85% TOP covers the needs until 2020 and ACQ levels for seven additional years.

Figure 56: Supply and demand balances: comparison of the levels of production + contracted gas at ACQ level, 85% TOP level, 75% TOP level and 65% TOP level vs consumption at five different annual growth rates, 2008-2030 (Bcm)



Source: Author's research

There is indeed both over-capacity and over-contracted gas supply in Italy. However, the objectives of constructing additional infrastructure can be explained by the need to diversify sources of supply and will also help to overcome the potential problem of contracted capacity which prevents flexible access to the Italian system at times of peak demand, tight supply or high gas prices for arbitrage opportunities. Better interconnections with European countries will also provide the opportunity for Italy to manage its oversupply and benefit from price arbitrage with other markets. In the view of these balances, the government's objective of becoming the gas hub for Southern Europe looks like a real opportunity, providing that access to infrastructure and competition bottlenecks are solved... and gas demand in other European markets starts also to recover to pre-2008 levels![361]

[361] See Honore (forthcoming 2013)

SUMMARY AND CONCLUSIONS

Italy has long been seen as a gas market with dynamic demand growth, a rather stagnant market structure organised around the incumbent ENI despite liberalisation and with gas prices among the highest in Europe. However, a closer look at the situation in 2013 reveals a different picture. The liberalisation process proved in itself not to be sufficient to promote competition in the 2000s, but increasing liquidity of spot markets, combined with the various measures taken by the government or the regulator to restrain ENI's dominant position, started to improve competition in Italy in the early 2010s.

Gas plays a central role in the energy mix, representing about 50% of electricity generation and about 40% of the total primary consumption, and is a key factor in the country's energy security, given the high degree of dependence on imports (over 90% of gas requirements). As a result, additional import capacity from interconnections with other European countries and external suppliers will improve security of supply thanks to better diversification of sources and routes. Security has been high on the government's agenda following tensions in recent winters, especially February 2012 when peak demand reached record high levels. Import capacity proved sufficient but actual gas flows were not able to meet Italian needs. As a result, efforts have also turned towards increasing the working gas capacity of storage and improving access. These developments will reinforce security of supply but also competition and gas trading opportunities in Italy.

Spot gas prices in Italy have historically been high, consistently trading at an important premium compared to other European gas prices. Crude oil prices have been the main driver of the PSV prices, which have at times been above the BAFA oil-indexed prices. The high Italian spot prices reflected the lack of liquidity and competition, as well as transportation constraints. For most of 2012, prices were still decoupled from north-west European hubs and the gap between day-ahead spot gas prices on the Italian PSV and the Dutch TTF was around €10.00/MWh. However, there has been a convergence of price between PSV prices with those on other European hubs since the first quarter of 2012, and by the end of the year the spread was almost non-existent thanks to improved third party access to cross-border capacity, especially the TAG pipeline. Wholesale suppliers have been able to get physical supply directly from north European hubs and used TTF spot indexation in supply contracts with industrial players. As a result, TTF prices have become the main driver of the PSV at the expense of oil. Also, spot prices at the PSV were down from the previous year in 2012 contrary to other hub where prices increased. It is hard to imagine circumstances that could lead them to diverge again, so the correlation between PSV prices and TTF prices is expected to stay in the future.

PSV prices are correlated with north-west European prices and PSV volumes are increasing rapidly, but liquidity at the hub is still lagging far behind NBP or TTF, the two most liquid hubs in Europe. The development of a successful gas hub requires the liberalisation of the market with TPA to infrastructure, and the introduction of competition between market players. As a general rule, the greater the number of market participants, the more liquid the market. Additional cross border import capacity (including reverse flows towards Northern Europe), and better access to this increased capacity combined with the creation of a balancing market and the start of a curve market should certainly improve the Italian situation in the future.

Even in Italy, spot prices have been lower than oil-linked prices on average in 2009-2012. Since 2009, the profitability of the gas sector has been severely hit by lower demand, oversupply and the improved liquidity at European hubs. Limited sales opportunities translated into additional competition between wholesalers at the expense of companies that import gas on long-term, oil-indexed TOP contracts. This situation has led the major energy companies to renegotiate their contracts with key suppliers. Agreements on price discounts and/or flexibility of TOP clauses have been reached but without a switch to gas to gas competition in the contracts. As a result, renegotiations are still ongoing in 2013.

Lower prices would be good news for depressed gas demand. After years of fast growth in the 1990s and early 2000s, gas consumption was flat between 2005 and 2008 mainly due to a decline in industrial gas use as a result of bad macroeconomic conditions. Gas demand, especially in industry and power generation, was hit even harder after the economic crisis that started in 2008.

In the mid 2000s, gas demand in the power generation sector was still expected to continue to grow rapidly as more and more power plants were converted (or built to use) natural gas. However, the slow increase in electricity demand and the rapid rise of renewable energy led to over-capacity in gas plants by the late 2000s. Gas plant operators compete against other fuels and against each other, which depresses their margins. Despite the traditional high market share of gas in the Italian generation market, the total volume of electricity produced at gas-fired plants has plunged as a rising share of intermittent renewable power generation pushed fossil plants down the merit order. The competitiveness of cheap coal (helped by low CO_2 prices) has also contributed to the erosion of gas used for power generation (even if the phenomenon was limited compared to other European countries). In conclusion, gas for power generation has been hit three times: once by the recession, once by the increase in renewable capacity and once by the competition with cheap coal.

Looking ahead, the 2010s do not look particularly optimistic for gas in Italy. Contrary to other European countries, gas plants cannot count on the phase out of large amount of nuclear capacity to create a gap in baseload generation, nor can they count on the impacts of the LCPD by 2015. With only about 2 GW of coal and oil plants that have opted out in Italy, positive impacts on gas plants will be limited. Gas will however be used more and more for backing up intermittent and unpredictable generation by renewable energy. Substantial reserves with a high degree of flexibility will be needed, which will come from the gas plants to which the government is considering making capacity payments from 2017 in order to make it profitable for these flexible plants to stay online if only for peak generation.

National Energy Strategy scenarios expect a decline of gas demand of 12.5 - 19.8% between 2010 and 2020, or from about 75.2 Bcm in 2010 to about 60.3 - 65.8 Bcm in 2020.[362] As for the electricity sector, gas is expected to go from generating 155 TWh of electricity in 2010 to between 120 - 136.8 TWh in 2020, or a drop of 11.7 - 22.6%. This would represent a fall in gas used in the power sector from 30 Bcm in 2010 down to 22.8 – 25.9 Bcm by 2020.[363] An important conclusion of this paper is that gas demand in Italy is likely to stay depressed in the 2010s, especially if the economic situation

[362] Author's calculations
[363] Author's calculations

of the country -and in the rest of Europe- does not improve. This is slightly less pessimistic than in the National Energy Strategy with a loss of about 0.4%/y on average (from 74.3 Bcm in 2012 to about 71.9 Bcm in 2020). In conclusion and without any major changes (economic growth and lower gas prices), it seems that a return to pre-recession levels of gas usage remains a distant and probably unachievable prospect.

On paper, Italy has enough import capacity to cover gas demand until at least 2030 as long as the full capacity of the 120+ Bcm/y of infrastructure is available. However, this conclusion comes from purely comparing consumption data with total import capacity. Additional infrastructure would improve supply security by allowing for better diversification of routes and sources, by bypassing bottlenecks of pre-booked capacity and by increasing the flexibility of supply. The National Energy Strategy stresses that a further increase in gas import capacity is needed for two main reasons: to diversify sources (most gas is currently imported from Algeria and Russia), and to increase imports in order for Italy to become an exporter to northern Europe.

In 2012, long-term contract commitments were about 110 Bcm, well above the inland consumption which only reached 74.3 Bcm. These over-contracted volumes can be explained by the high dependence on imports and the rapid growth in demand in the 1990s, which was expected to continue in the 2000s and 2010s. Even in an optimistic scenario of 2.5%/y growth on average (extremely ‘optimistic’ from the expectations in 2013), Italy will not need to secure additional gas under long term contract before 2017. If demand stays flat, contracted gas should be enough to cover annual demand until the end of decade. If demand declines by 2.5%/y, there will be no need to secure additional gas before 2027.

The results of the consultation on the National Energy Strategy will shape the future of the gas industry in Italy, but it already seemed obvious in 2013 that there will be no return to 1990s gas demand growth but rather challenges and uncertainties about future consumption, especially in the power sector. However, Italy is a fast evolving gas market and new opportunities for the gas industry could be found. The over-capacity and over-contracted gas supply provide an excellent opportunity to achieve the government’s objective to become the gas hub for Southern Europe. Better interconnections with European countries, including capacity which would allow reverse flow of significant contracted volumes, will also provide the opportunity for Italy to manage its oversupply and benefit from price arbitrages with other markets. Therefore, maybe more importantly than additional import capacity, the country may need additional export capacity in order to improve opportunities to sell the oversupply of gas. The launch of the gas forward market will also complement the existing spot market and reinforce the position of Italy as a potential regional hub. The end of the economic recession and GDP growth recovery, promised sometimes in the 2010s both in Italy and in the rest of Europe, will also provide additional opportunities for gas, even if in different ways from what we have seen in the past.

APPENDICES

APPENDIX 1: THE ITALIAN GAS NETWORK

Map 4: The Italian gas network (2011)

Source: IEA (2012b), p.VI.39

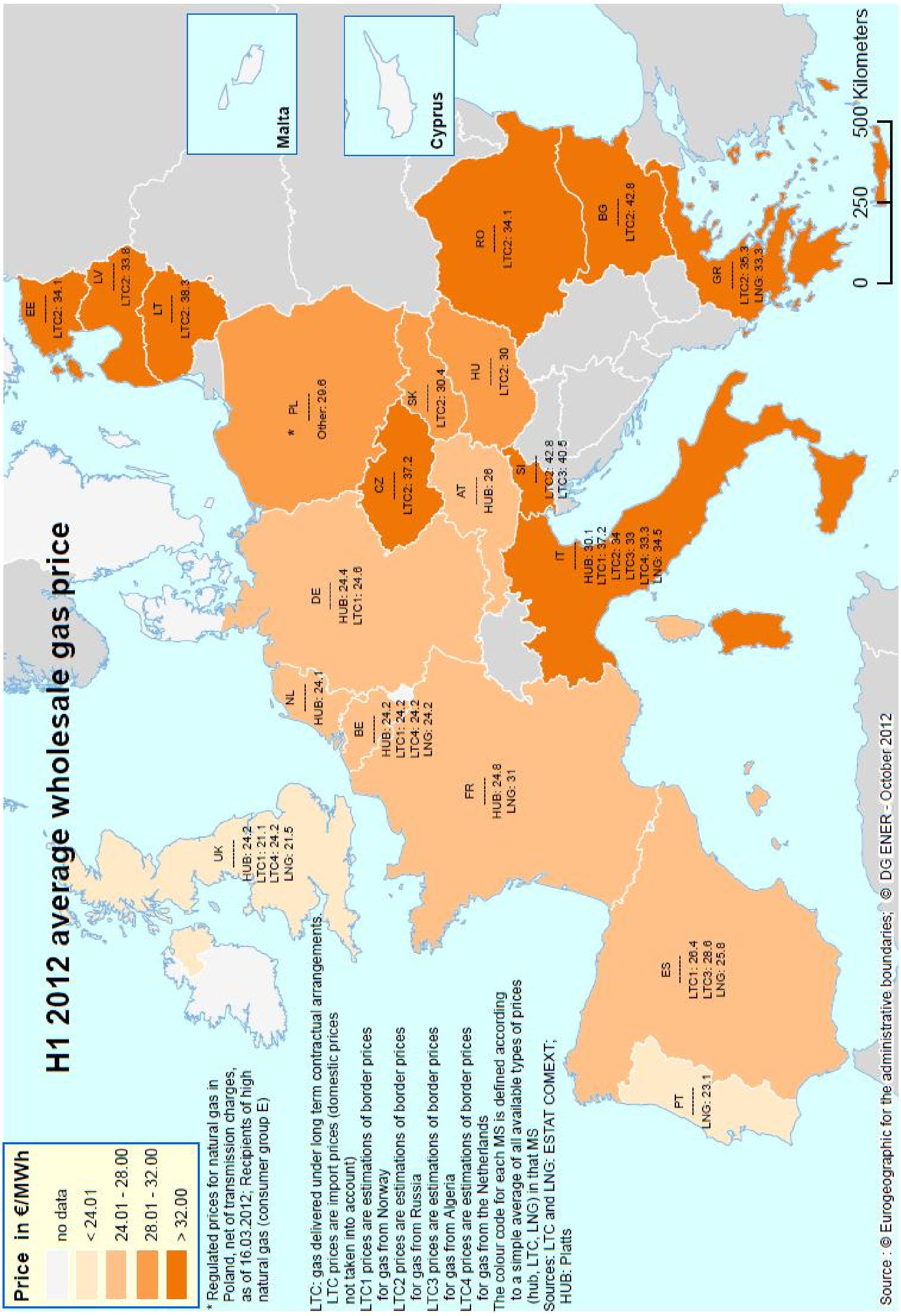
APPENDIX 2: NATURAL GAS IMPORTS INTO ITALY

Map 5: Natural gas imports to Italy, 2011

Source: Gas Matters Monthly, March 2012, Italy's winter gas crisis brings liberalisation decree into sharp focus, p.23

APPENDIX 3: AVERAGE WHOLESALE GAS PRICES IN EUROPE

Map 6: Average wholesale gas prices in Europe in H1 2012, with estimates of import prices by country and sources (€/MWh)



Source: European Commission, Quarterly report on gas market, Quarter 2 and Quarter 3, 2012

APPENDIX 4: GAS FIELDS IN ITALY

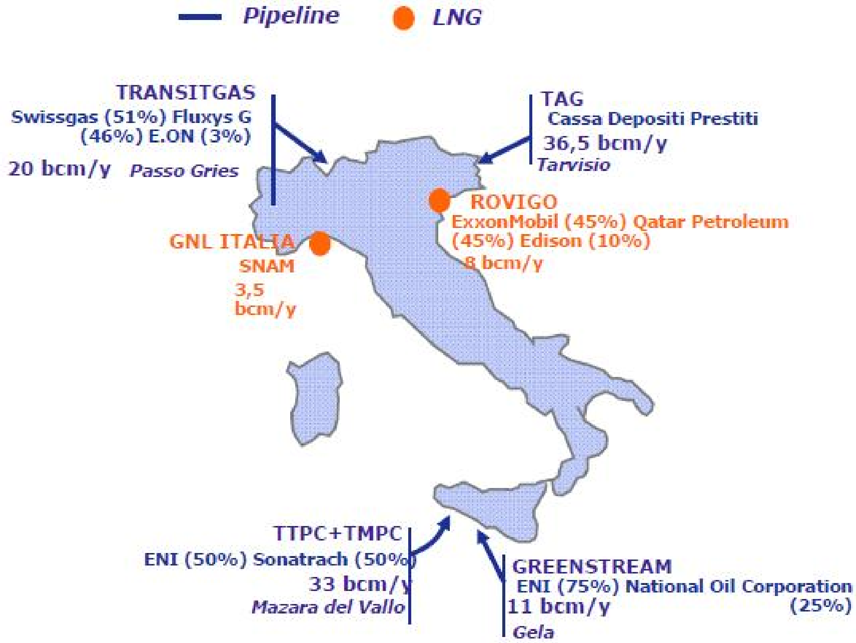
Map 7: Gas fields in Italy, 2011

● Gas fields

Source: Petroleum Economist (2006), p. 22 and author's updates

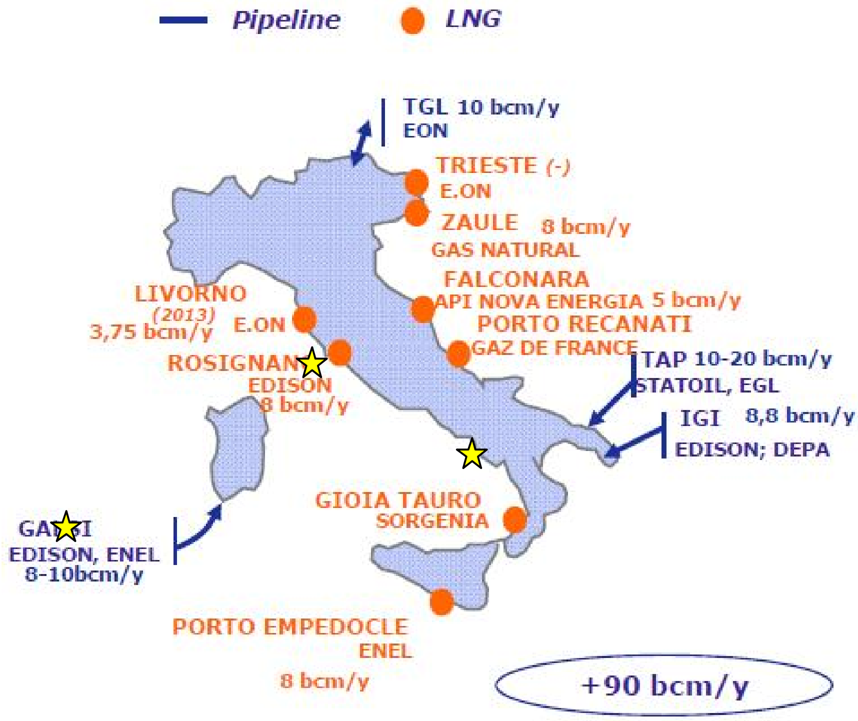
APPENDIX 5: EXISTING AND PLANNED IMPORT CAPACITY

Map 8: Existing import capacity as of 2012



Source: Enel (2013), slide 5, from AEEG (2012)

Map 9: Planned import capacity as of 2012

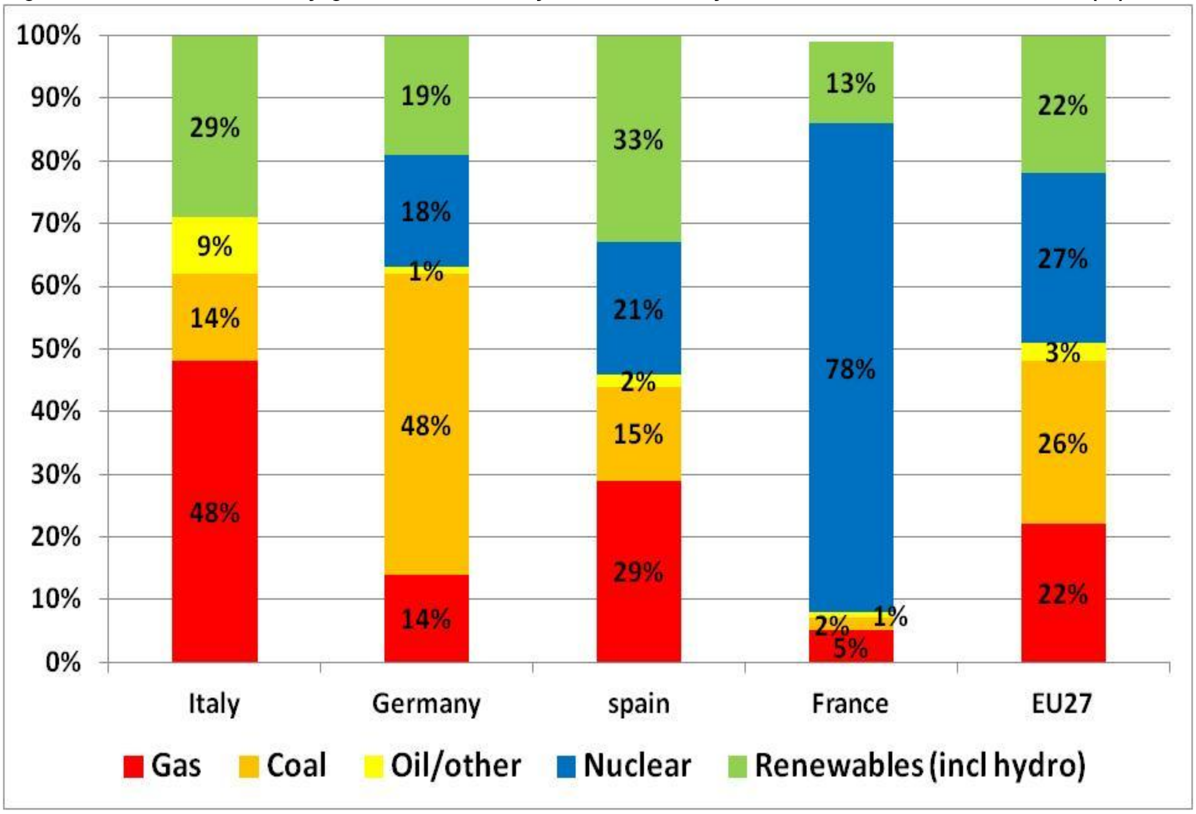


☆ Cancelled or on hold

Source: Hawkins (2013), slide 5 with original data from AEEG (2012c) and author's updates

APPENDIX 6: GROSS ELECTRICITY GENERATION MIX IN ITALY AND SELECTED COUNTRIES

Figure 57: Gross electricity generation mix by source in Italy and selected countries, 2011 (%)



Source: ENTSOE, Country packages for 2011, https://www.entsoe.eu/

APPENDIX 7: COMPARISON OF EUROPEAN EXCHANGES, YEARLY SUMMARY

The average day-ahead power price on Italy's IPEX power exchange rose by 4.5% in 2012 to €75.48/MWh. Despite a decline after the economic crisis [Table 18], Italy still has one of Europe's highest final electricity prices. This situation is a consequence of both the extensive use of natural gas, and being a somewhat isolated electricity system, which partly explains the price differential from other, better-connected continental markets. Another part of the explanation is that CCGTs are at the margin in the Italian wholesale market and as a result, (mostly) oil-linked gas prices influence electricity prices.[364] The average price on the Italian Power Exchange is the highest of the exchanges shown in Table 19, with a difference of over €44/MWh as compared to the Scandinavian Exchange and over €30/MWh higher than all of the other main Exchanges in 2012.

Table 18: Statistics of the PSV? day-ahead gas market and market clearing price, 2004-2012

period	purchasing price - National Single Price PUN (€/MWh)			total volumes (MWh)	liquidity (%)	no. of participants at 31 Dec
	average	min	max			
2004*	51,60	1,10	189,19	231.571.983	29,1	73
2005	58,59	10,42	170,61	323.184.850	62,8	91
2006	74,75	15,06	378,47	329.790.030	59,6	103
2007	70,99	21,44	242,42	329.949.207	67,1	127
2008	86,99	21,54	211,99	336.961.297	69,0	151
2009	63,72	9,07	172,25	313.425.166	68,0	167
2010	64,12	10,00	174,62	318.561.565	62,6	198
2011	72,23	10,00	164,80	311.493.877	57,9	181
2012	75,48	12,14	324,20	298.668.836	59,8	192

* The data refer to the nine months from 1 Apr. 2004 to 31 Dec. 2004

Source: http://www.mercatoelettrico.org/En/Statistiche/ME/DatiSintesi.aspx

Table 19: Comparison of European exchanges, yearly summary - average price (€/MWh)

period	IPEX	EPEX Germany	Nord Pool	OMEL	EPEX France
2004 *	51,60	28,52	28,91	27,93	28,13
2005	58,59	45,97	29,33	53,67	46,67
2006	74,75	50,78	48,59	50,53	49,29
2007	70,99	37,99	27,93	39,35	40,88
2008	86,99	65,76	44,73	64,44	69,15
2009	63,72	38,85	35,02	36,96	43,01
2010	64,12	44,49	53,06	37,01	47,50
2011	72,23	51,12	47,05	49,93	48,89
2012	75,48	42,60	31,20	47,23	46,94

Source : GME website : http://www.mercatoelettrico.org/En/Statistiche/ME/BorseEuropee.aspx

[364] See GME, Electricity markets, annual data, table 'ITM-MTI' for details on the type of plants at the margins per hours in the various Italian regions.

GLOSSARY

ACER	Agency for the Cooperation of Energy Regulators
ACQ	Annual Contract Quantity
AEEG	*Autorità per l'Energia Elettrica e il Gas* (Regulatory Authority)
AGCM	*Autorità Garante della Concorrenza e del Mercato* (Competition Authority)
Bcm	Billion cubic metres
Bcm/y	Billion cubic metres per year
BoM	Balance of month
c€/cm	Euro cents per cubic metres
c€/kWh	Euro cents per kilowatt hour
CAGR	Compound annual growth rate
CAM	Capacity Allocation Mechanism
CCGT	Combined Cycle Gas Turbine
CCS	Carbon capture and storage
CDP	*Cassa Depositi e Prestiti*
CEER	Council of European Energy Regulators
cm/y	Cubic metres per year
CNG	Compressed natural gas
CO_2	Carbon dioxide
EC	European Commission
EU	European Union
EU ETS	European Union's Emission Trading System
€/MWh	Euros per megawatt hour
€/t ???	Euros per tonne
€/tCO_2	Euros per ton of CO_2
FID	Final Investment Decision
FiT	Feed-in tariff
GC	Green certificate
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GME	*Gestore Mercati Energetici* (Energy market operator)
GRIP	Gas Regional Investment Plan
GSE	*Gestore Servizi Energetici*
GW	Gigawatt
GWh	Gigawatt hour
IEA	International Energy Agency
ICC	International Chamber of Commerce
IED	Industrial Emission Directive
IMF	International Monetary Fund
ITO	Independent Transmission Operator
Km	kilometre
LCPD	Large Combustion Plant Directive
LNG	Liquefied Natural Gas

MMbtu	Million British thermal units
MMcm	Million cubic metres
MMcm/d	Million cubic metres per day
MMcm/h	Million cubic metres per hour
MMcm/y	Million cubic metres per year
MMtoe	Million tonnes of oil equivalent
MSE	*Ministero dello Sviluppo Economico* (Ministry for Economic Development)
Mtoe	Thousand tons of oil equivalent
MW	Megawatt
NEEAP	National Energy Efficiency Action Plan
NREAP	National Renewable Energy Action Plan
OECD	Organization for Economic Co-operation and Development
OTC	Over the counter
PPP	Power purchase parity
PSV	*Punto di Scambio Virtuale*
PV	Photovoltaic
R&C	Residential and commercial
SEEP	South East Europe Pipeline
TAG	Trans Austria Gasleitung pipeline
TANAP	Trans-Anatolian Pipeline
TAP	Trans-Adriatic Pipeline
TENP	Trans Europa Naturgas Pipeline
TFEU	Treaty on the Functioning of the European Union
TGL	*Tauern Gas Leitung* pipeline
Toe	Tonnes of oil equivalent
TOP	Take or pay
TPA	Third Party Access
TPES	Total Primary Energy Supply
TSO	Transmission System Operators
TWh	Terawatt hour
UNMIG	*Ministro dello sviluppo economico*, Direzione Generale per le Risorse Minerarie ed Energetiche (Ministry of Economic Development, department for energy)
$/bbl	US dollars per barrel
$/MMBtu	US dollars per million British thermal units
$/t	US dollars per tonne

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