10-YEAR DEVELOPMENT STATEMENT

2008-2017
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Notice.
This forward-looking document is by nature indicative in content. GRTgaz therefore accepts no liability in particular with regard to the implementation or non-implementation of the projects described, or for data and/or documents that are inaccurate, incomplete, omitted or subject to interpretation. However, GRTgaz will do its best to ensure that on the date of publication, this document reflects the most accurate 10-year forecast available to GRTgaz on the gas sector, notably with regard to current conditions, its own competences, and the documents and information in its possession.
PREFACE

Investment in gas infrastructures is a key issue in the construction of the Internal Gas Market. In its Green Paper of March 2006 on Europe’s strategy for secure, competitive and sustainable energy, the European Commission emphasises the urgency of the need for investment in Europe to guarantee security of supply and the development of an competitive market.

Transmission operators have a vital role to play in the construction of the Internal Gas Market. This is to develop and promote transparent and non-discriminatory third-party access to the system, based on a transmission offering that reflects the needs of customers.

Improving access, both in its commercial form and in the level of capacity provided, is a continuing objective for GRTgaz: the development of new transmission capacity is a major focus of its strategy.

However, as the market continues to open up, there is great uncertainty as to the future of the gas system as a whole: uncertainty on consumption, given that in the first quarter of 2007 the European Commission confirmed – with ambitious targets for 2020 – the determination of Member States to combat global warming by developing renewable energies and by reducing energy consumption; and uncertainty on intra-European gas flows, with delays in the effective development of liquefied natural gas (LNG) terminals and major international pipelines.

In this highly unstable environment, shippers and operators of adjacent infrastructures (LNG terminals, transmission systems managed by other operators, combined-cycle gas turbine power plants, etc.), whose input is crucial to GRTgaz in determining the development required for its own systems, have been stressing their need for new transmission capacity to increase their options, without being in a position to implement their commitments within a short timeframe.

Given this new environment, GRTgaz no longer has a deterministic vision of the future of the system, but needs to provide the market with the technical and economic information that will enable the different parties to make the best possible assessment of the transmission needs to which they are ready to commit.

GRTgaz therefore wished to use this new 10-Year Development Statement to give a clear picture of the impact on the transmission system of the different interconnection projects so far identified. To do this, a distinction has been made between the main core system, the primary driving force for gas flows, and the interconnections that connect up the different infrastructures adjacent to that core system.

For this purpose also, there is a particular focus on the development of links between GRTgaz’s North and South zones.

However, three reservations need to be stated with regard to this new document:

1. In the absence of sufficient perspective, the impact of strict compliance with the climate change targets set by the European Commission on gas transmission needs has not been studied;
2. Related to this issue, the emergence of large numbers of combined-cycle gas turbine power plants (CCGT) will increase the need for adjustable transmission capacity, which will have to be considered and met in consultation with flexibility suppliers;
3. Because the timescales involved in the construction of transmission infrastructures are sometimes longer than for the development of certain adjacent infrastructures, and because of the multiplicity of projects and an overstretched engineering market, there could be risk regarding the delay on transmission system delivery timeframes.

In addition, it should be recalled that, in accordance with Article 21 of law 2003-08 of January 3, 2003 amended by law 2006-1537 of December 7, 2006, GRTgaz’s investment programme is submitted annually for approval by the CRE (French Energy Regulatory Commission), and the total amount of investment is approved by GRTgaz’s Board of Directors.
Structure of this document

The 10-Year Development Statement is structured around five sections.

The first section recalls the main features of GRTgaz’s network and describes the essential factors used in designing capacity levels.

The second section presents all the contextual components that GRTgaz sees as influential and significant in the development of the transmission system. For example, the development of transportation capacity to link suppliers to end customers is affected both upstream – by changes in gas supply routes to Europe – and downstream, by trends in gas demand in France.

The third section explains GRTgaz’s infrastructure development strategy.

A fourth section describes plans for development and reinforcement that may be necessary to meet the market’s capacity requirements.

And finally, the fifth section summarises the investments that GRTgaz envisages to undertake over the period 2008–2017.

This statement is followed by three appendices, describing:

- the assumptions made by GRTgaz about future gas consumption in France and about standardised subscription levels;
- the methods used by GRTgaz to identify bottlenecks and decide on the need for system reinforcement;
- a breakdown of envisaged investment over the period sorted by purpose.
I. THE GRTgaz TRANSMISSION SYSTEM AND ITS DESIGN CHARACTERISTICS

I.1 GRTgaz’s transmission system, one of the longest in Europe

With approximately 31,700 km of high-pressure pipelines, GRTgaz carried almost 700 TWh of natural gas in 2007, meeting consumption requirements of some 450 TWh, covering more than 80% of total French demand.

GRTgaz’s transmission system is interconnected:
* at the borders with the Belgian, German and Swiss transmission systems;
* in south-west France with the TIGF system, itself interconnected with the Spanish system;
* on the coast with the Fos and Montoir LNG terminals, and with Norway’s GASSCO system;
* with underground storage facilities spread across all GRTgaz’s zones;
* with downstream distribution networks, which carry the gas to the end users.

Physically, because almost all natural gas used in France is imported, the gas enters the transmission system at the border interconnection points and leaves it downstream to flow into the distribution networks, or directly to large-volume industrial customers. Natural gas entering the GRTgaz system that is not consumed in France travels into adjacent transmission systems. Finally, a significant proportion of the natural gas carried on GRTgaz’s system goes into and comes out of natural gas storage facilities, mainly to cover climate-related fluctuations in consumption but also, increasingly, to take advantage of price differentials over time (economic choices).

The system is divided into a main transmission system and a regional system (“feeder system”).

The main system consists of the parts of the network that link the interconnection points with the adjacent transmission systems, LNG terminals and storage facilities. This network is composed of large pipes almost always with a diameter of 600 mm or more. A significant proportion of this network is meshed and constitutes the “core system”. In this part of the main system, gas can circulate in both directions, depending on the configuration of gas entries and exits at the interconnections. The direction of flow can thus vary from one day to the next, or even within a single day. The corollary of this feature is that a structure on the core system cannot be assigned specifically to carry gas from an entry point or towards an exit point.

The feeder system is composed of the parts of the system used to carry gas from the main system through to very large-volume users or to city distribution systems. Except in certain cases, the feeder system operates as a “branch”, in that gas flows in only one direction from the main system to the consumer. This network is composed of pipes whose diameter is almost always less than 600 mm.
I.2 The GRTgaz system, based on entry/exit zones

The contractual system is divided into entry/exit zones which govern the way the market works, i.e. how gas suppliers access their customers, as well as exchanges of gas between suppliers. It is within each of these zones that the different shippers must balance their gas entries and exits. These entry/exit zones are therefore also called balancing zones.

The entry/exit model allows system users to ignore the physical links between entry points and exit points on the system, enabling the gas market to work fluently and competitively.

**GRTgaz’s system operates on a fully unrestricted entry/exit model**, which offers the following functions:

- any consumer in the zone can be supplied with gas from any entry point in the zone, and conversely any supplier on an entry point can supply any consumer in the zone;
- a corollary to this fluidity is that gas volumes, once present in the zone, can be traded without reference to source or destination, and shippers can also trade subscribed capacity without restriction;
- requested capacity can be subscribed, up to the available quantities, whatever the intended purpose.

**In every balancing zone, to optimise transmission, shippers have access to further services in addition to the entry and exit functions:**

- access to a Gas Title Transfer Point (PEG) where trading transactions can be registered, soon to be supplemented with a gas exchange associated with each of these zones;
- quality conversion from H to L-gas, and from L to H-gas;
- management of shipper imbalances (the gap between entries and exits) based on market mechanisms;
- access to storage services provided by the storage operator.

The existence of several entry/exit zones reflects limitations in physical capacity on the main core transmission system and the impossibility in certain cases of delivering gas to a user in one zone from an entry point located in another entry/exit zone.

In order to determine marketable transmission capacity under the entry/exit model, GRTgaz carries out simulations of gas flows, based on reasonable assumptions. That process is described in Appendix 2 of this document.

On May 1, 2008, GRTgaz had 44 active shippers on its system.

The increase in the number of shippers (double since the end of 2006) reflects European actors interest in the French market. Both gas producers and high-volume consumers have moved into a market previously largely occupied by traditional wholesale suppliers, retailers and traders. This trend comes with the full liberalisation of the gas market in France on July 1, 2007.
I.3 A significant simplification to GRTgaz’s system on January 1, 2009

The organisation of gas transportation in France will change significantly from January 1, 2009, in order to promote and support market development.

The main features of this change are:
- an extensive recasting of system access, with a reduction in the number of GRTgaz’s entry/exit zones from four to two from January 1, 2009. This means that all consumers in the newly created great North zone will have direct access to a wider range of gas sources. Suppliers operating in this merged zone will have more options to choose between the zone’s different entry points;
- three entry/exit zones linked in series, covering the whole of France: two zones, North and South, operated by GRTgaz, and one zone operated by TIGF;
- a single link between GRTgaz’s North and South zones;
- a single link between GRTgaz’s South zone and the TIGF zone, operated in close coordination between the two transmission operators, with joint “marketing”.

The benefits expected from these changes are significant:
- general simplification of access to the system and to the market, across the country, for all shippers and consumers;
- for shippers who only use one or two entry points in the three existing zones in the north of France, the possibility of accessing all consumers in the new merged zone with exactly the same transmission conditions as their competitors;
- increased potential for arbitrage between the different sources of gas, for shippers who already use several entry points.

In addition, at the end of 2008, Powernext1 plans to create a Gas Exchange in France covering all the Title Transfer Points (PEGs). GRTgaz supports this initiative, which will enhance the liquidity and efficiency of the market and offer opportunities for further improvements to the balancing system and eventually for market couplings.

GRTgaz will carry out the technical adjustments to its system which will enable trading on the new organised market and enable the Gas Exchange to function.

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1. Powernext SA, created in 2001, is a so-called Multilateral Trading Facility which manages organised, transparent and anonymous marketplaces in the electricity and gas sectors. GRTgaz acquired a 5% stake in Powernext in May 2008.
Prior to the opening up of the market, transmitting natural gas was essentially a matter of carrying regular quantities, which were known well in advance (broadly speaking, planned consumption and a few regular transit volumes), from entry points into France.

Since the opening up of the energy markets, this activity has evolved significantly. The purpose is still to guarantee the transmission of natural gas for consumption, under certain climatic conditions, but now also to provide all shippers with a system that enables them to optimise their gas trading portfolio to suit their own criteria (cost, availability of resources, etc.).

Shippers thus need to be able to use multiple suppliers to enhance security of supply and take maximum advantage of the opportunities offered by producers, to export volumes received in France more extensively to neighbouring markets, to have easy access to storage services and to trade gas with trading partners with minimum restrictions.

Given these priorities, the transmission operator’s main objective must be to provide the market with necessary, sufficient and timely capacity, on economic terms that are compatible with the quality of service expected by users of the transmission system.

The main priority of feeder system development is to cover transmission needs at peak consumption periods, generally in times of cold weather. To determine these needs, GRTgaz establishes its own assumptions on the trends in volume and peak demand that its system needs to meet (cf. Appendix 1).

By contrast, developing the main system is much more complex. For GRTgaz, the aim is to build the capacity requested – and paid for – by the market. However, the process of making requests and commitments to purchase capacity is much trickier for the shippers. It is a process that very largely depends on projects that are not decided by GRTgaz, such as the construction of new LNG terminals, or projects associated with adjacent operators, such as the development of cross-border interconnections.

That is why GRTgaz maintains continuous consultation with all the stakeholders, and particularly with adjacent infrastructure operators:

- by coordinating transmission system development with LNG terminal development;
- via Open Seasons (market consultations) on the cross-border interconnections points;
- via the different bodies established to organise consultation, in particular the Gas Regional Initiatives (GRI) run by the European Regulators’ Group for Electricity and Gas (ERGEG).

This consultation process identifies the system development needed to create or increase capacity at the interconnections and links between the different entry/exit zones.

The reinforcement requirements of the core transmission system within each entry/exit zone follow increases in the zone’s entry and exit capacity. The entry/exit model means that congestion should never prevent a shipper supplying a client from any entry point in the zone. The necessary adjustments to the system are identified, with the requirement that this principle is met when the system is operating in flow constraint conditions, underpinned by reasonable assumptions (cf. Appendix 2).

The structures on the core system provide service without distinction at all entries and exits in the zone. This means that upgrades to a core system structure can be justified by increases in capacity on several entries or exits. That is why, in this document, these developments are analysed separately from interconnections and links, despite the connection with them.
II.1 Numerous supply infrastructure projects in Europe

There are numerous plans to increase gas supply in Europe, mostly in the form of infrastructure projects (pipelines or LNG terminals). These initiatives are driven by the need to satisfy demand that has been stimulated by electricity generation and to offer all parties the means to respond to the challenges arising out of energy market globalisation and liberalisation in Europe.

INCREASING NEED FOR GAS IN EUROPE

Gas demand in Europe is essentially driven by electricity production. Apart from the fact that gas emits less CO$_2$ than oil or coal, it is the preferred fuel for many wishing to develop their own electricity production capacity: the costs and timescales for building combined-cycle gas turbine power plants (CCGT) are relatively low, and these plants produce electricity continuously and at competitive rates. The fact that the demand for electricity is rising steadily, combined with the low investment in electricity production in the last decade, is also a factor that explains the strong interest in projects of this type, both in France and Europe.

In addition, because natural gas ensures a continuous supply of electricity, these systems represent a good backup to the development of electricity production from renewable energies, where output is very intermittent.

At the same time, gas consumption may flatten out in the residential and service sectors as the cost of gas rises (in line with oil prices) and building insulation improves.

This trend could be confirmed with the recent global warming positions announced by the European Commission, paralleled in France by the Grenelle de l’Environnement process. However, it should be noted that not all the effects of this new policy have yet been identified, in particular in the absence, at this stage, of concrete measures to achieve the very ambitious targets set by the European Commission.

(source Global Insight – October 2007)
On the European production side, output continues to decline, in particular in the UK, Italy and Germany, despite an increase in Norwegian production. This means that more and more natural gas will have to be imported from producer countries outside the European Economic Area.

**ESSENTIAL ARBITRAGE OPTIONS**

The global gas industry has undergone major changes in the last few years. The old economic model, based on long-term contracts frequently indexed on oil prices, is gradually being replaced by shorter-term contracts, where the price is no longer determined by oil prices but increasingly by supply and demand in the gas market itself. All around the world, therefore, LNG cargoes—which traditionally followed fixed routes—are increasingly subject to arbitrage. With liberalisation in Europe, there is a similar variability in pipeline gas flows, which responds to price signals around the continent. Within this context, there are numerous plans for new gas infrastructures to accommodate the new supply scenarios required by market operators.

**NEW SUPPLY ROUTES**

Moreover, there are many projects for new infrastructures to bring gas to Europe both through pipelines and by LNG tankers.

The main pipeline projects

The “Nord Stream” project will link Russia and Germany directly via the Baltic Sea, with the first pipeline set to come on stream in 2011 with an initial capacity of 27.5 bcm per year, which may rise to 55 bcm per year with the commissioning of a second pipeline in 2013.

The “Nabucco” project will provide access to production zones in the Caspian Sea and the Middle East via Turkey, creating new supply sources for Europe. This pipeline, with a capacity of 8 bcm per year, is set to come on line in 2013. Its capacity is subsequently expected to rise to 31 bcm per year.

The “South Stream” project will link the production zones in the Caspian Sea to Bulgaria through a pipeline with a capacity of 30 bcm per year, set to come on stream in 2013. This project comes on top of a pipeline to Greece and Italy and another to Austria.

The “Trans Adriatic Pipeline (TAP)” project linking Greece and Italy via Albania, with a capacity of 10 bcm per year, is due to come on stream in 2010, and the “Interconnector Greece-Italy (IGI)” project, also linking Greece and Italy, with a capacity of 8 to 10 bcm per year, is due to begin operations in 2012.

The “GALSI” project, a pipeline between Algeria and Italy via Sardinia, which will offer capacity of 8 to 10 bcm per year when it comes on stream in 2012.

The “Medgaz” project, linking Algeria and Spain via a pipeline with a capacity of 8 bcm per year, where the gas is due to start flowing in 2009.

LNG terminal projects

LNG has developed substantially throughout the world in recent years. This trend will continue, since transportation by LNG tanker, when possible, is more economical than pipeline transmission for linking production zones that are increasingly remote from the point of use. In addition, it reduces the risks associated with political instability in the transit countries and offers the potential for intercontinental arbitrage options between supply sources.

The coastal zones of the countries situated in the west and south of Europe are well-suited to the construction of LNG terminals.

Most LNG terminal projects are located in the following countries: UK, Netherlands, Spain, Italy, Belgium and France. However, projects are also being explored in other countries such as Germany, Poland or Croatia.
II.2 France at the crossroads of European resources

GROWING DEMAND FOR GAS IN FRANCE

France occupies a key position in Europe’s natural gas market, with residential and industrial consumption of around 50 bcm per year, almost 10% of total European consumption. As in the rest of Europe, these consumption levels are set to rise due to sustained growth in gas-fired power generation and the increased use of gas in refineries and heavy industry. Over the period 2008–2017, demand is expected to grow by an average annual rate of 1.6% (cf. Appendix 1).

FULL MARKET LIBERALISATION

Since July 2007, all users have been able to choose their natural gas suppliers.

As of March 31, 2008, the CRE’s electricity and natural gas observatory showed that non-residential sites receiving their gas under a market based offer accounted for 60% of total consumption. Almost a third of these consumptions is covered by alternative suppliers. Residential users, for their part, essentially obtain their gas from the historical suppliers under a regulated tariff contract.

Twelve new alternative suppliers feature on the supply list published by the CRE, alongside the 24 historical suppliers (including 22 local distribution firms).

COASTAL AREAS BENEFIT FROM LNG DEVELOPMENT

France has one of the longest coastlines in continental Europe. Since 2006, five projects for new LNG terminals or extensions have emerged in France, at Dunkerque, Antifer, Montoir-de-Bretagne, Le Verdon and Fos-sur-Mer, underlining the attractiveness of the French coast as a location for LNG infrastructures.
**ARBITRAGE AREA FOR EUROPEAN GAS RESOURCES**

**Because of its geographical position, France is situated at the crossroads of Europe’s main supply streams.** Plans to develop LNG terminals in western and south-western Europe could place France at the heart of the gas market and generate the emergence of a significant west-east arbitrage mechanism.

Be it for economic, strategic or environmental reasons, there is a very high level of uncertainty as to whether these new plans for supply infrastructures in Europe will come to fruition. Moreover, the use of this capacity at any given moment will depend on numerous factors, such as the attractiveness of the American or Asian market, domestic consumption in Russia, the growth of exports from the Persian Gulf, etc.

France could be on the first place where arbitrage between the different European gas resources could appear, making GRTgaz’s transmission system a powerful contributor to security of supply and to the achievement of the single market.

**A VISION SHARED WITH THE MARKET PLAYERS**

Consultation and discussion about the southern and north-western regions begun in 2005 by ERGEG through the “Gas Regional Initiatives” (GRI) also confirmed the necessity for coordinated development of France’s interconnection capacity with Spain, Belgium and Germany. **GRTgaz has therefore maintained close relations with TIGF, Enagás, Fluxys, EGT, GDF-DT and ENI GTI.**
GRTgaz has two priorities in operating, maintaining and developing the transmission system. The first is to supply users as required under its public service obligations, and the second is to meet the new requirements of shippers and thereby to contribute to the development of the single European market.

In response to identified needs, GRTgaz plans to increase its interconnections with capacity with adjacent systems so that the European transmission network is in a position at any time to adjust to potential changes in gas supply schemes. Before implementing any plans, GRTgaz will continue to consult the market in order to identify the need for improved interconnections.

Within this framework, GRTgaz’s strategy for the development of its transmission system reflects five objectives:

1. to create new entry capacity as required by the creation of planned LNG terminals or the expansion of existing LNG terminals;
2. to reinforce entry and/or exit capacity from adjacent systems, at the borders, and with TIGF in France;
3. to reinforce core system capacity to reflect upgrades to interconnections and storage facilities (any significant growth in an interconnection brings additional gas into the core system and generates bottlenecks which must be removed to ensure fluidity across the entry/exit zones);
4. to increase link capacity between GRTgaz’s entry/exit zones, or even to remove all physical bottlenecks completely and merge entry/exit zones;
5. to develop capacity on the feeder system in order to deal with demand peaks.

In addition to these development objectives, GRTgaz needs to invest significantly in its transmission system for other purposes, in particular to comply with new regulatory standards, but also to gradually renew its older installations.
DEVELOPMENTS IN PROGRESS OR UNDER CONSIDERATION

IV.1 Development of interconnections with the LNG terminals

DEVELOPMENTS REQUIRED BY THE FOS CAVAOU TERMINAL (APPROACHING COMPLETION)

The new Fos Cavaou terminal will be fully connected to the transmission system at the end of 2008. This process will have entailed the laying of a new large-diameter pipeline between the terminal and the Saint-Martin-de-Crau compressor station. At the same time, the Saint-Martin-de-Crau interconnection has been completely upgraded to maintain gas flows under all conditions.

GRTgaz and TIGF also need to reinforce the core system, with GRTgaz focusing on the Guyenne pipeline. On GRTgaz’s side, this work will be completed at the end of 2008.

PLANNED LNG TERMINAL PROJECTS

In 2006 and 2007, the emergence of several LNG terminal projects prompted GRTgaz to enter into discussions with the project promoters, to identify capacity requirements and to ensure that the scope and timetable of the increase in regasification capacity is consistent with the system’s interconnection and transportation capacity.

From north to south, these projects are:

* a new terminal at Dunkerque, with a stated capacity of 9 bcm per year, possibly expanding to 16 bcm per year;
* a new terminal at Antifer, with a stated capacity of 9 bcm per year, possibly expanding to 18 bcm per year;
* a two-stage extension of capacity on the Montoir-de-Bretagne terminal, starting with 12.5 bcm per year, possibly followed by a further 16.5 bcm per year;
* a new terminal at Le Verdon, south of the Gironde estuary, with capacity of 9 bcm per year, possibly expanding to 15 bcm per year;
* a new terminal in Fos, with a stated capacity of 8 bcm per year.

Public Debates were held on the Dunkerque, Antifer and Le Verdon projects between September and December 2007, and the findings recently published by the French National Commission for Public Debate (CNDP). GRTgaz was involved in the Debates on the Dunkerque and Antifer projects.

In order to anticipate the improvements needed on the transmission system, GRTgaz entered into early discussions with the promoters of the projects located on GRTgaz’s zones, and with TIGF regarding the impact of the Le Verdon project. The aim is to meet the needs of shippers by ensuring that transmission capacity keeps pace with real levels of development in regasification capacity.

These consultations led to the signature of a study agreement with certain LNG terminal project operators and the establishment of a partnership to coordinate the sale of transmission and regasification capacity.

In addition, at the request of the CRE (French Energy Regulatory Commission) and in consultation with LNG terminal operators and shippers, GRTgaz adjusted its pricing structures for access to the transmission system downstream from an LNG terminal.
INTERCONNECTION INVESTMENT REQUIRED BY PLANNED LNG TERMINAL PROJECTS

The creation of new entry capacity into the system from LNG terminals demands major developments to the transmission system.

In order to take further quantities of gas from these points without reducing the capacity of the existing entry points or the fluidity of the system, it is necessary:

- to create or reinforce the connection between the LNG terminals and the main core system;
- in most cases, to reinforce core system capacity; without such reinforcement, firm capacity would have to be restricted because of insufficient capacity on the core system.

That is why the investment required to accommodate an LNG terminal does not stop with the investment in connecting and linking the terminal to the core system, but entails potentially substantial investment in the core system itself.

It is possible that not all these terminal projects will come to fruition, and that therefore not all the expected transmission investment will be necessary. This will essentially depend on go-ahead decisions by the terminal project promoters, which will only be taken over the next few years.

That is why:

- GRTgaz is analysing the projects and investments required (in interconnection and in the core system) so as to be able to implement them as close as possible to the time when the terminals are due to come on stream, in the event that the decision to build them is taken and actually implemented. For this purpose, studies and consultations have already begun;
- The projects under consideration depend on the terminals actually being built and on shippers undertaking to subscribe capacity on the system;
- The investments under consideration are indicative. At this stage, they in no way constitute a commitment on the part of GRTgaz.

The investment on GRTgaz’s transmission system required to establish the connections between the Dunkerque, Antifer and Montoir-extension terminals and the core system is currently estimated at €660 million over the period 2008–2017.

This amount does not include:

- investment on the core system to carry the gas within the entry/exit zones. This core system investment, which is largely common to other projects, is covered below in paragraph IV.4;
- investment in the connection of the Le Verdon terminal, and of a third terminal at Fos.

IV.2 Development of interconnections with adjacent transmission operators

DEVELOPMENT OF ENTRY CAPACITY AT OBERGAILBACH

In 2005, GRTgaz undertook a market consultation in order to gauge the need for new entry capacity at Obergailbach.

The outcome of this consultation prompted GRTgaz to plan a two-stage process for the development of entry capacity:

- the first stage will increase firm entry capacity by 120 GWh per day by the end of 2008. This will increase firm entry capacity to 550 GWh per day;
- the second stage will increase firm entry capacity to 620 GWh per day by the end of 2009.

The new infrastructures required for the planned increase in entry capacity at Obergailbach are shown on the map below.
The provisional timetable for the commissioning of these new infrastructures is shown in the table below.

<table>
<thead>
<tr>
<th>Projects</th>
<th>Provisional commissioning dates</th>
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<tbody>
<tr>
<td>North-East Pipeline (looping + adaptation of the Obergailbach receiving station)</td>
<td>2008</td>
</tr>
<tr>
<td>Laneuvelotte compressor station (upgrade)</td>
<td>2008 / 2009</td>
</tr>
<tr>
<td>Laneuvelotte interconnection station</td>
<td>2010</td>
</tr>
<tr>
<td>Morelmaison interconnection station (adaptation)</td>
<td>2009</td>
</tr>
<tr>
<td>Taisnières H interconnection station (adaptation)</td>
<td>2009</td>
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The Laneuvelotte interconnection station has been fully upgraded to provide transit capacity consistent with the new entry capacity at Obergailbach. Given the ageing of certain components of the existing interconnection station, the investment in this station is not solely geared to the development of capacity at Obergailbach, but also to the renovation of those installations. Investment represents €120 million for the period 2007–2011.

At the beginning of 2008, E.On Gastransport began consultations regarding all the entry and exit points on its system, in particular the Medelsheim/Obergailbach interconnection point.

GRTgaz is able to increase capacity at Obergailbach by around 100 GWh per day by 2013. Firm entry capacity at this point could rise to 720 GWh per day.

Subject to enough demand from shippers justifying this development and to allocation rules to be decided with the agreement of the CRE, GRTgaz envisages to allocate this new capacity to shippers who obtained capacity at Medelsheim under E.On Gastransport’s 2008 Open Season.
In 2005, GRTgaz and TIGF reached an agreement to coordinate the development of capacity on their respective networks in the south of France. The primary objective of this coordination was to provide an outlet for gas from the new Fos Cavaou terminal, where construction was beginning at the same time, even in the event of a reversal in the physical direction of gas flow at the Spanish border, from its historical north-south direction to south-north. To handle this scenario, work began to reinforce the Guyenne pipeline, which runs through both TIGF and GRTgaz zones.

Since 2005, the development prospects of the transmission system in the south of France have changed considerably. Firstly, new LNG terminal projects have emerged at Le Verdon and Fos and, secondly, demand from the Spanish market with a view to reinforcing interconnection with France, in both directions, has been clearly confirmed by the market players and regulators. However, this demand is no longer confined just to the interconnection itself, but extends to a link between the Spanish market and the North PEG, which is itself linked to the marketplaces of northern Europe.

In the long run, this demand will entail the construction of transmission infrastructures from the Pyrenees border to northern France, to ensure gas transit between these distant regions. So it is no longer just the interconnection at the border between the two countries that is affected, but truly GRTgaz’s entire core system. This topic was at the heart of the discussions of the South Gas Regional Initiative, led by the French, Spanish and Portuguese regulators with the active participation of transmission system operators, in particular ENAGÁS, GRTgaz and TIGF.

Following an initial phase of consultation, an understanding was reached on physical and commercial capacity, and on coordinated decision-making. Indeed, the level of planned entry capacity, in particular from the LNG terminals, could reverse the physical direction of the flows at Taisnières. Up to now, this option was prevented by the fact that in France the gas is odorised across the whole transmission system, whilst in Belgium the presence of artificial sulphur in gas is prohibited on the transmission system. That is why GRTgaz plans to install a gas deodorising plant at the exit point from its system. However, because this is an entirely new process on such a scale, GRTgaz is running a pilot plant in 2008 at its Research Centre, in order to test the economic benefits of the project before building a full-size plant at Taisnières. The target date for commissioning this plant, with a planned capacity of some 80 GWh per day, is 2012.
a - Development of the “Western route”
Between now and 2013, this development would reinforce the route that passes through the existing interconnection point at Port-de-Larrau and via the Guyenne pipeline. It would increase capacity between:

- Spain and the TIGF zone,
- the TIGF zone and the GRTgaz South zone.

The development of the “Western route” requires a significant programme of investment in the Enagás and TIGF networks and, for GRTgaz, the creation of a new compressor station at Chazelles, on the Guyenne pipeline, located within the core system. This programme will not coincide with the reinforcement of link capacity between GRTgaz’s South and North zones, as it is not achievable until 2015. However, it should be noted that although full capacity has been reached on this link in the north to south direction, that is not the case in the south to north direction, where extensive capacity still remains.

b - Development of the “Eastern route”, with the MIDCAT (Midi – Catalonia) project
By 2015, this project would develop physical interconnection capacity via the eastern Pyrenees, on a new route through the Perthus Pass area.

This development would reinforce capacity between Spain and GRTgaz’s South zone. This new capacity could be sold to enable shippers to carry gas from Spain to GRTgaz’s South zone and vice versa. At the same time, link capacity between GRTgaz’s North and South zones would also be reinforced by an Eastern route, running along the Vallée du Rhône-Lyonnais/Bourgogne axis (cf. paragraph IV.5).

Developing this route would require the building of numerous infrastructures with correspondingly high levels of investment. Assuming a decision is made in 2009, the earliest date for commissioning would be 2015.

The “Eastern” programme would include the MIDCAT interconnection between the border and the Midi pipeline, then, in the core system, a looping of the Rhône pipeline and partial looping of the Est-Lyonnais, Bourgogne and, possibly, Midi pipelines.

It should be noted that these reinforcements to GRTgaz’s core system, including the looping of the Rhône pipeline, would contribute to projects other than the development of the France-Spain interconnection and the reinforcement of the North-South link, such as development of interconnection capacity to new regasification capacities in the Fos-sur-Mer zone and to the development of salt cavity storage capacity in the south of France.

In any case, investment decisions are subject to approval by the CRE in France, and financial plans must be approved by the transmission system operators’ Boards of Directors.

In the short term, the development of the Eastern route requires consultation with the market to decide by what method capacity on this route could be commercialised. On first analysis, two main options could be envisaged:

- In the form of additional entry/exit capacity between the three zones, ENAGAS, TIGF and GRTgaz. In this case, the “Eastern route” capacity would simply be added to the “Western route” capacity, under a single contract.
- In the form of capacity directly linking the new exit point from the ENAGAS zone (Perthus region) to the entry point in the GRTgaz zone (on the Midi pipeline). In this case, the “Eastern route” capacity would be contractually separate from the “Western route” capacity.

One- or two-phase consultation and decision-making process
Under the South GRI, the market consultation process is planned to take place in autumn 2008. This process should specify:

- the services on offer to the market,
- the price levels envisaged,
- the provisional decision and implementation schedules,
- methods for allocating capacity.

The immediate aim of the transmission system operators is to gather the market commitments required to trigger the development of the “Western route”. The development of the “Eastern route” is more complex, and requires the services and financial implications to be defined precisely in advance. In particular, the impact of investment in the North-South link on the level and structure of GRTgaz’s tariffs needs to be assessed.

In the light of these issues, and to avoid delaying commercialisation and decisions relating to the Western route, the Open Season process may have to be run in two phases.
**Summary of developed capacity**

In 2008, upgrades already decided by GRTgaz or underway will develop entry capacity at Obergailbach and at Fos for the Fos Cavaou LNG terminal. Once these investments are complete, a summary of the capacity situation will look like this:

### DEVELOPMENT OF EXIT CAPACITY TO SWITZERLAND AT OLTINGUE

The main exit point on the system to Switzerland and Italy is located at Oltingue. The flow is stable and uses much of the capacity of that exit point. However, GRTgaz has received signs of interest from several shippers in the development of exit capacity at Oltingue. GRTgaz has therefore opened discussions with the downstream operator of the ENI GTI transmission system. It is not yet certain whether reinforcement in Switzerland will be feasible. For GRTgaz, it would be necessary to upgrade the Marches du Nord-Est pipeline.

#### FORECASTS OF EXISTING AND COMMMITTED FIRM CAPACITY AT THE NORTH ZONE ENTRY AND EXIT POINTS

<table>
<thead>
<tr>
<th>GWh per day</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>entries</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PIR Dunkerque</td>
<td>570</td>
<td>570</td>
<td>570</td>
<td>570</td>
<td>570</td>
</tr>
<tr>
<td>PIR Taisnières H</td>
<td>590</td>
<td>590</td>
<td>590</td>
<td>590</td>
<td>590</td>
</tr>
<tr>
<td>PIR Taisnières B</td>
<td>230</td>
<td>230</td>
<td>230</td>
<td>230</td>
<td>230</td>
</tr>
<tr>
<td>PIR Obergailbach</td>
<td>430</td>
<td>550</td>
<td>620</td>
<td>620</td>
<td>620</td>
</tr>
<tr>
<td>PITTM Montoir</td>
<td>360</td>
<td>360</td>
<td>370</td>
<td>370</td>
<td>370</td>
</tr>
<tr>
<td>GRTgaz South → GRTgaz North</td>
<td>120</td>
<td>120</td>
<td>120</td>
<td>230</td>
<td>230</td>
</tr>
<tr>
<td><strong>exits</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PIR Oltingue</td>
<td>223</td>
<td>223</td>
<td>223</td>
<td>223</td>
<td>223</td>
</tr>
</tbody>
</table>

#### FORECASTS OF EXISTING AND COMMMITTED FIRM CAPACITY AT THE SOUTH ZONE ENTRY AND EXIT POINTS

<table>
<thead>
<tr>
<th>GWh per day</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>entries</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PITTM Fos</td>
<td>200</td>
<td>400</td>
<td>400</td>
<td>400</td>
<td>400</td>
</tr>
<tr>
<td>PIR TIGF → GRTgaz South</td>
<td>10</td>
<td>30</td>
<td>80</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>GRTgaz North → GRTgaz South</td>
<td>230</td>
<td>230</td>
<td>230</td>
<td>230</td>
<td>230</td>
</tr>
<tr>
<td><strong>exits</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GRTgaz South → TIGF</td>
<td>93</td>
<td>325</td>
<td>325</td>
<td>325</td>
<td>325</td>
</tr>
</tbody>
</table>

The development of new entry and exit capacity arising from new LNG terminals and the different interconnections would very significantly increase capacity.
**FORECASTS OF FIRM CAPACITY AT THE NORTH ZONE ENTRY AND EXIT POINTS**

<table>
<thead>
<tr>
<th>GWh per day</th>
<th>Eventual (depending on development options chosen by adjacent infrastructure operators)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>entries</strong></td>
<td></td>
</tr>
<tr>
<td>PITT M Dunkerque</td>
<td>360</td>
</tr>
<tr>
<td>PIR Taisnières H</td>
<td>770</td>
</tr>
<tr>
<td>PIR Taisnières B</td>
<td>230</td>
</tr>
<tr>
<td>PIR Obergailbach</td>
<td>720</td>
</tr>
<tr>
<td>PITT Montoir</td>
<td>420</td>
</tr>
<tr>
<td>PITT Antifer</td>
<td>315</td>
</tr>
<tr>
<td>GRTgaz South → GRTgaz North</td>
<td>230</td>
</tr>
<tr>
<td><strong>exits</strong></td>
<td></td>
</tr>
<tr>
<td>PIR Oltingue</td>
<td>280</td>
</tr>
</tbody>
</table>

(1) assumption of 330-day load matching in the terminal (per year)
(2) without development of the North-South link

**FORECASTS OF FIRM CAPACITY AT THE SOUTH ZONE ENTRY AND EXIT POINTS**

<table>
<thead>
<tr>
<th>GWh per day</th>
<th>Eventual (depending on the timetable chosen by adjacent infrastructure operators)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>entries</strong></td>
<td></td>
</tr>
<tr>
<td>PITT M Fos</td>
<td>410</td>
</tr>
<tr>
<td>PIR TIGF → GRTgaz South</td>
<td>255</td>
</tr>
<tr>
<td>PIR MIDCAT → GRTgaz South</td>
<td>230</td>
</tr>
<tr>
<td>GRTgaz North → GRTgaz South</td>
<td>230</td>
</tr>
<tr>
<td><strong>exits</strong></td>
<td></td>
</tr>
<tr>
<td>GRTgaz South → MIDCAT</td>
<td>180</td>
</tr>
<tr>
<td>GRTgaz South → TIGF</td>
<td>375</td>
</tr>
</tbody>
</table>

(2) without development of the North-South link

Developments already in train will increase entry and exit capacity on GRTgaz’s system by some 30% between 2008 and 2011 (around 200 GWh per day in the North zone and 500 GWh per day in the South zone). If all the potential projects are implemented, this capacity would eventually increase by almost 80% over 2008 levels, with equivalent development in the North zone and in the South zone.

**IV.4 The consequences of developing entry and exit capacity on the core system**

**THE UPGRADES REQUIRED**

With regard to the management of entry/exit zones, the system upgrades required for the development of the entry and exit points are not confined to the parts of the system immediately adjacent to those interconnection points. The required upgrades also extend to the core system, because of the need to be able to handle a very wide variety of scenarios. Indeed, without the development of core system capacity, bottlenecks would appear with the new entry capacity, depriving the new supplies of sufficient outlets and restricting their range of influence.

With the development of LNG terminals in the North balancing zone, therefore, it will become possible to supply the whole of that zone either exclusively with LNG from the terminals located in the north and in the west of the zone, or solely with gas from the borders with Germany and Belgium in the north-east of the zone. This situation puts pressure on the core system, since it is required to carry maximum flows in both directions. The growth in entry capacity on GRTgaz’s network necessarily entails a development of the core system in order to carry this gas and to offer new options for supply and arbitrage between gas resources.
The increase in entry and exit capacity has a significant impact on the core system, in both the North and South zones. In order to handle these entry flows, whether fully or partially, it will be necessary to start upgrading the core system along several transportation routes, which will require the laying of new, large-diameter pipelines, with the associated compression levels, in particular:
- a Cuvilly/Dierrey/Voisines axis, from the north to the east of France,
- a Morelmaison/Voisines/Dierrey/Chémery axis, from the east to the west of France,
- a Saint-Martin-de-Crau/Etrez/Voisines axis, from the south-east to the east of France, notably passing through the Rhône Valley.

The approximate level of investment in the core system that would be required in the period 2008–2017, arising from the forecasts for entry and exit capacity summarised in the tables above, would be around €2,000 million (at current values), mainly concentrated in 2012 and 2015. In this scenario, any fall or rise in entry or exit capacity could respectively reduce or increase the level of upgrade to the core system.

It should be noted that the creation of a terminal at Le Verdon would have a significant impact on GRTgaz’s core system. Indeed, the new physical flow of gas could potentially combine with the flows from Spain and from Fos, requiring at the very minimum that the Rhône and Est-Lyonnais pipelines be looped, in order to carry all these volumes northwards.

This impact on the core system will occur regardless of the route of the connection, whether it is directly connected to the TIGF system south of the Gironde, or to the GRTgaz system north of the Gironde (these different options are currently being studied).

The growth in CCGT plants, which is extensive and relatively concentrated in the south east, the north, the east and Ile de France, also affects the core system by generating very concentrated exit flows to those areas, with hourly fluctuations.

For GRTgaz, it appears:
- that a good proportion of these projects ought to be implemented to develop this new entry and exit capacity,
- but that none of the major new terminal projects has so far been decided, nor the border interconnections. It is possible that some of these projects will never be implemented.

So GRTgaz is both preparing to build these major infrastructures, but also considers that decisions on implementation – and therefore on investment – can only be taken when:
- the projects of adjacent operators have been formally agreed,
- commitments have been received from shippers to subscribe the new transmission capacity.

Moreover, the timetable for engineering works will depend on multiple factors, which are beyond GRTgaz’s control:
- the decision timetable of the adjacent operators, which will govern the identification of the necessary core system structures and the order in which work is undertaken,
- the authorisation procedures for these structures,
- the availability of engineering contractors, suppliers and building contractors, in a market that continues to be overstretched.

That is why, in the absence of information on the timetable for decisions on terminals or on the plans of adjacent operators, development forecasts should be treated with caution, and be considered as purely indicative until work actually begins.
ECONOMIC CONSEQUENCES

The potential long-term developments needed on GRTgaz’s transmission system, interconnections and core system upgrades, are likely to cost a substantial amount and would probably, if implemented, entail price increases. In these circumstances, the price equalisation system implemented by GRTgaz at System Interconnection Points (PIR), LNG Terminal Interconnection Points (PITTM) and Exit Points might be put into question.

A particular feature of the core system is that one of its structures can potentially be used to handle gas flowing to or from all interconnection points. It is therefore difficult to allocate a particular core system structure to a particular LNG terminal, or to a particular border entry/exit point.

It is nevertheless possible to make such an allocation on the basis of marginal theory alone, which would suggest that the cost should be assigned to the rate charged at the entry point concerned. However, depending on the order in which projects are implemented, such a policy would generate windfall – or conversely very damaging – effects, out of keeping with the conduct of programmes of this size. Thus the core system development costs would be applied to the rate charged at the entry point corresponding to the first terminal to be built. Yet the resulting capacity would be of benefit to the next terminal or the interconnection with another system.

Given these factors, GRTgaz remains favourable to the equalisation principle, which has the advantage of simplifying the transportation system for shippers.

IV.5 Increase in link capacity between entry/exit zones and zone merger

THE MERGER OF THREE BALANCING ZONES ON JANUARY 1, 2009

The transmission system was not historically designed for the flexible use of entry points, but for flows that were known in advance, based on long-term supply contracts. Because of its physical limitations, the transmission system was divided into 4 entry/exit zones on January 1, 2007, with flow constraints being passed on to users.

In order to adapt the system to the needs of the market, GRTgaz has committed the investment needed to merge the three zones in northern France. In 2009, this merger will bring real benefits to shippers, who will have unlimited possibilities to move their gas across the whole new North zone, from any entry point on that zone. It will also simplify the existing tariff structure.
As a result, the number of zones in France will be reduced to three: GRTgaz’s two zones – North and South – and the TIGF zone, which will be interconnected in series.

The North zone is divided into two physical balancing areas, respectively associated with H-gas and L-gas.

In order to enhance fluidity between GRTgaz’s South zone and the TIGF zone, the two operators have begun harmonising their access terms, in particular by introducing joint rules for capacity allocation and congestion management. Any shipper subscribing capacity with GRTgaz or TIGF at the interface between the two systems, will be guaranteed the same capacity in the other transmission system.

In addition, the simplification of the contractual system will result in a single link between the GRTgaz South and TIGF zones.

This means that the transmission system operators manage all the complexity of multiple physical interfaces, leaving the market to deal with one single simple concept: for the shipper, there is only a single route between two entry/exit zones. From 2009 onwards, all these arrangements should improve market integration between GRTgaz’s South zone and the TIGF zone.

THE DEVELOPMENT OF CAPACITY BETWEEN GRTgaz’s NORTH AND SOUTH ZONES

GRTgaz began marketing the available capacity between its North and South balancing zones at the start of 2008. This process showed that shipper demand was greater than the capacity on offer, so available capacity was allocated in proportion to the volumes requested.

This means that there is active market demand for increased capacity between those two zones, in particular in the north-south direction.

In practice, the bottlenecks between the north and south of France are profoundly entrenched in the system. Historically, the big demand zones of south-east France were supplied with LNG from Fos, topped up with gas descending from the north to the south of France, mainly via the eastern corridor using the East, Bourgogne, Est-Lyonnais and Rhône pipelines. Thus, marketable transmission capacity from GRTgaz’s North zone to its South zone is restricted to 230 GWh per day.

This bottleneck arises not only from restrictions in the capacity of the structures situated near the boundary between the two zones, but also, and above all, from a lack of capacity within the North and South zones that would allow gas to be brought from the entry points (Fos or Taisnières) to the link.

The creation of an extra 200 GWh per day or so of additional capacity would roughly entail to double transportation capacity on the route between Lille and Marseille. The main investments required would then be as follows:

- Tripling of the Taisnières – Cuvilly pipeline,
- Looping of the Beauche pipeline,
- New Cuvilly – Dierrey pipeline,
- Looping of the Dierrey – Voisines pipeline,
- Partial looping of the North-East pipeline,
- Partial looping of the Bourgogne pipeline,
- Looping of the Rhône pipeline between Saint-Martin-de-Crau and Saint-Avit,
- Upgrading of the Cuvilly, Dierrey, Voisines, Etrez compressor and interconnection stations.

These developments entail the laying of more than 800 km of pipeline. The exceptional size of this programme could overrun the standard timeframe for completing major structures, which is around 5 to 6 years. The total cost of these developments is currently estimated at €1,600 million at 2008 values.

If the cost of this increase in capacity were to be recouped solely through revenues from the link, the link rate would have to triple to around €700 per MWh per day at constant values (€200 per MWh per day envisaged in 2009).

However, the core system structures envisaged to increase capacity on the North-South link will also – with the development of the associated interconnections – increase entry/exit capacity on the system by some 300 GWh per day in the north and 200 GWh per day in the south.

Besides, in the event that the core system has already been upgraded for the development of the entry and exit points, the additional investment expenditure required, estimated at around €400 million (at 2008 values), would be very much below the levels referred to above. The impact on tariffs would be significantly less, in so far as a proportion of the investment costs would be covered by revenues from the new entry points. In this case, the cost of the link could remain below the €300 per MWh per day threshold.
The final stage in the simplification of the transmission system covered by GRTgaz would be to create a single balancing zone. However, this merger would demand very high levels of investment.

A single zone would mean being able to supply the whole zones covered by GRTgaz, i.e. some 80% of total French demand, using gas from two or three entry points, alternatively in the north, or in the south, or in the east, or in the west.

The additional investment would correspond to the completion of the looping of the Lille – Marseille route, i.e.:

- Completion of the looping of the North-East pipeline,
- Completion of the looping of the Bourgogne pipeline,
- Looping of the Est-Lyonnais pipeline,
- Upgrades to the Dierrey, Voisines, Palleau, Etrez and Saint-Avis compressor stations.

The extra investment cost of such a merger is estimated at around €800 million at 2008 values, on top of the €1,600 million at 2008 values required to increase the North-South link by 200 GWh per day. Because of the disappearance of link terms, the whole cost would have to be applied to the other tariff terms. This total cost (€2,400 million at 2008 values) would entail a doubling or so of the entry and exit capacity terms envisaged for 2009 on the main system.

These investment costs might seem high compared with the situation in other countries in Europe, which have already developed a single zone on their territory, and raise questions about why the French situation is different.

In practice, the differences between countries are very great:

- The density of gas use is much lower in France than amongst its European neighbours, a consequence of its large size in relation to limited levels of consumption and gas transit; in practice, a single GRTgaz entry/exit zone would be seven to eight times larger in area than the single zone in the Netherlands or Belgium;
- France has entry points spread around all its borders and coastline, so gas flows can travel in all directions, whilst gas flows amongst its European neighbours are, for the most part, one-directional;
- In France, the entry/exit zones are managed without links between entries and exits, with no subscription conditions, and with no flow constraints on shippers.

It should be added that the creation of a single zone would automatically increase the level of investment needed to develop further subsequent entry capacity. Indeed, any further bottleneck generated by a new entry point would have to be removed across the whole single zone and not on a zone “confined” to half of France.
INDICATIVE INVESTMENT ASSUMPTION FOR THE PERIOD 2008–2017

It is tricky to establish an investment forecast for the whole period, because of the number of intended projects and the high degree of uncertainty as to their implementation, with any decision probably a year or more away. The exercise is made even trickier by the fact that there are significant interactions between the projects in terms of their impact on the core transmission system.

However, it is helpful to establish a hypothesis on future investment, notably in order to measure the possible impact of the prospective investment on GRTgaz’s transmission prices and thereby to evaluate its overall effect. This short- and medium-term perspective constitutes a basis for discussion with all the market players: shippers, engineering firms, construction firms, etc.

This investment hypothesis takes into account the following factors:

- ongoing investment in fluidity measures, which represents €545 million;
- development projects for which GRTgaz has already undertaken feasibility studies, i.e. excluding, among other things, the development of the North/South link, for all these projects, an assumption of 60% of investment has been applied, on the basis that it is likely that not all of them will be completed, or not all simultaneously; this estimate gives a further fluidity budget of €2,000 million over the period;
- investment programmes not associated with fluidity, which can be estimated with a certain degree of confidence – assuming no major change to the regulatory framework – at €2,400 million.

Within this framework, the indicative assumption for investment over the period is approximately €5,000 million. It is quite clear that this assumption is purely exploratory, and that the real level of investment will depend on which of the currently known projects are actually undertaken, as well as on possible future projects.

By taking this investment assumption and combining it with a parallel assumption about the transmission capacity that will be developed – i.e. 60% of the projects envisaged in this assumption – it is possible to measure the economic impact of the investment.

The ratio “Regulated Asset Base : Entry Capacity Offered” is used to measure this impact. Although very simplified, this indicator can cast light on average transmission price trends, all other things being equal.

This indicator is assessed at current values, assuming inflation of 2% per annum. It shows:

- over the whole period 2008–2017, an average above-inflation annual increase of some 1%, i.e. close to 3% per annum;
- over the early part of the period, from 2008 to 2012, an average above-inflation annual increase of slightly over 2%, i.e. a little more than 4% per annum.

This trend shows that the prospective investment would give rise to an above-RPI increase in transmission rates. This is a modest increase, particularly in the light of current rises in infrastructure construction costs and energy prices.

However, the increase is higher in the short term, which is explained by the fact that measures to improve fluidity, already well underway with the debottlenecking of the system in the north and the reinforcement of entry capacity at Obereggalbach and Fos, coincide with the programme to reduce emissions.

Finally, it is clear that the debottlenecking of the system between the north and south, whether partial or total, would result in much steeper rises. The level of these rises is also difficult to measure, since the investments required for such a debottlenecking programme would differ greatly depending on whether interconnections are being developed elsewhere.

(source GRTgaz)
**APPENDIX I**

**CONSUMPTION IN FRANCE AND STANDARDISED SUBSCRIPTIONS**

### 1 - Public service obligations

The public service obligations in the gas sector are laid down in Decree 2004-251 of March 19, 2004 and apply to all players in the gas supply chain in France. Article 9 of Section II of the Decree lays down the obligations of transmission system operators, including that of maintaining continuity of supply, excluding maintenance or cases of force majeure, in the following circumstances:

- a cold winter such as occurs statistically every 50 years;
- a period of extremely low temperature lasting a maximum of three days, as occurs statistically every 50 years.

This obligation applies to shippers with regard to residential customers, non-residential customers who have not signed an interruptible supply contract and customers performing a public interest role in fulfilling the essential needs of the nation, such as health, defence or public administration.

In order to fulfil this obligation, GRTgaz is required to maintain and develop a transmission system extensive enough for its transportation and delivery capacities to be available and sufficient to meet the needs of consumers.

For this purpose, GRTgaz applies normative assumptions about consumption volumes and peak consumption levels. These normative assumptions need to be reasonably prudent, in order to cover the abovementioned climatic scenarios applying to the transmission business, and are not intended for use in other contexts.

### 2 - Gas demand sector by sector

In establishing these normative assumptions about consumption trends, GRTgaz employs a model that includes several macroeconomic factors and implements a market segmentation defined by customer type (Residential/Tertiary/Industry/Energy).

For its medium-term, 3-year assumptions, GRTgaz uses information drawn from consultations with local distribution system operators and consumers directly connected to the transmission system.

Through these consultations, it arrives at assumptions on future consumption which are then consolidated through a macroeconomic assessment of demand growth based on indicators such as rises in GDP or energy prices.

Beyond three years, GRTgaz employs a sector-by-sector approach to identify consumption trends. Within this framework, the main assumptions on consumption trends used for this 10-year Statement are as follows:

- **Residential, service sector and natural gas for vehicles (NGV):** 0.3% average annual rise over the period 2007–2017, given the effects of climate change and the gradual introduction of environmental regulations, in particular subsequent to the Grenelle de l’Environnement process.

- **Industry and refineries:** 1.2% average annual rise over the 10 years, through growth in the use of natural gas as a feedstock, refining (hydrogen production) and biofuels. Excluding refining and biofuels, the growth is 0.7% per annum. Biofuel production is driven by higher biofuel incorporation targets. It should roughly offset the effects of a regulatory climate less favourable to the sugar industry within the World Trade Organisation.

- **Centralised electricity generation:** the short- and medium-term assumptions regarding consumption are based on familiarity with the projects and an assessment of the probability of their implementation. Indeed, GRTgaz is in direct relations with RTE (France’s electricity transmission system operator) and operators who are developing combined-cycle gas turbine (CCGT) projects. Over the longer term, GRTgaz uses the assumptions for electricity supply and demand drawn up by RTE and included in the Multiannual Investment Programme for power generation (PPIe).

- **Cogeneration:** the assumption is that natural gas demand will remain stable, with substantial uncertainty associated with the future regulatory framework.
The table below shows the normative assumptions for gas demand within GRTgaz’s zones, for the period 2008–2017 and broken down by sectors:

<table>
<thead>
<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential and Service Sector</td>
<td>246</td>
<td>247</td>
<td>250</td>
<td>254</td>
<td>254</td>
<td>0,3%</td>
</tr>
<tr>
<td>Industrial sector including refineries</td>
<td>193</td>
<td>198</td>
<td>203</td>
<td>214</td>
<td>217</td>
<td>1,2%</td>
</tr>
<tr>
<td>Industry excluding refineries and biofuels</td>
<td>181</td>
<td>182</td>
<td>186</td>
<td>192</td>
<td>195</td>
<td>0,7%</td>
</tr>
<tr>
<td>Centralised electricity production and cogeneration</td>
<td>31</td>
<td>32</td>
<td>51</td>
<td>76</td>
<td>83</td>
<td>10,4%</td>
</tr>
<tr>
<td>System operators’ own consumption</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>0,6%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>476</td>
<td>483</td>
<td>510</td>
<td>549</td>
<td>561</td>
<td>1,6%</td>
</tr>
</tbody>
</table>

*Actual consumption  **Average annual growth rate

NB: GRTgaz publishes regular online information on changes in gas demand within its zones on [www.grtgaz.com](http://www.grtgaz.com).

**Comparison of demand assumptions established in 2007 and 2008**

3 - Peak gas demand

PEAK CONSUMPTION MODELLING

The Decree on the public service obligations covers a weather scenario defined as a period of three days of extremely low temperatures as occurs statistically once every 50 years. This scenario, called a “1-in-50 peak-day demand” scenario, is more constraining for the feeder system, i.e. the part of the network that supplies gas to consumers.

In order to meet its obligations, GRTgaz must assess 1-in-50 peak-day gas demand in order to adjust transmission capacity on the feeder system and delivery capacity.

Depending on their levels of consumption, natural gas users are either supplied directly from the transmission system (called “direct customers”), or from a local distribution network.

Direct customers, electricity generation plants, refineries, big industrial plants or commercial sites know their peak gas demand level, and indeed are often able to control it by adjusting activity. GRTgaz therefore considers that the exit capacity required by these users is the same as that subscribed by the shippers who supply them.

Consumers connected to the local distribution systems have no precise idea of their peak gas demand, largely because most of them do not have their gas use metered on a day-to-day basis. Conversely, the quantities delivered to the local distribution systems are measured or calculated every day, so GRTgaz is able to estimate gas demand by means of a “winter analysis”.

GRTgaz – 10-year statement 2008–2017
THE METHOD EMPLOYED FOR WINTER ANALYSIS

Every year, GRTgaz employs an analysis of the previous winter to extrapolate gas demand for a 1-in-50 peak-day demand scenario.

The Decree on the public service obligations takes account of the empirically observed fact that the quantity of gas consumed to provide heating on a given day depends not only on the temperature on that day, but also on that of the two previous days (thermal inertia).

Using statistical analysis, it is possible to assign weightings $\alpha_0$, $\alpha_1$, and $\alpha_2$ to the temperatures of days $d$, $d-1$ and $d-2$ in such a way that the resulting weighted average ($\alpha_0T_d + \alpha_1T_{d-1} + \alpha_2T_{d-2}$) shows the best possible correlation with consumption on day $d$.

This weighted average, which is called the “effective temperature”, is used by GRTgaz to analyse daily consumption during cold periods. Effective temperature is calculated using the following formula:

$$T_{\text{eff}} = 0.64T_d + 0.24T_{d-1} + 0.12T_{d-2}$$

Peak gas demand on the local distribution systems is determined by the following model:

1. Heating devices are switched on below a certain threshold temperature $T_t$; consumption at this temperature is called “$E_0$”.
2. For effective temperatures that fall below $T_t$, consumption increases proportionally to $(T_t - T_{\text{eff}})$, the proportionality coefficient being the gradient termed $G$.
3. Peak gas demand is determined by adding the product of the gradient by $(T_s - T_{\text{eff}})$ to $E_0$, where $T_{\text{eff}}$ refers to the effective temperature resulting from a “maximum three-day period as occurs statistically every 50 years”.

The consumption for each day $d$, therefore, is given by the following equation:

$$E_d = E_0 + G(T_t - T_{\text{eff}})$$

At times of peak cold, this equation becomes:

$$E_2 = E_0 + G(T_t - T_{\text{eff}})$$

where: $E_d$ is consumption measured or calculated for day $d$; $E_0$ is consumption at the threshold temperature $T_t$; $E_2$ is consumption at 1-in-50 peak day demand.

The day-to-day figure used in the analysis is for consumption determined between 6 a.m. on day $d$ and 6 a.m. the next morning. Consumption at weekends, public holidays, long week-ends and school holidays is not taken into account, because it is significantly below consumption on other days at equivalent temperature.

To ensure uniformity with consumption on day “$d$”, the temperature of day “$d$” is the average of eight instantaneous temperature readings taken every three hours between 6 a.m. on day “$d$” and 3 a.m. the next morning.

TRENDS IN PEAK CONSUMPTION IN FRANCE

The assumption for peak-day demand consumption deduced from the analysis of the winter of 2007-2008, is 4% below that of winter 2006-2007.

This recent phenomenon may be the result of a change in consumer behaviour, and in particular the behaviour of households, under the dual impact of rising energy prices and the Grenelle de l’Environnement process. In the absence of sufficient perspective, it is hard to determine at present whether this fall is a one-off or already represents an underlying trend.

The assumptions for 1-in-50 peak-day demand per gas year on GRTgaz’s transmission system for the period 2008–2017, are given in the table below.

Peak gas demand is observed to be approximately 1% of annual consumption for customers connected to the distribution systems and 0.5% of that annual consumption for direct customers.

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>TOTAL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gas year* (bn kWh)</td>
<td>1.7%</td>
<td>481</td>
<td>520</td>
<td>560</td>
<td>571</td>
</tr>
<tr>
<td>P2 total (GWh/d)</td>
<td>1.4%</td>
<td>3866</td>
<td>4142</td>
<td>4405</td>
<td>4456</td>
</tr>
<tr>
<td>P2 firm (GWh/d)</td>
<td>1.5%</td>
<td>3710</td>
<td>3984</td>
<td>4253</td>
<td>4307</td>
</tr>
<tr>
<td>Public distribution systems</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gas year (bn kWh)</td>
<td>0.4%</td>
<td>315</td>
<td>320</td>
<td>326</td>
<td>327</td>
</tr>
<tr>
<td>P2 total (GWh/d)</td>
<td>0.4%</td>
<td>3031</td>
<td>3084</td>
<td>3142</td>
<td>3151</td>
</tr>
<tr>
<td>P2 firm (GWh/d)</td>
<td>0.3%</td>
<td>2983</td>
<td>3031</td>
<td>3082</td>
<td>3088</td>
</tr>
<tr>
<td>Direct customers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gas year (bn kWh)</td>
<td>4.0%</td>
<td>163</td>
<td>196</td>
<td>230</td>
<td>240</td>
</tr>
<tr>
<td>P2 total (GWh/d)</td>
<td>4.6%</td>
<td>817</td>
<td>1042</td>
<td>1245</td>
<td>1286</td>
</tr>
<tr>
<td>P2 firm (GWh/d)</td>
<td>5.4%</td>
<td>710</td>
<td>938</td>
<td>1154</td>
<td>1201</td>
</tr>
<tr>
<td>GRTgaz’s own consumption</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gas year (bn kWh)</td>
<td>0.7%</td>
<td>4.1</td>
<td>3.8</td>
<td>4.2</td>
<td>4.4</td>
</tr>
<tr>
<td>P2 total (GWh/d)</td>
<td>0.7%</td>
<td>17.0</td>
<td>15.9</td>
<td>17.5</td>
<td>18.3</td>
</tr>
<tr>
<td>P2 firm (GWh/d)</td>
<td>0.7%</td>
<td>17.0</td>
<td>15.9</td>
<td>17.5</td>
<td>18.3</td>
</tr>
</tbody>
</table>

* Gas year: from November 1 of year N to October 31 of year N+1  ** P2: gas demand at 1-in-50 peak day demand  *** Average annual growth rate
4 - Standardised subscription

Every supplier who transports gas on the transmission system and supplies customers from a distribution network must subscribe delivery capacity at the PITDs, the Interface Point between the Transmission System and the Distribution Network to which its customers are connected. To meet its continuity of supply obligations, each supplier must subscribe sufficient delivery capacity to meet the consumption needs of its customers at periods of 1-in-50 peak-day demand.

The method used for calculating delivery capacities at the PITDs was standardised using a method developed by the GTG (Gas Working Group), a consultation body headed by the French Energy Regulatory Commission (CRE) and involving the different players, in particular suppliers and infrastructure operators.

This method is described in the document "Système de souscriptions normalisées des capacités de transport aux PITD" (standardised system for subscribing transmission capacity at the PITDs), available on the website at www.gtg2007.com. GRTgaz uses this method to calculate subscriptions of monthly delivery capacity for each supplier at the end of each month, taking into account the development of their customer portfolio.

The standardised system for subscribing delivery capacity at the PITDs came into force on January 1, 2007.
1 - Determination of system capacity at interconnection points and links

Shippers obtain access to the French transmission system through a tariff system with 5 balancing zones: 4 zones for GRTgaz and one for TIGF.

To make access easier and to attract new players into the French market, GRTgaz has undertaken a program to reduce the number of balancing zones. On January 1, 2009, therefore, the number of zones in GRTgaz’s tariff structure will be reduced from 4 to 2, through a merger of the North, East and West zones.

As a result, the number of zones in France will fall to three: GRTgaz’s two zones, North and South, and the TIGF zone.

In order to simplify its tariff system, GRTgaz needs to invest in new infrastructures to develop internal physical capacity. These developments, which are currently underway, will remove the current bottlenecks between zones and eliminate the links that currently separate them. This debottlenecking programme was begun in 2007 with the commissioning of the Cuvilly station and will continue until the end of 2010.

2 - The method used for determining capacity

Determining the capacity of a transmission system requires a set of data – the technical characteristics of the system’s component infrastructures, the system’s operating constraints and the distribution of gas flows within the system. When planning new infrastructure, the dimensions are determined using capacity forecasts and scenarios for the use of system capacity which GRTgaz draws up on the basis of its view of the level of gas flows in the coming years.

Technical characteristics
The transmission system primarily consists of pipelines and compressor stations.

As regards the pipelines, the technical characteristics that affect the capacity of the system are: diameter, maximum safe pressure (MSP), length and roughness. These characteristics govern load losses in the pipe, i.e. the fall in pressure that occurs as the gas flows through the pipeline. Basically, the capacity of a transmission system is directly linked with the load losses generated in the pipes.

The function of compressor stations is to boost gas pressure in the pipes when load losses have generated excessive pressure drops. The technical characteristics of the compressor stations are primarily their power, the maximum and minimum flows they can compress and the limits in compression rates (ratio between downstream and upstream pressure).

The characteristics of other facilities on the system, such as the regulation valves that generate specific load losses, also affect capacity.

All these characteristics are known for existing or definitely planned infrastructures, but are provisional when considering new infrastructure.
Operating constraints

The operating constraints relate to the availability of minimum pressure levels at different points on the transmission system to allow the gas to be transported and delivered. These conditions are established by GRTgaz in order to meet its public service obligations for supply to the distribution networks and its contractual undertakings under connection contracts signed with industrial clients.

The distribution of flows across the system

The level of actual flows on the system depends on the extent to which shippers use their subscribed capacity at the entry/exit points, the level of consumption and the use of storage capacity. Shippers may prefer certain entry points to others in different market conditions. In winter, moreover, it may be preferable to withdraw gas from underground storage facilities rather than taking it from border points. In summer, gas from varied supply sources may be injected into the underground storage facilities, depending on the period.

 Broadly speaking, it is neither possible nor helpful for GRTgaz to explore all the possible flow combinations at the entry and exit points on the system. In fact, exploring all the possible options for system supply solutions would significantly reduce the level of firm capacity that GRTgaz could sell or, in the case of new capacity, would result in investment in infrastructure that would be very substantially underused.

3 - Design scenarios

Capacity is therefore determined on the basis of flow distribution scenarios that are considered realistic and acceptable.

GRTgaz establishes these scenarios on the basis of its knowledge of past flows and its vision of future trends. They correspond to normal use scenarios which are used to determine firm capacity on GRTgaz’s transmission system. The objective of the calculation is to maximise the capacity offered to shippers on a given system at different entry/exit points.

The scenarios cover a wide range of climatic conditions from 1-in-50 peak-day demand (corresponding to an extremely low temperature for a period of three days as occurs statistically every fifty years as defined in Decree No. 2004-251 of March 19, 2004 on the public service obligations in the gas sector) to the day in August when consumption is lowest.

In addition, the scenarios for use of the system consider the weather-dependent use of underground storage facilities, where gas is injected in summer and withdrawn in winter. In particular, the maximum level of withdrawal assumed when determining transmission capacity depends on consumption levels and therefore on temperature (for example, maximum levels of withdrawal from storage facilities is not considered to constitute a normal use of the system in conditions of moderate cold). This mechanism for the use of storage facilities by shippers is consistent with the provisions of Decrees 2004-251 of March 19, 2004 on the public service obligations in the gas sector and 2006-1034 of August 21, 2006 on access to natural gas underground storage facilities.

GRTgaz’s framework of validity for firm capacity therefore covers all climate situations under which each shipper is able to meet their public service obligations, in particular through the use of underground storage facilities to supply customers in winter and their refilling in the summer period. In addition, there is a wide range of possible supply strategies from the system entry points.

4 - Development of new interconnection capacity and core system upgrade requirements

Interconnection capacity can be generated by an upgrade to the existing system or by a new infrastructure project. In both cases, operators need to work together to agree on the design characteristics of the structures on both sides of the interconnection point. This consultation process is currently underway both through the Open Season for the development of the Taisnières entry point and for projects for new LNG terminals (new entry capacity) or for a link to and from Spain in the Eastern Pyrenees (new entry and exit capacity).

For GRTgaz, the aim of this consultation is twofold: first, the design of structures directly linked to the entry or exit point concerned; second, the inclusion of new capacity in system use scenarios. The creation of additional entry or exit capacity modifies the possibilities for distributing flows across the system by expanding the supply strategies available to shippers. In an entry/exit system, therefore, an increase in entry or exit capacity should go hand-in-hand with the enhancement of transmission system fluidity, which generates a need for reinforcement not only near the entry or exit points affected by the increases, but also within GRTgaz’s core system.

The development of interconnection capacity requires investment not only on the entry or exit point concerned, but also potentially within the whole balancing zone to which that point belongs, in order to maintain and, if possible, improve flow within the zone in question.
GRTgaz’s global investment plan is geared to a range of different goals.

1 - The public service obligations

The public service obligations in the French natural gas sector are defined by Decree No. 2004-251 of March 19, 2004. This Decree sets out a certain number of obligations on all involved in the natural gas supply chain (cf. Appendix I 1 - Public service obligations).

Over the period 2008–2017, GRTgaz plans to invest around €450 million (at current values) to meet its public service obligations.

2 - Environmental regulations

GRTgaz must make sure that its infrastructures and equipment comply with environmental standards and regulations. Recent changes to the regulations will require significant investment in compliance operations.

GRTgaz’s turbo-compressors fall within the ambit of the Order of August 11, 1999 on the abatement of pollution from combustion engines and turbines. In order to comply with this law, GRTgaz has begun a program to cut pollution on its installations through reductions in nitrogen oxide (NOx) levels.

Eleven compressor stations are currently being upgraded to meet these standards. On some of them, the work undertaken to meet regulations is combined with increases in compression capacity in order to optimise investment. One of these stations is Évry-Grégy, where output is being increased to contribute to the merger of the North, East and West zones.

Over the period 2008-2017, GRTgaz plans to invest €490 million (at current values) in green measures to bring its installations into line with environmental regulations.
3 - Rules on installation security

GRTgaz must make sure that its infrastructures and equipment comply with security standards and regulations. Recent changes to the regulations will require significant investment in compliance measures.

In 2006, new security regulations for natural gas transmission infrastructures were introduced. The Order of August 4, 2006 replaced the previous rules established by the Order of May 11, 1970. This new Order establishes the minimum requirements applicable to the design, construction, operation and temporary or permanent intervention of pipelines for the transmission of combustible gases, liquid or liquefied hydrocarbons and chemical products, in order to maintain the safety of people and property and to protect the environment.

Guides for professionals are being prepared in order to specify the technical provisions required for implementing this new Order.

The new regulations will make it necessary to reinforce protections on part of the transmission system where the environment has changed over time, in particular with increased urbanisation. GRTgaz estimates that it will need to install physical protection, in the form of concrete slabs, on approximately 800 km of the transmission system.

The investment required to bring installations into line with security regulations is estimated at around €570 million (at current values) over the period 2008–2017.

4 - System connections and extensions

The development of the feeder system largely reflects the need for new transportation capacity arising out of the increase in demand for gas. The developments required fall within the ambit of the public service obligations.

Under these obligations, GRTgaz must also ensure that the gas delivered to end customers meets required standards, in particular with regard to odorisation. Gas quality is monitored by the installation of devices for measurement and chromatographic analysis.

The development of the feeder system must also meet demand for connections by new customers. In this respect, the most significant system developments relate to the connection of combined-cycle gas turbine power plants. The biofuel industry is another developing sector, particularly in Champagne and Picardy. Environmental regulations are prompting certain industries, notably petrochemicals, to replace polluting fuels with natural gas.

Dynamic development of gas-fired power generation plants

The development of electricity generation from gas is the principal source of growth in gas consumption in France. This has created a dynamic market in the connection of new sites associated with multiple projects for gas-fired power plants.

As at May 1, 2008, more than 40 projects, supported by 10 promoters, had been identified. Most of these are combined-cycle gas turbine power plants (CCGT), which have higher output than combustion turbines, but also require greater initial investment. For eleven of these projects, the project promoter and GRTgaz have already signed connection contracts. Together, these eleven projects represent electricity generation capacity of 4,600 MWe.

Many of the projects will eventually involve two generation units, generally with an output per unit of 400 MWe, corresponding to unit consumption of around 20 GWh per day.

Some of these projects require a reinforcement of the feeder system, or even of the main transmission system. This is the case, in particular, for the North Brittany pipeline and the Provence pipeline.

On the basis of the portfolio of projects and GRTgaz’s estimates of the likelihood of each one reaching fruition, the investment required to connect power plants to the transmission system is estimated at €120 million (at current values) over the period 2008–2017. Altogether, the investment earmarked for connecting new customers – local distribution systems and customers directly connected to the distribution system, including power stations – together with extending the transmission system into new service areas, stands at €280 million (at current values) over the period 2008–2017.
5 - Enhancing infrastructure reliability

In addition, GRTgaz is investing in upgrades to its industrial facilities in order to maintain the level of performance and reliability required to perform its role as a transmission system operator.

The purpose of investing in infrastructure reliability is to maintain the expected level of performance in the services GRTgaz offers its customers.

The main reason for upgrading facilities is age-related deterioration. For example, the maintenance of more than 4,000 gas delivery stations requires repeated investment in the total or partial replacement of equipment, when it is no longer sufficiently reliable or becomes technologically obsolete.

In addition, GRTgaz regularly inspects its pipelines for faults that can emerge over time. When faults are detected, pipeline sections generally need to be replaced. These replacement operations may require the pipeline to be partially or totally shut down, reducing transportation capacity for a certain period of time.

In addition to its regular maintenance programs, GRTgaz needs to undertake major operations on specific installations. This is the case for several interconnection stations in the Paris area, and for the Lannevelotte interconnection station. The latter is being completely renovated and modernised, in order to match its transit capacity to the increase in entry capacity at Obergailbach in 2009.

GRTgaz plans to invest €510 million over the period 2008–2017 in maintaining optimum performance levels in its facilities.

6 - Enhancing system fluidity

The investments associated with this function are largely described in the body of this document.

Over the period 2008–2017, the indicative assumption for investment in GRTgaz’s system fluidity and the development of entry/exit capacity on the main system is approximately €2,500 million (at current values).

7 - Other investments

Other investments, or non-infrastructure investments, relate primarily to real estate, plant and equipment and the sales IT system.

Over the period 2008–2017, this “non-infrastructure” investment represents an amount of €150 million (at current values) for GRTgaz.
GRTgaz's grid

January 2008