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COMMISSION FOR ELECTRICITY
AND GAS REGULATION

STUDY

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'Monitoring of the Import Capacity for Natural Gas 2008'

drafted in application of Article 15/14, §2, 2° of the law of 12 April 1965 on the transport of gaseous and other products by pipeline

15 May 2008

Policy conclusions

1. Investment shortfall: situation of contractual congestion

The network operator's investment schedule has to contend with delays and reviews. The network operator is not managing to initiate investments for the Belgian market in time and fails to pursue an appropriate congestion policy in the event of delays. The network operator's attitude towards a congestion situation that was foreseeable, and is currently a reality, is very worrying in the light of market access for new supply companies and harmful for a good operation of the market. Efforts need to be made to avoid shortfalls in or obstacles to the provision of transport capacity that could lead to increases in the price of natural gas molecules. The planning of the natural gas transport network can no longer solely be an activity of the network operator, but should be subject to consultation and approval, as is legally provided for in the case of the development plan of the operator of the electricity transmission network.

2. Coupling with transit: investments for the national market should not be subservient

The network operator experiences difficulty in successfully meshing transport capacity for Belgium with transit activities. Network extensions for the Belgian market should not be subservient to or subordinate to investments for transit. Capacity expansion for the international market comes on top of projects that are necessary to cover Belgium's capacity requirements. The CREG advocates a network for shared use and an investment schedule based on this objective. However, the network operator continues to present investment projects in an individualised manner, whereby all too often the transit shippers determine whether the project materialises or not.

This ambiguity between national market and transit is a stumbling block for network extensions and integrated network management that in the end results in problems of market access for new natural gas suppliers and leads to frustration among end users. The European Commission indicates unambiguously that the equal treatment of international and national transport should be pursued.

3. Need for an effective congestion policy and “open seasons” for the national market

The network operator takes refuge behind the fact that the Royal Decree of 4 April 2003 on the code of conduct concerning access to transport networks for natural gas (the code of conduct) does not apply to transit activities, and fails, on the basis of the provisions of the code of conduct, to present an effective congestion policy for the Belgian market. However, here one should not forget the existence of Regulation (EC) no. 1775/2005 of the European Parliament and of the Council of 28 September 2005 on the conditions for access to natural gas transmission networks (the gas regulation that has been applicable since 1 July 2006). The CREG has long been confronted with a denial of the existence of contractual congestion by the network operator, despite the latter’s own findings and the reactions of shippers that point to this problem. The network operator is failing to fulfil its obligations, as a result of which the operation of the market at source, i.e. access to the market, is being impeded.

However, a congestion policy is essential to obtain competition on the natural gas market and is not in itself a sign of an investment policy found wanting. In a free natural gas market there will probably always be a need for some form of congestion policy because shippers change route according to where the natural gas can be bought most cheaply and where it can be sold under the best conditions. The over-booking of demand by shippers bears witness to this and therefore calls for specific treatment.

To gain a better view of the import points that have to be strengthened, it is also recommended that enquiries be addressed to the shippers by means of “open seasons” for the national market and not only for transit. Shippers should be given more participation in the choice of entry points that are strengthened: this facilitates the network operator’s planning task and offers more guarantees in combating congestion.

4. Need for network coupling: coordination with adjacent network operators

Transport networks are still too often managed and reinforced from an isolated point of view. The lack of cooperation is reflected in the sometimes substantial capacity differences on either side of the interconnections. This in itself is an impediment for shippers. Consultation and agreements between network operators could contribute towards a better network

coupling, but cooperation is also needed at operational level because the management of a network on which more and more shippers are active, becomes increasingly difficult to carry off successfully if one does not look further than one's own network. This certainly applies to a relatively small network with a large number of interconnections, such as the Belgian transport network, where the predictability of natural gas flows is not self evident. In this field substantial improvements in efficiency could no doubt still be made.

5. Optimal use of the network: effective handling of over-booking of demand

Shippers book more firm transport capacity in Belgium than what they can avail themselves of for certain upstream. This practice shows that the network is becoming increasingly used to commercial factors and that demand for capacity is no longer merely a derivative of the peak flow of Belgian natural gas consumption. However, the network management must react to this in a targeted fashion by making as much capacity that has been reserved but is not always used, available again to other shippers who wish to make use of it. The lack of such a mechanism is one of the reasons for the current situation of contractual congestion. Over-booking of demand could in large measure flow back to the shippers if there was a liquid day-ahead market where booked but non-nominated capacity was re-offered to the shippers, and a liquid secondary market.

6. Towards a new investment and transport model: balance between network extensions and network management

When network management techniques and services are exhausted in order to meet the shippers' demand, network extensions are necessary. Creation of transport capacity not only occurs by means of network extensions but also, and primarily, by means of a range of services aimed at having as much unused capacity as possible (including that which has been booked) flow back to interested shippers. In order to reinforce market access, and as and when more shippers become active on the transport network, the operator is expected to provide for a network management that develops services that are customised to the shippers.

Based on the promotion of free market forces and the need for flexibility for shippers, the network must be able to offer additional capacity to make arbitrage possible. This may call

for targeted network extensions, but first and foremost requires a different way of running the network in the form of a bespoke service for shippers. This trend is in line with the evolution towards an entry/exit model as championed by the European Commission. In consultation, a new balance will have to be found between the capacity offered and the shippers' demand that goes further than the transport requirement estimated on the supply flow.

The current congestion problem appears not so much to be a problem of physical transport capacity, since the Belgian transport network rates well in respect of the physical transport capacity available in the upstream and downstream networks. This general picture does not detract from the fact that reinforcements are urgently needed at some interconnections. The congestion problem appears to point more to management that is not leading to a full utilisation of the network's availability. This means that the way in which the transport network's availability is turned into services customised to the shippers could still be improved. The dual treatment of national transport and transit and the lack of an integrated approach are certainly part of the reason for this.

Introduction

1 Introduction

1.1 Context

(1) The Commission for Electricity and Gas Regulation (CREG) has drafted this study on the monitoring of the import capacity for Belgium's natural gas provisioning in accordance with Article 15/14, §2, 2° of the law of 12 April 1965 on the transport of gaseous and other products by pipeline (the Gas Act).

The aforementioned Article 15/14 of the Gas Act states that the CREG may carry out investigations and studies related to the gas market on its own initiative. The reasons for the present study are expounded below.

(2) In both the indicative plans drafted by the CREG in 2001[1] and 2004[2], the need for investments, linked to efficient network management striving for optimal use of the existing transport network's capacity, was clearly identified. After the concern voiced since 2005 regarding the lack of investments for the national natural gas market, the CREG now has a justified basis for stating that the network operator Fluxys is only fulfilling its obligations as operator of the transport network with difficulty[3]. The action that needs to be taken to initiate investments for the national market in a timely fashion and to pursue an adapted congestion policy in the event of delays, is not being taken. For that matter, it is telling that Fluxys has difficulty recognising the existence of contractual congestion for the national natural gas market, even though i) since the existence of publications on available capacity on the Belgian transport network, most figures are zero or virtually zero, ii) shippers for new connections can be induced to sign a contract that can be interrupted, iii) a series of applications for entry capacity have been refused, and iv) there is a dependence on conditional import capacity in counterflow (*backhaul*) of which only one historical shipper can avail itself. Fluxys' attitude towards this congestion situation is very worrying from the perspective of market access for new natural gas suppliers, and is harmful for a good functioning of the market. Only the issue of access to the Belgian natural gas market

[1] Proposal for an indicative plan for natural gas provisioning (2001-2011), approved by the competent minister on 3 March 2003.
[2] Proposal for an indicative plan for natural gas provisioning (2004-2014), approved by the competent minister on 19 December 2006.
[3] This finding ties in, for example, with the conclusions of the study commissioned by the CREG General Council and carried out by the British consulting firm CEPA, entitled "Structure and Functioning of the Natural Gas Market in Belgium in a European Context", which was presented to the public on 7 March 2008 (www.creg.be).

which is supplied with high-calorific natural gas (H-gas) has been targeted thus far, and still nothing has been said about access to the market for low-calorific natural gas (L-gas) which represents 28% of the Belgian natural gas market. Potential newcomers scarcely even dare consider this market option, in view of the limited chances of success vis-à-vis the historical suppliers that control the supply chains for this market.

(3) The CREG regards explanations given by the network operator based on arguments concerning longer and more difficult permit procedures, greater uncertainty of the natural gas market and limited income, as unfounded. Nothing has prevented or prevents the network operator from handling difficult issues together with the CREG with a view to finding a suitable solution, in the interest of a timely availability of transport capacity, whether by means of network extensions or by other means.

(4) The CREG is legally bound, on the grounds of Article 15/2 of the Gas Act, to inform the minister. With this study the CREG reports that the network operator Fluxys is failing to offer shippers sufficient transport capacity, whether by means of network extensions or by other means.

(5) As long as there are bottlenecks in the supply of transport capacity there can never be talk of a genuine competitive pricing of natural gas where producers and suppliers are forced into maximum efficiency. Congestion on the capacity market forms an obstacle to market entry, helps those who have transport capacity and endangers the business plans of new and smaller suppliers.

(6) This study is a monitoring study and does not aim to offer an update of the indicative plan for natural gas provisioning, or to replace the prospective study on the security of natural gas provisioning, 2008-2013, which henceforth has to be drafted by the General Directorate for Energy of the Federal Ministry for Economic Affairs, Small- and Medium-Sized Enterprises, the Self-employed and Energy, in accordance with Article 15/13 of the law of 1 June 2005 amending the Gas Act.

1.2. Content

(7) Security of natural gas provisioning and the entry of new natural gas suppliers depend, for an import country, on the degree of interconnection with the upstream

networks. For a transit country the importance of interconnection with the downstream networks also counts. Belgium both imports and transits sizeable volumes of natural gas. On the basis of this fact, this study focuses on the availability and use of the interconnection capacity of the Belgian natural gas transport network with the surrounding networks. In particular the study focuses on the offer of import capacity for the Belgian market and the extent to which the investment policy pursued by the operator of the transport network Fluxys is effective in capacity supply.

(8) The study refers to Fluxys' investment assignment to gear its network to the demand for transport capacity, that can be found in Article 15/1, §1, 1° of the law of 12 April 1965 on the organisation of the gas market (the Gas Act) combined with Article 6, first para., of the Royal Decree of 4 April 2003 on the code of conduct concerning access to the transport networks for natural gas (the code of conduct). This obligation applies insofar as this balance can be achieved in an economically acceptable, safe, reliable and efficient manner.

(9) The CREG's monitoring assignment ensues from the same Gas Act and is expressed in Article 15/2: "After an opinion by the Commission the minister may oblige any transport company to implement the connections or improvements he deems necessary, insofar as these are economically justified or where a customer undertakes to assume the relevant extra cost."

In addition Article 21, 3° of the code of conduct states that the operator of the transport network will inform the CREG if access to the transport network is only possible provided an additional infrastructure is built and further studies are carried out on the feasibility of the project. Given that operation of the market basically depends on timely investments, the CREG laments the fact that practice shows that the network operator Fluxys pays little heed to this article of the code of conduct.

(10) The study focuses chiefly on supply of import capacity for the Belgian H-gas market, a market for which the network operator has the obligation to provide for enough transport capacity in advance within the bounds of what is economically reasonable. The L-gas market and the transit market come under a different investment framework:

- The announced halt in investments for the Belgian L-gas market (main lines) in the Indicative Plan for Natural Gas Provisioning, 2004-2014 (www.creg.be)

remains, until further notice, the starting point for regulation. A monitoring of the switchover from L-gas customers to H-gas is needed. Monitoring is also needed to ascertain whether there is enough capacity on the H-gas network to make the switchover possible. If this is not the case and a congestion policy is necessary pending sufficient firm entry capacity for H-gas, an adjusted congestion policy also has to be implemented on the L-gas network. This means a trimming down of the switchover pending sufficient H-gas transport capacity.

- Capacity expansion for the international market is additional to the projects that are needed to cover Belgian requirements. This working method is in keeping with the positive attitude concerning a further development of the transit activity and meets the principle that investments have to be made in transit capacity as soon as bookings at the exits at the border increase. This avoids investments planned for the Belgian market being grabbed for transit, with possible supply problems for the Belgian market as a result.

(11) The study is structured as follows. The summary gives an overview of the study's six main policy conclusions. Then the findings are placed in a broader context in which the CREG formulates a standpoint (Chapter 2). There then follows a report of the technical analysis in five chapters. An analysis is made of the technical firm transport capacity on both sides of each interconnection of the Belgian natural gas transport network (Chapter 3), the overall network supply and use (Chapter 4), and the network extensions that have been decided on and the creation of capacity associated with them (Chapter 5). Finally, transport capacity supply is compared with the prospects for demand in order to be able to draw conclusions regarding the adequacy of the planned investments and security of supply.

2 Findings and standpoints

2.1 Introduction

(12) In this summary the findings of the study are placed in a broader context in which the CREG formulates a standpoint. Attention is given first to the supply of import capacity for the Belgian H-gas market, a market for which the network operator has the obligation to offer sufficient transport capacity in advance within the bounds of what is economically reasonable. The L-gas market and the transit market come under a different investment framework: (i) investments for the L-gas market have been discontinued until further notice, as a result of which the surplus demand, which exceeds the import capacity, is transferred to the H-gas market by means of a switchover of end users, and (ii) extra transport capacity for transit does not occur in advance, but on the basis of specific commitments on the part of transit shippers.

(13) The study yields conclusions in the following areas, which are discussed in greater detail below[4]:

1. Investment shortfall: situation of contractual congestion;
2. Coupling with transit: investments for the national market should not be subservient;
3. Need for an effective congestion policy and "open seasons" for the national market;
4. Need for network coupling: coordination with adjacent network operators;
5. Optimal use of the network: effective handling of over-booking of demand;
6. Towards a new investment and transport model: balance between network extensions and network management.

2.2 Investment shortfall: situation of contractual congestion

(14) Major delays in the investment schedule and projects of the operator of the transport network Fluxys lead to a situation of contractual congestion on the transport network. The balance between supply and demand of entry capacity will remain critical until

[4] These conclusions dovetail with the conclusions of the study commissioned by the CREG General Council and carried out by the British consulting firm CEPA, entitled "Structure and Functioning of the Natural Gas Market in Belgium in a European Context", which was presented to the public on 7 March 2008 (see www.creg.be).

2011 but even after that, the investments that have been decided on do not provide any guarantee that the demand for firm entry capacity can always be met at all the entry points. This shortfall in entry capacity is visible on account of the series of refusals of applications made by shippers for additional capacity and the limited quantities of entry capacity that are published online by the network operator Fluxys.

(15) As long as there are bottlenecks on the transport capacity market there can never be talk of a genuine competitive pricing of natural gas where producers and suppliers are forced into maximum efficiency. Limited capacity supply forms an obstacle for market entry, helps those that have transport capacity at their disposal, and endangers the business plans of new and small suppliers. This does not mean that the transport network alone is the key to a competitive natural gas market, but it is an important decisive factor.

(16) The Belgian transport network undeniably has to deal with a hesitant investment policy on the part of the network operator Fluxys, something which has been the case since the liberalisation of the market and despite the indicative planning drawn up by the CREG. On the basis of information received from Fluxys, the CREG concludes that the minimum package of investments proposed in the Indicative Plan for Natural Gas Provisioning, 2004-2014 has hitherto not been attained. Back in 2005 the CREG expressed its concern over the further development of transport capacity for the national market. In the period from January 2000 to April 2008, only two investment projects creating entry capacity for the Belgian market had been commissioned. The first of these relates to the Zandvliet H entry point which was commissioned in the middle of 2004 and is only locally relevant in the Antwerp region. The current entry capacity is 120 k.m³(n)/h and is heavily dependent on upstream developments in the "*GasTransportServices*" (GTS) transport network in the Netherlands. The second project concerns the doubling of the throughput capacity of the LNG terminal which was recently brought into use in April 2008, resulting in 300 k.m³(n)/h extra emission capacity becoming available for the Belgian market[5]. In July 2008 the compression project at Zelzate becomes operational and will create 290 k.m³(n)/h extra transport capacity for the provisioning of the Antwerp region. As the network operator's proposals currently stand, a series of reinforcements will be carried out from the beginning of October 2010 that should drastically crank up the capacity supply for the

[5] Before the doubling 800 k.m³(n)/h was available for the Belgian market. After the doubling of the throughput capacity offered to the market increases to 1,700 k.m³(n)/h, of which 600 k.m³(n)/h is currently booked for transit.

Belgian market. Entry capacity is expected to increase by 42% by 1/10/2012 vis-à-vis the current supply (1/05/08) for the Belgian market. Despite this strong growth, supply remains critical. In addition to a demand for natural gas that continues to rise sharply, the demand for transport is developing a dynamic of its own on account of the increasing numbers of shippers involved, as a result of which the network's commercial requirements will increase.

(17) Contractual congestion is the consequence of strong growth in demand for capacity, which is higher than the growth in demand for natural gas, and the evidently difficult process of making specific reinforcements. A few thoughts on the delays:

- The network operator is faced with longer periods for the various permit procedures. Nothing prevents a start being made on the applications for permits in the commencement stage of the project initiative. When action is taken far enough in advance, an exceptional delay or a refusal in an application procedure can be offset through capacity creation thanks to other projects or the working out of a suitable congestion policy for bridging. Taking action in advance in this way is desirable for the contracting of contractors and equipment;

- Growing market uncertainty applies only partially to the national market because the demand here can be estimated. For transit a more strategic approach is indeed needed. However, there are enough channels to look for suitable measures to avoid delays, in conjunction with the CREG. By coupling reinforcements for the national market with transit projects, reinforcements for the national market run the risk of being subject to the principles applicable to the transit market. However, investments for the national market should not be subservient to transit projects, due to the liberalisation and supply security of the national market;

- Investment in import capacity possibly also requires upstream investment initiatives. Here, too, measures should be taken in good time and new consultation structures developed between neighbouring network operators. The organisation of the various market surveys by means of international "open seasons" is a good initiative in which Fluxys plays a leading role. This form of international market consultation, which at the moment is still experiencing some teething problems, should evolve into a permanent consultative platform between network operators with the aim of gearing the networks to each other. Regular "open seasons" for the provisioning of the national market, and not only for transit, are recommended, all the more so on

account of the growing divergence between demand for capacity and demand for natural gas.

- Regulated tariffs. Fluxys' income is determined in accordance with the law. Deferring investments that are necessary for the national natural gas supply pending better financial conditions is a blocking of the market mechanism, and puts market growth at risk.

On the issue of the management of delays, the CREG has only been involved to a minor degree and laments the fact that the network operator Fluxys has difficulty recognising the existence of contractual congestion and the need for an adapted congestion policy to be pursued. What is more, a congestion policy is not a sign of an unsuccessful investment policy but points to a market-oriented management of the transport network with a view to meeting the demand as effectively as possible by shifting as much available capacity as possible to the shippers. Moreover, an effective congestion policy has hitherto been lacking.

(18) On account of security of supply only entry capacity over which the network operator Fluxys has control and which it can offer as "firm" entry capacity for the national market, can be included to the tune of 100% in the capacity balance sheet for the Belgian market, subject to deduction of the firm exit capacity at the border. It is pointed out that Fluxys keeps the capacity supply balanced by taking into account bookings of "backhaul" capacity at Blaregnies, although this, at least in the current circumstances, is conditional capacity. Moreover, this capacity is only available for the shipper responsible for the natural gas flow. It is therefore conditional capacity and indirectly shields the market of the shipper in question from competitors because they simply cannot avail themselves of entry capacity.

(19) The main capacity-creating investment projects from the previous two proposals for an indicative plan are the reinforcement of the LNG terminal (Indicative Plan for Natural Gas Provisioning, 2001-2011[6]) and the reinforcement plus meshing of the VTN pipeline with a view to the import of natural gas from the east for the Belgian market (Indicative Plan for Natural Gas Provisioning, 2004-2014[7]).

[6] Approved by the competent minister on 3 March 2003.
[7] Approved by the competent minister on 19 December 2006.

The first project that was presented in the first indicative plan, and was forwarded to the minister with responsibility for energy in October 2001, was recently commissioned (in April 2008).

The urgency of the reinforcement of the VTN pipeline for the Belgian market is well known, but due to all kinds of delays the first phase of this project will only be commissioned on 1/10/2010. The fact that this investment has not been forthcoming is due to the fact that this matter has been linked to the network operator Fluxys' project for transit investments. The CREG is of the view that reinforcements for the national market should not be subservient to activities aimed at transit.

In this respect, and this also applies to capacity booking at the LNG terminal, a careful monitoring should be carried out to ascertain that capacity that was originally planned for the national market, under the investment schedule, is not in the end booked for transit. If this is the case, new investments will have to be made for the national market in good time (bearing in mind the investment periods) to ensure that the capacity balance sheet for the Belgian market is balanced. The CREG does not have a sufficient guarantee that the Belgian market can rely on 1,100 k.m³(n)/h of firm emission capacity at the LNG terminal, in the knowledge that two of the three shippers (with 66% of the capacity) are chiefly international players and do not (yet) have any share on the Belgian natural gas market. Nevertheless, this is the basic principle adopted by Fluxys in the planning of the necessary import capacity in the medium term. However, here it should be added that insofar as the LNG shippers do not have exit capacity at their disposal at the national border, they are "forced" to sell natural gas in Belgium.

The upshot is that the reinforcement of the LNG terminal does not offer unconditional and certain capacity for the national market and that the reinforcement of the VTN pipeline with a view to the Belgian market only starts up on 1/10/2010. Until then the Zelzate interconnection point with the Netherlands is not a physical entry point for Belgium.

(20) The investment schedule of the network operator Fluxys contends with the indicative character. It is advisable for the network operator of the natural gas transport network to draw up a plan for the development of the transport network in the manner stipulated for the network operator of the transmission network in Article 13 of the law of 29 April 1999 concerning the organisation of the electricity market.

2.3 Coupling with transit: investments for the national market should not be subservient

(21) Given the operational interaction between the national natural gas market and the much bigger (in terms of capacity booking) transit market (36% booking for the national market, 64% booking for transit), the national market is very susceptible to developments on the transit market. In theory it is efficient to look for global solutions that meet both the international and the national market (utilisation of synergies). The danger – and reality illustrates this – is that national investments are rendered dependent on developments on the transit market that are subject to different principles and are generally more uncertain. The result is a shortage of capacity on the national market. The fact that the planned transport capacity for the Belgian market is concentrated on the VTN pipeline accentuates the consequences of this strategy.

(22) However, investments for the national market may not be rendered subservient to or dependent on investments for the foreign market (transit). Capacity expansion for the international market is additional to the projects that are needed to cover Belgian requirements. This working method is in keeping with a positive attitude towards continued development of the transit activity and respects the principle that investments should be made in transit capacity as soon as bookings at the exits at the border increase. This avoids investments planned for the Belgian market being grabbed for transit, with possible supply problems for the Belgian market as a result.

(23) At the moment use of the VTN pipeline is controlled by transit shippers under long-term contracts and only a small amount of capacity is freed up for the national market through free negotiation or the release of free capacity. In addition there are divergent requirements regarding natural gas quality, further to which bi-directional flows with the rest of the network are not always possible. The capacity of the VTN pipeline at the moment therefore does not form part of the unconditional part of the capacity supply for the Belgian market. This explains why the VTN pipeline is only meshed with the rest of the network to a small degree, and only directly supplies a few consumption sites in Belgium. This handicap will first have to be overcome, and this will in itself call for investments. If there is no guarantee that the investments in the VTN2 project can be used jointly and unconditionally for transit and the Belgian

market, these investments will not yield any “firm” transport capacity for the Belgian market and consideration should be given to investments that do make this contribution.

(24) The CREG rejects network operator Fluxys’ policy of viewing investments project per project and determining the regulation regime and application (transit/national transport) per individual project, to the detriment of the systematic approach. It is the network in its entirety that determines performance and the possible service. Given that the network system is responsible for the transport services, the granting of regimes per project is artificial and runs the risk of eventually leading to a distortion of the network. A project approach is also not in line with the evolution towards an entry/exit model as prescribed by the European directives.

(25) Network efficiency also means that in principle investments cannot be made in exit capacity if this is not offset by enough entry capacity, and vice versa (especially at the border). If, for example, not enough entry capacity for transit is available to supply the appreciable increase in the Interconnector’s reverse capacity, there is the chance of unnatural effects such as the export of natural gas (resulting in price increases) and the use of entry capacity that was intended for the national market.

The CREG is of the view that efforts should be made to avoid a situation whereby shortages or obstacles on the capacity market lead to increases in the price of natural gas molecules. On the other hand, efficiency gains booked by shippers thanks to easier access to the transport network should lead to price reductions among the end customers.

(26) The CREG wants to promote transit as much as possible within the preconditions safeguarding the free operation of the market for natural gas and the efficiency of the national transport system. In principle the building of transit projects may not hamper competition and security of supply on the national market. Such negative effects should be detected in good time and neutralised. If transit projects lead to planned reinforcements of the internal network being rendered redundant or, conversely, require reinforcements in view of the interaction between transit and national transport, the CREG wishes to react to this in an adapted manner. The problem of natural gas qualities is in this respect an issue that has not yet been resolved.

(27) The CREG strives for an integrated and meshed transport network in which natural gas flows can move freely, promoting liquidity and making the balancing requirements more flexible. These objectives promote both access to the market and competition, and security of supply.

(28) Transport capacity remaining for a long time in the hands of transit shippers under a regime possibly departing from the standard, does not offer any unconditional possibility of access for the national market. If natural gas for transit and the national market remains incompatible, this automatically leads to separate physical investments. The CREG advises that joint investments be chosen, that can be used without any problem for both transit and internal transport. Separate investments lead to inferior solutions and endanger possible synergy between the national market and the growing transit market.

(29) Given that investment cannot always be made in a phased fashion, the fact is that progressive investment offers extra capacity during the early years of the new investments. At the moment no capacity reserve is provided for in the investment schedule, which means that the system converges towards a total load at all the network's entry points as and when extreme values in demand for natural gas are reached. On the other hand, in normal circumstances, there is freedom of movement as regards the choice of entry points on the network and on average there is considerable freedom in the choice of provisioning route.

A problem may arise in the granting of capacity to transit and internal transport for example for VTN2. There is a conflict if "dormant"[8] capacity is automatically assigned to national transport. The CREG is of the view that dormant capacity should be assigned according to the ratio: *exits* home / *exits* border.

(30) In addition to capacity supply for import and transfer, investments should be made to further mesh the network, to facilitate the balancing of the network and to evolve towards a network with a single gas quality, namely EASEE-gas CBP[9]. In this respect the creation of an NBP (national balancing point) is important, together with the problem of the quality of natural gas that currently applies to the VTN and the Zeebrugge hub. The CREG feels that investments can only be made in natural gas

[8] The part of the capacity, created by means of network extensions, that is not immediately reserved but for which provision is made to absorb the expected growth in future demand.
[9] *Common Business Practices*, www.easee-gas.org

mixing for the British market if this is financed by means of export to the UK and is not a hindrance for the rest of the market.

2.4 Need for an effective congestion policy and "open seasons" for the national market

(31) The CREG concludes that the operator of the natural gas transport network Fluxys does not have an effective congestion policy, even though it is aware that the investments are experiencing lengthy delays and despite the CREG's exhortations. The CREG urges that bridging measures be taken pending the commissioning of new investments. Moreover, a congestion policy (contractual congestion) will remain important given that there will always be the possibility, in a free and volatile market, of shippers shifting to certain entry points in function of fluctuating market conditions, with (temporary) congestion as a result.

The CREG recommends that the congestion management instruments be deployed in a transparent and non-discriminatory fashion:

- As long as there is no congestion, every shipper can book free capacity but when a situation of scarcity begins to appear, transparency and effective free capacity calculation are critical requirements. Merely informative/indicative data are certainly not enough in that case. In this respect the planned network reinforcements and the effect that these have on entry capacity should also be published.

- Techniques for being able to offer "backhaul" capacity as firm capacity. The capacity balance sheet is kept balanced by taking conditional entry capacity (backhaul) at Blaregnies into account. A system of "contractual network management instruments"[10] should ideally be developed so that firm entry capacity can be offered. Consultation with the CREG is necessary to agree on the

[10] Contractual network management instruments: collective name for all kinds of agreements between individual shippers and the network operator that can help increase the performance of the natural gas transport network, such as, *inter alia*, the agreement allowing the network operator to request a shipper to inject a quantity of natural gas into the natural gas transport network at a particular moment and for a particular length of time. The main aim of these innovative instruments is to improve the predictability of the shippers' natural gas flows for the network operator, making it possible for network performance to improve.

degree to which capacity created by means of contractual network management instruments can be employed as an alternative to physical investments.

- Need for a marketing policy for interruptible capacity. The capacity balance sheet is kept balanced by interruptible contracts being offered, especially to new customers in the Antwerp area. This approach involves a rationing, and not an economic utilisation of the potential in interruptible capacity. It is non-transparent and discriminatory, in particular for new customers and new suppliers. Fluxys should pursue a transparent commercial policy as regards the utilisation of interruptible capacity and involve the entire market in this: large and small consumers affiliated to the transport network; and the customers of existing and new suppliers. Consultation with the CREG is needed to agree on the extent to which interruptible capacity can be used as an alternative to physical investments.

- The network operator facilitates the secondary market. As a matter of fact, every shipper has the obligation to offer unused capacity on the secondary market.

- Negotiations with shippers for contracts at favourable entry points and procedures for the buying back of capacity preferably at unfavourable entry points.

- Optimisation of the performance of the transport network: further network efficiency through synergy with transit activities.

- Optimisation of available capacities taking account of the adjacent network operators.

- Adaptation of the allocation rules in the event of congestion. Among other things, the development of a system whereby applications for capacity are not handled according to the principle of “first committed, first served”, but according to the impact on the transport network, starting with applications with a positive impact on the network and, of course, still taking account of security of supply.

  The so-called “continuation principle” also deserves to be adapted, certainly in the case of congestion. In the continuation principle the network operator assumes that after the end of the period of the existing transport contract, the shipper in question will extend the same booking, and consequently this anticipated capacity considered as booked until the end date of the existing transport contract is a

guarantee of security of supply but possibly too strong a principle in times of contractual congestion. This is mainly because the existing shipper in fact has the certainty of being able to extend the contract up until the end date. It would appear more efficient to start from the principle that there is an automatic release of the transport capacity at the end of the transport contract.

A capacity utilisation limit should be determined, beyond which an adapted capacity allocation mechanism starts, for example in the event of an 80% utilisation of the technical capacity.

It is not the aim of this study to discuss a congestion policy at length. For that matter, it is not up to the CREG to propose the entire range of possible congestion measures. The above-mentioned techniques are therefore merely a sample from among the possibilities that the CREG is encouraging. It is the responsibility of the operator of the transport network to submit a proposal for a coherent congestion policy.

Depending on the need for a switchover from L-gas customers to H gas and the congestion situation on the H-gas market, a parallel congestion policy should be pursued on the L-gas network to cut down the need for a switchover on account of the halt in investments on the L-gas network.

(32) Firm capacity is not created solely by investments being made in the transport network's "hardware". All kinds of innovative instruments (cf. contractual network management instruments) can also create firm capacity, but these instruments have to meet criteria so that the created capacity can be deemed equivalent to physical firm capacity.

(33) It is possible for there to be enough entry capacity over the entire transport network as a whole, but nonetheless to be a shortage of entry capacity at local entry points.

- The reinforcements option should be based as far as possible on "open seasons". These reinforcements do not call for long-term commitments in favour of the national market;

- If shifts occur between entry points resulting in local contractual congestion and whilst the national capacity balance sheet is still balanced, investments will be made if, in theory, the market is prepared to enter into long-term commitments, for

the national market as well. Of course the aim is not for temporary shifts to particular entry points, resulting in congestion, automatically having to give rise to additional reinforcements. On the other hand, the investment schedule cannot stick to entry capacity that structurally is of less interest to shippers. In that case consideration would have to be given to investments elsewhere, to avoid costs being incurred for nothing.

2.5 Need for network coupling: coordination with the neighbouring network operators

(34) Unfortunately operators of transport networks are still developing their networks from a too isolated standpoint, and there is a lack of cooperation. This shortfall is visible in the sometimes sizeable differences in available capacities on the two sides of interconnections between networks. This can partly be explained by commercial arguments, given that reinforcements and new pipelines may be in competition between network operators. However, there is no getting round the fact that investment decisions increasingly have to be made in consultation between operators in order to guarantee efficient interconnections.

(35) Timely capacity supply is essential for market access and competitive pricing of natural gas: this requires communication with shippers and adjacent network operators ("open season" procedures for the national market as well). There is a need for coordination between network operators: a gearing of *downstream* entry capacity to *upstream* exit capacity and vice versa, too.

(36) Belgium is already very heavily interconnected with its neighbouring transport networks. The Belgian natural gas market has highly differentiated supply routes, the most important of which accounting for less than 25% of supply. This marked interweaving of the Belgian natural gas transport network within the European network potentially makes access for new players more flexible. However, it should be added that the Indicative Plan for Natural Gas Provisioning, 2004-2014 proposes investments that have hitherto not yet been started. It should also be stated that the national market can only reap full benefit from these international interconnections if transit and internal transport are treated on an equal footing, and no further problems arise as far as interchangeability of natural gas qualities is concerned.

In this respect reference can be made to Regulation (EC) no. 1775/2005 of the European Parliament and of the Council of 28 September 2005 on the conditions for access to the natural gas transmission networks (the Gas Regulation), which has been in force since 1 July 2006. All sections of the Gas Regulation are binding and it is directly applicable in every Member State. The provisions of the Gas Regulation apply both to national transport and to transit, with the exception of the natural gas transmission systems for which exemptions are granted on the grounds of Articles 22, 27 and 28 of Directive 2003/55/EC (cf. Article 16 of the Gas Regulation), something that has no examples in Belgium.

2.6 Optimal use of the network: effective handling of over-booking of demand

(37) A high degree of over-booking of demand[11] is noted, i.e. extra booking of firm entry capacity on the Fluxys transport network vis-à-vis the booked firm exit capacity upstream. Whilst the total exit booking in the adjacent transport networks towards Belgium is estimated at 11,073 k.m³(n)/h, the firm entry booking on the Fluxys transport network is 15,196 k.m³(n)/h. There is therefore an over-booking of demand to the tune of 4,123 k.m³(n)/h.

(38) Owing to the "matching rule" for the national market, it is mainly transit shippers that (i) turn interruptible transport contracts upstream into firm transport contracts for the sake of securities, (ii) book firm capacity on several transit routes in order to safeguard possibilities of arbitrage between markets, (iii) book firm capacity downstream without any capacity booking upstream with a view to trading/sale at the border, and (iv) book firm transport capacity for the Belgian market and transit at the same time for the sake of arbitrage, on the Fluxys transport network. It is estimated that around 42% of the booked firm transit capacity in Belgium is not covered by a firm capacity booking upstream.

(39) The phenomenon of over-booking of demand is commercially explicable and proves that arbitrage is important in the portfolio management of transit shippers and the existence of expected opportunities in which the expected arbitrage profits outweigh the extra expenses for transport capacity. The fact that the network operator allows over-bookings of demand is also rational insofar as no more firm capacity is allocated than that which can be guaranteed as firm. For that matter, the network operator is not always in a position to identify cases of over-booking of demand.

(40) The high level of over-bookings of demand offers a major potential for the day-ahead market where booked but non-nominated capacity flows back to the shippers. This potential can only actually be tapped as soon as a new royal decree on the code of conduct concerning access to the transport networks for natural gas, which is also applicable to transit activities, has been approved. The current code of conduct does

[11] Two notions of overbooking are applied: over-booking of demand and over-booking of supply. In the case of over-booking of demand, the shipper books more firm capacity than the firm natural gas flow in its portfolio. In the case of overbooking of supply, the network operator sells more firm entry/exit capacity than what the network can guarantee.

not apply to transit. It is to be recommended that capacity on the day-ahead market not only be offered as interruptible capacity, but also in packages of firm capacity for a specific period.

(41) The high level of over-bookings of demand offers considerable potential for a liquid secondary market, certainly if shippers are obliged to offer all unused capacity on the secondary market. Hitherto there has not been any organised secondary market for transport capacity booked for the national market. In April 2008 the network operator did organise a platform for the trading of booked transport capacity for transit. But here again the obligation to offer all unused capacity on the secondary market only applies to shippers for the national market, and not to transit shippers. A substantial release of (over-)booked transport capacity can therefore be expected as soon as the code of conduct becomes applicable to transit as well.

(42) However, the problem lies in the use of the network. Together with the adjacent operators, the network operator should (certainly in times of congestion) assess the over-bookings of demand and on the basis of this assessment calculate the transport network's availability, with a view to ensuring that as much firm transport capacity as possible is freed up.

(43) The phenomenon of over-booking of demand illustrates the fact that the demand for transport capacity is not merely a derivative of the demand for natural gas. The investment model and the transport model should take account of over-bookings of demand within the bounds of what is reasonable.

2.7 Towards a new investment and transport model: balance between network extensions and network management

(44) The creation of a demand dynamic for transport capacity, which is promoted by the entry of several shippers and the gradual creation of competitive pressure, which is to be encouraged, calls for an adapted investment model and commercial management of the transport network. To some extent the network's physical needs and commercial requirements are disconnected. For investment planning this means a shift of focus away from peak flows towards the capacity demands of the shippers themselves.

(45) As a result of “unbundling” and the sharing out of responsibilities between the various players in the market, a trend can be seen in which transport capacity requirements are less and less a direct derivative of the demand for natural gas, but increasingly constitute a demand of the shippers in itself (see the phenomenon of over-bookings of demand). As and when the natural gas market becomes liquid, transport services will experience a separate demand, with a dynamic of its own, to which investments should in part be linked. It is Fluxys’ responsibility to offer transport services in a way that meets the reasonable needs of the network users (Royal Decree code of conduct[12], Article 6, para. 1). The CREG’s monitoring of the market mechanism (including the removal of contractual congestion) plays a key role in investment monitoring. In the event of substantial changes in market behaviour (for example in the case of large amounts of capacity being reserved for transit), the investment schedule should urgently be reviewed.

(46) The investment model that the network operator Fluxys has hitherto applied needs to be reviewed because:

- there is a gradual evolution towards an entry/exit model for transport in which no distinction is made operationally between internal transport and transit;

- account should explicitly be taken of the resources required for flexibility and incident management. This also means provision being made for enough entry capacity so that shippers are able to redress imbalances in a flexible manner;

- the approach should be geared more to the shippers’ immediate demand for transport and less via the derivative of the demand for transport on the basis of the natural gas supply.

Among other things, this means that the criterion of investing on the basis of the average flow for a peak day will have to be reviewed. “Open seasons” – for the national market as well – deserve to be introduced in order to be able to form an idea of the needs of the shippers themselves, needs that are chiefly determined by each one’s portfolio management.

[12] The Royal Decree of 4 April 2003 on the code of conduct concerning access to the transport networks for natural gas.

(47) Transport capacity and extensions of the transport network should be assessed more and more on the basis of the benefits on the consumers' side, and therefore the consumer price of natural gas. For the suppliers on the Belgian market the new infrastructure will also afford them greater flexibility to bring in their natural gas at the entry point of their choice, and can therefore make competition between producers felt to a greater degree. Zeebrugge's role as a hub can only continue to be guaranteed if the transport network is opened up to as many natural gas sources as possible.

(48) In addition to a balance sheet weighing up demand against supply in transport capacity, there should be a balance sheet for flexibility requirements (both for the operational requirements of the network operator and the necessary balancing resources for the shippers) and for incident management (provision of back-up capacity). Linepack and other resources provided for flexibility management and incident management should in principle be frozen and may not be offered as firm transport capacity. A check should be made with the CREG, however, as to how these resources can be offered to as great a degree as possible as interruptible capacity. The CREG is of the view that Fluxys should be able to assume responsibility autonomously, by means of its own resources, for the range of its own operational resources[13] and basic flexibility[14] offered to shippers.

(49) For the sake of achieving the objective of the free market, it is necessary for the network supply to follow commercial trends and not limit itself to offering transport capacity derived from an aggregated provisioning of natural gas.

[13] The resources that the network operator itself needs for an efficient network management and to ensure system integrity.
[14] The flexibility that cannot be imported given the network design but has to be supplied from the network itself. This mainly concerns buffer capacity (*linepack*) in the pipelines.

3 Monitoring of interconnection points

3.1 Introduction

(50) After an explanation of the transport network, this monitoring overview presents a picture of the technical firm transport capacity and booked firm transport capacity[15] on both sides of each interconnection of the Belgian natural gas transport network. It relates to a situation estimated for 1 May 2008.

(51) The monitoring of each interconnection is a snap shot estimated for 1 May 2008. Only transport capacity offered as firm is included in the monitoring. For insight into the capacities on the other side of the interconnections at the border, use is made of information made available on line by the neighbouring network operators[16] and direct contacts are made. Unfortunately not all network operators use the same units and where necessary conversions are made into the units used by the network operator Fluxys. In this study, capacity is expressed in $m^3(n)/h$ where an average energy content of 11.630 $kWh/m^3(n)$ (or 41.868 $MJ/m^3(n)$) is used for H-gas, and an average energy content of 9.769 $kWh/m^3(n)$ (or 35.168 $MJ/m^3(n)$) is used for L-gas.

(52) At the moment there are not yet any international directives for the calculation of technical and available transport capacities[17]. This makes comparisons of available capacities over time and between network operators difficult, and partly explains the often sizeable differences between available capacities on either side of the interconnections. For a good understanding of this chapter, it is first and foremost important to take account of the following comments:

- the technical entry and exit capacities at the interconnections are not fix and may fluctuate according to the way the network operator runs the network and the network scenarios used by the network operator to calculate the network's availability.

[15] This concerns total booked firm transport capacity, the capacity underwritten both for the long term and the short term.

[16] Interconnector operator: www.interconnector.com; Zeepipe operator: www.gassco.no; Dutch network operator: www.gastransportservices.nl; German network operators: www.wingas-transport.de and www.eon-gastransport.de; Luxembourg network operator: www.soteg.lu and French network operator www.grtgaz.com.

[17] The "Available Capacity Calculation" task force of CEER/ERGEG, under the chairmanship of the CREG, is active in this area. For background information, reference is made to www.ergeg.org.

- the technical firm entry and exit capacities are in theory calculated according to a "worst-case" scenario to guarantee the security of firm capacity and are therefore relatively low. Less stringent network scenarios would lead to a higher availability of transport capacity.

If for example the German network operator EGT (E.ON Gastransport) reports that in May 2008 the firm exit capacity at EYN1 is 613 k.m³(n)/h, this does not necessarily mean that EGT would not be able to supply a higher flow rate at Eynatten with the same network, and thus without extra investments, but in a different operational mode. Ascertaining the maximum amount that EGT could carry over at Eynatten would call for a network simulation to be carried out, based on the "best-case" scenario.

There is also the marketing of interruptible capacity that can be interrupted. This supply can also fluctuate and be subject to different conditions. Nothing rules out the possibility of a operator offering, on top of the firm capacity, a further 20% in non-firm capacity, which for example is guaranteed in 90% of cases. In addition to international agreements on the manner of capacity calculation, there is also a need for transport services to be geared to each other internationally. International coordination between network operators is becoming increasingly important.

(53) The background in (52) is useful but does not detract from the analysis that follows and which mainly looks at bookings. Booked firm capacities are a fixed item of information and are comparable. In the analysis an examination is made of differences in over-bookings[18] at two levels:

- When more firm capacity is booked by the shipper downstream than upstream, there is an over-booking of demand. In the event of over-bookings of demand the shipper books more firm transport capacity than the firm natural gas flow it can have at its disposal.

- When the network operator sells more firm capacity than what the network can provide, there is an over-booking of supply.

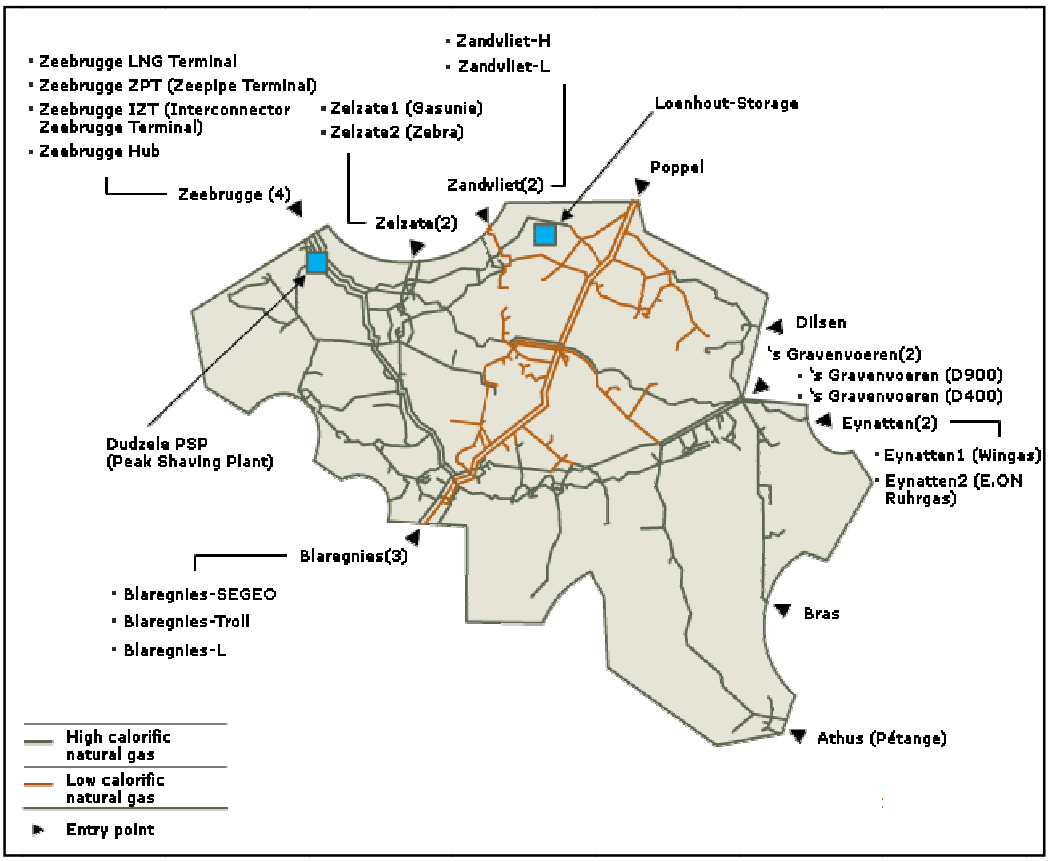
[18] Under-bookings can theoretically also occur, but appear to be less relevant in the context of the problem under discussion.

3.2 Interconnectivity of Belgium

(54) Figure 1 depicts the natural gas transport network operated by Fluxys with a distinction made between the transport network for H-gas and the transport network for L-gas[19]. The main lines of the H-gas transport network are: the TROLL pipeline and parallel the Flemish pipeline between Zeebrugge and Blaregnies, the VTN pipeline between Zeebrugge and Eynatten, the SEGEO pipeline between 's Gravenvoeren and Blaregnies. The VTN pipeline is the only bi-directional pipeline that can physically be switched into both forward mode (from Zeebrugge towards Eynatten) and reverse mode (from Eynatten towards Zeebrugge). The Dorsales are the L-gas pipelines between Poppel and Blaregnies. The main upstream pipelines are: the *Interconnector* between Bacton (in the UK) and Zeebrugge, the *Zeepipe* pipeline which links the North Sea production fields with Zeebrugge and two important German axes that connect to the Belgian transport network at Eynatten: the northerly WEDAL pipeline managed by Wingas and the southerly TENP pipeline managed by EGT (E.ON Gastransport), the pipeline that links Emden in the north-west of Germany with 's Gravenvoeren and runs across the Netherlands. After the *Zeepipe*, this is an important pipeline for the supply of Norwegian natural gas.

[19] The calorific upper value of H-gas can legally vary from 9.606 to 12.793 kWh/m³(n). As is customary, the average of 11.630 kWh/m³(n) is used in this study. The calorific upper value of L gas can legally vary from 9.528 to 10.746 kWh/m³(n). As is customary, the average of 9.769 kWh/m³(n) is used in this study.

Figure 1. The natural gas transport network operated by Fluxys.



www.fluxys.be

(55) The current physical import points at the national border for the H-gas market are: (i) the LNG terminal, (ii) the *Zeepipe* terminal (ZPT), (iii) Zandvleit H (since the middle of 2004), (iv) Obbicht (Dilsen), (v) 's Gravenvoeren. In addition the Interconnector Zeebrugge terminal (IZT) is a physical import point from the UK if the VTN pipeline is switched into forward mode, and alternatively Eynatten 1 (WEDAL) and Eynatten 2 (TENP) are physical import points if the VTN pipeline is switched into reverse mode[20]. The interconnection point at Eynatten is chiefly booked for transit both in reverse mode (import from Germany) and forward mode (export to Germany). Other border points can possibly be used conditionally as an entry point by means of backhaul

[20] In light of the UK's shift towards a position of net importer and a shift towards provisioning from the East, it is most probable that the VTN pipeline will increasingly be switched into reverse mode. In any case it is more than likely that Eynatten will be a physical import point at moments of peak demand. Outside moments of peak demand the mode will depend on whether or not the *Interconnector* is used for the baseload provisioning of the UK or for arbitrage. Indications show that the BBL pipeline is mainly used for the baseload provisioning of the UK and the *Interconnector* for trading (arbitrage cf. Zeebrugge hub).

capacity booking[21]. The storage capacity of Loenhout and the Dudzele peak shaving plant (PSP) are also entry points of the H-gas transport network, chiefly for the supply of a peak flow.

There are also two direct pipelines for H gas between a consumption site in Belgium and a transport network abroad: (i) the direct pipeline at Momignies which connects the company "Verrerie de Momignies" directly with the GRTgaz network and is operated by Fluxys, and (ii) the direct pipeline connecting the BASF site in Antwerp directly with the GTS network and operated by Wingas (although the BASF site is also connected to the Fluxys transport network).

(56) The current physical import points along the national border for the L-gas market are Poppel and to a minor degree Zandvliet L. Blaregnies L is a conditional entry point where L gas for the French market can, if necessary, be counter-booked for the Belgian market. The Lillo and Loenhout natural gas transformers are also entry points for the L-gas transport network (which are supplied via the H-gas transport network) for peak flow supply. Zandvliet L cannot be used as an entry point during peak demand when the Lillo natural gas transformer is in use[22].

There is also a direct pipeline for L gas at Veldwezelt which connects the consumption site of the Heylen brickworks for the production of ornamental bricks directly with the GTS network in the Netherlands.

(57) The H-gas transport network is meshed, albeit to differing degrees, across the whole of the country, except in the Brussels Capital Region, which is supplied solely with L gas. The L-gas transport network is meshed, but is mainly concentrated, in addition to Brussels, in the provinces of Antwerp, Limburg, Flemish Brabant, Walloon Brabant and Hainault. There is no L-gas transport network in the provinces of West Flanders, East Flanders and Luxembourg.

[21] Hitherto the network operator has only offered conditional backhaul capacity. Given that this capacity is not firm, it cannot be included in the budget for planned firm entry capacity. It is recommended that contractual network management instruments be used to secure certainties regarding forward gas flows, as a result of which a firm entry capacity at relevant points at the border could also be offered.

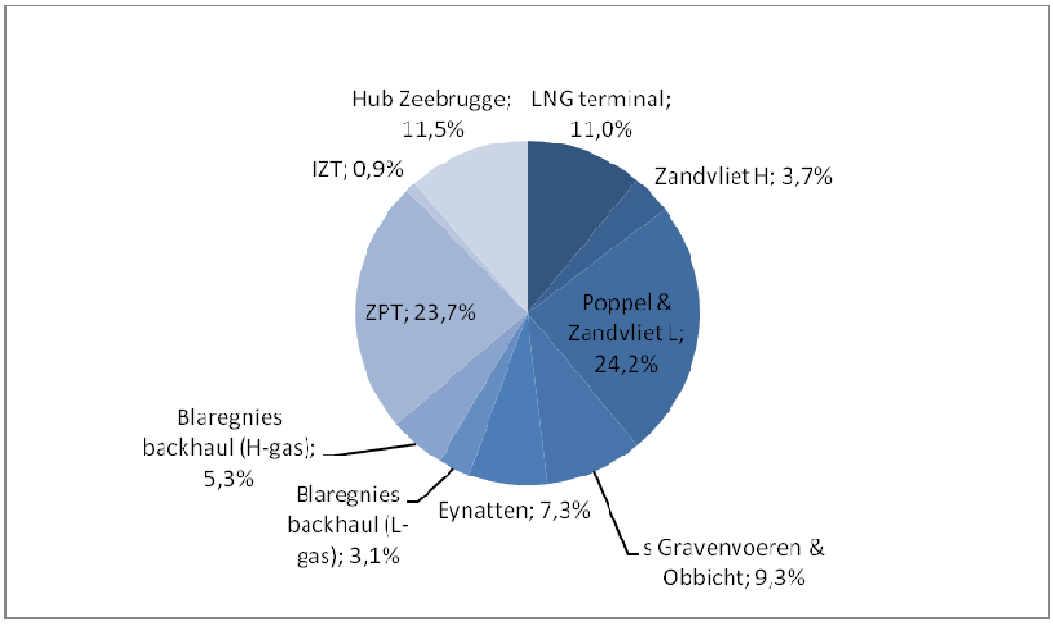
[22] The reason for this can be summarised, in simplified form, as follows. The pressure at Zandvliet-L is a maximum of 40 bar, and the emission pressure of the Lillo natural gas transformer is 53 bar. If the Zandvliet L entry point were not closed when the Lillo natural gas transformer was in use, L gas would flow towards the Netherlands.

(58) In comparison with the neighbouring countries the Belgian transport network rates very well in the field of interconnections, certainly in relation to the size of the national natural gas market. Apart from the two LNG terminals, the French H-gas market only has three physical import points of relevance: (i) the terminal of the offshore Franpipe at Dunkirk, (ii) the border point at Blaregnies/Taisnières with Belgium for the import of H-gas via the TROLL and the SEGEO pipelines, and (iii) the border point with the German transport network at Obergailbach/Medelsheim where Russian natural gas, *inter alia*, comes in via the MEDAL pipeline. The Dutch transport network has one concentrated natural gas route from the north. The only import junction is located at Emden/Oude Statenzijl in the north east of the Netherlands[23]. The British transport network has also hitherto been heavily dependent on the mooring point in Saint Fergus in Scotland, but is increasingly opening up through the more southerly-located Bacton (*Interconnector* between Bacton and Zeebrugge, and BBL between Bacton and Balgzand in the Netherlands) and Easington (connection with the Norwegian fields).

(59) Figure 2 shows the breakdown in natural gas provisioning for the entry points in 2007. The most important entry point for the provisioning of the Belgian market for H gas is ZPT with a share of 23.7%. There is a provisioning in backhaul on the transit flows to France to the tune of 5.3%. The Belgian L-gas market, measured in energy, covers 27.3%, of which 3.1% is supplied in backhaul on the transit flows to France. Given that backhaul capacity is dependent on transit flows, 8.4% of the Belgian market is satisfied by means of conditional transport capacity and is in fact in the hands of transit shippers.

[23] This important junction, which will also be significant for the provisioning of Belgium from the beginning of 2011, connects the GTS network with the north-German network of German transport network operator BEB, which incidentally was taken over by the Dutch transport network operator GTS in 2007.

Figure 2. Breakdown of natural gas provisioning by entry point, in 2007.



3.3 LNG terminal

(60) From a network-technical point of view, the LNG terminal (operator Fluxys LNG, in use since 1987) is viewed as an upstream installation. This means that the terminal's throughput capacity relates to an upstream exit capacity such as, for example, the exit capacity that can be provided by GTS at 's Gravenvoeren, and therefore does not necessarily correspond to the downstream entry capacity in the Fluxys transport network.

(61) Further to an "open season" in 2003-2004 the LNG terminal's throughput capacity was doubled to 9 billion m³(n) per year and the emission capacity increased from 950 k.m³(n)/h to 1,850 k.m³(n)/h. This new emission capacity was commissioned in April 2008.

At the moment 150 k.m³(n)/h is reserved for Fluxys for the purposes of operational flexibility.

Before the reinforcement the entire 800 k.m³(n)/h in emission capacity was reserved by Distrigas for injection into the transport network of primarily LNG supplies under the Algerian supply contract to the tune of 4.5 billion m³(n) per year.

(62) The emission capacity after commissioning of the doubled LNG terminal was awarded to three shippers under long-term agreements (www.fluxys.be):

- 510 k.m³(n)/h (2.7 billion m³/year, 33 unloading turns per year) was contracted by Distrigas (20 years counting from April 2007) (thus a regression of 290 k.m³(n)/h);

- 340 k.m³(n)/h (1.8 billion m³/year, 22 unloading turns per year) contracted by Suez LNG Trading (15 years starting in 2008);

- 850 k.m³(n)/h (4.5 billion m³/year, 55 unloading turns per year) contracted by Exxon-Mobil / Qatar Petroleum (20 years counting from April 2007)[24].

It is important to note that both Suez LNG TradingTractebel and Exxon-Mobil / Qatar Petroleum are chiefly international players and do not (yet) have any Belgian end customers (and therefore also do not (yet) have any capacity on the transport network). These new players have not (yet) announced the markets for which they will be using their booked capacity at the terminal. In any case they are assuming that there are no downstream capacity obstructions.

On 29 March 2007 the first shipload of LNG was unloaded at the LNG terminal under Distrigas' new long-term contract with the Qatar producer RasGas.

(63) To be able to meet the quality specifications on the VTN pipeline and at the Zeebrugge hub, which are in conformity with the specifications in the UK and are more restrictive than those on the Continent, Exxon-Mobil / Qatar Petroleum has invested in a nitrogen plant at the terminal. This nitrogen plant makes it possible, if necessary, to impoverish the natural gas from the LNG transhipment with a view to compliance with the quality requirements on the VTN pipeline and at the Zeebrugge hub. In this way, around half of the LNG terminal's emission capacity can be handled, albeit for a relatively short space of time due to the small storage volume for nitrogen on the site. This investment testifies to an interest in transit, given that there is no problem at all in dispatching LNG directly for the Belgian market (see Chapter 4).

[24] On 27 June 2007 it was announced that EDF had signed a contract with Exxon-Mobil to take over this capacity for four years.

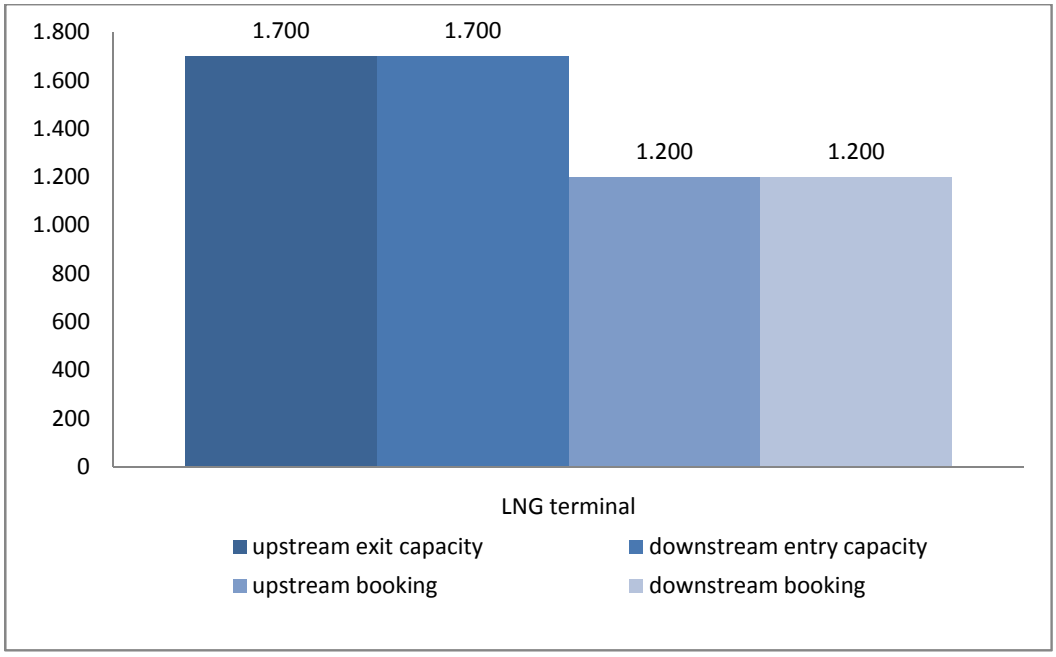
(64) Table 1 and Figure 3 present the technical firm capacity upstream/downstream at the interconnection point between the LNG terminal and the Fluxys transport network and the associated firm bookings (in k.m³(n)/h firm, situation as at 1/05/2008).

Table 1. Upstream/downstream situation interconnection LNG terminal (in k.m³(n)/h firm).

Upstream exit			Downstream entry		
Capacity	Booking national	Booking transit	Capacity	Booking national	Booking transit
1.700 (+150*) (@80bar)	600	600	1.700 (+150*)	600	600

(*) a priori allocation of emission capacity for the network operator Fluxys for the purpose of operational flexibility

Figure 3. Upstream/downstream situation LNG terminal (in k.m³(n)/h firm).



(65) The LNG terminal's emission capacity is 1,850 k.m³(n)/h, of which 150 k.m³(n)/h is booked by Fluxys for operational flexibility. There are no problems downstream on Fluxys' transport network to absorb the LNG terminal's entire emission capacity. The booked emission capacity tallies with the booked firm entry capacity on the Fluxys transport network. 600 k.m³(n)/h in firm capacity is booked for the national market,

and 600 k.m³(n)/h in firm capacity is also booked for transit to the Zeebrugge hub. As at 1/05/2008 there is still 500 k.m³(n)/h of free firm emission capacity.

(66) At the moment there are no upstream/downstream capacity problems at the LNG terminal, aside from the issue of the interchangeability of natural gas qualities (see Chapter 4). A strict monitoring is needed of the use made of the free emission capacity at the LNG terminal for transit or for the Belgian market[25].

(67) In December 2007 Fluxys LNG launched a new "open season" to gauge the interest in a second round of capacity expansion at the LNG terminal. Depending on the result of this new survey, the terminal may expand even further from 2015-2016 (www.fluxys.net).

3.4 Zeepipe terminal (ZPT)

(68) ZPT is the reception terminal at Zeebrugge for the 814 km offshore *Zeepipe* (ND1000) pipeline that links the Sleipner fields in the North Sea with Zeebrugge (www.gassco.no). The first phase of the *Zeepipe* project was commissioned on 1 October 1993.

(69) The *Zeepipe*'s technical transport capacity amounts to 39.719 M.m³(n)/day (www.gassco.no). Converted, the transport capacity amounts to 1,655 k.m³(n)/h and a maximum of approximately 14.497 billion cubic metres of natural gas per year can be transported to the ZPT at Zeebrugge. It is assumed that upstream the *Zeepipe* can currently provide for a peak flow of 2,100 k.m³(n)/h (temporarily, not guaranteed). Guaranteed pressure is 80 bar. ZPT is therefore a powerful entry point for the transport network (H-gas) and has considerable potential for expansion, depending on upstream investments.

(70) The *Zeepipe* has a parallel *offshore* pipeline called the *Franpipe*, which connects the Draupner fields in the North Sea with the reception terminal at Dunkirk. The first Norwegian supplies through this pipeline took place on 1 July 1998. This offshore pipeline is 840 km (ND1050) long and has a technical transport capacity of 50.905

[25] If, on the occasion of the network design (cf. investment plan) of the necessary import capacity for the Belgian market, account is taken of an available import capacity through the LNG terminal of 1,100 k.m³(n)/h, no more than 600 k.m³(n)/h can indeed be allocated to transit shippers without the necessary import capacity for the Belgian market being endangered.

M.m³(n)/day (www.gassco.no). Converted, the transport capacity amounts to 2,121 k.m³(n)/h and a maximum of approximately 18.580 billion cubic metres of natural gas per year can be transported to the terminal at Dunkirk. Operational management of the terminal at Dunkirk is handled from the Zeepipe terminal at Zeebrugge[26].

(71) In 2007 Norwegian investment intentions were announced that could possibly lead to an additional offshore pipeline with a reception terminal at Zeebrugge. Den Helder in the Netherlands and Bacton in the UK were also mentioned as possible terminals. However, the Norwegian government has shelved this project until further notice.

(72) Table 2 and Figure 4 present the technical firm capacity and bookings of firm upstream exit capacity on the *Zeepipe* and firm downstream entry capacity at ZPT (in k.m³(n)/h firm, situation as at 1/05/2008).

[26] For the French market there are major possibilities for arbitrage between the *Franpipe* and the *Zeepipe*. This helps explain the transit shippers' booking behaviour.

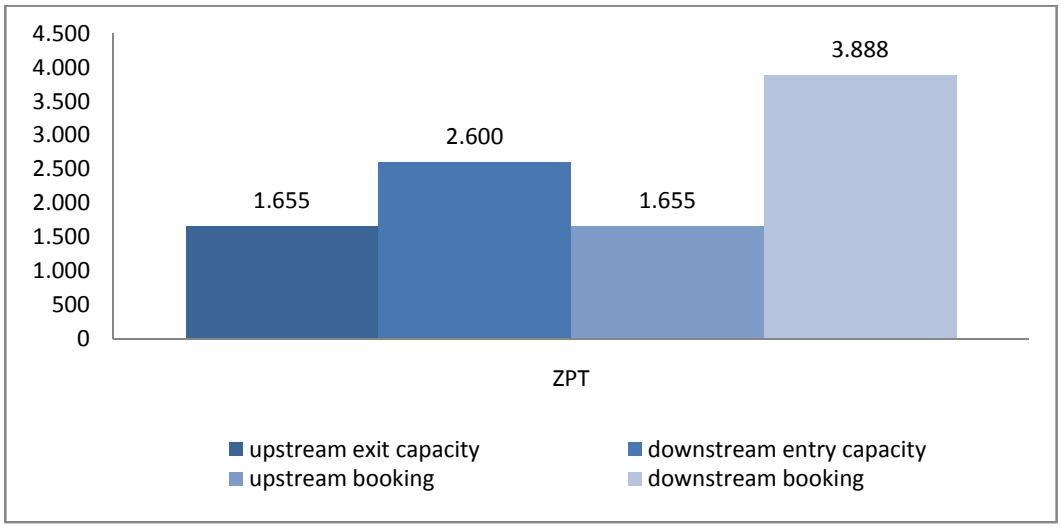
Table 2. Upstream/downstream situation ZPT interconnection (in k.m³(n)/h firm)

Upstream exit			Downstream entry		
Capacity	Booking national	Booking transit	Capacity	Booking national	Booking transit
1.655* (@80bar)	1.655*		2.600 (M) 1.655 (U)	656	3.232

M: metering capacity; U: limitation owing to physical upstream capacity. There is a peak flow of 2,100 k.m³(n)/h although not guaranteed (not firm).

(*) www.gassco.no

Figure 4. Upstream/downstream situation ZPT interconnection (in k.m³(n)/h firm).



(73) The firm downstream entry capacity on the Fluxys transport network is limited by the technical capacity of the *Zeepipe* and amounts to 1,655 k.m³(n)/h. There is an over-booking of demand for firm entry capacity on the transport network vis-à-vis the firm booking upstream (or technical upstream capacity) in the *Zeepipe*. The over-booking of demand amounts to 2,233 k.m³(n)/h firm entry capacity or a downstream/upstream over-booking ratio of 2.34.

Clearly shippers want firm entry capacity on Fluxys' transport network in order to safeguard arbitrage possibilities: arbitrage between supply on the Belgian market (via the hub) and transit in addition to arbitrage between transit routes (markets).

(74) Given that the firm entry booking for the national market upstream is guaranteed[27], the over-bookings of demand are only for transit capacity. Of the 3,232 k.m³(n)/h in firm entry booking for transit, only 999 k.m³(n)/h can physically be guaranteed upstream. Or in terms of network use, of the 3,232 k.m³(n)/h capacity booking for transit on the transport network, a maximum flow of 999 k.m³(n)/h can actually be supplied (69% over-booking).

(75) Fluxys guarantees the firmness of the over-booked entry capacity. At all times the shipper in question can nominate natural gas flows in a different way. However, in the network simulations it is assumed that the *Zeepipe*'s physical flow will not be greater than 2,100 k.m³(n)/h. Monitoring of the upstream situation is therefore essential in order to take account, in good time, of the maximum upstream flow and the effect of this on the transport network's availability.

(76) There is also an over-booking of firm entry capacity on the Fluxys transport network vis-à-vis the metering capacity (over-booking of supply). The metering capacity is 2,600 k.m³(n)/h whilst the total firm entry booking is 3,888 k.m³(n)/h. This kind of over-booking implies contractual risks for Fluxys if at a given moment the *Zeepipe* flow were physically to be increased up to a level higher than 2,600 k.m³(n)/h.

3.5 Interconnector Zeebrugge terminal / Zeebrugge Hub (IZT/HUB[28])

(77) The transport capacity of the *Interconnector* in reverse mode has gradually been increased by the operator Interconnector (UK) Limited (www.interconnector.com):

- November 2005: from 8.5 G.m³(n)/y to 16.5 G.m³(n)/y;
- October 2006: 23.5 G.m³(n)/y;
- October 2007: 25.5 G.m³(n)/y.

This reinforcement was not carried out in a coordinated fashion by Interconnector (UK) Limited, with the result that there are no guarantees for the UK of there being sufficient transport capacity upstream in order to utilise the *Interconnector*'s full capacity and to provision the UK. In any case (78) indicates that there is sufficient capacity on the Belgian side, both in reverse mode and forward mode. Bottlenecks in

[27] It is assumed that shippers safeguard firm contracts downstream across the whole supply chain.
[28] The Zeebrugge hub is supplied by means of entry capacity to the interconnections allocated to transit. From a network-technical point of view the Zeebrugge hub is on IZT. Therefore IZT and the Zeebrugge hub are taken together in line with the way Fluxys presents the available capacities and bookings on line (www.fluxys.net).

reverse mode are further upstream in Germany and the Netherlands. The “open seasons” in the Netherlands (cf. GTS, see also creation of Zelzate as a physical entry point) and Germany (cf. EGT) are opportunities for transit shippers to gear capacities to each other across the whole supply chain. Apart from the availability of upstream capacity, the problem of the interchangeability of natural gas qualities is raised (see Chapter 4).

(78) Table 3 and Figure 5 present the technical firm capacity and bookings of firm upstream exit capacity and downstream entry capacity at IZT/HUB, both in reverse mode (to the UK) and forward mode (to Belgium) (in k.m³(n)/h firm, situation as at 1/05/2008).

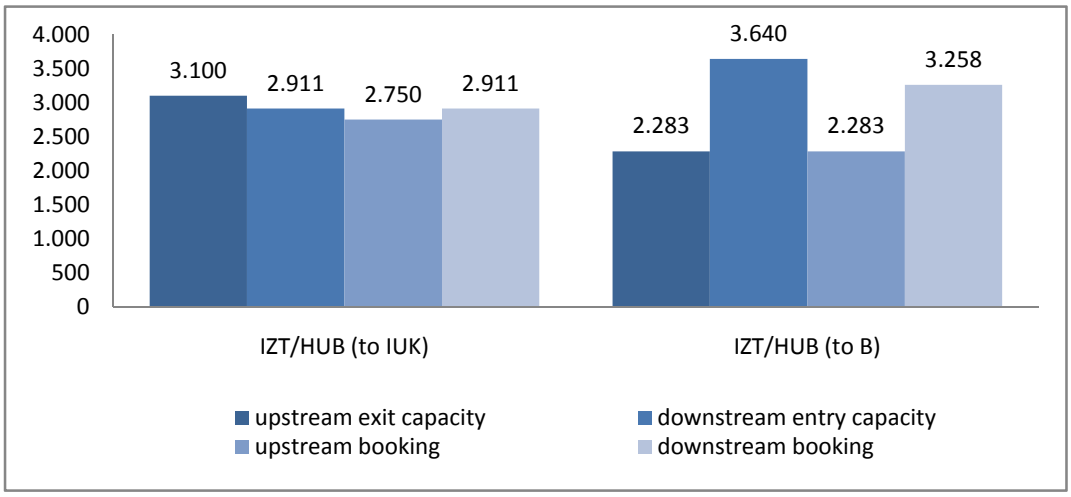
Table 3. Upstream/downstream situation at IZT/HUB (in k.m³(n)/h firm).

	Upstream exit			Downstream entry		
	Capacity	Booking national	Booking transit	Capacity	Booking national	Booking transit
Reverse (B ⇒ UK)	3.100 (M) 2.911 (U) (@55 bar)	2.750		2.911* (25,5 G.m³(n)/y)*	2.911*	
Forward (UK ⇒ B)	2.283* (@80 bar) (20,0 G.m³(n)/y)*	2.283*		3.640 (M) 2.283 (U)	679 (HUB)+ 209 (IZT) = 888	2.370**

M: metering capacity; U: limitation owing to upstream and/or downstream physical capacity

(*) www.interconnector.com, (**) conditional capacity: the capacity for transit concerns conditional capacity (almost firm) and cannot be guaranteed in an extreme network configuration in which a maximum flow is supplied on the VTN pipeline towards the UK. In order nonetheless to offer firm capacity, compression is needed at Zeebrugge.

Figure 5. Upstream/downstream situation at IZT/HUB (in k.m³(n)/h firm).



(79) The situation in reverse mode is as follows:

- the firm exit capacity on Fluxys' transport network is higher than *Interconnector*'s firm entry capacity. *Interconnector*'s firm entry capacity is fully booked (until September 2018);

- the firm exit booking on the Fluxys transport network is 161 k.m³(n)/h lower than the firm entry booking on *Interconnector*. There is an over-booking of demand for firm reverse capacity on Interconnector, or, in other words, an over-booking of demand for firm exit capacity on the Fluxys transport network with a ratio of 0.94.

The situation in forward mode is as follows:

- the firm entry capacity on the Fluxys transport network is higher than Interconnector's exit capacity. Interconnector's exit capacity is fully booked (up until September 2018);

- the firm entry booking on Fluxys' transport network is 3,258 k.m³(n)/h. This means an over-booking of firm entry capacity to the tune of 975 k.m³(n)/h or a demand over-booking ratio of 1.43.

(80) Both in reverse and forward mode, the transport capacity on the Belgian side is limited by the technical capacity of the *Interconnector*, even after the three-step reinforcement of the Interconnector (77).

(81) Fluxys guarantees the firmness of the over-booked entry capacity. At all times the shipper in question can nominate natural gas flows in a different way. However, in the network simulations it is assumed that the physical flow from the UK (*Interconnector* in forward mode) will not be greater than 2,700 k.m³(n)/h (this is higher than the exit capacity given by Interconnector (UK) Limited). Monitoring of the upstream situation is therefore essential in order to take account, in good time, of the maximum upstream flow and the effect of this on the transport network's availability.

3.6 Zelzate

(82) In addition to the interconnection with the GTS transport network (ZEL1), there is also an interconnection in Zelzate with the Zeeland ZEBRA (distribution) network (ZEL2). This ZEBRA network in the Netherlands is only supplied from Zelzate (so Zelzate cannot be an exit point for ZEBRA), but there is an emergency connection in the Netherlands with the GTS network. The ZEBRA network is small and has no more than 10 industrial consumers.

(83) Zelzate is not yet a physical import point for Belgium. Import from the Netherlands calls for an adaptation to bi-directional use of Fluxys' existing metering installation at Zelzate. Fluxys has made provision for this, as well as the commissioning of the VTN2 project (from phase 1, 1/10/2010). An earlier adaptation of the metering installation is of little use, since GTS cannot offer physical exit capacity any earlier.

(84) In 2005 GTS held an "open season" to manage their investment projects for the H-gas network. One of the results of this market survey is a project to provide for a closer connection between Balgzand[29] and Zelzate, and this means a pipeline from Rotterdam to Zelzate. This connection is due to pass off in two phases: from the Wijngaarden junction to Ossendrecht (approx. 70 km) by 2010, and then from Ossendrecht to Zelzate (approx. 55 km) by 2012. This reinforcement on the Dutch network will make it possible to convey natural gas from the north-east in Emden (see also the *Nord Stream* project for the supply of natural gas through the German-Russian pipeline under the Baltic Sea) and from Balgzand (see alternative route for the BBL) to Zelzate. At the moment a new "open season" is under way, which is being coordinated between the neighbouring operators GTS, Fluxys and GRTgaz (referred to as the "north-south open season"). Once again there appears to be interest on the part of shippers in organising their transport portfolio from the Netherlands via Zelzate, but also - and this is apparent in particular from the new survey - in provisioning the Belgian market. Zelzate is becoming a new important entry point for the Belgian market.

[29] Starting point, on the Dutch coast, of the 235 km long Balgzand-Bacton Pipeline (BBL), in operation since 1 December 2006, with an initial transport capacity towards the UK of 1,750 k.m³(n)/h or 10.5 billion m³(n) per year. Fluxys has a 20% stake in this interconnector. Only physical natural gas transport towards the UK is possible.

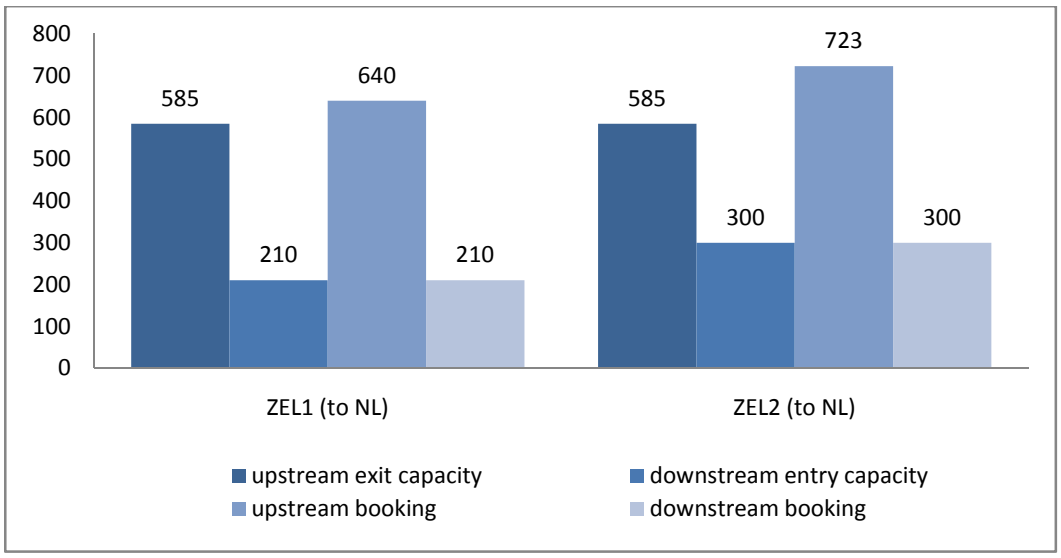
(85) Table 4 and Figure 6 present the technical firm capacity and the bookings of firm upstream exit capacity and downstream entry capacity at ZEL1 (GTS) and ZEL2 (ZEBRA) (in k.m³(n)/h firm, situation as at 1/05/2008). Until such a time as the metering installation is adapted, ZEL is not a physical import point for Belgium.

Table 4. Upstream/downstream situation at ZEL1 and ZEL2 interconnections (in k.m³(n)/h firm).

	Upstream exit			Downstream entry		
	Capacity	Booking national	Booking transit	Capacity	Booking national	Booking transit
ZEL1 (GTS)						
Reverse (B ⇒ NL)	585 (@55 bar)	340 + 300 (swap ZEL2 ⇒ ZEL1) = 640		210*	210*	
Forward (NL ⇒ B)	physical firm from 1/10/2010					
ZEL2 (ZEBRA)						
Reverse (B ⇒ NL)	585 (@55 bar)	723		300	300	
Forward (NL ⇒ B)	physical firm from 1/10/2010					

(*)www.gastransportservices.nl

Figure 6. Upstream/downstream situation at ZEL1 and ZEL2 interconnections (in k.m³(n)/h firm).



(86) The firm exit capacity on the Fluxys transport network is higher than the entry capacity on the Dutch side, in the case of both ZEL1 and ZEL2. In the case of ZEL1 there is 375 k.m³(n)/h more firm exit capacity in the Fluxys transport network than there is entry capacity in the GTS transport network (ratio of 2.79). In the case of ZEL2 there is 285 k.m³(n)/h more exit capacity in the Fluxys transport network than there is entry capacity in the ZEBRA network (ratio of 1.95).

(87) There is a striking over-booking of demand for firm exit capacity vis-à-vis the available – and fully booked – entry capacity in the Netherlands. In the case of ZEL1 there is an over-booking ratio of 3.0, and in the case of ZEL2 there is an over-booking ratio of 2.4.

(88) There is also an overbooking of supply of firm exit capacity vis-à-vis Fluxys' available firm exit capacity, in the case of both ZEL1 and ZEL2. These kinds of over-bookings could possibly entail contractual risks for Fluxys should the entry capacity in the Netherlands be greater than the exit capacity in the Fluxys network. Monitoring and coordination between Fluxys and GTS are therefore important here, too.

3.7 Zandvliet H

(89) The Zandvliet H interconnection is a new entry point that was brought into service in the middle of 2004 with the aim of opening up Antwerp, and in particular the port industry, from the north, and thus reducing the heavy dependency on the Zeebrugge entry points[30]. However, the Zandvliet H interconnection between the GTS and Fluxys networks is only a relevant entry locally in Antwerp. The downstream entry capacity is mainly determined by the local off-take downstream in the Antwerp port area.

(90) Table 5 and Figure 7 present the technical firm capacity and the bookings of firm upstream exit capacity and downstream entry capacity at Zandvliet H (in k.m³(n)/h firm, situation as at 1/05/2008).

[30] Provisioning of Antwerp with H-gas and use (injection and emission) of the underground storage at Loenhout was only possible from the west. The opening up of both Antwerp and the underground storage at Loenhout are therefore major objectives when it comes to security of supply and incident management. Zandvliet H makes a minor contribution by provisioning the port industry at local level. Therefore the planned investment project involving Antwerp (and the underground storage at Loenhout) being connected to the VTN pipeline (see VTN2 - project) is a major initiative by Fluxys (see Chapter 5).

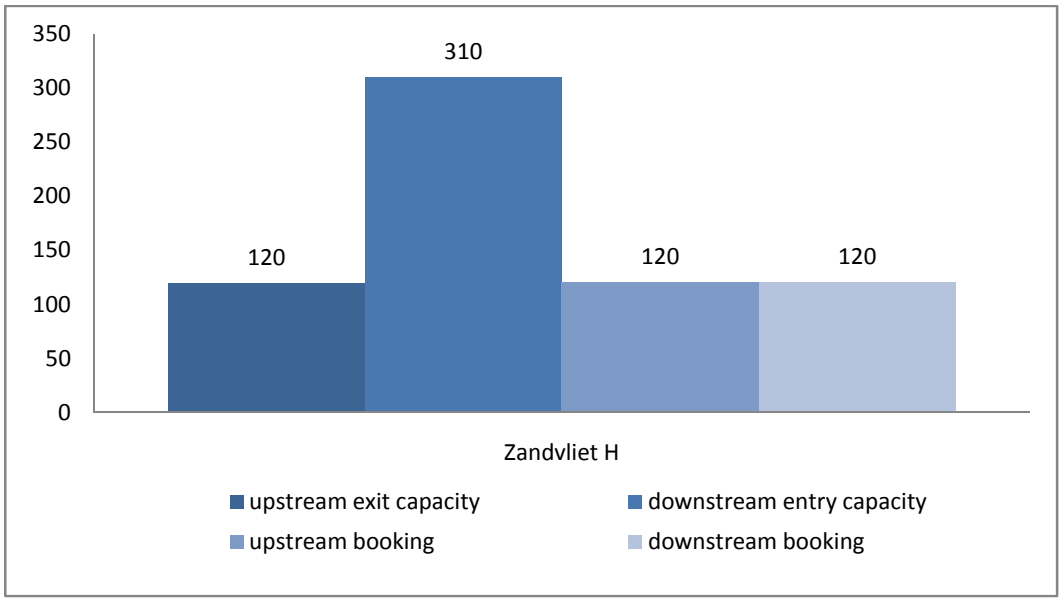
Table 5. Upstream/downstream situation at the Zandvliet H interconnection (in k.m³(n)/h firm).

Upstream exit			Downstream entry		
Capacity	Booking national	Booking transit	Capacity	Booking national	Booking transit
120 (@55bar)	120		310 (M) 120 (U)	120	N/A*

M: metering capacity; U: limitation owing to physical upstream capacity

*N/A: not applicable, only for the local Belgian market

Figure 7. Upstream/downstream situation at the Zandvliet H interconnection (in k.m³(n)/h firm).



(91) GTS's exit capacity is 120 k.m³(n)/h[31]. 120 k.m³(n)/h of firm capacity is booked on either side of the interconnection point. As and when GTS strengthens its network (see Zelzate interconnection and the current "open seasons") it will become possible to supply a greater rate of flow from the Netherlands. The importance for the Belgian market will then, as has been said, depend primarily on the local off-take potential.

[31] This exit capacity in the Netherlands is not independent of the newly created exit capacity for the purpose of the direct pipeline for the provisioning of BASF Antwerp (see below).

3.8 Obbicht - ’s Gravenvoeren

(92) The Obbicht (Dilsen) interconnection is the sister entry point of the ’s Gravenvoeren entry points located further to the south. Both interconnections are provisioned by the same upstream GTS pipeline. The Obbicht entry point used to be of limited importance, because it discharges in a predominantly L-gas area. However, Obbicht’s importance is growing due to the laying of the ND600 pipeline to Lommel in 2003-2004. This is in the framework of (i) a promotion of imports of natural gas from the East and (ii) the provisioning of H-gas in Limburg and the Kempen (see also the growth in combined heat and power plants (CHP) and power plants. The Indicative Plan for Gas Provisioning, 2004 (www.creg.be) recommended that this pipeline be extended as far as the underground storage at Loenhout, so as to complete the arc with Antwerp from the east. In function of new developments, Fluxys has opted for an alternative route via the new VTN2 project. This decision also has its advantages, but these can only properly be turned to good account if the problem of the interchangeability of natural gas qualities is solved (see Chapter 4).

(93) The ’s Gravenvoeren interconnection is important for transit to France via the SEGEO pipeline (713 k.m³(n)/h) and for transit to the Grand Duchy of Luxembourg via the exit points of Bras and Pétange (180 k.m³(n)/h). The remaining entry capacity is for the Belgian market. The current “open seasons” indicate a strong interest on the part of transit shippers in booking more capacity at the ’s Gravenvoeren interconnection point from the Netherlands. GTS has investment initiatives under way in order to carry out the necessary reinforcements on the Dutch transport network.

(94) The ’s Gravenvoeren interconnection point has to cope with contractual congestion: there are more requests for firm entry capacity than there is available supply. This is mainly a reflection of the shift to the east as an entry point for the Belgian market. Pending additional reinforcements, a specific congestion policy is therefore necessary.

(95) Table 6 and Figure 8 present the technical firm capacity and the bookings of firm upstream exit capacity and downstream entry capacity at Obbicht and ’s Gravenvoeren (in k.m³(n)/h firm, situation as at 1/05/2008).

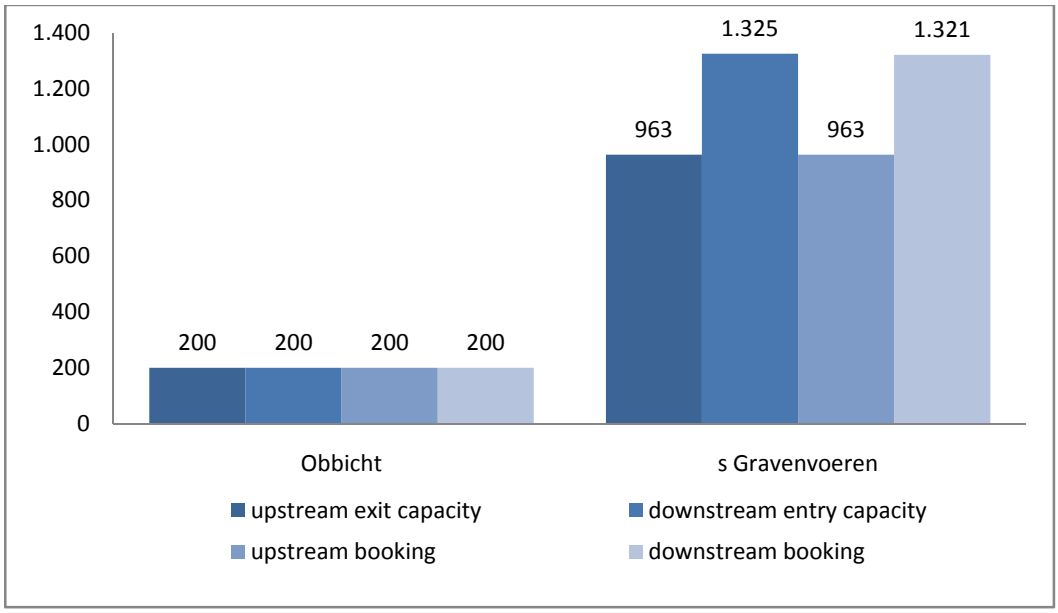
Table 6. Upstream/downstream situation at the Obbicht and 's Gravenvoeren interconnections (in k.m³(n)/h firm).

	Upstream exit			Downstream entry		
	Capacity	Booking national	Booking transit	Capacity	Booking national	Booking transit
Obbicht	200 (@49 bar)	200	N/A*	200 (U) 400 (M)	200	N/A*
's Gravenvoeren	963** (@49 bar)	963**		1.325 (M) 963 (U)	450	713 + 158*** = 871

M: metering capacity, U: limitation owing to upstream capacity

(*) N/A: not applicable, no transit, (**) www.gastransportservices.nl, (***)transit for the Grand Duchy of Luxembourg

Figure 8. Upstream/downstream situation at the Obbicht and 's Gravenvoeren interconnections (in k.m³(n)/h firm).



(96) The Obbicht entry point is only for the Belgian market and is managed in combination with the 's Gravenvoeren interconnection point. There is correspondence upstream/downstream at Obbicht both as regards available firm capacity and booked firm capacity. Expansion of the entry capacity is heavily dependent on investments upstream in the GTS transport network.

(97) The firm exit capacity at 's Gravenvoeren on the GTS transport network is 963 k.m³(n)/h. This firm exit capacity is fully booked. The firm exit capacity on the Fluxys

transport network is 1,325 k.m³(n)/h. The firm exit capacity that GTS can offer at 's Gravenvoeren is restrictive.

(98) There is an over-booking of demand for firm entry capacity on the Fluxys network at 's Gravenvoeren. The over-booking of demand amounts to 358 k.m³(n)/h or a ratio of 1.37.

3.9 Eynatten

(99) In Eynatten there is a connection to two German pipelines: (i) the WEDAL in the north-east, which is managed by Wingas, and (ii) the TENP in the south-east, which is operated by EGT (E.ON Gastransport). Both pipelines, the upstream supply capacity of which is substantial and mainly increases in function of the interconnections with the Siberian natural gas fields, are connected to the VTN pipeline. Consequently there are in fact two entry points at Eynatten and there is upstream meshing.

(100) The entry capacity at Eynatten is chiefly booked for transit through the VTN pipeline to the Zeebrugge hub, and/or the UK through the Interconnector. This reverse flow of whether or not Russian natural gas is currently mainly used to supply the British market during the winter. Given that the UK is becoming increasingly dependent on imports from the Continent, it can be assumed that the physical natural gas flows from east to west will gain the upper hand.

(101) The "open season" for the reinforcement of the Fluxys network from east to west, which is the cornerstone of the VTN2 project, has shown that Eynatten is becoming more attractive as an entry point because the supply from the east is growing. The design of the existing VTN pipeline is to a large degree determined on the basis of a strategy for transit. Testimony to this are the small number of branch lines for the Belgian market, the most important of which are located to the east of the Berneau compression point with a branch line onto the SEGEO pipeline, and to the west in the Zeebrugge region (principally at Zomergem and Wachtebeke). The natural gas quality is therefore determined by the transit requirements (see Chapter 4).

(102) The VTN pipeline (and the doubling by means of the VTN2 project) should therefore be integrated to a greater degree in the meshed transport network in order thereby

also to be able to be used as fully-fledged supply gas for Belgian consumers. This means that not only does the entry capacity have to be expanded, but that investments also have to be made in additional branch pipelines (see decided investment for a branch pipeline at Wilsele in the direction of Loenhout, see Chapter 5).

(103) Like the 's Gravenvoeren entry point, the Eynatten interconnection point is faced with contractual congestion: there are more requests for firm entry capacity than can be offered. Pending additional investments (see VTN2 project), a specific congestion policy is needed.

(104) Table 7 and Figure 9 present the technical firm capacity and the bookings of firm upstream exit capacity and downstream entry capacity at Eynatten 1 and Eynatten 2, both in forward and reverse mode (in k.m³(n)/h firm, situation as at 1/05/2008).

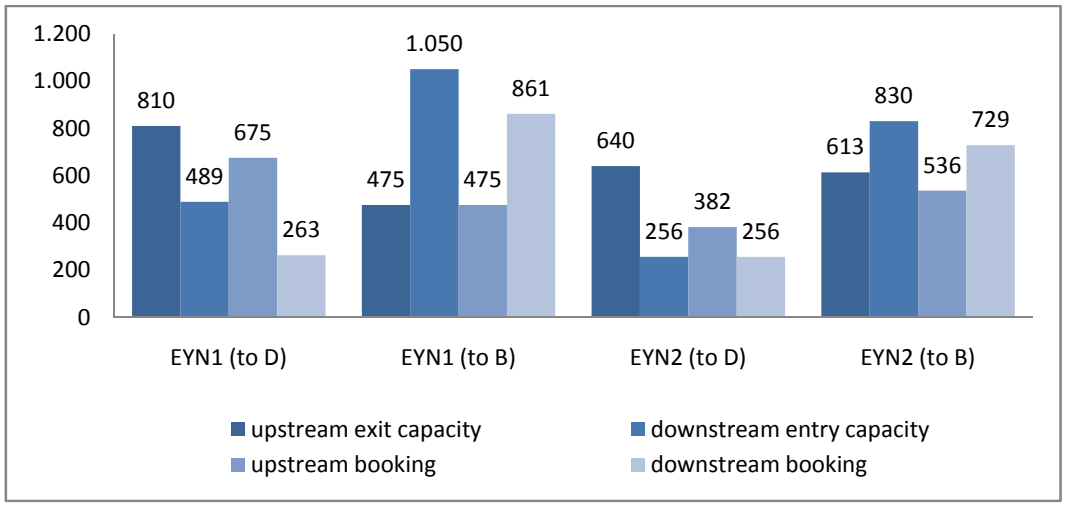
Table 7. Upstream/downstream situation at Eynatten 1 and Eynatten 2 (in k.m³(n)/h firm).

	Upstream exit			Downstream entry		
	Capacity	Booking national	Booking transit	Capacity	Booking national	Booking transit
Eynatten 1 (Wedal)						
Reverse (B ⇒ D)	810 (@49bar) (after vTn2: 1.350)	675		489* (@80 bar)	263*	
Forward (D ⇒ B)	475*	475*		1.050 (M) (after vTn2: 1.250)	216	645
Eynatten 2 (Tenp)						
Reverse (B ⇒ D)	640 (@49 bar)	382		256**	256**	
Forward (D ⇒ B)	613**	536**		830 (M)	6	723

M: metering capacity

(*) www.wingas-transport.de, (**) www.eon-gastransport.de

Figure 9. Upstream/downstream situation at Eynatten 1 and Eynatten 2 (in k.m³(n)/h firm).



(105) The situation at Eynatten 1 is as follows:

EYN1 reverse:

- the Fluxys firm exit capacity at EYN1 is 321 k.m³(n)/h higher than the firm entry capacity on the German side. The firm entry capacity on the German side is booked to the tune of 54%;

- the firm exit booking is 412 k.m³(n)/h higher than the firm entry booking on the German side. There is an over-booking of demand for firm exit capacity on the Fluxys transport network in comparison with the booked firm entry capacity on the Wingas transport network with a ratio of 2.57.

EYN1 forward:

- the Fluxys firm entry capacity is 575 k.m³(n)/h higher than the firm exit capacity on the German side;

- the firm entry booking is 386 k.m³(n)/h higher than the firm exit booking on the German side. There is an over-booking of demand for firm entry capacity on the Fluxys transport network in comparison with the booked firm exit capacity on the Wingas transport network with a ratio of 1.81.

(106) The situation at Eynatten 2 is as follows:

EYN2 reverse:

- the Fluxys firm exit capacity at EYN2 is 384 k.m³(n)/h higher than the firm entry capacity on the German side;

- the firm exit booking is 126 k.m³(n)/h higher than the firm entry booking on the German side. There is an over-booking of demand for firm exit capacity on the Fluxys transport network in comparison with the booked firm entry capacity on the EGT transport network with a ratio of 1.49.

EYN2 forward:

- the Fluxys firm entry capacity is 217 k.m³(n)/h higher than the firm exit capacity on the German side;

- the firm entry booking on the Fluxys transport network is 193 k.m³(n)/h higher than the firm exit booking on the German side. There is an under-booking of the firm entry capacity on the Fluxys transport network in comparison with the booked firm exit capacity on the EGT transport network with a ratio of 1.36.

(107) In terms of availability of firm transport capacity for the Belgian market, it is found that for both EYN1 and EYN2 the bottleneck lies on the German side.

3.10 Natural gas storage

(108) The underground natural gas storage at Loenhout and the PSP at Dudzele are important entry points on the transport network for the supply of peak flows of H gas. The underground natural gas storage in Loenhout is deployed predominantly to absorb the peak in demand for household heating during the winter.

(109) The underground storage capacity at Loenhout is 600 M.m³(n), of which 20 M.m³(n) is intended for the operator of the transport network for the purposes of operational flexibility, the injection capacity amounts to 250 k.m³(n)/h and the peak emission capacity is 500 k.m³(n)/h. Of this, 100 k.m³(n)/h is intended for the operator of the transport network for the purposes of operational flexibility. However, peak emission capacity does not require the storage to be completely filled. A filling percentage of 31% is estimated as being sufficient.

(110) The PSP at Dudzele has two LNG reservoirs of 59 M.m³ (55 M.m³ useful volume) and a firm emission capacity of 410 k.m³(n)/h[32], of which 50 k.m³(n)/ is intended for the operator of the transport network for the purposes of operational flexibility. On top of this there is 90 k.m³(n)/h interruptible emission capacity.

(111) The new investments in Loenhout aim at a 15% expansion of the storage capacity, to raise the useful volume to 700 million m³(n). This is to be done in a phased manner over the period 2008-2011 (www.fluxys.net). Moreover, flexibility in the way the storage is used will be enhanced by means of an increase in both the injection and emission capacities (see Chapter 5).

[32] The firm emission capacity, and therefore guaranteed emission capacity, has recently been reduced from 450 k.m³(n)/h to 410 k.m³(n)/h for technical reasons.

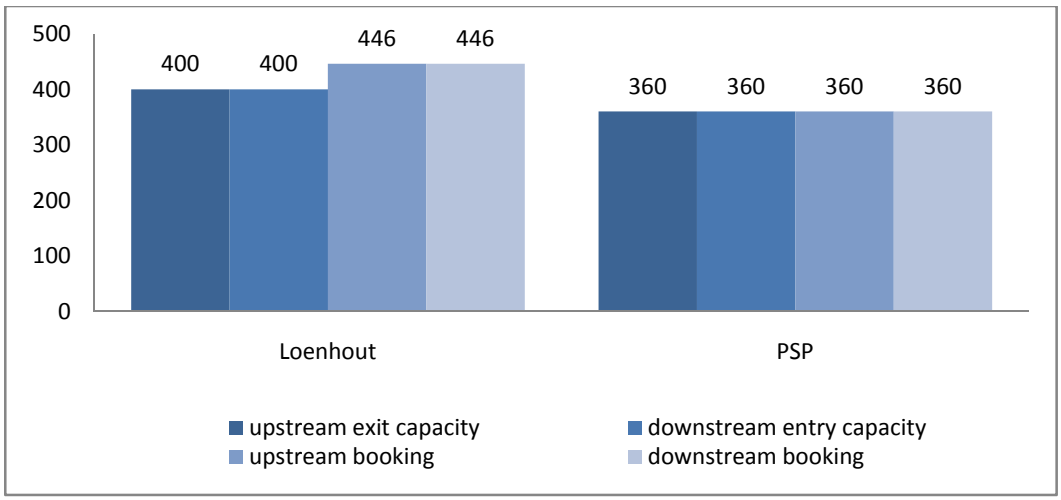
(112) Table 8 and Figure 10 present the technical firm emission capacity and the bookings of firm emission capacity for the underground storage at Loenhout and at the PSP at Dudzele (in k.m³(n)/h firm, situation as at 1/05/2008).

Table 8. The upstream/downstream situation for storage (in k.m³(n)/h firm).

	Upstream exit			Downstream entry		
	Capacity	Booking national	Booking transit	Capacity	Booking national	Booking transit
Loenhout	400 (+100*)	446	N/A**	400 (+100*)	446	N/A**
PSP Dudzele	360 (+50*)	360	N/A**	360 (+50*)	500	N/A**

(*) a priori allocation of emission capacity for the operator of the natural gas transport network for the purposes of operational flexibility, (**) N/A: not applicable (no use for transit)

Figure 10. The upstream/downstream situation for storage (in k.m³(n)/h firm).



(113) There are no problems downstream on the Fluxys transport network for the evacuation of the entire emission capacity (including interruptible emission capacity) of both the underground storage at Loenhout and the PSP at Dudzele.

(114) It is striking that on the transport network more firm entry capacity is booked than the available firm emission capacity of both storage facilities. However, the explanation is not surprising. Shippers concerned also want to be able to use the storage's interruptible emissioncapacity with certainty, and book firm capacity for this on the Fluxys transport network.

3.11 Blaregnies H

(115) Blaregnies H is an important interconnection with the French market and is supplied by means of the TROLL pipeline from Zeebrugge and the SEGEO pipeline from 's Gravenvoeren and Eynatten. The maximum exit capacity from Belgium on the TROLL pipeline is 1,650 k.m³(n)/h. The maximum exit capacity from Belgium on the SEGEO pipeline is 713 k.m³(n)/h.

(116) In theory Blaregnies H can be used as a physical entry point for the Belgian market through a switchover of the metering line. This is an option that dates from the period when the pipelines in question were used for the Algerian LNG contracted by Belgium which was unloaded at the Montoir terminal in Brittany pending availability of the Zeebrugge terminal. In this way the Belgian transport network also has a physical entry point in the south. This physical import capacity is 400 k.m³(n)/h. However, physical import cannot occur just like that, due to problems of interoperability. Given that France odorises natural gas on the transport network, whereas natural gas on the Belgian transport network is not odorised[33], natural gas cannot, physically speaking, be exported to Belgium just like that. However, there are projects under way at GRTgaz to solve this shortcoming. In practice the natural gas flow does not physically have to be turned around, as long as there is sufficient transit of natural gas on the TROLL pipeline, but a backhaul booking is simply made.

(117) For the Belgian market there is a conditional backhaul to the tune of 275 k.m³(n)/h and there is still free conditional backhaul capacity to the tune of 1,030 k.m³(n)/h (1/05/2008) (www.fluxys.net).

(118) The maximum entry capacity in France is 590,000 MWh/day (1/05/2008) (www.grtgaz.com). After conversion, this means a flow of 2,114 k.m³(n)/h. This entry capacity is fully booked.

(119) GRTgaz offers backhaul capacity to the tune of 122,000 MWh/day (01/05/2008) (www.grtgaz.com). After conversion, this means a flow of 437 k.m³(n)/h. This

[33] In France natural gas is odorised when it is imported, whereas in Belgium natural gas is odorised at the "city gates" of the distribution networks. Odorisation is carried out so that the otherwise virtually odourless natural gas can be detected in the event of leaks. In Belgium the decision has been taken not to odorise on the transport network on account of the chemical industry which has a direct connection and encounters problems with odorised natural gas as a raw material. France has opted to build a deodorisation plant at the take-off points for the chemical industry.

backhaul capacity is booked to the tune of 18,490 MWh/day (1/05/2008) (www.grtgaz.com). After conversion, this means 66.244 k.m³(n)/h.

(120) Table 9 and Figure 11 present the technical firm exit capacity and the bookings of firm entry capacity at Blargenies H (in k.m³(n)/h firm, situation as at 1/05/2008).

Table 9. The upstream/downstream situation at Blaregnies H (in k.m³(n)/h firm).

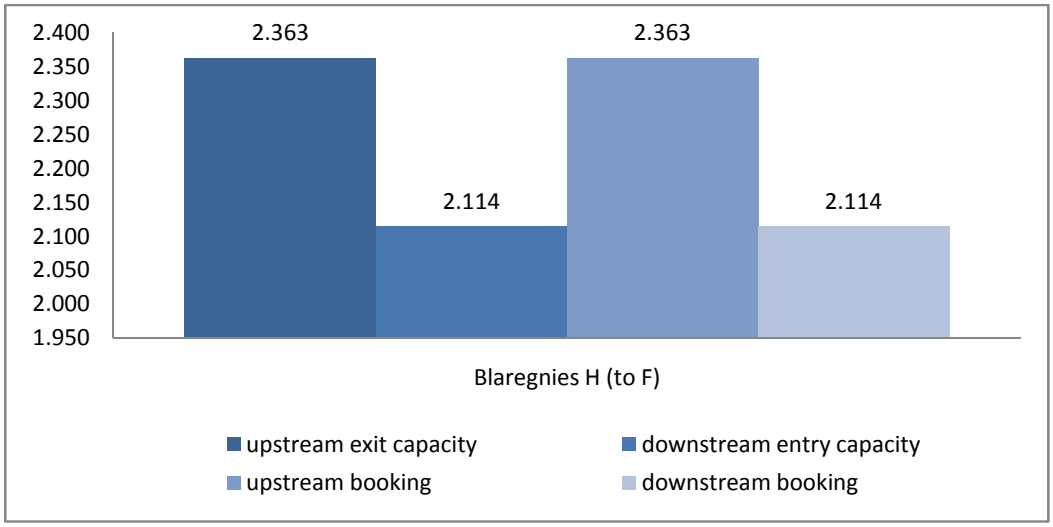
	Upstream exit			Downstream entry		
	Capacity	Booking national	Booking transit	Capacity	Booking national	Booking transit
Blaregnies Segeo (B ⇒ F)	960 (M) 713 (U) (@49 bar)	713		2.114*	2.114*	
Blaregnies Troll (B ⇒ F)	1.650 (M+U) (@49 bar)	1.650 (after 2008:1610)				
Blaregnies Segeo (F ⇒ B)	437 (*backhaul*)*	91 (*backhaul*)*		260	189	N/A
Blargenies Troll (F ⇒ B)				N/A	N/A	N/A

M: metering capacity, U: limitation due to upstream and/or downstream capacity

(*) www.grtgaz.com

N/A: not applicable; not available

Figure 11. The upstream/downstream situation at Blaregnies h (in k.m³(n)/h firm).



(121) The firm exit capacity at Blaregnies H via both TROLL and SEGEO main lines is 2,363 k.m³(n)/h and is fully booked. The TROLL pipeline provides a flow of 1,650 k.m³(n)/h and the SEGEO pipeline provides a flow of 713 k.m³(n)/h. The firm entry capacity in France is 2,114 k.m³(n)/h and is fully booked.

(122) There is an over-booking of demand for exit capacity on the Fluxys transport network of 249 k.m³(n)/h vis-à-vis the booked and available firm entry capacity of the GRTgaz transport network (a ratio of 1.12).

(123) GRTgaz offers 437 k.m³(n)/h backhaul exit capacity, of which 91 k.m³(n)/h is booked. Fluxys offers entry capacity to the tune of 260 k.m³(n)/h, of which 189 k.m³(n)/h is booked. There is clearly an over-booking of backhaul entry capacity on the Fluxys network in comparison with the booked backhaul exit capacity on the French side (a ratio of 2.86). However, one explanation is that transit shippers can counter-book on their own transit flows in Blaregnies, as a result of which no transactions occur on the French side[34].

3.12 Grand Duchy of Luxembourg

(124) Transit through Belgium is important for the Luxembourg market. There are two interconnections, one at Bras and one at Pétange, both of which are currently supplied from 's Gravenvoeren. In fact the network of the Luxembourg transport network operator SOTEG is a distribution network and the Bras and Pétange interconnections can be viewed as "city gates". This explains the relatively low supply pressure from Belgium. For this transit, unlike for other transit, provision does have to be made for flexibility services. Fluctuations in the off-take pattern at Luxembourg (as far as supply through Bras and Pétange is concerned) necessarily have to be absorbed via the Fluxys network. It is important to note that current capacity for the provisioning of Luxembourg is saturated. The Grand Duchy of Luxembourg is also provisioned from Germany through the EGT transport network.

[34] Conditional backhaul capacity does not actually form part of this study, but is mentioned here given the fact that in principle firm entry capacity can be offered at Blargenies for the Belgian market. Both the marketing and supply of firm backhaul capacity are matters discussed between the CREG and the operator of the natural gas transport network Fluxys.

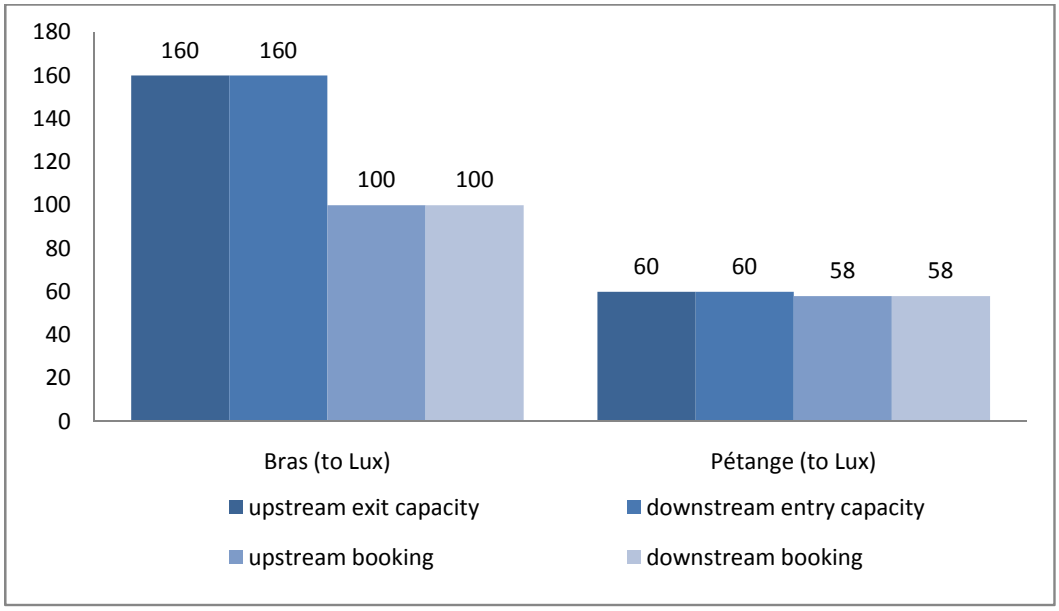
(125) Table 10 and Figure 12 present the technical firm exit capacity and the bookings of firm entry capacity for the Luxembourg market (in k.m³(n)/h firm, situation as at 1/05/2008)

Table 10. Upstream/downstream interconnection points with the Grand Duchy of Luxembourg (in k.m³(n)/h firm).

	Upstream exit			Downstream entry		
	Capacity	Booking national	Booking transit	Capacity	Booking national	Booking transit
Bras	160 (@27 bar)	N/A*	100	160**	100	N/A*
Pétange	60 (@27 bar)	N/A*	58	60**	58	N/A*

(*) N/A: not applicable, (**) www.soteg.lu

Figure 12. Upstream/downstream interconnection points with the Grand Duchy of Luxembourg (in k.m³(n)/h firm).



(126) The firm exit capacity on the Fluxys transport network tallies with the firm entry capacity on the network of the Luxembourg network operator SOTEG. This applies in the case of both interconnections. This equivalence can also be found in the booked capacities.

3.13 L-gas market

(127) Further to the ministerial approval of the indicative plan for natural gas provisioning, 2004-2014 (www.creg.be), which proposes the guideline for a freeze in transport capacity on the Belgian L-gas transport network (main lines), investments for L gas in Belgium have been halted until further notice[35]. This study stands by this guideline, and as and when Belgian demand for L gas exceeds the import capacity, so this will be switched over to H gas. However, in this framework nothing prevents the export capacity from the Netherlands from being raised, as a result of which the import capacity in Belgium could also increase.

(128) Poppel is the main entry point for the Belgian L-gas market and the only one available during peak periods when the Lillo transformer is in operation. Outside peak periods, Zandvliet L is also an import point[36].

(129) Table 11 and Figure 13 present the technical firm exit capacity and the bookings of firm entry capacity at Poppel (in k.m³(n)/h firm, situation as at 1/05/2008). The sketches of the situation for Poppel and Zandvliet L are not additive.

[35] This is a freeze on investments, not a freeze on imports, and is applicable until further notice. In this context it is important to note that on 21 March 2008 Distrigas and GasTerra made public a statement of intent for an extension of L-gas supplies from the Netherlands after the current long-term contract expires in 2016.

[36] The almost total dependence on the Poppel entry point for the L-gas market in Belgium (28% market share) and transit of L gas to France is especially critical from an incident management standpoint.

Table 11. Upstream/downstream situation for L gas (in k.m³(n)/h firm).

	Upstream exit			Downstream entry		
	Capacity	Booking national	Booking transit	Capacity	Booking national	Booking transit
Poppel	2.815* (@49 bar)	1.572+ 139**= 1.711	1.100	3.730 (M) 2.815 (U)	1.490***	1.300
Zandvliet L	200 (@40 bar)	200	N/A	200	200	N/A
Blaregnies L (B ⇒ F)	1.470 (M) 1.300 (U) (@49 bar)	1.300		981****	981****	
Transfo Loenhout	252	252	N/A	300	300	N/A
Transfo Lillo	93	93	N/A	110	110	N/A

M: metering capacity, U: limitation due to physical upstream capacity.

N/A: not applicable

Stand-alone data for Poppel and Zandvliet L, and therefore not additive. In the event of peak flow demand for L gas only Poppel entry point in use (cf. Lillo transformer in use).

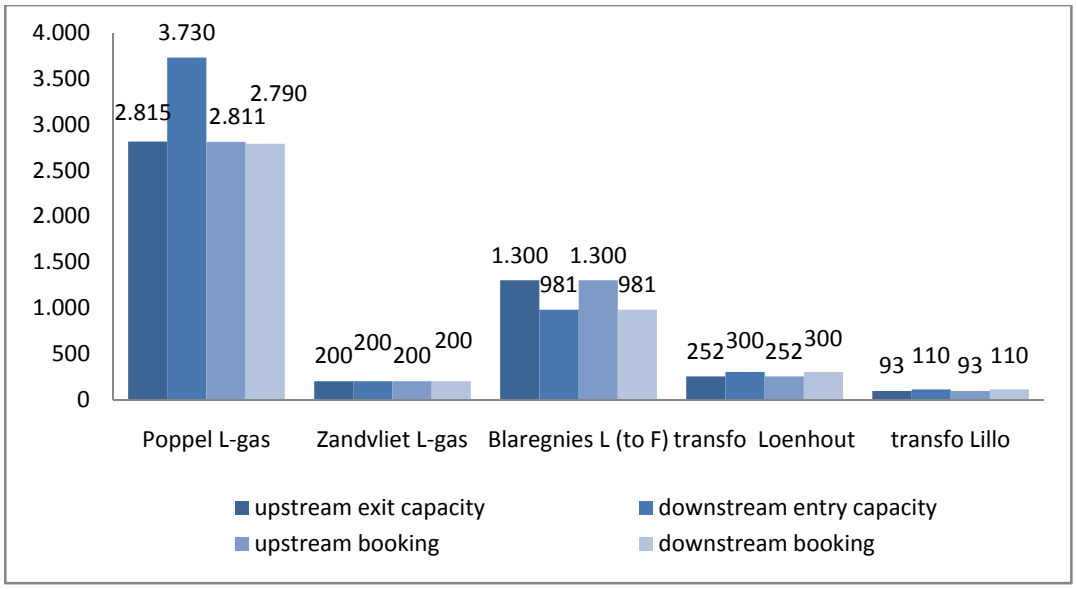
(*) NMa/DTe, *Gas Monitor. Developments in the gas wholesale market in the Netherlands in 2006*, December 2007

(**) conversion of 139 k.m³(n)/h non-firm transport capacity into firm transport capacity

(***) including 139 k.m³(n)/h interruptible transport capacity which is converted into firm transport capacity

(****) www.grtgaz.com

Figure 13. Upstream/downstream situation for L gas (in k.m³(n)/h firm).



(130) The firm exit capacity at Poppel on the GTS transport network is 2,815 k.m³(n)/h. The firm entry capacity on the Fluxys transport network is higher and is thus limited by the exit capacity that the Netherlands is able to guarantee.

(131) For the Belgian market a firm entry capacity of 1,572 k.m³(n)/h (at peak) is booked at Poppel. In 2007 139 k.m³(n)/h of interruptible exit capacity in the Netherlands was also converted into firm exit capacity. This brings the total to 1,711 k.m³(n)/h of booked exit capacity in the Netherlands for the Belgian market.

(132) The booked firm exit capacity at Poppel on the GTS transport network is 2,811 k.m³(n)/h. On the Belgian side an under-booking of demand for firm entry capacity was observed for the Belgian market and an over-booking of demand for firm capacity for transit. In total there is an under-booking on the Belgian side of 21 k.m³(n)/h.

(133) The firm exit capacity at Blaregnies L on the Fluxys transport network is 1,470 k.m³(n)/h but is limited by the booked firm transit to the tune of 1,300 k.m³(n)/h. The firm entry capacity on the GRTgaz transport network is lower and amounts to 981 k.m³(n)/h.

(134) For the French market 1,100 k.m³(n)/h of firm exit capacity is booked on the GTS transport network, 1,300 k.m³(n)/h of firm capacity is booked for transit through Belgium and then 981 k.m³(n)/h of firm entry capacity is booked on the GRTgaz transport network. The booking chain raises a number of questions regarding consistency, but account should be taken of the fact that 275 k.m³(n)/h of firm exit capacity is counter-booked in Blaregnies L for the Belgian market. Moreover, as well as firm entry capacity in France, firm entry capacity is not yet booked for the L-gas market either. This backhaul transaction is not visible at GRTgaz which incidentally does not offer any backhaul capacity at Blaregnies L.

(135) At the Zandvliet L interconnection, which is thus only in operation outside peak periods, equivalence is noted upstream/downstream both as regards available firm capacities and bookings. In fact Zandvliet H is included in the situation description of Poppel applicable to the peak demand period.

(136) For the Loenhout transformer entry capacity of 252 k.m³(n)/h is needed on the H-gas network in order to guarantee the production of 300 k.m³(n)/h of L gas by means of the addition of 48 m³ of nitrogen. These capacities are fully booked. A similar situation applies to the Lillo transformer.

3.14 Direct pipelines

(137) There are three isolated pipelines in Belgium which connect an industrial consumption site on Belgian soil directly with a transport network in another country:

- at Momignies, the industrial site “Verrerie de Momignies” is directly connected to the GRTgaz (H-gas) transport network. This direct pipeline is operated by Fluxys.

- at Veldwezelt, the industrial site of the Heylen brickworks for the production of ornamental bricks is directly connected to the GTS (L-gas) transport network. This direct pipeline is operated by Fluxys.

- at Antwerp, the industrial site of BASF, as well as being connected to the Fluxys transport network, is also directly connected to the GTS (H-gas) transport network. This direct pipeline is operated by Wingas.

(138) Unlike the direct pipelines at Momignies and Veldwezelt, the direct pipeline at Zandvliet is a direct connection, which has repercussions on the interconnected transport networks of GTS and Fluxys. As well as the substantial flow that may run through this pipeline in a phased manner, and which in itself already has repercussions on account of its size, there are also network-technical aspects. This direct pipeline is supplied via the same main line that supplies the current Zandvliet H entry point and from 1/10/2010 will also supply Zelzate as an exit point of the GTS transport network.

(139) As of 01.01.2007 there is a new Zandvliet GTS exit point that connects to the Wingas “Antwerp Gas Pipeline”. This 2.3-km-long pipeline (ND500) will supply the customer BASANT (BASF Antwerp) with gas.

(140) The estimated required flow rates on the BASF site at Antwerp are:

- BASF: 113 k.m³(n)/h + 20 k.m³(n)/h (planned)
- Zandvliet Power: 66 k.m³(n)/h + 70 k.m³(n)/h (planned)
- Air Liquide: 39 k.m³(n)/h + 70 k.m³(n)/h (planned)

Total BASF site thus: 218 k.m³(n)/h + 160 k.m³(n)/h (planned) = 378 k.m³(n)/h.

(141) Initially GTS can in principle provide a flow rate of 20 k.m³(n)/h or 9% of the necessary flow rate for the BASF site. Therefore BASF still depends on provisioning from the Fluxys transport network to the tune of 91%. In time, and after investments made by GTS, the Netherlands might be able to supply a flow rate of 650 k.m³(n)/h or 172% of the BASF site's predicted flow rate requirement.

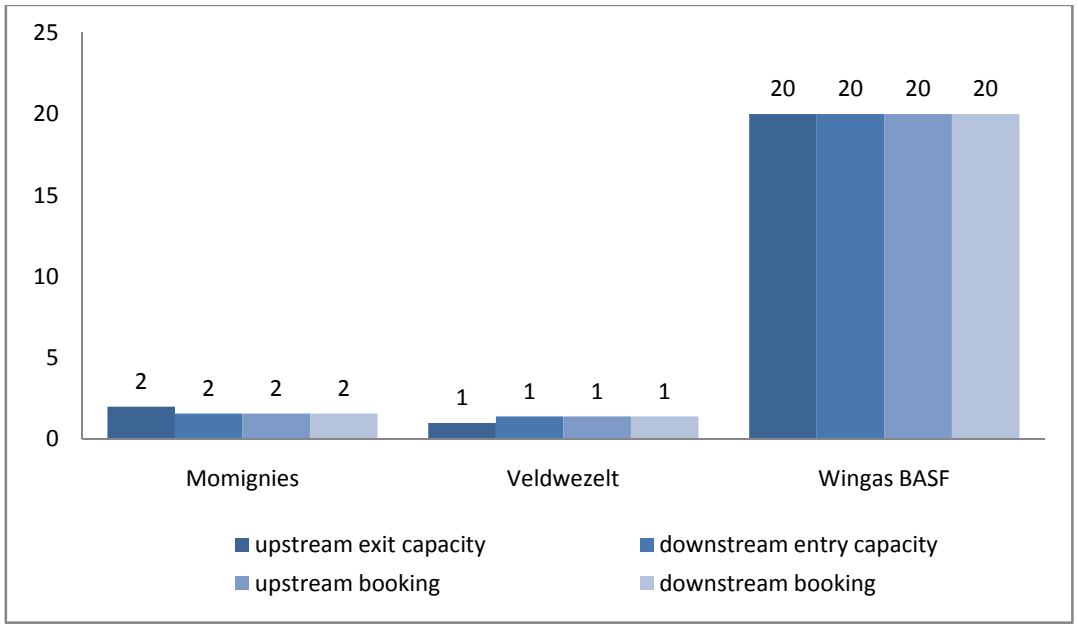
(142) Table 12 and Figure 14 present the technical firm exit capacity and the bookings of firm entry capacity at the interconnections of the direct pipelines (in k.m³(n)/h firm, situation as at 1/05/2008).

Table 12. Upstream/downstream situation at interconnections on direct pipelines (in k.m³(n)/h firm).

	Upstream exit			Downstream entry		
	Capacity	Booking national	Booking transit	Capacity	Booking national	Booking transit
Momignies	1,6	1,6 (@4,9bar)	N/A	1,6	1,6	N/A
Veldwezelt	1,4	1,4	N/A	1,4	1,4	N/A
Wingas BASF	20 (term 650)	20	N/A	20	20	N/A

N/A: not available

Figure 14. Upstream/downstream situation at interconnections on direct pipelines (in k.m³(n)/h firm).



4 Monitoring of network supply and use

(143) In this monitoring overview the analyses per interconnection in Chapter 3 are combined in order to obtain an overall picture for the Belgian transport network as a whole.

4.1 Upstream/downstream matching?

(144) Table 13 presents an overview of the technical firm capacities and bookings at the interconnections of the Belgian transport network (in k.m³(n)/h, situation as at 1/05/2008).

Table 13. Overview of the upstream/downstream situation at the interconnections of the Belgian transport network for H gas and L gas (in k.m³(n)/h firm, including the three direct pipelines).

	Upstream exit capacity	Downstream entry capacity	Upstream booking	Downstream booking total	Downstream booking national	Downstream booking transit
LNG terminal	1.700	1.700	1.200	1.200	600	600
ZPT	1.655	2.600	1.655	3.888	656	3.232
IZT/HUB to UK	3.100	2.911	2.750	2.911	2.911	0
IZT/HUB to B	2.283	3.640	2.283	3.258	888	2.370
ZEL1 (to NL)	585	210	640	210	210	0
ZEL2 (to NL)	585	300	723	300	300	0
Zandvliet H	120	310	120	120	120	0
Obbicht	200	200	200	200	200	0
's Gravenvoeren	963	1.325	963	1.321	450	871
EYN1 (to D)	810	489	675	263	263	0
EYN1 (to B)	475	1.050	475	861	216	645
EYN2 (to D)	640	256	382	256	256	0
EYN2 (to B)	613	830	536	729	6	723
Loenhout	400	400	446	446	446	0
PSP	360	360	360	360	360	0
Blaregnies H (to F)	2.363	2.114	2.363	2.114	2.114	0
Bras (to Lux)	160	160	100	100	100	0
Pétange (to Lux)	60	60	58	58	58	0
Poppel L-gas	2.815	3.730	2.811	2.790	1.490	1.300
Zandvliet L-gas	200	200	200	200	200	0
Blaregnies L (to F)	1.300	981	1.300	981	981	0
Transfo Loenhout	252	300	252	300	300	0
Transfo lillo	93	110	93	110	110	0
Momignies	2	2	2	2	2	0
Veldwezelt	1	1	1	1	1	0
Wingas BASF	20	20	20	20	20	0
Total on entry points transport network	**11.608**	**16.168**	**11.073**	**15.196**	**5.455**	**9.741**
Total on exit points transport network	**9.603**	**7.481**	**8.991**	**7.193**	**7.193**	**0**

(145) The technical firm exit capacity in the neighbouring transport networks is estimated at 11.6 million m³(n)/h. The technical firm entry capacity in Belgium is estimated at 16.2 million m³(n)/h. These aggregated figures show that import capacity in Belgium is cut back by export capacity in the neighbouring countries.

(146) The booked firm exit capacity in the neighbouring transport networks is estimated at 11.1 million m³(n)/h. The booked firm entry capacity in Belgium is estimated at 15.2 million m³(n)/h. These aggregated figures show that there is an over-booking of import capacity in Belgium vis-à-vis the booked export capacity in the neighbouring countries towards Belgium. This over-booking of demand for firm entry capacity amounts to 4.1 million m³(n)/h.

(147) Of the total 15,196 k.m³(n)/h in booked entry capacity in Belgium, 5,455 k.m³(n)/h (36% share) is intended for the Belgian market and 9,741 k.m³(n)/h (64% share) for transit. Given the “matching” rule for the national market, which provides for a tallying between entry and exit, it can be assumed that the over-booking of demand to the tune of 4.1 million m³(n)/h of firm entry capacity can be attributed to transit activities. This means that 42% of the booked transport capacity concerns an over-booking of demand. The following factors, which may reinforce each other, may account for these over-bookings:

- transit shippers book firm transit capacity on several routes in Belgium in order to be able to arbitrate with certainty between different markets when the opportunity presents itself;

- shippers simultaneously book capacity for the Belgian market and for transit;

- shippers without transport capacity upstream book firm entry capacity in the prospect of possible natural gas deliveries/purchases at the border.

(148) The technical firm exit capacity for the export of natural gas is estimated at 9.6 million m³(n)/h. The associated technical firm entry capacity on the other side of the interconnections is estimated at 7.5 million m³(n)/h. These aggregated figures show that export capacity in Belgium is cut back by import capacity in the neighbouring countries.

(149) The booked firm exit capacity for the export of natural gas is estimated at 9.0 million $m^3(n)/h$. The associated booked firm entry capacity on the other side of the interconnections is estimated at 7.2 million $m^3(n)/h$. These aggregated figures show that, by analogy with the entry points, at the exit points on the border more firm exit capacity is booked in Belgium than firm entry capacity on the other side of the interconnections.

(150) The volume of booked firm entry capacity for transit (9.7 million $m^3(n)/h$) and booked firm exit capacity at the border (9.6 million $m^3(n)/h$) are level.

4.2 Belgian transport network: a strong international link?

(151) The marked interconnectivity, substantial transit, a relatively small transport network (moreover divided into two separate networks) and very large neighbouring networks lead one to assume that the Belgian transport network “breathes” thanks to what happens in the neighbouring networks. This is confirmed by the observation that the available firm transport capacities in Belgium, barring a couple of exceptions, are higher than in the neighbouring networks. So in terms of flow rate capacity the Belgian transport network is a strong link at international level.

(152) This conclusion does not clash with the need for investments. On the contrary, to maintain this position, Belgium should keep at least to the same investment rate as in the neighbouring countries, where there is a lot happening (see the current “open seasons”).

Moreover, there is also the commercial aspect. The Belgian transport network (cf. transit) is used heavily for commercial purposes (cf. short-term contracts, Zeebrugge hub, etc.) and this calls for extra transport capacity. The commercial use of the transport network calls for a greater transport capacity than would be required if solely security of supply was targeted. The liberalisation of the market demands that it be possible for the transport network to be used commercially.

(153) Transport networks do not exist independently of each other, which means that performance and use of the network cannot be viewed in isolation from what is happening in neighbouring transport networks. Cooperation between network operators, and this certainly applies to Belgium, is a necessity. Cooperation should

make it possible for networks to gear themselves to each other to as great a degree as possible. The recent international “open seasons” for international reinforcements are a good initiative but at the same time show that in the field of coordination, effective structures still have to be developed. This conclusion is in line with European initiatives striving for better coordination (cf. ERGEG Gas Regional Initiatives) and even a single network operator of the transport network within the single European market.

4.3 Over-booking of demand: a disruptive practice?

(154) The fact that transit shippers book more firm entry capacity in Belgium than what they have available upstream, is not in itself a disruptive practice in a competitive environment and can be explained by the commercial motive of being able to react to arbitrage possibilities. Shippers are thus prepared to bear extra costs for over-booked firm capacity with a view to commercial opportunities in the case of natural gas supplies. This behaviour illustrates that the demand for transport capacity is less and less a direct derivative of the demand for natural gas. However, it is essential that account be taken of this shift in the investment and transport model. Obviously the transport network will be heading for congestion more quickly if investments are planned on the basis of the expected peak natural gas demands, whilst capacity can be booked from the point of view of a commercial management of portfolios. This process is further accelerated as and when several shippers[37] become active on the market.

Booking more firm exit capacity at a border point than firm entry capacity downstream is not in itself a disruptive practice, either, and is also explained from the standpoint of optimisation of shippers’ portfolio management.

(155) The fact that Fluxys permits over-booking of demand for firm entry capacity or firm exit capacity at the border is not in itself a disruptive practice, either, as long as the operator Fluxys can meet these commitments. However, this calls for the investment model to be consistent with the commercial model. If there is inconsistency, the permitted over-booking of demand will be a disruptive practice, particularly in the event of congestion. This phenomenon of overbooking, which in a way anticipates an entry/exit model, is expected to become more important. The conclusion is that the

[37] In 2007 six shippers were active (Distrigas, GdF, Wingas, EdF, Essent, SPE). In May 2008 eight active shippers were counted (the new ones being E.ON, Eneco Energy Trade).

operator of the transport network will have to adjust the investment model and commercial model, and test them for coherence. Lack of consistency will especially be felt in periods of congestion, for which an effective congestion policy will then have to be called on.

(156) However, the bottleneck is the way in which this over-booking of demand for firm capacity is handled by the operator of the natural gas transport network. In capacity calculations, capacity allocations and the congestion policy, over-bookings should be given special attention and should not be taken into account for the entire volume subscribed. Otherwise, the system will have to contend with an inherent hoarding problem. There is a paradox: there is a high degree of over-booking of firm entry capacity vis-à-vis the upstream availability, yet on the other hand, the available firm entry capacity is calculated in extreme scenarios. This problem is felt all the more acutely as long as there is no secondary market for capacity and “use-it-or-lose-it” cannot be applied to transit.

(157) Granting more firm capacity than is available, both at entry and exit points on the border, is a form of over-booking (supply over-booking) of a different kind, in which the operator of the transport network is the responsible party. On the face of it there is no objection to Fluxys granting more firm capacity than is available, but this can only be done provided Fluxys can continue to guarantee all transport contracts. Available capacities are not a static factor, and Fluxys can avail itself of tools, including commercial tools, with which to meet all its obligations. In any case a prudent approach should be adopted to this kind of over-booking.

(158) Offering more firm entry capacity than what the flow rate can provide for upstream is an interesting form of overbooking. In theory the operator can offer “unlimited” firm entry capacity in this case, as long as the upstream flow is known for certain. However, this “unlimited” over-booking should take account of the fact that the upstream capacity is not a fixed factor. There is nothing to prevent the upstream network operator from effecting a reinforcement, and in that case, in the event of over-booking downstream, the downstream operator could find itself in contractual problems because the network is insufficient. The conclusions regarding this type of overbooking are:

- As long as the technical entry capacity at an interconnection is greater than the technical upstream exit capacity, there can be no talk of congestion of

entry capacity. As long as this inequality applies, firm entry capacity can be booked.

- In this respect, too, closer cooperation and agreements between neighbouring operators are advocated, in order to meet the demand for transport capacity effectively.

  Neighbouring network operators should find out from each other how much the maximum exit capacity is for each interconnection. Technically this means that the interconnection point's availability is calculated according to the best-case scenario. This maximum availability constitutes a very useful piece of information for the downstream network operator in order to optimise capacity allocation.

4.4 Over-booking of demand: a booster for day-ahead and secondary markets?

(159) By definition over-booking of demand is not nominated. The over-booking of demand for firm entry capacity to the tune of 4,123 k.m³(n)/h therefore offers a sizeable potential for capacity and liquidity to be released onto the transport market. This would be an ideal mechanism for obtaining liquidity on the market for transport capacity in the context of efforts to combat contractual congestion. However, up until now this mechanism has not been visible in practice.

(160) According to the code of conduct, shippers are obliged to offer unused transport capacity on the secondary market. This is a very precise principle but:

- Hitherto this principle has only been applicable to transport capacity booked for the national market because the code of conduct does not apply to transit. The new draft royal decree on the code of conduct which is being developed will change this situation, in accordance with the European Regulation. As was seen earlier, this mainly concerns over-booking of demand in the case of transit.

- Hitherto there has not been any organised secondary market for the trade in transport capacity booked for the national market. The new code of conduct will

change things in this respect, with inclusion of the principle that the network operator should “facilitate” a secondary market.

- In April 2008 the network operator launched a platform for the trade in transport capacity on the secondary market. So it is therefore a question of waiting and seeing how successful this platform, and the release of over-booked capacity, is. But as was said, the code of conduct does not apply to transit and therefore there is no obligation to offer unused capacity. The new code of conduct could provide for a thorough reform with reference to this.

(161) According to the code of conduct non-nominated transport capacity should be offered on the day-ahead market as interruptible capacity. This is a very precise principle but suffers from problems similar to those with which the principle of the secondary market has to contend:

- This principle only applies to transport capacity booked for the national market because the code of conduct does not apply to transit.

- A day-ahead market, for the national market, is launched by the network operator on 1 April 2008. It is therefore a question of waiting and seeing how successful this is, but given that over-bookings are chiefly carried out by transit shippers it is a question of waiting until such a platform also becomes available for unused capacity for transit.

- Given the nature and scope of over-booked capacity, an assessment needs to be made to see whether or not it is possible also to offer the recycled transport capacity in certain packets that are firm because firm transport capacity is more useful for shippers than interruptible capacity

(162) The conclusion of this section is clear: over-bookings of demand offer a potential for freeing up liquidity on the capacity market, network efficiency and the combating of congestion. The new royal decree on the code of conduct should lay down rules on this, and the question is whether, pending this royal decree, the network operator should not already pro-actively gear the congestion policy to these views.

4.5 One type of natural gas differs from another: natural gas quality?

(163) The problem of the interchangeability of natural gas qualities is a major obstacle to synergy between transit and the provisioning of the national market. Up until now it has been possible for transit flows to be used operationally without any problem for the provisioning of the national market. However, the other way round is not always possible, chiefly on account of the restrictive quality requirements for the British market. The VTN2 project and the provisioning of the underground storage at Loenhout through the planned Wilsele-Loenhout pipeline are only useful for the Belgian market if the quality specifications for transit are in accordance with those of the national market. However, up until now this has not been the case, and thus puts at risk the effectiveness of the investments that have been decided on. This issue is examined in further detail here on account of its crucial importance.

(164) The CREG, like other regulatory bodies (Bundesnetzagentur in Germany, E-Control in Austria, etc.) is urging for a binding application of the EASEE gas standard concerning natural gas quality in the EU and therefore also in the UK. In the Fluxys transport network (H-gas), the natural gas quality on the VTN pipeline (and therefore also the Zeebrugge hub) is geared to the British quality, which differs from the EASEE gas standard. This means that the Belgian market can be supplied without any problem through the Zeebrugge hub and the VTN pipeline, but that conversely natural gas from other sources, especially LNG, cannot always be injected into this separate system. This is a manifest obstacle to network development and the liquidity of the market. If investments continue to be made on the basis of this separated system, we will get a distortion of the national network and all kinds of possible synergies will be lost.

(165) The margin within which the quality (GCV – gross calorific value) of H-gas can fluctuate was regulated for the first time in the main conditions governing transfer. It is laid down that for the transport network the quality of natural gas may fluctuate within the following limits [34.582 MJ/m^3(n); 46.055 MJ/m^3(n)]. However, it is still possible that the quality of transit gas may diverge from these provisions but any departure should of course not endanger the regulations for the transport network.

(166) When the VTN1 project was launched, it was contractually agreed with the first user (Wingas) (27/11/1996) that the natural gas quality on this connection could not

exceed the limit of 41.8 MJ/m³(n). Given that i) there was no regulation on the matter, and ii) Wingas acted as the first contracting party, it is difficult to call into question this contractual agreement for the duration of the contract in question. All parties that have entered into a contract for use of the VTN pipeline since then (Conoco, Gazexport, Thyssengas, etc.) thus knew of this "restrictive" provision originating in the first contract with Wingas. The market has therefore acted here, and there can barely be talk of any conflict in this start-up situation in which transit was targeted. For the term of the initial contract with Wingas the natural gas quality in the VTN pipeline meets the upper limit of 41.8 MJ/m³(n).

(167) It should be mentioned that the limit of 41.8 MJ/m³(n) is not imposed by the German regulations for their own market. EGT, which runs the TENP branch at Eynatten, for example, does not enforce compliance with the Wingas (WEDAL) limit. This contrasts, for example, with the Wobbe problem for the British market. This relates to Wobbe specifications that are not derived from contractual agreements but are imposed by the British regulations.

(168) However, it does not automatically follow on from this that the Zeebrugge hub should use the same upper limit as on the VTN pipeline, which is the case at the moment, as a result of which LNG, for example, cannot be physically traded on the hub just like that and Norwegian gas cannot always be injected into the VTN pipeline (in forward mode). The hub can be located at another point, whereby it is not the natural gas in the VTN pipeline that is the standard, but Norwegian and/or LNG if the problem of interchangeability of natural gas qualities continues to arise.

(169) However, this is not self-evident, for in that case no natural gas could be transferred to Germany on account of the specification agreed with Wingas. Of course the hub would become less interesting if transit to Germany were no longer possible (at least via the WEDAL). For example price arbitrage with Germany would be difficult, which would mean it would not be possible to smooth out higher natural gas prices in Germany.

(170) As long as the natural gas quality of the VTN pipeline remains the standard for the Zeebrugge hub, the Belgian market can continue to take off natural gas from the hub but there is no guarantee that natural gas can be traded for the Belgian market at the hub. This is a barrier for newcomers on the Belgian market because they do not have the guarantee of being able to offer their surpluses at the hub (cf. also barrier for the

creation of an intra-day market). It is clear that the current situation protects the German market from newcomers through Eynatten. It is possibly for this reason that the existing situation is being perpetuated for as long as possible by the parties concerned.

(171) The Wingas quality specification, 41.8 MJ/m³(n), is only important if the VTN pipeline is in forward mode. In reverse mode the specifications applicable to the Belgian transport network are not a problem. It also needs to be stated that as and when more Russian natural gas comes onto the European market[38], there will be a trend towards a lower energy content, on average, of the natural gas transported. This is because Russian natural gas represents fewer calories per m³ than for example Norwegian natural gas and LNG.

(172) The CREG asks Fluxys to give the necessary guarantees that the reinforcements of the transport network that have been decided on do not pose any problems as regards interchangeability of natural gas.

[38] It is estimated that at the moment 6% of Belgian natural gas provisioning is covered, via the various different supply companies, by Russian supply contracts. As and when supply through Germany (see Eynatten interconnection), but also through the Netherlands (see Zelzate), increases, the share of Russian natural gas on the Belgian market will grow.

5 Monitoring of investment decisions

5.1 Introduction

(174) This monitoring overview discusses a number of reinforcements in Belgium that have an effect, directly or indirectly, on the physical firm import capacity or the physical firm emission capacity of the storage installations at Loenhout and Dudzele. Only projects that have been decided on by the operator of the natural gas transport network Fluxys are included according to the planned date of commissioning[39].

(175) The creation of entry capacity is estimated at the time of the peak flow for which the transport network is designed (cf. -11°Ceq.) and according to the natural gas flow scenario that is most probable at that moment for the transport network (VTN pipeline in reverse mode: import via Eynatten and via Zelzate from 01/10/2010). Even though this network configuration and load is used as a basis, the calculation of the effect of an individual investment on import capacity is a theoretical approach. Transport capacity is created by the deployment of a whole series of resources that are inter-dependent, with the result that the contribution of each element is difficult to isolate and can vary.

(176) In accordance with the guideline contained in the Indicative Plan for Natural Gas Provisioning, 2004-2014, no investments are being made in Belgium in additional import capacity for L-gas from the Netherlands. This means that this monitoring overview only concerns investments in the H-gas transport network and takes account of any necessary conversion to absorb extra L-gas demand (the flow that exceeds the import flow rate).

(177) Knowledge of investments in upstream (e.g. Germany) and downstream (e.g. France) networks with an effect on the interconnections with Belgium is limited, at least as regards the specific effects for Belgium. In this part a check is not made as to whether

[39] These are investment proposals of the transport network operator Fluxys that have reached such a state of advancement that they can bear the label “decided”. This does not necessarily mean that all decisions have been officially approved by the Board of Directors, but on the other hand it does not prevent certain orders for equipment from being in progress. On the other hand permits required for the building may still be pending and may delay commissioning, something that should absolutely be avoided given the capacity shortage.

the import capacity is met by at least as much export capacity upstream[40] (see Chapter 4 for the existing situation). Several international "open seasons" are currently under way and foreign projects are in the starting blocks that will have an impact on the Belgian transport network[41].

5.2 Zelzate project

Phase 1: four compressor units

(178) The commissioning of the compression at Zelzate is scheduled for 1/07/2008. This compression has a technical capacity-creation capability of 1,260 k.m³(n)/h (pressure ratio 1.4; four units each with a nominal flow of 420 k.m³(n)/h, one of which is in standby). This compression does not have any effect on the entry capacity at Eynatten, but it will at Zeebrugge (IZT) and Zelzate as soon as phase 2 is implemented. This compression solves the conditional nature of the entry capacity at IZT/HUB for the Belgian market but not for transit to Blaregnies from Zeebrugge, which remains conditional as long as there is no compression at Zeebrugge itself.

The compression at Zelzate can work in several modes. In the mode direction Antwerp (Kallo) on the ND600, substantial linepack can be created for the Belgian market. This alternative also of course means that there is a sizeable capacity creation of 290 k.m³(n)/h in the direction of Antwerp (cf. problem of Loenhout storage injection at >10°C).

The compression at Zelzate fulfils four objectives:

a) the creation of additional transport capacity from Zeebrugge to Antwerp. The additional capacity is needed to cover the fast-growing demand for capacity in the Antwerp region;
b) the possibility of injecting natural gas from the VTN into the high-pressure pipeline towards Antwerp and Zomergem;

[40] This is an essential coordination task of the network operator. Effective investment planning for the Belgian market requires the network operator to organise the necessary gearing with the neighbouring operators. Unfortunately the network operator's current investment schedule is not the result of such a coordination. This isolated manner of planning is no longer tenable and is at the expense of network efficiency and network access and therefore impedes effective operation of the market.
[41] Import capacity in Belgium is not only determined by investments in Belgium. Investments in an upstream network can increase the physical firm import capacity in Belgium by means, for example, of increased compression upstream.

c) the creation of Zelzate as an entry point (after phase 2);
d) the creation of firm entry capacity from the Loenhout storage, independent of consumption in the Antwerp region.

Phase 2: metering installation

(179) At the moment physical firm import from the Netherlands at the Zelzate interconnection point (ZEL1 (GTS) and ZEL2 (ZEBRA)) is not possible. Physical import calls for the adaptation to bi-directional use of the existing metering installation on the Belgian side. Fluxys plans the commissioning of this investment for 1/10/2010, together with the commissioning of phase 1 and 2 of the VTN2 project. On the Dutch side the existing flow regulation also has to be adapted for bi-directional use. GTS currently has virtually no exit capacity towards Zelzate. GTS has to carry out a major reinforcement on the Dutch transport network: a new compression station further to the "open season" in the Netherlands, and strengthen the network.

Phase 3: fifth compressor unit

(180) There are plans for a fifth compressor unit at Zelzate with a technical capacity-creation capability of 420 k.m³(n)/h (pressure ratio 1.4). Commissioning is scheduled for 01/11/2011. However, the investment decision is dependent on the current negotiations between Fluxys and GTS concerning the pressure guarantee that GTS can offer at ZEL[42]. If GTS does not supply the desired pressure guarantee, Fluxys will install boosters at the compression site at Zelzate.

5.3 Extension of Loenhout storage

(181) The total underground storage volume at Loenhout amounts to 1.200 M.m³(n), of which 0.600 M.m³(n) can usefully be used (www.fluxys.net). The storage volume is to be extended to 1.400 M.m³(n) with an increase of the useful storage volume to 0.700 M.m³(n) (www.fluxys.net). This extension is to occur gradually over four years, from 2008 to 2011.

(182) The emission capacity is 500 k.m³(n)/h. The emission capacity will gradually be extended to 625 k.m³(n)/h in 2011 (www.fluxys.net): 50 k.m³(n)/h from 1 January

[42] GTS offers a pressure guarantee of 49 bar whilst Fluxys wants a pressure guarantee of 59 bar.

2010 and then 75 k.m³(n)/h from 2011. The firm emission capacity booked by Fluxys for operational flexibility is still estimated at 100 k.m³(n)/h. Therefore 525 k.m³(n)/h of emission capacity will be offered on the market from 2011.

5.4 VTN2 project

(183) The VTN2 project makes it possible to strengthen an important main line of the transport network across the entire length of the route from Eynatten to IZT (272 km), in a phased manner. In total five phases can be distinguished, leading to a gradual doubling of the pipeline, starting at the interconnection with Germany at Eynatten.

- phase 1 VTN2: Eynatten-Haccourt (43 km) – decision taken, with commissioning on 01/10/2010;
- phase 2 VTN2: Haccourt-Opwijk (130 km) – decision taken, with commissioning on 1/10/2010;
- phase 3 VTN2: Opwijk-Desteldonk (40 km) – decision taken[43], with commissioning on 1/10/2012;
- phase 4 VTN2: Desteldonk-Zomergem (19 km) - no decision yet taken;
- phase 5 VT2: Zomergem-IZT (40 km) - no decision yet taken.

(184) As things stand at the moment, the operator of the transport network Fluxys has only taken decisions on the first three phases. As was said in (174), this part only includes investments for which decisions have currently been taken.

(185) GTS has taken far-reaching initiatives to increase upstream capacity at Zelzate on the basis of their “open season” in 2005 and the “open season” currently under way which is being coordinated with Fluxys and GRTgaz. There are also initiatives in Germany to reinforce upstream capacity: reinforcements by operator Wingas, the EGT “open season” currently under way and investment initiatives by another German operator RWE. These initiatives contribute to an attuning of capacities upstream and downstream.

[43] This extension has in fact not yet been the subject of a formal decision by the network operator Fluxys but there would appear be sufficient grounds to assume that this investment will indeed be made. It will subsequently be established that this investment, too, is certainly necessary for Belgian provisioning.

Phase 1: Eynatten-Haccourt pipeline

(186) The first phase of the VTN2 project concerns a doubling of the existing vTn pipeline between Eynatten and Haccourt (ND1000, 43 km). Commissioning was planned for 01/10/2009, but permit problems mean that commissioning will probably only take place on 1/10/2010 (adaptation carried out in March 2008). This investment creates an additional physical firm import capacity to the tune of 165 k.m³(n)/h at Eynatten (cf. comments (175)).

(187) The border metering stations of Raeren, both EGT and Wingas, can also be reinforced to a total metering capacity from Germany of 1,250 k.m³(n)/h.

Phase 2: Haccourt-Opwijk pipeline

(188) The second phase of the VTN2 project concerns a continuation of phase 1 in the form of a doubling of the existing VTN pipeline between Haccourt and Opwijk (ND1000, 130 km). Commissioning is planned for 01/10/2010. This investment creates an additional firm import capacity of 506 k.m³(n)/h at Eynatten (cf. comments (175)).

(189) After completion of phases 1 and 2 of the VTN2 project, the EYN-IZT capacity will increase by 671 k.m³(n)/h (reverse mode). The IZT-EYN capacity will increase by 533 k.m³(n)/h (forward mode).

Phase 3: Opwijk-Desteldonk pipeline

(190) The third phase of the VTN2 project concerns a doubling of the existing VTN pipeline between Opwijk and Desteldonk (ND1200, 40 km). Commissioning is planned for 01/10/2012. This investment will create an entry capacity of 310 k.m³(n)/h at Eynatten[44] (cf. comments (175)).

5.5 Wilsele-Loenhout pipeline

(191) Fluxys' investment plan offers the branch line on the VTN pipeline from Wilsele to Loenhout (ND900, 80 km) as an alternative to the connection pipeline between Lommel and Loenhout. In this way Loenhout (and the Antwerp region) is opened up

[44] Creation of capacity, in relation to the investment, is substantial. This is explained by the fact that at Opwijk there is a switchover from a ND1000 pipeline to a ND1200 pipeline.

by means of a connection with the VTN pipeline (cf. VTN2 project). The choice is a result of the dominant importance given to compression at Zelzate and the VTN2 project. Moreover this option offers the advantage of the high departure pressure on the VTN pipeline, so that compression at the departure point becomes redundant. Commissioning is scheduled for 1/12/2011.

(192) This connection does not directly create entry capacity but reinforces evacuation of the import potential created by the compression at Zelzate and the VTN2 project.

5.6 Berneau compression

(193) The existing compressor at Berneau (20.888 MW) is used to raise the pressure on the SEGEO pipeline to a sufficient level so that transfer from the 's Gravenvoeren entry points to the Blaregnies exit point is possible. GTS's pressure guarantee at 's Gravenvoeren is "only" 49 bar, whilst Fluxys' pressure guarantee at Blaregnies is also 49 bar. Unlike the new compressors (also at Zelzate), which are electrically driven, the existing compressor at Berneau runs on natural gas.

(194) Fluxys' investment plan makes provision for a compressor at the junction, at Berneau, of the VTN pipeline (Eynatten-Zeebrugge) and the SEGEO pipeline ('s Gravenvoeren-Blaregnies). This compressor has a capacity-creating capability of 900 k.m³(n)/h (pressure ratio 1.7) and commissioning is planned for 1/10/2012. The investment increases the physical firm entry capacity on the SEGEO pipeline. This compression creates firm entry capacity at 's Gravenvoeren by means of excess supply vis-à-vis consumption being evacuated from the SEGEO pipeline to the VTN pipeline.

5.7 Creation of capacity

(195) Table 14 presents a picture of the capacity creation at the interconnections if the investments discussed above are actually implemented. The capacity creation is assigned to individual investments, but the creation is only possible in combination with all the investments referred to in (175).

Table 14. Creation of entry capacity via the commissioning of the investment projects that have been decided on.

interconnection	k.m³(n)/h	date	project	allocation national k.m³(n)/h	allocation transit k.m³(n)/h
IZT/HUB	+290	01/07/2008	- phase 1 compression ZEL	290	0
EYN (*reverse*)	+671 +310	01/10/2010 01/10/2012	- phase 1 & 2 VTN2 - phase 3 VTN2	195* 310*	476* 0*
ZEL (*reverse*)	+1.270	01/10/2010	- metering installation at ZEL - phase 1 & 2 compression at ZEL - phase 2 (and thereafter also phase 3) VTN2	500*	770*
Storage Loenhout	+50 +75	01/01/2010 01/01/2011	- phase 1 increase in emission capacity - phase 2 increase in emission capacity	50 75	0 0
Zandvliet H	+180	01/01/2011	- reinforcement *upstream* GTS	180	0
Total	**+2.846**			**1.600**	**1.246**

*allocation on the basis of Fluxys' current allocation based on the results of the "open season" for the VTN2 project

**Zandvliet H is an entry point for local consumption in the Antwerp region. The entry capacity is mainly determined by the capacity that GTS can supply and the local off-take flow. This therefore concerns a reinforcement in the GTS transport network to the benefit of capacity on the Fluxys transport network.

(196) The master cards in the investments that have been decided on are the adaptation and strengthening of ZEL as a physical firm entry point for the Belgian market and the revaluation of the Eynatten entry point as an entry point for the Belgian market.

6 Monitoring of security of supply

6.1 Introduction

(197) This monitoring overview examines prospects for the supply of entry capacity for the Belgian H-gas market and the demand for entry capacity. This comparison can be used to ascertain whether the investments that have been decided on are sufficient in scope for the provisioning of Belgian H-gas customers.

(198) As indicated earlier there is a freeze on investments for the L-gas market until further notice and the increase in demand, which exceeds import capacity, is absorbed by the conversion of L-gas customers to H-gas customers. In this sense, balance on the L-gas market is guaranteed.

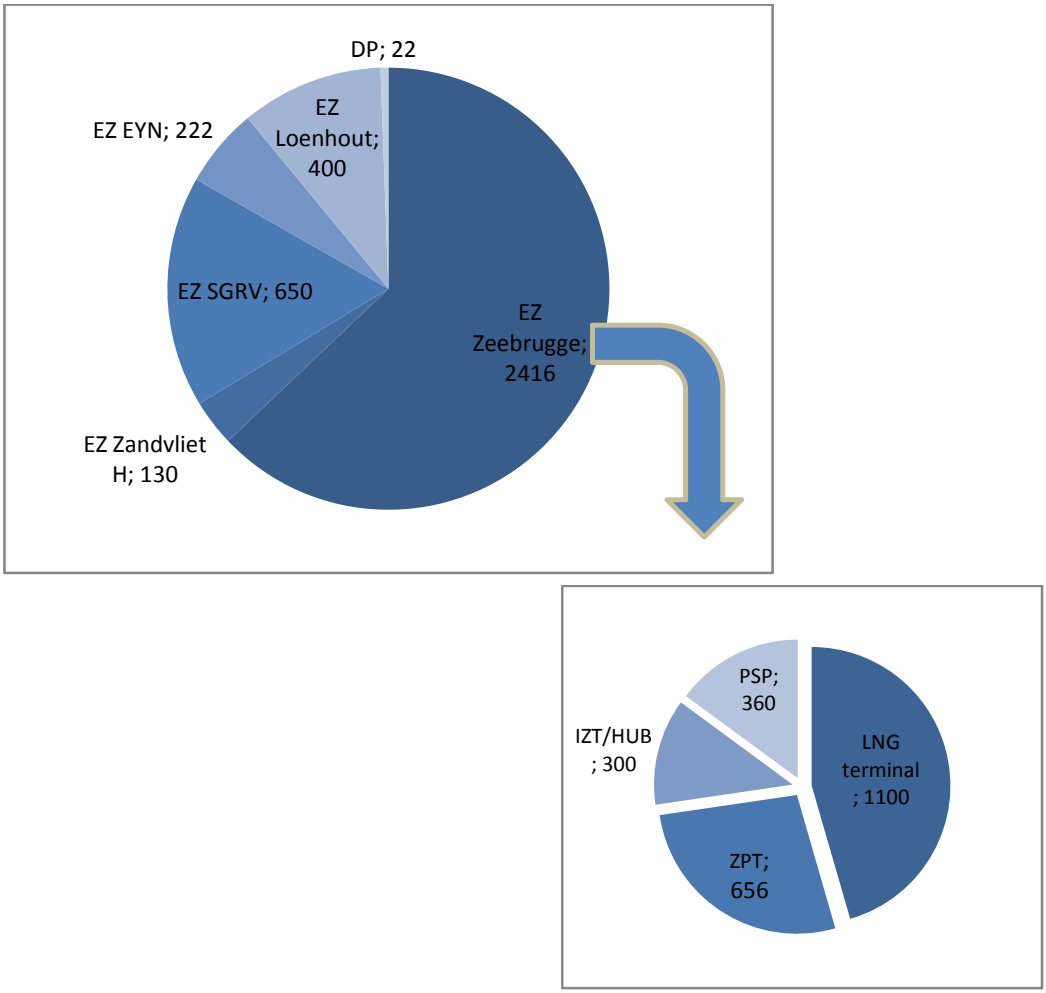
(199) Pending the prospects for demand that the CREG is developing for the purposes of the “Prospective Study on the Security of Natural Gas Provisioning”, use is made in this analysis of the prospects that Fluxys currently uses in its investment plan. These prospects for peak rates of flow for the Belgian market are plausible, on the basis of the information that the CREG currently has at its disposal.

(200) In addition to the prospects for peak rates of flow, the CREG has made an analysis of the possible evolution of demand for entry capacity on the part of shippers. As more shippers become involved and the network is used to a greater degree from a commercial portfolio management standpoint, so there is a divergence of transport capacity that is simply needed to satisfy an aggregated supply flow and transport capacity requested by shippers. This phenomenon is one that has been noted recently and one that will increase. However, as the transport network evolves towards full load, the difference between peak flow and requested capacity diminishes.

6.2 Supply of import capacity

(201) The firm physical entry capacity for the Belgian H-gas market is estimated at 3,840 k.m³(n)/h as at 1 May 2008. Only firm entry capacity is taken into account. The breakdown of this entry capacity is presented in Figure 15.

Figure 15. Firm physical entry capacity per entry zone for H gas (in k.m³(n)/h firm).

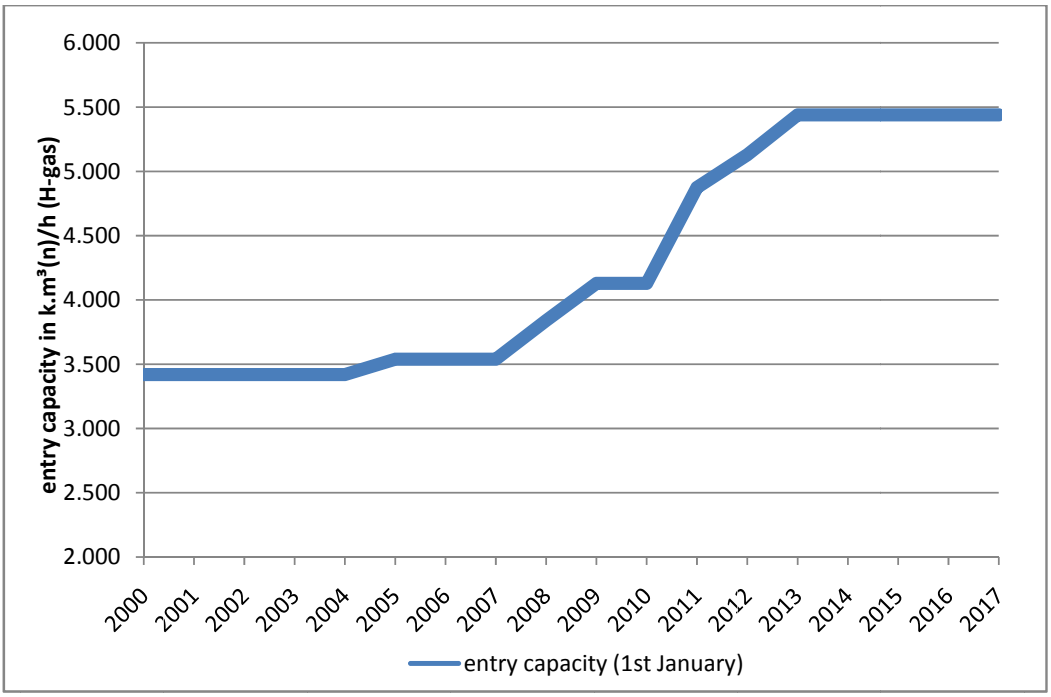


EZ: entry zone; DP: direct pipelines (Momignies and Wingas BASF)

(202) In the period January 2000 – May 2008 two investments were commissioned which create additional entry capacity for the Belgian market: (i) the new Zandvliet H entry point (mid 2004) with an entry capacity of 120 k.m³(n)/h, and (ii) the doubling of the throughput capacity of the LNG terminal in April 2008, with an increase of 300 k.m³(n)/h[45] for the Belgian market. The next investment to create entry capacity for the Belgian market is the Zelzate compression on 1/07/2008 (+290 k.m³(n)/h direction Antwerp) whereupon there will be a wait until 1/10/2010 for the commencement of a major phased reinforcement of import capacity (see Chapter 4). Figure 16 provides a picture of this evolution.

[45] Extra emission capacity minus the emission capacity booked for transit. The existing emission capacity (before the extension) was intended in its entirety for the Belgian market.

Figure 16. Estimated evolution of import capacity in the period 2000-2017 (in k.m³(n)/h firm).



(203) The investments decided on create an additional entry capacity for the Belgian market to the tune of 1,600 k.m³(n)/h by 1/10/2012. This represents a major increase of 42% vis-à-vis the level in May 2008.

It is therefore assumed that the current free emission capacity at the LNG terminal amounting to 1,100 k.m³(n)/h will continue to be intended for Belgium; in other words that there would be no additional interest in the LNG terminal for transit. This is a rather improbable hypothesis. It is likewise assumed that the capacity allocation for transit in the new investment projects will not change. Consequently the supply of import capacity in Figure 16 is a somewhat optimistic development for the Belgian market.

6.3 Demand for import capacity

(204) Pending the prospects for demand that the CREG is developing for the purposes of the “Prospective Study on Security of Natural Gas Provisioning”, here Fluxys’ prospects for demand are taken as a possible evolution in demand. These are the predicted flows at -11°C equivalent for the Belgian H-gas market. In this methodology the demand for entry capacity is still induced from the physical needs on the demand

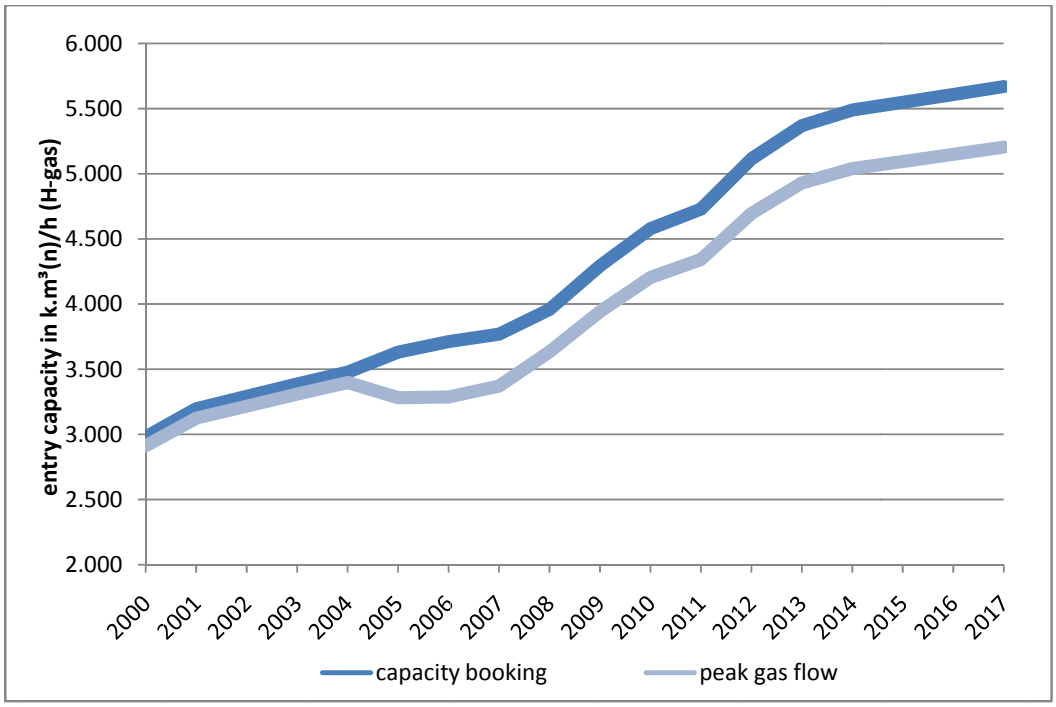
side in which account is also taken of information on new connections, and shipper's commercial capacity demand is not taken as a basis.

(205) In the methodology to deduce peak flows, the physical requirements on the demand side are taken as a basis, and not the shippers' commercial demand for entry capacity. As and when more shippers become active on the transport network, so a divergence will appear between the peak rate of flow and the entry capacity requested. This is logical, since the supply portfolio will become fragmented into several portfolios, each of which will be managed differently. This also leads to part of the pooling effect being lost.

(206) On the basis of an analysis of the relationship between peak flow and requested entry capacity, the CREG has made prospects of the requested entry capacity in the event of peak flow. It is assumed that the number of shippers will increase from eight to 12. In the event of even more active shippers, the divergence would increase still further. Because the network is converging towards full load, the difference between requested entry capacity and peak flow is relatively small. This difference is larger outside peak periods. The ratio of requested entry capacity/physical natural gas requirement is higher in the case of a lower network load.

(207) Figure 17 presents the evolution of peak flow and the higher evolution of requested entry capacity in the period 2000-2017.

Figure 17. Estimated evolution in peak gas flow and requested entry capacity on the H-gas market (in k.m³(n)/h firm).



(208) The peak flow of the Belgian H-gas market at -11°C eq. is estimated at 3,634 k.m³(n)/h in 2008. This peak flow could rise to 5,205 k.m³(n)/h in 2017. This is a growth of 43%, or average annual growth of 4.1%. This marked growth is chiefly attributable to the electricity sector[46] which is also anticipating[47] the withdrawal from nuclear energy. This growth calls for the market intentions for an appreciable expansion of power plants running on natural gas actually to be carried through.

(209) In the case of the supply portfolio further fragmenting among several shippers, requested entry capacity could grow from 3,958 k.m³(n)/h in 2008 to 5,669 k.m³(n)/h in 2017. This is a prudent expectation. Depending on the further development of the marketing of transport capacity and the desired flexibility of shippers, the difference between peak flow and requested entry capacity will be greater.

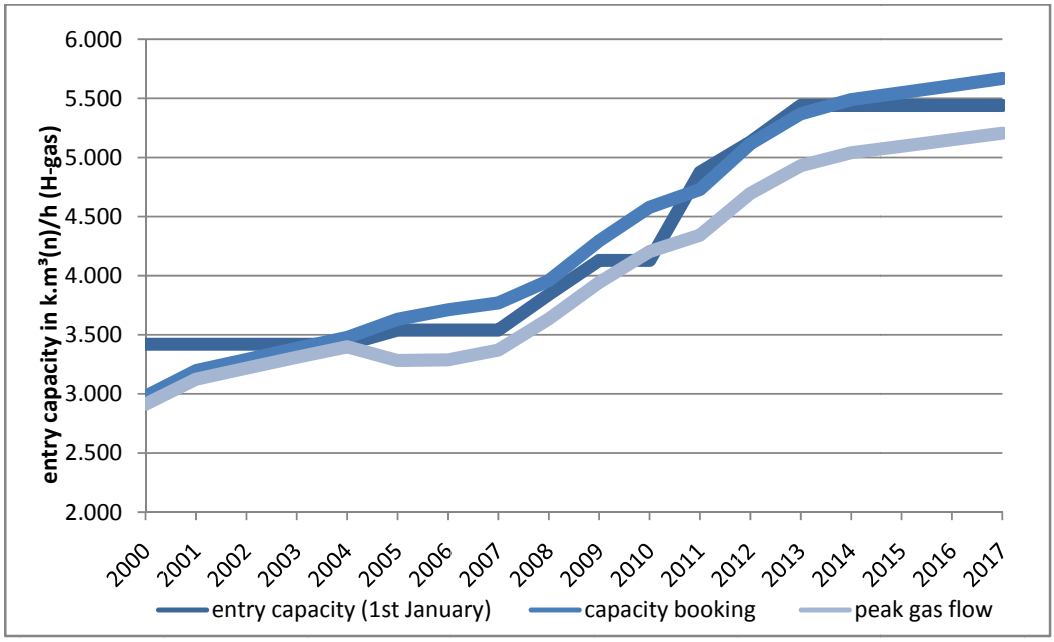
[46] It is not so much the growth in demand for natural gas for electricity production that is responsible for this, but rather the growth in installed capacity (growth in power plants' connections to natural gas). For every new power plant, provision should be made, in principle, for an import capacity (and supply capacity) capable of covering the power plant's peak off-take.

[47] Anticipations here means the bottom-up expectations of the sector itself, which are reflected in their intentions regarding the construction of new gas-fired power plants.

6.4 Comparison of supply and demand

(210) Figure 18 presents a comparison of entry capacity supply and demand.

Figure 18. Estimated evolution of demand for and supply of firm entry capacity for the Belgian H-gas market over the period 2000-2017 (in k.m³(n)/h firm).



(211) The planned import capacity is too limited to be able to conclude that the investments would guarantee that physical congestion could be ruled out. The planned use of the Zelzate entry point and the commissioning of phases 1 & 2 of the VTN2 project on 1/10/2010 are an absolute last-minute reinforcement, since otherwise security of supply would suffer a crisis in the event of a severe winter in 2010/2011. In any case, capacity supply is extremely critical up until 1/10/2010 as regards physical import possibilities. Local entry points will most probably be confronted with physical congestion.

(212) The bleak picture for physical congestion also applies (and all the more so) to contractual congestion. Up until the series of commissioning from 1/10/2010 onwards, the network will be in a state of contractual congestion. After this there will be a respite, but supply will remain critical and local entry points will most probably continue to be faced with contractual congestion. This congestion could intensify depending on the choice of entry and shift of entry (shippers' shift of route).

(213) It may be too late to speed up investments, and we are still confronted with the unavoidable lead times for new investments. What cannot be achieved with the infrastructure will have to be achieved with an innovative form of network operation. As has previously been expounded in this study, it is not only pipelines that create capacity; there is a whole range of techniques that can used to ensure that the network is run more efficiently.

(214) The analysis presents a gloomy picture of the supply of transport capacity in a constantly expanding national natural gas market. This finding is significant because:

- the evolution in supply of import capacity is not very sensitive and is based on a calculation of the investments that have been decided on by Fluxys, the capacity-creating capability of which has been estimated optimistically;

- the evolution in demand for capacity has a margin of uncertainty, but is mainly driven here by the strong growth in power plants running on natural gas, which will grow still further after 2015 in the event of a withdrawal from nuclear energy. This development has been reported by the sector itself. What is more, in this study the discrepancy between the evolution in demand for transport capacity and peak flow has been estimated very prudently.

In short, the picture given here is strong enough to warrant concern and to underline the need for appropriate initiatives to be taken urgently.

(215) Given the current investment model and commercial model, everything points to the need for a continuous policy for congestion management. However, the operator of the natural gas transport network has hitherto not pursued an effective congestion policy.

(216) The current investment policy does not enable an active switchover policy to be implemented from L-gas customers to H-gas customers, that goes further than the switchover as and when demand for L-gas exceeds the import capacity. In this configuration there is by definition contractual congestion at the entry point at Poppel and a congestion policy is also required for L gas that also takes into consideration physical congestion that is not inconceivable in the event of a severe winter.

(217) Operational network management is increasingly dependent on shippers' behaviour and is not easily predictable since this behaviour is prompted by commercial considerations and is therefore volatile. From this point of view, the need for a continuous congestion policy, certainly for local entry points, is in itself not a problem, and in this way a contribution can be made towards optimal use of the network. Physical congestion, on the other hand, needs to be estimated and assessed in good time, with a view to the necessary reinforcements.

(218) Following on from the findings in the previous chapters, this analysis shows that the network management is confronted with a new dynamic in which the shippers are the driving force. The challenge for the operator consists in anticipating developments on the transport market, and not just the flow demand at peak periods, and using these insights to further refine the investment model, network management and the commercial operating model.

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during its meeting on 15 May 2008

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