ASSESSING PIPE-TO-PIPE COMPETITION:

THEORETICAL FRAMEWORK AND APPLICATION TO GTS

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Contents

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1. Introduction and Executive Summary

In December 2007 *The Brattle Group* prepared a report for the NMa investigating the status of pipe-to-pipe competition (P2PC) between Gas Transport Services B.V. (GTS) and other gas transporters (hereafter referred to as the 2007 report).[1] The research was motivated by European Regulation 1775/2005, which makes the use of tariff benchmarking to set tariffs conditional on the existence and extent of P2P competition facing a Transmission System Operator (TSO). Our report focused on the question: *does the level of P2P competition facing GTS constitute "effective competition"*?[2] We developed a specific interpretation of "effective competition" in the sense of the Regulation. In our view P2P competition is effective if it means that *in the absence of cost-based tariff regulation GTS would be constrained by competitive forces from raising prices "significantly" above current levels*. The "significance" of a level of price increase is inevitably a matter of judgement. We suggest—by analogy with the SSNIP test used in market definition for competition proceedings—that 10% is a reasonable criterion (however our empirical findings are not very sensitive to this choice of parameter value).

The NMa has asked us to update our 2007 analysis, in light of possible changes in the tariffs charged by potentially competing gas networks and changes in the available capacity on those networks. As a first step, the NMa asked us to review whether there have been any developments in methodologies for analysing P2PC that might lead us to modify our 2007 methodology. We have searched for methodologies or analyses of P2PC carried out since 2007, and we report our findings in Section 2. Section 3 discusses competition in the destination market, which is the market for moving gas to a certain point in the network, and section 4 discusses competition in the origin market, which is the market for moving gas from a particular point in the network. Finally, section 5 analyses the market for transit, which is the market for moving gas from one specific point to another specific point.

Note that the 2007 report analysed the possibility of competition in Quality Conversion (QC) services. Since 2009, the QC service is no longer offered as a separate service. Therefore we do not include an analysis of QC in this report.

In the Dutch debate regarding the regulation of gas transmission tariffs parties have advanced arguments that GTS tariffs are very low relative to neighbouring countries, and that therefore prices should be benchmarked to avoid two potential problems:

- Stranding of assets—there could be high demand for new infrastructure, GTS could invest and then later find that some of this infrastructure is "stranded" because potentially competing networks (i.e., primarily German ones) lower their prices in future (voluntarily or as a result of regulatory action).
- Security of supply – reports from Professor Jepma and from the ECN claim that if GTS's tariffs are too far below neighbouring tariffs then they will attract volumes of

[1] Boaz Moselle, Dan Harris (The Brattle Group), Assessing Pipe-to-Pipe Competition: Theoretical Framework and Application to GTS, December 2007.

[2] See Recital 7, which should be read in conjunction with Article 3.

transit that could threaten the ability to carry domestic gas supplies (the "Jepma effect").[3,4]

We conclude that the first issue ('stranded assets') is relevant to Regulation 1775, but that the Jepma effect is not, and is therefore not discussed in this report. For a discussion of the Jepma effect we refer readers to our 2007 report.

With respect to the stranding issue, in our 2007 report we noted that to justify the use of benchmarking to avoid the stranded asset problem, NMa should first be satisfied that the problem has a reasonable chance of occurring. Long-term contracts can eliminate or substantially reduce the risk of stranded assets. If GTS only builds new transit capacity when customers have signed relatively long-term contracts of *e.g.* 10 or 15 years for the majority of the capacity, then this would defer the risk of asset stranding, which could only occur once the 'open season' contracts have expired.

The question is then whether competition would lead to the assets being stranded, once the 'open season' contracts have expired. Clearly it is impossible to say now whether competition would emerge at that time. NMa must balance the risk of asset stranding at some point in the future against the risk that benchmarking could lead to a substantial increase in tariffs now, to the detriment of shippers and gas users. On balance, it seems difficult to justify the use of benchmarking to avoid the stranding problem. The chance of the problem occurring is highly uncertain, and the problem can be managed by the use of long-term contracts.

1.1. Developments in the analysis of P2PC

There have been several cases since the publication of our 2007 report where various bodies have discussed or analysed P2PC, most notably the German regulator and the European Regulators' Group for Electricity and Gas (ERGEG). While these developments are interesting, they have not led us to conclude that there are any shortcomings in our 2007 methodology which need to be addressed. However, the German regulator's methodology introduces an interesting standard which addresses the question of 'how much competition is enough'? In other words, is it sufficient to have only one alternative pipeline for there to be effective competition? The answer of the BNA is that it is not, and the BNA proposes a threshold for a sufficient level of competition based on a competition index. While we support this approach in theory, we have not applied it in this report because we do not find any situations in which an alternative network has spare capacity that could compete with GTS at a similar price.

1.2. Assessment of competition in transportation

To assess the extent of competition in transporting gas we maintain our 2007 methodology, which is an adaptation of the methodology used by the Federal Energy Regulatory Commission (FERC) in the United States. The methodology distinguishes between three types of "product

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[3] '*Hydra Aantasting van leveringszekerheid*', C.J. Jepma, with M. Broekhof and W.P. van der Gaast, September 2004.

[4] '*Druk in de gasleiding Verband tussen tarieven voor gastransport, omleidingsstromen en congestie in Nederland*', W. Lise, J. de Joode, M.G. Boots ECN-C--05-098 November 2005.

markets": "destination markets", "origin markets", and "parallel path" or "transit markets". Note that there are many markets of each type, differentiated by location.

Destination markets

For a given exit point served by GTS we define the *"destination market"* to comprise all pipelines (actual or potential) that could compete with GTS in bringing gas to that point. In concrete terms this has different implications depending on the nature of the exit point. For a Dutch consumer located near the German border, competition to GTS might come from a German network that could build a direct line over the border to the consumer. For a French consumer of gas that is exported from the Netherlands (and therefore "served by GTS" along part of the transportation route), competition might come from any pipeline able to bring competitive gas to the same consumer.

In destination markets the main competitive constraint on GTS's pricing is the potential for customers to bypass the GTS network by building their own pipeline. For example, if GTS attempted to raise the price of exit capacity at Maastricht, customers could in theory build their own pipeline which connects to the Fluxys network, thereby avoiding GTS's tariffs. We have estimated the costs of building a 'bypass' pipeline for two groups of industrial consumers relatively close to the border.

We calculate that, because of the economies of scale inherent in pipelines, for smaller groups of customers a bypass pipeline is not economic even if they are very close to the border. Even for a larger group of customers in Delfzijl – which has relative low GTS tariffs – a bypass pipeline is only economic if it is less than about 20 km from the foreign network. We also identify several reasons why, even if it was cost-effective to build a bypass pipeline, it would be difficult to build one in practise. These reasons include the difficultly in co-ordinating a group of customers to create a demand large enough to make the pipeline cost-effective, and difficulties in gaining permits and rights-of-way.

Conversely, the cost of new capacity for third-parties is likely to be significantly higher than GTS's Long-Run Marginal Costs (LRMC), due to advantages GTS has in using existing rights-of-way, gaining access to new rights-of-way, and GTS's economies of scale and scope. Therefore, the ability of third-parties to build their own new capacity is a weak constraint on GTS's pricing of either new or existing capacity. We conclude that that there is no effective competition in the destination markets for most if not all consumers in the Netherlands: in the absence of tariff regulation GTS could raise its prices significantly without losing significant volumes.

For consumers outside the Netherlands the issue is more difficult to analyse quantitatively. However, we note that the majority of gas exported from the Netherlands to a specific destination is either L-gas and/or sold under long term contractual agreements. Therefore it would not be possible for the customer to choose an alternative source of gas from outside the Netherlands, if border exit prices were to increase. It therefore seems likely that GTS would be able to increase the price of border exit capacity without reducing export flows.

Origin markets

Analogously, for a given entry point served by GTS we define an *"origin market"* to comprise all pipelines (actual or potential) that could compete with GTS in taking gas from that point. For example, a Dutch gas field that injects gas into the GTS network could in principle choose instead to build its own pipeline to serve consumers or interconnect with other networks.

We find that it would be prohibitively expensive for gas produced offshore of the Netherlands and arriving at Den Helder to build a bypass pipeline to either the Fluxys network or one of the German networks. Den Helder is 160 km from the Belgian border and (overland) more than 190 km from the German border. A pipe to the German border, even for a relatively large gas user, would cost the equivalent of over €18/kW/year (an estimate which excludes the cost of compression), well in excess of the avoided GTS tariff (€3.12/kW/year). We conclude that GTS would be able to raise the price of entry capacity at domestic origin points significantly.

We conclude that GTS would also be able to raise the price of border entry capacity. Demand for capacity at border entry points would not be sensitive to an increase in the price of capacity. Gas importers are the marginal (price-setting) source of gas, and since all importers would experience the price increase, shippers could pass on price increases to their customers.

Transit markets

Finally, a *"parallel path market"* involves competition to take gas between two fixed points or areas. The key issue with regard to GTS is the existence of competition for gas transiting across the Netherlands, and we focus on these "*transit markets*" (a subset of the parallel path markets). For example, competition in taking gas from Emden to Belgium might come from Open Grid Europe, Thyssengas or Wingas.[5]

We look at competition for transit between origin A and destination B by looking at transit capacity that goes from A to B on the GTS route, and seeing whether there is available capacity on an alternative route at a tariff competitive with GTS's tariff. If there is, then transit capacity on the GTS route could switch to an alternative route in response to a price rise by GTS. GTS would be unable to raise its prices significantly. Table 1 shows our findings for a selection of routes analysed.

[5] GTS has an entry-exit tariff system so does not explicitly sell "transit" or have a "transit" tariff (see section 5.1 for more discussion). However GTS could in theory charge more to shippers using its system for transit while keeping tariffs constant for other system users. For example, it could raise all entry charges at cross-border entry points, and lower all exit charges at exit points within the Netherlands by an amount equal to the increase in entry charges. See the discussion in Appendix I for more details.

Table 1: Summary of transit route analysis

From	To	Conclusions
Emden	Belgium	Both Open Grid Europe and Wingas have sold entry capacity at Emden and exit capacity at Eynatten, but neither firm are currently offering exit capacity at Eynatten. Therefore shippers would not be able to use this as an alternative route. In any case, the cost of both routes is about 20% more than the cost of using the GTS route.
North Germany	South Germany	GTS route is more expensive than the alternative German routes. When the German routes are congested GTS would have market power on this route. Data shows that there is limited capacity available on the Open Grid Europe route and capacity is only available intermittently on the Wingas network.
Emden	France	There is currently no available capacity on alternative routes - it would not be possible for customers currently sending gas from Emden to France via the GTS network to divert gas onto an alternative network in response to a price increase from GTS. However, we note that the cost of using an alternative network is similar to the cost of using the GTS route, and so this could become a competing route in future.

In the markets for transit services – where gas flows through the Netherlands but starts and ends outside it – we find that the price of alternative capacity is at least 110% of the current price of GTS transit. We also find that there no little spare capacity on alternative routes, and this will remain the case until at least the end of 2012. For example, one of the main transit routes across the Netherlands is from Emden to the south of the Netherlands. We calculate that because of a lack of capacity on alternative routes, in the absence of tariff regulation it would be profitable, for GTS to raise prices for transit routes significantly.

For reasons discussed above, GTS could set prices in excess of its long-run marginal costs without attracting entry. We conclude that there is no effective competition in the transit markets.

Multi-year tariffs and large international projects

In our 2007 report, we noted that holders of long-term pipeline capacity that is sold at a fixed price can provide competition to the pipeline owner. A holder of long-term fixed-price capacity in effect becomes a rival pipeline, able to moderate the pricing of primary capacity. At the time of our 2007 report, the issue of whether to change the law to allow GTS to set long-term tariffs was being actively debated. However, we understand that this is no longer a high priority, and it does not

seem likely that long-term tariffs will be allowed in the near future. Therefore we do no analyse this issue again in this report.

Large international projects, such as the export of gas from a large offshore field or an LNG terminal, have some choice where they land gas, and are therefore in a strong position to negotiate tariffs with GTS, *if multi-year tariffs were allowed*. The ability of large projects to bargain could limit GTS's ability to raise prices at a given entry point and exit point. This ability is not simply theoretical. However, this consideration is of limited relevance at the current time, since there is no immediate prospect of multi-year tariffs. We refer readers to our 2007 report for a fuller discussion of these issues.

2. Developments in the analysis of P2PC

In our 2007 report we surveyed international practice and methodologies for establishing the presence or absence of P2P competition. Appendix I of our 2007 report also provided an overview of the literature on P2PC to date, including academic papers, views from National Regulatory Agencies and the European Commission. Based on this review, we analysed three types of gas-transport product-markets:

1. Destination markets – The destination market is concerned with the analysis of shippers that must transport gas *to* a particular point on the network, probably because they have signed a contract to supply gas at that point or have a facility which needs gas at that point. A power station without a long-term supply agreement would be an example of this type of customer – because the plant does not have a long-term contract, it is free to buy gas from any number of points in Europe, but must always transport gas to the power station. The competitive concern is that such customers should have an adequate choice of independent competing pipelines on which to transport gas to their specific point on the network. For example, if a customer could transport gas from points A or B to point C, (and gas was priced similarly at points A and B) then a merger of the owners of the A to C and B to C routes would be a concern for these customers, because the merged company could increase the price of transport over both routes.

2. Origin markets – The origin market is concerned with the analysis of shippers that must transport gas *from* a particular point on the network, probably because they have signed a contract to buy gas at that point, or have invested in gas production there. A gas producer who has not signed a long-term gas contract (and can therefore sell on a number of 'spot' markets) is an example of this type of customer. These customers are concerned with having a choice of evacuation routes to points on the network where gas fetches a similar price. For example, if the customers could transport gas from C to points A or B (and gas was priced similarly at points A and B) then a merger of the owners of the C to A and C to B routes would be a concern to these customers, because the merged entity could increase the price of gas transport on both routes.

3. Parallel-path markets – this concerns the analysis of shippers that must transport gas *from* a particular point on the network *to* a particular point on the network, because they have signed a contract to buy gas at the origin (or have invested in production facilities at the origin point) and sell it at the destination. An example would be a gas producer who has agreed to sell gas to a specific power station. These customers are concerned with having a choice of routes from point A to point B. A merger of two separately owned pipelines that went from A to B would be of concern to these customers.

As a first stop in updating the 2007 analysis, we have reviewed whether there have been any developments in methodologies for analysing P2PC that might lead us to modify our 2007 methodology. We have searched for methodologies or analyses of P2PC carried out since 2007, and we report our findings below.

2.1. Germany

Germany is unusual in Europe in having multiple Transmission Owners (TOs) active in its territory.[6] The German TOs had asserted that there was P2PC in Germany, and hence there was no need to regulate pipeline tariffs. The German Energy law states that the energy regulator (the *Bundesnetzagentur* or BNA) can set gas transport tariffs using benchmarking, if TOs face effective P2PC. In 2008 the BNA set out to determine whether there was effective P2PC in Germany – the first time it had formally done so. We have reviewed the BNA's methodology. The BNA also kindly took time to discuss their methodology with us and answer questions.

All the German TOs apply an entry-exit system of tariffication, but instead of each TO forming its own entry-exit system, groups of TOs join together to form a single market area (or Virtual Trading Point). Each market area is similar in design to the Dutch TTF, and there is a single market operator for each market area. Currently there are six market areas in Germany, but this will reduce in future as market areas continue to combine with one another. With respect to P2PC, the key point is that a shipper can usually gain access to a market area via one of several TOs, and a distribution network might be connected to more than one TO.

In the context of the market structure described above, the BNA defined the following product markets:

- An entry market. This market is further divided into entry capacity serving the same:
  - market area;
  - border (e.g. Germany-Poland)
  - production facility;
  - storage facility;
- An exit market. This market is further divided into exit capacity serving the same:
  - distribution networks;
  - directly connected customers;
  - gas storages;
  - neighbouring countries;
  - neighbouring market area.

The BNA did not investigate every market for each TO. For example in the case of Gasunie Deutschland the BNA only examined distribution networks and neighbouring TOs.

The BNA analysis considered whether a customer needed to be connected to an entry point for that entry point to compete with the customer's current entry point. For example, if a customer was

[6] . In this section, we distinguish between TOs and System Operators or SOs, as in Germany this distinction is relevant. There can be many TOs in a market area but only one SO. In contrast, most jurisdictions have a combined TO and SO or Transmission System operator (TSO).

connected to entry point A, but could build a connecting pipeline to entry point B, then could entry points A and B be said to compete with one another? The BNA considered that this was not the case, and that building this sort of pipeline would be prohibitively expensive.

The BNA calculated the Herfindahl-Hirschman Index (HHI) and the Residual Supplier Index (RSI) for the markets defined above. Looking at both the indices taken together, the BNA's test for competition was that if a TO's market share is over 50%, the HHI larger than 2000 and the RSI is below 0.65, effective competition is ruled out. TSOs have an opportunity to prove that there is effective competition, but the requirements for this proof are very demanding.

The BNA's competitive test is an interesting point, because it addresses the 'is two enough?' question – in other words, even if a pipeline did face potential competition from a second pipeline, would this in practice be sufficient to moderate prices? In most cases a market with only two competing suppliers would not be considered competitive – this is an issue we addressed on page 59 of our 2007 report, and the BNA seems to agree that 'two is not enough', since a market with two suppliers holding equal shares would fail the BNA's test for competition.

The BNA did not employ a 'SSNIP' test, which is to say that they considered all transport products to be substitutes regardless of their relative cost. This approach differs to our 2007 methodology, which only considered products to be substitutes if the prices of the products did not differ by more that 10% (although in fact we carried out the analysis of the basis of all available products).

The SSNIP test involves considering by how much a hypothetical monopolist could profitably raise the current price. However, if it is suspected that the party being analysed has already raised the price of the product above a competitive level, then there is a case for calculating a competitive price, and determining the ability of a hypothetical monopolist to profitably raise the price from this calculated level. The BNA explained that they did not employ the SSNIP test partly because they suspected that transport prices were above competitive levels, and of the difficulties of establishing what a competitive price for gas transport should be.

In the case of GTS, we are analysed the ability of GTS to raise the price from the regulated level. In this case the regulated price is the proxy for the competitive price, and there is no need to make any adjustments. In contrast, the BNA was working from an 'unregulated' price (or at least a price not set by a cost of service type methodology). Accordingly, we did not face the same problem as the BNA in applying the SSNIP test. We also note that we doubt that the absence of the SSNIP test had a significant effect on the BNA's results. If prices of alternative transport products were close, then the SSNIP test would have concluded that these products were substitutes. If they were not close, one could conclude that there could not be P2PC, since competition would cause prices to equalise. In other words, a large difference in the prices offered by different TSOs would itself be evidence of a lack of P2PC.

In common with our 2007 methodology, the BNA considered whether there was actually capacity available for alternative entry and exit points. The BNA undertook a survey of the TSOs, to gather information about the utilisation rates of their pipelines, the availability of spare capacity at entry and exit points, activities undertaken by the TSOs to actively market their capacity to customers, constraints and actual experiences of customers switching from one TO to another – the last point being the most direct evidence of active P2PC.

The BNA also considered the potential for new pipelines to offer competition, but only if those pipelines would be available within two to three years, and there was a demonstration that work had actually started on the pipelines – for example the project developer had obtained permits, and there was information available on the capacity that would be offered by the new pipeline. Ultimately, the BNA concluded that "new entrants face considerable market entry barriers so that there is no indication of so-called potential pipe-to-pipe competition either. These market entry barriers are, for instance, statutory planning and environmental approval procedures that need to be implemented prior to pipeline construction, the greater room for manoeuvre incumbent network operators have with regard to pricing and the fact that investment costs are generally sunk costs."[7]

Conclusions regarding the BNA's methodology for assessing P2PC

The BNA's methodology is interesting, since apart from our own work for the NMa in 2007 it is one of the first instances of a Member State regulator assessing P2PC. The methodology seems broadly consistent with our 2007 methodology, bearing in mind that the BNA was assessing the existence of P2PC within its territory between multiple TSOs whose tariffs were not subject to an explicit price control. This is a different situation from GTS, which currently has regulated tariffs, and which does not face direct competition for customers within its territory, other than from potential new pipelines.

For example, we simply do not need to examine many of the markets considered by the BNA because the results in the case of GTS are self evident. GTS provides the only access to the TTF market area – unlike in Germany where several TOs may be able to provide access to the same MO. Similarly, all Dutch Network Operators (DNOs) are supplied by GTS, and there is no alternative. Any shipper leaving the TTF must also use GTS, and there is no equivalent of the German situation where there could be competition to go from one market are to another, since in the Netherlands there is only one market area.

The main focus for potential competition in our 2007 study GTS was in the transit market, which was less relevant to the situation in Germany. The BNA did not consider a transit product or market, but given the specific circumstances in Germany this is understandable.

The BNA did not consider that it is feasible for customers to connect to an alternative network at reasonable cost. In contrast, in our 2007 methodology, we estimated the cost for a customer to connect to a rival network – e.g. the Fluxys network. We also noted that many practical barriers that might prevent a customer building its own pipeline in practice. While we sympathise with the BNA's conclusion – that customers could not 'bypass' the TOs network using by building their own pipeline, we prefer to carry estimate the cost of bypass pipelines in our methodology because it addresses the point explicitly, rather than dismissing the possibility.

The BNA defined destination market differently than in our 2007 methodology. Whereas we considered each customer as a separate destination market (noting that a distribution network operator (DNO) is a customer) the BNA defined several different types of markets that we did not examine individually, for example DNOs. However, the BNA's approach makes sense in the context of the German situation, where several TOs could potentially be supplying a single DNO.

[7] See BNA Press Release, Decision to tighten gas grid competition, Bonn, 21 October 2008.

We maintain that our market definitions are appropriate for the Dutch situation, where GTS services all customers within the Netherlands.

The BNA took the view that only one alternative pipeline is not sufficient for there to be effective competition. This is an interesting precedent, and one which we will adopt in our methodology, should there be evidence the one or more pipelines can provide P2PC to GTS.

2.2. ERGEG's 2007-2009 Consultation

In November 2007, shortly before we issued our first report to the NMa, the European Energy Regulators issued a consultation document on the principles for calculating tariffs for access to gas transmission networks.[8] One of the issues the consultation addressed was the criteria for determining when effective P2PC existed. The ERGEG document noted that:

> "In order to assess whether effective pipe-to-pipe competition exists, NRAs shall assess whether the relevant pipelines can be considered a relevant market, e.g. by executing the so-called Small but Significant Non-transitory Increase in Price (SSNIP) test. If relevant pipelines are not within the same market, they are not in competition with each other. Having two pipelines in the same market is a necessary but not sufficient condition for effective pipe-to-pipe competition. When assessing the degree of competition between pipelines, the standard assessment tools of European competition authorities in merger or cartel investigations should be used, (at least) taking into account the following criteria:
>
> - If there exists competitive behaviour among (possibly) competing system operators;
> - If there exists real transportation alternatives for the network users between (possibly) competing system operators, assuring a real choice exists;
> - If there exists practical experiences of network users concerning transportation alternatives and competitive behaviour of system operators (assessment to be conducted);
> - If there exist sufficient interdependency between (possibly) competing system operators;
> - If there exists an appropriately low level of concentration of system operators in the relevant market;
> - If there exists sufficient available capacity for network users in order to have a real choice between (possibly) competing system operators. This should be done together with the analysis of an upstream market; and
> - If the (possibly) competing system operators did not enter into formal or informal agreements concerning common (non competitive) network operation.
>
> In the event that a benchmarking of tariffs is applied, the tariffs emerging shall not significantly deviate from those that would accrue from a pure cost-based approach. The benchmarking therefore serves as a plausibility check for the cost based approach."

In January 2009 ERGEG published as assessment of the comments that it had received on the consultation. ERGEG concluded that "almost all of the answers which were received indicate

[8] Principles on Calculating Tariffs for Access to Gas Transmission Networks - An ERGEG Public Consultation Paper Ref: E07-CBT-01-03 22-November-2007.

absence of proper circumstances for real competition, ERGEG, is being reaffirmed in its request for strict criteria needed for the assessment of pipe-to-pipe competition."[9]

The methodology which we applied in our 2007 study fulfils ERGEG's list of criteria that should be taken into account when assessing P2PC. For example, we apply the SSNIP test to determine the relevant markets, we use standard assessment tools of competition analysis and we assess whether there is actually alternative capacity available. The one area where we could modify the 2007 methodology slightly is to investigate if there was "practical experience of network users concerning transportation alternatives". We take this to mean whether the shippers themselves actually regard alternative routes as providing effective substitutes for one another. This could perhaps be determined based on a survey of shippers using the GTS pipeline system. However, we also note that all of the shippers that responded to ERGEG's consultation paper were at best highly sceptical about the possibility of P2PC. Given this, we do not think that adding a survey to the methodology at this time is necessary or cost effective. However, NMa could (and we think should) put its initial conclusions on the effectiveness of P2PC out for consultation, and invite shippers to respond if they regard one or more gas transport routs as substitutes that could potentially provide P2PC.

2.3. The US

In our 2007 study, to a large extent we adopted the market definitions used by the US Federal Energy Regulatory Commission (FERC) in deciding on the existence of P2PC. We can confirm that there have not been any major developments in the FERC's methodology for assessing P2PC since our 2007 study. We note that in 2008, the FERC made a modification to the rules which removed the price control on short-term secondary capacity sales – that is, the sale of capacity from one capacity holder to another.[10] The FERC reasoned that, since the primary price – that is, the price at which the pipeline sells capacity to the first buyer – is controlled by the FERC, then it should not be possible for the price of secondary capacity to sustainably move above the regulated price. Accordingly, secondary price controls were not required.

The FERC's decision confirms the view expressed in section 8.1 of our 2007 report, that holders of long-term capacity can compete effectively with the pipeline in offering capacity in the secondary market. However, we also pointed out that this could only happen if the holding of long-term primary capacity was relatively diverse, so that there would be competition for sales in the secondary market, and if the price of primary capacity was set on a long-term basis. These conditions are not yet met in the Netherlands. However, the FERC decision confirms that, when these conditions are met, then the NMa could relax the regulation of prices in the secondary market, if it was satisfied that the holding of primary capacity was suitably diverse.

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[9] Principles on Calculating Tariffs for Access to Gas Transmission Networks Evaluation of Comments Ref: E08-CBT-01-03a 15 Jan 2009 p.54.

[10] FERC Press Release, Final Capacity Release Rule Expands Gas Supply Market Options, June 19, 2008 Docket No. RM08-1-000.

2.4. Australia

In our 2007 study, we also relied on experience in Australia with P2PC. In Australia, the competition authority (the National Competition Council or NCC) assesses whether a pipeline should be 'covered', that is, required to give access to third parties under regulated conditions. We have checked to see if there have been any developments in the Australian regulatory regime since our 2007 report.

We can confirm that there have been no material developments in the methodology applied by the NCC since 2007. However, the NCC has issued further detailed guidelines as to how it will make coverage decisions, and has also refined the regulatory regime to include two levels of pipeline tariff 'coverage':[11]

- 'light regulation' where the pipeline must provide TPA but can avoid the process of setting reference tariffs in advance;
- Full regulation, where there the NCC controls prices and related terms and conditions of service supply in advance of the pipeline offering the services;

In essence, the difference between light and full regulation is similar to the difference between regulated and negotiated tariffs under the EU Gas Directive. The purpose of the reform was to ensure that the burden and cost of regulation is proportional to the degree of market power. In Australia, where there are potentially competing networks, the degree of market power a pipeline has may be more nuanced than in many European countries, and so the trade off between the benefits and costs of regulation may be more finely balanced.

This issue seems relevant to our methodology for assessing the existence of effective P2PC, since in many ways light regulation is similar in effect to the use of benchmarking to set tariffs. That is, the pipeline must still offer TPA and the non-price terms of access are regulated, but the pipeline is given more freedom in setting its tariffs. A determination that market power is not so severe as to warrant full regulation would be similar to a decision allowing benchmarking to set tariffs. In both cases, the regulator must be convinced that the risks of the exercise of market power are not so great as to merit the costs of regulation.

When considering whether to apply light regulation:

"The National Gas Law requires the National Competition Council to consider the likely effectiveness of light regulation as opposed to access arrangement regulation in promoting access to pipeline services in light of the costs of each form of regulation. Accordingly, where light regulation can reduce the costs of regulation while still providing an effective check on a pipeline's market power, the

[11] For a full discussion see Light regulation of covered pipeline services A guide to the function and powers of the National Competition Council under the National Gas Law Part C – Light regulation of covered pipeline services, Version 16 February 2010.

light regulation option should be available. Light regulation may be particularly relevant for point to point transmission pipelines with a small number of users who have countervailing market power."[12]

The National Gas Law recognises that, in Australia, there may be a small number of potential users of a pipeline, and that the user would therefore have significant bargaining power. We recognised this possibility in our 2007 report, where we noted that large international gas projects could have the ability to negotiate tariffs with GTS before they invest. We noted that in these cases there is the possibility to allow negotiated tariffs. Accordingly, we think the ability of customers to bargain with GTS under certain circumstances is adequately covered by our 2007 methodology.

The NCC has also made more explicit the factors that it will consider in assessing the existence of market power. These are:

1. The presence and extent of any barriers to entry in a market for pipeline services. We consider this in our 2007 methodology, for example in our discussion of the possibility of bypass pipelines;

2. The presence and extent of any network externalities or interdependencies between a natural gas service provided by a service provider and any other natural gas service provided by the service provider. In the EU, such interdependencies are addressed by the unbundling requirements of the third Gas Directive;

3. The extent to which any market power possessed by a service provider is, or is likely to be, mitigated by any countervailing market power possessed by a user or prospective user. In our 2007 study we also considered the ability of developers of large international gas projects to bargain with the TSO;

4. The presence and extent of any substitute, and the elasticity of demand, in a market for a pipeline service in which a service provider provides that service. The analysis of substitute products was at the core of our 2007 methodology;

5. The presence and extent of any substitute for, and the elasticity of demand in a market for, electricity or gas. This criteria is particular to the NCC's methodology, as the criteria for deciding whether or not to regulate or cover a pipeline involves deciding whether that access (or increased access) to pipeline services provided by means of the pipeline would promote a material increase in competition in at least one market, other than the market for the pipeline services provided by means of the pipeline. In our methodology we only analyse the markets for gas transport services;

6. The extent to which there is information available to a prospective user or user, and whether that information is adequate, to enable the prospective user or user to negotiate on an informed basis with a service provider for the provision of a pipeline service to them by the service provider.

[12] National Competition Council, Light regulation of covered pipeline services A guide to the function and powers of the National Competition Council under the National Gas Law Part C – Light regulation of covered pipeline services, Version 16 February 2010 p.29.

One of the criteria is that a pipeline may be covered if it would be "uneconomic" for anyone to develop another pipeline as an alternative to the existing pipeline. In other words, that the business of the existing pipeline is not contestable. The NCC has clarified that, when evaluating whether it is economic or not to build an additional pipeline, it will take a social cost-benefit perspective, and examine the costs to society of building another pipeline rather than the costs to an individual.

In our 2007 methodology, when considering the possibility of a bypass pipeline, we considered the costs to the developer of the pipeline, not the costs to society. Clearly, any bypass pipeline is socially wasteful – since it duplicates existing infrastructure, and so under the NCC's criteria the construction of a bypass pipeline would be uneconomic. However, we are interested in determining if the ability of a network user to build a bypass pipeline could constrain GTS's pricing. In this case it is correct to adopt the perspective of the person building the pipeline, so we determine what GTS tariff would motivate bypass. We agree that bypass pipelines are socially wasteful, but maintain that our approach is correct for assessing the ability of bypass pipelines to constrain pricing.

We also note that the NCC's methodology gives more weight than we do to the possibility of building competing pipelines. For example if demand is growing on a particular route, then the NCC might judge that the threat of construction of a second pipeline is sufficient to provide competition. There are two reasons why the NCC gives this more weight. First, there are long-term transport contracts available in Australian, so that a customer could use the possibility of a second pipeline to lock-in competitive tariffs for a long (e.g. 10-15 year) period. This is not currently possible in the Netherlands. Accordingly, the existing pipeline cannot provide a credible guarantee that it will not raise prices. Second, from a practical perspective it is easier to build a competing pipeline in Australia – which has very low population density across most of the pipeline route – than it is to build a pipeline in the Netherlands, which is one of the most densely populated countries in the world.

2.5. Academic Studies

We have also searched for recent academic articles that discuss P2PC. One paper gave an interesting review of our 2007 methodology and also a short overview of the methodology employed by the BNA.[13] However, the paper did not propose any refinements to our methodology or give any criticisms of it.

Another paper discussed our 2007 report in the context of a discussion on the setting of transport tariffs in the Netherlands and in particular whether tariff benchmarking should be allowed to adjust tariffs to avoid the so-called 'Jepma effect'.[14] While the paper does not put forward any methodologies for the assessment of P2PC (as this is not the purpose of the paper) there are one or two misunderstandings in the paper in relation to our 2007 report which are worth briefly noting here. First, the paper misunderstands our definition of P2PC by interpreting it as a test that "if the

[13] J.F.M. Beukenkamp *Concurrentie tussen pijpleidingen: spookverhaal of werkelijkheid*? (Competition between pipelines: ghost story or reality?), *Tijdschrift voor Energierecht*, No. 2 August 2010.

[14] Klop, Manuel, Charting the Gaps: EU regulation of gas transmission tariffs in the Netherlands and the UK, January 2009 Oxford Institute for Energy Studies, NG 26.

cost to shippers of transiting the gas through Germany would be exceeded by the costs of transiting the gas through the Netherlands after a Dutch increase" then there is P2PC.[15] In fact the test that we use is if GTS could profitably raise tariffs by more than 10%, then there is not effective P2PC. The GTS tariffs may still be lower than the relevant German tariffs after the price increase. The paper then goes on to construct a table entitled 'The Brattle Group's definition of P2P competition' which is based on this misunderstanding.

Second, our 2007 report pointed out that it was not clear that Regulation 1775 allowed for tariff benchmarking for the purposes of avoiding the 'Jepma effect' and increasing security of supply for domestic Dutch gas users. We noted that even benchmarked tariffs were still required to be cost-reflective. The author then misinterprets this statement as an alternative definition of P2PC, and notes that "it may be concluded that the definition laid down at the start of the [Brattle 2007] report differs from the definition actually used."[16] This is not the case. As a full and careful reading of our 2007 report would reveal, we apply a methodology which is consistent with the statement at the beginning of our report that "P2P competition is effective if it means that in the absence of cost-based tariff regulation GTS would be constrained by competitive forces from raising prices 'significantly' above current levels".

We also reviewed a paper which discussed the possibility of P2PC in Germany.[17] The paper gives an interesting overview of the economics of P2PC, including the discussion of natural monopoly, and discusses the specific situation in Germany. The paper also notes the strong possibility for collusion between pipeline operators. The paper concludes that P2PC is not possible in Germany (in contrast to the BNAs conclusions for some TSOs). However, the paper does not propose or apply a detailed methodology for assessing the existence of P2PC, and so we cannot draw any lessons from it in terms of modifying out 2007 methodology.

2.6. Hub to Hub capacity

Since we wrote out 2007 report, there have been several developments in so-called hub-to-hub services. EU regulators have recently set out a vision for the gas market as a series of VTPs with TSOs selling 'virtual' capacity to facilitate inter-VTP trade.[18] Therefore one could argue that the hub-to-hub service is a new type of market that we need to analyse. In our view this is not the case, since GTS has a monopoly on access to the TTF. One could not get into the TTF without using the GTS pipeline network, and so we can easily conclude that GTS does not face competition in the market for transfers to and from the TTF to other gas trading hubs.

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[15] *Ibid*. p.61.

[16] *Ibid*. p.62.

[17] Christian von Hirschhausen, Anne Neumann and Sophia Rüster, Competition in Natural Gas Transportation? Technical and Economic Fundamentals and an Application to Germany Report for EFET Germany, July 2007 Globalization of Natural Gas Markets Working Papers WP-GG-21b.

[18] See CEER vision for European gas target model 1st workshop, Vienna, 3 December 2010

In our recent report for the Dutch Ministry of Economic Affairs, we noted that there was competition between gas hubs, in the sense that the hubs would be competing with one another to attract traders. Policy makers in different countries might want a liquid hub to develop in their country so that they could enjoy the associated benefits of a more liquid gas market.[19] The question is whether the competition between gas hubs to capture more trading business could somehow provide a competitive constraint on GTS's pricing.

The argument could be that while raising capacity charges would clearly earn more money for GTS (absent regulated tariffs), GTS's high charges could result in a less liquid TTF and trading activity moving to Germany. GTS would then lose out on the fees charged for TTF trades (title transfer registration service). It might also lose out because in the longer term, transit volumes and capacity bookings might drop as parties as less keen to transport gas via the less liquid Dutch market.

However, the short-term effect of reduced TTF trading fees would not remove the incentive for GTS to raise prices. Currently GTS earns about €1 billion per year from the sale of entry and exit capacity, while revenue from TTF fees is only about €6 million, or roughly 0.6% of the amount GTS earns from capacity sales. Even a small increase in the price of capacity would easily offset any reduction in TTF trading fees. We conclude that in the short-term, competition between hubs for trading business would not remove GTS's incentive to increase tariffs.

In the longer term, we acknowledge that a reduction in TTF liquidity could reduce demand for transit capacity across the Netherlands, but from the perspective of analysing GTS's incentives and ability to raise prices absent regulation, assuming a drop in future capacity bookings is too uncertain to act as a competitive constraint.

2.7. Conclusions on methodology

There have been several cases since 2007 where various bodies have discussed or analysed P2PC, most notably the German regulator and ERGEG. While these developments are interesting, they have not led us to conclude that there are any shortcomings in our 2007 methodology which need to be addressed. However, the German regulator's methodology introduces an interesting standard which addresses the question of 'how much competition is enough'? In other words, is it sufficient to have only one alternative pipeline for there to be effective competition? The answer of the BNA is that it is not, and the BNA proposes a threshold for a sufficient level of competition based on a competition index. We adopt this same standard in our updated methodology.

3. Destination markets

Customers in a destination market are shippers that must transport gas *to* a particular point on the network. We analyse exit points within the Netherlands ('domestic exit points') and exit points on the border separately, as they present slightly different issues.

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[19] "Economic Impact of the Dutch Gas Hub Strategy on the Netherlands" September 30th 2010 (released December 8th 2010 and available from www.brattle.com) §3.9.

Figure 1: GTE map of gas pipelines in and around the Netherlands

We conclude that GTS has a very high share of the destination market, and that the main restraint to GTS pricing in this market is the ability of third-parties to build pipes which bypass the GTS network and connect directly with a neighbouring network. Hence, the majority of our analysis focuses on the cost and non-cost issues of building new bypass pipelines. We conclude that for the majority of customers the cost of building their own pipeline far exceeds the current GTS tariffs, so that, for most customers, GTS could raise tariffs significantly without losing customers. We also identify non-cost issues which make building bypass pipelines difficult.

Some of the discussion in this and the following sections involve analysis of specific points in the gas transmission network. For convenience, in Figure 1 we include a Gas Transmission Europe (GTE) map, which shows the main places in the gas network relevant to this analysis.

3.1. Methodology

Domestic Exit points

There are no existing pipeline alternatives to GTS for most Dutch consumers; GTS supplies nearly all of the domestic exit points (the notable exception is the Zebra pipeline, which we discuss on page 25). However, it may be that GTS may not be able to raise prices significantly, if a customer could build a new pipeline to an alternative network, such as the Zebra pipeline, the Fluxys network or one of the German networks, at a reasonable cost. (Alternatively a different pipeline operator could sign up one or more customers on long-term transport contracts, and build a pipeline for them).

The European Commission's market definition guidelines would, in most cases not include pipelines which have not been built yet. According to European Commission's guidelines on market definition, the competitive constraints arising from supply side substitutability are in general less immediate and in any case require an analysis of additional factors. As a result such constraints are taken into account at the assessment stage of competition analysis.[20] Specifically, the Commission Notice says that "[s]upply-side substitutability may also be taken into account when defining markets in those situations in which its effects are equivalent to those of demand substitution in terms of effectiveness and immediacy". Since building an alternative pipeline takes several years, it is not as effective and immediate as a consumer switching to an existing pipeline. Therefore, bypass lines would not be included in the product market definition. Accordingly, GTS has a market share close to 100% at most domestic exit points. Also the BNA in its methodology only considered pipelines that were not yet in service as potential competition if significant work had already begun on the pipeline.

However, evidence from other gas markets such as the UK suggests that building bypass lines can be cost-effective for a sub-set of customers that are located relatively near to an alternative network, and can therefore bypass the incumbent. For example, in the UK Transco (now national Grid Gas) responded to the efforts of some customers to build bypass lines by introducing a 'short-haul tariff' – a lower tariff for relatively short distance gas transport. Therefore, the issue of bypass lines is relevant to a competitive assessment of GTS's position in the destination market, and our methodology focuses on the ability of customers to constrain GTS price increases by building their own pipeline.

Border Exit points

If parallel-path (transit) flows had reasonable alternative routes (discussed in more detail below) then GTS may worry that increasing border exit charges would cause transit flows to divert to an alternative pipeline. But in Appendix I we explain that competition in the parallel path market cannot prevent price increases at border exit points, if GTS can price-discriminate between border exit points and nearby domestic exit points. For example, GTS could raise border exit charges, but reduce border entry charges by an amount which ensures transit flows pay the same amount.

[20] *Commission Notice on the definition of the relevant market for the purposes of Community competition law*, OJ C 372 on 9/12/1997.

Therefore GTS could raise border exit charges, without risk of losing transit flows to competing pipelines.

Therefore competition in the transit markets (were it to exist) could not restrain GTS's pricing for border exit points. In common with domestic exit points, only the ability of customers to build a bypass pipeline could restrain GTS's pricing at border exit points.

3.2. Domestic Exit points

The cost of building an alternative line

In this section we estimate the cost to 'bypass' the GTS network in response to tariff increases and connect to an alternative network. Realistically, only industrial customers or a power station could build their own pipeline, or have one built for them. This is because constructing an alternative pipeline either requires a long-term contract (if a third-party builds a pipeline) or, if the customers build it, the project is equivalent to a long-term contract because the customers have taken on the long-term commitment of paying for the line. It would be much more difficult to sign up many household customers for such a long-term transportation contract. For example, suppose Delta decided to build its own pipeline from one of its distribution grids to Belgium so that it could bypass the GTS grid. There is a risk that small customers, not bound by a long-term contract, could switch to an alternative supplier that did use the GTS grid. Delta would be left with an empty pipeline. Since a short pipeline will be cheaper, customers are also more likely to build a pipeline if they are close to an alternative network – which in practice means near to the Dutch border or to the Zebra pipe.

Accordingly, we focus our analysis on two groups of industrial customers who are relatively near the Dutch border (Maastricht and Delfzijl), and are therefore most likely to build a 'bypass' pipeline. Note that there is nothing particular about these customer groups, other than that they are a group of industrial customers relatively near to the Dutch border, and so it is most likely that building a bypass line would be economic. If building a bypass line was not cost-effective[21] for these customers, it would probably not be cost-effective for any group of customers.

In both cases we assume that the industrial customers are already importing gas from a foreign network, and so they are already paying the exit fee from the foreign network. Therefore the saving by building a pipeline is the avoided GTS costs. If the customers were buying gas from within the Netherlands, then they would need to negotiate a new source of supply delivered on the foreign network, and the exit costs from the foreign network would be additional. We think it more realistic to imagine that someone already buying gas from a foreign supplier would want to bypass the GTS network – in any case this assumption increases the savings from a bypass line and if anything will overestimate the competitive constraint that bypass lines could impose on GTS's pricing.

If customers are connected to the GTS network, in addition to entry and exit charges they pay a connection fee. According to GTS, the connection fee covers the costs of a pressure reduction station (*gasontvangststation* or GOS), which is required to make the gas available at the connection

[21] By cost-effective, we mean that cost of building the pipeline is less than the present value of future payments to GTS. In practise, we compare the annualised cost of a pipeline with the GTS tariffs, because we do not know how GTS tariffs will developed in future and therefore cannot calculate their present value.

in a safe and controlled way. If customers bypassed the GTS network, they would need to build their own pressure reduction station. Since we do not have costs for a pressure reduction station, we assume its costs are equal to the connection tariff that the customers currently pay to GTS (i.e. that the GTS connection fee is cost reflective). Assuming the customers save the connection fee, while not adding the costs of a pressure reduction station, would overestimate the cost savings from bypassing GTS. Hence, our calculation takes the case that the customers make no saving on the connection cost, but only on the entry and exit charges.

We take the case that the pipeline from Delfzijl would connect to the Gassco pipeline at Emden, bypassing the GTS network. We assume that the exit costs from the Gassco system would remain the same, although the builder of the bypass pipeline would need to pay for the creation of a new tie-in point to the Gassco pipeline. Therefore, the customers of the bypass pipeline saves the GTS entry costs at Emden, plus the exit costs at their respective delivery points. We estimate the approximate length of a pipeline from Delfzijl to Emden at around 10 km – though we should stress that we do not have pipeline maps and so cannot make a detailed estimate of the exact distances required.

The pipeline from Maastricht would connect to the Fluxys network; again we do not have a map of the Fluxys pipeline grid, but we take the case that a 20 km pipeline should be sufficient to reach the nearest tie-in point to the Fluxys network. In the case of a Maastricht pipeline, we assume that prior to building their pipeline, the Maastricht shippers were importing gas from Belgium to the Netherlands. In common with the Delfzijl case, the shippers would save the entry costs (in this case we assume the entry point is Zelzate, since this is the only non-backhaul H-gas entry point from Belgium) and the exit costs at their respective exit points. Based on data from GTS in our 2007 study we estimated that the Delfzijl customers would require a 300 mm diameter pipeline and the Maastricht customers would need a diameter of 150 mm.

We have estimated pipeline costs based on information from National Grid, the owner and operator of the pipeline system in Great Britain. National Grid publishes a document which describes the methodology that it uses to charge for use of the Gas Transmission System in Great Britain, and part of this methodology uses the estimated cost of a new pipeline. However, while in our 2007 study National Grid gave an equation which allowed us to estimate pipeline costs based on the pipe diameter, in the 2010 study National Grid only provide an 'expansion constant', which is the average cost per GWh/day/km for a large diameter pipeline (see Table 2). Since the expansion constant is nevertheless based on up-to-date pipeline costs we use it to derive the costs of bypass pipelines.

The National Grid expansion factor is calculated for large pipelines with an average diameter of 1050 mm. The cost of the pipeline is related to its diameter, but the maximum flow rate is related to the diameter squared. Therefore we cannot simply use the same expansion constant for the smaller bypass pipelines for which we are trying to estimate costs. Doing so would significantly underestimate the actual cost of capacity for a smaller diameter pipeline. Therefore in Table 2 we also calculate the capacity of each pipeline diameter using an equation published by National Grid. Taking the large diameter pipeline as a baseline, we use the 2007 cost equation from National Grid to estimate the cost factor in Table 2. We will not use this cost directly, but rather it gives us the relative cost of pipelines according to their diameter – this is the ratio calculated in row 4 of Table 2. The ratio illustrates that a 300 mm pipeline is 66% of the cost of a 1050 mm pipeline, where as the maximum flowrate is only 4%. This illustrates the enormous economies of scale that are present

in building pipelines. For the large National Grid pipeline, we multiply the expansion factor by the calculated flowrate to derive the cost per km (row [6] of Table 2). We then use the ratios to derive the cost of the smaller pipelines. This results in a cost per km of about €996,000 for the 300 mm pipeline and €890,000 for the 150 mm pipeline.[22] Finally, we convert this capital to a cost of capacity (€/kW) for comparison with the GTS tariffs.

Table 2: Derivation of pipeline costs

			National Grid [A]	Delfzijl [B]	Maastricht [C]
Diameter, mm	[1]	See note	1050	300	150
Flow, GWh/day	[2]	See note	624	23	4
Cost factor	[3]	See note	0.68	0.44	0.40
Ratio	[4]	See note	1.00	0.66	0.59
Capital cost, €/GWh/day/km	[5]	See note	2437		
Capital cost, €/km	[6]	See note	1,520,585	996,344	891,496
Capital cost, €/GWh/day/km	[7]	[6]/[2]		42,436	233,131
Capital cost, €/kW/km	[8]	[7] x 24/1000000		1.02	5.60

Notes:

[1]: National Grid diameter is the average diameter used from 'The Statement of the Gas Transmission Transportation Charging Methodology' April 2010 Version 7.0 p.18. Delfzijl and Maastrict diameters calculated using data from GTS in our 2007 report.

[2]: Calculated using the equations in the 'The Statement of the Gas Transmission Transportation Charging Methodology' April 2010 pp.18-19.

[3]: 0.0003115 x [1]+0.3505652 Source: National Grid, The Statement of the Gas Transmission Transportation Charging Methodology Effective from 1 April 2007, Table 2.2.1.1a p10.

[4]: Ratio of the cost each pipeline to the National Grid pipeline

[5]: Expansion constant from 'The Statement of the Gas Transmission Transportation Charging Methodology' April 2010 p.50.

[6]: [A] calculated as [2]x[5]. [B] and [C] calculated as [6][A] x [4].

In Table 3 we have used the costs per km derived above to calculate the capital costs for the Maastricht and Delfzijl pipelines. We convert the capital costs to an equivalent annual tariff, and compare this to the costs saved from bypassing the GTS network. We adopt National Grid's assumption of a 20 year pay-back period for the project. Our calculations indicate that customers at Delfzijl could apparently save about 45% of their current gas transportation costs by building their own pipeline, but for the group of customers at Maastricht using the 150 mm pipeline it would not be economic to build a bypass line.

From this we conclude that the inherent economies of scale for pipelines mean that only customer who could build a reasonably large pipeline would be able to profitably bypass the GTS network. Even for these customers the ability to build a bypass pipeline rapidly becomes a weak constraint on GTS's pricing. For example, we calculate that if the Delfzijl customers were just

[22] In our 2007 study, we estimated costs per km of €710,000 for the 150 mm pipeline and €840,000 for the 300 mm pipeline, so costs have increased by about 19% for the 300 mm pipeline and 26% for the smaller line.

under 20 km from the German network, it would no longer be cost effective for them to bypass the GTS network.

Table 3: Pipeline costs and savings from building a bypass pipeline assuming a 20 year depreciation period

			Maastricht	Delfzijl
Distance, km	[1]	Assumed	20	10
Capital cost, €/kW/km	[2]	Table 2	5.60	1.02
Capital cost, €/kW	[3]	[1] x [2]	111.9	10.2
Discount rate	[4]	See note	7.0%	7.0%
Annualised cost, €/kW/year	[5]	See note	10.56	0.96
GTS tariffs				
Relevant GTS entry tariff, €/kW/year	[6]	See note	1.922	1.25
Relevant GTS exit tariff, €/kW/year	[7]	See note	2.804	0.512
Total GTS costs saved, €/kW/year	[8]	[6]+[7]	4.726	1.762
Savings				
Net saving, €/kW/year	[9]	[8]-[5]	-5.837	0.801
Net saving, %	[10]	[9]/[8]	-124%	45%

Notes:

[4]: Since GTS's cost of capital has not been updated, we use the 7% pre-tax real return used in our 2007 report.

[5]: Annual tariff (in real 2011 money) that has a present value equal to the initial cost when paid every year for 20 years, using the discount rate shown.

[6]: Relevant entry tariff is at Zelzate for Maastricht customers and at Emden for Delfzijl customers.

[7]: Relevant exit tariff is the average exit for all the customers considered. In practise all customers at each location have very similar exit tariffs.

In Table 4 we investigate the effects of assuming a 55 year depreciation period for the pipeline. The table shows that net savings increase, but that increasing the depreciation period only reduced the annualises capital cost by about 30%. The end result is the same – it is economic for the group of customers at Delfzijl to build a bypass pipeline but not for the group of customers in Maastricht.

Table 4: Pipeline costs and savings from building a bypass pipeline assuming a 55 year depreciation period

			Maastricht	Delfzijl
Distance, km	[1]	Assumed	20	10
Capital cost, €/kW/km	[2]	Table 2	5.60	1.02
Capital cost, €/kW	[3]	[1] x [2]	111.9	10.2
Discount rate	[4]	See note	7.0%	7.0%
Annualised cost, €/kW/year	[5]	See note	8.03	0.73
GTS tariffs				
Relevant GTS entry tariff, €/kW/year	[6]	See note	1.922	1.25
Relevant GTS exit tariff, €/kW/year	[7]	See note	2.804	0.512
Total GTS costs saved, €/kW/year	[8]	[6]+[7]	4.726	1.762
Savings				
Net saving, €/kW/year	[9]	[8]-[5]	-3.301	1.031
Net saving, %	[10]	[9]/[8]	-70%	59%

Notes:

[4]: Since GTS's cost of capital has not been updated, we use the 7% pre-tax real return used in our 2007 report.

[5]: Annual tariff (in real 2010 money) that has a present value equal to the initial cost when paid every year for 55 years, using the discount rate shown.

[6]: Relevant entry tariff is at Zelzate for Maastricht customers and at Emden for Delfzijl customers.

[7]: Relevant exit tariff is the average exit for all the customers considered. In practise all customers at each location have very similar exit tariffs.

Practical difficulties in building a pipeline

Our analysis indicates that, even though GTS's tariffs are relatively low, for large customers sufficiently close to alternative networks it may be cheaper to build their own pipeline and bypass the GTS network. This conclusion raises a question: if it is cheaper for some industrial customers to build their own pipeline than use the GTS system, why have they not already done so? One possibility is that we have significantly underestimated the cost of building a new pipeline. However, we think this is unlikely, since we have confirmed our estimates with third-parties. However, even if it was cheaper for customers to build their own line than pay GTS's tariffs, in practise, it could be very difficult for someone other than GTS to build a pipeline across the Netherlands. Accordingly, GTS may be able to charge more than the material and project management costs of building a bypass pipeline, because there are other practical difficulties involved.

For example, under Dutch law GTS has special 'eminent domain' powers to gain right-of-way for pipelines, an advantage not enjoyed by an independent pipeline developer.[23] Moreover, there

[23] Several of these issues have emerged from discussions with a large gas supplier in the Netherlands who had considered building its own pipeline.

would be no reason for GTS to offer the developer access to its pipeline right-of way, so the new pipeline developer would have to gain permission for a new pipeline corridor to lay a pipeline across the Netherlands. This would involve gaining permission and permits from multiple municipalities, local authorities, and private land owners, as well as liaising with Non-Governmental Organisations and local interest groups.

Our calculations above confirm that there are significant economies of a scale in building a pipeline, and that only a pipeline with a relatively large capacity will be economic. Therefore, either a few very large customers would group together to build a pipeline, or a larger number of smaller customers would have to get together. But economists have recognised that it is often difficult for large numbers of companies to join together and sign long-term contracts, as they would need to do to build a pipeline.[24] Not all consumers would be willing to share the risk of incurring long-term investments in pipeline infrastructure. In our experience, consumers prefer short-term contracts in liberalised energy markets.

The builder of the new pipeline would also have to negotiate a connection with the neighbouring pipeline network (e.g. Fluxys), which would involve the construction of a new connection or tie-in point, as well as a new exit charge. As such agreements are uncommon, it may take some time to negotiate.

Given the practical difficulties in building a new transit pipeline across the Netherlands, we conclude that GTS could charge significantly above the cost of building a bypass pipeline without significant risk of losing customers.

Note that the difficulties cited above may also explain why customers in Germany have not bypassed the more expensive German gas transport networks by building their own pipelines to the GTS network. As far as we are aware, there are two gas storages in Germany which have built their own pipelines to the GTS system, but these are the only examples of bypass. It seems likely that the factors listed above limit the ability of third-parties to build their own pipeline (also in Germany). In its studies on pipe-to-pipe competition the BNA also dismissed the possibility of customers building their own bypass pipelines.

The Zebra pipe

The Zebra pipeline, which runs approximately 60 km from the Dutch-Belgium border near Zelzate into the province of Zeeland is the only significant non-GTS gas pipeline in the Netherlands. It is instructive to review the circumstances surrounding the construction of the Zebra pipeline, to see if they are consistent with the difficulties we have identified above.

One of the difficulties that we outlined above was obtaining permits and rights-of way. But for the Zebra pipeline, because we understand that other pipes already passed through the land it was already authorised for pipeline use. Therefore the Zebra project avoided some of the permitting issues that other pipeline projects would face.

We also noted that economies of scale played an important role, and that for a pipeline to be economic the owners must be large gas users. The Zebra pipeline was constructed to serve a large

[24] Coase, RH, *The Firm, The Market, and The Law* (The University of Chicago Press)(1988), pp. 38-9.

power plant that provided steam and electricity to three large customers: Dow, Delta, and Essent.[25] We estimate that the demand when the Zebra pipe was first operational was approximately 900 million cubic metres per year.[26] Assuming a load factor of 70%, this equates to a peak capacity of about 1,400 MW, about 50% more than the Delfzijl users which we used in our case study above. This confirms that Delta's customers were using a significant volume of gas.

Another unusual factor which led to the development of the Zebra project was the large difference between UK gas prices and prices in the Netherlands. The principal attraction of the pipeline was as a method to obtain cheap gas from the United Kingdom. In the absence of capacity constraints, the difference in Dutch-UK gas prices should not have changed the economics of building a pipeline: the only relevant factor would be the cost of the alternative i.e. the GTS tariffs. However, if the GTS network was congested, then this would significantly increase the attractiveness of building more capacity to import cheap gas from the UK. Since the Zebra pipeline was built, price differences between the UK and the Netherlands have narrowed considerably, reducing the incentive of any other industrial group to finance a new pipeline.

Finally, we stated that co-ordination is problematic, and that customers may be unwilling to sign long-term contracts (or equivalently fund a pipeline project). The Zebra pipeline involved just three parties, which used large amounts of gas, so co-ordination was relatively easy. We also note that large new gas-fired power plants present a notable exception to the reluctance to sign long-term gas transport contracts, as investors often want to be sure that the owners have access to long-term gas supplies before they will loan money to construct a new plant. The Zebra pipeline was actually built to coincide with the completion of Elsta's 400 MW gas-fired power plant, which is the largest user of the pipeline.[27] The plant owners were willing to undertake long-term commitments to persuade bankers that the project had secured its supplies.

The construction of the Zebra pipeline suggests that to build an independent 'bypass line' a project requires a few large users which are relatively near to the border, and that permitting and gaining rights of way remain a crucial factor. The circumstances which led to the construction of the Zebra pipeline were very unusual.

3.3. Border Exit Points

Some shippers have to export gas from the Netherlands, and must therefore use an exit point at the border. GTS currently has a monopoly over these shippers, since they have no choice but to use a GTS exit point. More generally, GTS has a monopoly over parties producing gas in the

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[25] The original investors now have several customers each. Essent has informed us that it has five customers, and that Delta has three or four customers. The total number of customers is therefore approximately 10 or 11.

[26] A 1998 document available on PNEM/MEGA's website on 15th November 2000 indicated that PNEM/MEGA, now part of Essent, had contracted 600 million cubic metres of gas supplies per year, and equated this amount to a 2/3rd share of the Zebra venture. This implies a total use of 900 million cubic metres per year.

[27] A Centrica news release of 15th July 1997 reported that delivery of gas to be used by the Elsta plant would start in October 1998. The Zebra pipe actually began operation in September 1998 as described in a 1998 document available on PNEM/MEGA's website on 15th November 2000.

Netherlands, since the gas must either be sold to a domestic customer via a domestic GTS exit point (discussed above) or exported via a GTS border exit point.

Only the ability of parties to build their own pipeline can constrain GTS's pricing over border exit points. As we have discussed, this is a constraint that could apply only to a small number of large customers who are physically close to an alternative network.

A related issue is the reaction of shippers that buy gas in the Netherlands and use a border exit point to export the gas to a market outside the Netherlands. GasTerra is the main example of this kind of shipper. GasTerra exports gas to France, Belgium, Italy and Switzerland for example, and these are all examples of destination markets.

One possibility is that increases in the price of border exit capacity could make the gas sufficiently expensive that the buyer switches to an alternative source of gas from outside of the Netherlands – for example the customer in France buys gas from the UK instead (or, if the shipper bears the increased costs of gas transport, then it may no longer want to sell the gas if it is not making a profit). In this case GTS would lose customers as it attempted to raise prices – so demand elasticity would constrain GTS's ability to raise prices at border exit points.

A quantitative analysis of this issue is beyond the scope of this engagement, since for each of the major destination markets we would need to analyse the price and availability of alternative sources of gas. However, there are a number of qualitative factors which indicate that in reality GTS would not lose significant volumes if it raised border exit prices.

First, GasTerra sells gas under binding long-term contracts, so that it could not simply stop shipping gas in response to an increase in the price of transportation. A more likely scenario is that GasTerra would re-negotiate the contract so as to share the increased costs of border exit capacity with the gas buyer. Because of the long-term nature of most of the export contracts, GTS would not lose any capacity bookings until the long-term contracts expired. Second, the cost of gas transport is usually a relatively small part of the overall cost of gas. If Dutch gas is relatively cheap before an increase in the price of GTS's capacity (and the fact that customers are buying the gas in preference to others sources suggest that this is the case), then customers or GasTerra may be willing to tolerate significant increases in the price of GTS capacity before they switch to another supply/stop selling the gas. Finally, some of the border exit capacity will be used by transit flows, rather than GasTerra exporting gas from the Netherlands. As we conclude in section 5 that there is not effective competition in the transit market, GTS could be willing to raise the price of border exit capacity, since the loss of some export flows would be offset by the increased profits on the remaining transit flows.

The above factors suggest that the theoretical ability of customers outside of the Netherlands to switch to another source of gas would not be an effective constraint of the price of border exit capacity.

3.4. Conclusions on destination markets

1. The only constraint on GTS's ability to raise prices is the potential for customers to bypass the GTS network with their own pipeline.

Our calculations show that bypass is not cost effective for most Dutch exit points, only for exit points within about 10 km of border, bypass could be cost-effective.

2. However, other factors, such as the ability to gain rights-of-way and permits, and gathering together a large enough group of customers to make the pipeline cost-effective present additional obstacles to building a bypass pipeline.

3. We conclude that in the absence of regulation, GTS could raise prices at most domestic exit points in the Netherlands. At most GTS faces effective competition at exit points within 10km of a neighbouring pipeline network.

4. We conclude that GTS could also raise the price of border exit points, since it would not be cost effective for shippers exporting gas from the Netherlands to bypass the GTS network, and it seems unlikely that customers outside of the Netherlands would stop buying Dutch gas in response to an increase in the cost of border exit capacity.

4. Origin markets

Customers in an origin market are shippers that must transport gas *from* a particular point on the network, probably because they have signed a contract to buy gas at that point, or have invested in gas production there. Origin markets are domestic entry points taking Dutch gas production; and border entry points that send gas to a point inside the Dutch network.

4.1. Domestic entry points for Dutch gas production

In common with domestic exit points, domestic entry points taking Dutch gas production (be it from a gas field or a gas storage facility) have no alternative but to use the GTS network, unless they build their own pipelines to a neighbouring network. Again, the only potential competition is from the threat of customers or suppliers building new pipes from their production facility to a neighbouring network. In our discussion of domestic exit points, we concluded that only large users near the Dutch border might be able to economically build their own pipeline and bypass the GTS network. In the case of origin markets, there are relatively few gas production locations which could economically connect to a neighbouring network. We suspect that the Anneveen field and some others in the Schonebeek area could connect to a German network at relatively low cost, but these fields are relatively small and nearing the end of their life.[28]

It would be prohibitively expensive for gas produced offshore of the Netherlands and arriving at Den Helder to build a bypass pipeline to either Fluxys or a German network. Den Helder is 160 km from the Belgian border and (overland) more than 190 km from the German border. A pipe to the German border, even for a relatively large gas user, would cost the equivalent of over

[28] These fields are operated by NAM, who sells the gas to GasTerra at the edge of the production facility. Hence it could be GasTerra which built a pipe to Germany in this example.

€18/kW/year (an estimate which excludes the cost of compression), well in excess of the avoided GTS tariff (€3.12/kW/year).[29]

Moreover, much of the gas is destined for sale in the Dutch market, and so it is likely that producers would have to connect to the GTS network at some point. Building a private pipeline to 'jump' from one GTS entry point to another is unlikely to be cost-effective, since the GTS tariffs are relatively 'flat'. For example, in entry tariffs for gas production points in the Netherlands varied from €1.250/kW/hour/year to €2.108/kW/hour/year, a difference of €0.858/kW/hour/year.[30] This price difference would only be enough to justify a pipeline of less than 10 km, even for a relatively large user or producer.

4.2. Border entry points

In this section, we discuss border entry points used by shippers that deliver gas to a customer within the Netherlands (we analyse shippers using a border entry point and delivering gas to a customer outside of the Netherlands in the next section). Clearly, shippers have to use the border entry point (and the domestic exit point) if they want to supply gas to a customer in the Netherlands. The risk to GTS is that as it raised prices, these shippers could divert their gas to another market; GTS would lose transport volumes, and the price rise could be unprofitable. Therefore, the question is whether in practice shippers would divert their gas flows to another market in response to a price rise by GTS.

Shippers would only divert their flows if they were contractually able to do so and if the rise in the price of gas transport reduced their profits. For example, if a shipper was contractually committed to delivering gas to a certain point in the Netherlands, then the shipper would have no choice but to use one of the entry points on the GTS network. Alternatively, if the shipper had a contract whereby the cost of gas transport was an add-on which was passed through to the customer, and the customer was compelled to continue taking the gas, an increase in gas transport costs would not affect demand for gas transport.

Similarly, if customers had no choice but to buy gas from outside the Netherlands, then they would have to pay the increased border entry charges. In the Netherlands, it seems likely that imports are the 'marginal' source of gas, since Dutch gas is already being produced at its physical or contractual limits. Therefore, a customer would not be able to switch to a domestic source of gas to avoid the increase in border entry charges. Shippers could pass on the increase in the cost of border entry capacity without experiencing a loss in gas sales. There would be no reduction in profitability, at least in the short-to-medium term given the very low elasticity of demand for natural gas (and the small proportion of the final price that transport charges comprise). Therefore, if GTS raised prices at all border entry points, shippers could pass on these costs to customers, who

[29] Sum of the H-gas entry tariff for the NOGAT pipeline at Den Helder and the H-gas exit tariff at Oude Statenzijl on the German border.

[30] Production point tariffs from GTS TSC 2011-1. Tariffs include quality conversion.

would have no choice but to pay them. Hence there would be little if any incentive for shippers to divert their gas to another market or to stop using GTS's gas transport services.[31]

Therefore, GTS could raise the price of border entry capacity, since by doing so it would not lose customers who are transporting gas to a point within the Netherlands. As we discuss above and in Appendix I, GTS could raise border entry charges without diverting transit flows away from the GTS system.

4.3. New entry points

New entry capacity – such as GTS plans to construct for the open season – is in theory subject to greater competition, since customers potentially have a choice of building an alternative route. However, as we discuss on page 24 in more detail, in practice we suspect customers would find great practical difficulty in trying to build a new pipeline from their entry point to a customer. GTS would not have to grant access to their existing pipeline right-of-way, so the new pipeline would have to seek new permits and attempt to buy or rent land for the pipeline. In a country as densely populated as the Netherlands this would be extremely difficult. In contrast, GTS can expand its pipeline capacity using existing rights of way, at a lower cost. Therefore, in the absence of regulation GTS could charge above its own LRMC, since this would still be lower than a third party's LRMC.

4.4. Conclusions for origin markets

In common with the destination market, few domestic entry points could build a pipeline to a neighbouring network at a cost similar to the current GTS tariffs. Demand for capacity at border entry points would not be sensitive to an increase in the price of capacity, since shippers could pass on price increases to their customers. The cost of new capacity for third-parties is likely to be significantly higher than GTS's LRMC, due to advantages GTS has in using existing rights-of-way and gaining access to new rights-of-way. Therefore, the ability of third-parties to build their own new capacity is a weak constraint on GTS's pricing of new capacity; GTS could set prices in excess of its costs. We conclude that, absent regulation, GTS could profitably raise prices at domestic and border entry points for both new and existing capacity.

5. Transit markets

The product in this case is the transit of gas from an origin point A to a destination point B. By transit, we mean a gas flow which goes through the Netherlands but starts and ends outside it. In common with cases in the aviation industry, it does not make sense to differentiate the product market from the geographic market, since the product involves moving something from one point to another. In the language of the FERC methodology the transit markets are a subset of the parallel-path markets. We do not include parallel-path routes that begin and end in the Netherlands,

[31] Note that the situation described above is in contrast to shipper in a parallel path (transit) market (discussed below), where a shipper is sending gas via the Netherlands to e.g. Belgium. Because the Belgium market is receiving gas from several sources in addition to the gas transiting through the Netherlands, the shipper could not pass on any increase in transport costs charged by GTS; if it tried to do so, customers in Belgium might switch to one of the other sources of gas.

since GTS is the only provider of such services within the Netherlands, so that the only competition is from the building of independent pipelines, an issue we analysed in sections 3 and 4.

In this section, we identify several transit products (defined by a start point and an end point) which GTS offers, and identify several alternative products which could occupy the same product market. If alternative products are available, we carry out three tests:

1. **SSNIP test-based competitive assessment**. A market definition exercise, asking if the alternative products are not more than 110% of the price of the GTS product, and are therefore (according to the SSNIP test) reasonable substitutes from the point of view of the consumer.

2. **Broader competitive assessment**. A competitive assessment, analysing by how much GTS could profitably raise the price of its transit product given the pricing and available capacity on other routes. Note that in this competitive assessment we include all alternative products, even if market definition exercise concluded that they were not reasonable substitutes—we therefore refer to this as the "broader competitive assessment".

3. **Analysis of the extent of competition**. We adopt the BNA's criteria to establish the intensity of competition on alternative routes. For example, if there is only one alternative route, the BNA's methodology would conclude that this is not sufficient to provide effective competition.

5.1. Description of methodology

GTS – and most European TSOs – do not sell "transit capacity" as such. Rather they sell capacity separately at entry and exit points. Consumers create their own transit capacity by buying capacity at a border entry point and a corresponding capacity at a border exit point. In the absence of any legal constraints however, GTS could raise the price of transit independently of the price of other transportation services (imports, exports, within-country transportation), by raising border entry and/or exit tariffs, as explained in Appendix I.

There may be several different routes or paths from A to B, and the objective of our analysis is to determine if alternative routes can discipline the price charged for GTS's transit product. In essence, the basic question we investigate is: could GTS profitably and sustainably increase the price of gas transit for a particular transit product or route? The questions to answer are then twofold: does an alternative route identified occupy the same product market as the GTS transit product? That is, is the alternative route a 'reasonable' substitute for the GTS transit product? And if it is, is there enough of the alternative product available to discipline GTS's prices?

With regard to the first question we would not consider an alternative route a good substitute for the GTS transit product, if the price of the alternative route was more than about 110% of the GTS product; in this case GTS could raise the price of its route by more than 10% without losing any custom. It is common practice in analysing the competition 'product A' faces to define which

other products compete with it (or occupy the same market).[32] Such products should be 'reasonable substitutes' from the point of view of the consumer. Typically if a potential substitute 'product B' is more than about 10% more expensive than 'product A', then product B is not regarded as a reasonable substitute. The number of 10% finds support in the Small Sustainable Non-transient Increase in Price (SSNIP) test, which defines markets by reference to a 5-10% price increase (and which we discuss in more detail below), and the FERC methodology described in our 2007 report.

With regard to the second question (the availability of capacity), there may be spare capacity at a price less than 110% of the GTS route, but the amount of capacity available may be small, relative to the amount of capacity customers are using on the GTS route. In this case GTS could profitably raise prices, because it would only lose a relatively small volume of its customers. For example, suppose transit flow on a GTS route was 6,000 MW, and there was 100 MW available on an alternative route which charged just 1% more than GTS; GTS could profitably increase its prices by *e.g.* 15% and earn a higher profit on the remaining 5,900 MW of flow that could not switch to the alternative network.

Put simply, if there is plentiful capacity available on alternative routes at a similar price to the GTS route then the market for GTS's transit product may be competitive, depending on the form that competition takes. If the number of alternative routes is small and competition is intense then GTS could not profitably raise its tariffs for this route; if it did, customers would switch to the alternative route, and GTS would lose revenue and profits. The alternative route or routes cap GTS's tariffs for this particular combination of entry and exit points. However, before drawing this conclusion one would need to assess the intensity of competition given the number of competing firms.

Note that by "available capacity", we mean capacity which is available for customers that were using the GTS route to buy. Capacity which has been bought by a shipper using e.g. the German network but is not being used and is not for sale is not "available". Capacity available to buy can be either primary or secondary capacity.[33] As we describe below, we have investigated the available capacity by checking 'bulletin boards' used for offering secondary capacity.

In sum, a necessary condition for effective competition on a given GTS route is that there is at least one alternative route which has adequate spare capacity. If the price of this route is more than 10% more than the price of the GTS route then according to standard tests (the SSNIP test, which we discuss below in more detail) then it is not an effective substitute for the GTS route, and GTS can be considered to hold a monopoly.

Below we identify plausible transit products for GTS, and feasible alternative routes on the networks of one or more TSOs. For each transit product, we describe the current flow over the GTS network, which alternative routes the gas could switch to if GTS raised its prices. We then analyse

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[32] For example, the ERGEG document states that "NRAs [National Regulatory Authorities] shall assess whether the relevant pipelines can be considered a relevant market, e.g. by executing the so-called Small but Significant Non-transitory Increase in Price (SSNIP) test. If relevant pipelines are not within the same market, they are not in competition with each other." *Loc. cit.* footnote 8 p.12.

[33] By Primary capacity, we mean capacity bought directly from the pipeline owner. Secondary capacity is capacity bought from another shipper – essentially 'second-hand' primary capacity.

the availability and price of the alternative routes. To account for the possibility that GTS tariffs could rise in future, we also look at competition even from pipes that according to the SSNIP test are not adequate substitutes for the GTS route.

Caveats

There is a possibility that shippers on the alternative route have bought capacity but are not using it, and would therefore be willing to sell it if asked. In this case our approach of looking at primary capacity available and secondary capacity advertised on bulletin boards would underestimate the amount of the alternative product on offer. However it would be odd if shippers have not offered unused capacity for sale already, since absent market power they have good incentives to do so. Accordingly, we assume that if shippers on the alternative route have not offered unused capacity for sale before GTS raises its prices they will not do so after. On a practical level, we cannot know whether there is unused capacity available but for some reason not advertised, and so there would be no way of dealing with this in our analysis. However, we judge the risk that this is the case to be very small.

Similarly, there is a possibility that an attempt by GTS to raise prices, and the subsequent requests by shippers for capacity on the alternative route, could increase the supply of capacity that shippers are using. In other words, that the supply of available capacity is 'elastic'. However, we do not include this possibility in our analysis for two reasons, the first theoretical and the other practical. First, shippers selling capacity would have to stop supplying gas on that particular route – it would not be profitable to sell capacity to a third-party and then have to buy the capacity back at a higher price. We work on the presumption that most shippers have gas supply contracts to honour, and could not simply stop supplying gas; therefore they cannot sell the capacity they are using. Again, on a practical level we would have no way of estimating the amount of capacity that is being used but that might become available, though there are good reasons to believe that the amount of such capacity will be very small.

There is also the theoretical possibility that demand is sufficiently elastic to limit GTS's price increases – in other words, if GTS raised prices shippers would simply stop shipping gas from the origin to the destination market. If this were true then even absent alternative transit products or routes, GTS would not be able to significantly raise prices. However, for the reasons discussed above we do not consider this possibility realistic, since in reality shippers are compelled by contracts to continue using the transit route even if the price of transit rises. Moreover, if the gas on this transit route did not set the price at the destination, then the buyer or seller could still profitably transport gas on this route; though their profits would reduce by the amount of the increase in GTS's transit tariffs.

The SSNIP test

In applying the SSNIP test in this context, our aim is to determine if an alternative transit product offered by *e.g.* RWE occupies the same market as the GTS transit product – are these two products reasonable substitutes from the view point of consumers? Specifically, in defining the relevant transit market, we have investigated whether GTS could raise its prices (by 5 to 10%) above *current* levels.

Whether one uses current or competitive levels depends on the purpose for which the SSNIP test is being applied. For example, in an Article 82 case (abuse of a dominant position) and Article

81 case (cartels) the market definition practice is to investigate if the party could raise prices above *competitive* levels. In merger analysis one would investigate if the party could raise prices above *current* levels.[34]

We note that GTS's current tariffs are regulated. The purpose of regulated tariffs is to approximate the tariffs that would result under competition, in the sense that competition reduces prices to the level of costs. Therefore, GTS's current tariffs are the competitive tariffs in this case. There is no need to make a new estimate of what GTS's competitive tariffs might be. Therefore we perform the analysis using GTS's current tariffs.

However, we stress that our conclusions do not depend on the use of current or competitive prices, since we carry out a competitive assessment of GTS against all alternative routes, even when the SSNIP test (based on current prices) implies that these alternative routes do not occupy the same product market as the GTS route.

Market definition would also, in most cases not include pipelines which have not been built yet. According to European Commission's guidelines on market definition, the competitive constraints arising from supply side substitutability are in general less immediate and in any case require an analysis of additional factors. As a result such constraints are taken into account at the assessment stage of competition analysis.[35] Specifically, the Commission Notice says that "[s]upply-side substitutability may also be taken into account when defining markets in those situations in which its effects are equivalent to those of demand substitution in terms of effectiveness and immediacy". Since building an alternative pipeline takes several years, it is not as effective and immediate as a consumer switching to an existing pipeline. We note that while the BNA has considered competition pipelines that are not yet in service, there has to be evidence that construction has begun on such pipelines.

One possible exception to this arises when the GTS infrastructure itself is not yet built, i.e. an Open Season context (or more properly, a post-Open Season context where GTS would be trying to sign shippers up to LT contracts at an agreed long-term tariff). In this case, it would be feasible for an alternative pipeline project to compete with the GTS project; this competition could limit the ability of GTS to raise prices in the absence of regulation. We will discuss this issue in section 5.7.

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[34] The difference is logical, because in merger control the point is to check that competition after the merger is no less than before, so the current level of prices is the right starting point, while in an Article 81/82 proceeding the point is to see whether specific illegal behaviour is raising prices above the competitive level and competitive prices are therefore relevant. Using current prices in an Article 81/82 context risks committing the "cellophane fallacy". For a detailed discussion of the cellophane fallacy see section 2.3 of our report *Factors affecting geographic market definition and merger control for the Dutch electricity sector*, June 2006, The Brattle Group, available from the NMA website.

[35] *Commission Notice on the definition of the relevant market for the purposes of Community competition law*, OJ C 372 on 9/12/1997.

5.2. Transit Routes Analysed

In our 2007 report we defined a number of transit routes (defined by the start and end point) where shippers could plausible be using the GTS network to transit gas, and which rival TSOs could potentially offer competing capacity. The routes analysed were:

- Emden in North Germany to Belgium;
- North Germany to South Germany;
- Emden to France.

Our 2007 report also discussed several other transit routes which did not seem plausible and were therefore ruled out. In our 2007 report we also noted that the creation of new gas trading hubs and the signing of new gas contracts could create new transit routes or products.

We have reviewed recent patterns of capacity bookings provided by the NMa, which show entry and exit capacity bookings by shipper. Since entry and exit capacity is booked independently there are no actual bookings of 'transit capacity'. However, if a shipper books e.g. 100 MW on entry capacity at point A and a corresponding capacity of exit capacity at point B, we can reasonably assume that route A to B is a transit route for this shipper. Having reviewed the most recent booking data we conclude that our choice of transit routes from the 2007 study remain the most appropriate routes for potential transit competition. Accordingly, we apply our analysis using the same transit routes as in the 2007 study.

One additional development since our 2007 report has been the consolidation of the German market areas or hubs into Net Connect Germany (NCG) and GasPool. However, as we explain in section 2.6, the development of the gas trading hubs in Germany does not represent a new transit route.

5.3. Transit market 1: Emden to Belgium (H-gas)

Relevant transit: The relevant transit is the movement of H-gas from Emden to Belgium.

Scenario: Norwegian H-gas flowing through from Emden to Belgium diverts to a German network.

Current flow through the GTS network: we assume that the gas currently flows via the GTS network, entering at Emden (points 15A-E in Figure 1) and leaving to enter the Fluxys system at either s'Gravenvoeren, Obbicht, Hilvarenbeek, Zandvliet or Zelzate (points 6, 5, 3A-B, 2A-B). Our analysis uses Zandvliet tariffs since they are the highest firm tariff, and hence customers using this exit point would be first to switch to the alternative route.[36]

[36] Using the Zelzate exit point would be more expensive, but exit capacity is interruptible and so we do not consider this a substitute product.

Feasibility: Belgium imports about 6 bcm of Norwegian gas,[37] so the transaction is realistic. However, we do not know if the delivery point of these volumes is fixed (i.e. may not be able to switch to delivery via Germany), though even if they are, a change of route that was beneficial to both the buyer and seller might be achievable through renegotiation.

Potential alternatives: we consider all routes from Emden into Belgium through existing pipelines that do not use the GTS system, as listed below.

Available primary capacity on alternative routes

1. **Open Grid Europe (**formerly E.On Transport**)** has 112 MWh/h of firm entry capacity available at the Emden NPT point from October 2011 to March 2012 inclusive and 262 MWh/h from April 2012 to October 2012 inclusive. However, over the same period Open Grid Europe has no firm capacity available exiting at Eynatten.

2. **Wingas** has built entry and exit capacity at Bunde and Eynatten respectively. However, Wingas only has firm entry at Bunde available intermittently – specifically 1,289 MWh/h of capacity from 01/06/11 to 31/08/11, 1,289 MWh/h during December, 1,154.579 from 01/01/12 to 28/02/12 and the same amount from 01/06/12 to 30/09/12. Wingas does not have available exit capacity at Eynatten during 2011, but has about 3,600 MWh/h of capacity available from January 2012.

3. **Gasunie Deutschland Transport Services** (GTS Deutschland**)** has firm capacity available entering at the Emden EPT1 point but does not have an exit to Belgium. In any case, GTS Deutschland is a wholly owned subsidiary of GTS. While the revenues of GTS Deutschland might continue to be regulated even if those of GTS in the Netherlands were not, GTS Deutschland might still have sufficient flexibility so as to avoid competing with its Dutch parent company. Therefore we do not think it is appropriate to rely on competition from GTS Deutschland to restrain GTS's pricing, and we do not consider any routes involving GTS Deutschland in our analysis. This also applies to other routes considered.

4. **Thyssengas (RWE)** has no entry capacity available at Emden until October 2013, and so we discount the Thyssengas route as a potential competitor to GTS. Thyssengas does not own primary exit capacity at Eynatten.

There is no secondary capacity advertised for any of the networks on this route.

We conclude that, whereas in 2007 there was some available capacity on this route, there is now no available capacity on the Emden- Eynatten route from April 2011 until at least October 2012.

SSNIP test-based competitive assessment

Even though there is no available capacity for shippers to switch to a rival network, for completeness we have analysed the differences in tariffs between the GTS route and potential

[37] According to the BP Statistical Review of World Energy June 2010, Norway exported 6.39 bcm of gas to Belgium in 2010.

alternative routes. Specifically we compare GTS's tariffs – including the obligatory Quality Conversion (QC) element – to the Open Grid Europe tariffs and the Wingas tariffs, as these two networks at least own entry capacity at Emden and exit capacity at Eynatten, even if none is currently available.

Table 5: Tariff comparison Emden to Belgium based on 2011 tariffs

Route			Tariff €/kWh/h/year
Open Grid Europe route			
Emden (entry)	[1]	Open Grid Europe	2.19
Eynatte (exit)	[2]	Open Grid Europe	2.24
Eynatten (entry)	[3]	Fluxys	0.64
Total	[4]	Sum, [1], [2], [3]	5.07
Wingas			
Emden - Bunde (entry)	[5]	Wingas	2.39
Eynatten (exit)	[6]	Open Grid Europe	2.17
Eynatten (entry)	[7]	Fluxys	0.64
Total	[8]	Sum, [5], [6], [7]	5.20
GTS route			
Emden (entry)	[9]	GTS	1.25
Zandvliet (exit)	[10]	GTS	2.44
Zandvliet (entry)	[11]	Fluxys	0.64
Total	[12]	Sum, [9], [10], [11]	4.32
Difference OGE - GTS	[13]	[4]-[12]	0.74
Difference Windgas - GTS	[14]	[8]-[12]	0.87

Notes and sources:
[1]; [2]; [3]; [5]; [6]; [7]; [9]; [10]; [11]: Companies' websites
[4]; [8]; [12]; [13]; [14]: See calculations above

Error! Reference source not found. illustrates the difference in tariffs between the GTS route and the two German routes. Note that Fluxys charges a uniform entry tariff at all entry points, and we ignore the fact that the two routes would deliver gas into different balancing zones in the Fluxys system.[38] **Error! Reference source not found.** illustrates that the Open Grid Europe tariffs are 0.74 €/kWh/h/year higher than the tariff on the GTS route, or 118% of the price of the GTS route. The Wingas tariffs are 0.87 €/kWh/h/year higher than the tariff on the GTS route, or 121% of the price of the GTS route. According to the SSNIP test methodology, the neither the Open Grid Europe route not the Wingas routes are reasonable substitutes for the GTS route. In terms of the transit products, the German transit routes do not occupy the same product market. Even if there are

[38] We also account for the commodity fee Fluxys charges, which is expressed as a percentage of the gas transported. We take a gas price of €20/MWh to estimate the Fluxys commodity fee.

differences in the services provided (for example *force majeure* clauses etc.),[39] it seems plausible that, absent regulation, GTS could raise its tariffs on this route by more than 10%. Assuming that there are no significant non-price differences in the transport services offered, even if spare capacity was available (which it is not) GTS could apparently raise its tariffs on this route by nearly 20% without losing any customers.

We conclude that on the basis of the SSNIP test GTS enjoys a monopoly on this transit route, and therefore does not face effective competition.

5.4. Transit Product 2: North Germany to South Germany (H-Gas)

Relevant transit: The relevant transit is the movement of H-gas from North Germany to South Germany.

Scenario: Gas flowing from Emden through the GTS network diverts to the Open Grid Europe network.

Current flow: we assume that gas currently flows from Emden, through the GTS network, then exits the GTS system at Bocholtz to enter the Open Grid Europe network (Bocholtz is the only H-gas exit from the GTS network into southern Germany).

Feasibility: Germany imports about 30 bcm of Norwegian gas, so the transaction is realistic. However, we note that E.ONRuhrgas is the main buyer, and would presumably use its own network rather than the GTS network. VNG and Deutsche Shell buy about 4 bcm/year each, and may be more open to using the GTS network.

Potential alternatives: The gas flows directly onto either the Open Grid Europe at Emden or the Wingas network at Bunde.

Tariff comparison

Table 2 illustrates the costs of transporting gas from North to South Germany on both the GTS route (including Quality Conversion tariffs) and the two German networks that have entry capacity available at Emden/Bunde (Open Grid Europe and Wingas). Note that we do not include the cost of exit capacity within the German system, since the shipper would have to pay this cost using either the GTS route or one of the German routes.

Table 2 shows that the GTS route (including the obligatory Quality Conversion 'supplement') is already 2.34 €/kWh/h/year more expensive than the Wingas route, and 2.54 €/kWh/h/year more expensive than the Open Grid Europe. Hence flows would presumably already be using the German routes, unless there was some non-price reason not to.

If there was no congestion on the German routes, then we would not expect anyone to be using the GTS route for transporting gas from north to south Germany. GTS would not gain anything by

[39] *Force majeure* clauses excuse a party from liability if some unforseen event beyond the control of that party prevents it from performing its obligations under the contract. Typically, force majeure clauses cover natural disasters or other "Acts of God", war, or the failure of third parties--such as suppliers and subcontractors--to perform their obligations to the contracting party. In gas pipeline contracts there can be differences between TSOs as to the circumstances covered by *force majeure.*

raising the price for this route since customers could switch to using the cheaper (un-congested) route provided by Open Grid Europe or Wingas.

Table 6: Tariff comparison North to South Germany

Route			Tariff €/kWh/h/year
GTS route			
Emden (entry)	[1]	GTS (incl. QC)	1.25
Bocholtz (exit)	[2]	GTS (incl. QC)	1.85
Bocholtz (entry)	[3]	Open Grid Europe	1.63
Total	[4]	Sum, [1], [2], [3]	4.73
Open Grid Europe			
Emden (entry)	[5]	Open Grid Europe	2.19
Wingas			
Bunde	[6]	Wingas	2.39
Difference GTS - OGE	[6]	[4]-[5]	2.54
Difference GTS - Wingas	[7]	[4]-[6]	2.34

There is a relatively small amount of entry capacity available at Emden on the Open Grid Europe network (about 110 MW from October 2011 to March 2012 inclusive, then increasing to 260 MW), while on the Wingas network capacity is available at Bunde only intermittently. We conclude that when there was spare capacity on the German TSOs networks shippers would not be using the GTS network to ship gas from North to South Germany. If there was congestion on the German routes, then shippers might use the GTS network instead. GTS could raise tariffs for this transit route without losing market share or causing further flows to divert to the German routes. Therefore absent regulation GTS could exercise market power on this route if there was congestion on the entry points of the German TSOs. We conclude that GTS has intermittent market power on this route, depending on the availability of capacity on the German TSOs networks.

5.5. Transit Product 3: Emden to France (H-gas)

Relevant transit: The relevant transit is the movement of H-gas from Emden to France.

Scenario: Gas flowing from Emden through the GTS network diverts to the Open Grid Europe network.

Current route: We assume gas flows into the GTS system at Emden, then exits the GTS system and enters the Fluxys system at s'Gravenvoeren, Obbicht, Zandvleit or Zelzate. The gas exits the Fluxys system and enters the GRT Gaz system at Quévy, Blaregnies/Taieniéres.

Feasibility: GdF imports about 20 bcm/year from Norway, so this scenario is realistic, and a proportion of this gas may already go through the GTS network. GRTgaz Deutschland and Open Grid Europe have exit capacity into France.

Potential alternative: Gas could flow into the Open Grid Europe system at Emden, and exit at Medelsheim/Obergailbach into the GRT Gaz system. Alternatively, gas could exit the Open Grid Europe system and enter the Swizzgas system at Wallbach, then exit the Swizzgas system and enter the GRT Gaz system at Oltingue. We also account for a route where gas flows through the Open Grid Europe system, exits Germany and enters Belgium at Eynatten, and then enters France at Blaregnies.

We note that Eni gas Transport Deutschland has offered 40,000 Nm3/hour of capacity on its TENP pipeline from Bocholtz to Wallbach/Passo Gries. However, we do not consider this in our analysis because using entering gas in the TENP pipeline at Bocholtz could only be done by using the GTS exit point at Bocholtz. Therefore use of the TENP pipeline could not bypass the GTS pipeline system.

Available primary capacity on alternative routes

Open Grid Europe has no firm exit capacity at either Medelsheim/Obergailbach or Wallbach until at least October 2012. GRTgaz Deutschland has no capacity for sale at Medelsheim. As noted above Open Grid Europe has no firm capacity available exiting at Eynatten. Hence it would not be possible for customers currently sending gas from Emden to France via the GTS network to divert gas onto the Open Grid Europe network in response to a price increase from GTS.

Tariff comparison

Even though there is no available capacity for shippers to switch to transport gas from Emden to France, for completeness we have analysed the differences in tariffs between the GTS route and the Open Grid Europe tariff, including the route via Switzerland.

Table 7: Tariff comparison Emden to France

Route			Tariff €/kWh/h/year
Open Grid Europe and GRTgaz Deutschland route			
Emden (entry)	[1]	Open Grid Europe	2.19
Medelsheim / Obergailbach (exit)	[2]	GRTgaz Deutschland	2.19
Medelsheim / Obergailbach (entry)	[3]	GRTgaz	2.32
Total	[4]	Sum, [1], [2], [3]	6.70
Open Grid Europe and Fluxys route			
Emden (entry)	[5]	Open Grid Europe	2.19
Eynatten (exit)	[6]	Open Grid Europe	2.24
Eynatten (entry)	[7]	Fluxys	0.64
Blaregnies incl. transit, (exit)	[8]	Fluxys	1.86
Taisnieres H (entry)	[9]	GRTgaz	2.32
Total	[10]	Sum, [5] to [9]	7.56
Open Grid Europe and Swissgas route			
Emden (entry)	[11]	Open Grid Europe	2.19
Wallbach (exit)	[12]	Open Grid Europe	2.99
Wallbach (entry) to Olingue (exit)	[13]	See note	3.65
Oltingue (entry)	[14]	GRTgaz	1.62
Total	[15]	Sum, [11] to [14]	10.45
GTS route			
Emden (entry)	[16]	GTS (Including QC)	1.25
Zandvliet (exit)	[17]	GTS	2.44
Zandvliet (entry)	[18]	Fluxys	0.64
Blaregnies (exit)	[19]	Fluxys	0.18
Taisnieres H (entry)	[20]	GRTgaz	2.32
Total	[21]	Sum, [16] to [21]	6.82
Difference OGE and GRTgaz Deutschland - GTS	[22]	[4]-[21]	-0.12
Difference OGE and Fluxys - GTS	[23]	[10]-[21]	0.74
Difference OGE and Swissgas - GTS	[24]	[15]-[21]	3.63

Notes:
[13]: At the time of writing, Swissgas only publishes point-to-point tariffs from Wallbach to various delivery points within Switzerland. We use the lowest published point-to-point tariff as a proxy for the entry fee at Wallbach and exit at Oltlingue.

As Table 7 illustrates the Open Grid Europe/GRTgaz Deutschland route is 0.12 €/kWh/h/year cheaper than the GTS route, or about 2%. Accordingly, this route could be a good substitute for the GTS route, but as we note above there is currently no capacity available. The route via Belgium is 0.74 €/kWh/h/year or 11% more expensive than the GTS route. Using a combination of the Open Grid Europe network and the Swissgas network costs 3.63 €/kWh/h/year more than the GTS network. We conclude that the Open Grid Europe route does not presently offer competition to GTS for the transit route Emden-France, because there is no firm capacity available on the alternative routes. Were capacity available, then the prices are close enough that it could be reasonable to consider the Open Grid Europe route from Emden to France as a reasonable substitute to the GTS route.

5.6. Other possible transit markets

We considered additional transit routes to see whether there was any potential for competition, but in each case decided there is not:

1. L-gas transit. As far as we are aware there is no L-gas transit, since L-gas is only exported from the Netherlands, and very little L-gas is imported. Hence GTS could not lose transit flows of L-gas by raising prices.

2. South-west Germany to Zeebrugge. A possible scenario is that gas flowing from East of Belgium to Zeebrugge via the GTS network diverts to the Fluxys network. However, to flow gas to Zeebrugge via GTS would require entering the GTS network at Bocholtz. The entry capacity at Bolscholtz would be a backhaul, since the physical flow of gas is leaving the Netherlands. Hence the product would be non-firm. It seems unlikely that the assumed current route is feasible.

3. GasTerra is importing about 3 bcm/year Russian of gas to use for its contract with Centrica.[40] But GasTerra has long-term capacity on the BBL; to switch routes it would have to buy secondary capacity on ICUK, which would likely be prohibitively expensive. Hence it seems very unlikely that an increase in tariffs of 10% or less would cause flows to switch from the BBL to ICUK, though lack of information on the cost of secondary capacity for ICUK makes this impossible to confirm. Similar arguments would apply to Russian gas sold to the UK via the Baltic pipeline.

4. GDF imports about 8 bcm of Russian gas – some deliveries are at Baumgarten, some are at Waidhaus: it seems unlikely that it would be economic to divert via GTS/Fluxys networks, as the flow would still have to transit via German gas networks.

5.7. Contestability of transit markets

In the section above we noted that, absent regulation, GTS could raise its prices significantly above the current levels. However, in theory there is a limit to what GTS could charge; the LRMC of a new pipeline should constrain both the price of GTS's new capacity (in the open season) and its existing capacity; if GTS attempted to charge much more than the LRMC for transit capacity, customers could build there own pipeline. The contestability of transit capacity is an important point, as if transit was clearly contestable this would set a clear limit on GTS's prices.

We note a number of reasons why it would be more expensive for a third-party to build a pipeline across the Netherlands that it would be for GTS to do it. GTS has significant economies of scope and scale. For example GTS could add capacity by modifying an existing compressor, or adding more compression. This is an operation which involves modifying only one piece of equipment. In contrast, a third-party would need to build an entire new pipeline of potentially several hundred kilometres.

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[40] GasTerra supplies about 8 bcm/year of gas to Centrica in the UK via the BBL pipeline (Centrica Press Release, 25/6/02). We also understand that Gazprom and GasTerra have negotiated a swap agreement that would involve Gazprom shipping gas to the Netherlands via NEGP and GasTerra shipping the same volume of gas to the UK via BBL. The volume may be 3 bcm ('Gazprom Is in Search for Own Route to U.K.', The *Kommersant*, Tuesday, April 18, 2006. Hence in effect GasTerra transports about 3 bcm/year of Russian gas to the UK.

If GTS needed to, it could also add new pipelines more easily than a third-party, since it has existing rights-of-way in which to lay the pipe. If required GTS has special 'eminent domain' powers to acquire new rights-of-way (as we discuss on page 24). In contrast a third-party would have to acquire new rights-of-way with no eminent domain powers, which could be expensive and very time consuming.

As we discuss elsewhere, pipelines have significant economies of scale; to reduce the €/kW price of shipping gas to a cost-effective level a new project would need to transport significant amounts of gas. A sufficiently large project – for example an LNG terminal shipping gas across the Netherlands – could achieve this. However, given the issues cited above it seems likely that the costs for a third-party would exceed GTS's LRMC. Therefore, GTS could charge more than its own LRMC for new capacity. The exact amount it could charge would vary by the precise route, and would require an engineering study to determine the difference between the costs for GTS of adding capacity and the costs for a third-party.

Appendix I : Entry-exit pricing and tariffs for transit

In an entry and exit system, it is perhaps not immediately obvious how GTS could increase the price of e.g. border entry capacity, while maintaining the price of transit capacity at the same level. If it was true that GTS could not raise the price of e.g. border entry points without also raising the price of transit capacity, then a competitive transit market might discipline the price of border entry capacity. Since GTS charges the same price at an entry point to all users regardless of their destination, it could be that GTS is reluctant to e.g. raise border entry tariffs, for fear of losing transit volumes.

In this section we briefly demonstrate that, leaving aside price discrimination concerns which we discuss later, this is not the case. Looking purely in formal terms, GTS could raise the price for origin and destination markets without affecting the price of transit flows.

Consider the system of price increases illustrated in Figure 2. The price increase for different types of user would be as follows:

- A gas importer: 1+B
- A gas exporter: A-1
- Gas transit: 0
- Gas transport within the Netherlands: A + B.

By applying an offsetting decrease in the price of border exit capacity, GTS could neutralize the effect of the price increase on gas transit, while raising prices to all other types of customers. As long as A > 1 and B > -1, the price increase is profitable for GTS, regardless of the different volume of each type of customer.

Figure 2: Hypothetical price increases, raising border entry tariffs

	Netherlands	Border
Entry	**+A**	**+1**
Exit	**+B**	**-1**

Figure 3 illustrates that GTS could get an identical outcome while *reducing* border entry tariffs. In this case the price increase for different types of user would be as follows:

- A gas importer: -1+B+2 = 1+B
- A gas exporter: A-2+1 = A-1
- Gas transit: 0
- Gas transport within the Netherlands: A-2+B+2 = A + B.

Figure 3: Hypothetical price increases, reducing border entry tariffs

	Netherlands	Border
Entry	**A-2**	**-1**
Exit	**B+2**	**+1**

Accordingly, the competitiveness of transit or parallel path markets would not reduce the risk of market power abuse in the origin and destination markets.

We note that the discussion above assumes that GTS would be able to e.g. reduce the price of a border exit point, while maintaining relatively high prices for nearby domestic exit points; this could raise issues of price discrimination, and could limit the ability of GTS to engage in the kind of pricing we describe above. If this was the case then competition in the parallel path market could provide some protection for users on the origin and destination markets.

This discussion also does not presume that GTS would engage in the behaviour we describe, or that this behaviour is legal. This appendix simply demonstrates that in an entry-exit system it is possible to raise the price of border entry capacity or border exit capacity, without increasing the price of transit, if some price discrimination is possible. Therefore, *competition in the transit market would not necessarily discipline prices for border entry and exit capacity*.