



Economic analysis of the sunset clause

A REPORT PREPARED FOR:

- E-CONTROL AUSTRIA, VIENNA
- BUNDESNETZAGENTUR FÜR ELEKTRIZITÄT, GAS, TELEKOMMUNIKATION, POST UND EISENBAHNEN, BONN
- COMMISSION DE RÉGULATION DE L'ÉNERGIE, PARIS
- NEDERLANDSE MEDEDINGINGSAUTORITEIT, THE HAGUE
- COMISIÓN NACIONAL DE ENERGÍA, MADRID
- OFGEM, LONDON

July 2011

Economic analysis of the sunset clause

1	Introduction	1
1.1	<i>Background to the study</i>	1
1.2	<i>Structure of the report</i>	2
2	Our remit	3
3	Sunset clause and its effect	5
3.1	<i>Sunset clause</i>	5
3.2	<i>Scope for effect of sunset clause</i>	9
4	Possible competitive effects of the sunset clause	10
4.1	<i>One wholesale market or two</i>	10
4.2	<i>Operation of a GSA</i>	11
4.3	<i>Behaviour of buyer and seller under the GSA</i>	13
4.4	<i>Who would acquire the bundled rights</i>	18
4.5	<i>Other impacts</i>	19
5	Quantitative assessment of the sunset clause	21
5.1	<i>Measuring the competitive effect of the sunset clause</i>	21
5.2	<i>Approach</i>	27
5.3	<i>Data</i>	29
5.4	<i>Results</i>	31
6	Conclusions	37
	Annexe 1: Contract data	39

Economic analysis of the sunset clause

Figure 1. Delivery arrangements before and after bundling	8
Figure 2. Elements of a typical GSA	12
Figure 3. Spare booked transportation capacity	14
Figure 4. Contract capacity over time	27
Table 1. Assumptions on GSA maximum deliverability in relation to ACQ	30
Table 2. Supply and demand assumptions	31
Table 3. Relative scale of the additional entry capacity	32
Table 4. Results of the pivot analysis – residual supply index	33
Table 5. Results of HHI analysis	34
Table 6. GSA data	39

1 Introduction

1.1 Background to the study

The third energy package aims at the adoption of European network codes for cross-border network and market integration issues. The preparation of the codes would be a two-step process, with the Agency for the Cooperation of Energy Regulators (ACER), at the request of the EC, preparing Framework Guidelines setting out principles for ENTSOG to follow in developing the network codes.

In this context and anticipating the work of ACER, the EC asked ERGEG to prepare pilot Framework Guidelines on capacity allocation mechanisms in gas. ERGEG published its pilot Framework Guidelines in June 2010 and ACER published draft Framework Guidelines in March 2011.

When a shipper wishes to ship gas from one zone to another the shipper will require exit capacity in one zone and entry capacity in the next zone. Trade will be facilitated if both of the exit and the entry rights can be acquired in one transaction.

The draft Framework Guidelines set out that the network codes shall require Transmission System Operators (TSOs) jointly to offer bundled firm entry and exit capacity on either side of a gas zone border in order that complementary capacity products can be bought in the one transaction. We refer to this as mandatory bundling.

Mandatory bundling is comparatively easy to arrange in respect of capacity that is not currently committed through existing gas transportation contracts. However, existing gas transportation contracts will typically be to or from the border of a gas zone. In respect of these contracts, entry and exit capacity rights are not presently bundled. The EC is of the view that there could be merit in bringing about changes to existing gas transportation contracts before their normal expiry in order to cause a unification of rights on either side of the border such that the new bundled rights are either identical to, or extremely similar to, the bundled rights in which new cross zone border capacity will be sold.

To this end the EC has proposed the addition of a 'sunset clause' which would, after a period of five years, mandate rearrangement of existing transportation capacity contracts which involved either delivery of gas to a zone border or from a zone border. Holders of such capacity contracts would collectively receive in compensation bundled capacity rights, which would be equivalent to the aggregate of the rights that are currently held on either side of the border.

Parties holding the relevant existing exit and entry rights would be invited to reach agreement on the disposition of the bundled rights and notify the relevant

TSOs jointly of the agreed disposition. If the parties failed to agree there would need to be a default split of the bundled rights.

Concerns have been voiced over the legal basis for such mandatory termination of existing transportation capacity contracts, the legal action to which it might expose TSOs and the disruption / cause for termination that it might induce in gas supply contracts which use presently the border as the delivery point.

E-Control in concert with other energy regulators has requested that two related studies be undertaken, aimed at gaining a better understanding of:

- the legal feasibility of imposing a sunset clause in the manner proposed and the legal consequences for parties to existing transportation capacity contracts and any implications for affected supply contracts; and
- the economic impact of the sunset clause, focussing on the effect that it would have on competition in wholesale gas markets.

Frontier Economics Ltd (Frontier) has been asked to undertake the study of the economic impact of imposition of mandatory bundling on capacity that is currently committed through existing transportation contracts, i.e. the sunset clause.

1.2 Structure of the report

This document is our final report describing the results of the study. It is organised as follows:

- Section 2 describes our remit for the study;
- Section 3 sets out the sunset clause and its effect on market outcomes;
- Section 4 considers qualitatively the competition effects of bundling;
- Section 5 considers quantitatively the competition effects of bundling; and
- Section 6 sets out our conclusions from the study.

2 Our remit

The terms of reference issued by E-Control in April 2011 requested that the study consider the legal implementation of the sunset clause and the necessary contractual amendments as well as its competition effects. E-Control then decided to procure separately the legal and economic components of the study.

The legal study¹ concludes that it would be legally possible for the Commission to introduce conditions such as the sunset clause in a network code so long as the principles of subsidiarity and proportionality are respected.

The objective of the economic component is to provide a better understanding of the economic consequences of the sunset clause, focussing on the effect that it would have on competition in wholesale gas markets.

Nevertheless, the economic component of the study needs to consider some aspects of implementation since these may influence the economic effects of the study. For example, the allocation of bundled rights between the contracting parties may affect competitive conditions in different ways depending upon the market positions of the contracting parties.

In addition to a qualitative assessment of the effect, it was agreed to try to quantify the extent of the change in competition that might arise from the imposition of the sunset clause. In doing so, it was agreed that the scope of work be limited to assessing the effect of the sunset clause on market structure and not to examine the price effect of the sunset clause or undertake a cost benefit analysis.

Tracing all of the competitive effects is potentially extremely complex and well beyond what is feasible within the timescales and resources available for this study. Therefore, it was agreed to carry out a limited analysis of the effect of the sunset clause on the wholesale gas market.

It was agreed to assess the effect for a limited number of sample countries:

- France;
- the Netherlands;
- Germany;
- Austria; and
- Slovenia.

¹ RAUE, *Legal Impact Assessment of the Framework Guidelines on Capacity Allocation Mechanisms for the European Gas Transmission Network*, June 2011.

This selection encompasses countries with differing gas sectors, including:

- a net gas exporter (Netherlands);
- a country with few gas importers (France);
- a country with several gas importers (Germany); and
- two countries with large transit flows (Slovenia and Austria).

In addition, it was agreed to focus on the annual commodity market and not on shorter term seasonal or peak period delivery markets due to a lack of within year data.

3 Sunset clause and its effect

3.1 Sunset clause

ACER's draft *Framework Guidelines on Capacity Allocation Mechanisms for the European Gas Transmission Network* foresees that the network codes shall set out that Transmission System Operators jointly offer bundled firm capacity services for cross-border services. Hence, the corresponding exit and entry capacity available at both sides of every point connecting adjacent entry-exit systems within a Member State or between two or more Member States shall be integrated in such a way that the transport of gas from one system to an adjacent system is provided on the basis of a single allocation procedure and single nomination, i.e. mandatory bundling.

The initial intention was that the principles of mandatory bundling would apply only to new contracts. However, an amendment introduced in the pilot Framework Guidelines of June 2010 proposes that existing capacity contracts should be amended such as to create bundled rights subject to a single party's nomination no later than a date of five years after the Network Code becomes legally binding, the 'sunset clause'. The specific wording is as follows:²

2.4.2 Amendment of existing capacity contracts

The network code(s) shall ensure that existing capacity contracted before the entry into force of legally binding network code(s) shall be bundled no later than five years thereafter. Network users holding existing capacity contracts should aim at reaching an agreement on the split of the new bundled capacity. National regulatory authorities may moderate between the parties.

If no agreement on the split of bundled capacity can be reached, the network code(s) shall entitle Transmission System Operators to split the bundled capacity between the original capacity holders proportionally to their capacity rights. The duration of the new bundled services shall not exceed the duration of the original capacity contracts they are built upon. Any further details of this procedure shall be set out in the network code(s).

Network codes are not meant and do not regulate supply contracts, only capacity contracts. Insofar as these Framework Guidelines could have an effect on supply contracts, implementation of network codes shall not entitle contracting parties to cancel supply contracts. It could only serve to separate and amend the capacity contract if this is included in the supply contract.

² The text has been taken from ACER's draft Framework Guidelines, DFGC-2011-G-001, dated 3rd March 2011.

The sunset clause requires all existing capacity contracts at a border between gas zones to be bundled such that one nomination is made covering exit from one zone and entry into the adjacent zone.

The assumption is that the parties with transport capacity rights to the border and from the border will collectively not lose rights that they hold in aggregate prior to the coming into force of the legally binding network code. Collectively, the parties will be able to access the same capacity and achieve the same movements of gas for the same cost as would have been the case had their existing gas transportation capacity contracts endured.³

Existing parties holding gas transportation rights to or from a gas zone border will each be awarded rights which can be combined such that one of the parties will have the equivalent cross border rights in the bundled form. Collectively, the rights are thus exit on one zone, entry on the adjacent zone plus exemption/compensation matching any congestion charge related to transfers between the zones.⁴ The parties holding the capacity contracts will have the right (and obligation) to rearrange the way in which they exercise those rights.

In some cases, the booked capacity on one side of a border may exceed the booked capacity on the other side of the border. The sunset clause would apply to the matched capacity. The unmatched capacity does create an implementation issue. However, we do not consider this would create an obstacle to implementation, for example, it would be possible to compensate the holder of the unmatched capacity for the loss of rights.

It has to be stressed that the sunset clause only applies to the capacity contract and not to the underlying commodity contract, which will be unchanged.⁵

The main expectation from the amendment of capacity contracts is that by bundling the exit/entry capacities, the delivery point of the commodity contract⁶ will move from the border flange to a within zone hub either further upstream or

³ To the extent the sunset clause requires a party to operate in a gas jurisdiction in which it would not otherwise operate an additional cost may be incurred. However, many of the parties to which the sunset clause applies would either already operate in several countries or would be required to operate in new jurisdictions due to capacity bundling and not due to the sunset clause *per se*.

In any case, the additional cost of operating in a country is likely to be low relative to the benefit of operating in the country for all but the smallest of shippers. For example, the fees for PEG Nord are € 6000 for an annual subscription and 0.01 € per MWh of trade. TTF fees are €15,156 for an annual subscription and € 0.01475 per MWh of trade for the first 4 TWh traded per year. There are 82 registered shippers on the GRTgaz network and 80 registered shippers on TTF, implying both small and large shippers are registered.

⁴ The three elements of the rights allow the nomination of gas flows at the exit point of one zone and at the entry point of the adjacent zone with, effectively, no congestion charge payable for either flow nomination. This puts the parties in the same (collective) position as they had prior to bundling.

⁵ To what extent this is possible is treated in a separate legal report.

⁶ We refer to the commodity contract as a Gas Supply Agreement or GSA.

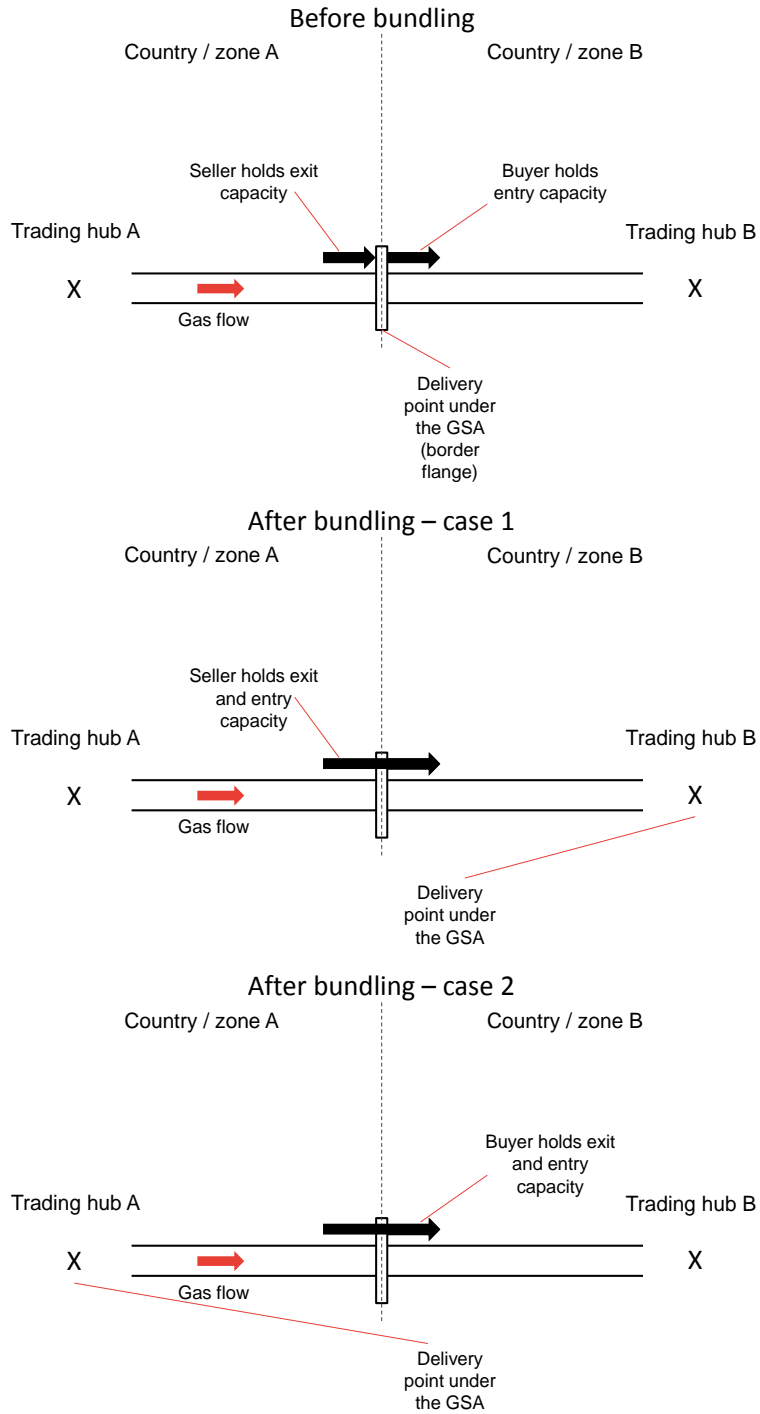
Sunset clause and its effect

downstream from the flange (as shown in **Figure 1**) and this will cause economic effects. However, there are some caveats to this view:

- A different legal possibility can be considered whereby the delivery point of the GSA remains at the border flange and an agent is responsible for nominating cross border flows in accordance with the rights of the parties under the GSA. In effect this outcome could retain the status quo of unbundled transportation rights whereby either party is able to veto flows not allowed for under the GSA.
- A further different legal possibility can be considered where the delivery point only slightly moves to the right or left side of the border flange.
- There may also be matching transport contracts where the buyer and the shipper is the same party on both sides of the border, i.e. the border in question is not a delivery point in the sense of a point at which gas changes title.

The important effect comes from the effective single nomination right. While the first caveat, above, could potentially have the effect of retaining the status quo, the second and third caveats would not. Nevertheless, in the following discussion we will assume that the delivery point moves to a within zone hub further upstream or further downstream from the border flange. We think that this is a valid assumption, as long as, the whole Framework Guidelines sees hub-to-hub competition as the important step to a more competitive European gas market.

Figure 1. Delivery arrangements before and after bundling



Source: Frontier

Sunset clause and its effect

3.2 Scope for effect of sunset clause

Some changes in market presence and market power may be expected to emanate from the policy of bundled services as applied to new, or newly available, capacity. The rules will not discriminate between 3rd country and EU natural gas undertakings in the way that new capacity is offered to shippers.

However, the issue for this study is the incremental change that the sunset clause might bring about through its effect on *existing* capacity contracts and consequent effects that those changes may have on market competition.

As a precursor to discussing what changes the sunset clause may effect, it is useful to note certain features of cross border transportation that it will not affect. In particular, the sunset clause will not affect:

- the physical capacity of the system;
- the use of transportation capacity contracts where the same party holds the capacity on either side of the border; or
- the ability of the TSOs to offer/use the capacity after the later of the two (i.e. exit and entry) nomination deadlines.

The sunset clause will also make no difference in respect of any volumes that would flow both with and without a sunset clause. With regard to the last point, it is important to note that the mere transfer of delivery point will not directly change competitive conditions.

Assume for the moment that the sunset clause causes the relevant parties to agree that title to the gas will now transfer at the downstream hub rather than at the border flange. While the movement of the delivery point from the border flange to an actual or virtual within zone hub may appear to change the structure of the market operating at that hub, this change will have no direct competitive effect. The gas will still belong to the same party. Even if notionally the upstream supplier is now regarded as a seller at that hub, it will not seek alternative buyers for the quantities delivered under the contract and will have no influence on what is done with the gas. In respect of contracted gas, the upstream supplier would only be present in the market in name and not as a competitive force.

To affect competition, the sunset clause would need to result in a change in the behaviour of one or more market participants. Thus, the sunset clause will make a difference in cases where the party holding the bundled transport right chooses to flow a different quantity of gas than would currently be chosen by the buyer under its gas supply agreement (GSA) or by buyer and seller together under a separate agreement.

In Section 4 we analyse systematically the circumstances in which a different use would be made of the cross border capacity.

4 Possible competitive effects of the sunset clause

In this section we consider the possible competitive effects of the sunset clause.

To set the context for the discussion, we first consider whether there are, in any given area, two wholesale markets (often referred to as upstream and downstream wholesale markets) or just one wholesale market. We then consider the operation of a GSA, the behaviour of buyers and sellers under the GSA and finally who is likely to acquire the bundled rights.

4.1 One wholesale market or two

Views differ within Europe as to whether there are, in any given area, upstream and downstream wholesale markets or just one wholesale market. There is no imperative that there should be a geographically uniform answer to this question, but it is useful to understand why different regulatory authorities reach different conclusions.

In the UK, for example, no one would refer to an upstream wholesale market or a downstream wholesale market. The only subdivision would be by product (e.g. peak versus annual commodity) rather than by position in a vertical value chain.

In contrast, in Germany, for example, it would be quite normal to think of an upstream wholesale market in which producers participate as sellers and importers participate as buyers. In the so called downstream wholesale market, the importers are now the sellers and retailers, power companies, etc, are the buyers.

As a simple generalisation, sellers in the upstream market have not had a material role as sellers in the downstream market. The difference in the make-up of market participants suggests that there have been, and for the time being continue to be, two separate markets.

We now consider why there have been two separate markets. The UK experience suggests that it is easy for producers or indeed any party with access to bulk gas to participate in the wholesale market, selling to the type of buyers that in countries such as Germany would be categorised as buyers in the downstream wholesale market. This suggests quite strongly that there is nothing in the nature of the downstream wholesale market which fundamentally distinguishes sale of bulk gas in the downstream market as a different type of economic activity to the sale of gas in the upstream wholesale market.

To the extent that the separation of the two markets continues, the reason for this separation must be either:

- an inability to access transportation capacity; or
- a continuance of behavioural patterns, originally induced by contracts with restrictive destination clauses and some promise of exclusivity, but which continue after the illegality of such contract terms has been well established.

In many cases there appears to be physical transportation capacity available, but there is contractual congestion in the sense that all available capacity has been booked.

The extent of any problems based on the continuation of past behaviour patterns cannot be tested while access to transportation capacity provides a binding constraint.

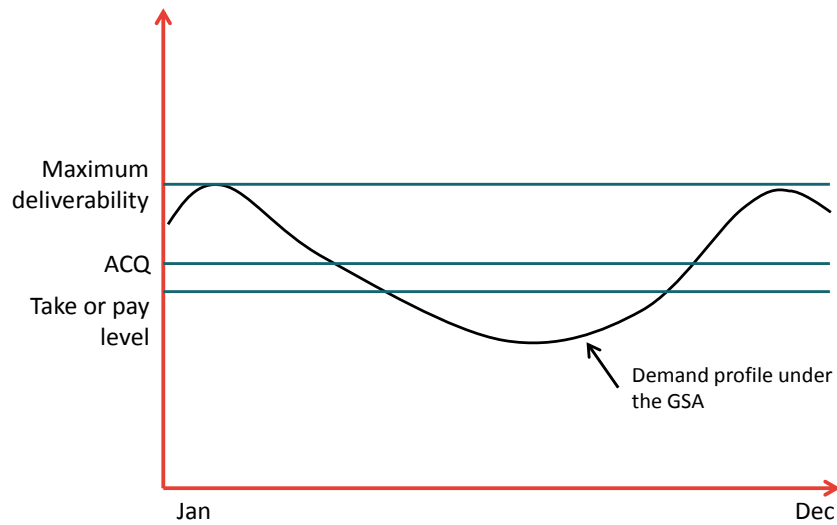
The application of the sunset clause may make an appreciable contribution to the early relief of the access to transportation constraint. But, other factors such as the expiry of existing capacity contracts and new investment will also make a contribution.

However, for those countries in relation to which two wholesale markets presently operate, we cannot say with any certainty how long the structure will prevail before the markets coalesce. It is therefore helpful to consider the effect of the sunset clause in relation to both a 'two wholesale market model' and a 'one wholesale market model'.

4.2 Operation of a GSA

We describe the key relevant components of a GSA and then consider the implications for the buyer's opportunity cost of nominating to take delivery of a gas quantity under the GSA.

The key relevant elements of a typical GSA are illustrated by **Figure 2**.

Figure 2. Elements of a typical GSA

Source: Frontier

A GSA would normally specify an annual contract quantity (ACQ) which is the maximum quantity of gas that the buyer has the right to nominate under the GSA over the contract year. **Figure 2** shows the ACQ expressed as an average daily quantity throughout the contract year. The ACQ would apply to the year as a whole and not to each individual day.

The GSA would also specify a maximum quantity of gas that the buyer has the right to nominate in any hour or day within the contract year. In **Figure 2**, we have labelled this 'maximum deliverability'. This limit applies to each hour or day within the contract year. A GSA may also specify a minimum hourly or daily nomination quantity, which is not relevant to this analysis.

The third relevant component of a GSA is the take or pay (ToP) quantity of gas. Under a GSA the buyer commits to pay for this quantity of gas irrespective of whether the buyer nominates a higher or lower quantity of gas over the contract year. In the case of some GSAs, it may be possible for the buyer to take in a future contract year any gas paid for but not taken as a result of the ToP quantity. In other GSAs, the buyer has no right to take the gas in future. **Figure 2** shows the take or pay quantity as an average daily level throughout the contract year although we note that the ToP level applies to the year as a whole and not to each individual day.

Figure 2 shows the gas nominated by the buyer under the hypothetical GSA as varying from day to day within the contract year, with the highest flows occurring in winter and the lowest flows occurring in summer.

Possible competitive effects of the sunset clause

The opportunity cost of the buyer nominating an incremental delivery of gas under the GSA will be determined by:

- the likelihood of being under the ToP quantity for the year;
- the likelihood of coming up against the maximum annual volume constraint (i.e. the ACQ); and
- the incremental price for gas as determined by the contract.

The opportunity cost of taking delivery of incremental gas under the GSA may vary from very low if there is a high probability of falling under the ToP volume, to the discounted future market price of gas at the same delivery point if the annual contract quantity is expected to bind. The contract price of gas may be between, but could in principle fall outside, these measures.

4.3 Behaviour of buyer and seller under the GSA

Market participants' behaviour will respond to the price signals and opportunity set that they face. A seller will respond to market prices and to the demands (nominated flows) of the buyer under the GSA. The buyer will respond to its perception of market prices and the opportunity cost of the gas available to it under the GSA.

We now turn to the decisions that the buyer and seller would make under different circumstances, looking in turn at:

- behaviour with no sunset clause;
- behaviour with mandatory bundling and the bundled rights being exercised by the buyer; and
- behaviour with mandatory bundling and the bundled rights being exercised by the seller.

We consider these decisions under both the two wholesale market model and the one wholesale market model.

4.3.1 Without the sunset clause (counterfactual)

Where two separate parties have transportation contracts, one to and one from a border with delivery at the flange, the cross border gas flow will be determined by (i.e. the 'before bundling' case shown in **Figure 1**):

- the nomination by the buyer under the GSA; and
- any extra gas that the two parties agree to flow up to the transportation capacity held by the parties.

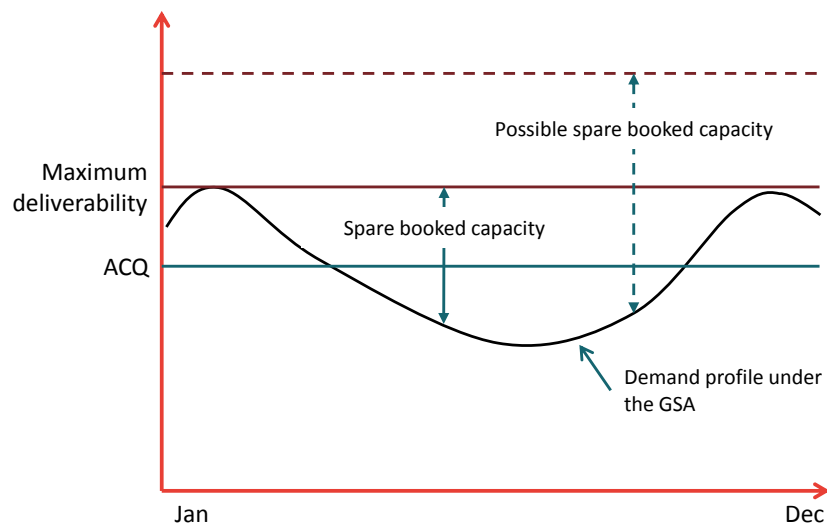
We consider each in turn.

Possible competitive effects of the sunset clause

The buyer will nominate a gas volume under the GSA up to the point at which buyer's contract opportunity cost is equal to the value of gas to the buyer at the downstream hub.

The buyer and seller may make an agreement to flow gas that is unrelated to the GSA up to the level allowed by the transportation capacity held by the parties. To operate the GSA, the parties would each need to have booked transportation capacity up to the level of the maximum deliverability under the GSA. The buyer and seller could agree to flow gas outside the GSA up to this level, depicted as "spare booked capacity" in **Figure 3**. Over the year, the aggregate spare booked capacity would be equal to the difference between the maximum deliverability (expressed on an annual basis) and the ACQ over the year.

Figure 3. Spare booked transportation capacity



Source: Frontier

To the extent the buyer and seller held capacity over and above that required to operate the GSA, they could agree to flow gas up to the higher level of transportation capacity booked, depicted 'possible spare booked capacity' in **Figure 3**.

An agreement to flow additional gas might happen if the upstream hub price is lower than the price at the downstream hub, but this will be a bilateral negotiation which may be difficult to organise in time to exploit. Reasons why apparently attractive trades might not materialise are:

- the buyer has market power on the downstream hub such that the buyer's marginal revenue from incremental sales on the downstream hub does not exceed the upstream hub price even when the apparent price on the downstream hub exceeds that on the upstream hub; and

Possible competitive effects of the sunset clause

- the seller thinks that by refusing to agree to use cross border capacity for a trade outside the GSA, the buyer will need to buy incremental volume under the GSA at a contract price providing the seller with a greater profit (for example, if the price under the GSA were higher than the price at the upstream hub).

In the less likely event that the price at the upstream hub is higher than the price at the downstream, the buyer may be able with the cooperation of the seller to take delivery of gas under the GSA at the upstream hub and replace his own need with purchases at the downstream hub.

An alternative that would not require the agreement of both parties to flow additional gas might in theory be possible if one or other party obtained interruptible rights for capacity on the side of the border to which they did not otherwise hold firm rights. In this case if the buyer did not call for gas under the GSA, the buyer or seller could utilise their interruptible rights to flow gas outside the GSA. However, we note that the availability of capacity under the interruptible rights would be at the discretion of the buyer (through its flow decisions under the GSA) and therefore the network operator would not be able to pre-specify the proportion of time for which capacity would be available. In addition, payment would be required for the interruptible rights and therefore the rights would not be available at zero marginal cost, as would be the case with the sunset clause.

4.3.2 Sunset clause operates – seller nominates bundled rights

We now consider the case where the sunset clause operates and the seller acquires the bundled transportation rights (i.e. the ‘after bundling – case 1’ shown in **Figure 1**).

In this case, we assume that the effective delivery point moves to the downstream hub. The buyer will still choose the quantity that it wishes to buy under the GSA. However, the seller will now have more freedom in deciding how to meet his contractual obligations. The seller can:

- nominate a cross border flow that is commensurate with the buyer’s nomination under the GSA; or
- provide the quantity required by the buyer under the GSA by buying gas at the downstream hub, thus releasing gas that would otherwise be committed to the GSA to sell at the upstream hub or further upstream.

In addition to meeting GSA contractual obligations, the seller will also have the option to ship additional gas to the downstream hub in line with the ‘spare booked capacity’ or ‘possible spare booked capacity’ depicted in **Figure 3**.

This would be worthwhile providing that the value of gas at the downstream hub exceeds the value at the upstream hub.

Possible competitive effects of the sunset clause

Markets may be insufficiently liquid to allow large flow changes to and from the hubs without moving the price so as to make such flows unattractive. However, even if the whole spare capacity were not used for this reason, the full competitive effect would have been realised by the point at which prices at the two hubs were equated..

With the sunset clause, unless the seller's decisions were distorted by the seller's market power on one or both hubs, gas should now flow to the downstream hub whenever gas is more valuable at that hub than at the upstream hub. The seller will have the incentive to make full use of the transportation capacity, not just the part of the contracted capacity that would match the buyer's GSA nomination.

Conversely, when the value of gas is higher at the upstream hub the seller should choose not to flow gas, unless the seller has market power at the upstream hub and his marginal revenue from incremental sales at the upstream hub is lower than the price at the downstream hub.⁷

The sunset clause therefore gives the seller the ability to sell gas on the downstream hub that it would not otherwise have been able to. However, the profile of the available extra capacity over the year may be dictated by the manner in which the buyer calls for delivery under the GSA and the available capacity will only be known with the notice period defined by the nomination arrangements under the GSA. The seller can therefore either make spot sales or access storage within country in order to shape the incremental gas deliveries into a more high value product.

To the extent that there was no contractual congestion on the border, the effect of the sunset clause would be less. However, the finding of the EC's sector inquiry that "*although contractual congestion is common, most pipelines are not, in general, experiencing high levels of utilisation*"⁸ suggests contractual congestion and the extent of the 'spare booked capacity' and 'possible spare booked capacity' has in the past been significant. While we have not verified whether this situation continues today, it would not be unreasonable to assume that it does continue on at least some borders.

Up to this point we have not explicitly considered whether there is a single wholesale market or two (upstream and downstream) wholesale markets.

In the case of the two wholesale market model, in respect of the incremental gas, the seller now has the choice of selling to a downstream wholesale market buyer or to a party who is an upstream market buyer, i.e. who would presently be called an importer. Hence, the incremental gas may be offered in one of two wholesale

⁷ More complex situations arise if the seller has market power on both the upstream and downstream hubs.

⁸ Para 223, *DG Competition Report on Energy Sector Inquiry*, 10 January 2007.

Possible competitive effects of the sunset clause

markets. On the assumption that the seller actually wants to sell the incremental gas, he will make his choice depending on the prices (or strictly net proceeds) available from each market. In principle, the analysis of competitive effects (i.e. our quantitative assessment in Section 5) needs to consider both possibilities.

In summary, competitive conditions are likely to improve as a result of the sunset clause if the seller does not have market power. This is because the sunset clause gives the seller the ability to sell gas to a downstream wholesale market buyer or to an importer who is an upstream market buyer that it would not otherwise have been able to. The biggest improvement is to be expected if the buyer had market power which would be eroded by the sunset clause with the seller holding the bundled rights. However, some benefits could be expected even if the buyer does not have market power.

An additional improvement in competitive conditions may also occur due to increased transparency as a result of the sunset clause. Without the sunset clause, if the upstream seller chose not to allow additional gas to flow across the border in relation to the 'spare booked capacity' or 'possible spare booked capacity', it would be unclear whether the lack of flow were due to the seller or the buyer choosing not to utilise his transportation right. However, if the seller were to acquire the bundled cross border capacity, it would be more transparent that seller was choosing not to flow gas than it would be without the sunset clause.

4.3.3 Sunset clause operates – buyer nominates bundled rights

We now consider the case where the sunset clause operates and the buyer acquires the bundled transportation rights (i.e. the 'after bundling – case 2' shown in **Figure 1**). In this case, we assume that the delivery point of a GSA presently delivering at the border moves to the upstream hub.

The buyer will still nominate the quantity it chooses under the GSA but will receive this at the upstream hub. It will choose the quantity based on its perception of its opportunity cost of buying under the contract and the value (or marginal revenue that the gas would be worth at the upstream hub.

The buyer will then have a free choice as to whether to sell that gas at the upstream hub or to ship it to the downstream hub, exercising its bundled capacity rights. The buyer will choose whether or not to ship based on a comparison of the marginal revenue that it will receive at the two hubs. If the buyer has market power at one or both of the hubs, the economics indicated by its marginal revenue calculations will not necessarily align with the perceived prices on the two hubs.

The differences from the without sunset clause case are broadly symmetric with those that arise when the seller has control. If neither party has market power, trades are facilitated owing primarily to a reduction in the transaction costs of arranging trades that arbitrage price differences between the two hubs.

Possible competitive effects of the sunset clause

If the seller has market power at the upstream hub, this may be mitigated to some extent by the fact that it will now be easier for the buyer to resell the GSA gas at that hub.

Again, up to this point we have not explicitly considered whether there is a single wholesale market or two (upstream and downstream) wholesale markets.

If the buyer under the GSA acquires the bundled rights and bought extra gas, in the case of the two wholesale market model, it too would have a choice of selling the incremental gas on the downstream wholesale market or to another buyer on the upstream wholesale market. However, it is perhaps more likely that the buyer under the GSA would choose to sell the gas in the downstream wholesale market rather than reselling it into the upstream wholesale market.

As was the case with the seller acquiring the bundled rights, the additional transparency regarding responsibility for flow nominations due to the sunset clause would bring additional competitive benefits.

4.4 Who would acquire the bundled rights

So far we have discussed two possible outcomes of the sunset clause. In one case the seller would hold the bundled rights. In the other, the buyer would.

The Framework Guidelines envisage that current capacity holders would have the opportunity to agree between themselves which of them would hold the bundled rights. It is also the intention that a default clause split of the rights would operate if the parties failed to agree.

In analysing the potential competitive effects of the sunset clause, it is therefore important to consider who would be most likely to acquire the bundled rights. Without exploring the ways in which the parties might approach negotiations, it is reasonable to assume that the rights are likely to be acquired by the party that attaches the greater value to them.

If neither party has any market power, the rights would be derived from the option to use the cross border capacity in a way that is not pre-empted by flows under the GSA. The value would arise through the price differences between the two hubs and both parties should place a similar valuation on the rights.

However, if one party has market power such that it would choose deliberately not to exercise the option to flow gas in accordance with the prevailing price difference, it must be because it is more valuable to them to make that choice than to simply exploit the price differential. This means that the party with market power is likely to value the bundled rights more highly than the party that only sees value in the price differentials.

Possible competitive effects of the sunset clause

In short, in a free negotiation between the two parties, the one that has the most to gain from the exercise of market power is the more likely to end up acquiring the bundled rights.

Inevitably this must diminish the competitive gains that can be expected to flow from imposition of a sunset clause.

Setting aside market power, relative to the seller, the buyer would have the additional advantage of being able to coordinate its GSA purchases with the use of spare transportation capacity. It could therefore determine rather than predict when spare transportation capacity would be available and know this with a much longer lead time than would be available to the seller. Depending on the value of flexibility, the buyer could also choose to improve the profile of spare capacity at the cost of foregoing some of the flexibility available to it under the GSA. This may mean that the buyer, all things being equal, would place a higher value on the bundled capacity than the seller.

4.5 Other impacts

In addition to competitive effects it is worth considering how the sunset clause might impact:

- existing GSAs; and
- security of supply.

4.5.1 Impact on the GSA

Viewed from an economic perspective, the imposition of the sunset clause seems unlikely to frustrate the operation of existing GSAs since minor adaptations can leave them essentially intact with the same economic effect..

There would be various ways in which it would be possible to comply with the requirement of a sunset clause. Some might involve a minor change to value under the GSA. This can be dealt with through a minor adjustment to price. However, it is not necessary to have any change in the GSA price. Suppose the cross border transportation rights are assigned from one party to the GSA (Party B) to the other party to the GSA (Party A) and delivery under the GSA shifts to trading hub B, as in **Figure 1**. Party B retains the obligation to make payments due under its existing transportation contract which procured the entry rights into the country B network (rights now assigned to Party A). Therefore, in this case no adjustment is required to the price terms in the GSA, or price review terms, to take account of the change to the delivery location.

Only if the cross border transportation rights *and* obligations were assigned from Party B to Party A would the price under the GSA need adjusting to take account of the extra costs that Party A would now incur for transportation into the country B network.

Possible competitive effects of the sunset clause

4.5.2 Impact on security of supply

From an economic perspective, we consider that the imposition of the sunset clause would not frustrate the operation of existing GSAs and that only minor adaptations would be required. However, even if the sunset clause did cause existing GSAs to terminate, this would not change the physical capacity to deliver gas to a country and that capacity would be used to flow gas at the right price. Consequently, we do not believe that the sunset clause would jeopardise security of supply in any way.

5 Quantitative assessment of the sunset clause

We have been asked to try to quantify the extent of the change in competition that might arise from the imposition of the sunset clause. The forgoing discussion will have made clear that tracing all of the competitive effects is potentially extremely complex and well beyond what is feasible within the timescales and resources that are available for this study. Therefore, to help understand the effect of the sunset clause on competition, we carry out a limited analysis of the wholesale gas market (i) without the sunset clause (i.e. the counterfactual); and (ii) with the sunset clause in place. This section describes this analysis and notes its major limitations.

5.1 Measuring the competitive effect of the sunset clause

In analysing the effect of the sunset clause on competition conditions, it is important to understand the nature of the change induced by the sunset clause because this is relevant to the metric which should be used to describe the competitive effect.

In essence, the mandatory bundling will give one (or both) of two parties direct access to transportation capacity not required by a GSA. Without the bundling, use of that transportation capacity is subject to the veto of either party and, even if not vetoed, it would still require commercial negotiation and coordination to make use of it. Hence, although forced bundling is not creating new physical capacity, it does have the effect of creating additional accessible transportation capacity.

Additions to capacity need to be analysed differently from changes in market share arising from, say, a merger. HHIs are best suited to describing changes in the structure of a market when the capacity supplying that market remains unchanged. In this case one party's increase in market share is automatically accompanied by a real diminution in the ability of at least one other party to compete with that party.

In contrast, an addition to accessible transportation capacity, e.g. through application of the sunset clause, will not have the immediate effect of reducing the ability of any party to compete in any of the upstream, downstream or unified wholesale markets. We regard it as inconceivable that a pipeline or other import facility would now be closed because access to another had improved. Therefore, a static analysis makes it clear that the effect of the sunset clause would be unambiguously pro-competitive. This conclusion is reinforced by the fact that even if the party acquiring the bundled rights were to make no use of

them other than for the GSA, the behaviour of that party would become more transparent and easier for regulatory authorities to monitor.

The residual question that remains is whether the change induced by the sunset clause will have a dynamic effect, foreclosing other investment. It seems unlikely that this would be a major factor, but we cannot rule out that it may delay incremental transportation investment that would have been subject to open access and therefore would have been more pro-competitive.

5.1.1 Implications for competition metrics

No foreclosure

If the view is taken that the sunset clause creates an increase in accessible capacity that will neither cause the closure of existing capacity nor foreclose new investment within a relevant timeframe, then the Herfindahl-Hirschman Index (HHI) is not a useful metric. A better metric would be the residual demand faced by the largest player, i.e. the demand faced by the largest player if all other players were supplying the market. This is a pivot analysis.

In many jurisdictions, gas demand is experiencing low growth or is even declining due to energy efficiency measures and the commissioning of large quantities of renewable electricity generation. In such circumstances, the lack of a need for new capacity investment means that foreclosure, if it happened, might well not happen for many years.

The pivot analysis considers capacity to deliver gas and the demand for gas. However, we can only analyse the annual commodity market because that is the only timeframe in relation to which we can, based on the available data, measure the extent of the spare capacity that the sunset clause might create.

Hence, the best metric becomes the extent to which the largest player faces a reduction in residual demand due to the sunset clause, measured as an annual quantity.⁹

With foreclosure

If the view were that, within a relevant timeframe, the additional capacity provided by mandatory bundling would indeed foreclose capacity that would otherwise be added, then we would still be in the position that the immediate effect could only be pro-competitive and the residual demand metric discussed above will give a measure of this. However, in the longer term – post the point at which investment that would otherwise have happened has been foreclosed –

⁹ This is not a precise analogue of pivot analysis in the power generation market where the emphasis is on the capacity available to generate power at peak, not the amount of energy that can be produced over the course of a year.

Quantitative assessment of the sunset clause

the HHI would in principal become a more useful metric with which to judge the competitive effect of the change.

In calculating HHIs, traditionally, competition analysis has focussed on actual shares that individual firms supply to a market (whether measured by volume or revenue). The benefit of this measure is that it reflects capacity that is economic and will avoid inclusion of capacity that cannot realistically compete. However, market share data would not give the best indication of competitive conditions if unused capacity does provide a competitive constraint.

In the analysis of wholesale energy markets, it is common practice to assume that capacity shares may in fact be a better indication of competitive conditions. The key justification for this is that energy infrastructure tends to be very capital intensive and operate with a relatively low marginal cost. So long as price remains higher than the low marginal cost all capacity is capable of providing a competitive constraint.

In addition, since the sunset clause potentially alters the way in which the spare capacity to deliver gas is used, we need to consider capacity shares rather than market shares. Therefore, in calculating HHIs, we consider capacity shares for the delivery of gas over a year.

A further complication in the use of HHIs in the two wholesale market model needs to be recognised. The HHI of a market is a simple measure that analyses a market in isolation of connected markets. However, even if the upstream and downstream markets are considered to be separate, there is an important linkage between them. GSAs in the upstream market will typically have price review clauses. Furthermore, those clauses will be designed to make the price of gas reflect a net back of the value achieved in the downstream wholesale and retail markets. Therefore, the extent of competition depends on effects that competition in one market may induce in the price on the other.

To illustrate this, suppose hypothetically that the upstream seller acquires the bundled rights, has no prior presence in the downstream wholesale market and now chooses to sell on that market. Viewed in isolation, it may appear that it would be profitable for the seller to sell gas in the downstream market, even though the incremental supply lowers the clearing price in that market. However, a lower price in downstream wholesale market would in time, through the price review clause, lead to a lower price in the upstream wholesale market where the seller may have a much larger market share. This means that the seller cannot necessarily be expected to behave in the way that HHI analysis assumes a player with a small market share would do.

The implication of this linkage and its potential influence on the behaviours of buyers and sellers is that an analysis of a notionally combined market may be helpful even in places where a separation of the two is accepted.

Conclusions regarding choice of metrics

We propose to analyse residual demand reflecting the fact that the sunset clause will increase accessible transport capacity.

In, addition, to address the concerns of those that believe this additional capacity might in due course foreclose other new investment, we will analyse the impact of the sunset clause on:

- HHIs for an upstream wholesale market;
- HHIs for a downstream wholesale market; and
- HHIs for a coalesced wholesale market, having regard to contracts.

By comparing the HHI and the pivot analysis for the counterfactual and the with sunset clause cases, we make inferences about the effect of the sunset clause on competition.

5.1.2 Other issues with the quantitative analysis

Market definition

In order to estimate the competition indicators of market structure, we need to define the relevant market in the product dimension and in the geographic dimension.¹⁰ In previous sections, we have already discussed the one wholesale market model and the two wholesale markets model in the context of understanding the competitive effects of the sunset clause.

The relevant market covers all of the products and geographic regions that provide a competitive constraint for the product in the region in question. The theoretical approach to defining the relevant market is to start with the narrowest possible relevant market in both the geographic and product dimensions. If a hypothetical monopolist could not raise price profitably, due to supply or demand side substitution, the market would be widened to encompass some of the constraining products and geographies. The test for profitability of a hypothetical monopolist would then be repeated for the broader market. The process ceases once the market has been widened to the point where the hypothetical monopolist could raise price profitably, i.e. it did not face a competitive constraint from outside the market. This process is known as the SSNIP test, i.e. the small but significant and non-transitory increase in price test.

We do not assess formally the extent of the market in geographic and product dimensions. Rather, we assume that markets are no broader than national in

¹⁰ It may be possible to assess directly the extent of competition, without first defining the relevant market. This would be done by considering the strength of all supply and demand side substitutes and how this would change as a result of the sunset clause.

Quantitative assessment of the sunset clause

scope¹¹. In effect, this means that the gas transportation network is sufficiently strong for there to be effective supply and demand side substitution within a country but there is more limited supply and demand side substitution operating between countries (i.e. transportation or other barriers create competitive constraints between countries).

We note that it is possible that an upstream wholesale market has a different geographic extent (e.g. broader) to the downstream wholesale market. However, for the purposes of this analysis we treat the upstream, downstream and coalesced wholesale markets as having the same geographic definition.

In product terms, we focus on the annual commodity market and not on shorter term seasonal or peak period delivery markets. This is not to imply that competitive effects will only occur in this market, but as described previously limited data availability make this the market that is easiest to analyse.

To make the analysis of this market tractable in the time available, we also assume in effect that there is sufficient gas storage within the country to meet within year flexibility requirements.

In practice, the extent of the excess cross border capacity beyond that required to operate a GSA varies within the year. During summer when gas demand is low, there is likely to be excess cross border capacity. However, during winter when gas demand is high, there is may not be excess capacity.

If competitive pressures vary inversely with the level of demand, this would mean that by focussing only on annual measures of market structure, our quantitative analysis may overstate the effect of the sunset clause on competition. Conversely, to the extent that booked capacity exceeds that required to meet the maximum deliverability requirements under the GSAs, our quantitative analysis would tend to understate the effect of the sunset clause.

Treatment of long term contracts in the notionally combined market

When considering the notionally combined wholesale market, the characteristics of the gas sector make it difficult to identify who might benefit from the exercise of market power and who has the control to exercise it. This is because the supply at the wholesale level in Europe comprises a variety of contracts.

If all contracts with upstream suppliers were of very short duration, one would conclude that upstream suppliers controlled the volume supplied to the market in all but the very short term and would be the ones to benefit from any rise in price due to a restriction of supply. Conversely, if all gas were sold on very long term contracts with the price set independently of observed gas prices and the

¹¹ The geographic scope in France and Germany may be considered sub-national in line with the gas balancing zones.

volume of supply controlled by the buyers, one would conclude that the buyers in such long term contracts would both control the volume of gas released to the market and be the beneficiaries of any price rise due to a restriction of supply.

The reality does not match either extreme. Contracts are typically not very short in duration, nor infinitely long. Contracts typically have prices linked to a basket of indicators and a periodic price review. It is likely that prevailing gas prices in a country might be at least a partial influence on the periodic price review. In reality, therefore, it is likely that upstream and downstream parties would share the benefit of any price rise through a supply restriction.

The incidence of any ability to restrict supply to the market is also uncertain. With the existing set of contracts, it is typically the buyer who can exercise the right to vary the volume delivered within defined parameters. However, in the market for contract renewal, it is the upstream suppliers that would have the ability to restrict supply if competition from other upstream suppliers were inadequate.

In short, to the extent that the ability to restrict supply exists, it is likely that in the notionally combined wholesale market, both the ability and benefit will be spread over both the suppliers and buyers with long term contracts. It is impossible to be precise about the distribution but we propose to analyse wholesale markets, attributing long term contract volumes 50% to suppliers and 50% to buyers.

Timeframe for the analysis

In theory it might be thought appropriate to consider competitive conditions, with and without the sunset clause, over some long period into the future from when the sunset clause applies. However, the reality is that such an assessment is not practicable.

Conditions a long way into the future are inevitably unpredictable and it would be wrong to assess the impact of a regulatory change on the basis of conjecture about how the gas sector may or may not evolve. Even assessing competitive conditions in the first year for which the sunset applies (e.g. 2017) would be difficult.

To assume some GSAs expire in line with their terms and no new long term GSAs are put in place by 2017 would tend to understate the market position of the downstream importers. However, it would be wrong to speculate about which new GSAs will be signed between now and 2017.

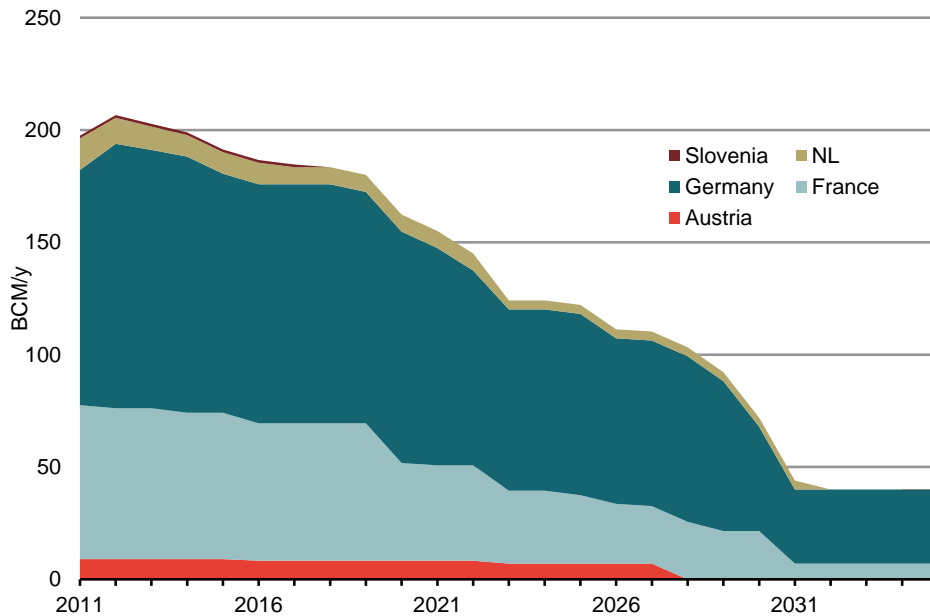
Therefore, we apply the competitive assessment to 2011 and implicitly assume that this is representative of competitive conditions in 2017 and beyond.

It is worth noting, however, that the effect of the sunset clause will diminish over time as the long term contracts that existed prior to mandatory bundling terminate. **Figure 4** shows import contracts over time for the five countries on

Quantitative assessment of the sunset clause

which we focus. About 10 years after bundling becomes mandatory about half of today's level of contracted capacity would remain (a little over 100 bcm per year in 2027).

Figure 4. Contract capacity over time



Source: Frontier

5.2 Approach

By comparing the HHI and the pivot analysis for the counterfactual and the with sunset clause cases, we make inferences about the effect of the sunset clause on competition.

5.2.1 Counterfactual – without the sunset clause

In the counterfactual, we assess the structure of the markets for the annual delivery of wholesale gas at the country level, without the sunset clause.

Where not otherwise known, we assume that the upstream supplier holds exit transportation capacity rights from the upstream system at the flange where the GSA is delivered up to the extent of the maximum daily (or hourly) deliverability under the GSA, expressed on an annual basis. We also assume that the downstream importer holds entry transportation capacity rights from the flange to the downstream hub up to the extent of the maximum daily (or hourly) deliverability under the GSA, expressed on an annual basis.

As discussed previously, the difference between the maximum deliverability and the annual contract quantity (ACQ) represents the contracted but unused capacity whose use is potentially affected by the sunset clause, and which is therefore the focus of this analysis (i.e. the ‘spare booked capacity’ in **Figure 3**). To the extent that the parties hold additional transportation capacity (i.e. the ‘possible spare booked capacity’ in **Figure 3**), this would mean that the sunset clause could have an even greater effect than that considered in our quantitative analysis.

The cross border capacity related to the difference between the ACQ and the take or pay quantity is in effect bundled and held by the downstream importer. When the importer nominates to take a quantity of gas that falls between the take or pay quantity and the ACQ, a flow nomination is made by the upstream supplier and downstream importer on the cross-border exit and entry capacity.

In the counterfactual, we would assume that cross-border capacity related to the ‘spare’ capacity under the GSA is not able to be used. Within a year this capacity could be used by the contracting parties. However, over a year the importing party can nominate under the GSA only up to the ACQ. To the extent that the parties would have used their transportation rights for gas that was not supplied under the GSA, this assumption will overestimate the benefit derived from instituting a sunset clause.

5.2.2 With the sunset clause

In the case with the sunset clause, the rights to the capacity on either side of the border will be bundled. Broadly, there are three possible outcomes:¹²

- the upstream supplier acquires the bundled capacity rights and the delivery point moves to the downstream hub;
- the downstream buyer acquires the bundled capacity rights and the delivery point moves to the upstream hub; and
- the upstream supplier and the downstream buyer each acquire some combination of the bundled capacity rights.

All of the three outcomes are possible at any border. To assess the impact on market outcomes of all possible combinations of cases at all borders would be impractical. Therefore, we propose to focus the analysis on each of the three outcomes occurring on all borders simultaneously (i.e. we would undertake the analysis with the sunset clause for three cases). In the case where the upstream supplier and the downstream buyer each acquired some combination of the bundled capacity rights, we would ascribe the bundled rights 50:50.

¹² We note that if the delivery point of the GSA was originally at a hub, the sunset clause would not imply a change.

Quantitative assessment of the sunset clause

With the sunset clause, the holder can now utilise the “spare” capacity (as well as enjoy the option of meeting GSA obligations without exercising transportation rights across the relevant border). The holder of the ‘spare’ capacity to deliver gas to the downstream market will vary according to each of the three cases above. This change from the counterfactual would be reflected in the HHI and the pivot analysis.

5.3 Data

To quantitatively assess the effect of the sunset clause, we use data on the demand and supply of gas to each market.

The supply of gas to each market over a year comprises:¹³

- piped imports;
- LNG imports; and
- domestic production.

Information about which firm has booked what import capacity is not publically available. Therefore, in ascribing capacity to supply to individual firms, we use information about long term contracts and information about domestic production. Long term gas supply agreements are confidential although some information about contracts can be drawn from public sources, for example:

- press releases by the importing or upstream supply companies;
- sector specific publications (e.g. GasMatters, Heren Report, Argus Gas, Oil & Gas Journal, Platts);
- reports published by regulators or competition authorities (e.g. the sector enquiry); and
- reports from consultancies or academics.

Frontier has a GSA database sourced from publicly available data and industry intelligence. Given the confidential nature of much of the contract information, these data are incomplete, indicative and subject to some uncertainty. In addition, based on industry experience we have made assumptions about the typical ratio of maximum deliverability (expressed as an annualised quantity) to ACQ under GSAs. Given the incomplete nature of the data available on GSAs, we have allowed E-Control and the other regulators the opportunity to review our GSA data assumptions.

¹³ We ignore changes to the level of gas in storage.

Annexe 1 summarises the GSA information we have used for the analysis. **Table 1** presents the relevant assumptions on GSA flexibility.

Table 1. Assumptions on GSA maximum deliverability in relation to ACQ

Algeria	105%
Denmark	105%
Netherlands (L-gas)	130%
Netherlands (H-gas)	120%
Norway	110%
Russia	105%
United Kingdom	105%
Others	105%

Source: Frontier

In undertaking the HHI analysis, the focus is on the change of HHI as a result of the sunset clause. Therefore, we consider capacity to supply based on domestic production and GSAs. We do not include within the HHI analysis pipeline and LNG import capacity over and above that required by the GSAs for delivery in the country of focus or required for export and transit contracts.

In considering the pivot analysis, we consider the capacity to supply the market based on domestic production and imports, less capacity required for transit contracts and exports. The import capacity over and above that required by the GSAs for delivery in the country of focus or required for export and transit contracts is ascribed to the competitive fringe.

In the case of the pivot analysis, we use the annual demand for gas as published by the BP Statistical Review, 2010.

Table 2 summarises the information about demand, import capacity, and capacity required for transit flows and exports for each country.

Table 2. Supply and demand assumptions

Import country	Demand	Production	Transits/ Exports	Import capacity (pipelines)	Import capacity (LNG)
Austria	10.1	1.7	42.4	56.0	0.0
France	46.9	1.0	5.8	67.0	24.5
Germany	91.3	12.7	39.7	190.1	0.0
Netherlands	48.9	75.8	49.4	29.1	0.0
Slovenia	0.88	0.0	1.2	3.4	0.0

Source: Various

5.4 Results

In this section we present the results of the quantitative analysis for each country with and without the assumption of foreclosure. As described, we do this for the upstream wholesale market, the downstream wholesale market and a coalesced wholesale market. We consider three cases for application of the sunset clause:

- the seller acquires all of the transportation rights corresponding to the spare contract capacity;
- the buyer acquires all of the rights corresponding to the spare contract capacity; and
- the buyer and seller each acquire half of the rights corresponding to the spare contract capacity.

5.4.1 Without foreclosure

In this section, we consider the effect of the sunset clause with the assumption that the additional capacity provided would not foreclose capacity that would otherwise be added. In this case, the addition of capacity would unambiguously improve competition.

To give an idea of the scale of the impact of the sunset clause, in **Table 3** we compare the spare capacity that would be freed up by the sunset clause with the annual demand for gas in each country considered and to several measures of piped import capacity. We note that if the parties held transportation capacity over and above that required to meet the maximum deliverability under the GSA, the effect of the sunset clause could be greater than that shown here.

Table 3. Relative scale of the additional entry capacity

	Ratio to demand ¹⁴	Ratio to pipe entry capacity	Ratio to pipe entry capacity excl. transit flows	Ratio to pipe import contracts
France	9%	7%	7%	11%
Slovenia	7%	2%	3%	5%
Austria	5%	1%	4%	6%
Germany	13%	6%	8%	11%
Netherlands	2%	4%	net-export	7%

Source: Frontier

The effect of the sunset clause would be to allow a significant increase (ranging from 2% to 13% of demand) in the capacity available to deliver gas to the country in question. Even if not all of this capacity were made available, competitive conditions would improve.

We undertook a pivot analysis for deliverability over the year to each market. We calculated the residual supply index (RSI), as shown in **Table 4**, as the percentage of its own capacity to supply that the largest player in the counterfactual would need to withhold from the market to create a supply shortfall. An RSI below 100% means that the player is pivotal and an RSI above 100% means that it is not.

¹⁴ Demand comprises indigenous demand and therefore excludes exports and transit flows.

Table 4. Results of the pivot analysis – residual supply index

Country	Wholesale market	Firm	Counter-factual	Acquirer of spare capacity			50/50
				Producer	Importer		
Austria	Upstream	Gazprom	82%	84%	87%	86%	
	Downstream	OMV	56%	61%	56%	59%	
France	Upstream	Statoil/Troll consortium	134%	140%	143%	141%	
	Downstream	GDF SUEZ	45%	54%	46%	50%	
Germany	Upstream	Statoil/Troll consortium	115%	123%	127%	125%	
	Downstream	E.ON Ruhrgas	95%	107%	100%	104%	
Slovenia	Upstream	Gazprom	169%	172%	176%	174%	
	Downstream	Geoplin	112%	119%	112%	115%	
Netherlands	Upstream	GasTerra	45%	46%	45%	46%	
	Downstream	GasTerra	36%	37%	36%	37%	

Source: Frontier

We undertook the pivot assessment for all players in each market and for each view of the wholesale market (upstream wholesale market, downstream wholesale market and the coalesced wholesale market), for the counterfactual and for the three cases as to who acquired the additional capacity rights. In all cases, as expected, the addition of capacity reduces (or in some cases at worst does not increase) the extent to which any player is pivotal.

We do not present all results in **Table 4**. However, we do show the results for the largest player in the counterfactual for the most critical view of the wholesale market, ie separate upstream and downstream wholesale markets. The increasing RSI between the counterfactual and the three cases for the acquirer of the additional capacity indicates that the extent to which the player is pivotal generally falls and is never made worse. This suggests an improvement in competitive conditions due to a reduction in the ability and / or incentive to raise price by withholding capacity.

Again, to the extent that the parties held transportation capacity over and above that required to meet the maximum deliverability under the GSA, the effect of the sunset clause could be greater than that shown in **Table 4**.

This result illustrates that without foreclosure the sunset clause unambiguously improves competitive outcomes.

5.4.2 With foreclosure

In this section we consider the effect of the sunset clause with the assumption that the additional capacity provided by the sunset clause would foreclose capacity that would otherwise be added.

The results of the quantitative assessment are presented in **Table 5**. Each country has three rows representing the upstream wholesale market, the downstream wholesale market and the combined or coalesced wholesale market where we allocate supply under long term contracts 50:50 to the seller and buyer.

Quantitative assessment of the sunset clause

The four columns of HHI results represent the counterfactual and the three cases for the acquirer of the additional capacity – the upstream seller, the downstream buyer and a 50:50 split between the seller and the buyer. A reduction in HHI is indicated by green shading and an increase in HHI indicated by red shading.

Table 5. Results of HHI analysis

	Wholesale market	HHI Counterfactual	Change in HHI by acquirer of spare capacity		
			Producer	Importer	50/50
Austria	Upstream	4655	15	-297	-149
	Downstream	8200	-726	24	-359
	Coalesced	3785	-118	101	-16
France	Upstream	1633	21	-161	-82
	Downstream	8809	-1049	27	-522
	Coalesced	2614	-200	248	12
Germany	Upstream	2534	2	-378	-204
	Downstream	2791	-435	34	-214
	Coalesced	1482	-12	32	-5
Slovenia	Upstream	4410	0	-387	-202
	Downstream	10000	-920	0	-468
	Coalesced	3602	-125	141	0
Netherlands	Upstream	4645	-26	31	-54
	Downstream	6075	-129	-23	-77
	Coalesced	5334	-93	-5	-65

Source: Frontier

In interpreting the HHI results, the thresholds applied by the EC when considering a merger provide some guidance. The HHI as a result of a merger will be seen as not critical by the EC in an initial appraisal of the merger, i.e. if the post-merger HHI is between 1,000 and 2,000 with a delta below 250 or if the post-merger HHI is above 2,000 with a delta below 150. We reiterate that it is only appropriate to apply HHIs to this case if one assumed the provision of additional capacity due to the sunset clause would in turn foreclose capacity elsewhere.

Applying these criteria to the results in **Table 5** suggests that the sunset clause would appreciably improve competitive conditions if, for example, in the Austrian upstream wholesale market, the importer acquired the cross border rights or the rights were divided equally between the importer and producer. If the producer acquired the rights there would be no appreciable detriment to competition in the upstream wholesale market.

When we consider the upstream wholesale market, competitive conditions tend to improve most when the importer acquires the rights to the additional capacity. The exception to this rule is the Netherlands where the large share of domestic production means that the importer acquiring the additional rights increases concentration whereas the seller acquiring the additional rights reduces concentration.

Quantitative assessment of the sunset clause

When we consider the downstream wholesale market, competitive conditions tend to improve most when the seller acquires the rights to the additional capacity. Where both the seller and the importer each acquire half of the additional capacity, the HHI tends to improve irrespective of the country and wholesale market considered. However, the improvement in HHI is less than in the case where the importer acquires rights and we consider the upstream wholesale market or where the seller acquires the rights and we consider the downstream wholesale market.

A possible logical issue is that if the upstream and downstream wholesale markets were truly separate, it may be thought that there were barriers to the importer using the additional capacity to sell into the upstream wholesale market or to the seller using the additional capacity to sell into the downstream wholesale market. If this were the case, some of the cells in **Table 5** (e.g. upstream – importer or downstream – seller) would not be valid. Since bundling may help to remove such barriers and accelerate the convergence of upstream and downstream wholesale markets, we show the results for all combinations.

In any case, it is likely that the distinction between the upstream and downstream wholesale markets will be eroded over time through moves such as mandatory bundling, the move to the gas target model, enforcement against destination clauses, the introduction of new supply sources through LNG imports, retail competition etc.

In most cases the sunset clause improves competition even with the possibility of foreclosure. It is not formally possible to assign probabilities to the outcomes shown and to derive some sort of weighted average to conclude that the sunset clause is unambiguously beneficial for competition in the case of foreclosure. However, as mentioned earlier some of the outcomes are more likely than others. The acquirer of the capacity is likely to be the player with the greater market power or, all other things being equal, the buyer. If one considers the default rule to allocate the bundled rights 50:50 to buyer and seller, one could reach the conclusion that, even in the case of foreclosure, the sunset clause is likely to lead to an improvement in competitive conditions. Only in one case assessed would the application of the default rule result in any increase of HHI and that increase is marginal.

To help understand the intuition behind the results, it is worth considering the results in more detail for one country, France.

France has a large gas import company, GDF SUEZ. When we consider the upstream wholesale market, under the assumption of a national market, the HHI of 1633 indicates a market that is neither very concentrated nor very competitive in the counterfactual.

However, we do note that France has a lower HHI for the upstream wholesale market than all of the other countries assessed. This is because five companies

are relatively important suppliers of the French market, supplying gas from Russia, the North Sea, North Africa and the Middle East in the form of piped gas and LNG imports. In contrast other countries such as Germany do not import gas in the form of LNG and therefore rely on a narrower range of upstream gas suppliers.

With the sunset clause, allocating the 'spare' cross border capacity associated with the GSAs to the upstream supplier increases HHI by 21, indicating a slight lessening of competitive pressures. However, allocating the 'spare' capacity to the importer or 50:50 to the upstream supplier and downstream importer reduces HHI by 161 and 82, respectively. This indicates an increase in competitive pressures.

When we consider the downstream market, under the assumption of a national market, the HHI of 8809 indicates a concentrated market in the counterfactual. This is due to GDF SUEZ having a large share of French gas imports.

With the sunset clause, allocating the 'spare' cross border capacity associated with the GSAs to the upstream supplier reduces HHI by 1049, indicating an increase in competitive pressures. However, allocating the 'spare' capacity to the importer increases HHI by 27 (indicating a reduction in competitive pressures) and allocating the spare capacity 50:50 to the seller and the importer reduces HHI by 522 (indicating an increase in competitive pressure).

Finally, when we consider the coalesced market, under the assumption of a national market, the HHI of 2614 indicates a concentrated market in the counterfactual.

With the sunset clause, allocating the 'spare' cross border capacity associated with the GSAs to the upstream supplier reduces HHI by 200, indicating an increase in competitive pressures. However, allocating the 'spare' capacity to the importer or 50:50 to the seller and importer increases HHI by 248 and 12, respectively (indicating a reduction in competitive pressures).

6 Conclusions

The imposition of mandatory bundling on capacity that is currently committed through existing transportation contracts, as would be required by the sunset clause, affects competition to the extent that parties change behaviour or could change behaviour due to the sunset clause. Therefore the sunset clause will have no effect with respect to gas volumes that parties would flow with and without the sunset clause, e.g. the annual contract quantity (ACQ) under a gas supply agreement (GSA).

The sunset clause is likely to have two competitive effects in the gas markets of Europe.

Firstly, to the extent that the buyers and sellers of gas through long term contracts hold cross-border transportation capacity rights in excess of the ACQ under a GSA (the 'spare booked capacity') or in excess of that required to operate the GSA (the 'possible spare booked capacity'), bundling will make it easier for whoever acquires the bundled capacity rights to utilise those rights. This is because, with bundling, utilising the 'spare' capacity would not require the consent of both parties.

From a static perspective, the increase in accessible capacity would unambiguously improve competition. This is shown by the pivot assessment.

Only if one took the view that the additional capacity provided by the sunset clause would foreclose capacity that would otherwise be added within a relevant timeframe could the sunset clause be detrimental to competition. Given that demand for gas is increasing slowly or is declining in many parts of Europe, foreclosure becomes less likely and the static assessment of competition more prominent.

Assuming the possibility of foreclosure, whether the additional capacity provided by the sunset clause would be beneficial or detrimental to competition is an empirical question that depends upon the concentration of the market and the acquirer of the additional rights.

In a free negotiation between the two parties, the one that has the most to gain from the exercise of market power is the more likely to end up acquiring the bundled rights. This implies that the competitive gains expected to flow from imposition of the sunset clause are diminished. However, the default rule of a 50:50 allocation of the additional capacity to seller and importer anticipates this outcome. Applying the default rule, the sunset clause would result in an increase in HHI in only one case assessed and that increase was marginal. Therefore, even assuming foreclosure, it is likely that the sunset clause would be beneficial to competition.

One of the benefits of allowing additional cross border capacity to be used is that this may accelerate convergence of the upstream and downstream wholesale markets into a single market, where they are currently separate.

The quantitative analysis considers the annual delivery of gas. In the case of spare transportation capacity that is required to operate the GSA ('spare booked capacity'), the additional capacity due to the sunset clause is likely to be made available in summer when flows under the GSA are low. Therefore, storage or other forms of flexibility would need to be available to make full use of the additional capacity. However, to the extent booked capacity exceeded that required to operate the GSA, the sunset clause would make additional capacity available throughout the year, providing benefits in excess of those assumed in this analysis.

The party with the greater market power is likely to value the bundled rights more highly than the other party. Therefore, given a free negotiation over assignment, the party with the greater market power is likely to attain the bundled rights. This would reduce the competitive benefit of the sunset clause but does not remove the benefit. The default rule, i.e. the proportional split between the original capacity holders, and the added transparency due to the sunset clause (see below) both tend to mitigate this effect.

A second competitive effect of the sunset clause relates to improvement in transparency. Without the sunset clause, if the seller or buyer chose not to allow additional gas to flow across the border in relation to the 'spare booked capacity' or 'possible spare booked capacity', it would be unclear whether the lack of flow was due to the seller or the buyer vetoing the use of the transportation. However, if one party were to acquire the bundled cross border capacity, it would be more transparent that the choice to flow or not to flow gas was that of the bundled rights holder alone. Consequently, it would be easier for regulatory authorities to monitor behaviour in the market.

The sunset clause would be less effective on borders without contractual congestion since bundling could be achieved without the sunset clause. However, the EC's sector inquiry found that '*contractual congestion is common*' and to the extent this situation continues, the sunset clause would be beneficial especially at contractually congested borders.

Conclusions

Annexe 1: Contract data

Table 6. GSA data

Import country	Import company	Export country	Export company	ACQ (BCM/y)
Austria	OMV/Econgas	Norway	Statoil/Troll consortium	1.30
	OMV/Econgas	Russia	Gazprom	7.00
	Tigas and Vorarlberger Erdgas GmbH	Germany	E.ON Ruhrgas	0.70
France	EDF	Norway	Statoil	1.00
	GDF	Russia	Gazprom	12.00
	GDF	Algeria	Sonatrach (LNG)	10.73
	GDF	Norway	Statoil/Troll consortium	16.00
	GDF	Norway	Phillips (Ekofisk)	0.48
	GDF	Norway	Statoil	0.70
	GDF	Netherlands	GasTerra	8.88
	GDF	Qatar	Qatargas (LNG)	7.00
	GDF	Egypt	BG (LNG)	4.86
	GDF	Nigeria	NLNG (LNG)	0.97
	GDF	Algeria	Sonatrach	1.20
	Total	Norway	Statoil (LNG)	1.00
	Total	Algeria	Sonatrach	1.20

	E.ON Ruhrgas	Denmark	Dong	1.70
	E.ON Ruhrgas	Netherlands	GasTerra	13.00
	E.ON Ruhrgas	Norway	Statoil/Troll consortium	20.20
	E.ON Ruhrgas	Norway	Phillips/Ekofisk consortium	1.00
	E.ON Ruhrgas	Russia	Gazprom	20.00
	E.ON Ruhrgas	UK	BP	1.00
	ExxonMobil	Norway	Statoil/Troll consortium	0.60
Germany	RWE	Netherlands	GasTerra	5.10
	RWE	Norway	Statoil/Troll consortium	3.40
	Shell/ExxonMobil	Denmark	Dong	1.00
	Shell/ExxonMobil	Netherlands	GasTerra	4.00
	Shell/ExxonMobil	Norway	Statoil/Troll consortium	7.00
	VNG	Norway	Statoil/Troll consortium	6.00
	VNG	Russia	Gazprom	6.00
	Wingas	Russia	Gazprom	13.50
	Wingas	UK	ENI	1.20
	Netherlands	Delta	Norway	Statoil/Troll consortium
E.ON Benelux		Norway	Statoil/Troll consortium	0.40
Electrabel (Epon)		Norway	Statoil/Troll consortium	0.40
Essent		Denmark	Dong	0.50
Essent		Norway	Statoil/Troll consortium	0.40
Essent		Norway	Statoil	1.40
Gas Terra		Norway	Statoil/Troll consortium	3.60
Gas Terra		Russia	Gazprom	4.00
GasTerra		Germany	Shell/ExxonMobil	1.20
Norsk Hydro		UK	ExxonMobil	0.80
Norsk Hydro		Denmark	MöllerMaersk	0.60
Nuon (UNA)		Norway	Statoil/Troll consortium	0.40

Annexe 1: Contract data

Slovenia	Geoplin	Algeria	Sonatrach	0.35
	Geoplin	Austria	OMV	0.15
	Geoplin	Russia	Gazprom	0.70

Source: Company websites, industry publications, conference presentations etc.

Frontier Economics Limited in Europe is a member of the Frontier Economics network, which consists of separate companies based in Europe (Brussels, Cologne, London & Madrid) and Australia (Brisbane, Melbourne & Sydney). The companies are independently owned, and legal commitments entered into by any one company do not impose any obligations on other companies in the network. All views expressed in this document are the views of Frontier Economics Limited.

FRONTIER ECONOMICS EUROPE

BRUSSELS | COLOGNE | LONDON | MADRID

Frontier Economics Ltd 71 High Holborn London WC1V 6DA

Tel. +44 (0)20 7031 7000 Fax. +44 (0)20 7031 7001 www.frontier-economics.com