

Market-based Balancing

Gas Committee
European Federation of Energy Traders
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Market-based balancing

EFET recommends the implementation of within-day balancing markets in Europe. The effects of this will be:

- a reduction in the costs of balancing for TSOs
- the provision of better economic signals to ensure within-day market response and timely investment decisions
- the provision of cost-reflective cash-out prices based on the cost the TSO actually incurs in bringing its system into balance
- the improvement of liquidity in the traded market
- an increase in information transparency

Introduction

The Madrid Gas Forum, the EU Gas Regulation and the draft third package favour the implementation of market-based balancing. Full implementation of market-based balancing is consistent with establishing a traded market that can be accessed both by the transmission system users and the transmission system operators within the balancing period. This note recognises that a special effort is now needed by TSOs, Regulators and Market Participants to achieve this.

We recall that Conclusion 34 of the 11th Madrid Gas Forum stated that

- **“The Forum agreed that balancing regimes should converge to a market based approach and stressed that regional balancing markets must be compatible with the goal to achieve a single European gas market and invited all stakeholders to accelerate the process.”**

We hope that this paper will give impetus to the fulfilment of market-based balancing as agreed by the Madrid Forum.

Action is required now, both at National level to make improvements this year, and at a multi-system or regional level to ensure that we all strive towards the compatibility goal agreed by the Madrid Forum

Our objective in this paper is to set out some practical considerations to help ensure that a full transition to market-based balancing is achieved across Europe.

The sections below describe the current difficulties in balancing experienced in many Member States in Europe and the advantages in establishing balancing markets for gas. The importance of the provision of flexibility is discussed together with practical considerations on this and other design issues that will assist in the development and implementation of market-based balancing in gas.

1. Difficulties in meeting balancing obligations

During the transition to a competitive, liberalised market, responsibility for balancing the gas system changes from a single vertically integrated company (in conjunction with its connected systems) to multiple players. Although the ultimate responsibility lies with the TSO to ensure that the system is physically balanced, it is neither realistic nor economic to allow conditions whereby shippers do not contribute to the system balance.

Balancing rules typically comprise either an obligation on shippers to balance inputs and off-takes physically, or a financial incentive to do so, with penalties for being out of balance. The design of balancing rules and associated arrangements (such as transparency) have a significant impact on the risks faced by shippers.

The arrangements can create real barriers to entry, particularly in the early stages of liberalisation, as the absolute level of risk is driven higher at the same time as shippers' ability to manage their exposure effectively is hindered. It is important that all market participants are consulted in the design of balancing rule changes.

The problems described below are commonly associated with markets that are in the process of liberalisation.

1.1 *Lack of information*

- Historical information on consumption is not always available to new players, who are therefore unable to estimate demand accurately.
- Information on allocations of both supplies and consumption is frequently not available until well after the gas flow period, preventing shippers from taking timely actions to rectify a growing imbalance.

1.2 *Lack of flexibility available to the market*

- In several markets there is little or no spare flexibility available: existing storage is tied up in long term contracts or is reserved for strategic storage. Within-day flexibility such as linepack is not offered by the TSO (although imbalance tolerances are a good way in which to distribute linepack flexibility to shippers) and the market may be too illiquid to trade within-day. These factors, coupled with an artificially high imbalance price (sometimes referred to as an imbalance tariff or penalty) significantly increase the cost of purchasing flexibility.
- The risks in a new market often mean that independent investors are reluctant to develop storage facilities and new entrants are unable to commit to long term contracts to underwrite new investments without confidence that the market will develop in a reasonable time-frame. This in turn drives up the value of existing flexibility (which is usually held by the historical player or by the TSO) and creates a barrier to entry.
- The impact on market development is particularly acute in systems where there is already a shortage of storage (e.g. Spain, Italy, Czech Republic) or where a large proportion of storage is withheld for security of supply (e.g. Germany).

- A lack of price transparency also prevents large end-consumers from investing to create flexibility (or reduce volatility of consumption) and makes it difficult to value different supply offers in ways that might reduce the demand for flexibility.
- The TSOs may have contracted forward for flexibility for the residual balancing of the system. Usually this happens at the beginning of the year, and a commitment is required for the full calendar or gas year. In developing markets, there are usually only a few parties who can commit to provide these services and short-term providers are not encouraged to offer flexibility. Hence the lack of competition may impact on the cost of any products.
- It is difficult for the TSO to estimate how much flexibility it will need, and if the TSO is risk-averse, it will crowd out other users seeking flexibility - particularly when it is able to pass on all of the costs.
- With less flexibility available to other shippers, the TSO begins to move away from a residual balancing role to the primary system balancer.
- Further problems may arise if there is a significant mismatch between the costs of acquiring the options and the revenues from imbalance charges, which must be recovered from system users.

1.3 *Non-market based imbalance charges*

- Shipper imbalances are cashed out at a managed price. Where this is used, the price tends to be fixed at a high level (when a shipper is short) and a low level (when a shipper is long). Alternatively the prices could be more closely related to market prices such as day-ahead price index in a neighbouring market – but with a spurious premium or discount – and be subject to influences not present in the local market. A balance must be struck to ensure that cash-out prices provide sufficient commercial incentives for shippers to balance, without an onerous penalty regime that may deter entry and reduce trading liquidity. Ideally the cash-out price should reflect the actual costs efficiently incurred by the TSO in balancing its system.

1.4 *Other factors*

- Balancing zones are often set within a very limited geographical locale – frequently with multiple zones in a single system. Ideally, balancing zones and markets should be as large as possible subject only to practical operational needs and economic limits. In practice this means that balancing zones will increasingly need to cover multiple systems. As discussed recently by EFET¹, ERGEG and others, as Europe moves towards regional markets this could be facilitated by independent system operators responsible for several systems, eventually leading to Regional Independent System Operators (R_ISO) once the 3rd package is implemented.

¹ "Regional Gas Grids – Towards the Single European Market 12 October 2007 is available in the Gas Position Paper section of www.EFET.org

- The length of the balancing period is clearly a factor that must be taken into account. Physics dictates that small balancing zones need shorter balancing periods, and larger, well-integrated, zones can accommodate longer balancing periods. Daily balancing would seem to be the most appropriate model to promote participation in a balancing market – not least because capacity is sold and gas is traded on a daily basis - thus improving liquidity. However, it is recognised that this may not be achievable across Europe without some system investments. Therefore, in the short term, where different balancing periods still exist, an interface product needs to be developed to ensure that holders of flexibility in a daily balanced market can transfer this flexibility into an hourly balanced market. We are not aware of any successful, competitive gas market where hourly pricing has developed.
- Currently many individual markets do not have the necessary control over the sources of gas to ensure that flows can be ramped up or down quickly especially when flows are travelling over long distances. This, coupled with a lack of liquidity, means that it may be more reasonable for a TSO to operate a balancing market that aims to hit an end of day linepack figure instead of an hourly figure to enable more players to be able to offer flexibility to the TSO.

The establishment of a balancing market reduces the costs of balancing and contributes to liquidity at trading hubs. Additional safeguards can be put in place on a transitional basis if TSOs have concerns that liquidity will initially be insufficient to guarantee system security.

2. The importance of the provision of flexibility in the development of balancing markets in gas

On any individual day, different parties may have spare flexibility available, either upward or downward, that they could offer to the TSO or to the market if it is not being used. Upward flexibility can be provided by increasing supply (additional production or storage withdrawal) or by reducing demand (interrupting consumption or reducing storage injection). Downward flexibility can be provided by reducing supply or increasing demand.

These same parties may not be able to commit to providing this optionality for a full year, and therefore on different days, different players will be able to offer varying amounts of flexibility to the system. By allowing parties to bid and offer available flexibility on the day, cheaper sources of flexibility compared to an annual option will frequently if not always be available. Additionally, the TSO can reduce costs of balancing by buying and selling gas only when required at competitive prices, and does not require them to purchase a year-long option.

The ability of shippers to offer flexibility can be instigated (and indeed stimulated) via a screen based balancing market. Parties with the ability to take or to sell within-day gas can make this available. Transactions via a screen-based system would also give transparent information on current prices and on actions taken by TSOs to balance the system: in particular the marginal price of gas used to balance the system and the total costs of balancing the system on any given day.

A TSO might have acquired long-term flexibility options to try to fulfil their residual balancing role. Such options tend to distort the market, and since they may even prevent the establishment of market-based balancing they should be avoided. Where such TSO options already exist, until they are phased out the costs economically incurred by the TSO should be added to the system charges, as they serve to keep the balance of the whole system to the benefit of all users. Only if the use of the option can be clearly identified with an individual shipper causing that specific imbalance should the relevant part of the cost be allocated to an individual shipper.

The ability for shippers to bid in available flexibility on a daily basis provides a reflection of the value of short-notice gas on the day for that system, and therefore can provide more accurate cash-out charges (as long as the within-day market is sufficiently liquid and competitive).

In certain circumstances, TSOs may need to access gas at a specific location, or with a short lead time, or of a particular gas quality. Where there are specific parameters which a TSO may prioritise over price, then a balancing market could require these to be specified. Bids taken out of price order for system reasons could be excluded from setting the marginal price. The additional costs could be socialised in the grid tariffs (system costs), as they do not reflect the imbalance created by an individual market player but are caused by certain aspects of the grid system or its operation. Alternatively costs could be recovered via a balancing neutrality fund. Protracted debate on such solutions however, should be avoided as the occurrences of such complexities and hence the need for these types of measures should be reduced as larger and more integrated balancing markets are established across Europe.

A functioning daily balancing market is also a way in which the TSO can comply with its obligations under the 2nd Gas Directive to provide access to linepack. By there being in effect a financial incentive rather than an absolute physical obligation on shippers to balance their inputs and outputs the TSO is in effect allowing shippers access to linepack at the market value through the cash-out mechanism.

3. Additional considerations when designing balancing markets

3.1 *TSO neutrality*

It is essential that the TSO operates in a balancing market for system balancing reasons only and not for commercial gain. Actions should be proportional to the balancing task and not reflect any speculative activity, given its privileged position of having information about the state of the system and shippers' open positions. The TSO's neutrality is also enhanced by rules that:

- Ensure that imbalance revenues above or below the cost of balancing are returned to the system users in a manner that is not unduly discriminatory. One mechanism is to smear these charges or rebates across all system users in proportion to their system usage.
- Ensure that vertically integrated companies operating networks are sufficiently separated to prevent the leakage of commercial information to the trading arm of

the business. This could even be achieved by outsourcing the system balancing function.

Shippers will be more likely to use the balancing market when confidence is created through transparent operating rules, good flow of information and certainty on the treatment of revenue flows.

3.2 *Regulatory measures to help promote liquidity*

In early stages of liberalisation, a balancing market may be illiquid and flexibility may be concentrated with only a few shippers. To reduce the impact of low liquidity, it is important that holders of flexibility participate in the balancing market.

Some companies are not unreasonably concerned that their dominant position may lead them to constant investigation by competition authorities, with the result that they withdraw from such a market. It is therefore important that the National Regulatory Authorities establish conditions that allow the holders of flexibility to participate in an open manner with transparent rules without the need to establish a regulated price on the balancing market.

This could be achieved by the dominant player(s) reaching an agreement with the regulator to make all the spare flexibility available on a day, within an agreed bid/offer spread. The dominant player(s) can then decide the price level to place bids and offers, around where it/they believe the market will be. The incentive to ensure that the price is close to market is that otherwise an opportunity is created for shippers to go deliberately long or short into the system, and arbitrage between the cash-out price and the market price, where there is a difference².

3.3 *Transitional measures*

Low levels of liquidity may also mean that the TSO is not confident that it can maintain a safe system and that at times of stress there may be insufficient gas offered on a balancing market to fill a shortage of gas. This is generally only a one-sided concern given that if there is too much gas in the system, it is usually easier for parties to reduce flows. Only as a last resort (e.g. if an emergency was developing that was beyond the response available from the market) the TSO could back gas out of the system. Such action could of course cause the imbalance to be transferred to another system as well as causing commercial allocation difficulties of resolving whose gas was backed out.

Depending on the maturity of the market there may be some transitional measures that could be implemented before relying fully on a balancing market. For example:

- The TSO could obtain a proportion of balancing gas from the balancing market and retain annual contracts in place for the remainder. This proportion could increase year on year until an optimal suite of contracts is obtained by the TSO.

² This was the method adopted by the UK regulator to deal with Centrica's dominance in the flexibility mechanism.

- The TSO could have access to an amount of gas in store that it may use in cases when the market failed to offer sufficient gas to balance the system (“Balancing Margins” gas). This amount could be reduced over time, depending on market liquidity and how much had been used in the previous year. It should only be necessary to have gas available to top up the system, not the means to dispose of surplus gas.

In any case, the market must have clear rules on how the TSO will interact, transparency on the state of the system, and any particular rules such as security levels for pipelines or sources of flexibility such as storage.

3.4 TSO incentives

In principle, TSOs have a responsibility for their safety of the system, and therefore they hold the ultimate responsibility for residual system balancing. Once a balancing market is in place the TSOs must have the right to use the balancing market, but only for residual balancing purposes. The TSO should be entitled to the recovery of all efficiently incurred costs in fulfilling their obligations.

However, the theoretical need for continuous regulatory investigations to establish efficiently incurred costs until a balancing market is in place is not welcome by TSOs or by most regulators, so the concept of TSO incentives has developed. Unfortunately, incentives on TSOs can lead to market distortions and they require careful design and implementation. Where this is deemed necessary to encourage efficient behaviour by the TSO, cost targets for balancing the system might be set. If the TSO beats the target level of costs, the TSO would keep a share of the difference. If costs exceed the target the TSO would have to pay a proportion of the costs. It can also be the case that where significant uncertainty exists regarding the likely level of costs, potential profits or losses can be capped.

A working example of this principle is the TSO could be incentivised to ensure that any buy or sell action it takes on the balancing market remains close to the system average price³ - the closer it is, the more money it can earn against its incentive. If the TSO anticipates the need to buy gas later in the day, the TSO could take an early action to buy a small quantity of gas close to the market price to incentivise shippers to offer additional gas to the market and vice versa. However, regulatory guidance should be sought to ascertain what level of pre-emptive actions is acceptable. There should in this sense also be regulatory oversight in order to avoid the TSO taking some action to increase the market price which would then in turn benefit its supply affiliate (or any other market participant) in offering its spare flexibility to the market.

Making the TSO financially responsible for balancing margins gas provides strong encouragement for them to minimise the amounts needed. However, incentives must be set for a given balancing regime and operation. It would therefore not be acceptable for a TSO to reduce its costs of system balancing by tightening the imbalance regime and passing costs back to shippers. The regime should be designed to minimise the overall costs of balancing that will ultimately be borne by consumers – i.e. costs undertaken by TSOs *and* suppliers.

³ i.e. the volume-weighted average of bids and offers taken to balance the system.

3.5 Shipper incentives to perform on accepted bids/offers

It is essential that the TSO is able to rely on bids and offers made by shippers in a balancing market; there must therefore be strong incentives on shippers to perform on those bids and offers that are taken by the TSO in order to balance the system. If the cash-out price for failing to deliver is less than the price paid for the offer (and vice versa for bids to offtake gas from the system), then the shipper is not penalised for failing to perform on the bid. The TSO may be concerned that the shipper might make no changes to gas flows, take the money for the bid and pay the penalty, then re-bid flexibility at a higher price, knowing that the system is still short. To avoid this, the penalty should be no less than the marginal price of the bids or offers taken. This would lead to a dual price cash-out.

In more developed markets, single price cash-out may be possible. A system balance is achieved through an aggregated mechanism rather than by achieving a balance through requiring each shipper to balance its portfolio individually. Prices send economic signals to shippers and consumers to adjust supply and demand to bring the system back in to balance. This simplified approach can have the advantage of reducing the role of the TSO, but there is also the disadvantage that some costs are effectively socialised between market players.

3.6 Other balancing considerations:

In the creation of a balancing market, it is important that it is not only the TSO that can accept bids/offers within-day, but that shippers too can rectify their imbalance positions directly by buying and selling gas within-day. This should help the TSO to balance the system by ensuring that it has to take less action for residual balancing on a day.

In some markets, TSOs are unable to provide the necessary information to allow parties to rectify an imbalance position on a timely basis, and/or the supply of flexibility products is insufficient on a day to meet the market needs. Under these circumstances, alternative balancing tools may be necessary. One such example, could be the *ex post* trading of imbalance positions at the virtual trading point at least for a transitional period until the informational issues are resolved.

Some TSOs have expressed concerns that *ex post* imbalance trading might reduce individual shippers' incentives to balance. We therefore only advocate this where the existing incentives are inexplicably more onerous than equivalent market-based systems, and the lack of information means that there is a significant risk of many shippers being individually out of balance while the overall system is reasonably balanced. Imbalance trading therefore prevents the TSO making excessive (often unregulated) returns from imbalance charging at times when only a small balancing action is necessary.

Given the interconnectedness of Continental Europe, better access to cross border capacity - together with a suitable allocation methodology - would allow holders of flexibility in one market to offer this into local or neighbouring balancing markets. In this way, greater regional efficiency in balancing markets can be achieved.

Improved integration and consistency across borders should also enable TSOs better to assist each other in balancing and help move towards multi-system operators.

A TSO should not be allowed to withhold flexibility in its own market for it then to offer the spare flexibility to other markets where it is not regulated. In particular, this behaviour should be prevented in vertically integrated companies where a TSO's withholding of flexibility could protect the position of its supply affiliate in the home market.

There are a number of different models which would allow shippers to transfer flexibility from one market to another including shipper to shipper, shipper to TSO, TSO to TSO or by the creation of Multi-System Operators or eventually Regional Independent System Operators (R_ISO). Currently there is a range of different balancing regimes in Europe which makes the transfer of flexibility more difficult. If a shipper operating in a daily balanced regime wants to offer flexibility in an hourly balanced market; it needs to ensure that its daily flexibility can be appropriately transferred into hourly flexibility. Allocation regimes may need to be developed to address this problem. Until such a time, it may only be possible to transfer spare flexibility into a different market using a TSO to TSO model or a regional balancing market via a R_ISO

With the commercial and political trend of establishing multi-system operation, there is a growing impetus towards a R_ISO model. But, for this to be successful the balancing regimes within individual countries, and indeed individual TSO systems, must be improved. These improvements can and should be put in place now, while at the same time keeping in mind the longer term vision of R-ISOs and regional balancing across Europe.

4. Conclusions

Onerous balancing obligations, combined with a poverty of information and lack of available flexibility, continue to form barriers to entry in many European gas markets. Rules which require a market to hold significantly more storage in aggregate than is required to balance the system are inefficient and can provide erroneous economic signals for capital investment in the provision of flexibility.

The establishment of a balancing market can significantly improve the efficiency of the market and the accuracy of the economic signals, while at the same time allowing the historical player to participate in and to promote the market for a fair return.

Where there are specific concerns for a particular market around levels of market maturity, transitional measures can be implemented to provide safeguards while market players become more practised in their new roles.

Ideally, a daily-balanced regime will achieve greatest liquidity, with an intra-day balancing market operating to achieve a system balance by the end of the balancing period. Market-based balancing is also possible in hourly-balanced markets, but requires more detailed terms around how the TSO takes actions to achieve a system balance at minimum aggregate cost. It may also require new allocation mechanisms to allow within day gas to be traded between daily- and hourly-balanced markets.

Action needs to be taken now, during 2008, to improve national balancing regimes and to plan for the introduction of multi-system market-based balancing.

Together, these methods can be used to achieve convergence of balancing rules eventually enabling market participants and independent operators to access regional balancing markets on a consistent basis across Europe.