EFET[1] Guide on

the Features of a Successful Virtual Trading Point

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[1] The European Federation of Energy Traders (EFET) promotes and facilitates European energy trading in open, transparent, sustainable and liquid wholesale markets, unhindered by national borders or other undue obstacles. EFET currently represents more than 100 energy trading companies, active in over 27 European countries. For more information, visit our website at www.efet.org.

EFET European Federation of Energy Traders

PART I

The features of a successful Virtual Trading Point

1.1 Introduction

The full implementation of entry-exit transportation access systems requires the establishment of **virtual trading points (VTPs)** where the rights to entry-paid gas can be transferred between market participants. The goal is for inputs and offtakes to be balanced at a single VTP in each individual entry-exit system. Successful development of liquid wholesale trading hubs at these virtual points will need additional hub services to ensure that the desired range of trading can take place in a fair and transparent manner. This paper sets out the features of such hubs which will help attract trading and promote liquidity, if built into the relevant access systems[2].

VTPs downstream of entry points to a system and upstream of exit points currently exist as a single-node or part of a multi-node model[3]. A shipper should be able to import or produce gas and use entry capacity to transport that gas to the VTP, where it can be sold or re-traded. A net buyer at a VTP should be able to acquire exit capacity to take the gas off-system, for export to another system, for injection into storage, or for supply to an end user. Gas can be traded at the VTP without the need to hold entry or exit capacity.

Typically, existing hubs to date have been contained within a single TSO's system, and by implication under a single regulatory jurisdiction. However, more complex hubs have also been established. One example is in The Netherlands where high and low-cal markets have been combined into a single hub. In Germany, hubs now span multiple transportation systems and gas qualities. A regional hub spanning multiple regimes and regulatory jurisdictions is being looked at, but no successful example yet exists.

The purpose of this paper is to encourage a common approach to hub design that will improve the workability of hubs, reduce inefficient costs and risks associated with

[2] In this paper, the term *Virtual Trading Point* refers to an arrangement set out in entry-exit transportation systems to facilitate title transfer and trading downstream of entry and upstream of exit points. A *Virtual Trading Point* can become a *Gas Hub* when it has traders, products, service providers and liquidity, perhaps supported by additional hub services offered by a Hub Operator. Where multiple *Virtual Trading Points* exist within a single market or transportation system, they can be said to be *Nodes* within a *Multi-Node* system – effectively multiple entry-exit systems within a single transport network.

[3] A multi-node system should be seen as transitional towards single-node. See section 1.4.

trading multiple hubs, and to provide new and developing hubs with a roadmap of how to create a liquid and competitive wholesale gas market. It should be remembered that good hub design should complement other measures to increase willingness to trade to improve liquidity.

1.2 Aspects of a hub

One obvious advantage of a VTP is to enable **pooling of liquidity** that would otherwise develop at multiple entry or exit points. By having a single point, or small number of points where gas can be traded, activity will be focused there. In this way an efficient market can be established where buyers can seek the cheapest source of gas from those able to offer gas at the hub, and sellers can seek the parties who place the highest value on the gas available. Transaction costs are reduced as less time is spent identifying who is able to buy or sell at a particular location out of a large potential range of locations. Trading and information systems need only be developed in respect of a single point (or small number of points).

At a VTP, non vertically-integrated participants can manage an upstream or downstream portfolio in isolation, without the need to engage in sales or production. Barriers to entry are reduced, as parties do not need to be vertically integrated across production/import and supply. Those who choose to be vertically integrated have a liquid location to trade out mismatches in positions caused by timing of new supplies or changes in customer portfolios in the longer term, or to ensure efficient utilization of balancing options in the shorter term.

Where a VTP is contained within a single transportation system, it is only subject to **one national regulatory authority**, which may not be the case for a hub serving a region and requiring an entry-exit system across multiple TSOs, which could span multiple regulatory regimes. However, a hub serving a region may be preferred if this would enhance liquidity by bringing together traders from neighbouring countries, especially to areas where market concentration remains high[4]. For this to be successful, interoperability and common data exchange rules would be essential for successful operation of the hub. To this end, the framework introduced by the Third internal Energy Market package may indeed facilitate such projects.

A VTP can be used as a location for operation of a **balancing market**. It allows a TSO to select available offers (or bids) from a larger number of potential sources and market participants, thus ensuring that the hub is being balanced transparently at the

[4] See also section 1.4 for suggestions on regulation of a regional hub.

lowest cost. (Where a TSO requires action in respect of a particular location, this can be specified, allowing bids or offers to be taken out of price order.)

Other uses of VTPs include providing a location for the delivery or resale of gas from gas release programmes, Virtual Storage products and other market innovations where greater flexibility is desired.

1.3 Conditions to be built into VTP access terms

VTP access terms should be described in detail as a subset of network access arrangements in entry-exit systems. The inclusion of hub services terms will depend on how the roles of the different participants are defined (see section 2.2) and the regulatory arrangements for cost recovery. These can specify the obligations of traders, pipeline users, and the TSO (or a suitable independent body) as hub operator. VTP terms should include the following:

- Terms should allow for **title transfer of gas** (where title is held by the shippers) or an equivalent transfer of imbalances (where title has been passed to the TSO).

- **Allocations should be made equal to nominations (i.e. trade notifications)**, making the hub "super-firm", as trades can then be held whole.

- Only parties bringing gas onto the system or taking gas off the system can directly cause a physical imbalance, though non-physical traders can still indirectly do so. Both must therefore be subject to **cash-out rules for being long or short** in the system. One example of where a non-physical trader can be long or short is where a trade has failed because of incorrect entry of data. In such circumstances, the terms should clarify whether no gas is allocated, or a "lesser of" rule applies where possible, trading chains should be held whole in a situation of imbalance, if the trading chain has not contributed to any physical imbalance.

- **VTP access terms** should form a standalone subset of the network access terms. It should be possible for a non-physical trader to trade at the VTP without the need to sign up to full network access arrangements. As described above, non-physical traders will still need access to imbalance cash-out arrangements, but would not need access to capacity services.

- A VTP shall be built into the balancing regimes of transportation access systems as a **location for imbalance cash-out**, and as a location for trading out imbalances between shippers. Appendix 1 describes the key features of an efficient balancing regime. Until such time as an efficient balancing regime is established, *ex post* imbalance trading can be introduced at the VTP as a transitional measure to help overcome low levels of competition, onerous imbalance charges and lack of flexibility services.

- There should be **clearly defined imbalance charges**, which can be referenced in trading contracts for incidents such as a failure to perform. These should be market-based and not unduly punitive.

- **Credit arrangements** should be sufficient to protect TSOs and other shippers from avoidable risks of poor performance by less creditworthy network users. However, they should not be unduly onerous such that they represent a high barrier to entry, or a way of "handicapping" types of market participants.

- **Governance arrangements** should provide a framework to allow hub trading rules to develop along with the market, with appropriate checks and balances. For example, where arrangements are established in detail in primary or secondary legislation, errors and hindrances can be sustained for an excessive period, and may then be subject to political intervention. Hub operating rules should be subject to regulatory approval.

Transportation terms can have a significant effect on the interaction between hubs. A discussion of the type of cross-border capacity arrangements that facilitate hub-to-hub trading is beyond the scope of this paper. Nevertheless, we note that joint sale of consistent capacity products between adjacent gas transmission systems could lead to increased liquidity. Measures that minimize the risk of inconsistent capacity products being 'bundled' together should also be provided. TSOs should have the obligation to provide consistent contractual arrangements, particularly with regard to firmness, before capacity is bundled. The bundled capacity should lead to single capacity contracts with single nomination, operation and payment procedures[5].

1.4. Hub services

The following conditions are described in the Commission Regulation establishing a Network Code on Gas Balancing of Transmission Networks:

[5] See for example *EFET response to ENTSOG CAM Network Code Consultation* (13/02/2012) www.efet.org.

- A *trading platform* is offered by a *trading platform operator* to allow participants to post, amend and accept bids and offers. This may be the same platform used by the TSO to undertake balancing actions, and may be provided by the TSO or another entity, such as the Hub Operator. If no suitable platform exists, then it must be created by the TSO.

- Nevertheless, if a joint balancing platform is to be offered, it shall be offered by the TSOs concerned.

- The trading platform operator must make available the necessary information for traders to confirm the trade, publish the evolution of the marginal buy price and marginal sell price or provide this to the TSO for their publication.

Additional services could include the isolation of groups of trades that have no net physical effect on the system, such that they could be held whole even in the event of a physical shortfall (or excess) at the hub.

Data and communications services with market participants, network users, and other platforms including broker systems and exchanges, should be provided using open standard communication protocols. In particular, the most commonly used external platforms should be able to access and display trading platform data.

It would be expected that if a platform would meet the requirements of an Organised Trading Facility or a Multilateral Transfer Facility, then it would additionally be subject to relevant financial regulation.

Trade reporting, and clearly defined market surveillance rules should also be available.

1.5 Multi-node model

In some transportation systems, multiple trading points have been implemented. These may be virtual trading points within a single transportation system (e.g. PEG-Nord and PEG-Sud of GRTgaz in France) to reflect transportation constraints, or to seek greater granularity in transportation tariffs, or where operation of a single virtual trading point carries uncertainties caused by conditional transportation or flow commitments. Elsewhere, virtual trading points have been added to historical trading points at borders, LNG terminals, or in-tank storage, thereby creating multiple nodes.

Other forms of multi-node systems have included separation of high-cal and low-cal gas nominally at the same hub (e.g. NCG and Gaspool) and separation of domestic

and international (transit) accounts (e.g. CEGH in Austria). Yet in The Netherlands, these have been successfully combined in a single hub, with TTF covering multiple gas qualities and domestic/international flows.

VTPs are possible under a multi-node model, but risk fragmenting already low levels of liquidity in a nascent traded market. This can be countered, to some extent as a first step towards a fully-fledged entry-exit system, by allowing imbalances in sub-nodes to be taken to a principle node, and traded or cashed out there. Unless separate balancing markets are to be established for each node, the transfer of imbalances between nodes should be possible at transparent, predetermined prices. This may be relevant as part of a phased merger of nodes or VTPs, where a combined balancing market precedes full merger of points.

A multi-node model should be seen as transitional, reducing numbers of nodes as the TSO gains experience of operating an entry-exit system. The treatment of inter-node capacity is key to this transition, and to the speed of developing liquidity at individual nodes. In this transitional phase if sufficient inter-node capacity exists, or can be created by system reinforcement or virtual capacity, then it may be possible to consolidate market trading in a primary location, with other nodes priced relative to the liquid point, especially if imbalances can be aggregated and traded across nodes. This service does not require the TSO to hold back capacity to facilitate.

Germany has demonstrated that it is possible to create a single node that covers multiple transportation systems. Initial difficulties in allowing imbalances in different networks to be offset were subsequently resolved. Users must still sign up to different network access agreements for the connected systems, which can be administratively complex compared to a single system, and it is hoped that this process will be simplified in future.

Where multiple nodes exist because a VTP has been introduced as an addition to historical (physical) trading points, then migration of existing trading to the new point is ideally to be desired. However, care must be taken over how trading will transfer to the new point, without destroying liquidity in the process. Issues such as comparability of trading terms, transferability of capacity, transportation tariffs, and the extent of historical contracts may all be relevant. Again, industry consultation is important to establish what is relevant to any specific hub.

In theory, it should equally be possible to establish a single node that covers multiple member states and regulatory jurisdictions, although this has not yet been implemented in Europe. This might follow a similar path to the transitional multi-node model, where improved capacity between nodes would create the effect of pooling liquidity at key points, which could be used for price reporting. Alternatively,

combined entry-exit systems may also be possible with appropriate agreements between affected TSOs and National Regulatory Authorities (NRAs).

Understandably, regulatory arrangements for a multi-region model will need to be established clearly. One possibility is that hub oversight is undertaken by the NRA in whose jurisdiction a trading hub has been established. Some obligation to consult NRAs in other affected member states, with support of ACER, would be a reasonable requirement. Where a hub has been created by instituting a single entry-exit system across multiple TSOs, and where revenue-sharing mechanisms and inter-TSO compensation payments are required, a common approach will be essential, and the role of ACER may increase.

1.6 Further thoughts

Currently, access arrangements at hubs are unnecessarily diverse, leading to increased complexity for market players, increased costs and risks of managing multiple systems and buying and selling under different contractual arrangements, and loss of opportunity to share costs among network operators, hub operators and exchanges. As the Third Internal Energy Market package seeks to bring about convergence in network access terms, greater convergence of hub design and trading terms would also improve the effectiveness and efficiency of cross-border hub-to-hub trading. The degree of convergence may additionally depend on removal of legislative differences between member states including treatment of credit netting and aspects of licensing arrangements.

The creation of effective **balancing markets** is closely related to the generation of liquidity at a hub through improvements in firmness, price signals and transaction numbers. Comments on balancing are included in Appendix 1.

Access to **transportation capacity** in and out of a hub is critical. Capacity availability and utilization rates should be published in accordance with the Gas Transmission Regulation[6]. Availability should be maximized through secondary trading of capacity, oversell-and-buyback and sales of interruptible capacity. Further papers on capacity are available on www.efet.org .

Simplified access terms should be constructed for parties who are not physically shipping gas on the system, e.g. pure traders or exchange operators[7].

[6] European Regulation EC/1775/2005 on Conditions for Access to the Natural Gas Transmission Networks.

[7] See also Section 1.3.

Measures easing current administrative burdens resulting from licensing should be introduced by EU member states through the establishment of mutual recognition mechanisms, similar to those in place in other sectors of the internal market.

Costs of developing a basic hub can be recovered through general transportation tariffs, as a service ordinarily required by shippers. This should not prevent the later establishment of an exchange or more sophisticated hub arrangements, which can provide value added services at a reasonable commercial return. Where these cannot be offered competitively by third parties, regulatory oversight will be necessary[8].

Standard trading terms should be established by those using the hub, but the more complete the access terms, the fewer eventualities need to be addressed in a trading contract, which allows simplified trading arrangements. EFET has developed, and recommends its General Agreement concerning the delivery and acceptance of natural gas, which seek to standardize trading terms across hubs and other trading points as far as possible. Where specific conditions must be addressed for relevant transportation systems, specialised appendices have also been developed[9].

Where historical contracts contain **destination clauses** limiting delivery to a physical point downstream of a VTP, then the relevant VTP could be assigned as an alternate offtake point. This could further stimulate liquidity and provide a means for large users and resellers to manage their contractual commitments.

[8] See also Section 2.2.

[9] The EFET General Master Agreement and Appendices may be downloaded from the EFET website www.efet.org.

PART II

Road Map to a successful, liquid virtual trading point

2. 1 Introduction

Recent years have seen the establishment of a number of new VTPs – both in new markets and in existing markets through replacement of pre-existing physical hubs. Other trading points exist at a very basic stage of development, and are very thinly traded, often with very different development plans being proposed by the relevant authorities.

This road map takes trader experiences from existing hubs to provide recommendations on what has been most successful from the viewpoint of EFET members. These recommendations are intended to help Regulatory Authorities, TSOs, Hub operators and Exchanges in developing hubs in an efficient and economic way.

However, good hub design is necessary but not sufficient to create liquidity. It is also important to improve the underlying conditions that make parties want to trade at the hub.

Above all, it cannot be stated enough that frequent and continuous consultation between hub operators, TSOs, exchanges, shippers and representative trading organisations is an essential feature of successful hub development.

2.2 Roles for provision of hubs

While the stakeholders involved at a hub would include shippers and traders, brokers who facilitate trading, and regulatory authorities, there are three particular roles for running a trading hub:

- Transmission System Operator (TSO)[10]
- Hub Operator
- Exchange

[10] *"transmission system operator" means a natural or legal person who carries out the function of transmission and is responsible for operating, ensuring the maintenance of, and, if necessary, developing the transmission system in a given area and, where applicable, its interconnections with other systems, and for ensuring the long-term ability of the system to meet reasonable demands for the transport of gas* (Directive 2009/73/EC concerning common rules for the internal market in natural gas, Article 2(4)).

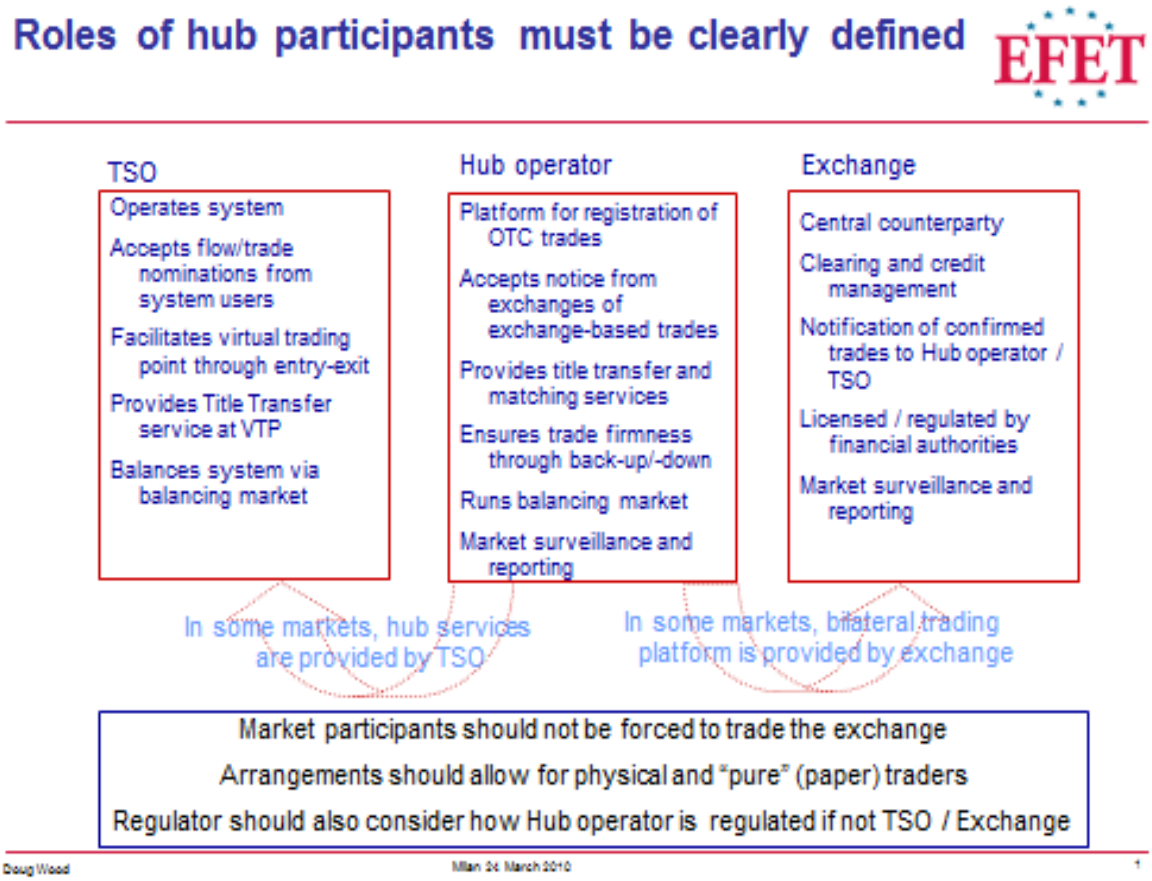

Figure 1. Roles of hub participants

TSO

The TSO has responsibility for the physical balancing of the system. Nominations for gas flows into and out of the system are made to the TSO, and the network access terms are required to allow transfers of gas at a virtual trading point between entry points and exit points. The TSO must therefore at least provide a platform to register bilateral trades at the trading point. The TSO may also buy and sell gas on a balancing market, which should be located at the same virtual trading point. (See Appendix 1 for features of an efficient balancing regime.)

Where access to flexibility is insufficient to establish a competitive balancing market, transitional measures such as a Backup/Backdown (BUBD) service are helpful. The TSO (or Hub Operator) would contract for provision of flexibility over a period such

as a year, through a tender process, in order to balance the hub and keep trades firm. It should be recognised however, that these tend to be more costly and less efficient than a competitive market, so should not be retained for longer than necessary. A phased transition from BUBD to Balancing Market may help to grow liquidity in the balancing market while the TSO builds confidence and experience in relying on the market.

Hub Operator (HO)

More advanced services may be provided by the TSO or by a separate Hub Operator. Services that could be contracted out include more sophisticated platforms for registration of trades including bids and offers, combination of bilateral on-the-day trading with the balancing market, "matching" services to protect "pure" traders from the requirement to pass a scale-back through an entire trading chain. Hub operators can also provide additional reporting and surveillance services.

One purpose of an independent hub operator is to allow the development of additional commercial services in response to stakeholder requirements, without requiring renegotiation of the regulated entity's allowed revenues and costs. These would relate to more advanced products that would not be normally required for the functioning of the market. Nevertheless, where only one party (perhaps an affiliate of the TSO) is in a position to offer these services, regulatory oversight is needed.

Additionally, the HO would also be the primary interface for brokerage platforms and for exchanges to register title transfers and nominations on behalf of clients.

As an independent Hub Operator is a relatively new concept, legislation often does not exist that would specify obligations such as maintaining confidentiality and not publishing information in a discriminatory fashion. A Hub Operator that is fully independent from the TSO may require special arrangements to allow them to access the system without taking equivalent obligations of a system user, either by licence or by access terms. This may be especially important where a hub operator is independent of the TSO but is owned by market parties who are trading in the market.

Particularly in early stages of hub development, the role of the HO is often fulfilled either by the TSO or by a specially created subsidiary or affiliate of the TSO. In other markets, it is possible that the role of HO is fulfilled by an exchange, which is subject to financial regulation and may not require specific new legislation for the role of HO. Finally, it is possible for the role of HO to be conducted by a fully- or semi-independent entity.

Exchange

The creation of a VTP also provides the opportunity for an exchange to be established. Use of a central counterparty allows for anonymisation of trades and alternative ways of managing credit risk. An exchange would normally be licensed and supervised under financial regulation, though they may also offer access to physical and financial products.

Exchanges may additionally provide the role of Hub Operator.

It is not uncommon for the role of HO to be provided initially by the TSO or an affiliate, then subsequently for the role to transfer to an Exchange.

2.3 Measures of hub development

Hub maturity can be described in two ways: by a series of steps undertaken to develop services at the hub, by operators, users and third parties, and by metrics on trading. The former could be regarded as activities that can be promoted or encouraged by the regulator and operators; the latter is more of a measure of the success of the former.

2.3.1 The development of services at a trading hub

What should be done	By whom
Establish a forum or mechanism for consultation on local hub development issues	NRA / Stakeholders
Determine area to be covered by VTP, and decide if multiple nodes are needed for a transitional phase	Traders / TSO / NRA
Establish an Entry-Exit system and virtual trading point(s) through network access arrangements. (See sections 1.3 and 1.5.)	TSO
The offering of title transfer or imbalance transfer services at the virtual trading point	TSO

Identify and resolve market structural issues including rules around participation of companies meeting dominance criteria	NRA
Establish and define role of Hub Operator	NRA
Governance of Hub Operator including licenses and arrangements for cost recovery	NRA (in consultation with other stakeholders)
Agree regulatory jurisdiction if a cross-border hub	NRAs/Governments/ACER
Firmness of the hub (achieved through contracted services such as Backup/Backdown)	TSO/HO
Firmness of the hub (achieved through a liquid balancing market)	TSO/HO
Establishment of a reference price(s) at the hub for imbalance penalties	TSO/HO
Development of a standard contract (such as use of the EFET master trading agreement or the development of a specialized annex if special terms must be catered for in the network access arrangements or local legal jurisdiction.	Traders (EFET)
Price Reporting Agencies start to report at the hub.	PRAs
Brokers become established (through voice, then systems)	Brokers/LEBA
Establishment of an exchange	Exchange/Financial Authority
Index becomes reliable and used as benchmark	PRAs, Market

2.3.2 Measures of liquidity

- Number of registered participants;
- Number of active participants (i.e. those who have conducted at least one trade in the last 12 months);
- Number of independent companies actively trading (i.e. stripping out multiple affiliates in same group);
- Numbers of trades;
- Quantity traded (in absolute terms, relative to local demand and relative to Demand + transit flows);
- Concentration of trading (to understand whether a small number of traders are responsible for most trades or whether the market is highly diversified);
- Products actively traded: Within Day, Day Ahead, Balance of Month, Month ahead, Quarter ahead, Season +1, Season + 2, Year + 1, Year + 2, Year + 3;
- Bid offer spread for products traded[11];
- Churn.

Other measures could also be considered including comparisons with numbers of active traders at adjacent hubs[12].

2.4 Transitional arrangements for liquidity provision

In the early stages of hub development, the growth in liquidity may be slow. There are a number of measures available to regulatory authorities, to market participants and to service providers that may help act as catalysts to liquidity.[13]

[11] The ICIS Hub Tradability Score is based on the bid offer spreads on the products listed.

[12] Common definitions will need to be established. These are not recommended here, but will be addressed in a later phase.

[13] See also *Liquidity Providers in European Gas Markets* (EFET) 18/09/2006

2.5 Additional points to consider

It is questionable whether early establishment of an exchange contributes greatly to growing liquidity, to an extent that justifies the costs. Attempts to set up an exchange before trading arrangements have bedded down can indeed be counterproductive, as it may use a trading contract that does not reflect terms traded OTC.

Obligations to sign up to an exchange – and in particular to allow third parties such as the Hub Operator to transact on an exchange on behalf of a shipper/trader (e.g. CEGH, Austria) – are to be avoided wherever possible. These may unnecessarily expose physical shippers to financial regulation and to raise barriers to entry for smaller shippers, at the same time as raising compliance problems for companies who must allow third parties to trade on their behalf.

Where an exchange is appointed and holds a monopoly position, some regulatory oversight may be necessary to ensure that the exchange meets user needs (e.g. provides an acceptable service, adopts trading terms that correspond to bilateral contracts, connects to the most commonly used trading/brokerage platforms).

Minor, practical difficulties have also emerged that merit consideration.

- The practice of requiring separate network user id's for trained individuals does not reflect how operational arrangements for network users who rely on shift teams of multiple individuals to provide a 24 hour service.

- Requirements to provide separate communication channels for particular exchanges rather than use of a common interface create unnecessary complications for companies wishing to trade multiple hubs and to use a single common front end for all hubs.

Different hubs report trading statistics on different bases, making comparisons less accurate. Common reporting definitions and formats would be helpful.

Governance arrangements for ongoing development are essential. Network access and hub trading rules will need to change to reflect European and national legislation, and changing market circumstances. To lock into trading arrangements e.g. in primary legislation that can only be amended by Government would prevent such changes from taking place, which will reduce the attractiveness of the hub. Alternative checks and balances should be established, but which allow more dynamic development.

New license arrangements may need to be created. If the role of hub operator is not taken by the TSO or by an exchange, then this role may not be defined in law. They may therefore not be subject to the same confidentiality requirements as is imposed on TSOs, which may in turn give rise to concerns over ownership of the hub operator. Similarly, if the operator is to offer services at the hub, they may need to become a licensed signatory to the local network code. Suitable thought should be given on whether they can take the role of shipper, or an alternative classification should be established.

Guidelines for Good Practice for Hub Operators could aim to set common arrangements at hubs without unnecessarily impinging on commercial arrangements. A suggested scope for such guidelines is included in Appendix 2.

3. Conclusions

The Third Internal Energy Market package, including the new EU balancing network code, is best delivered by gas networks that have entry-exit systems that contain a single VTP at which imbalances can be traded and cashed out. Well-designed VTPs can develop into robust and liquid trading hubs where the Hub Operator provides a wider range of services to market participants.

- Good hub design can contribute to the attractiveness of a hub to market participants, and can reduce unnecessary risks and costs. It should complement other activities to promote a welcome trading environment.

- Introduction of services in the order described will help avoid unnecessary reworking and early expense creating services with low demand.

- Additional regulation and legislation may be necessary – particularly where Hub Operator has not already been defined. Governance rules should also be explicitly included.

- Definition of the roles of different stakeholders will help greatly in assigning responsibility to deliver the steps identified for creation of a well-designed, operational hub.

- A range of parameters may be used to measure and track the maturity of the hub and the level of liquidity at that hub.

- It is important to consult and to recognise the needs of market participants at all stages of development, to ensure that errors are not built into the system that could more easily be corrected at an early rather than late stage.

The design of the VTP can clearly contribute to the attractiveness of trading at that location, but does not alone create the underlying desire to trade. Market conditions, regulation of trading, and wider conditions relating to network access are all relevant, but are not addressed in this paper. Nevertheless, it is hoped that this guide will assist regulatory authorities and hub developers to ensure that VTPs can best meet the demands of stakeholders and in so doing, evolve into efficient, well-functioning trading hubs.

Appendix 1 – Features of an Efficient Balancing Regime

Each member state may establish one or more balancing zones or be part of a wider regional balancing zone. Each balancing zone shall incorporate one or more TSO entry/exit systems. DSO systems should ideally form part of the balancing zone too, so that network users acquire the right of access to the relevant national balancing point with booking either entry or exit capacities..

Each balancing zone shall include a virtual trading point (VTP) at which network users transact bilaterally or through an exchange to buy and sell gas for a specific day. Within a balancing zone, each network user (including non-physical paper traders) will have a portfolio that it is responsible for balancing each gas day.

Harmonised rules and timescales regarding gas flow nominations and re-nominations at interconnection points shall be applied. This is to minimise the risk of gas in one balancing zone being unable to flow through an interconnection point to resolve imbalances in an adjacent market. These harmonised rules do not apply *per se* at other non-interconnection entry and exit points. However, TSOs may, in practice, be expected to adopt similar rules and timescales for operational expediency and to avoid any potential discrimination.

TSOs may reject nominations and re-nominations if they exceed the network user's allocated capacity (unless a re-nomination in excess of firm capacity constitutes a request for interruptible capacity – so called overnomination as foreseen in the CAM Network Code – or if other pay-as-use regimes apply[14]), if the implied flow rate is negative or if a re-nomination seeks to take effect before the effective start time.

At the end of each gas day any imbalance in a network user's portfolio (incorporating physical inputs and off-takes at all entry and exit points and all buy and sell trades at the VTP) is financially settled. The network user's imbalance is then reset to zero for the start of the following gas day. If a network user ends the day with a long imbalance position (i.e. inputs + buy trades > outputs + sell trades) it is deemed to have sold its long imbalance to the TSO at the relevant imbalance price (the marginal sell price). If a network user ends the day with a short imbalance position (i.e. outputs + sell trades > inputs + buy trades) it is deemed to have purchased its short imbalance from the TSO at the relevant imbalance price (the marginal buy price).

The relevant imbalance prices for financially settling network users' long and short imbalance positions are calculated each day based on the prices of the TSO's trades, in

[14] Particularly with regards to the challenge of organising flexible access to within-day capacity where pay-as-use regimes offer an efficient solution.

pursuit of its balancing actions, in short term standardised products on the trading platform. Typically only title trades at the VTP should influence imbalance prices. However, locational trades and temporal locational trades may be taken into account, subject to NRA approval.

In some cases, TSOs may not be able to rely solely on network users responding to end of day commercial incentives to safely or efficiently balance the system. For example, where there is a limited amount of line-pack in a balancing zone there will be less scope for network users to maintain imbalance portfolios during the day, as TSOs operating parameters will be tighter, and the lead time within which TSOs need system imbalances to be corrected will be shorter. Whilst TSOs could address this by taking balancing actions regularly throughout the day, this might generate significant balancing costs which may exceed the benefits of a pure end-of-day balancing.

TSOs shall consult on the type and need for within day obligations to use and how to apply them, prior to submitting them for NRA approval. Within day obligations, both new and existing, should meet certain pre-defined criteria. They must not pose a barrier to cross-border trade or market entry, or be applied where network users do not have sufficient information and means to avoid the charges associated with them. Network users' main balancing costs must relate to their end of day imbalances and their imbalances cannot be financially settled to zero within day. Finally within day obligations shall be cost reflective and the benefits must outweigh any potential negative impacts.

- As network users are primarily responsible for balancing the balancing zone they are ultimately responsible for the balancing costs and revenues arising from a TSO's efficiently incurred balancing actions, application of within day obligations, and
- end of day financial settlement of network users' portfolio imbalance positions.

The cash-flows associated with these activities are held in a balancing neutrality account and the net costs or revenues are attributed back to network users in accordance with a pre-defined methodology agreed with the NRA (e.g. by throughput or capacity).

In absence of sufficient liquidity in the short term wholesale gas market TSOs may implement any of the following interim measures. The extent to which TSOs need to use any of them should, following consultation, be justified in a roadmap report, along with a timeframe for their removal. The roadmap shall be updated every twelve months. Where interim measures are applied the roadmap shall foresee their termination within five years.

The five specific interim measures are:

- use of a balancing platform;
- an alternative to a balancing platform;
- release of a TSO's surplus flexibility;
- use of interim portfolio imbalance price determination; and
- use of tolerances.

Appendix 2 – Guidelines for Good Practice for Hub Operators

The following topics should be considered under a scoping exercise for Guidelines for Good Practice:

- Clarity over what services are to be offered as a base requirement by the TSO, and should therefore not be chargeable by a hub operator, whether this role is carried out by the TSO, is assigned to a TSO affiliate, or contracted out to a third party.

- Relationship with TSO, any exchanges, market participants, other third party service providers including brokerage platforms.

- Services to traders including:
  - Accepting and matching trades;
  - Notification of mismatch and assistance to resolve;
  - Aggregation of trades and automatic nomination to the TSO;
  - Trade revisions and renominations;
  - Rules for mismatched revisions to trades (original trade should stand, rather than this become a means for one party to "bust" a trade by amending it unilaterally);
  - Compensation in the event of an error by the HO;
  - Isolation of trading chains in the event of a hub scaleback;
  - Additional services such as "wheeling" between hubs (this would include transfer of imbalances across high-cal/low-cal or domestic/international nodes).

- Market surveillance
  - Reporting (including reporting of trades under REMIT);
  - Clarity of exposure to financial regulation (would additional services bring a platform under scope of EMIR).

- Tariff setting guidelines where the hub operator is an effective monopoly.

- Rules for selection/appointment of a hub operator in the event that it is tendered out to a third party.

- Confidentiality provisions.

- Data exchange rules (interoperability).

– Connection and interface provisions with brokerage platforms and exchanges.

– Ownership and in particular whether “third country” provisions relating to ownership of critical infrastructure under European legislation apply also to Hub Operators.