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The Outlook for a Gas Hub in SE Europe

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The Outlook for a Gas Hub in SE Europe

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Outline

- Study purpose
- Gas price formation mechanisms
- Oil indexation vs. gas-on-gas competition
- Stages of market development
- Hub types
- A gas hub for SE Europe
- Roles of hub participants
- Generic hub design
- Conditions for successful hub operation
- The case of Greece
- Gas hub location
- Next steps

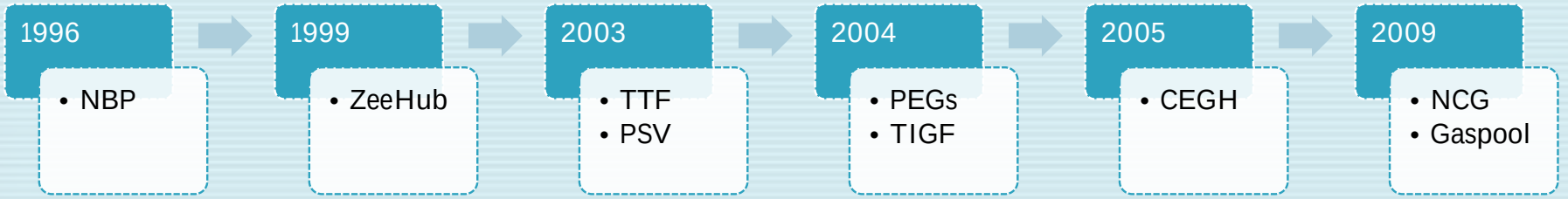
Study Purpose

Purpose

- Examine the conditions and prospects for establishing a regional Gas Hub for South-East Europe

Changes in gas price formation

- According to the International Gas Union, gas-on-gas competition in Europe increased from 15% in 2005 to 45% in 2012, while oil indexation decreased from 78% to 50% during the same period.
- Today, there are nine natural gas hubs operating across Europe.



RAISON D' ETRE

Gas hubs were made possible following a change in attitude towards trading

- "The development of the gas hubs in Continental Europe has been the result of a change in attitude towards trading", says the Oxford Institute of Energy Studies.
- The EU has shown a keen interest in the liberalization of the European energy markets for many years but their efforts have been redoubled recently and there is now a tight framework in place to ensure that the goals are achieved. However, legislation alone cannot effectively deliver the changes required to create a successful free and open traded market environment.
- It is essential that the participants of the market in question are willing to see change and that they actually embrace it; it is apparent that since 2010 there have been changes in attitudes to gas trading both by sellers and, especially, by buyers.
- A final contributor to the changing gas market in Continental Europe has been the push by the exchanges to open up the markets by offering new products on 'easy to trade' electronic platforms

RAISON D' ETRE

Why a gas hub for SE Europe (a)

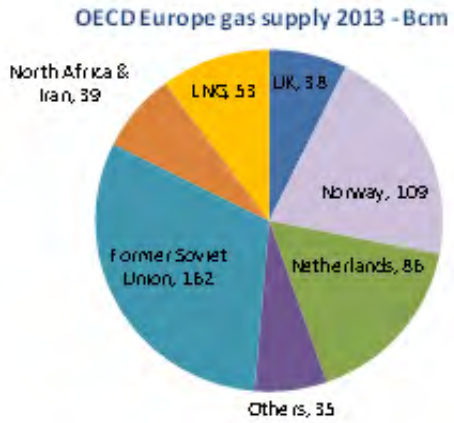
- Anticipated gas demand growth in all four countries of SE Europe – Romania, Bulgaria, Turkey, Greece – will ensure that higher gas volumes will be there by 2018/ 2019
- EU's Gas Target Model will most likely be fully implemented by 2016 which means that cross border gas trading will be much facilitated
- Cross border gas trading to be facilitated also by the emergence of several interconnectors in the region
- In view of increased gas volumes and the anticipated entry of new gas suppliers there will be a need for a regional mechanism (read hub) to help parties manage their gas portfolios and optimize them both physically and financially

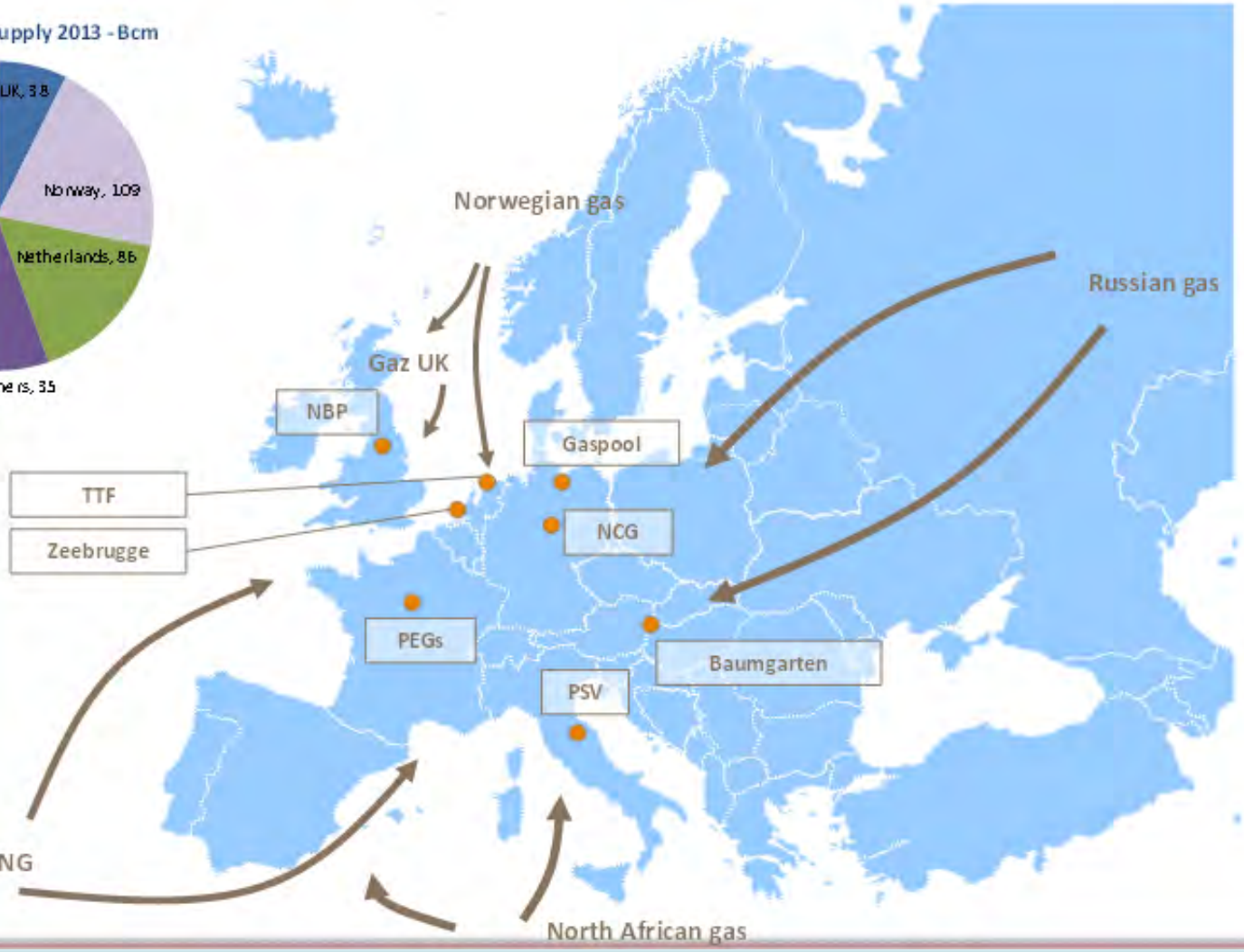
RAISON D' ETRE

Why a gas hub for SE Europe (b)

- A regional gas hub will help increase the volumes traded and provide too a sound risk management tool
- A regional gas hub in SE Europe will help further in the transformation of European gas market, whose demand is likely to reach some 600 bcma by 2020
- At the end of the present decade European gas market demand will be met by further diversification of gas supply sources and with the ability to move gas around relatively more easily from region to region
- SE Europe, placed between East (i.e. Russia, Caspian region) and West (North America) and South (LNG supplies from MENA) will be able to participate via increased pipeline flows and flexible LNG flows through organized gas hubs

Gas supply and main market places in Europe

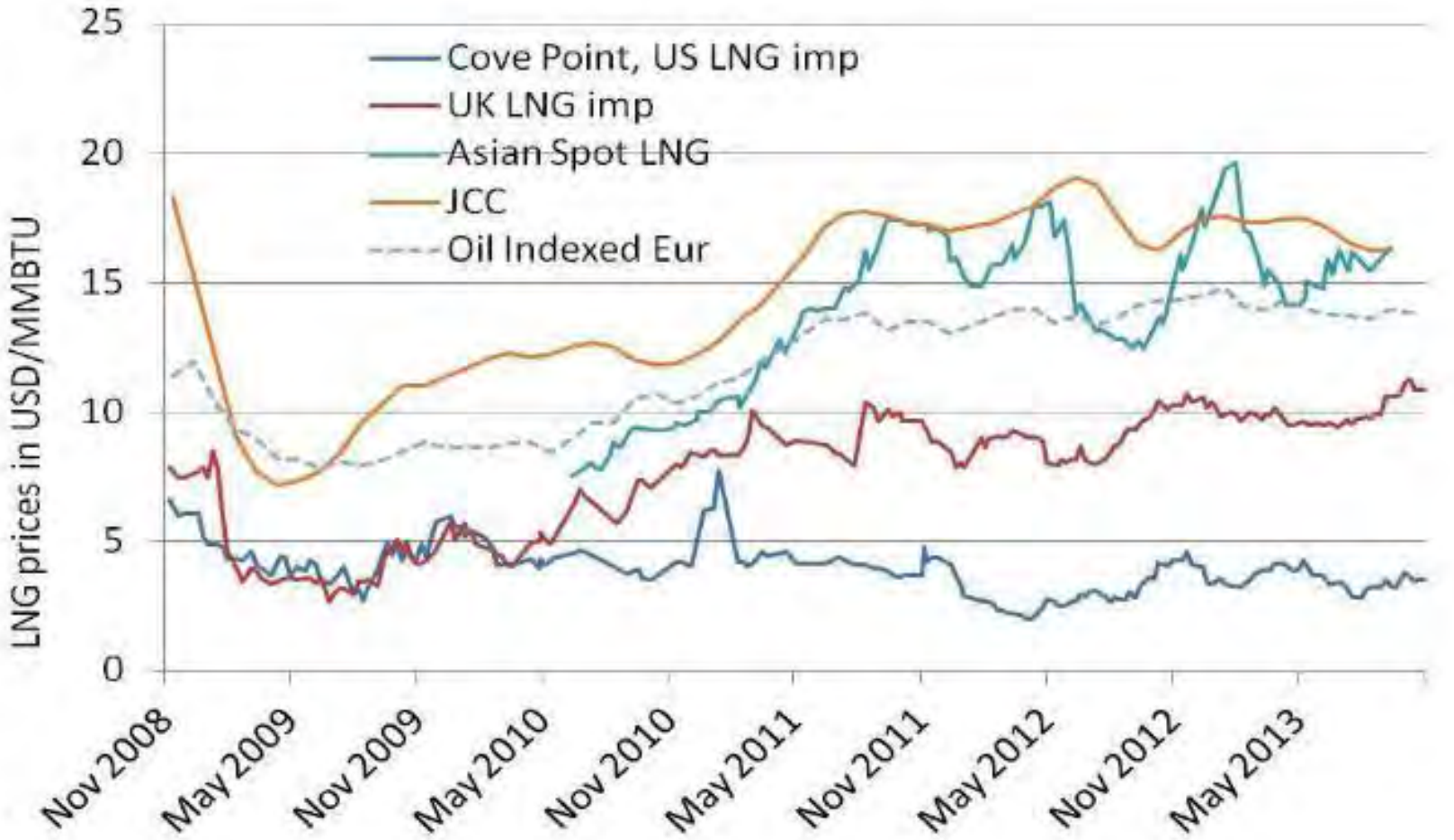




NBP (and US Henry Hub): structural liquidity!

Continental Europe: more short term liquidity, fuelled recently by gas oversupply.

Nat gas prices around the world – No global gas market, but many regional ones



Gas price formation mechanisms

Oil indexation

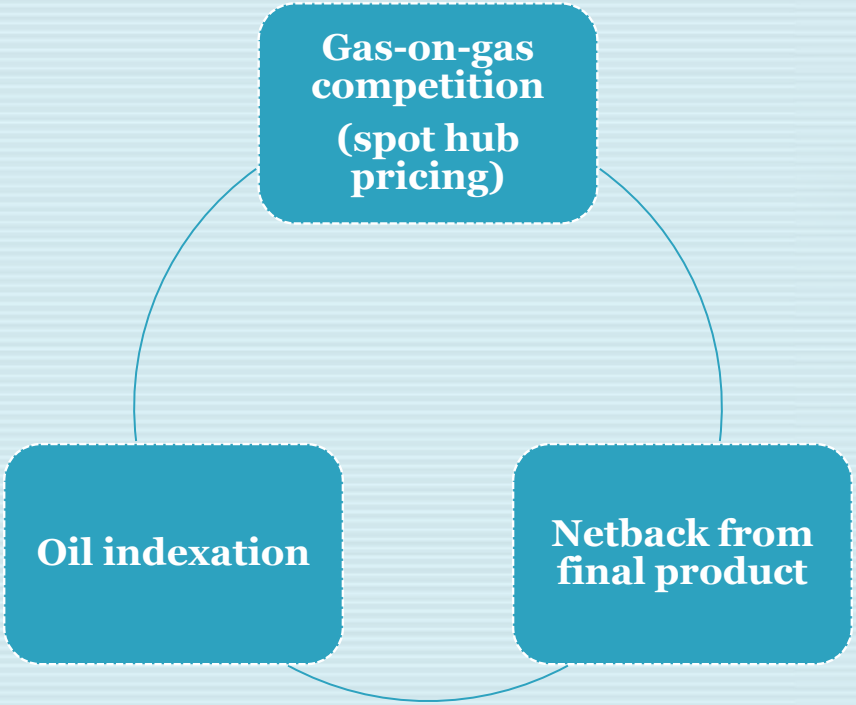
- The price is linked to competing fuels such as crude oil, gas oil or fuel oil, usually through a base price and an escalation clause.

Gas-on-gas competition (spot hub pricing)

- Indexation to spot prices determined by supply and demand of natural gas traded in physical as well as notional hubs.

Netback from final product

- The price received by the gas supplier is a function of the price received by the buyer for the final product the buyer produces (most commonly ammonia).



Oil indexation vs. Gas-on-gas competition

- Oil-indexed long-term contracts prevailed in the gas sector because they were considered to ensure investment security for the producer as well as security of supply for the consumer.
- Oil-linked prices were also considered more predictable. However, they are now under pressure by a number of factors (2008 financial crisis, full liberalization of British energy markets, deregulation of European electricity prices, shale gas arrival).
- The 20-30-year contracts of most European pipeline imports are still oil-indexed to a large extent.

- A gas price mechanism which reflects the market value of the product should be considered as a natural evolution for the pricing of a commodity.
- It is widely regarded that gas-on-gas competition provides the "right" price of gas.
- Another advantage of market pricing is that it allows for separate financial risk management since it separates the "financial" from the "physical".
- Market pricing is also more transparent and open.
- The big question is whether traded gas markets will become the dominant gas price-driver in Europe.

Stages of market development

SE Europe

Bilateral transactions

- no price discovery
- no standard agreement

Marketplace for balancing

- within day, day-ahead and month-ahead trading
- standard contract agreement
- marketplace for transactions
- price reporting
- new participants

Forward market

- possible to buy gas for future delivery
- index information at hub
- entry of financial players in the market

Source: Eclipse Energy Group

Hub types (OIES)

Trading hubs

- Mature hubs which allow the participants to manage gas portfolios.
- Britain's National Balancing Point (NBP) and the Dutch Title Transfer Facility (TTF).

Transit hubs

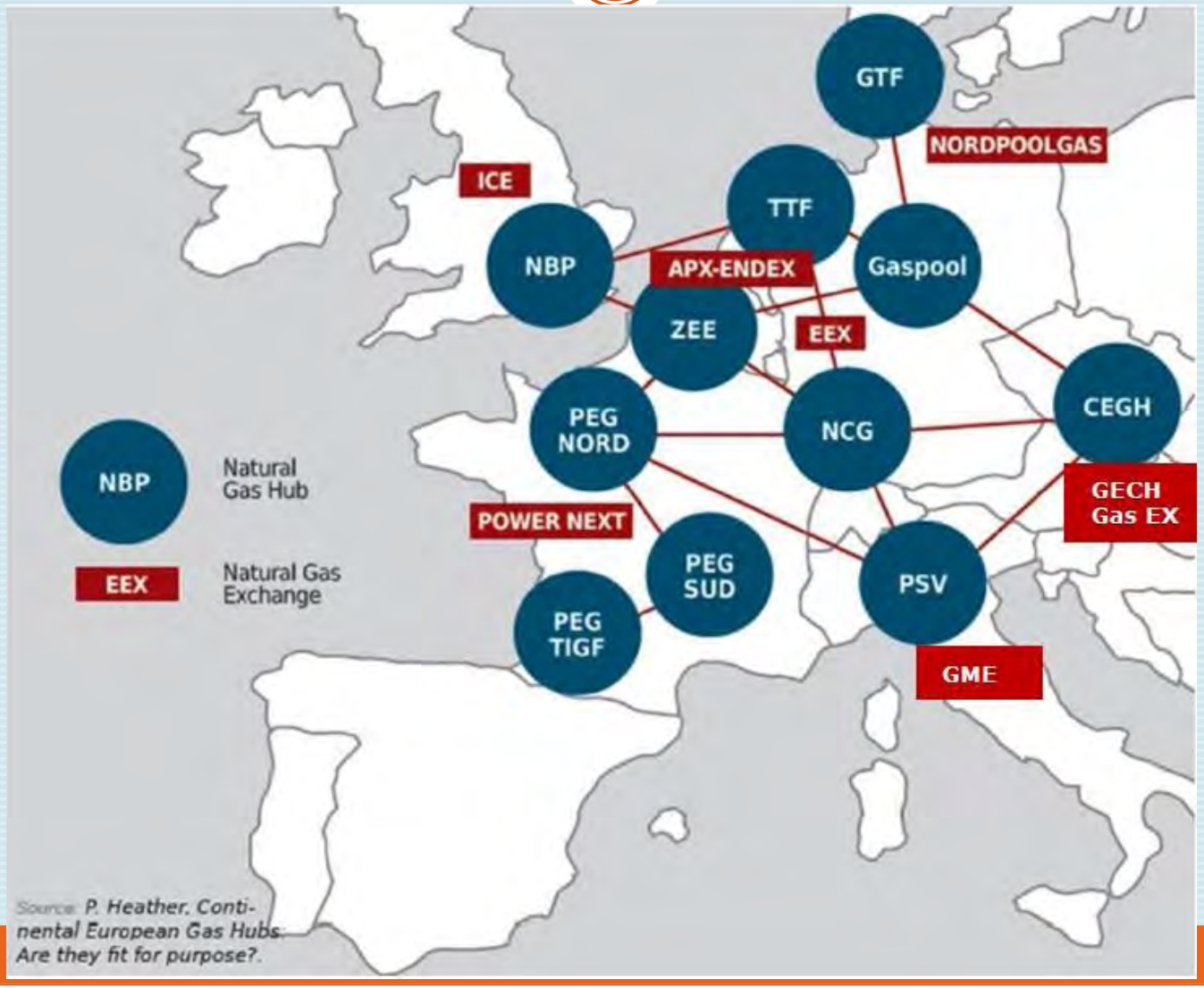
- Physical transit points where natural gas is physically traded, the main role of which is to facilitate the onward transportation of gas.
- Central European Gas Hub (CEGH) in Austria and the Zeebrugge hub (ZEE) in Belgium.

Transition hubs

- Virtual hubs which are relatively immature, but have set benchmark prices for natural gas in their national markets.
- German Gaspool Balancing Services (GPL) hub and the NetConnect Germany (NCG) hub, the French Points d' Echange de Gaz (PEGs) and the Italian Punto di Scambio Virtuale (PSV).

Source: Oxford Institute for Energy Studies

European gas hubs and exchanges



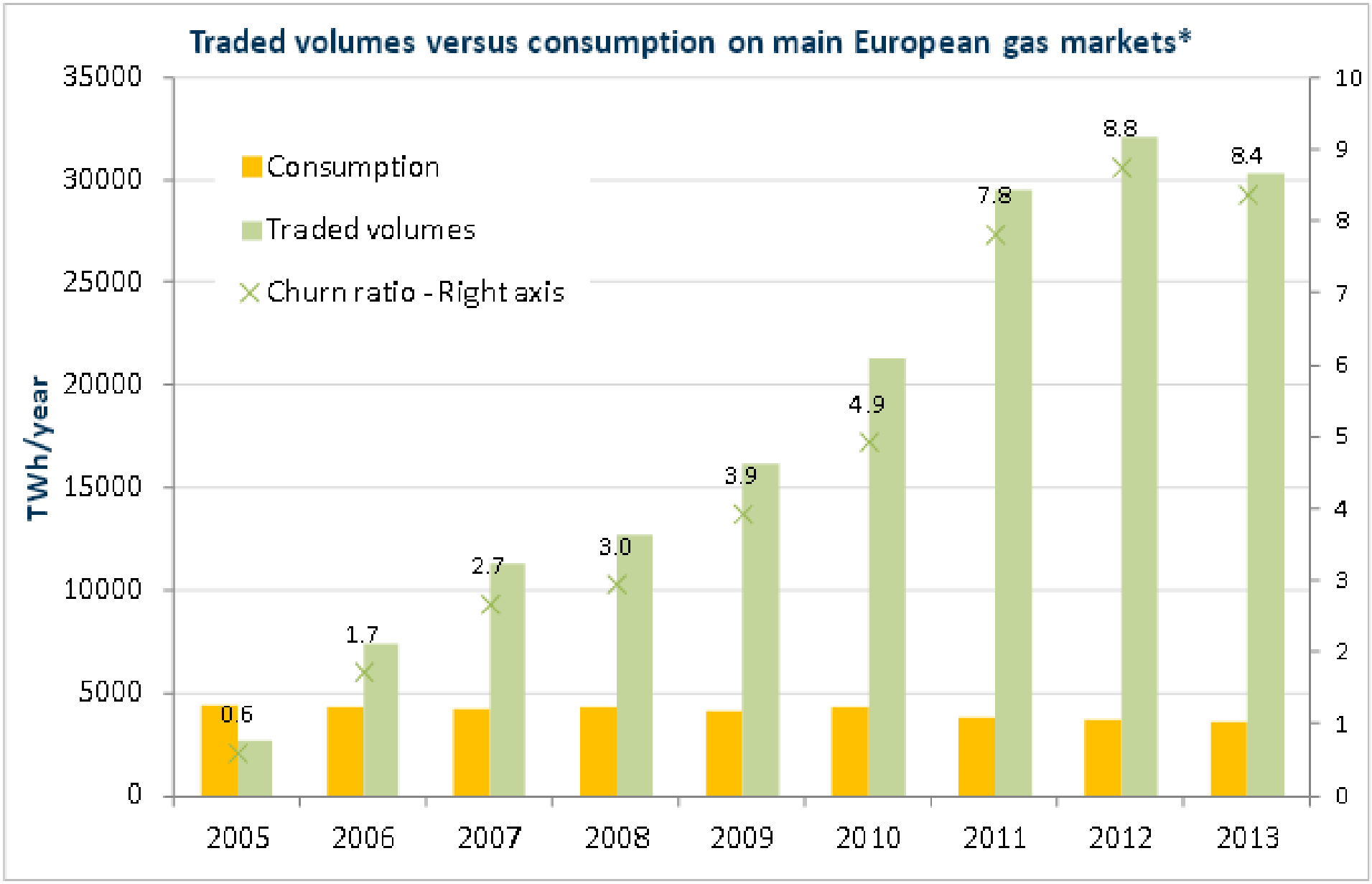
European gas markets and hubs

Source: Patrick Heather

A gas hub for SE Europe

- The establishment of a gas hub will facilitate the wholesale trading of natural gas between participants in South Eastern Europe.
- It will enable competitive markets to function, even though it will probably have an administrative role in the beginning of its operation.

stakeholders	hub participants
• shippers and traders • brokers who facilitate trading • regulatory authorities	• Trasmission System Operator (TSO) • Hub operator • Exchange



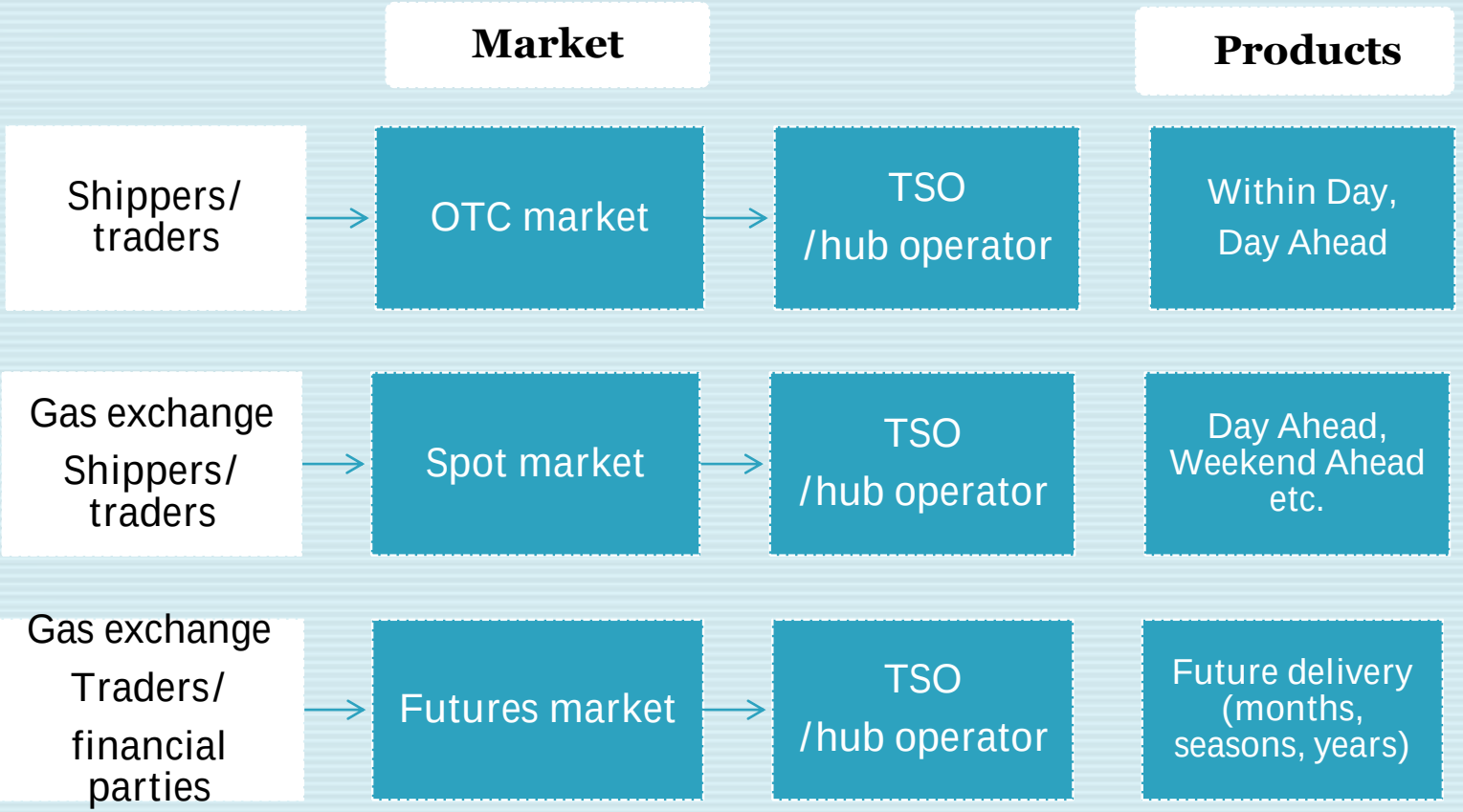
* UK, Netherlands, Belgium, Germany, France, Italy

Roles of hub participants of a VTP

TSO	Hub operator	Exchange
- Operates system - Accepts flow/trade nominations from system users - Facilitates virtual trading point through entry-exit - Provides Title Transfer service at VTP - Balances system via balancing market	- Platform for registration of OTC trades - Accepts notice from exchanges of exchange - based trades - Provides title transfer and matching services - Ensures trade firmness through back -up/-down - Runs balancing market - Market surveillance and reporting	- Central counterparty - Clearing and credit management - Notification of confirmed - trades to Hub operator /TSO - Licensed / regulated by financial authorities - Market surveillance and reporting

Source: EFET

Generic hub design (1/2)



Generic hub design (2/2)

- The natural gas hub will essentially serve as a common transaction point for a number of "sub-markets".
- The spot market is essentially a physical market with delivery obligations used for short-term, balancing purposes by shippers.
- While in a spot market gas is traded for limited time into the future, in a futures market gas products are traded with delivery at a future date (months, years).
- The futures market is a financial market and attracts non-physical players in order to hedge exposure.
- Physical parties (shippers) use the spot market in order to balance their portfolio and are usually less active on the futures market.
- Nevertheless, when moving from physical balancing on the spot market to a futures market, the physical gas supply and the virtual gas supply will meet at this hub - irrespective of whether the hub is physical or virtual.

A physical or a virtual hub? (1/2)

Physical hubs

- Gas is exchanged at a precise physical location, usually where several pipelines meet. Gas is delivered and off taken from this location by physical players, while pure traders buy and sell at the hub, but they never move gas from the hub.

Virtual hubs

- Gas is exchanged in a zone (part of a national or regional network). Physical parties import or export gas in/from the zone to end customers, whereas pure traders never import or export gas in/from the zone.
- Trading at virtual hubs does not require physical access to the hub.
- When moving towards an entry-exit system, virtual hubs are more suitable for gas trading.

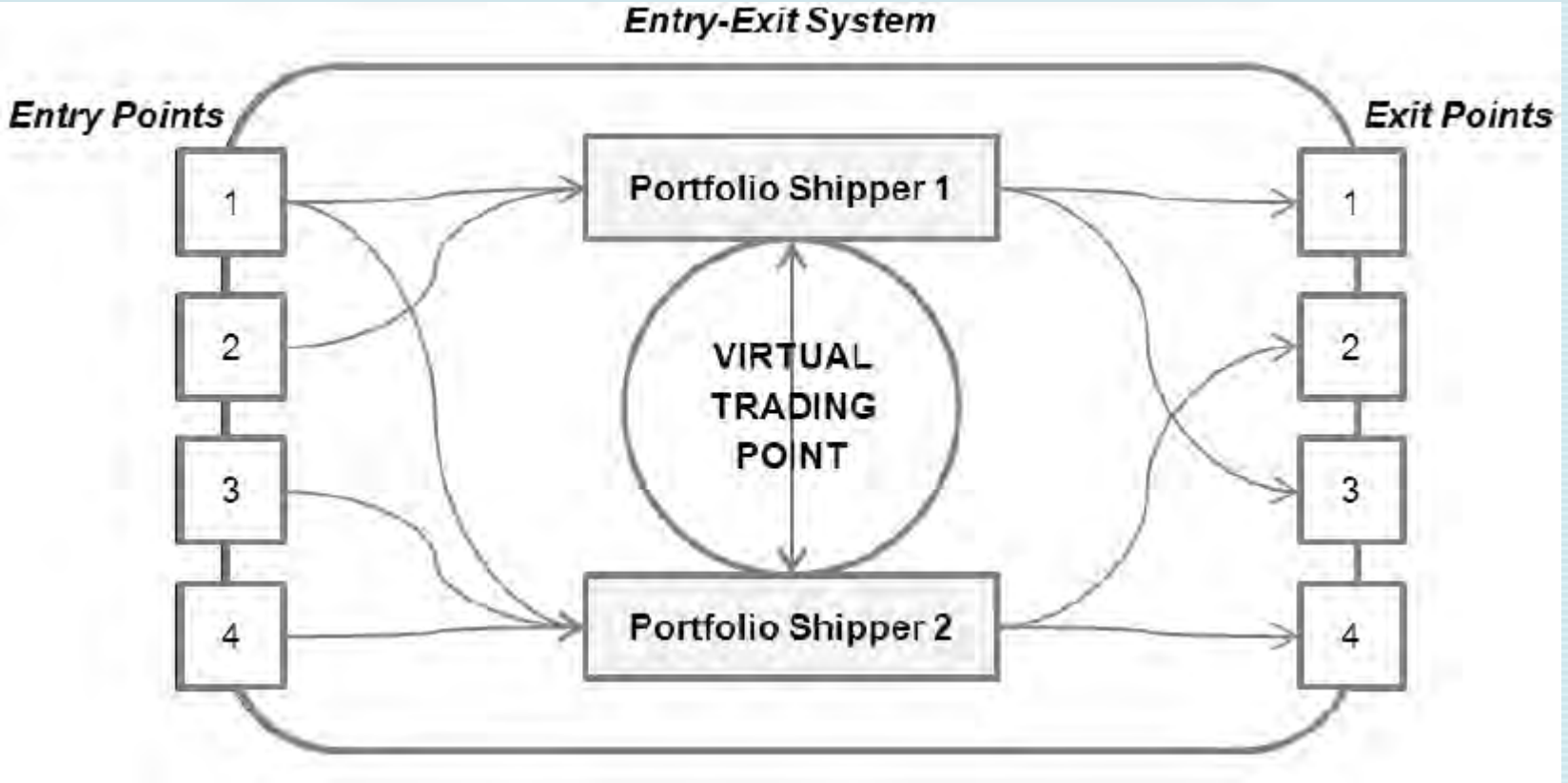
A physical or a virtual hub? (2/2)

At virtual hubs all gas which has paid a fee for access into the network (zone) can be traded.

At physical hubs, only gas physically passing at a precise physical location can be traded and this entails higher risks.

- A virtual hub can also serve as a location for operating a balancing market.
- The European experience to date has proven that virtual hubs present more rapid development than the physical hubs.
- The establishment of a virtual hub in South Eastern Europe would demand the creation of an entry-exit system with several zones. The Regulation (EC) No 715/2009 specifies that transmission system operators should have a de-coupled entry-exit system in place.

Entry-exit system



Source: IEFE - Centre for Research on Energy and Environmental Economics and Policy at Bocconi University

Conditions for successful hub operation

Diversification of supply

- Attracting and establishing multiple supply options, i.e. multiple entry points
- Availability of storage and reliable transport mechanisms are also vital, along with supply optionality, for the creation of a gas hub.

Liquidity

- At start, it is necessary that potential market participants express interest in participating in such a hub, thus ensuring initial activity.
- Series of factors affecting liquidity (number of active trading parties, volume nominated within the hub in per cent of volume traded, price volatility and price differentials between hubs, size of bid-offer spreads in the market etc.)

Transparency

- Product price must be transparent and all participants must have access to information.
- Building a regulated trading platform can contribute in creating a transparent environment which will provide reliable published prices.

Reliable delivery mechanism

- Shippers need to have uninterrupted access to capacity.
- As far as the financial players are concerned, if there is not enough volume to back up the physical delivery, the risk becomes higher for financial trading.

Standardization

- Making gas a tradable commodity is essential for the ability of the hub to "pool" transactions such that they can provide net positions.

The case of Greece (1/2)

Existing

Interconnections

- Interconnector Greece Turkey (IGT)
- GR-BG interconnector (Main line)

LNG terminals

- Revithoussa

Planned

Interconnections

- Interconnector Greece Bulgaria (IGB)
- Trans Adriatic Pipeline (TAP)

Storage facilities

- Underground storage facility in Kavala

FRSU

- Kavala
- Alexandroupolis

The case of Greece (2/2)

Greek Gas Network and International Interconnections

Source: DESFA

Planned regional gas infrastructure projects and their costs

Natural gas Project	Cost*
IGB	€180 million
TANAP	€805million (with TANAP's cost corresponding only to Turkey's European ground route)
TAP	€3.900 million
South Kavala UGS	€400 million
FSRU Alexandroupolis	€350 million
FSRU Kavala	€270 million
Total	**€5.905 million**

Gas hub location (1/3)

Turkey

- Largest market by volume.
- Several entry points for both pipeline transmission and LNG deliveries (6 at present, 8 potentially).

Bulgaria

- Small market but will soon become the European landing point for the giant South Stream pipeline (1 entry point at present and 4 potentially).
- Market operates under EU jurisdiction.

Greece

- A small but growing market with 3 entry points which potentially may increase to 7.
- Market operates under EU jurisdiction.

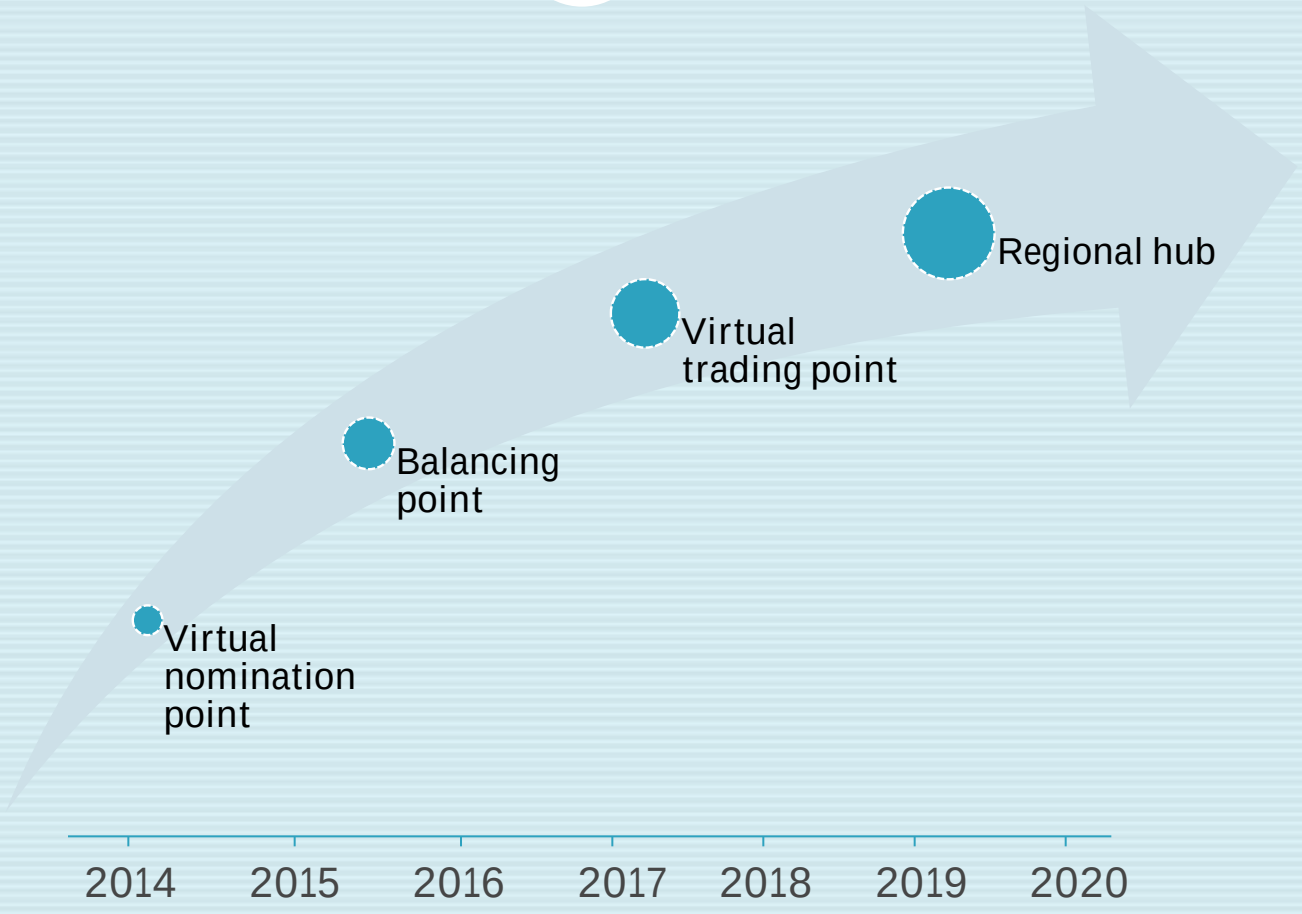
Gas hub location (2/3)

- Regional gas hub selection will have to take into consideration all the different characteristics of the three markets (Turkey, Bulgaria, Greece).
- A regional hub must combine market liquidity (i.e. gas volumes), experience in market operation, transparency of financial transactions and accommodation of trades from neighboring countries.
- The regional gas hub must have links with other European gas hubs and attain European approval and recognition.

Gas hub location (3/3)

- Can the Gas Hub be located in Greece?
  - The Greek TSO (DESFA) will operate a balancing platform by 2016.
  - The balancing point which will be operated by DESFA will have all the prerequisites to evolve in a virtual trading point.
  - By 2020 large gas quantities will become available via TAP. If in 2020 the trading platform is in operation and Greece has set up the primary and secondary market, it will have a competitive advantage over the neighboring countries.
- If physical, which is the best location for the hub?
  - Can the TAP/IGB/IGT junction serve as a physical hub?
- Gas Storage (in Greece) can serve as an important flexibility tool and may affect the location of the hub, if physical.

Potential gas market development in Greece



SWOT analysis for a gas hub in SE Europe

Strengths

- Multiple entry points in the future
- Development of infrastructure on track
- Planned storage facility will provide physical flexibility
- Alignment with the European Union regulatory regime
- Potentially multiple suppliers
- Setting up of balancing platforms is on track
- Exchanges with long history in the region (Athens, Istanbul)
- Regional economy with positive prospects

Weaknesses

- Inadequate infrastructure to date
- Inadequate storage facilities to date
- Inadequate entry points to date
- Non-existent balancing market to date
- Different consumption profiles in the region
- State dominance in the gas market at country level

Opportunities

- Introduction of competition in the regional market
- Establishing lower natural gas prices, which will reflect regional supply and demand
- Promotion of transparency and predictability in natural gas prices
- Establishing Over-The-Counter, as well as Exchange trading
- Creation of a spot and futures market

Threats

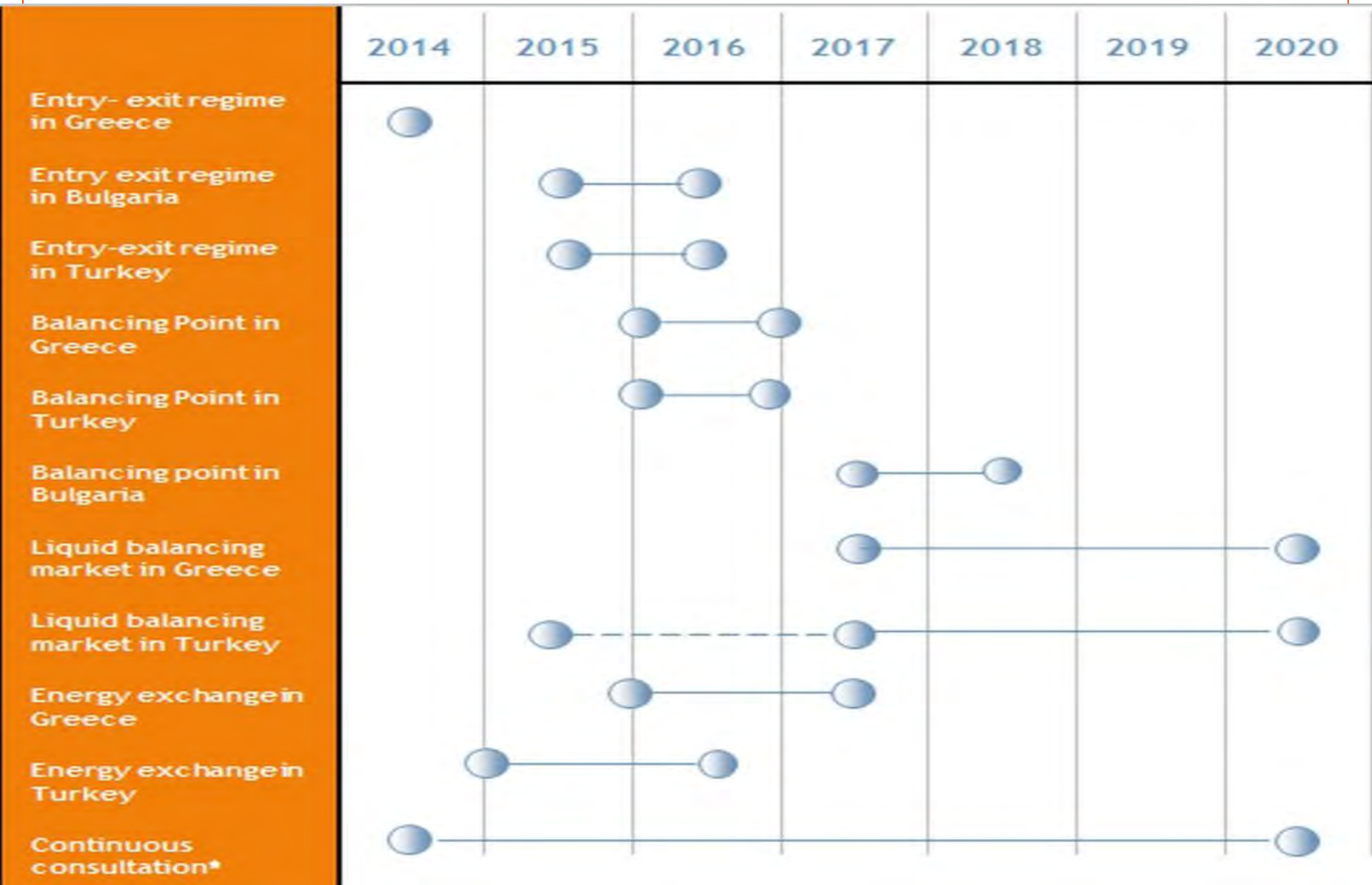
- Possible difficulties in ensuring adequate liquidity
- High possibility of bureaucratic delays
- Differences in regulatory regimes of countries in the region
- Possible difficulties in the cooperation between the different TSOs
- Serious difficulties in establishing a single node: It would require an entry-exit system across multiple TSOs, which will need to cover different regulatory systems

Next steps

It is too soon to talk about establishing a single node that covers multiple countries and regulatory jurisdictions.

- It is more important to implement Entry-Exit regimes with a virtual trading point.
- It is also necessary to establish continuous consultation between hub operators, TSOs, exchanges, shippers and representative trading organizations.
- Define the role of the Hub operator.
- Establish a liquid balancing market.
- Establish an energy exchange.
- Ensure that the roles of the TSO, the hub operator and the exchange are clearly defined.

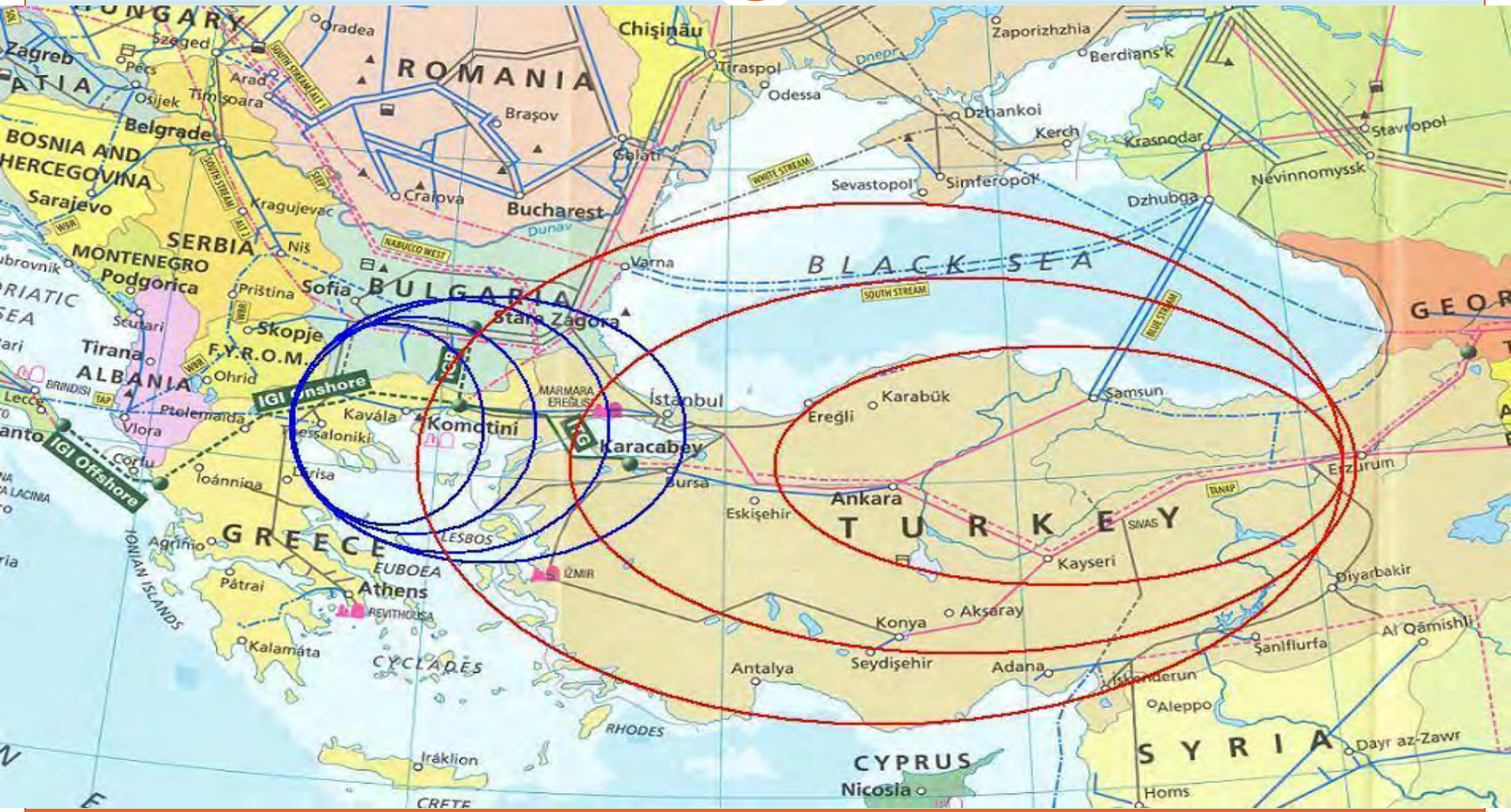
Roadmap for a regional gas hub - A road map for the establishment of these hubs is presented based on certain realistic assumptions.



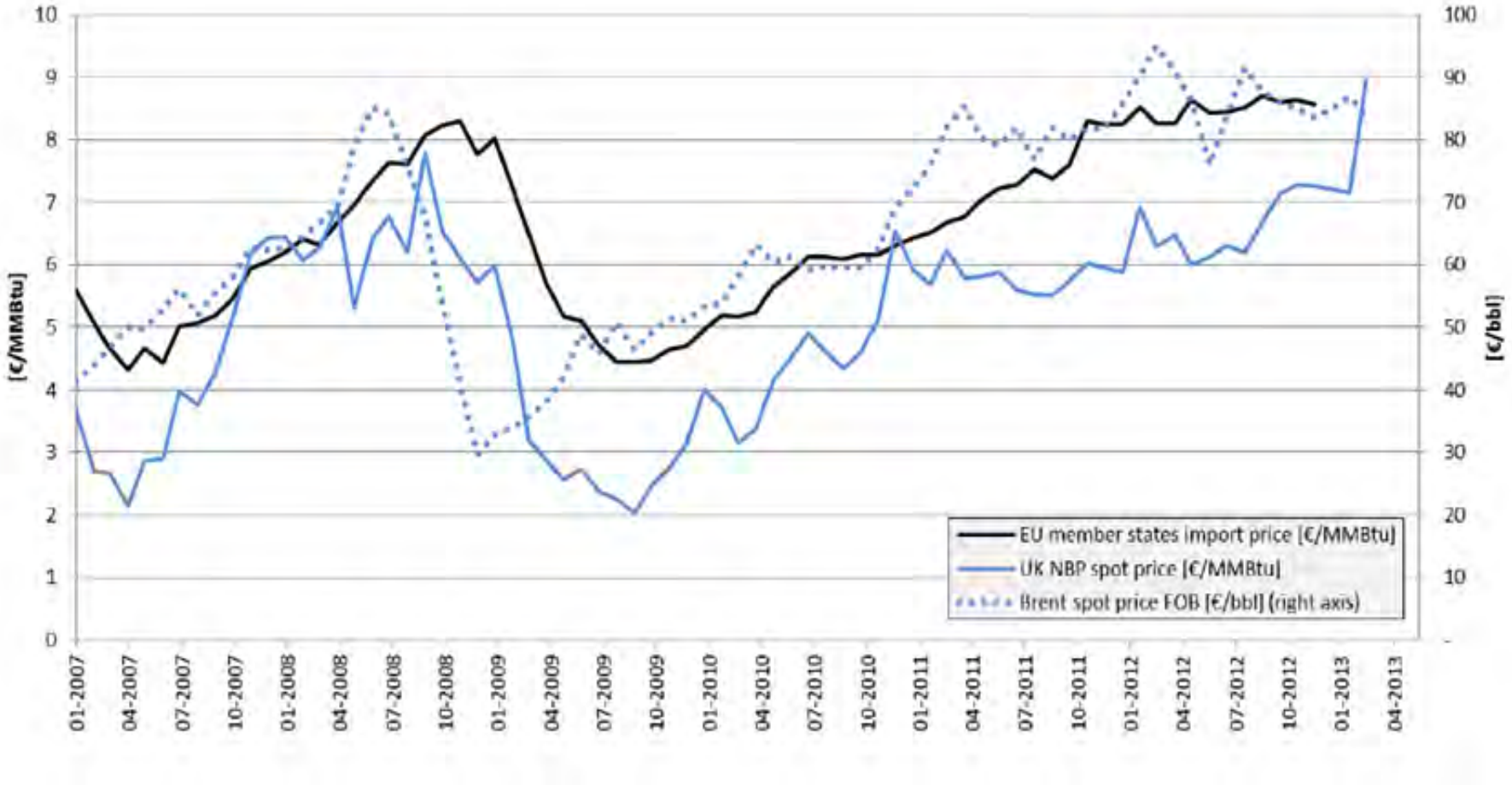
Scenarios for trading activity in the regional natural gas hub

Gas volume physically delivered (bcm)	Churn Ratios	Traded gas volume (bcm)	Traded value* (in million €)
1	1,5	1,5	462
	2	2	616
	2,5	2,5	770
	3	3	925
	4	4	1.233
	5	5	1.541
2	1,5	3	925
	2	4	1.233
	2,5	5	1.541
	3	6	1.849
	4	8	2.466
	5	10	3.082
3	1,5	4,5	1.387
	2	6	1.849
	2,5	7,5	2.311
	3	9	2.774
	4	12	3.698
	5	15	4.623

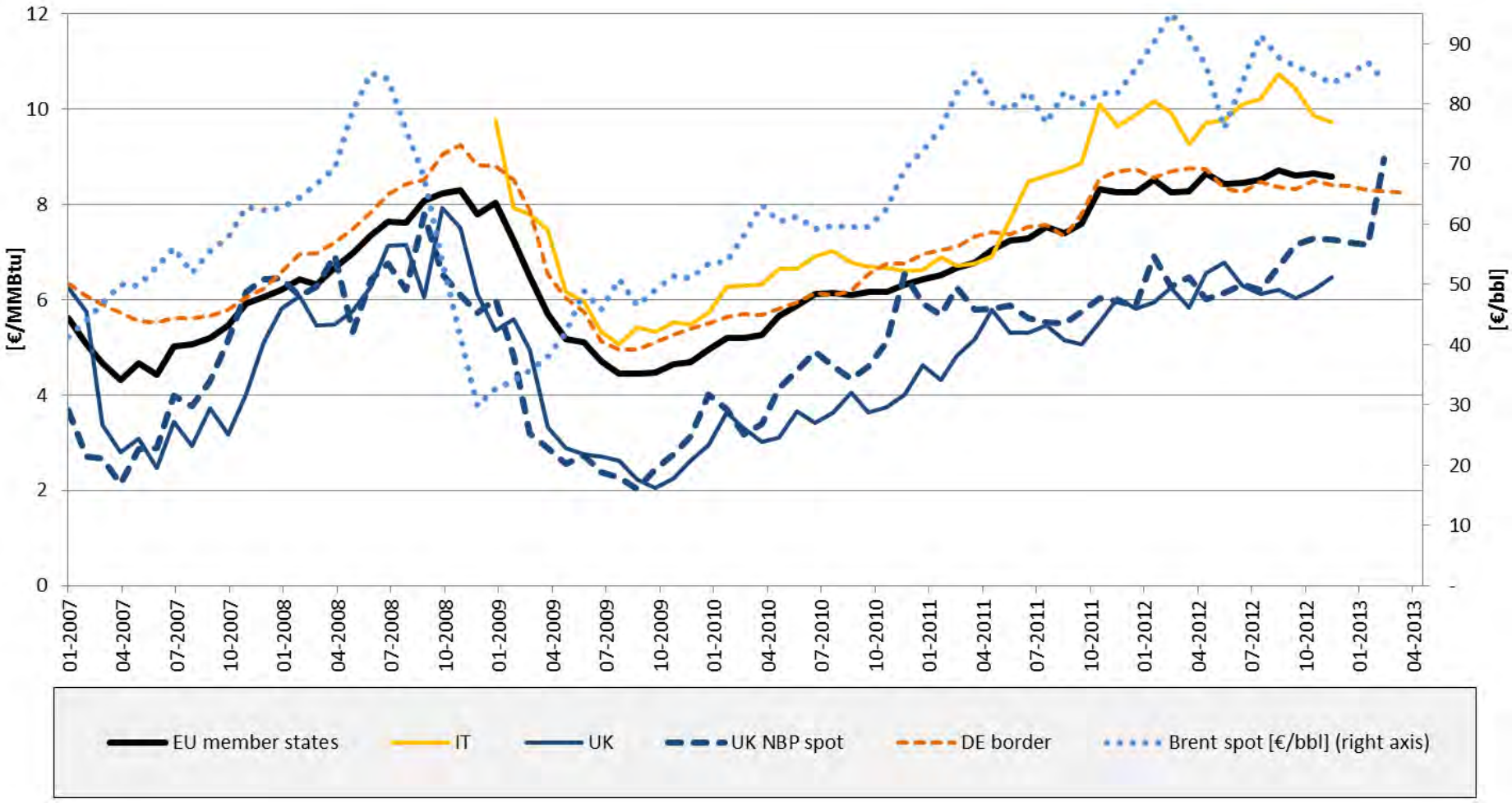
The Thessaloniki and Istanbul Gas Trading Hubs will between them cover a wide geographical range and adjacent trading zones.



Natural gas import and spot prices in Europe, 2007 – 2013



Natural gas import prices into European countries



Conclusions (1)

- two broad categories of Trading Gas Hubs: physical gas trading hubs and commercial hubs
- spot prices for gas volumes traded through the hubs are markedly lower
- available gas volumes in the region are set to increase sustainability by 2018-2020
- market liquidity will substantially increase with a parallel rise of gas trading opportunities
- the background is already set for the planning and establishment of one or two gas trading hubs
- the EU's role through its existing legislation and Directives is crucial towards the establishment of suitable conditions
- a series of key infrastructure projects (i.e. TAP-TANAP, IGB, South Kavala UGS, FSRUs) must be implemented

Conclusions (2)

- the process for the setting up and operation of at least two regional gas trading hubs has been set in motion.
- the broad concept is for two regional gas hubs (possibly in Thessaloniki and Istanbul) to handle between them the anticipated gas volumes that will be generated following the opening up of the regional gas market.
- having two regional exchanges will help considerably from a geographical aspect as the Istanbul one could take care of trades directed eastwards while the Thessaloniki one could deal with trades to the West and the North.
- The financial implications arising from the operation of these two likely hubs are considerable both in terms of planned infrastructure investment (of the order of €6,0 billion) and in terms of traded volumes (in excess of €4,0 billion per year with conservative churn ratios and minimal quantities).
- A SWOT analysis has revealed far more strengths and opportunities than weaknesses and threats.

Thank you for your attention

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