

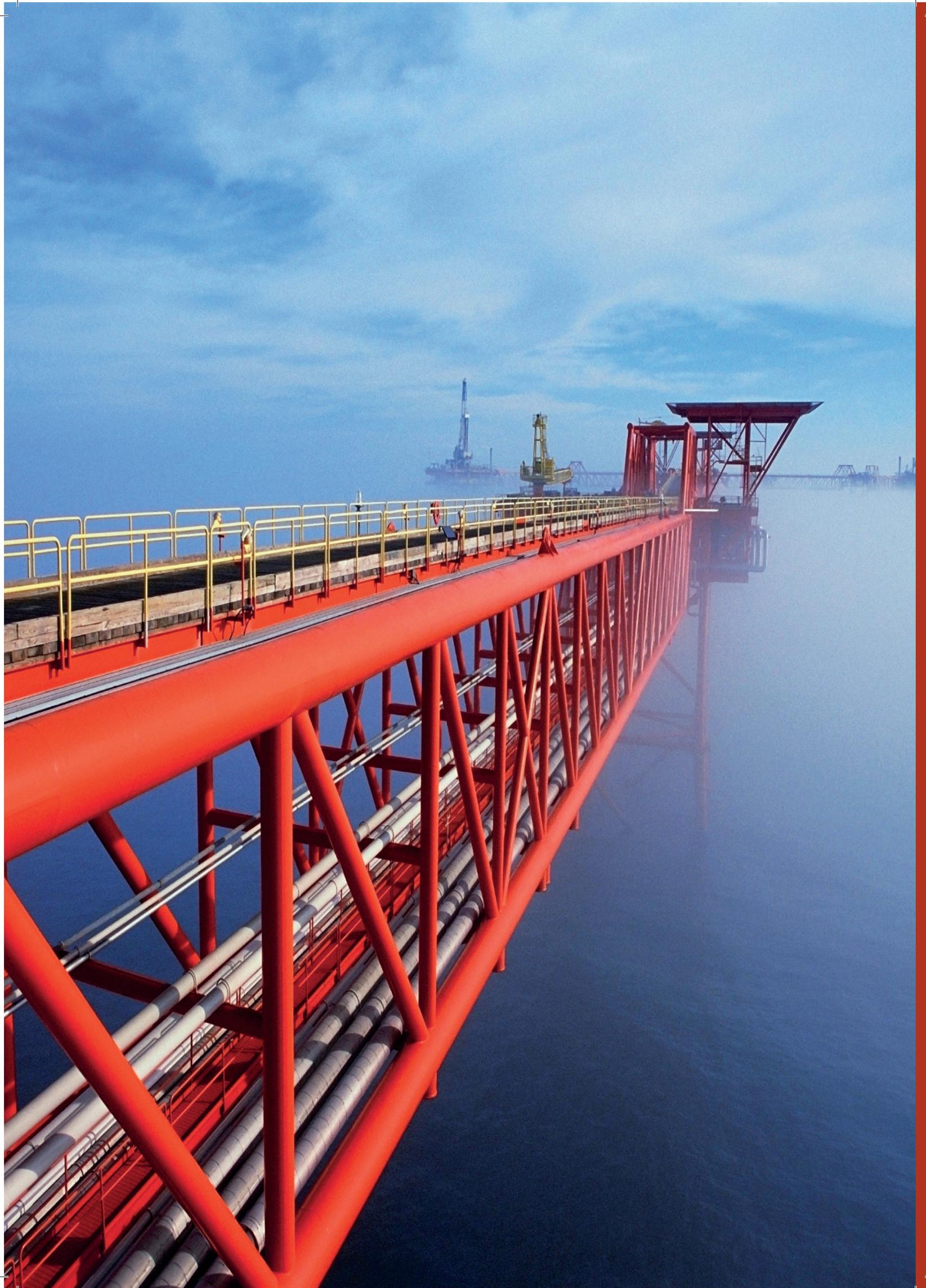


# Developing a Natural Gas Trading Hub / Exchange in Turkey

Final Report  
December 2013

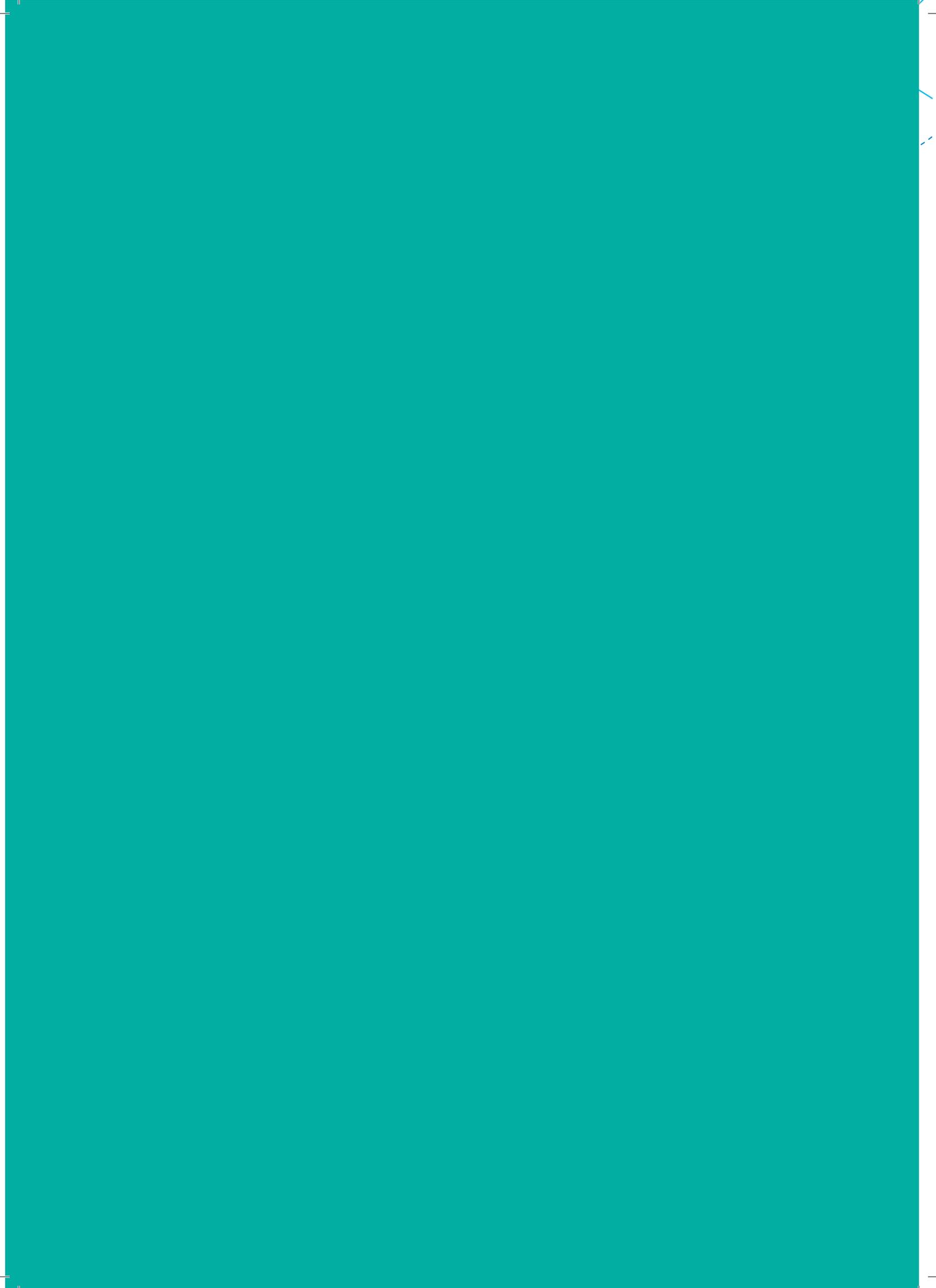
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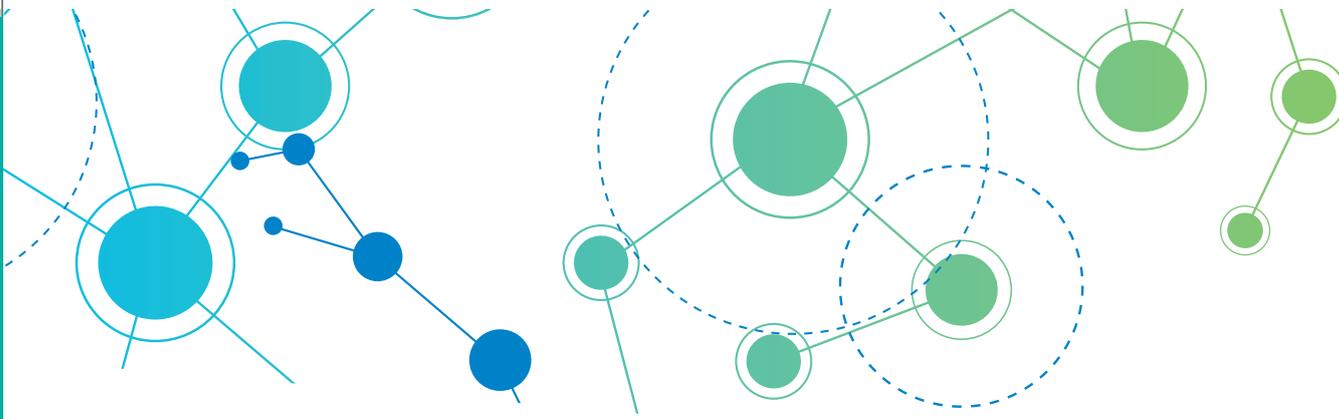
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# Executive Summary

The Turkish Energy Sector is going through significant change characterized by liberalization and achieving higher level of competition in order to meet its growing energy demand as one of the fastest developing nations in the world.

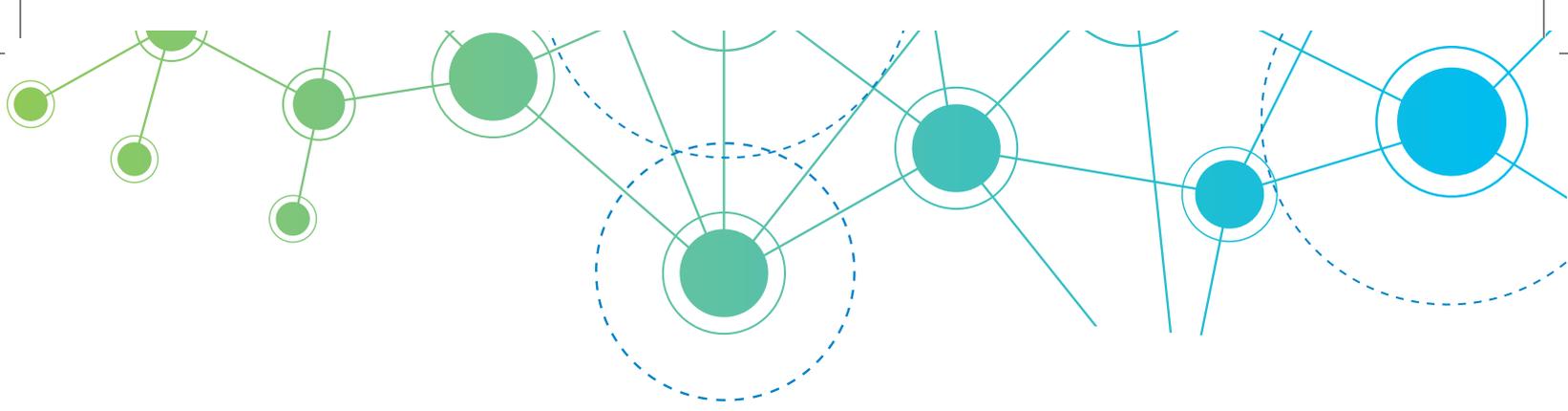
The start date of this liberalization for the natural gas market is usually accepted as 2001, with the enactment of Law 4646 which allowed significant advances to be made. At the same time, it needs to be recognized that many events dating all the way back to 1970's and 80's, such as formation of BOTAŞ and supply contracts signed with exporting countries still have an impact on the current state of the Turkish Natural Gas Market.

This report is developed by Accenture to analyze the Turkish and International Natural Gas Markets to develop recommendations and a roadmap for Turkey to achieve the desired level of liberalization and competition without jeopardizing key factors such as supply security. Although Accenture's engagement is commissioned by PETFORM and DIVID, the stakeholders for the engagement include the Ministry of Energy, the Energy Markets Regulatory Authority, Borsa Istanbul, BOTAŞ and the Market Players represented by the two associations. As such, this report has been prepared with strict neutrality and objectivity. The focus of the engagement is on Developing a Natural Gas Hub/ Exchange in Turkey. This scope requires analyzing the entire natural gas value chain from Exploration & Production on the supply side, through transmission and storage to Marketing & Trading and Distribution and Retail, because developments in any of these segments of the value chain have an impact on the ability to develop the marketplace. For example, lack of strict regulations on how and when consumers may switch to the Last Resort Supplier, impact the ability of shippers to have a balanced portfolio at beginning of the gas year and therefore hinder their trading capabilities throughout the year.

Natural Gas Hub and Exchange are terms that are sometimes used interchangeably, yet there is clear difference between the two. Experience shows that in order to have a successful exchange the following elements of technical infrastructure have to be in place: physical infrastructure, regulatory, operational and market & commercial frameworks. The ongoing efforts on improving physical infrastructure via the two compressors being built in the East to remove constraints, the upgrading of the Electronic Bulletin Board system and drafting of the new Natural Gas Law will all help in Turkey having an efficient natural gas hub which will catapult the development of a well-functioning marketplace in Turkey characterized by the Energy Exchange EPIAS.

The successful development of EPIAS is of critical importance in Turkey's objective to become a center of attraction for the region covering North Africa, Middle East, Caucasia and Eastern Europe. This is similar to the experience of the Netherlands, where the natural gas technical infrastructure was set up first, upon which the exchange was established. Recognizing the necessary elements in terms of infrastructure, regulations and transparency were in place, participants from other countries showed interest in the Netherlands turning it into a center of attraction for the region with significant amount of investment and trade going through.

Like any other country, particularly a developing one, supply security is one of the key concerns of Turkey and until today the approach has been mostly for BOTAŞ to secure supply through long term contracts. As a result, the supply side has been rather non-competitive. Experience from other markets shows how supply side (and there in turn wholesale and trading) can be made more competitive without jeopardizing supply security.



During the development of this report, subject matter experts from six markets (UK, Germany, Italy, France, Spain, and the Netherlands) with varying levels of competitiveness and liberalization were consulted. There are numerous lessons learned from these markets that would be of benefit for Turkey. For example, Germany's experience proves that despite lack of domestic production and having long term supply contracts with exporters such as Russia, achieving a competitive market is possible. Spain's approach to utilize LNG as a way to diversify supply and to introduce additional flexibility for shippers is another experience worth investigating for Turkey.

Analysis of international markets also shows certain common characteristics among these markets that can be considered as best practice. The unbundled and independent nature of the Transmission System Operator and Trading Arm of the incumbent is one such example. Enabling gas prices to be formed by the market without the influence of the dominant incumbent is another. Introduction of a marketplace for ancillary services, such as capacity and storage are additional elements that foster the growth. It is also worth noting that electricity and natural gas trading platforms are very much interlinked, with the same exchange operating both in most cases.

Analysis of the Turkish market's current state and international case studies enabled development of the following key recommendations for Turkey:

#### **Independent Transmission System Operator**

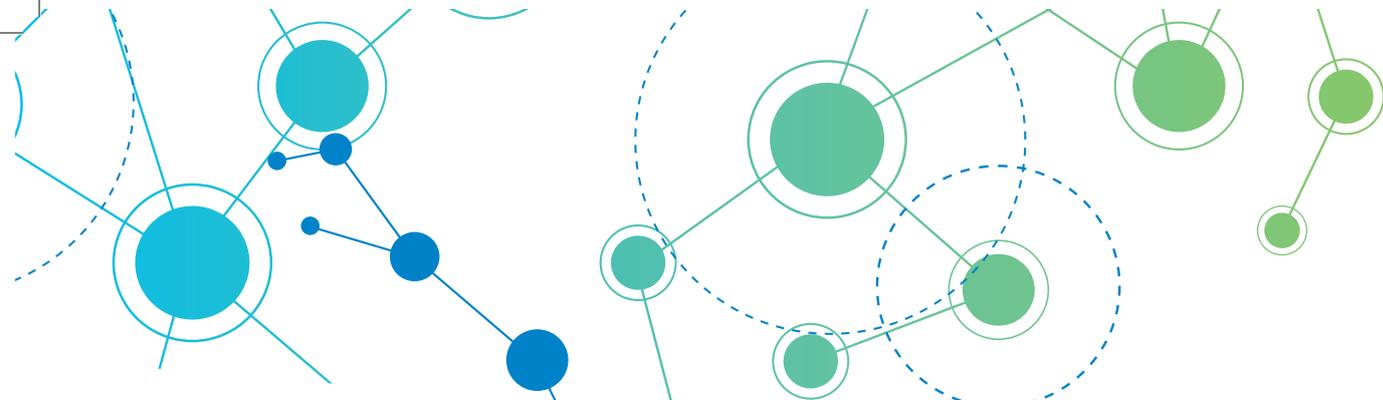
One of the key common features of successful international markets is that Transmission System Operator that is responsible for safe and efficient operations of the physical infrastructure is an independent entity. The fact that in Turkey BOTAŞ operates both as a trader and the system operator raises serious concerns regarding transparency and therefore impacts healthy development of a competitive market. As such, restructuring of trading and system operation arms of BOTAŞ under distinct separate legal entities will have a direct positive impact on development of competition and depth in the market.

#### **Comprehensive overhaul of the Electronic Bulletin Board (EBB) system**

Current EBB system has significant shortcomings. While the improvements targeted to be completed by end of 2013 are still ongoing, interim presentations made to market players about the progress shows the foreseen improvements are not at the desired level. Main shortcomings of the EBB system have been listed in this report. It is recommended that a comprehensive specification is developed following a detailed analysis taking this list as a basis and sufficient budget is allocated to make the much needed comprehensive overhaul of the system.

#### **Use of transparent, cost based pricing mechanism at BOTAŞ**

The prices BOTAŞ offers independent power producers are significantly lower than those offered to EUAS, Build-Operate, Build-Operate-Transfer plants. Additionally, BOTAŞ prices show no dependency on customer's consumption profiles, balancing and capacity costs prevailing in the market. This situation prevents other market players from being able to offer better prices to consumers and as such impacts the development of a competitive market.



### **Relieving the dominant position of BOTAS in trading**

Like in any other market, in the natural gas market the dominant position of any one player hinders the development of competition. In recent past, Turkey has taken successful initiatives to reduce the dominance of BOTAS in trading. To increase the level of competition it is important to continue these efforts through mechanisms such as contract and volume release.

### **Incorporation of gas indexed pricing elements in supply contracts**

In today's world, oil and gas are no longer substitutes for one another and as such, their prices are independently formed. Therefore, in an effort to limit the amount of unmanageable risk exposure natural gas traders are moving away from oil indexed pricing in their contracts. This is the reason countries such as Germany, which is heavily dependent on import gas have renegotiated their contracts with the exporting entity to incorporate natural gas price indices. Turkey as well, can renegotiate its supply contracts to incorporate gas price indices. While the ambition should be to utilize an index formed in the Turkish market, in the interim period international indices can be leveraged.

### **Increase in infrastructure investments and bringing them online in a speedy manner**

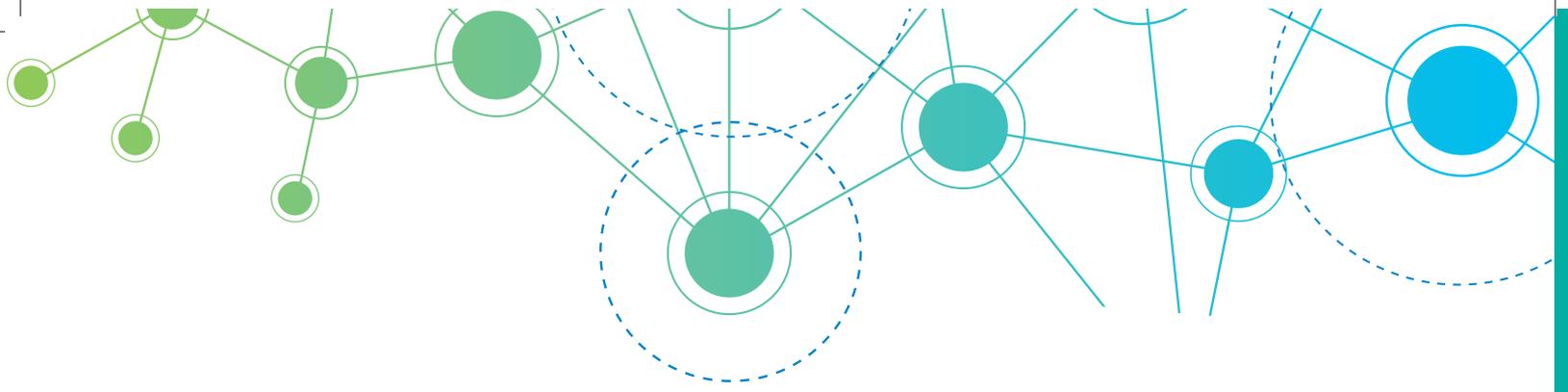
One of the prerequisites of having a well-functioning marketplace is the existence of a constraint-free network. This is the only manner in which "products" in the market can be decoupled from delivery points allowing for standardization and in turn increase in churn rates. Elimination of constraints in Turkey's network through pipeline, compressor, storage, LNG facilities investments will support development of the market and the energy exchange making Turkey a center of attraction for foreign investment. Various types of incentive mechanisms can be employed in order to speed up the development of these infrastructural investments by the private sector.

### **Increasing ownership of Turkish companies in natural gas fields abroad**

Turkey has made significant efforts in recent years to increase the exploration efforts in the domestic territories. A common practice in the international scene to support security of supply efforts is to acquire ownership in exploration and production blocks in other countries. Turkey as well can achieve this through state owned enterprises or by supporting privately owned companies.

### **Unbundling of distribution and retail companies**

Another common feature of all successful markets is the unbundled nature of distribution and retail companies and ease of switching providers. These efforts to liberate consumers promote more demanding consumers and therefore development of a variety of products and services. Through this, market players have more channels to create a competitive advantage and therefore increase competition in the market.



While the above mentioned recommendations are vital, it is recognized that their implementation will also take some time. As these recommendations are being implemented, in parallel focusing on short term activities that can be completed in 1-6 months will help move forward quickly. The below list of activities are recommended to be completed in the short term by public and private sectors, as they also set the basis for some of the long term recommendations captured above.

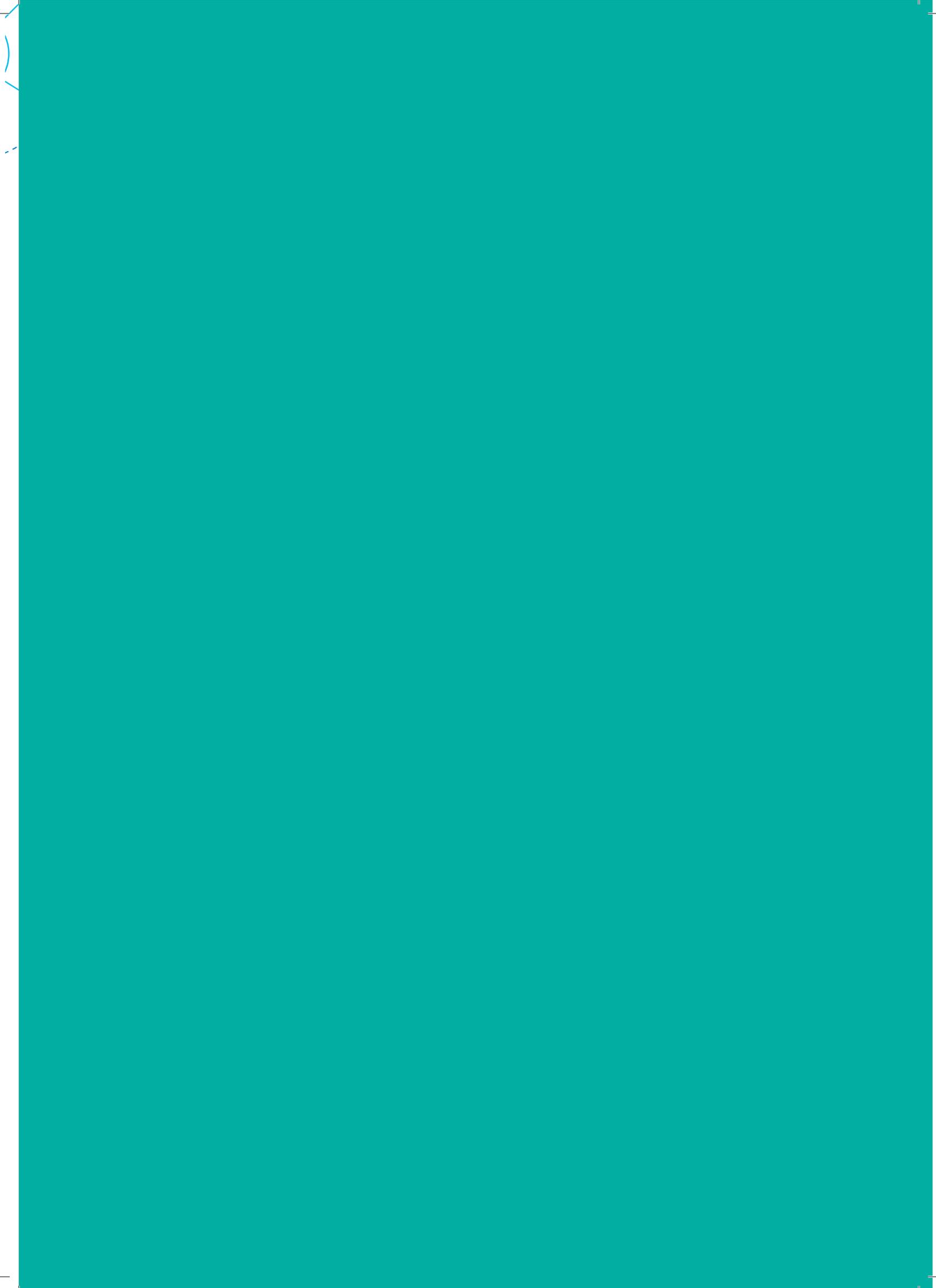
- Form a task force who will be responsible for preparing a detailed roadmap with assigned responsible parties and monitoring progress on the actions
- Perform study for identifying which markets' indices could be utilized for Turkey's supply contracts and how the pricing formulae could be shaped
- Perform n-1 study to identify Turkey's needs for complying with EU-wide accepted security of supply standards, taken at granularity of daily consumptions
- Perform a business case analysis comparing the loss from stamp duty elimination with gains from corporate tax
- Run feasibility analyses for identifying types (e.g. shore, FSRU), sizes and locations for LNG Terminals in Turkey
- Develop a web based system (possibly an extension to EBT) for BOTAŞ to make purchases in a transparent way; and indicate a reference price

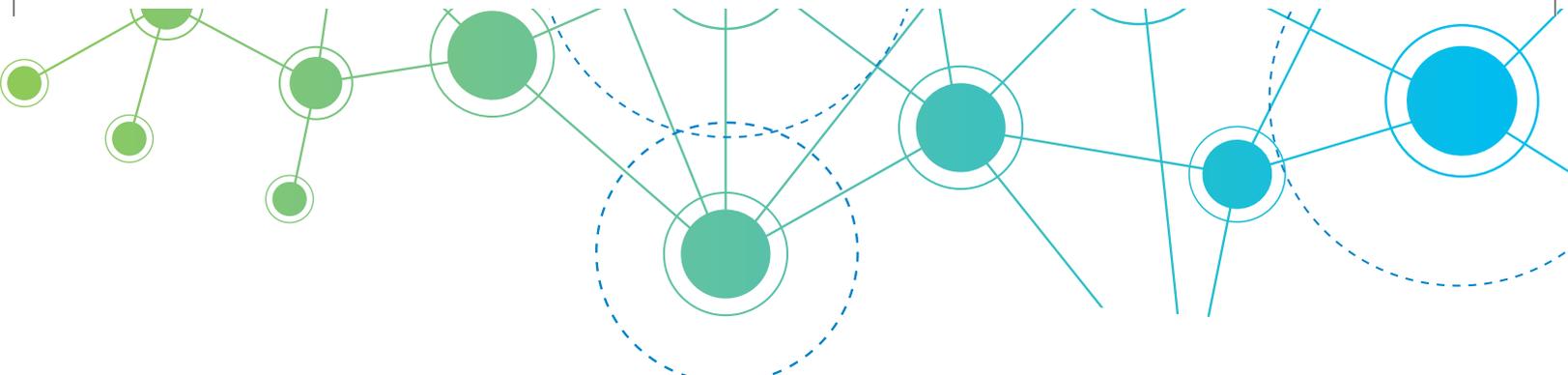
I would like to sincerely thank all the public and private sector representatives and my fellow colleagues who have helped in development of this report and hope this report will be beneficial for achieving the desired level of liberalization and competition in the Turkish Natural Gas Market.

Hakan Irgit

Managing Director

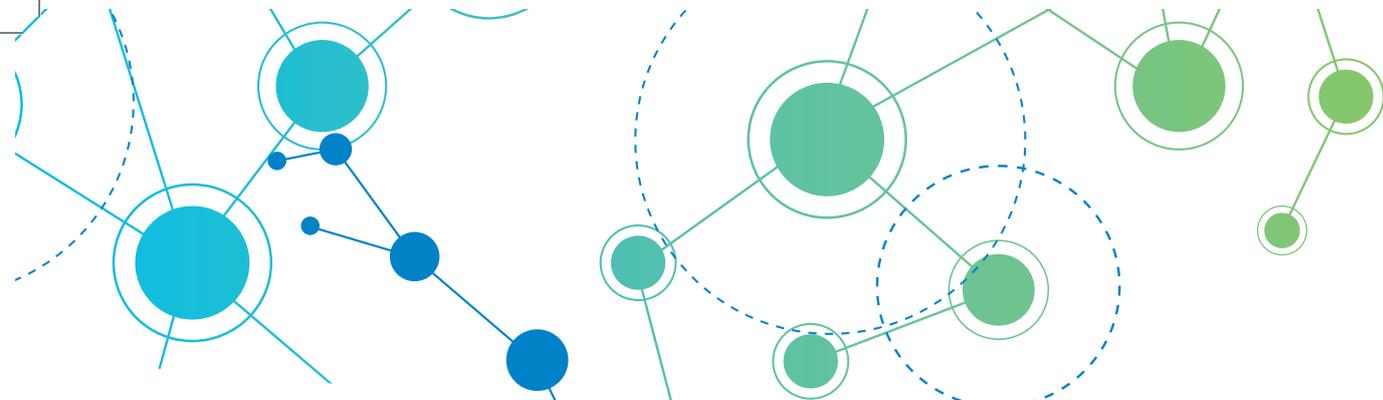
Accenture Turkey Energy, Utilities and Natural Resources Practice Lead



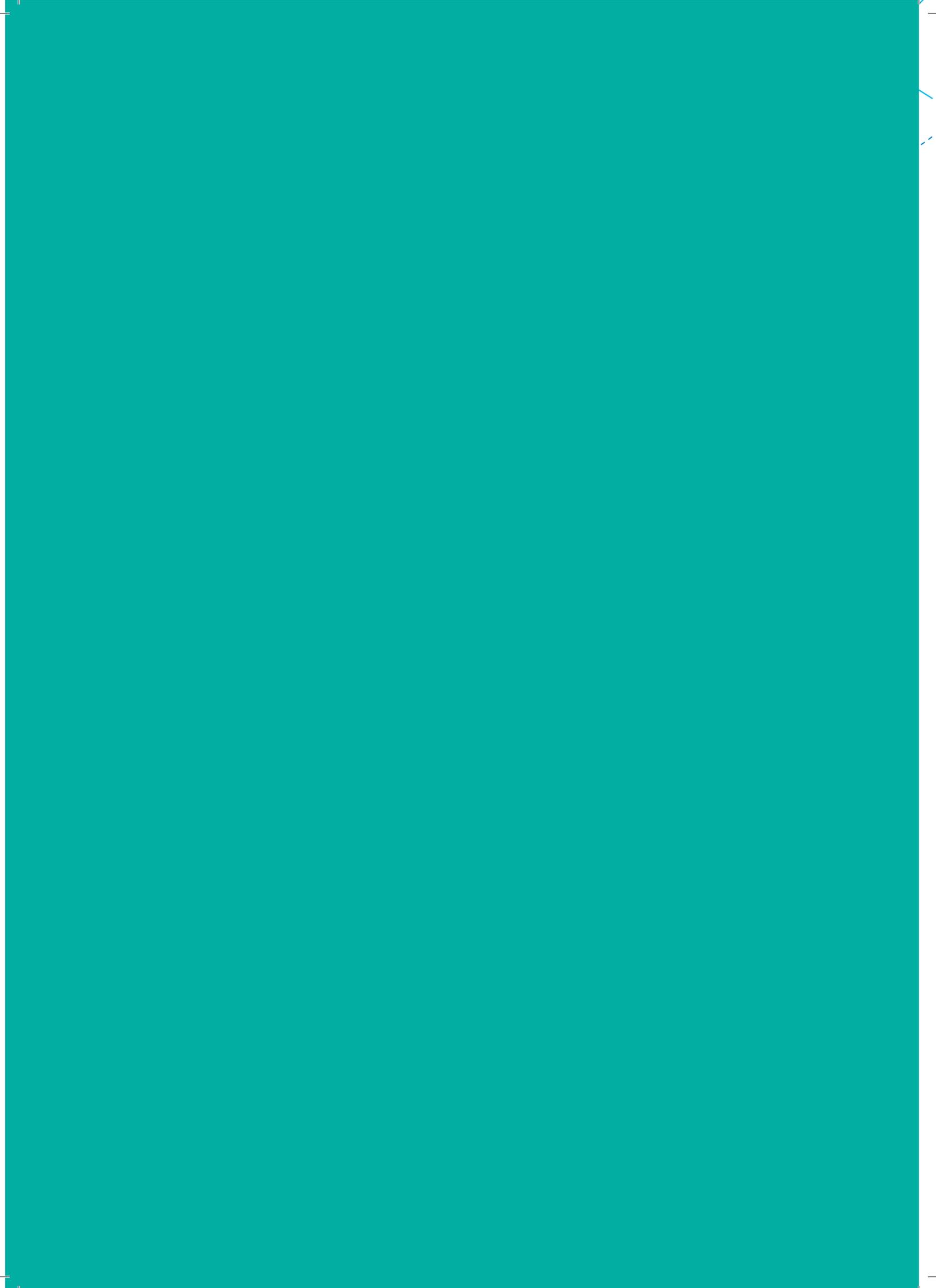


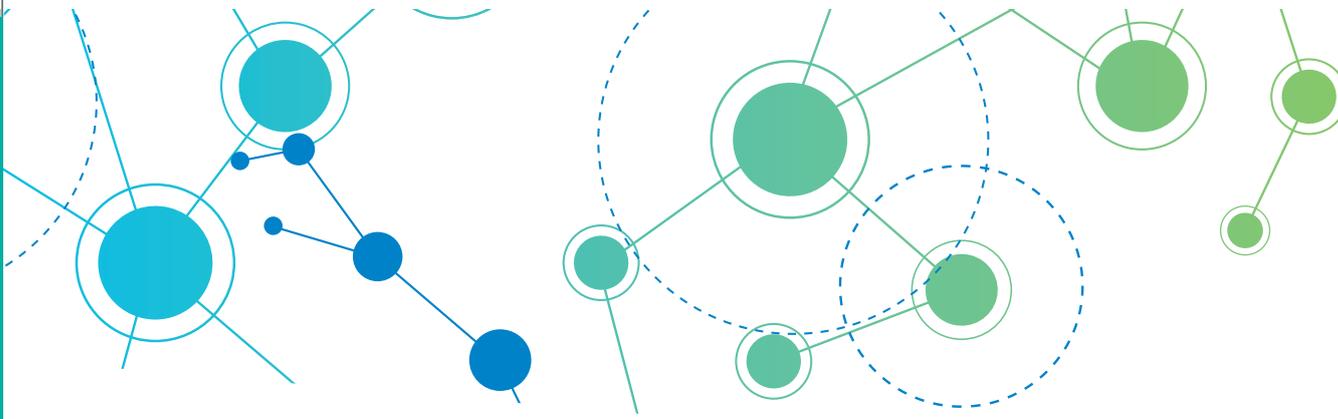
# Abbreviations

ACM	Authority for Consumers and Markets (Netherlands)
AEEG	Autorità per l'Energia Elettrica e il Gas - The Regulatory Authority for Electricity and Gas (Italy)
AMSEC	Annual Monthly System Entry Capacity
AOC (CDG)	Almacenamiento para la Operacion Commercial - Storage for Commercial Operation
APX	Amsterdam Power Exchange
bcm	billion cubic meter
BDDK	Banking Regulation and Supervision Agency
BO	Build-Operate
BOM	Balance of Month
BOT	Build-Operate-Transfer
BOTAŞ	Turkish Pipeline Company
CAPEX	Capital Expenses
CNE	Comisión Nacional de la Energía - National Energy Commission (Spain)
CRE	Commission de Régulation de l'Energie - Regulatory Commission of Energy (France)
DA	Day Ahead
DİVİD	Doğalgaz İthalatçıları ve İhracatçıları Derneği - Natural Gas Importers & Exporters Association (Turkey)
E&P	Exploration & Production
EBB	Electronic Bulletin Board
ECC	European Commodity Clearing
EEX	European Energy Exchange
EFET	European Federation of Energy Traders
EMRA	Energy Market Regulatory Authority (Turkey)
ENTSO -G	European Network of Transmission System Operators for Gas
EPDK	Enerji Piyasası Düzenleme Kurumu - Energy Market Regulatory Authority (Turkey)
EPIAS	Enerji Piyasaları İşletme Anonim Şirketi - Energy Exchange (Turkey)
FSRU	Floating Storage and Regasification Unit
GIS	Geographic Information System
GME	Gestore Mercati Energetici - Electricity Market Operator (Italy)
GPA	Gas Purchase Agreement
GRT Gaz	Gas Transmission System Operator (France)
GSE	Gestore dei Servizi Energetici - Energy Services Company (Italy)
GTL	Gas to Liquid
GTS	Gas Transport Services
HHI	Herfindahl-Hirschman Index
ICE	Intercontinental Exchange
IPP	Independent Power Producer
ISDA	International Swaps and Derivatives Association
ISO	International Organization for Standardization
KHK	Kanun Hükmünde Kararname - Legislative Decree
KUE	Kullanım Usul ve Esasları - Process and Procedures of Use



LNG	Liquefied Natural Gas
LSE	London Stock Exchange
L-T	Long-Term
mcm	million cubic meter
MSEC	Monthly System Entry Capacity
N/A	Not Applicable
NBP	National Balancing Point
NCG	NetConnect Germany
NGG	National Grid Gas
NGL	Natural Gas Liquids
NYSE	New York Stock Exchange
OCM	On-the-day Commodity Market
OFGEM	Office of Gas and Electricity Markets (UK)
OMEL	Operador del Mercado Ibérico de Energía - Energy Market Operator (Spain)
OTC	Over The Counter
PEG-N	Points d'Echange de Gaz-Nord
PEG-S	Points d'Echange de Gaz-Sud
PETFORM	Petrol Platformu Derneği - Petroleum Platform Association (Turkey)
P-GAS	Piped Natural Gas
PNG	Piped Natural Gas
PSV	French Gas Hub
QSEC	Quarterly System Entry Capacity
RK	Rekabet Kurumu - Turkish Competition Authority
SCADA	Supervisory Control and Data Acquisition
SEC	System Entry Capacity
ŞİD	Şebeke İşletme Düzenlemeleri - Network Code (Turkey)
SMP	System Marginal Price
SPK - CMB	Sermaye Piyasası Kurumu - Capital Markets Board
SRG	Snam Rete Gas
STC	Standard Transportation Contract
TIGF	Transport Infrastructures Gaz France
TN	Transfer Noktası - Transfer Point
TPA	Third Party Access
TPAO	Türkiye Petrolleri Anonim Ortaklığı - Turkish Petroleum Corporation
TSO	Transmission System Operator
TTF	Title Transfer Facility
UDN	Ulusal Dengeleme Noktası - National Balancing Point
UK	United Kingdom
VAS	Value Added Services
WA	Week Ahead
WDNW	Week Days Next Week
WE	Week Ends





# Introduction

## Gas Technical Hub vs. Exchange

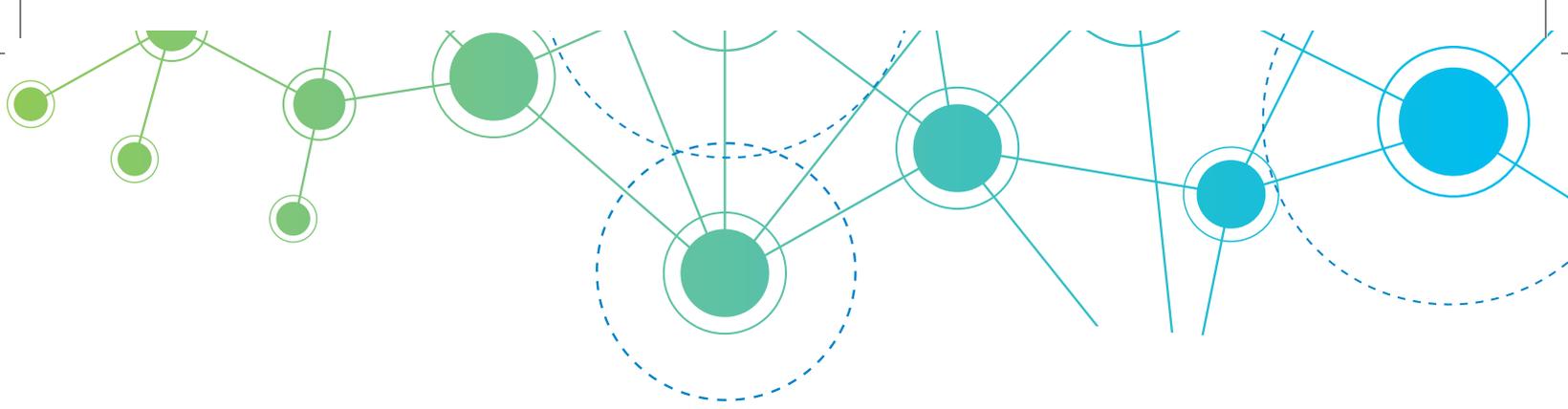
Hub and Exchange are terms frequently used interchangeably in the industry. While it is true they are very much related to one another, they are not necessarily the same thing. Below the definition of both terms is provided in a way to highlight the differences and shed light on the relationship between the two. It should be clarified that the Hub as explained here, refers to a “technical hub” with elements of physical infrastructure, regulatory, operational and market & commercial frameworks in place.

### Technical Hub

- Notional delivery area or point supporting standardized commercial activity. It represents a consolidation of multiple delivery points and supports a pool of liquidity for trading and investment as well as market operations such as balancing
- It represents the real physical transmission network – but without the need to capture specific delivery points in contract negotiations thus enabling a market-wide common pricing basis to be formed
- At the hub, both a spot market, where gas is traded for near-time delivery and a forward or futures market, where delivery can extend several years into the future, can be realized based upon the notional, common delivery point
- Bilateral contracts, OTC trades and exchange transactions, regularly quoted and executed, drive the formation of prices based upon single-point delivery at the hub
- The hub is critical in its support of the market, in terms of transparency, providing flexibility, balancing, futures trading and risk management by providing highly visible, reference-able and competition-based prices with many players instead of the hidden prices determined via purely, non-standard bilateral contracts

### Exchange

- An exchange is a highly organized market venue where standardized contracts are listed for market participants to meet and execute trades in a highly efficient manner
- Exchange contracts cover instruments such as forwards, futures, swaps and options. Each of these incorporates the notion of delivery of a commodity that is at a pre-specified point in time and location
- The location of delivery for exchange contracts is usually linked to the physical market and so the gas hub is chosen as the common reference
- Trades are concluded between a buyer and seller, usually on an anonymous basis. But in the form of its clearing house, via a process of novation, the exchange becomes the counterparty to all buyers and sellers. Thus, counterparty risk is removed
- Exchanges attract the investor community as well as the industry and physical trading community. Therefore, based upon trades being concluded on the common reference of delivery and price at the hub, market liquidity is increased by this wider participation
- Exchanges often support market and credit risk management activity via their provision of liquid forward/futures pricing



International experience shows that in order to have a successful exchange, along with physical infrastructure, regulations and a market structure that supports a trading environment need to be in place. The ongoing efforts on improving physical infrastructure via the two compressors being built in the East to remove constraints, the upgrading of the Electronic Bulletin Board system and drafting of the new Natural Gas Law will all help in Turkey achieve its objectives having an efficient natural gas hub which will catapult the development of a well-functioning marketplace in Turkey characterized by the Energy Exchange EPIAS.

## Physical Hub vs. Virtual Hub

While as mentioned above, having a well-functioning Technical Hub is critical for enabling a successful Exchange, the term Hub itself is classified in two categories; Physical and Virtual. The representation below explains what they mean and provides examples for both types of Hubs

### Physical Hub

- The hub is actually a real, specific area on the network such as where there is a confluence or intersection of multiple pipelines
- Trading is done at a real point where the physical pipelines intersect and therefore the trading conditions are affected by the characteristics of the region
- If multiple physical hubs exist in a geographical area, arbitrage opportunities between regional hub prices drive investments in transport capacity by private pipeline companies. However, markets would probably require a regulator that can regulate access to interconnecting pipelines throughout the gas market
- The hub acts as a common reference point for forming prices at other delivery areas and locations and is thus treated as a pool of liquidity

**Examples:** Henry Hub in Louisiana, USA and Zeebrugge in Belgium

### Virtual Hub

- The hub represents the whole network as a hypothetical, single delivery point and it is assumed that gas passes through this virtual point
- In order for a market to be established as a single hypothetical system, network connections have to possess enough firmness
- A virtual hub is considered less cumbersome due to simplified entry/exit arrangements, attracting new parties to gas markets
- The virtual hub can be used as a common reference point for forming prices at other delivery zones, hubs as well as specific, physical delivery points on its own real network

**Examples:** NBP in the UK and TTF in the Netherlands

**In both cases, the hub's core commercial purpose is to provide a reference for price-formation to support an efficient, transparent, competitive market via the principle of pooling trade activity**

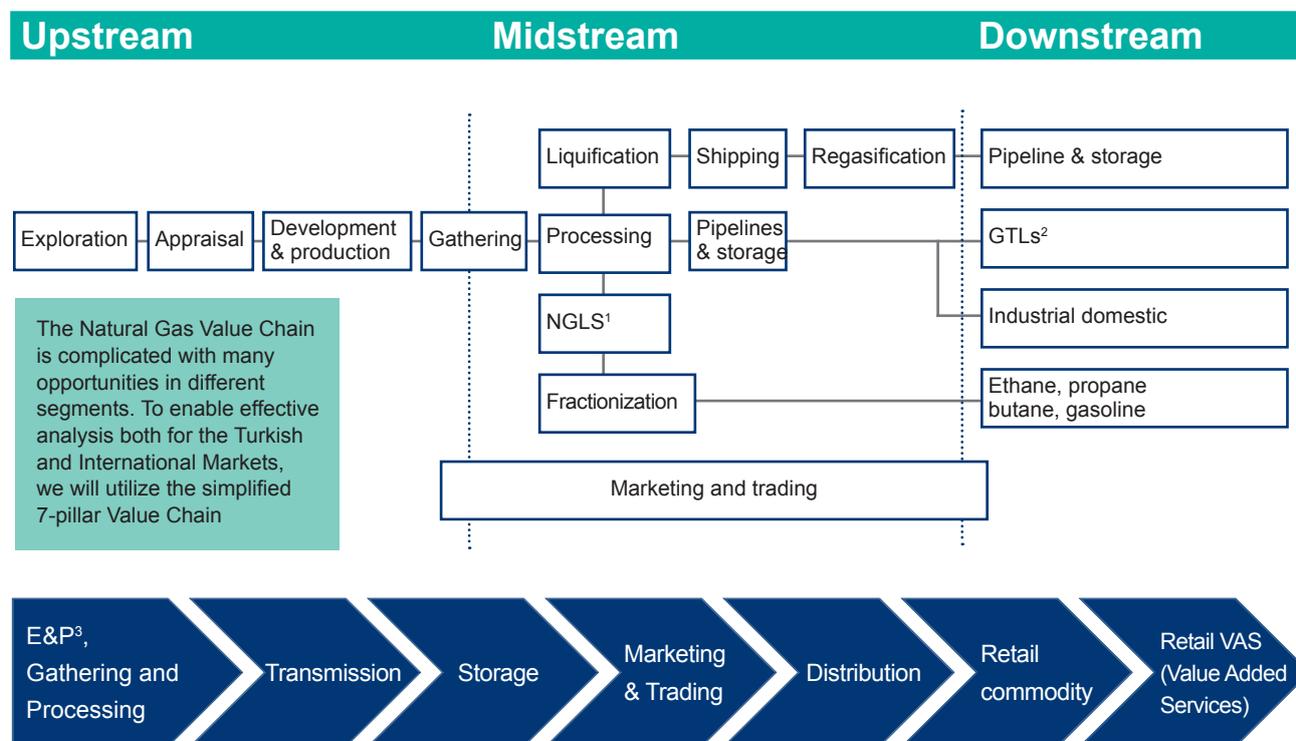
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# Key Definitions

## Gas Value Chain - Overview

Recognizing that achieving a competitive and liberal market is only possible when all segments of the market are addressed, we will be utilizing the entire Gas Value Chain as the framework of our analyses.

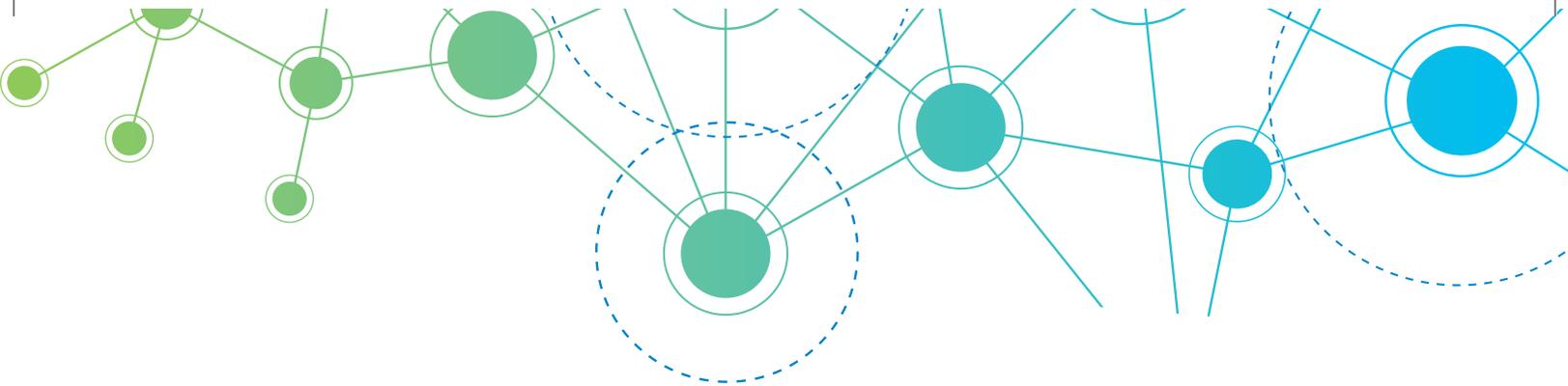
### Gas Value Chain



1: NGLS: Natural Gas Liquids

2: GTL: Gas to Liquid

3: Exploration and Production



# Turkish Natural Gas Market

## Liberalization Overview

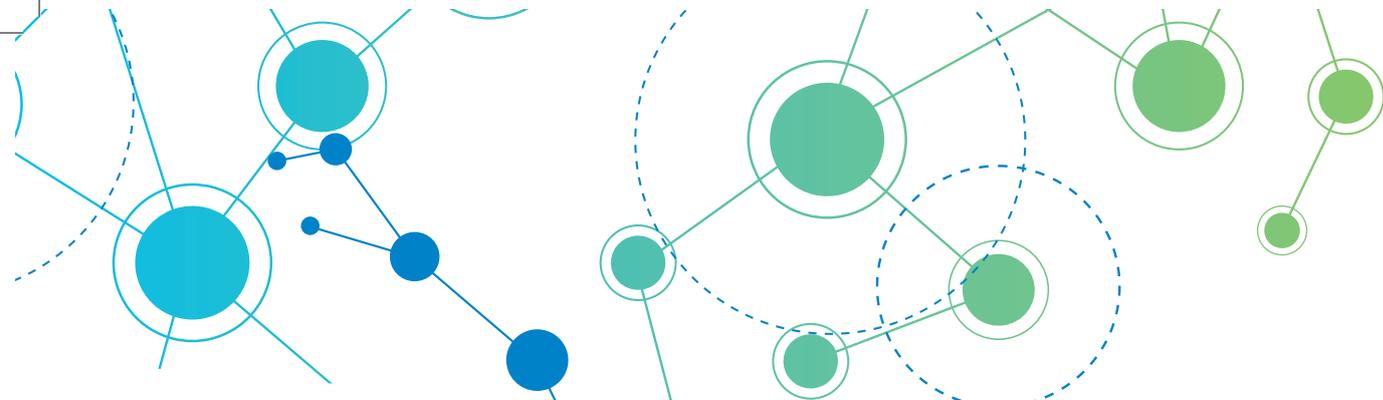
### Milestones in development of Turkish Market

2001 is generally recognized as the liberalization start date of the Turkish Energy Sector. Yet, in order to understand the development of the Turkish Gas Market and how it reached its current state, one needs to review events going all the way back to 1970 when first gas exploration took place and gas was consumed for a cement factory. In the more than 40 years since then, many key events domestically and with international context took place, shaping the industry.

1970

- 
- 1970** - In Kırklareli, the first gas is explored in 1970 and consumed in Pınarhisar Cement factory in 1976.
  - 1974** - The Turkish Petroleum Corporation (TPAO) established BOTAŞ (Boru Hatları ile Petrol Taşıma A.Ş.) by Decree No 7/7871
    - For transporting Iraqi crude oil to Turkey
  - 1984** - Cabinet Decision No. 84/8806
    - First agreement for natural gas import signed with USSR
  - 1985** - Articles of Association of BOTAŞ formed
    - Following the Decree on Public Economic Enterprises No. 233
  - 1986** - Natural gas export-import agreement signed with Soyuzgaz export-USSR
  - 1987** - First gas import to Turkey was realized
  - 1988** - Natural gas was introduced to houses and industry in Ankara
    - LNG agreement signed with Algeria
  - 1990** - The framework about the usage of natural gas was defined by KHK 397
  - 1992** - First natural gas delivery to Istanbul & Bursa
  - 1994** - Marmara Ereğlisi -BOTAŞ LNG Terminal went online
  - 1995** - BOTAŞ was restructured as a Corporation, State Economic Enterprise
    - LNG agreement signed with Nigeria
  - 1996** - First natural gas delivery to İzmit & Eskişehir
    - GPA signed with Iran
  - 1997** - GPA signed with Russia (Blue Stream)
  - 1998** - GPA signed with Russia (West)
  - 1999** - GPA signed with Turkmenistan

2000



2001

**2001** - Natural Gas Market Law No. 4646 enacted

- First gas delivery from Iran
- GPA signed with Azerbaijan

**2002** - First natural gas delivery from Blue Stream Pipeline from Russia

**2005** - Turkey-Greece natural gas pipeline construction started

- Contract release tenders for 4 bcm of the contract with Russia:
- Shell Energy: 250 million m<sup>3</sup>
- Bosphorus Gaz: 750 million m<sup>3</sup>
- Enerco Enerji: 2.500 million m<sup>3</sup>
- Avrasya Gaz: 500 million m<sup>3</sup>
- For the first time, private sector companies negotiated with Gazprom Export instead of BOTAŞ

**2006** - Aliağa - EGEGAZ LNG Terminal went online

**2007** - TPAO Storage Facility in Silivri

- 2005 contract release tenders awarded
- Shell Energy is the the first private importer and Aksa is the first private shipper
- First natural gas export from Turkey to Greece
- Two private shippers

**2008** - Cost based pricing decree

- Shell is the first private importer as of January 2008

**2009** - The share of the private sector increased to 4 bcm

- 4 private importers and other wholesale companies

**2010** - Access code enacted granting third parties access to LNG terminals

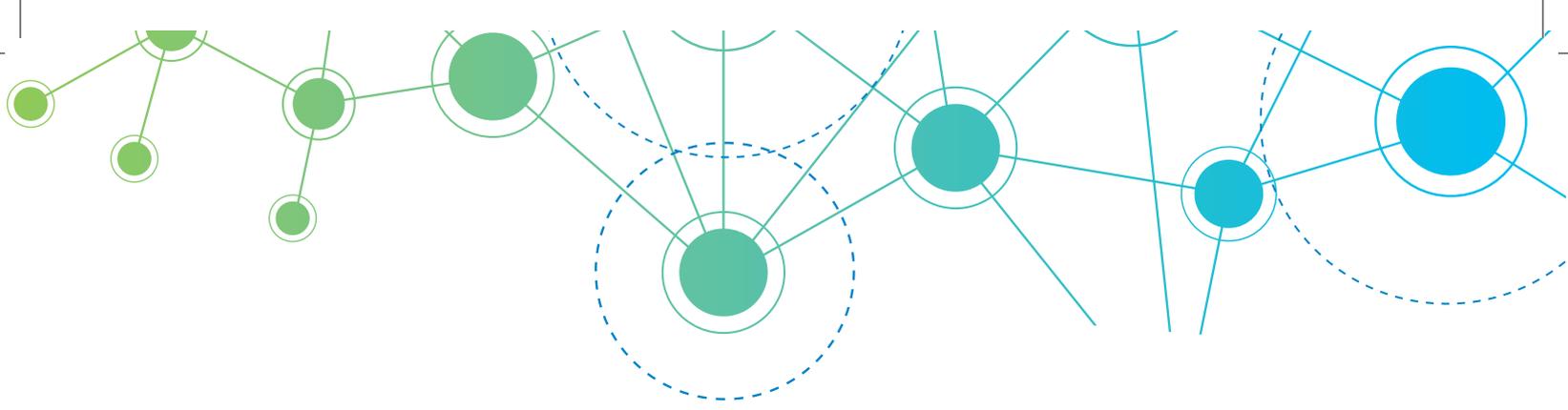
**2012** - Third party access to TPAO Silivri through enacted Access code

- Signature for new private importers adding up to 6 bcm/yr:
- Akfel: 2250 million m<sup>3</sup>
- Bosphorus Gaz: 1750 million m<sup>3</sup>
- Batı Hattı: 1000 million m<sup>3</sup>
- Kibar Holding: 1000 million m<sup>3</sup>

**2013** - Gas flow started for 2012 contracts (6 bcm/yr)

- SOCAR begins selling 1200 million m<sup>3</sup>
- 28 private shippers

2013



## Turkish Natural Gas Market Value Chain

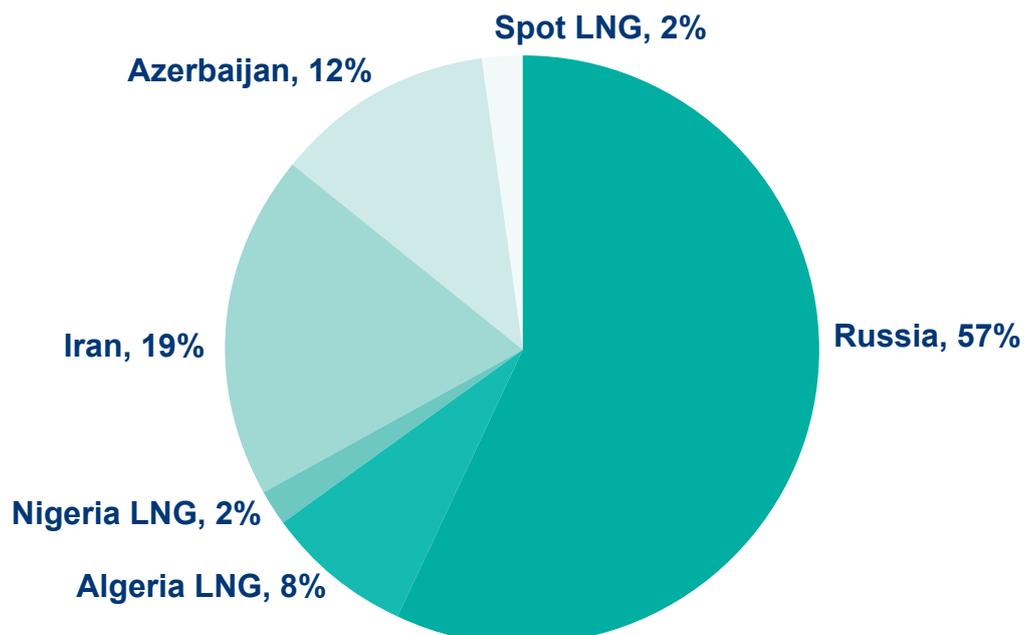
### Current Value Chain – E&P, Gathering and Processing

The projected consumption levels and value of existing long term contracts create opportunities for Turkey to increase share of short term supply contracts by 2015.

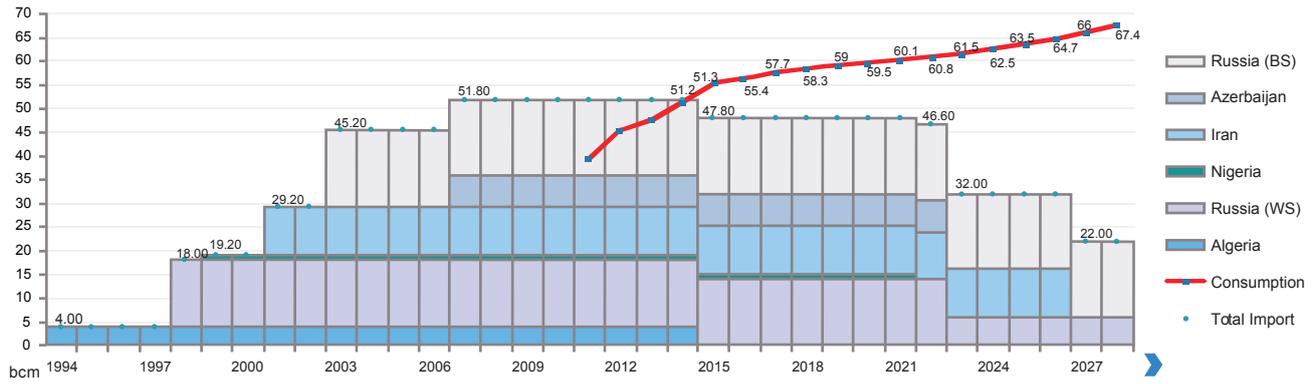
### Current Contracts

Supplier	Volume (bcm/yr)	Type	Period (yr)	Start Date	End Date
Russia (WS)	4	PNG	23	1998	2022
Russia (WS)	1	PNG	23	2013	2036
Russia (WS)	5	PNG	30	2013	2043
Russia (WS)	4	PNG	23	1998	2022
Russia (BS)	16	PNG	25	2003	2028
Algeria	4	LNG	20	1994	2014
Nigeria	1.2	LNG	22	1999	2021
Iran	10	PNG	25	2001	2026
Azerbaijan	6.6	PNG	15	2007	2022
Turkmenistan	16	PNG	30 n/a	-	-

### Import Mix



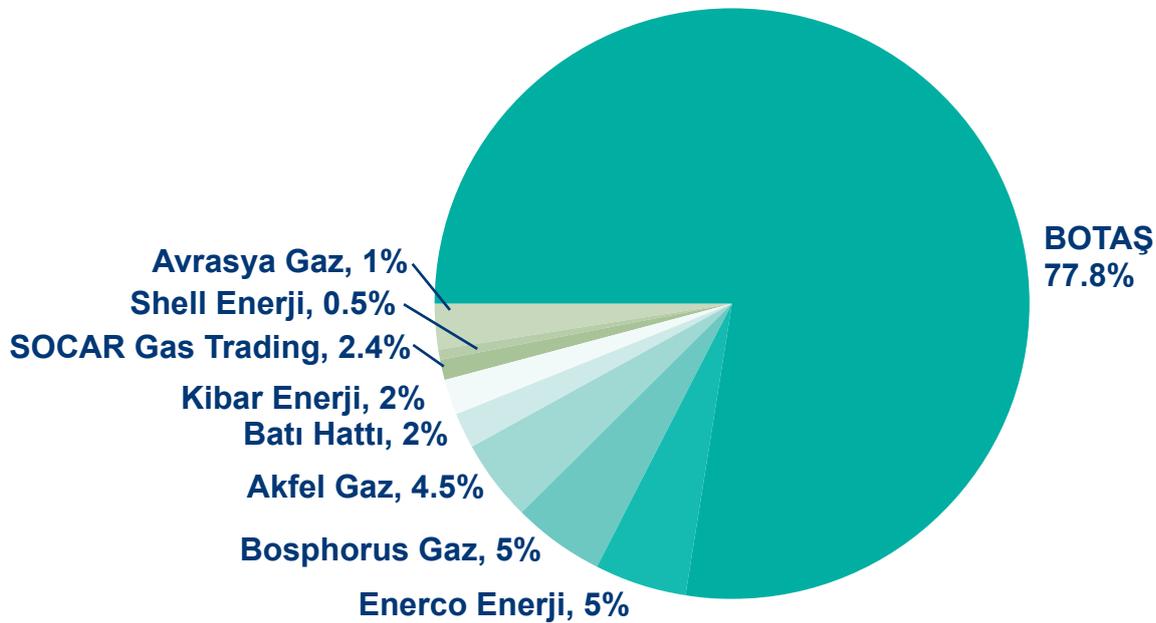
### Long Term Contract vs. Consumption Expectations



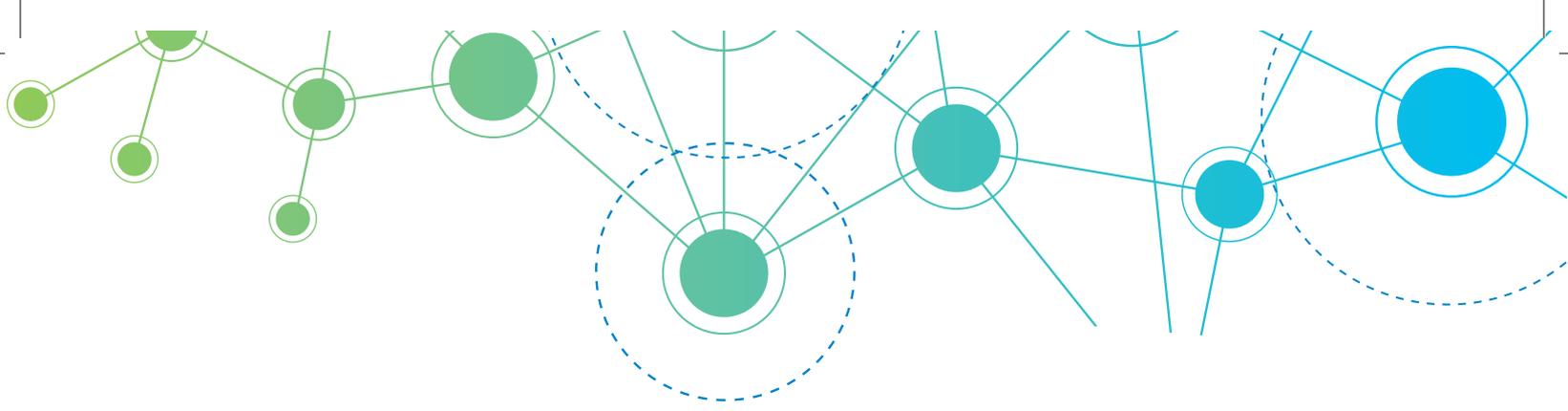
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BOTAŞ controls 78% of the long term supply contracts although there have been 3 contract transfer initiatives.

### Long Term Contract Gas Shares



Under the 2001 law, BOTAŞ was banned from signing new long-term contracts with suppliers until its import share had decreased to 20%. However, BOTAŞ is allowed to sign new spot LNG contracts.



### Steps Taken

- **Contracts Release in 2005: total 4 bcm/year:**
  - Enerco Enerji San.Tic. A.Ş.- 2.5bcm/year
  - Bosphorus Gaz Corporation A.Ş. - 0.75 bcm/year
  - Avrasya Gaz A.Ş. - 0.5bcm/year
  - Shell Enerji A.Ş.- 0.25bcm/year
- **New Private Importers in 2013: total 6 bcm/year:**
  - Akfel Gaz San. Tic. A.Ş. - 2.25 bcm/year
  - Bosphorus Gaz Corporation A.Ş. - 1.75 bcm/year
  - Bati Hatti Doğal Gaz Ticaret A.Ş. - 1 bcm/year
  - Kibar Enerji Dağıtım San. A.Ş. - 1 bcm/year
- **Volume Release in 2013: total 1.2 bcm/year:**
  - Socar Gas Ticareti A.Ş. – 1.2 bcm/year

Please Refer to References: 1

### Current Value Chain – Transmission

While most of the Pipeline entry points are located East of Ankara, Storage and LNG facilities are closer to the main consumption points in the West.

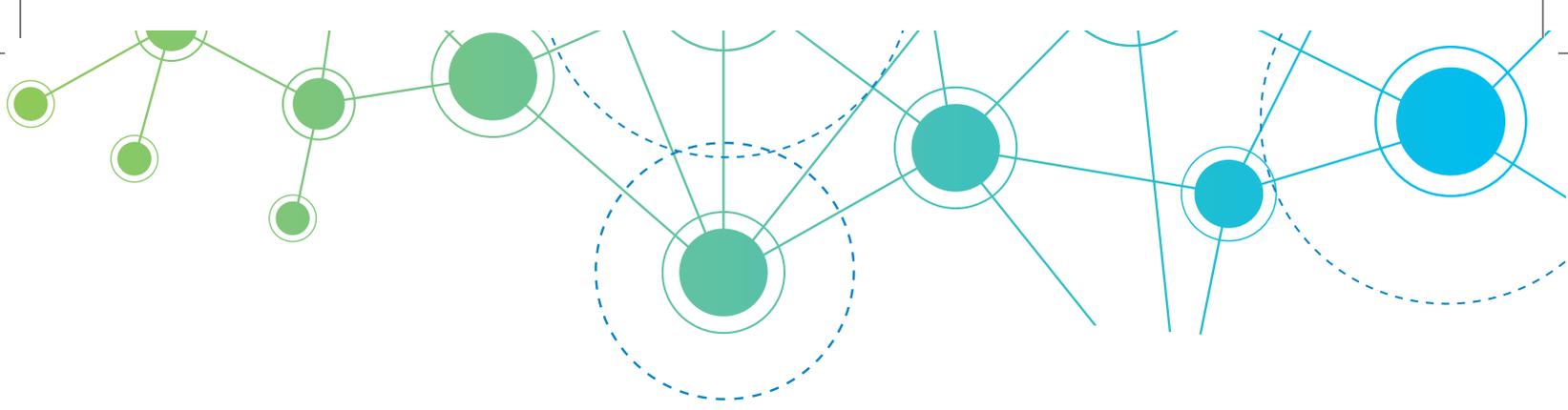
### Gas Transmission Map of Turkey



- |  |                       |  |                                |
|--|-----------------------|--|--------------------------------|
|  | Pipeline Entry Points |  | Domestic Processing Facilities |
|  | Pipeline Exit Points  |  | Storage Facility               |
|  | LNG Entry Points      |  | Physical Entry/Exit Points     |

Please Refer to References: 2,24





## Deficiencies

- No user authorization, one password for all
- No intraday data available
- Late payment collections
- No Pipeline and Storage data available on the GIS (Geographic Information System)
- No Transmission system stock or pressure data available on the GIS
- Significant amount of retroactive corrections; yet no retroactive correction reimbursement mechanism
- No e-documenting system
- Late invoicing as there is no automatic invoice in the system and invoices are confirmed through e-mails
- No capacity application
- No after day trade application
- No detailed report or balancing report
- Poor or No SCADA communication
- Lack of system logs
- Lack of Data export systems
- Outdated software technologies
- No Mobile Device compatibility
- Web browser incompatibility
- No other language selection
- Significant amount of retroactive corrections; yet no retroactive correction reimbursement mechanism
- No reliable historical data reports
- Lack of system and database security measures.
- No sign-in security (https or vpn connection)

## Risks

- Human interface may cause network code violations
- Data can be manually changed thus risk of data loss, data security and consequently wrong payment collection
- Frequent system failures
- Low system performance
- Late payment collections due to late invoice operations

- Capacity requests, After Day Trade Requests through fax cause document loss from time to time
- Lack of security can lead to major data changes and deletions which could cause unsolvable problems between shippers.
- Possible Human Errors caused by lack of automation.
- Data loss because of Exit-Entry Point Name Changes and no present Physical Unique ID

### Room for Improvement

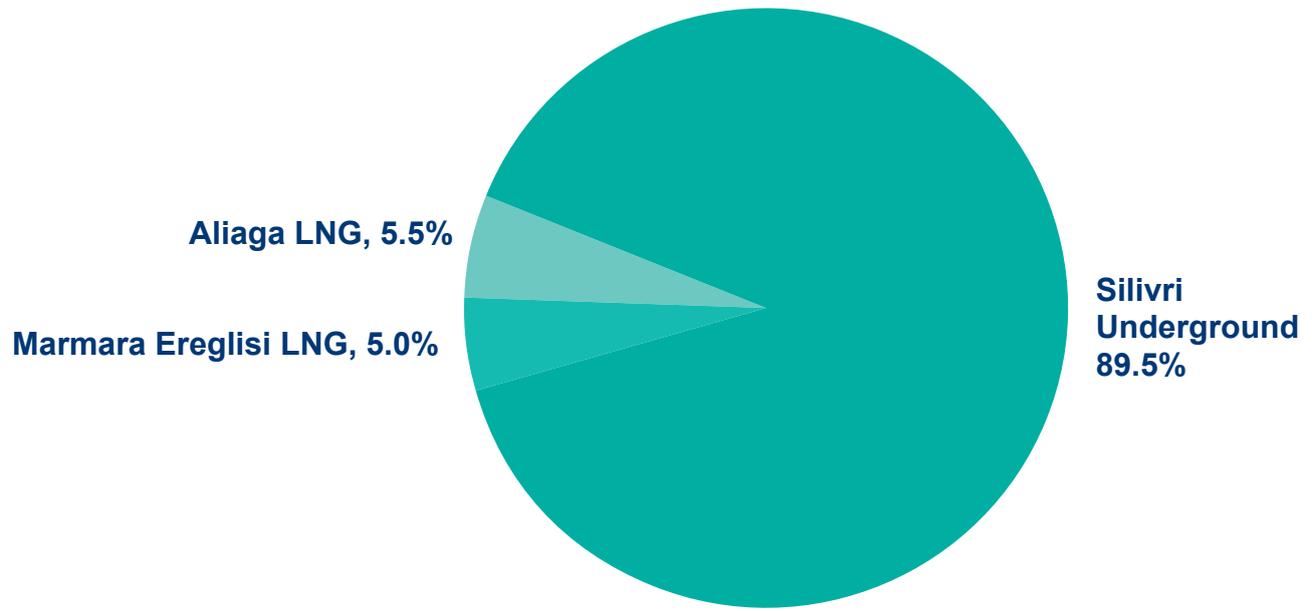
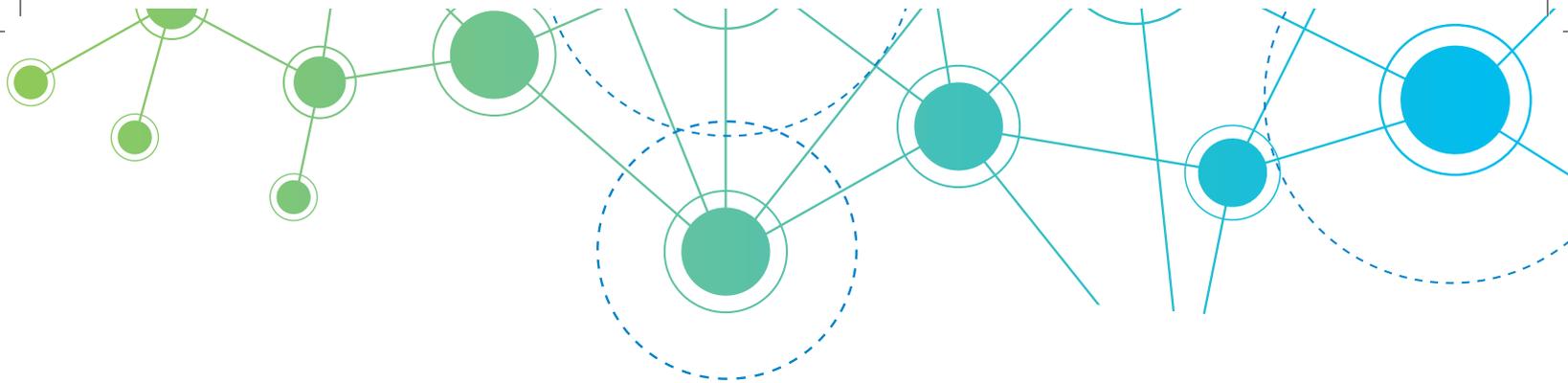
- User ID verification during log-in can improve data security
- User authorization optionality can be added for better operation management
- Reporting and data transfer can be restructured regarding effectiveness and diversification
- Two Way Data transfer should be supported by having web services
- Day-after trading and all capacity transactions can be automated through defining new system functionalities
- Tracking past records of transactions made and keeping back-ups can be enabled
- Invoicing and payment collection can be automated through the system
- Communication among all related parties can be improved
- Notifications and network related announcements can be better communicated through the system
- By adding the above listed functionalities to the system, standardization can be achieved

### Current Value Chain – Storage

Total capacity of existing storage facilities is 2.97 bcm which is 6.2% of total gas consumption expectation of 2013.

#### Gas Storage Capacities

- TPAO Silivri:
  - Underground storage facility
  - 2.1 bcm of 2.66 bcm is allocated to BOTAŞ
  - Maximum injection capacity: 16 mcm/day - withdrawal capacity: 20 mcm/day
- BOTAŞ Marmara Ereğlisi\*:
  - LNG storage facility
  - Maximum regasification capacity: 8.2 bcm/year
  - Maximum regasified LNG to transmission grid: 22.05 mcm/day
- EGEGAZ Aliğa\*:
  - LNG storage facility
  - Maximum regasification capacity: 6 bcm/year
  - Maximum regasified LNG to transmission grid: 16.4 mcm/day



Company	Location	Facility Type	Storage Capacity	Storage Capacity (mcm gas)
BOTAŞ	Marmara Ereğlisi	LNG	255,000m3 LNG (85.000m3 x 3)	149
EGEGAZ	Aliğa	LNG	280,000m3 LNG (140.000m3 x 2)	161
TPAO	Silivri	Underground	2,661 million m3 gas	2,661
BOTAŞ	Sultanhanı (Tuz gölü)	Underground (ongoing)	1,500 million m3 gas	1,500

Current Total: **2.98 bcm**    Planned Total: **4.47 bcm**

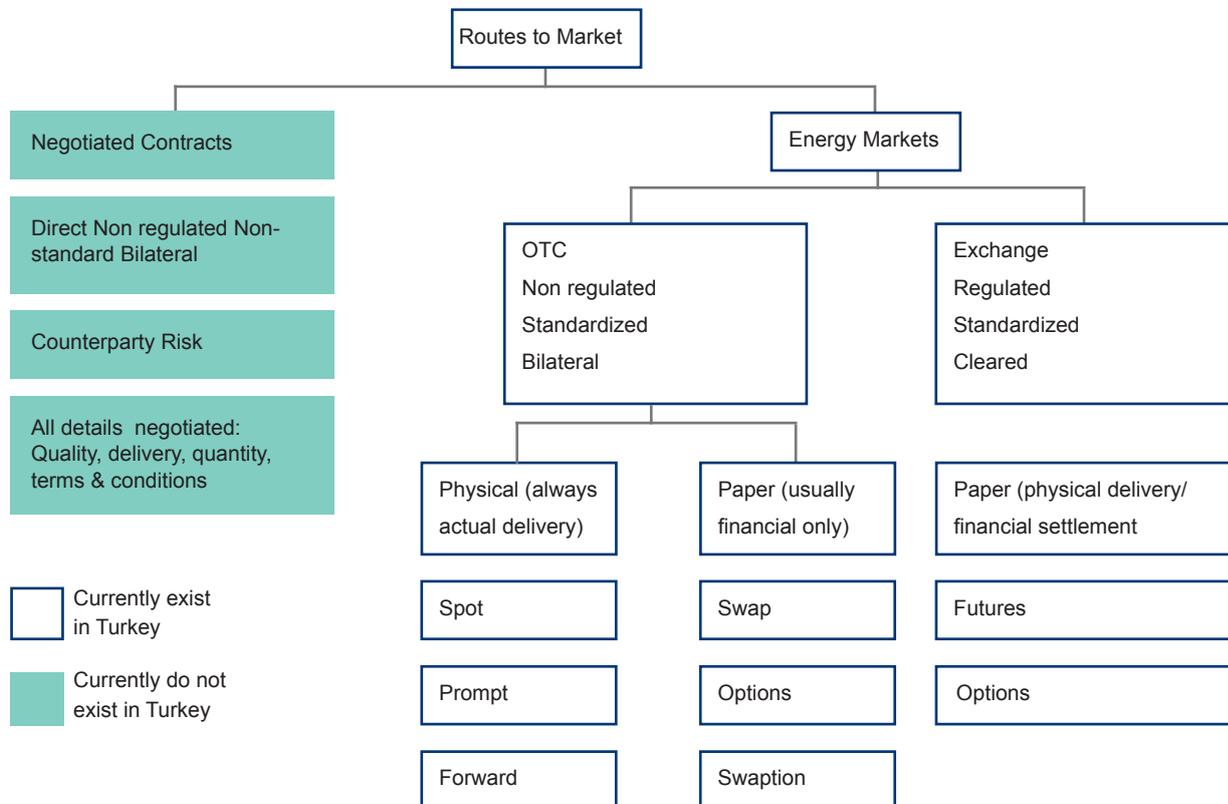
\* These capacities imply net gas delivery to the grid following any related processes such as regasification.

Please Refer to References: 1, 2

## Current Value Chain – Marketing and Trading

With the current maturity level of the Turkish Gas Trading Market, many routes to market are still not utilized. As market matures, more of these routes will be leveraged by the market participants. One of the factors impacting the maturity of the market is BOTAŞ's major influence on the demand and supply dynamics as it plays the role of the TSO as well as carrying out trading activities.

## Routes to Market



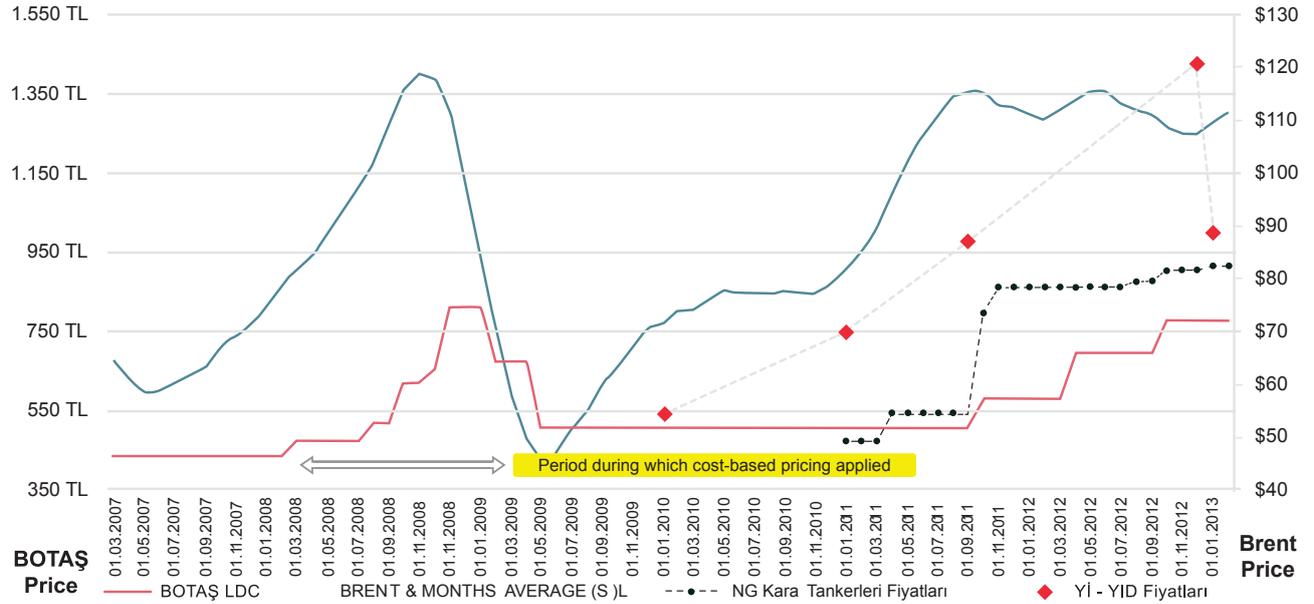
Please Refer to References: 6

Lack of cost based pricing has severe effects on market liberalization efforts.

## Pricing Policy & Implications

- BOTAŞ sells nearly 1/4 of its gas to state-owned power companies
  - Regulated price agreed under long-term contracts expected to be phased out within the next 5 years
  - Regulated prices do not allow the market to operate freely
  - Generally, independent power plants (IPPs) price of BOTAŞ is lower than Build-Own-Operate (BOO) and Build-Operate-Transfer (BOT) plants
  - In 2011, price of EÜAŞ, BOT and BOOs was \$485/1,000m<sup>3</sup>, while IPPs' \$390/1,000m<sup>3</sup>
- BOTAŞ applies all inclusive pricing policy (transmission and dispatch control fees and storage cost included)

### Comparison of BOTAŞ sales price vs Brent Crude prices



- As shown on the graph, cost based pricing is not applied by BOTAŞ since 2009.
- Government adjusts prices based on non-transparent parameters at non-pre-established times.
- BOTAŞ prices are independent of changing transmission and storage prices.
- BOTAŞ prices are independent of consumer consumption profile, balancing & capacity costs and market gas prices.

Kaynaklar: 1,3, 17

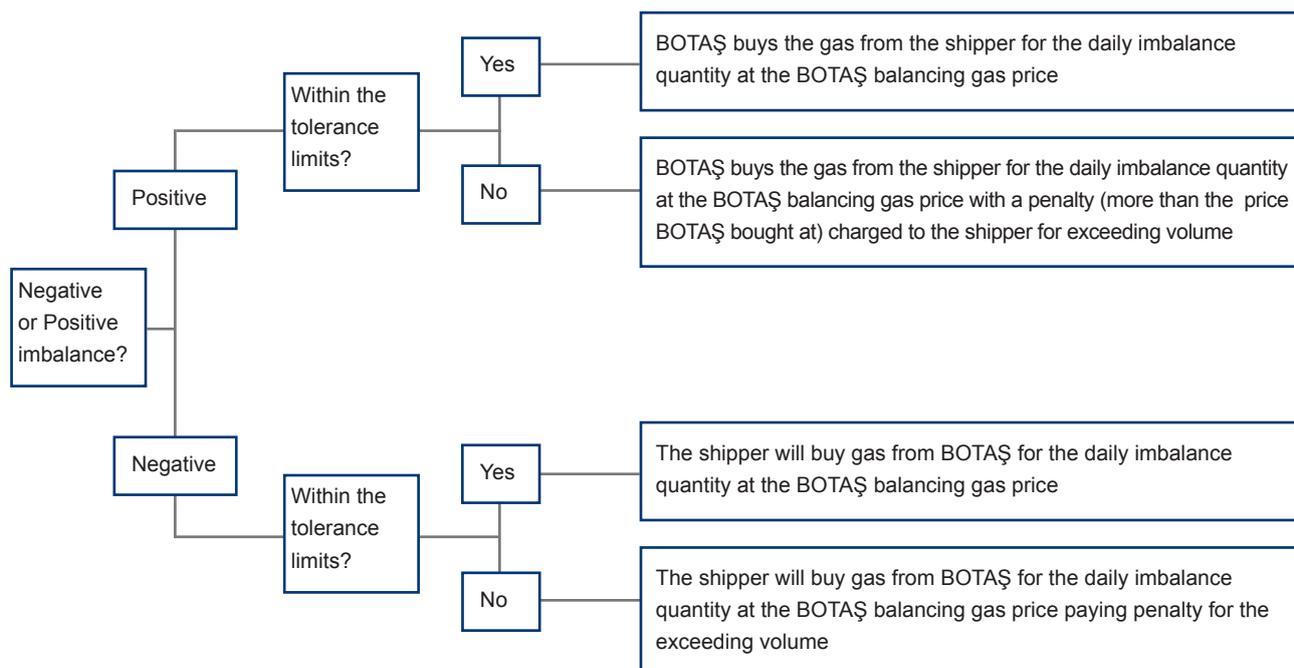
## Highlights

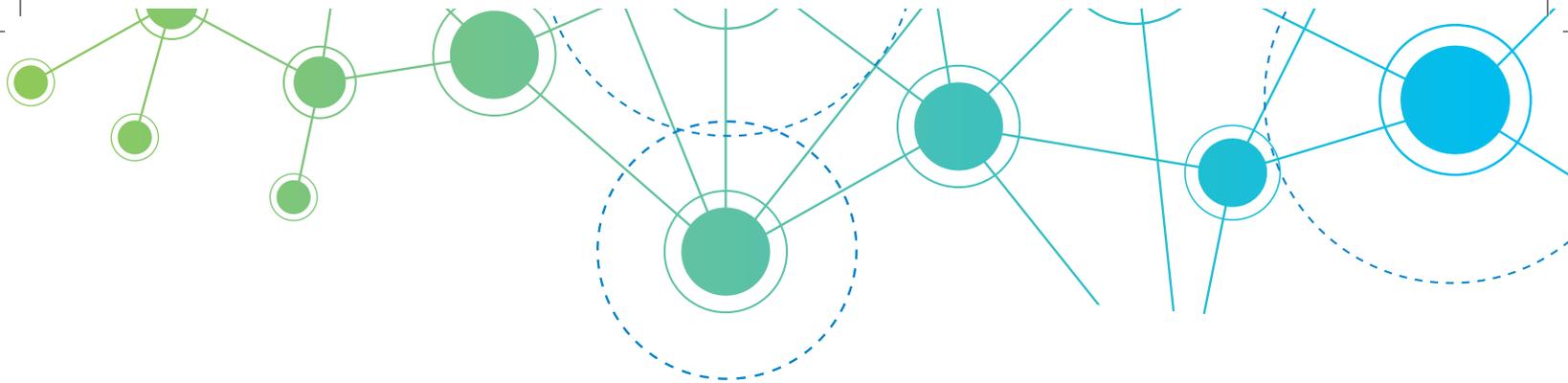
- The balancing gas price is published on the BOTAŞ website every month however there are delays in declaration
- If the import-licensed company sells to a wholesaler, they would also need to reserve capacity from the virtual points at TP (if at UDN no reservation needed)
- Shippers sign STC (Standard Transportation Contract) with the transporter (BOTAŞ)
- Shippers transfer capacity among themselves monthly
- Shippers enter the nominations to EBB, no end user interface
- Sales price to the customer can be calculated in various ways such as using individual purchase formulas/conditions or using BOTAŞ prices as an index
- Long-term sales (e.g. 5 years contracts) are possible but not commonly used
- Duration of BOTAŞ contracts is 1 year, therefore seasonal or monthly contracts are hardly implemented
- As a rule, distribution companies can purchase a maximum of half of their natural gas from a single company

## Balancing Mechanism

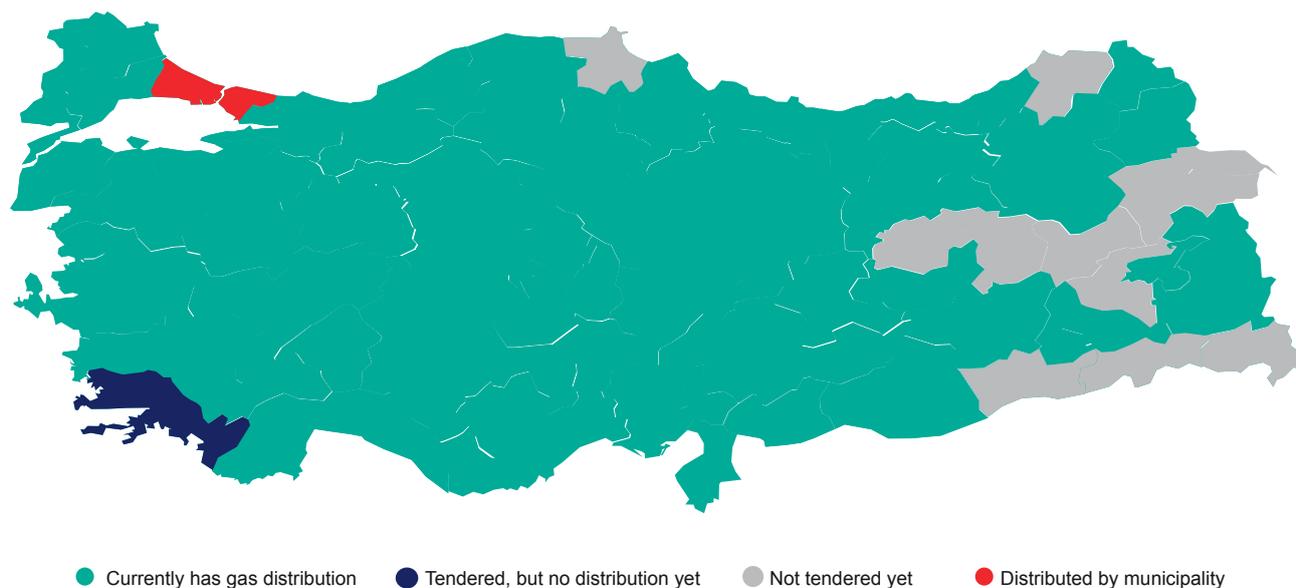
### Current Value Chain – Distribution

Out of 81 cities in Turkey, 69 cities currently have natural gas distribution.





### Gas Transmission Map of Turkey



License Tenders performed?	Current Natural Gas Distribution	Number of Cities
Yes	Yes	69
Yes	No	1
No	No	11

Please Refer to References: 22

### Current Value Chain – Retail Commodity

Despite the ever decreasing eligible consumer limits, factors such as limitations on obtaining daily consumption values are prohibiting a more liberal retail market

### Facts & Figures

- Distribution and Retail operations are still bundled for the incumbent providers
- Not all the eligible consumers' consumption can be measured on a daily basis

### An Illustration: İGDAŞ

Customer Type	TL/m3 (VAT exc.)	TL/KWH (VAT exc.)
Residential (Consumes between 0 -300,000 m3 gas)	0.915326	0.086027
Eligible Consumer (Consumes between 0 -300,000 m3 gas)	0.915326	0.086027
Eligible Consumer (Consumes between 300,001 -800,000 m3 gas)	0.854704	0.080329
Eligible Consumer (Consumes over 800,000 m3 gas)	0.767813	0.072163

Source: İGDAŞ

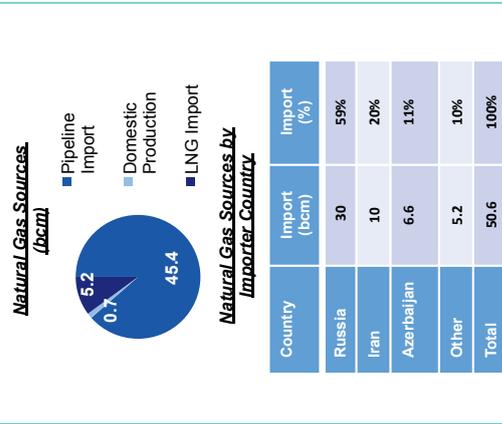
- All non-residential consumers are considered “eligible”
- For residential consumers eligibility limit is 300,000 m3
- Retail tariffs are based on consumption volumes, independent of consumption profiles

Please Refer to References: 23

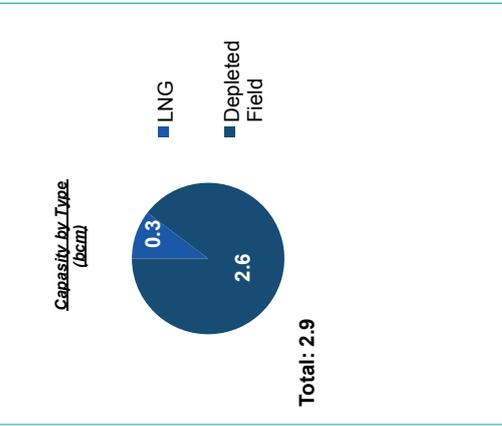
## Value Chain – Turkish Gas Market



# of Importer	Pipeline: 10 LNG: 33
# of Main Gas Producer and Importer*	3
Market share of the largest player	78%
HHI – Supply**	6,142
Entry/Exit Points	9/1
BOTAŞ Imports	Long LNG: 2 Spot LNG: 1 PNG: 9
Private Imports	Spot LNG: 33 PNG: 8+1(Socar VT)



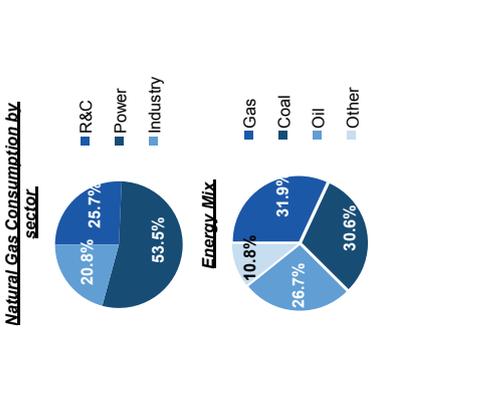
# of TSO	1
Pipeline Length (km)	13,000
Compressor	9
Pipeline Length (km / Surface Area km <sup>2</sup> )	0.017
Pipeline Length Compressor (km)	1,857
Storage Capacity (bcm)	3
Storage Capacity Annual Consumption	6%
# of LNG Terminals	2



# of Wholesaler**	42
# of Distributor**	64
# of Trader	N/A
Exchange Annual Trade Volume (TWh)	N/A
OTC Annual Trade Volume (TWh)	N/A
Churn Rate	N/A
Gas Market Value (b €) y*****	15.7

\*\* Number of license owners  
 \*\*\* Distributors + Wholesalers  
 \*\*\*\* HHI: Herfindahl-Hirschman Index:  
 Moderate concentration: 1,800-5,000;  
 very high concentration: above 5,000  
 \*\*\*\*\* Gas Mkt. Value = INBP Price x Wholesale QTY

Total Consumption (bcm)	47.6
# of Retailer	64+41***
# of Main Retailer Players*	N/A
Switch Rate (Entire retail market)	N/A
HHI - Retail**	N/A
Existence of Regulated Prices	Existing
Level of VAS Provided	Not Existing



\* Players dealing with at least %5 of the market

# Regulatory Framework Analysis

## Introduction

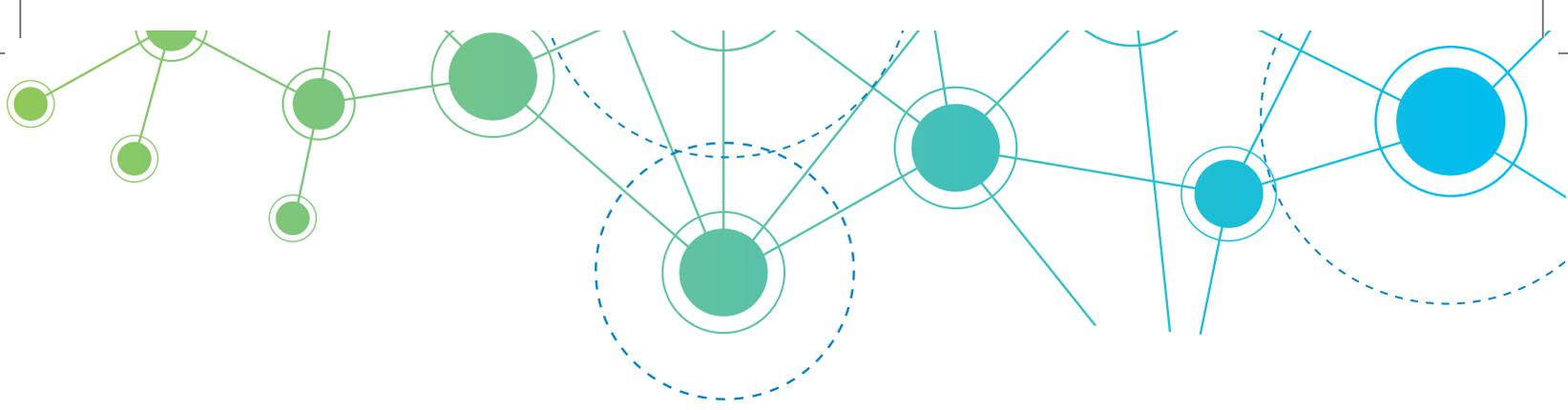
For the regulatory framework analysis, below listed legislations have been reviewed and the findings aligned with the value chain are presented.

- Doğal Gaz Piyasası Kanunu (Natural Gas Market Law) # 4646
- Doğal Gaz Piyasası İletim Şebekesi İşleyiş Yönetmeliği (Natural Gas Market Transmission Network Operations Directive)
- Doğal Gaz Piyasası Lisans Yönetmeliği (Natural Gas Market License Code)
- Sıvılaştırılmış Doğal Gaz Depolama Tesisi Temel Kullanım Usul Ve Esaslarının Belirlenmesine Dair Yönetmelik (Directive on Establishing Usage Procedures for LNG Storage Facilities)
- Yer Altı Doğal Gaz Depolama Tesisi Temel Kullanım Usul Ve Esaslarının Belirlenmesine Dair Yönetmelik (Directive on Establishing Usage Procedures for Underground Storage Facilities)
- Doğal Gaz Piyasası Dağıtım Ve Müşteri Hizmetleri Yönetmeliği (Natural Gas Market Distribution and Customer Service Code)
- Doğal Gaz Piyasası Tarifeler Yönetmeliği (Natural Gas Market Tariffs Code)
- Şebeke İşleyiş Düzenlemeleri (Network Code)
- EPDK Kurul Kararları (EMRA Council Resolution) # 4168
- EPDK Kurul Kararları (EMRA Council Resolution) # 416
- Kanun Hükmünde Kararname (Legislative Decree) # 397

## Regulatory Framework – E&P, Gathering and Processing



- No new purchase deals for BOTAŞ until its import amount falls below 20% of annual national consumption through contract/volume release as well as new contracts
- Import licenses are given for each import contract except spot LNG contracts as LNG licenses are not granted per contract but per importer
- Except BOTAŞ, no entity can take part in another company which is in the same line of business



### Regulatory Framework – Transmission



- BOTAŞ, currently vertically integrated, was supposed to be unbundled by 2009. It should at least be restructured to have (in draft of new law):
  - Transmission
  - LNG Plant Operations and Storage
  - Other Operations, separated
  - Trading (Market expectation)
- Transmission and Dispatch Control Tariff:
  - is calculated by revenue cap method
  - may differ as opposite direction, intermittent, and continuous transport
  - has two-tier structure: fixed capacity reservation charge & service charge proportional to quantities transported
- Transmission tariffs are subject to EMRA approval

### Regulatory Framework – Storage



- Storage tariffs are set through negotiations freely; but must be compliant with EMRA tariffs
  - Capacity to store 10% of the total annual imported gas amount must be allocated after the first 5 years
- No standard storage fee defined for end users
- Information should be transparent (maintenance programs, device calibrations, etc.)

### Regulatory Framework – Marketing & Trading

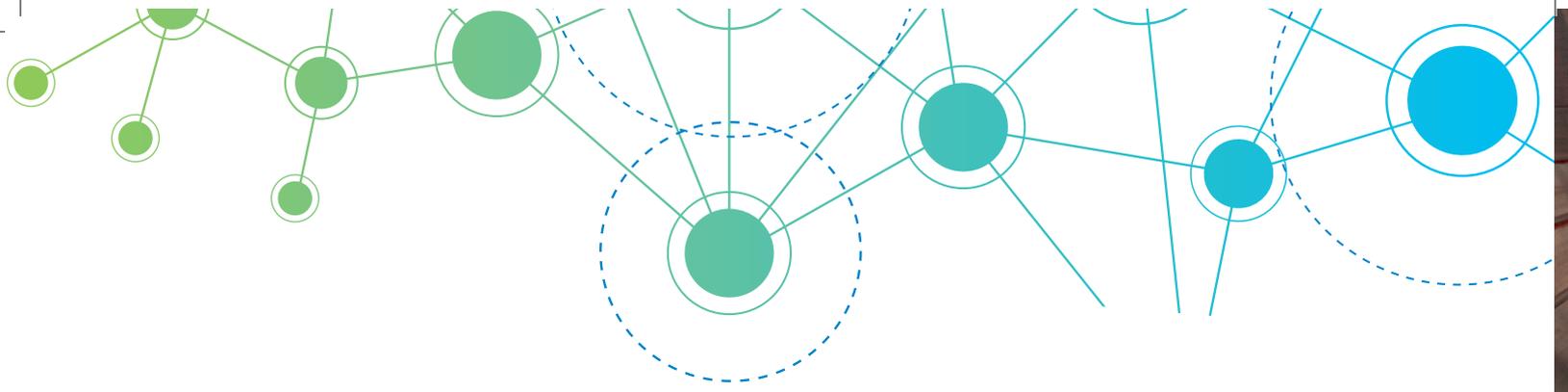


- Wholesale tariffs are set through negotiations freely; but must be compliant with EMRA regulations
- No entity can sell more than 20% of the required national consumption amount
- Although TNs and UDNs are separately defined in the Network Operating Code, values of each shipper are written in a netted way in EBB
- “Day” defined for gas and electricity differs and thus causes problems in coupling
- Intraday on/off instructions from power TSO cause significant imbalance to power plants and are not taken into consideration by the Gas TSO

### Regulatory Framework – Distribution



- Distribution Companies (NDC) can sell max 2 months consumption to prepaid customers
- Upon request, NDC is responsible to connect the requestor in its region to the distribution system if the request is technically and economically sound
- NDCs are expected to procure maximum 50% of the gas they distribute from one entity
- Last resort supplier mechanism is not all clear and there is no last resort tariff.
- In case NDC is last resort supplier, means of finding the necessary gas are not defined
- NDC consumers are charged fixed for connection costs - EMRA approved tariffs defined in bids
- In order to be able to use their eligible consumer rights, eligible consumers should have daily reading capability and corrector installed
- Ancillary services that can be provided by the NDCs and related tariffs are not defined
- Within 5 years of license approval, NDCs should establish Dispatch Control Centers



### Regulatory Framework – Retail and Retail VAS



- Distribution and retail remain bundled
- Eligible consumers should be notified by the NDC about eligibility both through the website of the NDC and through the notifications placed in three consecutive invoices
- Procedure and details of changing an eligible consumer's supplier are not defined
- Natural gas purchase & sale agreement between a supplier and an eligible consumer requires NDC to sign the Shipping & Delivery Agreements within 15 days, after which the agreement is no longer effective
- If eligible consumer stays with NDC, he would be exposed to the retail tariff
- Retail tariffs are subject to EMRA approval & include different components: natural gas unit purchase price and system usage price
- Different tariffs, as seasonal, uninterruptable & interruptible can be practiced in the market

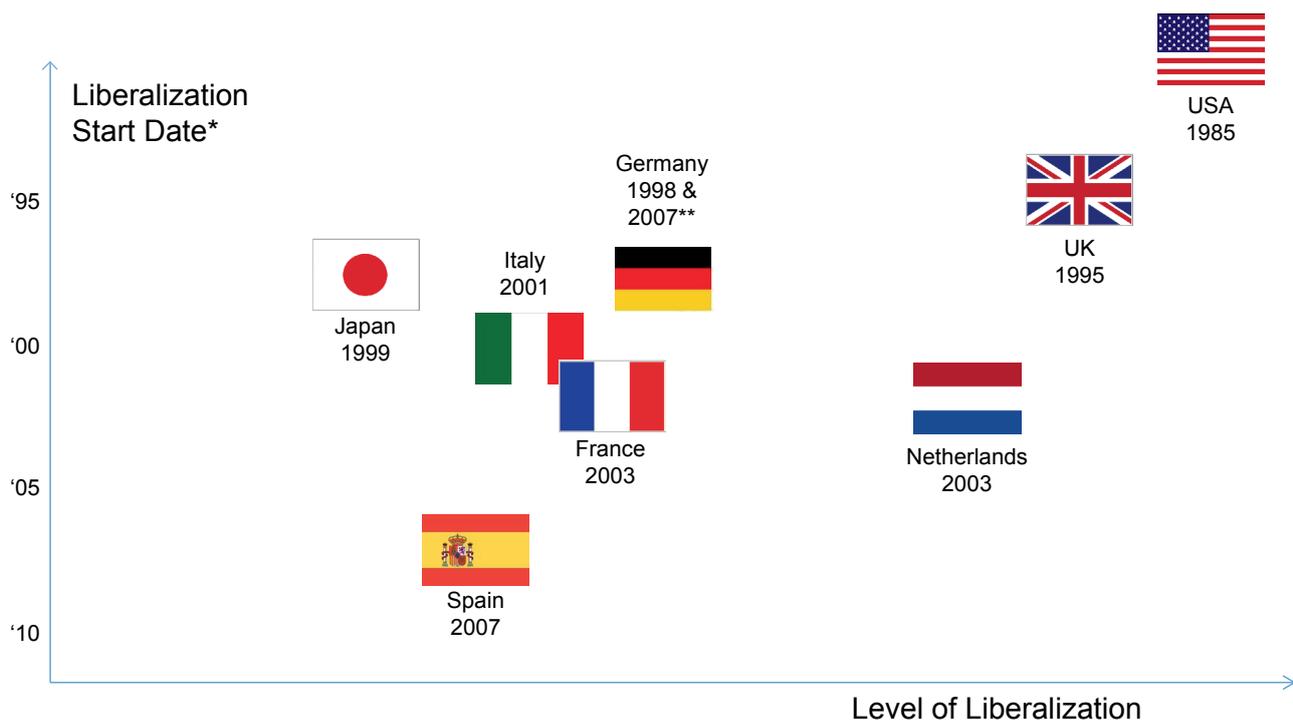


# International Natural Gas Markets

## Liberalization Overview

### Natural Gas Markets and Liberalization

Experience shows that level of liberalization has been affected by more factors than the start date of liberalization. The USA and the UK are early starters who have also the most liberal gas markets in the world. But comparison of the Netherlands and France shows that while their liberalization start dates are the same, the Netherlands is considered a much more liberal market than France.



\* Date on which government or regulator legislation instructed or enabled opening of the gas network(s) to new/Third Party Access

\*\* Although Germany decreed liberalization must start in 1998, the market structure and hindrance 3rd party access to the networks was an obstacle until 2007 when the BnetzA began to enforce structural changes.

In the following sections some of these markets will be analyzed in detail using the Value Chain Framework to understand why they are where they are. Through these examples, lessons applicable to the Turkish market development will also be identified.

# Value Chain Analysis

Value Chain – UK Gas Market



# of Producer and Importer	25
# of Main Gas Producer and Importer*	6
Market share of the largest player	22%
HHI – Supply**	1,125
Entry/Exit Points	9/3

**Natural Gas Sources (bcm)**

- Pipeline Import: 26
- Domestic Production: 28
- LNG Import: 48.5

**Natural Gas Sources by Importer Country**

Country	Import (bcm)	Import (%)
Qatar	22.9	42%
Norway	21.6	40%
Netherlands	5.5	10%
Other	4.3	8%
<b>Total</b>	<b>54.3</b>	<b>100%</b>

\* Players dealing with at least %5 of the market

# of TSO	1
Pipeline Length (km)	7,800
Compressor	28
Pipeline Length (km / Surface Area - km <sup>2</sup> )	0.032
Pipeline Length Compressor (km)	279
Storage Capacity (bcm)	4.9
Storage Capacity Annual Consumption	6%
# of LNG Terminals	4

**Capacity by Type (bcm)**

- LNG: 3.3
- Depleted Field: 1.3
- Salt Cavity: 0.3

Total: 4.9

\*\* HHI: Herfindahl-Hirschman Index:  
 Moderate concentration: 750-1,800; high concentration: 1,800-5,000; very high concentration: above 5,000

# of Wholesaler	70
# of Distributor	19
# of Trader	130
Exchange Annual Trade Volume (bcm)	614
OTC Annual Trade Volume (bcm)	1,090
Churn Rate	19.1
Gas Market Value (b €)	33

**Highlights**

- NBP has been mature hub for over 10 years
- 2010 Exchange trade share is 30% which was 20% in 2005 and 10% in 2000. Main driver is regulation and clearing on ICE.
- Estimation is 70-80% of trade is in spot & prompt market.

Total Consumption (bcm)	83.7
# of Retailer	19
# of Main Retailer Players*	6
Switch Rate (Entire retail market)	15%
HHI - Retail**	2,452
Existence of Regulated Prices	Not existing
Level of VAS Provided	High

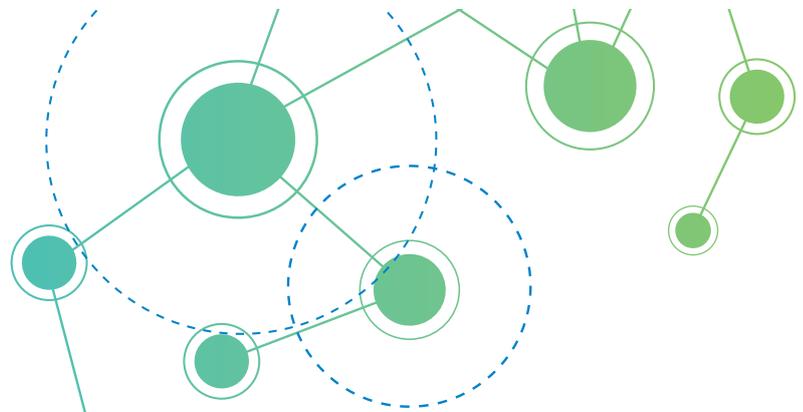
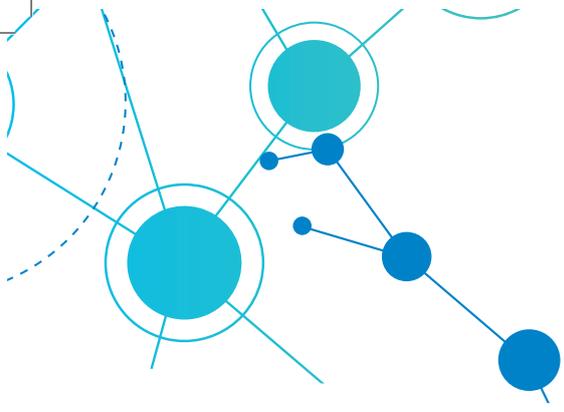
**Highlights:**  
 The British retail gas market is fully liberalized

**Natural Gas Consumption by Sector**

- R&C: 11%
- Power: 41%
- Industry: 36%
- Other: 12%

**Energy Mix**

- Gas: 34.8%
- Coal: 39.9%
- Oil: 14.3%
- Other: 11%



Value Chain – German Gas Market



# of Producer and Importer	22
# of Main Gas Producer and Importer*	7
Market share of the largest player	N/A
HHI – Supply**	1,886
Entry/Exit Points	22/16

Natural Gas Sources (bcm)	
Pipeline Import	84.2
Domestic Production	10.7

Natural Gas Sources by Importer Country	
Country	Import (bcm)
Russia	30.5
Norway	28.5
Netherland	18
Other	7.2
Total	84.2

\* Players dealing with at least %6 of the market

# of TSO	12
Pipeline Length (km)	31,500
Compressor	25
Pipeline Length (km / Surface Area km²)	0.088
Pipeline Length (km)	1260
Compressor (km)	21.4
Storage Capacity (bcm)	28%
Annual Consumption	0
# of LNG Terminals	0

**Capacity by Type (bcm)**

**Total: 21.4**

\*\* HHI: Herfindahl-Hirschman Index: Moderate concentration: 750-1,800; high concentration: 1,800-5,000; very high concentration: above 5,000

# of Wholesaler	70-90
# of Distributor	713
# of Trader	>100
Exchange Annual Trade Volume (bcm)	7
OTC Annual Trade Volume (bcm)	143
Churn Rate	1.5
Gas Market Value (b €)	31.5

**Highlights**

- High fees on EEX impacting trade volume of the Exchange
- Balancing is mostly done on OTC

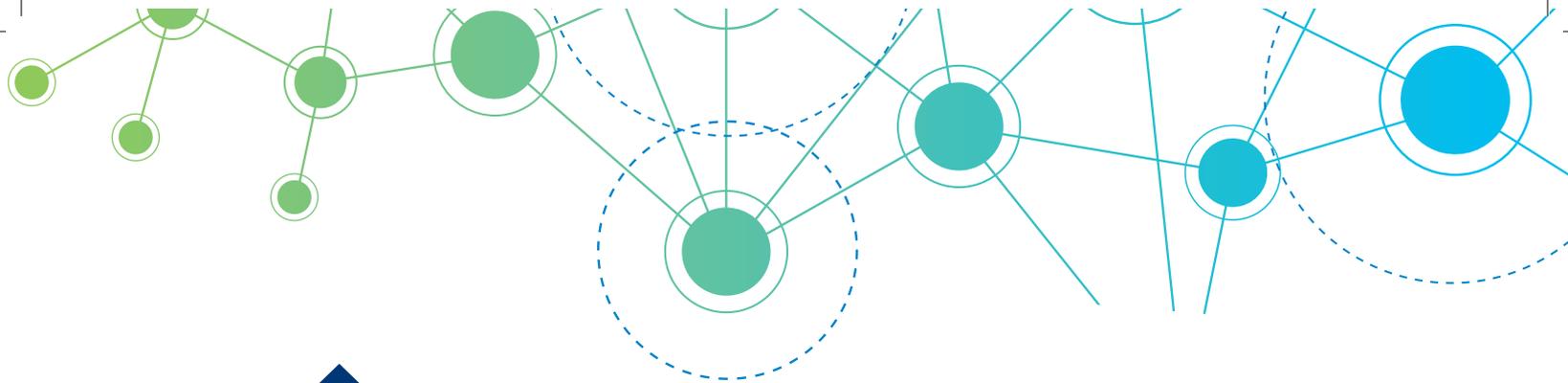
Total Consumption (bcm)	76.4
# of Retailer	820
# of Main Retailer Players*	2
Switch Rate (Entire retail market)	6.7%
HHI - Retail**	300
Existence of Regulated Prices	Not existing
Level of VAS Provided	High

**Natural Gas Consumption by sector**

**Energy Mix**



## Value Chain – Italian Gas Market



# of Producer and Importer	63
# of Main Gas Producer and Importer*	3
Market share of the largest player	39.2%
HHI – Supply**	2,575
Entry/Exit Points	8/2

Natural Gas Sources (bcm)	
Pipeline Import	28.3
Domestic Production	28
LNG Import	48.5
<b>Total</b>	<b>60.2</b>

Natural Gas Sources by Importer Country	
Country	Import (bcm)
Algeria	22.4
Russia	19.2
Qatar	6.1
Other	21.8
<b>Total</b>	<b>68.8</b>

Natural Gas Sources by Importer Country (%)	
Country	Import (%)
Algeria	33%
Russia	28%
Qatar	9%
Other	31%
<b>Total</b>	<b>100%</b>

**Highlight:**

- Total Import Capacity: 120bcm

\* Players dealing with at least %6 of the market

# of TSO	3
Pipeline Length (km)	33,585
Compressor	11
Pipeline Length (km / Surface Area km <sup>2</sup> )	0.111
Pipeline Length Compressor (km)	3,053
Storage Capacity (bcm)	12.2
Annual Consumption	16%
# of LNG Terminals	2

**Capacity by Type (bcm)**

0.2

12

Total: 12.2

- Depleted Gas Field
- LNG

\*\* HHI-Herfindahl-Hirschman Index:  
Moderate concentration: 750-1,800; high concentration: 1,800-5,000; very high concentration: above 5,000

# of Wholesaler	>150
# of Distributor	247
# of Trader	106
Exchange Annual Trade Volume (bcm)	17
OTC Annual Trade Volume (bcm)	17
Churn Rate	0.46
Gas Market Value (b €)	25

**Highlights**

- 60% of residential consumers to smart meters by 2018
- Trades on PSV is 77% of the Total consumed in 2011
- 38 wholesalers represents 97% of the market

Total Consumption (bcm)	76.1
# of Retailer	305
# of Main Retailer Players*	5
Switch Rate (Entire retail market)	4.5%
HHI - Retail**	1,102
Existence of Regulated Prices	Not existing
Level of VAS Provided	Medium

**Highlight:**

%10.4 of the residential sector is in the free market

**Natural Gas Consumption by sector**

- Power: 4%
- Industry: 45%
- R&C: 35%
- Other: 16%

**Energy Mix**

- Gas: 12.9%
- Coal: 38.8%
- Oil: 40.2%
- Other: 8.1%

## Value Chain – French Gas Market



# of Producer and Importer	16
# of Main Gas Producer and Importer*	3
Market share of the largest player	73%
HHI – Supply**	4,374
Entry/Exit Points	9/4

Natural Gas Sources (bcm)	
Pipeline Import	0.6
Domestic Production	32.1
LNG Import	0.6

Natural Gas Sources by Importer Country	
Country	Import (bcm)
Norway	16
Netherlands	7.2
Russia	6.1
Algeria	5.8
Other	10.3
<b>Total</b>	<b>45.5</b>

# of TSO	2
Pipeline Length (km)	36,000
Compressor	30
Pipeline Length (km / Surface Area - km <sup>2</sup> )	0.053
Pipeline Length Compressor (km)	1,200
Storage Capacity (bcm)	13.3
Annual Consumption	31%
# of LNG Terminals	3

**Capacity by Type (bcm)**

Total: 13.3

\*\* HHI: Herfindahl-Hirschman Index: Moderate concentration: 750-1,800; high concentration: 1,800-5,000; very high concentration: above 5,000

# of Wholesaler	97
# of Distributor	25
# of Trader	83
Exchange Annual Trade Volume (bcm)	7
OTC Annual Trade Volume (bcm)	26
Churn Rate	0.68
Gas Market Value (b €)	15.5

**Highlights**

- Market share of three largest companies: 95% of households & small industry
- 86% of residential sites & 56% of non-residential sites at NDCs: still regulated tariffs

Total Consumption (bcm)	42.1
# of Retailer	50
# of Main Retailer Players*	3
Switch Rate (Entire retail market)	3.5%
HHI- Retailer**	4,000
Existence of Regulated Prices	Existing
Level of VAS Provided	Low

**Natural Gas Consumption by sector**

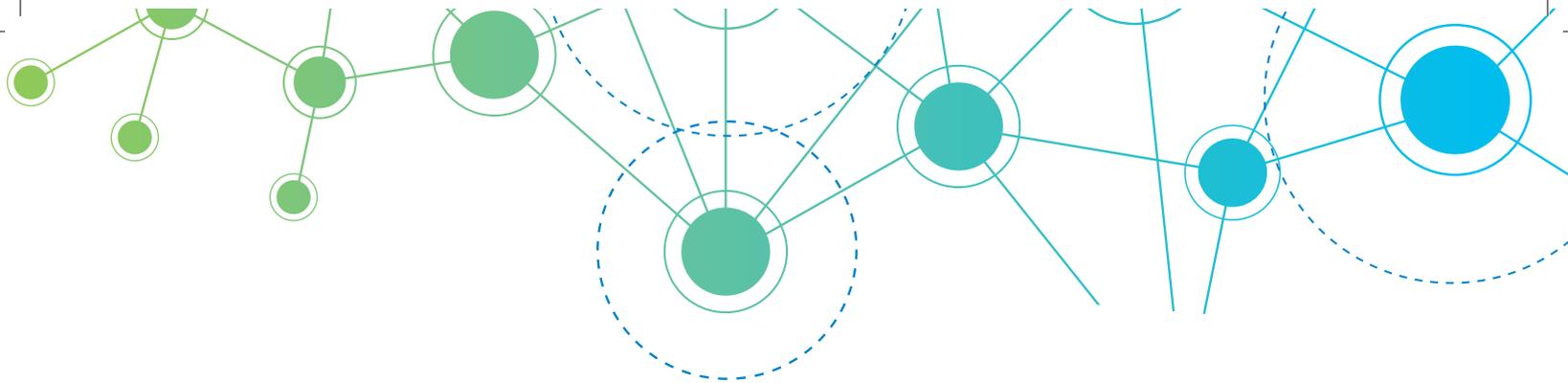
**Energy Mix**

\* Players dealing with at least %6 of the market

## Türkiye ile diğer piyasaların kıyaslaması

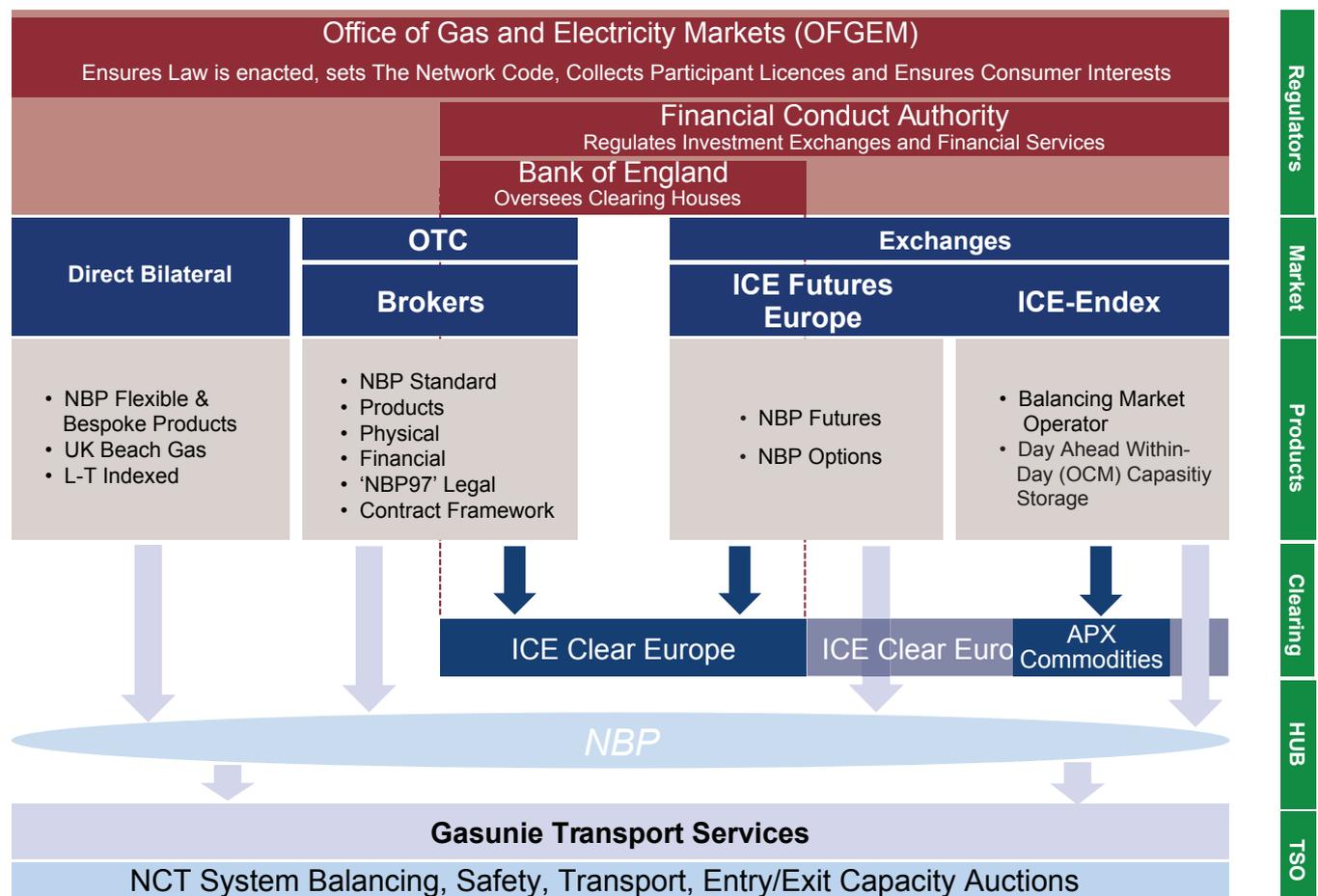
	Turkey	UK	Germany	Italy	France		
<b>E&amp;P and Gathering and Storage</b>	# of Producer and Importer	10 + 33	25	22	63	16	
	# of Main Gas Producer and Importer	3	6	7	3	3	
	Market share of the largest player	78%	22%	N/A	39.2%	73%	
	HHI – Supply	6,142	1,125	1,886	2,575	4,374	
	Entry/Exit Points	9/1	9/3	22/16	8/2	9/4	
	Natural Gas Sources (bcm / %)	Pipeline Import	45.4 / 89%	28 / 27%	84 / 89%	60 / 78%	33 / 70%
		Domestic Production	0.7 / 1%	49 / 47%	11 / 11%	8 / 11%	1 / 1%
		LNG Import	5.2 / 10%	26 / 26%	-	8 / 11%	13 / 29%
	Natural Gas Sources by importer country (bcm / %)	Russia: 30 / 59% Iran: 10 / 20% Azp: 5.4 / 11% Other: 5.2 / 10%	Qatar: 22.9 / 42% Norway: 21.6 / 40% Neth.: 5.5 / 10% Other: 4.3 / 8%	Russia: 30.6 / 36% Norway: 28.5 / 34% Neth.: 18 / 21% Other: 7.2 / 9%	Algeria: 22.4 / 33% Russia: 19.2 / 28% Qatar: 6.1 / 9% Other: 21.8 / 30%	Norway: 16 / 35% Neth.: 7.2 / 16% Russia: 6.1 / 13% Other: 16.1 / 36%	
	<b>Pipeline and Storage</b>	# of TSO	1	1	12	3	2
Pipeline Length (km)		13,000	7,800	31,500	33,585	36,000	
Compressor		9	28	25	11	30	
Pipeline Length / Surface Area (km/km <sup>2</sup> )		0.017	0.032	0.088	0.111	0.053	
Pipeline Length / Compressor (km)		1,857	279	1260	3,053	1,200	
Storage Capacity ( bcm )		3	4.9	21.4	12.2	13.3	
Storage Capacity / Annual Consumption		6%	6%	28%	16%	31%	
# of LNG Terminal		2	4	0	2	3	
<b>Marketing, Trading &amp; Distribution</b>	# of Wholesaler	42	70	70-90	>150	97	
	# of Distributor	64	19	713	247	25	
	# of Trader	N/A	130	>100	106	83	
	Exchange Annual Trade Volume (TWh)	N/A	614	7	17	7	
	OTC Annual Trade Volume (TWh)	N/A	1090	143	17	26	
	Gas Market Value (b€)	15.7	33	31.5	25	15.5	
	Churn Rate	N/A	19.1	1.5	0.46	0.68	
	Total Consumption (bcm)	47.6	83.7	76.4	76.1	42.1	
<b>Retail Commodity &amp; VAS</b>	# of Retailer	64+41	19	820	305	50	
	# of Main Retailer Player	N/A	6	2	5	3	
	Switch Rate (Entire retail market)	N/A	15%	6.7%	4.5%	3.5%	
	HHI - Retail	N/A	2,452	300	1,102	4,000	
	Existence of Regulated Prices	Existing	Not existing	Not existing	Not existing	Existing	
	Level of VAS Provided	Not Existing	High	High	Medium	Low	
	Natural Gas Consumption by sector (%)	R&C	26%	41%	46%	35%	47%
		Power	54%	36%	24%	45%	14%
		Industry	21%	12%	22%	16%	23%
		Other	-	11%	8%	4%	16%
Power Diversification (%)	Gas	32%	40%	22%	39%	16%	
	Oil	27%	35%	34%	40%	32	
	Coal	31%	14%	23%	8	-	
	Nuclear	-	-	-	-	41%	
	Other	11%	11%	21%	13%	12%	

Please Refer to References: 7, 27, 34, 35, 36

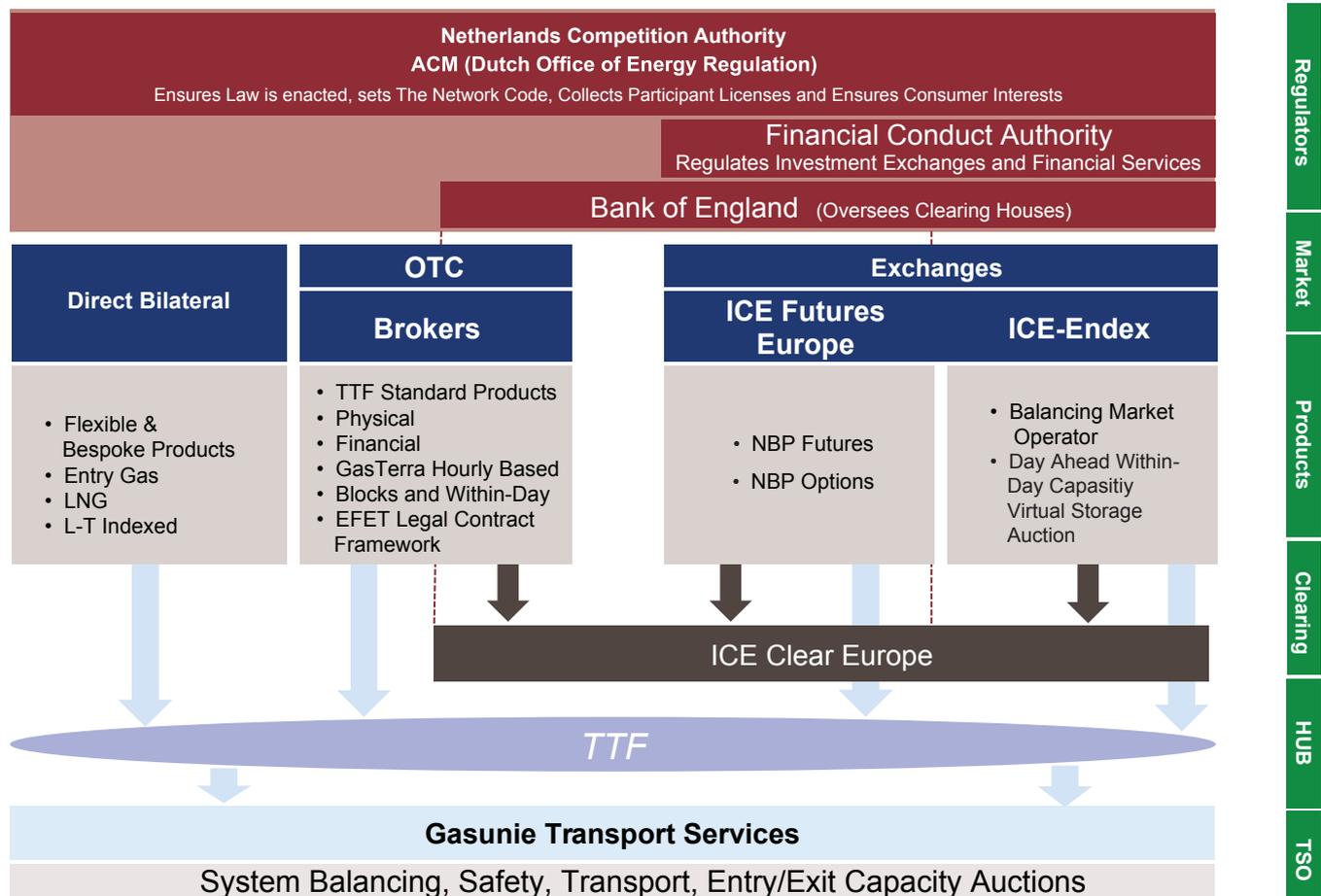


# Market Structure & Regulatory Analysis

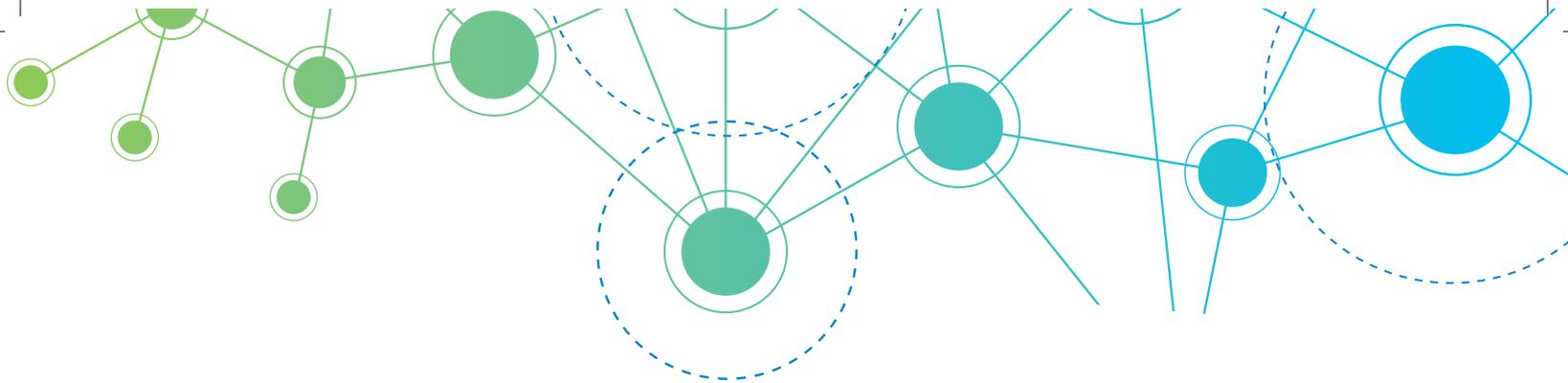
## Market Structure – UK



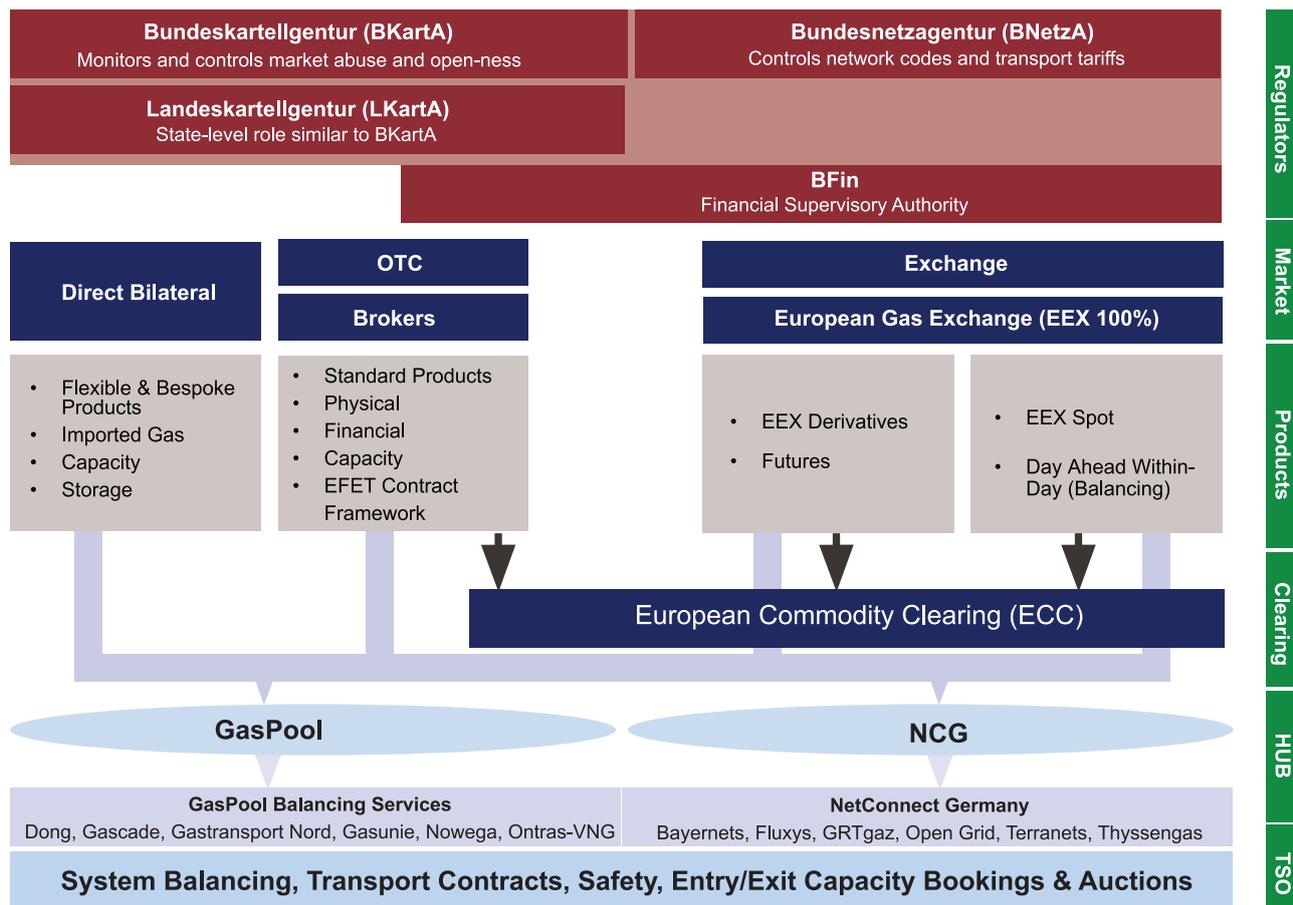
## Market Structure – Netherlands



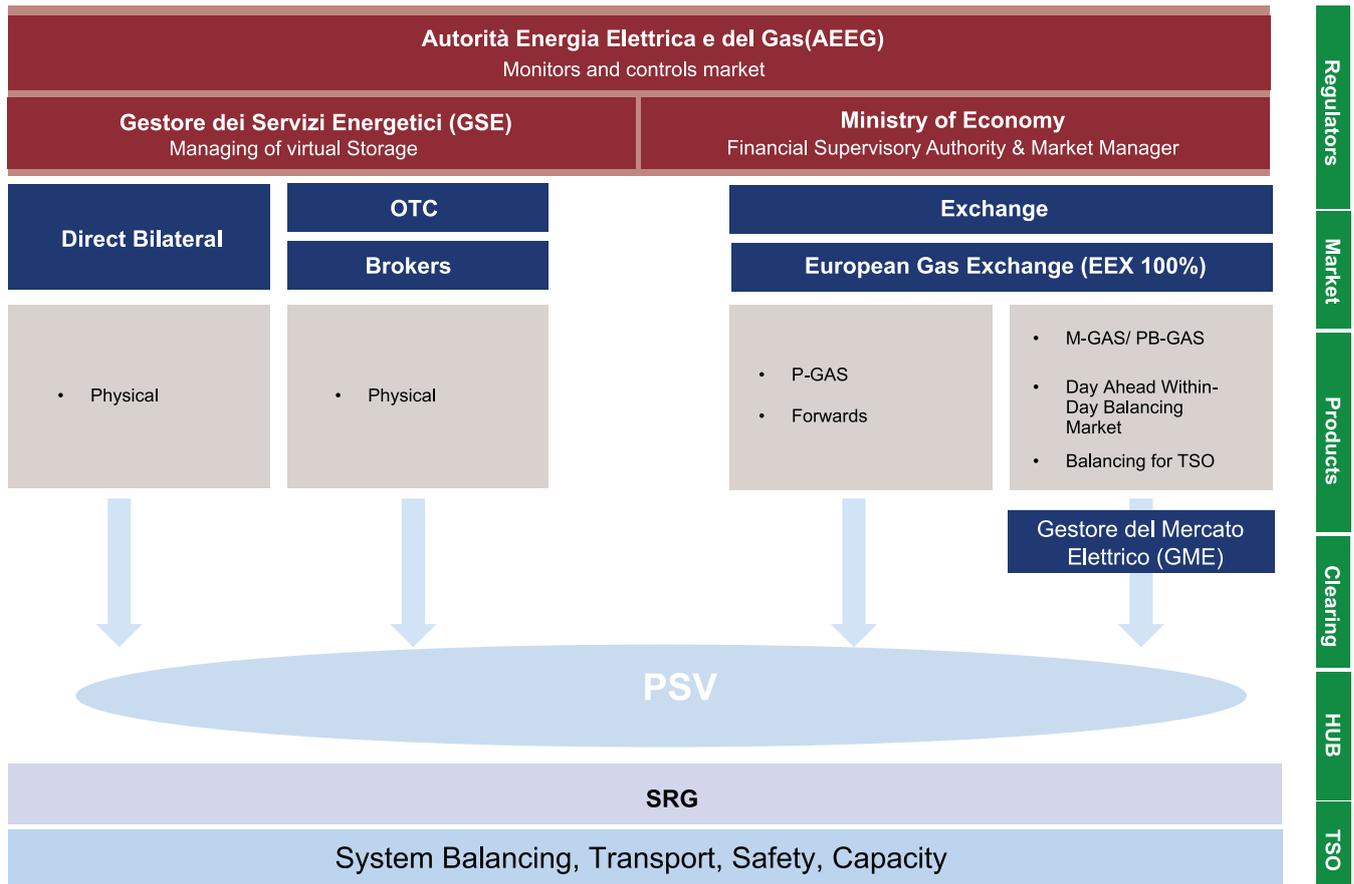
Please Refer to References: 7, 27, 34, 35, 36



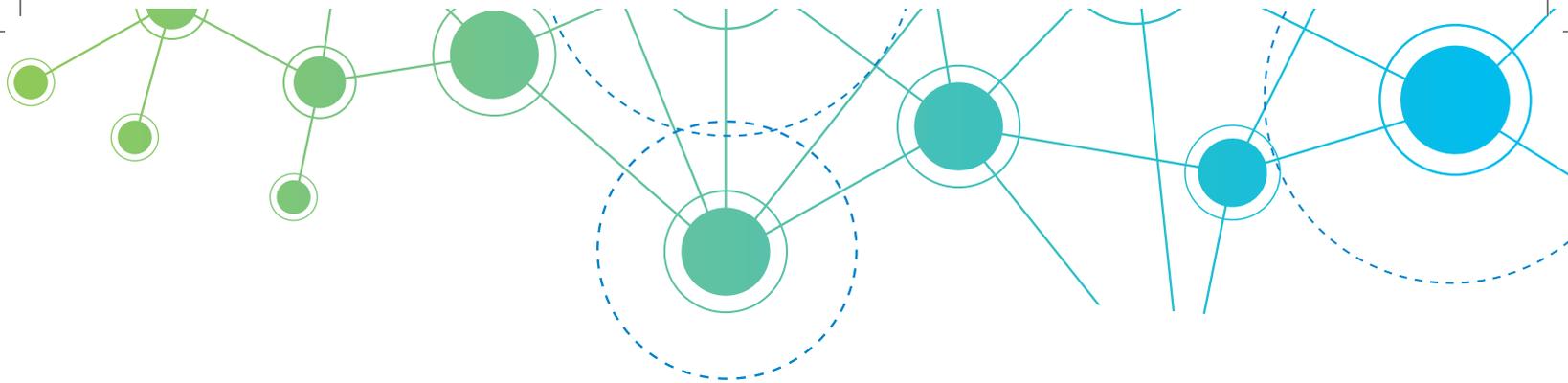
### Market Structure – Germany



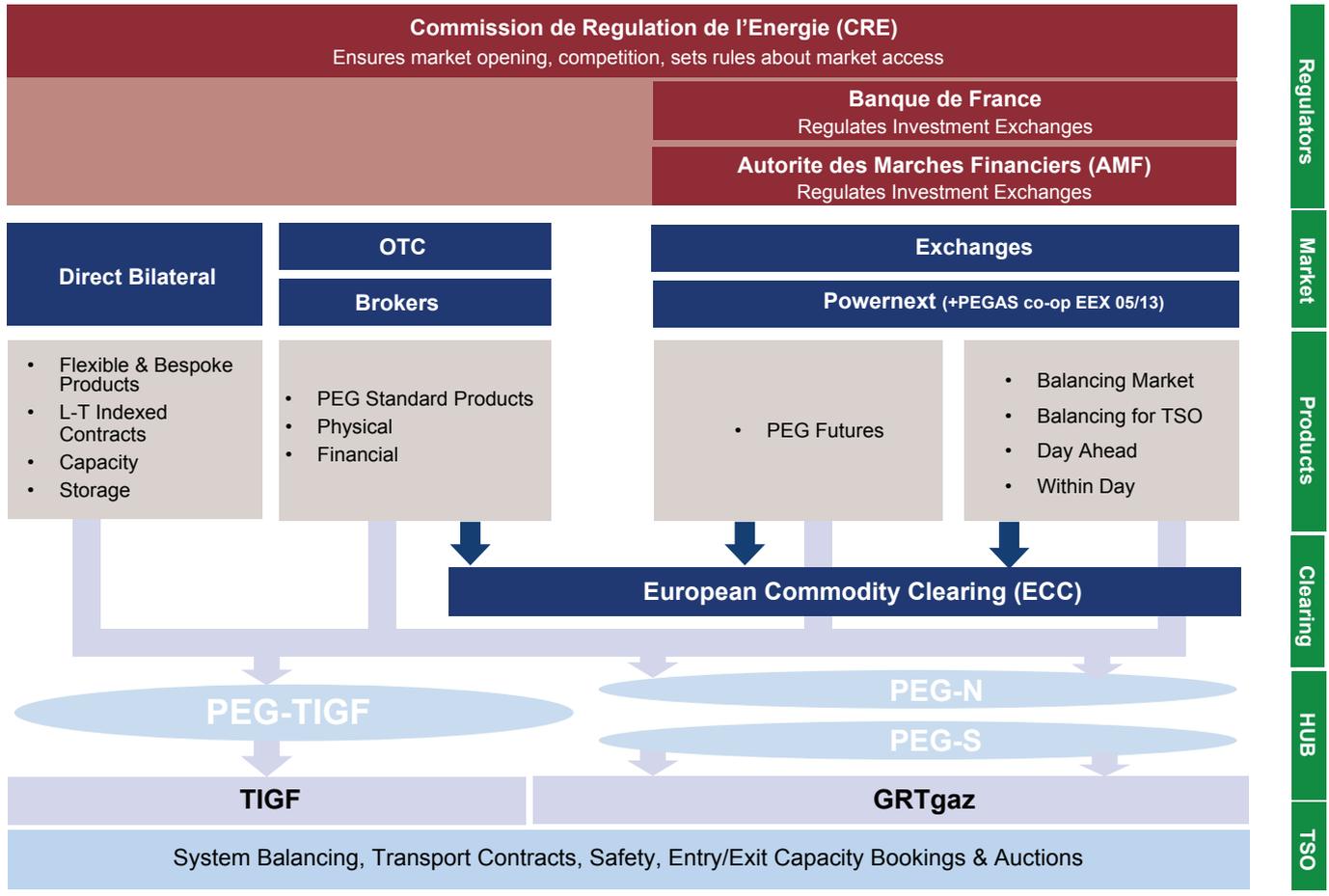
## Market Structure – Italy



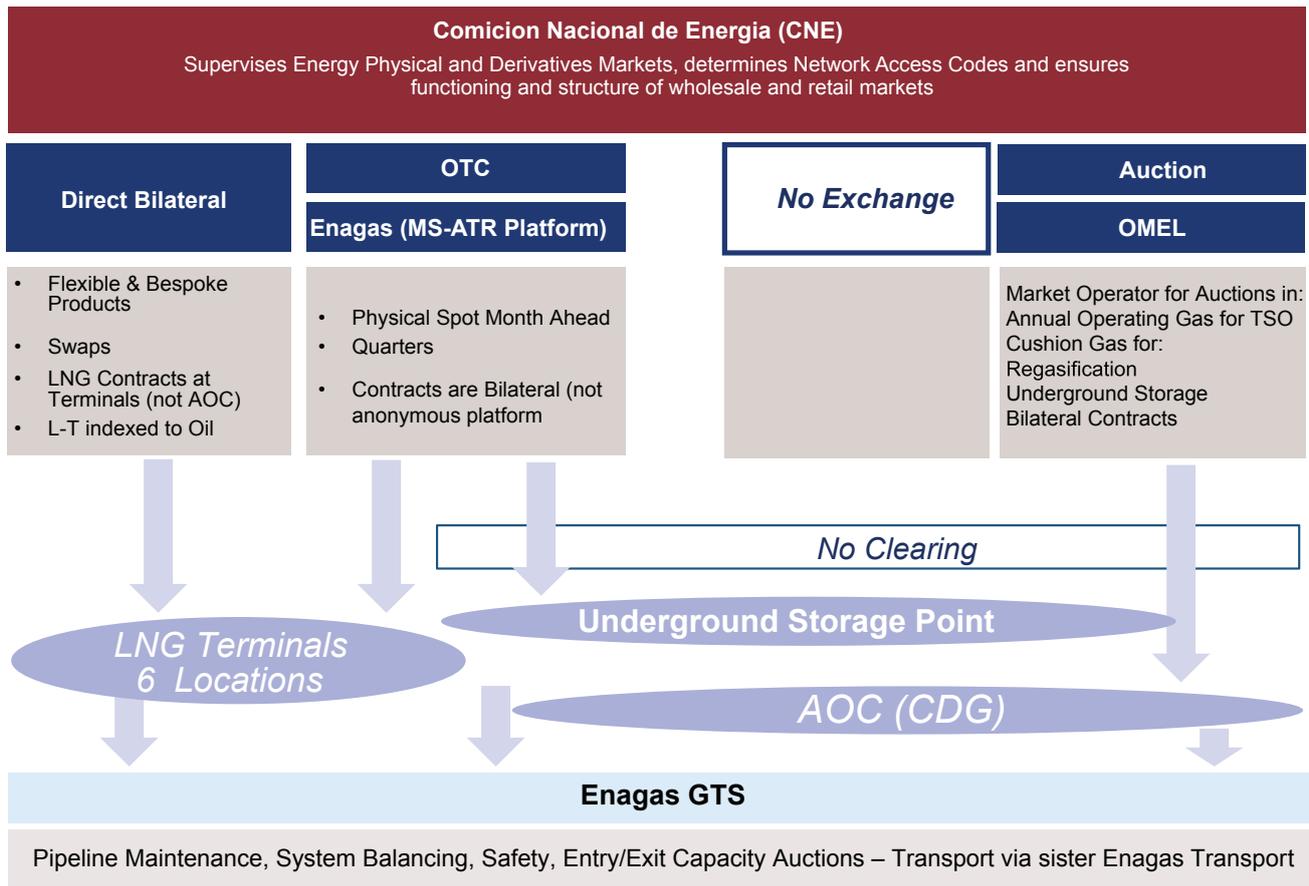
Please Refer to References: 7, 27, 34, 35, 36



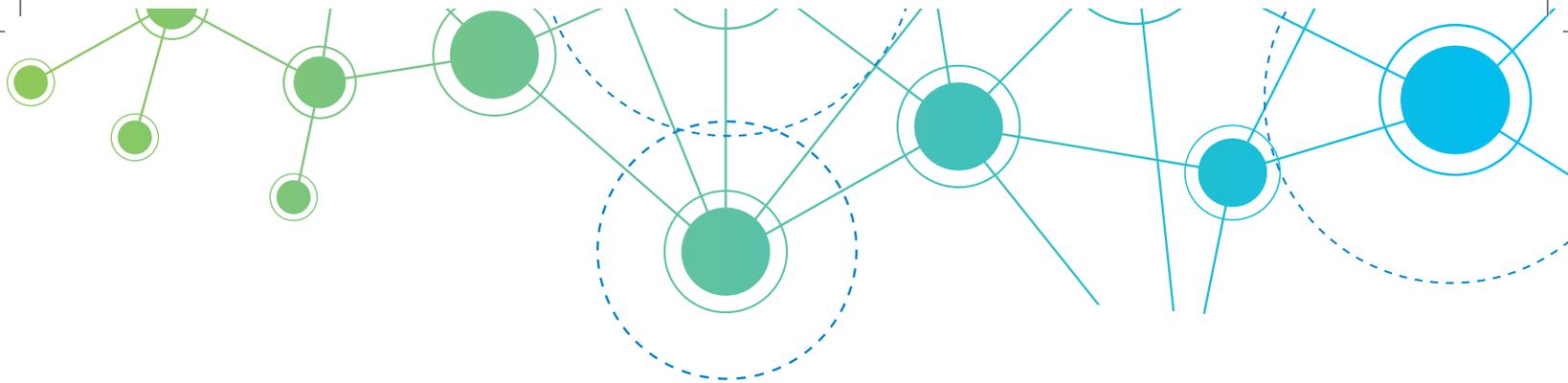
**Market Structure – France**



## Market Structure – Spain



Please Refer to References: 7, 27, 34, 35, 36



## Products on the Markets for Gas

### UK Market

#### OTC

**Physicals – Standard Products – can also be Cleared**

Spot : Within-Day, Day Ahead (DA)

Prompt : WA, WDNW, WE, BOM, Month Ahead

Forwards : Months, Quarters, Seasons (W= Oct-Mar, S=Apr-Sep) Years

**Financial** : Options, Swaps, Spark Spreads, Swaptions, Spread-Options

#### ICE

**NBP Futures – physical** delivery rights at NBP via matching nominations

Daily : Days from DA-6days, WA, WDNW, WE, BOM, Expiry 1D prior

Monthly : Months, Quarters, Seasons, out to 6 Years - Expiry 2D prior

**NBP Options:** On Monthly Gas Futures out to 36 consecutive months

#### ICE Index

**Within-Day: OCM** – for balancing on gas-day at NBP via Title

**NBP Spot** Day-Ahead (DA), WE, BOW, WA, WDNW – balancing as Title

Physical flow & Locational trades exist to help balance System issues

### German Market

#### OTC

**Physicals – Standard Products: can also be cleared on ECC**

- Spot : Within-Day, DA,
- Prompt: WA, WDNW, WE, BOM, Month Ahead
- Forwards: Months, Quarters, Seasons (W= Oct-Mar, S=Apr-Sep) Years

**Financial:** Options, Swaps, inc oil-indexed- some Spark Spreads

#### EEX

**NCG & GasPool Hubs - Physical**

- Spot : Within-Day; DA, DA+1, WE – All Hourly Volume – Expiry 3h
- Futures : BOM, 6 Months, 7 Quarters, 4 Seasons, 6 Years

Volumes are multiples of 1MWh or 10MWh each hour for DA, DA+1 and WE

- UK NBP and Dutch TTF products also provided

#### ICE

**Futures - physical** delivery rights at Hub via matching nominations

**NCG and GasPool Hubs**

- Monthly: Months, Quarters, Seasons, Years – up to 4 Calendar Years

### Italian Market

#### OTC (PSV)

**Physicals – Standard Products – can also be Cleared**

- Spot

#### M -GAS

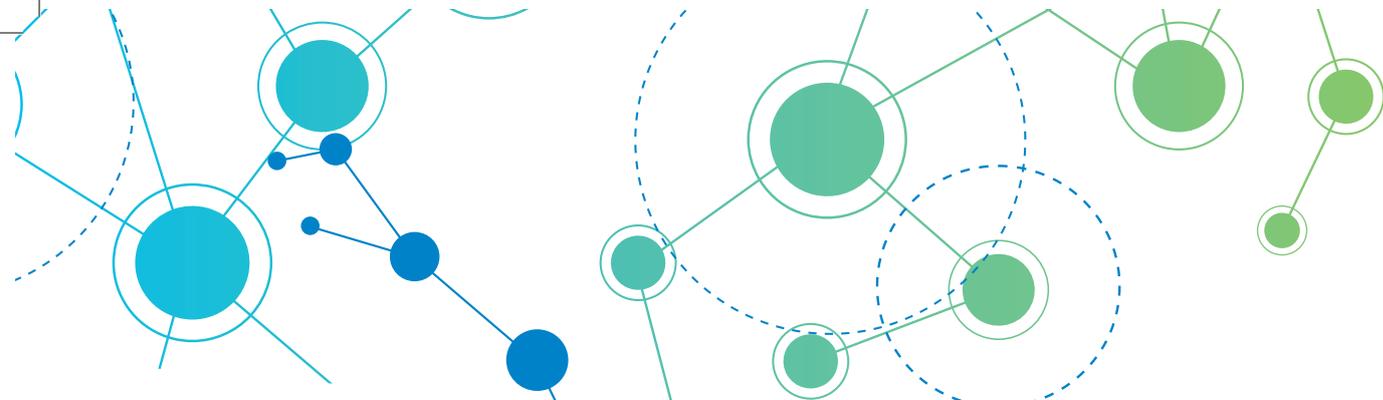
#### P-GAS

**Physicals – Standard Products**

- Spot: Within-Day, DA

#### PB-GAS

- **End-Day:** for balancing on gas-day
- Physical flow & Locational trades exist to help balance System issues



## French Market

### OTC

**Physicals At PEGs – Standard Products: can also be cleared on ECC**

- Spot: Within-Day, DA,
- Prompt: WA, WDNW, WE, BOM, Month Ahead
- Forwards: Months, Quarters, Seasons (W= Oct-Mar, S=Apr-Sep) Years
- L-T Contracts based on oil indexation still prevalent

**Financial:** Options, Swaps, inc oil-indexed- generally on Months/Q/S/Cal

Please Refer to References: 26

## Capacity and Storage Markets for Gas

### UK Market

#### Capacity Trade – Entry/Exit Model – Auctions and Secondary Trade

- NGG as TSO runs auctions every 6 months for monthly capacity with Max DQ
- Entry Capacity is booked for each NTS Entry Point months ahead
- Capacity can be traded OTC between shippers
- Within 1-2 weeks of delivery, NGG auction daily capacity, shippers also trade
- NGG provide a platform/bulletin board. Exchanges and brokers offer screens

### German Market

#### Capacity Trade – Entry/Exit Model – Bookings and Small Secondary Trade

- Each TSO group facilitates primary bookings via PRISMA platform
- Bookings have moved from all L-T to shorter term as a result
- Capacity can be traded secondary between shippers via same platform
- Pricing ruling means 'no more discount' for L-T bookings
- Exits are handled via ex-poste provided registration to flow into DSO

### Powernext

#### PEG-N, PEG-S, PEG-TIGF- Physical

- Spot : Within-Day; DA, DA+1, WE
- Spreads PEG-N/PEG-S on all Spot Products

#### PEG-N Only

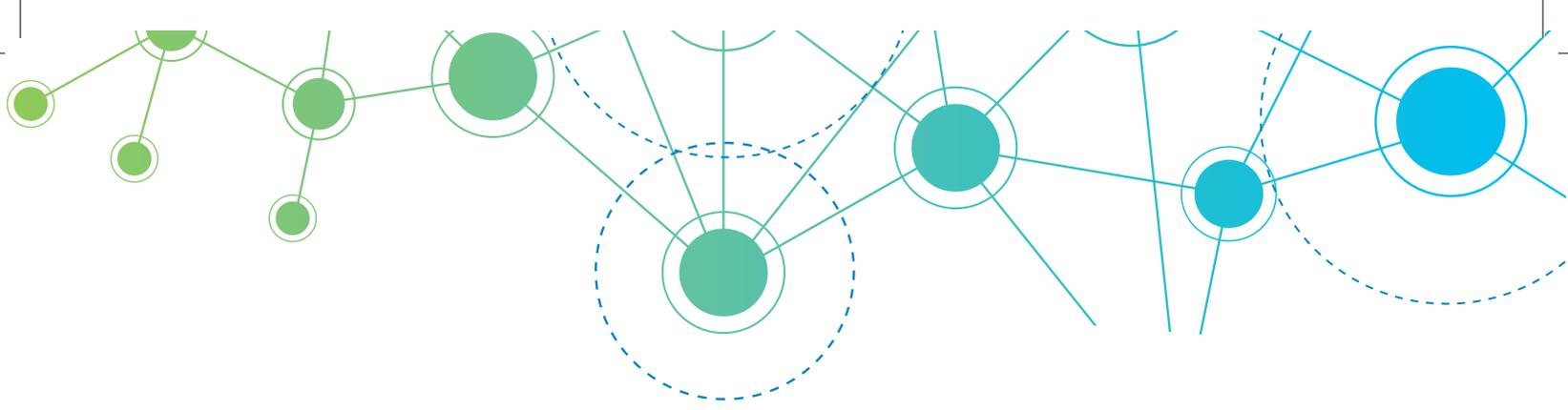
- Futures : 3 Months, 3 Quarters, 3 Seasons, 1 Year
- Spreads PEG-N / Dutch TTF on all maturities
- Pegas : new co-operation between Powernext and EEX to host their combined products on a single pan-European platform clearing via ECC

#### Storage

- Storage is auctioned by storage owners
- Trade in secondary market is done OTC
- ICE Endex list storage rights at Rough operated by Centrica Storage
- Products include: Withdrawal, Injection, Space – all Firm plus gas
- Some 'virtual' storage products have been available

#### Storage

- Storage products are offered directly by the Storage Operators
- Market is much less regulated than Network due to overcapacity
- 3rd Party access is non-discriminatory but pricing not transparent
- Consolidated platform (Store.x) exists



### Italian Market

#### Capacity Trade – Entry/Exit Model

- The shipper send the request of Capacity to TSO; the TSO approves the request
- Entry Point: Each shipper required capacity for each Entry Point
- The types of capacity are: Annual, six-monthly, monthly, annual intrrup. 1° and 2° level, six-monthly interrup. 1° and 2° level
- REMI: Each shipper required Annual capacity for each Delivery Point

#### Storage

- A part of Storage is assigned depending on domestic market
- A part of Storage is auctioned by storage owners
- Products include: Withdrawal, Injection, Space – all Firm plus gas
- Some ‘virtual’ storage products have been available

### French Market

#### Capacity – Subscriptions, Auctions, Developing Secondary Trade

- Each TSO offers subscriptions for Annual, Multi-annual, Monthly capacity
- Types: Entry and Exit on various point types Upstream &/or Downstream
- Capacity is Firm or Interruptible – except daily Firm
- Mechanism to encourage new entrants limits concentrated Firm bookings
- Daily Capacities available on auction basis – monthly from Apr13
- Bundled Capacity offered between GRTg /TIGF & to NCG & Belgian flows
- TIGF facilitate some secondary capacity trading inc. for interconnectors

#### Storage

- Storage is booked directly with facility owners
- Relatively unregulated vs transport with opaque and high pricing
- TIGF own significant assets

Please Refer to References: 26

## Shareholders

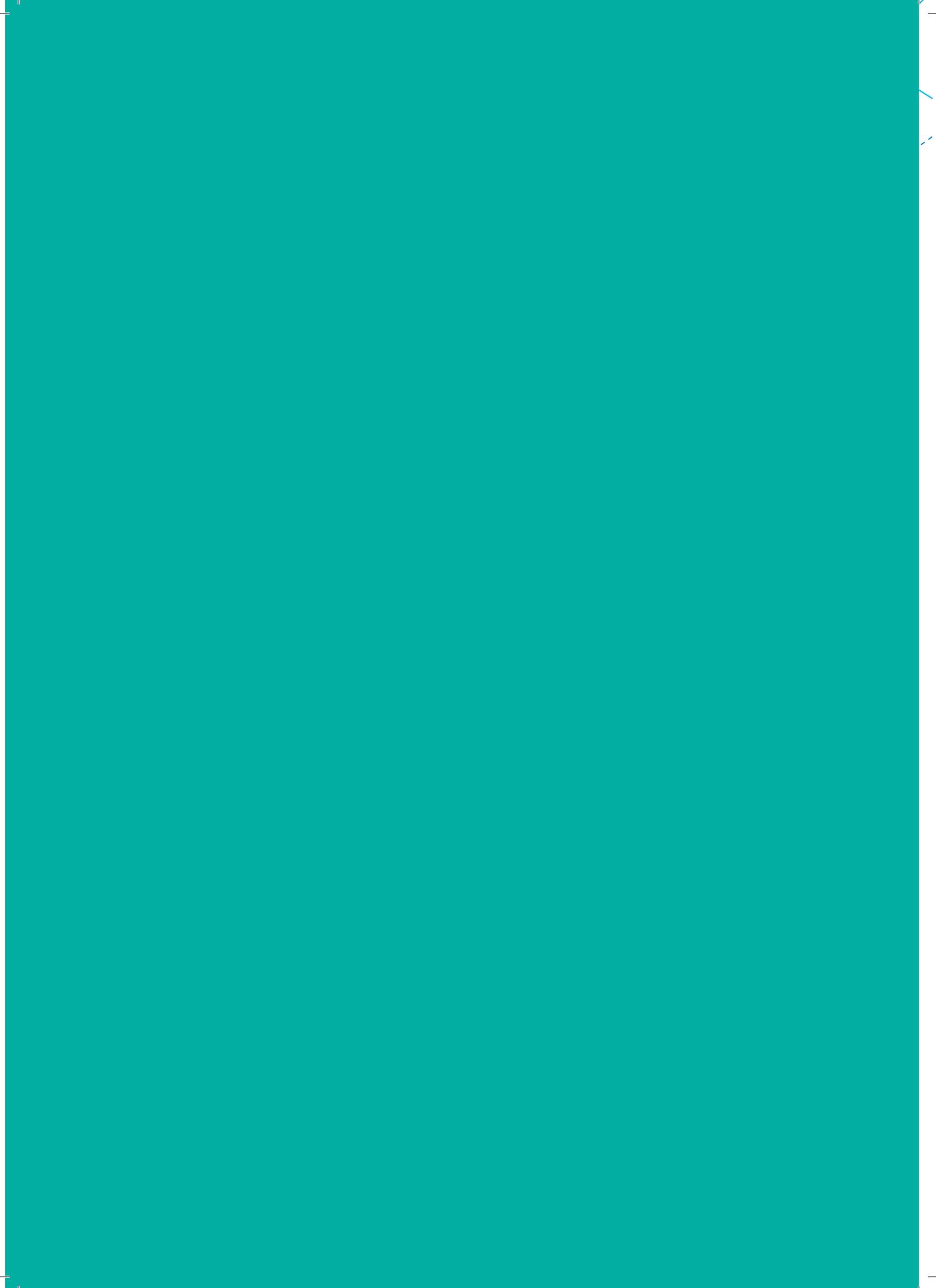
UK Market	
Exchange	ICE Publicly listed : NYSE ICE 100%
Exchange	ICE Endex 79.12% - ICE 20.88% - NV Gasunie
HUB	National Grid Plc. (NBP) Publicly Traded Company 100% LSE – NYSE
OTC	GFI, ICAP, TFS, Tullet Prebon using Trayport Software

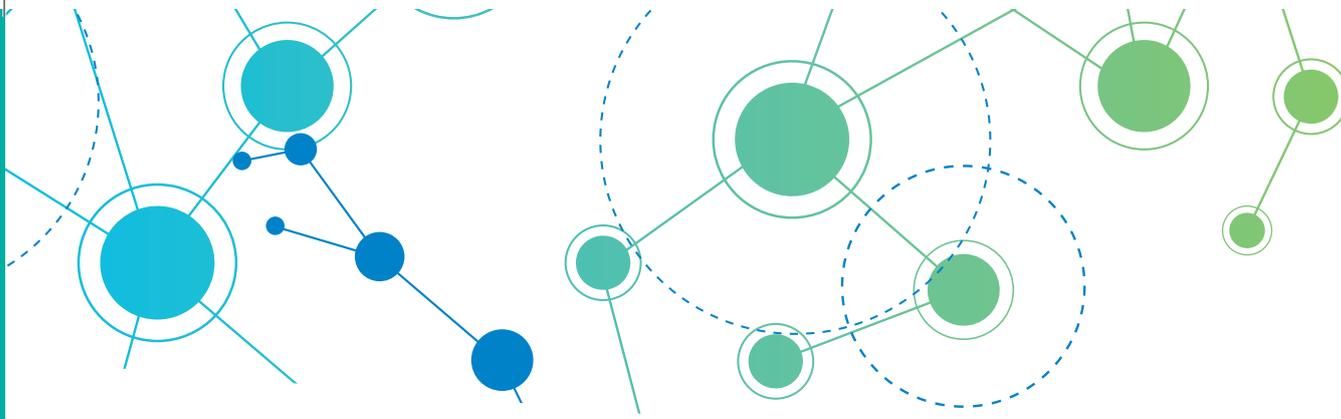
Italian Market	
Exchange	GME Min of Economy 100%
HUB	PSV – SnamRete Gas Free Float 49.68% Cassa Depositi (state) 30% Treasury Shares 0.09% Eni S.p.A. 20.23%
OTC	GFI, ICAP, TFS, Tullet Prebon using Trayport Software

German Market			
Exchange	EEX	59.97% Eurex Zurich AG	7.38% LVV Leipziger Versorgungs 32.65% Others (Energy companies and banks)
HUB	GasPool	GASCADE Northern Gas Transport Nowega GmbH	Gasunie Transport Services ONTRAS - VNG Transport GmbH
HUB	NCG	Terranets bw GmbH GRTgaz Deutschland	Open Grid Europe Fluxys TENP TSP S.p.A Bayernets GmbH Thyssengas GmbH
OTC	GFI, ICAP, TFS, Tullet Prebon using Trayport Software		

French Market			
Exchange	Powernext	3 European TSOs 53%	8 Private Traders 47%
HUB	Peg Nord	GDF Suez 75%	Société d'Infrastructures Gazières 25%
HUB	Peg Sud	GDF Suez 75%	Société d'Infrastructures Gazières 25%
HUB	Peg TIGF	Total 100%	
OTC	GFI, ICAP, TFS, Tullet Prebon using Trayport Software		

Please Refer to References: 26





# Analysis of International and Turkish Natural Gas Markets

## Analysis of International and Turkish Natural Gas Markets: Introduction

- In this section, the analysis is again done using the Value Chain segments as the framework.
- While general comments are made about each of the benchmarked markets, UK, Germany, Italy, France, Spain and the Netherlands, the overall intent of this section is to focus on the aspects of the markets that are relevant for the development of the Turkish Market. This is done in order to have a more to-the-point document that is most beneficial to the reviewer whose main interest is the Turkish Market.

## Analysis of International Markets: E&P, Gathering and Processing

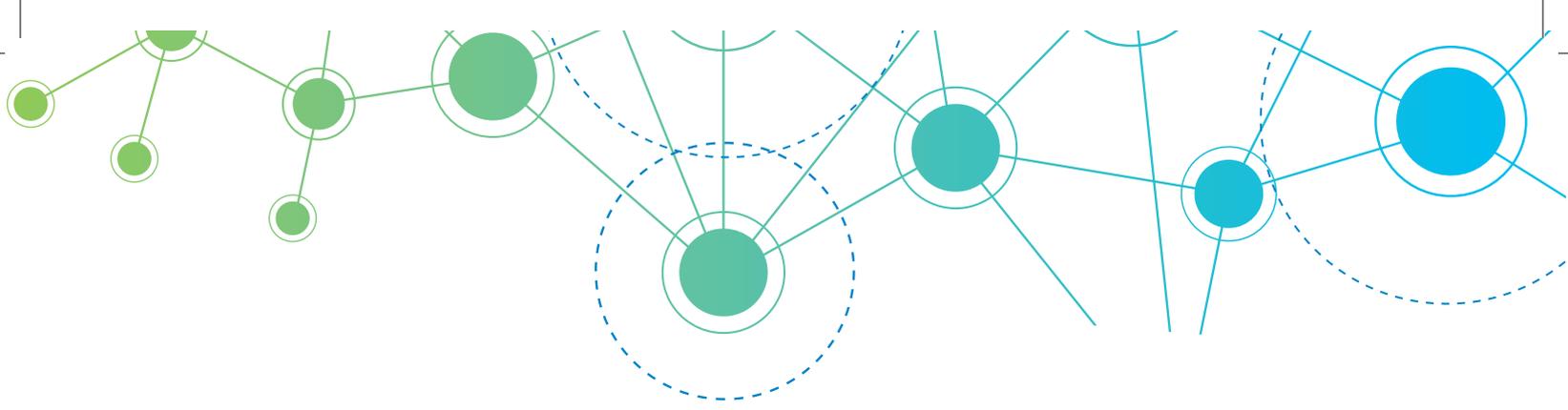
**Experience from international markets shows, that whilst domestic production is an important enabler, lack of it need not prevent formation of a competitive market**

In the UK, domestic production accounts for 45% of overall consumption, which clearly gave UK quite a bit of flexibility for balancing and price formation purposes in the domestic market. However, as North Sea gas (and coincidentally oil) production is in decline, the UK is finding itself more and more dependent on imported gas.

In order to continue to have the flexibility it has so far enjoyed, the UK is following a strategy to increase inter-connection via pipelines to mainland Europe (for example via the Bacton-Zeebrugge interconnector) and increasing number of LNG terminals (4 have been built in the last 10 years – 3 of which are operational). The 4 LNG plants account for nearly half of the total NG imported into the country. While most of it is gas from Qatar, having LNG plants provides flexibility to source NG from the world market on the spot if necessary as LNG trade activities are on the rise around the world. Indeed the UK will be a destination for US originated LNG tankers, when US begins exporting (Centrica have already secured supply on a long term contract).

Built upon a combination of traditionally strong national reserves of the Groningen Field, imports and interconnection with other markets, the strategy of the Dutch Government has been to develop the Netherlands into the 'Gas Roundabout' of Europe much in the spirit of the historically strong Dutch tradition of merchant trading and logistics. LNG has begun to play a part in the overall supply mix to Netherlands and the onwards destinations that its network serves.

Unlike the UK and Dutch markets, Germany lacks sufficient domestic production (only 11% of total supply). Germany achieves supply security through interconnections with surrounding countries. The 22 entry and 16 exit points enable Germany to have access to gas from multiple sources in case of a localized constraint in the system.



Similarly having capacity to store 28% of annual consumption at any given time, also gives Germany the flexibility to overcome peak periods relatively easily. These infrastructural characteristics also enable German gas market participants to manage the dominance of Russia in supply.

The Italian market is one of the developing gas markets with limited (less than 10%) domestic production. Recognizing the reliance on pipeline imports (close to 80%) Italy has also been utilizing LNG capabilities to increase supply security. The two LNG plants now provide enough capacity to meet close to 10% of annual consumption.

Although Italy serves as an entry point to the overall European market, with only 8 entry and 2 exit points, it is not possible to say Italy is very well interconnected. This is most likely due to its geographic location, being at the “tip” of the continent.

Italy seems to have taken the approach of building large import capacity to ensure supply security, as it uses about 65% of the 120bcm import capacity it has. Thus, Italy is well positioned to play a bigger role as Europe’s entry point and also enhance its supply security as the gas runs through its borders.

The French Market is another developing market with very limited domestic production (less than 2%). The share of the incumbent is quite high at 73%. The share of LNG is also quite high at nearly 30%. France seems to achieve supply security with a rather diversified supply sources and types and direct connectedness with the Netherlands.

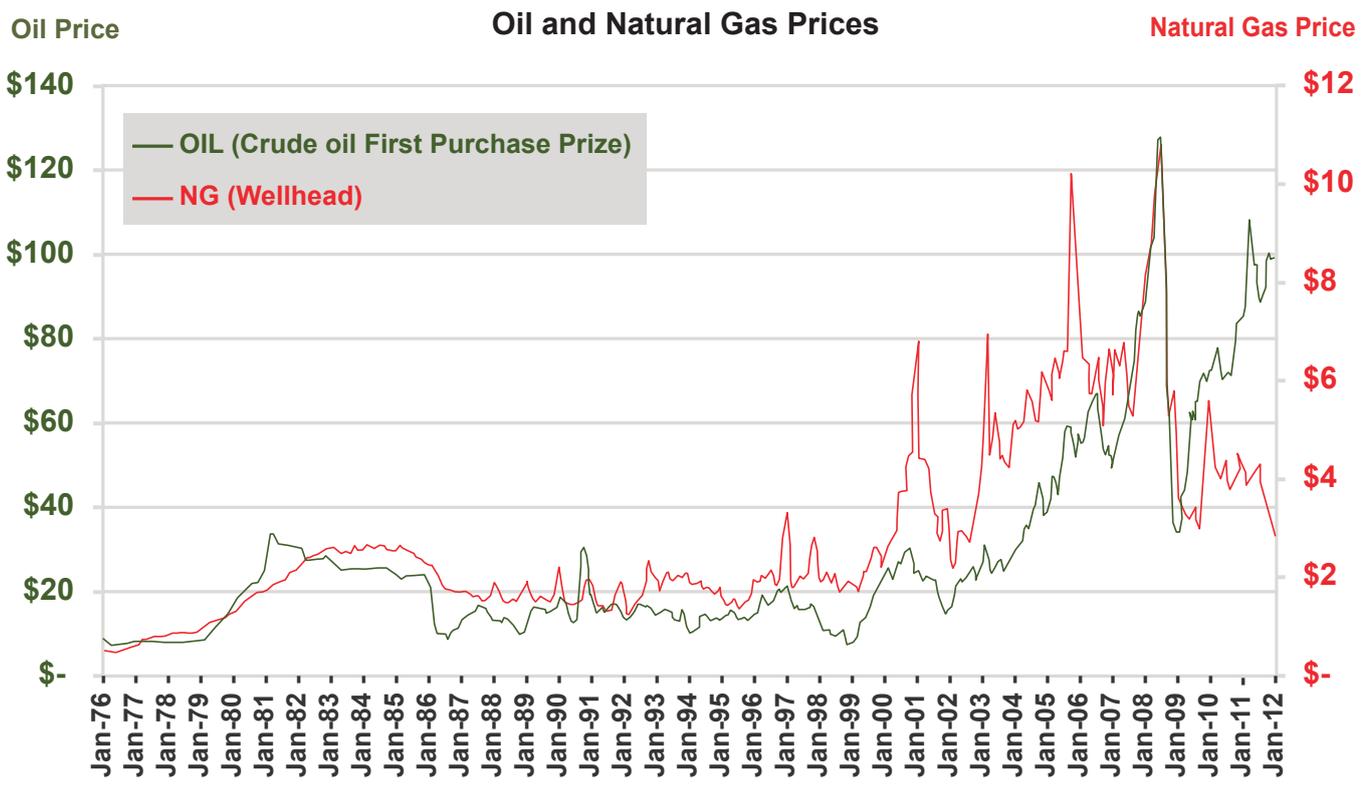
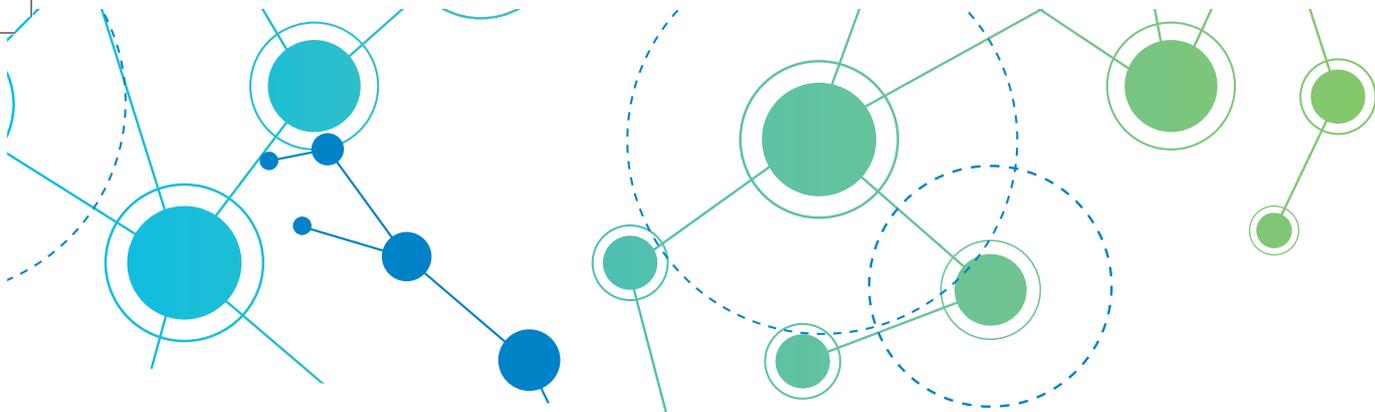
Spain is similar to Italy and France in terms of lack of sufficient domestic production and reliance on imports. While interconnections with France exist, again due to its geographic location Spain does not enjoy the level of interconnection that Germany has achieved.

However, Spain does have a very diversified supply source from up to 14 different countries. These supplier countries include Algeria and Norway which are connected via pipelines, but also and more importantly, Nigeria, Qatar, Trinidad and Tobago which deliver LNG to the six terminals spread around Spain. With 66% of imports coming via LNG, Spain is the fourth largest LNG destination in the world. LNG Spot trade is significant and price drivers are much more based on the international LNG market and the pull towards Asia can directly impact Spanish gas prices more so than local fundamentals. Cargoes are known to be re-directed and reloaded at Spanish terminals for re-shipment when prices favor it, which also increases Spain’s “global interconnection”.

**Oil indexed pricing on import contracts hinders market development; importers are re-negotiating contracts with exporters to introduce gas-indexed pricing.**

Dominance of Russian imports is felt throughout the value chain in many of the European Gas Markets. One of the reasons the Russian imports impact the entire value chain the fact that their pricing has traditionally been based totally on oil prices, as opposed to natural gas prices.

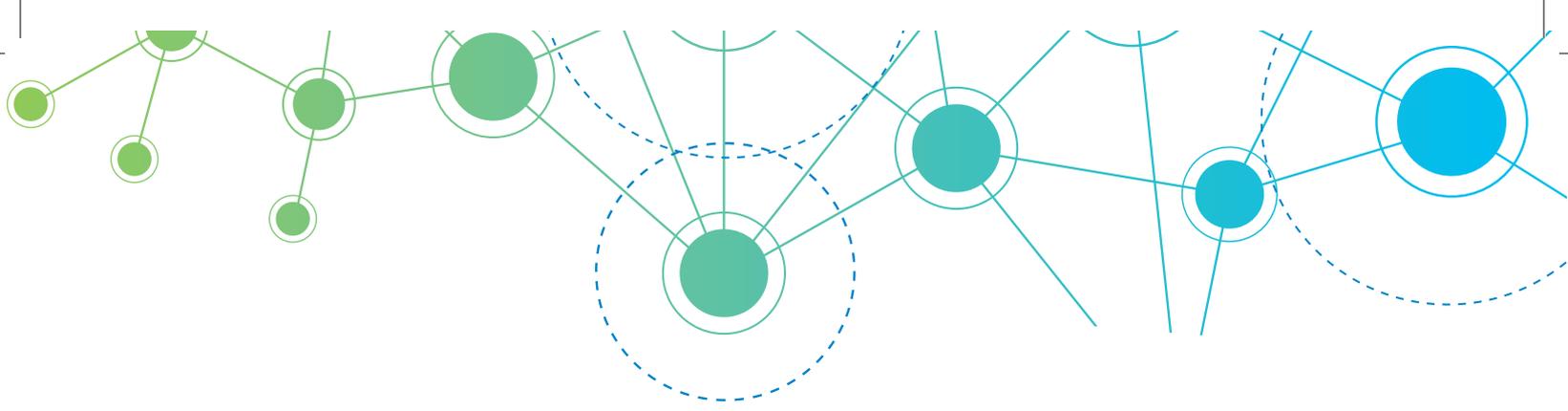
This was considered acceptable in the earlier days, as oil and natural gas were fuels that could substitute one another. However, as the use of NG increased in areas where oil was no longer a reasonable substitute, the natural gas market began having its own dynamics, and as can be seen in the graph to the side, natural gas prices can deviate significantly from the oil prices.



Indexing supply contracts to oil inhibits shippers from reacting to, or taking advantage of, the demand dynamics that prevail in the domestic market. In the end, both the shippers and the consumers lose as a “free” market, fundamentally driven by gas fundamentals, is not created.

Recognizing that natural gas is no longer merely a substitute fuel for oil, countries recently began moving towards basing their contract prices on a natural gas index. One such country was the Netherlands. Although the Netherlands was one of the first countries to use oil-indexed pricing, they are also one of the first ones to move away from it. Of course, having significant domestic production means it was relatively easy for the Netherlands to initiate this change.

For countries dependent on imports, this is a trickier and more difficult undertaking. Yet, recognizing the importance of this in achieving a liberal market Germany has already taken steps to introduce natural gas prices into the contracts with Gazprom. We expect to see this as an increasing trend in the near future, which Turkey can leverage as well



## Analysis of International Markets: Transmission

### Achieving a well functioning Hub representing the entire market requires investments and structural changes

Transmission system forms the backbone of the entire market impacting all downstream activities, including marketing & trading, distribution and retail. Review of successful markets shows transmission operations need to be managed well both in terms of infrastructure (e.g. pipeline, IT) and regulations (e.g. responsibilities of TSO(s), transparency). Markets such as UK, Netherlands, Italy and Spain each have one TSO for the entire transmission network, while Germany and France have multiple TSOs.

The UK's success as a well-functioning NG market relies heavily on its success in establishing a well-functioning Hub. The UK Hub, National Balancing Point (NBP) is a virtual hub representing the entire transmission network. In order to achieve this, UK has been successful in addressing constraints and really have "one grid serving the entire country". Perhaps the relatively large number of compressors along the transmission pipeline system (one compressor for every 279 km; in all other benchmarked countries in this report this number is >1000km, for Turkey 1,857km) is an indication of how the UK achieved this.

The state based political and social system is one of the challenges Germany is trying to overcome to achieve a unified gas market, as each region had its own TSO. In recent years, Germany has taken major steps to merge all the grids to achieve one unified grid. Although, currently there are two hubs (with 6 TSOs holding share in each), it is expected that in the near future these two will be merged and Germany will have one hub, just like the UK.

In fact, the association of TSOs (Vereinigung der Fernleitungsnetzbetreiber Gas e.V) established in March of 2013 where all 12 TSOs are represented to interchange data and speak one voice shows the movement in the right direction. One of the main responsibilities of this association is to develop the investments plans, such as compressors and pipelines, covering the entire German market. Similar concept is applied EU wide through the 10 year investment plans prepared by TSOs and made public.

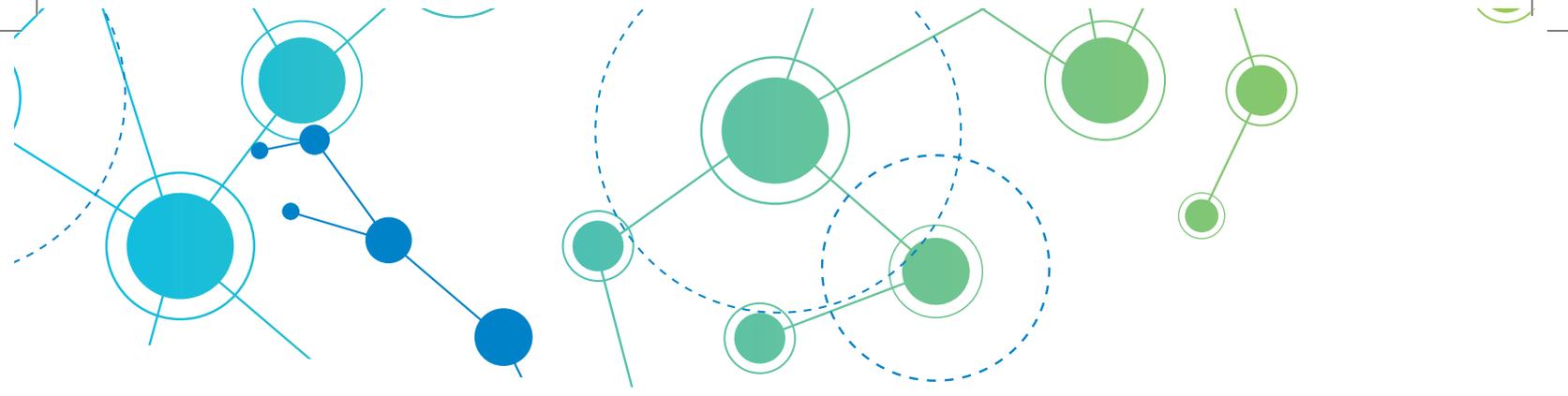
In France, infrastructural constraints have been the main reason for not being able to achieve one-hub and one-TSO managing the entire market. As France continues investments to reduce the constraints particularly between the North and the South of the country, it is expected they would be moving closer to operating as one hub with one TSO.

Spain does have a relatively well developed level of structure in terms of a fully unbundled TSO Enagas with TPA procedures in place. Capacity availability to enter the network at terminals and storage points is relatively good.

### Most efficient way of balancing the system is through a market driven mechanism; UK mechanism is taken as a basis for the EU-wide balancing network code

As one of its core operations, TSOs in different countries have varying ways of balancing the system. Usually the methods applied vary with the maturity and liquidity of the market.

In some countries the TSO applies penalties to the shippers who are in an imbalanced position. The experience shows however this approach is not the most effective in terms of penalty or price formation, and rather a market driven approach should be utilized. Such a market-based balancing mechanism is seen as more transparent and fair to participants.



There is an ongoing EU-wide initiative with the ambition to harmonize the balancing mechanisms under an EU-wide network balancing code. In the model, that is predominantly based on the current UK model, the objective is to give economic signals to the grid users that incentivizes them to balance their positions or suffer a market-based marginal 'cash-out' for any imbalances they still have on the gas-day.

In the UK, balancing is done on a daily granularity (whereas in Netherlands granularity is hourly). The shippers participate in the balancing market (called the On the day Commodity Market – OCM, operated by ICE Endex) to remedy their potential imbalances. The more the imbalance is on the market the higher the costs would be on the market to remedy these positions. The TSO is also a participant in the balancing market and does what is required to bring the overall system to balance. The cost the TSO incurs for balancing the overall system is effectively applied to those players who still have an imbalanced position at the end of the day via the System Marginal Prices of the OCM results. Since these are determined by market dynamics, in effect, these SMPs replace the penalties applied in earlier versions of the balancing mechanism with a transparently-formed buy and sell price which is applied to shippers who caused the overall system imbalance the TSO had to act upon.

This model is seen as most effective compared with models where the TSO determines the penalty amounts to be imposed on players, as penalties are determined by the market, which operates in a transparent way and is less susceptible to manipulation.

In the Netherlands, the Balancing Regime has evolved from an initially penalty-based one into a market-based one with daily balancing held via Bid Pricing Ladder operated by ICE Endex. This includes elements of an electricity-type balancing market and differs slightly from the UK's OCM. But essentially, both markets replace the former onus of the TSO to run the bidding/offering process to enable participants to achieve balance via trading in and out of within-day positions.

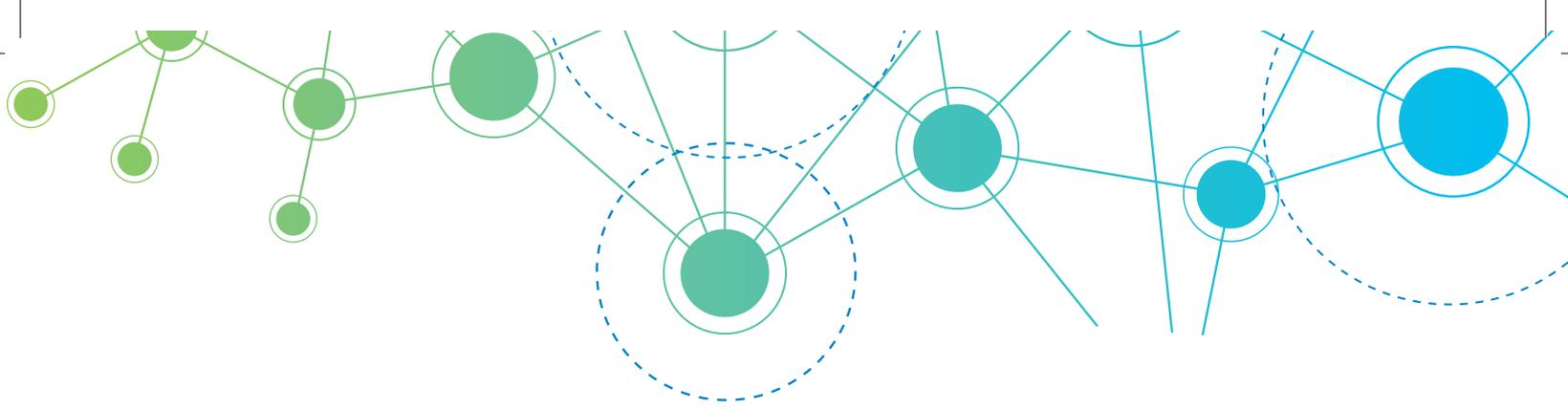
Key natural gas markets such as Italy, Germany and France have committed to moving to the new balancing mechanism by 2015. It is recognized that a certain amount of liquidity needs to be present for the new model to function well.

## Analysis of International Markets: Storage

**Sufficient storage capacity can be achieved in multiple ways. Efficient use of existing capacity is as important as the level of capacity**

Due to own production capabilities, until recently, the UK didn't feel the necessity for high storage capacity and therefore has a relatively low storage to annual consumption ratio at 6%. However, as imports become more important, it is expected UK will increase its storage capabilities as well. This could be an additional reason for increasing LNG investments, as the LNG plants' storage capacity accounts of more than 25% of the countries entire capacity. In fact, National Grid utilizes the LNG facility at Avonmouth for providing peak gas supply to shippers and contingency in case of supply failures.

It is also worth mentioning that one of the reasons for UK having a low level of storage capacity is that without any incentives, the market conditions didn't make it feasible for investors to develop storage facilities. As such UK has been discussing providing Third Party Access exemption to investors. Such exemptions are provided for "minor" storage facilities.



In addition to the capacity, the ability to utilize this capacity is a key driver for success of the market. In order to achieve most efficient utilization of storage facilities we see a trend towards having a market for capacity and other storage related products. For example, in the UK, Storage is auctioned by storage operators and secondary trade is done on OTC. Products include Withdrawal, Injection and Space. In Germany as well, there is a consolidated platform (Store.x) for storage trading of storage related products. In the Italian Market, part of the storage is assigned depending on the domestic market while the remaining part is auctioned by the storage operators, like in the UK.

It may be surprising that Germany does not have any LNG facilities. One of the reasons for this is the short coast line Germany has in the north, which is not very favorable for an LNG plant. Thanks to high level of interconnection and large storage capacity Germany is able to leverage Rotterdam Gateway terminal as entry point of LNG and manage its supply well without any LNG capabilities.

## Analysis of International Markets: Marketing & Trading

**The structures of developed markets carry many similarities. As one of the most developed, the UK market is explained in detail, while other markets are compared against the UK**

The well-established Supply and Infrastructure features provide with the required foundation to achieve success in the Trading, Distribution and Retail segments of the UK Natural Gas value chain as well.

However, this does not come by itself of course. The UK Market is well structured, with OFGEM overseeing and monitoring the functions and integrity of the UK gas and power markets. OFGEM Endorses market and network operational regime such as Network Code and its various Protects consumer interests.

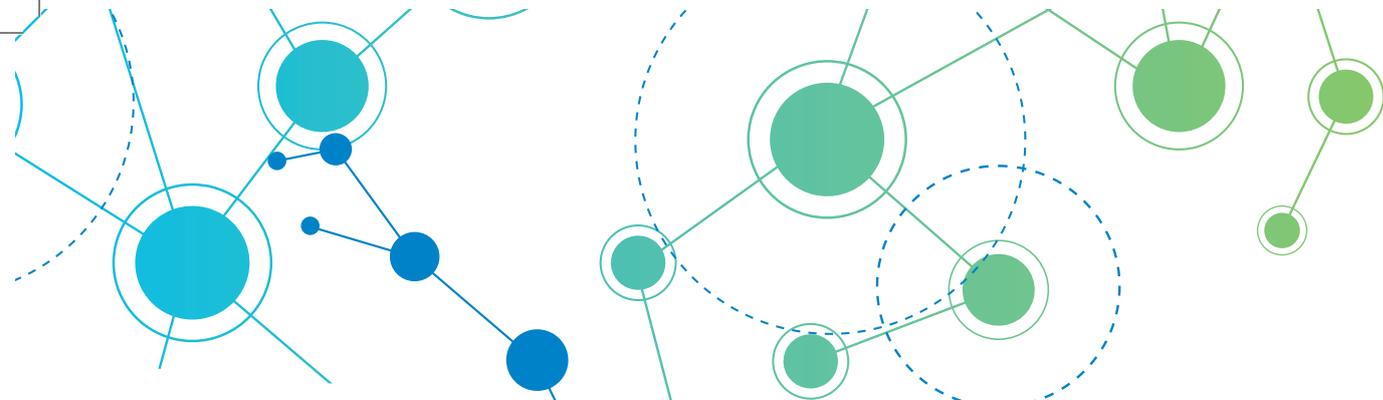
Financial Conduct Authority is the watchdog for financial transactions. It registers and regulates UK financial and derivative (including commodities) markets participants and exchanges and ensures integrity of the financial system to protect interests of the market as a whole as well as market clients. Until recently this was limited to Exchanges only (i.e. ICE Futures Europe and ICE Endex). However, due to increasing importance of OTC and many traders opting to clear their OTC trades via a clearing house, Financial Conduct Authority is now also monitoring OTC transactions that are cleared on ICE Clear Europe.

The role of Bank of England in context of the natural gas market is to oversee the structure and functions of clearing entities in the UK which includes central counterparties and UK-based investment exchange clearing houses.

Direct Bilateral markets are monitored by OFGEM. Participants engage in direct transactions with each other on a disclosed basis negotiating specific, unregulated market terms and conditions.

OTC market transactions are also routed as orders on an anonymous basis with the counterparties disclosed to each other after the trade is struck. Such trading is conducted via brokers who also provide a system platform to match buyers and sellers. Brokered OTC transactions are for standard products where market liquidity is higher than in the case of more tailored, flexible bilateral transactions.

OTC transactions may be subsequently placed upon a clearing house which effectively turns them into cleared products akin to exchange trades. The brokers in such business are regulated under the FCA.



The Exchanges (ICE Endex & ICE Futures Europe) are venues providing a facility for registered Members and/or their clients to agree transactions on a set of predefined products with prescribed terms and conditions. The transactions are cleared by a central body who takes-over as the counterparty for each buyer and seller.

The Clearing House (ICE Clear Europe) act on behalf of the Exchange upon which transactions were executed. The Clearing House is the counterparty to every transaction and fulfils settlement obligations even in the event of one or both of buyer and seller suffering financial failure.

The National Balancing Point (NBP) is the 'Hub' of UK Gas deliveries. It is a virtual hub in that no specific physical delivery location exists but rather it represents the transmission network as a whole. Serves to enable effective standardized gas delivery and pricing reference terms in UK gas transactions and thus an efficient balancing mechanism.

National Grid Gas, is the appointed Transmission System Operator for the UK Gas National Transmission System. NGG owns the pipeline network and is responsible for ensuring its safety, maintenance and investment and provides transportation and balancing services to the UK gas market.

It's critical to note that National Grid Gas only plays the role of the system operator. It does not play a role in any other segments of the value chain, such as in importing or trading.

With these characteristics in place UK enjoys one of the highest trade volumes (614bcm on Exchanges and 1,090 bcm on OTC) and churn rates (19.1).

**The Dutch market is also shown as best practice with a market structure that is very similar to that of UK with price linkage to NBP as well**

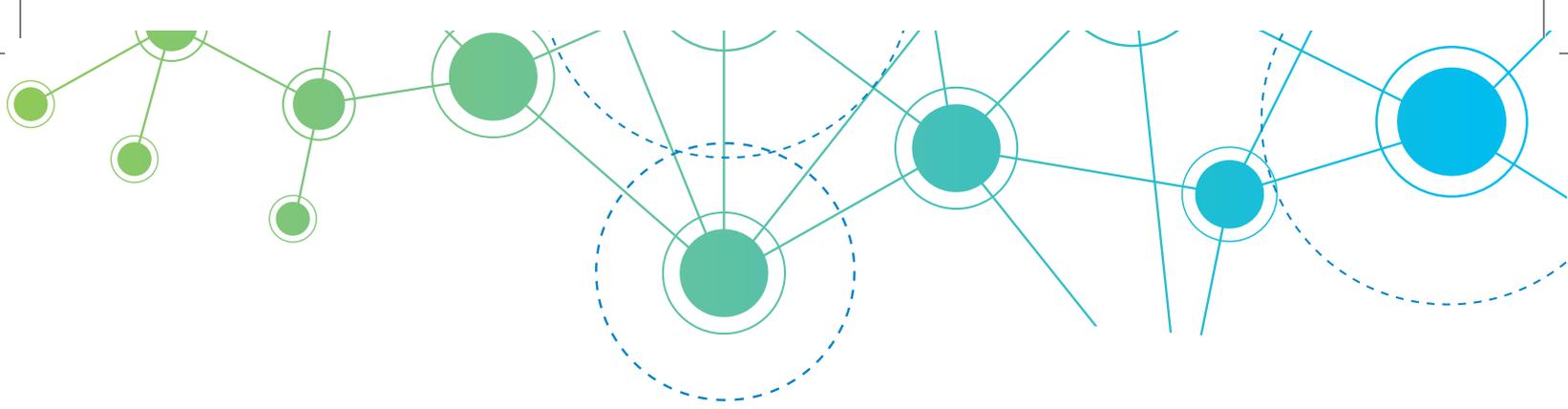
In the Netherlands, the TTF is the national balancing point and Hub, supported by a well developed and maintained network and infrastructure with fully unbundled TSO Gas Transport Services. GTS operate the balancing duties as TSO and must receive notice via Nominations, of all intended gas volumes from participants who wish to transfer title ownership of gas on the hub (hence Title Transfer Facility).

There is still significant share of the incumbent Gas Terra but an open, relatively easy-to-access market and network for entrants with competition in trading being well developed and second only to the UK in Europe. Gas Terra offer within-day gas balancing products and have largely supported the increased nearby liquidity at TTF by doing so.

TTF prices are formed from gas market activity and the linkage to oil indexes has been significantly eroded as its credibility as a price-setting hub has grown. Many of the long-term oil-indexed contracts in Netherlands have been renegotiated and higher portions of spot gas pricing included, based upon TTF spot prices.

The NBP price is a significant driver of TTF prices although many believe this will diminish owing to the closer fundamental linkage to the large consumption area in Germany. Currently, there is close correlation of NCG and TTF prices as indeed many German forward positions are hedged using more liquid TTF products.

OTC trading is significant and offered via broker platforms as well as via bilateral contracts. Churn rates are consistently well above 10 and around 14 since 2011 showing the very good depth and liquidity of the market TTF supports. Bid/Offer spreads even on forward products are relatively available and narrow compared to other markets.



Forward exchange based trading is offered on ICE Endex and covers products with delivery up to 3 years into the future based upon notional deliveries at the TTF.

**Spain is in process of developing an exchange; while Germany, Italy and France already have well functioning exchanges with Germany's being most advanced**

In Spain the wholesale market is characterized by major portion (>70%) as long-term bilateral contracts of duration over 10+ years. There is still dominance of the incumbent Gas Natural although its direct share has diminished to around 40%. But investments in other JV means Gas Natural's true share is still well over 50%.

Hub-based trading based upon the concept of a single balancing point is under-developed due to the LNG factor. Most wholesale trading takes place at the 6 LNG Terminals. There is a national balancing point which acts as the intended national hub – the AOC (also termed the CDG) but volumes are poor due to the LNG factor and effectively, Spain has 8 balancing points including the pooled underground storage point.

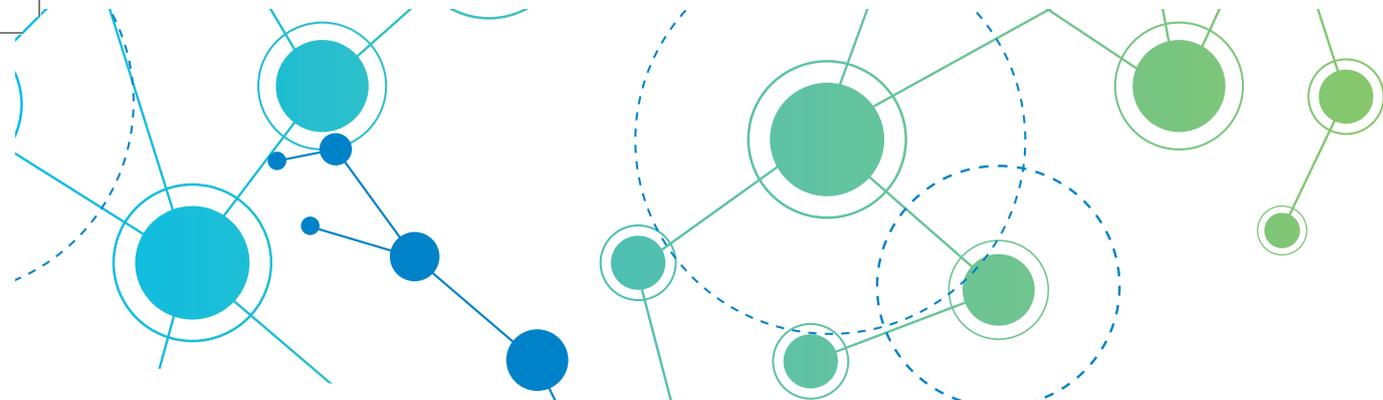
The TSO, Enagas, provides a platform (MS-ATR) for trading and nominating gas flows at the 8 balancing points including the AOC. This platform is analogous in many respects to the OTC broker platforms in other markets. However, it does not require prices to be input or recorded and, therefore, often acts as a volume switching facility and is a poor means of price formation or discovery. Most activity is focused on nearby deliveries up to front months.

Estimates are that volumes traded via the MS-ATR platform are over 100% of consumption. However, this does not equate to gas being traded based on the AOC hub per se; rather it means gas movements being executed over the MS-ATR platform, often without a price and/or linked to LNG Terminals with oil-indexation. Real churn rates at the AOC are below 1

There is no organized forward market and no exchange despite intentions to develop one. As such, the entire regulatory burden lies with the National Energy Commission and no authority from the financial domain is involved.

In Germany, the volumes traded on the exchange (7 bcm) and OTC (143 bcm) are significantly lower than that of UK's. Hence Germany still has some ground to cover to reach the level of the UK Market. However, with a churn ratio of 1.5, Germany is on the right track. The reason for traders to prefer OTC over exchange trading 20 times more is mostly attributed to the high fees imposed on trading on the EEX. The market structure of Germany is similar to that of the UK, with some notable differences. In terms of regulators, in Germany state-level regulators (LandesKartellgenger) play a role, while the Central Bank is not involved. Second, instead of one hub, Germany has two hubs, hence daily activities in the various markets are referencing not just one but two hubs for price formation.

The Italian market's differences stand out as having less products being traded on or off exchange and clearing only being done spot market and not derivatives. French market seems to have numerous products with multiple hubs and TSOs. The central bank of France is involved in a regulatory way, but unlike the UK, it does not oversee the OTC activities.



## Analysis of International Markets: Distribution, Retail & Retail Value Added Services

While the maturity and competitiveness of the more upstream segments of the value chain is important, certain elements can be put in place in the downstream to achieve liberalization

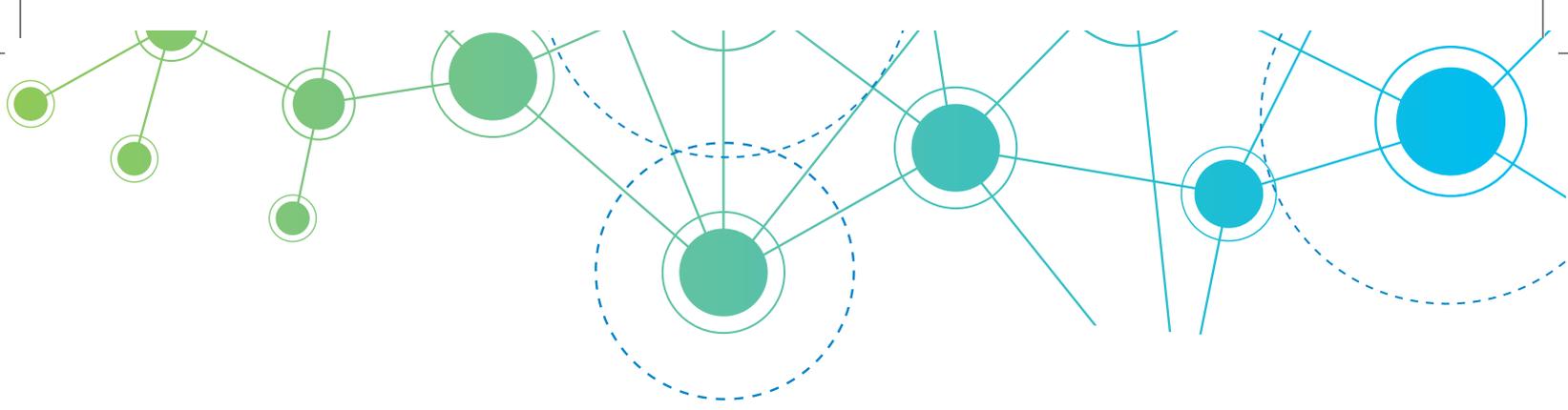
The successful operations carry over to distribution and particularly the retail side, which is fully liberalized in the UK. The regulatory authority OFGEM continuously monitors the retail market and makes enhancements to enable customers to easily identify the most appropriate tariffs for them and switch providers.

Along with regulations, running such a consumer-centric retail market requires significant amount of data management, which is provided by a centralized entity called xoserve. Xoserve's main responsibility is to track metering data and make supplier switching possible by registering the connections, recording the shipper or supplier details and also holding the meter asset and provider details.

As an independent body owned by five major distribution companies and the National Grid, xoserve enables standardization in the supplier switching process making the life of consumers, supplier and transmission system operator easier. As a result, switching rates reach 15% across the entire gas retail market in the UK and high level of Value Added Services are offered for the supplier to differentiate themselves and acquire customers.

The German retail market is one of the most liberal in the world. As the Herfindahl-Hirschman index of 300 shows, the market concentration is very low, hence competition is high. The large number of retailers and 6.7% churn rate also support these figures. As would be expected in such a liberal market, the level of value added services towards the customers is quite high, as supplier offer services such as energy management systems to keep their customers.

It is worth noting that the sophistication of the consumers develops along with the market itself. As such, regulatory and structural elements should be enhanced to increase consumer awareness and demand more from suppliers.

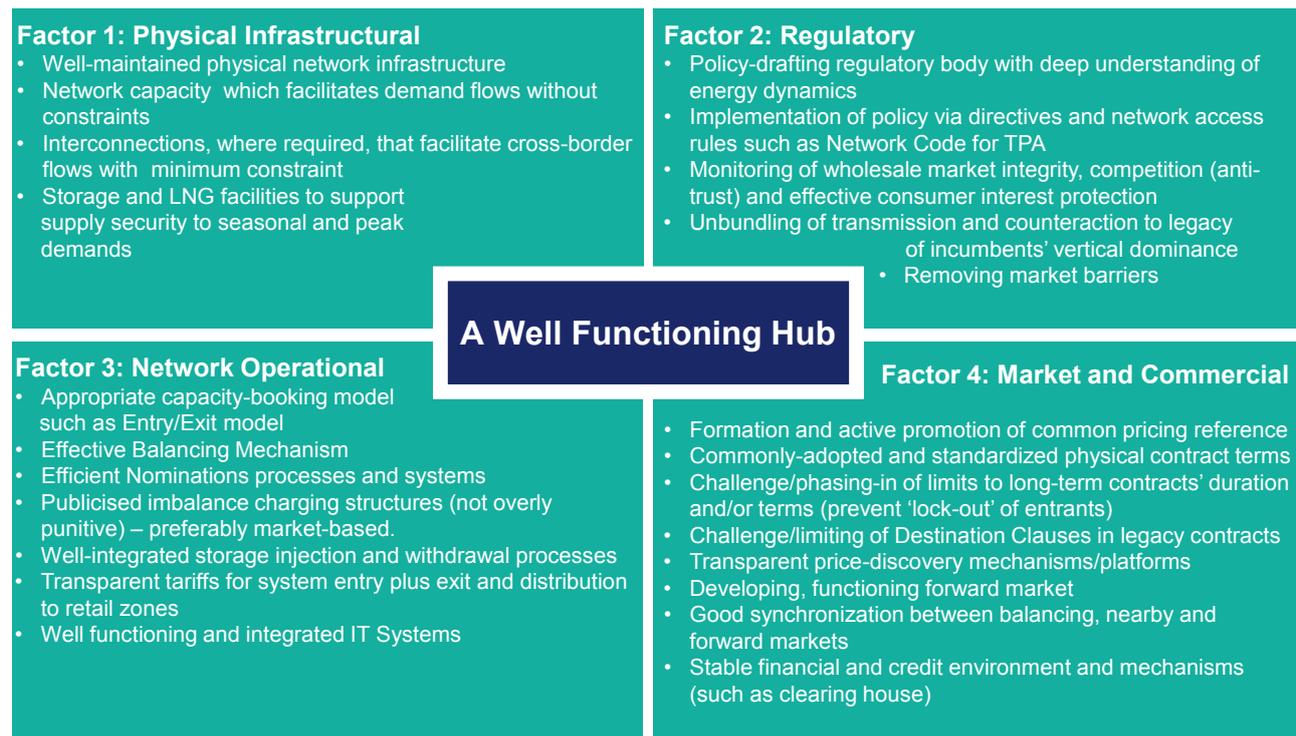


# Recommendations for the Turkish Natural Gas Market

## Typical Evolution of a Natural Gas Market

### Reference Hub Model 4 main requirements to have a well-functioning Hub

In order to have a liquefied and competitive exchange, establishment of a well-functioning hub is a requirement. The Reference Hub Model serves as a guide in developing the recommendations for the Turkish market.

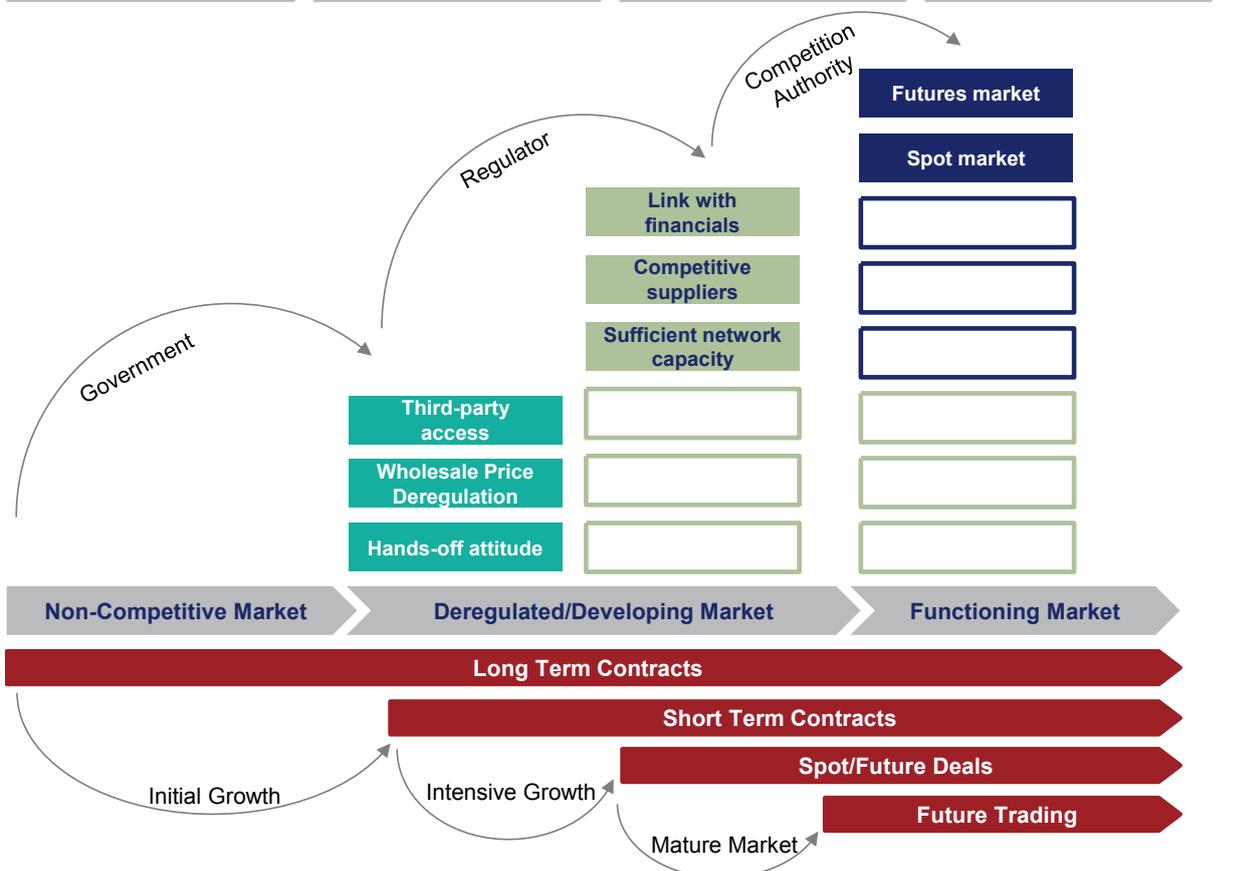


### Typical Evolution of Market Elements

Markets tend to follow similar paths in terms market elements, contract types and regulatory responsibilities, as they progress from being a full monopoly to achieving a fully competitive environment.

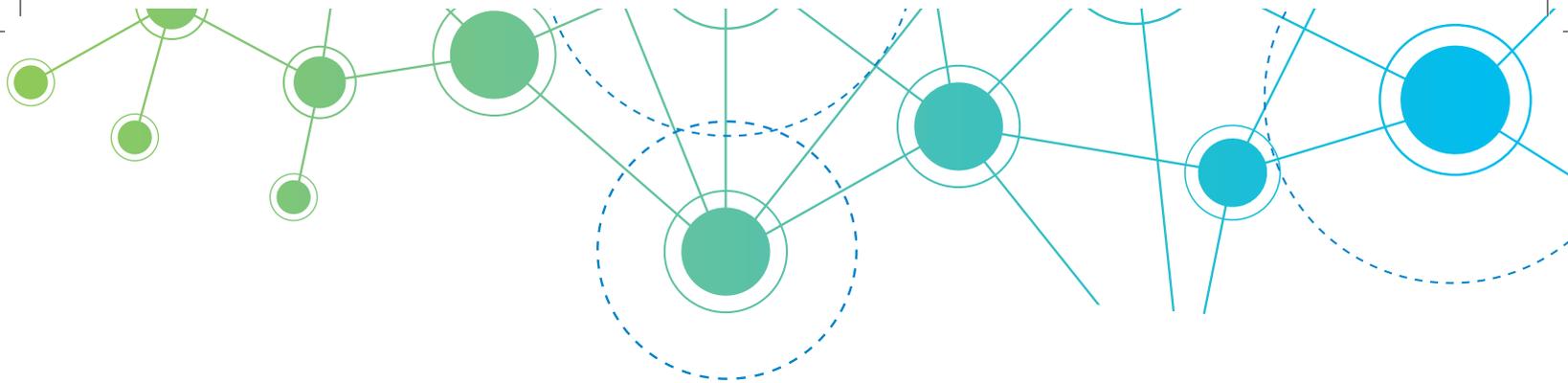
<ul style="list-style-type: none"> <li>• Monopoly rights on gas transmission and distribution</li> <li>• Supply obligation</li> <li>• Regulation of gas prices</li> </ul>	<ul style="list-style-type: none"> <li>• Possibility for competitors to build transmission pipelines</li> <li>• Direct sales to large endusers and local distributors</li> <li>• Regulation og (bundled) gas selling prices</li> </ul>	<ul style="list-style-type: none"> <li>• Third party access</li> <li>• Formation of "Market Price"</li> <li>• Unbundling of transport &amp; marketing functions</li> <li>• Competition in gas supply to large end users and local distributors</li> <li>• Regulation of access including use-of-system charge</li> <li>• Reducing market share of incumbent</li> </ul>	<ul style="list-style-type: none"> <li>• Third party access</li> <li>• Full unbundling</li> <li>• Competition in gas supply to all end users</li> <li>• No price controls on gas sales</li> <li>• Regulation of access including use-of-system charge</li> </ul>
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Competition



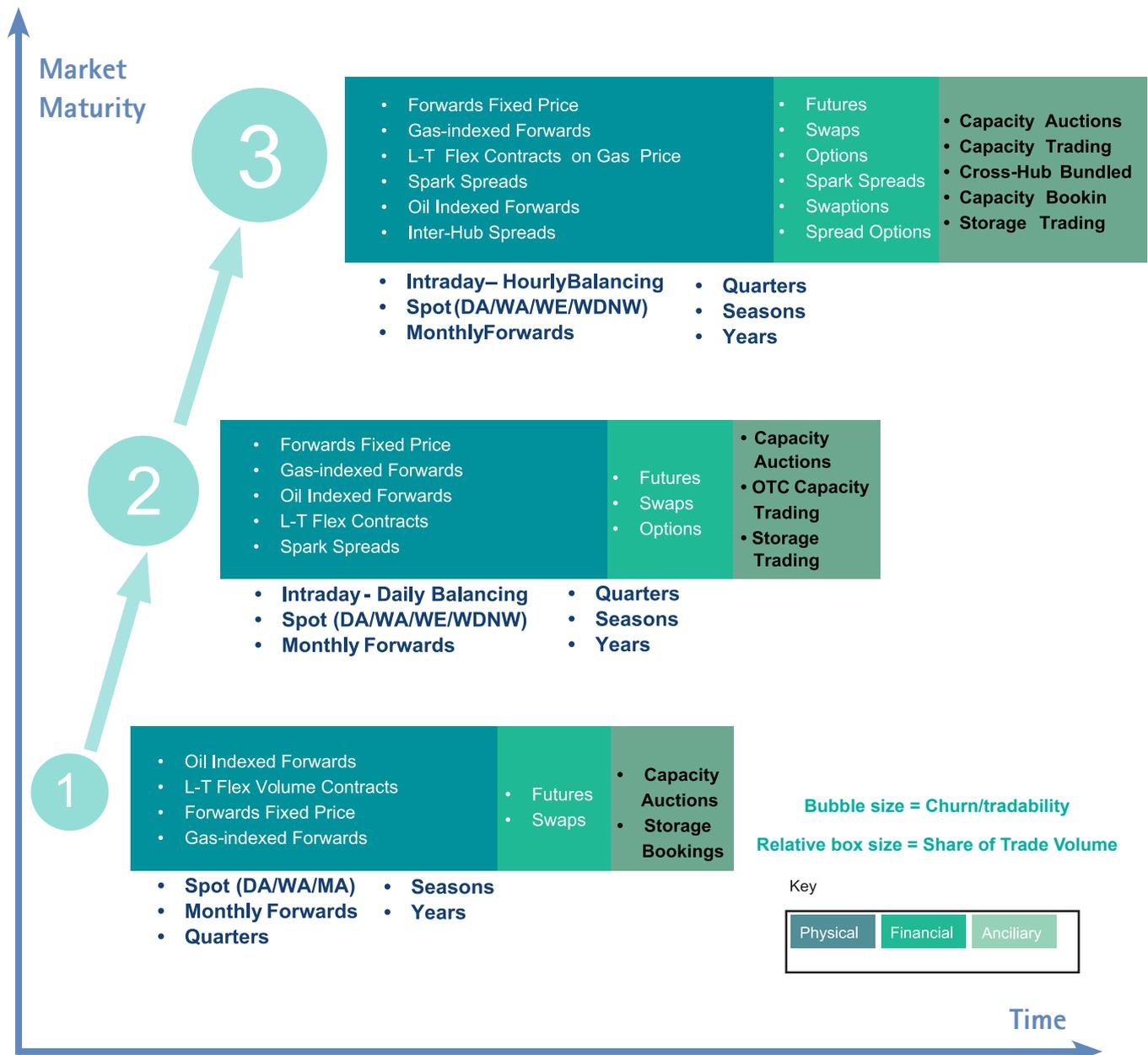
Market Elements

Contracts



### Gas Hub Market Evolution and Product Availability

As the market evolves the range of products available to trade increases whilst the relative levels of activity between them changes.



# Value Chain Recommendations

## Recommendations for Turkish Gas Market

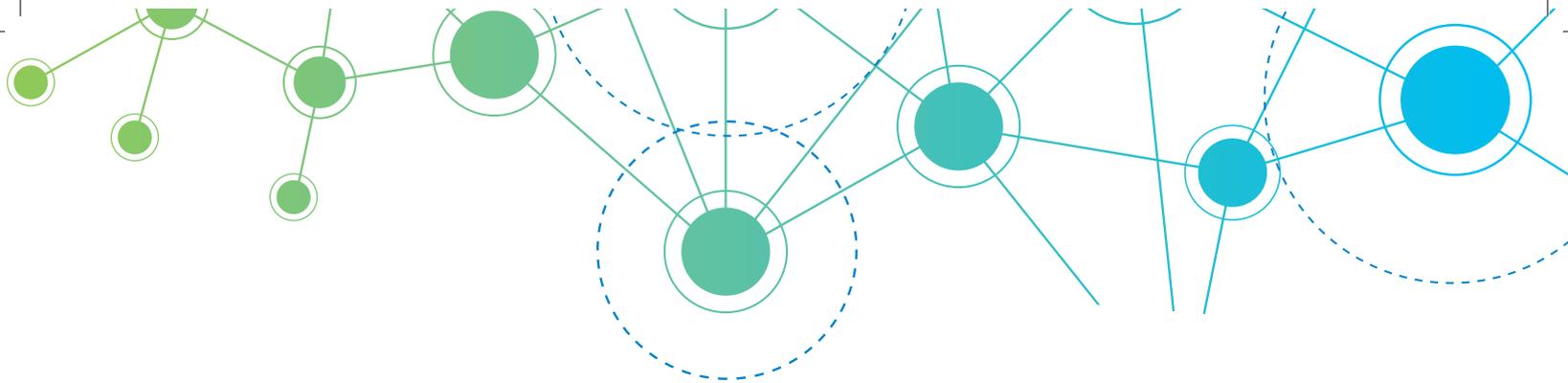
Upon reviewing the current state of the Turkish Market and drawing lessons to be learned from international markets recommendations for the Turkish Market are developed. These recommendations are again grouped per the Value Chain Framework and are presented in the structure shown.



After comparative analysis of Turkish and international natural gas markets, significant gaps and problem areas have been identified

Problem Definition			
Problem Details	Recommendations	Challenges	Lessons Learned

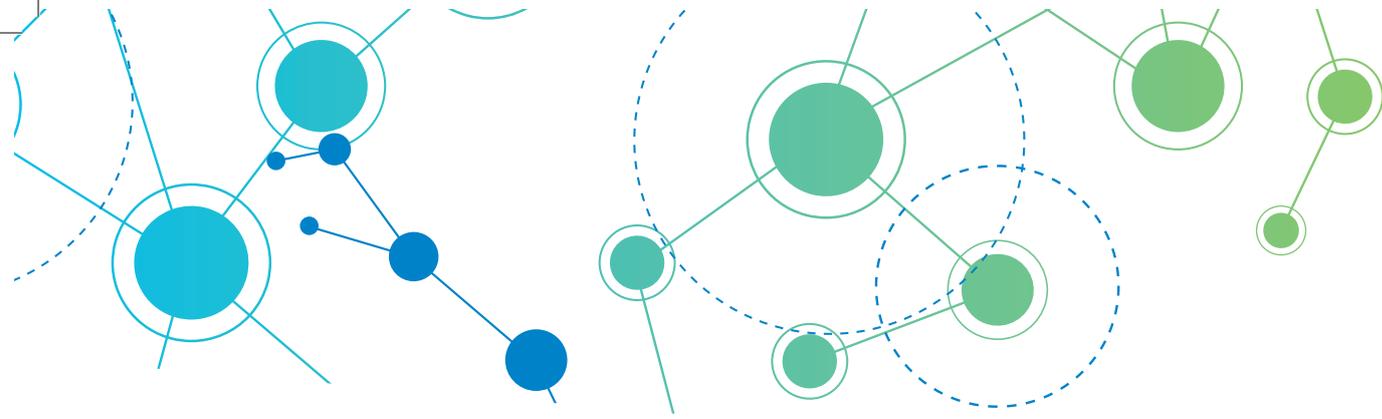
- Further details are defined for the major identified problems
- Recommendations are provided for the detailed problem
- The challenges associated with implementation of the recommendations are captured
- Experiences from other markets are included to strengthen the recommendation and provide context



**E&P, Gathering and Processing**



<b>Problem Definition</b> <b>Lack of supply security</b> <span style="float: right; background-color: #004a99; color: white; padding: 2px 5px; font-weight: bold;">1.1</span>			
Problem Details	Recommendations	Challenges	Lessons Learned
<ul style="list-style-type: none"> <li>Negligible domestic production</li> </ul>	<ul style="list-style-type: none"> <li>Continue with increased E&amp;P investments</li> <li>Develop program to increase Turkish know-how on E&amp;P activities</li> <li>Consider categorizing shale gas E&amp;P investments as "strategic" to leverage certain incentives and concessions</li> <li>Increase ownership in NG fields abroad</li> <li>Capitalize in NG fields abroad operated by Turkish companies</li> </ul>	<ul style="list-style-type: none"> <li>Lack of industrial know-how causing high investment costs</li> <li>Political risks and constraints</li> </ul>	<ul style="list-style-type: none"> <li>Other countries such as Qatar, Malaysia and Angola increased know-how through favorable product sharing agreements with international oil and gas companies</li> </ul>
<ul style="list-style-type: none"> <li>Dependency on few import countries</li> </ul>	<ul style="list-style-type: none"> <li>Diversify supplier countries for piped gas (e.g. Israel and N. Iraq)</li> <li>Increase interconnection capacity with existing supplier countries</li> <li>Enable importing &amp; exporting under multiple contracts with one import-export license</li> </ul>	<ul style="list-style-type: none"> <li>High investment costs to build new pipelines in order to reach new supplier countries</li> <li>Political Concerns</li> </ul>	<ul style="list-style-type: none"> <li>Germany's high level of interconnectedness via pipelines is one of the key enablers of liquidity</li> </ul>
<ul style="list-style-type: none"> <li>Dependency on few import countries</li> </ul>	<ul style="list-style-type: none"> <li>Diversify supplier countries for piped gas (e.g. Israel and N. Iraq)</li> <li>Increase interconnection capacity with existing supplier countries</li> <li>Enable importing &amp; exporting under multiple contracts with one import-export license</li> </ul>	<ul style="list-style-type: none"> <li>High investment costs to build new pipelines in order to reach new supplier countries</li> <li>Political Concerns</li> </ul>	<ul style="list-style-type: none"> <li>Germany's high level of interconnectedness via pipelines is one of the key enablers of liquidity</li> </ul>
<ul style="list-style-type: none"> <li>Existing long term oil-indexed supply contracts prevent taking advantage of worldwide natural gas market dynamics</li> </ul>	<ul style="list-style-type: none"> <li>Coordinate efforts to establish a Turkish gas price index</li> <li>In the interim, perform studies for identifying which markets' indices could be utilized for Turkey's supply contracts and how the pricing formulae could be shaped</li> <li>Re-negotiate existing supply contracts to introduce gas-indexed elements or other indices reflecting market conditions to the pricing</li> <li>Aim for including gas-indexed pricing components in new contracts</li> <li>Increase the share of LNG import contracts, which tend to be more gas-indexed</li> </ul>	<ul style="list-style-type: none"> <li>Existing Gas exporters are reluctant to convert their contract terms</li> </ul>	<ul style="list-style-type: none"> <li>Germany re-negotiated their contract to increase gas indexed components of the price</li> <li>Trend is short term contracts; in UK 73% of all contracts were long term in 2009; currently 51%</li> <li>The gas volumes traded on Gaspool and NCG (Germany) have increased significantly due to forming a portfolio with short term and long term agreements together</li> </ul>



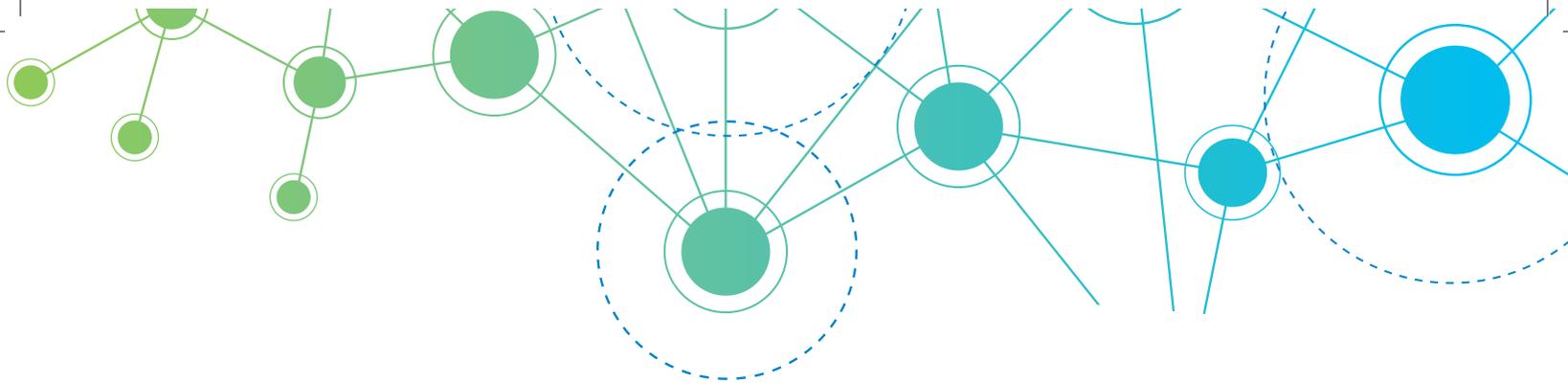
**Transmission**



Problem Definition			
Lack of transparency in balancing mechanism (and price formation)			
2.1			
Problem Details	Recommendations	Challenges	Lessons Learned
<ul style="list-style-type: none"> <li>Market players suffer from learning their balancing status days after real time</li> </ul>	<ul style="list-style-type: none"> <li>Improve the software and hardware such as EBT and SCADA to make balancing data available and visible to market participants in a timely manner</li> <li>Finalize and publicize the balancing algorithm and mechanism</li> <li>Formalize balancing responsibilities of the TSO</li> <li>Alternatively, establish a Balancing Market under EPIAS (see Marketing &amp; Trading recommendations)</li> </ul>	<ul style="list-style-type: none"> <li>Restrictive procurement rules hindering software procurements</li> <li>Current balancing price formation mechanism is not publicized</li> </ul>	<ul style="list-style-type: none"> <li>Market players monitor their balancing situation with 5 min. delays in Netherlands</li> <li>Thanks to well defined Network Code and well functioning balancing mechanism and nominations system, UK could start balancing on a daily basis in 1996 with various improvements since made to the system</li> </ul>

Problem Definition			
Existence of system constraints causing transmission problems			
2.2			
Problem Details	Recommendations	Challenges	Lessons Learned
<ul style="list-style-type: none"> <li>Insufficient gas pressure throughout the pipeline for healthy transmission especially from East of Turkey to West</li> <li>Ground for improvement in transmission grid management</li> </ul>	<ul style="list-style-type: none"> <li>Perform n-1 study to identify Turkey's infrastructure needs for complying with EU-wide accepted security of supply standards, taken at granularity of daily consumptions</li> <li>Increase the pipeline coverage and number of compressors</li> <li>Increase the number of entry points closer to consumption centers</li> <li>Increase the interconnectedness via domestic and international two-way pipelines and LNG terminals (for re-routing offloaded cargo)</li> <li>Develop a Network Development Plan for Turkey similar to the Ten Year Network Development Plans prepared by members of ENTSO-G</li> </ul>	<ul style="list-style-type: none"> <li>Budgetary and planning constraints</li> <li>Restricted procurement rules hindering necessary procurements</li> </ul>	<ul style="list-style-type: none"> <li>Pipeline length per compressor ratio of Germany: 1,260 km, France: 1,200 km and UK: 279 km. Same KPI is 1,857 km for Turkey</li> <li>Pipeline length per surface area ratio of Germany: 0.088 km, France: 0.053 km, Italy: 0.111 km and UK: 0.032 km. Same KPI is 0.017 km for Turkey</li> </ul>

These KPIs are only indicative and might be affected by demographic, geographic and technical characteristics of countries

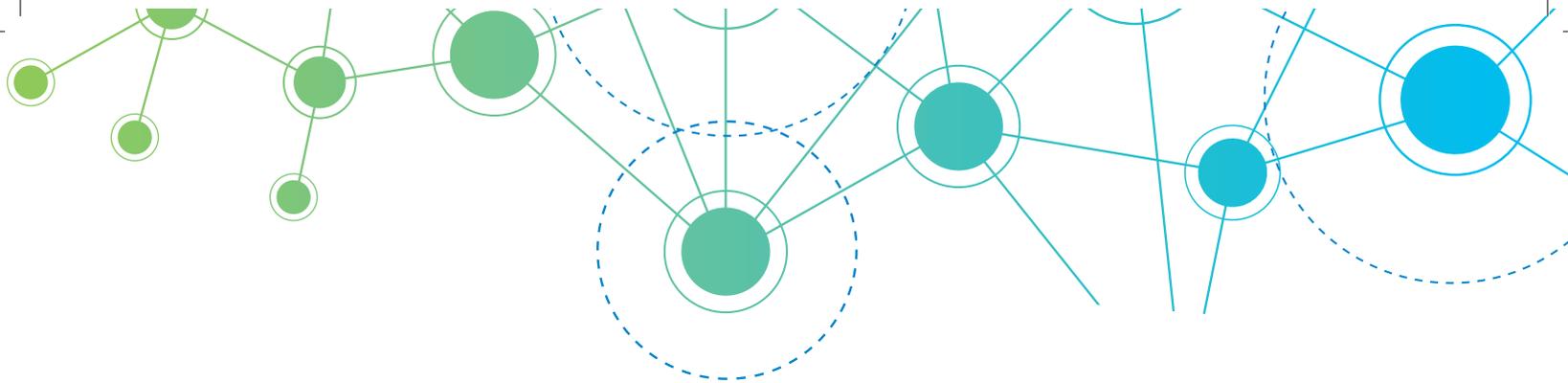


<b>Problem Definition</b> <b>Lack of ancillary services market</b>			2.3
Problem Details	Recommendations	Challenges	Lessons Learned
<ul style="list-style-type: none"> <li>• Undefined ancillary services and related tariffs</li> <li>• Capacity booking model does not support market players to remedy their imbalances</li> </ul>	<ul style="list-style-type: none"> <li>• Introduce ancillary products (capacity auctions and storage bookings)</li> <li>• Introduce the ancillary services market concept into regulations</li> </ul>	<ul style="list-style-type: none"> <li>• Limited knowledge of the ancillary services and their definitions in the market</li> </ul>	<ul style="list-style-type: none"> <li>• UK TSO (National Grid Gas) sells capacity at each of the system's Entry Points via capacity auctions in accordance with its obligations under the Uniform Network Code. There are several types of System Entry Capacities (SEC), with trading periods up to 16 years forward. The three main categories are Quarterly (QSEC), Annual Monthly (AMSEC) and Rolling Monthly (RMSEC). Capacity can be re-traded between shippers</li> <li>• Recent German legislation on capacity allocation and congestion management is intended to improve the balancing, particularly by increasing the use of capacity auctions on a centralized booking platform: PRISMA. Both German virtual points (hubs), NCG and Gaspool, have grown significantly since 2007</li> </ul>

## Storage



Problem Definition			3.1
Current storage capacity raises concerns on supply security and market stability			
Problem Details	Recommendations	Challenges	Lessons Learned
<ul style="list-style-type: none"> <li>Although allowed, BOTAŞ's dominance is preventing 3rd party access to existing storage facilities due to high costs</li> </ul>	<ul style="list-style-type: none"> <li>Unbundle BOTAŞ's trading arm from system operations</li> <li>Reduce BOTAŞ's dominance in Marketing &amp; Trading</li> <li>Improve send-out capacities of existing storage facilities to enable meeting daily peak demands</li> </ul>		<ul style="list-style-type: none"> <li>Incentives for investors have often consisted of Exemptions from providing 3rd party access to the new facilities</li> <li>More direct incentives are difficult to design without implications for state involvement or competition principles</li> <li>Storage capacity usage in Spain:</li> <li>Part of the capacity is allocated to the supplying companies (for their storage obligations) in proportion to their final sales in the previous year, and the remaining capacity is allocated by an auction mechanism</li> <li>In case there is still capacity left, the first agent asking for it gets it</li> </ul>
<ul style="list-style-type: none"> <li>Potential gas shortages causing risk of high gas and therefore electricity prices in a short time period</li> </ul>	<ul style="list-style-type: none"> <li>Perform a study on required capacity (could be part of the n-1 study)</li> <li>Incentivize storage capacity investments (strategic &amp; operational)</li> <li>Identify rules for utilization of strategic reserves</li> <li>Integrate flexible consumers to the market, such that during peak periods they are motivated to reduce consumption</li> <li>Enable environment for building micro storage facilities closer to consumption centers</li> </ul>	<ul style="list-style-type: none"> <li>Significant CAPEX</li> <li>Investors requesting for exclusivity</li> <li>Turkey lacks underground formations ideal for storage</li> </ul>	<ul style="list-style-type: none"> <li>Storage capacity per annual consumption ratio of Germany: 28%, France: 31% and Italy: 16%. Same KPI is 6% for Turkey</li> <li>The gas volumes traded on Gaspool and NCG (Germany) have increased significantly due to building new storage units</li> <li>During Hurricane Katrina in 2005, the US Gas Storage has been used as a strategic supply when the supply was cut from the imports and the domestic production. Future prices increased as the Hurricanes struck, which formed an incentive to retain and expand storage levels in the US</li> </ul>
<ul style="list-style-type: none"> <li>Lack of storage flexibility hinders better management of supply &amp; demand fluctuations</li> <li>Restrictions in injection and send-out</li> <li>Low withdrawal capacity of Silivri preventing timely gas off take (gas stays until next winter – opportunity cost)</li> </ul>	<ul style="list-style-type: none"> <li>Increase send-out capacities at existing facilities</li> <li>Improve the flexibility (e.g. timing, pressure levels) of the storage infrastructure (better gas in-take / off-take)</li> <li>Change the regulation in the way that TSO guarantees necessary pressure at the storage injection point.</li> </ul>	<ul style="list-style-type: none"> <li>Pressure spec. difference between the storage (50 bar) and transmission (35 bar) leading to uncertainty about the ability to inject</li> </ul>	

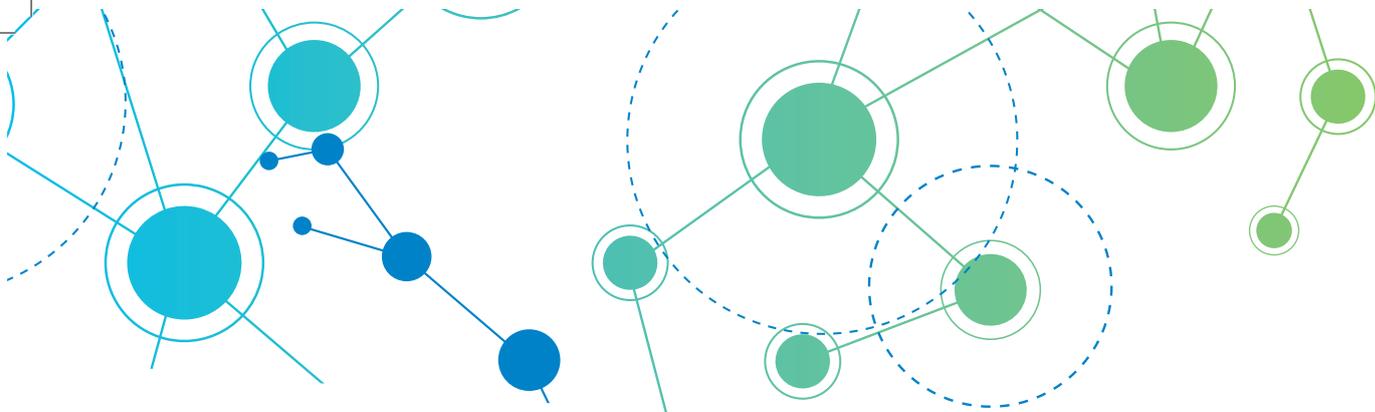


Problem Definition			3.2
Regulations hinder full utilization of storage facilities			
Problem Details	Recommendations	Challenges	Lessons Learned
<ul style="list-style-type: none"> <li>Not enough storage capacity available to fulfill 10% capacity allocation requirements</li> <li>Unclear capacity fee for the stored gas</li> <li>No defined procedure for 3rd party access</li> <li>Existing KUE's do not favor 3rd party access</li> </ul>	<ul style="list-style-type: none"> <li>Re-visit storage regulations and corresponding obligations (e.g. allocating capacity for 10% of traded volume after 5 years)</li> </ul>		<ul style="list-style-type: none"> <li>In Spain, all gas retailers must keep gas stocks equivalent of 20 days of firm sales in the previous year</li> </ul>

**Marketing & Trading**



Problem Definition			4.1
Lack of market driven pricing mechanism preventing market participation and competition growth			
Problem Details	Recommendations	Challenges	Lessons Learned
<ul style="list-style-type: none"> <li>Increasing demand for gas-to-gas and supply-demand based pricing</li> </ul>	<ul style="list-style-type: none"> <li>Eliminate Incumbent's wholesale tariff, which inherently sets a cap for wholesale prices</li> <li>Convert to cost based pricing regardless of consumer type (e.g. BOT, BOO, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>Governmental support to cross subsidization</li> </ul>	
<ul style="list-style-type: none"> <li>Reference price and transparency expectations</li> </ul>	<ul style="list-style-type: none"> <li>Leverage UDN to be used as a price index / common reference point</li> <li>Develop a web based system (possibly an extension to EBT) for BOTAŞ to make purchases in a transparent way; and thereby indicating a reference price</li> <li>Define transparency rules for the new energy exchange and establish an online information disclosure platform for the market similar to Public Disclosure Platform (KAP)</li> </ul>	<ul style="list-style-type: none"> <li>Dominant share of existing oil indexed contracts among supply contracts</li> </ul>	<ul style="list-style-type: none"> <li>Market Operator for running the balancing and shorter-term trading enables nearby price-discovery (early UK, Australia, NL)</li> <li>Promotion of price information by publishers and agencies (e.g. Heren, Argus, Exchanges, Reuters, Bloomberg etc.)</li> <li>In UK, Brokers and the trade press helped to disseminate information both at the time of trading and in daily reports, which served to create transparency and in turn gave confidence to market participants that it was 'safe' to trade NBPgas</li> </ul>

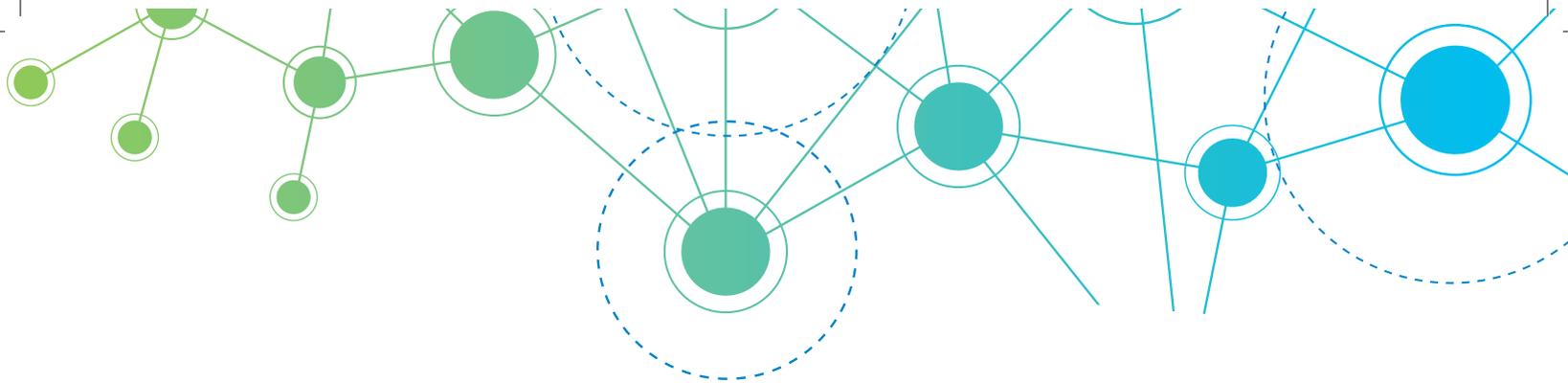


**Problem Definition**

**Lack of market driven pricing mechanism preventing market participation and competition growth**

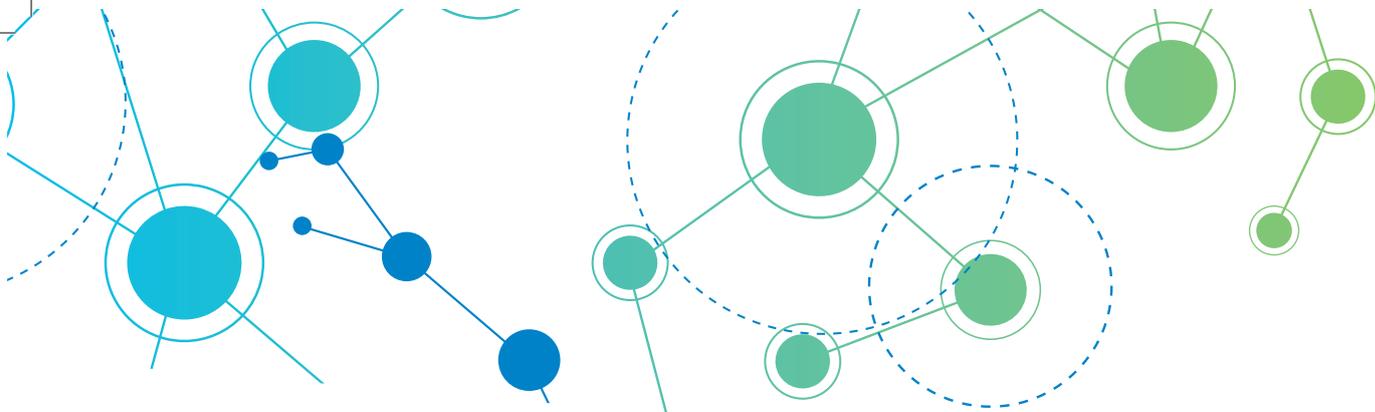
**4.1**

Problem Details	Recommendations	Challenges	Lessons Learned
<ul style="list-style-type: none"> <li>Lack of risk management tools in the market</li> <li>Existence of counter party risks in the market</li> <li>Lack of automated systems for trading and trader transparency</li> </ul>	<ul style="list-style-type: none"> <li>Establish an electronic trading platform on EPIAS that is purpose built for commodity exchange and compatible with range of energy products such as electricity, gas, coal, carbon and oil</li> <li>Support the establishment of OTC platforms</li> <li>Leverage rules, processes and technology of existing market for facilitating exchange and clearing house</li> </ul>	<ul style="list-style-type: none"> <li>Ambiguities surrounding the EPIAS formation (timing, operations, products)</li> <li>Stamp duty preventing development of bilateral and OTC trade</li> <li>Differences between electricity and gas "day"s</li> <li>Fixed gas prices set by governmental bodies</li> <li>Limited knowledge of organized markets</li> </ul>	<ul style="list-style-type: none"> <li>In UK, the ICE gas futures market, based on the NBP'97 contract, was quick to establish itself in 1997 and to gain a 10% market penetration</li> <li>Forward prices were established as core to risk management using futures as a price risk hedging tool</li> <li>OTC trade is standardized under the NBP'97 contract terms whilst trade in futures on ICE compliments by referring to the NBP hub</li> <li>Gas volumes traded on Gaspool and NCG (Germany) have increased significantly since common hub price references for EEX and OTC trading have converged and enabled price hedging between them</li> <li>Trading was on a 'high' in the late 90's with the number of participants increasing almost monthly, volumes growing exponentially in OTC deals, futures, swaps, and even a few options</li> </ul>
<ul style="list-style-type: none"> <li>Lack of well functioning balancing market</li> <li>Late announcement of the balancing price monthly</li> <li>Importers &amp; Wholesalers having no say in balancing price formation</li> </ul>	<ul style="list-style-type: none"> <li>In short term, create a transparent and market based balancing mechanism operated by TSO</li> <li>In longer term, while the balancing responsibility lies with the TSO, move the operations for the balancing market to EPIAS for increased efficiency and transparency.</li> <li>To increase liquidity, all kinds of penalties would not be applied due to balancing adjustments.</li> </ul>	<ul style="list-style-type: none"> <li>Delays in monitoring balancing status of players</li> <li>Limited awareness of the market participants regarding balancing market</li> </ul>	<ul style="list-style-type: none"> <li>The functioning of developed hub-based markets such as NBP and TTF is founded on a well-established regime for balancing and nominations</li> <li>Consolidating the number of points on the network at which wholesale participants make their nominations enables the TSO to manage the balancing of the network efficiently and with shorter timeframes thus helping to support active trading and competition</li> <li>A single balancing point which coincides with the regional or national hub upon which participants base their transactions for delivery and pricing is a well-proven model (UK NBP, Dutch TTF, increasingly others)</li> <li>The EU-wide balancing network code, which should become law before the end of the year, will harmonize the mechanisms used to balance gas in different zones and put the focus on market-based incentives.</li> <li>Key European natural gas markets such as Germany, Italy and France are already moving towards new gas balancing rules ahead of a 2015 deadline to enforce a market-based system.</li> </ul>



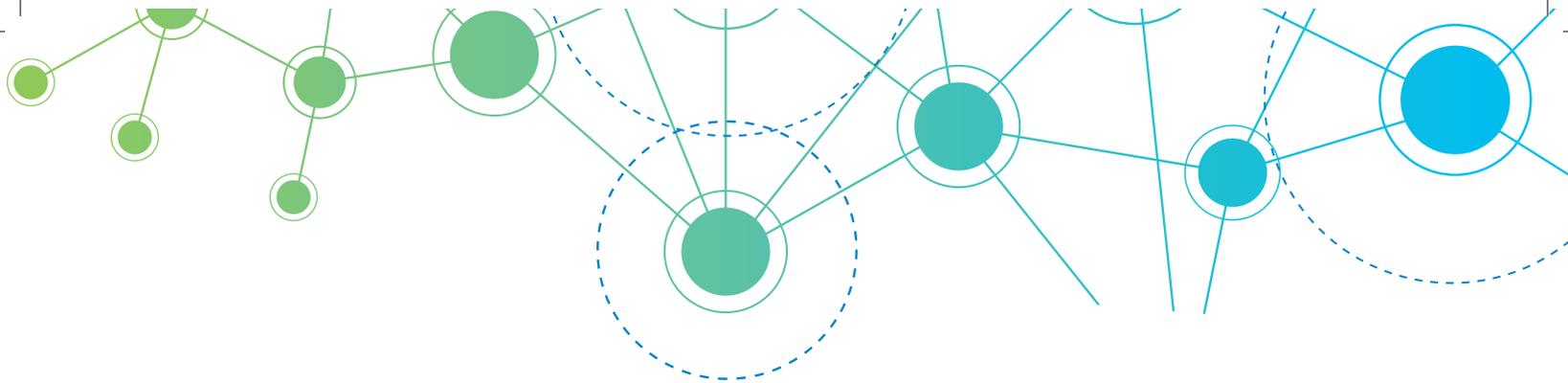
<b>Problem Definition</b> <b>Lack of market driven pricing mechanism preventing market participation and competition growth</b>			
			<b>4.1</b>
Problem Details	Recommendations	Challenges	Lessons Learned
<ul style="list-style-type: none"> <li>• Need for supporting price formation and transaction volume at all times for liquidity</li> </ul>	<ul style="list-style-type: none"> <li>• Market makers to stimulate hub-based product trading for early evolution</li> <li>• Put capacity allocation and trading systems in place to secure a liquid supply market</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of trust towards the market as it is in a transition phase (e.g. physical and financial transactions may be perceived as disparate)</li> <li>• Lack of automated systems for trading and trader transparency</li> </ul>	<ul style="list-style-type: none"> <li>• Most markets have enjoyed improved liquidity as balancing and forward markets have converged creating as seamless a market as possible with both physical and financial players perceiving a truly common pricing reference</li> <li>• Where price discovery is slow or very thin, market makers have proven beneficial (e.g. TTF in NL)</li> <li>• Liquidity in all markets has been supported by provision of products which are as standardized as possible</li> </ul>

<b>Problem Definition</b> <b>Lack of quicker contract enactment and efficient contract execution</b>			
			<b>4.2</b>
Problem Details	Recommendations	Challenges	Lessons Learned
<ul style="list-style-type: none"> <li>• Need for efficiency in comparing competitiveness of suppliers</li> <li>• Inefficient collateral management due to many unstandardized contracts</li> <li>• Reliance on volume or price flexibility of the current contracts</li> </ul>	<ul style="list-style-type: none"> <li>• Standardize products/contracts based on agreed rules and procedures such as EFET or ISDA</li> <li>• Minimize flexibility for sustaining product standardization through defined tolerances</li> </ul>	<ul style="list-style-type: none"> <li>• Companies insisting on different contract terms to maintain flexibility</li> </ul>	<ul style="list-style-type: none"> <li>• Standard Product - Short Term Flat Gas in NBP'97 includes several principles which remove complexity and overly flexible delivery terms around volume and location/destination</li> <li>• Exchange products (ICE) were successfully launched by mirroring NBP'97 terms</li> <li>• Liquidity in all markets (UK, Netherlands, Germany) has been supported by provision of products which are as standardized as possible</li> </ul>



<b>Problem Definition</b> <b>Limited transaction volume and open market due to tax burdens on trade transactions</b>			
			<b>4.3</b>
Problem Details	Recommendations	Challenges	Lessons Learned
<ul style="list-style-type: none"> <li>Stamp duty tax hindering liquidity formation</li> </ul>	<ul style="list-style-type: none"> <li>Remove stamp duty tax to facilitate better trading medium in all gas transactions</li> <li>Perform a business case analysis comparing the loss from stamp duty elimination with gains from corporate tax</li> </ul>	<ul style="list-style-type: none"> <li>Governmental appetite towards stamp duty tax</li> </ul>	<ul style="list-style-type: none"> <li>No taxes other than VAT on physical commodity deliveries in EU markets or Sales Tax in many US states</li> <li>Sweden introduced 0.5% tax on buying/selling stocks in 1984. Collected tax revenue was 1/3 of expected. Tax was doubled to increase revenues, but resulted in 50% of trade moving to London. Tax removed in 1990</li> </ul>

<b>Problem Definition</b> <b>Being dominant in other segments of the value chain, BOTAS's trading operations damage competition in the market</b>			
			<b>4.4</b>
Problem Details	Recommendations	Challenges	Lessons Learned
<ul style="list-style-type: none"> <li>Demand for separating transmission from trading for a neutral management of transmission function</li> </ul>	<ul style="list-style-type: none"> <li>Accelerate the unbundling process of BOTAS</li> <li>Continue with contract and volume transfers to reduce BOTAS dominance in the market</li> </ul>		<ul style="list-style-type: none"> <li>In UK, British Gas had been unbundled within four years between 1990 and 1994 with the TSO function being created, divested and evolving into National Grid</li> <li>In Spain: companies that engage in one or more regulated activity – regasification, strategic storage, transmission and distribution – must have as their sole corporate purpose the performance of such activities. Therefore, they may neither engage in production or commercialization nor be shareholders in companies that carry out such activities</li> </ul>



## Distribution



<b>Problem Definition</b> <span style="float: right;"><b>5.1</b></span>			
<b>Difficulties in consumption data collection hindering management of system balancing</b>			
Problem Details	Recommendations	Challenges	Lessons Learned
<ul style="list-style-type: none"> <li>Eligible consumers with only daily reading capability and corrector installed can practice its rights</li> <li>Not all the existing eligible consumers' consumption can be measured on a smart meter</li> </ul>	<ul style="list-style-type: none"> <li>Develop consumption profiling to improve consumption forecasts and consequently balancing management</li> <li>Develop a roll-out plan for smart meters taking into consideration consumption profiles and investment costs</li> </ul>	<ul style="list-style-type: none"> <li>Cost of smart metering</li> </ul>	

<b>Problem Definition</b> <span style="float: right;"><b>5.2</b></span>			
<b>Current level of maturity in last resort supplier mechanism yields unfavorable conditions for NDCs</b>			
Problem Details	Recommendations	Challenges	Lessons Learned
<ul style="list-style-type: none"> <li>Timing of consumer switching to the last resort supplier impacts Distribution Company's (NDC's) financials and ability to meet delivery obligations</li> <li>If left to be a mandatory last resort supplier, NDCs suffer from either finding the necessary gas or supplying at relatively high rate</li> </ul>	<ul style="list-style-type: none"> <li>Limited number of last resort suppliers can be identified through an auction mechanism</li> <li>A last resort tariff should be set including the cost and risks of the last resort suppliers</li> <li>Time frames for switching periods should be established and enforced</li> <li>Meter data/consumption data should be available to new supplier based upon switch initiation process (not only at actual switch-over)</li> </ul>		<ul style="list-style-type: none"> <li>In Spain, through an auction mechanism five suppliers are given the right to act as supplier of last resort covering the whole country for a period of 4 years. The last resort tariffs and expected quantities are established through participation of these five suppliers. The tariffs are established for the whole country; enable suppliers to cover cost and margin; have an additive structure</li> </ul>

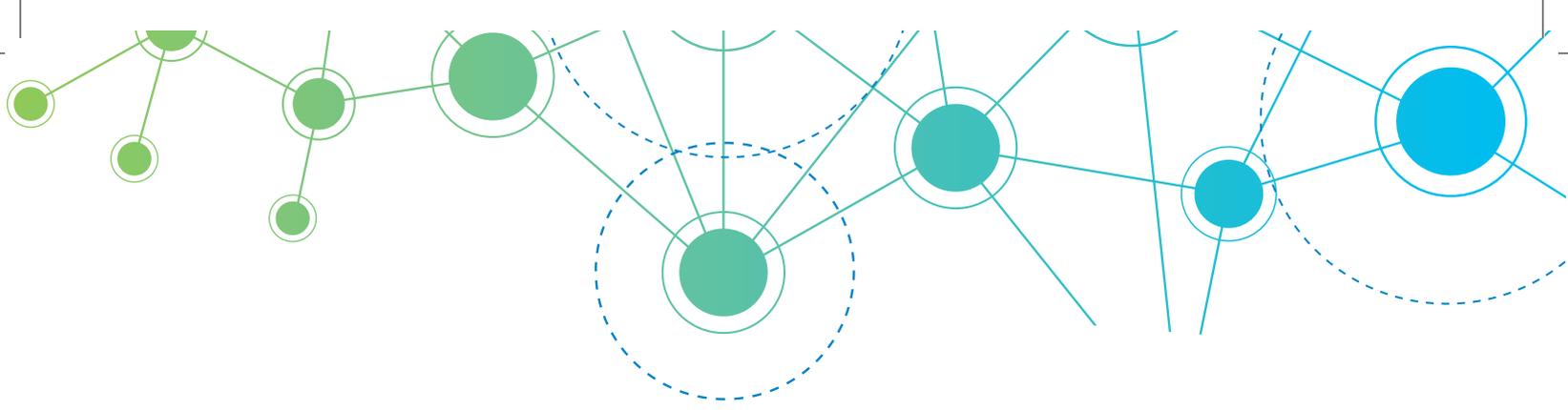
## Retail Commodity



Problem Definition				6.1
No defined procedure for changing an Eligible consumer's supplier				
Problem Details	Recommendations	Challenges	Lessons Learned	
<ul style="list-style-type: none"> <li>End consumers facing difficulties during switching their NG suppliers</li> </ul>	<ul style="list-style-type: none"> <li>Clearly defined and rule-based switching process must be established and communicated</li> <li>Compensation scheme for the new supplier in event of financial loss not caused by him should be defined</li> <li>A centralized, neutral body should be established enabling standardized communication between distribution and retail/wholesale companies</li> </ul>	<ul style="list-style-type: none"> <li>There is no defined standard contracts and switch process currently.</li> </ul>	<ul style="list-style-type: none"> <li>Clearly defined switching process has been established and refined in UK and other countries. Xoserve enables communication between NDCs and Retailers</li> <li>Directives that suppliers must simplify their tariffs to make them more easily comparable</li> <li>Other directives have forced suppliers to make retail customer aware of most cost-effective tariff</li> </ul>	

Problem Definition				6.2
Dependency on NDCs for Retail Sales				
Problem Details	Recommendations	Challenges	Lessons Learned	
<ul style="list-style-type: none"> <li>Need for Supplier to sign shipping &amp; delivery agreements with NDC for any eligible consumer supply agreement</li> <li>Short duration of 15 days for obtaining NDC approval, after which contract is not enacted</li> </ul>	<ul style="list-style-type: none"> <li>Unbundle Distribution and Retail, such that NDCs become neutral towards all Retailers</li> <li>Regulations should enforce NDCs to enable eligible consumer switching within a certain period of time</li> </ul>	<ul style="list-style-type: none"> <li>NDC investors may object based on legal grounds due to risk of losing retail customers</li> </ul>	<ul style="list-style-type: none"> <li>Practically all mature markets have unbundled Distribution and Retail (UK, Netherlands, Spain, Germany)</li> </ul>	

Problem Definition				6.3
No regulated retail tariffs; yet cap for energy prices + other costs acts as an implicit tariff				
Problem Details	Recommendations	Challenges	Lessons Learned	
<ul style="list-style-type: none"> <li>Retail prices not defined freely by the retail companies</li> </ul>	<ul style="list-style-type: none"> <li>Cap on the overall retail gas prices should be removed</li> <li>The structure of tariff should be standardized and the mechanism for identifying cost of each element other than pure energy cost should be regulated</li> </ul>	<ul style="list-style-type: none"> <li>Finding the right balance between the end user and supplier might be difficult to manage</li> </ul>	<ul style="list-style-type: none"> <li>In UK, among the cases of customers who has switched; the main motivation of 77% for switching was price</li> <li>Complete removal of regulation of tariffs is not best solution. Some level of control over structure of tariffs has been retained or refined by regulator</li> </ul>	



# Market Structure and Roles & Responsibilities

## Turkish Natural Gas Market Structure Recommendation

The next step is to present the structure of the market along with the roles of the key players involved.

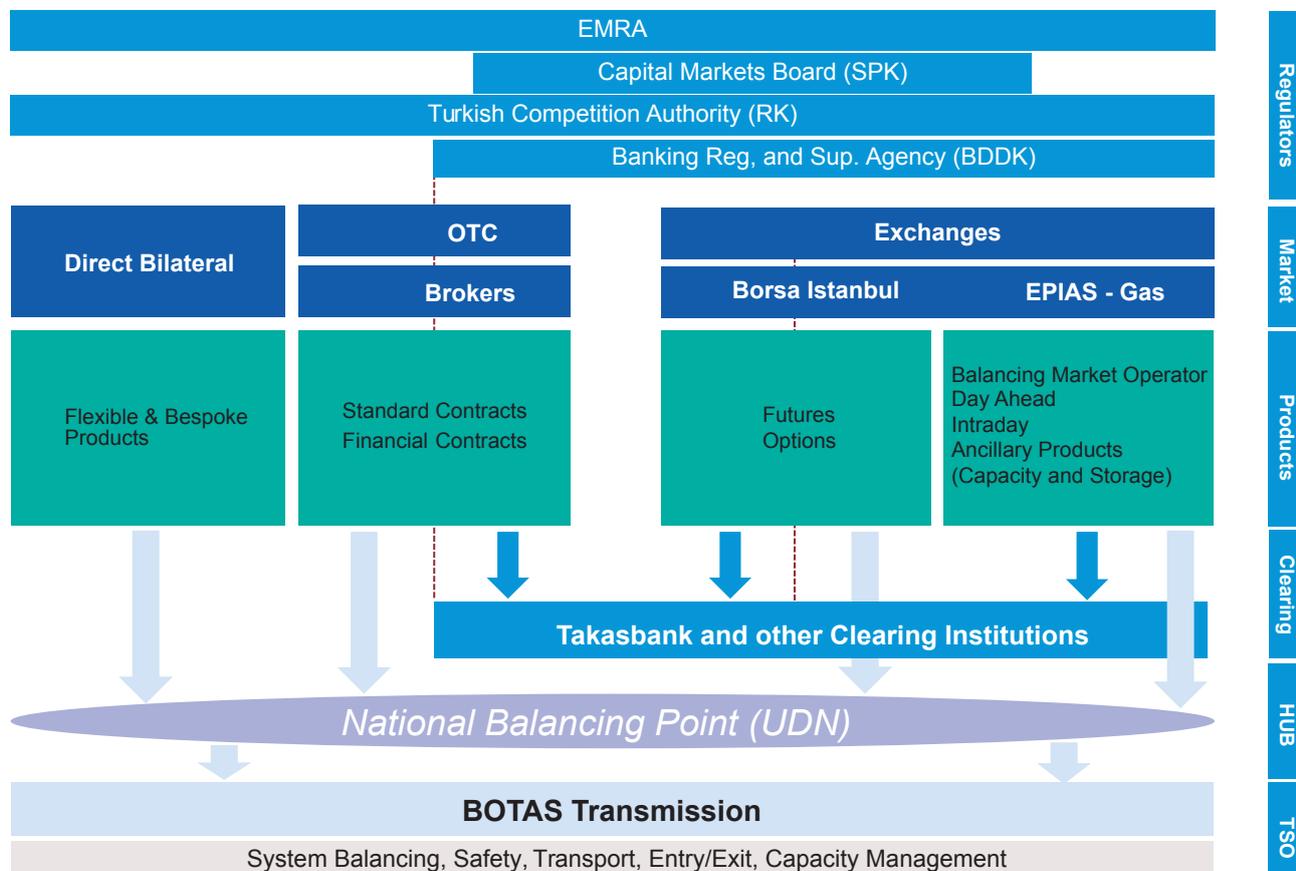
First, the ideal to-be structure of the market is presented. This is where Turkey should be in 4-8 year time frame and is represented as “Recommended Market Structure for Turkey – Long Term”.

Recognizing that it is not feasible to “jump” to the ideal to-be state, an intermediate structure is presented for the near term, “Recommended Market Structure for Turkey – Near Term”.

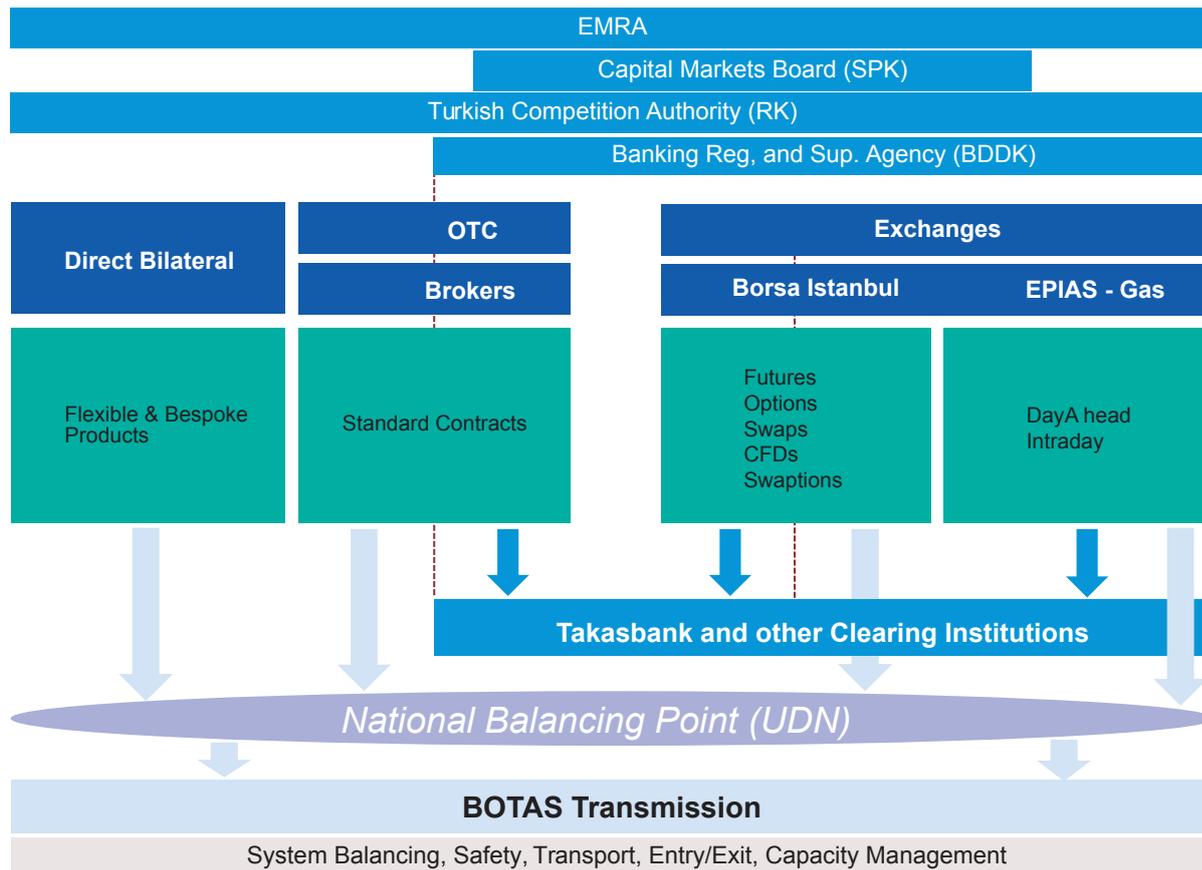
Following the market structure overviews, each element of the structure is analyzed in more detail.

Then a process flow is presented to explain how trade activities would take place and prices would be formed in the ideal to-be market structure, presented as “To-be Working Mechanism”.

## Recommended Market Structure for Turkey – Long Term



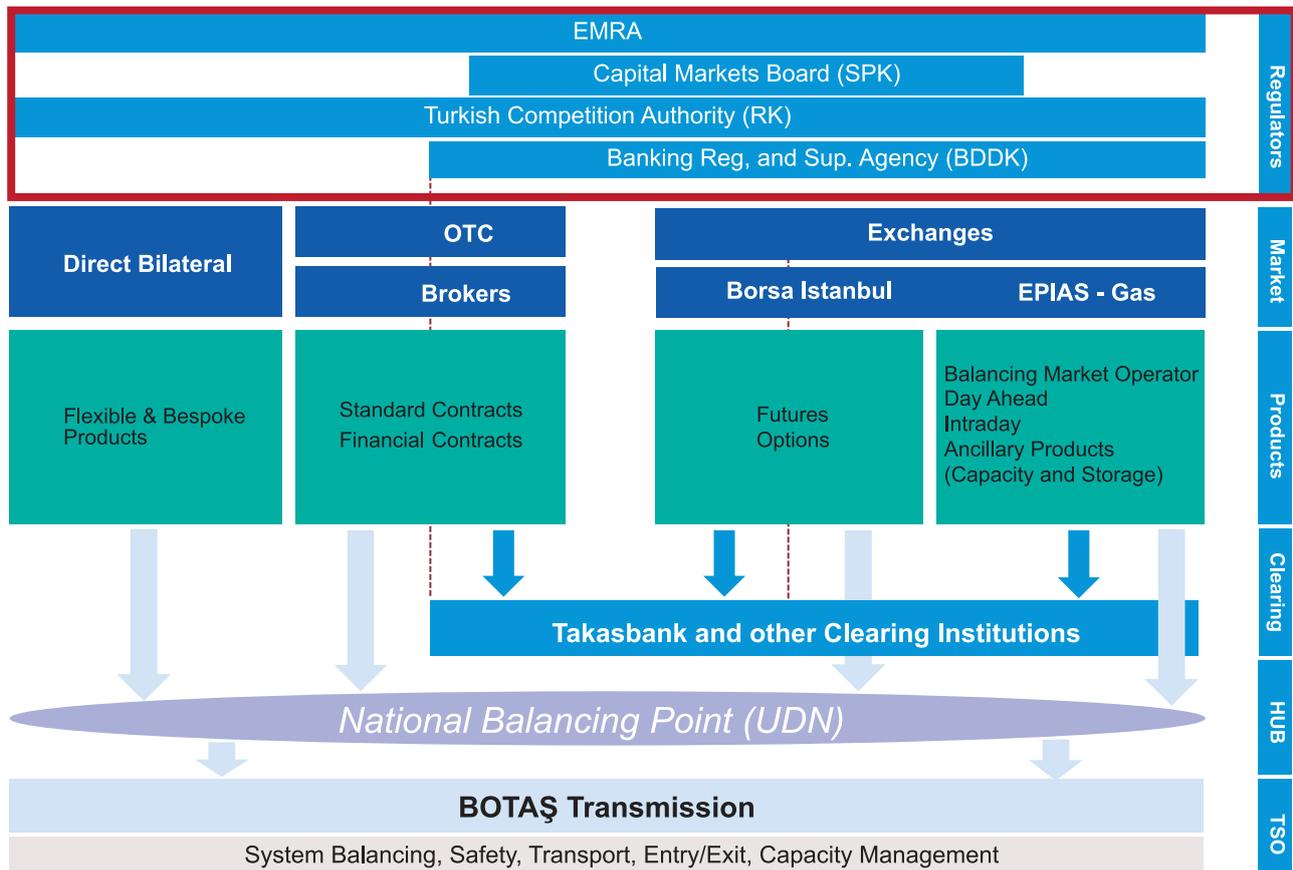
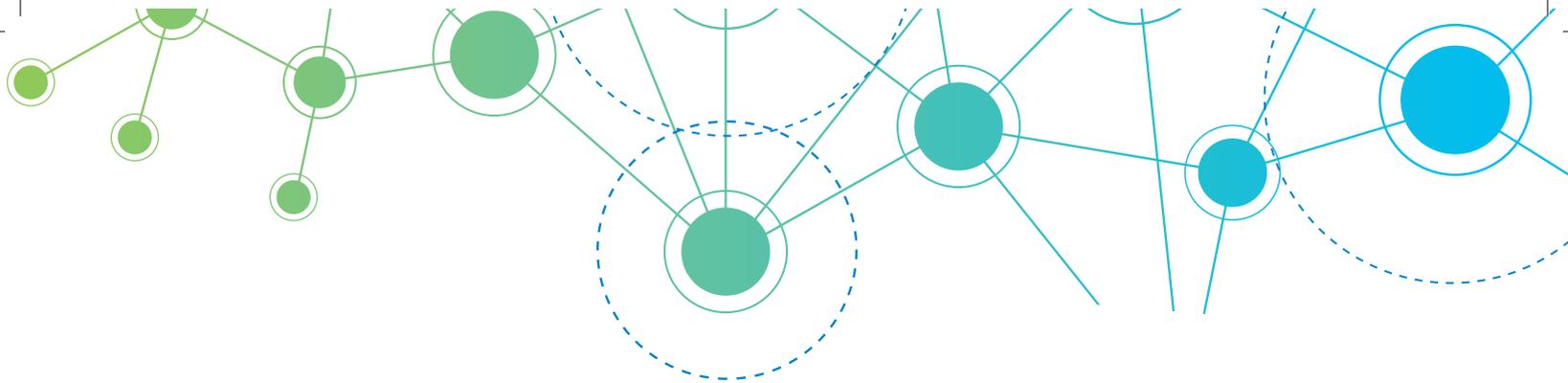
### Recommended Market Structure for Turkey – Near Term



### Recommended Market Structure Analysis

#### Regulators

- EMRA
- Capital Markets Board (SPK)
- Turkish Competition Authority (RK)
- Banking Regulation and Supervision Agency (BDDK)



**Roles of Regulators:**

**EMRA:**

- Monitor transactions on the NG market
- Make required regulations and deliver government schemes to ensure well-functioning NG market
- Define OTC and bilateral trades
- Contribute to building the gas market
- Monitor transactions on the natural gas market
- Set certain natural gas tariffs

**Capital Markets Board (SPK):**

- Ensure the proper functioning, stability and integrity of the regulated gas markets
- Ensure that market participants comply with the relevant laws
- Ensure that stakeholders are able to meet their payment obligations
- Enforce fair and transparent conditions on the markets

**Turkish Competition Authority (RK):**

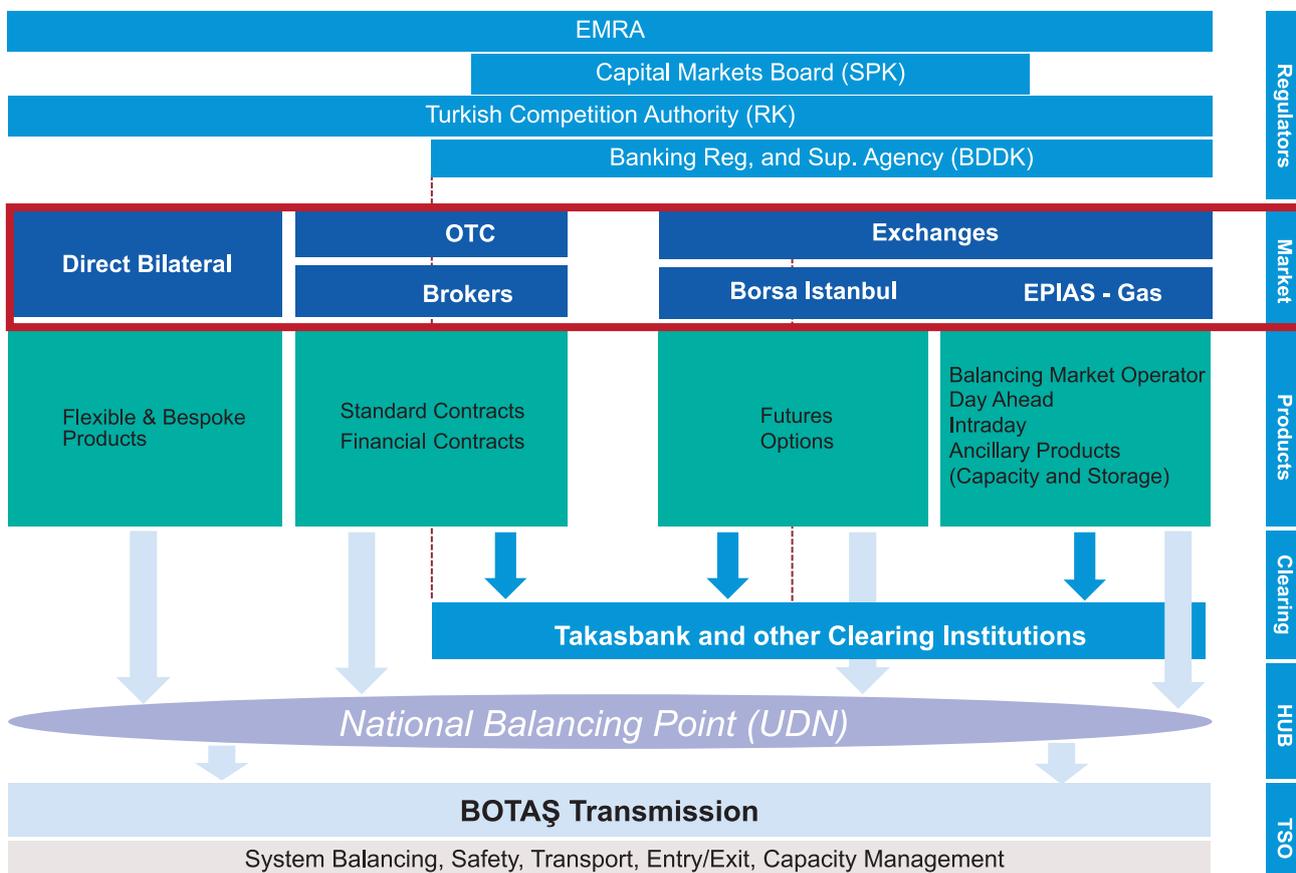
- Protect competition to guarantee a maximum of choice and product diversity
- Control abusive practices of dominant companies
- Examine the effects which a concentration (merger) between two or more companies might have on competition

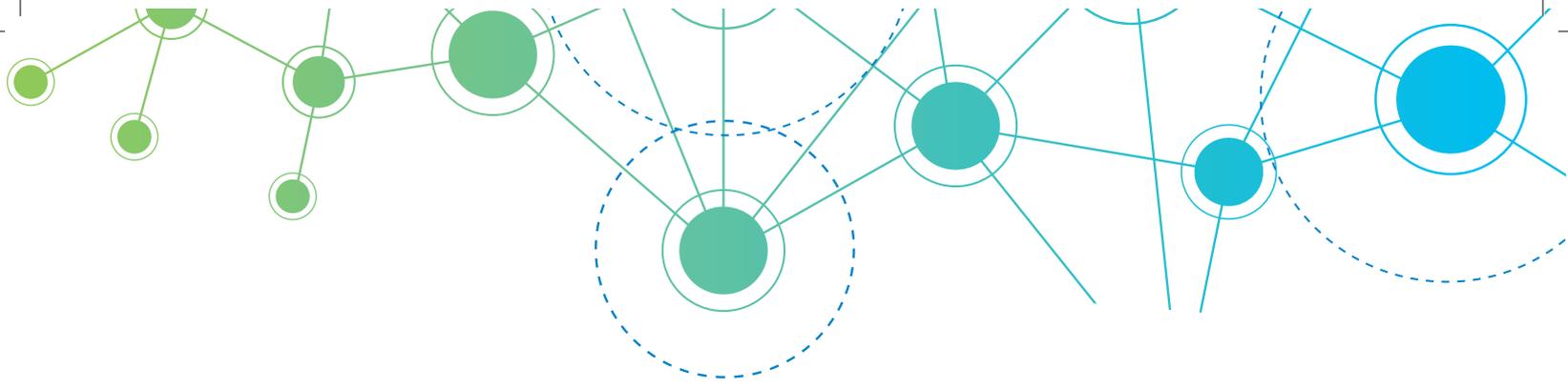
**Banking Regulation and Supervision Agency (BDDK):**

- Take necessary decisions and measures in order to protect the rights of the clearing bank customers and ensure sound operating of the clearing system and to implement them
- Supervise the implementation of establishment and activities, management and organizational structure, merger, disintegration, change of shares and liquidation of clearing banks

**Markets**

- Direct Bilateral
- OTC/Brokers
- Exchange/EPIAS
- Exchange/Borsa Istanbul





### Characteristics of the Market Places

#### Direct Bilateral:

- Not regulated
- Relationship driven
- Supply contracts (long/short term)
- Not subject to transparency requirements as organized markets
- Counterparty risk is significant
- Contracts often include flexibility on volume
- Pricing dependent on commodity, generally index pricing

#### OTC:

- Not regulated, but increased interest from regulators
- Broker driven market for standard products
- Both standard and non-standardized contracts
- Transparent depending on commodity
- Bilateral credit risk or central clearing

#### EPIAS:

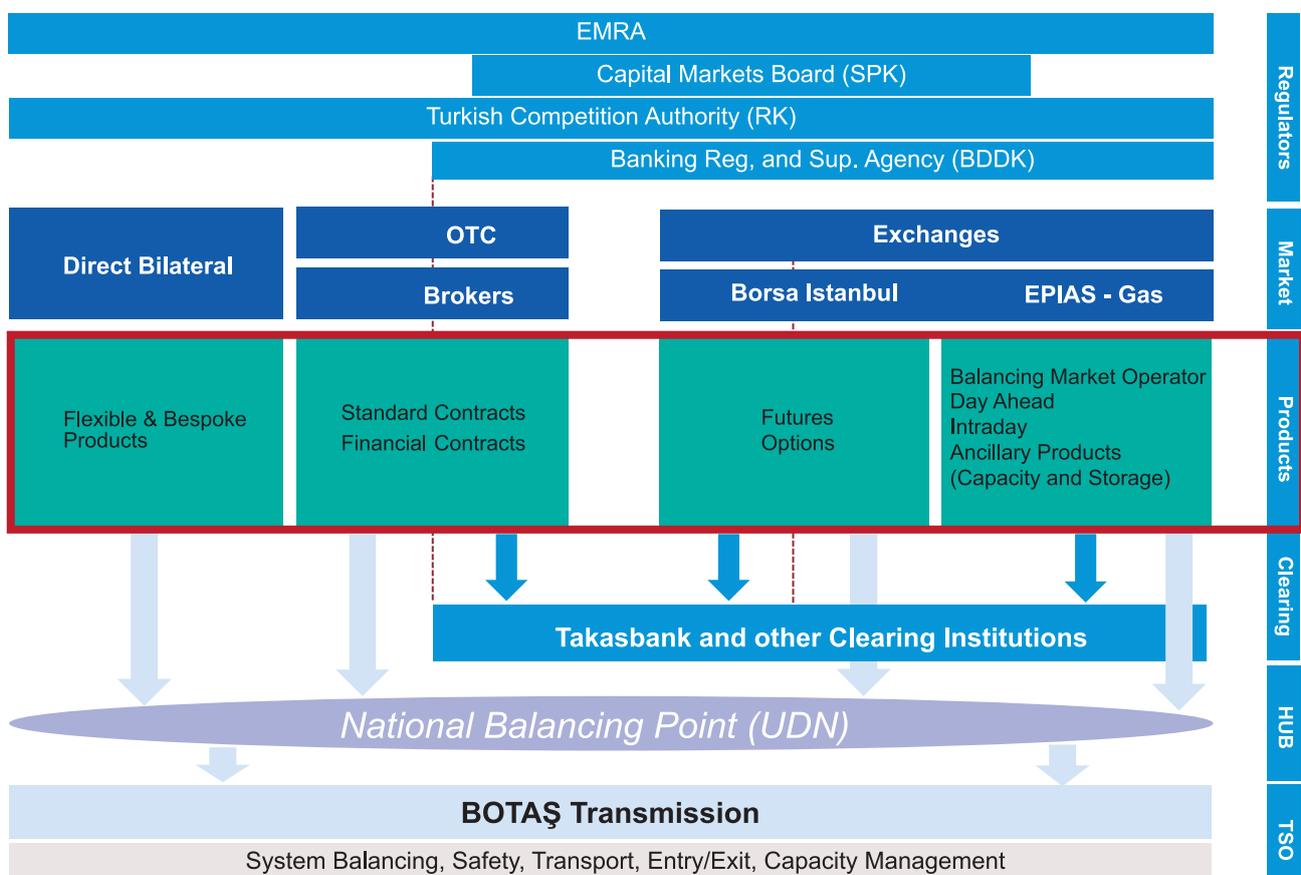
- Regulated
- Standardized contracts
- Transparent
- Central Clearing
- Counterparty risk eliminated
- Physical delivery enabled
- Market information disseminated by industry specific vendors
- Pricing dependent on commodity and supply & demand dynamics

#### Borsa İstanbul:

- Regulated
- Most advanced form of market
- Standardized contracts
- Extremely transparent
- Central clearing
- Counter party risk eliminated
- Rarely leads to physical delivery
- Easy access to markets
- Network effect

## Products

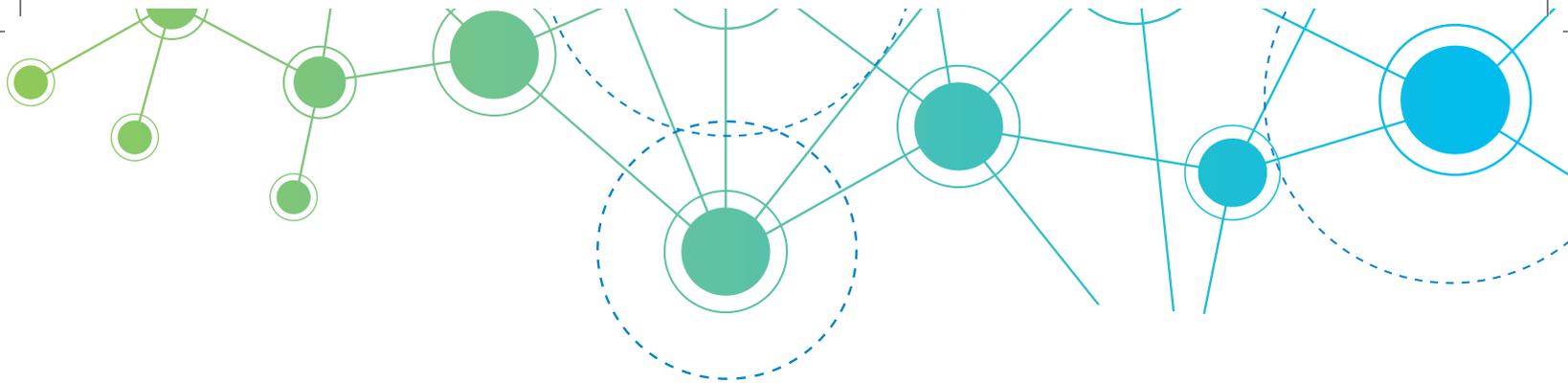
- Physicals – Standard Products
- Financials
- Balancing Products



## Product Types

Physicals – Standard Products:

- Spot : Intraday (for balancing), DA, DA+1, WE
- Prompt : WA, WDNW, WE, BOM, Month Ahead
- Forwards : Months, Quarters, Seasons (W= Oct-Mar, S=Apr-Sep) Years
- L-T Contracts based on oil indexation still prevalent



**Financials:**

- Futures
- Clearing
- Option
- (Spark Spread)
- Swaption
- Spread-Option

**Balancing Products:**

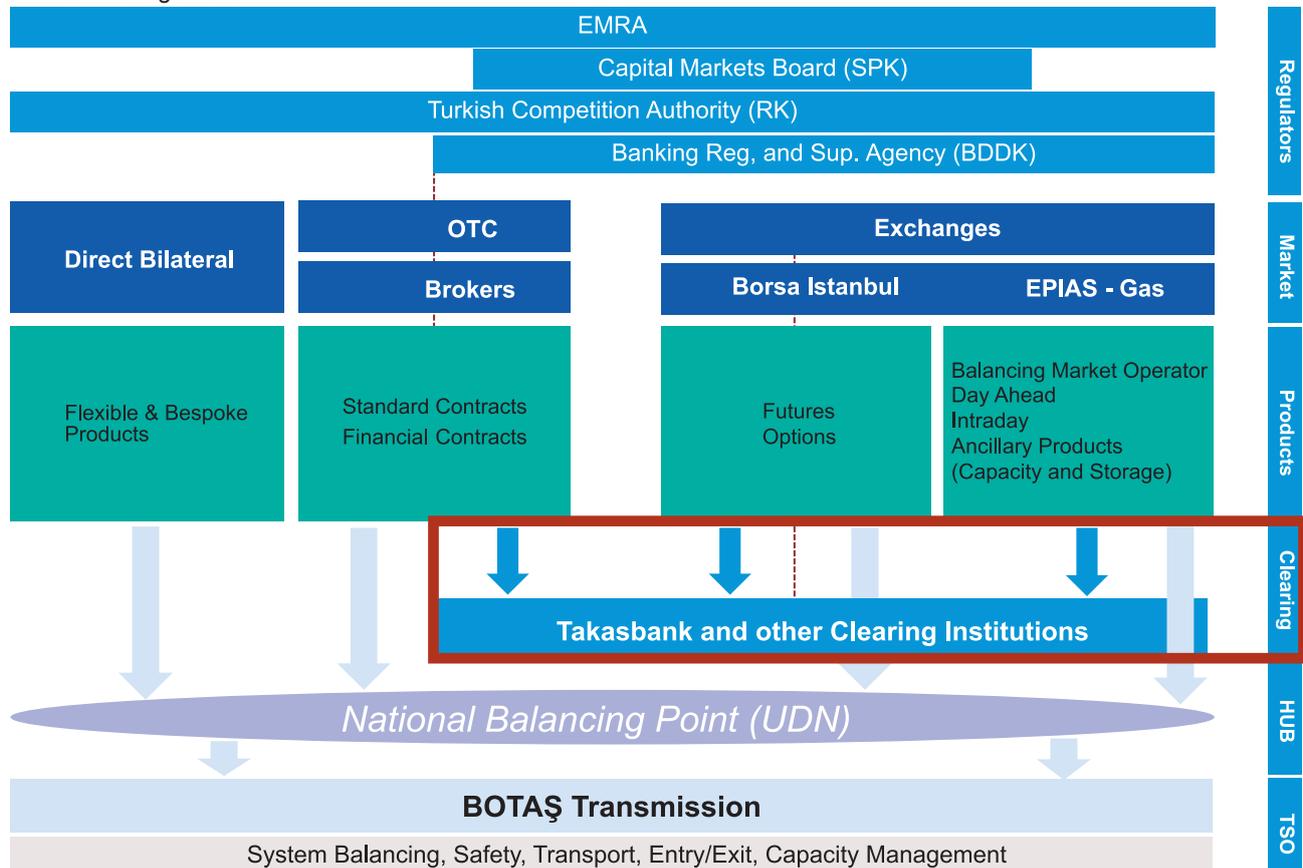
- End-Day: for balancing on gas-day
- Physical flow & Locational trades exist to help balance System issues

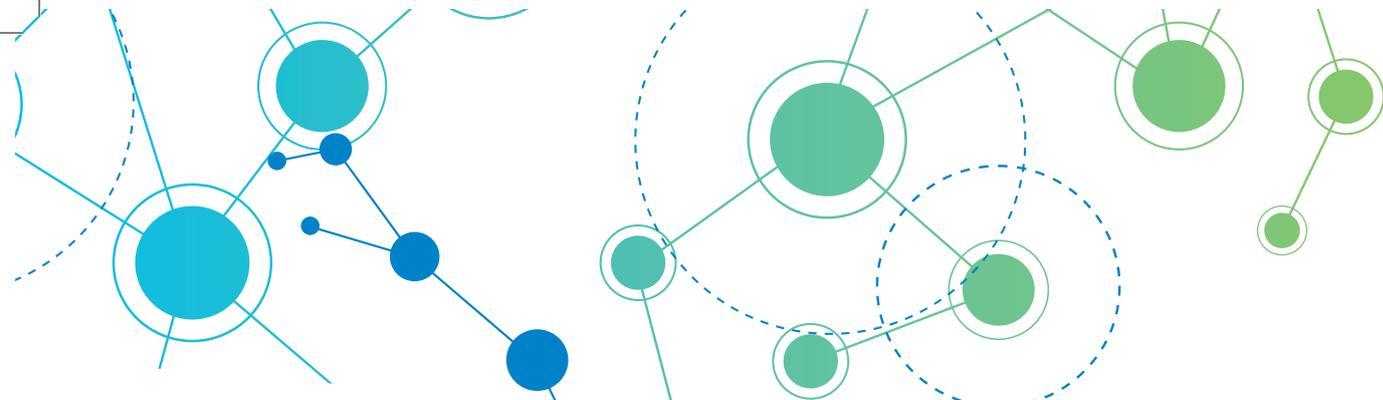
**Capacity & Storage Products:**

- Network Entry Capacity (for various durations)
- Network Exit Capacity
- Storage : Injection, Space, Withdrawal

**Clearing – Functions**

- Exchange & OTC Clearing
- Physical Settlement (Delivery)
- Financial Settlement (Payment)
- Invoicing
- Risk Management





## Clearing House Functions

### Exchange and OTC Clearing

- Acts as a central counterparty, offers interfaces for the clearing of OTC transactions in standard products listed at partner exchanges or the transactions of the exchange itself.

### Physical Settlement (Delivery):

- Manages agreements with TSO for delivery of the traded contracts
- In charge of physical settlement of Power (Intraday, DA, Futures), Gas (Intraday, DA, Futures), Emission Allowances
- Trading participants opting for physical settlement sign a balancing area agreement with the relevant TSO, alternatively, a third-party agreement permitting access to a balancing area can be concluded
- Clearing Members are not involved in the physical settlement process, they act as a payment agent and guarantor
- TSOs guarantee grid security through balancing of nominated amounts

### Financial Settlement (Payment):

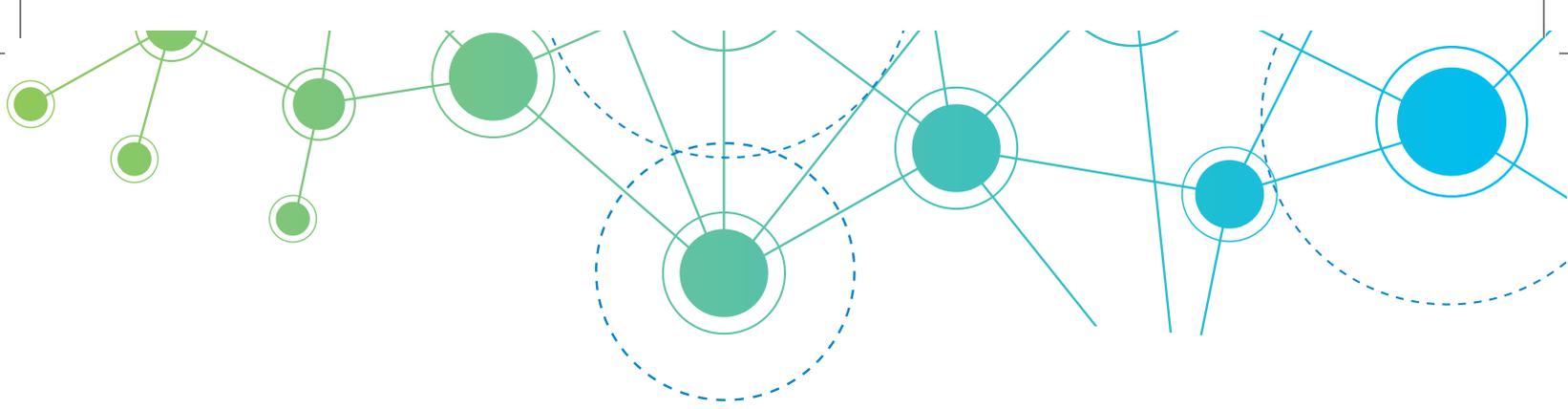
- Guarantees financial fulfillment and carries out cash clearing for purchases and sales of all spot market transactions concluded on partner exchanges or OTC-registered trades
- Co-operates with international banks as Clearing Members. For TL settlement, uses central bank money, for payments in foreign currencies, may use private settlement agent model
- If a Non-Clearing Member starts trading on a partner exchange, financial settlement is carried out via its Clearing Member

### Invoicing:

- Clearing house invoices clearing fees only, other invoices connected to trades are issued by the exchanges themselves
- 2 groups of invoices: Delivery (Settlement of spot transactions, Settlement of intraday transactions, Settlement of futures expiries) and Trading (Purchases, Sales)

### Risk Management:

- Serves as a central counterparty for a variety of markets and products
- Places itself between the counterparties, becoming the buyer for every seller and the seller for every buyer and, thus, ensures the fulfillment of open contracts concluded on the markets for which it provides clearing
- Novation of trades as soon as they are matched in the different markets' trading platforms or have been accepted as OTC deals by the two participants, as a result, the trading participant is not exposed to the other trading participants' credit risk
- Defines criteria for the admission of Clearing Members, ensures that its Clearing Members have the necessary resources to fulfill the highest requirements
- Daily settlement of profits and losses: Open positions are marked to market every day and profits and losses are paid out or collected on a daily basis, payments are settled on a net basis
- Margins are required on a daily basis to cover current and future exposures of open positions and pending spot market transactions

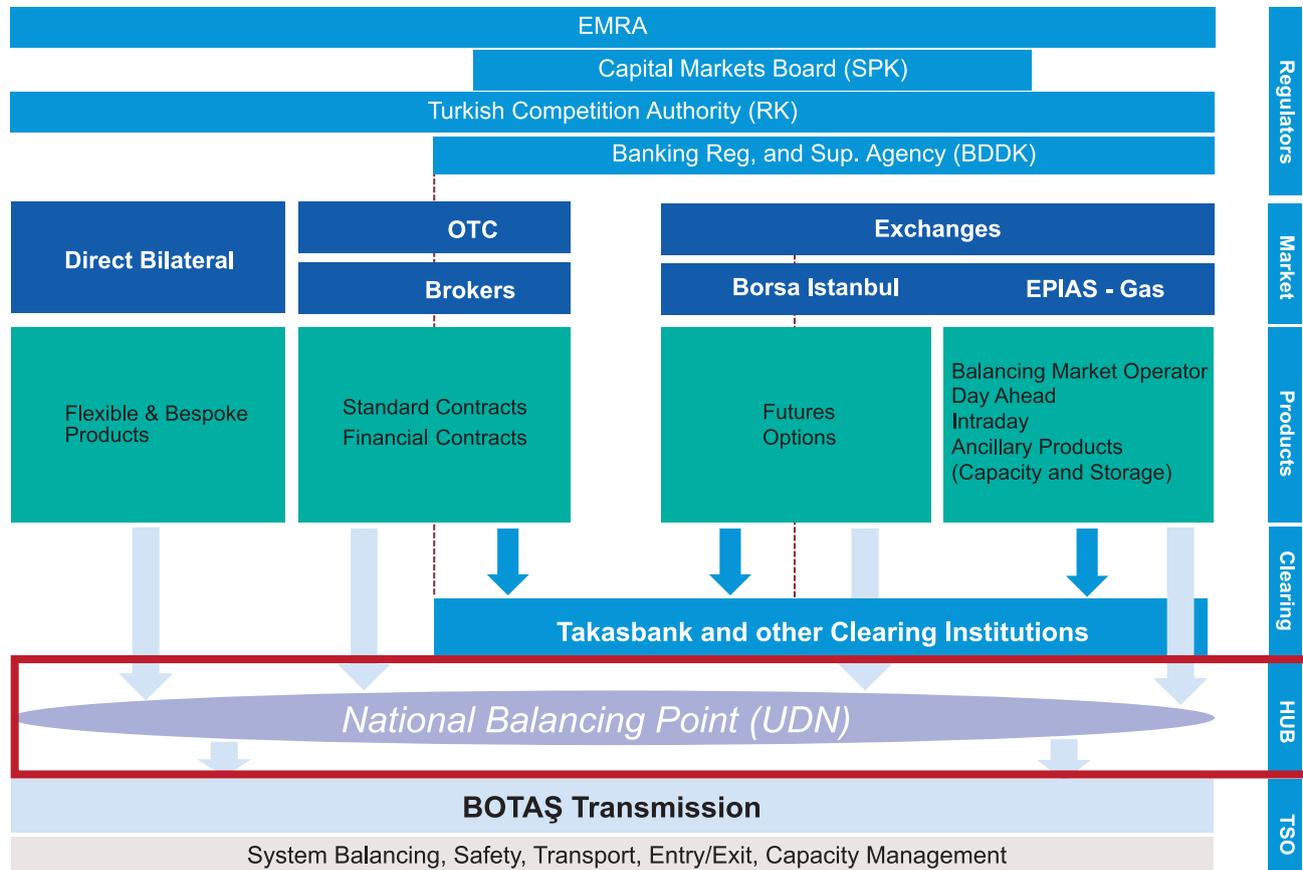


### Hub Price Publishers

- Exchange
- OTC Platforms
- Price Reporting Agencies
- Market Operator

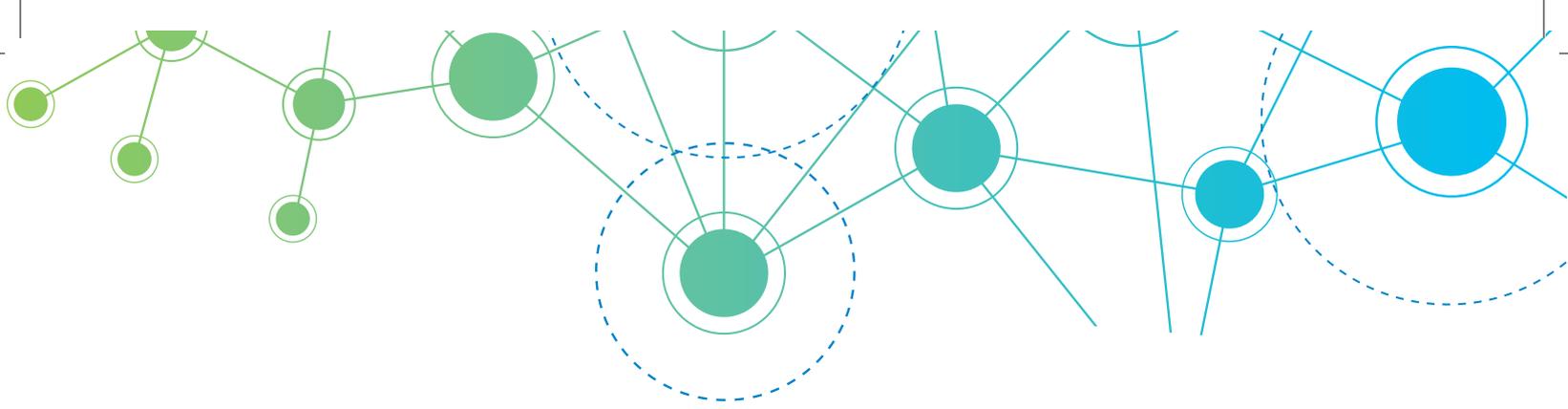
### Hub Working Mechanism

- Hub reference prices support creating a transparent gas market and affect pricing of the upcoming bilateral, OTC and Exchange trades
- Both of physically delivered or financial gas trades might be included in the Hub price formations
- The market venue/operator, platform or price reporting agency(e.g. Heren and Argus) calculates a reference price for the market which is based on delivery at the hub for a specified product/delivery time slot
- Prices will be for each “product” – i.e. for each of Day Ahead, Week Ahead, Week Days Next Week, Weekend, Balance of Month, Month Ahead, then each Month, Quarter, Season Year
- Each of the price “Publishers” as outlined above, will have their own version of the price according to the sector (OTC or exchange) and timing of the data they collect. For example; exchanges will have a clearly defined methodology which could be weighted average of the day’s observed trades, or observed over shorter time period within that day
- Usually the OTC and exchange prices are not blended together except in case of certain market reports from the agencies like Heren or Argus
- Market Players report OTC, bilateral and spot exchange trade details with Market Operator to run the Gas Day D price-formation of physical gas trade
- The prices reported for bilateral/OTC are for trades types for “flat” gas- i.e. constant flow without flexibility/swing etc.
- Market Operator to run the price-formation of physical gas trade – certainly for balancing mechanism. For products further forward delivery such as months, quarters, etc. - whatever the trading venue/platform is such as brokers or exchange, it could be design into model that they have to report trades (i.e. price, volume, delivery period/product) to the Market Operator
- The TSO does not calculate “Hub Price“ of core market trading - they are concerned with only volume to determine whether system is in balance or not after analyzing submitted nominations.
- TSO becomes a party to price-formation only for balancing market in the functioning of balancing mechanism (i.e. when market-based mechanism).



**Hub – Elements**

- Transportation
- Parking
- Loaning
- Storage
- Peaking
- Balancing
- Title Transfer
- Electronic Trading
- Administration
- Compression
- Risk Management
- Hob-to-hub Transfers



**Transportation/Wheeling:**

Transfer of gas from one interconnected pipeline to another through a header (hub), by displacement (including exchanges), or by physical transfer over the transmission of a market center pipeline

**Parking:**

A short-term transaction in which the market center holds the shipper's gas for redelivery at a later date. Often uses storage facilities, but may also use displacement or variations in line-pack

**Loaning:**

A short-term advance of gas to a shipper by a market center that is repaid in kind by the shipper a short time later. Also referred to as advancing, drafting, reverse parking, and imbalance resolution

**Storage:**

Storage that is longer than parking, such as seasonal storage. Injection and withdrawal operations may be separately charged

**Peaking:**

Short-term (usually less than a day and perhaps hourly) sales of gas to meet unanticipated increases in demand or shortages of gas experienced by the buyer

**Balancing:**

A short-term interruptible arrangement to cover a temporary imbalance situation. The service is often provided in conjunction with parking and loaning

**Title Transfer:**

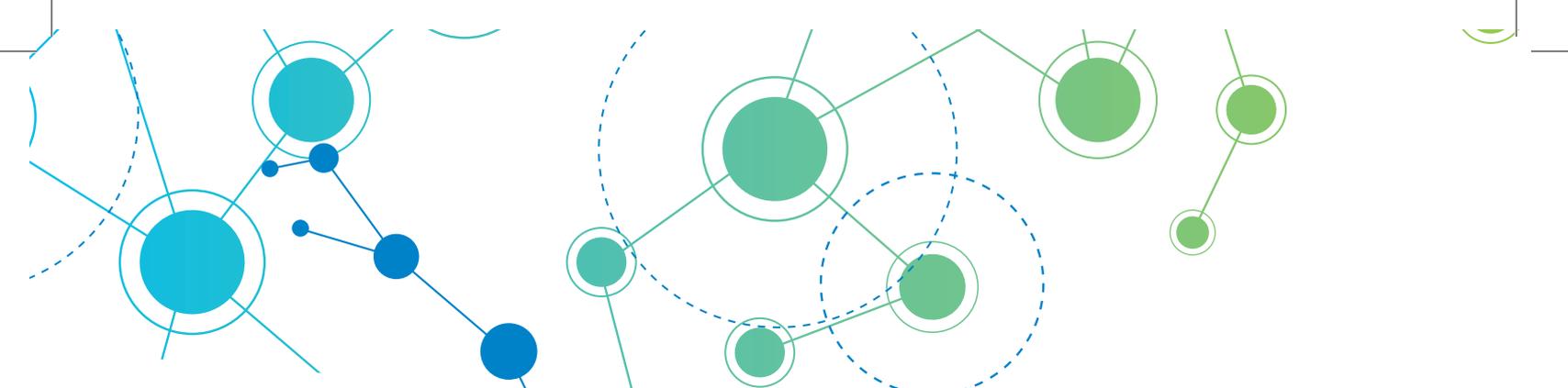
A service in which changes in ownership of a specific gas package are recorded by the market center. Title may transfer several times for some gas before it leaves the center. The service is merely an accounting or documentation of title transfers that may be done electronically, by hard copy, or both

**Electronic Trading:**

Trading systems that either electronically match buyers with sellers or facilitate direct negotiation for legally binding transactions. A market center or other transaction point serves as the location where gas is transferred from buyer to seller. Customers may connect with the hub electronically to enter gas nominations, examine their account position, and access E-mail and bulletin board services

**Administration:**

Assistance to shippers with the administrative aspects of gas transfers, such as nominations and confirmations



Compression:

Provision of compression as a separate service. If compression is bundled with transportation, it is not a separate service

Risk Management:

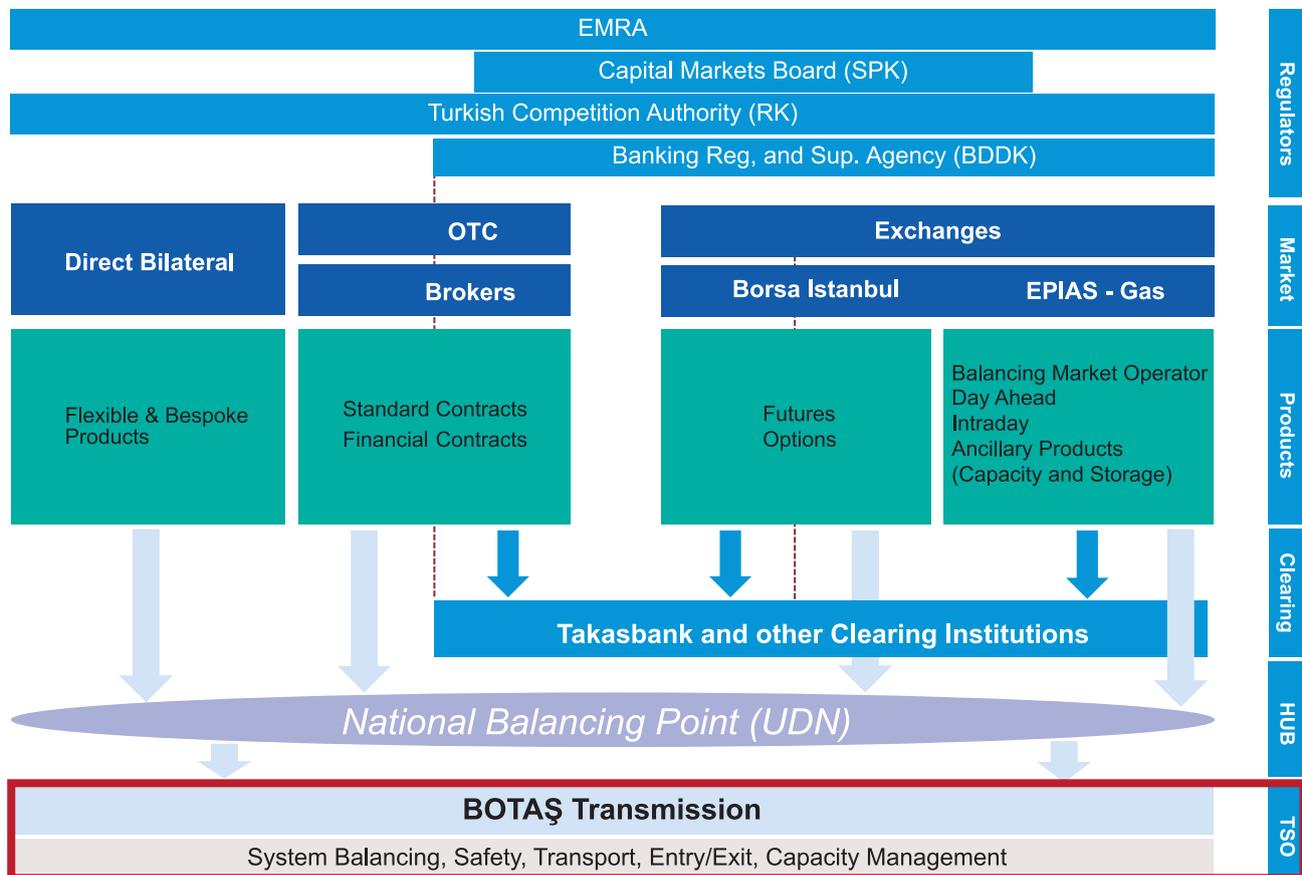
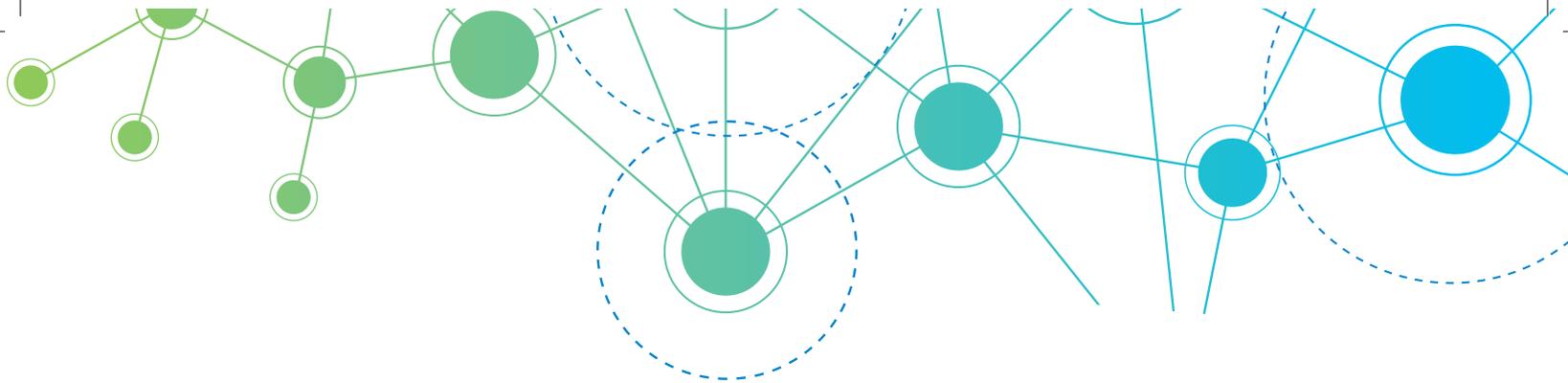
Services that relate to reducing the risk of price changes to gas buyers and sellers, for example, exchange of futures for physicals

Hub-to-Hub Transfers:

Arranging simultaneous receipt of a customer's gas into a connection associated with one center and an instantaneous delivery at a distant connection associated with another center

**Roles**

- Asset Management
- Operation and Maintenance
- Quality Assurance
- System Balancing
- Network Code Implementation



**TSO's Responsibilities**

**Asset Management:**

- Own and operate assets such as high pressure gas pipelines, the international connections, and underground storage facilities for functioning of the entire market as well as underground storage and regasification facilities (if applicable) gas balancing

**Operation and Maintenance:**

- Manage development and expansion of the trunk network in the gas sector, guarantee the maintenance and improvement of the network under homogeneous and coherent criteria

**Quality Assurance:**

- After treatment, which includes checking the gas quality, meets statutory safety requirements and measuring the calorific value (the amount of energy contained), transporting gas into the pipeline

**System Balancing:**

- Ensure a balanced system by buying and selling gas and using stored gas to ensure that in most normal circumstances, demand can be met
- Manage gas in store (the so called Top-up and Operating Margins gas) to ensure the system is balanced and that supplies are maintained

**Network Code Implementation:**

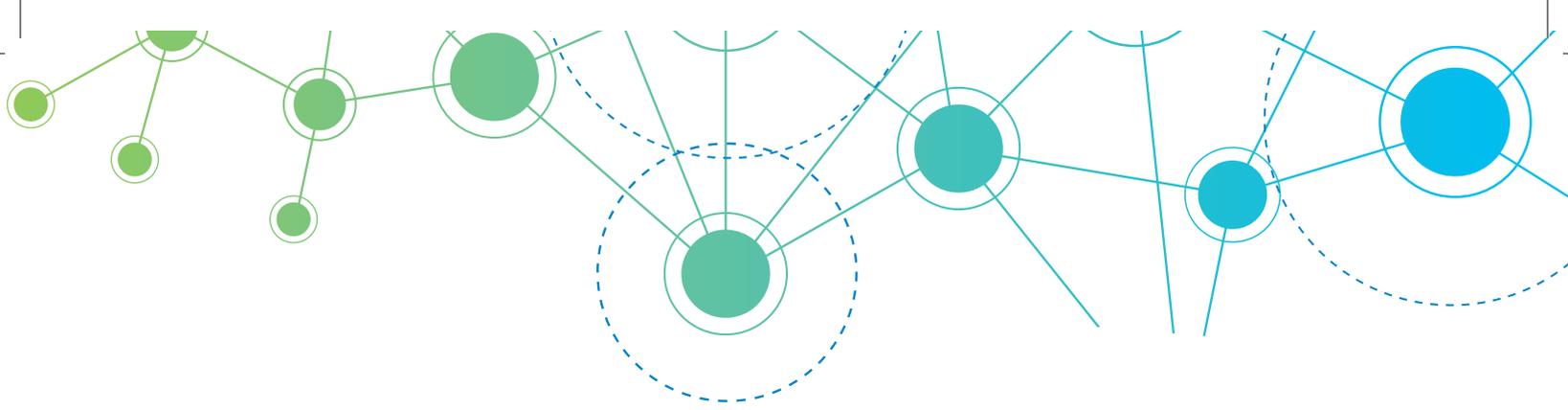
- Usually the system is balanced by gas bought on the open market through the Intraday Balancing' set up as part of the Network Code - the rules that govern the supply of gas

# Market Operating Mechanism

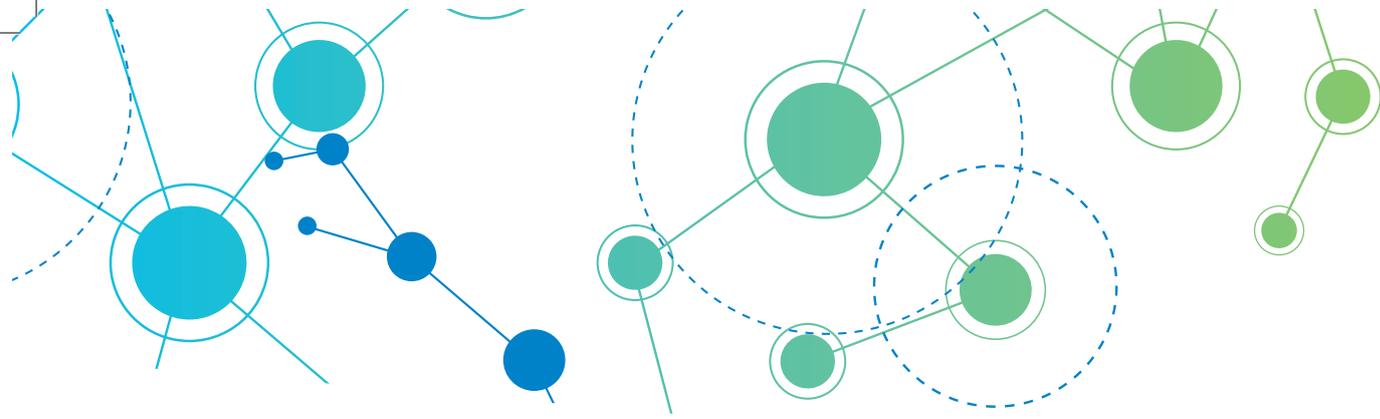
## Turkish Gas Market High Level To-Be Operating Mechanism

The process flow explained in this section represents the targeted operating mechanism for the Turkish Gas Market

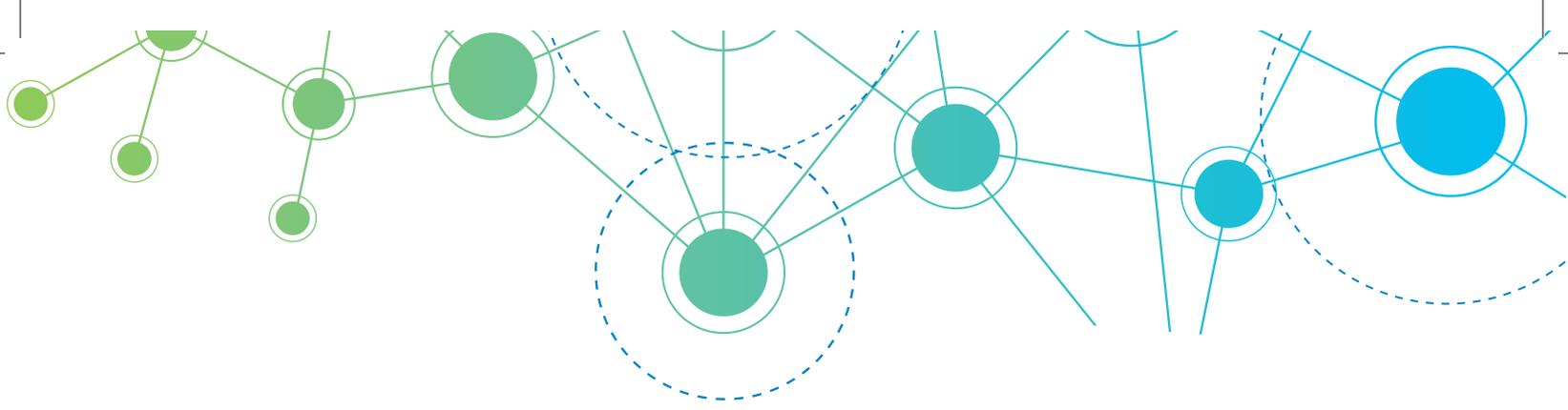
Time	Process Step	Output	Details
• Trade Day	Bilateral agreements are signed among players	• Physical Bilateral Contracts	<ul style="list-style-type: none"> <li>Contract Confirmation issued between counterparties</li> <li>Delivery Terms stipulate whether on UDN or TN</li> <li>Pricing Terms stipulate if fixed or indexed with indexation rules</li> <li>Quantity Terms determine volume per period and flexibility if applicable</li> <li>Schedule determines which other parties (TSO etc.) must be informed</li> </ul>
	Financial products are traded under BIST	• Financial Trades • <b>Financial Gas Product Prices</b>	• Exchange prices calculated and published for each product according to Exchange methodology
	OTC trades are performed	• Physical and Financial OTC Contracts • <b>Daily OTC Prices</b>	• The prices are periodically announced by OTC platform based on the transactions in OTC
	Spot market trades are conducted under EPIAS	• Physical Exchange Contracts (Product) • <b>Daily Gas Exchange Product Prices</b>	<ul style="list-style-type: none"> <li>Physical trade executed on exchange (e.g. EPIAS) is matched (confirmed) via Exchange process</li> <li>Exchanges record all trade details</li> <li>Trade is cleared via a Clearing Bank</li> <li>Prices are recorded and Exchange Closing and/or Settlement prices, for each product (delivery period) are published according to Exchange methodology</li> <li>Day Ahead products are also traded under EPIAS</li> </ul>
	Shipper buys/sells (trades) Capacity to flow gas onto the system considering difference between their capacity booking and planned flow	• Capacity Positions / Trades	<ul style="list-style-type: none"> <li>Shippers review their Capacity position for Entry Capacity to flow gas onto the system / Network</li> <li>Where their Capacity position is less than the quantity of gas they intend to flow on the system on a given Gas Day, they will need to buy more Capacity either directly from TSO in auctions, or from another Shipper</li> <li>Capacity rights could be traded in the exchange as ancillary products</li> </ul>
	Reporting Agencies will collect, calculate and announce the blended price according to transactions performed in bilateral, OTC, EPIAS and BIST	• <b>Various Hub Prices by Reporting Agencies</b>	• Reporting Agencies; Argus, Heren, etc.
• D-7 up to D-1	Market players inform TSO about their physical gas flows. It is important to consider the bilateral agreements, OTC trades, EPIAS spot trades and BIST futures transactions with physical delivery, if any	• Nomination to TSO	<ul style="list-style-type: none"> <li>TSO may be informed D-7 or less</li> <li>TSO must be informed latest D-1 of gas to be flowed (Nomination)</li> <li>Nomination includes: Date of gas flow, Volume/Gas Amount, Type (Entry, Exit, within the UDN), Location (if Entry or Exit)</li> </ul>



Time	Process Step	Output	Details
• D-1	Shippers can make Re-nominations on all types. Entry Nominations must be finalized by 16:00	• Re-nominations to TSO	• N/A
	TSO aggregates Nominations at each location	• Aggregated Nominations	• TSO has view of Gas Day potential balance and prepares for balancing taking into account updated data on consumption patterns, weather and any technical supply issues
	Market Operator (EPIAS) announces Day-ahead price to be a reference for Intraday Market	• <b>Day-ahead Market Prices</b>	• N/A
• Gas Day D	Market Operator (EPIAS) opens Intraday transactions and facilitates the trading of gas for delivery on-the-day delivery as a Balancing Mechanism of Shippers	• N/A	• There are Intraday products traded under EPIAS • Market Players make trades in Intraday market to maintain their balance
	Shippers take action to balance	• N/A	Shippers can take action to balance by trading: • TSO nominations system (EBT) (if they find equal/opposite Shipper position with counterparty) • Intraday Market
	Shippers place bids or offers with volume and price according to their balance (long/short) on Intraday Market	• Bids and Offers	• N/A
	Market Operator (EPIAS) calculates and announces the Intraday prices according to trading results	• <b>Intraday Gas Prices</b>	
	Market Operator (EPIAS) informs TSO of net Gas Day Positions of each Shipper who traded on the Intraday Market	• Intraday Trade Nominations	• The TSO can see the total Nominations which form the balance of each Shipper • TSO's and Market Operator's systems could be integrated to automatize data flow
	Shippers must make further Nominations / Re-nominations onto TSO systems (EBT)	• Nominations/ re-nominations to TSO	• N/A
	Market Operator (EPIAS) closes Intraday transactions at cut-off time and starts Balancing Market transactions	• N/A	• The TSO make trades in Balancing Market with shippers to keep system in balance • Shippers cannot make any trade among themselves in Balancing Market
	The TSO ensures that system entries and system exists are 'balanced' (including any losses, pressure maintenance and/or technical actions) by aggregating all Shippers' Nominations for Entry, Intra-system and Exit flows	• N/A	• N/A
	The TSO takes actions in form of buys/sells according to its view of: • current network conditions (pressure, line-pack, temp. etc.) • updated demand forecasts • Shippers' current balances from Nominations/re-nominations	• N/A	• The TSO's buy/sell orders are matched with shippers bids/offers in the Balancing Market
	Market players perform gas transmission actions which they are supposed to do	• N/A	• N/A



Time	Process Step	Output	Details
• Gas Day D	TSO reviews and reconciles Shippers Capacity positions versus their gas flows from Nominations. Where insufficient Capacity position exists (i.e. Shipper is short Capacity) the TSO will invoke Capacity Overrun mechanism for allocating Capacity at punitive rates/penalties	• Capacity Overrun Charges	• N/A
• D + 1	TSO reviews the final Gas Day balances of Shippers to determine any imbalances (i.e. flows which are not as per what was finally the balance (Re) Nominated to TSO) Imbalances are Cash-Settled at the Balancing Gas Sell/Buy Price	• N/A	<ul style="list-style-type: none"> <li>• Shippers with imbalance are cash-out at Balancing Gas Sell/Buy Price</li> <li>• Balancing Gas Sell/Buy Price will be multiplied by a penalty factor if the corresponding shipper's imbalance exceeds allowed limits</li> <li>• Alternatively; system marginal buy/sell price might be charged to the imbalanced shippers; <ul style="list-style-type: none"> <li>• System Marginal Prices = The highest (System Marginal Buy) and lowest (System Marginal Sell) prices of the trades conducted by TSO</li> <li>• Charged at the SMP(Buy) if the shipper is in short position</li> <li>• Charged at the SMP(Sell) if the shipper is in long position</li> </ul> </li> </ul>
	Market Operator(EPIAS) manages financial settlement and invoicing process of Balancing trading done on the Intraday and Balancing Markets	• Intraday / Balancing Market Cash Settlements	<ul style="list-style-type: none"> <li>• Shippers who traded on Intraday Market are cash-settled according to trades among themselves</li> <li>• Shippers who traded on Balancing Market and shippers in imbalance are cash-settled according to defined settlement rules</li> </ul>
• D / D+n	Actualization - the actual consumption data from meters is recorded at later dates (except those on real-time or Daily Metered Sites) and real consumption adjustments are made	• Actuals Adjustments	• The actual consumption data availability depends on the customer classification



# Roadmap

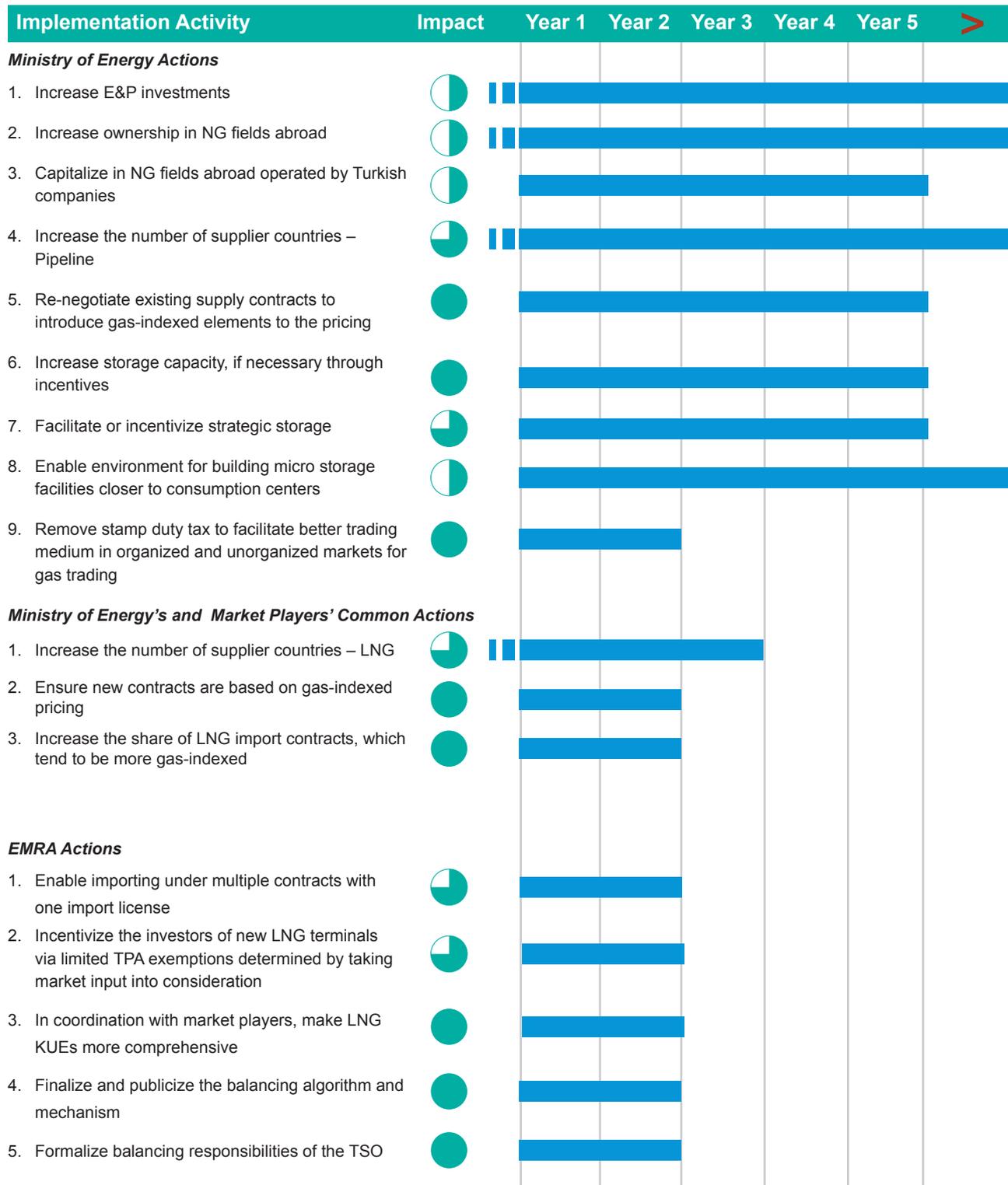
## Introduction

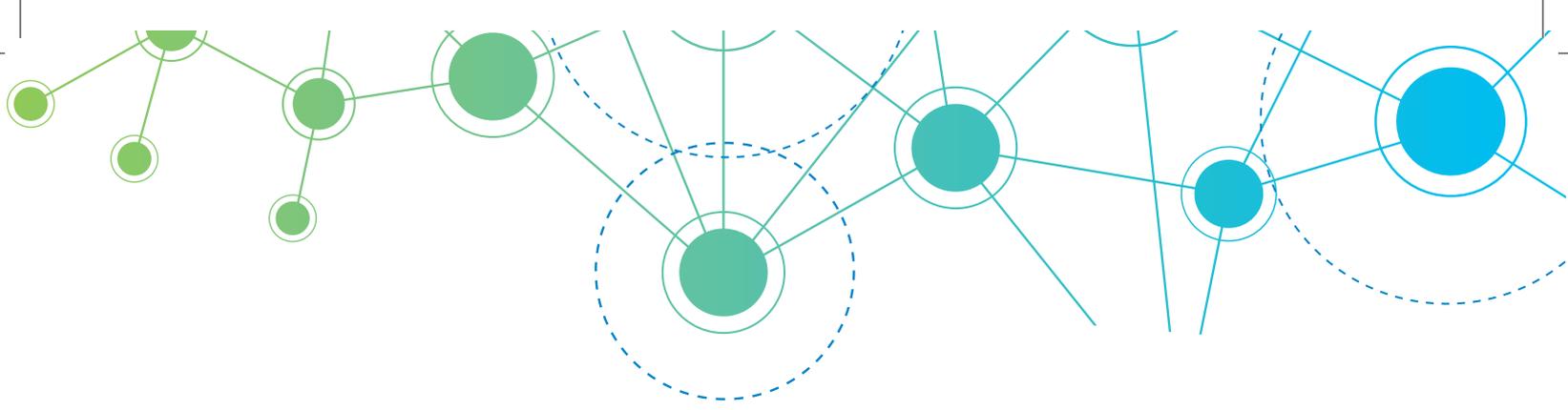
Achieving a competitive and liberal gas market is no easy task and requires involvement and cooperation multiple parties to complete many action items. In development of the roadmap, these actions are presented in two categories. The first category represents the Immediate Next Actions which will create large impact with relatively small effort. The remaining activities which span over a longer period of time are presented in the Roadmap slides with responsible parties identified.

## Immediate Next Actions

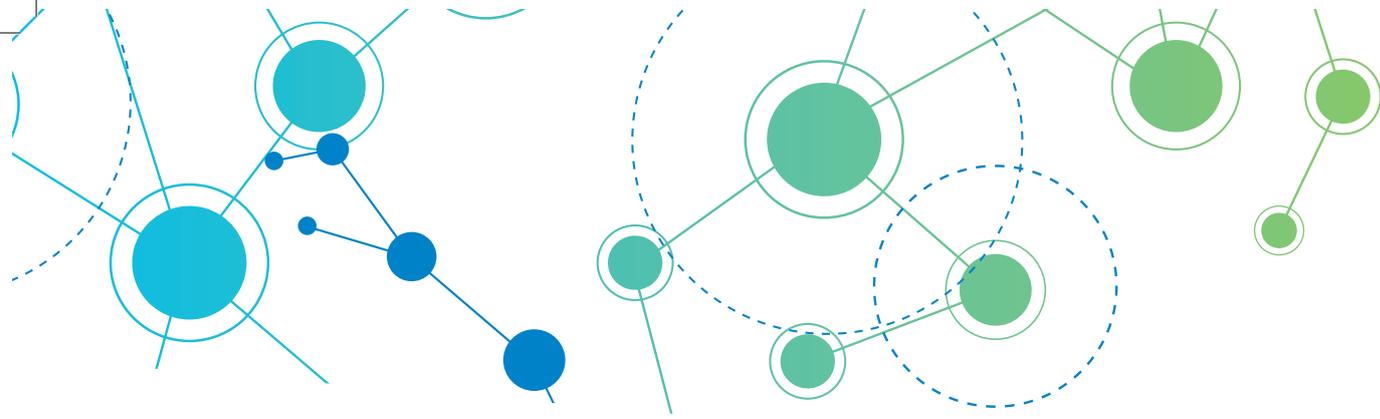
- Form a task force who will be responsible for preparing a detailed roadmap with assigned responsible parties and monitoring progress on the actions
- Perform study for identifying which markets' indices could be utilized for Turkey's supply contracts and how the pricing formulae could be shaped
- Perform n-1 study to identify Turkey's needs for complying with EU-wide accepted security of supply standards, taken at granularity of daily consumptions
- Perform a business case analysis comparing the loss from stamp duty elimination with gains from corporate tax
- Run feasibility analyses for identifying types (e.g. shore, FSRU), sizes and locations for LNG Terminals in Turkey
- Develop a web based system (possibly an extension to EBT) for BOTAŞ to make purchases in a transparent way; and indicate a reference price

## Roadmap for the Implementation of the Recommendations





Implementation Activity	Impact	Year 1	Year 2	Year 3	Year 4	Year 5
<b>EPDK Aktiviteleri</b>						
1. Establish a Balancing Market under EPIAS	●	[Bar spanning Year 1 to Year 5]				
2. Introduce the ancillary services market concept into regulations	●	[Bar spanning Year 1 to Year 2]				
3. Reduce BOTAŞ's dominance in Marketing & Trading	●	[Bar spanning Year 1 to Year 2]				
4. Unbundle BOTAŞ's trading arm from system operations	●	[Bar in Year 1]	[Bar spanning Year 2 to Year 5]			
5. Re-visit storage regulations and corresponding obligations (e.g. storing 10% of traded volume after 5 years)	●	[Bar in Year 1]	[Bar spanning Year 2 to Year 5]			
6. Eliminate Incumbent's wholesale tariff, setting a cap for wholesale prices due to dominance of incumbent	●	[Bar spanning Year 1 to Year 2]				
7. Develop consumption profiling to improve consumption forecasts and consequently balancing management or transfer meter ownerships to NDCs	●	[Bar spanning Year 1 to Year 2]				
8. Identify last resort suppliers through an auction mechanism	●	[Bar spanning Year 1 to Year 3]				
9. Set a last resort tariff including the cost and risks of the last resort suppliers	●	[Bar spanning Year 1 to Year 2]				
10. Establish and enforce time frames for switching periods	●	[Bar spanning Year 1 to Year 2]				
11. Ensure meter data/consumption data availability to new supplier based upon switch initiation process (not only at actual switch-over)	●	[Bar spanning Year 1 to Year 4]				
12. Establish and communicate clearly defined and rule-based switching process	●	[Bar spanning Year 1 to Year 2]				
13. Define compensation scheme for new supplier in event of financial loss according to non-fault errors in process	●	[Bar spanning Year 1 to Year 2]				
14. Establish a centralized, neutral body enabling standardized communication between distribution and retail/wholesale companies	●	[Bar spanning Year 1 to Year 2]				
15. Unbundle Distribution and Retail, such that NDCs become neutral towards all Retailers	●	[Bar spanning Year 1 to Year 2]				
16. Make regulations to enforce NDCs to enable eligible consumer switching within a certain period of time	●	[Bar spanning Year 1 to Year 2]				
17. Remove cap for retail gas prices. Standardize tariff structure and regulate mechanism for identifying cost of each element other than pure energy cost	●	[Bar spanning Year 1 to Year 3]				



Implementation Activity	Impact	Year 1	Year 2	Year 3	Year 4	Year 5
<b>Market Players Actions</b>						
1. Support the establishment of OTC platforms	●	■				
2. Market makers to stimulate hub-based product trading for early evolution	●		■			
3. Standardize products/contracts based on agreed rules and procedures such as EFET or ISDA	◐	■				
4. Minimize flexibility for sustaining product standardization through defined tolerances	◐	■				
5. Facilitate more diverse (customizable according to customer needs) and easy to compare retail tariffs for customers	◐	■	■			
6. Develop LNG transportation capability in the market	◐	■	■	■	■	■
<b>EPIAS Actions</b>						
1. Introduce ancillary products (capacity auctions and storage bookings)	◐		■	■	■	
2. Leverage UDN to be used as a price index / common reference point	●	■				
3. Establish an energy market place (exchange) for NG linked with electricity	●	■				
4. Build and operate balancing market under EPIAS	●		■	■	■	■
5. Put capacity allocation and trading systems in place to secure a liquid supply market	●	■	■	■	■	■
<b>BOTAŞ Actions</b>						
1. Improve the software and hardware such as EBT and SCADA to make balancing data available and visible to market participant in a timely manner	◐	■	■	■		
2. Increase the pipeline coverage and number of compressors	◐	■	■	■	■	■
3. Increase the number of entry points closer to consumption centers	◐	■	■	■	■	■
4. Increase the interconnectedness via domestic and international two-way pipelines and LNG terminals (for re-routing offloaded cargo)	●	■	■	■	■	■
5. Develop a Network Development Plan for Turkey similar to the Ten Year Network Development Plans prepared by members of ENTSO-G	◐	■				
6. Improve the flexibility (e.g. timing, pressure levels) of the storage infrastructure (better gas in-take / off-take)	●	■	■	■	■	■
7. Convert to cost based pricing regardless of consumer type ( e.g. BOT, BOO)	●	■				

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