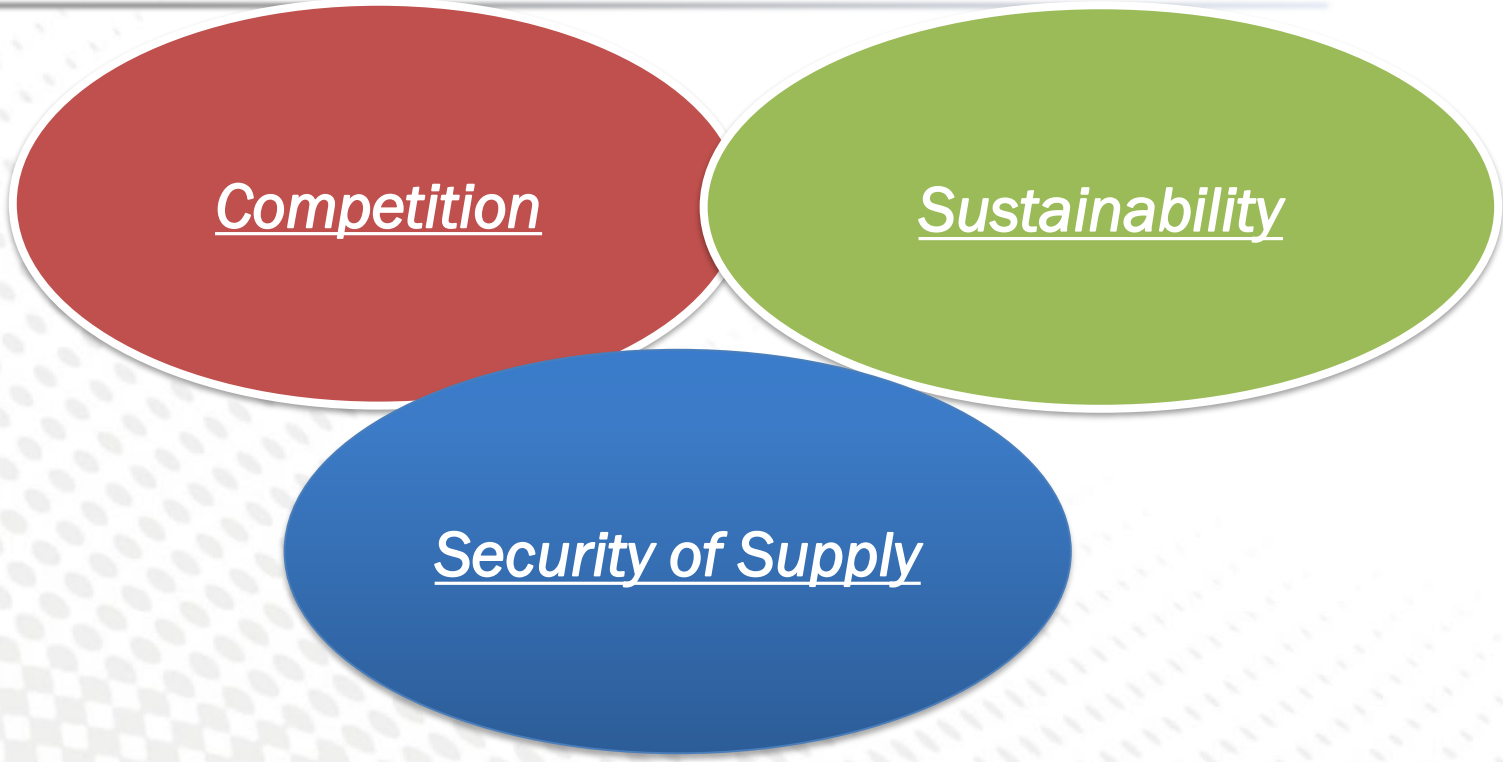
EPDK
ENERGY MARKET
REGULATORY AUTHORITY

The implications of organized natural gas markets on security of supply and predictability

Bağdagül KAYA CANER, LL.M.
Head of Natural Gas Network Regulations Group
Natural Gas Market Department
Energy Market Regulatority Authority, TURKEY

Policy Priorities of Liberalised Energy Markets



ELEMENTS of SECURITY of SUPPLY in LIBERALISED ENERGY MARKETS

1. ADEQUACY OF THE COMMODITY
2. SUFFICIENCY OF THE INFRASTRUCTURE
3. SYSTEM INTEGRITY

ELEMENTS ENHANCING SECURITY of SUPPLY in LIBERALISED ENERGY MARKETS

1. CLEAR ALLOCATION OF DUTIES AND RESPONSIBILITIES
2. INVESTMENT SIGNALS AND PLANS
3. REGULATORY FRAMEWORK AND TRANSPARENCY

COMPETITIVE NATURAL GAS WHOLESALE MARKETS

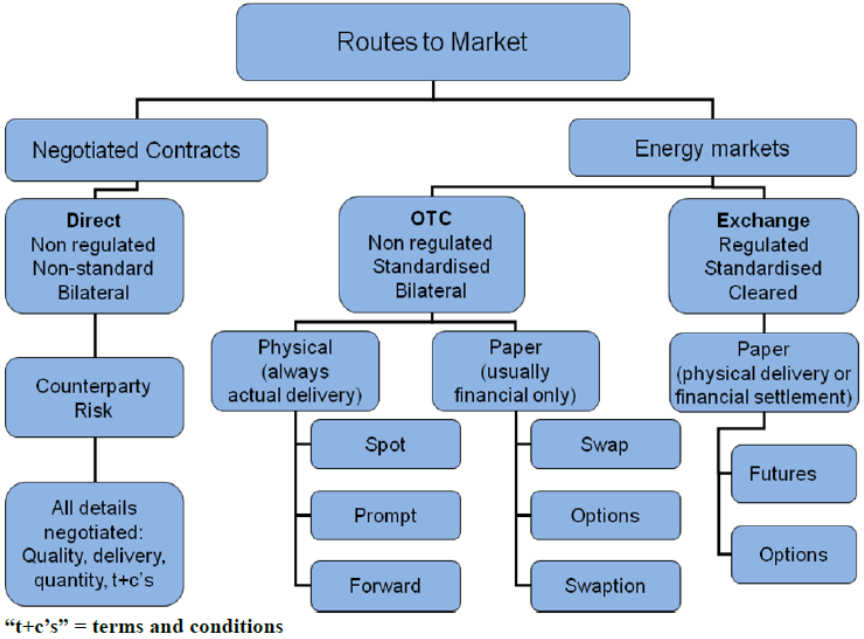
1. Adequate network capacity and non-discriminatory TPA rules:
- Multiple transmission lines and/or multiple entry points
- Independent Transmission Operator

2. Competitive number of market participants

3. Participation of financial institutions

Wholesale Energy Markets

The UK Example:



Source: The Oxford Institute of Energy Studies

Wholesale energy markets encompass both commodity and derivatives markets*

Regulation No. 1227 on Wholesale Energy Market Integrity and Transperancy (REMIT)

BILATERAL CONTRACTS vs OTC vs. EXCHANGE TRADED PRODUCTS

Bilaretal Contracts:

- Direct, non-regulated, non-standardized negotiated contracts, they are also called as "*old world contacts*",
- Terms and conditions, including quantity, quality, length of contract and price of natural gas is negotiated,
- Tend to cover medium or long term periods,
- It can be said that negotiated contracts have relatively higher counterparty risks.

BILATERAL CONTRACTS vs OTC vs. EXCHANGE TRADED PRODUCTS

OTC Trade:

- Mostly non-regulated, however the use of standardised bilateral contracts is prevalent.
- Can either be physical or financially settled. That is to say, while physical OTC trade ends up with actual natural gas delivery, financial OTC trade usually ends up with financial settlement.
- Physical OTC transactions can be either for spot or forward purposes whereas financial OTC transactions in natural gas markets are used for swaps, futures or options.

BILATERAL CONTRACTS vs OTC vs. EXCHANGE TRADED PRODUCTS

Organised Market

A group of traders operating under recognised rules in buying and selling a single commodity or related commodities; a commodity exchange.

- Exchange transactions are most of the time regulated by regulatory authorities, standardised, cleared.
- Can be described as financial transactions however physical or financial settlement may be possible.
- Financially settled exchange based transactions encompass buying or selling futures or options

BILATERAL CONTRACTS vs OTC vs. EXCHANGE TRADED PRODUCTS

Exchange Traded Products:

- In the exchanges which act as an intermediary, both sides of the energy trade enter in to agreement with the exchange instead of entering into agreements with one another. This situation, decreases the risks associated with the counterparty.
- It makes the trade relatively less disputable and fast
- The cost of the transactions (exchange fees, clearing fees, guarantee e.t.c) can be deemed higher in the exchanges.
- Exchange transactions take place in a comparably transparent trade environment, thus the risks of the trading parties are said to be lower.

FUNCTIONS NATURAL GAS EXCHANGES

«Exchanges perfom a vital role in the development of commodity markets

Natural Gas Exchanges have five major functions:

1.Price discovery

2.Price transparency

3.Supply/pricing flexibility

4.Physical balancing

*5.Financial Risk Management .»**

**Heather (2015)*

FUNCTIONS OF NATURAL GAS EXCHANGES

- *«By way of transparency exchange traded products provide reliable price signals*
- *Compared to OTC traded products, exchange traded products demonstrate a smaller volume however they create market reference prices*
- *Well functioning exchange trading also plays an essential role in designing gas balancing systems (i.e. EU Network Code on Balancing,the Uk and new Turkish gas balancing regime)*
- *Exchanges help efficient allocation of the commodity across different locations and different market participants»**

**The Oxford Institute of Energy Studies,2016*

An Overview of Natural Gas Hubs in the EU in 2016

Natural gas hubs tend to be at the heart of **gas** infrastructure networks such as pipelines and liquefied **natural gas** (LNG) terminals.

Hubs are used as a central pricing point for the network's **natural gas**.

- **Designated as a balancing point in 2008**
- **Open for bilateral trade since 2011**
- **Price reference point since 01.09.2018**

Source: The Oxford Institute of Energy Studies

An Overview of Natural Gas Hubs in the EU

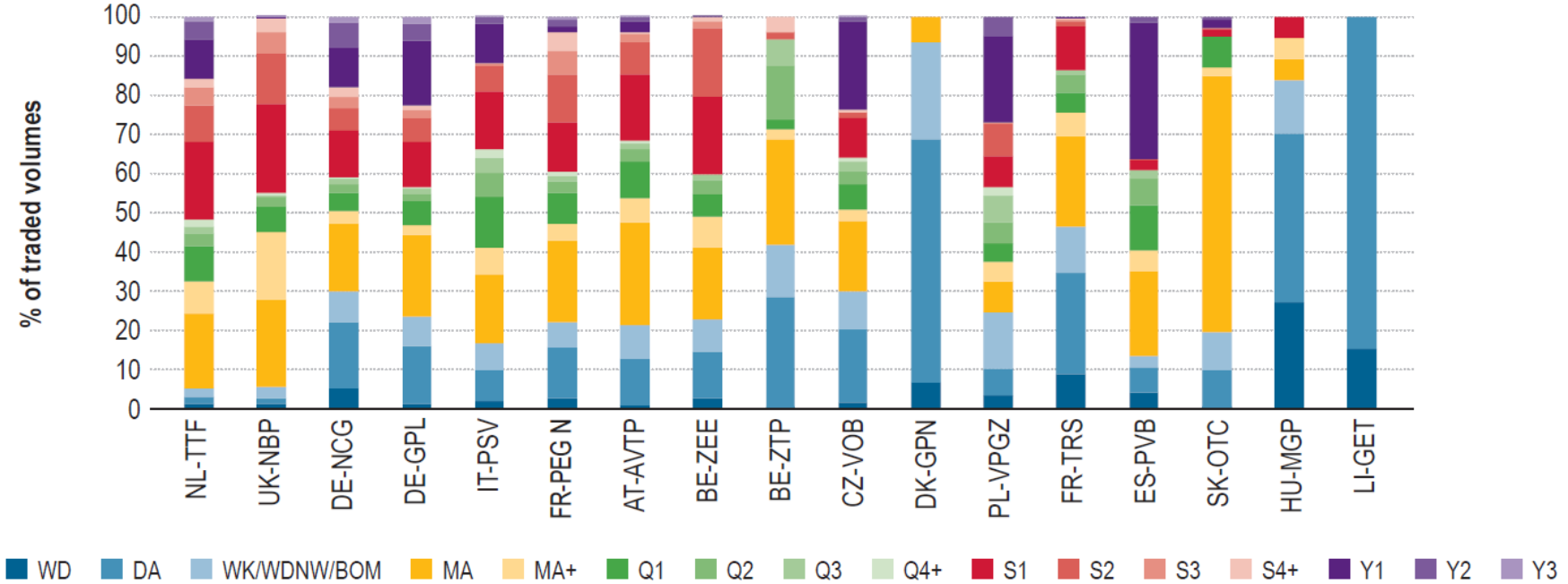
2016 Product valuation based on absolute volumes*	OTC	CLEARING	WD DA	BOW W/E WDNW BOM	MA MONTHS	QUARTERS	SEASONS	CAL YEAR	GAS YEAR	INDEX	EXCHANGE	(% SHARE)	BALANCING TRADES	SPOT PROMPT	FUTURES MONTHS	FUTURES QUARTERS	FUTURES SEASONS	FUTURES YEARS	OPTIONS MONTHS
TTF	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	ICE PGS CME	82 17 1	N	Y	Y	Y	Y	Y	Y
NBP	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	ICE PGS CME	99 0 0	Y	Y	Y	Y	Y	Y	Y
NCG	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	PGS ICE	99 0	N	Y	Y	Y	Y	Y	N
GASPOOL	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	PGS ICE	99 1	N	Y	Y	Y	Y	Y	N
PSV	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	GME PGS ICE	66 30 3	Y	Y	Y	Y	Y	Y	N
PEG NORD	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	PGS	100	N	Y	Y	Y	Y	Y	N
ZEE + ZTP	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	ICE PGS	93 7	Y	Y	Y	Y	Y	Y	N
VTP	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	CGH	100	N	Y	Y	Y	Y	Y	N
PEG TRS	Y	N	Y	Y	Y	Y	Y	N	N	N	PGS	100	N	Y	Y	N	N	N	N
PVB	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	MIB	100	N	Y	Y	N	N	N	N
VOB	Y	Y	Y	Y	Y	N	N	N	N	N	CGH	100	N	Y	Y	N	N	N	N

*KEY:	GREEN: =/>600TWh	AMBER: <600tTWh	BLUE: <250TWh	RED: <50TWh	GREEN: =/>500TWh	AMBER: <500TWh	BLUE= <100TWh	RED: <30TWh
GREY: No volumes	Hubs column based on OTC + Exchange 'score'/64; OTC column based on 'score'/36; Exchange column based on 'score'/28							
	ICE=ICE/Endex	PGS=PEGAS	CME=CME Europe	CGH=CEGH	MIB=MIBGAS	Y=AVAILABLE	N=NOT AVAILABLE	

Sources: OTC: LEBA, Tankard, ICIS, Exchange: ICE, ICE-Endex, PEGAS, CME, CEGH, GME; MIBGAS; P. Heather

Source: The Oxford Institute of Energy Studies

An Overview of Natural Gas Hubs in the EU



Source: The Oxford Institute of Energy Studies

An Overview of Natural Gas Hubs in the EU

2016	5 KEY ELEMENTS					
HUB	Active Market Participants	Traded Products*	Traded Volumes	Tradability Index (Q4)	Churn Rate	Score /15**
TTF	>40	53	22230	20	57.1	15
NBP	>40	47	20045	19	22.1	15
NCG	30	29	2080	16	4.0	10
GPL	30	23	1110	15	2.5	9
PSV	18	23	885	15	1.2	7
ZEE+ZTP	15	17	780	10	4.1	7
PEG Nord	15	18	550	14	1.7	7
VTP	15	14	530	10	5.7	7
VOB	<10	6	105	8	1.1	5
PEG TRS	<10	13	100	7	0.6	5
PVB	<10	9	30	0	0.1	5

* Score /64 derived from the OTC and Exchange product categories in the Traded Products Table.
** Score based on each of the Key Elements scoring zero for Grey; 1 point for Red; 2 points for Amber; 3 points for Green.

Source: The Oxford Institute of Energy Studies

Gas Hub Development in the EU

Advanced hubs: NBP and TTF

Broad liquidity

Sizeable forward markets which contribute to supply hedging

Larger presence of financial players

Price reference for other EU hubs and for long-term contracts indexation

Advancing hubs: NWE region

Ongoing increasing liquidity

More reliant on spot products and balancing operations

Progress on supply hedging role but relatively **lower longer-term products liquidity levels** results in weaker price risk management role

Developing hubs: Poland and Czech R.

Improving liquidity from a lower base taking advantage of enhanced interconnectivity

Liquidity partially driven by market obligations imposed on incumbents

Still significant reliance on long-term contracts

Illiquid hubs: SEE, Iberia, Baltic

Reliance chiefly on long-term contracts

Embryonic organised market places

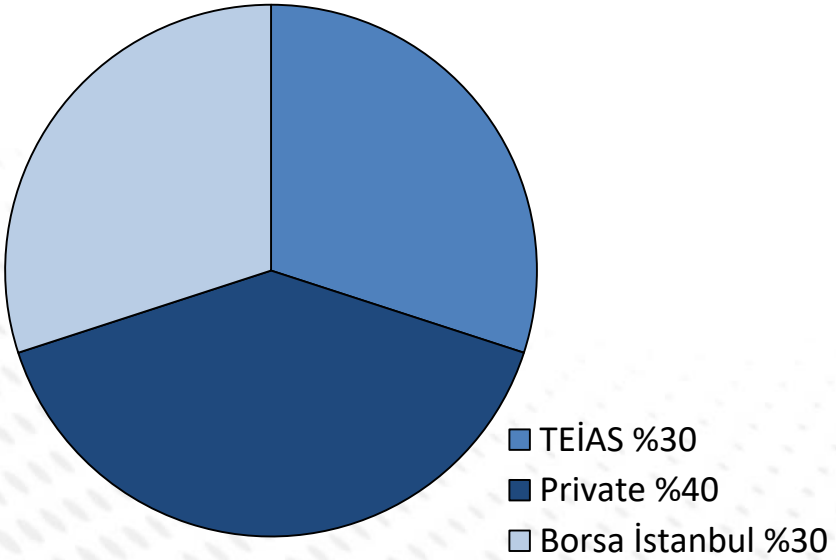
Source: ACER

EPİAŞ / EXIST
Energy Exchange İstanbul

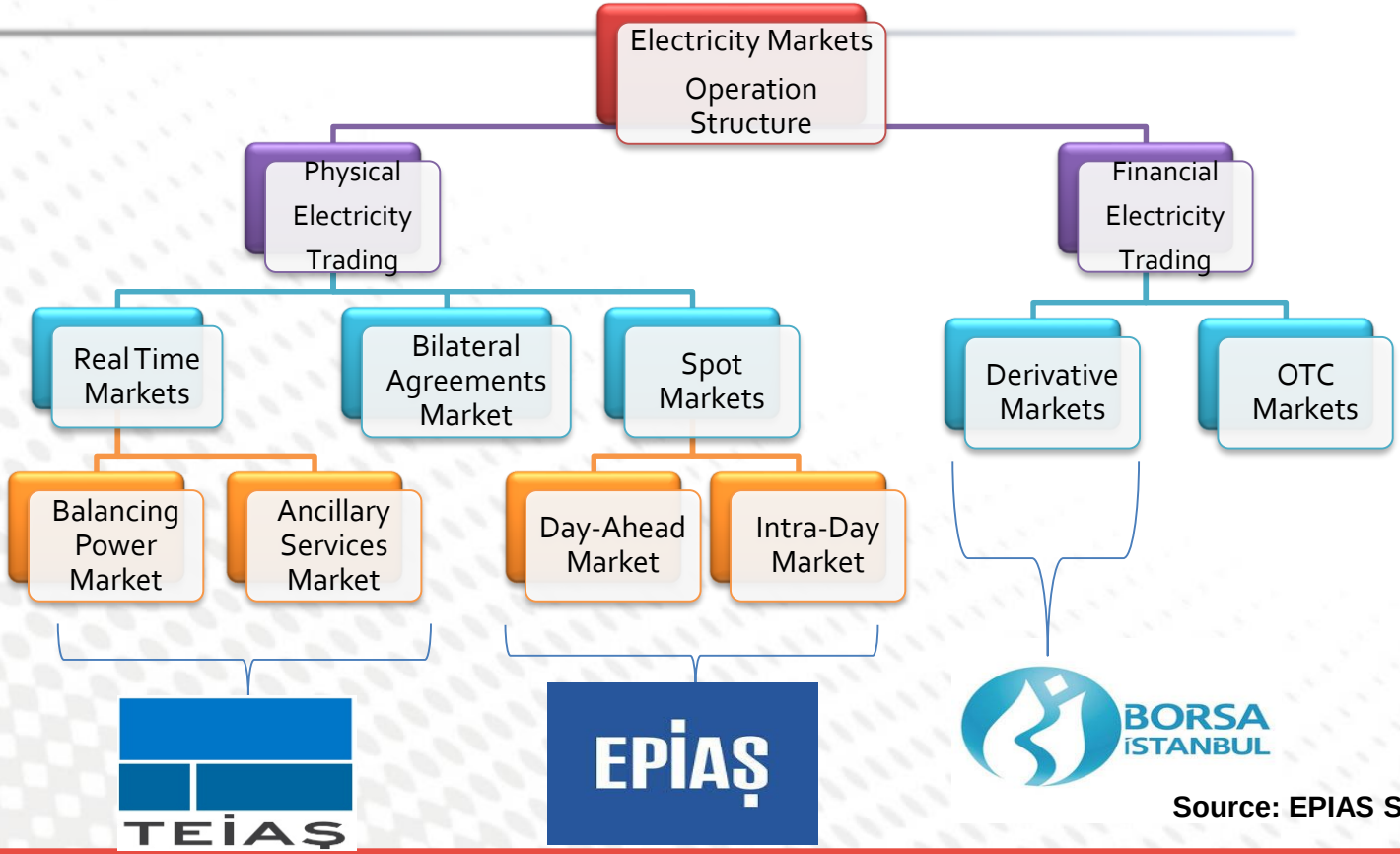
In accordance with the new EML 6446;

- Officially established on March 12, 2015 ,
- Granted «Market Operation License» from EMRA
- Operational on 1 September 2015
- Day-ahead & intra-day market for electricity
- Continuous Trade market for gas started in 1.09.2018
- Financial settlement of transactions
- Effective, transparent, reliable manner
- Provide reliable reference price formation

Shareholders



Power Exchange Mechanism



Source: EPIAS Strategic Plan

Turkish Case:Organised Natural Gas Wholesale Market

- In line with Turkey's objective of becoming natural gas trading center, organized natural gas market has been **operational since 1st of September 2018.**
- **By-Law on Organized Natural Gas Wholesale Market** was published by EMRA in **March 2017**.
- **Organised Market Operation Procedures and Principles** was approved by EMRA in **September 2017**.
- Comprehensive amendments to the **Network Code of BOTAŞ** was approved by EMRA in March 2018.

Turkish Case:Organised Natural Gas Wholesale Market

•Organised Natural Gas Wholesale Market will be operated by Turkish **Energy Exchange (EXIST)**.

•This market design aims to let the market players trade **anonymously** in an **organised liberal market** operated under **continuous trade** principles, additionally letting the transmission system operator **balance the system** by entering into the continuous trade platform when needed.

•The Organised Natural Gas Wholesale Market is expected to give players much needed price signals about the market.

Turkish Case:Organised Natural Gas Wholesale Market

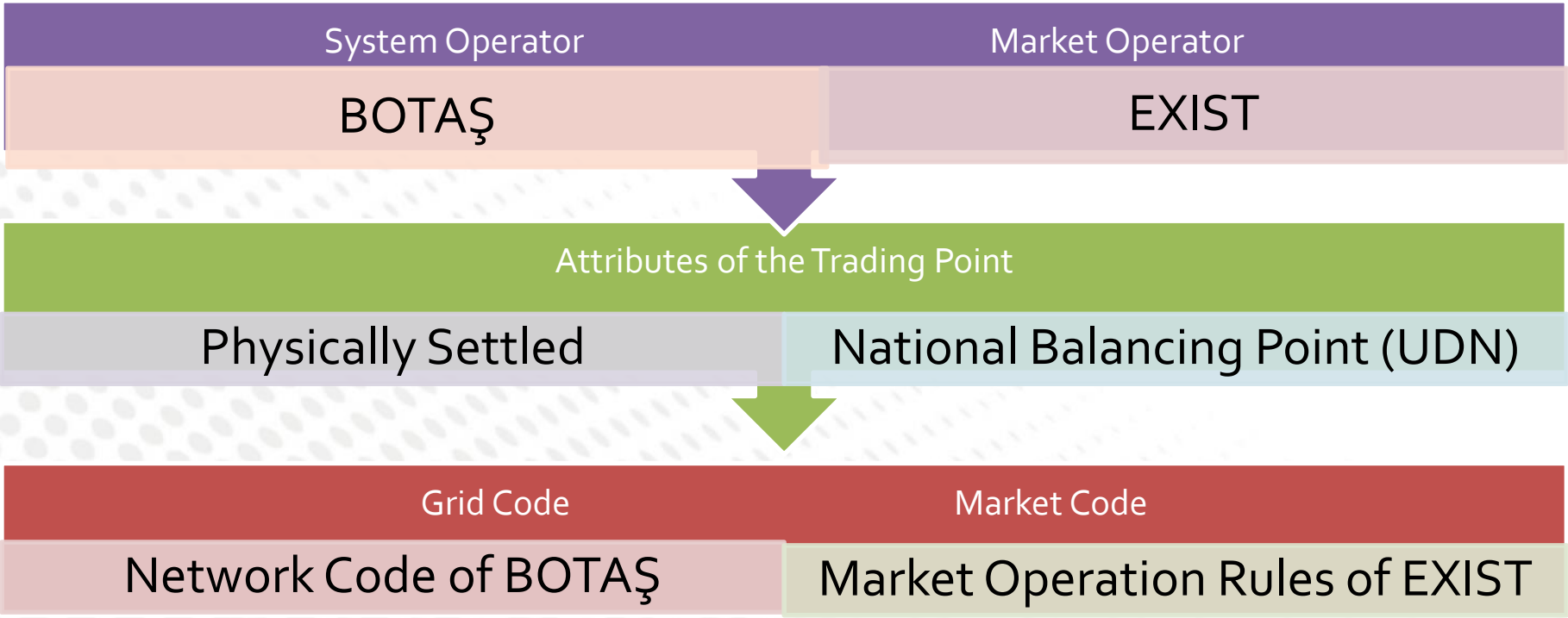
Organised Natural Gas Wholesale Market will:

- Serve as a tool for the TSO to maintain the physical balance of the system,
- Serve as a platform where the market players can trade gas day-ahead, intraday and end of the day,
- Be the means for the market players to balance themselves,
- Indicate Market based reference prices .
- In the future will be a tool for demand side response.

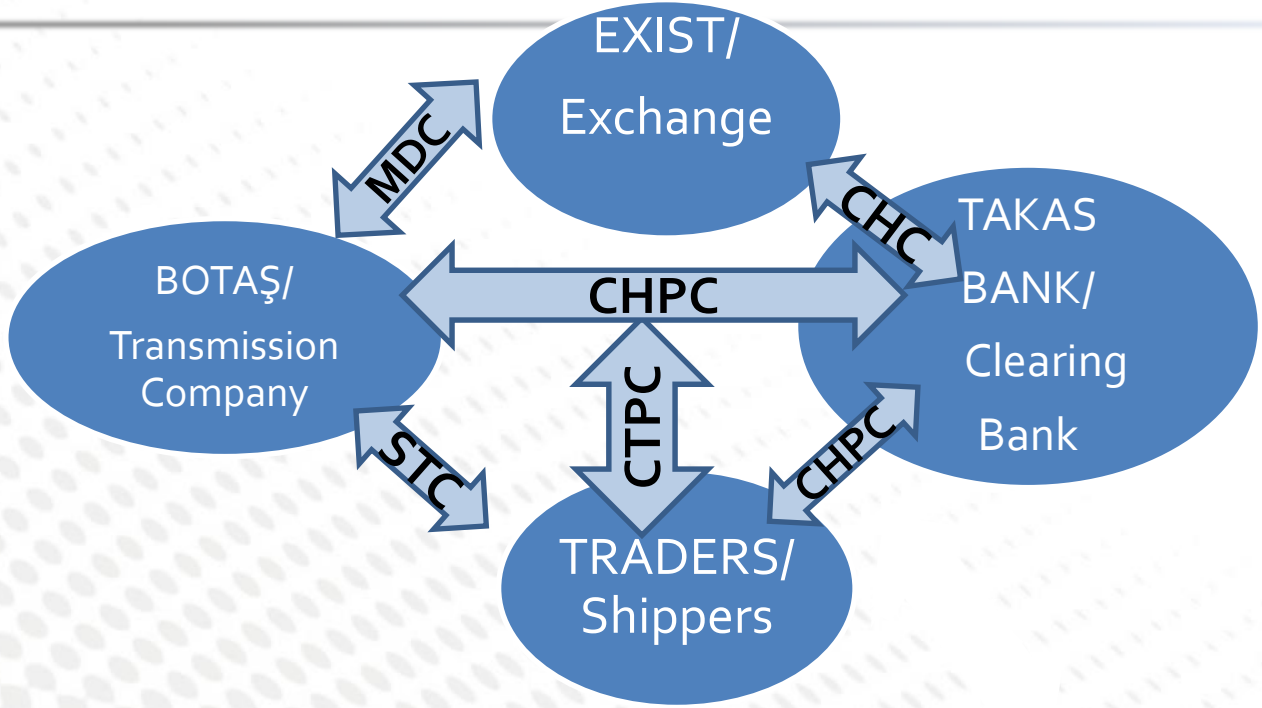
Turkish Case:Organised Natural Gas Wholesale Market

- Participating in the **Continuous Trade Platform** is completely **voluntary**.
- **Import, wholesale and** export license holders willing to enter the market shall have a **Standard Transportation Contract** signed with the TSO, BOTAŞ.
- A contract must also be signed with EXIST in order to participate in **Continuous Trade Platform**.
- The TSO may enter the system as a **Residual Balancer** when needed.
- **Non-market based methods** may be used when the TSO can't balance the system by trading in the market.
- Net matchings will be entered to **Electronic Bulletin Board** of BOTAŞ as **nominations** for the **EPİAŞ virtual entry/exit points.**
- **Residual Balancer Price, Balancing Gas Buy Price** and **Balancing Gas Sell Price** will be calculated based on the market-based balancing operations.

Turkish Case:Organised Natural Gas Wholesale Market



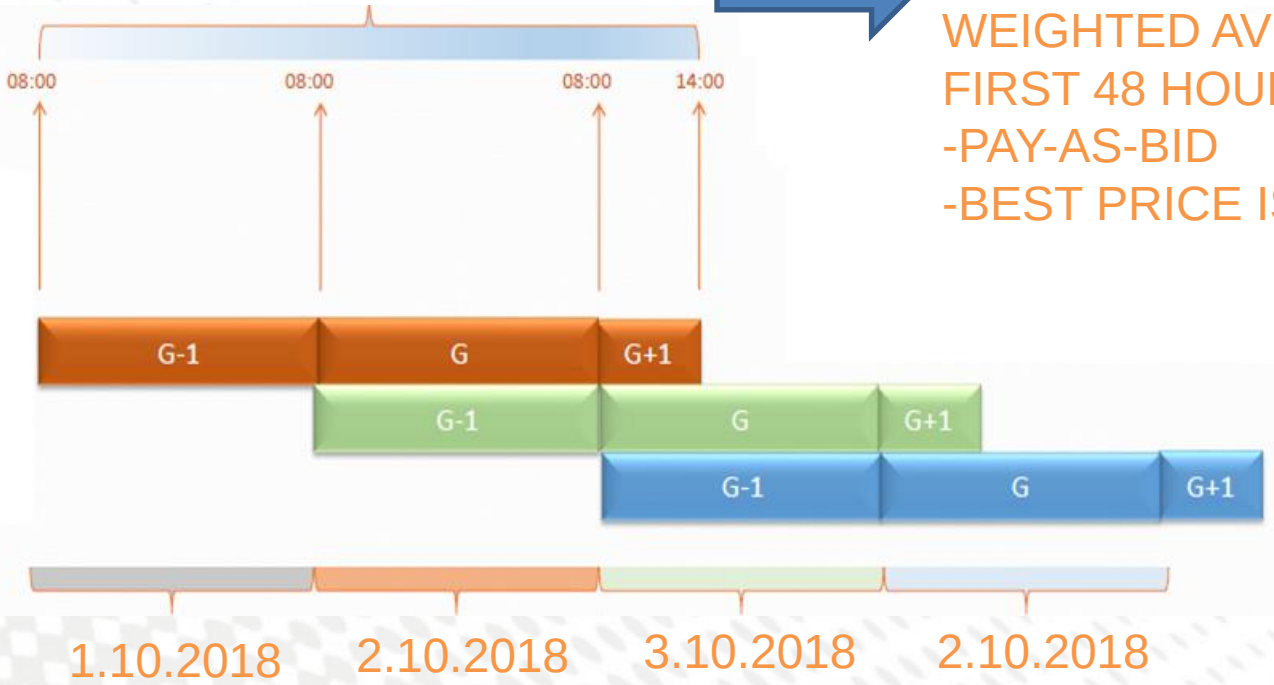
Turkish Case:Organised Natural Gas Wholesale Market



MDC: Market Delivery Contract **CHC**: Clearing House Contract
STC: Standard Transportation Contract **CHPC**: Clearing House-Participant Contract **CTPC**: Continuous Trade Participant Contract

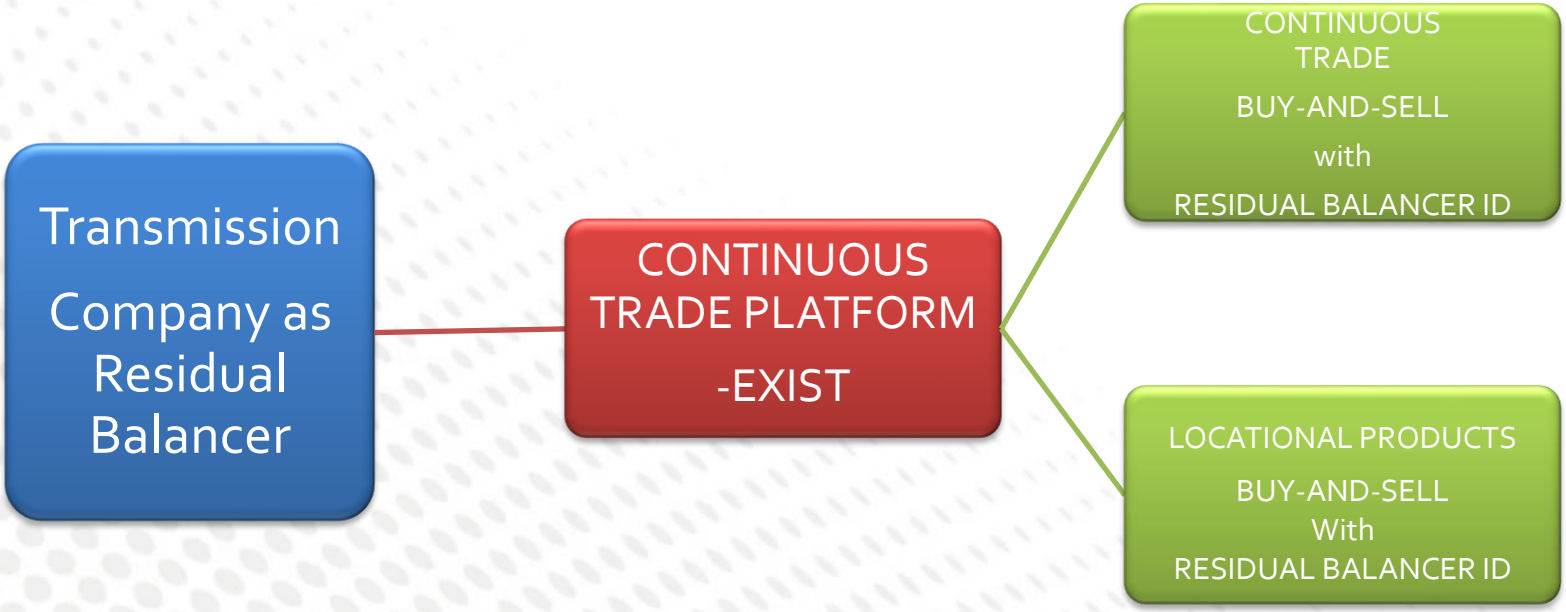
Turkish Case:Organised Natural Gas Wholesale Market

54 HOURS –TRADE HOURS



-DAILY REFERENCE PRICE-WEIGHTED AVERAGE OF FIRST 48 HOURS
-PAY-AS-BID
-BEST PRICE IS MATCHED

Turkish Case:Organised Natural Gas Wholesale Market

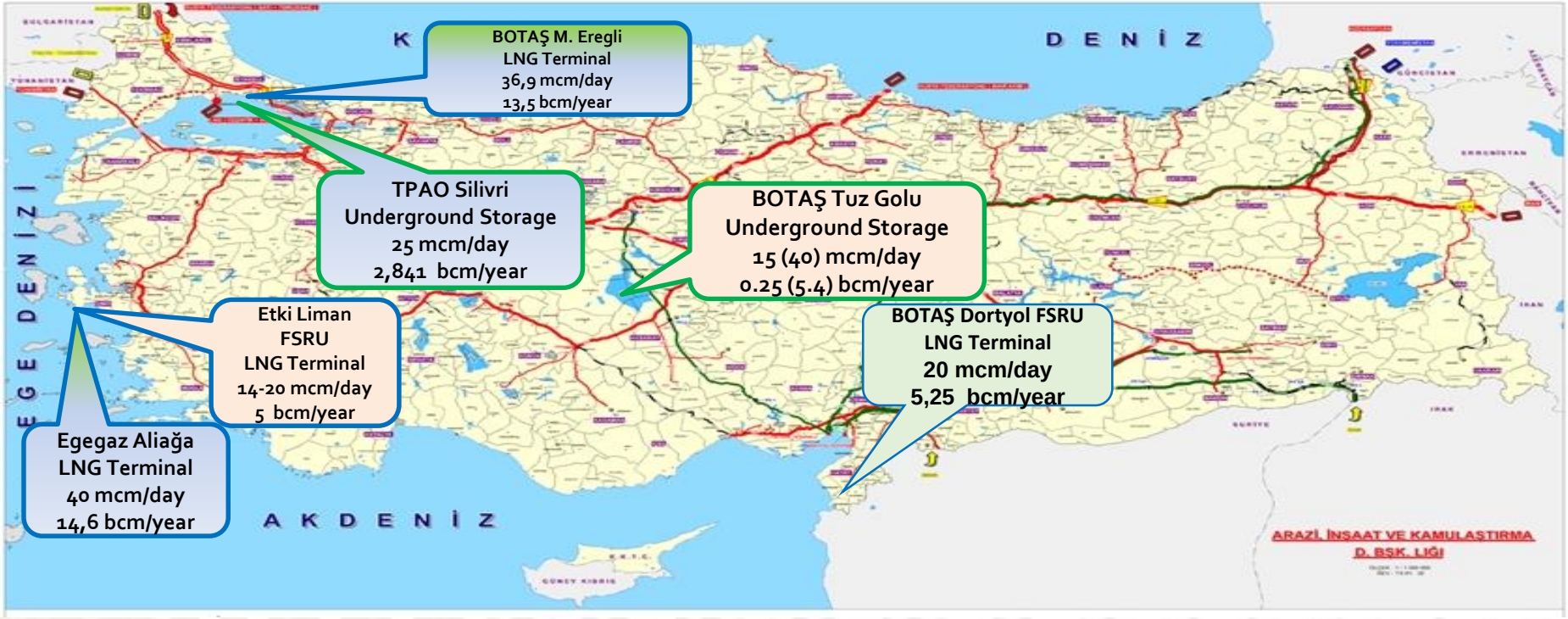


NETWORK CODE of BOTAŞ

Positive Imbalance Price = max ((Daily Reference Price x 1,03), Residual Balancer Buy Price)

Negative Imbalance Price = min ((Daily Reference Price x 0,97),Residual Balancer Sell Price)

LNG,Underground Storage & Entry Points



Conclusions

- Reference prices generated by liquid organised natural gas markets give price signals to new investments
- Liquid organised natural gas markets with a range of products provides hedging for electricty and gas market participants against market risks and provide flexibility tools
- Daily Reference Price may be used as price reference in cross-border trade
- Balancing regimes correlated with organised natural gas market:
- Reflect the actual demand and supply structure therefore contribute to well-functioning of the market and system integrity
- Creates synergy with organised electricity markets
- In the medium to long term may affect the pricing structure, terms and duration of natural gas supply contracts

THANK YOU FOR YOUR ATTENTION!

bkaya@epdk.org.tr

W www.epdk.org.tr