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Energy Trading in Turkey

12 December 2018

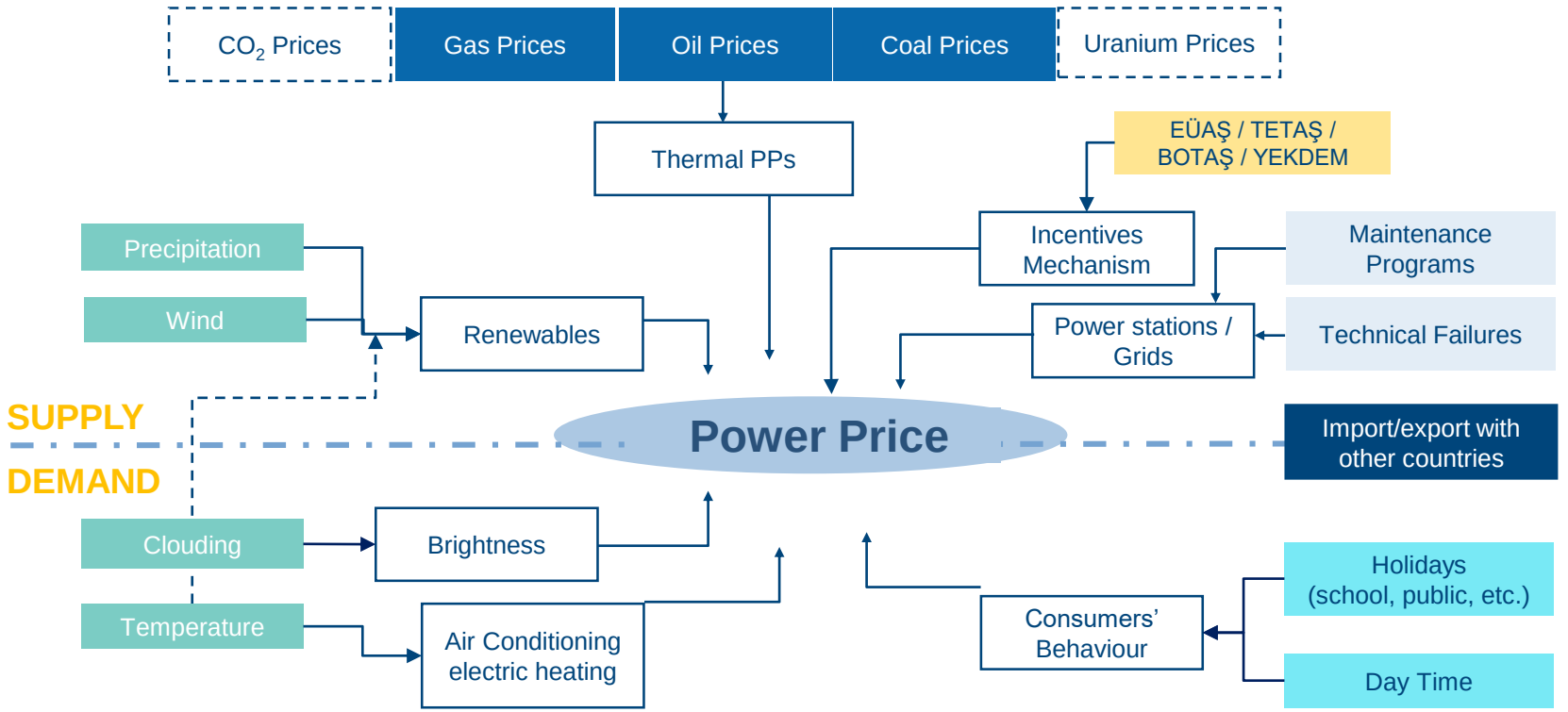
Fundamental Factors Influencing Power Prices

The current market pricing mechanism resembles the developed market and is based on the demand / supply model.

Turkish energy price in short-term and mid-term depends on a number of factors including weather, commodity prices, regulatory system, technical failures and social events.

In addition to short-term and mid-term factors, there are a number of global long-term influences:

- Changes in the market structure
- Political decisions
- Changes in installed capacity
- Economic growth pace



Turkish Power Market Structures w Key Figures & Interactions

The share of state-owned generation company (EUAS) has been on a declining trend out the last decade due to privatization of generation assets and the increase in IPP investments.

As of 2017:

- Transmission system is fully operated by EUAS(1)
- Distribution companies have been privatized
- In Retail sector about 90% of the market is liberalized; consumers are able to choose among the eligible suppliers

Generation

- Gross generation (2017): 295.5 TWh
- Internal consumption (2017): 1.8%
- Net Generation (2017): 98.2%

Transmission

- Transmission Losses: 2.1%
- Transmission Losses: 6.21 TWh

Wholesale

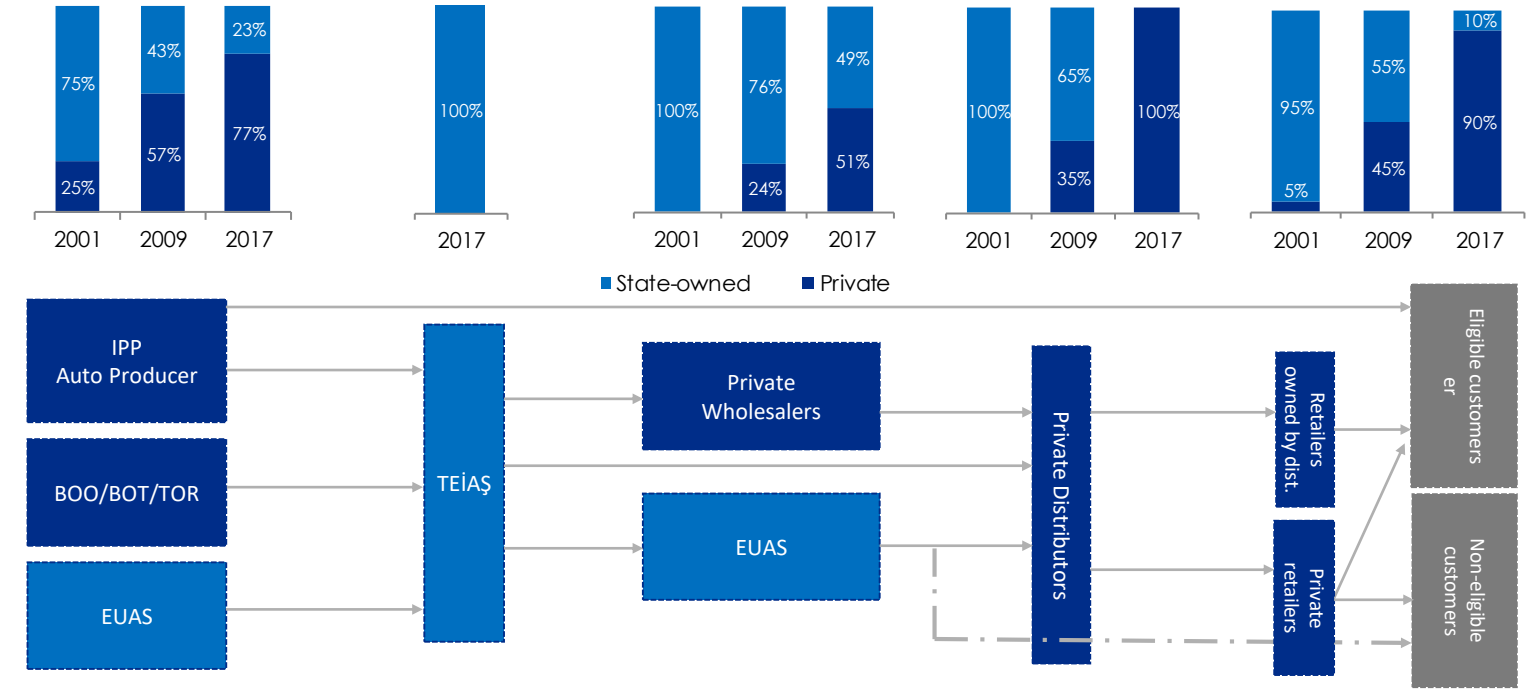
- Import: 2.73 TWh
- Export: 3.30 TWh
- Net: 0.2 %

Distribution

- Distribution losses (2016): (7.2% of distributed, 12% of gross)
- Distribution losses (2016): 33 TWh

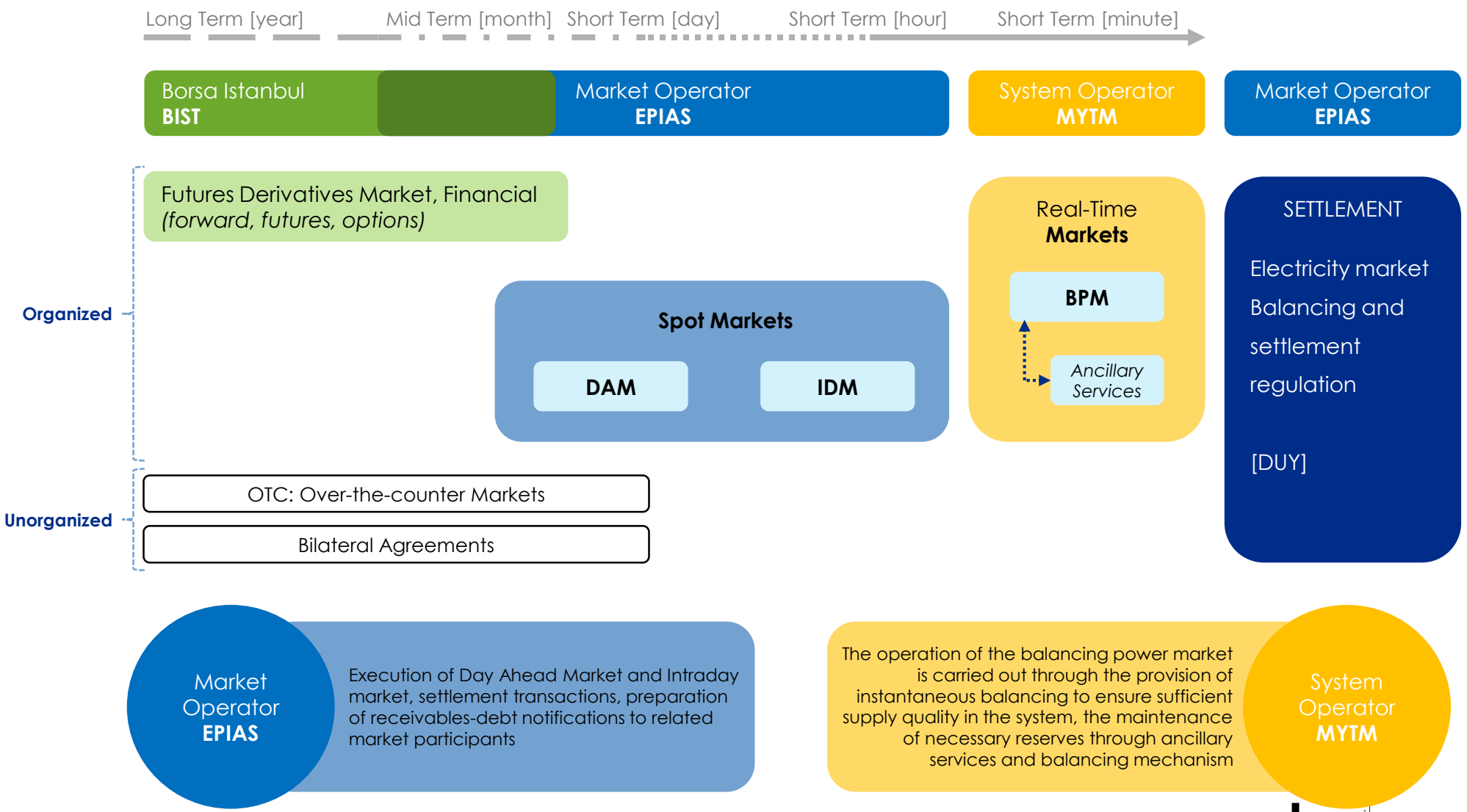
Retail

- Gross consumption (2017): 294.9 TWh
- Net Consumption (2017)[2]: 225,7 TWh



Notes: (1) All TEIAS competencies have been transferred to EUAS; (2) Net consumption is revised to 225,7 TWh which is stated as actual consumption in EMRA report. To highlight, dist. Loss figures belongs to 2016

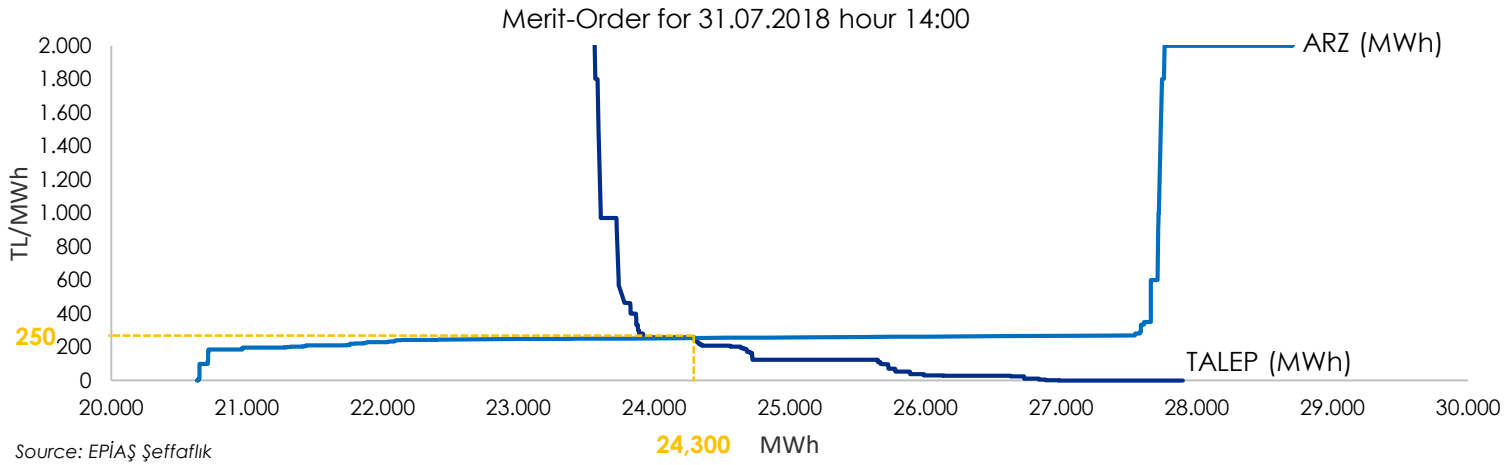
Power Sales Options in Turkey



Price Formation & Merit-Order Stack

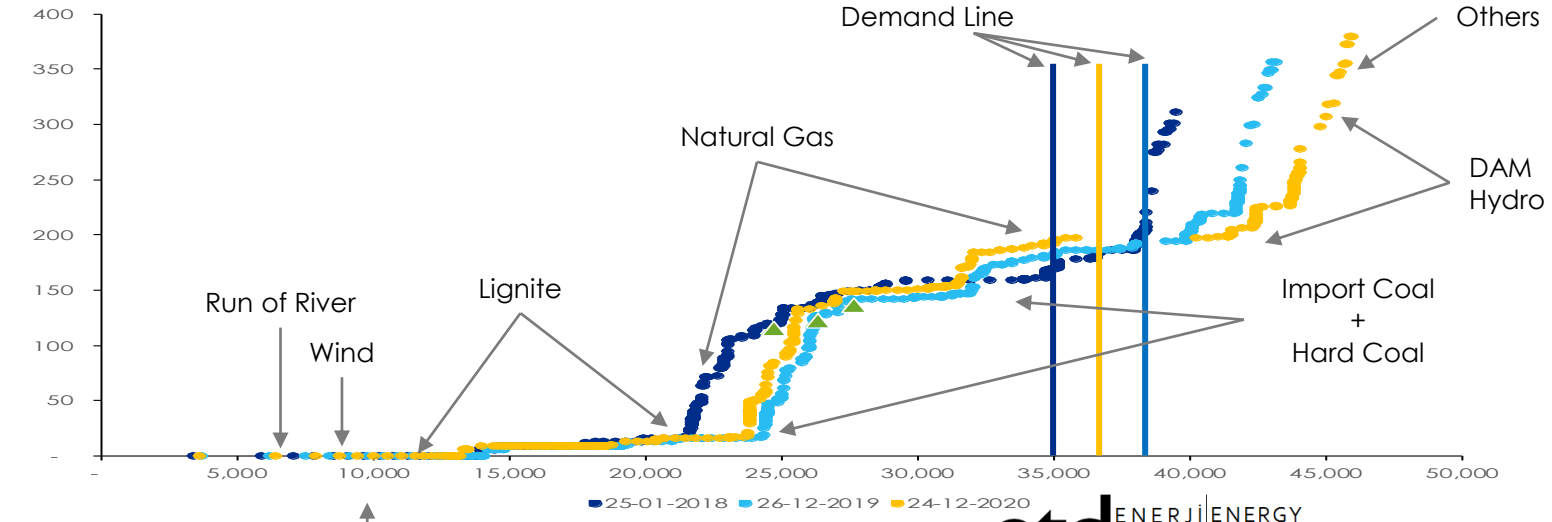
- In price formation, it is essential that the intersection of supply and demand curves.
- Variables which affecting demand and supply are the determining factors in price formation.
- The arrangement of the resources in the Merit Order mainly varies with fuel costs.

The Intersection Point of Supply and Demand Curves Determines the Market Clearing Price (MCP)(1)



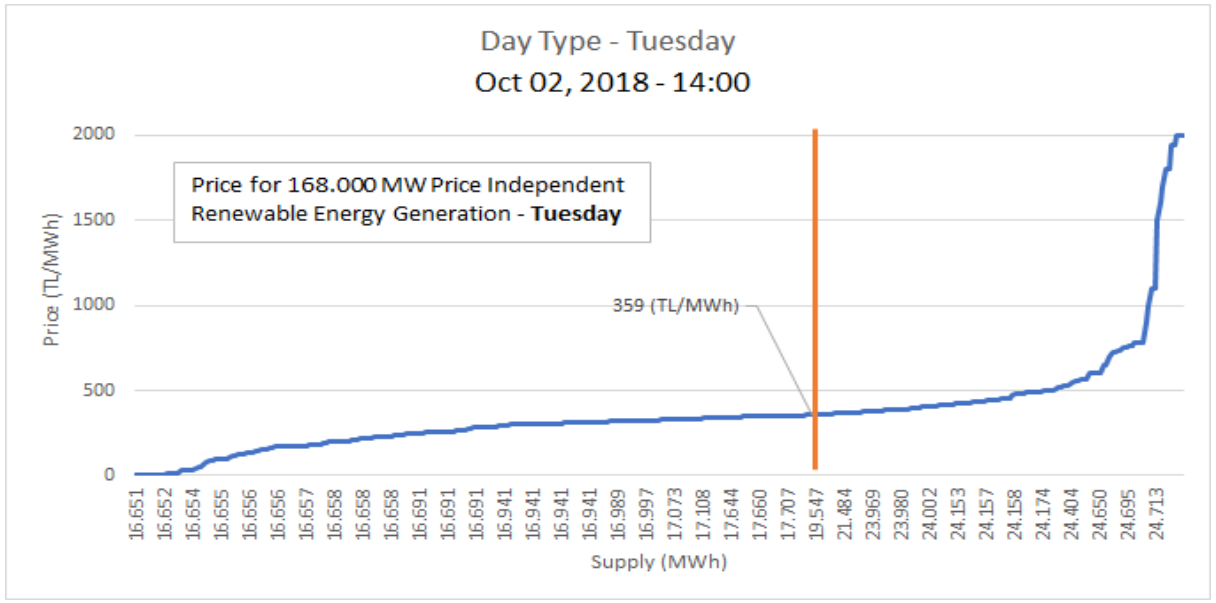
Source: EPİAŞ Şeffaflık

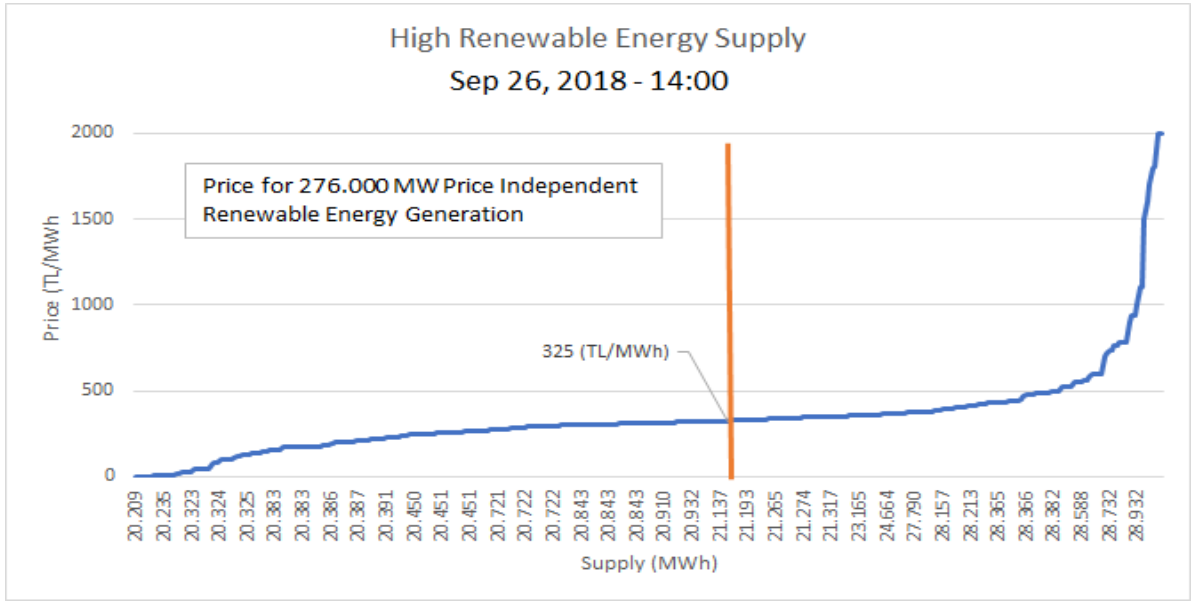
Simulated Merit-Order Representation

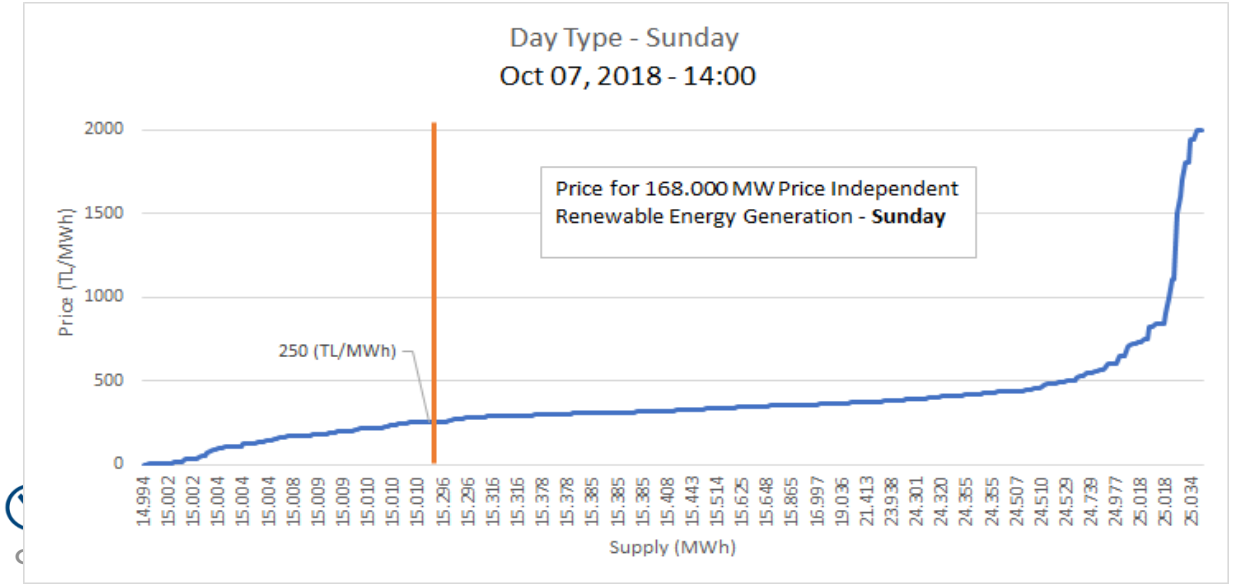


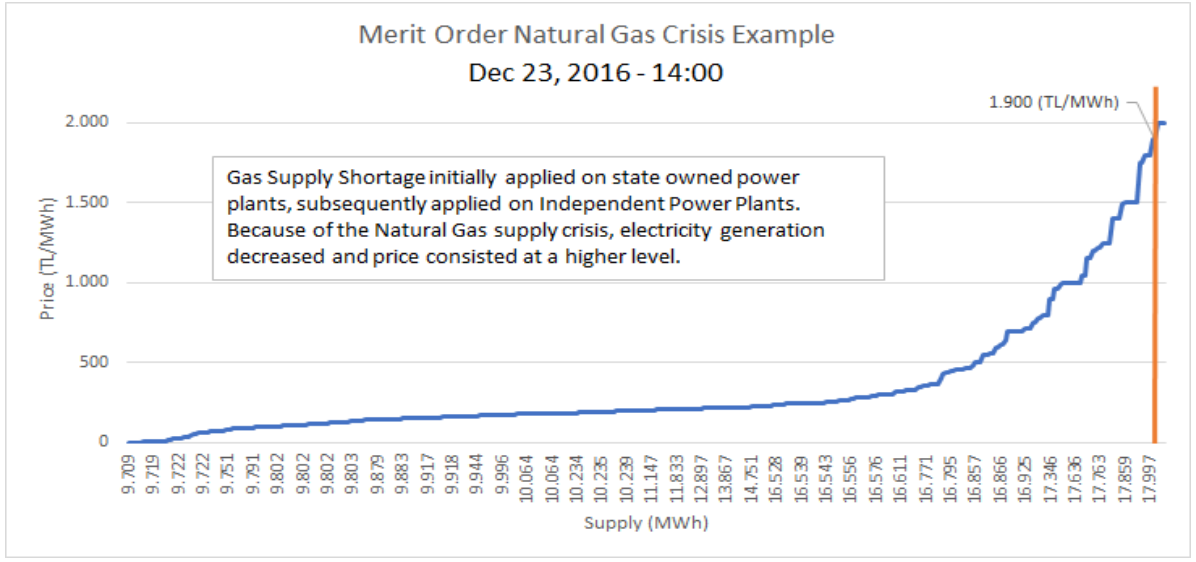
Source: GAMA Energy Analysis

Price Formation & Merit-Order Stack









Turkish Derivatives Exchange Market

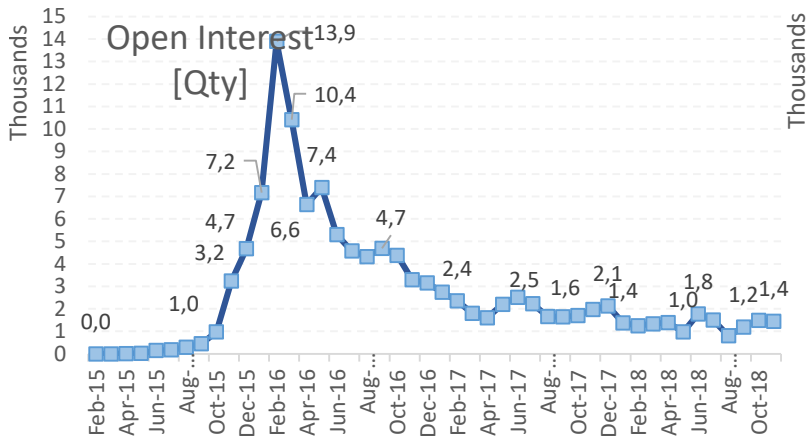
Besides OTC markets Turkish Derivatives Exchange Market (VIOP) had been introduced in the beginning of 2015.

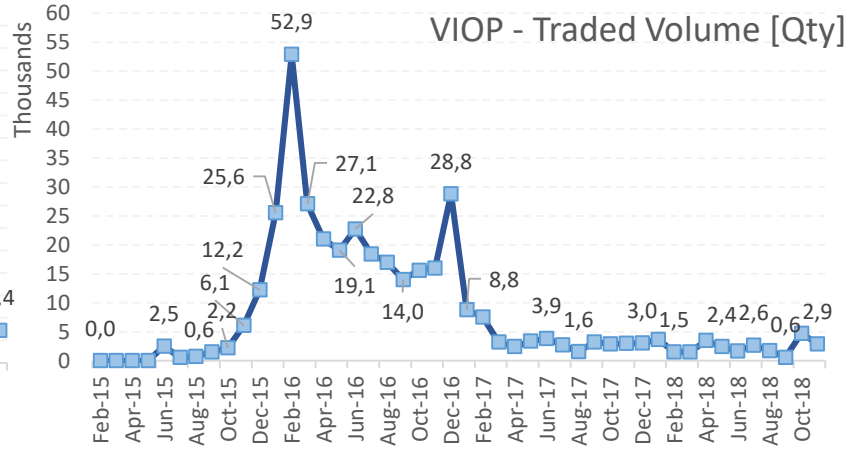
It has become an important financial market with increasing liquidity in its first years but it has returned to its initial levels due to the reduced predictability.

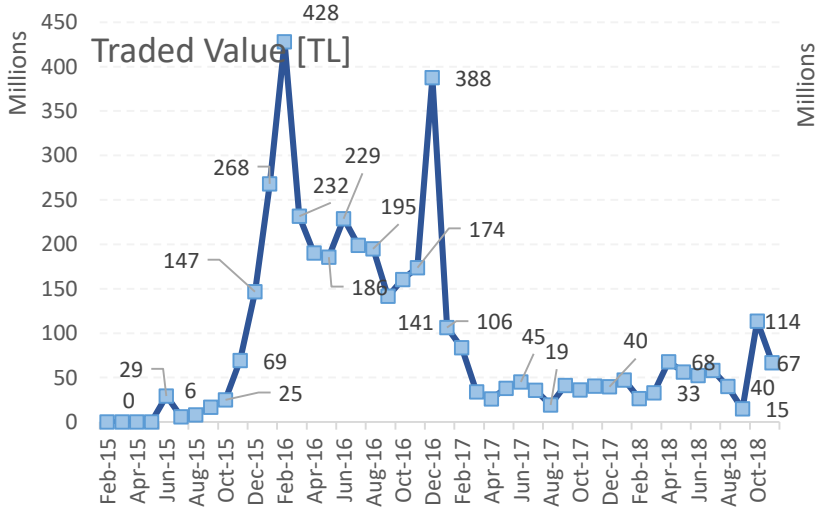
This market, which operates under BIST, gains depth through monthly contracts with the participation of market makers and other players.

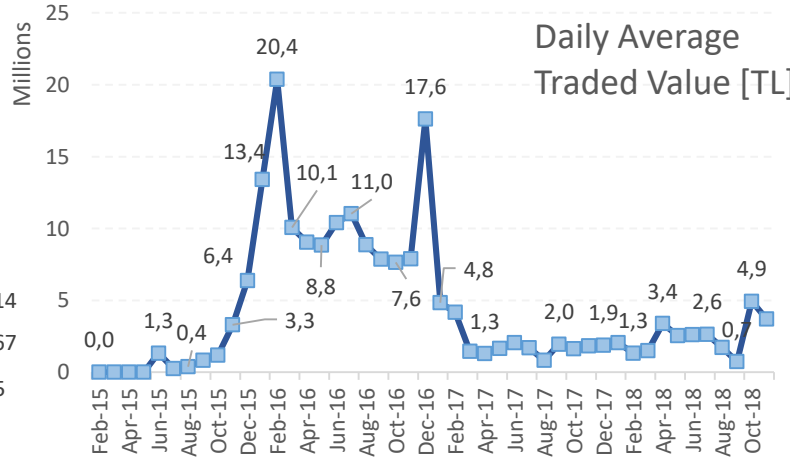
The most important purpose in this market where there is no physical delivery option is to protect the positions of the companies financially and to eliminate the counterparty risk.

Turkish Derivatives Exchange Market, 2015-2018*









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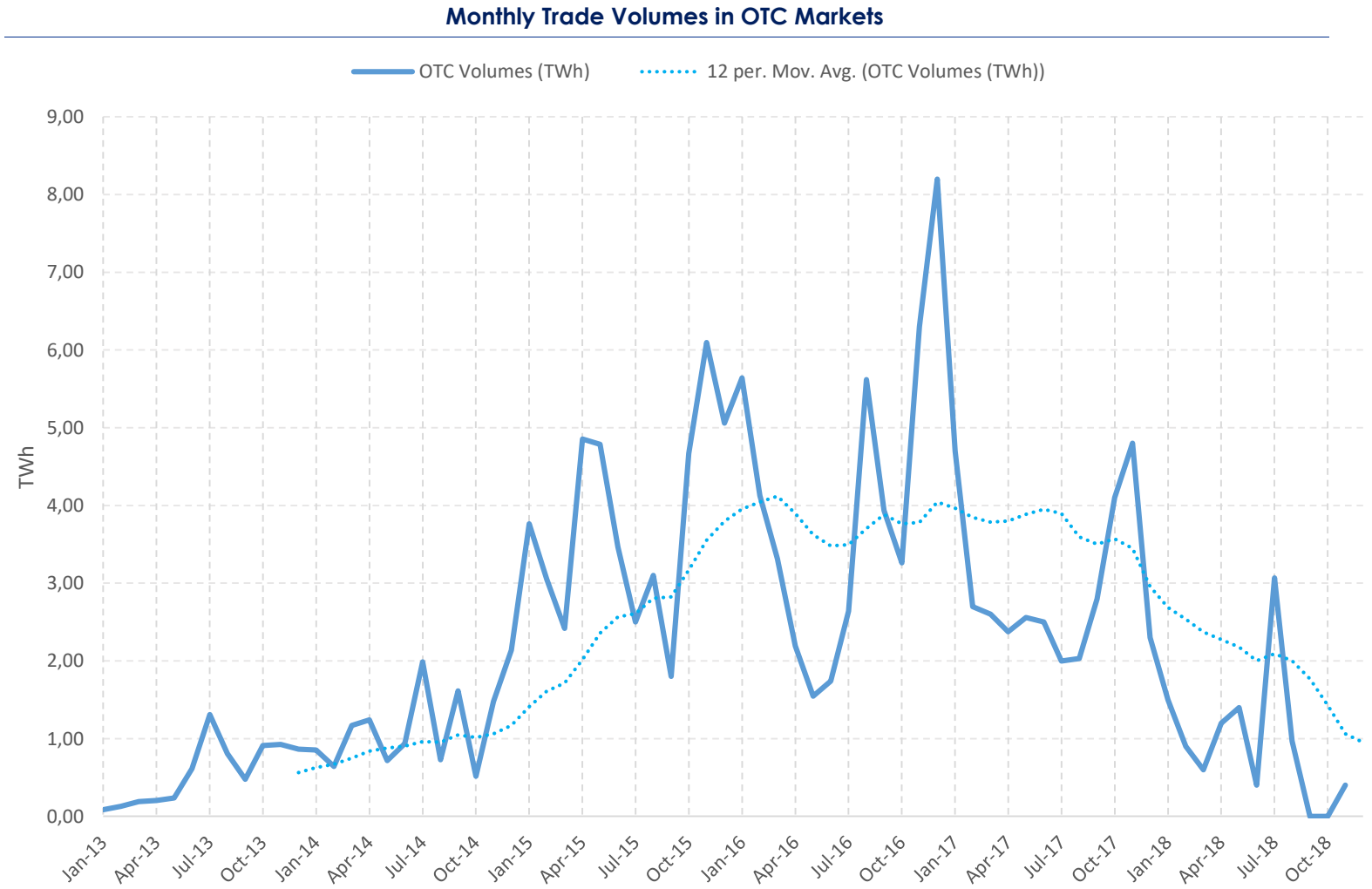
Over-the-Counter Markets | OTCs

- In Turkish Electricity Market both physical and financial trading are possible in the OTC.
- With the establishment of EPİAŞ and the opening of the intraday market, positive reflections in volumes in OTC markets are being observed.
- Currently, 6 different brokers are active in the OTC market.
- Recent developments caused to declining trend in transaction liquidity, similar to the volume of VİOPs.

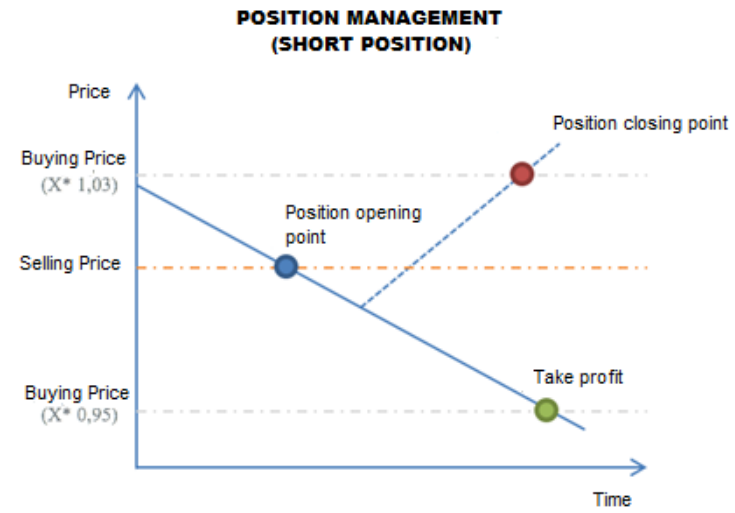


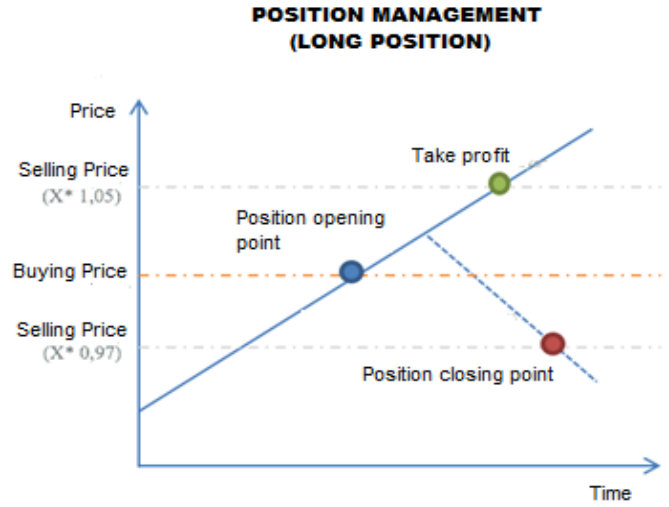
Types of Power Plants in Turkish Merit Order and Specifications/Offer Structures

Technology	Ownership	Offer Price Structure	Generation Profile	Generation Planning Methodology
Wind	Private	Variable O&M + Variable System Usage	Uncertain Doesn't have an ordinary profile, generally generates summer and winter seasons	Stochastic
Run of River	Private	Variable O&M + Variable System Usage	Uncertain Doesn't have an ordinary profile, generally generates spring season	Stochastic
Solar	Private	Variable O&M + Variable System Usage	More or less certain Highest in summer, daytime generation	Stochastic
Geothermal	Private	Variable O&M + Variable System Usage	Baseload when available	Deterministic, dependent to forced outages
Biomass/Biogas	Private	Variable O&M + Variable System Usage	Baseload when available	Deterministic, dependent to forced outages
Local Coal (Lignite)	Private	Fuel Cost + Variable O&M + Variable System Usage	Baseload / minimum load when available	Deterministic, dependent to forced outages Optimisation Market Prices
Local Coal (Lignite)	State Owned	Fuel Cost + Variable O&M + Variable System Usage	Baseload / minimum load when available	Deterministic, dependent to forced outages Optimisation Against Company Demand Profile
Import Coal	Private	Fuel Cost + Variable O&M + Variable System Usage	Baseload / minimum load when available	Deterministic, dependent to forced outages Optimisation Against Market Prices
Natural Gas	Private	Fuel Cost + Variable O&M + Variable System Usage	Baseload / minimum load / SFC when available	Deterministic, dependent to forced outages Optimisation Against Market Prices
Natural Gas	State Owned	Fuel Cost + Variable O&M + Variable System Usage	Baseload / minimum load / SFC when available	Deterministic, dependent to forced outages Optimisation Against Company Demand Profile
Hydro Storage	Private	Water Value + Variable O&M + Variable System Usage	Baseload / minimum load / SFC when available	Stochastic, dependent to forced outages Optimisation Against Market Prices
Hydro Storage	State Owned	Water Value + Variable O&M + Variable System Usage	Baseload / minimum load / SFC when available	Stochastic, dependent to forced outages Optimisation Against Company Demand Profile

Position Types

- **SPECULATIVE**
  - Taking position by considering possible price movement that might happen in the market.
  - It provides high profibility if its done with right risk management and true trading mentality.
  - More than %50 of deals in the market are done for this purposes.
- **ARBITRAGE**
  - Risk free deals made by using the prices diffirences that occur between diffirent markets.
  - It can rarely be cought between OTC market brokers
  - It can highly be cought between OTC-Viop
- **HEDGE**
  - Minimizing or closing the risk which is carried by assets, portfolios or prop book.
  - Call-Put options, forwards, off market deals.





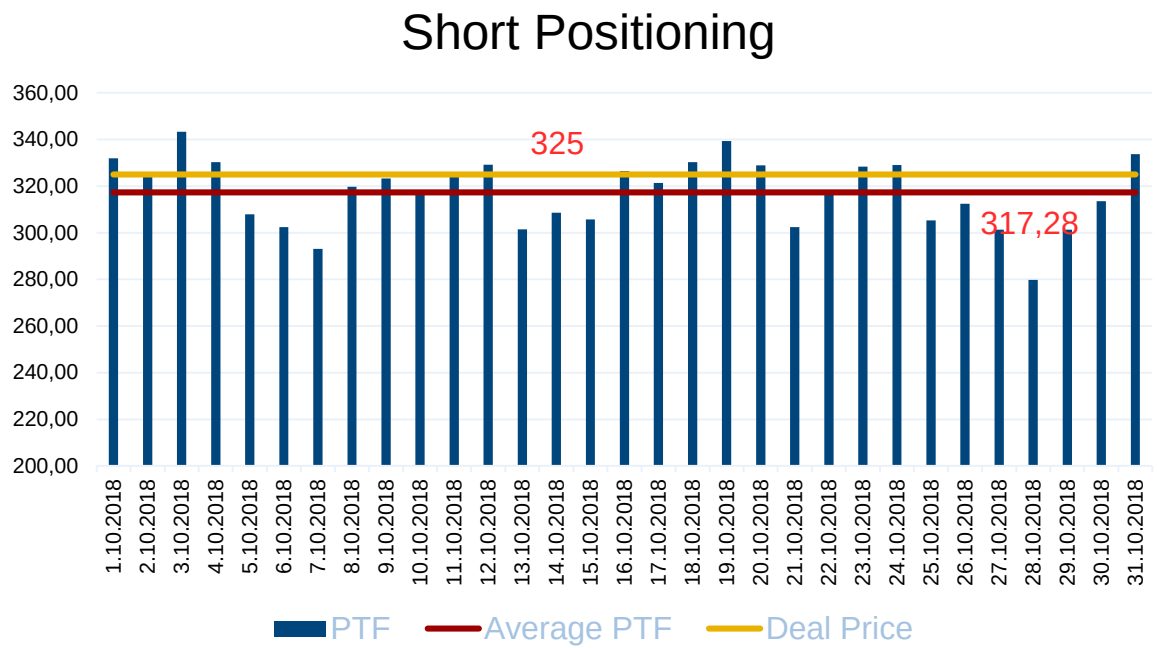
Product Types

- **PHYSICAL**
  - Delivered via Epiaş
  - Requries 60 days bank guarantee
  - %50 of the market deals in liquid season. %80 in slow period.

- **FINANCIAL**
  - Amount between deal price and DAM price.
  - Lower bill amount.
  - Higher profit margin.
  - No financial cost.

- **BIST-FUTURES**
  - Future trading under bist electronic platform.
  - High volatility.
  - High risk.

Example


Short Positioning
360,00
340,00
320,00
300,00
280,00
260,00
240,00
220,00
200,00
325
317,28
1.10.2018
2.10.2018
3.10.2018
4.10.2018
5.10.2018
6.10.2018
7.10.2018
8.10.2018
9.10.2018
10.10.2018
11.10.2018
12.10.2018
13.10.2018
14.10.2018
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16.10.2018
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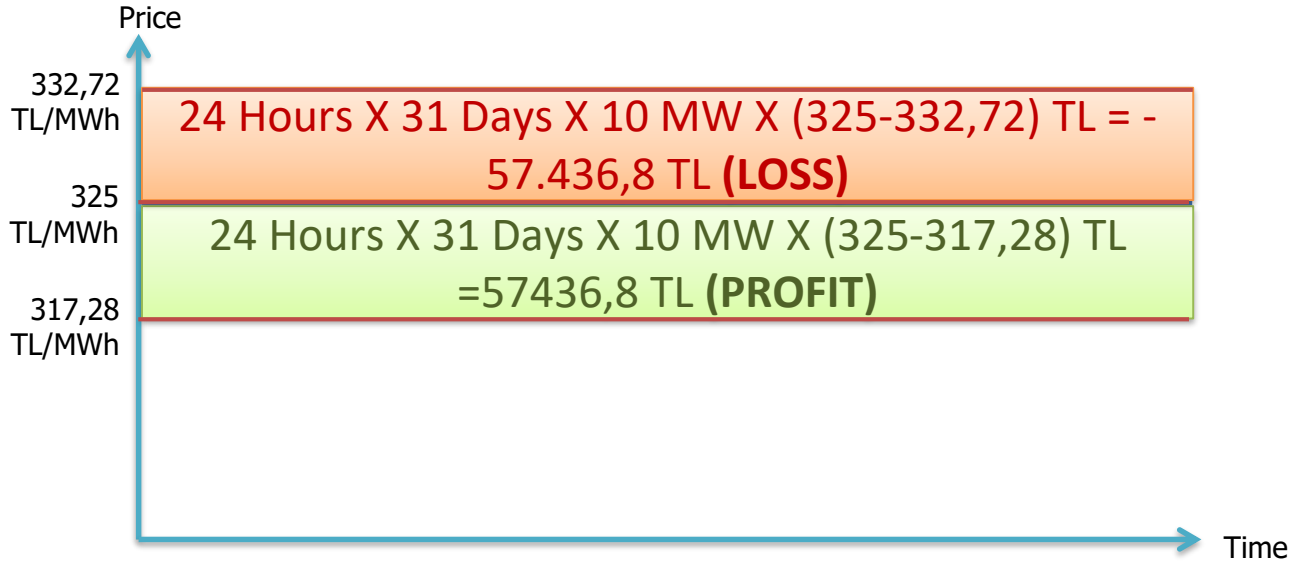
18.10.2018
19.10.2018
20.10.2018
21.10.2018
22.10.2018
23.10.2018
24.10.2018
25.10.2018
26.10.2018
27.10.2018
28.10.2018
29.10.2018
30.10.2018
31.10.2018
PTF
Average PTF
Deal Price


Price
332,72 TL/MWh
325 TL/MWh
317,28 TL/MWh
24 Hours X 31 Days X 10 MW X (325-332,72) TL = -57.436,8 TL (LOSS)
24 Hours X 31 Days X 10 MW X (325-317,28) TL =57436,8 TL (PROFIT)
Time

How to Trade

➢ Conduct an Honest Self-Assessment

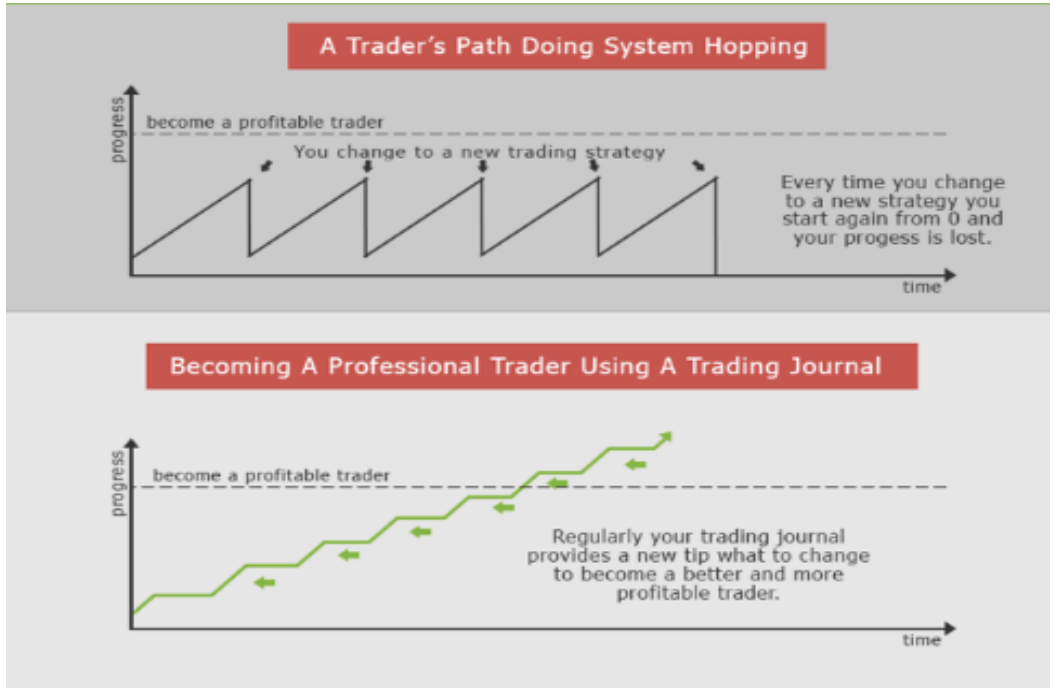
– Emotional control-know yourself
– High level of focus
– Flexibility
– Analytical abilities
– Market knowledge
– Risk taker

➢ Learn the markets

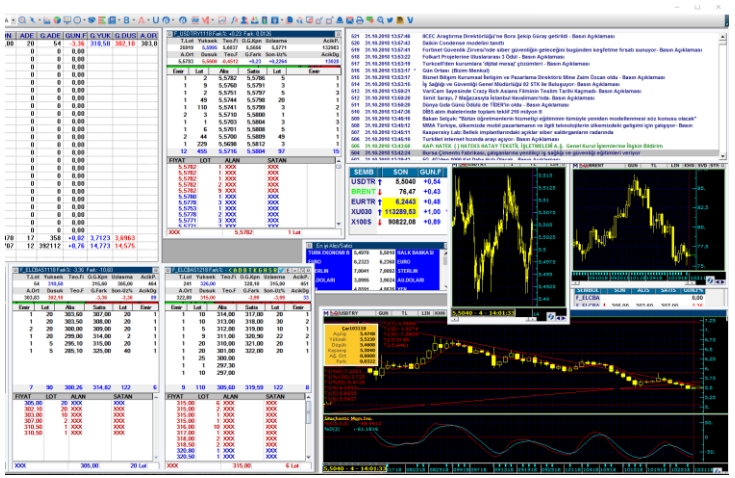
– Analyse
– Network
– Data
– infrastructure

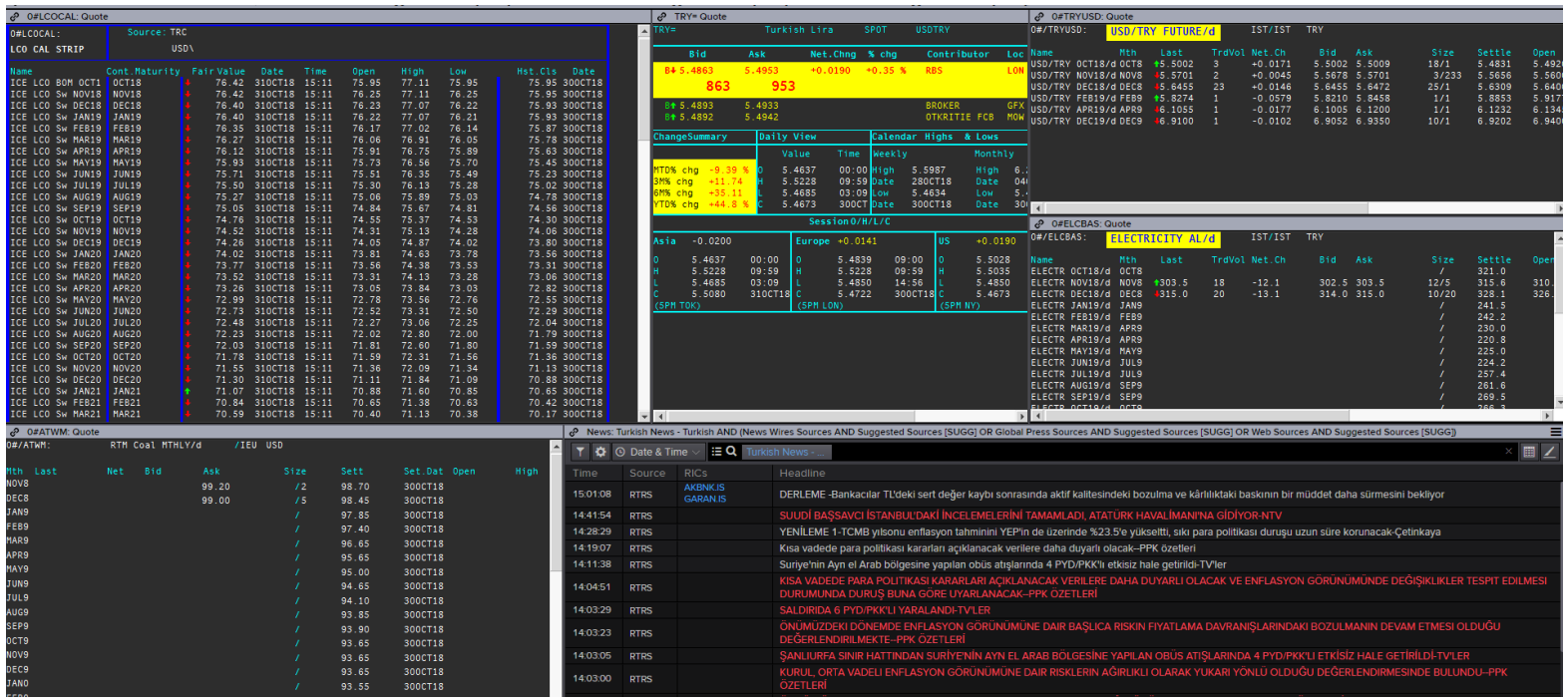
➢ Create a trading strategy

– Amount of starting capital.
– Entry and exit points.
– Maximum and minimum spends per trade (including leverage).
– Assets to trade.
– Maximum and minimum frequency of trades

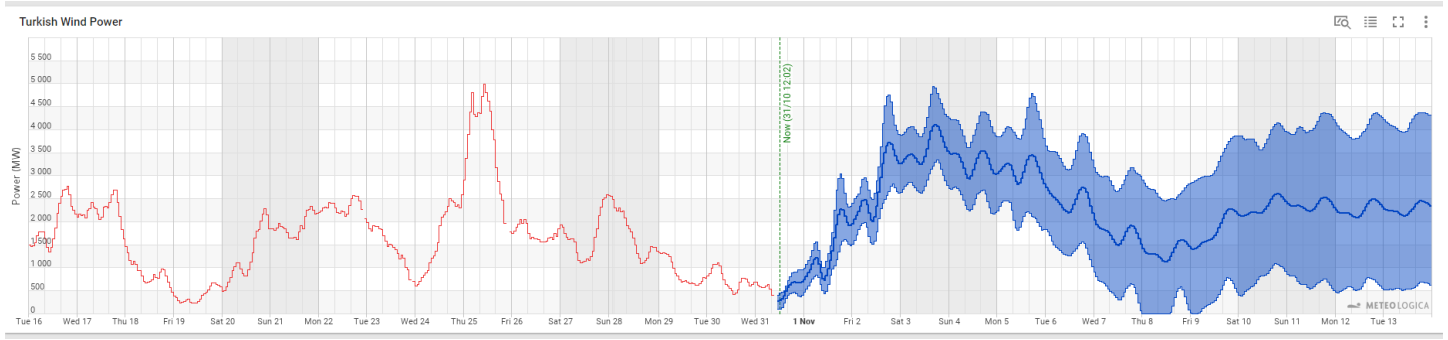


Indicators of a Trade





- Daily Forecast Report
- Weather forecasts
- Epiaş Data
- Network
- Coal Prices
- Oil Prices
- Dollar rate
- Market Data
- Market Movement
- Trading Sense
- Limits



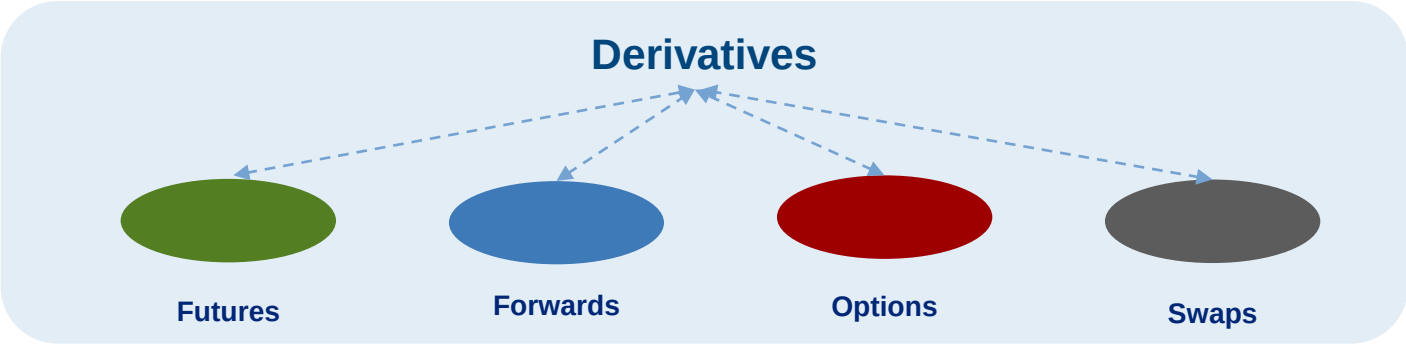
Valuation of Options & Derivatives

A derivative (basically) is a contract that is traded on an exchange, such as the Exchange Istanbul, or over the counter.

In a nutshell, options are derivatives, but derivatives are not necessarily options.

The word «derivative» → derives their value from an underlying.

The underlying can be indices, interest rates, prices of a commodity, etc.



FUTUREs	FORWARDs
only Exchanges	in OTC markets
Only Standardized Products	Can be Customised
Counterparty (Credit) Risk is Negligible	High CP Risk (No Clearing House)
Offset or Thro Delivery	Physical Delivery
M2Market on Daily Basis	Not M2Market
Margining	No Margining
Leverage Effect	No Leverage

What is an Option?

An option is the right -- but not the obligation -- to buy or sell a security, such as a power contract, at a specific price, on or before a certain date.

CALL – An option that gives the holder the right to buy the underlying security at a particular price for a specified, fixed period of time.

PUT – An option that gives the holder the right to sell the underlying security at a particular price for a specified, fixed period of time.

Keep in mind; it is Risky Business

	CALL	PUT
Buyer (owner/holder)	Has the **right** to **buy** stock (power) at a certain price	Has the **right** to **sell** stock at a certain price
Seller (writer)	Has the **obligation** to **sell** stock at a certain price	Has the **obligation** to **buy** stock at a certain price