

European Union / Instrument for Pre-Accession (IPA) Energy Sector Technical Assistance Project

This project is co-financed by the European Union and the Republic of Turkey

2013 ENERGY SECTOR PROGRAM PHASE-2 PROJECT
Workshop on gas capacity auctions

EU IPA13/CS-02.a

Energy Market Development

9th – 11th September, Ankara

THE WORLD BANK | MRC | ECCO | exergia | REPUBLIC OF TURKEY MINISTRY OF ENERGY AND NATURAL RESOURCES

1

Agenda Monday 9 September

- Unbundling.
- The role of the TSO (Transmission System Operator).
- The role of the commercial players.
- Integration of gas markets.
- Cross-border gas grid capacity auctions
 - ❑ EU's rules.
 - ❑ The different types of auctions.
 - ❑ Price setting mechanism.
 - ❑ Why buy cross-border gas grid capacity?
 - ❑ The floor price and the entry-exit model for gas grid fees.
 - ❑ How to bid at cross-border capacity auctions.
- Exercise – the main task today
 - ❑ Bid as a commercial player at an auction.
 - ❑ Role of the TSO: run the auction.
 - ❑ What was the commercial player's profit/loss?
- **The exercises are the main element of this course**
 - ❑ As explaining the auctions is not rocket science.

9-11 Sep 2019

2

Auctions of cross-border gas grid capacity

9-11 Sep 2019

MRC | ECCO | exergia

3

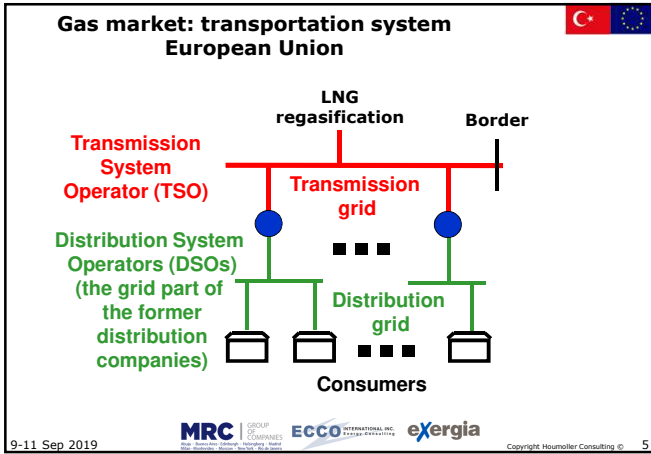
Auctions of cross-border gas grid capacity
EU's rules

- For the European Union, the central document is **COMMISSION REGULATION (EU) 2017/459 of 16 March 2017**
 - ❑ *Network code on capacity allocation mechanisms in gas transmission systems.*

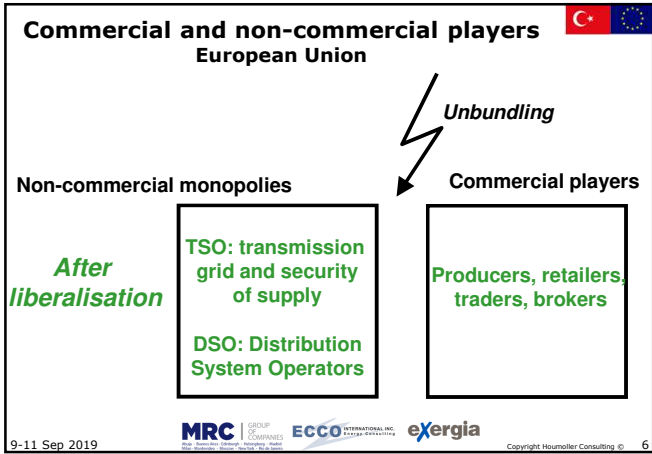
9-11 Sep 2019

MRC | ECCO | exergia

4





5



6

Transmission System Operator (TSO) European Union

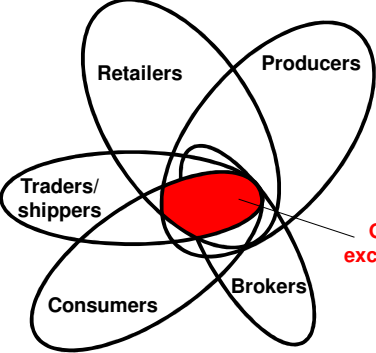
- The TSO is a non-commercial monopolist.
- In the European Union, each TSO has two tasks:
 - ❑ Maintains the security of supply in the TSO's home country.
 - ❑ Owns and operates the transmission grid.
- ❑ Many EU countries have only one TSO.
- ❑ However, some EU Member States have more than one TSO (eg, Germany)
 - ✓ For these countries, each TSO operates the transmission grid and maintains the security of supply in the TSO's control area.

9-11 Sep 2019 MRC GROUP OF COMPANIES ECCO INTERNATIONAL INC. exergia Copyright Houmoller Consulting © 7

7

The gas market's trading system European Union



9-11 Sep 2019 MRC GROUP OF COMPANIES ECCO INTERNATIONAL INC. exergia Copyright Houmoller Consulting © 8

8

Integration of gas markets

- First step: in each of the two countries, there is an incumbent. The two incumbents trade with each other (bilateral, cross-border trade).
- Second step – unbundling and more competition in both countries:
 - ❑ Unbundling: TSOs in both countries, who operate the gas transmission grid.
 - ❑ Competition: each country has a number of commercial players, who trade gas at the whole-sale market and/or sell gas to consumers.
- Now there are many market players, who want cross-border grid capacity. Question: how to grant the capacity?
- Answer: The two TSOs operate a co-ordinated auction system, where the market players can buy cross-border grid capacity. After having bought cross-border capacity, market players can trade across the border.

Country 1 TSO ₁
Country 2 TSO ₂

9-11 Sep 2019 MRC GROUP OF COMPANIES ECCO INTERNATIONAL INC. exergia Copyright Houmoller Consulting © 9

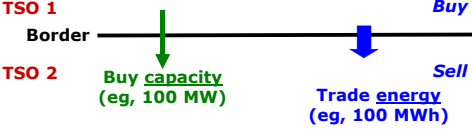
9

Auction of cross-border capacity

The two TSOs at each side of the border run a co-ordinated auction (bundled capacity)

- First: At the auction, the market players buy capacity in a given direction.
- Second: After having bought capacity in a given direction at the border, a market player can trade energy in this direction.

Case for one day of operation
Market player: "I believe direction south is the right one"



9-11 Sep 2019 MRC GROUP OF COMPANIES ECCO INTERNATIONAL INC. exergia Copyright Houmoller Consulting © 10

10


Purchase of cross-border gas grid capacity

- Assume you are a gas retailer
 - ❑ You sell gas to consumers.
- Question: why buy cross-border gas grid capacity?
- You may have a division of work between commercial players:
 - ❑ Traders/shippers trade at the whole-sale market
 - ✓ For example, they can import and export gas.
 - ❑ Retailers sell to consumers.

9-11 Sep 2019 MRC GROUP OF COMPANIES ECCO INTERNATIONAL INC. exergia Copyright Houmoller Consulting © 11

11

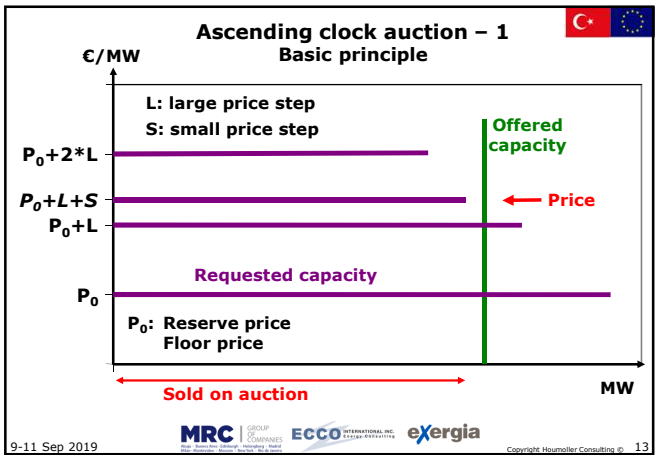
Two auction systems for cross-border gas grid capacity European Union



- Ascending clock auction.
- Uniform-price auction.

9-11 Sep 2019 MRC GROUP OF COMPANIES ECCO INTERNATIONAL INC. exergia Copyright Houmoller Consulting © 12

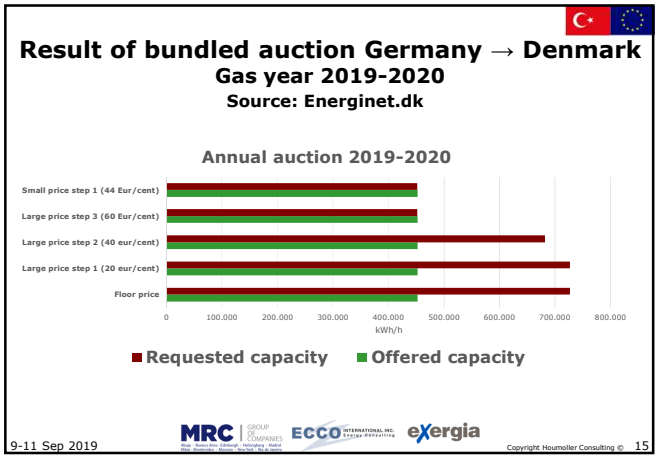
12



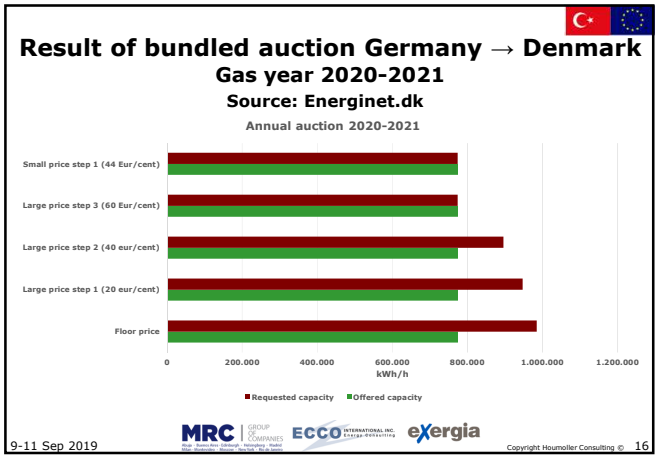
13

- ### Ascending clock auction – 1
- Network users place volume bids against escalating prices announced in consecutive bidding rounds
 - ❑ Starting at the reserve price P_0 .
 - ✓ Then reserve price P_0 is the minimum price.
 - The first bidding round, with the price P_0 , has a duration of 3 hours
 - ❑ 'Bidding round' means the period of time during which network users can submit, amend and withdraw bids.
 - ❑ Subsequent bidding rounds has have a duration of 1 hour.
 - ❑ There is a period of 1 hour between bidding rounds.
- 9-11 Sep 2019 MRC GROUP OF COMPANIES ECCO INTERNATIONAL INC. EXERGIA Copyright Houmoller Consulting © 14

14



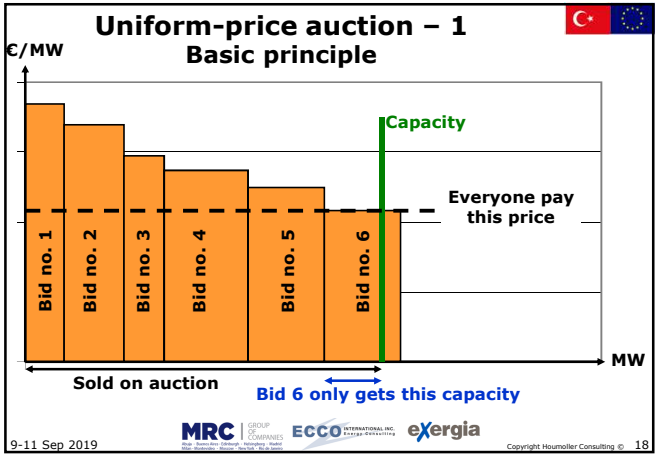
15



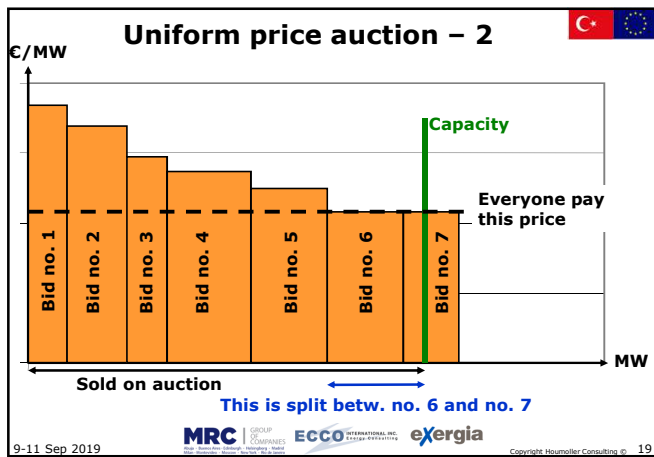
16

- ### Ascending clock auction – 2
- A bid must specify
 - ❑ The identity of the network user applying.
 - ❑ The interconnection point and the direction of flow.
 - ❑ The standard capacity product for which the capacity is applied for.
 - ❑ per price step, the amount of capacity for the respective standard capacity product applied for.
- 9-11 Sep 2019 MRC GROUP OF COMPANIES ECCO INTERNATIONAL INC. EXERGIA Copyright Houmoller Consulting © 17

17



18



19

Uniform-price auction – 1

- In a uniform-price auction, there is a single bidding round in which the network user bids price as well as quantity.
- During the bidding round of a given auction, network users may submit up to 10 bids.
 - ❑ Each bid shall be treated independently from other bids.
 - ❑ After the closure of the bidding round, remaining bids may not be modified or withdrawn.
- The transmission system operator shall rank all bids relating to a given standard capacity product according to their bid price, the highest price ranking first.
- The clearing price shall be defined as the price of the lowest successful bid, if the demand exceeds the offer at the reserve price.
 - ❑ In all other cases, the clearing price shall be equal to the reserve price.

20

Bidding at a uniform-price auction

- A bid shall specify:
 - The identity of the network user applying.
 - The concerned interconnection point and direction of the flow.
 - The standard capacity product for which the capacity is applied for.
 - The amount of capacity for the respective standard capacity product applied for
 - ❑ Which shall be equal to or smaller than the capacity offered in a specific auction.
 - The minimum amount of capacity, which the network user is willing to be allocated.
 - The bid prices, which shall not be less than the reserve price applicable for the relevant standard capacity product
 - ❑ Bids with a bid price below the reserve price shall not be accepted.

21

Entry-Exit model for gas grid tariffs

Transmission grid

- You pay for entering the transmission grid
 - ❑ Example for Denmark – firm capacity for a year:
 - ✓ 23.54 DKK/kWh/hour/year ≈ 3.155 €/kWh/hour/year.
- You pay also for exiting the transmission grid
 - ❑ Example for Denmark – firm capacity for a year:
 - ✓ 23.54 DKK/kWh/hour/year ≈ 3.155 €/kWh/hour/year
 - Same as entry fee.

<https://en.energinet.dk/Gas/Tariffs-and-Fees>

22

Floor price P_0

Also called reserve price

- Reserve price direction south:
 - ❑ $P_{0,south} = (\text{exit fee country 1}) + (\text{entry fee country 2})$.
- Reserve price direction north:
 - ❑ $P_{0,north} = (\text{exit fee country 2}) + (\text{entry fee country 1})$.
- The two reserve prices may not be the same.

23


Capacity products offered at actions in EU

- Transmission system operators shall offer yearly, quarterly, monthly, daily and within-day standard capacity products.
- Yearly standard capacity products shall be the capacity which may be applied for, in a given amount, by a network user for all gas days in a particular gas year (starting on 1 October).
- Daily standard capacity products shall be the capacity which may be applied for, in a given amount, by a network user for a single gas day.
- Within-day standard capacity products shall be the capacity which may be applied for, in a given amount, by a network user from a start time within a particular gas day until the end of the same gas day.
- The capacity offered shall be expressed in energy units per unit of time.
 - ❑ The following units shall be used: kWh/h or kWh/d.
 - ❑ In case of kWh/d a flat flow rate over the gas day is assumed.


24

Annual, quarterly, monthly, daily and within-day auctions

- **Annual auctions** use the ascending-clock auction
 - ❑ The auction process shall offer capacity at least for the upcoming 5 gas years and for no longer than the upcoming 15 gas years for existing capacity.
- **Quarterly auctions** use the ascending-clock auction algorithm
 - ❑ The normal quarters are used (Jan-Mar, Apr-Jun, Jul-Sep, Oct-Dec).
- **Day-ahead auctions** use the uniform price auction
 - ❑ The bidding round shall open every day at 15.30 UTC (winter time) or 14.30 UTC (daylight saving).
 - ✓ It closes 30 min. later.
 - ✓ Results must be published within 30 min.
- Subject to capacity being made available, a **within-day auction** shall be held every hour during gas day using the uniform price auction
 - ❑ Each hour on the relevant gas day, capacity effective from the hour + 4 shall be auctioned as within-day capacity.


9-11 Sep 2019  Copyright Houmøller Consulting © 25

25


Preventing hoarding of capacity 

At the annual and monthly auctions


- Assume a player has bought capacity at a monthly or an annual auction.
- You may have this rule: every morning, the player must tell the TSOs, if the player will use the capacity the next day
 - ❑ Unused capacity is given to the day-ahead auction.
 - ❑ The TSOs may not compensate the player
 - ✓ All players must simply take this rule into account, when bidding at monthly and annual auctions.

9-11 Sep 2019  Copyright Houmøller Consulting © 26


26

How to bid at cross-border capacity auctions 


- Assume you are a shipper/trader, who buy and sell at the whole-sale market.
- Assume you want to bid at an auction for cross-border grid capacity.
- Concerning the price in your purchase bid:
 - ❑ What will be the basis for your bid price?
- Concerning the volume in your purchase bid:
 - ❑ What will be the basis for the size of the volume in your purchase bid?


9-11 Sep 2019  Copyright Houmøller Consulting © 27

27

Price transparency 

- A price-transparent whole-sale market is an important prerequisite for a well-functioning cross-border auction environment!
 - ❑ This gives you a chance of estimating the value of cross-border capacity.



9-11 Sep 2019  Copyright Houmøller Consulting © 28

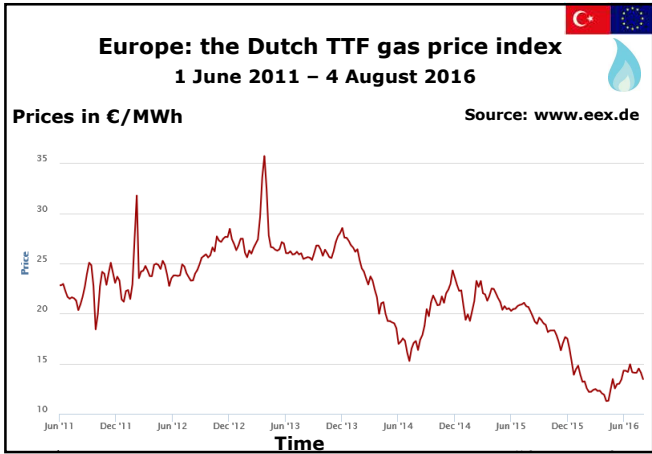
28

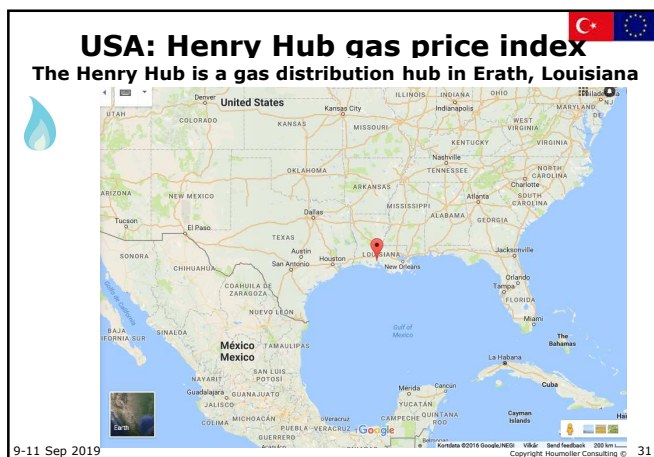
The historical prices

9-11 Sep 2019  Copyright Houmøller Consulting © 29

29



30



31

Henry Hub gas prices

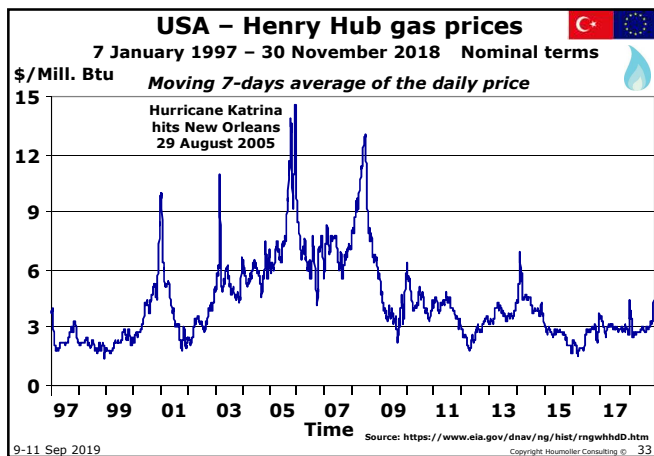
- Gas prices set at Henry Hub are denominated in US \$ per millions of British thermal units.
- They are seen to be the primary price for the North American natural gas market.

9-11 Sep 2019

MRC GROUP OF COMPANIES ECCO INTERNATIONAL INC. exergia

Copyright Houmoller Consulting © 32

32



33

Transmission System Operator (TSO) Threats and opportunities

- For the TSO, who is selling cross-border grid capacity:
- What are the risks and opportunities?

9-11 Sep 2019

MRC GROUP OF COMPANIES ECCO INTERNATIONAL INC. exergia

Copyright Houmoller Consulting © 34

34

Team exercise

Buying cross-border grid capacity

Running a cross-border capacity auction

- Please refer to the paper with the exercise.
- For task no. 1 and no. 3, you have the role of a commercial player
 - ❑ You work for the commercial company GasTrade.
- For task no. 2, you have the role of the TSO
 - ❑ You run the auction.
- Please note: *the PowerPoint slides produced during the exercises are part of the material from the course*
 - ❑ Please send the slides to anders@houmollerconsulting.dk.
 - ❑ In the next step, the slides will be sent to a representative for the participants.

9-11 Sep 2019

Copyright Houmoller Consulting © 35

35

Thank you for your attention!

Anders Plejdrup Houmøller
Houmoller Consulting ApS
 Tel. +45 28 11 23 00
anders@houmollerconsulting.dk
 Web houmollerconsulting.dk

9-11 Sep 2019

Copyright Houmoller Consulting © 36

36