ENERJI PIYASASI DÜZENLEME KURUMU

TURKISH ELECTRICITY MARKET

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ELECTRICITY MARKET LAW (No. 4628)

- With the Law No. 4628, the following is foreseen:
 - Removal of the monopolist structure in electricity supply
 - Opening the activities in the electricity market other than network operations to competition, under the regulation and supervision of EMRA
 - Regulation of network activities (transmission & disribution) by EMRA
 - Ensuring the operation of the electricity market under free market principles, in a competitive, stable, financially reliable, and transparent business environment, where participants are treated without discrimination.







LICENSING

> All market activities are conducted under licenses issued by EMRA.

➤Separate licenses are required for each market activity and for each facility where the activity is carried out.

Separate accounts are required for

- all licensed activities and facilities & regions
- sales to eligible consumers and sales to captive consumers
- non-market activities



TARIFFS

Regulated tariffs are for:

- Transmission
- Distribution
- Sale of electricity & capacity to captive consumers
- Wholesale by the state owned wholesale company (TETAŞ)
- > Principles of tariff structure:
 - Costs not directly related to market operations shall not be included
 - Cost reflectiveness is used
 - If need arises, direct payment can be applied to consumers in need, without affecting the tariff structure



GENERATION COMPANIES

- State owned generation company EUAS
- Other state owned generation companies formed by restructuring of EUAS
- Private sector generation companies
- Independent pproducers

can operate generation facilities, and sell capacity and/or energy.



GENERATION COMPANIES

➢ EUAS shall be entitled to build, lease and operate new generation facilities, if deemed necessary, in accordance with the EMRAapproved Generation Capacity Projection and with due regard to the generation investments by the private sector.

 \succ Total market share of generation facilities operated by a particular private sector generation company and its affiliates shall not exceed 20% of the total installed capacity in the preceding year.

 \succ Generation companies shall not engage in any <u>market activities</u> other than those described above.



INDEPENDENT PRODUCERS

Generate electricity for their own needs and operate in parallel to the transmission and/or distribution system.

 \succ Can sell up to 20% of their annual generation to the market.

 \geq EMRA has the right to determine and to increase this ratio. For instance, it was increased to 50% until 31 December 2008 by the EMRA Board decision on 31 December 2007.



<u>TRANSMISSION COMPANY</u> (Turkish Electricity Transmission Co. - TEİAŞ)

Transmission network planning construction and operation

Power system control and operation (via NLDC)

- Market Balancing and Settlement (via MFSC)
- Preparation of the transmission, connection and use of system tariffs and Grid Code
- International interconnection activities
- Preparation of generation capacity projection
- > Shall not engage in any activity other than transmission activity.



WHOLESALERS

➤ Turkish Electricity Trading and Contracting Co. (TETAŞ) and private sector wholesale companies.

≻ TETAŞ

- ✓ Takes over and executes the existing energy sale and purchase contracts
- ✓ Shall primarily purchase electricity from EUAŞ
- ✓ Can make new annual purchase contracts to meet contractual obligations to distributon companies (subject to the approval of EMRA).



WHOLESALERS

 \succ Wholesale companies can also sell to eligible consumers (TETAS is not allowed to sell to any new eligible consumers).

Electricity can be exported to or imported from any country meeting the international interconnection conditions with the approval of MENR and EMRA

➤ Total market share of any private sector wholesale company together with its affiliates shall not exceed 10% of the total electricity consumed during the preceding year.



DISTRIBUTION COMPANIES

- Distribution network planning construction and operation
- Supplier of Last Resort
- > May engage in retail business and/or retail sale services
- Preparation of regional demand forecasts

> May engage in generation activities (separate license, account separation)

> Shall not engage in any activity other than those defined above.



RETAIL SALE COMPANIES

- Retail sale companies and distribution companies holding retail sale licenses
- Retail sale or retail sale service activities without any limitation on a regional basis.
- Right to electricity import via distribution voltage level.



DISTRIBUTION REGIONS



There are 21 distribution (also retail sale) companies and majority of them were privatized. By the end of 2010, almost all of the distribution companies will be private.



ELIGIBLE CONSUMERS

Eligible consumer

- is either directly connected to the transmission grid or
- consumes above the threshold set by EMRA.

Eligibility threshold

- 480 MWh per annum for 2009
- 100 MWh per annum after February 2010

Market opening degree

- ~ 63% (Potential, based on energy consumption)
- Gradual market opening will be employed
- The Board of EMRA has the right to lower eligibility threshold annually.



REFORM MILESTONES

Licensing Day	September 3, 2002
Eligible Consumers Day	March 3, 2003
Financial Settlement Date	December 1, 2003
Balancing and Settlement Date	August 1, 2006
Market Date	When privatization process completed and infrastructure established



History of the balancing and settlement market

1. Communiqué Regarding The Financial Settlement December 2003 – July 2006

2. Transitional Balancing and Settlement Regulation (T-BSR) August 2006 – November 2009

3. Final BSR (F - BSR) December 2009 –



STRUCTURE OF THE BALANCING AND SETTLEMENT MARKET





DAY-AHEAD PLANNING

- Day Ahead Planning: The actions carried out under the coordination of Market Operator in order to balance the foreseen hourly demand regarding the following day on the day ahead.
- Through the Day Ahead Planning, a balanced system is delivered to the system operator by the market operator.
- > Enables market participants to manage their imbalances
- Day Ahead Prices (DAP) are calculated separately for each hour. The System Day Ahead Prices are considered as the reference price to the Balancing Power Market.
- Hourly prices, used for the settlement of Day Ahead Planning, are determined by marginal pricing principal.





BALANCING POWER MARKET

- Balancing Power Market is the wholesale electricity market which is operated by the System Operator and where the reserve capacity, obtained by the change in output power within 15 minutes, is sold or purchased, to serve the purpose of real-time balancing of demand and supply.
- The sum of the DGS's and sold/purchased energy in the Day Ahead Market is notified as Final Day Ahead Generation/Consumption Schedule (FDGS) to the Balancing Power Market by generation companies. Together with these FDGS bid and offers are re-notified.
- To correct the imbalance in the system, up-regulation instruction is issued to the entities starting from the lowest price in the case of energy deficit, down-regulation instruction is issued starting from the highest price in the case of energy surplus in the system.
- The hourly prices determined in this way are called System Hourly Marginal Prices.







- By 16:00 each day; each market participant notify the System Operator of offers and bids regarding balancing power market and Final Day Ahead Generation/Consumption Schedules containing the hourly generation or consumption values for the settlement aggregation entities in the form of generation and consumption facility registered under its own account.
- By 17:00 each day; the System Operator controls notifications regarding final day ahead generation/consumption schedules and its offers and bids, thus, identifies whether material error exists. System Operator gets in contact with the relevant market participant regarding the erroneous notifications and assures the required corrections are done until 17:00.
- The offers and bids submitted under the balancing power market are ranked by System Operator according to their prices, for each hour.
- By 17:00 each day; in order to eliminate the existing or predictable short or long position in the system regarding the relevant day, removing the system constraints and/or building capacity regarding provision of ancillary services, System Operator evaluates the offers and bids submitted under the balancing power market and gives the instructions for the accepted offers and bids to the related market participants. The notifications regarding the termination of instructions are made to the related market participants.



INSTALLED POWER & ANNUAL CONSUMPTION (2009 - MWh)

Installed Capacity : 45.125 MW : 35 % Hydro + Renewable

Thermal

Yearly Consumption (2009): 193.3 TWh

Peak Load (2009) : 29.870 MW

: 65 %



INSTALLED CAPACITY - As of March 2010





GROWTH IN ENERGY CONSUMPTION

Years	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Consumption (Twh)	114	118.5	128.3	126.9	132.9	141.2	150	160.8	174.6	190	198,1	193.3
Growth (%)	8.1	3.9	8.3	-1.1	4.7	6.2	6.2	7.2	8.6	8.8	4.3	-2.4





OPERATION OF THE ELECTRICITY SYSTEM

The Operation and Control of Turkish Electricity System is done by National Load Dispatch Center (NLDC) and 9 Regional Load Dispatch Centers (RLDCs).





ENERJI PIYASASI TURKISH ELECTRICITY TRANSMISSION SYSTEM

(AS OF DEC. 2009)

NUMBER OF SUBSTATIONS:

- > 400 kV TRANSMISSION SUBS: 75
- > 220 kV TRANSMISSION SUBS: 1
- > 154 kV TRANSMISSION SUBS: 497
- > 66 kV TRANSMISSION SUBS: 14TOTAL : 587 SUBSTATION (93 226 MVA)





TRANSMISSION LINES

- > 400 kV LINES : 14 622 km
- > 154 kV LINES : 31 874 km
- > 220 kV LINES : 84 km (Georgia, Armenia)
- > 66 kV LINES : 508 km
- CABLE LINES : 213 km (154 and 400 kV) TOTAL : 47 301 km



TRANSMISSION TARIFF

Project & Cost Based Regulation

• Connection and use of system tariffs include terms and conditions for connection to and use of transmission system

• Shall establish non-discriminatory prices, which will be included in the relevant connection and use of system agreements, on the basis of non-discriminatory conduct principle.

• The connection charges do not include the grid investment costs.

• The connection charges are limited to the costs incurred in relation to the connection of the related legal entity.



TRANSMISSION TARIFF

Transmission tariff is based on "Revenue Cap Regulation"

• The transmission tariff to be prepared by the TEIAS includes prices, terms and conditions for the provision of transmission service to all users benefiting from the transmission of

- generated,
- imported,
- exported

electricity over the transmission facilities, which will be employed on the basis of non-discriminatory conduct principle. Grid investments to be made by the TEİAŞ and transmission surcharges take place in the transmission tariff.



TRANSMISSION TARIFF

• Components of the transmission tariff are:

System Use	Regional Tariff (14+1)	opex+amortization+return
<u>System Operation</u> - Controlable - Non-controlable	National Single Tariff Pass-Through	opex+amortization+return ancillary services
Market Operation	Monthly revenue cap	opex+amortization+return





LENGTH AND CAPACITIES OF INTERCONNECTION LINES

Interconnection Line	Technical Characteristics	Transmission Capacties (MVA)
Turkey - Georgia	Hopa (Turkey) - Batum (Georgia), 220 kV- 954 MCM, Rail – 28 km	287
Turkey - Azerbaijan	Iğdır (Turkey) - Babek (Nahcivan), 154 kV- 2x477 MCM, Hawk - 180 km	2x132
Turkey -Armenia	Kars(Turkey) - Gumri(Armenia), 220 kV - 2X954 MCM, Cardinal - 80.7km	574
Turkey -Iran	1.Doğubeyazıt (Turkey) – Bazargan (İran), 154 kV- 954 MCM, Cardinal –40 km 2.Başkale (Turkey) – Khoy (İran), 400 kV- 3x954 MCM, Cardinal - 124 km	204 581
Turkey - Iraq	PS.3 (Turkey) - Zakho (Iraq), 400 kV- 2x954 MCM, Cardinal-28 km	408
Turkey - Syria	Birecik HES (Turkey) – Aleppo (Syria), 400 kV- 2x954 MCM, Cardinal – 124 km	1005
Turkey - Bulgaria	1.Babaeski (Turkey)-Maritsa East (Bulgaria), 400 kV- 2x954 MCM, Rail -136 km 2.Hamitabat (Turkey)-Maritsa-East (Bulgaria), 400 kV- 3x954 MCM, Cardinal - 150 km	995 1510
Turkey -Greece	Babaeski (Turkey) - Phillipi (Greece), 400 kV – 3x954 MCM, Cardinal - 260km	1510





UCTE / ENTSO-E CONNECTION

- For connection with the UCTE grid, the application has been made in 2000 and subgroup was formed in the frame of WG System Development of UCTE to tackle with the issue of connection of Turkey.
- For the synchronization of the Turkish Power System with the UCTE Power System, 1st Project namely "Complementary technical studies for the synchronization of the Turkish Power System with the UCTE Power System" has been developed, on 28 September 2005 Service Contract was signed.
- The system interconnection of Turkey to UCTE is feasible provided that: the periodical frequency oscillations is between the inter-area oscillations (0,15 Hz) which is admissible for parallel operation



UCTE / ENTSO-E CONNECTION

- Following the defined conclusion of the1st Project, as the second phase of the studies, the "Rehabilitation of the Frequency Control Performance of Turkish Power System for Synchronous Operation with UCTE" namely 2nd UCTE Project, has been developed.
- The Project is ongoing with the participation of UCTE members TSOs, namely AMPRION, TERNA, SwissGrid, HTSO, RTE, ESO, EMS. in addition to TEIAŞ and EÜAŞ.
- The Name of UCTE (Union of Coordination of Transmission Electricity) has been changed as ENTSO-E (European Network of Transmission System Operators for Electricity) at 01 July 2009.
- The "Agreement" to determine the necessary preparations within the scope of work and all technical, institutional, legal issues, and also contains the basic criteria, requirements and obligations of the parties has been signed on 18 December 2009 in Sofia-Bulgaria.
- TEİAŞ has gained observer status within-ENTSO-E.



UCTE / ENTSO-E CONNECTION

PROSPECTIVE TIMETABLE

Process	Date		
Isolated test at Maximum Load Conditions	11-25 January 2010 Has been successfully completed.		
Isolated test for Minimum Load Conditions	22 March – 05 April 2010 Has been successfully completed.		
Trial Parallel Operation with No Exchange	June 2010		
Trial Parallel Operation with Exchange Program	July 2010-June 2011		



EIJLLPST PROJECT

• EIJLLPST electrical interconnection project aims to interconnect the electrical networks of the 8 countries (Egypt, Jordan, Syria, Turkey, Iraq, Libya, Lebanon, Palestine).

- In the current situation; Egypt, Jordan, Libya, Lebanon and Syria are electrically interconnected .
- Iraq-Syria interconnection line is under construction.
- Palestine, Jordan and Egypt are being fed from the medium voltage level, and completed a feasibility study about the realization of high voltage interconnection.
- Turkey-Syria and Turkey-Iraq interconnection lines have been completed and Turkey exports electricity to Syria and Iraq by the method of isolated region.
- The construction of the second interconnection line between Turkey and Iraq is going on within this project.





AKHALTSIKHE (GEO) – BORCKA (TR) INTERCONNECTION

- A Memorandum of Understanding (MoU) was signed on July 29, 2009.
- According to this MoU:
 - A new 400 kV transmission line and DC Back to Back station at Akhaltsikhe Substation will be constructed.
 - Net energy transfer by 2012 is planned to be up to 650 MW and increased to 1000 MW in accordance with the development of the power demand of both countries.
 - Both countries will also promote electricity exchange through the existing line.



IMPORT & EXPORT

- Import and Export is possible to and from countries that fulfill the international interconnection requirements.
- Subject to available capacity and the approval of EMRA
- The eligible market participants are:
 - TETAŞ
 - Private sector wholesale companies
 - Retail sale companies (import only)
 - Distribution companies holding retail sale licenses (import only)



IMPORT & EXPORT

Regulations on cross-border trade

- The purchase/sales agreements between governments (which are managed by TETAŞ) have a priority in the allocation of the cross-border transmission capacity.
- Having allocated the required capacity to TETAŞ, the remaining capacity is allocated by the method of "Explicit Auction" in case of congestion.
- The revenues obtained from congestion are mainly used for;
 - Establishment of new interconnection lines,
 - Strengthening of transmission and distribution systems for increasing NTC values of existing interconnection lines,



IMPORT & EXPORT

Regulations on cross-border trade

- Having the transmission capacity allocated, it is possible to sell;
 - The imported electricity in the internal electricity market by making bilateral contracts or the balancing and settlement mechanism.
 - The exported electricity in a foreign country.
- In this case, the user is subject to the corresponding "system use" and "system operation" tariffs, and market "operation fee".



PRODUCTION, IMPORT & EXPORT (2009)

	(MWh)
Production	194.059.821
Georgia	181.933
Azerbaijan	125.307
Turkmenistan	505.420
Total Import	812.660
Iraq	1.215.042
Syria	334.828
Total Export	1.549.871
Total Consumption	193.322.610





Thank you for your attention.

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