National Programme for Turkey 2010 under the Instrument for Pre-Accession Assistance

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

TR2010/0315.01-01/001

“Technical Assistance for Harmonisation of Transmission Code in line with ENTSO-E”

Explanatory note

Supporting document for the amended Electricity Transmission Grid Regulation and other amended regulations

27 April 2015

1. Preamble

A consortium, composed of RTE International (France), ELIA System operator (Belgium) and FICHTNER (Germany), and led by RTE International has been selected by CFCU to provide technical assistance to TEIAS according to Service Contract n° TR2010/0315.01/001 “Technical Assistance for Harmonisation of Transmission Code in line with ENTSO-E”.

This project is co-financed by the European Union and the Republic of Turkey, both represented by CFCU.

2. Aim of this document

TEIAS has conducted from November 2014 to January 2015 a public consultation process aiming at identifying the views and proposals of all relevant parties on the update of the following documents:

- Electricity transmission grid regulation
- Electricity market distribution regulation
- Electricity market balancing and settlement regulation
- Electricity Market Ancillary Services Regulation
- Electricity Market Import and Export Regulation
- Principles and procedures on capacity allocation and secondary market for physical transmission rights in accordance with the electricity market export and import regulation
- Auction rules established by TEIAS and the neighbouring TSOs for the Allocation of Capacities on the Interconnection.

These regulations and documents are sets of rules which apply to one or more parts of the energy sector, but do not contain the motivation for the requirements. Regulations provide the “whats”, but not the “whys”. This Explanatory Note is a supporting document which focuses on the “whys and aims to explain and justify why new amendments are proposed to be introduced in Turkish power system regulations in order to harmonise them with ENTSO-E requirements.

This Explanatory Note gives in chapter 3 information on the background of the harmonisation of Turkish Regulations in line with ENTSO-E (who is ENSO-E? Why a public consultation? What do the European network codes contain?). In a second part (chapter 4), this Explanatory Note gives an overview of the amendments proposed to be introduced in Turkish regulation with their justification.

This Explanatory Note finally gives detailed information on the procedure for sending written comments to TEIAS during the period of written consultation (chapter 5).

Another supporting document, focused on legal aspects, has been drafted separately from this explanatory note. This guidance document explains the grounds and justifications under which the Turkish regulations harmonised with ENTSO-E requirements will be enacted.

3. Introduction

3.1 Background and Objectives of the public consultation

On 15 April 2015, TEIAS signed with ENTSO-E the long-term agreement on the permanent synchronisation of the Turkish power system with the Continental Europe area. This is a major step for the integration of Turkish system into European electric system, opening the way to new opportunities to reinforce this integration both for market activities and flexibility of network operation.

Moreover ENTSO-E has drafted a first set of nine European network codes and regulations. They are in the process to be approved by the European Commission (EC) and published. A first regulation has already been adopted by EU member states in December 2014 (regulation on Capacity Allocation and Congestion Management) and is in the way to get final approval from EU parliament and EC and to be published at the Official Journal of the European Union. The following network code which is in the process of adoption (Comitology) is the network code on "Requirement for Generators". The vote for its adoption is expected to be held on May 2015. The other seven network codes and regulations of this first set are also expected to be adopted in 2015 according to EC views.

At this point, a new step of integration is now under progress with the harmonisation of Turkish power system regulations with the ENTSO-E RGCE requirements. This harmonisation is carried out as part of a project of technical assistance to TEIAS, co-financed by the European Union and the Republic of Turkey.

This harmonisation aims to facilitate the integration of the Turkish Electricity Market to the EU Internal Electricity Market, to fulfil power system operational security and quality of supply requirements of ENTSO-E RGCE and to set rules for the integration of renewable and other types of generation.

To meet these objectives, the Turkish Grid Code and the other relevant Turkish regulations have been updated in order to be in line with RGCE Operation Handbook and nine draft EU grid codes.

A consultation process on the amendments proposed to be introduced in the Turkish regulations was conducted in the framework of the technical assistance mentioned above. Actually the European regulation requires the organisation of such a consultation process while implementing measures pursuant to European Network Codes. Hence, the organisation of such a public consultation is part of the objectives of harmonisation

This public consultation aims at identifying the views and proposals of all relevant parties during the decision-making process. The consultation process was conducted by TEIAS at an early stage and in an open and transparent manner, involving all relevant market participants, and, in particular, the organisations representing all stakeholders. That consultation also involves national regulatory authorities and other national authorities, supply and generation undertakings, system users including customers, distribution system operators, including relevant industry associations, technical bodies and stakeholder platforms. The consultation process is mainly based on a written public consultation during which all relevant parties can send comments on the consulted draft regulations. Jointly to this process, TEIAS organises public workshops for presenting the amendments and helping the relevant parties to make their comments.

The full consultation process has been carried out according to the following steps and schedule:

31 October	• Announcement of the public consultation on TEIAS website and invitation for stakeholders to participate
14 November	• First workshop (1 day) *Introductory workshop*

26 November to 5 December	• Publication of draft harmonised regulations for public consultation (with supporting documents) and beginning of the written public consultation
10 to 12 December	• Second workshop (3 days) *Extensive workshop with detailed presentations of amendments by field of activity.*
12 January 2015	• End of the written public consultation
8 March 2015	• Final public workshop *Presentation of the feed-back of the public consultation and updated regulations and documents*

A consultation report has been made publicly available. It details the analysis of all the comments received from stakeholders, explains whether it has been taken into account or not and gives the relevant justifications. It finally summarise the updates which are introduced in the Turkish regulations, as results of this public consultation.

3.2 Who is ENTSO-E and what are the European Network Codes?

3.2.1 ENTSO-E and network codes

ENTSO-E, the European Network of Transmission System Operators, represents 41 electricity transmission system operators (TSOs) from 34 countries across Europe.

ENTSO-E was established and given legal mandates by the EU's Third Legislative Package for the Internal Energy Market in 2009, which aims at further liberalising the gas and electricity markets in the EU.

ENTSO-E promotes closer cooperation across Europe's TSOs to support the implementation of EU energy policy and achieve Europe's energy & climate policy objectives, which are changing the very nature of the power system.

The main objectives of ENTSO-E centre on the integration of renewable energy sources (RES) such as wind and solar power into the power system, and the completion of the internal energy market (IEM), which is central to meeting the European Union's energy policy objectives of affordability, sustainability and security of supply.

The drafting of network codes is one of the main contributions of ENTSO-E to the achievement of these objectives.

Network codes are sets of rules which apply to one or more parts of the energy sector. The need for them was identified during the course of developing the Third Energy Package. More specifically, Regulation (EC) 714/2009 sets out the areas in which network codes will be developed and a process for developing them.

At present, ENTSO-E is working on 10 network codes listed here below:

•Capacity Allocation & Congestion Management

•Requirements for Generators

•Electricity Balancing

•Forward Capacity Allocation

•Demand Connection

•Operational Security

•Operational Planning & Scheduling

•Load Frequency Control & Reserves

•High Voltage Direct Current Connections

•Emergency and Restoration

The last code on Emergency and Restoration is under preparation by ENTSO-E and is not enough developed to be considered as a firm input for the harmonisation of the Turkish regulations. Only the nine first codes have been considered for drafting the amended Turkish regulations subject to public consultation.

3.2.2 RGCE and Operation Handbook

RGCE is the Regional Group of the System Operations Committee of ENTSO-E representing TSOs belonging to the Synchronous Area Continental Europe where Turkey is now interconnected. The Regional Group Continental Europe comprises the TSOs of the former UCTE synchronous area.

The main purpose of the Regional Group Continental Europe (RGCE) is to pursue the reliable and efficient operation of the Continental Europe Synchronous Area. The RG CE provides a framework for the regional activities of the member TSOs in the Continental Europe Synchronous Area within ENTSO-E.

This includes, inter alia, the management of all operational issues (among others those related to frequency regulation, scheduling and accounting, and coordination services), development and updating of the Operation Handbook, implementation of the Operation Handbook and the procedures to be applied in case of potential infringements (Multilateral Agreement), compliance monitoring with the Operation Handbook, and interoperability assessments for requested extensions of the synchronous system.

The Multilateral Agreement (MLA) is an agreement dated 1 July 2005 including subsequent amendments by which the Parties (member TSOs of the former UCTE and today of the RG CE) have committed themselves to fully comply with the Operation Handbook and by which the parties have committed themselves to settle their possible disputes.

The Operation Handbook (OH) is a comprehensive collection of technical standards for the operation of the interconnected grid of the RG CE. It is divided in 8 Policies, 3 of them originating from 2005 and 4 originating from 2006, all having been revised in the meantime, and the 8th established in 2008.

The Operation Handbook (OH) has been considered as a key input for the harmonisation of the Turkish regulations with ENTSO-E requirements.

The Operation Handbook (OH) includes requirements on emergency and restoration which prefigure the content of the future network code on Emergency and Restoration and, as such, have been considered in the harmonisation of the Turkish regulations with ENTSO-E requirements.

3.3 Why a public consultation?

The amendments proposed to be introduced in the Turkish regulations lead to a major change in the functioning of the Turkish power system. About one thousand amendments are proposed to be introduced in 6 different regulations. This is the first reason for organising a consultation process on this revision.

The 6 amended regulations are the following:

- Electricity Transmission Grid regulation
- Electricity market distribution regulation
- Electricity market balancing and settlement regulation
- Electricity Market Ancillary Services Regulation
- Electricity Market Import and Export Regulation
- Principles and procedures on capacity allocation and secondary market for physical transmission rights in accordance with the electricity market export and import regulation

Furthermore, another document is updated and proposed to be consulted in the same process. It describes the auction rules established by TEIAS and the neighbouring TSOs for the Allocation of Capacities on the Interconnection.

Another reason for organising this public consultation consists in meeting the objectives of harmonisation addressed to the technical assistance mentioned above.

Public Consultation for developing network codes is mandatory in European regulation (Regulation (EC) 714-2009). Moreover, European TSOs are also required to consult on a draft proposal before implementing measures pursuant to European network codes. This requirement is included in most of the network codes. As a result, full harmonisation with European regulation will require the introduction in Turkey of a consultation process.

Public consultation will be beneficial for Stakeholders, TEIAS and EMRA. It implies the implementation of a transparent process based on transparent criteria for accepting or rejecting comments coming from the consultation. Final regulations will be improved by including views and proposals of all relevant parties. They also will be more robust in case of future disputes.

3.4 What do the European Network Codes contain?

This section gives a synthetic description of the content of each European Network Code.

3.4.1 General

Network codes are a set of rules drafted by ENTSO-E, with guidance from the Agency for the Cooperation of Energy Regulators (ACER), to facilitate the harmonisation, integration and efficiency of the European electricity market. Each network code is an integral part of the drive towards completion of the internal energy market, and achieving the European Union's 20-20-20 energy objectives of:

- A 20% reduction in EU greenhouse gas emissions from 1990 levels;
- Raising the share of EU energy consumption produced from renewable resources to 20%;
- A 20% improvement in the EU's energy efficiency.

Representing European electricity transmission system operators, ENTSO-E was mandated by the European Commission (EC) to draft these rules for electricity, with sister association ENTSOG drafting the rules for gas. Under development since 2011, each code takes approximately 18 months to complete. Following ACER's recommendation, each code is submitted to the European Commission for approval through the Comitology process, to then be voted into EU law and implemented across Member States.

At the date (February 2015), none of these European network codes have been published and are legally into force. The code the most advanced in the process of approval is the regulation on capacity allocation and congestion management (CACM) which has been adopted by EU member states. For the network code on Requirement for Generators, Comitology is on process and the adoption is planned next May. For the seven other network codes considered in the harmonisation of Turkish regulations, EC expects to have them adopted by end of 2015.

The network codes cover three key areas of the European electricity transmission sector:

- Grid connections: Clean low-carbon renewable electricity generation is on the rise, with wind capacity possibly meeting 14% of European electricity consumption by 2030. However, these energy sources have different technical parameters from traditional fossil fuel sources and so the grid connection rules need to be adapted to get this energy on the grid. Connection codes cover these challenges.
- Grid operations: The European electricity system is increasingly integrated, allowing better distribution of electricity resources across all Member States. While European electricity generators, operators and distributors have been working together for decades, a highly integrated pan-European electricity system means consistent operational monitoring and coordination across all the 27 EU countries. Operational codes cover these challenges.
- Cross-border electricity markets: Cross-border trading through the integration of the European wholesale electricity market, helps ensure security of supply and optimum pricing for the different types of energy. The EC Quarterly Report on European Electricity Markets confirms that 2013 Q2 cross-border physical power flows increased by 4%, compared to Q1 2012 – but market integration is not yet complete. The market codes set down rules to harmonise cross-border power trading, creating an equal playing ground for all market participants; in turn leading to more cost efficient electricity.

3.4.2 Requirements for Generators

The network code on Requirements for Grid Connection Applicable to all Generators (NC RfG) sets out the technical requirements that all new electricity generators will adhere to. The requirements depend on the size of the generator – with the smallest only facing a minimum set of requirements, and the obligations building up gradually as plant size increases. The RfG code sets requirements for Synchronous Power Generating Modules, Power Park Modules and Offshore Generation Facilities.

It includes prescriptive requirements and specific parameters (eg. frequency related requirements), framework requirements (eg. reactive power provision requirements) and principle requirements (eg. information exchange).

It also defines the operational notification procedure for connection to the grid and requirements for assessing the compliance of generators with the requirements under the RfG network code.

3.4.3 Demand connection

The Demand Connection Code (DCC) includes requirements relating to:

- Transmission connected demand facilities (large users which connect directly to the transmission network). These are generally industrial in nature (for example data centres, steel works, aluminium smelters etc.);
- Transmission connected distribution networks;
- Grid users providing demand side response (DSR); and
- The roles and responsibilities of grid users and network operators.

The general requirements in the code define how to avoid and cope with extreme system events that could threaten the stability of the transmission system (including frequency and voltage ranges).

Further requirements outline the principles, procedures and parameters of user connection, with values that are closely related to those of the Network Code on Requirements for Generators (including for existing users, compliance, and derogation).

Operational requirements contained within NC DCC ensure that information exchange, a system defence plan (including in instances of low frequency demand disconnection and low voltage demand disconnection), power flow control (demand side response) and voltage management (active control of reactive power) are possible.

The DCC sets out the connection requirements that DSR providers with cross-border relevance will be obliged to comply with (including rules regarding reaction times, communication and compliance testing).

3.4.4 HVDC Connection Code

The Network Code on High Voltage Direct Current Connections (NC HVDC) will specify connection requirements for new DC connections, links between or within synchronous areas (parts of the European grid which are operated as one system and maintain the same frequency at all times) and new DC-connected Power Park Modules, such as offshore wind farms, which are becoming increasingly prominent in the European electricity system.

3.4.5 Operational Security

In the past, each electricity transmission system operator (TSO) had their own rules for operating their system; these rules were based mainly on national requirements. Increased interconnection between TSOs, ever increasing amounts of electricity generated from renewable sources and the creation of a single internal energy market means that TSOs now require common, binding rules to operate not only national electricity transmission systems, but also a European system.

The Network Code on Operational Security (NC OS) sets out the framework for maintaining a secure interconnected European electricity transmission system. It contains the common, legally binding principles and rules for operating electricity transmission networks, which all TSOs must follow.

By doing this, the TSOs ensure that networks operate in a secure, coordinated and efficient manner at all times. Because effective coordination between TSOs is a prerequisite for the completion of the European internal electricity market, the NC OS also contributes to Europe’s energy policy objectives of decarbonising the energy sector and enhancing competition.

3.4.6 Operational Planning and Scheduling

The Network Code on Operational Planning & Scheduling (NC OPS) introduces common methodologies for operational security and adequacy analysis. By doing so, it allows the different TSOs to work together in a coherent and coordinated way across Europe to efficiently prepare operational processes. It also allows TSOs to use transmission resources efficiently. The code provides procedures to handle the uncertainties which are inherent to studies of future operation conditions, in a coordinated way, from year-ahead to some hours ahead, and which tend to increase with the increasing amount of renewable generation.

The OPS code specifies the way in which the maintenance of assets is coordinated. Since all power plants and all transmission lines can't be taken offline at the same time, TSOs make coordinated availability plans to ensure the adequacy of the grid, generation and demand. With the electricity flows increasingly crossing borders, these availability plans also affect operations in neighbouring countries. Therefore, the NC OPS improves efficiency by ensuring that the TSOs coordinate all availability plans, which prevent the need for costly measures that might otherwise be required.

Finally, the NC OPS ensures that every actor involved in system operations and electricity markets knows what is expected of them. It determines the roles and responsibilities for transmission system operators (TSOs), distribution system operators (DSOs), significant grid users and market players with regard to operational scheduling procedures and prescribes how the different parties exchange data.

3.4.7 Load Frequency Control and Reserves

The Network Code on Load Frequency Control & Reserves (NC LFCR) contains significant technical detail. While much of this detail relates to cooperation between TSOs, it also establishes important rules for how parties providing reserves and TSOs will interact. The principal benefit of the NC LFCR comes from setting out a single set of rules in a transparent manner. The code will deliver the following benefits:

•Provide greater transparency and a requirement to produce public information on frequency parameters;

•Formalise, for the first time in Europe, harmonised system frequency quality targets;

•Introduce a series of harmonised control processes and operational procedures;

•Specify harmonised minimum technical requirements on the way reserves are provided (giving more clarity to the providers of these services); and

•Establish harmonised procedures for cross-border exchange, sharing and activation of electricity reserves, which will improve the efficiency of the European transmission system.

Crucially, the NC LFCR will provide a solid foundation on which a single European electricity market, and in particular, a balancing market can develop.

3.4.8 Capacity Allocation & Congestion Management

The Network Code on Capacity Allocation & Congestion Management (NC CACM) will help achieve a fully integrated electricity market for Europe by setting out the rules that will introduce a single approach to cross-border electricity trading in Europe. The guideline sets out rules for capacity allocation – allocating the available cross-border capacity on the electricity transmission infrastructure in day-ahead and intraday timescales, and outlines the way in which capacity will be calculated across the different zones. CACM also sets out the rules for congestion management, the management of scarce transmission capacity among the parties requesting use of such capacity.

3.4.9 Forward Capacity Allocation

The implementation of the Network Code on Forward Capacity Allocation (NC FCA) will ensure that appropriate cross-border hedging opportunities are offered on all borders. Transmission system operators (TSOs) will have to offer market participants either physical or financial long-term transmission rights (allowing them to hedge volatility in price differences between different bidding zones within day ahead markets and reducing risk).

Another significant goal is to establish a single allocation platform, which will become a single point of contact for each market player wanting to participate in auctions for transmission capacity. This single set of rules will reduce the costs of participating in the market and increase efficiency.

3.4.10 Electricity Balancing

The objective of any balancing market, be it national or pan-European, is to ensure that demand and supply remain in continuous balance at the lowest possible cost to customers.

The Network Code on Electricity Balancing (NC EB) aims to move Europe from the current situation in which most balancing is carried out on a national level, to a situation in which larger markets allow the different resources which Europe has available to be used in a more effective way (for example hydro power from Switzerland allowing greater levels of solar power to be connected in Italy or Germany).

The NC EB will promote greater integration, coordination and harmonisation of electricity balancing rules in order to make it easier to trade resources. This will allow TSOS to use the resources available more effectively, bring down costs and enhance security of supply.

4. Amendments for harmonisation with ENTSO-E requirements and justifications

4.1 About justifications

The requirements of ENTSO-E codes have been established following the principle of optimisation between the highest efficiency and lowest cost for all involved parties. The supporting documents of each European code give the explanations and justifications of requirements which are new or differ from the standards previously accepted by the involved parties.

In the present document, general information on the objectives and content of ENTSO-E codes are given, helping participants in the public consultation to understand why amendments have been introduced in Turkish regulations as a result of the process of harmonisation. Detailed justification is not given for amendments which consist in a simple transposition of a requirement included in the ENTSO-E codes. Participants are invited to consult supporting documents of ENTSO-E codes in order to find the initial justification of the requirement. However careful explanations and justifications are given in the cases in which ENTSO-E requirements have been adapted to Turkish context or postponed.

4.2 Legal aspects

Another supporting document, focused on legal aspects, has been drafted separately from this explanatory note. This guidance document explains the grounds and justifications under which the Turkish regulations harmonised with ENTSO-E requirements will be enacted.

It clarifies the context of harmonisation of the ENTSO-E network Codes with the Turkish legal framework and ensures compliance of these network codes with the provisions set forth in the Electricity Market law No. 6446 of March 14, 2013. It also ensures that this harmonisation respects the divisions of tasks and powers between EMRA, TEIAS and the Ministry of Energy and Natural Resources as the per the Laws and Regulations currently in force in Turkey and reminds the need to respect the principles of non-discrimination among market players, transparency and temperance/proportionality of the decisions to be taken by public entities and regulatory bodies while regulating the electricity sector.

This guidance document finally explains that harmonised regulation will enter into force following:

- The signing of the Long Term Agreement between ENTSO-E and TEIAS, and
- The enactment of the relevant network Codes and their publication at the Official Journal of the European Union.

4.3 Amendments for harmonisation with the European connection codes

More than 500 new amendments are proposed for the Turkish regulations on requirements for connecting new facilities. They apply to all generators and demand facilities including those connected to distribution networks (wind turbines, domestic solar cells, etc...). Amendments on connection issues achieve the harmonisation of Turkish regulations with the three European draft network codes on “requirements for Generators”, Demand connection” and “HVDC connections & DC connected Power Park Modules”.

4.3.1 General explanations

Investment decisions taken now will affect the power system for the next decades. As such, there is a need to make sure that all users are aware of the capabilities which their facilities will be required to provide – recognising both the need for all parties to make a contribution to security of supply and the high cost of imposing requirements retrospectively. The grid connection codes therefore seek to set proportionate connection requirements for all parties connecting to transmission networks (including generators, demand customers and HVDC connections). A stable set of connection rules also provides a framework within which operational and market rules can be developed.

For these reasons, it is recommended that the amendments for new facilities related to these connection codes are adopted into the Turkish regulations as soon as possible (with a similar schedule as proposed in European Codes, that is an entry into force three years after the date of publication of the relevant regulation). However, present requirements in Turkish regulation will still remain into force but will be applicable to existing facilities only.

All ENTSO-E requirements for generation, demand and HVDC facilities are proposed to be introduced into the Turkish regulation except requirements for offshore power park modules and demand side response. With offshore power park modules (either AC or DC collected), there is no need in Turkey in the coming years as no offshore generation facilities are planned to be built. Moreover, these offshore power park modules still belong to the so called “emerging technologies” for which it is difficult to define standard performances and it is recommended, before specifying requirements for such technologies in Turkish regulation, to get initial feed-back on the implementation of the requirements included in European Grid Code in countries where offshore generation is rapidly growing.

With demand side response which has been introduced into the European Demand Connection Code (reactive power control and transmission constraint management, system frequency control, very fast active power control), the requirements need further definition at European level before being implemented and the introduction of such dispositions in Turkish regulation is proposed to be postponed.

The proposed amendments to the Turkish regulation mainly concern the following issues:

- Requirements for active power control and frequency support
- Requirements for reactive power control and voltage support
- Requirements for short-circuit currents and fault ride through
- Requirements for control
- Requirements for protection devices and settings
- Information exchange and coordination,
- Operational notification procedure for connection
- Compliance testing and simulations

The harmonisation of Turkish regulation with ENTSO-E connection codes requires a procedure for connection to be made publicly available along with models of detailed specifications sent to the owner of the facilities during the connection procedure (according to chapters “Operational notification procedure” and “Compliance” of the ENTSO-E connection codes). The procedure shall at least include the description of the various steps required by the European network codes for notifying users of the compliance of new connected facilities. Models of contract will need also to be drafted in order to describe the detailed specifications which will be sent to the owner of the facility and the dispositions he will take to ensure the compliance of his facilities. These detailed specifications shall cover at least studies, tests and simulations required from the owner of the facilities to ensure that their facilities are compliant with the requirements.

This relevant procedure and these documents do not currently exist in the Turkish regulation even if some compliance tests are required for generators in the framework of Electricity Market Ancillary Services Regulation. With the privatisation of DSOs in Turkey, it is very important to quickly set up such a procedure for connecting the distribution systems guarantying a transparent and non discriminatory access to the transmission system for the involved DSOs. The experience of European TSOs shows that the introduction of such procedures and models of specifications in the regulation will take time and will need public consultation before it is approved by the national regulatory authorities. It is recommended that the relevant amendments in the Turkish regulation are introduced with a delay of implementation (entry into force proposed 3 years after publication of the regulation).

4.3.2 What do the amendments for new generators cover?

The amendments set out the technical requirements that all new electricity generators must adhere to. The requirements depend on the size of the generator – with the smallest facing only a minimum set of requirements and obligations, gradually building up as plant size increases.

The Turkish regulation, as the Network Code on Requirements for Generators (NC RfG), identifies four classes of generators to which the regulation will apply (type A, B, C, D). These are categorised by size, with type A covering the smallest generating units (anything above 800W) and including technologies such as solar panels installed on the roof of a house or a small wind turbine. Requirements increase as size increases, with type D applying to the largest plants connecting to electricity transmission systems (generators of maximum capacity above 75 MW or connected at 110 KV or above). Type B applies to generators of maximum capacity above 1 MW and connected below 66 kV. Type B applies to generators of maximum capacity above 50 MW and connected below 110 kV. Type C applies to generators of maximum capacity above 50 MW and below 75 MW and connected below 110 kV.

Type A generators have to meet the most basic set of requirements, focused on frequency stability. The requirements increase progressively; for example, some type D generators will have to meet most of the requirements met by a type A, B and C generators in addition to other specific requirements (see example here below).

Two large categories of generation exist: rotating machine generation and power electronic interfaces. For each category, specific requirements are set out (requirements for Synchronous Power Generating Modules and Power Park Modules).

In RfG NC, specific considerations for a given technology can be dealt with at the national implementation level. In Turkish regulations, this possibility is not used for new generating facilities.

The amendments also determine procedures to ensure non-discriminatory treatment of generators across Europe and are based on realistic future generation/demand scenarios based on the development of large volumes of renewable energy sources (RES) in Europe.

Example:

A 400 MW combined cycle is a type D Synchronous Power Generating Module. It shall fulfil the following requirements:

- *General requirements for Type A power generating modules except for the need of logic interface in order to cease active power output*
- *General requirements for Type B power generating modules except for the need of logic interface in order to reduce active power output*
- *General requirements for Type C power generating modules except for automatic disconnection at specified voltages (on a non mandatory base)*
- *General requirements for Type D power generating modules*
- *General requirements for Type B synchronous power generating modules except for voltage control system*
- *General requirements for Type C synchronous power generating modules*
- *General requirements for Type D synchronous power generating modules*

4.3.3 Will the amendments for new facilities apply to existing ones?

The requirements set out in the amendments will apply to new facilities (generators, demand, distribution networks, HVDC systems...). They will not apply to existing facilities unless TEIAS and the corresponding regulatory authority request it. For this to happen, a clear process must be followed including extensive analysis and approval by regulatory authorities.

If there is a valid case for retrofitting existing facilities, the amendments provide a transparent process to be followed. This involves a number of steps including; a quantified cost benefit analysis, public consultation and a final decision by the national regulatory authorities.

In other cases, present requirements on Turkish regulation still remain in force for existing facilities.

4.3.4 Could the amendments be more severe than those applied to the RGCE system according to the European connection codes?

The requirements set out in the amendments are aligned with the requirements applied to facilities connected to the RGCE system with some exceptions detailed here below.

In the amendments, fault ride through capability for power generating module Type B has been aligned with existing Turkish requirements for wind facilities, requiring the capability to stay connected during a fault with zero voltage instead of 0.05pu in ENTSO-E requirements. This is justified to maintain continuity with the existing Turkish requirements.

In the amendments, TEIAS has the right to require PSS functions and black-start capability for new generators while these capabilities are subject to negotiation in the ENTSO-E requirements. This is justified by the position of the Turkish network far from the centre of the synchronous zone which increases both the risk of power oscillations and the risk of being in a black-out state.

4.3.5 Why are compliance testing and operational notification required in the amendments?

The potential impact of non-compliance with any element required in Turkish regulations, namely a reduction in transmission system security, justifies robust operational notification and compliance testing in the grid connection procedure of all facilities (generators, demand, distribution networks and High Voltage Direct Current systems).

The inclusion of operational notification procedures and the related compliance enforcement provisions is in line with the minimum standards and requirements for connections defined by the corresponding ACER framework guidelines:

"The network code(s) shall define clear and transparent criteria and methods for compliance monitoring, including the requirements for compliance testing."

4.3.6 What do the amendments on HVDC connection cover?

The amendments on High Voltage Direct Current Connections will specify requirements for long distance DC connections and links between different synchronous areas which are expected to become increasingly prominent in Turkey, especially for connecting the Turkish transmission system to neighbouring non European countries.

This is a relatively new area in which fewer standards or grid codes exist, enabling Turkey to benefit from the innovative pan-European approach developed for drafting the ENTSO-E HVDC connection code.

Technical requirements defined in the amendments apply to all HVDC systems connected to the transmission network whatever the status of the owner of the system (TEIAS, other network operators or private investors). Requirements on compliance testing and operational notification do not apply to HVDC systems owned by TSOs.

Technical requirements have been designed to enable the HVDC system to face system technical challenges ahead like operating conditions with high RES injection (typically in windy / sunny conditions with moderate demand). Among them, the HVDC system shall have the capabilities of:

- Frequency management with reduced inertia in synchronous area,
- Voltage management in areas remote from main centres of RES installations during times of high RES production when conventional generation, which has traditionally provided this service,is displaced; and
- Fault level (system strength) management in context of rapid changes from high system strength during low RES production to extreme low system strength during high RES production, when synchronous generation is displaced (not operating).

4.4 Amendments for harmonisation with the European operational Security codes

About 300 amendments are proposed to be introduced into the Turkish regulations for real time operational security. These requirements apply to TEIAS, DSOs and grid users. Their main goal is to keep the European interconnected transmission system in a continuous and safe operation state.

The amendments are aimed at the adoption of common rules for operating the European interconnected network and mainly cover two fields of activities, the process of outage scheduling of the elements of the interconnected network and the load frequency control in the Continental Europe synchronous area to which the Turkish system is already interconnected. Amendments on operational security issues achieve the harmonisation of Turkish regulations with the three European draft network codes on “Operational Security”, “Operational Planning and Scheduling” and “Load Frequency Control & Reserve” and with the RGCE Operation Handbook.

4.4.1 General explanations

It is recommended that the harmonisation with ENTSO-E operational security codes done as soon as possible. There are few technical gaps (such as for example the lack of definition of the alert/emergency states or not enough detailed adequacy analyses). However, the harmonisation requires a significant number of amendments in order to describe in the regulation existing processes which were until now TEIAS internal procedures.

Special emphasis can be given to the following amendments summarised here:

- related to Operational Security principles for cross-border operation of the system, the normal, alert, emergency and black-out system states have to be defined and monitored;
- related to Reliability and redundancy of communication and assessment means: clear obligations in term of redundancy and reliability of TSO’s monitoring and system control tools have to be addressed (back-up of SCADA and Operational Security Assessment tools, Business Continuity);
- related to data exchange: amendments contain the obligations in term of accuracy or uncertainty as well as requirements for data exchange between DSOs;
- related to bilateral Inter-TSO contracts: amendments specify that such contracts shall exist with neighbouring ENTSO-E member TSOs and what the content of such contracts shall be;
- concerning TSO’s obligations related to cross-border operation of the system in the case of a defense plan: amendments ensure that TEIAS will support the emergency measures to be applied and coordinated by frequency leader in case of over- or under-frequency above 200mHz; they also ensure that settings of the Automatic Under Frequency Load Shedding plan will be aligned with synchronous area standards;
- amendments are introduced detailing the obligations of TEIAS in terms of cross-border operation of the system in case of a restoration plan involving several TSOs in the synchronous area: Black-start capability has to be tested regularly and at least once every 3 years; TEIAS shall follow the instructions of the resynchronisation leader to synchronize two separate areas involving more than one TSO; TEIAS shall respect criteria for the reconnection of load and generating units once the system is interconnected with neighbouring TSOs during the restoration process;
- related to training: amendments introduce obligations for TEIAS related to System Operation Employee training, employees in charge of real-time (including a certification process) and employees outside of the control rooms (who are carrying out operational planning and market balancing roles).
- related to adequacy: amendments add more details on the process of Adequacy analysis; summer and winter Generation Adequacy outlooks; and update of the area Adequacy assessment closer to real-time;
- amendments add high level description of NTC calculation method;

- Concerning the grid model and the DACF (day-ahead congestion forecast): amendments add more details on the grid models used for capacity calculation and the use of a yearly, weekly, daily (DACF) model; add explicit inclusion of the participation of Turkey to the DACF process of continental Europe; add that TEIAS carries out DACF N-1 security calculations according to Policy 3;
- Related to outage coordination: amendments add more details on the process and the procedures for outage scheduling (e.g. determination of a list of relevant generating units and relevant grid elements) and for availability plans (of relevant generating units and relevant grid elements);
- Concerning Load Frequency Control, amendments add provisions related to operation in alert state as well as provisions related to reserve providing units connected to DSO grids.

The requirement for the establishment of a “confidential Security Plan containing a risk assessment of critical assets owned or operated by the TSO, to major physical or cyber threat scenarios” needs to be better defined at ENTSO-E level before it is introduced as a mandatory requirement in Turkish regulation. The relevant amendments have not been introduced into Turkish regulation.

The harmonisation with ENTSO-E operational security codes also requires the development of grid models for time frames other than monthly, weekly and day-ahead. However these timeframe should not be implemented in ENTSO-E before 2016. The relevant amendments will not be introduced in Turkish regulation until these grid models are in operation inside ENTSO-E.

The harmonisation with ENTSO-E Load frequency & Reserve codes will need TEIAS to define dimensioning rules for Secondary and Tertiary Restoration Reserves. This requirement is introduced in Turkish regulation but the entry into force is planned for a date agreed with ENTSO-E (such dimensioning rules need the definition of common rules for a synchronous area which are not yet established at RGCE level).

4.4.2 What is operational security?

The primary goal of Europe’s transmission system operators (TSOs) is ensuring that “the lights stay on at all times”.

This is a complex task, which requires a broad range of activities to be performed in an efficient and coordinated way. These activities, which take place at different stages, are termed operational security analysis and the goal of keeping the lights on is termed operational security.

Operational security requirements need to set the implementation of a large number of processes, including how to manage short circuits, frequency control and power flows and how to undertake contingency analysis and dynamic stability analysis. They also need to identify a series of different system states, which are important to identify which of the processes will be applied when.

The exchange of data is crucial to efficient operational security analysis.

For a system to work properly and in a secure way, close interactions between all parties in that system are needed. In the electricity sector, this means customers, distribution system operators (DSOs), TSOs and generators. Each of these parties plays a role in supporting the system security (for example generators can provide services that are vital to ensuring the stability of the grid) and so, different obligations are addressed to those parties.

4.4.3 How do transmission system operators (TSOs) maintain operational security?

TSOs maintain operational security through operational planning processes and real-time operations. Operational planning starts over a year before real time as the TSOs define security criteria and undertake system stability studies. Clearly training staff so that they can operate the system safely and securely is also key. The TSOs continually update their plans and refine their analysis as the situation changes, and becomes clearer as real time approaches. They consistently look at system conditions; identify possible concerns and then actions to remedy these concerns.

4.4.4 Why does system operation need operational Planning & Scheduling?

The synchronous area of Continental Europe is one of the largest and most complex physical man-made systems in the world. To ensure this system is reliable, sustainable and stable (i.e. that the lights stay on at all times), transmission system operators (TSOs) must make plans and schedules to be able to operate the transmission system in real time.

For example, TSOs analyse in advance whether there will be enough electricity generation to meet customer demand (known as adequacy analysis) and plan the movement of electricity to ensure the transmission system can cope with it in a secure way (known as operational security analysis).

In practice, TSOs forecast and plan the operation of the system, exchanging the “schedules” of planned electricity flows, adjusting these forecasts where necessary due to short-term changes (e.g. wind volatility) and finally, operate the electricity transmission system in real time.

In the interconnected network of Continental Europe, the last decade has seen enormous changes in the way in which electricity is generated (with much higher levels of generation from unpredictable electricity sources, such as wind), traded (100% growth of intraday trade in one year alone) and consumed.

These changes make the job of planning and scheduling the electricity transmission system much more challenging. They also require TSOs to plan on both national and European levels. Clear communication and coordination among all European TSOs is key to planning and scheduling the transmission system so that it operates securely at all times.

All TSOs of the synchronous area need to work more closely together with a common approach to assessing the operational security of the European transmission grid.

4.4.5 What is Operational Planning & Scheduling?

To keep an electricity system reliable, sustainable and stable, TSOs make plans in order to be prepared to operate a system in real time. This involves analysing whether there will be enough generation to meet demand (adequacy analysis), and whether the system can handle the resulting flows in a secure way (operational security analysis).

Coordinating the maintenance of assets is the core of the operational planning process and is essential for ensuring the most efficient preparation for operating the transmission system. Since all power plants and all transmission lines can’t be taken offline at the same time, TSOs prepare and share coordinated availability plans to ensure adequacy of the grid, generation and demand. With electricity flows increasingly crossing borders due to greater interconnection, these availability plans affect operations in neighbouring countries and TSOs shall coordinate them to improve their overall efficiency.

Scheduling is a task in which TSOs collect and manage the schedules of market participants (i.e. their plans, notably for generation levels, or for electricity trading) in order to prepare the system for stable real time operation.

4.4.6 What is load frequency control?

Frequency quality is a requirement for electricity transmission systems to operate correctly; a balance between power production and consumption is needed to maintain the frequency at 50 Hz.

In a large synchronous area such as Continental Europe, each TSO ensures that there is no error in its transfer of electricity to neighboring TSOs. If this transfer error is zero then the system is balanced. If all the TSOs systems are balanced, then the frequency within the synchronous area will be at the required 50Hz.

When the TSOs see either their transfer error increasing or the system frequency changing from the standard value of 50 Hz they act to control it and restore the system to the required value. This may happen, for example, because a power plant has broken down or because a demand or generation forecast was inaccurate.

TSOs need to ensure that sufficient generation and/or demand is held in automatic readiness to manage all circumstances that might result in errors or frequency variations. This is referred to as reserves.

4.4.7 What are Frequency containment, Frequency restoration and replacement reserves in ENTSO-E codes?

In order to harmonise rules in all European synchronous areas, ENTSO-E introduced new definitions for the frequency control reserves (Frequency Containment, Frequency Restoration and Replacement Reserves).

In the synchronous area Continental Europe, these new definitions have not yet been introduced in the Operation Handbook which is the set of rules in force for TSOs operating this synchronous area.

For this reason, these new definitions have not been introduced into the Turkish Electricity Transmission Grid Regulation but some existing definitions have been adapted to prepare a further harmonisation.

In the Turkish Electricity Transmission Grid Regulation, "Primary frequency control" fully corresponds to the "Frequency Containment Process" defined in ENTSO-E NC LFCR (process that aims at stabilizing the System Frequency by compensating imbalances by means of appropriate reserves).

ENTSO-E NC LFCR defines the Frequency Restoration Reserves (FRR) as the active power reserves activated to restore System Frequency to the Nominal Frequency and power balance to the scheduled value. This code defines furthermore the automatic FRR (FRR that can be activated by an automatic control device) and the manual FRR. In the Continental Europe synchronous area, both automatic and manual FRR shall enable the TSO to restore frequency in under 15 minutes.

In the Turkish Electricity Transmission Grid Regulation, "Secondary frequency reserves" correspond to the automatic FRR defined in ENTSO-E NC LFCR (Active Power Reserves automatically activated to restore System Frequency to the Nominal Frequency and power balance to the scheduled value).

The amendments introduced in the Turkish Electricity Transmission Grid Regulation clarify the previous notion of "tertiary frequency control reserves" by distinguishing "Tertiary Restoration Reserves" and "Tertiary Replacement Reserves" according to their activation time (within 15 minutes for Tertiary Restoration Reserves and from 15 minutes up to hours for Tertiary Replacement Reserves).

In the Turkish Electricity Transmission Grid Regulation, "Tertiary Restoration Reserves" correspond to the Manual FRR defined in ENTSO-E NC LFCR (Active Power Reserves manually activated to restore System Frequency to the Nominal Frequency and power balance to the scheduled value).

In the Turkish Electricity Transmission Grid Regulation, “Tertiary Replacement Reserves” correspond to the Replacement Reserves defined in ENTSO-E NC LFCR (reserves used to restore/support the required level of FRR to be prepared for additional system imbalances).

4.5 Amendments for harmonisation with the European market codes

About 150 amendments are proposed to be introduced into the Turkish regulations for preparing the integration of the national Turkish Electricity market and balancing activities to wider scale entities such as coupled markets or cross-border coordinated balancing areas. The adoption of common rules for capacity allocation (from forward markets to real time) and congestion management are essential steps for allowing such future integration of markets. The adoption of common balancing products and of common rules for balancing is similarly an essential step for allowing the development of cross-border coordinated balancing areas. Amendments on market issues achieve the harmonisation of Turkish regulations with the three European draft network codes on “Capacity Calculation & Congestion Management”, “Forward Capacity Allocation” and “Electricity Balancing”.

4.5.1 General explanations

The harmonisation with ENTSO-E market codes will require great efforts from TEIAS in the coming years to comply with the very ambitious targets for market integration in Europe set in these codes. However, it is generally too soon to introduce mandatory requirements in the Turkish regulation related to this target situation. Most of the requirements either imply the implementation of measures taken in common with the other members of ENTSO-E (market coupling, flow based capacity allocation, financial transmission rights, cross-border balancing and balancing procurement) or need further definition at ENTSO-E level before being implemented. Finally, few requirements are proposed to be introduced now, mainly for transparency purposes (in order to describe in Turkish regulations already existing process) or to allow Turkish processes and mechanisms to be prepared for joining such regional initiatives (firmness of long term transmission rights in case of force majeure, harmonisation of intraday market closing time, “use or sell it” principle for Physical Transmission rights...).

Special emphasis can be given to the following amendments summarised here:

- related to Capacity Calculation: Amendments align the capacity calculation methodology with NC CACM for day-ahead, by adding i)the notion of non-costly and coordinated remedial actions in the capacity calculation phase; ii)the obligations on generation and load data provision for capacity calculation; iii)the description and usage of the Reliability Margin; iv)the firmness of Day-ahead Capacity and v)the firmness deadline;
- Amendments add details on the Publication of Information on Capacity Allocation;
- Amendments introduce the notion of firmness for allocated cross-border capacity in case of Force Majeure;
- Amendments add more details on the grid model (CGM) used for capacity calculation on daily basis (DACF);
- Related to the markets: amendments add details on terms and conditions to participate in the Forward Capacity Allocation and functioning of the market : timings, anonymity of the bidding; use of currency in international markets;
- Amendments require from TEIAS the use of redispatching and countertrading;
- Amendments include the process of calculation and validation of scheduled exchanges;

- On physical transmission rights: amendments align arrangements on explicit auctions with the transitional arrangements of the NC CACM with the introduction of the principles of remuneration of non-used long term Capacity Rights related to the day-ahead value of the capacity and the introduction of a firmness deadline and compensation rules in case of curtailment of transmission rights;
- Related to balancing: amendments modify the definition of balancing to be in line with European meaning (clearly separate processes related to day-head and intraday markets and real time balancing); they also include provisions for a procedure of consultation when establishing or revising balancing rules or inter TSO agreements related to balancing (by end of 2016);
- Related to balancing: amendments also add details on role and responsibility for DSOs, Balancing providers and Balance Responsible parties; add provisions to ensure financial neutrality of the TSO during the imbalance and settlement process; and finally add provisions allowing transfer of secondary frequency control obligation between balancing service providers inside Turkey.

The harmonisation with ENTSO-E code on Forward Capacity Allocation requires the introduction of caps limiting the compensation for curtailment. The introduction of these requirements in the Turkish regulation has been postponed so that TEIAS can avoid having to cope with the additional financial risk that would have resulted from the implementation of this measure.

ENTSO-E code on Forward Capacity Allocation introduces Financial Transmission Rights (FTRs). FTRs are not yet implemented in Europe and are seen as a next step which could be implemented in a mature market after a reasonable period of use of PTR – Physical transmission Rights (for example FTR would probably not be implemented in Continental West Europe before 2020). TEIAS only just started using PTR recently and it is recommended that TEIAS waits until at least a significant part of Europe has moved towards FTR before envisaging this.

The harmonisation with ENTSO-E balancing code will require TEIAS to allow demand side providers to contribute to balancing services. It will also require TEIAS to significantly adapt its secondary frequency control process in order to comply with the following requirements: introduction of a merit order for secondary reserve activation; separation of upwards and downwards reserve for capacity bids and activation; marginal price calculated only for balancing purposes (for energy activation); correction of imbalances in the settlement process in order to deduce the energy activated by the secondary frequency control. The experience of European TSOs shows that these evolutions have major cost implications and impacts on security of operation which need to be carefully studied before being introduced. Feasibility studies from TEIAS are needed before introducing mandatory requirements into the Turkish regulation. For that reason, these requirements are not included in the regulations subject to public consultation.

4.5.2 What is the EU target for market design and Capacity Allocation and Congestion Management?

The EU target for the electricity market design is based on four elements:

1. A single day-ahead market – the wholesale market in which generators, traders, and end users can submit bids and offers to buy or sell energy for delivery on the following day; and in which transmission capacity and electricity are auctioned together, with prices only differing if there is congestion on transmission networks.

2. Pan-European intraday markets, which allow market players to trade closer to real time, letting them manage risks and respond to changing conditions (such as varying wind forecasts). Intraday markets take place during the day of operation, as opposed to day-ahead markets where trades are concluded the day before the physical delivery.
3. A coordinated approach to capacity calculation – including implementing the innovative “flow-based” method – with the objective of making the best use of the electricity transmission lines which interconnect Europe.
4. The definition of a series of bidding zones (the largest geographical areas within which market participants can offer and buy energy – in the day-ahead, intraday and longer-term market timeframe – without having to acquire transmission capacity to conclude their trades) on the basis of transparent criteria reflecting both system security and the need to promote competition.

As explained above, it is too soon to introduce mandatory requirements in the Turkish regulation related to this target situation.

4.5.3 What is market coupling?

Market coupling is a method for integrating markets which allows two or more wholesale electricity market areas (normally corresponding to a national territory) to be merged into a single market area, as long as there is sufficient transmission capacity available between those markets. With market coupling, the daily cross-border transmission capacity between the various areas is not sold separately (explicitly auctioned) among the market parties, but is implicitly made available via energy transactions on power exchanges on either side of the border (hence the term implicit auction).

Buyers and sellers on a power exchange can match their bids and offers submitted via another power exchange as if it was one single market area, without the need to separately acquire the corresponding transmission capacity necessary to transport electricity between the two (or more) market areas.

4.5.4 What is the difference between the flow-based capacity allocation methodology and the coordinated net transfer capacity (NTC) allocation methodology?

The coordinated net transfer capacity (NTC) method is based on the principle of pre-defining a certain level of maximum commercial exchange capabilities for each border between bidding zones.

The flow-based method, instead of calculating aggregated transfer capabilities per bidding zone, determines physical margins on each “critical grid element” (transmission line which is likely to become congested) and their influencing factors (how each critical grid element is affected or affects another critical grid element). This normally allows an increase in cross-border transmission capacity where it is most needed because it more accurately reflects the actual situation on the grid.

EU regulation specifies that both methods are permissible approaches when calculating cross-border capacity. The flow based approach is preferred over the coordinated net transmission capacity approach for day ahead and intraday capacity calculation where interdependencies of cross-border capacity between bidding zones is high. The coordinated net transmission capacity approach may be applied in regions where interdependencies between cross-border capacities are low and the added value of the flow based method cannot be proven.

Due to the geographical situation of Turkey, far from the centre of the synchronous area and linked with only two TSOs which are members of ENTSO-E, there is currently no added value evident to the flow based method and NTC method can be maintained for allocating cross-border capacity.

4.5.5 What is meant by forward capacity allocation?

Electricity can be traded in various different timescales. This can be anything from a year or more before the energy is to be delivered (called the forward markets), until the day before the energy is to be delivered (the day ahead market) or even on the day of delivery itself (the intraday market).

In each of these markets, companies that want to buy an entitlement to use part of the available cross-border transmission capacity at a point in the future to flow energy between countries, bid for it through auctions. Parties that are successful in the auctions are allocated capacity (in the form of transmission rights).

Forward capacity allocation is the process of allocating transmission rights on markets in which the right to use cross-border capacity is sold in advance (be that weeks, months or even years before it will actually be used).

Regarding Turkish regulations, Electricity Market Import and Export regulation, regulation on capacity allocation and secondary market for transmission right and Auction Rules have been amended to be harmonised with European rules on forward capacity allocation.

4.5.6 What is meant by Electricity Balancing in ENTSO-E network codes?

Electricity balancing is the process through which the transmission system operators (TSOs) ensure that they are able to access a sufficient amount of energy to balance the differences between supply and demand that occur in every electricity transmission system. If back up power is not available, then a small problem on the transmission network (such as a power station not working) could have serious Europe-wide consequences for system security (i.e. there could be a need to disconnect some customers from the system).

There are two dimensions to electricity balancing: balancing energy and balancing reserves. When the intraday market closes, a clear picture is available of how much energy supply and demand is required. However, errors in forecasts and unforeseen events occurring mean these forecasts can often change. To ensure the balance between demand and generation, TSOs will either increase or decrease demand or generation (depending on whether there is too much or too little of one or the other).

They do this using an electricity balancing service provided by energy market participants. TSOs select the cheapest available provider – irrespective of whether it is a generator, an industrial customer or someone providing demand side response – with providers signalling the price at which they are willing to provide the service. This is called balancing energy.

There are circumstances where it is not sensible for a TSO to wait until just before real time to buy the services it needs. In these cases, the TSO will reserve capacity on a cross-border line in order to ensure that the service will be available. For example, Denmark could need to reserve capacity from Norway to ensure that it can access hydropower in cases where the wind stops blowing. This is called balancing reserves.

Balancing in existing Turkish regulations has a wider meaning than in ENTSO-E definition and includes the functioning of day-ahead and intraday markets (eg. Electricity Market Balancing and Settlement Regulation). Amendments are introduced to harmonise the definition of balancing to be in line with European meaning (to clearly separate processes related to day-ahead and intraday markets and real time balancing).

4.5.7 What is the EU target for Electricity Balancing?

The Network Code on Electricity Balancing (NC EB) aims to move Europe from the current situation in which most balancing is carried out on a national level, to a situation in which larger markets allow the different resources which Europe has available to be used in a more effective way.

The NC EB will promote greater integration, coordination and harmonisation of electricity balancing rules in order to make it easier to trade resources. This will allow TSOs to use the resources available more effectively, bring down costs and enhance security of supply.

The NC EB sets out a clear series of steps, which over the course of six years will see balancing markets grow from their current relatively underdeveloped state, to a set of regional markets and later a pan-European market.

This sequential approach allows TSOs and market participants to gain and share experience and, when clear milestones are reached to assess the appropriate next steps based on what is best for overall market and system security. This will make for more robust and effective long-term electricity balancing solutions.

A key part of the NC EB is that it creates a level playing field for all potential providers of balancing services, including demand side response and intermittent sources (like wind and solar power) by introducing standardised rules. Anyone will be able to offer balancing services with the most cost effective offers selected by the TSOs. The NC EB will encourage a greater number of parties to offer balancing services, which will create larger and more competitive balancing markets.

The implementation of this sequential process requires the adoption of common rules which are not yet defined at European level. First of all, the TSOs will need to work together to specify products (e.g. the services the TSO needs – such as how quickly energy can be provided and for how long delivery can be maintained) which can be offered Europe-wide. They will also need to form coordinated balancing areas (groups of countries which will work together) and update their existing balancing market rules. TSOs and market players will need to work closely as markets evolve and existing arrangements, national codes or contractual frameworks may need to be updated.

The development of a truly European balancing market will take over 5 years to complete and will require more changes to existing rules in Europe than in any other timeframe in which electricity is traded.

As European rules are far from being fully defined, it is considered to be too soon to introduce mandatory requirements in Turkish regulation related to the target situation. The proposed amendments only cover light adaptation of the national balancing market enabling it to be more easily integrated in a future European market without mentioning any explicit objective for this integration.

5. Documents considered for the harmonisation with the European connection codes

Turkish Regulation (*)	Reference version (With Official Gazette number of publication if available)
Electricity grid Code	Published in Official Gazette 28th of May 2014
Electricity Market Ancillary Services Regulation	Updated 17/12/2011 (28145)
Electricity Market Balancing and Settlement	Working update on 15/04/2014 (update on progress)
Regulation for Generation without a license in Electricity Market	Published 02/10/2013 (28783)
Electricity Market Import and Export	Updated 30/12/2012 (28513)
Electricity Market Connection and Usage of System Regulation	Published 28/01/2014 (28896)
Electric Market Distribution Code	Published 02/01/2014 (28870)
Regulation for documenting and supporting of Renewable Energy Sources	Published 01/11/2013 (28782)
Acceptance Regulation	Published 01/05/1995 (2280)
Principles for Capacity Allocation and Secondary Commercial transmission Rights	Published 07/06/2011 (27967)

(*) For legal issues, the Technical Assistance Team will also consider more general laws for the electricity sector (Electricity Market Law n°6446 - 14 March 2013 (28603) and Renewable Energy Law amended by law 6094 - 8 January 2011.

Other relevant Turkish documents
Model of Connection Agreement
Model of System Usage Agreement
Operational agreement with ESO & IPTO
Compliance Evaluation Questionnaire
Auction Rules

European network codes	**Reference version** (date)	**Comments**
Requirements for generators	8 March 2013	
Demand connection	21 December 2012	
HVDC Connections and DC-connected Power Park Modules	30 April 2014	Version sent by ENTSO-E and approved by ACER
Operational Security	24 September 2013	
Operational Planning and Scheduling	24 September 2013	
Load Frequency Control & Reserves	28 June 2013	Version sent by ENTSO-E and approved by ACER
Capacity calculation & Congestion management	27 September 2012 and Version adopted by EU Member States 5 December 2014	Amendments have been updated after public consultation with the most recent version
Forward Capacity Allocation	1 October 2013	
Electricity Balancing	23 December 2013 and Version sent by ENTSO-E to ACER on 16 September 2014 (dated 6 August 2014)	Amendments have been updated after public consultation with the most recent version