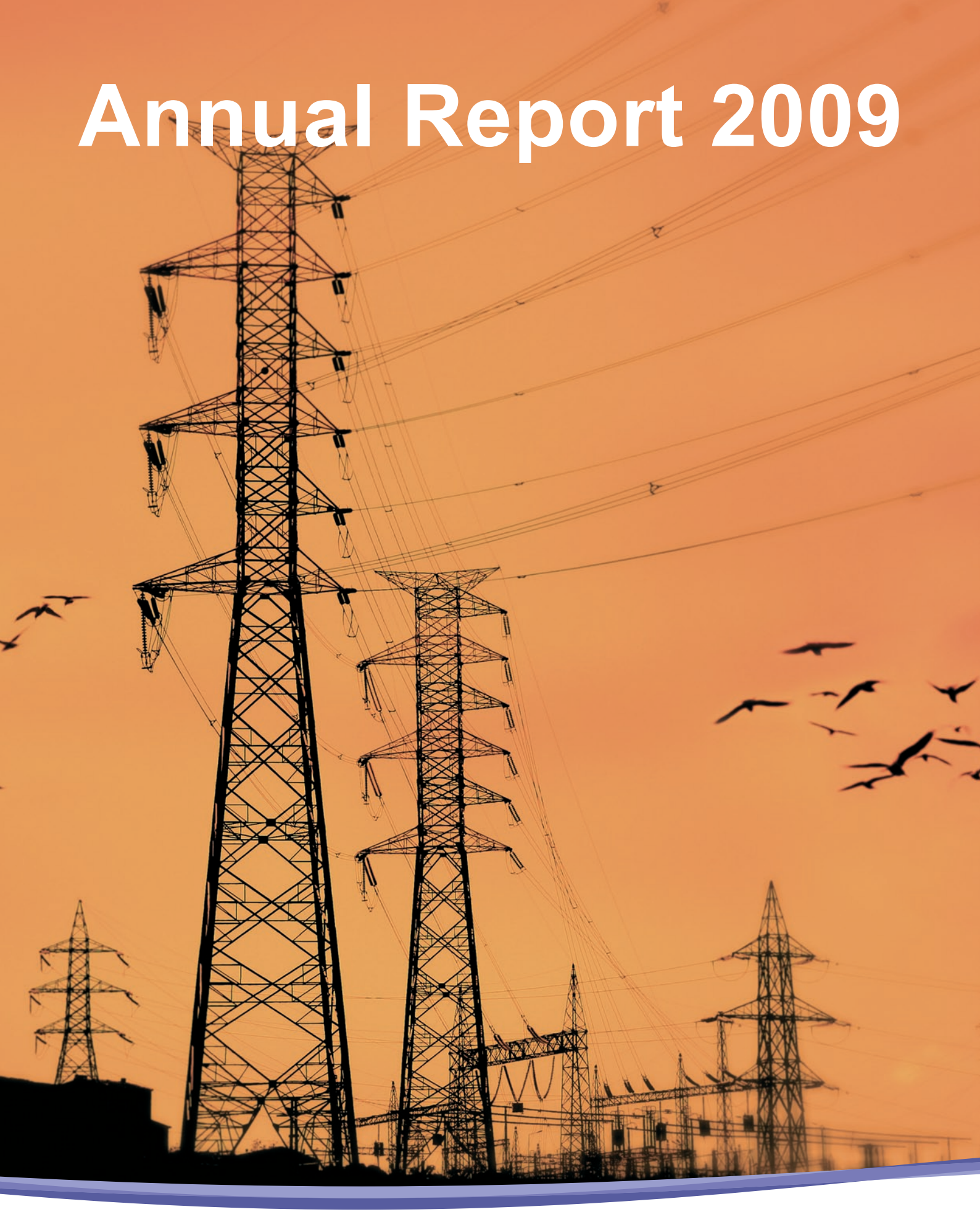
Annual Report 2009



European Network of
Transmission System Operators
for Electricity

entsoe

Annual Report 2009

Content

President's Foreword

2009 witnessed the creation of a new actor on the European energy stage: ENTSO-E, following the European Commission's proposals for a Third Package of Energy Legislation, adopted in 2009 after a two-year long process.

"The Third Package", as it is commonly known, is a major piece of legislation, which gives to ENTSO-E important responsibilities and recognizes the added value of TSOs in the process of market liberalization and climate change remedial actions.

Moving towards a decarbonized pan-European power system without jeopardizing customer demands for reliability is, in my opinion, a major challenge for all TSOs. In this respect, the establishment of ENTSO-E better fits today's and tomorrow's realities in the energy policy arena.

No less than 42 TSOs from 34 countries collaborate within ENTSO-E on system operations, system development, and market-related issues while ensuring a supportive role for regional initiatives. Quite a challenge!

TSOs play a crucial role in the process of the EU meeting the so-called "20-20-20-goals", a cornerstone in the combat against climate change. ENTSO-E stands able and ready to support society and stakeholders in the endeavor to increase renewable energy sources from today's share of 6.5 % to 20 % by 2020. For power systems, this means that a third of electricity will be generated by tens of thousands of small to medium size cogeneration and renewable energy sources as well as tens of large solar power plants and on-shore and off-shore wind power plants located all over Europe.

New major transmission highways at the European level and local reinforcement of distribution and transmission networks have to materialize, as massive quantities of power from coastal areas to inland – as well as between national power systems – will flow, depending on weather or price changes.

In addition to these renewable energy goals, the EU energy policy also stipulates a major effort to make energy 20 % more efficiently utilized over the coming ten years, and geopolitical realities call for a much more focused concern on the secure supply of energy to Europe's citizens and industry.

Together, these three pillars are key to our work. In fact, I strongly believe that they will, even more than legislation, be the driving force behind the integration of national power systems, and consequently, of their markets.

Network codes, ten-year development plans, adequacy reports, are among the main deliverables that all stakeholders are now contemplating from ENTSO-E. Work on these new tasks is well underway and the new premises, a location where our experts meet, where consultations with stakeholders as well as Board and Assembly meetings take place, reflect ENTSO-E's commitment to be an open, efficient and transparent body.

In the coming years, ENTSO-E also intends to contribute to the European research and development effort, as shown in our first R&D program. Exchanging experience and knowledge through relationships, or even partnerships, with TSO associations from other continents will be the next step for our young association.

This first year has lived up to its promises thanks to the cooperation established with representatives of our stakeholders in the industrial, regulatory and policy-making worlds. ENTSO-E staff were instrumental in delivering in due time our first deliverables, organizing the consultation process and workshops as well as tens of other pieces of work usually unnoticed but so important for a well-functioning association.

It is also my sheer pleasure to take this opportunity to convey a heartfelt thank you to representatives of our member TSOs, for their unflagging support in the creation phase of ENTSO-E. Without your commitment and proactive participation in the work we would not be where we are today.

Daniel Dobbeni

Chairman's Statement

ENTSO-E's vision – to become and remain the focal point for all European, technical, market and policy issues related to TSOs – is well under way now that the association is proceeding through its first operative year.

This means interfacing with many stakeholders: power system users (our members' customers), EU institutions, regulators and national governments.

ENTSO-E's work products contribute to the security of supply, a seamless, pan-European electricity market, the secure integration of renewable resources and a reliable future-oriented grid, adequate to energy policy goals, notably the so-called "20-20-20-targets".

Being the "TSO Hub" at European level, ENTSO-E's mission is to promote important aspects of energy policy in the face of significant challenges:

- **Security** – it pursues coordinated, reliable and secure operations of the electricity transmission network.
- **Adequacy** – it promotes the development of the interconnected European grid and investments for a sustainable power system.
- **Market** – it offers a platform for the market by proposing and implementing standardized market integration and transparency frameworks that facilitate competitive and truly integrated wholesale and retail markets, perhaps achieved in regional steps.
- **Sustainability** – it facilitates the secure integration of new generation sources, particularly growing amounts of renewable energy and thus the achievement of the EU's greenhouse gases reduction goals.

Among our deliverables, one document already stands out: our first (pilot) Ten Year Network Development Plan (TYNDP). Although launched on 1 March 2010 (when the public consultation period started) much of the work going into it took place during autumn and winter 2009. The drafting of this plan was organized in an open and transparent manner in coordination with EC and ERGEG, with early informal discussions with major stakeholders such as EURELECTRIC, EFET, EWEA, Greenpeace and many others.

In its new Brussels base, ENTSO-E's working organization is finding its feet and the workload of the 23 strong staff is already challenging, as indeed it is for the many groups of experts who, with the Brussels staff, comprise the multi-disciplinary virtual team that is ENTSO-E. It is my pleasure here to seize the opportunity and say Thank you, to all of you who have invested time and resources in the TSO community's common pursuit of making this part of the electricity industry a valuable player and facilitator in achieving European energy policy goals.

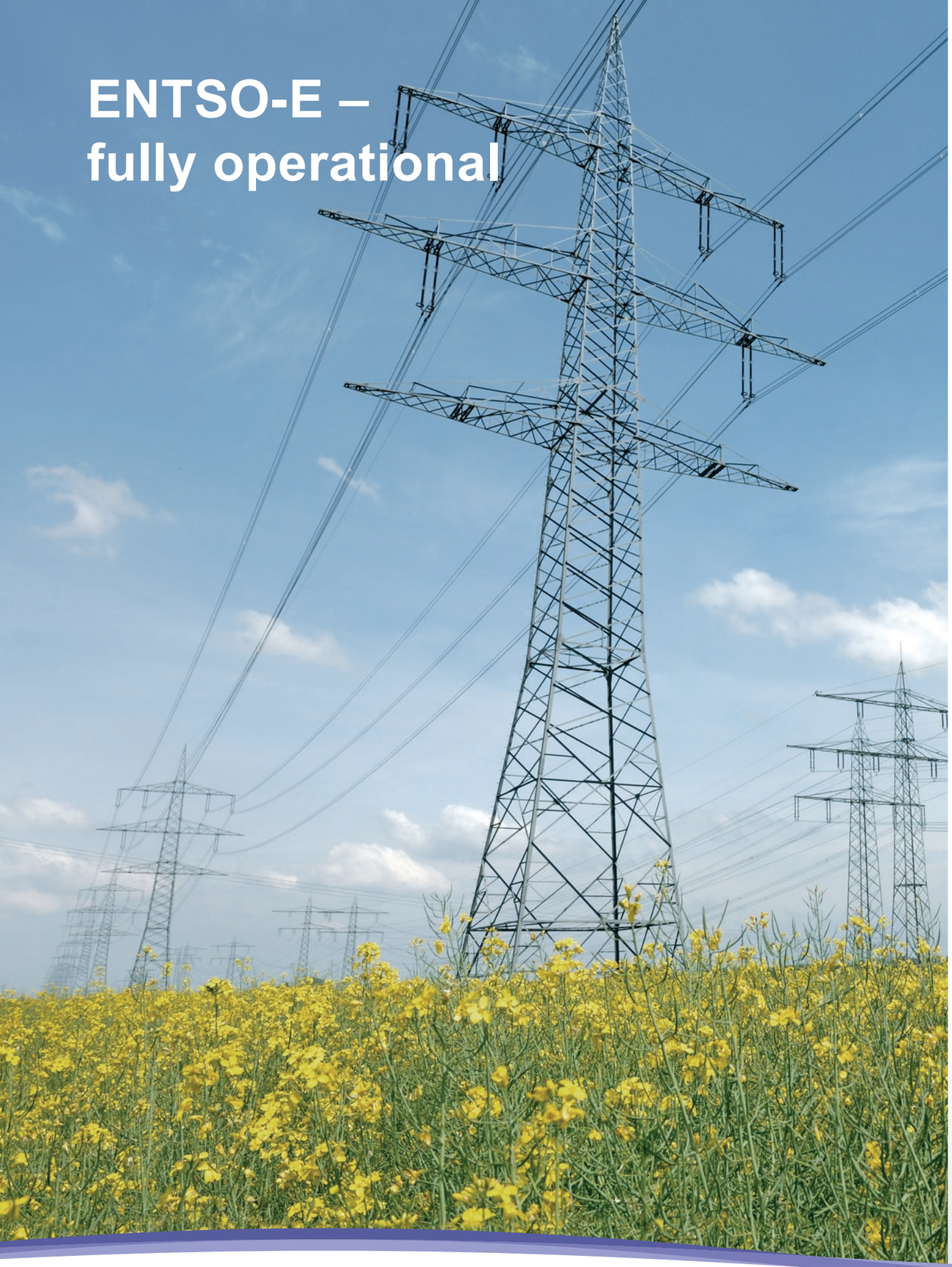
My thanks also go to representatives from our near neighbors in the regulatory and policy-making world. Continued close co-operation between all of us will be vital. As an example of this co-operation, I would like to mention the establishment of the Ad-hoc Advisory Group (AHAG), established as agreed between the Commission and ERGEG at the December 2009 Florence Forum. The role of AHAG is to advise the European Energy Regulators (in the future ACER) on preparatory work for the development of framework guidelines and network codes that come from those guidelines in the market area.

The coming years will by any standards mean a lot of work for this young organization and I believe we have made a great start in meeting the challenges set by the great expectations placed upon us.

Graeme Steele

Regulation (EC) No 714/2009, Article 4: European Network of Transmission System Operators for Electricity

"All transmission system operators shall cooperate at Community level through the ENTSO for Electricity, in order to promote the completion and functioning of the internal market in electricity and cross-border trade and to ensure the optimal management, coordinated operation and sound technical evolution of the European electricity transmission network."



ENTSO-E – fully operational

The Third Legislative Package for the Internal Energy Market (IEM) was adopted by the European Commission on 3 September 2009, almost a year after ENTSO-E was founded on 19 December 2008 and two months after ENTSO-E became fully operational on 1 July 2009. The first annual report, presented to stakeholders herewith, thus reflects the year 2009 with the first half spent on the starting-up process for the newly born organization for European TSOs, and the second half spent developing routines and first work products.

2009 can be described as a pioneering year reflecting the advent of increased cooperation and coordination among transmission system operators through ENTSO-E's start of operations on behalf of its 42 member TSOs in 34 European countries. ENTSO-E replaces its predecessor associations ATSOI, BALTSO, ETSO, Nordel, UCTE as well as UKTSOA, and not only continues and consolidates their work, but also takes on new mandates given to it by the Third Package. ENTSO-E's genuine legal raison d'être is Regulation (EC) 714/2009 on the conditions for access to the network for cross-border exchanges in electricity, which is part of the Third Package.

The elaboration of network codes for providing and managing effective and transparent access to the transmission networks across borders is now under way. So is the coordinated and sufficiently forward-looking planning and sound technical evolution of the transmission system in the Community, as the regulation asks for.

ENTSO-E and its members have started an ambitious work program, doing their utmost to meet EU and stakeholder expectations: a pilot network code on connection, consultation processes, the very complex preparation of the first Ten-Year Network Development Plan (TYNDP), the wholesale market target model, continued regional and statistical work and the start of numerous other TSO cooperation activities have fully engaged experts from the member companies and from the ENTSO-E Secretariat.

Through its work, ENTSO-E addresses the challenges of pan-European transmission grids and supports the three pillars of EU goals for a pan-European energy policy.

Thus, in line with the EU's energy policy goals and in line with Regulation (EC) 714/2009, ENTSO-E pursues primarily three objectives:

- Ensuring the secure and reliable operation of the European power transmission system in an increasingly complex pan-European electricity transmission network.
- Facilitating the secure integration of renewable energy sources and thus the achievement of the EU's greenhouse gases reduction goals.
- Enhancing the integration of the Internal Energy Market (IEM) by proposing and implementing standardized market integration and transparency frameworks.

These objectives – secure and reliable operation, the integration of sustainable energy sources and the further development of the IEM – are the very essence of ENTSO-E's existence and determine fundamentally all of ENTSO-E's activities.

Put in short, this mission is expressed and emphasized in ENTSO-E's maxim "Reliable, Sustainable, Connected". In 2009, ENTSO-E built the foundation of its future deliverables by putting in place the necessary working structure and by kicking off work in these three important areas.

Hence, the aim of this annual report is to reflect the work accomplished by ENTSO-E in its first operational year along the lines of the association's mission and maxim:

Reliable. Sustainable. Connected.

Inside ENTSO-E

The Brussels-based Secretariat assists and supports all ENTSO-E bodies in their work and is responsible for the direct and continuous interaction with European institutions, ERGEG/ACER and European-level stakeholders.

Assembly

ENTSO-E is governed by an Assembly, which is the general leading body of the association, and has full powers to enable the achievement of the association's objectives and purpose. Membership is required to be approved by the Assembly and the Assembly appoints the main office holders as well as the members of the Board.

President: Daniel Dobbeni,
Elia System Operator (BE)
Vice President: Jukka Ruusunen, Fingrid (FI)

Board

ENTSO-E is divided into three committees – System Operations, System Development and Market – and into a number of working groups, regional groups and expert groups. The ENTSO-E Board has a central role in this structure as it coordinates the committees' work and external representation, and implements Assembly decisions. The Board consists of 12 members that are appointed by the Assembly.

Chairman: Graeme Steele, National Grid (UK)
Vice Chairwoman: Malgorzata Klawe,
PSE Operator (PL)

Legal & Regulatory Group

Besides providing advice on legal issues and on the positioning of ENTSO-E in the evolution of the regulatory framework, it ensures legal and regulatory compliance of the association's activities.

Chairwoman: Jacqueline van Overbeek de Meyer,
TenneT TSO (NE)

System Development Committee

The System Development Committee is in charge of TSO cooperation regarding network development and planning. The main objective of the activities of the committee is to contribute to the adequacy and security planning of the transmission system by preparing the ENTSO-E Ten-Year Network Development Plan including generation adequacy outlooks. The committee activities aim at a European grid which is adequate for the purposes of a well-functioning European electricity market and, from the planning point of view, aims at a high standard of interoperability, reliability and security of European networks. The committee introduces technical rules or standards related to the planning of transmission systems and new technical concepts within its R&D activities. It also facilitates the exchange of information about efficient asset management, system technology and critical infrastructure protection. For these purposes, the committee may prepare system studies, investigate and develop long- and medium-term system extension strategies and manage system development data collection relevant to the committee's activities.

Chairman: Jean Verseille,
Réseau de transport d'électricité (FR)

System Operations Committee

The System Operations Committee is in charge of technical and operational cooperation of TSOs.

The objective of the committee is to contribute to ensuring and maintaining a high standard of operability, reliability and security of European networks. It introduces technical rules or standards related to the operation of the transmission system and reports on how these rules and standards have been implemented. The committee introduces new technical concepts for operation and aims at coherence and harmonization in operational issues between regions. It will deliver accurate, relevant and fast information for all stakeholders about power system operation and emergencies.

Chairman: Klaus Kleinekorte, Amprion (DE)

Market Committee

The Market Committee is in charge of TSO cooperation in market-related issues.

The objective of the committee is to facilitate a well-functioning European electricity market by contributing to market design and network-related market rules from the TSO perspective. It aims at integrating the views of market participants and all stakeholders into its activities.

The committee promotes efficient market mechanisms covering long-term, day-ahead, intra-day and balancing markets and system services. For these purposes, the committee may initiate studies on relevant areas such as market structure and congestion management issues, economic framework for TSOs and transparency policies. Market integration of renewable energy sources and decentralized generation are also included in focus areas in close collaboration with other committees.

Chairman: Juha Kekkonen, Fingrid (FI)

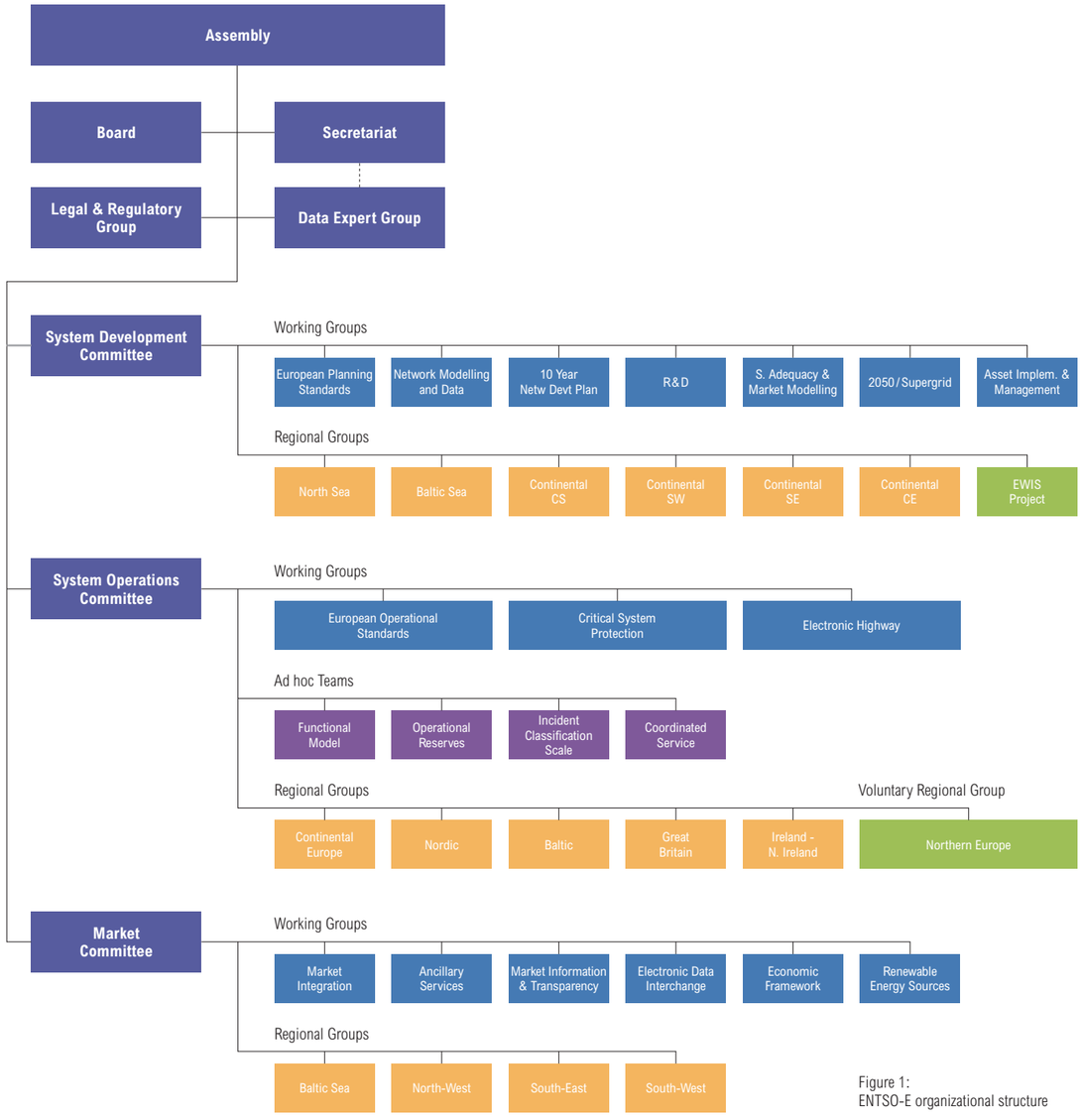


Figure 1:
ENTSO-E organizational structure

ENTSO-E Board Members

Graeme Steele, Chairman of the Board
(National Grid, UK)
Malgorzata Klawe, Vice Chairwoman of the Board
(PSE Operator, PL)

Members:
Pierre Bornard (Réseau de transport d'électricité, FR)
Zbynek Boldis (CEPS, CZ)
Luigi De Francisci (Terna, IT)
Martin Fuchs (transpower, DE)
Stelian Gal (Transelectrica, RO)
Bente Hagem (Statnett, NO)
Darius Masionis (LITGRID, LT – till 23/09/2009)
Aloyzas Koryzna (LITGRID, LT – since 23/09/2009)
Damjan Međimorec (HEP-OPS, HR)
Lajos Oroszki (Mavir, HU)
José Penedos (Rede Eléctrica Nacional, PT)

ENTSO-E Work Program 2009/2010

The preparation of an annual Work Program is one of the key deliverables required from ENTSO-E under the EU's Third Energy Package. According to Art. 8(5) of Regulation (EC) 714/2009, the ENTSO-E Work Program "shall contain a list and description of the network codes to be prepared, a plan on coordination of operation of the network, and research and development activities, to be realized in that year, and an indicative calendar".

As the Third Package has now begun its implementation phase (which will be complete in March 2011), ENTSO-E decided to publish a Work Program as early as mid-2009 such that it can make best use of the implementation period to test the Third Package processes and to advance those issues of most interest to stakeholders, regulators and the European Commission. One goal is that formal work on network code developments can progress rapidly after March 2011.

The formal process can only begin after the Agency for the Cooperation of Energy Regulators (ACER) can execute its tasks. Nonetheless, it is essential that as much preparatory work as possible is carried out before spring 2011 as this will be in the best interests of all concerned. The ENTSO-E Work Program 2009 – 2010 therefore focuses on:

- Pilot network code on grid connection with special focus on wind generation; as well as the preparation of further priority code areas
- Further key areas of TSO cooperation, such as the pilot Ten-Year Network Development Plan and a Research & Development Plan

Article 7(3) of Regulation (EC) 714/2009 stipulates that ENTSO-E shall produce an annual work program. Article 7(5) makes this more precise and reads:

"The annual work programme referred to in point (d) of paragraph 3 shall contain a list and description of the network codes to be prepared, a plan on coordination of operation of the network, and research and development activities to be realised in that year, and an indicative calendar."

Because of the importance of network codes and the entirely new and complex process for their development, a pilot code is one of the highest priority projects to advance the process together with the European Commission, ERGEG and stakeholders. Due to its urgency, grid connection with special focus on wind generation was chosen for the pilot code project.

Network codes are very important deliverables of ENTSO-E. The Third Package defines the code development process in great detail and lists 12 topic areas for network codes. More importantly, the Comitology process is foreseen to make ENTSO-E's network codes binding not only for TSOs but also for other affected market participants.

The involvement of the European Commission, member states, ACER and the extensive consultation will ensure that the codes are well balanced. Making the codes binding for others remedies a difficult shortcoming of the European energy market before the Third Package, namely that TSOs could make their operational rules binding for themselves through instruments such as operation handbooks and multilateral agreements, but that no one could impose these rules on other market participants whose cooperation is often crucial for operational security and market integration.

The Work Program 2009 – 2010 accounts for the choices of priority network code areas: wind connection (pilot code), transparency, preparations for market integration-related codes, general generation connection, load flow management, balancing tools/ancillary services, and standardized coordination methodology/procedures.

In addition, 11 other projects that do not (yet) lead to network codes are of high priority. ENTSO-E will engage with the EC and ERGEG in the first half of 2010 to prepare a common view of framework guideline and network code work for 2011 and 2012, with possible adjustments in the Work Program 2009 – 2010 resulting from that assessment.

Further Priorities

Other outstanding priorities that are equally required by ENTSO-E – as stipulated in the Third Package – include the Ten-Year Network Development Plan (TYNDP), a consolidated R&D Plan, and measures for improved operational coordination. Overall, the chosen priorities are not only informed by the Third Package but also by other pieces of legislation relevant to TSOs.

In addition to the high priority items listed in the Work Program 2009 – 2010, ENTSO-E's Committees and Groups carry out a wide range of other activities, largely in continuation of the work of previous associations. Examples are statistical and technical data, network maps, electronic data interchange (EDI) standards, critical systems protection, asset implementation and management, requests for extensions of the continental Europe synchronous area, and legal and regulatory issues affecting many work items including network codes.

ENTSO-E Consultation Process

In line with the requirements of Regulation (EC) 714/2009 Art. 10, ENTSO-E defined in December 2009 its consultation process. The process applies to outputs such as work programs, network codes, ten-year network development plans. Since Regulation (EC) 714/2009 does not provide any further guidance on the design of the public consultation, the definition of the process is left to ENTSO-E. Once ACER is put in place in March 2011, the document will be submitted to the Agency for reasoned opinion and may be reviewed to accommodate ACER's opinion.

Objectives

Through consultations with stakeholders, ENTSO-E aims to obtain expert input and views on ENTSO-E draft proposals; create buy-in for ENTSO-E final proposals; provide openness and transparency, while ensuring confidentiality of information. Due to these multiple objectives, there is a need for a flexible approach to consultation, meaning that the principles should be adaptable according to the significance and urgency of the issue at stake.

ENTSO-E President, Daniel Dobbeni (Elia), ERGEG President, Lord Mogg (Ofgem) as well as MEP, Lena Ek (SE) and former Energy Commissioner, Andris Piebalgs, discussed important issues like the consultation process at ENTSO-E's opening reception on 17 November 2009.

Regulation 714/2009, Art. 10, on the Subject of Consultations

Art. 10(1)
"While preparing the network codes, the draft Community-wide network development plan and the annual work programme referred to in Article 8(1), (2) and (3), the ENTSO for Electricity shall conduct an extensive consultation process, at an early stage and in an open and transparent manner, involving all relevant market participants, and, in particular, the organisations representing all stakeholders, in accordance with the rules of procedure referred to in Article 5(1). That consultation shall also involve 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. It shall aim at identifying the views and proposals of all relevant parties during the decision-making process."

Art. 10(2)
"All documents and minutes of meetings related to the consultations referred to in paragraph 1 shall be made public."

Art. 10(3)
"Before adopting the annual work programme and the network codes referred to in Article 8(1), (2) and (3), the ENTSO for Electricity shall indicate how the observations received during the consultation have been taken into consideration. It shall provide reasons where observations have not been taken into account."

Application

ENTSO-E commits to consult with stakeholders on all key deliverables mentioned in the Third Package (i.e. work program, TYNDP, network codes). However, consultation exercises will also be conducted with regard to other issues, whenever this is deemed appropriate with regard to the significance for stakeholders. A suitable example of this flexible approach is the Research & Development Plan, which went into public consultation although this is not required by the Third Package.

Depending on the nature of the work product being developed, ENTSO-E will consult informally with stakeholders at an early stage in order to get ideas and elements for preparatory work, and at a later stage, conduct a formal consultation to seek feedback on a draft proposal. At all stages where consultation is used, ENTSO-E will consult sufficiently early to take responses into account.

Further, ENTSO-E commits to actively seek consultation with any interested party directly affected by the subject matter in accordance with Article 10(1) of Regulation (EC) 714/2009, by making clear the target audience in the consultation document. These parties are normally industry associations representing transmission grid users (generators, distribution networks, suppliers and traders), market participants, consumers (including industry), power exchanges, the Agency and national regulators where appropriate. In addition, ENTSO-E commits to keeping the consultation open to any interested party, by announcing workshops and formal consultations on its website and through mailings to which any interested party can subscribe at any time free of charge.

Consultation Channels

ENTSO-E organizes, where appropriate, informal discussions with stakeholders at an early stage. This may be especially important when certain stakeholders are more directly affected by an ENTSO-E code or plan than others, or when their input or data form an important basis for ENTSO-E's work.

ENTSO-E seeks stakeholder engagement during the development process through one or more workshops, open usually to all interested stakeholders and announced via a public announcement, prior to the formal consultation.

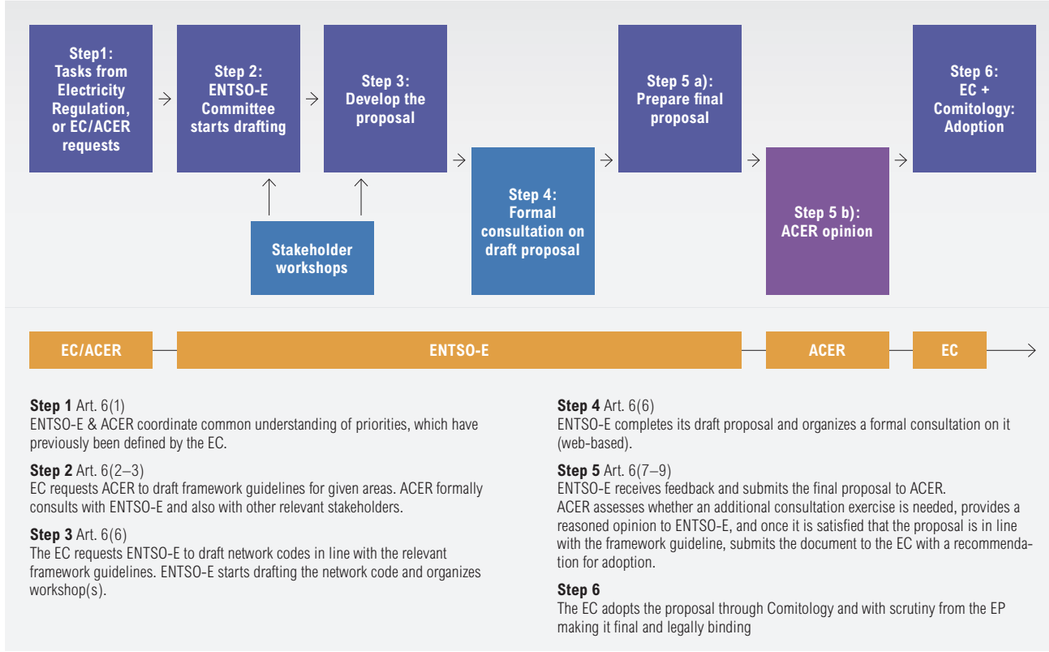


Figure 2:
ENTSO-E consultation process for network codes

The final ENTSO-E position following the consultation, including an evaluation of the responses received, explaining the reasons why comments have or have not been taken into account, are, in accordance with Article 10(3) of the Regulation, are made public. If necessary, and where timescales permit, ENTSO-E consults a second time if the response to the first consultation indicates significant problems or where revised proposals are radically different from the original proposals. ENTSO-E leaves it up to the consulted party to decide whether their response to a consultation is to be treated confidentially.

Through its consultation process document, ENTSO-E has committed itself to working towards a process, which, on the one hand, ensures stakeholder involvement at all important stages and, on the other hand, avoids duplication with ERGEG/ACER consultations. The Third Package's code development process makes close coordination between the EC, ENTSO-E and ERGEG/ACER necessary. The priorities for the development of framework guidelines and network codes will be established by the EC and detailed priorities and timetables will be communicated to stakeholders in the respective work programs of ENTSO-E and ERGEG/ACER. It is an objective that the consulted stakeholders see the consultation process on a specific framework guideline and corresponding network codes as one integrated process where the input sought by ACER on principles and that by ENTSO-E on the actual codes and their practical implications, complement rather than duplicate each other.

Reliable

"Reliable. Sustainable. Connected." As one can read from ENTSO-E's maxim, the reliable and secure supply of electric power is the TSO's most important task and the importance of a reliable power supply will not change in future. But why is this so?

Reliable system operation is essential to the functioning of today's society. As a matter of fact, in the last decades, our society's dependence on electricity and all devices associated with it has grown phenomenally. Our daily life is marked by this dependence on electrical devices: hospitals, relying increasingly on high-technology instruments such as x-rays, MRI scanners or life-sustaining respiratory machines; modern information and communication systems like the Internet are electrically powered; and it is not unusual for an average household to rely on dozens of different electrical devices, like fridges, ovens, vacuum cleaners, TV sets, personal computers, etc.

In short, electricity dependence has penetrated all spheres of our daily life. The industrial revolution, then the computerization and now the introduction of the Internet have dramatically changed our society and have made us fundamentally dependent on electric power. At the same time, the possibilities of storing electric power in larger quantities have remained limited. Thus, providing secure and reliable supply of electricity has become a fundamental pillar of the functioning of our society. The electricity transmission network is a central element in providing the electricity our society needs today.

More precisely, not only is the transmission network necessary to transport electricity from power plants to distribution systems and to customers, but it is also crucial to the reliability of the power supply. Only because the transmission network connects many power plants to many distribution systems, can the supply be switched seamlessly to another plant when one plant has a forced outage, without the customers even noticing. The primary driver behind international interconnections developing since about 1950 was the better use of the available power reserves. The more connected the systems have become, ultimately on today's pan-European scale, the more important is the optimal use of the reserves needed for a reliable supply. This means there must be clear and fair international rules for the joint operation of the interconnected transmission network, including methodologies for the sizing and use of operational reserves.

In this context, it is indispensable to point out that security of supply is directly connected with ENTSO-E's other two core missions: market integration and integration of renewable energy sources. Market integration with Europe-wide power trading and the rapid increase of fluctuating renewable energy sources (such as wind power), far from the load centers, mean that the power system – built over decades for a different world – must be operated closer and closer to its limits.

ENTSO-E therefore works on a number of tools to ensure that electricity continues to be supplied securely and reliably at any time and to address the present challenges. Some of these tools and mechanisms, especially Operation Handbooks, the associated compliance monitoring, system adequacy forecasts and outlook reports were developed by ENTSO-E's predecessors and are now continued and further developed by ENTSO-E. Other means for ensuring reliable electricity supply have been entrusted to ENTSO-E by the Third Package. This includes most notably the development of operational network codes, establishing operational rules that become legally binding for all users of the transmission networks. Both types of instruments help ensure today and in the future the highest possible security of supply.

Reliable system operation is only noticed when it is missing. Day in and day out, the grid operators – invisible and un-noticed – perform their important tasks to make society function. This also continues in today's changing context with new technical and energy policy challenges.

System Operations Committee – Working Group European Operational Standards (WG EOS)

The SOC is organized into a number of regional groups and into three functional working groups.

The Working Group European Operational Standards provides proposals for the harmonization of operational standards on a pan-European level and for the promotion of operational coherence among regions, facilitating market processes, but ensuring reliability and security of the European electricity transmission systems within the framework of liberalized energy markets. It helps to ensure compatibility between system operation, market solutions and system development issues.

On a pan-European level, WG EOS analyses proposals for definitions and updates of technical and operational standards for implementation by regions and individual TSOs.

System Operations Committee – Regional Group Continental Europe (RGCE)

The System Operation Committee's (SOC) Regional Group Continental Europe (RGCE) represents the area formerly covered by UCTE. The main purpose of RGCE is to pursue the reliable and efficient operation of the Continental Europe Synchronous Area. RGCE's activities include, inter alia:

- Management of all operational issues (among others those related to frequency regulation, scheduling and accounting, coordination services)
- Development and updating of the Operation Handbook (and pursuing its revision as initiated by UCTE in 2007), and adapting it as Europe-wide network codes begin to take over the Handbook's function
- Implementation of the Operation Handbook and the procedures to be applied in case of potential infringements
- Compliance monitoring against the Operation Handbook
- Interoperability assessments for requested extensions of the synchronous system

In order to pursue all these activities, the RG CE is organized in a number of sub-groups such as the System Frequency, Network Models and Forecast Tools, Coordinated System Operations, System Protection & Dynamics and Compliance Monitoring & Enforcement sub-groups.

System Operations Committee – Regional Groups

Beyond Regional Group Continental Europe (RGCE), four additional Regional Groups have been established within the SOC: Nordic, Baltic, Great Britain as well as Ireland/Northern Ireland. Moreover, the Voluntary Regional Group Northern Europe has likewise been established. Regional Groups under the System Operations Committee have been created following the principle of synchronous areas to allow for closer cooperation among TSOs that are for the most part neighboring. Their activities include things like maintaining and managing information systems, and frequency regulation issues. In order to do so, regional groups can be further sub-divided into functional sub-groups.

From Operation Handbooks to Network Codes

In order to ensure technical and organizational standards for a secure and reliable operation of the transmission system, ENTSO-E's predecessor associations such as NORDEL and UCTE established a collection of operation principles and rules. In the case of UCTE, ENTSO-E's largest predecessor association, a set of technical rules and recommendations was collected over more than 50 years in a range of different documents before consolidating these rules, for the first time in 2002, into one firm document: the UCTE Operation Handbook. The Operation Handbook was made binding for TSOs through multilateral agreements and its implementation was ensured through a compliance monitoring process.

In 2007, building on experiences following disturbances in the system and adapting to the changing TSO operational conditions, UCTE launched a revision of all policies in its Operation Handbook. In March 2009, revised Policies 1, 2 and 3 were approved by its Steering Committee: load-frequency control and performance, scheduling and accounting, and operational security. Policies 4, 5, 6 and 7 (coordinated operational planning, emergency procedures, communication infrastructure and data exchanges) have been in revision for most of 2009 and are expected to be approved by ENTSO-E's System Operations Committee Regional Group Continental Europe in the second half of 2010.

Network Codes remedy the Shortcomings of Operation Handbooks

Given that the only possible way to make the rules binding for TSOs were contracts between them, the Operation Handbook could not address issues where users of the grid such as power plants, customers or distribution networks were affected. Thus, standards for network access of customers and other economic rules, but also technical rules for connection to the grid, were only set by national grid codes, laws or contracts but could not be within the scope of international documents such as the Operation Handbook.

The Third Package recognizes the significance of this problem. This is why it entrusts ENTSO-E with the very important task of drafting network codes. Regulation (EC) 714/2009 defines the code development process in great detail and lists 12 topic areas for network codes. More importantly and very centrally, Comitology procedures are foreseen to make ENTSO-E's network codes binding not only for TSOs but also for other affected market participants and grid users.

The involvement of the European Commission, member states, ACER and extensive consultation will ensure that the codes are well balanced. Making the codes binding for others remedies this difficult shortcoming of the European energy market before the Third Package, namely that no one could impose binding rules (such as those stipulated in an Operation Handbook or similar) on other market participants whose cooperation is crucial for operational security and market integration.

Network Code Areas as defined by the Third Package

Due to their importance for effective system operation, market integration and also system development, network codes will cover, in accordance with Article 8(6) of Regulation (EC) 714/2009 the following areas:

1. **Operations-related code topics**
- Network security and reliability rules including rules for technical transmission reserve capacity for operational network security
- Interoperability rules
- Operational procedures in an emergency
- Balancing rules including network-related reserve power rules

2. **Development-related code topics**
- Network connection rules
- Energy efficiency regarding electricity networks

3. **Market-related code topics**
- Third-party access rules
- Data exchange and settlement rules
- Capacity allocation and congestion management rules
- Rules for trading related to technical and operational provision of network access services and system balancing
- Transparency rules
- Rules regarding harmonized transmission tariff structures including locational signals and inter-transmission system operator compensation rules

Together, these codes have the potential to become the framework of consistent detailed rules needed for the secure operation of European power systems and for the implementation of a liberalized Europe-wide electricity market according to the Third Package.

ENTSO-E's Work Program 2009 – 2010 thus based network code priorities on the importance of secure network operation, integration of renewable energy sources and market integration, and on the other hand on sufficient clarity and consensus between TSOs, regulators and market participants on goals and methods. From this perspective, network codes in the operational area will focus first on operational security.

Monitoring of Implementation

The monitoring of the implementation of codes and guidelines according to Art. 8(8) of Regulation (EC) 714/2009 will also be performed over the coming years. This may partly build on the compliance monitoring experience of TSOs in continental Europe and will thus include important regional aspects. Due to the inherent aspects of synchronous areas, the current regional operational rules differ widely in terms of scope, content and applied technical solutions. The System Operations Committee compares the approaches and develops a common terminology, ensuring the same understanding of technical terms used in different synchronous areas. Such a common understanding is a prerequisite for further work related to pan-European network codes, in both operational and market areas.

Compliance Monitoring

Compliance monitoring conducted within the System Operations Committee's Regional Group Continental Europe (RGCE) is the continuation of compliance monitoring activities initiated in the former UCTE. The objective of the compliance monitoring process is to encourage TSOs' compliance with the RGCE Operation Handbook (OH) (cf. previous article) which is necessary to preserve the security of supply of the synchronous area.

The 2009 Compliance Monitoring Program (CMP) was put in place after introducing a few minor changes in methodology, which resulted from the Compliance Monitoring Programs of 2006 – 2008. From 2010 onwards periodic on-site audits eventually become mandatory.

Compliance Monitoring Methodology

Compliance self-assessment information, schedules, documents and reviews are adapted and updated on a yearly basis.

The CMP is performed via regular and exceptional processes.

The regular compliance monitoring process is based on self-assessment and on-site compliance audits:

- The annual compliance self-assessment is conducted through reviews of member self-assessments and subsequent sets of data provided by the RGCE member TSOs on a regular basis.
- Periodic on-site compliance audits are performed on a five-year basis on every RGCE member TSO to verify compliance with a chosen set of RGCE Operation Handbook standards.

The exceptional compliance monitoring process is based on on-site compliance audits launched under control of the RGCE plenary following a triggering event that jeopardized the security and reliability of system operation of the interconnected system, after analysis by expert bodies. Such an on-site compliance audit can also be performed if an RGCE member TSO does not fulfill its obligations regarding the self-assessment process.

At the end of the yearly activities related to the CMP, an annual Compliance Oversight Report (COR) is prepared and submitted to the Plenary of RGCE for acknowledgement.

In the 2009 CMP, the same three compliance levels already used in 2007 and 2008 continued to apply: fully compliant; sufficiently compliant; non-compliant

Overview of the 2009 Compliance Oversight Report

Recommendations resulting from the Compliance Monitoring Process 2009 highlight the need to revise the Operation Handbook with the aim of providing measurable standards, enabling more objective and clearer evaluations. The ENTSO-E Secretariat will play an increasingly important role in compliance audits and compliance monitoring to ease the process and provide for improved methodology.

System Operations Committee – Working Group Electronic Highway (WG EH)

Working Group Electronic Highway (WG EH) was established only in February 2010. The Electronic Highway (EH) is a communication network that provides the necessary infrastructure to support data exchanges among TSOs.

It is designed for real-time and non-real-time data exchange between TSOs. WG EH coordinates the usage and extension of the electronic highway in order to provide a secure and reliable information exchange for system operations throughout Europe.

System Adequacy Forecast

The ENTSO-E System Adequacy Forecast (SAF), for the time period 2010 – 2025, was developed as the successor to the former UCTE System Adequacy Forecast Report and ETSO Power System Adequacy Report. The system adequacy methodology is thus very well established, and the various system adequacy retrospectives and long-term and short-term forecasts are an important work product for the European market. It is also a major input to ENTSO-E's Ten-Year Network Development Plan (TYNDP) as prescribed by Regulation (EC) 714/2009.

The SAF provides an overview of:

- Generation adequacy analysis for the whole of ENTSO-E
- Generation adequacy assessment for each individual country based on national comments received from TSOs' data correspondents
- Role of transmission capacities related to security of supply on a regional basis

Thus, for the market and for policy-makers, the SAF is an indispensable tool, providing an overview on whether the generation capacity, by country, by region or Europe-wide is sufficient to cover for the expected consumption.

Assessment Methodology

The assessment was primarily carried out using input data provided by each TSO for the years 2010, 2015, 2016, 2020 and 2025; other years and time horizons are calculated as linear extrapolations and are to be considered only as best estimates. The year 2016 has been introduced in order to assess the consequences on generation adequacy of the decommissioning of the oldest thermal plants by the end of 2015 at the latest, as a consequence of entry into force of the Large Combustion Plant Directive.

The adequacy analysis is carried out vis-à-vis two scenarios covering generating capacity evolution (conservative Scenario A and best estimate Scenario B) and is based on a comparison between available generation and load at three reference time points of the year (3rd Wednesday in January at 11 a.m. and at 7 p.m., 3rd Wednesday in July at 11 a.m.).

In order to assess adequacy, the "Remaining Capacity" is compared to a given "Adequacy Reference Margin" (ARM). The Remaining Capacity is calculated as Net Generating Capacity (NGC) minus Unavailable Capacity (which consists of outages, system services reserves, maintenance and non-usable capacities, e.g. because of energy limitations or fluctuating production); it is thus the part of NGC left on the system to cover any unexpected load variation and unplanned outages. The ARM gives an indication of capacities needed beyond those explicitly accounted for elsewhere in the methodology, i.e. capacities to cover the difference of load at the reference time point to the peak load ("margin against peak load"), and unexpected demand variations or longer term generation outages. If Remaining Capacity exceeds the ARM, it means

that no security of supply problems are expected and that some generating capacity is likely to be available for export.

In the load and consumption forecasts, most TSOs consider the influence of the economic crisis. All values provided are connected to the Gross National Product (GNP) and could change according to the rate of economic recovery/development in the future.

Summary of Results

During the entire monitored time period load figures are growing. The energy consumption growth for the period 2010 – 2015 must be monitored carefully and could still prove too optimistic due to the financial and economic crisis (despite the fact that national data correspondents already take into account the consequences of the crisis). ENTSO-E consumption is expected to be 3690 TWh in 2015 and 4004 TWh in 2020.

The net generating capacity (NGC) is increasing in both scenarios until 2015, with one isolated exception in Scenario A after 2015 (and a corresponding slowdown in Scenario B). Scenario B shows NGC increases of 3.43 % until 2015 and of 1.79 % after 2016.

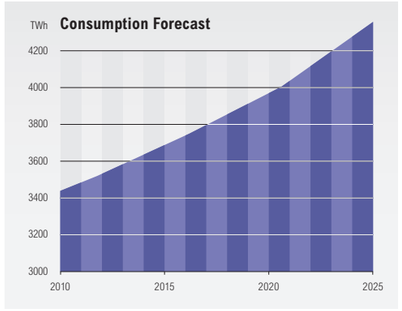


Figure 3:
Consumption forecast

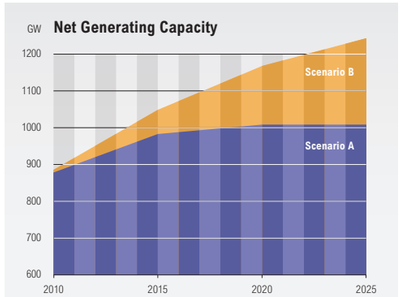


Figure 4:
ENTSO-E Net generation capacity, January 7 p.m.

Scenario A suggests about 1007 GW of NGC in 2020 while, Scenario B about 1163 GW. In 2025 the corresponding values are 1010 GW in Scenario A and 1238 GW in Scenario B. The values for 2025, however, are to be seen in the context of rather high uncertainty of data provided by national data correspondents. A number of documents and public policies with relevance to the forecasts do not cover such a long-term period.

Projection of installed Capacity according to Energy Sources

The Large Combustion Plant (LCP) Directive, which applies to combustion plants with a rated thermal input equal to or greater than 50 MW is one significant factor resulting in a decrease of installed capacity after 2015, particularly with regards to fossil fuel power plants. The LCP Directive applies only to EU member states; countries outside the EU perimeter are not obliged to follow its goals. The LCP Directive is a plausible cause for the significant decrease of installed capacity in fossil fuels after 2015 in both scenarios. In Scenario A, the decrease in 2016 is about 3 % (1,463 GW) compared to 2015. In Scenario B it is still a decrease of 0.19 % (1 GW) compared to 2015. In Scenario A the projected decrease carries on until 2025 (about 22 GW until 2025), while Scenario B projects a renewed sizeable increase of about 27 GW until 2020.

Noteworthy is the share of gas power plants in total fossil fuels installed capacity, which is disproportionately high and points to a preference for gas among potential investors. A range of reasons could be brought forward to explain such preferences among investors. The two most plausible include:

- lower investment costs and a higher flexibility compared to other types of thermal units, which in many countries is also related to a motivation to participate in ancillary services markets;
- existing climate change policies (favoring gas with lower CO_2 emissions per kWh than coal power plants)

The gas power plant installed capacity in Scenario A is almost stable after 2015, with a slight continuous increase (from 193.6 GW in 2015 up to 200.7 GW in 2025) whereas in Scenario B the increase is more rapid (from 214.6 GW in 2015 up to 253 GW in 2025).

This increase in installed capacity of gas power plants is also closely linked to the higher development of Renewable Energy Sources (RES) except for hydro power plants. Although this link can be observed in both scenarios, it is more visible in scenario B than in Scenario A. In Scenario A, the annual average growth in RES (excluding hydro) is 6.02 % per year (representing a total increase of about 140 GW until 2025) while in Scenario B it is 7.95 % per year with a total increase of about 218 GW until 2025. This increasing course of RES capacity (excluding hydro) is visible at each reference point. The main contributors between 2010 and 2025 are Germany (45.8 GW), Spain (39.9 GW), France (26.8 GW), Italy and Great Britain (both about 17.5 GW).

The evolution of RES installed capacity (excluding hydro) correlates mainly with increased wind power development. It is influenced by EU politics and also by individual member state policies.

The following graph shows the most important results of the SAF 2010 – 2025, i.e. the comparison of Remaining Capacity RC and the Adequacy Reference Margin ARM for the ENTSO-E area.

The generation adequacy in Scenario B should thus be maintained during all monitored periods in each reference point. In Scenario A, the generation adequacy should be maintained until 2020. After this term new generation capacity would be needed to achieve at least today's levels of adequacy, but it must be recalled that Scenario A only includes firmly known new generating units and thus very few known additions in the far future past 2020.

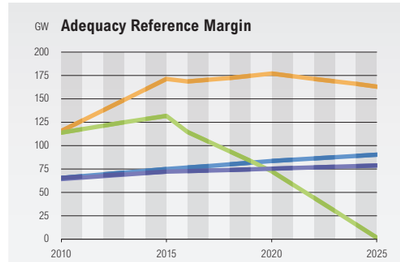


Figure 5:
ENTSO-E 2010 – 2025 Adequacy Reference Margin (ARM) and Remaining Capacity (RC) comparison

System Operations Committee – Working Group Critical System Protection (WG CSP)

The Working Group Critical System Protection (WG CSP) deals with the development of critical system and infrastructure protection issues on a European level. The establishment of the WG follows the European Commission's Directive on the identification and designation of European critical infrastructures and the assessment of the need to improve their protection (EPCIP). Thus, WG CSP is responsible for critical system protection issues regarding electricity transmission and is the official counterpart for the European Commission in all questions related to critical system protection within ENTSO-E.

System Development Committee – Working Group System Adequacy and Market Modelling (WG SAMM)

The aim of WG SAMM is to provide ENTSO-E bodies, TSOs, regulatory bodies, European institutions and electricity market stakeholders with consolidated retrospective and prospective views of ENTSO-E system adequacy. Thus, it is in charge of examining the adequacy of the electricity generating and transmission systems, at regional and European levels.

It monitors and forecasts the security of supply according to demand in agreement with adopted criteria and sustainability concerns (including environmental and competitive aspects). It builds prospective scenarios of the European electricity systems able to match the European energy policy objectives (e.g. 20-20-20); defines and implements the enhancement of harmonized methodologies needed for system adequacy assessment and market modeling.

It also provides ENTSO-E members with forecast scenarios of load, generation and exchange flow evolution as a basis for planning studies undertaken by the SDC, especially those needed in the framework of the Ten-Year Network Development Plan.

The Statistical Yearbook

The Statistical Yearbook (SYB) used to be a traditional UCTE report. The edition published in 2009 reflected the situation in 2008 and covered only the area of the former UCTE (ENTSO-E's Continental Europe Region) The Statistical Yearbook brings together a wide range of historical data on power systems in member countries, like generation, consumption, cross-border exchanges, network components, etc. In 2009, new data developments among all ENTSO-E members focused on the harmonization of data processes, data definitions and IT tools, to allow the publication of ENTSO-E-wide reports and yearbooks.

Data Handling at ENTSO-E and the Data Expert Group (DEG)

The ENTSO-E Data Expert Group (DEG) is a data facilitator and service centre for the entire association and all committees. The DEG tackles pan-European standardization of data handling and cooperates very closely to the Secretariat, which performs most of the regular data processing work (implementing and operating data management tools, issuing data reports, performing quality checks, etc.) and has a central function of handling data related to statistics, publications, system adequacy, power flow, including the Statistical Yearbook and the transparency platform (maintenance, plausibility and consistency checking). Furthermore, it prepares the data for issues such as the Common Information Model (CIM) and the interface with international standardization organizations. The DEG is also responsible for making proposals and coordinating work on the ENTSO-E Data Confidentiality Policy.

ENTSO-E Winter/Summer Outlook/Review Reports

The ENTSO-E Winter/Summer Outlook/Review Reports are published twice annually, in June and November, and are prepared at European level. They present a summary of the national power balances between foreseen generation and peak load for the winter and summer periods, respectively.

The forecasts present an outlook of the expected situation and point to potential shortages or risks in the near future of the electricity supply in all ENTSO-E countries. The surveys give TSOs the opportunity to share information and provide a basis for further, more detailed studies if required. The objective of the reviews is to compare the forecast to the situation actually faced by TSOs, taking into account weather conditions and their consequences on the power system (temperatures, hydro and wind conditions); availability of generation units; market conditions; use/availability of interconnections and imported energy, etc.

Main Results from the Winter Review/ Summer Outlook Report

The Summer Outlook Report, with reference to the period 1 June to 4 October, forecast no particular risk of power shortages throughout the summer of 2009. The balance between power generation and demand in the different regions was expected to remain adequate.

Besides considering normal conditions, the TSOs also took into account a scenario of severe weather conditions, such as the effect of a prolonged spell of hot, dry weather which could increase electrical demand for air-conditioning or reduce the output from hydro-generation or thermal generation facilities. Under such conditions, a number of TSOs identified periods when power imports from their neighbors would be needed under these circumstances, and have described the measures in place to ensure that this support would be available.

The review of the winter 2008/2009 pointed in particular to the gas dispute between Russia and Ukraine in January 2009, which resulted in a reduction in gas supplies to a number of Central and South-Eastern European countries. The availability of gas from storage facilities and the ability of gas-fired generation to operate on alternative fuel meant that the effects on the electricity supply-demand balance could be minimized.

Main Results from the Winter Outlook/ Summer Review Report

The Winter Outlook 2009/2010 predicted on the whole, no particular risk of shortage under normal conditions. A few countries though were expected to depend on imports from their neighbors during specific periods.

In the North Sea Region, French RTE predicted the need for imports of up to 4,000 MW from mid-November to January, in order to cover its electricity demand and to satisfy the security criterion set by RTE, due to reduced availability of the French generating fleet over the winter period.

During winter 2010, parts of the Continental South East Region were also forecast to depend on imports of electrical energy. However, no particular risk of shortage was expected for the winter 2009/2010: the available generation capacities in Bulgaria and Romania were sufficient to cover the import needs even in severe conditions in neighboring countries.

Finland and Latvia were equally expected to depend on imports, but with a clear expectation that these imports would be available. Even with the shutdown of the Ignalina nuclear plant at the end of 2009, Lithuania was predicted to be able to cover peak load during the winter period. In 2010, gas-fired power plants will form the major part of generation capacity in Lithuania. The main supplier of that gas is Russia.

Sustainable

Besides the uncompromising necessity for reliable operations and a secure electricity supply, ENTSO-E fully recognizes and is committed to contributing to the European Union's sustainability goals. "Sustainable" therefore refers directly to the integration of renewable energy sources into the transmission system.

Renewable energy sources are at the core of the current European energy policy agenda. The European Union's 20-20-20 goals are the prime example in this context. They stipulate that, by 2020 at least 20 % of EU energy consumption has to come from renewable resources, green-house gas emissions should be reduced by 20 % of 1990 levels, and 20 % of energy consumption should be saved compared to projected 2020 levels. Because of the fact that electricity offers more possibilities for decarbonization than other energy forms, this target may well imply that more than one third of electricity consumption will have to be met by renewable energy sources such as wind or solar power.

According to ENTSO-E projections for 2020, the share of renewable energy in the electricity generation mix stands at about 25.5 % within the EU (29.8 % for the entire ENTSO-E area). The electricity grid and transmission system operators are at the center of significant efforts that are therefore still required in order to efficiently integrate into the system the necessary additional renewable energy generation while maintaining the reliability of the system and the quality of supply. In addition, significant technological and operational progress is necessary in order to promote energy efficiency through the renovation of ageing infrastructure, the employment of innovative technologies, or smart grids.

Renewable sources of energy are often located in remote areas: wind in the North Sea or sunshine in Southern Europe or even North Africa. The challenge lies in the fact that significant transmission capacity is necessary to bring this energy to consumers who live in, say, London, Madrid, the Ruhr area, or the densely populated Netherlands, or to the mountainous areas of the Alps where it can be stored in the form of water reservoirs and be used at opportune moments via hydroelectric generators.

This chapter therefore illustrates to what extent the integration of renewable energy sources into the transmission network and, more generally, the European Union's 20-20-20 goals constitute drivers for some of the most important of ENTSO-E's deliverables. The Ten-Year Network Development Plan (TYNDP), the Research and Development Plan and the pilot network code with special focus on wind energy generation directly promote the achievement of the 20-20-20 goals. In 2009, preparations for all of these projects started and the first results became available in the first half of 2010.

By delivering high-quality results on the above tasks and building on the unique expertise and know-how of its members, ENTSO-E has the ambition to contribute significantly to the attainment of the EU energy policy goals, and as a consequence to a higher standard of living for European citizens and to a sustainable economic development. The transmission systems are thus a cornerstone for achieving the energy policy goals.

Ten-Year Network Development Plan

The transmission network has always been central to the economic evolution of Europe. From the first local grids that expanded the access to electricity to the citizens of Europe over 100 years ago, to national grids that optimized the usage of natural resources, and to transnational grids that ensure security of supply and market integration, the transmission network has always been adapting to the needs of each era.

The industry structure has been undergoing an especially deep transition in the last years with the liberalization of national electricity markets and their integration into an internal European electricity market (1st, 2nd and 3rd EU Internal Energy Market Legislative Packages). In addition, the EU has set ambitious objectives with regard to climate change and sustainable development (e.g. EU Renewable Energy Directive and 2020 CO_2 and energy efficiency goals).

What is particular to today's conditions is the magnitude and speed of the changes in the industry's landscape stimulated by EU legislation and the technological advances in the sector, but within a regulatory and infrastructure permitting context that does not favor the rapid expansion of transmission infrastructure.

Having recognized the challenge, the EC through Regulation (EC) 714/2009 calls upon ENTSO-E to draft every two years a non-binding Union-wide Ten-Year Network Development Plan (TYNDP) with the objective of ensuring greater transparency of the entire electricity transmission network in the Community and to support the decision-making processes at regional and European level. ENTSO-E, being at the heart of the evolution, proactively decided in summer 2009 to launch a pilot TYNDP, with the aim of publishing the document in June 2010, well ahead of a formal application of the Regulation, in order to:

- Gain feedback from stakeholders regarding the content and collaboration they expect for the next releases of the report;
- Illustrate existing trends for attaining European energy policy objectives;
- Test the necessary processes and Europe-wide methodologies;
- Feed the political debate with an in-depth review of existing trends;

What is more, an early release of the pilot TYNDP also aims to deliver valuable input for the National Renewable Energy Action Plans (NREAPs) that member states are committed to submitting in June 2010 to detail how they plan to achieve their parts of the renewable energy targets in the Renewable Energy Directive. To achieve the above objectives, the pilot release of the TYNDP provides the most up-to-date and accurate information on the planned or envisaged transmission investment projects of European importance. It provides an outlook of the future condition of the electricity system in Europe and discusses the development and evaluation of generation-demand scenarios, based on which analyses (such as the System Adequacy Forecast) will be performed. It also puts forward the challenges related to the development of the transmission network. The pilot project initiates a "learning-by-doing" process to build TYNDP reports in an open and transparent manner, with strong involvement of stakeholders, European Regulators and the European Commission.

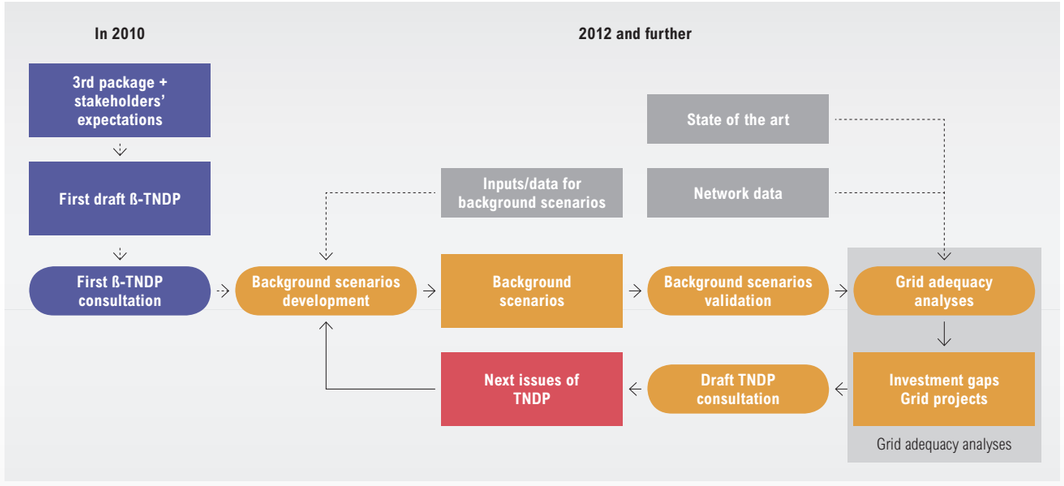


Figure 6:
Build-up process of the TYNDP

Much of the second half of 2009 was devoted to planning the scope and outlook of the TYNDP, and accumulating a wealth of background material regarding the current infrastructure and best practices of TSOs. In parallel, TSOs provided expert estimations for the evolution of the power system over the next ten years and the corresponding transmission infrastructure investments. At the end of 2009, all material had been collected in order to permit adequate time for the drafting of the TYNDP at the beginning of 2010 and the beginning of the public consultation on the report on 1 March 2010.

All in all, the TYNDP is a multi-faceted vehicle for:

- Raising awareness on the challenges faced in developing the transmission network;
- Providing accurate and comprehensive information to all stakeholders on which their own planning (generation investments, industrial developments, etc.) could be based;
- Assisting decision-makers to build on its contents in order to efficiently promote infrastructure investment;
- Initiating a constructive dialogue to better coordinate market forces and political leadership in seeking to fulfill EU policy goals.

As part of the TYNDP, ENTSO-E has described plans to improve methodologies, scenarios and criteria further over the next releases. Comments on these plans from stakeholders, the Commission and ERGEG have been especially valuable and confirm the urgency for ENTSO-E to provide this pan-European overview as early as possible, and to continue improving it.

System Development Committee – Regional Groups

Aside from its seven working groups, the System Development Committee organizes its work in six Regional Groups: North Sea, Baltic Sea, Continental Central South, Continental South West, Continental South East and Continental Central East.

Beyond regional initiatives, such as the definition of the North Sea offshore grid (RG North Sea), Regional Groups are instrumental in developing regional plans and market studies, network models, etc., as important input to future releases of the TYNDP.

System Development Committee – Working Group Network Modelling & Data (WG NM&D)

The main objective of WG NM&D is to build common network models that allow TSOs to perform grid analyses, needed for evaluating the future behavior of the European transmission system, and thus to assess the envisaged development of pan-European high voltage transmission infrastructures.

It provides support for medium- and long-term planning studies carried out by the TSOs with the purpose of improving system studies (e.g. coordinated planning, integration of renewables, or system extension studies concerning the future connection of the European transmission network with other systems).Therefore, the support provided by the WG NM&D is crucial to the preparation of ENTSO-E's TYNDP which will use network models based on the requirements prepared by WG NM&D.

In 2009, WG NM&D worked on the requirements for the future data collection process related to network models. A substantial part of the work was done by the end of 2009 which allowed the start of the first pan-European data collection on network models in early 2010. In addition to these activities, WG NM&D contributes to the development of a common database for planning studies, data exchange standards and associated methodologies.

System Development Committee – Working Group Ten-Year Network Development Plan (WG TYNDP)

As can be guessed from its name, the main mission of WG TYNDP consists in issuing the ENTSO-E TYNDP on a periodic basis (i.e. every two years), in very close cooperation with other WGs and RGs of the System Development Committee.

Beyond the release of the TYNDP itself, WG TYNDP supports the SDC's regional groups in creating and consolidating a framework that allows TSOs to exchange information on their development plans, to initiate joint planning studies and to assess the effect of new grid devices that are announced on the whole pan-European system.

It fosters the coordination of regional system adequacy studies and network studies. It develops and compiles appropriate methodologies and tools and makes them available to regional groups.

Pilot Network Code

The development of network codes is one of ENTSO-E's most important new tasks under the Third Package's Art. 6(6) of Regulation (EC) 714/2009: "The Commission shall request the ENTSO for Electricity to submit a network code which is in line with the relevant framework guideline, to the Agency within a reasonable period of time not exceeding 12 months." In line with its Work Program 2009/2010 (see Chapter 1.3), ENTSO-E started preparations for a pilot network code already in 2009.

In summer 2009, ENTSO-E announced the commencement of expert work on a pilot code on grid connection with special focus on wind generation, in parallel with the relevant Pilot Framework Guidelines on grid connection by ERGEG.

The objective of the pilot code project is to experiment with the process of framework guidelines and code drafting and the associated consultations even before ACER's tasks are in force in March 2011. It is intended to demonstrate the efficiency and practical benefits of the new approaches made possible by the Third Package's network code processes.

During autumn 2009 and winter 2009/10, ENTSO-E engaged in a scoping exercise in close collaboration with ERGEG in order to best define the relevant contents. In parallel, ENTSO-E's experts have been working on synthesizing a consistent Europe-wide picture of existing codes and practices within former TSO associations and in the different countries, on which the pilot code is to be based. In accordance with Regulation (EC) 714/2009, but also answering a concrete need for technical collaboration, ENTSO-E has initiated a series of informal meetings with EWEA, the European Wind Energy Association, to achieve a common understanding on the structure and content of the pilot code.

Focus and Scope of the Pilot Code

The pilot code will give special focus to wind generation connection conditions. This aspect was chosen by ENTSO-E and ERGEG, with support from the European Commission and the Florence Forum, acknowledging that wind energy is set to shoulder the greatest part of renewable energy growth over the next few years. A goal is to identify and develop European rules for harmonizing grid code requirements, particularly relevant to the connection of wind generators to transmission networks across Europe. In order to ensure consistency of connection conditions for all types of generation resources and to find the best overall set of future connection conditions, the pilot code will likewise include a section applicable to all generators. With only a slight delay after the pilot work, additional sections will be added to the network code dedicated to the specific features of other types of generation resources.

Harmonizing wind generator connection rules is a relatively new issue and is urgent not only in the perception of TSOs, but also of ERGEG, the European Commission, stakeholders including EWEA, and of the European Wind Integration Study (EWIS). The available EWIS outputs provide a valuable starting point for these codes.

Pilot Code Drafting Process

This pilot code relates to a planned ERGEG framework guideline to be developed between March and September 2010. This framework guideline together with the initial impact assessment shall lead regulators to select between possible policy options; the framework guideline will cover the network connection issue as a whole. ENTSO-E and ERGEG have already begun to coordinate these two mutually dependent pilot projects closely. Where needed, issues that impact on distribution system operators (DSOs) will likewise be addressed and included in the network code in a consistent way.

The resulting network code will need to pass through the formal steps again after ACER's tasks are in force, but this should proceed much faster leading to a swift submission to – and passage through – the Commission's Comitology process. This will not only lead to speedier completion of one specific urgent network code, but would also provide a much firmer basis for future swift adoption of network codes building on an improved common understanding of the network code establishment process.

Expected Benefits

Compared to the present situation of having wind-generator-to-network connection requirements specific to each EU member state, there are a number of benefits that will result from harmonization across Europe:

- Common standards promote the adoption of best practices across Europe and thereby facilitate the achievement of policy goals (i.e. with respect to security/quality of supply, economic efficiency and environmental objectives).

- Manufacturers and developers of wind turbine generators will be able to reduce costs by standardizing the design of wind generator equipment, protection and controls (rather than being expected to meet the specific requirements of each member state.
  Wind generation developers and network operators will benefit from lower costs of interfacing standardized turbines (i.e. reduced costs in connection design, commissioning/compliance testing and implementing operational requirements).

- A European harmonization mechanism for the structure and technical content of generation requirements will increase transparency and bring benefits to every affected party.
  With such a structure, it is intended that all EU Member states will have generation connection requirements of the same format and definitions, including the requirement for criteria to relate to the point of common coupling between a wind park and network.

- The respective challenges and resulting effects of achieving a "generic format" and a "content-related harmonization" for the requirements set for the generation type under review will be considered.

System Development Committee – Working Group European Planning Standards (WG EPS)

On behalf of the System Development Committee, the Working Group European Planning Standards is responsible for TSO cooperation and coordination on planning standards for the development of the electricity network. Its main mission is to coordinate the development of European planning codes in line with the framework guidelines according to European legislation (Third Energy Package) in order to provide a secure, adequate, economic and environmentally sustainable European grid and interface to its customers (generators, industrial customers and distribution system operators) and between TSOs. Its work is intended to help create a well-functioning European electricity market and, from the planning point of view, a high standard of interoperability, reliability and security.

Considering the future European regulatory and legislative framework, the main objectives of the WG EPS lie in the establishment of network codes for the European transmission system based on the framework guidelines which will be developed by ACER. A further field of action will be to investigate methodologies (probabilistic studies…), criteria, standards and processes for grid planning.

Market Committee – Working Group Renewable Energy Sources (WG RES)

On behalf of the Market Committee and ENTSO-E, WG RES works towards the development of a market-oriented integration of renewable energy sources (RES). The working group aims to contribute to the creation of an appropriate regulatory framework for renewables by delivering concrete and constructive proposals compatible with existing market and operational rules that are applicable to the electricity sector. Whenever needed, it also produces proposals for new rules. Such rules focus on security of supply, market development and economic efficiency.

More specifically, the WG formulates policy suggestions aiming at the realization of a harmonized pan-European regulatory framework; prepares input to network code development when needed; and drafts relevant position papers on issues related to the integration of renewable energy sources.

System Development Committee – Working Group Asset Implementation & Management (WG AIM)

WG AIM's main task is to coordinate and harmonize the implementation and management of assets so that they contribute to a secure, environmentally sustainable and economic transmission system. This is to ensure that the European transmission grid has a high standard of availability, reliability and security, thus supporting the development of the European electricity market.

The objective of WG AIM is to develop and coordinate recommendations in relation to asset implementation and management, to support the implementation of assets identified in development plans and to promote new technologies for existing grids. Such recommendations will cover the optimization and refurbishment of existing assets and the installation of additional assets. The implementation of these harmonized recommendations will, however, remain the task of each individual TSO as the owner of the assets.

System Development Committee – Working Group 2050/Supergrid

WG 2050/supergrid is a newly created ENTSO-E working group, established in early 2010, with the task of preparing ENTSO-E's position on how to approach a pan-European supergrid. ENTSO-E, being the most competent entity with regards to the electricity transmission grid, needs to research and evaluate all aspects of a comprehensive and sustainable supergrid.

In this context, all required concepts, scope of work and scenarios that are relevant to the supergrid concept are work items for WG 2050/supergrid. The working group will consult and cooperate with relevant stakeholders and will assess previous supergrid concepts and visions that have so far been suggested by various parties. It is of utmost importance for ENTSO-E to obtain a complete overview of the long-term energy pwolicy in order to develop the grid in line with European objectives.

System Development Committee – Working Group Research & Development (WG R&D)

WG R&D is constituted as part of ENTSO-E's System Development Committee. However, since R&D activities have a significant impact not only on system development, but also on system operations and the market, it works in very close cooperation with all three committees.

One of the most important tasks of WG R&D in 2009 was the preparation of the consolidated ENTSO-E R&D Plan, which puts forward research and development projects that are to be executed in the coming years. WG R&D has, within ENTSO-E, important coordination tasks in all fields of research and development: it coordinates ENTSO-E's R&D portfolio across all business areas of ENTSO-E members, coordinates the association's R&D activities with corresponding R&D programs from the European Commission and stakeholders and manages a network of TSO experts in the area of R&D.

Run-up to the first Edition of the Research & Development Plan

In 2009, ENTSO-E started preparations for its first Research and Development Plan (R&D Plan). The document is required by the Third Energy Package, both by Directive (EC) 72/2009 and by Regulation (EC) 714/2009, which underlines that ENTSO-E shall adopt a research plan for common network operation.

In the context of the European Electricity Grid Initiative (EEGI) for a common platform for TSOs and Distribution System Operators (DSOs), the consolidated ENTSO-E R&D Plan serves TSOs' needs and contributes to the process launched by the European Commission for a Strategic Energy Technology (SET) Plan. The ENTSO-E R&D Plan thus defines priority research fields as a basis for ENTSO-E's active participation in the SET Plan.

ENTSO-E's member TSOs have recognized the importance of research and development across the whole range of ENTSO-E's activities and have established a Working Group for Research and Development (WG R&D), which ensures the cross-functional role of coordinating within ENTSO-E the R&D portfolio in all matters in relation to TSO business: system operation, electricity market operation, transmission grid development, asset implementation and management. The ENTSO-E R&D plan also underlines the need to define the interaction between TSOs and DSOs so that smart grids, investments in meters and the distribution system can lead to substantial benefits at the European transmission level through demand-response contributions to intraday and balancing markets.

Given the enormous investments in transmission and generation infrastructure needed over the coming decade to replace aging assets and to integrate renewable resources and markets, innovation and R&D should contribute to choosing the most efficient investments. Progress in information communication technology (ICT) will keep opening up new, cost-effective opportunities for improved market integration while maintaining reliability. The future-oriented concepts of smart grids and of a potential European supergrid exemplify this. R&D coordinated by TSOs and by ENTSO-E should contribute to a realistic discussion of these concepts in preparation of well-founded and well-tested implementations.

Priority research fields, which are included in the R&D plan and subsequently in R&D projects managed by ENTSO-E members, beginning in 2010 and 2011, include the following:

- Architecture and planning tools for the pan-European network
- Tools to prove the efficiency of technology aimed at increasing both the flexibility and security of transmission system operation
- New tools based on simulation techniques that will give rise to new market design options

The specific R&D products will likely extend advanced tools for designing future energy scenarios:

- Tools for pan-European network behavior monitoring in order to provide better transmission adequacy assessments
- Tools for better surveys of pan-European markets
- New tools for modeling markets, taking into account the rapidly increasing penetration of renewable energy sources
- Complementary tools for facilitating the specific integration into the market of these renewable energy sources
- Dedicated planning tools that take into account active demand

The preparation of the first ENTSO-E R&D Plan was based on existing materials available from the TSOs involved in EEGI, which was extended by a joint effort of all TSOs involved in WG R&D and all three ENTSO-E committees. The first draft of the ENTSO-E R&D Plan was approved by the ENTSO-E Assembly on 16 December 2009. Although Regulation (EC) 714/2009, Art. 10 does not require ENTSO-E to conduct a formal consultation on the R&D Plan, ENTSO-E held a public consultation on the document in the first Quarter of 2010, with the expectation of receiving highly valuable stakeholder input to the document. The final version of the first edition of the ENTSO-E R&D Plan which reflects input from the public consultation was published by ENTSO-E on 31 March 2010.

Connected

Associations need to be well connected to policy makers and ENTSO-E has built on the contacts of ETSO and UCTE in Brussels and is now well-known within the energy policy community in Europe. But of course connections take on an even more important meaning for network operators – interconnections are the very essence of any network. In the context of the electricity transmission system, a sufficiently connected network requires very close collaboration between TSOs and is a pre-requisite for effective cross-border trading and European energy market integration. Thus, the network development shown in the TYNDP is not only important for the integration of renewable energy and Europe's climate change goals, but also for Europe's customers to benefit more and more from a well-functioning internal market in electricity.

The interrelationship between ENTSO-E's three core missions will, once again, also become visible in this chapter. A fully developed IEM is a key means to reaching the energy policy goals of security of supply, sustainability and, eventually, competitive end-user prices. The reason is that the Internal Energy Market generally stimulates efficiency in both the utilization and development of the power system, which delivers significant benefits of trade and competitive markets for customers.

In 2009, ENTSO-E together with regulators, the Commission and stakeholders contributed strongly to the development of the first clear target model for European wholesale market integration. ENTSO-E is committed to helping implement this target model, ultimately through network codes, based on a robust road map for integrating physical and financial markets in all time-frames, including the market impact of growing contributions from renewable energy. The TSOs' contributions are crucial so that every single European customer can stay connected to all of Europe's electricity generators and suppliers.

This final chapter will provide an overview of the first steps taken in 2009, constituting the building blocks on which ENTSO-E will construct its contribution to a fully developed Internal Energy Market. Transparency is in this context as important as market coupling initiatives and a well-regulated inter-TSO compensation mechanism, to mention just a few of the most important aspects.

The Target Market Model for Europe 2015

One central element on the way towards a fully developed Internal Electricity Market is the definition of a target market model for Europe in 2015. The truly integrated internal electricity market will benefit consumers by providing competitive prices and sustainable as well as secure supply through efficient utilization of the power system. The target model establishes the essential elements for inter-regional and EU-wide coordinated congestion management. It represents a medium-term view, for progressive implementation until 2015.

Therefore, work towards a target market model for Europe has been one of the highest priorities of ENTSO-E's Market Committee in 2009 and the Committee's most important preparatory work for network codes concerns corresponding designs for market integration. This work was brought into a substantially new phase in the Electricity Regulatory Forum [1] (or so-called Florence Forum), in December 2009. The discussions focused in particular on how the emerging target model agreed by the Project Coordination Group (PCG) could be further developed and eventually implemented in future.

1) The Florence Forum was set up in 1998 to discuss the creation of a true internal electricity market. It addresses cross-border trade of electricity, in particular the tarification of cross-border electricity exchanges and the management of scarce interconnection capacity.
Participants include national regulatory authorities, member state governments, the European Commission, transmission system operators, electricity traders, consumers, network users and power exchanges. Since 1998, the Forum has met once or twice a year, formerly in Florence and now in Rome.

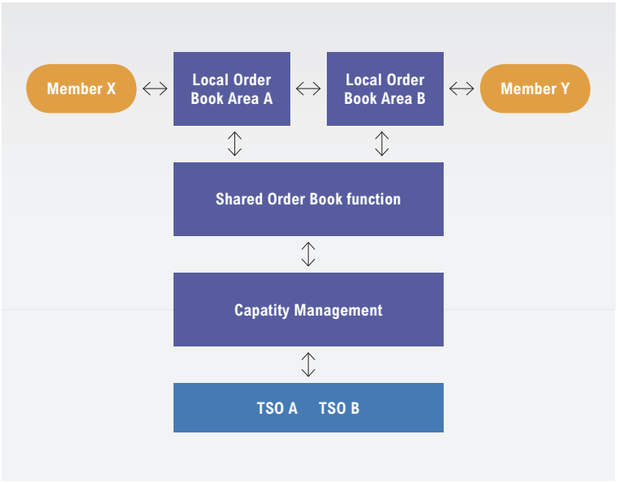


Figure 7:
The target model for Inter-Regional Intraday capacity allocation: the capacity management module will interact with the shared order function so that only feasible bids/offers are visible in each market area.

**Market Committee –
Working Group Market Integration (WG MI)**

The main objective of Working Group Market Integration is to work toward the establishment of an integrated and seamless European electricity market. More specifically, the WG works on the convergence and integration of Europe's physical and financial markets in forward, day-ahead and intra-day timeframes. It contributes to improving coordinated and efficient congestion management methodologies in capacity calculation, allocation and transmission capacity usage. Moreover, it develops appropriate governance frameworks to support market integration activities and, in close coordination with WG Ancillary Services, it works on market integration issues associated with consistent imbalance settlement mechanisms.

**Market Committee –
Working Group Ancillary Services (WG AS)**

Working Group Ancillary Services works on harmonized, efficient and market-based procurement schemes for ancillary services (such as demand-side management) as well as on the associated regulatory framework that contributes best to the establishment of a seamless European electricity market.

The WG's key objectives are:

- Separated and clear-cut roles for TSOs and providers of ancillary services as an important prerequisite for effective unbundling.
- Efficient markets, meaning harmonized rules to facilitate market processes and to eliminate entry barriers of national markets for potential providers of ancillary services.
- Cross-border markets for ancillary services and balancing where possible and reasonable improvement in social welfare while observing capacity constraints.
- Enhanced TSO-TSO cooperation in the procurement and dispatch of ancillary services.

The Forum confirmed a tentative roadmap for the establishment of a European target model for the electricity market and emphasized the need to continue the work in the form of concrete implementation projects.

Following the Forum's conclusions, the work will be continued through an Ad-hoc Advisory Group (AHAG) of all stakeholders, which will assist ERGEG in overseeing the work and solving issues which might hinder progress. The AHAG is chaired by ERGEG and acts as a "steering forum" for the three market integration projects. Besides ENTSO-E, it involves Eurelectric, EuroPEX, EFET, IFIEC, CEFIC, as well as the European Commission.

In total, three specific market integration projects were launched of which ENTSO-E is chairing two (one project to develop a European capacity calculation concept based on a common grid model and flow-based calculation, where clear benefits can be demonstrated; and one project to develop the target model for intraday trade as well as a means for its implementation where appropriate). The European Commission, on the other hand, chairs one project that will design a governance framework for day-ahead market coupling followed by the implementation of a common European day-ahead market coupling by 2015, including the use of price-coupling methodology.

Beyond developing the target model & road map presented by the PCG, the main objective of the three market integration projects is to provide input to ERGEG's work on framework guidelines on capacity allocation and congestion management, as appropriate, and pave the way for code-making and implementation. All three projects were put in place in early 2010, starting with the approval of their terms of reference. Work on all three projects will continue throughout 2010, making progress towards the target market model for Europe 2015.

Market Coupling between Central West Europe and the Nordic Region

In order to support and accelerate the development of the internal electricity market, the thirteen transmission system operators (TSOs) of the Central West Europe and Nordic Regions agreed in October 2009 on a joint declaration representing their common view of the main market coupling principles for day-ahead markets.

Market coupling is a service in the public interest. Its main objectives is to maximize the total social welfare from the use of cross-border transmission capacity; the non-discriminatory and transparent allocation of capacity and efficient price signals. Or, to put it differently, market coupling is a method whereby TSOs and power exchanges cooperate in matching day-ahead energy trades and cross-border transmission capacities in one integrated process. This ensures an efficient use of interconnection capacity and gives the right price signals and flows across the coupled area.

The thirteen TSOs involved are Amprion, 50Hertz Transmission, transpower, EnBW TNG (Germany), Creos (Luxembourg), Elia (Belgium), Energinet.dk (Denmark), Fingrid (Finland), RTE (France), Statnett (Norway), Svenska Kraftnät (Sweden), TenneT (The Netherlands) and National Grid (UK). Together with power exchanges, they have been pursuing a number of local market coupling projects in the Central West Europe and Nordic regions: TLC (to be replaced by CWE), EMCC and NorNed. These initiatives are temporary market harmonization steps towards a more European solution.

As part of the initiative, the parties agreed to pursue a single price coupling mechanism across their area, creating one market region. Such a mechanism is considered to be the most efficient, objective, non-discriminatory and transparent solution for allocating cross-border capacity, thus enhancing social welfare. One key principle of the cooperation is that TSOs will make the day-ahead capacity available to power exchanges, which, in turn, will provide the required data on markets (market data, market rules, matching algorithms, etc). A criterion for the price coupling solution is that it is extendable to other regions.

The TSOs are already in dialogue with all relevant stakeholders, including power exchanges, market parties, national regulatory authorities, and the European Commission.

Market Committee – Regional Groups

Within ENTSO-E's Market Committee, four regional groups have been established (Baltic Sea, North-West, South-East and South-West).

The Market Committee's Regional Groups work on regional initiatives with a view to improving the functioning of electricity markets with a regional focus between several countries and with the eventual objective of creating an internal EU electricity market.

Regional initiatives, such as market coupling or the harmonization of markets at a regional level are conducted while taking into account overall consistency with the rest of Europe and with emerging European target models.

Further examples of initiatives and activities include, among others, the development of common congestion management and capacity allocation methods, the coordination of reserves and balancing power markets between participating countries, and the coordination of ancillary services and balancing markets.

The Last Voluntary Inter-TSO Compensation Agreement

In December 2009, European TSOs reached a new voluntary agreement on inter-TSO compensation for transits (ITC). This continued a long successful history of such voluntary agreements in ETSO since the first IEM Directive, contributing significantly to efficient and easy-to-implement cross-border trading. The Agreement, which was signed by 39 TSOs from 33 countries, was an interim solution until the official EC guideline for ITC compensation enters in force, later in 2010.

The ENTSO-E agreement is based on the EC proposal for binding guidelines on ITC, which had been submitted for approval by EU member states under Comitology. The agreement foresees two components to be compensated: transmission losses and infrastructure costs.

In line with previous practice, transmission losses are compensated based on the WWT (With and Without Transit) model. This means that losses are calculated on the transmission grid of each TSO in a load flow situation with transits and in a load flow situation without transits. The price used to calculate the value of transit losses shall be equal to the price used to compensate losses by national tariffs. All ITC parties will therefore receive full compensation for losses in their system attributable to transits.

A framework fund will be used to compensate transmission system operators for the costs of making infrastructure available to host transit flows of electricity. In line with the EC proposal, the value of the framework fund has been set at 100 million Euros per year.

Similar to previous ITC agreements, and to draft EC guidelines, the agreement foresees that perimeter flows (i.e. third country imports and exports) shall contribute to the framework fund and WWT calculations. The perimeter fee amounts to 0.7 MWh for 2010.

In the European Commission's Electricity Cross-Border Committee meeting in March 2010, the proposed guidelines on inter-TSO compensation and on transmission charging were eventually adopted. In order to address accurately the distinct situation before and after March 2011 (when ACER and ENTSO-E are officially put in place according to the Third Package's schedule) Regulations (EC) 1228/2003 and (EC) 714/2009 will be amended correspondingly and changes will come into force in 2010 and on 3 March 2011, respectively. The technical provisions in both regulations are very similar. Thus, with this decision, further voluntary ITC agreements will no longer be required. ENTSO-E is pleased that based on the successful ITC history of ETSO and ENTSO-E, these complex and often controversial rules are now clarified in European legislation.

Market Committee – Working Group Economic Framework (WG EF)

Working Group Economic Framework provides the ENTSO-E Market Committee with appropriate tools to promote a consistent and sound economic framework for TSOs. Besides the inter-TSO compensation (ITC) mechanism, it focuses on the regulatory treatment of revenues and costs, pricing structures and methods of sharing joint revenues and costs. The Working Group is also in charge of producing regular overviews on transmission tariffs, congestion rents, ITC and other relevant financial data.

Within the context of the Market Committee's long-term objective of developing an integrated and seamless European electricity market, WG EF aims, among others, to:

- promote fair treatment of TSO revenues/costs and effective incentive schemes for TSOs;
- promote efficient and consistent transmission pricing structures which provide market participants with effective signals;

Transparency

Transparency is essential in order to achieve well-functioning, efficient, liquid and competitive wholesale markets and thus a fully developed IEM. Additional information is requested by market actors to follow and understand the electricity market and manage their business risks properly. Furthermore, transparency is the foundation for creating a level playing field, thus increasing competition between different market players.

European TSOs have already contributed and will continue to enhance transparency provisions through data and publications made available on their own websites. But they make their most important contribution to transparency through www.entsoe.net the European transparency platform, offering the best information available today, including all member TSOs of ENTSO-E and thus surpassing the scope of the European Commission.

Transparency has improved significantly over the past few years (e.g. thanks to European legislation and voluntary initiatives by market participants). However the need for further legislation and initiatives to improve transparency on a European scale has been widely recognized. Following a request by the Commission, ERGEG is currently working on a draft guideline on fundamental data transparency, which will eventually become legally binding by passing through Comitology. A final version of the draft guideline is expected by the end of 2010. ENTSO-E's role will be to closely cooperate with ERGEG throughout the drafting process of the guideline.

In early 2010, ENTSO-E has published its transparency policy, summarizing the positions and main initiatives related to transparency of ENTSO-E. The transparency policy is subject to a revision procedure every two years or whenever necessary (e.g. where there are changes in legislation, such as the future transparency guidelines).

As part of this policy, any infrastructure connected to the European HV grid which may have an impact on the IEM is believed to be subject to transparency (e.g. interconnectors, generation units, significant consumption units, etc). The same is also true for external factors such as weather forecasts, shortages in primary fuels or general economical/political conditions. Although ENTSO-E acknowledges the need for enhanced transparency in all these areas, the principal focus of ENTSO-E will be information on fundamental data pertaining to TSOs and data from other sources related to TSO core business (e.g. auction data, balancing data, generation data). In this context, fundamental data are data describing physical conditions that influence the electricity market directly or indirectly. In parallel to this

Market Committee – Working Group Market Information and Transparency

WG MIT works towards achieving the highest possible level of transparency of market information. It develops, supports and promotes the www.entsoe.net (formerly ETSOVista) platform as a compliance tool supporting the work and harmonization of the European Electronic Data Interchange.

The working group analyses transparency requirements and develops the ENTSO-E transparency policy, which defines what data and information need to be published by TSOs. It develops and guides the work of www.entsoe.net, with the aim of turning it into a compliance tool to: (a) ensure full participation from the TSOs; (b) achieve a satisfactory quality of data; and (c) ease access of information to market participants.

In close cooperation with WG EDI (see below), it harmonizes electronic data interchanges by developing standards for information exchange and supports the implementation of standardized EDI documents.

Market Committee – Working Group Electronic Data Interchange (WG EDI)

Working Group EDI contributes to the establishment of an effective European Electricity Market (EEM) by actively supporting the harmonization and implementation of standardized Electronic Data Interchange (EDI) between TSOs and market participants. Standardized EDI solutions aim to lower the costs for all parties and facilitate market integration.

WG EDI works in close cooperation with other working groups to develop the electronic data interchange required for market business processes. Its long-term objective is:

- to develop standards for information exchange in co-operation with other working groups;
- to support the implementation of standardized EDI documents wherever these are needed for the European Electricity Market;
- to cooperate with other standardization bodies such as the International Electrotechnical Commission (IEC) in order to encourage IT vendors to develop ENTSO-E standards into commercial products which will reduce IT costs for TSOs and market participants in the future.

transparency policy on fundamental data, the Commission is currently also preparing a second legal document on transaction data transparency.

Main Transparency Principles

Individual TSOs and ENTSO-E are already publishing a huge variety of information items. As market participants request additional information and coherent data describing the functioning of the IEM, increased ex ante and ex post information and harmonization of definitions and methods are needed. Also, in the future, such services delivered by ENTSO-E will mainly be focused on fundamental market data. An extension to other categories is not intended although the scope of data publication may change.

ENTSO-E aims to become the front runner for transparency on a regional and European level. Therefore, ENTSO-E is committed to providing market participants with simultaneous, homogenous and reliable data of appropriate quality, without discrimination.

ENTSO-E will support the improvement of market transparency at a regional and European level by periodic consultations with stakeholders on additional information which can be made available, thus surpassing minimum requirements in the legislation. Moreover, it will operate, maintain and, where appropriate, enhance its central data platform, www.entsoe.net, which will display relevant, coherent, well-defined and structured data for all ENTSO-E regional electricity markets in an easily accessible manner. The data will be free of charge and of the highest standard available at the time of publication.

ENTSO-E.NET – the Transparency Platform

ENTSO-E will provide market actors, the European Commission, regulators and the public in general with fundamental market data at a pan-European level through the transparency platform www.entsoe.net. This platform facilitates comparisons of data, understanding of price formation and risk analysis. It will be developed into a complete transparency compliance platform where as a minimum all data required by legislation can be found. ENTSO-E will implement common definitions and standards for the publication of market relevant information on www.entsoe.net and in addition each TSO will publish any individual information on its own website needed to meet individual requirements unique for its area.

The publications on www.entsoe.net will be expanded with additional data according to existing and future legal and regulatory transparency requirements. Also, some additional publications can be made. Examples of such future publications are:

- Exports and imports out of and into Europe
- Aggregated data on renewable generation, wind solar power, etc.

Today www.entsoe.net is prepared to publish data at a European level corresponding approximately to congestion management guidelines 1228/2003. The transparency platform can already be accessed via the Internet at www.entsoe.net. Further information on ENTSO-E's transparency policy and any updates to this policy can already be found on ENTSO-E's website (www.entsoe.eu).

Interconnection Studies

ENTSO-E's "being connected" does not only refer to the market but also to interconnections in general and also to possible new interconnections with non-member TSOs. Requests for new interconnections or system couplings may grow out of EU policy, or come from external countries – they are usually motivated by the same reserve sharing, reliability and market benefits that have led to Europe's existing extensive interconnections.

Beyond the ENTSO-E area, interconnections already exist to the East – from Estonia, Latvia and Lithuania to Russia and Belorussia via meshed alternating current (AC) network connections, and from Finland and Norway to Russia via direct current (DC) connections – and to the South – from Spain to Morocco via two AC subsea cables, with Morocco also being connected synchronously to Algeria and Tunisia. Further studies and tests have been on-going or in preparatory stages for a possible interconnection between Tunisia and Libya/Egypt/Jordan/Syria, and also for a possible interconnection of Ukraine and Moldova to Continental Europe synchronous area. The most advanced studies and tests concern a synchronous interconnection between Continental Europe and Turkey. In March 2000, the Turkish system operator TEIAS made an application to UCTE for synchronous interconnection to Continental Europe and for membership. After consideration by the UCTE Steering Committee, a Project Group was established and scheduled the activities for carrying forward the connection in three phases:

1. Preparatory Phase – complementary static and stability studies and investigations on the Turkish power system in accordance with the standards defined by the UCTE Operation Handbook. This phase was finished successfully in April 2007.

2. Monitoring of the implementation of upgrading measures – in order to meet all the requirements of the complementary studies, TEIAS decided to launch, in July 2007, a second project: "Rehabilitation of the Frequency Control Performance of the Turkish Power System for Synchronous Operation with UCTE" with the task of providing consultancy and elaborating recommendations.

3. Tests in island mode and trial parallel operation – before its synchronous interconnection, the performance of the Turkish power system must be evaluated in a trial phase comprising tests in isolated mode and interconnected mode under real operating conditions.

In 2009 significant progress was made towards the foreseen tests and trial parallel operation. An "Agreement Concerning the Procedure Steps and Measures to Achieve the Interconnection of the Turkish Power System with the Continental Europe Synchronous Area of ENTSO-E" was signed in Sofia on 18 December 2009. The ENTSO-E Project Group on the synchronous interconnection of the Turkish electrical system concluded that the Turkish power system has completed all necessary measures in order to start so-called "island tests", i.e. closely monitored periods of operation of the Turkish system without interconnection to other countries. Two such island tests, under low and high load conditions, each of two weeks duration, were successfully carried out in the first quarter of 2010.

Pending the analysis of these tests and provided there is a positive outcome, a one-year trial involving the parallel operation of TEIAS with the ENTSO-E's Regional Group Continental Europe interconnected network could begin in 2010.

ENTSO-E's regional groups under the System Operations Committee and System Development Committee have both been deeply committed to supporting the activities of the Project Group.

ENTSO-E's Network Map

In January 2010, ENTSO-E published its first grid map, which is based on the previous UCTE map of the interconnected network.

The grid map is a comprehensive illustration of the interconnected networks. It shows power plants (distinguishing between hydro, wind and thermal), stations, existing high-voltage lines and lines under construction for voltages of 220 kV and higher, as well as high-voltage lines of 110 kV to 150 kV if these lines cross national borders.

The ENTSO-E map is an indispensable tool in understanding the present state of the grid as well as the need for future grid investment projects in order to achieve European energy policy goals. The map has been upgraded with the latest data, while the Russian grid has been entirely updated and Cyprus' network has been added. The grid map is available in various sizes and can be ordered from the ENTSO-E website www.entsoe.eu.

Outlook

The first year of operations having concluded, ENTSO-E's Work Program for 2009–2010 urgently focuses on a number of important new tasks assigned to the TSOs by the Third Legislative Energy Package. Among these, the pilot Ten-Year Network Development Plan, the R&D Plan, and, not least, the pilot network code stand out.

The need to develop network codes in 12 different topic areas and the entirely new, complex process for their development, make the drafting of a pilot network code one of the highest priority projects, not least in order to try out the code drafting process together with the European Commission, ERGEG and stakeholders. Grid connection of wind generation has been the topic of choice for the pilot code, thereby responding to the urgency of providing a harmonized framework for the massive projected investments in this sector in attainment of EU policy goals.

The pilot network code on grid connection with special focus on wind generation has witnessed significant progress in its start-up phase in 2009. And yet, a lot of important work on the code is still to be done throughout 2010 and until March 2011, when ACER will begin work on its tasks. Early consultations with the Commission and ERGEG as well as stakeholders are essential for a robust code and are foreseen to constitute an important part of the work on the code in 2010. In this context, the progress of work on the code is tightly bound to the progress of ERGEG on the corresponding framework guideline, respecting the order of actions stipulated in the Third Package, with the objective of releasing the pilot code for public consultation at the end of 2010.

Besides the pilot network code on conditions for grid connection, there are further important network codes to be drafted in the areas of market integration and system operations. Since the development process of network codes may take three years and ACER, which plays a significant role in that process, cannot exercise its tasks before March 2011, the regional groups under the System Operations Committee will also continue the revision of existing rules and the monitoring of compliance and adequate implementation of these policies by all TSOs.

Furthermore, in 2009, important steps were also made towards a target market model with the establishment of the Ad-hoc Advisory Group of stakeholders (AHAG). As agreed between the European Commission and ERGEG, AHAG provides a platform for advice to European energy regulators in the development of their Framework Guideline on Capacity Allocation and Congestion Management. Based on the work accomplished in the three market integration projects on capacity calculation; intra-day trade- chaired by ENTSO-E – and on the governance framework for day-ahead market coupling, ENTSO-E will already be starting its code drafting in this area towards the end of 2010.

As data transparency is a central issue in the complex electricity market, and essential to achieving a well-functioning, efficient and competitive wholesale market, ENTSO-E is publishing its first transparency policy in spring 2010. Throughout 2010, ENTSO-E will also be closely cooperating with ERGEG on the drafting of a guideline on fundamental data transparency, which is expected to be finalized by the end of 2010 and to go directly into the Comitology process before it becomes binding in the first half of 2011.

In the first half of 2010, ENTSO-E's pilot Ten-Year Network Development Plan was released for public consultation for a period of six weeks. Once the feedback is collected, the document will be updated with the newly gained insights and presented to the Florence Forum in June 2010. At the same time, the pilot TYNDP can become an important input for the National Renewable Energy Action Plans (NREAPs), which are to be delivered by EU Member States by the end of June 2010.

Since additional transmission infrastructure is often crucial to integrate additional renewable energy sources into the system, it is expected that the NREAPs will make use of the TYNDP investment projects to assess the measures that are required to attain the national targets related to the EU 2020 goals. Furthermore, the wealth of information within the TYNDP – an inside look at the expertise and know-how of TSOs – can be used as a methodological and factual basis for policy-making on transmission infrastructure.

The next release of the TYNDP is foreseen for 2012, adding three significant aspects to the second edition:

1. updated bottom-up scenarios as well as long-run top-down scenarios, involving ACER, stakeholders as well as policy decision-makers,

2. regional market studies and

3. an ENTSO-E-wide common framework for regional network studies, based on pan-European scenarios and integrated medium- and long-term network models.

Beyond this project work and the various tools given to ENTSO-E by the Third Package, ENTSO-E will also in future be heavily dependent on the expertise and engagement of its stakeholders. In this context, ENTSO-E's stakeholder relations and consultation process will be reviewed regularly. ENTSO-E's consultation process, in particular, must promote openness and trust among stakeholders, encourage their active engagement, and at all times it should reflect the theme "we say what we do, and we do what we say".

In addition to the high priority work presented in this activity report, ENTSO-E's committees and groups carry out many other activities, largely in continuation of the work of the prior associations. Examples are statistical and technical data, network maps, electronic data interchange (EDI) standards, critical systems protection, asset implementation and management, requests for extensions of the continental Europe synchronous area, and legal and regulatory issues.

Thus clearly, in 2010 and beyond, the broader framework of ENTSO-E's activities will continue to be constituted by the Third Package. Regulation (EC) 714/2009 sets the goals and the direction of ENTSO-E's work. Optimal management of the electricity transmission network, providing a reliable electricity supply, enhancing the integration of the European electricity market and contributing to a sustainable energy environment will remain at the core of ENTSO-E's interest.

To put it succinctly, ENTSO-E will also in future ensure that the European transmission system remains "**Reliable, Sustainable, Connected**".

Appendices

ENTSO-E in Brief

Who is ENTSO-E

- ENTSO-E, the European Network of Transmission System Operators (TSOs), is the single TSO platform in Europe, speaking with one voice on behalf of its 42 members.
- ENTSO-E was established on 19 December 2008 and became fully operational as of 1 July 2009 – ahead of the official schedule set by the Third Energy Package.
- ENTSO-E replaces its six predecessor associations ATSOI, BALTSO, ETSO, Nordel, UCTE and UKTSOA and continues and consolidates their work.
- ENTSO-E's legal raison d'être is Regulation (EC) 714/2009 on the conditions for access to the network for cross-border exchanges in electricity. The Regulation is part of the Third Energy Package on the Internal Energy Market, which came into effect on 3 September 2009.

Our Mission

ENTSO-E's mission is to promote important aspects of energy policy in the face of significant challenges:

- **Security** – it pursues coordinated, reliable and secure operation of the electricity transmission network.
- **Adequacy** – it promotes the development of the interconnected European grid and investments for a sustainable power system.
- **Market** – it offers a platform for the market by proposing and implementing standardized market integration and transparency frameworks that facilitate competitive and truly integrated continental-scale wholesale and retail markets.

Our Vision

ENTSO-E's vision is to become and remain the focal point for all European, technical, market and policy issues related to TSOs, interfacing with power system users, EU institutions, regulators and national governments. ENTSO-E's work products contribute to security of supply, a seamless, pan-European electricity market, secure integration of renewable resources and a reliable future-oriented grid, adequate for energy policy goals.

Our Activities

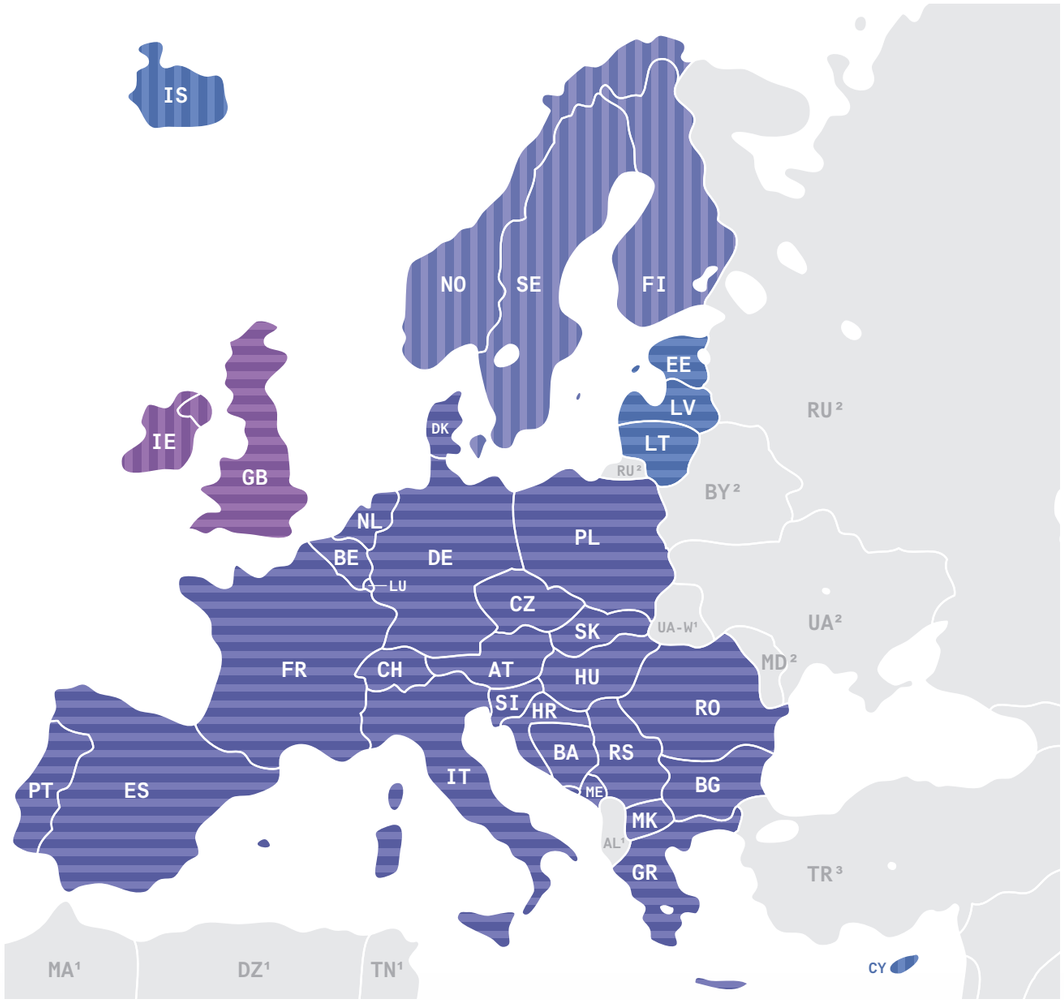
At ENTSO-E, the TSOs cooperate regionally and on a European scale. ENTSO-E's activities are organized into three committees: System Development, System Operations and Market, and are supported by a Legal & Regulatory Group. The activities are focused on:

- reliable operation
- optimal management of the transmission system
- sound technical evolution of the European electricity grid
- security of supply
- meeting the needs of the Internal Energy Market and facilitating market integration
- network development plans
- network codes
- promotion of relevant R&D
- consultation with stakeholders and development of positions on energy policy issues
- promotion of the public acceptability of transmission infrastructure

ENTSO-E in Numbers

- **42** Transmission System Operators (TSOs)
- **34** European countries
- **400** TWh of electricity exchanges between member TSOs
- **525** million customers served by the represented power systems
- **828** GW of installed generation capacity
- **3400** TWh of electricity consumption
- **305,000** km of transmission lines managed by the TSOs

The ENTSO-E Synchronous Areas



Continental European synchronous area

Baltic synchronous area

Nordic synchronous area

British synchronous area

Irish synchronous area

Isolated systems of Cyprus and Iceland

[1] synchronous with the continental European system

[2] synchronous with the Baltic system

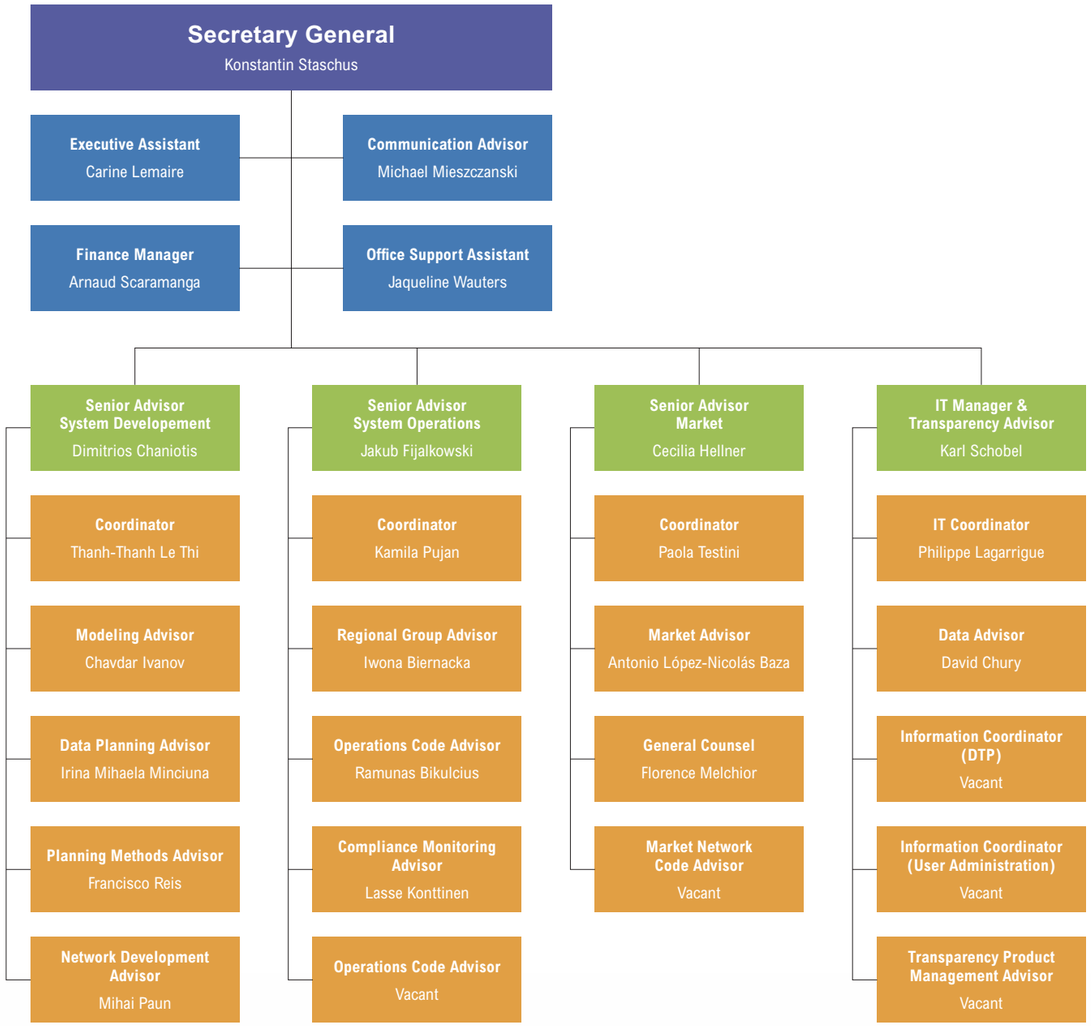
[3] from September 2010 planned trial parallel interconnection with the continental European system

ENTSO-E Members

Country	Company	Abbreviation
AT | Austria	TIWAG Netz AG	TIWAG Netz
	Verbund – Austrian Power Grid	VERBUND APG
	VKW-Netz AG	VKW-Netz
BA | Bosnia and Herzegovina	Nezavisni operator sustava u Bosni i Hercegovini	ISO BiH
BE | Belgium	Elia System Operator SA	Elia
BG | Bulgaria	Electroenergien Sistemen Operator SA	ESO
CH | Switzerland	swissgrid ag	swissgrid
CY | Cyprus	Cyprus Transmission System Operator	Cyprus TSO
CZ | Czech Republic	ČEPS a.s.	ČEPS
DE | Germany	50Hertz Transmission GmbH	50Hertz
	Amprion GmbH	Amprion
	EnBW Transportnetze AG	EnBW TNG
	transpower stromübertragungs gmbh	transpower
DK | Denmark	Energinet.dk	Energinet.dk
EE | Estonia	Elering OÜ	Elering OÜ
ES | Spain	Red Eléctrica de España S.A.	REE
FI | Finland	Fingrid OyJ	Fingrid
FR | France	Réseau de transport d'électricité	RTE
GB | United Kingdom	National Grid Electricity Transmission plc	National Grid
	System Operation Northern Ireland Ltd	SONI
	Scottish and Southern Energy plc	SSE
	Scottish Power Transmission plc	SPTransmission
GR | Greece	Hellenic Transmission System Operator S.A.	HTSO

Country	Company	Abbreviation
HR | Croatia	HEP-Operator prijenosnog sustava d.o.o.	HEP-OPS
HU | Hungary	MAVIR Magyar Villamosenergia-ipari Átviteli Rendszerirányító Zártkörűen Működő Részvénytársaság	MAVIR ZRt.
IE | Ireland	EirGrid plc	EirGrid
IS | Iceland	Landsnet hf	Landsnet
IT | Italy	Terna – Rete Elettrica Nazionale SpA	Terna
LT | Lithuania	LITGRID UAB	LITGRID
LU | Luxembourg	Creos Luxembourg S.A.	Creos Luxembourg
LV | Latvia	AS Augstsprieguma tīkls	Augstsprieguma tīkls
ME | Montenegro	AD Prenos	AD Prenos
MK | FYROM	Macedonian Transmission System Operator AD	MEPSO
NL | Netherlands	TenneT TSO B.V.	TenneT TSO
NO | Norway	Statnett SF	Statnett
PL | Poland	PSE Operator S.A.	PSE Operator
PT | Portugal	Rede Eléctrica Nacional, S.A.	REN
RO | Romania	C.N. Transelectrica S.A.	Transelectrica
RS | Serbia	JP Elektromreža Srbije	EMS
SE | Sweden	Affärsverket Svenska Kraftnät	Svenska Kraftnät
SI | Slovenia	Elektro Slovenija d.o.o.	ELES
SK | Slovak Republic	Slovenska elektrizacna prenosova sustava, a.s.	SEPS

ENTSO-E Staff*



*As of quarter 2/2010

ENTSO-E Work Program 2009/2010 Indicative Schedule

The following schedule tables set carefully chosen, but still ambitious goals: However, these target dates may not be detrimental to the primary transparency goals to be achieved via a close consultation of stakeholders following the requirements especially of Art. 10 of the Regulation 714/2009.

					Upon	
Activity	Goal	Work start (quarter/year)	Deliverable & completion date (end of quarter/year)	Committee / Group in charge	Interaction with other groups	Consultation with (start quarter/year)
Connection of generation	Development of the pilot code for grid connection with special focus on wind generation	Q3/2009	Some draft pilot codechapters (Q2/2010); input to framework guideline consultation (Q3/2010); pilot code proposal (Q1/2011)	System Development Committee (SDC)	System Operations Committee (SOC), Market Committee (MC), Legal & Regulatory Group (LRG)	All stakeholders; in particular ERGEG regarding their pilot framework guideline on connection (Q2/2010 – Q3/2010)
Other generation connection specificities	Development of remaining chapters of generation connection network code	Q2/2010	Q3/2011	SDC	SOC, MC, LRG	All stakeholders (2010)
Transparency	– Development of transparency policy as input to EC Guideline – entsoe.net (ETSOVista) development	Q3/2009 Q3/2009	1. position paper/ transparency policy (Q1/2010) 2. update of entsoe.net platform (Q2/2010) 3. continuous input to ERGEG and EC for Guideline (until Q4/2010)	MC	Data Expert Group, LRG	All stakeholders (on position paper: beginning early in 2010)
Operational network codes	Scoping work on operational framework guideline and network codes Development of operational network codes: 1. load flow management 2. use of balancing tools and of ancillary services 3. standardized coordination methodology / procedures	Q1/2010 Q4/2009 Q4/2009 Q4/2009	1. Continuous input to ERGEG framework guideline (until Q3/2010) 2. Terminology (Q2/2010) 3. Comparison analyses on operational rules in synchronous areas (Q2/2010) 4. Network codes (Q4/2011)	SOC	As needed	All stakeholders; in particular ERGEG, EURELECTRIC (beginning in Q1/2010; intense on the different topics during different quarters in 2010)
Market integration issues	Design and implementation of market integration through contributions to Ad-Hoc Advisory Group and 3 implementation projects Code development	Q1/2010 After Q3/2010	Ultimate deliverables are network codes whose number and scopes depend on the framework guideline, the implementation projects and EC priorities: Intraday code Day-ahead code Capacity calculation code Completion dates depend on priorities and availability of experts, possibly as early as Q4/2011	 MC MC MC intensely coordinated with SOC	 SOC, LRG SOC, LRG LRG	ERGEG's Ad-Hoc Advisory Group involving all stakeholders (through at least Q1/2010) ERGEG during development of (input to) framework guideline (Q2 – 3/2010) All stakeholders for code development (starting Q4/2010)
Network development and planning	Preparation of a pilot TYNDP (the first draft early 2010)	Q3/2009	Report (Q2/2010)	SDC	All SDC WGs and RGs; EWIS project, LRG	All stakeholders; in particular ERGEG, EURELECTRIC, EFET, EWEA (Q3 – 4/2009), public consultation (Q1 – 2/2010)

Activity	Goal	Work start (quarter/year)	Deliverable & completion date (end of quarter/year)	Committee / Group in charge	Upon: Interaction with other groups	Upon: Consultation with (start quarter/year)
R&D	Preparation of a consolidated TSO R&D Plan, contributions to EC's Strategic Energy Technologies Plan	Q3/2009	R&D plan (Q4/2009)	SDC lead, with MC and SOC	SOC, MC, LRG	EC, ERGEG, DSOs (start Q1/2010)
Operational issues	Preparations for common operational tools; coordination of regions for operational issues	Q4/2009	1. Operational experience exchange forum (Q1/2010) 2. Congestion forecasting improvements (Q4/2010) 3. Actions aiming at harmonization of regional Network Codes (Q4/2010)	SOC	–	None
Network development and planning	Development of position papers on future transmission technology, EMF and licensing procedures	From Q3/2009 to Q4/2010	Position papers (from Q1/2010 to Q4/2010)	SDC	WG R&D, MC, SOC, LRG	EC, EP, ERGEG (Q3/2009)
Network development and planning	Formulation of long-term strategy/vision for the extension of the Europ. network, possibly with a view to effects on mkt integration	Q4/2009	System extension strategy (Q4/2011)	SDC	SDC, MC, LRG	EC and other stakeholders (beginning in Q2/2010)
TSO cooperation on operational issues	Development of technical document on operational reserves	Q4/2009	1. Comparison analyses 2. Proposed common principles for methodology for reserves' determination (Q4/2010)	SOC	MC, LRG	ERGEG, EURELECTRIC, EFET (Q1/2010)
Operational issues	Development of technical document on determination of incident classification and methodology of incident analyses	Q4/2009	1. Criteria for incident classification 2. Methodology of incident analyses (both Q4/2010)	SOC	None	None
Ancillary services	Ancillary services – definition of commercial products and standards	Q3/2009	Document (Q4/2010)	MC	SOC, LRG	All stakeholders; in particular EURELECTRIC (2010)
Economic framework market issues	Economic framework positions – ITC – investment incentives – tariffs	Q4/2009	Position papers: ITC (Q4/2009) Others (Q4/2010)	MC	SDC, LRG	All major stakeholders (Q4/2009 and later)
RES integration	1) Roadmap for the development of offshore wind generation 2) Overview of policies on RES support and grid connection	Q3/2009	Roadmap and paper (both Q2/2010)	MC, intensely coordinated with SDC, SOC and LRG	–	EC, ERGEG, European coordinator (Q3–4/2009)

Abbreviations

AC	Alternating Current
ACER	Agency for the Cooperation of Energy Regulators
AHAG	Ad-hoc Advisory Group
ARM	Adequacy Reference Margin
CEFIC	European Chemical Industry Council
CMP	Compliance Monitoring Program
COR	Compliance Oversight Report
DC	Direct Current
DSO	Distribution System Operator
EC	European Commission
EEGI	European Electricity Grid Initiative
EEM	European Electricity Market
EFET	European Federation of Energy Traders
ENTSO-E	European Network of Transmission System Operators for Electricity
EP	European Parliament
ERGEG	European Regulator's Group for Electricity & Gas
EWEA	European Wind Energy Association
EWIS	European Wind Integration Study
ICT	Information & Communication Technology
IEC	International Electrotechnical Commission
IEM	Internal Energy Market
IFIEC	International Federation of Industrial Energy Consumers
LCP	Large Combustion Plant
MC	Market Committee
NGC	Net Generation Capacity
NREAP	National Renewable Energy Action Plan
RGCE	Regional Group Continental Europe
SAF	System Adequacy Forcast
SDC	System Development Committee
SOC	System Operations Committee
TSO	Transmission system operator
WG AIM	Working Group Asset Implementation & Management
WG AS	Working Group Ancillary Services
WG CSP	Working Group Critical System Protection
WG EDI	Working Group Electronic Data Interchange
WG EF	Working Group European Framework
WG EH	Working Group Electronic Highway
WG EOS	Working Group European Operational Standards
WG EPS	Working Group European Planning Standards
WG MI	Working Group Market Integration
WG MIT	Working Group Market Information & Transparency
WG NM&D	Working Group Network Models & Data
WG RES	Working Group Renewable Energy Sources
WG SAMM	Working Group System Adequacy & Market Modelling
WWT	With & Without Transit

Imprint

Publisher: ENTSO-E AISBL
Avenue de Cortenbergh 100, 1000 Brussels – Belgium

Editor-in-Chief: Konstantin Staschus, Ph. D.

Managing Editor: Michael Mieszczanski

Design & Layout: Oswald und Martin Werbeagentur, Berlin

Printed by: Kehrberg Druck Produktion Service, Berlin

Photos: ENTSO-E (p. 6, 7, 13), 50Hertz (p. 14, 25, 33, 37, 45)
istockphoto.com (p. 1, 8, 16, 19, 21, 26, 30, 34, 39, 40 42, 44, 46)

Contact

ENTSO-E AISBL

Avenue de Cortenbergh 100
1000 Brussels – Belgium

Tel +32 2 741 09 50
Fax +32 2 741 09 51

info@entsoe.eu
www.entsoe.eu

European Network of
Transmission System Operators
for Electricity