

A close-up photograph of several hands holding and interlocking white plastic gears of different sizes. The background is blurred, showing more hands and gears, suggesting a complex mechanical system or a collaborative effort.

ENTSO-E WORK PROGRAMME

2016 THROUGH DECEMBER 2017

Version for public consultation

European Network of
Transmission System Operators
for Electricity

entsoe



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» EXECUTIVE SUMMARY

In 2017, ENTSO-E will enter a new phase for several of its important legally mandated tasks. After almost seven years of development work, most of the network codes¹⁾ (NC) will have been adopted. This means that the focus shifts now to the many implementation tasks for all parties concerned, such as transmission system operators (TSOs) for their national implementation of connection codes and TSOs with support from ENTSO-E for regional and pan-European ‘all TSOs’ tasks in markets and operations. Regulators and ACER will be busy with ‘all NRAs’ tasks and monitoring activities, and the stakeholders and market participants will be involved in the three new stakeholder committees.

However, the new phase is not only about NCs. It is also about the increasing importance of regional cooperation in energy, about the active customer paradigm, a new approach for consolidated market studies for both the ten-year network development plans (TYNDP) and adequacy forecasts, and the new European Technology and Innovation Platform for Smart Networks for Energy Transition.

The European Network of TSOs for Electricity has been formally established under Regulation 714/2009, which defines its role and legal mandate. Additional roles and responsibilities are contained in Regulations 838/2010 (inter-TSO compensation), 543/2013 (fundamental data transparency), and 347/2013 (infrastructure, trans-European networks). Moreover, ENTSO-E works closely with the European Commission (EC) and ACER and consults with all the stakeholders when carrying out its duties. ENTSO-E’s mission is to fulfil its various legal mandates for the benefit of electricity customers, and to leverage its mandated work products to shape future energy policy for the benefit of society at large in the face of significant challenges in the areas of security of supply, the integration of a pan-European electricity market, and sustainability.

While the implementation of the 2009 ‘Third Energy Package’ continues to be a main driver of our work programme (including implementation monitoring, the building of the common grid model (CGM), the TYNDP, and our Transparency Platform among others), the new phase will undoubtedly also be shaped by the forthcoming ‘Energy Union’ legislative initiatives in the

areas of electricity market design and renewables. The EC’s proposals are expected by Q4 2016. Therefore, additional tasks such as on an enhanced and pan-European role in system adequacy assessment or on regional cooperation have been included in our work programme.

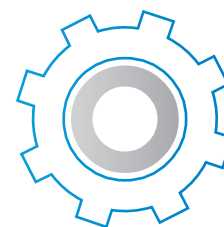
Five themes characterize ENTSO-E’s work for 2017:

- **Delivery of our legal mandate, with emphasis on the implementation activities of the NCs.**
- **Enhanced cooperation and co-creation with our stakeholders, and enhanced transparency.**
- **Continuation of our proactive contributions to policy and the new EC legislative initiatives.**
- **Retail-wholesale interface and TSO-DSO co-operation.**
- **Regional co-operation including for ‘policy regions’.**

Transmission System Operators are in a unique position and at the same time share high responsibility towards society to help deliver the energy transition. For 2017, ENTSO-E is anticipating a dynamic and fast changing environment of the energy sector, and in response is planning innovative initiatives and even better delivery of its legal mandate, in order to fulfil the expectations of its stakeholders.

1) For clarity, the term ‘network codes’ (NC) is mainly used in this document to define a set of common rules for electricity markets, be it ‘network codes’ or ‘binding guidelines’, as defined by Regulation (EC) No. 714/2009. The term ‘network codes and guidelines’ is used on very specific occasions when it actually contributes to a better understanding of the document. When relevant, reference is made to the regulation for NC or guideline that entered into force.

1 INTRODUCTION



1.1 STRATEGIC PLANNING

The European power system is in the midst of transformative change. This transition is built upon innovation but at its core is driven by customer empowerment. Sustainability, choice, quality of services, transparency, regional cooperation and participation are key factors in achieving the “Energy Union”. ENTSO-E believes that strong European co-operation, with an important role for regions, is the basis for addressing the opportunities and challenges related to the energy transition.

The strategy of ENTSO-E is designed to deliver the EU energy policy objectives, and is updated by the Board and monitored by track-

ing the progress of the strategic plan and the alignment with new external developments. The current strategic plan was approved in April 2015, as ENTSO-E’s response to the Energy Union initiative.

Eleven strategic goals had been identified to be delivered throughout 2015 and 2016. Those are shown below in the table together with their most recent status. This shows progress with most, while specific measures have been taken where needed.

ENTSO-E will review its strategic priorities for the year ahead in Q3 2016.

Strategic Goal	Progress	Comments
Stakeholder perception of ENTSO-E improves further	On track	Enhanced transparency, communication and co-creation with stakeholders
Complete plan to deliver day-ahead market coupling in all of Europe (at least net transfer capacity basis)	In progress	New project launched June 2016 for pan-European TSO preparation tasks
Deliver intraday with local projects for all TSOs currently in the project	In progress	More TSO resources required for this and many NC implementation tasks
Establish efficient implementation of balancing code and pilot projects	On track	Imbalance netting: project launched. aFRR, mFRR, RR: to be launched.
All RSCs established, their five tasks implemented	On track	RSC target date to establish is end 2017
Joint TSO/DSO co-creation on wholesale-retail markets and data handling	On track	After joint data management report, joint work on other topics planned
ENTSO-E’s new adequacy methodology and results to become the basis for enhancements of the market design, security of supply, and market integration at the regional and European levels	On track	TYNDP 2016 and Mid-term Adequacy Forecast published June 2016, including our new approach and methodologies
Clarify ENTSO-E’s position on the role and governance of power exchanges	On track	Position paper will be published September 2016
Establish an ENTSO-E independent Advisory Board	On track	Representatives of stakeholders nominated; 1st meeting 15 Sep 2016
Systematic implementation of project management approach	In progress	Central Project Management Office established and functioning
TYNDP to become the reference for legislation and investment support, related to the pan-European power system	In progress	Alignment of national procedures for cross-border projects may require further harmonisation

Table 1: ENTSO-E’s strategic objectives

ENTSO-E's strategy for 2017 is being built around five themes as presented below:

1. Continue successfully discharging the Association's legal mandates (NC implementation, TYNDP, Transparency Platform, Mid-term Adequacy Forecast, other specific tasks assigned to it).
2. Further improving ENTSO-E's performance and perception. This is to be delivered through increased transparency on information sharing between TSOs and between TSOs and society at large. The independent Advisory Council, stakeholder committees, and our policy contributions and their advocacy are all initiatives under this theme and explained more in detail in the following chapters of the current programme. Leadership in European energy policy development and engaging transparently concerning how society's best interests are advanced across the entire European power system, will also continue to be a major contribution from ENTSO-E in 2017.
3. ENTSO-E will continue to make ambitious policy proposals to support the EC's legislative initiative on market design and renewables, incl. analysing its impacts on role and tasks of TSOs.
4. Retail-wholesale interface (TSO-DSO co-creation for the benefit of active customers). More details are presented in Section 4.3 below.
5. TSOs have a long tradition of cooperation and will continue doing so in 2017, according to the provisions of the network codes like our flagship strategy of regional security coordinators (RSC), (presented in more detail in Section 4.1 below). In addition TSOs are ready to contribute in 2017 to the concept of regional cooperation which will emerge from the upcoming EC legislative initiatives. ENTSO-E has already put forward a [vision](#) on reasonably sized and voluntary "policy regions" bringing together political, regulatory and technical/commercial competences in stable regional frameworks as stepping stones to reach the Energy Union's policy objectives.

1.2 GENERAL DESCRIPTION OF THE WORK PROGRAMME

This work programme covers the period from September 2016 through the end of 2017. Our work programme builds on the obligations under ENTSO-E's legal mandate and strategic objectives. Because of the importance of the NC for ENTSO-E's work and for the European electricity market and system and also because the codes constitute one coherent overall project with many interre-

lationships between them, the work programme contains a separate 'Network Code' chapter focusing on implementation. The other chapters follow the major sets of ENTSO-E deliverables, namely TYNDP, Transparency Platform, regional cooperation, TSO-DSO interface, and our interface with various stakeholders and third-party TSOs.

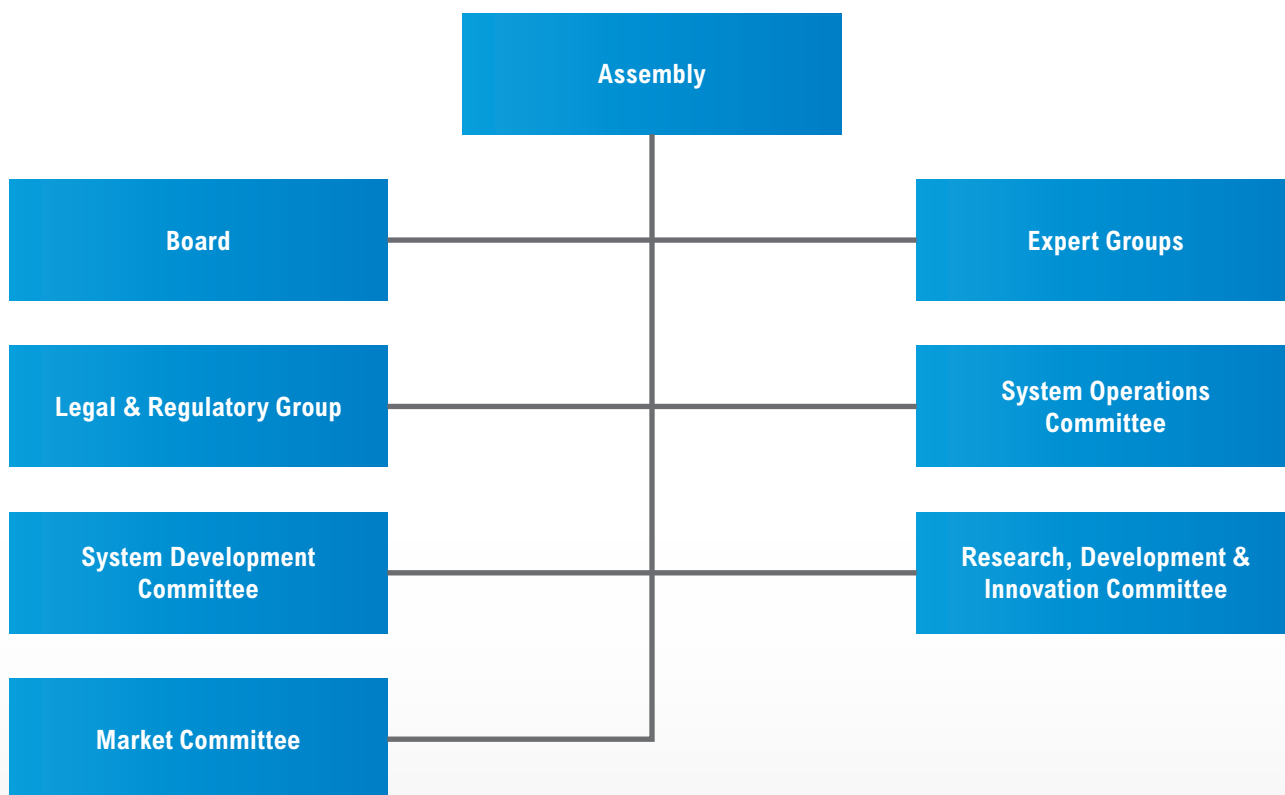


Figure 1: ENTSO-E bodies' organisation.

ENTSO-E is organised into four committees, which have responsibility for delivering the work programme through projects, mandated work products, policy suggestions, and ongoing work, and this work programme describes the deliverables and calendars under the headings of these committees.

They are:

- 1) **‘System Development’** – planning and development of the transmission infrastructure;
- 2) **‘System Operations’** – enhancing cooperation in the secure operation of the transmission system including emerging relationships with non-ENTSO-E TSOs;
- 3) **‘Market’** – developing and implementing the commercial rules necessary to support the internal market for energy;
- 4) **‘Research, Development, and Innovation’**, with content scope covering all of the aforementioned committees to keep TSOs at the vanguard of innovative solutions to energy and power challenges in Europe. The committees are supported by the ‘Legal and Regulatory Group’ (Figure 1).

Pursuant to the strategic objective of implementing a project management approach in ENTSO-E’s work, a central project management office has been developed together with a customised project management framework. The project management office is following up and monitoring the implementation of the

approach in order to ensure optimisation of resources and timely delivery of our work.

In parallel, in 2016, the Association structure has been streamlined in order to sustain this approach, and while the re-organisation is still ongoing at the time of issuance of this report, the expectation is that the number of ‘working groups’ will be reduced by almost half.

ENTSO-E needs to fulfil its legal mandate in accordance with the applicable requirements. The Legal and Regulatory Group and the Secretariat Legal Section ensure this by: (i) providing advice to all ENTSO-E bodies, including on strategic issues with legal dimensions; (ii) ensuring legal coherence, compliance, and robustness of ENTSO-E deliverables; (iii) facilitating, advising on, and providing legal support to each step of the NC process (from their development and adoption to their implementation); (iv) drafting the necessary contractual framework for certain ENTSO-E activities; and (v) ensuring the compliance of the ENTSO-E bodies with the rules of the Association.

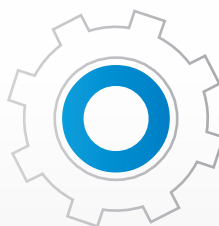
1.3 RESOURCES

In assessing resource requirements, ENTSO-E analysed the workload of tasks required by its legal mandate, various new tasks, and the work on policy positions, communication, and general management and support of the tasks performed by the Association’s main bodies and working groups. ENTSO-E emphasises project management practices, resource optimisation, fast delivery, and efficiency.

To fulfil its legal mandate and strategy, the Association has planned a total budget of M€ 19.95. This represents a 9.6 % increase from the 2016 budget and reflects additional mandates related to CGM operations and development for coordinated system operations as well as the consolidation of market modelling studies for the TYNDP and adequacy forecasts. These market modelling studies have been undertaken so far by TSO experts mainly at regional level. To improve efficiency, the TSOs in the System Development Committee have decided that they can be consolidated and coordinated at ENTSO-E pan-European level, however still performed by TSO experts. The studies support not only the TYNDP but also ENTSO-E’s new adequacy methodology with Europe-wide consistently defined reliability indicators and an important role in European and regional adequacy discussions between Member States. The CGM Programme is in line with ENTSO-E’s ‘Core Strategy for TSO Coordination’ which requires

services from RSCs and/or TSOs. More details are provided in Section 2.6 below.

Finally, now that the NC drafting phase is largely over, ENTSO-E’s NC activities focus on their implementation, and NCs impose deliverables on ‘all TSOs’, which are supported by the committees of ENTSO-E. The process put in place is complex and allows for the participation of TSOs that are not ENTSO-E members but are certified TSOs; it also allows for an appropriate level of involvement of the ENTSO-E members that are non-EU TSOs. ENTSO-E’s project-driven way of working implies that most tasks for ‘all TSOs’ self-organise and require less ENTSO-E staff resources for monitoring than in the recent past.



The number of full-time equivalent staff in the secretariat in 2016 was 72.5 and is expected to be increased to 76.7 in 2017. This increase is almost entirely attributed to the new responsibility with regards to system adequacy assessment; otherwise, the manpower of the secretariat remains at the same levels of 2016 against an increasing workload, as efficiencies save resources on recurring admin tasks.

The summary of resources covers the tasks that the ENTSO-E secretariat will be involved in during 2017 and is depicted in Figure 2 below.

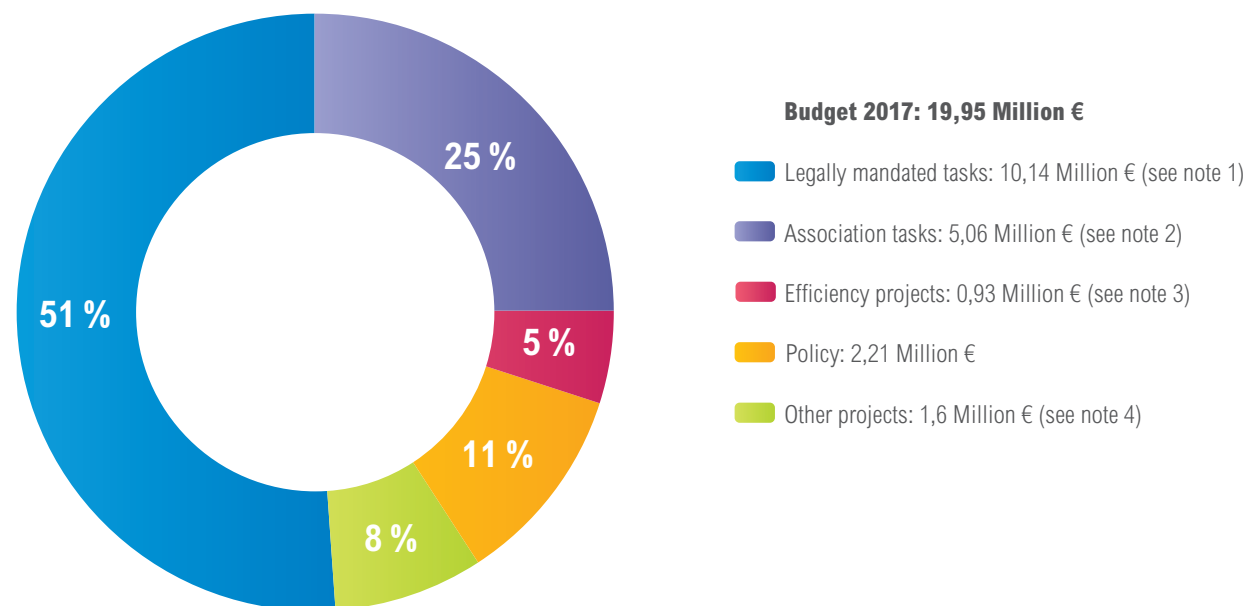


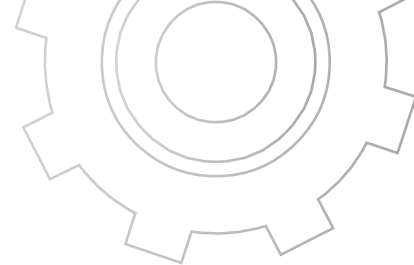
Figure 2: ENTSO-E secretariat budget 2017

Note 1: Includes NC implementation, CGM, Transparency Platform, TYNDP, system adequacy (market modelling), and awareness system.

Note 2: Includes support to ENTSO-E bodies and working groups, management, supporting activities (human resources, legal, finance, information technology (IT)) and reserves.

Note 3: Includes IT efficiency projects, process improvement, and employee development.

Note 4: Includes R&D activities and regional TSO coordination.



2 NETWORK CODES – RULES OF THE GAME

2.1. NETWORK CODE DEVELOPMENT

The beginning of 2017 should mark the end of the adoption phase of the first set of eight NCs. While all NCs have or are expected to receive a positive vote from EU Member State experts by the end of 2016²⁾, it is likely that at least one code, the Electricity Balancing Guideline, will still be going through the final stages of adoption in early 2017, including scrutiny by the European Parliament and Council, and publication in the *Official Journal of the European Union*.

The NCs are the building blocks of the internal electricity market. They provide Europe with a coherent, strong and efficient set of harmonised rules and requirements covering all important cross-border aspects of the electricity sector: connection requirements, coordination of system operations, and completion of pan-European electricity markets. Developing them in a relatively short

timeframe has been a major task for ENTSO-E and all parties involved, including the EC, ACER, DSOs, power exchanges, and all market participants.

ENTSO-E is the platform for all overarching pan-European questions. This is particularly important in the context of implementing network codes by which TSOs agree upon all their pan-European tasks within the framework of the association. Network codes set deadlines and principles for common standards. The coordination and monitoring role of ENTSO-E for network code implementation makes the association the natural place for ensuring interoperability

In 2017, ENTSO-E resources will be focusing on the specific implementation tasks for each NC and the start of their monitoring.

2.2. NETWORK CODE IMPLEMENTATION

2.2.1 HOW ARE NETWORK CODES IMPLEMENTED IN EUROPE, REGIONS, AND MEMBER STATES?

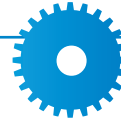
The NCs have been developed to help achieve Europe's three energy policy goals: ensuring security of operation, creating a competitive internal electricity market, and decarbonising the electricity sector. NCs shall be implemented and complied with across Europe. TSOs from countries which are not members of the EU, are also involved in NC implementation work to anticipate the application of these NCs in their legal framework.

Each NC requires the definition of a series of steps to be taken before they can be considered fully implemented. This might include national decisions, regional agreements, and new European common methodologies. All market participants, DSOs, TSOs, and regulators are involved in various ways. The related workload as well as the consultation processes are significant.

The detailed implementation plan is presented in the next sections, which introduce the work ahead for each family of codes:

- **Connection codes:** Although their implementation is the responsibility of each EU Member State, ENTSO-E has monitoring duties and acts as a platform to share information and good practices through the publication of implementation guidelines, support of the European Stakeholder Committee, and maintenance of an active library on its website, providing information on all national implementation processes.
- **Operational codes:** Several implementation projects with deliverables on the pan-European and regional levels defined in the SO Guideline and the Emergency and Restoration Code have already begun in 2016. The entry into force of both regulations will trigger the work on the remaining tasks.

2) At the time of writing, Electricity Balancing and Emergency and Restoration are being discussed by Member State experts gathered in the Electricity Cross-Border Committee.



What are ‘all TSOs’ deliverables?

Network codes need to be sound and efficient legal documents.

To fulfil this requirement, the codes merely provide descriptions of technical elements. Different entities (in most cases all TSOs from a specific region or the EU) are tasked to produce these technical elements, such as new methodologies and technical studies, within a defined timeframe.

The delivery of these tasks involves, in most cases, consultation of all stakeholders, discussions with the regulatory authorities, and extensive work and coordination of technical experts. The TSOs have decided that the ENTSO-E structures are the most efficient vehicle to facilitate the delivery of pan-European tasks and set specific rules to ensure that all TSOs can use these structures. Further, ENTSO-E coordinates and supports the decision-making process for some regional tasks. However, as ENTSO-E has no legal role in these processes, the validation of draft deliverables to be submitted to regulatory authorities is made by ‘all TSOs’, not by ENTSO-E (different from ENTSO-E’s legally mandated tasks, such as drafting NCs).

The TSOs whose countries are not members of the EU are also involved in the development phase because implemented decisions will apply to them either immediately or after the specific regulations are integrated in their legal framework in most cases. They participate in an informal vote aimed at reaching consensus beyond the borders of the EU. However, only TSOs from the EU (or relevant regions) participate in the final formal vote to legally validate a draft deliverable. Voting rules are similar to the Lisbon Treaty voting rules (i.e., taking into account the number of Member States as well as their populations).

Once ‘all TSOs’ have reached a decision, the draft deliverable is handed to NRAs, which must similarly reach an ‘all NRAs’ decision within a certain timeframe to formally adopt the deliverable and make it legally binding. A safety net process led by ACER is also foreseen, which leads to an ACER decision and potential redrafting of some elements, in case NRAs cannot reach a consensus.

See Section 2.2.4 of this document for details on the work of ENTSO-E during these processes.

- As for the family of market codes, the following developments are to be noted; the CACM Regulation will enter the third year of its official implementation period in August 2017, and the Forward Capacity Allocation Guideline is expected to enter into force in Q3 2016. Moreover, 2017 will mark the formal start of the implementation of the Electricity Balancing Guideline. Several early implementation projects at the European and regional levels are already ongoing or planned.

ENTSO-E will provide dedicated resources to ensure the delivery and consistency of deliverables, communication, and stakeholder engagement. ENTSO-E will in particular:

- Participate in the design and drafting of ENTSO-E and all TSO deliverables;
- Organise consultations, working groups and public workshops for all European tasks and, when relevant, share information on regional and national task delivery;
- Support the NC European Stakeholder Committees, chaired by ACER, which allow a continuous involvement of stakeholders during the whole implementation programme;
- Facilitate the adoption of all TSO deliverables;
- Act as a platform to share information and good practices for regional and national tasks among TSOs and with stakeholders through its website;
- Advise member TSOs on technical and legal issues and participate when needed in meetings or forums set up for the implementation of NCs, such as the CACM Coordination Group;
- Elaborate on agreements, such as aligning the existing operational agreements with the requirements of the SO Guideline and NC Emergency and Restoration;
- Review the several major operational IT tools to provide a secure and smooth coordination among TSOs and RSCs with appropriate interoperability standards.



2.2.2 ENGAGING WITH STAKEHOLDERS

Effective stakeholder engagement is essential in ensuring a successful process, and ENTSO-E greatly values stakeholders' input. Stakeholders will be kept abreast of developments and are encouraged to provide their views and feedback. ENTSO-E has also shown that it is a learning organisation; while the exchange with stakeholders has started off in a difficult manner, right after the creation of ENTSO-E, we are pleased to see that [the latest stakeholder survey](#) shows an increase by 5% of the satisfaction of stakeholders with ENTSO-E's practice of taking their positions into account and exchanging with them. We recognise that further improvements are required and will pursue our efforts in 2017.

A cornerstone of the stakeholder engagement strategy is the joint creation by ENTSO-E and ACER of three 'European Stakeholder Committees', one per 'family' of codes. The market-code European Stakeholder Committee was created in 2015, and was followed in 2016 by the connection- and operational-code committees, after the first code of each family entered into force.

ENTSO-E volunteers to support these committees by supporting ACER in the preparation and development of meetings, providing secretariat services, informing stakeholders of progress, and, of course, participating in the discussions. The meetings can be followed in real time via live streams, and all minutes and documents of the meetings are publicly available on ENTSO-E's website.

Several specific consultations and workshops will be organised in 2017. User or expert groups will be created for specific purposes. A pre-emptive planning of public workshops and consultations is provided in the following sections of this document when available.

ENTSO-E will also continue maintaining its active library of connection codes, which allows following the national processes and decisions made in each EU Member State on the implementation of connection codes from ENTSO-E's website. All publicly available information on the regional and European projects of operational and market codes are also available on ENTSO-E's website.

2.2.3 MONITORING THE IMPLEMENTATION OF NCS

ENTSO-E is entrusted with the tasks of monitoring and analysing the implementation of the NCs and guidelines and their effect on the harmonisation of applicable rules aimed at facilitating market integration.

ENTSO-E, in close coordination with ACER, started its monitoring activities in early 2016, following the entry into force of the CACM Regulation and the NC on Requirements for Generators. So far, these activities encompass the elaboration of monitoring plans (only for the CACM Regulation) and monitoring reports as well as the collection of data to support ENTSO-E and ACER in their monitoring activities (including the identification of data to be collected and the design and implementation of interfaces for data collection).

Significant focus will be given by ENTSO-E to implementation monitoring in the second half of 2016 and in 2017. It will have to increase its monitoring activities under the CACM Regulation and the NC on Requirements for Generators. It will also initiate its monitoring activities for subsequent regulations to enter into force (Demand Connection, High-Voltage Direct Current, Forward Capacity Allocation, System Operation, Emergency and Restoration, and Electricity Balancing), based on discussions with ACER on the most efficient approaches to collect data needed for ACER's and ENTSO-E's monitoring.

ENTSO-E is committed to the continuous monitoring of the NCs and guidelines along their progressive implementation at the EU level and in accordance with the applicable legal requirements. ENTSO-E's monitoring of activities in the second half of 2016 and in 2017 will principally include the following:

- Elaboration of monitoring plans for the Forward Capacity Allocation and Electricity Balancing Codes;
- Elaboration of monitoring reports; and
- Cooperation with ACER on the list of information to be submitted to ACER for monitoring purposes.

2.2.4 ENTSO-E FACILITATING THE COOPERATION OF ALL TSOs ON THE EUROPEAN LEVEL

The implementation of NCs and guidelines requires the cooperation of 'all TSOs' at the EU level (understood as entities certified as TSOs in accordance with the Third Energy Package, who can be members or non-members of ENTSO-E). They have to:

- Develop proposals for terms and conditions or methodologies; and
- Develop some proposals and reviews in cooperation with nominated electricity market operators (NEMOs) or other legal entities to be established by TSOs at the European or regional level (i.e., the European single allocation platform or the RSCs).

ENTSO-E facilitates this cooperation of all TSOs. ENTSO-E and an all TSO forum have set up a strategy and rules for the development of deliverables under the NCs and guidelines by all TSOs, which:

- Allow for the adoption of 'all TSOs' deliverables under the umbrella of the relevant ENTSO-E committees;
- Ensure the coordination of ENTSO-E non-member TSOs and ENTSO-E member TSOs;
- Allow the EC and ACER to have a single point of contact for all TSO matters; and
- Have already delivered positive results since their first implementation in 2015 regarding several deliverables under the CACM Regulation and the FCA Guideline (i.e., respectively the capacity calculation region (CCR) and the harmonised allocation rules (HAR) proposals).

In the second half of 2016 and in 2017, facilitation by ENTSO-E of the all TSOs process will increase. More and more of 'all TSOs' deliverables have to be developed as a result of the implementation of the regulations and guidelines on CACM, FCA, electricity balancing, and system operations. Among others, the following 'all TSOs' deliverables (further described below) will be facilitated:

- Under the CACM Regulation: the methodology for scheduling exchanges, the congestion income distribution methodology, and the intraday capacity pricing;
- Under the FCA Guideline: the documentation of the single allocation platform, the update of the harmonised allocation rules, and the methodology for congestion income distribution;
- Under the draft Electricity Balancing Guideline: the CBA methodology for TSO balancing service provider application, the general principles for algorithms, activation optimisation functions and pricing, the proposals for settlement issues, and the methodology for reservation of cross-border capacity; and

2.3 MARKET CODES

2.3.1 CACM REGULATION

The CACM Regulation entered into force on 14 August 2015. It sets out rules for operating day-ahead and intraday markets, calculating cross-border capacity, and defining and reviewing bidding zones.

The entry into force of the CACM Regulation marks the start of the formal implementation period, during which EU Member States, ENTSO-E, TSOs, regulators, power exchanges, and market participants collaborate to develop the methodologies and tools described in the regulation.

Since the entry into force of the CACM Regulation, ENTSO-E and the TSOs have fulfilled the following implementation steps:

- Definition of the capacity calculation regions: TSOs submitted a proposal on CCRs to all national regulatory authorities (NRAs), fulfilling the first milestone in the implementation of CACM. As part of the CCRs proposal, the 16 TSOs of the Central-Western Europe and Central-Eastern Europe CCRs signed a memorandum of understanding on 3 March 2016 to develop a common day-ahead flow-based capacity calculation methodology and aim to merge the two regions into one.
- Common Grid Model (CGM) and generation and load data provision methodologies.

- Under the draft SO Guideline: methodologies for coordinating operational security analysis and assessing the relevance of assets for outage coordination, key organisational requirements, roles and responsibilities in relation to data exchange, and the synchronous area operational agreements.

ENTSO-E is additionally facilitating the position of all TSOs and ENTSO-E towards the EC and ACER, e.g. in the CACM Coordination Group established to exchange views on CACM implementation matters.

Finally, ENTSO-E is creating the necessary structures for the co-operation of all TSOs with other entities. Such structures were, among others, created with NEMOs, via the NEMO committee to be officially established for the coordination of all NEMOs. These structures will support the implementation as well as the monitoring of the CACM Regulation in the second half of 2016 and in 2017.

- Day-ahead firmness deadline and intraday cross-zonal gate times: TSOs will submit the final proposal to all NRAs, considering the results and comments gathered during the public consultation by December 2016.
- Price coupling and continuous matching algorithm: NEMOs and TSOs have started the cooperation to develop a common set of requirements that will be subject to public consultation by Q4 2016.
- ENTSO-E Monitoring Plan

The regulatory approval process of some of these elements will continue through 2017. All of them have implications for the work of ENTSO-E and TSOs in 2017 and beyond.

Implementation efforts will continue in the second half of 2016 and in 2017 with the following activities:

- Methodology for scheduled exchanges: In the second half of 2016, the TSOs will start the public consultation of the schedule exchanges methodology. This methodology will be submitted to the NRAs by December 2016.
- Intraday capacity pricing: The TSOs have already started the work on the development of an intraday capacity pricing methodology. This methodology will be submitted to the NRAs by August 2017, after a public consultation, which will take place in Q2 2017.
- Congestion income distribution methodology: The TSOs will submit the congestion income distribution methodology to the NRAs by August 2016.

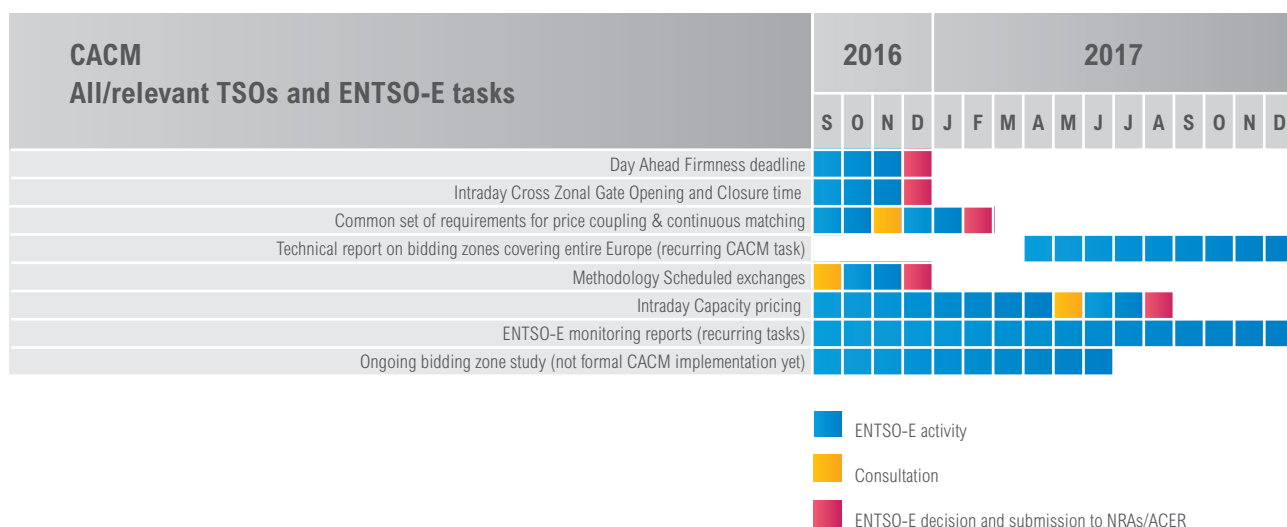


Figure 3: CACM main activities for 2017

- Start the regional work: Once the NRAs and ACER approve the CCRs, the regional work will start. In 2017, each CCR will develop and publicly consult on the capacity calculation methodologies as well as develop re-dispatching methodologies and cost sharing methodologies.
- ENTSO-E monitoring activities: Moreover, ENTSO-E monitoring activities and reporting on the CACM implementation (as ENTSO-E capacity calculation report) will increase in 2017.

2.3.2 FORWARD CAPACITY ALLOCATION GUIDELINE

The entry into force of the FCA Guideline is expected in Q3 2016. ENTSO-E and TSOs have already engaged into early implementation projects, among which are the implementation of harmonised allocation rules for 2016 and 2017 and the development of the documentation of the single allocation platform.

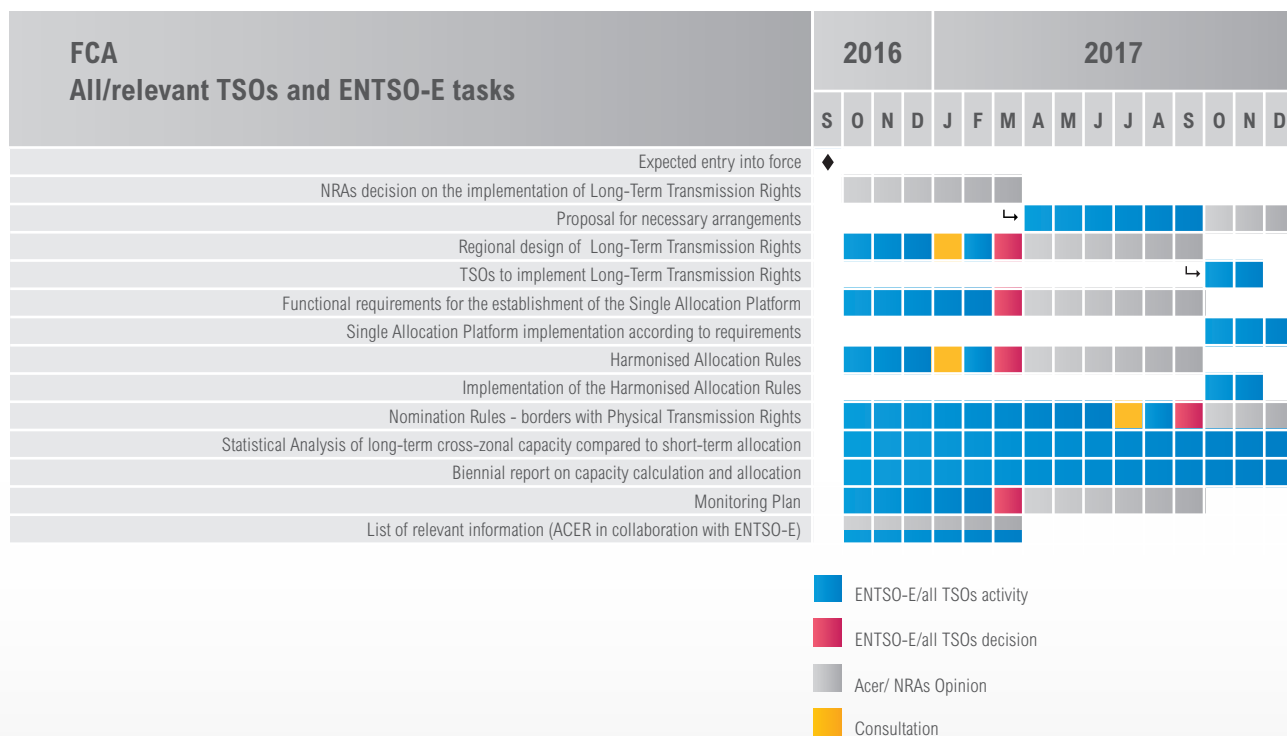


Figure 4: FCA main activities for 2017

Following the entry into force of the guideline, the focus will be put on the first deliverables, which include the finalisation of the single allocation platform documentation, an update to the harmonised allocation rules, the regional design of long-term transmission rights, the development of the monitoring plan, and the methodology for congestion income distribution. The accomplishment of some deliverables of the FCA Guideline will depend on the progress of the CACM implementation (e.g., the methodologies on capacity calculation) on the CGM and on the splitting of long-term cross-zonal capacity.

2.3.3 ELECTRICITY BALANCING GUIDELINE

The entry into force of the Electricity Balancing Guideline is expected mid-2017.

For the (early) implementation of the Electricity Balancing Guideline, ENTSO-E will focus on organising the implementation of the European target, the former the European Integration Model (EIM). Therefore, it will be important to develop a high-level design, the roadmap, timelines, and governance for the implementation of the European target. Subsequently, ENTSO-E will monitor its implementation.

2.4 SYSTEM OPERATION CODES

2.4.1 SYSTEM OPERATION GUIDELINE

The regulation establishing a guideline on electricity transmission – SO Guideline – was positively voted by the Electricity Cross-Border Committee on 4 May 2016. The adoption constitutes an important milestone. The estimated time for entering into force is the end of 2016.

In 2017, the focus will be on the implementation of the SO Guideline, which will have already started in 2016. Several implementation projects with deliverables at the pan-European and regional levels have already begun, such as the development of methodologies for coordinating operational security analysis and assessing the relevance of assets for outage coordination, key organisational requirements, roles and responsibilities in relation to data exchange, and the synchronous area operational agreements. The RSCs have specific roles in the SO Guideline, including the provision to the TSOs of five services, including the capacity calculation and operational security analysis.

Major items to be started in 2017 in line with the guideline are:

- Develop a CBA methodology for TSO balancing service provider application dependent on the final working of the Electricity Balancing Guideline;
- Further develop standard products for manual frequency restoration reserves, automatic frequency restoration reserves and replacement reserves;
- Develop the general principles for the algorithms, the activation optimisation functions, and pricing required in the guideline;
- Develop proposals for settlement issues according to the guideline, especially regarding imbalance settlement for balancing responsible parties (BRPs); and
- Develop a methodology for reservation of cross-border capacity for balancing purposes.

Stakeholders will be involved early in the development of these deliverables via the Balancing Stakeholder Group before and via the Market European Stakeholder Committee after entry into force of the guideline.

For each project, the geographical scope (pan-European, regional, or national) and, accordingly, the steering body have been specified. Projects on the pan-European level are steered by ENTSO-E with the exception of the CGM related activities that are already fully covered by a separate project structure under the System Operation Committee at ENTSO-E called the CGM Programme. Projects on synchronous area level are to be steered by respective regional groups under Steering Group Operations with the objective to harmonise as much as reasonable on a pan-European level. Steering Group Code preliminary analysis led to the conclusion that projects related to regional security coordination could be taken over by the ongoing ENTSO-E project 'TSO Coordination Strategy Implementation with RSCs' as this project already has the necessary expertise, and the identified implementation activities are covered with the current project to a certain extent.

The preliminary timeline for the implementation of the SO Guideline, including the planned public workshops, is shown in Figure 5.



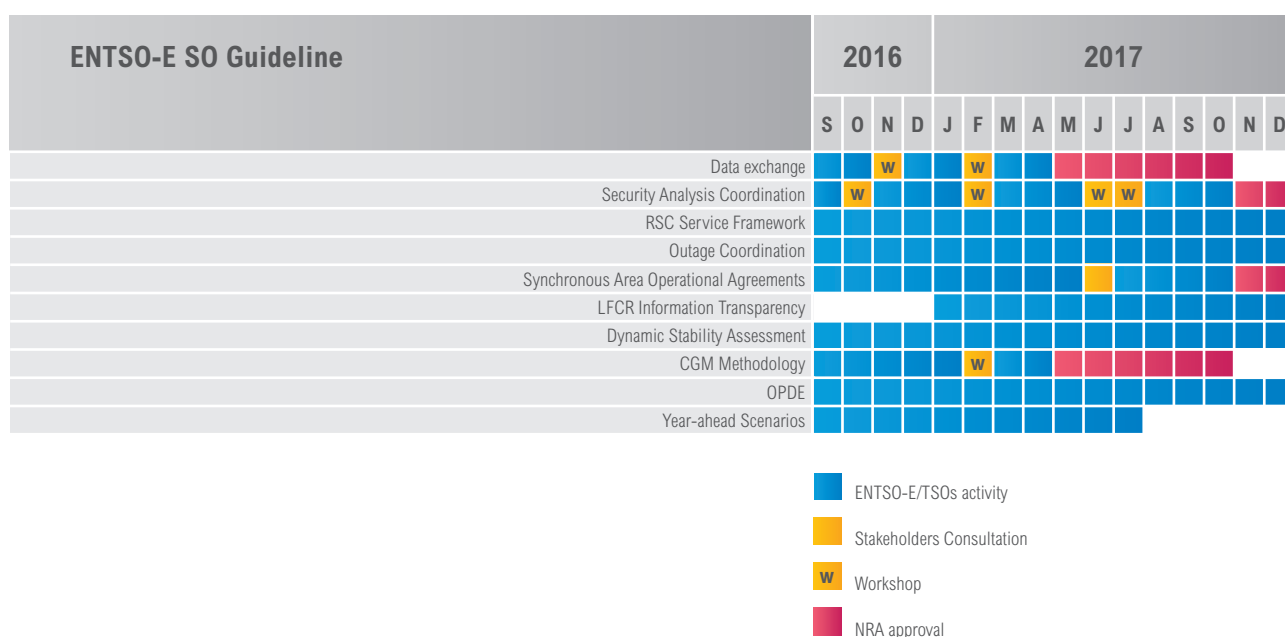


Figure 5: SO Guideline main activities in 2017

2.4.2 EMERGENCY AND RESTORATION CODE

The Emergency and Restoration Code (ER NC) is expected to be approved in the Electricity Cross-Border Committee in October 2016, with an entry into force of the ER NC expected in spring 2017.

Similar to the SO Guideline and the ER NC, the focus in 2017 will be on implementation. The implementation of the ER NC has already started for the over-frequency control scheme. The ER NC is primarily subject to implementation at a national or TSO level. The RSCs will have a role in consistency assessment of each TSO's system defence plans.

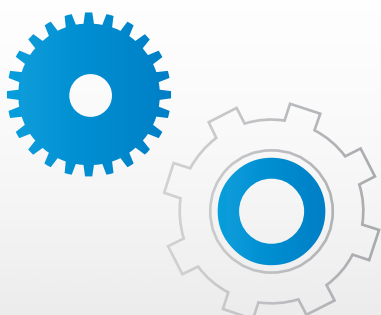
2.5 SYSTEM DEVELOPMENT REGULATIONS

All the three connection NCs (Requirement for Generators, Demand Connection, and High-Voltage Direct Current) were approved and entered into force in 2016.³⁾ A specificity of the connection codes is that their implementation is the responsibility of each EU Member State. The only responsibility of ENTSO-E in the process, aside from monitoring their implementation, is the development and delivery of the non-binding written guidance to its members and other system operators. These guidance documents are to be provided no later than six months after the entry into force of each regulation and thereafter every two years and shall include stakeholder consultation.

ENTSO-E delivered the guidance documents in 2016, after consultation with stakeholders in line with regulatory requirements.

The final versions are expected to be published during the first quarter of 2017. ENTSO-E is currently looking into developing additional guidance documents for the implementation of connection codes, which are expected to be published by the end of 2017.⁴⁾ In addition to the guidance delivery, ENTSO-E will work closely with ACER on the monitoring of the national code implementation in line with Article 59 (RfG NC), Article 57 (DC NC), and Article 74 (HVDC NC).

ENTSO-E also acts as a platform to exchange good practices and share information among EU Member States, both internally for its member TSOs and externally through supporting the European Stakeholder Committee on Connection Codes and maintaining an active library on its website.



3) RfG entered into force 17 May 2016, and the other two codes are expected to enter into force in autumn 2016.

4) More detail will be added in the final version of this report (because the detailed planning for new guidance documents is to be set in autumn of 2016).

2.6 COMMON GRID MODEL AND OPERATIONAL PLANNING DATA ENVIRONMENT

The CGM Programme focusses on the creation and exchange of individual grid models from each TSO in order to be able to merge these individual grid models into the common or pan-European grid model. A CGM is a prerequisite for any joint regional security evaluation and capacity calculation among several TSOs and is specified in the CACM Regulation and the SO Guideline.

In terms of governance and project management, CGM is a project team divided into five working packages, that reports ultimately to the System Operations Committee. Moreover, 2017 will be a crucial year for the CGM because both the operational planning data environment (OPDE), to be understood as a data exchange platform, and the all TSO communication network for non-real time operational and market-related data (ATOM), needed to support the platform, will be commissioned in 2017. The project plan foresees four phases – see overview in Figure 6:

- Development phase
- Transition phase
- Stability phase, and
- Operational phase

The implementation of the OPDE will require a large number of contracts to be entered into force between TSOs, RSCs, software and hardware providers and ENTSO-E. Necessary exchange of information with other parties will be also ensured. In addition, there will be various IT software development, maintenance, and hosting agreements to be agreed upon.

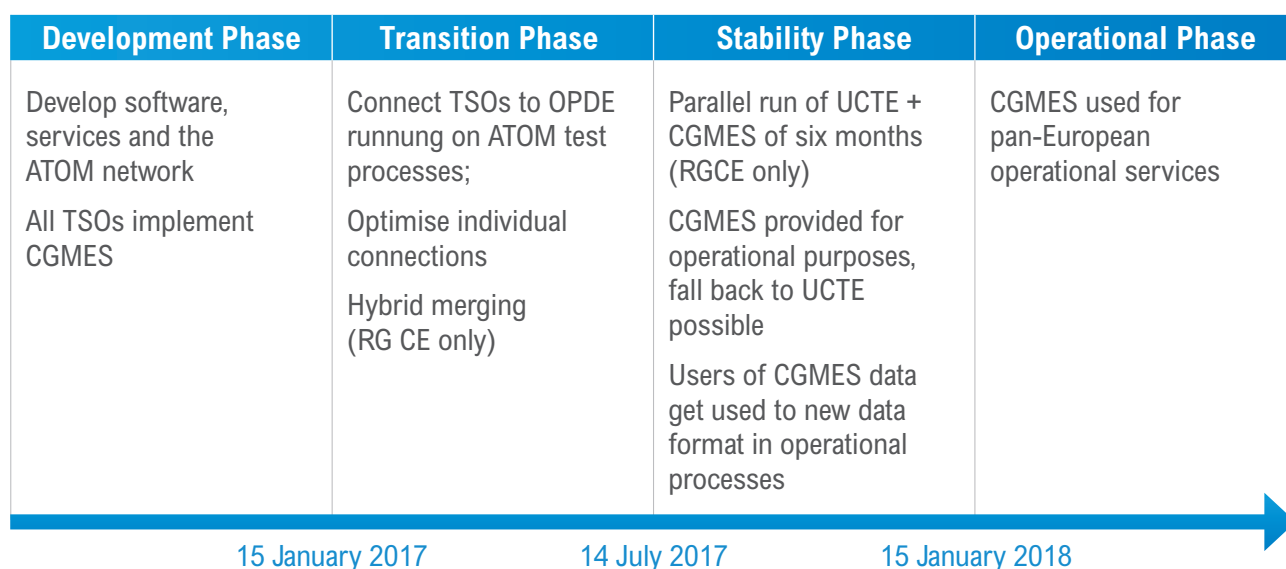
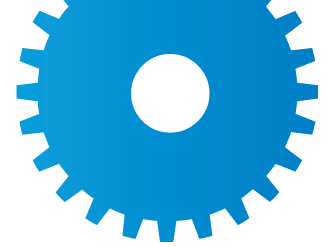


Figure 6: The four phases to make the common grid model





3 GRID OF THE FUTURE

3.1 TYNDP 2018

Every two years, ENTSO-E delivers a TYNDP that provides a long-term vision of the power system.⁵⁾ This plan has to inform institutions and stakeholders about investment needs, the added value of infrastructure projects, and potential barriers to their realisation. The TYNDP has to go along with maximum transparency on criteria and methodology.

The role of TYNDPs was expanded in 2013,⁶⁾ anchoring them more strongly as the foundation of European grid planning and the sole basis for transmission projects that are eligible to be labelled as 'of Common Interest' (PCI). Such a label aims to address the structural challenge in electricity infrastructure development of long delays to obtain permits by providing mechanisms at the national level to streamline the process and, in some cases, financing leverage.

The TYNDP aims to provide a benchmark for transmission network development (scenarios, system needs, development solutions, and project assessment).

Pan-European system development is coordinated and linked with the national needs, finding synergies when relevant between European, regional, and national studies, making use of the profound expertise of regional and local conditions of ENTSO-E members.

The TYNDP provides objective, non-discriminatory, useful, and easy to read information on projects and includes innovative smart solutions for grid and system development.

It uses a holistic approach, taking into account transmission development, NC development, and market development.

5) As mandated by Regulation (EC) 714/2009

6) By Regulation (EU) 347/2013

3.1.1 WHAT IS NEXT FOR THE TYNDP 2018?

Work on the TYNDP 2018 is already on its way since the end of 2015. It has been discussed in the Network Development Stakeholders Group, and all stakeholders were invited to contribute in the consultations organised by ENTSO-E during the summer of 2016. The scenario building started in May 2016, with a consultation on study horizons and scenario outlines. The next steps and main changes compared to the previous edition are the following:

- The two ENTSOs (electricity and gas) join forces to propose a combined process (scenario building and milestones) to deliver their respective TYNDPs in a two-year timeframe.
- The TYNDP will focus more than ever on identifying longer-run pan-European relevance system needs.
- The TYNDP will also feed the PCI selection process by supplying a cost-benefit analysis (CBA) 2.0 of projects expected to be commissioned in a decade or so.
- In order to maximise output and resource utilisation, ENTSO-E will explore new 2040 scenarios and corresponding investment needs and make project Cost Benefits Analysis assessments for two mid-term study years (2025, 2030). The 'Scenario report' will be compiled and consulted in mid-2017.
- The identification of system needs will basically rely on pan-European market studies, along with regional analyses, in particular regional network studies (in order to characterise every need better, possibly analyse the evolution from ten-year to longer-run horizons, and possibly propose reinforcement concepts). The 'identification of system needs' package (one pan-European report and regional investment plan reports) will be compiled and consulted by the end of 2017.
- The CBA methodology, updated with a first draft put into consultation by ENTSO-E in spring 2016, will be submitted to ACER and the EC later for validation and implementation for the TYNDP 2018.
- Subject to the dedicated EC guidelines, ENTSO-E will organise two windows for project promoters to ask for TYNDP assessment: one in mid-2017 (based on which the reference grid will be set up), and one at the end of 2017.



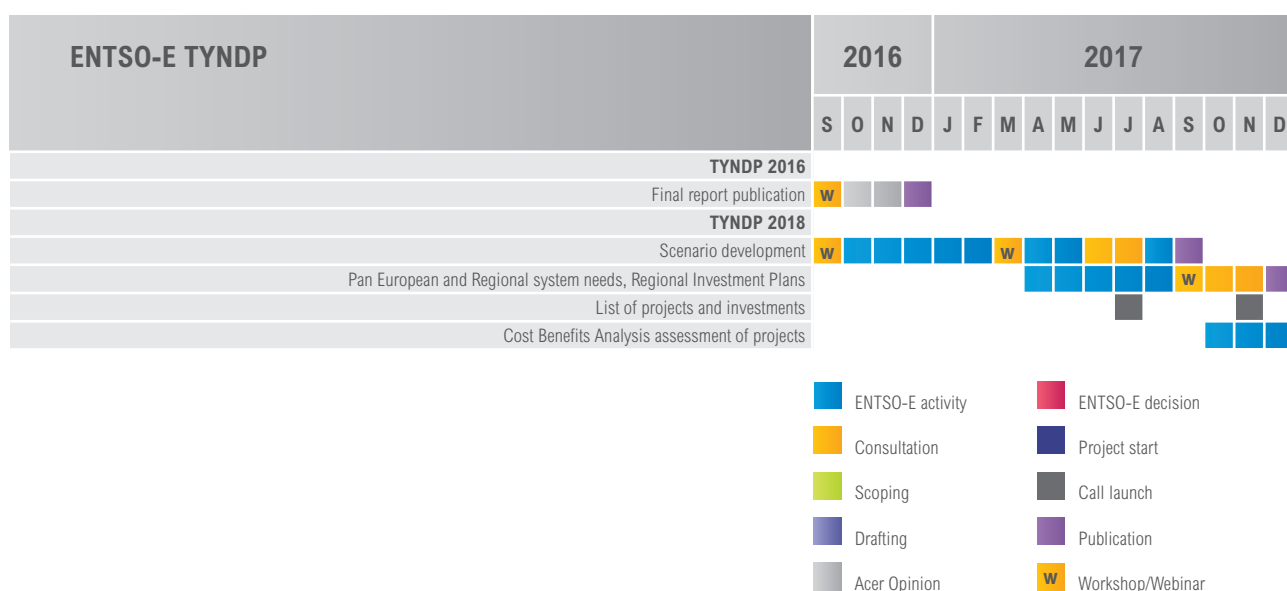


Figure 7: TYNDP 2018 main activities

3.1.2 STAKEHOLDERS SHAPING THE FUTURE GRID

The TYNDP sets up the vision of the European power system of the future and can be seen as a reference for European stakeholders, regulators, TSOs, project promoters, and national ministries. Still, the TYNDP is a living object, bound to evolve to meet stakeholders' rising expectations. For instance, scenario storylines will have to answer the still open questions about power system operation and profitability issues that are today answered in a too simplified manner. Market modelling will also evolve consistently with rising concerns about security of supply or increasing de-

mand side response. Public consultations and workshops will be organised throughout 2017 to engage all interested stakeholders in the process (see details of consultation periods in Figure 7 above).

Further development of interactive communication through modular reporting and self-supporting reports will be developed by the end of 2016. The feedback from the third PCI list selection process in 2017 will also be essential.

3.2 SYSTEM ADEQUACY – AN IMPORTANT ROLE FOR ENTSO-E

3.2.1 MID-TERM ADEQUACY FORECAST AND SEASONAL OUTLOOKS

The fast evolution of the energy mix (i.e., growing development of renewable energy sources and reduction of conventional power plants) requires a regular assessment (on a yearly basis) of the adequacy situation at time horizons of up to 10 years ahead. This is in line with the expectations communicated by relevant stakeholders, namely, the EC during ongoing discussions regarding the forthcoming legislative proposals on market design (market design and risk preparedness in the area of security of electricity supply legislation), the recommendations of the Electricity Coordination Group, the joint declaration for regional cooperation on security of electricity supply in the framework of the internal energy market by the Pentilateral Energy Forum, and feedback from NRAs and ACER.

The Electricity Coordination Group stated that adequacy assessments are more useful when focussed on the mid-term horizon (up to 10 years ahead). These can be used to assess potential load shedding risks and send signals to both market players and decision makers on the need for the generation fleet to evolve. Adequacy assessments are less informative beyond this period due to the increasing levels of uncertainty around future energy systems. After several years of publishing the predecessor reports 'Scenario Outlook and Adequacy Forecast' based on a simpler methodology, the new 'Mid-term Adequacy Forecast' (MAF) fulfils the role of providing a pan-European adequacy assessment for the next 10 years. ENTSO-E published the first MAF in July 2016, with a successful implementation of pan-EU probabilistic market modelling adequacy assessments. Already in MAF 2016, an advanced temperature-sensitive load model, harmonised probabilistic

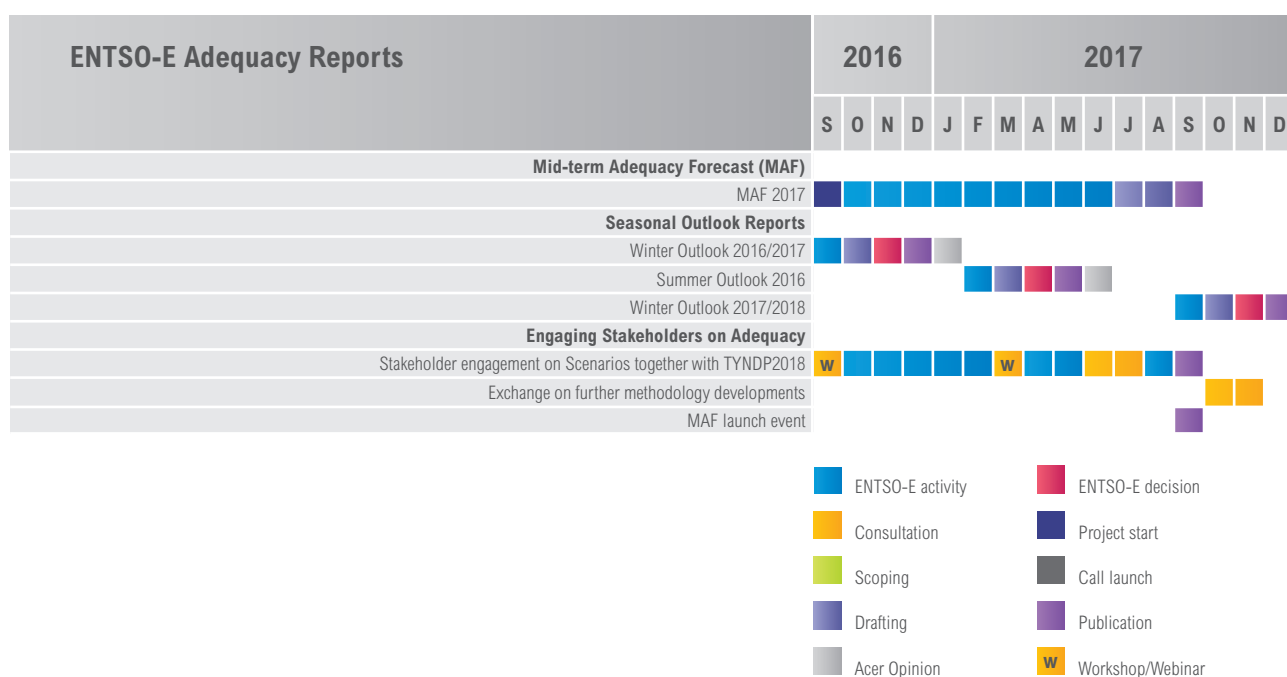


Figure 8: Main activities on adequacy

hydrological analysis with datasets for extended dry and wet hydro conditions, and forced outage rates for thermal units as well as HVDC links were implemented.

ENTSO-E aims to publish the MAF 2017, further improving the methodology (e.g., use of an extended pan-European Climate Database to cover more representative samples of the climatic variations and extreme events).

Under Regulation (EC) 714/2009, ENTSO-E is also mandated to issue short-term 'Seasonal Outlook' reports twice a year, covering the coming summer and winter periods, before 1 June and 1 December, respectively.

3.3 COST-BENEFIT ANALYSIS

ENTSO-E elaborated a CBA methodology to assess the transmission and storage infrastructure projects included in the TYNDP⁷⁾. The first CBA methodology was approved and published by the EC on 5 February 2015. Stakeholders' previous feedback and ENTSO-E's experience with the current CBA 1.0 (used in the TYNDP 2014 and 2016) has clearly shown the need for improving the European project assessment methodology, which resulted in the current version 2.0 of the CBA methodology.

7) As requested by Regulation (EU) No 347/2013

3.2.2 ENGAGING STAKEHOLDERS ON ADEQUACY

ENTSO-E welcomes the increasing interaction with stakeholders to define robust MAF assumptions and especially to further improve the data regarding decommissioning/mothballing of power units.

The 'Seasonal Outlooks' inform stakeholders of potential risks to system adequacy. The goal is to raise awareness and incentivise stakeholders to adapt their actions to reduce these risks by, for instance, reviewing maintenance schedules of power plants, postponing decommissioning, and conducting other risk preparedness actions.

Most of the work on CBA 2.0 is being performed during 2016, including public consultation and delivery of the ENTSO-E CBA to ACER and the EC (including EU Member States). Moreover, 2017 will see a well-defined CBA 2.0, which is expected to be approved by the EC in the first quarter of the year. As requested by Regulation 714/2009, ENTSO-E will publish the final CBA methodology within two weeks after approval of the document by the EC. The CBA 2.0 will be used later on within the context of TYNDP 2018 and, if no significant updates are necessary, also within the context of TYNDP 2020.

3.4 SMART GRID – RESEARCH, DEVELOPMENT AND INNOVATION

The European grid must be prepared to face game-changing environments, such as new actors entering the electricity market (e.g., storage, ICT, prosumers, and active customers). In the coming years, the objective is to transform the European energy system into an integrated one, with emphasis on flexibility, storage, and end-to-end digitalisation to integrate different technologies and market services. At the same time, links among electricity, transport, gas, and heat networks must be identified, modelled, and used.

ENTSO-E coordinates TSOs' innovation activities to ensure the future grid is up to the challenge. The publication in 2016 of the ENTSO-E Research and Innovation (R&I) Roadmap, covering the period 2017–2026, aims to support TSOs to answer societal challenges as key system integrators of different components and technologies.

The active customer (consumer and prosumer) will need smart grids and systems, integrating smart meters, highly developed

home automation systems and appliances, enabling demand response, portfolio management, and load optimisation. Big data management, the Internet of things, and the post-processing and security of data are required not only for inter-TSO cooperation but also for the empowerment of consumers. No business model for digital energy can flourish without a strong interface between distribution and transmission and between wholesale and retail markets. On the operation side, innovative solutions will be needed for substation automation in conjunction with standard fault analysis and location, dynamic line rating, and the use of optical or nanotechnologies. At the same time, the power system must be secure and safe through better controllability, which requires more observability.

Electricity grids must also be prepared to create synergies with other energy networks (gas and heat) and to adopt the transition towards sustainable transport through the deployment of electric vehicles, which requires the evolution of the battery sector and the creation of efficient charging station networks.

3.4.1 RESEARCH, DEVELOPMENT, AND INNOVATION ACTIVITIES IN 2017

Regulation (EC) 714/2009 and Directive 2009/72/EC mandate ENTSO-E to promote and coordinate research, development, and innovation activities of TSOs, and stipulates a set of mandated deliverables/instruments to implement them. The Energy Union has highlighted the innovation imperative as a fifth dimension.

In accordance with the mandate and in line with the deliverables requested by its participation in European research and innovation projects, in 2017, ENTSO-E will focus its R&I activities on the following:

- Support the Strategic Energy Technology (SET) Plan⁸⁾ activities through its participation in the European Technology and Innovation Platform on Smart Networks for Energy Transition and Horizon 2020. This activity will aim at positioning and ensuring that system views are properly addressed on the European energy research policy scene.
- Develop the Implementation Plan 2017–2019 based on the roadmap directions and on the specific proposals of TSOs. The Implementation Plan 2017–2019 will be part of the Integrated Implementation Plan developed by the Grid+Storage project.

- Develop the Implementation Plan 2018–2020, outlining future R&I activities in line with the R&I Roadmap and the outcome of the monitoring and knowledge sharing activities. The Implementation Plan 2018–2020 is expected to be released by Q4 2017.
- Develop a R&I Monitoring/Application Report summarising project results, assessing their implementation in TSO business, or highlighting areas for improvement in TSO cooperation. The Monitoring/Application Report is expected to be released by Q4 2017.
- Ensure appropriate knowledge sharing and promotion of R&I activities relevant for the TSO industry, with the aim of facilitating the implementation of the R&I project results into TSO daily businesses.
- Facilitate and foster the active participation of TSOs and ENTSO-E in R&I activities. In the period 2016 to February 2017, TSOs are expecting to participate in the preparation of project proposals to answer announced Horizon 2020⁹⁾ calls.
- Cooperate with CENELEC,¹⁰⁾ especially in relation to NC implementation and standards. In particular, participate and contribute in the Smart Energy Grid-Coordination Group and other high-level groups focussed on NC implementation chaired by CENELEC. Organise/participate in common workshops with CENELEC when applicable.

8) https://ec.europa.eu/energy/sites/ener/files/documents/1_EN_ACT_part1_v8_0.pdf

9) EU Research and Innovation Programme 2014–2020

10) European Standardization Organization

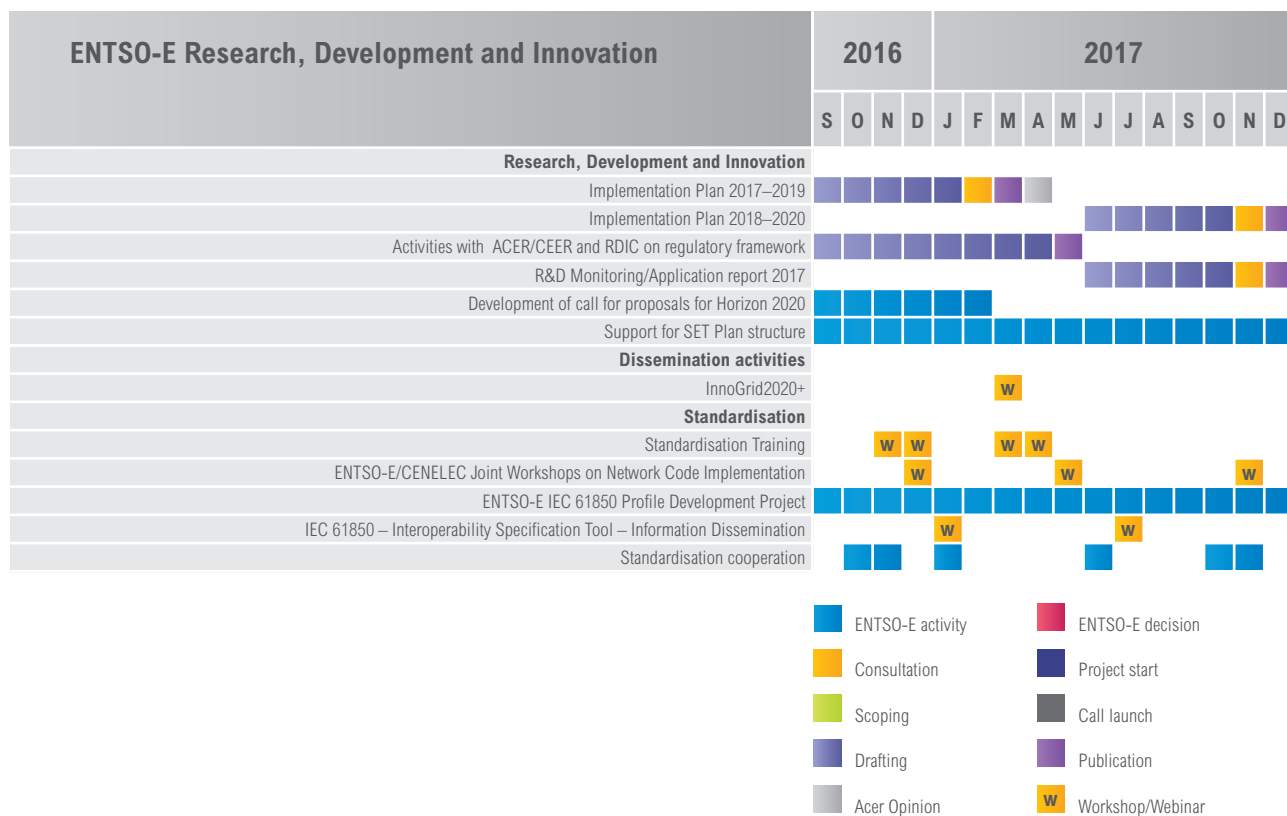


Figure 9: Research, development and innovation activities

- Enhance the standardisation activities through monitoring the domains of interest for TSOs, providing training workshops for interested TSOs, and driving the implementation of the standardisation strategy.
- Creation of an ENTSO-E wide profile under the IEC 61850 standard in order to reach multi-vendor interoperability over the life cycle of systems of assets efficiently.
- Elaborate adequate external and internal communication to maximise the effect of TSOs' R&I efforts towards the EC and ACER and ensure adequate visibility of TSOs' R&I activities in the public domain. One deliverable is the annual InnoGrid 2020+ conference, which is co-organised with EDSO for Smart Grids.
- Start to enact the cross-functional role of coordination within R&I activities in relation to the TSO business (i.e., system operations, facilitation of electricity markets, and transmission grid development).

3.4.2 GRID + STORAGE AND SUPPORT ACTIVITIES FOR THE SET PLAN

The Grid+Storage project is a service contract with the EC where ENTSO-E, together with DSOs (EDSO for Smart Grids) and the storage community (EASE), developed an integrated R&I roadmap published in mid-2016. The Integrated Implementation Plan 2017–2019 provides information on R&I concrete actions, which will be proposed for the period 2017–2019 (see Figure 9).

The support to the new structure of the SET Plan, in particular to the new European Technology and Innovation Platform on Smart Networks for Energy Transition in which ENTSO-E participates in a leading role, will be ensured through a four-year EC funded project (2017–2020). It aims to enhance the interaction between

the stakeholders at the European level and at the national and international levels. It also aims to set several long-term energy scenarios at the European level and to analyse the ongoing research, development, and innovation projects in the EU and, when relevant, in Member States, developing the R&I Roadmap and Implementation Plans for the European energy system. It will also enhance the collaboration between projects through support of the ongoing BRIDGE process initiated by the EC for the funded R&I projects of Horizon 2020.

3.5 EC FORA: ENTSO-E ENGAGEMENT

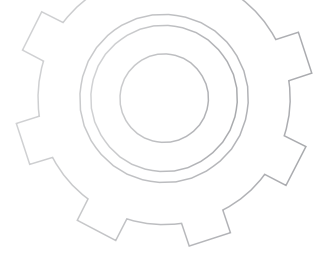
The EC runs several fora set up as Florence Forum, Copenhagen Infrastructure Forum, and London Forum on retail, to ensure stakeholder exchange and contributions on the various dimensions of the internal energy market ahead. In particular, ENTSO-E is actively involved in all three fora.

The Infrastructure Forum was established by the EC in the end of 2015 and shall support the timely implementation of needed European networks. In particular, this Forum supports the development of Projects of Common Interest (PCIs), focusing on timely

implementation and acceptance of projects, bringing value locally, facilitating political buy-in on all levels, etc. In June 2016, the Forum invited the ENTSOs to set up expert groups on implementation of transmission projects in the electricity and gas sectors, respectively.

In 2017, each of the fora will gather once, and ENTSO-E will contribute in an active manner, transparently presenting its activities.





4 TOWARDS THE SINGLE ELECTRICITY MARKET

4.1 REGIONAL COOPERATION AS A PILLAR OF THE ENERGY UNION

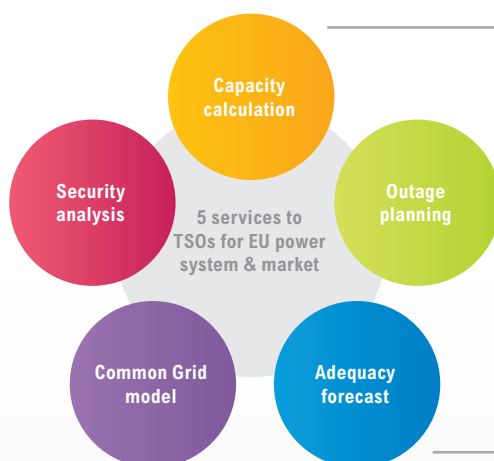
On 10 December 2015, European TSOs and ENTSO-E signed a multilateral agreement on participation in RSCs. It requires ENTSO-E members to participate in RSCs or to contract five essential services from them. The agreement ensures also that RSCs develop in a harmonised, interoperable and standardised way under ENTSO-E's coordination, tools, standards, and methodologies. With the approval of the SO Guideline in May 2016, the RSCs have become legally binding, including the provision of five standardised services to TSOs, as shown in Figure 10 below.

Following the signing of the multilateral agreement in December 2015 the project moved on to developing and implementing the five services and establishing three new RSCs; Baltic, Nordic, and South-East Europe. The development of an RSC requires the deployment of significant resources; the key tasks include:

- Establishing offices,
- Selecting and training operational staff,
- Developing IT systems and tools,
- Designing business processes,
- Testing and trials, and
- Rolling out services.

Some services are already being provided by RSCs such as coordinated security analysis and coordinated capacity calculation.

REGIONAL SECURITY COORDINATION



MULTILATERAL AGREEMENT



Figure 10: Standardised five services of RSCs and the multilateral agreement

It is expected that all the RSCs will be providing the five services to TSOs by the end of 2017, as shown in Table 2 below.

RSCs	Participating TSOs
Coreso	50 Hertz
	Eirgrid*
	Elia
	National Grid
	REE*
	REN
	RTE
	TERNA
TSCNET	50 Hertz
	Amprion
	APG
	CEPS
	ELES
	Energinet
	HOPS
	MAVIR
	PSE
	Swissgrid
	TenneT (NL)
	TenneT (DE)
	Transnet BW
	Transelectrica*
SCC	EMS
	CGES
	NOS-BiH
Baltic	AST
	Elering
	Litgrid
SEE	IPTO
	ESO
	MEPSO
	OST
	KOSTT
	TEIAS
Nordic	Energinet.dk
	Fingrid
	Statnett
	Svenska kraftnät

Baltic, Nordic and SEE RSCs are under establishment

Table 2: Recipient TSOs by RSC (* expected to join)

ENTSO-E will facilitate the coordination and cooperation of RSCs with one another and under the umbrella of the ENTSO-E structure, as defined, among others, by the multilateral agreement on participation in regional security coordination initiatives, proactively concluded among TSOs at the end of 2015.

Engaging stakeholders in regional cooperation

During 2017, a quarterly report will be published on the ENTSO-E website, which provides an update on the status of the implementation of the RSCs and of the five services. The report will show the timing of establishment of all RSCs. It is expected that future options for regional coordination may result in stakeholder meetings and forums during 2017, once the content of the EC's legislative package becomes known in late 2016.

4.2 TRANSPARENCY PLATFORM – CREATING A LEVEL PLAYING FIELD FOR ENERGY TRADING

4.2.1 WHAT IS NEW FOR 2017?

During the months following the go-live of 5 January 2015, the data population increased significantly and the Transparency Platform is now able to handle a significant amount of data (i.e., 120,000 data files are being submitted to the Transparency Platform daily by the numerous data providers, and around 3,000,000 values are being published on a daily basis). In this respect, it acts as a central platform for the publication of fundamental electricity market data. At once, a huge number of users benefit from the data, as the statistics show.

In 2015, Transparency Platform statistics¹¹⁾ showed there were 361,000 browser sessions and more than 9 million views. By the writing of this report, at the end of June 2016, statistics show there are already 221,000 browser sessions and 6 million views. This large scale and far reaching use of the Transparency Platform sheds light on its importance and on the responsibility and accuracy needed for improving it as much as possible.

There is room for improvement in several aspects of the Transparency Platform. First, the platform should become more user-friendly, which would imply changes both to the user experience (graphical user interface and navigation) and to the data download facility. In order to meet these requirements, an evolution plan of the Transparency Platform has been agreed upon, which sets developments for the timeframe of 2017–2020. This plan covers the following four main pillars and includes the changes arising from the revision of the manual of procedures:

11) statistics are taken from <https://www.google.com/analytics>; a browser session is every time a web browser opens a page of a website.

- The Transparency Platform should be a single, unique, intuitive, and user-friendly platform, which would gather all data related to the internal energy market in one place. This information is to be made available not only to the experts but to the whole public for free.
- A direct consequence of the previous point will be that the Transparency Platform should respond to the various needs of potential users (e.g., market participants, analysts, TSOs, EC, NRAs, ACER, and academia).
- As the unique platform for all information relating to the establishment and operation of the internal energy market, the Transparency Platform should be populated with additional data. Extending the scope of information published on the platform must in no way affect the delivery and public availability of data under the legal mandate.
- Once such a significant amount of information is gathered, there needs to be an optimised method of reporting, publishing the right data at the right time, thus responding to the needs of the users.

To the extent possible, the pillars will be implemented in parallel and, depending on the entry into force of the FCA and Electricity Balancing guidelines, the development for many of them will start already in 2017. The modifications of the Transparency Platform will require a substantial amount of legal work to ensure: (i) compliance with the existing legal framework, (ii) legal robustness of the ENTSO-E manual of procedures, and (iii) adequacy of the contractual framework within which the Transparency Platform has been elaborated. It will also be necessary to ensure the platform's design supports the receipt of additional data following the entry into force in Energy Community countries of Regulation (EU) n° 543/2013 as early as 2017.

4.2.2 IMPROVING THE TRANSPARENCY PLATFORM WITH STAKEHOLDERS

The success of the ENTSO-E Transparency User Group has been acknowledged by the majority of its members (BDEW/RWE, ELEXON, EDF Trading, ENGIE, EEX, etc.), including ENTSO-E who pointed out a few areas for improvement. The extensive work undertaken by the user group has helped to define the

different pillars mentioned in Section 4.2.1. The group will continue its work in 2017, focusing on fine-tuning and on the additional data items mentioned above.

4.3 TSO-DSO PLATFORM – CUSTOMERS AS ACTIVE MARKET PARTICIPANTS

The importance of the TSO-DSO interface and the wholesale-retail integration are rising in parallel to the deployment of distributed generation and the advent of new technological and market opportunities, such as demand side response, aggregators, and smart grids. The forthcoming EC legislative proposals on energy market design (end of 2016) will include relevant elements of the 'appropriate framework for TSO-DSO interaction', data handling, evolving roles of the DSO, and oversight as well as an appropriate DSO representation. This appropriate framework serves, as all other amendments on the retail side, the empowerment of the customers, who should be able to participate in all markets if they wish to do so.

In March 2016, ENTSO-E adapted to the above-mentioned changes by launching a 'TSO-DSO Wholesale/Retail' project for a duration of two years. The group has been established to foster TSO position building on the wholesale-retail integration as well as to develop joint positions with DSO associations on data management and distributed flexibility and to contribute proactively to the future legislation on distributed flexibility and wholesale-retail integration. These tasks will continue over 2017.

The four European associations representing electricity DSOs (CEDEC, EDSO for Smart Grids, EURELECTRIC, and GEODE) and ENTSO-E have intensified their cooperation over 2016 and created a systematic and more structured framework. Following the completion of the joint report on data management in 2016, in 2017, all five associations will work on formulating more advanced joint positions on data management models (e.g., data hubs) and making proposals to the EC on distributed flexibility. The work covers congestion management, balancing and flexibility, active power management, and planning and will include discussions on those remaining points in the data report where contributors so far 'agreed to disagree'.



4.4 MULTI-REGIONAL COUPLING (MRC) PROGRAMME EXTENSION TO COVER ALL EUROPE

The coupling of electricity markets maximises social welfare and sends the most relevant price signal for investments in transmission and in generation, storage, and demand response.

An important step of European market integration took place on 4 February 2014, when price coupling in North-Western Europe (NWE) and the start-up solution in South-Western Europe (SWE) went live. After that, in May 2014, NWE and SWE regions were coupled and the MRC was created. Since the launch of NWE, one extension of the PCR¹²⁾-coupled area has taken place in February 2015, when Italy coupled with France, Austria, and Slovenia. As a result, the now-coupled area under MRC covers 19 countries, standing at about 85 % of European electricity consumption.

A key strategic objective of the ENTSO-E Board is to deliver a complete plan on day-ahead market coupling in all of Europe (at least on a net transfer capacity basis). Given the welfare gains of market coupling and its requirement on a pan-European level as enshrined in the CACM Regulation, a plan for the swiftest realistic extension of the MRC to neighbouring regions is vital. Fulfill-

ing this objective requires a roadmap outlining the steps to be taken, also with a view at the interaction of the potential extension of the MRC to the 4M MC countries (Czech Republic, Slovakia, Hungary and Romania) with the ongoing NWE-CEE FB MC project, not least in the frame of the outstanding CCR discussions.

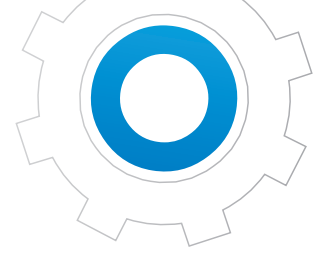
ENTSO-E has launched in August 2016 a project “on TSO preparations for the MRC extension plan”, to look not only on the potential extension to the 4M MC countries (as above) but also to plan the MRC extension to the SEE region – as other parts of Europe are already covered with sufficiently clear steps. The project manager will interface with the MRC project and keep the respective power exchanges informed; once the TSO preparations for a particular coupling step are accomplished, an MRC implementation project involving the relevant TSOs and power exchanges will take over. The MRC Joint Steering Committee has formed an ‘Extension taskforce’ and also invited all remaining borders to join the day-ahead solution.

4.5 ENERGY UNION

ENTSO-E’s purpose is also to contribute to the overall shaping of the energy union objectives. It does this with policy and position papers, participation in debates, annual and regional events, and dedicated stakeholder meetings. For 2017, activities and potential publications and events will address market design, demand response, and the active customer paradigm, innovation and NC implementation, and regional TSO cooperation.

12) Price Coupling of Regions





5 CONNECTING WITH NEIGHBOURING REGIONS

5.1 SYSTEM EXTENSION STUDIES WITH UKRAINE AND MOLDOVA

The system extension process with the Ukrainian and Moldovan systems began when Ukrenergo and Moldelectrica reconfirmed their intention to continue the studies for synchronous operation of their transmission systems with continental Europe, which had previously started in 2006 under the Union for the Coordination of the Transmission of Electricity (UCTE). Following this development, Transelectrica reconfirmed its intention to be the TSO supporting party.

The feasibility study on synchronous interconnection of Ukraine and Moldova with the power system of continental Europe was completed in January 2016. It was decided that the synchronous interconnection is feasible in principle, but the report requested a roadmap be developed by a newly established Project Group Ukraine/Moldova, which would be tasked with managing the next steps of the synchronous interconnection process, including important additional studies.

A project group for Ukraine and Moldova was established in June 2016 and shall prepare a roadmap detailing the catalogues of measures (i.e., organisational and technical steps) to be included in the future connection agreements with Ukrenergo and Moldelectrica. Continued interface with the EC is expected, which will outline the additional studies required and discuss the outcome of these studies. Various options including hybrid AC/DC, or a pure DC operation interconnection will be analysed to address challenges with the dynamic stability of the interconnected system.

The elaboration of draft connection agreements with Ukrenergo and Moldelectrica, which detail the catalogues of measures and next steps is anticipated in early 2017.

5.2 SYSTEM EXTENSION STUDIES IN THE BALTICS

The EC (BEMIP Working Group on ‘Various aspects of the integration of the Baltic States’ electricity network into the continental European network, including their synchronous operation’) is

conducting a study in 2016 on the different options for the desynchronisation of the Baltic States’ network from the Russian grid. ENTSO-E will monitor the developments in 2017.

5.3 SOUTH-EAST EUROPE REGIONAL PROGRAMME

ENTSO-E dedicates resources in supporting the TSOs of South-East Europe in aligning their legal and regulatory framework with that of the EU and consequently ensuring the consistent development of their national and regional electricity markets in line with the requirements of the internal electricity market.

The South-East Europe regional programme particularly supports the TSOs of the six Western Balkan countries (WB6), which are not members of the European Union and are therefore not subject to exactly the same energy legislation. The alignment of their electricity markets, supported by the Energy Community, should

ultimately allow them to be an integral part of the European internal electricity market. This is consistent with the so-called Berlin process and its translation into a memorandum of understanding (WB6 MoU) between WB6 actors through which the WB6 energy ministers vested their TSOs with the mission to further collaborate, especially in terms of day-ahead market integration and in terms of balancing cooperation.

ENTSO-E will support the implementation of the WB6 MoU and ensure its coherence with the market coupling plans at the pan-European level. The WB6 MoU requires:

- Each WB6 country to proceed to day-ahead market coupling with at least one country of the Energy Community or of the European Union by July 2018. As an intermediate step, all project implementation agreements between the TSOs, NRAs, and power exchanges should be finalised by November 2016; and

- Each WB6 country to cooperate for cross-border balancing by 31 December 2018.

In addition to market developments, the South-East Europe regional programme aims at facilitating the collaboration of the regional TSOs in terms of system development and system operation, thus affecting the activities of all ENTSO-E committees. It finally requires a close and reinforced cooperation with the EC and the Energy Community Secretariat, for instance through participation at the Athens Forum.

5.4 COOPERATION WITH TSOS AND THIRD PARTIES

ENTSO-E is reinforcing its cooperation with TSOs, which are not yet its members but are located in countries that are members of the Energy Community. After welcoming TEIAS (Turkey) as its first ever observer member at the beginning of 2016, ENTSO-E expects to welcome OST (Albania) as a new member of ENTSO-E

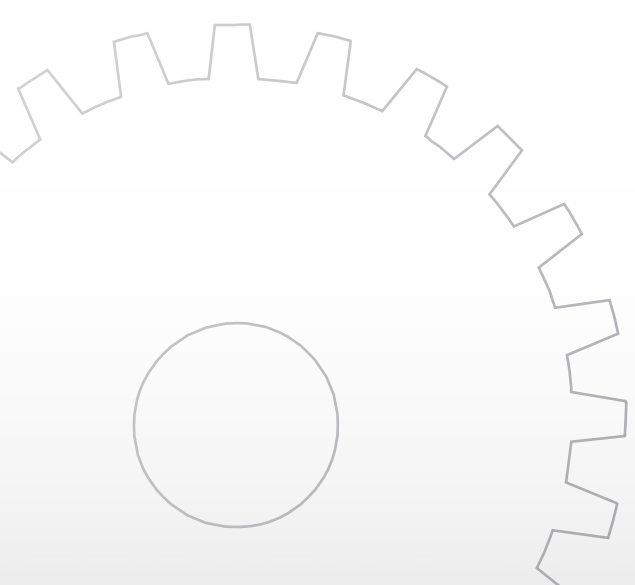
by the end of 2016 or early 2017. The applications of Ukrenergo (Ukraine) and KOSTT (Kosovo¹³) for an increased collaboration within ENTSO-E structures will also require further resources in 2017 to assess the compliance with the requirements established in the articles of association and internal regulations.

5.5 US-EU NETWORKS WORKSHOP AND STUDY TOUR

ENTSO-E's last study tour to the US took place in 2015. In 2017, the planned visit is likely to include a public workshop, exchange with the US Department of Energy, the Federal Energy Regulatory Commission, the North American Electric Reliability Corpora-

tion, the PJM Interconnection, the New York State authorities, and other companies. It is envisaged to co-organise this tour, in 2017, with DSOs. The indicative timing is the second quarter of 2017, with a delegation of approximately 20 participants.

13) This designation is without prejudice to positions on status, and is in line with UNSCR 1244 and the ICJ Opinion on the Kosovo declaration of independence.



6 OTHER ACTIVITIES

6.1 RETRO-FIT OF DISPERSED GENERATION

The application of frequency settings for new dispersed generation units and the retro-fit of dispersed generation that have inadequate frequency disconnection settings in continental Europe is a programme that started in 2015 and is still ongoing.

Due to the complexity and cost of the task, including the timing of the TSO retro-fit programmes, the total MW at risk remain above the secure levels. Since this risk becomes relevant with a frequency deviation larger than 200 MHz, alternative measures have been considered to improve the frequency quality in continental Europe and to reduce the probability of reaching the frequency disconnection thresholds. During 2017, TSOs will keep working closely with NRAs and DSOs to monitor the evolution of the capacity at risk.

6.2 ANNUAL WORK PROGRAMME

The next ENTSO-E annual work programme will target public consultation in September 2017. The feedback will be reviewed before submitting the work programme for ACER opinion in late autumn 2017.

6.3 ANNUAL REPORT

The annual report informs stakeholders on the progress of ENTSO-E in delivering its annual work programme and carrying out its obligations under European regulations. In 2017, ENTSO-E aims to publish its annual report during the first quarter of the year. This report will build on the feedback provided by stakeholders and ACER on the 2015 Annual Report.

6.4 CONFERENCES

ENTSO-E launched its first three regional conferences in 2016. The purpose of these conferences was three-fold: draw attention to the increasingly important regional developments, discuss relevant topics with the regional constituencies, while developing a closer understanding with the region's TSO members and increasing the interaction with members in several activities from conferences to training and internal exchanges. In 2016, the regional conferences covered the Baltic area (Vilnius), Central-East Europe (Bratislava), and South-East Europe (Thessaloniki).

For 2017, the regional conference series shall include the Iberian Peninsula plus France as well as the Southern area around Switzerland, Italy, Austria, and Germany. Major events also include, like every year, ENTSO-E's annual conference and the sixth edition of the InnoGrid2020+ conference.

6.5 ACER AND EU INSTITUTIONS

ENTSO-E is strongly committed to maintaining its close and productive working relationship with ACER and the EU institutions. On NCs, ENTSO-E wants to go further and engage with national regulators, EU Member States, and all stakeholders to ensure that NCs are well understood and that all parties have the capacity to implement them successfully. The European Stakeholder Committees for implementation of NC, jointly set up with ACER, will be key in meeting this challenge.

Stakeholder engagement will continue to be the barometer encouraging/helping ENTSO-E to fulfil its mission and functions in a way that best supports the competitiveness, sustainability, and security of the EU power system.

6.6 ENGAGEMENT WITH THE ENERGY COMMUNITY

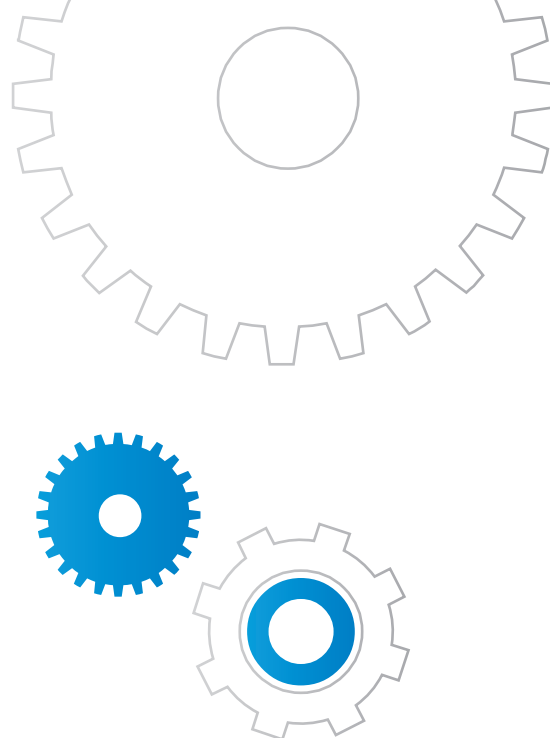
The Energy Community is a key partner for ENTSO-E. The Energy Community covers many of the countries where TSOs are ENTSO-E members and cooperation is instrumental in achieving a common set of principles with contracting parties regarding the internal energy market. ENTSO-E's experience can help solve challenges related to the technical implementation, cooperation, and capacity-building in the Energy Community region with a view to integrating markets, fostering interconnections, and the timely implementation of the EU energy law.

In 2016 and 2017, ENTSO-E will be working with Energy Community on the development of the first joint programme which will have the following objectives:

- More systematic and effective engagement of ENTSO-E on common objectives for the internal energy market;
- Engagement with the TSOs of the region to improve local technical and market knowledge/experience/capacity to implement the EU electricity law; and
- Trust-building between TSOs to foster better cross-border cooperation and pilot project initiatives/regional initiatives.

6.7 INDEPENDENT ADVISORY COUNCIL

An independent Advisory Council has been determined by ENTSO-E in March 2016 and gathers first in September 2016. It will provide independent advice on ENTSO-E's work products and strategy. It will meet two times in 2017, after its constituting session in 2016. Experts nominated by relevant stakeholders are participating in the Advisory Council.



7 CONCLUSIONS

With the anticipated adoption of all NCs by the beginning of 2017, ENTSO-E enters a new phase of challenges. ENTSO-E's eighth Annual Work Programme for 2017 is dominated by the implementation of NC activities, and this will be delivered in close cooperation with our stakeholders.

The forthcoming legislative proposals by EC on market design and renewables is expected to give ENTSO-E an enhanced mandate in its role in system adequacy assessment and to bring increased responsibilities and opportunities. Our continuing cooperation with the DSOs will be reinforced in 2017 and further concrete proposals for retail market integration will be developed. A closer interface with ACER is also expected.

Our work in delivering TYNDP, the Transparency Platform, and other legal mandates will continue by taking stock of lessons learned through the years and by responding to our stakeholders' feedback, with the aim of maintaining a high quality service and deliverables.

ENTSO-E has a clear aspiration to play a leading role in facilitating the internal energy market and implementing a reliable, competitive, and sustainable power system. In 2017, we will continue our enhanced contribution to policy debate by developing papers on all TSO-relevant energy transition issues. We will also continue our engagement with our neighbours and applicants for new membership in 2017.

ENTSO-E is anticipating the dynamic and fast changing environment of the energy sector in 2017, and in response is planning innovative initiatives and even better delivery of its legal mandate, in order to fulfil the expectations of its stakeholders. This is the main theme behind the design of our eighth Annual Work Programme for 2017.





ENTSO-E PUBLICATIONS

Publication	Overview	Frequency
Annual Work Programme	The work programme represents ENTSO-E's priorities and major deliverables for the upcoming year.	Annually – Q4
Annual Report	The annual report reviews the work achieved on system development, operational security, market integration, and NC drafting and implementation from the previous year.	Annually – Q1
Ten-Year Network Development Plan	The TYNDP provides information on needed pan-European investments in electricity transmission systems to support policy, generation and the grid decision-making processes at regional and European levels.	Biennial – Q4, in even years
Mid-term Adequacy Forecast	The MAF analyses the mid- and long-term system adequacy of the pan-European interconnected system.	Annually – Q2
Seasonal Outlook Reports	The ENTSO-E Seasonal Outlook Reports present the views of Europe's electricity TSOs regarding national, regional, and pan-European security of supply for the summer and winter periods.	Biannually – Q2/Q4
R&I Roadmap	The R&I Roadmap lays the groundwork for the upcoming electricity highways, smart grids, and the change to a low-carbon electricity system.	Every four years – Q1/Q2
R&D Implementation Plan	The R&D Implementation Plan defines short-term R&D activities and gives practical implementation details for the next three years.	Annually – Q1/Q2
R&D Application Report	The R&D Application Report analyses the concrete effect of TSOs' R&D projects.	Biannually – Q1/Q2, in odd years
R&D Monitoring Report	The R&D Monitoring Report assesses the progress of TSO-related research and development work within the R&I Roadmap.	Biannually – Q1/Q2, in even years
Electricity in Europe	Electricity in Europe provides a brief analysis in text and graphics of the major provisional electricity transmission statistics and trends from the previous year.	Annually – Q2
Statistical Factsheet	The statistical factsheet provides updated essential information and data on ENTSO-E and its 41 member TSOs in a handy format.	Annually – Q2
Monthly Statistics Reports	ENTSO-E's monthly statistics provide basic figures on power systems of member TSOs, including production, consumption, and cross-border exchanges.	Monthly
Yearly Statistics & Adequacy Retrospect (YS & AR)	The YS & AR report provides a range of figures on members' power systems, including production, consumption, cross-border exchanges, and network components.	Annually – Q2
European Transmission Tariffs	ENTSO-E's Overview of Transmission Tariffs in Europe analyses the design, structure, and level of transmission tariffs in more than 30 countries.	Annually – Q3

Table 3: Overview of publications

GLOSSARY

ACRONYM	DEFINITION	ACRONYM	DEFINITION
aFRR	Automatic Frequency Restoration Reserves	IEM	Internal Electricity Market
ATOM Network	All TSO network for non-real time Operational and Market-related data	IGM	Individual Grid Model
BRP	Balancing Responsible Parties	JAO	Joint Allocation Office
BSP	Balancing Service Provider	LTR	Long-Term Transmission Rights
C NC	Connection Network Code	MAF	Mid-term Adequacy Forecast
CACM	Capacity Allocation and Congestion Management	mFRR	Manual Frequency Restoration Reserves
CBA	Cost-Benefit Analysis	MLA	Multilateral Agreement
CENELEC	European Committee for Electrotechnical Standardisation	NC	Network Code
CGM	Common Grid Model	NDSG	Network Development Stakeholder Group
CGMES	Common Grid Model Exchange Standard	NEMO	Nominated Electricity Market Operator
CMO	Common Merit Order	NRA	National Regulatory Authority
CWE FB	Central-Western Europe Flow-Based	OPDE	Operational Planning Data Environment
D&I	Data and Information	PCI	Projects of Common Interest
DCC	Demand Connection Code	Prosumers	Neologism to designate producers and consumers
DSO	Distribution System Operator	RES	Renewable Energy Sources
EASE	European Association for Storage of Energy	RfG	Requirements for Generators
EB	Electricity Balancing	RR	Replacement Reserves
EDSO	European Distribution System Operators' Association	RSC	Regional Security Coordinator
ENTSOG	European Network of Transmission System Operators for Gas	SAP	Single Allocation Platform
FCA	Forward Capacity Allocation	SET Plan	Strategic Energy Technology Plan
HVDC	High-Voltage Direct-Current Code	SOAF	Scenario Outlook and Adequacy Forecast
ICT	Inter transmission system Operator Compensation for Transits	TSC	TSO Security Cooperation
IEC	International Electrotechnical Commission	TSO	Transmission System Operator
		TYNDP	Ten-Year Network Development Plan
		XBID	Cross-Border Intraday



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