European Network of
Transmission System Operators
for Electricity

ENTSO-E WORK PROGRAMME

2015 THROUGH DECEMBER 2016

Contents

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Glossary

Acronym	Definition
ACER	Agency for the Cooperation of Energy Regulators
C NC	Connection Network Codes
CACM	Capacity Allocation and Congestion Management
CAO	Central Allocation Office
CASC	Capacity Allocating Service Company
CBA	Cost–Benefit Analysis
CEER	Council of European Energy Regulators
CGM	Common Grid Model
CGMES	Common Grid Model Exchange Standard
CMO	Common Merit Order
CWE FB	Central Western Europe Flow-Based
D&I	Data and Information
DCC	Demand Connection Code
DSO	Distribution System Operators
EAS	ENTSO- E Awareness System
EASE	European Association for Storage of Energy
EC	European Commission
EDICT	ENTSO-E Disturbance and Incident Classification Tool
EH	Electronic Highway
ENTSOG	European Network of Transmission System Operators - Gas
FCA	Forward Capacity Allocation
HVDC	High-Voltage Direct-Current Code
ICS	Incident Classification Scale
IEC	International Electro technical Commission
IEM	Internal Electricity Market
IGM	Individual Grid Model
LFCR	Load Frequency Control & Reserves
LTR	Long-Term Transmission Rights
NC	Network Codes
NC EB	Network Code Electricity Balancing
NDSG	Network Development Stakeholder Group
NRA	National Regulatory Authorities
OPDE	Operational Planning Data Environment
OPS	Operational Planning & Scheduling
OS	Operational Security
PX	Power Exchange
RES	Renewable Energy Sources
RfG	Requirements for Generators
RSCI	Regional Security Coordination Initiatives
SCC	Southern Coordination Centre
SO GL	System Operation Guidelines
SOAF	Scenario Outlook & Adequacy Forecast

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SOG	System Operation Guideline
TF	Task Force
TSCnet	TSO Security Cooperation
TYNDP	Ten-Year Network Development Plan
UCAIug	UCA International Users Group
XBID	Cross Border Intra-day

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EXECUTIVE SUMMARY

ENTSO-E is the association representing European Transmission System Operators (TSOs) and 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, 543/2013 and 347/2013. 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 in maintaining a high level of operational security and promoting the adequate development of the interconnected European grid and investments for a reliable, efficient and sustainable power system.
- Markets, by proposing and implementing market integration and transparency frameworks that facilitate competitive and integrated continental wholesale and retail markets.
- Sustainability, by facilitating secure integration of renewable generation sources and other energy mix changes.

ENTSO-E's seventh Annual Work Programme is dominated by further improvements in legally mandated work products and also by our vision in response to the EC's "Energy Union" initiative. At times of monumental changes and challenges in the European energy system, the Association recognises the need to move in two directions: with ENTSO-E priority contributions to electricity system and market; and changing our Association to even better meet expectations.

Four priority contributions are planned to the development of the electricity system and market:

- Integrate renewables into markets and grids. For example, ENTSO-E plans to contribute in 2016 to a market design fit for RES and to a strong grid that integrates more RES in the TYNDP 2016.
- Develop further TSOs' regional cooperation. TSOs and ENTSO-E will begin implementing in 2016 the multilateral TSO contract for Regional Security Coordination Initiatives.
- Develop further the European day-ahead and intra-day market coupling in the "all TSOs" framework, which better accommodates RES surpluses and deficits.
- Secure a sound investment climate for the transition of the power system. ENTSO-E in 2016 will deliver guidance, transparency and data with regard to investment plans but also in contributing to a regulatory framework that facilitates those capital-intensive investments.

Three measures are proposed in changing the Association in 2016, in alignment with our strategic plan:

- A transparent, engaging and credible ENTSO-E using the new European stakeholder committees as one of the tools for the development.
- ENTSO-E as a partner in shaping the energy transition. This will be covered by our "Vision Package", which includes the Vision paper and policy papers. Furthermore, ENTSO-E is planning an increased exchange with EU institutions on all working levels for 2016.
- Further improved cooperation with regulators, including NRAs

In addition, in 2016 ENTSO-E will continue the delivery of its legal mandates and work in the areas of: network codes implementation, which with the completion of the codes drafting becomes our main item of focus; the TYNDP 2016; other legal mandates such as the enhancement of the Transparency Platform, Scenario Outlook and Adequacy Forecast reports and operational tools (including EAS and CGM); and also external relations with third-country TSOs. In designing our Annual Work Programme 2016, ENTSO-E's intention is to take necessary actions to respond effectively to the challenges and to any related initiative by the EC that may result from its Energy Union Communication, while maintaining the highest standards in delivering our legal mandate.

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1. INTRODUCTION

1.1. Strategic Planning

The strategy of ENTSO-E is developed by the Board by tracking the progress of the strategic plan and the alignment with new external developments. The strategic plan was approved by the Assembly in 2014, and has been enhanced in April 2015, with ENTSO-E's response to the Energy Union initiative.

In developing the best strategy for the coming years, members were led by the realisation that TSOs need to proactively shape and implement the changes that the energy industry is undergoing. For example, the changes in resource mix, smart grids and customer empowerment present enormous opportunities and risks for the power system and for society. TSOs need to contribute their expertise towards policy makers' many necessary decisions and adjustments of market design, security of supply, secure operations and viability of the energy mix, competitiveness and sustainability. Stakeholder feedback, which ENTSO-E sought and received, also points in the direction of taking a clear European perspective, being more active in explaining identified areas for improvement to the public and taking a leading role in coordinating the implementation of adjustments that have been decided.

The TSOs' neutral and unbundled role in the electricity market is the basis not only for the legal mandate but also for policy suggestions. Being a non-profit association of its member TSOs, ENTSO-E's policy suggestions build on the public-service orientation of its members, where regulation is designed to align the TSOs' interests with those of consumers and society at large. ENTSO-E is committed to explain transparently how society's interests are advanced through its work products, especially in the rare cases of doubts about interest alignment.

The six pillars of ENTSO-E's strategy are:

1. The highest standards will be followed in discharging the Association's legal mandates: Network Codes (NC), TYNDP, Transparency Platform, SOAF or other specific tasks assigned to it.
2. Enhanced visibility and transparency in all our work areas. The Association will increase its public visibility to ensure the TSOs' input and system perspective on security of supply, competitiveness and sustainability get considered in energy policy decisions. There will be further increased transparency on information sharing between TSOs, and between TSOs and society at large. We will actively use the new European stakeholder committees as a tool for transparency and dialogue. We intend transparently to disseminate relevant power system data (subject to legal limitations for data publication under the relevant national law), to the market and ensure data are supported by sufficient context and explanation to avoid misinterpretation.
3. Streamlined and trustful governance of ENTSO-E with enhanced powers for the Board and faster decision making while further strengthening transparency and participation by all members.
4. Leadership in European energy policy development and engaging transparently on how society's best interests are advanced across the entire European power system.
5. Enhanced role of the Secretariat, which focuses on the pan-European dimension, looking at the entire power system and ensuring that the diversity of all national interests is reflected but does not conflict with the pan-European interest.
6. Enhanced implementation and regional cooperation of TSOs–details presented in Section 3 below.

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The strategic plan has been translated in a number of interventions, actions and internal restructuring of the Secretariat. The target is a reformed Association to deliver the six objectives above.

Furthermore, as a response to the Energy Union communication, a broad vision has been developed. ENTSO-E's Vision Package includes the June 2015 Vision Paper and four position papers on:

- Security of supply and management of scarcity situations
- Market design and innovation
- Regional TSO cooperation
- New regulatory framework

Our Vision Package will be launched at ENTSO-E's Annual Conference in November 2015.

1.2. General Description of the Work Programme

This work programme covers the period from September 2015 through to the end of 2016. The work programme builds on the results of the Board's strategic review of ENTSO-E working practices and decision making and its impact on how work is done and the way ENTSO-E presents itself to stakeholders. The resources of ENTSO-E are described as they relate to the various tasks undertaken by the Secretariat. 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 interrelationships between them, the work programme contains a separate Network Code chapter. The other chapters follow the major sets of ENTSO-E deliverables.

ENTSO-E is organised into four Committees, which have responsibility for delivering the work programme of projects, mandated work products, policy suggestions and on-going 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 legally by the 'Legal and Regulatory Group' (Figure 1).

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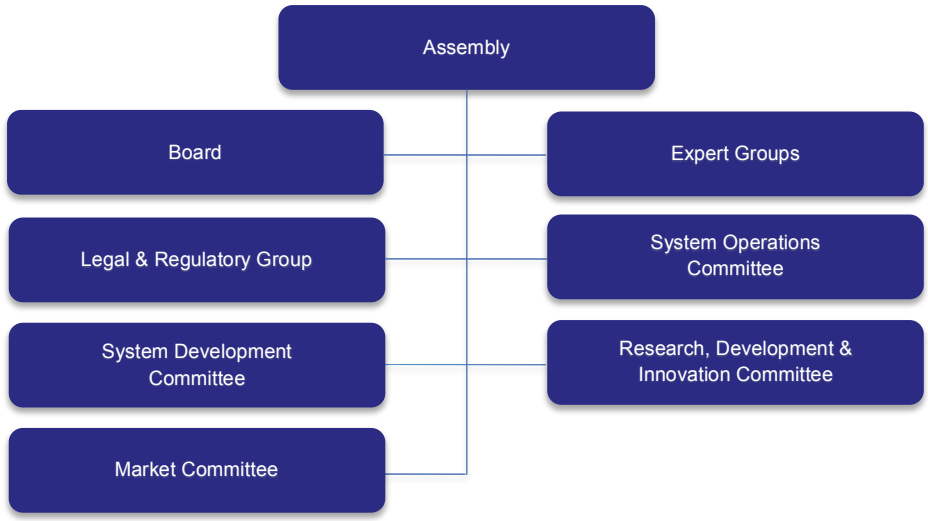

Figure 1: ENTSO-E Bodies' Organisation

Our work in 2016 will focus on:

- **Regional cooperation.** TSOs have proactively set up a variety of regional cooperation initiatives such as the central auction offices; for example, CAO/CASC on the market side and several RSCIs such as TSC and Coreso on the operational security side. ENTSO-E will participate actively in their further development and scope of work to ensure the full EU regions provide coverage and build up rules consistent with the Codes.
- The implementation of **Network Codes** approved via the comitology process and continued engagement on those prepared for approval. The completion of this process for all codes is considered by ENTSO-E as a key prerequisite for the implementation of the Internal Energy Market. One example of the central significance of the codes implementation work is the Europe-wide application of day-ahead and intra-day market coupling. Building on the successful voluntary market coupling cooperation of TSOs and PXs, the Capacity Allocation and Congestion Management Guideline gives a legally binding framework for extending these projects to Europe-wide coverage. The steps towards that goal will form one concentration of ENTSO-E's work in 2016, applying the CACM Guideline's "all TSOs" and "all NRAs" decision processes and ENTSO-E's regional cooperation structures.
- **Innovation.** The enormous changes in resource mix, smart grids and customer empowerment mean innovation is crucial to develop a power system fit for the future. ENTSO-E is updating its research, development and innovation strategy in autumn 2015 to contribute even better from 2016 onwards to the definition of research directions, to research consortia formation and to R&D results dissemination.
- Along with completion of the target model, there is a need to augment significantly the **market design** that will facilitate the integration of RES into the market and the provision of operational flexibility services (e.g. Demand-Side Response) necessary for efficient system operation with high penetrations of RES.
- While network codes constitute the "software" for IEM, "hardware" is represented by the infrastructure. ENTSO-E will deliver in 2016 the new TYNDP which details the projects and investments required to ensure the timely expansion of the power system "fit for purpose". Here, ENTSO-E's guiding principle is that infrastructure investments should be made where

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the socio-economic gains are the largest and comply with the targets and decisions of the European Institutions.

- ENTSO-E will continue fully to discharge its legal mandate such as the Adequacy reports and the short-term forecasting scenarios whose methodology will be reviewed to make these reports the basis of pan-European and Regional Security of Supply Assessments.
- The Association will complete its strategic plan in Q2/2016, which implies reforming and being able to serve more efficiently its purpose within the context of the Energy Union initiative.
- ENTSO-E will extend the range of services it provides for Stakeholders, like the improvement of the Transparency Platform.
- Other activities led by Committees as detailed in Chapters 3 and 4 below.
- Last but not least, ENTSO-E has an active engagement plan for 2016 for cooperation and international exchanges of best practices with the **European neighbours**, in particular with the **Energy Community** including Ukraine, the Mediterranean TSOs and Georgian TSO.

1.3. Resources

To fulfil its legal mandate and strategy, the Association has planned a total budget of M€ 18.2 for 2016. This represents a 2.8% increase from the 2015 budget including major investments in new and/or enhanced IT projects like the CGM and the Transparency Platform. It must be also noted that the ENTSO-E budget now includes for the first time "all TSOs" operating costs. The number of Full Time Equivalent (FTE) staff in the Secretariat in 2015 is 71.5 and is expected to be limited to 72.5 FTE in 2016. The budget for 2016 is approved in October 2015 and is included in the final version of the Annual Work Programme to be published in December 2015.

This summary of resources covers the tasks that the ENTSO-E Secretariat will be involved in during 2016. However, even on this horizon, significant uncertainties exist. For example, the timing of the comitology proceedings for the various NC is still uncertain, and for this and other reasons the number of member TSO and Secretariat experts needed is only a rough estimate.

In assessing resource requirements, the ENTSO-E Board analysed the workload of tasks required by ENTSO-E. ENTSO-E's strong growth in legally mandated tasks has entailed a significant expansion over the years of the Members' and Secretariat's workload and of the Association's budget. Other projects are necessary for the running of the Association. Finally, there is work on policy positions, advocacy and communication and the general administration, management and support of the tasks performed by our Working Groups and main association bodies. The administration costs have grown over the years partly in proportion to the overall amount of work ENTSO-E is required to produce, i.e. they are also largely driven by the increase of legally mandated work. ENTSO-E focuses on working ways emphasising project management practices, resources optimisation, faster delivery and efficiency.

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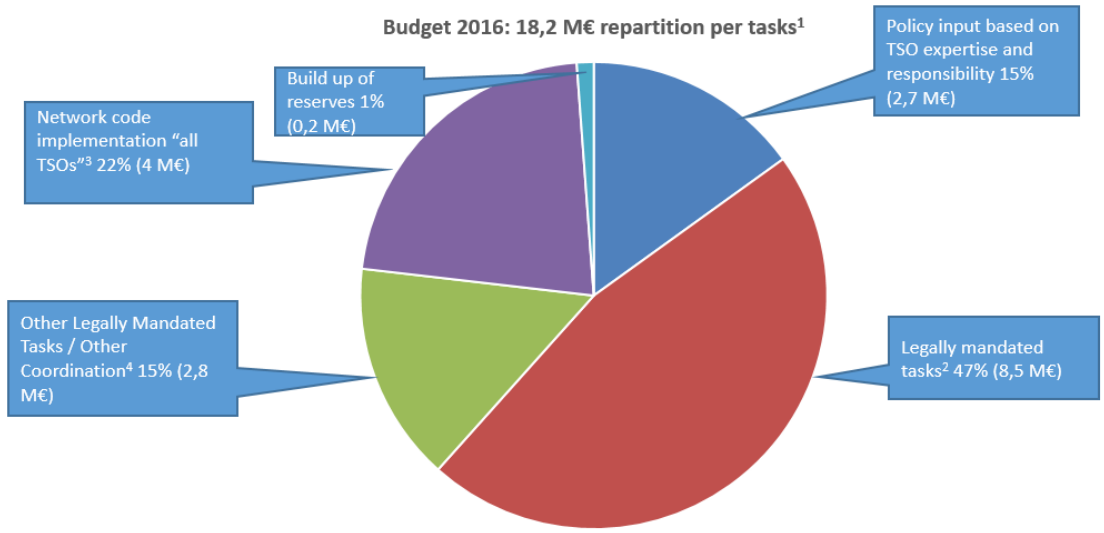

[1]Budget repartition per tasks includes proportional allocation of administrative and efficiency tasks (support to ENTSO-E bodies and working groups, management, HR/IT/Legal support, IT efficiency projects, process improvement…)
[2]Includes Network Code implementation, Common Grid Model, Transparency Platform, TYNDP, System Adequacy
[3]Includes TSOs tasks for network code implementation, ENTSO-E Awareness System, Electric Highway
[4]Includes R&D activities, regional TSOs' coordination

Figure 2: Budget 2016

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2. MAJOR WORK PRODUCTS

2.1. Network Codes Development and Implementation

2.1.1. Overall activity

The NC[1] are the building blocks of the IEM. They will 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, the coordination of system operations and the completion of pan-European electricity markets.

Developing them in a relatively short time frame has been a major task for ENTSO-E and all parties involved, including the European Commission (EC), ACER, Distribution System Operators (DSOs), Power Exchanges, and all market participants. One NC (CACM GL) has entered into force on 14 August 2015, three NC (RfG, DCC, HVDC) are already adopted and two more (FCA, SOG) are expected to be adopted by the end of 2015 or early 2016 by Member States and the Commission and will become binding regulations in 2016. The remaining two NC, on Balancing and on Emergency and Restoration procedures will be reviewed and voted by Member States in 2016 through the comitology procedure.

In 2016, ENTSO-E resources will be more committed than ever to make NC a reality, by focusing on the detailed implementation tasks for each NC entering into force, and by continuing the last years' push for carefully chosen early implementation projects. This is the NC implementation program detailed below. ENTSO-E's focus through 2016 will include further cooperation with the EC, ACER and all stakeholders including Energy Community countries to support the implementation process. ENTSO-E will keep working on improving stakeholder engagement and transparency in all of its projects. European Network Codes Stakeholder Committees, which were designed in close collaboration with ACER and stakeholders, will expand in 2016 to cover connection and operational codes, after already starting in 2015 for market codes.

The timetable below (Figure 3) shows the high-level network code schedule. More details on implementation of the different codes are given in the sections below with separate timetables.

[1] For clarity, the term "network codes" (NC) is mainly used in this document to define any 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.

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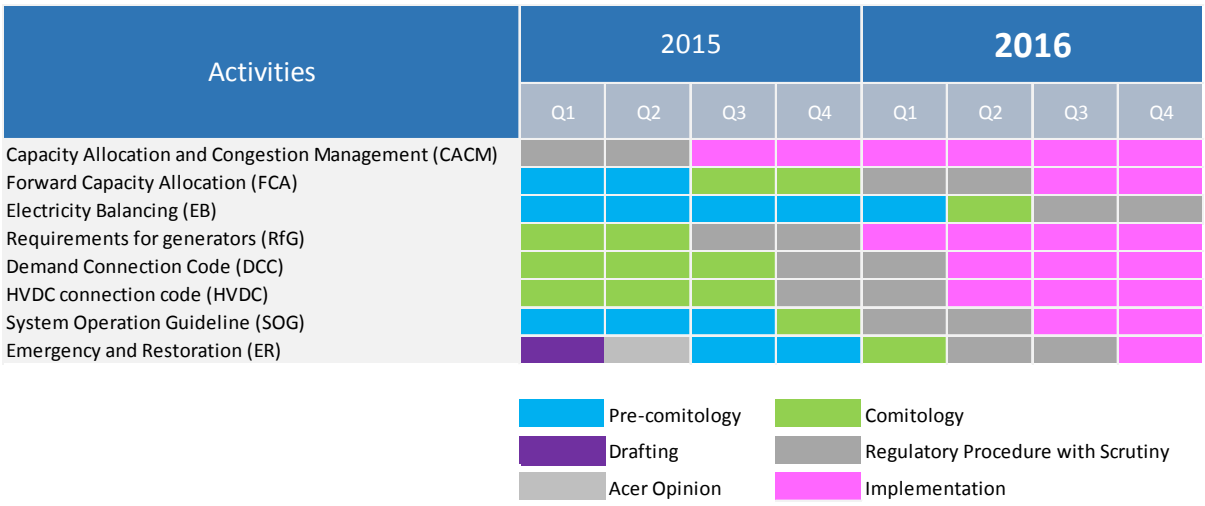

Figure 3: Network Codes main activities

2.1.2. Scoping and drafting of NC

ENTSO-E delivered to ACER the 10th[2] NC on Emergency and Restoration in 2015. At the beginning of 2016, no code is anticipated to be in the drafting stage.

It is possible that ENTSO-E will be requested to begin work on an additional NC in 2016. For example, the EC and ACER are considering engaging in a scoping exercise on transmission tariffs structure in 2016. Other topics may also become more urgent than they currently appear, depending on market developments. Should the EC, ACER and ENTSO-E conclude that new rules need to be developed through a network code, ENTSO-E will be involved in the elaboration of the framework guideline.

2.1.3. Supporting the adoption process of NC

At the time of writing, two NC have already been approved by Member States[3]. Capacity Allocation and Congestion Management was published in the Official Journal of the European Union, and Requirements for Generators was undergoing Council and Parliament scrutiny. The Annual Priority List of the EC indicates their intention to submit four other codes to Member States comitology vote in 2015 (Demand Connection, High-Voltage Direct-Current Connections, Forward Capacity Allocation and the combined System Operations Code). This would leave the remaining two codes on Electricity Balancing and Emergency and Restoration procedures for comitology in 2016.

[2] The three codes on System Operations were merged into a single document in 2015. Therefore, ENTSO-E delivered 10 codes but in the final adopted form there will be eight.

[3] After Member States approve a code, it is sent to the European Parliament and European Council for a scrutiny period of a maximum of three months. If no objection is made, the code can be published in the Official Journal of the European Union and becomes binding.

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The current schedule of comitology will, however, depend on the contributions from Member States. Despite the efforts made by ENTSO-E with ACER, the EC and stakeholders during the drafting and pre-comitology phase to ensure that the codes are as balanced and representative as possible, some important issues will likely still need to be discussed during comitology.

During the pre-comitology and comitology phases, ENTSO-E will keep working with the EC to clarify aspects of the texts and, if necessary, fine tune the draft code taking into consideration the Commission's legal review. ENTSO-E may also need to adjust its supporting document to explain the content and purpose of each network code, to place it within the wider context of European energy policy and to demonstrate the benefits it will deliver.

2.1.4. Implementation

2.1.4.1. Description of the implementation program

The NC have been developed to help achieve Europe's three energy policy goals: ensuring security of operation, creating a competitive internal electricity market (IEM) and decarbonising the electricity sector. For this to happen, NC need to be implemented and complied with across all countries represented by ENTSO-E members.

Each NC/guideline requires the definition of a series of steps (e.g. methodologies) to be taken before they can be considered as fully implemented. This might include national decisions, regional agreements and new pan-European common methodologies. All market participants, DSOs, TSOs and regulators will be involved and the required work and consultation is expected to be extensive.

2.1.4.2. Stakeholder engagement

The implementation of NC needs to be undertaken in a coordinated way. Effective stakeholder engagement is essential in ensuring a successful process, and ENTSO-E values greatly their input. This involves the sharing of views and information by all interested parties. Stakeholders will be kept abreast of developments and are encouraged to provide their views and feedback. TSOs have the ultimate responsibility to implement a large number of tasks at pan-European, regional and national level. TSOs have asked for ENTSO-E's support for all pan-European aspects of these tasks, and in particular to ensure consistency of work and communication.

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 codes European Stakeholder Committee was created in 2015, and will be followed in 2016 by the connection and operational codes committees, after the first code of each family enters into force.

ENTSO-E volunteers to support these committees by supporting ACER in the preparation and development of the meetings, providing secretariat services, informing stakeholders of progress and of course participating in the discussions. All Stakeholder Committee presentations and reports, as well as videos streams of each meeting will be made available on the ENTSO-E website. Non-

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members of the Stakeholder Committee will also have an opportunity to ask questions or issue remarks from the site. ENTSO-E is developing and will maintain a web-based "Library" for network codes implementation, where all available drafts and final documents related to the implementation of all codes at national, regional and pan-European level will be made available to the public.

Several specific consultations and workshops will be organised in 2016. Users' or experts' groups will be created for specific purposes. This is detailed in the following sections of this document.

2.1.4.3. Implementation monitoring

Implementation monitoring of the NC is a general task that ENTSO-E is given by Article 8(8) of EC Regulation 2009/714. Implementation monitoring plans will be defined periodically in close coordination of ENTSO-E and TSOs with ACER and national regulatory authorities. ENTSO-E and ACER are committed to an early start to this program in 2016.

2.1.4.4. Market Codes

Implementation activities for the three market codes are summarised in Figure 4 below, including both early implementation tasks before, and formal tasks after, a code enters into force.

Capacity Allocation and Congestion Management (CACM) Implementation

The CACM Regulation entered into force in Q3/2015. The TSOs have decided that ENTSO-E will be the platform for discussion of pan-European implementation tasks. The ENTSO-E Secretariat will support these discussions and decision processes.

According to the CACM Regulation, the following pan-European tasks will have to be delivered during 2015 and 2016. ENTSO-E Market Committee meetings will be used to discuss the corresponding "all TSOs" decisions and work on these has started already:

- Determination of capacity calculation regions (Article 15(1)) expected end November 2015
- Day-ahead firmness deadline (Article 69) expected November 2016
- Intra-day cross-zonal gate opening and closure time (Article 59(1)) expected November 2016
- Requirements for price coupling algorithm (Article 37(1)) expected for March 2016
- Requirements for continuous matching algorithm (Article 37(1)) expected for March 2016
- Generation and load data provision (Article 16) expected May 2016
- CGM methodology (Article 17) expected May 2016
- Congestion income distribution methodology (Article 73) expected July 2016
- Monitoring activities of ENTSO-E (Article 82)–Monitoring plan expected for January 2016, activities continuous

CACM Coordination Group

With the objective of paving the way for a smooth approval process of implementation decisions, ENTSO-E has created jointly with ACER the CACM Coordination Group to discuss and exchange

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views on the 9 methodologies and terms that shall be developed by "all TSOs" and submitted to the approval of "all NRAs", and eight methodologies and terms more shall be developed by "all TSOs of the concerned region" and submitted for approval by the NRAs in these regions.

Bidding Zones Review

The ENTSO-E work on the Bidding Zones Review started before the entry into force of the CACM and will continue in 2015 and 2016. The results of the Review are expected in Q3/2016.

Forward Capacity Allocation (FCA) Early Implementation

The Harmonised Allocation Rules early implementation project has been finished and will bring major benefits to the market participants having a single set of rules and the same procedures when contacting several allocation platforms and participating in long-term auctions. ENTSO-E will look into the next projects to start, based on possibilities and the different interests from the market side. Some of the projects overlap with the CACM implementation; those will be coordinated with the ongoing projects under CACM (e.g. capacity calculation methodology, common grid model etc.). One of the biggest projects arising from the FCA is going to be the establishment of the Single Allocation Platform (SAP), which will allocate long-term transmission rights (LTR) on the bidding-zone borders where these products are to be offered based on NRA decisions. Important steps have been taken already by deciding on the merger of two of the existing platforms, i.e. CASC and CAO. The experience from the merger will be fed into the establishment of the SAP and will ideally help the involved parties on the major decisions. This project will need to be coordinated with the evolvement of the Harmonised Allocation Rules, which finally might also govern products that are not offered at the moment.

Electricity Balancing Early Implementation

ENTSO-E has launched several early implementation projects to achieve the deliverables from the draft NC EB in a timely manner. These implementation projects have been agreed upon with ACER. The following table shows the projected schedule for presenting a first proposal to stakeholders in the Balancing Stakeholder Group. The feedback from stakeholders will be taken into account when finally preparing the deliverables from the NC EB.

Furthermore, ENTSO-E is working on electricity-balancing pilot projects, which shall create experience for the implementation of the NC EB. As early as 2013, ENTSO-E developed several electricity-balancing pilot projects with a wide geographical scope across Europe. The objectives of the pilot projects are to gain bottom-up experience for the implementation of the different steps towards a single European balancing market and to create awareness of the potential barriers, such as regulatory issues, IT development, additional costs and interaction with the intra-day markets. Pilot projects have expanded in geographical size and are expected to expand further in 2016 while also further developing the requirements from the NC EB.

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The European stakeholder group for the pilot projects has been transformed into the Balancing Stakeholder Group. This group is co-chaired by ACER and ENTSO-E and shall discuss proposals for the early implementation of the NC EB to receive constructive feedback from various European stakeholder associations. The Terms of Reference (ToR) of this group foresee deliverables for proposals for NC EB requirements also in 2016 (Figure 4 below represents the deliverables as agreed in these ToR. Workshops identify the date on which the deliverables shall be discussed with the Balancing Stakeholder Group. At this stage, the deliverables will not be final deliverables).

Summary of Market Codes Implementation Tasks

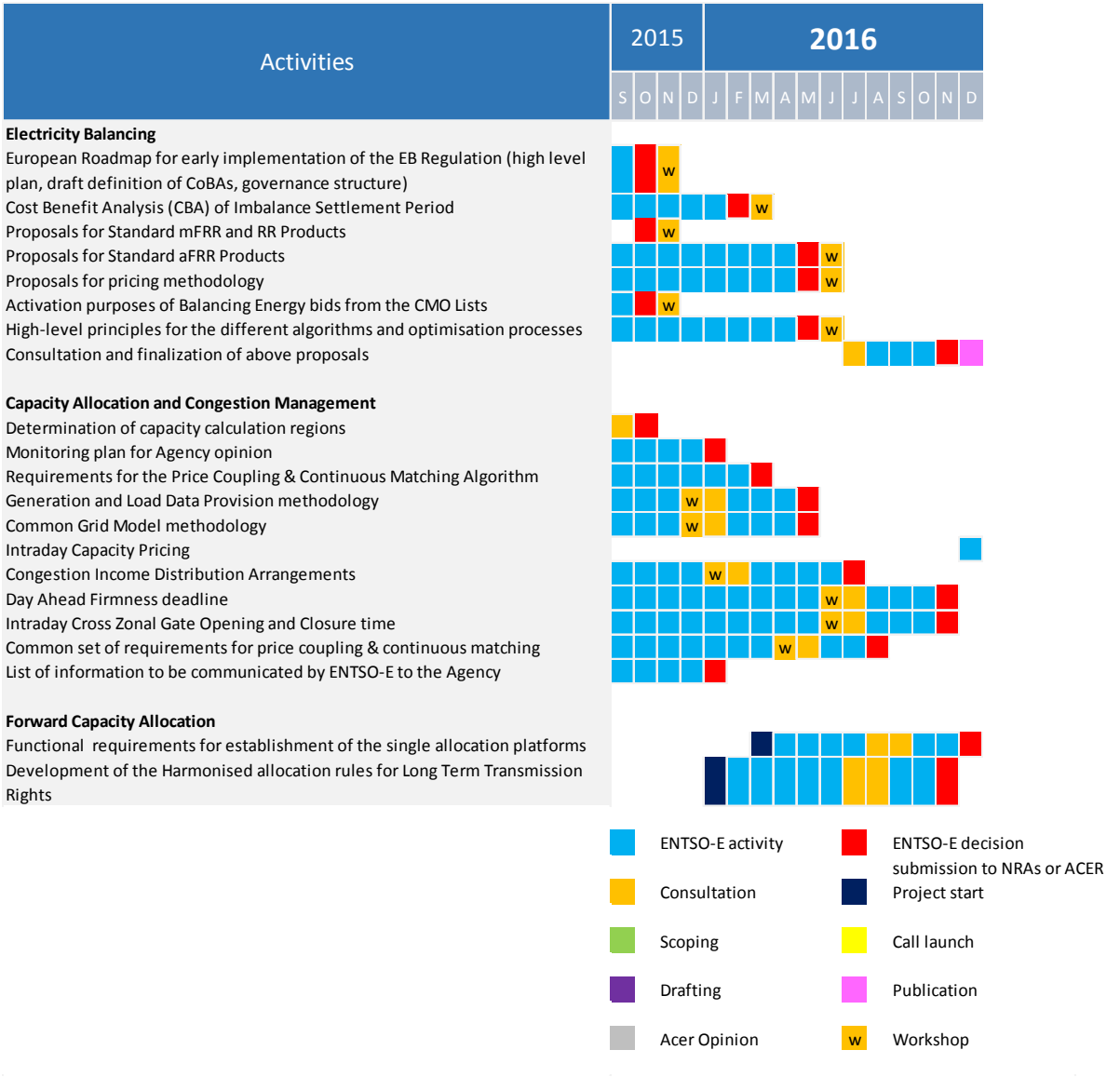

Figure 4: Market Codes Activities

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2.1.4.5. System Operations Codes

Objective

In the area of NC, the 2016 objectives with respect to system operation are twofold: on the one hand, completion of any outstanding comitology activities for all operational codes. On the other hand, implement the provisions of these codes (methodologies, tools, reporting requirements, etc.).

Key Deliverables (see Figure 5)

Operational Codes in the Form of European System Operation Guideline (Regulation)

The three codes for operation in normal conditions (Operational Security, Operational Planning & Scheduling and Load-Frequency Control & Reserves) will be merged into one legislative document. All three operational codes as above will be processed by the comitology process anticipated to run until Q1/2016, and released to enter into force after Parliament and Council scrutiny in summer 2016. According to the EC's planning, the operational NC on "Emergency and Restoration" will enter into the comitology process in 2016.

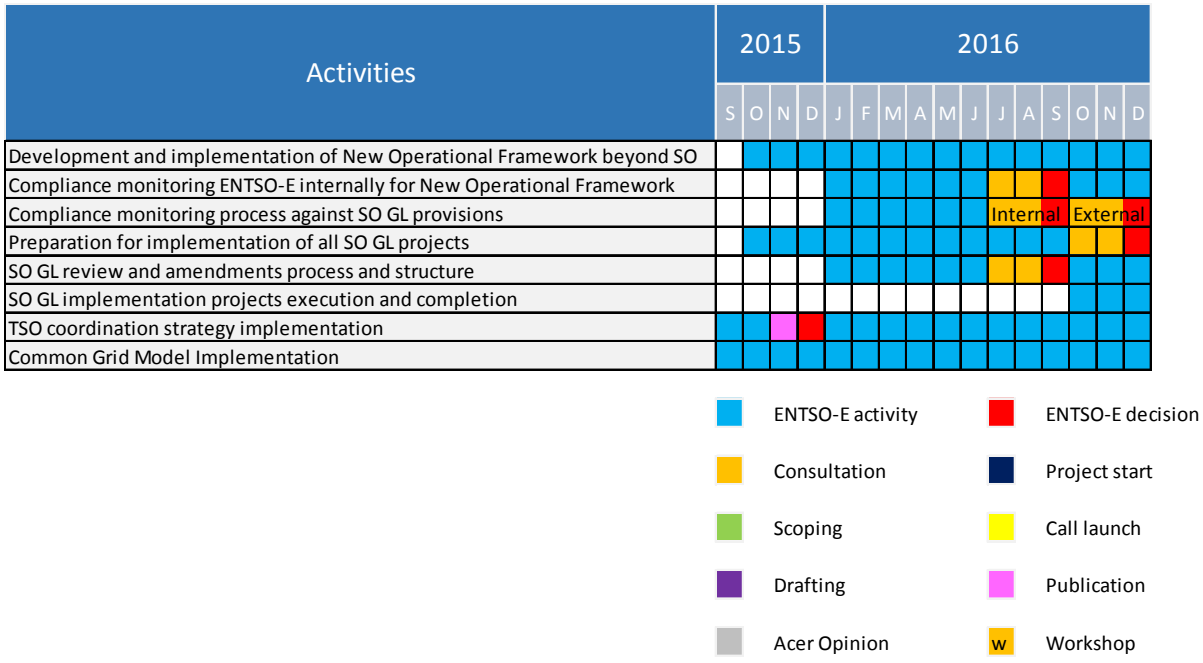

Figure 5: System Operation Codes activities

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New Operational Framework

The legally binding System Operation Guidelines (SO GL/Regulation) will be complemented by provisions that are foreseen in the text of SO GL and with additional provisions such as contractual agreements, inter-TSO standards, etc. needed for cross-border interconnected operation but not directly prescribed to become legally binding in SO GL. This work will continue in 2017.

Implementation of the pan-European CGM

A CGM is a prerequisite for any joint regional security evaluation and capacity calculation among several TSOs. ENTSO-E keeps the level of commitment high on this innovative subject in the more general framework of reliable TSO information exchange.

Figure 6 gives a systematic overview of the CGM data, information flow and usage.

The CGM is not only used for operational tasks but also for market and asset management/grid planning activities as follows:

- System operations: operational security calculation
- Market: capacity calculation
- Operational and system development planning: outage coordination

A programme Common Grid Model (CGM programme) has been started and five interdependent projects have been set up within ENTSO-E that report to the System Operations Committee. This programme focusses on the grid models and associated information to enable the execution of operational and capacity calculation processes as defined in the Network Codes and Guidelines for Operational Security, Operational Planning & Scheduling, Capacity Allocation & Congestion Management and Forward Capacity Allocation.

The Programme Team Common Grid Model (PT CGM) has been set up to develop methodologies and support the implementation to be performed by the ENTSO-E in the field of data exchange among TSOs and Regional Security Coordination Initiatives (RSCIs).

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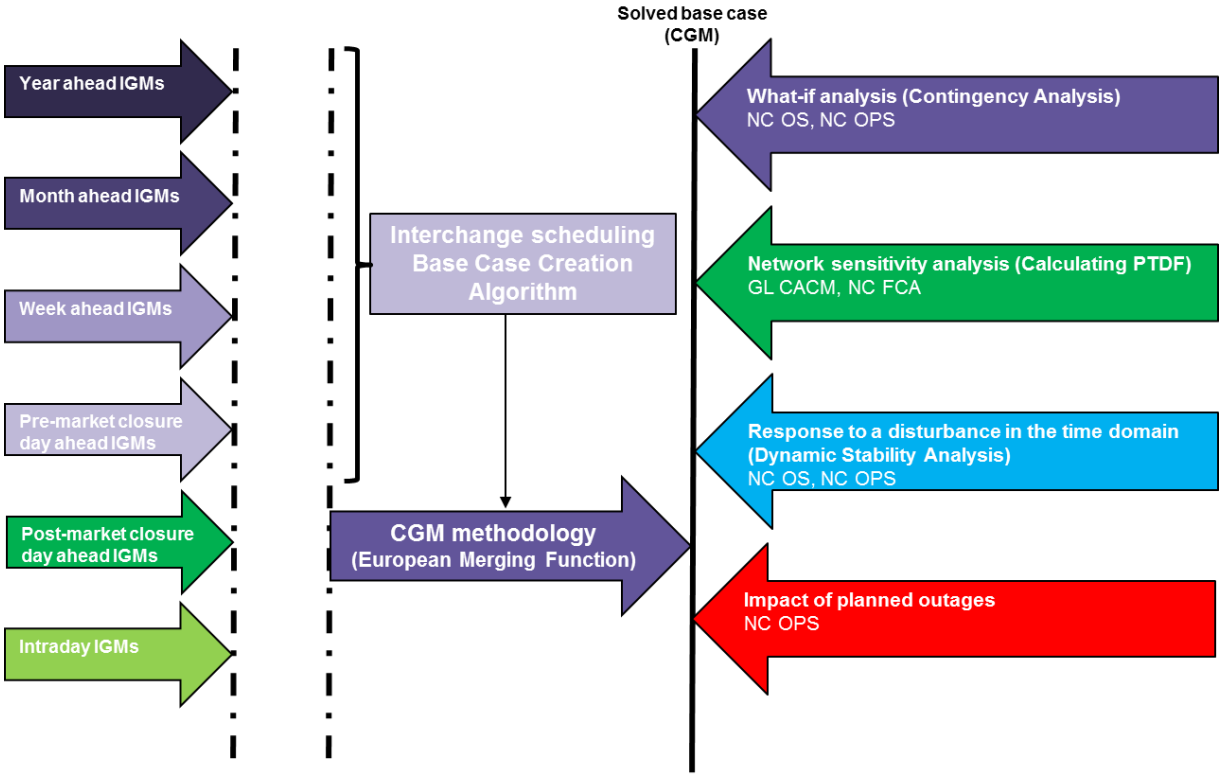

Figure 6: NC and information exchange

The PT CGM focuses its activities as well on the development of the exchange of steady-state grid models using the CGM Exchange Standard (CGMES), supporting coordinated outage planning, coordinated operational security assessment and coordinated capacity calculation processes.

Global purpose and global outputs of the CGM program will be:

- Specification of the different modelling/calculation forecast processes (time horizons) and associated purposes.
- Individual Grid Model (IGM)[4] specification of harmonised data exchange of physical network model data.
- IGM specification of harmonised exchange of data defining the operating conditions of the network.
- Specification and a description of the process to merge IGMs to form the CGM.
- Specification and description of the applied assumptions and methodology to obtain generator unit schedules when these schedules are not available. This is clearly required for all forecast processes that will be performed before market closure (from year ahead to two-day ahead).

[4] Each TSO will deliver its own IGM and this TSO is fully responsible for the content.

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2.1.4.6. Grid Connection Network Codes

Within the frame of the Connection Network Codes (C NC) ENTSO-E has developed, in line with the ACER framework guidelines, three NC on grid connection: Requirements for Generators (NC RfG), Demand Connection Code (NC DCC) and the High-Voltage Direct-Current and DC-connected Power Park Modules (NC HVDC).

NC RfG and DCC were recommended by ACER to the EC in 2013, NC HVDC in 2014, all with the realistic expectation of being approved by Member States by the end of 2015. Full application, as per the code requirements, begins three years after the entry into force of the European legislation. These three years can be grouped in two main parts: the first two years will be used by the MSs to assimilate the European NC in their national provisions, and the last year will be used by the impacted parties to comply with the NC requirements.

To support the implementation of the Connection NC at the national level, ENTSO-E will develop, during 2015 and early 2016, an "Active Library". This web-based platform will facilitate the Connection NC implementation on one hand by offering the TSOs the possibility to exchange best practices and learnings from the national level, and on the other hand offer interested stakeholders access to the final national Connection NC parameters and a view on the status of the implementation along with the explanatory information on the NC.

2.1.5. Legal and Regulatory Group

The Legal & Regulatory Group (LRG) together with the Secretariat Legal Section will provide legal support regarding the future regulations establishing NC in the following three working areas:

- supporting the pre-comitology and comitology process for NC (i.e. in 2016 operational, EB and ER NC). While doing so, the legal coherence and robustness of all of the NC will be ensured, including effective legal coordination, particularly with already adopted NC.
- supporting the implementation and monitoring of NC. In particular, legal support will be provided on general issues raised by the implementation of NC: for example for decisions to be adopted by "all TSOs" pursuant to the NC, development of the necessary voting processes to ensure the timely delivery of the proposals on terms and methodologies required by NC. Other examples concern legal support related to the implementation of the CACM NC (bidding-zone study, congestion-income distribution, market coupling, establishment of the capacity calculation regions, etc.), to the early implementation of the draft FCA NC (e.g. Harmonisation of Allocation Rules), the draft EB NC (CBA methodology, balancing pilot projects, etc.), the operational GLs and related initiatives (i.e. RSCIs).
- finally, supporting the drafting of NC or amendment to NC if needed; while doing so, the LRG together with the Secretariat Legal Section will provide support to ensure the legal coherence of the NC/amendments proposals with NC already in force or future NC, considering possible changes in (pre-)comitology or during (early) implementation.

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2.2. Ten-Year Network Development Plan (TYNDP)

As mandated by Regulation (EC) 714/2009, every two years ENTSO-E delivers a TYNDP that provides a long-term vision on the power system, including a generation adequacy outlook. This plan serves to inform institutions and stakeholders with maximum transparency about investment needs, value of projects and potential barriers. After the most recent TYNDP 2014, Regulation (EU) 347/2013 expands the role of the next TYNDPs, 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 permit-obtaining times by providing for mechanisms at a national level to streamline the process, and in some cases that of financing leverage.

For the TYNDP 2016, ENTSO-E decided to separate the publication of the six Regional Investment Plans from the TYNDP 2016 report itself. The objective is to provide further focus, transparency and clarity to stakeholders on joint TSO studies that are performed to identify the investment needs and lead to a TYNDP 2016 list of project candidates. The six Regional Investment Plans summarise the outcomes of these planning studies, and are consulted during summer 2015 together with the list of TYNDP 2016 project candidates[5]. After consolidation of a final list, the assessments of all projects based on cost–benefit analyses (CBA) take place, feeding into the TYNDP 2016 report, which will be published for consultation during summer 2016. This separated publication of regional plans and TYNDP2016, provides all stakeholders with a full view on all basic assumptions, scenario designs and data sets prior to the project-specific CBA studies.

The development of the TYNDP 2016 started late 2014 with the definition of the storyline of the TYNDP 2016 scenarios. This activity continued in 2015 with intense data collections and market studies to quantify these scenarios. Following a public consultation in May–June 2015, these are to be finalised in Q3/2015 and used as a baseline for the project assessments up to summer 2016.

ENTSO-E will apply the CBA methodology as approved by the EC in February 2015 for assessing all TYNDP 2016 projects. In doing so, ENTSO-E builds on the experience and lessons learned from the TYNDP 2014 assessment where a draft CBA methodology was applied to a large extent, and from the collaboration with the Network Development Stakeholders Group. ENTSO-E continues to work on improving the methodology for use in TYNDPs beyond 2016. In particular, collaboration is intensified with storage association/promoters to reach a pragmatic, detailed and fair CBA assessment approach of storage facilities as required by Regulation 347/2013, to model key components of transmission and storage assets business plans that are not yet captured. Via regular information exchanges (webinars, stakeholder group, communications with non-members, ENTSO-E/ACER/EC trilateral meetings) the findings of these complementary studies will be reviewed, which can be part of the TYNDP2016 report and/or taken up in the ongoing work to review the CBA methodology.

[5] The TYNDP is the base later on of the PCI selection. The TYNDP 2016 project list is therefore built in a transparent, advertised and consulted process. A call for TYNDP 2016 project candidates was organised by ENTSO-E during the month of April 2015, in line with the draft EC guidelines used for the submission of projects in the TYNDP. One sole process was set up for every project promoter to enable every project fulfilling the requirements set up by these guidelines to be in the TYNDP 2016. In addition to EC and ACER, this process was supervised by the Network Development Stakeholder Group (ND SG) to monitor equal treatment among all project promoters.

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Interactions with ENTSOG and its TYNDP on gas infrastructure is strengthened and clarified, in particular with respect to data sets and scenarios. In line with the regulatory requirements and the shared interest in consistent grid development, the two ENTSOs have created a common task force which works on electricity and gas linkages especially in planning, and the way to put in practice those interdependencies.

In every step of the TYNDP preparation, ENTSO-E continues close collaboration with the stakeholders, for instance by organising early in the process stakeholder workshops at the European and regional level, for collecting ideas and suggestions for future improvements of the ENTSO-E outcomes. The positive experience of the Network Development Stakeholder Group continues as set up at the beginning of the TYNDP 2014. The group is involved in all of the steps of the TYNDP development, from the scenario definition, oversight on the project detail updates, methodology improvements, to the focus of the TYNDP report. ENTSO-E aspires to apply new means for stakeholder involvement throughout the process, e.g. via means of more frequent webinars and newsletter updates.

ENTSO-E launched several activities to increase the transparency of the TYNDP. A significant effort is made on making available to stakeholders more data used in the studies. As a first step, ENTSO-E published in March 2015 a data set[6] that includes input data that can be used by stakeholders to model the TYNDP 2014 scenarios. As a second step, ENTSO-E has made available to stakeholders a grid data set based on TYNDP 2014 Vision 1 2030 in June 2015. Throughout 2016, ENTSO-E will continue to increase the transparency of the TYNDP studies and the data and assumptions considered, starting with the publication of TYNDP 2016 market datasets first half of November.

[6] The data set is available on the ENTSO-E website.

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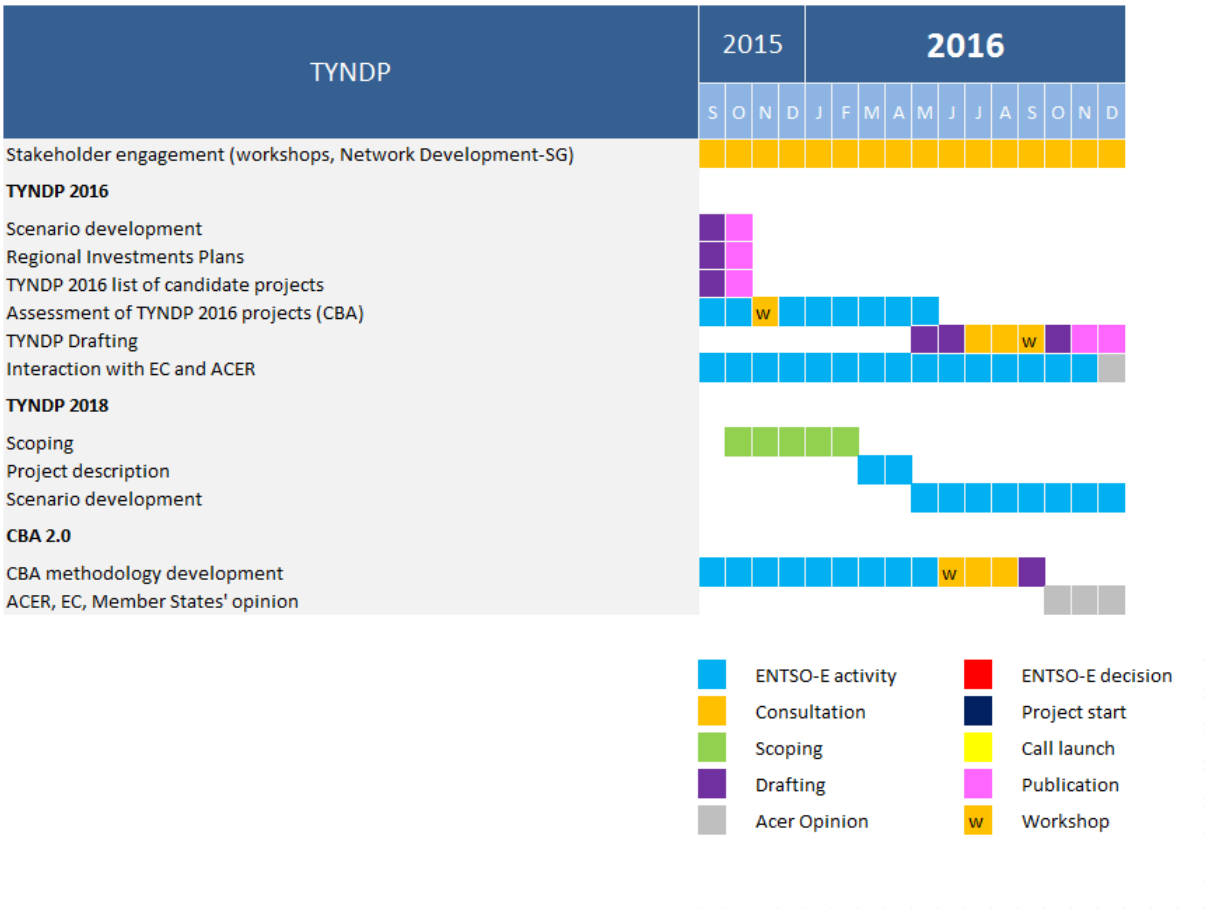

Figure 7: TYNDP main activities

The preparation of TYNDP 2018 will start in 2016 prior to finalisation of TYNDP 2016, including preparatory work such as definition of the scenario storylines, new planning perspectives (including more prominently 2050 perspectives from the e-Highway2050 project) and strengthened modelling.

2.3. Adequacy methodologies and legally mandated reports

Under Regulation (EC) 714/2009, ENTSO-E is mandated to issue reports assessing generation adequacy of the European power system on two markedly different time horizons: short-term "seasonal outlook" reports twice a year, covering the coming summer and winter periods, respectively, as well as a mid-assessment every two years, as part of the TYNDP package, known as Scenario Outlook and Adequacy Forecast (SOAF) reports.

The focus of the Adequacy Forecast assessment is to assess overall generation adequacy in the mid-term 5–10 years (maximum) by use of bottom-up scenarios, 'built on national generation adequacy outlooks prepared by each individual transmission system operator'. For this analysis, the increase in cross-border capacity is considered only from projects with a high level of confidence (by TSOs), to be commissioned before the considered time horizon.

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Within this time frame, relevant stakeholders (e.g. Member State authorities, policy makers, regulatory agencies, energy producers) are able to establish countermeasures to ensure the desired adequacy levels. Furthermore, because of the importance and increased relevance of the forecasts provided by the SOAF report, ENTSO-E has opted to maintain the tradition to publish it every year.

Regarding the seasonal generation outlooks, the proposed NC on Operational Planning and Scheduling (Art. 47(2)) further specified that the reports shall be issued before 1 June and 1 December 2016.

As to the content, structure and assessment behind the reports, the integration of large amounts of renewable energy sources, the internal electricity market, new storage technologies, demand-side response and evolving policies all require revised system adequacy assessment methodologies. ENTSO-E is committed to developing its existing European adequacy methodology with a special emphasis on harmonised inputs, system flexibility and interconnection assessments. Because of increasing levels of interconnection in Europe, pan-European and regional adequacy assessments are required to complement the national adequacy assessments.

The implementation phase of the new target adequacy methodology is progressing in 2015 and has the following targets for 2016:

- Pan-EU target methodology implemented, proof-of-concept tested and proven to provide reliable indicators for adequacy assessment, based on stochastic sequential market modelling tool(s). Efficient sequential hourly resolution algorithm/tool(s) available.
- Harmonised Database (MMDB) for Market modelling studies both for adequacy (SOAF) and project assessment (TYNDP).
- Stable group of TSO market modellers for adequacy: specifically knowledge, tools and resources are available on a stable working structure, probably requiring an increase of resources committed from TSOs. Available tools(s) for market modelling are proven and benchmarked as fit-for-purpose.
- Interaction with stakeholders on definitions, assumptions, modelling issues and discussion of results.

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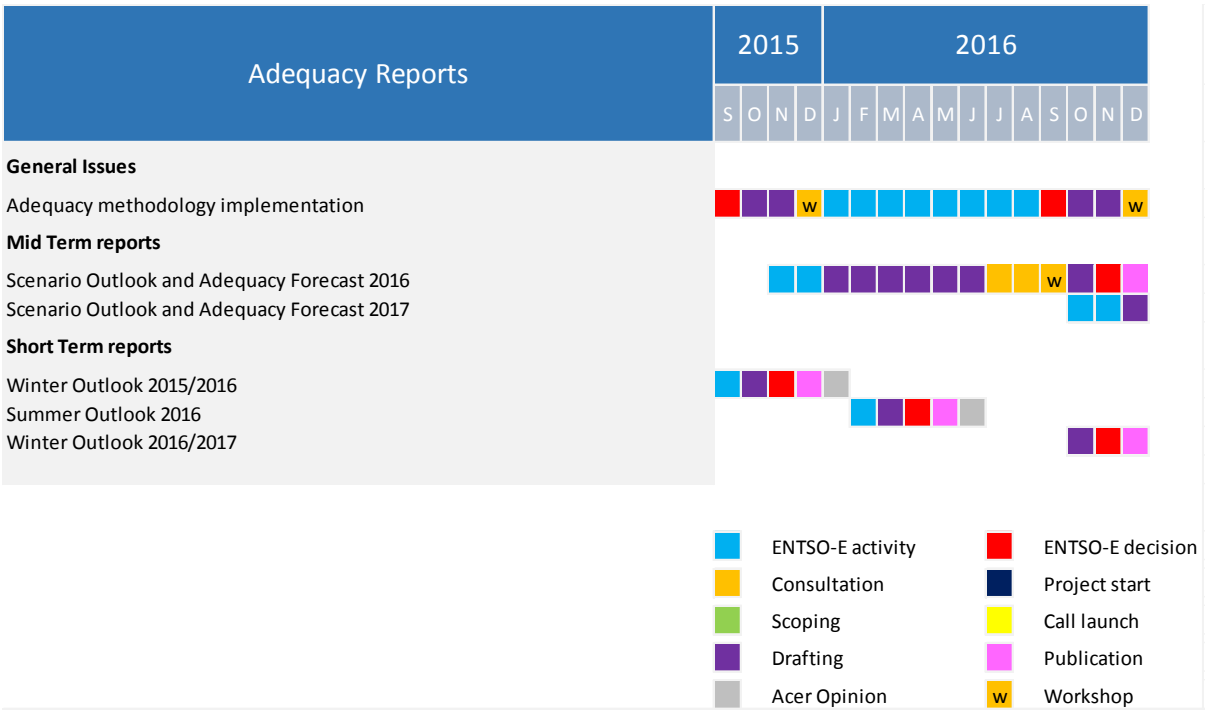

Figure 8: Adequacy main activities

2.4. Regional Security Coordination Initiatives

Regional Security Coordination Initiatives (RSCIs) have been pioneered and developed proactively by TSOs. They offer efficient regional coordination services and provide TSOs with an overview of electricity flows at European regional level to complement their own system data. In November 2014, ENTSO-E released a Policy Paper titled "Future TSO Coordination for Europe". The paper outlined the future TSO coordination strategy, which is based on a wider application and further development of the RSCI model and will ensure full European coverage. According to the agreed strategy, coordination functions will be organised by existing or new RSCIs. These functions are: (1) Coordinated Security Analysis, (2) Short- and Medium-Term Adequacy Forecasts, (3) Coordinated Capacity Calculation, (4) Outage Planning Coordination and (5) Improved IGM/CGM Delivery. The approach is based on an all-TSOs Multilateral Agreement (MLA), making participation in RSCIs mandatory for interconnected TSOs with operational responsibility. The MLA will be signed by the end of the year. According to this strategy, TSOs will be procuring services from existing or new RSCIs for the five coordination functions. It will also define TSOs' as well as the RSCIs' obligations and ENTSO-E's role considering the service specifications and the interoperability requirements.

ENTSO-E established a project for implementation of the strategy. The detailed implementation plan of the strategy has already been developed. The plan is based on the TSO intentions, on the current status of services provided by RSCIs and timescales for establishing new RSCIs. The existing RSCIs (Coreso, TSCNET and SCC) already provide most of the coordination services. In 2015 and 2016, these RSCIs will be able to provide all services already defined in the November 2014 policy paper. The overall completion date of the project is Q4/2017–when all interconnected TSOs will procure all

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services from some RSCI. Dates will depend on the time taken for TSOs to establish new RSCIs if they choose not to procure services from existing RSCIs. TSOs are to decide by November 2015 from which RSCIs (existing and new) they will initially procure the different services. RSCI services may also develop in the future depending on specific regional needs. Therefore, flexibility of the concept is crucial and TSOs will have the freedom to decide on their service providers in accordance with contractual arrangements.

At the moment ¾ of the European consumers are covered by RSCIs (Coreso, TSCNET and SCC) for most of the above functions. In the coming two years, RSCIs will be gradually rolling out all the above-mentioned services according to interoperability and ENTSO-E standard criteria according to the plan. TSOs will work towards preparing the framework to ensure cross-RSCI coordination with sufficient safeguards to prevent discrepancies; ENTSO-E SOC is responsible to promote the project and to organize the work.

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3. CONTINUOUS COMMITTEES' ACTIVITIES

3.1. Innovation and Standardisation (Research Development & Innovation Activities)

Objective

The Research, Development and Innovation Committee (RDIC)[7] is in charge of TSO cooperation regarding research, development and innovation activities. Its main mission is to facilitate the fulfilment of the Third Energy Package mandate, requesting Member States, regulators, transmission operators and distribution operators to launch innovation programs with appropriate incentivising schemes, much beyond 2020, in all subjects in relation to the TSO business, i.e. system operations, facilitation of electricity markets and transmission grid development.

As part of developing a new research, development and innovation strategy, RDIC works on developing a new dimension: self-initiated inter-TSO cooperation, in terms of multilateral projects, knowledge sharing, spreading best practices and dissemination of national projects results outside the framework provided by EC. The overarching aim is to create more value for society by building projects in a framework that covers topics not addressed by EC calls, and by optimising the use of the available resources because of greater coordination between national, regional and European levels.

Key deliverables

Although ENTSO-E's role is to facilitate and coordinate activities mainly in areas with an EU or European dimension, research and innovation is and remains a business of consortia made up of universities and companies–TSOs as well as equipment manufacturers and others. However, ENTSO-E may also actively participate in consortia answering EU calls for proposals.

In this framework, in 2015–2016, ENTSO-E elaborates tools and provides the organisation to coordinate ENTSO-E members and the Association's involvement in the European energy research and innovation activities. ENTSO-E participates in the structures of the EU Strategic Energy Technology Plan (SET Plan).

As part of the "Grid + Storage" project, ENTSO-E is increasing the interactions and formal collaborations with Distribution System Operators (DSOs)–EDSO for Smart Grids, and with the storage community (EASE) in the spirit of the integrated approach advocated by the EC DG Energy. An integrated research and innovation roadmap will be published in 2016 to reflect on the new SET Plan and Energy Union objectives. The dissemination of the work of ENTSO-E and TSOs on research and innovation activities will continue to be ensured. Conferences such as InnoGrid2020+, organised by ENTSO-E, demonstrate how ENTSO-E's and TSOs' activities support the vision for the future development of the European power system.

ENTSO-E will also continue dissemination and collaboration activities aimed at benchmarking the R&D state-of-the-art outside Europe, e.g. by organising an ENTSO-E booth in the Cigré General

[7] In 2015 ENTSO-E renamed the R&D Committee to Research, Development and Innovation Committee to stress the innovation aspect of the work.

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Session in Paris 2016. In 2015, ENTSO-E proposed a special edition of the IEEE Power & Energy Magazine on European research in power systems.

In the period 2015–2016, ENTSO-E is expecting to participate in the preparation of project proposals to answer announced Horizon2020[8] calls. The expected role of ENTSO-E is to ensure that there is sufficient "system vision", i.e. the right interaction between different projects, and that deliverables are consistent, which allows for a higher degree of scalability and replicability of R&D results.

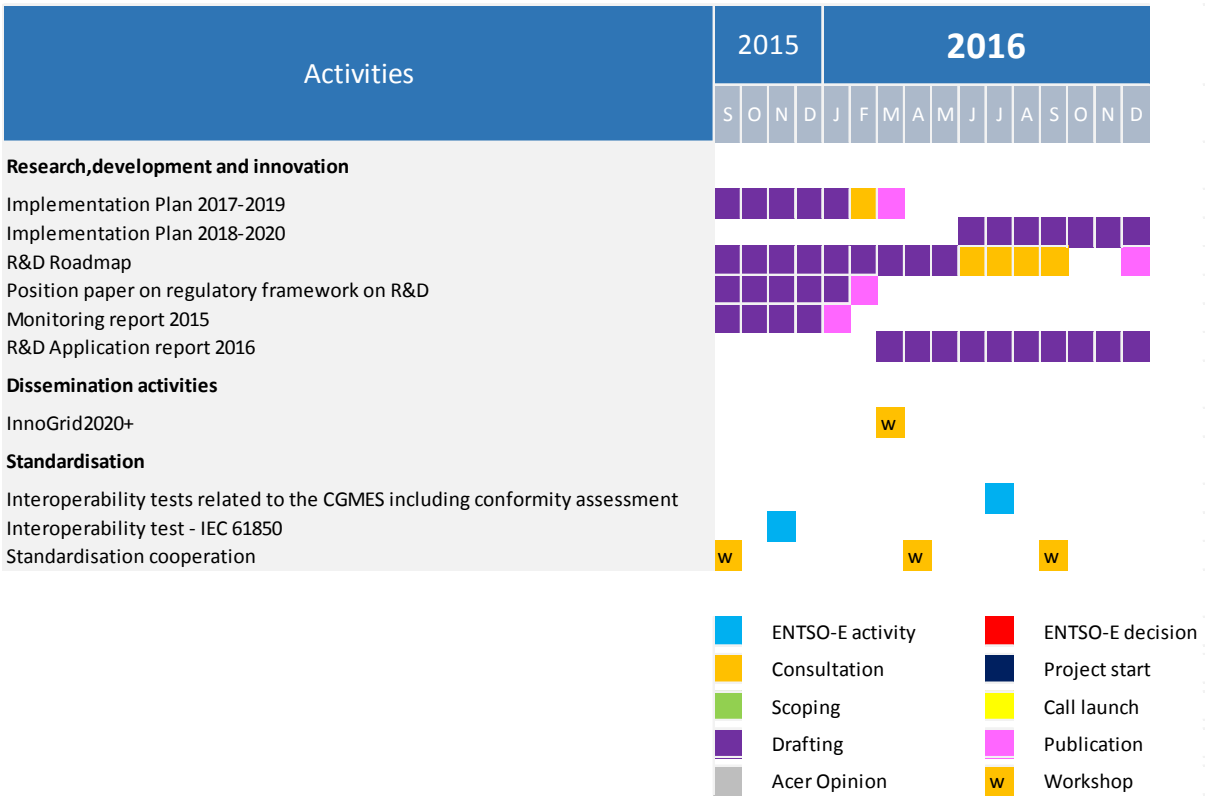

Figure 9: Research, Development and Innovation activities

The following key activities are planned for the period 2015–2016 (see Figure 9).

Position Paper on Regulatory Framework and Research, Development and Innovation

Compared with the expectations, TSO position in research and innovation activities is considered weak. In order to strengthen the position, a review of funding arrangements will be performed to incentivise further R&I in areas which will benefit customers; for example improved operational efficiency. In most countries, R&D expenses are subject to revenue-cap remuneration schemes. The gap between resources and expectations needs to be addressed at the regulatory level. There are already examples in network regulation with incentives for innovation. This calls for more funding

[8] The EU Research and Innovation programme.

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opportunities and harmonisation of regulatory frameworks, allowing tariffs explicitly to cover research and innovation investment costs in the long run.

Therefore, a position paper will further explain the problem and propose actions to be taken in close cooperation with all relevant stakeholders in 2015 and 2016.

R&D Roadmap 2017–2026

In 2012, ENTSO-E published the R&D Roadmap 2013–2022. It was closely tied to the EU's Strategic Energy Technology (SET) Plan and, in particular, to the European Electricity Grid Initiative (EEGI), one of the SET Plan's industrial initiatives combining EU and Member State R&D activities to achieve synergies. ENTSO-E is launching the revision of the ENTSO-E R&D Roadmap that will follow the schedule of the new EEGI R&I Roadmap planned for release at the end of 2016 as a deliverable of the "Grid + Storage" project (Roadmap in Q2 2016 and Implementation Plan by Q4 2016) and to reflect on the new SET Plan needs and on the Energy Union. This roadmap will take into account all recent developments in the energy sector from a holistic point of view. The timeframe and the scope of the roadmap will be clarified.

R&D Implementation Plan

The objective of the Implementation Plans is to outline planned activities for the next three years and consider not only new directions set by the EU but also the outcome of the Application Report 2014.

In 2015 and 2016, ENTSO-E will continue the work on the following Implementation Plans, which cover the periods 2017–2019 and 2018–2020. The Implementation Plan 2017–2019 will consider the outcome of early discussions on the R&D Roadmap 2017–2026. It is planned that the Implementation Plan 2017–2019 shall be released in Q4/2016 and the Implementation Plan 2018–2020 in 2017. The timing for the releases are indicative due to ongoing discussions with the EC and SET Plan structures.

Monitoring of Research and Innovation Activities

The main objective of the R&D Application Report 2014 published at the beginning of 2015 is to analyse the concrete impact of TSOs' R&D projects. It allows stakeholders, notably regulators, to take stock of how TSOs' R&D projects have led to the development of concrete solutions for a better functioning of the grid and for the support of Europe's energy transition.

By the end of 2015, ENTSO-E is preparing the R&D Monitoring report 2015, which will inform stakeholders about the recent R&D work and share new knowledge. This is also in line with the recommendations in the last ACER opinion.

In 2016, ENTSO-E will elaborate the next version of the R&D Application report, which might be combined or replaced by results from monitoring activities depending on the schedule of the research and innovation activities to be performed in 2015 and 2016. During 2015-2016 ENTSO-E will continue to discuss with relevant stakeholders on the monitoring mechanism on the implementation of R&I projects' results as recommended in the ACER opinion issues in 2015. The outcome of the discussions might result in adaptation of the ENTSO-E deliverables as indicated in the work program.

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Standardisation

Standardisation activities are one of the important areas in which coordinated processes are crucial. ENTSO-E considers standardisation key for guiding efficient and cost-effective deployment of new technologies and techniques.

The benefits for society are having adequate standards in support of secure and stable system operation, of processes for the smart grid environment and for interoperable tools, equipment, etc.

The Memorandum of Understanding (MOU) between ENTSO-E and CEN/CENELEC facilitates cooperation and allows early consideration of topics of standardisation interest. Furthermore, ENTSO-E is extending its liaisons with the International Electrotechnical Commission (IEC) and is actively involved in the IEC Common Information Model and IEC 61850 interoperability aspects.

In 2015 ENTSO-E is continuing the development of a tool to support harmonisation of TSOs' requirements related to IEC 61850 and its interoperability. In 2015–2016 ENTSO-E will focus on:

- improving the interactions with standardisation bodies
- taking actions to improve interoperability of software applications using the ENTSO-E Common Grid Model Exchange Standard (CGMES) by applying a conformity assessment framework.
- Improving interoperability of IEC 61850 in its different domains:
    - At information and communication levels by developing a tool cornerstone of the ENTSO-E profile and containing the superset of ENTSO-E members' requirements.
    - At engineering level by drawing up a generic ENTSO-E engineering process.
    - At system testing and maintenance level by drawing up the generic requirements of ENTSO-E members.

In the general worldwide context of utility communications standardisation, ENTSO-E will contribute to the use cases for the next UCA International Users Group for Interoperability Test 2015 (UCAIug IOP) that will be organised in Brussels; ENTSO-E will host as well the next WG10 meeting in October 2015 in Brussels.

3.2. Other Committee and LRG Activities

The TSO experts in the ENTSO-E Committees on System Development, System Operations, Market and the Legal and Regulatory Group, jointly perform a large number of additional legal mandates, routine tasks and new projects. All of those activities, reported in detail in the section below, are in a way linked to each other as they are serving to create a strong, sustainable, efficient and resilient power system and a truly pan-European competitive market. The tasks require close and complex collaboration between many entities and it is an important function of ENTSO-E to ensure that all of these cooperative TSO tasks complement each other and are performed efficiently and effectively.

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3.2.1. System Development Activities

For system development, data exchange and data transparency issues are key. In 2015 ENTSO-E has launched an improved transparency and clarification of the TYNDP process, involving the compilation of previously less easily available inputs and results of market studies. The result consists of synthetic spreadsheets and manageable grid data sets for planning studies.

The strategic programme for information integration and studies (SPRINTS) launched by ENTSO-E, governs various projects focused on development of tools or methodologies necessary for the system development activities. In 2015–2016, ENTSO-E's SPRINTS work will focus on the following:

- Improvement of the ENTSO-E CGMES Conformity Assessment Framework, which aims to ensure interoperability between various systems using this standard to exchange network models.
- Developing innovative security strategies and protection schemes.
- Improving network modelling to allow better planning of innovative devices for grid control over large distances.
- Improving market modelling processes using the ENTSO-E Market Modelling Database aiming at data integration of system adequacy and market modelling types of data.
- Further improvements of a set of methodologies that will aim at increasing data consistency and reusability of data in different studies, hence increasing efficiency in performing system development studies.

3.2.2. System Operations Activities

For system operations, exchange between TSO control centres of real-time information is key (ENTSO-E Awareness System, Electronic Highway) and so preventing disturbances and incidents (compliance monitoring, critical system protection) as well as analysis of any incidents that do occur. Improved operational clarity on the interfaces between the different synchronous areas and with synchronously connected non-ENTSO-E Member TSOs also requires attention.

Optimal use of assets

In co-ordination with the other ENTSO-E Committees, the System Operations Committee will work to develop strategies for: (a) weather and conductor related operation – e.g. dynamic line rating; (b) probabilistic approaches for system operation; (c) dynamic studies in operations; (d) smart operation, e.g. phase-shifting transformer coordination principles.

Incident Classification Scale

The Common Incident Classification Scale (ICS) was developed by ENTSO-E according to Regulation (EC) 714/2009. The Incident Classification Scale has to be used by each TSO in ENTSO-E. The new EDICT (ENTSO-E Disturbance and Incident Classification Tool) system will be in operation by the end of 2015. Each TSO will have to report grid and system incidents on a four degree scale (0 to 3) corresponding to incidents of increasing seriousness up to incidents perceived at the level of the system operation performance.

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ENTSO-E produces an ICS annual report each year according to the Incident Classification Scale giving an overview of the system operation performance. The ICS annual report that will be published in Q3/2016, covers the incidents which took place in 2015. The incidents of 2015 are being classified by TSOs by the current latest ICS methodology which was approved on 8 May 2014.

A further ICS methodology update was initially planned for mid-2015 considering the estimated adoption date of the operational network codes. As the pre-comitology phase for the codes lasted longer than expected, the review of the methodology was postponed accordingly and is foreseen to start after the adoption of System Operation Guideline.

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ENTSO-E Awareness System

The ENTSO-E Awareness System is now in full operational use in the control centres in the interconnected TSOs Europe-wide. Further work is taking place in Q1/Q2 2016 to investigate the development of additional information such as generation mix and voltage displays. TSO–TSO messages are being further enhanced following initial operational experience. This will take place Q2/Q3 2016. These developments will further enhance the information available to TSOs regarding systems beyond their own area of control and thus react promptly to offer assistance or enact system measures if an area appears to be under stress. This example of TSO-coordinated response will help to increase the security of supply across Europe.

Critical System Protection

Work will continue in 2016 assessing and enhancing the TSO cyber and physical security, by improvements in sharing best practices among TSOs.

Electronic Highway

The Electronic Highway (EH) of ENTSO-E is a communication network that provides the necessary infrastructure to support all operational data exchanges among TSOs, including the EAS and RSCIs. The draft plan for year 2016 related to the EH is the following:

- Identify and mitigate vulnerabilities over EH, perform second security audit as requested
- Investigate and support RSCIs' connections to the EH
- Support TSOs to upgrade the backbone to 10 Mbps
- Monitor and support smooth functioning of EH

Integration of the Kosovo[9] Power System in the Continental European Synchronous Area

In 2016, the connection agreement between all TSOs from Continental Europe and the Kosovo Electricity Transmission and Market operator (KOSTT) has been signed on 1 October 2015. KOSTT will be working with the assistance of ENTSO-E (Project Group Kosovo) to achieve full compliance with the Continental Europe Operation Handbook according to the list of measures defined in the connection agreement.

Regionally Coordinated System Operation

Implementation of new operational procedures

ENTSO-E will continue working on the development of operational procedures to meet the regional needs and ensure cross-regional coordination, e.g.:

[9] 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.

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- To develop and follow the process that will lead to the full TSO observability of all relevant generators by Q3 2016.
- Revision and harmonisation of the Nordic frequency containment process (FCP) will take place by Q4 2016. The overall goals are to increase the level of frequency quality compared with present levels and create well-defined and geographically harmonised requirements.
- Development of basic concepts for the coordination of phase shifters transformers to optimize the use of assets will continue, deliverables are expected for Q4 2016.

The aim of the operational procedures is to address the current challenges from intermittent energy sources and increasing decentralised generation, strong interdependencies between the different transmission systems and shorter market-time intervals.

Interoperability of synchronous areas

Work will continue to promote cooperation between the involved TSOs with the aim of ensuring the reliable operation, optimal management and technical development of the HVDC links between synchronous systems (Great Britain, Ireland, Nordic, Baltic and Continental Europe). ENTSO-E will develop concepts for the operation of Inter- and Intra-Synchronous areas HVDC links (Start on Q1 2016, to be continued on 2017).

Frequency quality

In 2016 ENTSO-E will adapt the quarterly load frequency control reports with the parameters requested by the Network Code Load-Frequency Control & Reserves.

Work will continue with the development of measures to improve frequency quality, e.g. to study the socio-economic impact of different tools to monitor system inertia, revision and harmonisation of frequency processes across the different synchronous areas, as well as monitoring and analysis of inter-area frequency oscillations.

Integration of renewable energy sources

ENTSO-E will continue identifying challenges and developing solutions to integrate renewable energy sources enhancing the security of the electricity system. Some of the activities will be:

- Monitoring the evolution of dispersed generation with particular reference to Continental Europe (CE).
- Analysing the impact of power electronics in transmission networks, especially on protection schemes.
- Addressing frequency quality issues considering the changes in the generation mix. To this end the work will focus on the definition of the minimum required inertia at synchronous area level according to the Guideline on Transmission System Operation.

Compliance Monitoring of the Regional Group Continental Europe Operation Handbook:

The compliance monitoring process is the process of assessing whether the ENTSO-E RGCE member TSOs are compliant with the standards of RGCE Operations Handbook. RGCE coordinates the development of the standards as well as promotes and supports its application.

Main objectives in 2016:

- TSOs compliance monitoring process, self-assessment

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- Perform onsite audits of seven selected TSOs for 2016
- Publish the results in the Compliance Oversight Report
- Design the compliance monitoring program for 2017
- Follow up of the non-compliances and action plans
- Investigate possible cooperation with the future task of monitoring NC

3.2.3. Market Activities

The main objective of the market activities will be to ensure the follow-up of the NC and to focus on the implementation of the codes to establish proposals for pan-EU elements and to coordinate developments on regional processes. Positions will also be developed on market-design-related topics and on any possible future ACER framework guidelines.

Below are the main features of the work expected in addition to the implementation of the market NC (as outlined under 2.1.4.4), although changes to priorities or how these areas of work develop are likely, given the current active energy policy debates. In addition to ENTSO-E's Transparency Platform, which provides market participants Europe-wide a myriad of physical system data, often with only one-hour delay after real time, the market activities focus on fair international distribution of transmission costs and on appropriate investment incentives. The fields of electronic data interchange and the TSO–DSO interface are also important, especially in the context of increasing integration of wholesale and retail markets, smart grids and empowering the customers.

European Day-Ahead and Intra-day Market

In 2016, ENTSO-E and the TSOs will develop further the European day-ahead (DA) and intra-day (ID) market coupling in the "All TSOs" frame. The CACM GL paves the way to integrate the different regional markets across Europe for DA and ID timeframes, following the target model. This will build on the following recent progress on DA coupling:
In May 2014 Southwest Europe (SWE) joined Northwest Europe (NWE) DA coupling and renamed the project to Multi-Regional Coupling (MRC), giving an important step forward towards the IEM.
In November 2014, the 4M Market Coupling Project implemented DA ATC-based price coupling covering Czech–Slovak–Hungarian plus Romanian market areas based also on the PCR solution, which will facilitate the future integration of the MRC project with the 4M project.
In February 2015, Italian borders (Italian–Austrian, Italian–French and Italian–Slovenian) have been coupled with the MRC.
In May 2015, the Central-Western European Region implemented flow-based capacity calculation for the first time in Europe.

The CACM GL implementation on ID coupling will also build on important recent progress of the regional Cross-Border Intra-Day (XBID) Project, which signed the platform development contract with the software provider in Q2/2015, with a view to 2017 implementation.

ENTSO-E has encouraged regional coordination, working in close cooperation with all of the TSOs, achieving pan-European solutions assuring consistency between implementation projects and the corresponding NC. The European development in both ID and DA projects will continue with full speed in 2016.

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Transparency Platform

Following the provisions of the Transparency Regulation (EC) 543/2013, the ENTSO-E Transparency Platform was put into operation on 5 January 2015. A significant step in the development of the Platform is the compliance with REMIT in autumn 2015, especially after the adoption of the Implementing Acts. For 2016, there is a clear indication to expand the Transparency Platform from a "compliance tool" to a "market-oriented service". The enhancements in the download facility (with expected delivery in Q2 2016) and the revision of the technical documentation (starting in Q1 2016), represent two crucial developments in that direction. Moreover, an improved governance structure shall be introduced and new ways of working shall be adopted after the official closure of the project. The proposed structure aims at a faster decision-making process taking into consideration all associated interdependencies and ensuring the stable operation of the Platform. In addition, the advisory role of the ENTSO-E Transparency Users Group is also acknowledged.

Market Design

ENTSO-E is progressing on the further analysis of the recommendations from the Market Design Policy Paper, published September 2014. A paper on Cross-Border Capacity Remuneration Mechanism Participation has been published, papers on Demand-Side Response and Balancing Incentives are in progress and cooperation on common positions between TSOs and DSOs is ongoing. This work will lead to more concrete activities for ENTSO-E in 2016.

ENTSO-E will continue to investigate how the market can promote tools and technologies facilitating large-scale integration of RES. Among others, the topics flexibility, early implementation of the NC on Electricity Balancing and establishment of the RSCIs will need further analysis and development of positions in 2016.

Furthermore, the EC's consultative market design communication with closing date 15 October 2015 is likely to reveal further topics requiring more detailed analysis. ENTSO-E will follow this communication and other policy proposals from the EC closely and give input to it.

The Challenges of Financing Infrastructure–Investment Incentives

It is vital that the regulatory and financial barriers to making infrastructure investments are tackled. In December 2014, ENTSO-E published a policy paper and a policy brief on "Fostering electricity transmission investments to achieve Europe's energy goals, towards a future-looking regulation" explaining first the current issues TSOs are facing in their attempts to meet the "investment challenge" and providing advice to enhance and stabilise regulatory frameworks.

ENTSO-E will continue to work with the Commission and ACER to encourage National Regulatory Authorities and Member States to improve the regulatory certainty for investors in transmission projects to encourage vital investment. ENTSO-E is taking part in the Steering Committee of the EC study on comparative review of investment conditions for electricity and gas transmission system operators with detailed assessment of 14 selected countries in the European Union to give guidance to the contractors (BearingPoint and Microeconomix) on the execution of the tasks.

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Inter-TSO compensation

ENTSO-E will continue to manage the Inter-TSO Compensation (ITC) process under the framework of the ITC Multi-annual Contract and ITC Regulation No. 838/2010. The tasks involved will be the coordination of the ITC settlement process, annual ITC audit process and preparation and delivery of the ITC data for annual monitoring report developed by ACER.

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Delivery of the Annual Tariffs Report

The ENTSO-E Overview of Transmission Tariffs in Europe provides a comparative overview of transmission tariffs for more than 30 European countries, including the components of the transmission tariffs and other regulatory charges recovered by TSOs. The 2015 overview was published in July 2015. The 2016 version will follow the same timeline and structure.

Congestion Revenue Management Report

ENTSO-E delivers its annual Congestion Revenue Management report to EC and ACER on a voluntary basis.

ACER Work on Tariffs Structure Harmonisation

In EC Decision 2014/713 on the establishment of the annual priority lists for the development of NC and guidelines for 2015, the scoping activity by the Agency to assess the possible need for a framework guideline has been identified by EC as a priority matter. ACER has hired a consultant (CEPA) to assess whether increased harmonisation of electricity transmission tariff structures across all of the Member States of the European Union ("Member States") would be beneficial, and if so, recommend the most appropriate policy option(s) to the Agency.

ENTSO-E participates actively in the study through answers to the consultant's questionnaire and workshops organised by ACER and the consultant. The conclusions of the study are expected to be published in autumn 2015 and the ACER scoping paper is expected at the end of the year.

Electronic Data Interchange

ENTSO-E's EDI activities will continue to focus on harmonisation and implementation of standardised electronic data interchange. ENTSO-E will continue to develop and maintain the detailed descriptions of common business processes and 'role models', in formats that are easily understood and implemented by the software industry, partially in collaboration with other electricity and gas associations and by liaison with European and international standardisation bodies.

In addition, the drafting of NC will be monitored closely to ensure alignment with current and future common business processes' descriptions.

1. Standardisation work on the IEC 62325 series (CIM for Market) will be carried out. This includes drafting the documents necessary to inform the stakeholders of the way relevant ENTSO-E recommendations can be incorporated into IEC 62325 standards, involvement in drafting of the numerous corresponding standards and also conducting any necessary interoperability (IOP) tests to ensure conformity.
2. A dedicated TF was created in 2015 to follow up IEC work on Business Use Case and to issue alerts to MC when issues conflicting with the NC are identified.
3. Development of the necessary electronic documents in support of the NC under development/approval, awaiting the inputs of responsible bodies for NC.

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4. A task force will finalise a Weather Data Exchange Process document. The task will involve the drafting of a document on a proposed standardised weather data exchange process between a weather data provider and system operator (TSO and/or DSO) to provide weather data for operation planning and the control centres.
5. Development of data exchanges to support the publication of information related to flow-based market coupling and CGMES-related net positions.

REMIT[10]

ENTSO-E has updated its Transparency Platform to fulfil its obligation arising from the REMIT Implementing Regulation. The obligation includes the submission of data from the transparency platform to ACER's market monitoring system on a daily basis. In addition to this, TSOs' obligation will start on 7 April 2016 from which they (or third party/parties on their behalf) will need to send transportation transaction data to ACER. This means a TSO project in each EU country that requires an appropriate level of coordination to ensure information flow and experience sharing between the involved TSOs.

TSO–DSO cooperation

Following the recommendation of the EC to enhance cooperation between DSOs and TSOs, an MOU has been signed between ENTSO-E and the four European associations representing DSOs (CEDEC, EDSO4SG, GEODE and Eurelectric). Furthermore three workshops were implemented in 2015 ENTSO-E and the four European associations representing DSOs. Based on these workshops, two joint policy papers on general guidelines and data management were planned. The first was published in 2015, the joint paper on data management is scheduled for around the end of Q1/2016. In 2016, work on the main identified challenges (uncoordinated access to resources, regulatory uncertainty and lack of grid visibility and grid data), shall be intensified, in addition to the data management work which will likely continue beyond the publication of the first joint paper on this topic. Furthermore, joint workshops on network planning and active and reactive power management will be organised.

3.2.4. Legal & Regulatory Group activities

Background

The LRG together with the Secretariat Legal Section works on a variety of legal issues that can be divided into two broad categories:

- NC-related legal work: legal support to all future regulations establishing NC throughout their elaboration and adoption process during comitology and implementation, including early implementation (see Section 2.1.5); and

[10] As per Regulation (EU) No 1227/2011 of the European Parliament and of the Council on wholesale energy market integrity and transparency.

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- Non-NC related legal work: legal support to the Association activities, including advice on corporate legal issues.

Non-NC related legal work

The LRG, together with the Secretariat Legal Section, advises on legal questions raised by the Association's bodies (legal assessment, contracts (e.g. drafting, amendments, negotiation, implementation and assessment), processes, etc.) or identifies legal risks or strategic legal issues on its own initiative. As examples of these activities, the LRG together with the Secretariat Legal Section will support:

- the Market Committee on the implementation of the ITC as well as the implementation of, and reporting under, the REMIT Regulation and the Transparency Regulation;
- the System Development Committee on legal questions raised during the preparation of the TYNDPs (e.g. CBA methodology and the link between the electricity and gas network model), the approach for Cross-Border Cost Allocation (CBCA), the PCIs selection, the TYNDP data transparency, the CGMES and the Network Modelling Database (NMD);
- the System Operations Committee regarding the implementation and monitoring of the EAS contracts and the TSO coordination strategy within RSCI. Legal support will also be provided for the development of the CGM methodologies as well as advice on legal matters related to the synchronous area extension agreement and external relations issues;
- the Secretariat Corporate Affairs Section on the legal evaluation of EU legislation proposals and legal aspects of ENTSO-E's positioning in public consultations;
- the Secretariat D&I Section on contractual issues related notably to the transparency platform, NMD, IT contracts tool, data protection, IP rights, etc.; and
- the Board and the Assembly on strategic issues with a legal dimension.

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4. GENERAL ACTIVITIES

Annual Work Programme

The next ENTSO-E annual work programme will again be subject to a positive response from ACER and will target public consultation in September 2016. The feedback will be reviewed before submitting the work programme for ACER opinion in late autumn 2016.

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 2016, 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.

Contribution to Public European Debates on Energy: Response to Energy Union Initiative, Vision Package, ENTSO-E Annual Conference and Regulatory Work

Building both on its European perspective and on the TSOs' profound understanding of the diversity and challenges of European countries' electricity systems, ENTSO-E will continue contributing to the public debate on energy in Europe. The EC will work on legislative follow-ups to the summer 2015 market-design consultation. It will also design a consultation on how to reach 2030 interconnection targets. These are examples of discussions to which ENTSO-E will contribute by sharing in a transparent way its experience, understanding of the situation and positions.

In response to the EC's Energy Union strategy, ENTSO-E is developing a Vision Package comprising four executive papers on market design, on regions to enforce the Internal Energy Market, on better regulation for energy in the EU and on a new framework for European security of supply. The whole package comprising all four documents will be released at ENTSO-E's Annual Conference on 20 November 2015.

Stakeholder Engagement

Stakeholder contributions play an essential part in the development of all main ENTSO-E deliverables, including NC, 10-year network development plans, scenario outlooks and adequacy forecasts, annual work programmes and R&D roadmaps.

ENTSO-E is committed in engaging with customers, stakeholders and other relevant parties, to strive to understand their needs and to use stakeholders' feedback as an important contribution for improving the quality of ENTSO-E work products. When conducting consultations ENTSO-E will always publish non confidential comments and answer to them as far as is allowed by its resources.

Consultation with stakeholders is far more than a mandatory requirement—stakeholder expertise and experience are indispensable to delivering well-critiqued, effective and workable and acceptable proposals. ENTSO-E is committed to taking into account the broadest range of views from stakeholders at an early stage of development of its products. The Association engages on a regular

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basis with individual stakeholders and stakeholder groups through numerous informal meetings, formal web-based consultations and workshops.

ENTSO-E's online consultation tool was chosen primarily for its user-friendliness. It allows stakeholders easily to contribute to the development of ENTSO-E's deliverables.

ACER and EU Institutions

ENTSO-E is strongly committed to maintaining its close and productive working relationship with ACER and the EU institutions. On NC, ENTSO-E wants to go further and engage with national regulators, Member States, and all stakeholders to ensure that NC 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 missions and functions in a way that maximises the competitiveness, sustainability and security of the EU power system.

Engagement with the Energy Community

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

In 2015 and 2016, ENTSO-E will be working with EnC on the development of the first joint program to reach:

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

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Overview of 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
Scenario Outlook & Adequacy Forecast	The SOAF analyses the mid- and long-term system adequacy of the pan-European interconnected system.	Annually—Q2
Outlook Reports	The ENTSO-E 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&D Roadmap	The R&D 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 impact 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&D Roadmap 2013–2022.	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

Figure 10: Plan of Major Publications

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5. CONCLUSIONS

This Annual Work Programme sets out an ambitious plan of activity for ENTSO-E. With the publication of EC's "Energy Union" communication, 2016 is going to be a seminal year for the European energy sector and its transition to a sustainable system. The programme above describes more than our planned activities that are either legally mandated or routine operational tasks. ENTSO-E has a clear aspiration also to play a leading role in facilitating IEM and implementing a reliable, competitive and sustainable power system.

ENTSO-E's seventh Annual Work Programme for the year 2016 is dominated by our vision as a response to the EC's "Energy Union" initiative. At times of monumental changes and challenges for the power system, the Association recognises the need to move towards the external world by innovative initiatives and contributions; and develop the Association to fulfil the expectations of stakeholders.

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