

ENTSO-E

Annual Work Programme

ENTSO-E's work on legal mandates – 2023 Edition



ENTSO-E Mission Statement

Who we are

ENTSO-E, the European Network of Transmission System Operators for Electricity, is the **association for the cooperation of the European transmission system operators (TSOs)**. The 39 member TSOs, representing 35 countries, are responsible for the **secure and coordinated operation** of Europe's electricity system, the largest interconnected electrical grid in the world. In addition to its core, historical role in technical cooperation, ENTSO-E is also the common voice of TSOs.

ENTSO-E **brings together the unique expertise of TSOs for the benefit of European citizens** by keeping the lights on, enabling the energy transition, and promoting the completion and optimal functioning of the internal electricity market, including via the fulfilment of the mandates given to ENTSO-E based on EU legislation.

Our mission

ENTSO-E and its members, as the European TSO community, fulfil a common mission: Ensuring the **security of the interconnected power system in all time frames at pan-European level** and the **optimal functioning and development of the European interconnected electricity markets**, while enabling the integration of electricity generated from renewable energy sources and of emerging technologies.

Our vision

ENTSO-E plays a central role in enabling Europe to become the first **climate-neutral continent by 2050** by creating a system that is secure, sustainable and affordable, and that integrates the expected amount of renewable energy, thereby offering an essential contribution to the European Green Deal. This endeavour requires **sector integration** and close cooperation among all actors.

Europe is moving towards a sustainable, digitalised, integrated and electrified energy system with a combination of centralised and distributed resources.

ENTSO-E acts to ensure that this energy system **keeps consumers at its centre** and is operated and developed with **climate objectives** and **social welfare** in mind.

ENTSO-E is committed to use its unique expertise and system-wide view – supported by a responsibility to maintain the system's security – to deliver a comprehensive roadmap of how a climate-neutral Europe looks.

Our values

ENTSO-E acts in **solidarity** as a community of TSOs united by a shared **responsibility**.

As the professional association of independent and neutral regulated entities acting under a clear legal mandate, ENTSO-E serves the interests of society by **optimising social welfare** in its dimensions of safety, economy, environment, and performance.

ENTSO-E is committed to working with the highest technical rigour as well as developing sustainable and **innovative responses to prepare for the future** and overcoming the challenges of keeping the power system secure in a climate-neutral Europe. In all its activities, ENTSO-E acts with **transparency** and in a trustworthy dialogue with legislative and regulatory decision makers and stakeholders.

Our contributions

ENTSO-E supports the cooperation among its members at European and regional levels. Over the past decades, TSOs have undertaken initiatives to increase their cooperation in network planning, operation and market integration, thereby successfully contributing to meeting EU climate and energy targets.

To carry out its legally mandated tasks, ENTSO-E's key responsibilities include the following:

- › Development and implementation of standards, network codes, platforms and tools to ensure secure system and market operation as well as integration of renewable energy;
- › Assessment of the adequacy of the system in different timeframes;
- › Coordination of the planning and development of infrastructures at the European level (Ten-Year Network Development Plans, TYNDPs);
- › Coordination of research, development and innovation activities of TSOs;
- › Development of platforms to enable the transparent sharing of data with market participants.

ENTSO-E supports its members in the **implementation and monitoring** of the agreed common rules.

ENTSO-E is the common voice of European TSOs and provides expert contributions and a constructive view to energy debates to support policymakers in making informed decisions.

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Introduction

General Introduction

This Annual Work Programme (AWP) covers the period from January to December 2023. It focuses on the legally mandated tasks given to Transmission System Operators (TSOs) and the European Network of TSOs (ENTSO-E) directly by European Union (EU) Regulations, Directives and Network Codes and Guidelines as well as the related terms and conditions or methodologies.

The main elements of ENTSO-E's work are related to the development of methodologies which includes the proper consideration of stakeholders' feedback and their implementation once approved by the Agency for the Cooperation of Energy Regulators (ACER). The ENTSO-E's work detailed within this document is related to its legally mandated tasks under EU law and its tasks under the Articles of Association which covers pan-European all TSO tasks and specific regional tasks. The activities foreseen in this work programme will be delivered by the ENTSO-E Secretariat and the 39 members of ENTSO-E, which provide the required expertise and financial resources to the Association. The successful implementation of this work programme is also influenced by the input provided by stakeholders via public consultations, the independent Advisory Council, the Network Codes European Stakeholder Committees, and other stakeholder groups.

In accordance with Art. 31 of Regulation (EU) 2019/943 on the internal market for electricity (IEM Regulation), the AWP 2023 will be published for consultation in July and August 2022. Following the public consultation, it will be submitted to ACER for opinion in November 2022.

In line with its mission statement, ENTSO-E aims at delivering its legally mandated tasks, while providing transparent information and involving stakeholders as much as possible, in order to deliver in the relevant timescales. ENTSO-E is supported by its TSO experts in achieving the wide range of tasks of the AWP. Expert resources are continuously optimised and deployed taking into account the specific

technical requirements and the most efficient way to deliver the best products and services in a timely manner. ENTSO-E is organised in Committees and dedicated groups which enable a clear repartition of responsibilities and help gather the necessary expertise to achieve their tasks. The AWP presents the legally mandated tasks according to the repartition between different entities.

Chapter 1 describes the System Operations tasks, Chapter 2 explains the Markets tasks, Chapter 3 contains the System Development tasks, Chapter 4 details the work on the Transparency Regulation, Chapter 5 describes the Research, Development & Innovation tasks, Chapter 6 explains the upcoming tasks on new Network Codes, Chapter 7 describes the tasks for cooperation on the Transmission & Distribution Interface, Chapter 8 explains the upcoming tasks on interoperability and data and finally, Chapter 9 presents monitoring activities associated to the above mentioned topics. Annex 1 provides the list of abbreviations used within this document.

While delivering legally mandated tasks, ENTSO-E also aims at supporting policy objectives as described in the following chapter.

The draft 2023 AWP list of deliverables in Annex 2 is subject to regulatory changes and confirmation of necessary resources and approvals. Due to the increase in the list of activities for ENTSO-E and TSOs, it is anticipated that the activities will be prioritised and implemented in a smart and efficient manner. More detail on the impacted tasks is provided in the list of deliverables.

Policy context

The EU is willing to play a leading role in the global fight against climate change, which has become the main driver for EU legislative work on energy related topics.

In November 2018 the EU set out its objective for a **climate-neutral economy by 2050**. Moreover, as an intermediate step towards climate neutrality, the EU has also raised its 2030 climate ambitions and **committed to cutting greenhouse gas (GHG) emissions by at least 55 % by 2030** compared to 1990 levels. Both 2030 and 2050 emission reduction targets have become legally-binding following the adoption of the **European Climate Law** in June 2021.

With the aim to achieve these targets, the European Commission (EC) launched in December 2019 a set of key policy initiatives to decarbonise the energy sector, grouped under the umbrella label of the **“European Green Deal”**. This important policy package reaffirms the EU energy strategic pillars, with a stronger focus on decarbonisation:

- › ensuring a **secure** and **affordable energy supply**
- › developing a **fully integrated, interconnected** and **digitalised EU energy market**
- › prioritising energy efficiency, improving the energy performance of buildings and facilitating the large-scale integration of **renewable energy sources** in the power sector

The European Green Deal includes some important policy initiatives with a direct impact on the power sector:

- › an Offshore renewable strategy
- › a Hydrogen strategy
- › an Energy system integration strategy

To implement those strategies, the Commission presented several legislative proposals, and, in July 2021, the **“Fit for 55” package**, a set of legislative proposals to achieve the new 2030 GHG emission goal. The package includes proposals to increase the binding target of renewable sources in the

EU’s energy mix to 40 %, to promote the uptake of renewable fuels such as hydrogen in industry and transport, to increase energy efficiency targets at EU level and make them binding, to review the energy taxation and the EU emissions trading system (EU ETS) and to introduce a carbon border adjustment mechanism. On 3 June 2022, the new TEN-E Regulation was adopted [Regulation (EU) 2022/869] and provides for new rules for cross-border electricity infrastructure. The updated legislation intends to keep assuring market integration, competitiveness, and supply security while adding focus on hydrogen infrastructure, offshore electricity grids, and smart grids.

To further underline the importance of the green transition, it was announced that 30 % of the EUR 750bn NextGenerationEU recovery fund (ratified by all Member States in the first months of 2021), will be allocated to climate action. To foster green investments, a “Taxonomy” of projects is also being finalised, which will provide companies, investors and policymakers with appropriate definitions for which economic activities can be considered environmentally sustainable.

Finally, the European Commission has issued on 18 May 2022 its REPowerEU package, to “rapidly reduce dependence on Russian fossil fuels and fast forward the green transition” The measures in the package focus on energy saving, diversification of energy supplies, and accelerated roll out of renewable energy to replace fossil fuels in homes, industry and power generation.

In parallel, the implementation of the previous legislative packages (the Third Energy Package and the Clean Energy Package (CEP)) is still ongoing, which includes drafting rules to improve cybersecurity of the whole system, and rules on demand side flexibility.

_____ **REGULATION (EU) 2019/943 on the internal market for electricity**

_____ **REGULATION (EU) 2019/941 on risk-preparedness in the electricity sector**

_____ **REGULATION (EU) 2022/869 on guidelines for trans-European energy infrastructure**

_____ **REGULATION (EU) No 543/2013 on the submission and publication of data in electricity markets (Transparency Regulation)**

_____ **Commission Regulation (EU) No 838/2010 of 23 September 2010 on guidelines relating to the inter-transmission system operator compensation mechanism**

1. System Operation

System Operation Guideline

Regulation (EU) 2017/1485 establishing a guideline on electricity transmission system operation (SOGL) sets out harmonised rules on how to ensure security of supply through efficient grid operation in a variable renewables paradigm. The implementation of the SOGL and the methodologies that stem from it entails several tasks for ENTSO-E and TSOs at the pan-European, synchronous area, and regional levels. Work at pan-European level is facilitated by ENTSO-E, whereas synchronous areas' activities are organised by TSOs in respective regional groups. According to Art. 65 SOGL, ENTSO-E will publish the common list of year-ahead scenarios by 15 July as accustomed since 2018. ENTSO-E

will fulfil the obligation from Art. 45(1) of the Methodology for coordinating operational security analysis (CSAM) which requires the publication on the website of the common hours (T0 to T5) that define the key milestones of the daily Coordinated Security Analysis (CSA) process, which are jointly defined by TSOs and Regional Coordination Centres (RCCs). New common hours will be published if there is a need for amending the current ones (default hours) as the process is further implemented. The process of implementation of recommendations developed by the Expert Panels investigating the three 2021 ICS Scale 2 incidents will continue to be followed throughout 2023.

Network Code Emergency & Restoration

In 2023, TSOs will pursue national implementation and the developments at Member States level will be communicated regularly through the NC ER Active Library and the System Operations Stakeholders Committee. ENTSO-E and TSOs

will also assess the potential for further alignment of the rules concerning the suspension and restoration of market activities.

Synchronous Areas & Regional Groups

Depending on the specific arrangements with each Regional Group corresponding to a synchronous area, ENTSO-E supports on an ad-hoc basis or provides administrative and technical support for the Region on a continuous basis. ENTSO-E will continue its work to develop mutual coordination and support between synchronous areas, using the functionality of HVDC links to implement new services. The work is pursued on the coordination of short- and long-term

measures to mitigate the frequency deviations in Continental Europe, notably the deterministic frequency deviations related to the change of scheduling programmes at the early morning and late evening hours. ENTSO-E also continues to support the project of synchronisation between the Baltic TSOs and the synchronous area of Continental Europe. In 2023, the work on elaboration of the relevant procedures and essential system checks for the synchronous operation will continue.

Coordination with 3rd country TSOs

The Agreement for the Synchronous Operation between Continental Europe TSOs and TEIAS, the Turkish TSO, was updated to provide for compliance with the Operational Framework of Continental Europe TSOs on 21 March 2021. Entry into force of a similar agreement with Ukrenergo, the Ukrainian TSO, regarding the Burshtyn Island synchronous operations with Continental Europe has been concluded mid-2021. Both agreements have triggered work for their implementation in 2021 and 2022. Additionally, an Observer agreement between the new Central System Operations Region (SOR) and Swissgrid was concluded in 2021.

Following the successful emergency trial synchronisation between ENTSO-E Continental Europe TSOs and Ukrenergo/Moldelectrica in 2022, in 2023 work will pursue to monitor the stability of the system, ensure the compliance with the catalogue of measures from the ongoing connection agreement, integrate gradually both TSOs in some pan-European and/or regional processes. Depending on the progress in implementing their Catalogue of Measures and the damping measures, long-term agreements will be drafted covering the entire networks operated by Ukrenergo and by Moldelectrica respectively.



Following the request by the European Commission and the Energy Community Secretariat, the TSOs and ENTSO-E's experts have provided feedback on the adapted legislation which is to be implemented in the Contracting Parties of the Energy Community. The dedicated experts will continue providing useful feedback related to the implementation challenges of the adapted legislation to the European Commission and the Energy Community Secretariat. The Trade Cooperation Agreement ('TCA') signed on December

2020 between the United Kingdom ('UK') and the European Union ('EU') foresees that EU and UK TSOs shall prepare technical procedures once requested by the Specialised Committee on Energy. Further work on the preparation of a Day-Ahead Target model based on the concept of "Multi-region loose volume coupling" ('MRLVC') as foreseen in Articles ENER.14, ENER.19 and Annex ENER-4 of the Trade and Cooperation Agreement ('TCA') and on the capacity calculation technical procedures may continue in 2023.

European Awareness System

ENTSO-E oversees the European Awareness System (EAS) development and upgrades in collaboration with hosting entities and the software supplier. In line with the recommendations from 8th January 2021 CE system split, ENTSO-E will pursue the implementation of Wide Area Metering System (WAMS) data into EAS.

The EAS is currently using the Electronic Highway communication network to enable the real-time data transfer. The Physical Communication Network (PCN)¹, which consists in communication lines and routers, has been deployed in 2021 and the Electronic Highway migration is expected to start by end of 2022. In 2023, the migration from Electronic Highway will be pursued, allowing for exchanges of operational planning data and real-time data between TSOs and Regional Coordination Centres (RCCs).

¹ The PCN itself is not a legally mandated task of ENTSO-E. However, since this communication network constitutes a prerequisite for secure and reliable operation of legally mandated services such as OPDE and EAS, it is of special interest and importance to ENTSO-E. and other indicated in the Regulation stakeholders.



Risk Preparedness Regulation

Pursuant Art. 6 of the Regulation (EU) 2019/941 on risk-preparedness in the electricity sector (Risk Preparedness Regulation), in September 2020 ENTSO-E submitted to the relevant stakeholders, including the Electricity Coordination Group (ECG), the “identification of regional electricity crisis scenarios”.

The ECG provided amendment recommendations to ENTSO-E in March 2021, according to Art. 6(2) of the Risk Preparedness Regulation. Consequently, in 2021 and 2022, the ENTSO-E Working Group Risk Preparedness has assessed each of the nine recommendations, and whether an update of the

Methodology on the assessment of regional electricity crisis scenarios is required. If it will be decided that the Methodology is to be updated, this work will be extended from 2022 to 2023.

As prescribed in the Article 6(3) of the Regulation: “The ENTSO for Electricity shall update the regional electricity crisis scenarios every four years (...)”. Following this article, in 2023 ENTSO-E will prepare and start the 2nd cycle of the regional electricity crisis scenarios identification with its members. This process will be concluded in September 2024 with report submission to the ECG and ACER.

Common Grid Model (CGM)

The CGM is the dataset, supported by IT/communication architecture that allows for the coordination of power flows in Europe. The CGM finds its legal basis in three of the network codes: the SOGL (Art. 64), the Regulation (EU) 2015/1222 establishing a guideline on capacity allocation and congestion management (CACM Regulation) (Art. 17) and the Regulation (EU) 2016/1719 establishing a guideline on forward capacity allocation (FCA Regulation) (Art. 18).

The Minimum Viable Solution Go-Live of the CGM Build Process has been performed end of 2021. The following capability for pan-European exchange of network model data between TSOs and RCCs as set out by the EU under various Network Codes will be in operation:

- › TSOs exchanging Individual Grid Models (IGMs),
- › RCCs merging these IGMs into a CGM,

- › using the Communication Network (CN), ENTSO-E’s Communication and Connectivity Service Platform (ECCO SP), ENTSO-E’s Operational Planning Data Environment (OPDE) Platform, and
- › the Common Grid Model Exchange Standard (CGMES).

These components are prerequisites for several services harmonised in the Network Codes, including short- and long-term Capacity Calculation (CC), CSA, Outage Planning Coordination (OPC), Short-term Adequacy Analysis (STA), and the optional requirement from SOGL Art.69 on W-1 model creation.

In 2023, the platforms will be operated, maintained and the migration of further services will be supported. This includes the support of legally mandated monitoring activities (e.g. annual report on regional coordination assessment according to Article 17 SOGL).

Regional Coordination Centres

RSCs transitioned to RCCs² on 1 July 2022. The implementation of the RSC services from SOGL is still ongoing:

- › STA and OPC are in operation but will continue to be updated.
- › CGM is live, and IGMs are provided by TSOs over OPDE into pan-European CGMs.
- › The implementation of CSA and CC in the regions according to regional methodologies will be pursued.
- › Consistency assessment of system defence plans and restoration plans (Art. 6 of NC ER) is established already.

ENTSO-E is actively involved in various aspects of the STA (Art. 81 SO GL), OPC (Art. 80 SO GL) and CGM services, while the CC (Art. 25 CACM Regulation) and CSA (Art. 75 SO GL) services are mainly implemented in the regions. IEM Regulation (Recital 59, Art. 30(1)(e) and Art. 30(2)) stipulates that ENTSO-E will have a more active role in monitoring and coordinating the implementation of regional services.

In addition to the original services defined in the network codes and guidelines, new RCC tasks are defined in Art. 37(1) IEM Regulation. ENTSO-E shall prepare proposals for the new tasks, which are not already covered in the Network Codes or Guidelines.

By end of 2021, the Steering Group Regional Coordination has been set up under the System Operation Committee as framework for regional collaboration as required by Art. 30(1) (e) of IEM Regulation. This framework is used to ensure a platform for efficient, transparent, and smooth collaboration between RCCs, TSOs, the regions (CCR/SOR), ENTSO-E as well as external stakeholders.

Specifically, on the implementation of the new RCC tasks, ENTSO-E needs to work across committees as the RCC services are wider in nature than the original RSC services. The RCC framework will ensure this collaboration with the other committees on finalisation of the proposals:

- › Art. 37(1)(g) – Training and Certification: the proposal has been submitted to ACER; establishment phase has started and is expected to last until 2024, after which execution phase is expected to last until 2026.
- › Art. 37(1)(h) – Supporting restoration: a proposal is expected to be submitted by Q3 2023, and implementation to start in Q4 2023 or Q1 2024.

- › Art. 37(1)(i) – Post disturbance analysis: a proposal has been submitted and was approved by ACER beginning of 2022; implementation is expected to start second half of 2022 and to continue in 2023
- › Art. 37(1)(j) and Art. 37(1)(k) – Sizing and procurement of balancing capacities: a proposal is expected to be submitted to ACER in Q1 2023; regional implementation by RCCs is expected to start later in 2023.
- › Art. 37(1)(l) – Inter-TSO settlement: a proposal is being reviewed by TSOs and expected to be submitted to ACER in 2022; implementation is expected to start mid of 2023, where applicable.
- › Art. 37(1)(o) – Maximum Entry Capacity: the ERAA methodology has been approved by ACER; Industrialised tool will be developed in 2023, go-live for MEC calculation is pending availability of ERAA data with flow-based capacity calculation which is expected 2024.
- › Art. 37(1)(p) – Needs for new infrastructures, which is related to system development: a proposal is expected to be submitted to ACER in November 2022; implementation is expected to start for next applicable TYNDP release.

6 RSCs

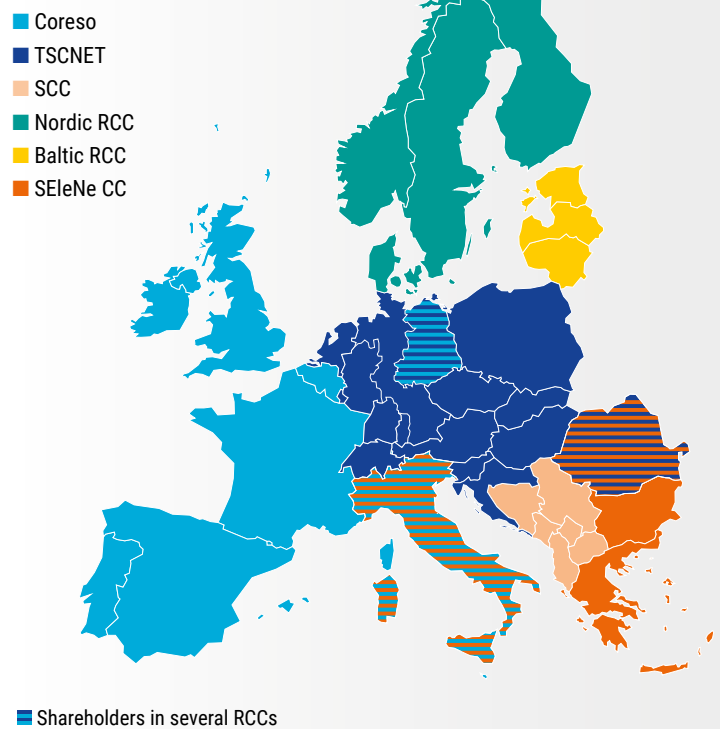


Figure 1 – RSC Shareholders map

² The RSCs were established as voluntary initiatives in 2008 and their roles were formalised in the network codes. In the IEM Regulation, the RSCs are replaced by RCCs as of 1 July 2022. The IEM Regulation further specifies more detailed regulations for the establishment, implementation and performance of the RCCs.

2. Market

Capacity Allocation and Congestion Management Guideline

CACM Regulation sets out the methods for calculating how much cross-zonal capacity can market participants use without endangering system security and harmonises how cross border markets operate in Europe to increase competitiveness. The implementation of CACM Regulation is almost complete at the pan-European level. Nevertheless, implementation of the methodologies is still ongoing and regular amendment of the methodologies are being performed to ensure the consistency of the full regulatory framework. Further, the CACM Regulation amendment process triggered in 2021 will have impact on some methodologies, which will have to be adapted to comply with the Guideline amendment. Additionally, the amended CACM Regulation might

introduce new terms and conditions or methodologies to be developed. The following paragraphs describe the ENTSO-E and All TSOs tasks to be undertaken in 2023, according to the existing CACM Regulation and the ACER's recommendation on amendment of CACM.

The implementation of the CACM and the methodologies that stem from it entails several tasks for ENTSO-E and TSOs at the pan-European and regional levels. Work at pan-European level is facilitated by ENTSO-E, whereas the regional activities are organised by TSOs in respective regional groups and facilitated by ENTSO-E on ad-hoc bases.

All TSOs (supported by ENTSO-E) will perform the following tasks:

- › **Algorithm (Art. 37 CACM Regulation):** In accordance with ACER Decision No 04/2020 of 30 January 2020 on the nominated electricity market operators' (NEMOs) proposal for the price coupling algorithm and for the continuous trading matching algorithm, also incorporating TSOs' and NEMOs' proposals for a common set of requirements (Art. 37 CACM Regulation) and the deadlines set in IEM Regulation, the work on the implementation of 15-minute products in Day Ahead will continue in 2023. The delivery is planned in 2025. ENTSO-E will coordinate the updates of the methodologies to allow for the 15-minute products go-live. This is the case for example for the scheduled exchanges methodology (Art. 43.1 CACM Regulation) where adaptation will be introduced.
- › **Intraday Auctions (Art. 55 CACM Regulation):** All TSOs together with the NEMOs will enter in 2023 to the testing phase of the Intraday Auctions according to the decision from ACER on Pricing of intraday. The go-live is planned for beginning of 2024 one year beyond the legal deadline.
- › **Capacity Calculation Regions (Art. 15 CACM Regulation):** The work on CCR assessment and definition, in accordance with ACER Decision No 04 / 2021 of 7 May 2021 on the determination of CCRs, will be due by three months after the implementation of the first version of the regional operational security coordination in accordance with Article 76(1) of the SOGL in the Core CCR.
- › **Congestion Income Distribution (Art. 73.1 CACM Regulation):** All TSOs will submit the methodology by June 2023, to provide solutions addressing unintuitive flows (meaning flows against prices differences) irrespective of their causes and also including the transfer of congestion income between CCRs. This is in accordance with ACER's Decision No 16/2021 of 17 December 2021 on the congestion income distribution methodology.
- › **CACM Amendment:** All TSOs and ENTSO-E will prepare for the early implementation of the amendment of the CACM regulation, specifically establishing the program of the methodologies to be developed once the amended regulation will enter into force.
- › **Internal Energy Market Regulation Bidding Zone Review (Art. 14(6) IEM regulation):** Internal Energy Market Regulation Bidding Zone Review (Art. 14(6) IEM regulation): Following ACER Decision No 29/2020 of 24 November 2020 on the methodology and assumptions that are to be used in the Bidding Zone Review process in accordance with Art. 14(5) IEM Regulation, all Bidding Zone Review Regions (except the Baltic region) delivered the locational marginal prices (LMP) by 31 March 2022, which has been used as input for ACER to propose alternative configurations for the Bidding Zone Review. The delivery of the alternative configurations for the Bidding Zone Review by ACER has triggered the Bidding Zone Review, which has started on the 8 August and will last till August 2023. In this Bidding Zone Review, ENTSO-E will lead the pan-EU studies on transition, liquidity, and transaction costs, coordinate the different Bidding Zone Review Regions and deal with the stakeholder's management and the public consultation envisaged.

ENTSO-E will continue in 2023 working with the TSOs on the implementation and on the reporting of the 70 % obligation in capacity calculation (Art. 16 IEM regulation) and issue an annual voluntary report in 2023 in addition to preparing

the mandated 3-yearly report due in 2024. Discussions and workshops for further alignment between TSOs, RCCs, ACER, National Regulatory Authorities (NRAs) and the EC will continue.

Forward Capacity Allocation Guideline

FCA Regulation sets out the rules for cross-zonal capacity calculation and allocation in the forward timeframe. The implementation of the FCA Regulation is completed at the pan-European level. Nevertheless, implementation of the methodologies is still ongoing and regular amendment of the methodologies are being performed to ensure the consistency of the full system.

Long-Term Flow-Based Allocation implementation: In order to allow for a timely implementation of the long-term flow-based in the Core and Nordic CCR, all TSOs will continue the implementation of the requirements for the single allocation platform (SAP requirements – Art. 49 FCA Regulation); the congestion income distribution methodology (CID – Art. 57 FCA Regulation) and the methodology for sharing costs

incurred to ensure firmness and remuneration of long-term transmission rights (FRC – Art. 61 FCA Regulation), as soon as possible and no later than 1 October 2022.

The harmonised allocation rules pursuant to Art. 51 FCA will be revised until March 2023 according to the bi-yearly rhythm and will also take into account the needed changes to implement Long-term Flow based approach.

FCA amendments: All TSOs and ENTSO-E will prepare for contributing to the amendment proposal of the FCA regulation following ACER's public consultation on Long Term design (June 2022). The framework of the work is still to be defined as no official request has been triggered yet on the amendment of this regulation.

Electricity Balancing Guideline

Regulation (EU) 2017/2195 establishing a guideline on electricity balancing ('EB Regulation') lays down a detailed guideline on electricity balancing. The implementation of EB Regulation and the methodologies that stem from it

entails several tasks for TSOs at the pan-European and regional levels. Work at pan-European level is facilitated by ENTSO-E. During 2023, ENTSO-E will continue advancing on the implementation of EB Regulation.

Harmonisation of Cross-Zonal Capacity (CZC) allocation processes

All TSOs will continue working on the Harmonisation of CZC allocation processes for the exchange of balancing capacity or sharing of reserves. Pursuant to Art. 38(3) EB Regulation, all TSOs shall submit to ACER by December 2022 a proposal for harmonisation of the CZC allocation processes, taking as starting point the CCRs' proposals submitted in accordance with Art. 41(1) and 42(1) EB Regulation. The alignment with

ACER and NRAs is foreseen until methodology approval in June 2023. Moreover, ENTSO-E will remain available to the CCRs to provide any needed support and follow-up with regard to the CCR methodology proposals on CZC calculation in the balancing time frame in accordance with Art. 37(3) EB Regulation, which is also expected to be approved in June 2023.

RCC Procurement and Sizing Proposals

Work on Art.37(1)(j) and Art.37(1)(k) of the Regulation (EU) 2019/943 of the European Parliament and of the Council of 5 June 2019 on the internal market for electricity ('IEM Regulation') will continue, two separate TSO proposals are

expected to be submitted to ACER during the Q1 2023, with ACER approval expected in Q3 2023. ENTSO-E will ensure the necessary coordination and alignment among the CCRs and the stakeholders, when necessary.

European Balancing Platforms

In addition to drafting the all TSOs and ENTSO-E methodologies and supporting in the regional ones if requested, ENTSO-E will continue supporting the implementation and operation of the European balancing platforms. On 1 June 2022 the automatic Frequency Restoration Reserve Platform (PICASSO) went live and in Q3 2022 manual Frequency Restoration Reserve Platform (MARI) will go-live, completing the implementation of the four European balancing platforms. During 2023, TSOs will continue their accessions to the respective balancing platforms in accordance with the accession roadmaps.

In addition, in 2023 all TSOs will continue working on the establishment of the capacity management module (CMM) – a central module common to all balancing platforms proposed by all TSOs – in order to increase the efficiency and robustness of the operation of the platforms. Following the regular practice, ENTSO-E will organise at least one public workshop on the European balancing platforms.

ENTSO-E in cooperation with European balancing platforms will continue monitoring of the EB Regulation implementation by publishing respective reports.

Inter-Transmission System Operator Compensation

The Inter Transmission System Operator Compensation (ITC) Agreement is a multiparty agreement concluded between ENTSO-E and its member TSOs plus KOSTT and National Grid ESO. It offers a single frame to compensate European TSOs for costs associated with hosting transit flows. The ITC mechanism is governed by Art. 49 IEM Regulation. It is further specified by Regulation (EU) No 838/2010 on laying down guidelines relating to the ITC mechanism and a common regulatory approach to transmission charging.

The ITC covers both the utilisation of the grid infrastructure by transits and the losses caused by transits. The ITC Funds are financed by all importing and all exporting ITC Parties, including fees applied to the Perimeter Countries (Belarus, Moldova, Morocco, Russia, Türkiye, Ukraine) for scheduled energy exchanges with ITC Parties.

Amprion and Swissgrid are the Data Administrators of the ITC Agreement implementing the legislated tasks of ENTSO-E and its member TSOs. They are in charge of the Compilation Report, the Report on Capacity Allocated in a Manner not Compatible with Congestion Management Guidelines, the

Report on the Snapshots, the Report on Transit Losses and monthly Preliminary and Final Settlement Notifications, which are then sent by ENTSO-E to ITC parties for their signature. Each Data Administrator covers a specific geographical area.

In 2023, as every year, the ITC parties provide and check the values for the calculation of the annual perimeter fee, such as cost of losses, vertical load and capacity allocated not compatible with CACM Regulation. ENTSO-E publishes the perimeter fee and the ITC Transit Losses Data Report on its website. In addition, ENTSO-E on behalf of the ITC parties provides information to ACER upon request, which ACER uses for their monitoring report on ITC. Furthermore, ENTSO-E may initiate a discussion in 2023 with ACER and the EC on possible recommendations in order for the ITC Mechanism to adequately reflect current political and market conditions.

In 2023, ENTSO-E will furthermore continue to work closely with Ukrenergo and Moldelectrica towards a possible accession of Ukraine and Moldova to the ITC mechanism, in coordination with the Energy Community and the European Commission.



3. System Development

Europe's Ten-Year Network Development Plan

The TYNDP (Art. 30 (1) (b) and Art. 48 IEM Regulation and Regulation (EU) No 2022/869 on guidelines for trans-European energy infrastructure (TEN-E Regulation)) is a pan-European network development plan which provides a long-term vision of the power system, embedded in a multi-sector energy view.

It is the foundation of European grid planning and the basis for transmission projects that are eligible to be labelled as 'Projects of Common Interest'. It is published every two years by ENTSO-E.

The TYNDP 2022 edition is planned to be finalised in the first quarter of 2023. An initial release is available in Autumn 2022 and submitted for ACER opinion. Taking into account the recommendations of ACER on the initial release, ENTSO-E releases the final TYNDP 2022.

The year 2023 will see an intensification of preparations for TYNDP 2024, which will be the first edition subject to the newly revised TEN-E regulation.

The TYNDP provides a benchmark for transmission network development (scenarios, system needs, development solutions, and project assessment). The Pan-European system development is coordinated and linked with national planning needs, identifying synergies, when relevant, between European, regional, and national studies, and making use of the expertise of the regional and local context of TSOs.

The first step in the preparation of the TYNDP is the building of long-term European energy scenarios. The work on the 2024 scenarios is scheduled to be initiated in 2022 with the release by ACER of the first edition of new Framework Guidelines. ENTSO-E and ENTSOG will follow these guidelines and reinforce their collaboration with the EU DSO Entity and other stakeholders to prepare the 2024 scenarios.

ENTSO-E already anticipates a more streamlined and collaborative stakeholder involvement in the preparation of the scenarios along the way, taking the form of workshops, consultations to gather qualitative or quantitative input, and direct exchange with some stakeholders on specific areas.

In 2023, ENTSO-E will prepare the selection of candidate projects for the TYNDP 2024. The Selection Guidelines will be submitted to public consultation during the year 2023, before formal call for projects currently scheduled in Q4 2023.

ENTSO-E will also work on the continuous improvement of its models and methodologies. In particular, the further development of multi-sector methodologies and models are crucial.

ENTSO-E has a new mandate to develop strategic Offshore Network Development Plans for each European Sea basin, as part of the TYNDP. "Those strategic plans shall provide a high-level outlook on offshore generation capacities potential and resulting offshore grid needs, including potential needs for interconnectors, hybrid projects, radial connections, reinforcements and hydrogen infrastructure" (revised TEN-E, Art. 14.2). Another part to be delivered 1.5 years later, will "present the results of the application of the cost benefit and cost-sharing to the priority offshore grid corridors." (TEN-E, Art. 15.2) The responsibility of developing guidance on the respective methodology lies with the European Commission, while the responsibility related to offshore generation capacities and respective locations lies with the Member States organised in the offshore priority corridors under the TEN-E regulation.

The first edition of the Offshore Network Development Plans will be delivered in early 2024.

The European Resource Adequacy Assessment

Under Art. 23 IEM Regulation, ENTSO-E is mandated to perform a yearly European Resource Adequacy Assessment (ERAA). 'Resource adequacy' can be defined as the continuous balance between net available resource on the one hand and net demand levels on the other hand. ERAA is based upon a state-of-the-art probabilistic analysis, aiming to model and analyse possible events with potentially adverse consequences for the supply of electric power. Among many valuable purposes this provides to decision makers, the IEM Regulation in particular makes it the reference for qualified decisions on the introduction and continuation of capacity mechanisms.

ERAA 2023 will be the third edition of the ERAA based on the ERAA target methodology which was approved by the ACER decision No 24 / 2020 of 2 October 2020, building on the first and second editions ERAA 2021-2022. Both have brought significant methodological improvements compared to the previous mid-term adequacy forecasts released until 2020. By end of 2023 the implementation of the approved ERAA target methodology is completed. As the preparation of each ERAA edition starts in Autumn of the previous year, all requirements are thus planned to be implemented in ERAA 2024. The [ERAA implementation roadmap](#) to reach the target

Seasonal outlooks

Since early 2022 the Seasonal Outlooks have been put in high focus to address the current energy crisis, with a strong priority in terms of resource and anticipation. This can be expected further regarding the year 2023. ENTSO-E's Winter and Summer Outlooks (Article 30 (1) f, IEM Regulation) are pan-European, system-wide analyses of risks to the security of the electricity supply. They present TSOs' views on the risks to security of supply and the countermeasures planned for the coming season, either individually or in cooperation. Analyses are performed twice a year to ensure a comprehensive view regarding the summer and winter, the seasons in which weather conditions can be extreme and strain the system. ENTSO-E publishes a Summer Outlook before 1 June

Capacity registry tool

As required per Article 25 of ACER's decision on technical specifications for cross border participation in capacity mechanism, Annex 1, the capacity registry tool came live end 2021. As first TSOs are expected to connect and start data

Maximum Entry Capacity

A dedicated Task Team has been set up end 2021 to work on the implementation of the maximum entry capacity methodologies (TT MEC). From summer 2022, developments are expected to start building the calculation tool that will be

methodology is regularly updated, at least yearly with each next ERAA publication, building on ENTSO-E's advancing experience as well as ACER's and other Stakeholders' feedback.

The ERAA 2023 package will be released and provided for consultation in November 2023. It will contain the findings of the study, provide a description of the process, input data, the main assumptions, and methodological advancements. The delivery also builds on regular consultations and workshops with stakeholders throughout the full year project timeline.

ENTSO-E foresees for ERAA a gradual implementation of the flow-based methodology in the relevant regions, including the Nordics region for ERAA 2023. Furthermore, ENTSO-E will continue improving the pan-European Climate Database through a forward-looking climate projection database accounting for the impact of climate change, which shall be available early 2023. ENTSO-E will as well further enhance the modelling of the Economic Viability Assessment, Demand Side Response and sectoral integration in ERAA, building on the TYNDP experience.

and a Winter Outlook before 1 December. Each outlook is accompanied by a review of events for the previous season. The review is based on qualitative information by TSOs that present the most important events that occurred during the past period and compare them to the forecasts and risks reported in the previous Seasonal Outlook. Important or unusual events or conditions of the power system as well as the remedial actions taken by the TSOs are included. The outlooks are based on data collected from TSOs and on a probabilistic methodology. ENTSO-E uses a common database and tool structure for Seasonal Outlooks, as it does for ERAA, including the Climate Database, Pan-European Market Modelling Data base and demand forecast tool.

exchanges by end 2022, ENTSO-E anticipates that lessons learned from first months of use will lead to procedures and/or tool related evolutions (in 2023).

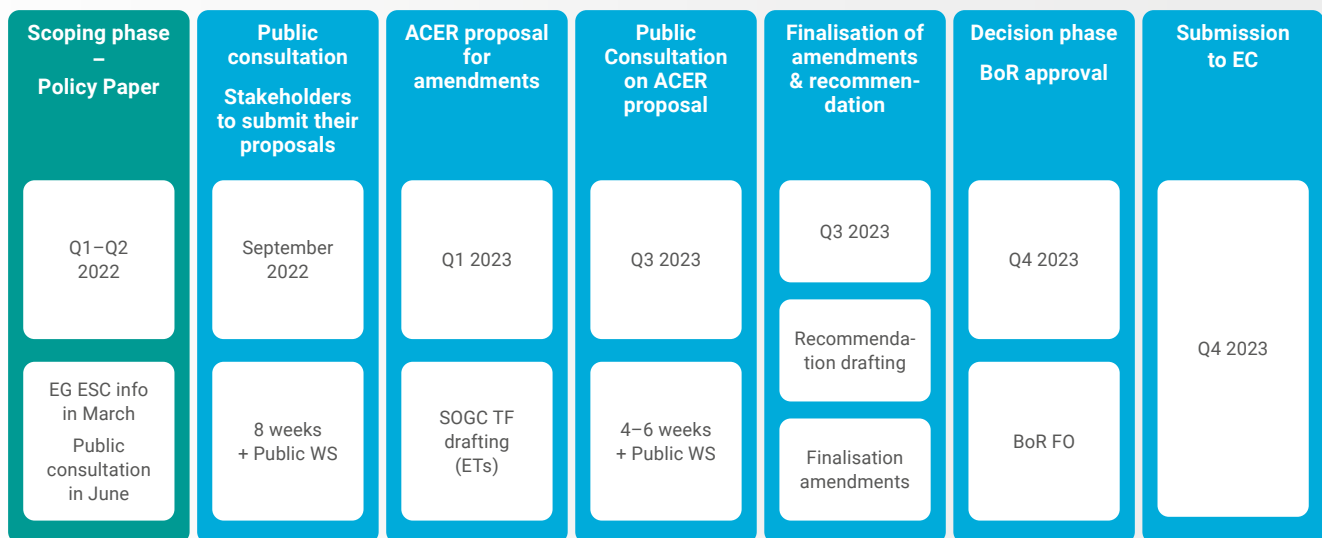
used by RCCs to determine the maximum entry capacities as per Article 26(7) of the Regulation (EU) 2019/943. The implementation work will further develop in 2023.

Connection Network Codes

The three Connection Network Codes (CNCs) – Regulation (EU) 2016/1388 establishing a Network Code on Demand Connection (DC), Regulation (EU) 2016/631 establishing a network code on requirements for grid connection of generators (RfG), and Regulation (EU) 2016/1447 establishing a network code on requirements for the grid connection of high voltage direct current systems and direct current-connected power park modules (HVDC) – define the technical capabilities of system users (power generating modules, distribution systems, demand facilities and HVDC systems) to provide a system-supportive performance under all system operation conditions contributing to preserving or restoring system security, especially in the event of exceptional out-of-range contingencies.

Based on ENTSO-E’s implementation monitoring reports, new tasks from IEM Regulation, TSOs’ experiences from national

implementations and issues discussed in the European Stakeholder Committees or their Expert Groups (EGs), ENTSO-E has prepared detailed high priority proposals for amending the CNCs³. In 2023, the process on the Connection Network Codes (NC RfG and NC DC only) amendment, initiated by ACER in 2022 according to the Art. 60 of IEM Regulation, determines the work flow after the submission of ENTSO-E’s proposals in 2022, followed by the assessment of ACER proposal, response to the consultation and collaboration in the overall process towards the recommendation which ACER is expected to submit to the European Commission by the end of the year 2023. ENTSO-E also strives to align positions with the EU DSO Entity during this process. In addition, ENTSO-E will continue preparing amendment proposals for NC HVDC, expecting the initiation of an analogue process during 2023, as well as contributing to additional EGs that might be initiated with a longer-term perspective.



ENTSO-E is planning to continue assessing the list of the Implementation Guidance Documents (IGDs) over 2023, according to Art. 58 RfG, Art. 56 NC DC and Art. 75 NC HVDC. The IGDs are non-binding reports, mainly for TSOs and other system operators, which give guidance and clarification on both technical and non-technical issues with a view to enhancing coordination and harmonisation where appropriate. Revisions or creation of new IGDs is likely to support the amendment proposals and the work of the EGs.

Furthermore, ENTSO-E will continue monitoring and providing recommendations where relevant on both existing and new European standards as mandated by Art. 7.3.f NC RfG, Art.

6.3.f NC DC and Art. 5.3.f NC HVDC. A continuous gap analysis will continue to support the overall CNC assessment, trigger the revision of some standards, and achieve better alignment between standards and Network Codes.

In addition, ENTSO-E will perform the yearly process mandated by Art. 59.2 NC RfG and Art. 76.2 NC HVDC and requested by ACER in their letters from 14 March 2017 on NC RfG and on NC HVDC, in regards of the collection, treatment and submission to ACER of information from TSOs and DSOs about the compliance (and still non-compliance) of the installed generation capacities and HVDC systems.

³ By 1 July 2025, the Commission shall review the existing network codes and guidelines in order to assess which of their provisions could be appropriately incorporated into legislative acts of the Union concerning the internal electricity market and how the empowerments for network codes and guidelines could be revised.

4. Transparency Regulation

Regulation (EU) No 543/2013 on the submission and publication of data in electricity markets (Transparency Regulation) sets out the criteria for data submission and its publication on a centralised platform, namely the ENTSO-E Transparency Platform (TP).

In line with the requirements set in art. 5 of the Transparency Regulation, to facilitate the harmonised data submissions to the platform, ENTSO-E developed a Manual of Procedure comprised of technical guides in which data definitions and the technicalities related to data exchanges are elaborated.

Market related fundamental information on generation, consumption, transmission, and balancing is published on the TP, which is collected through various sources such as TSOs, power exchanges and other third parties including Single Intraday Coupling and the Single Allocation Platform.

TP implementation to comply with updated MoP v3r3

As required by Transparency Regulation, the Manual of Procedures of the TP was revised and updated in 2021. The new release includes amendments to the existing documents and new documents related to the publication requirements stemming from the System Operation Guidelines (COMMISSION REGULATION (EU) 2017/1485) and Balancing Implementation Frameworks. These amendments will impact the current data publications and will generate new data

publication requirements on the ENTSO-E Transparency Platform from which the users will benefit. New balancing datasets stemming from IN IF are added to the TP whereas balancing datasets from mFRR and aFRR IFs will appear from July 2022. The SOGL related updated data publications will become available on the TP in December 2022 with new rich and standard data items replacing and updating the existing SOGL data publications.

Update of the TP Manual of Procedures and release of the MoP v3r4

A new release of the Manual of Procedures of the Transparency Platform (MoP v3r4) is being drafted and is foreseen to be released in Q4 2023. The new release will support continuous allocations and negative values in offered

capacity. Moreover, representation of losses on HVDC lines and various other improvements, including clarifications in the Detailed Data Descriptions without impact on publications, may also potentially be included in the MoP v3r4.

TP development potentially to become an Inside Information Platform

Moreover, TP will be further developed to be capable of accommodating the willingness of TSOs to utilise the TP as Inside Information Platform to fulfil the requirements

stemming from article 4(1) of REMIT to publicly disclose inside information.



CACM 2.0 requirements development

The Capacity Allocation and Congestion Management Guideline draft revision indicates new publication requirements for the ENTSO-E Transparency platform. It is foreseen that a methodology for the new publications shall

be developed in collaboration between all TSOs and NEMOs. In addition, the new publication requirements are expected to lead to new implementations on the Transparency platform.

Data quality improvements

Following the revision and improvement of the Memorandum of Understanding in 2022, ENTSO-E will continue monitoring

the quality and completeness of the data which TSOs submit to the TP, as required by the agreed quality standards.

Continuation of TP architecture implementation

Lastly, to facilitate the ever-increasing data publications, both the back-end architecture and Graphical User Interface (GUI) of the TP will undergo major upgrades that will be delivered in three packages. Developments on TP will not have any

technical impact on data providers nor on the end users, but rather these implementations will result in enriched user experience and better performance, ensuring a robust business continuity.

Potential FCA data provision project implementation

The TP functionality will be extended in order to accommodate the reporting of data for the purpose of providing data to ACER for its monitoring activities according to the list of information required by Art. 63 of the FCA Regulation. Data from the different TSOs will become available as more and

more capacity calculation methodologies go live in the different regions. The data that will be reported on the TP for this purpose, will not be made publicly available but it will be shared with ACER only.

5. Research, Development & Innovation

Accelerating RDI programmes

ENTSO-E’s Research, Development, and Innovation (RDI) activities, as legally mandated by Art. 30(1)(i) IEM Regulation, involve coordinating the research, development, and innovation planning of TSOs and the deployment of those plans through efficient research programmes. 2023 marks the start of the **new RDI Roadmap cycle** with initiating the review of the current 10-year Roadmap and the preparation of the new one for the period of 2024–2034.

As a continuation of the RDI Implementation Report – the second item of the RDI Roadmap cycle – ENTSO-E delivered the **RDI Monitoring Report 2022** to assess the ongoing RDI related projects and activities of the TSOs against the milestone of the RDI Roadmap 2020–2030 and the Implementation Report 2021–2025. The aim of this work was to identify gaps and to create a snapshot of coverage of the designated research and innovation pathways already taken

by TSOs through national, regional and EU funded research projects.

The new Roadmap cycle will focus on the need of accelerating RDI activities, urged by the Fit for 55 package and the foreseeable geopolitical changes. These new factors induce major shifts in the pace of the identified milestones which must be one of the key drivers for the upcoming comprehensive 10-year research and innovation planning.

In 2023, ENTSO-E’s Research, Development and Innovation Committee will initiate the review of RDI Roadmap and will continue the **coordination and initiation of RDI programmes** through its Working Groups. The process is anchored in the 13 project concepts developed in the RDI Implementation Report 2021–2025 (see figure 2).



Figure 2 - RDI Implementation Report 2021–2025: 13 project concepts sorted into the 6 Flagship topics introduced by the RDI Roadmap



Realising these concepts leads to real-life demonstrations and applications, and in the end, to the achievement of the milestones laid down in the RDI Roadmap 2020–2030. Furthermore, a next step would be to uptake the outcomes of projects and implementable innovative solutions in legal mandates of ENTSO-E and within TSOs business. To foster and realise innovative solutions, ENTSO-E will continue supporting discussion on improvements regarding the current regulatory framework.

ENTSO-E will also maintain strong cooperation with policy makers, regulators and stakeholders across the European research and innovation sphere for an enhanced stakeholder engagement. ENTSO-E participates in the EU endorsed European Technology & Innovation Platforms on Smart Networks for Energy Transition Platform (ETIP SNET) and other activities under the umbrella of the European Commission's Strategic Energy Technology plan.

In 2023, ENTSO-E will continue to facilitate proposals for the HorizonEurope calls and foster TSO participation in European RDI projects and ETIP SNET together with strategic stakeholders.

ENTSO-E is involved in the following EU funded projects:

1. INTERRFACE (2019 – 2023), which gathers 42 partners – TSOs, DSOs, aggregators, and IT providers – to conceive a digital solution to support new flexibility markets. Participating TSOs are Elering, AST, Fingrid, ESO, Transelectrica, Eles and REN.

2. OneNet (2020 – 2023), the largest project of its kind with 72 partners, of which 14 are TSOs. The main objective of the project is to develop an open and flexible architecture to make the European electricity system smarter and more efficient. The two abovementioned projects are aiming at investigating how the local flexibility markets could be most efficiently connected to the wholesale markets with strong focus on the TSO – DSO coordination. OneNet picks up the work done in the INTERRFACE and CoordiNet projects bringing closer the flexibility platforms' deployment into the business environment.

3. BD4NRG (2021 – 2024), which consists of 34 partners, among those TSOs are ELES and REN. The project aims at evolving, upscaling and demonstrating an innovative energy-tailored Big Data Analytics Toolbox.

4. READY4DC (2022 – 2023), in which 7 partners (among those the TenneT as TSO as well as WindEurope and T&D Europe) have established an open community of experts to reach consensus on the way towards technical and legal changes for the development of multi-vendor HVDC systems in Europe.

5. IntNET (2022 – 2025), which consists of 12 partners (among those ENTSO-E stakeholders E.DSO and Florence School of Regulation) and aims to create a common knowledge base for interoperability activities on energy services in Europe and to develop a comprehensive and accepted Interoperability Maturity Model.

6. New Network Codes, Guidelines and Regulations

Network Code Demand Response

On 1 June 2022 the European Commission (hereafter “the Commission”) invited ACER to submit framework guidelines for the development of a network code on Demand Response based on Article 59(1)(e) of Regulation (EU) 2019/943 of 5 June 2019 on the internal market for electricity. This Article empowers the Commission to establish a network code with rules implementing Article 57 of this Regulation and Articles 17, 31, 32, 36, 40 and 54 of Directive (EU) 2019/944 in relation to demand response, including rules on aggregation, energy storage, and demand curtailment rules.

ENTSO-E expects ACER to submit these framework guidelines in December 2022 and the Commission to consequently request ENTSO-E and the EU DSO Entity to submit a proposal of network code in early 2023. This will imply to convene a drafting committee with relevant stakeholders as per Article 59(10) of Regulation (EU)2019/943, and to set up a TSO-DSO development team as per the Memorandum of Understanding between the two associations. In parallel of this drafting process, it will be equally important to assess the potential impact of new rules on the existing network codes and guidelines with the view to ensure legal security and applicability. Such impact assessment could lead to the development of amendment proposals.

Network Code Cybersecurity

On 23 July 2021 the European Commission requested ENTSO-E to work in close collaboration with EU DSO entity and in accordance with Article 59 (9) of Regulation (EU) 2019/943 of 5 June 2019 on the internal market for electricity, to submit a proposal for a Network Code on Cybersecurity (hereafter “NCCS”) aspects of cross-border electricity flows, including rules on risk assessments, common minimum requirements, planning, monitoring, reporting and crisis management to ACER for their review by 14 January 2022. ACER submitted the NCCS to the Commission on 14 July 2022 followed by the Comitology process.

In 2023 it is expected for the NCCS to be finalised and into force. During 2023 all the entities falling under the scope of this Network Code shall perform activities to comply with the legal obligations. For ENTSO-E in close collaboration with the EU DSO entity that would mainly but not exclusively mean the activities on:

- › establishing the Cybersecurity Risk Working Group;
- › collaborating with the Stakeholders through the work of the Cybersecurity Risk Working Group, Electricity Coordination Group and bilateral channels;
- › developing risk assessment methodologies;
- › developing harmonised procurement requirements;
- › developing harmonised incident classification scale methodology;
- › developing transitional electricity cybersecurity impact index;
- › developing transitional list of European and international standards and controls.



Implementing Acts Data Interoperability

ENTSO-E is part of the drafting team developing the implementing acts on interoperability requirements and procedures for access to data, to be adopted by the European Commission as required by Article 24(2) IEM Directive. The implementing acts shall include:

- › a part on metering and consumption data (that was drafted in 2022);
- › a part on master data (due in 2023);
- › a part on customer switching (due in 2023); and
- › a part on demand response and other services (due in 2023).

As part of the general interoperability requirement, if the European Commission mandates it, the cooperation foreseen between the ENTSO-E and EU DSO entity may take the form of a Joint Working Group, extensively consulting with all relevant stakeholders, including representatives of national regulatory authorities, consumer associations, electricity retailers, European standardisation organisations, service and technology providers, and equipment and component manufacturers.

Tasks of Joint Working Group:

1. developing guidance to assist Member States in the reporting of national practices;
2. collecting the reports of national practices provided by Member States regarding the implementation of the reference model;
3. publishing the reports of national practices in a publicly available repository which shall be kept up to date;
4. assisting the Commission in the monitoring of the implementation of the reference model included in this Regulation and its further development as a result of regulatory, market or technology changes, and support the Commission, upon its request, in developing, as part of future implementing acts.

7. Cooperation on the Transmission & Distribution Interface

Article 30(1)(g) of Regulation (EU)2019/743 requires ENTSO-E to cooperate with the EU DSO Entity and distribution system operators. Similarly, Article 55(2)(b) of Regulation (EU) 2019/943 requires the EU DSO Entity to cooperate with ENTSO-E in various areas pertaining to the planning and operation of the transmission and distribution systems. Considering this legal mandate, ENTSO-E and the EU DSO Entity have concluded a Memorandum of Understanding in 2022 which further specifies the modalities of their cooperation.

Against this background, ENTSO-E intends to strengthen its cooperation with the EU DSO Entity in the following areas for next year, in addition to the cooperation on the development of network codes and guidelines (see chapter 6):

- › On system planning, ENTSO-E will further involve the EU DSO Entity in the Ten-Year Network Development Plan 2024 besides common scenarios building and identify best practices on TSO-DSO coordination related to network development and planning;
- › On system operation, ENTSO-E will organise technical exchanges on the implementation of national frameworks for grid and market data exchanges;

- › On cyber-resilience, ENTSO-E intends to develop joint activities in the areas of cyber-resilience risk assessment, preparedness of system operators for managing outages caused by failing or corrupted connected systems, and behaviour of such connected systems during containment and restoration processes;

The frequency and format of this knowledge sharing initiatives might evolve according to the topic: public event, technical workshops, joint report etc.

8. Interoperability and Data

ENTSO-E maintains the Electronic Data Interchange (EDI) library and Common Grid Model Exchange Standard (CGMES) library, which gather documents and definitions for the harmonisation and implementation of standardised electronic data interchanges between actors in the electrical industry in Europe. ENTSO-E also maintains and develops the tooling needed for data exchange harmonisation.

Main activities in 2023 will include the development of the Common Information Model and implementation guides to support data exchanges required from the Network Codes and Clean Energy Package, production of international standards, maintenance of the harmonised electricity role model and training activities for the TSO-RCC community.



9. Monitoring and Reporting activities

Related to the System Operation,

ENTSO-E continues to fulfil the reporting obligations according to Art. 15 of the Commission Regulation (EU) 2017/1485 (SOGL) for the incident classification scale and Art. 16 SOGL for the load frequency control annual reports. ENTSO-E will also ensure monitoring of Synchronous Area (SA) on Dynamic Stability Assessment (DSA) as implementation of Arts. 38 and 39 SOGL.

Furthermore, ENTSO-E will support all TSOs in the preparation of the biennial report on the Probabilistic Coordinated Security Assessment in accordance with Art. 44 of the Methodology for coordinating operational security analysis (CSAm) which stems from Art. 75 SO GL and covering the progress towards the probabilistic risk assessment (PRA) by 2027. In addition, ENTSO-E will be supporting TSOs to gather and improve the quality of PRA data over 2023.

Regarding the RCCs,

ENTSO-E will publish an annual report on regional coordination assessment, based on the annual reports on regional coordination assessment provided by the regional RCCs, and in accordance with article 17 SOGL. Furthermore, ENTSO-E will facilitate the coordination of new transparency and reporting obligations for RCCs according to the Regulation (EU) 2019/943 Arts. 37 and 46. In particular, according to

its Art. 41(2) on the transparency of all relevant documentation on the websites of ENTSO-E and RCCs, Art. 46(3) on the annual report by RCCs on the outcome of the continuous monitoring, and Art. 30(2) on the ENTSO-E report to ACER on the shortcomings identified regarding the establishment and performance of RCCs, based on the inputs provided by RCCs.

Related to the Market activities,

All relevant NEMOs and TSOs will provide a yearly report to the regulatory authorities explaining the costs of establishing, amending, and operating single day-ahead and intraday coupling in accordance with Art. 80 of the CACM Regulation. In addition, ENTSO-E will produce the biennial report on capacity calculation and allocation covering Arts. 82(2)(b) and 31 CACM as well as Art. 63(1)(c) and 26 of the FCA Regulation. Furthermore, ENTSO-E will publish a yearly

market report covering the implementation and operation of balancing, day-ahead and intraday and long-term markets. This report will contain the short version of the balancing report according to Art. 59(2)(b) of the Commission Regulation (EU) 2017/2195 (EBGL). A yearly report pursuant to Art. 23 EBGL will be prepared and will focus on the costs of establishing, amending, and operating the European balancing energy platforms.

Related to the grid Connection Network Codes (CNC),

ENTSO-E continues monitoring the CNC Implementation in each Member State. An annual report is produced by the end of each year consolidating the findings of each CNC.

In December 2022, ENTSO-E will provide the fourth edition of the Implementation Monitoring report, in which potential divergences of national implementations will be highlighted.

Related to the TSO–DSO Interface,

Pursuant to Art. 55(2) of the Regulation (EU) 2019/943, and in line with the Memorandum of Understanding mentioned in section 6, ENTSO-E will cooperate with the EU DSO Entity on the monitoring of the implementation of network codes and

guidelines which are relevant to the operation and planning of distribution grids and the coordinated operation of the transmission networks and distribution networks.

A complete overview of Network Codes Monitoring Reports can be found on [ENTSO-E website](#).

Annexes



Annex 1 – List of Abbreviations

ACER	Agency for the Cooperation of Energy Regulators	ECCo SP	ENTSO-E's Communication and Connectivity Service Platform
aFRR	automatic Frequency Restoration Reserves	EG	Expert Group
AWP	Annual Work Programme	ENTSO-E	European Network of Transmission System Operators
BZ	Bidding zone	ENTSOG	European Network of Transmission System Operators for Gas
CACM Regulation	Regulation (EU) 2015/1222 establishing a guideline on capacity allocation and congestion management	ERAA	European resource adequacy assessment
CBA	Cost Benefit Analysis	ETIP SNET	European Technology & Innovation Platforms on Smart Networks for Energy Transition Platform
CC	Capacity Calculation	EU	European Union
CCR	Capacity Calculation Region	FCA Regulation	Regulation (EU) 2016/1719 establishing a guideline on forward capacity allocation
CGM	Common Grid Model	FSKar	Financial Settlement of KΔf, ACE and ramping period
CGMES	Common Grid Model Exchange Standard	HVDC	Regulation (EU) 2016/1447 establishing a network code on requirements for the grid connection of high voltage direct current systems and direct current-connected power park modules
CM	Capacity Mechanism	IEM Directive	Directive (EU) 2019/944 on the internal market for electricity
CNC	Connection Network Code	IEM Regulation	Regulation (EU) 2019/943 on the internal market for electricity
CSA	Coordinated Security Analysis	IGD	Implementation Guidance Document
CSAM	Coordinated Security Analysis Methodology	IGM	Individual Grid Model
CZC	Cross-zonal capacity	IN	Imbalance netting
DCC	Regulation (EU) 2016/1388 establishing a Network Code on Demand Connection	ITC	Inter Transmission System Operator Compensation
DSF	Demand Side Flexibility	LMP	Local Marginal Pricing
DSO	Distribution System Operator		
EAS	European Awareness System		
EB GL	Regulation (EU) 2017/2195 establishing a guideline on electricity balancing		

mFRR	manual Frequency Restoration Reserves	Risk Preparedness Regulation	Regulation (EU) 2019/941 on risk-preparedness in the electricity sector
NC DSR	Network Code on Demand Side Response	RPP	Risk Preparedness Plan
NC ER	Regulation (EU) 2017/2196 establishing a network code on electricity emergency and restoration	RSC	Regional Security Coordinator
NCCS	Network Code on Cybersecurity	SAFA	Synchronous Area Framework Agreement
NEMO	Nominated Electricity Market Operators	SOGL	Regulation (EU) 2017/1485 establishing a guideline on electricity transmission system operation
NRA	National Regulatory Authority	SOR	System Operation Region
OPC	Outage Planning Coordination	STA	Short-term Adequacy Analysis
OPDE	Operational Planning Data Environment	TEN-E Regulation	Regulation (EU) No 2022/869 on guidelines for trans-European energy infrastructure
PCN	Physical Communication Network	TP	Transparency Platform
RCC	Regional Coordination Centre	Transparency Regulation	Regulation (EU) No 543/2013 on the submission and publication of data in electricity markets
RDI	Research, Development and Innovation	TSOs	Transmission System Operators
RfG	Regulation (EU) 2016/631 establishing a network code on requirements for grid connection of generators	TYNDP	Ten-Year Network Development Plan
RG CE	Regional Group Continental Europe		

Annex 2 – List of Deliverables

Topic	Regulation	Article	Level 1 Article content/activity	Type of task	J	F	M	A	M	J	J	A	S	O	N	D
MARKETS																
BZ	Reg 2019/943	A.14(6)	Bidding Zone review*	legally-mandated all TSOs												
BZ	Reg 2019/943	A.14(2)	Bidding Zone technical report	legally-mandated EE												
CACM	Reg 2015/1222	A.10	Day-to-day management of the single day-ahead and intraday coupling	legally-mandated all TSOs												
CACM	Reg 2015/1222	A. 55.3	Intraday auctions in accordance to ACER decision on Intraday capacity pricing	legally-mandated all TSOs												
CACM	Reg 2019/943	A. 8.4	Implementation of 15 minutes products in ID and DA	legally-mandated all TSOs												
CACM	Reg 2015/1222	A.15(1)	Capacity Calculation Region Assessment	legally-mandated all TSOs												
CACM	Reg. 2015/1222	A. 73.1	Congestion Income Distribution	legally-mandated all TSOs												
CACM	Reg. 2015/1222	A. 43.1	Scheduled Exchanges Methodology (amendment due to 15 min)	legally-mandated all TSOs												
CACM	New rules		CACM amendments	legally-mandated EE												
EB	Reg 2017/2195	A. 20.6	Implementation of mFRR Platform*	legally-mandated all TSOs												
EB	Reg 2017/2195	A. 21.6	Implementation of aFRR-Platform*	legally-mandated all TSOs												
EB	Reg 2017/2195	A. 22.5	Implementation of IN-Platform	legally-mandated all TSOs												
EB	Reg 2017/2195	A. 23.1	Report on costs of establishing, amending and operating European balancing platforms	legally-mandated all TSOs												
EB	Reg 2017/2195	A. 38.3	Harmonisation of CZC allocation process for the exchange of BC or sharing of reserves*	legally-mandated EE												
FCA	Reg. 2016/1719		Update of the FCA methodologies to introduce Long Term Flow based (1 October 2022 for Single Allocation Platform requirements (FCA Article 49), Congestion Income Distribution (FCA Article 57), sharing costs to ensure firmness and remuneration of long-term transmission rights (FCA Article 61), and 1 March 2023 for Harmonised Allocation Rules (FCA Article 51)).	legally-mandated all TSOs												
FCA	Reg. 2016/1719	A 51	Update of the FCA methodologies to introduce Harmonised Allocation Rules (FCA Article 51)	legally-mandated all TSOs												
FCA	New rules		Contribution to FCA amendment process	legally-mandated EE												
Monitoring CACM	Reg 1222/2015	A. 80.2	Annual CACM cost report	legally-mandated all TSOs												

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Monitoring CACM	Reg 1222/2015	A. 82.2 A. 82.4 & A. 82.5	Monitor the implementation of single day-ahead and intraday coupling/(a) progress and potential problems with the implementation. Collect data from TSOs/CCRs based on the list of information agreed between ACER and ENTSO-E. Data is to be submitted following the go live of the methodologies in each CCR and on a six month basis following that. The data will be made available to ACER in order to complete its monitoring activities.	legally-mandated EE												
Monitoring CACM	Reg 1222/2015	A.31.2	Capacity Calculation and allocation report	legally-mandated EE												
Monitoring EB	Reg 2017/2195	A.59.2.b	European report on integration of balancing markets (High-level)	legally-mandated EE												
Monitoring EB	Reg 2017/2195	A.63.1	Monitoring of the implementation of the EB	legally-mandated EE												
Monitoring FCA	Reg 2016/1719	A.63.1 A.63.3 & A.63.4	Monitor the implementation of forward capacity allocation and the establishment of single allocation platform/(a) the progress and potential problems with the implementation. Collect data from TSOs/CCRs based on the list of information agreed between ACER and ENTSO-E. Data is to be submitted following the go live of the methodologies in each CCR and on a six month basis following that. The data will be made available to ACER in order to complete its monitoring activities.	legally-mandated EE												
Monitoring FCA	Reg 2016/1719	A.26.2	Capacity Calculation and allocation report	legally-mandated EE												
Other			Cooperation with third countries	other												
RCC	Reg 2019/943	A.37.1.k	ENTSO-E shall develop proposals for RCC tasks – Regional procurement of balancing capacity**	legally-mandated EE												
RCC	Reg 2019/943	A.37.1.l	ENTSO-E shall develop proposals for RCC tasks – Inter-TSO settlement	legally-mandated EE												
RCC	Reg 2019/943	A.37.1.o	ENTSO-E shall develop proposals for RCC tasks – Maximum Entry Capacity	legally-mandated EE												
TP			Continuation of TP back-end architecture and front-end implementation	legally-mandated EE												
TP			TP development potentially to become an Inside Information Platform	legally-mandated EE												
TP			TP development for CACM Amendment requirements**	legally-mandated EE												
TP	Reg. 2015/1222, Reg. 2016/1719	A.82.4 A.63.3	Development of the TP for the ACER data provision purposes. The TP will be used for monitoring activities according to the list of information required by Art. 82 of the CACM Regulation and by Art. 63 of the FCA Regulation. Data from the different CCRs will become available as more and more capacity calculation methodologies go live in the different CCRs.	legally-mandated EE												

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OPERATIONS																
SOGL	Reg. 2017/1485	A.114	Operate an ENTSOE operational planning data environment for the storage, exchange and management of all relevant information for the CGM Business Process.*	legally-mandated EE												
NCCS			Development of methodologies (including public consultation, alignment with Stakeholders, drating etc.).	legally-mandated all TSOs												
NCCS			Performance of the union wide and regional risk assessment including the report	legally-mandated all TSOs	The exact timeline of work is not known yet.											
NCCS			Develop a transitional list of high-impact and critical-impact processes.	legally-mandated EE	The exact timeline of work is not known yet.											
New rules on Demand Response	Reg. 2019/943	Article 59.1e (NC DSR)	Rules implementing Article 57 of this Regulation and Articles 17, 31, 32, 36, 40 and 54 of Directive (EU) 2019/944 in relation to demand response, including rules on aggregation, energy storage, and demand curtailment rules	legally-mandated EE												
PCN	Reg. 2017/2196	A.41	Communication Systems for the restoration plans/ needs. The Physical Communication Network (PCN) is an asset required to be operational to ensure the 24h communication services during an emergency state	legally-mandated all TSOs												
RCC	Reg 2019/943	A.30(2)	Report to ACER on shortcomings identified regarding the establishment and performance of regional coordination centres.	legally-mandated EE												
RCC	Reg 2019/943	A.37.1.b	ENTSO-E shall develop proposals for RCC tasks – Coordinated Security Analysis	legally-mandated EE												
RCC	Reg 2019/943	A.37.1.c	ENTSO-E shall develop proposals for RCC tasks – Common Grid Model	legally-mandated EE												
RCC	Reg 2019/943	A.37.1.d	ENTSO-E shall develop proposals for RCC tasks – Consistency defense and restoration plans	legally-mandated EE												
RCC	Reg 2019/943	A.37.1.e	ENTSO-E shall develop proposals for RCC tasks – Short term adequacy	legally-mandated EE												
RCC	Reg 2019/943	A.37.1.f	ENTSO-E shall develop proposals for RCC tasks – Outage Planning Coordination	legally-mandated EE												
RCC	Reg 2019/943	A.37.1.g	ENTSO-E shall develop proposals for RCC tasks – Training	legally-mandated EE												
RCC	Reg 2019/943	A.37.1.h	ENTSO-E shall develop proposals for RCC tasks – Supporting restoration	legally-mandated EE												
RCC	Reg 2019/943	A.37.1.i	ENTSO-E shall develop proposals for RCC tasks – Post-disturbance analysis	legally-mandated EE												
RCC	Reg 2019/943	A.37.1.j	ENTSO-E shall develop proposals for RCC tasks – Regional sizing of reserve capacity**	legally-mandated EE												
RCC	Reg 2019/943	A.41(2)	ENTSO-E and RCCs shall operate transparently and Publish documents on websites, full transparency towards stakeholders	legally-mandated EE												

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RCC	Reg 2019/943	A. 46 (3)	Receive the RCC Annual Report	legally-mandated EE												
RPP	Reg. 2019/941	A. 6	RPP crisis scenarios identification (update every 4 years)	legally-mandated EE												
SOGL		A. 65	Common list of year-ahead scenarios against which TSOs assess the operation of the interconnected transmission system for the following year**	legally-mandated all TSOs												
SOGL	Reg. 2017/1485	A.14.2	Comprehensive, standardised format, digital data archive of the information required by ACER*	legally-mandated EE												
SOGL	Reg. 2017/1485	A.15	Annual incident classification scale report	legally-mandated EE												
SOGL	Reg. 2017/1485	A.16	Annual report on load-frequency control	legally-mandated EE												
SOGL	Reg. 2017/1485	A.17	Annual report on regional coordination assessment	legally-mandated EE												
SOGL Regional	Reg. 2017/1485 Reg. 2017/2196	SOGL A.13/A.118 E&R A.10	Agreements for Future Synchronous Operation between Continental Europe TSOs and Ukrenergo/ Moldelectrica	legally-mandated all TSOs												
SOGL Regional	Reg. 2017/1485 Reg. 2017/2196	SOGL A.13/A.118 E&R A.10	Agreement for Synchronous Operation between Continental Europe TSOs and KOSTT	legally-mandated all TSOs												
SOGL Regional	Reg. 2017/1485 Reg. 2017/2195 Reg. 2017/2196	SOGL A.13/A.118 EBGL A. 50, 51 E&R A.10	RG CE: Implementation of SAFA methodologies (including FSKar)	legally-mandated all TSOs												
SOGL/CSAM	Reg. 2017/1485	A. 75.1/A.44.1	Report on status on probabilistic risk management approaches and maturity	legally-mandated EE												
TSO – DSO	Reg. 2019/943	Article 30.1g (TSO-DSO)	Cooperate with distribution system operators and the EU DSO entity	legally-mandated EE												
RDI																
RDI			INTERRFACE project work	grant agreement												
RDI			OneNet project work	grant agreement												
RDI			READY4DC project work	grant agreement												
RDI			IntNET project work	grant agreement												
RDI	Reg. 2019/943	Art. 30.1/i.	RDI Monitoring Report	legally-mandated EE												
RDI	Reg. 2019/943	Art. 30.1/i.	RDI Roadmap 2024–2034	legally-mandated EE												
RDI			Initiation of projects based on the ongoing programmes	other												
RDI	Reg. 2019/943	Art. 30.1/i	Development of programmes	legally-mandated EE												
RDI			BD4NRG project work	grant agreement												

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SYSTEM DEVELOPMENT																
Adequacy	Reg 2019/943	A. 23	ERAA (European Resource Adequacy Assessment)*	legally-mandated EE												W
Adequacy	Reg 2019/943	A. 30.1m	Summer Outlook	legally-mandated EE						W						
Adequacy	Reg 2019/943	A. 30.1m	Winter Outlook	legally-mandated EE												W
DC	Reg. 2016/1388	A. 56	Non-binding guidance on implementation of DC NC, explaining technical issues, conditions and interdependencies	legally-mandated EE												
HVDC	Reg. 2016/1447	A. 75	Non-binding guidance on implementation of HVDC NC, explaining technical issues, conditions and interdependencies	legally-mandated EE												
HVDC	Reg. 2016/1447	A. 76.2	HVDC List of information to ACER	legally-mandated EE												
RCC	Reg 2019/943	A. 37.1.p	ENTSO-E shall develop proposals for RCC tasks – Need for new infrastructures	legally-mandated EE												
RfG	Reg. 2016/631	A. 58	Non-binding guidance on implementation of RfG NC, explaining technical issues, conditions and interdependencies	legally-mandated EE												
RfG	Reg. 2016/631	A. 59.2	RfG List of information to ACER	legally-mandated EE												
RfG, DC, HVDC	Reg. 2016/631, 2016/1388, 2016/1447	A. 59.1, A. 57.1, A. 76.1	Monitoring (analysis and preparation of report) – joint CNCs report	legally-mandated EE												
RfG, DC, HVDC	Reg. 2016/631, 2016/1388, 2016/1447	A. 7.3.f & preamble 27, A. 6.3.f & preamble 17, A. 5.3.f & preamble 13	Monitoring of existing and under development standards	legally-mandated EE												
RfG, DC, HVDC	Reg. 2016/631, 2016/1388, 2016/1447		CNC amendment	legally-mandated EE	ACER's process on the grid connection NCs amendment											
TYNDP	Reg 2019/943	A. 30.1b	Cost Benefit Analysis methodology continuous improvements and preparation for new Ten-E requirements*	legally-mandated EE												
TYNDP	Reg 2019/943	A. 30.1b	Scenarios 2024: methodologies, building and preparation for draft release	legally-mandated EE	The exact timeline of work is not known yet.											
TYNDP	Reg 2019/943	A. 30.1b	Initiation of TYNDP 2024 planning studies: governance, innovation, construction of models, methodologies	legally-mandated EE												
TYNDP	Reg 2019/943	A. 30.1b	TYNDP 2024: selection of projects	legally-mandated EE												
TYNDP	Reg 2019/943	A. 30.1b	TYNDP 2024: preparation for new TEN-E requirements (offshore, sector coupling)	legally-mandated EE	The exact timeline of work is not known yet.											
TYNDP	TEN-E	A.15.2	Offshore Network Development Plans*	legally-mandated EE												

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