

ENTSO-E

Annual Work Programme

ENTSO-E's work on legal mandates – 2022 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

This Annual Work Programme (AWP) covers the period from January to December 2022. 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 42 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.

While delivering legally mandated tasks, ENTSO-E also aims at supporting policy objectives, in particular the Green Deal, on a pan-European level. This ambition concerns all aspects of the ENTSO-E's work as the increase of variable renewable generation, the electrification of several sectors, among others impact all TSOs' activities. Concretely, this evolution has led, for example, TSOs at enhancing forecast, planning and regional coordination of real time operations. It has also pushed to the introduction of new products on the energy markets as well as enhanced coordination with Distribution System Operators (DSOs) to develop new flexibility services. With the planning and the research and development sides, ENTSO-E and TSOs are anticipating the impact of achieving a carbon-neutral European energy system by 2050. Examples

of ENTSO-E and TSOs' involvement towards this objective are highlighted in green boxes along this document.

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.

In accordance with Art. 32(2) of Regulation (EU) 2019/943 on the internal market for electricity (IEM Regulation), the AWP 2022 was published for consultation from 05 July to 20 August 2021. Following the public consultation, it was submitted to ACER for opinion in October 2021.

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 tasks, Chapter 6 describes the tasks for cooperation on the Transmission & Distribution Interface (i.e. cooperation between ENTSO-E and DSOs and EU DSO Entity), Chapter 7 explains the upcoming tasks on cybersecurity, interoperability and data and finally, Chapter 8 presents monitoring activities associated to the above mentioned topics. The annex provides the list of abbreviations used within this document. Furthermore, the individual chapters are linked with a colour code to their respective regulation:

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

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

REGULATION (EU) No 347/2013 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 (SOGI) sets out harmonised rules on how to ensure security of supply through efficient grid operation in a variable renewables paradigm. The implementation of the SOGI and the methodologies that stem from it entails several tasks for 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 SOGI, 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 Security Coordinators (RSCs). New common hours will be published if there is a need for amending the current ones (default hours) as the process is further implemented.

Network Code Emergency & Restoration

The legal mandates from the Regulation (EU) 2017/2196 establishing a network code on electricity emergency and restoration (NC ER) were fulfilled in December 2020, the publication of the report of harmonization for rules of Market suspension being the last mandate. In 2022, TSOs are

pursuing 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.

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 2022, the work on elaboration of the relevant procedures and essential system checks for the synchronous operation will continue.

Coordination with 3rd country TSOs¹

The Agreement for the Synchronous Operation between Continental Europe TSOs and TEIAS, the Turkish TSO, is updated to provide for compliance with the Operational Framework of Continental Europe TSOs. Entry into force of a similar agreement with Ukrenergo, the Ukrainian TSO, regarding the Burshtyn Island synchronous operations with Continental Europe is expected by mid-2021. Both agreements will trigger work for their implementation in 2021 and 2022.

At the end of 2021, based on the results of ongoing studies (both static and dynamic), decisions are expected to be made regarding the measures to be implemented to ensure the dynamic stability of the interconnections with Ukraine and Moldova, and whether it will be a pure synchronous, a pure DC or a hybrid AC/DC connection. The Agreement for the Future Synchronous Operation between Continental Europe TSOs and Ukrenergo/Moldelectrica is expected to be updated accordingly by the end of 2021. Island operation tests of the Ukrainian/Moldova power system are planned in 2022.

European Awareness System

ENTSO-E is in charge of the European Awareness System (EAS) development and upgrades in collaboration with hosting entities and the software supplier. For 2022, key activities planned are finalisation of specifications for the new EAS and commencing the tendering process.

In order to support the future needs of data exchange between TSOs and the EAS, the migration process from ENTSO-E Electronic Highway to the new ENTSO-E pan-European Physical Communication Network (PCN) will be facilitated and rolled out.

Risk Preparedness Regulation

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

The ECG provided amendments recommendation to the ENTSO-E in March 2021, according to Art. 6(2) Risk Preparedness Regulation. Consequently, in 2021, the ENTSO-E Working Group on the Risk Preparedness is to assess how each of nine provided recommendations is to be treated and whether their merit call for the update of the Methodology on the assessment of regional electricity crisis scenarios. If it will be decided that the Methodology is to be updated, this work will extend to 2022.

As prescribed in the Art. 8.2 of the corresponding Methodology: “(...) ENTSO-E shall publish a report assessing whether there would be the need for the development of necessary computational methods and tools to be used as a pan-European method for the assessment of regional electricity crisis scenarios.” Therefore, in 2021 works on this report is carried out and potential development of computational tools or any other products, will in consequence take place in 2022.

¹ Legally speaking, the category of ‘3rd country TSOs’ should be understood as the group of all the TSOs which are not located in the EU where the Regulation (EC) N° 2019/943 requires them to collaborate through ENTSO-E. As ENTSO-E membership goes beyond the EU and counts 42 TSOs from 35 countries, the term “3rd Country TSOs” refers to the group of all the TSOs that are not ENTSO-E members (full Member, Associated Member or Observer Member under the terms defined in ENTSO-E’s Articles of Association).



Physical Communication Network

The PCN² which consists in communication lines and routers will be deployed by end of 2021 and will be ready for the Electronic Highway migration in 2022. The migration from Electronic Highway will be finalised, allowing for exchange of real-time data between TSOs and Regional Coordination Centres (RCCs). In addition, the PCN will be used by the Common Grid Model (CGM) Build Process and ENTSO-E's

Operational Planning Data Environment (OPDE) Platform. Over the course of 2022, the deployment of additional services, such as Balancing Platforms, will be assessed.

ENTSO-E will continue the monitoring, compliance and development of service provision of the EAS according to Art. 30(1)(i)(ii) IEM Regulation.

Common Grid Model

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).

With the Minimum Viable Solution Go-Live of the CGM Build Process scheduled by end of 2021, the following capability for pan-European exchange of network model data between TSOs and RSCs as set out by the EU under various Network Codes will be in operation:

- › TSOs exchanging Individual Grid Models (IGMs),
- › RSCs merging these IGMs into a CGM,
- › using the PCN, ENTSO-E's Communication and Connectivity Service Platform (ECCo SP), ENTSO-E's OPDE Platform, and
- › the Common Grid Model Exchange Standard (CGMES).

The constitute parts for operating the CGM Build Process are prerequisites for several services harmonised in the Network Codes, including short- and long-term Capacity Calculation (CC), CSA, Outage Planning Coordination (OPC) and Short-term Adequacy Analysis (STA). The Minimum Viable Solution Go-Live of the CGM Build Process will be a key enabler for the migration of the above-mentioned services to the CGMES and/or ENTSO-E's OPDE.

With the cutover to live operations expected at the end of 2021, the CGM Build Process using the All TSO IT communication network for Operational and Market related data via PCN, ECCo SP and ENTSO-E's OPDE Platform will be operational. In 2022, the CGM Build Process and underlying platforms will be operated, maintained and the migration of further services will be supported.

² 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.

Regional Coordination Centres

The year 2022 will be critical for the RSCs due to their transition to RCCs by 1 July 2022³.

The implementation of the RSC services from SOGL is still ongoing:

- › STA and OPC is in operation, but continuously updated
- › CGM: With the Go-Live of the CGM Build Process by end 2021, the RSCs begin to merge IGMs provided by TSOs over OPDE into pan-European CGMs.
- › CC and CSA: the services are under implementation in the regions according to regional methodologies.
- › 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 monitoring and coordinating role in implementation of also regional services.

6 RSCs

- Coreso (2008)
- TSCNET (2008)
- SCC (2015)
- Nordic RSC (2016)
- Baltic RSC (2016)
- SEleNe CC (2020)

■ Services obtained from several RSCs

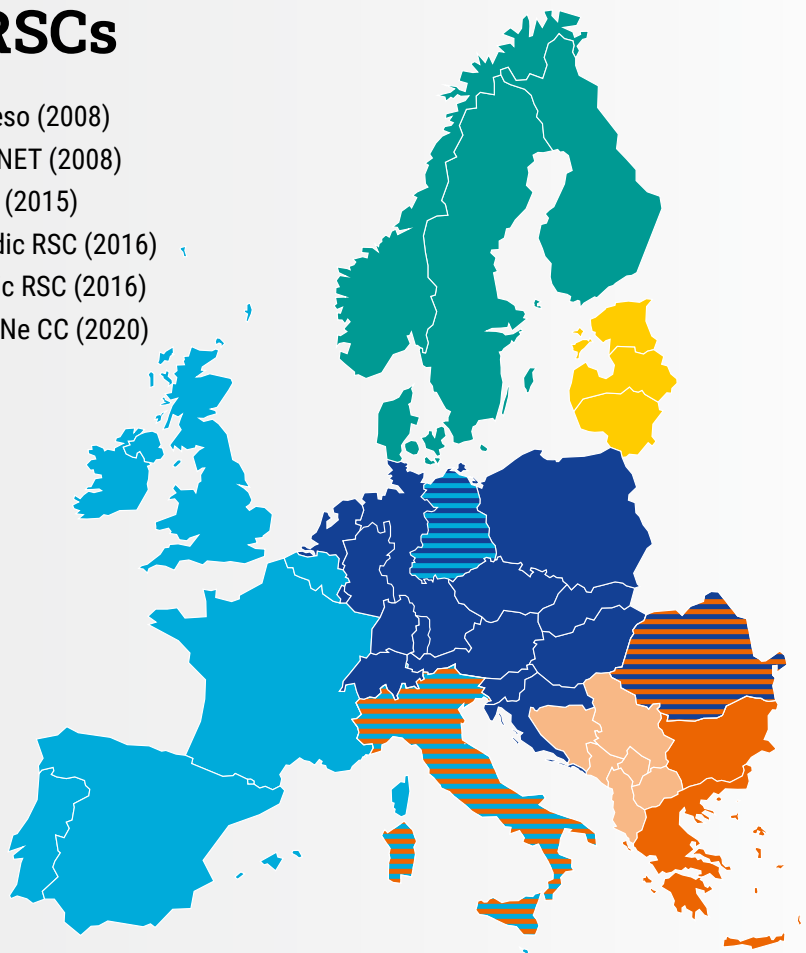


Figure 1: Geographical scope of the Six Regional Security Coordinators established according to SO GL

³ 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, which enter into operation 1 July 2022. The IEM Regulation further specifies more detailed regulations for the establishment, implementation and performance of the RCCs.

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, ENTSO-E will set up the initial framework for RCC collaboration as required by Art. 30(1)(e) of IEM Regulation. This framework will be implemented and used in 2022 and onwards to ensure smooth collaboration between RCCs, TSOs, ENTSO-E as well as external stakeholders. The IEM Regulation introduces new requirements for reporting and stakeholder engagement outlined further below will be aligned in 2022 through the new framework.

Specifically, on 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 such as facilitating the regional procurement of balancing capacity (Art.37(1)(k) of IEM Regulation), which is market related, and the Ten-Year Network Development Plan (TYNDP) related task (Art.37(1)(p) of IEM Regulation), which is of course related to system development.

The vast majority of the System Operation tasks aim at improving operations and securing electricity supply by enhancing forecast, planning and regional coordination in order to cope with higher and higher volumes of variable RES and with the gradual phase out of conventional power plant in the system. This is key to achieving a carbon-neutral European energy system by 2050.



2 Market

Capacity Allocation and Congestion Management Guideline

CACM Regulation sets out the methods for calculating how much space can market participants use on cross border lines 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. Further, the CACM Regulation amendment process triggered in 2021 may have impact on some methodologies, which will have to be adapted to comply with the Guideline amendment. This amendment process may also trigger changes on other deliverables such as the CGM. The following paragraphs describe the tasks to be undertaken in 2022, as far as known from the existing CACM Regulation.

- › Single Day ahead Coupling and the Single Intraday Coupling governance (Art. 10 CACM Regulation): The go-live of the governance structure is expected in Q1 2022, after delayed due to the covid situation in 2020, and the focus made on the operation of the market coupling.
- › Intraday Auctions (Art. 55 CACM Regulation): The work on Intraday Auctions according to the decision from ACER on Pricing of intraday capacity will continue in 2022. The legal deadline for their implementation is 1st January 2023.
- › Cost sharing (Art. 74(7) CACM Regulation): ENTSO-E will coordinate the work by All TSOs of each capacity calculation region (CCR) to assess potential further harmonisation of the redispatching and countertrading cost sharing methodologies between the CCRs in 2022. ENTSO-E will help the CCRs identifying the areas where harmonisation could be achieved by organising information sharing sessions with the relevant experts of the CCRs.



- › 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 2022. ENTSO-E will review if there is any impact from the introduction of the 15-minutes products on the already developed methodologies before its implementation.
- › 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
- › ENTSO-E will continue in 2022 following and working with the TSOs on the implementation and the monitoring of the 70% obligation in capacity calculation (Art. 16 IEM regulation). Discussions and workshops for further alignment between TSOs, RCCs, ACER, National Regulatory Authorities (NRAs) and the EC will continue.
- › 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 Great Britain) will have to deliver data items resulting from locational marginal pricing (LMP) by 31 October 2021, that will be used as input for ACER to propose alternative configurations for the Bidding Zones Reviews of the different regions.
- › ENTSO-E prepared a framework agreement to organise the work on the LMP calculations joined by Central Europe, Iberian Peninsula, South-East Europe and Ireland TSOs. ENTSO-E also leads the coordination of all bidding zone regions in this delivery.

In 2022, ACER will decide on alternative configurations and ENTSO-E will continue its coordination role on the bidding zone reviews done by the bidding zone review regions, with the aim at delivering a final common report from all regions, one year after ACER decides on alternative configurations as established by the bidding zone review methodology.

The introduction of 15 min trades in Day Ahead and Intraday markets and their seamless application in Market Coupling across the entire EU will increase flexibility in the system and thus facilitate better use of energy from renewable sources.

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 currently planned to be complete at the pan-European level by the end of 2022 but some developments as the ones mentioned below could delay the completion.

Following NRAs request, the TSOs have worked in the preparation of a general description of potential new advanced long-term transmission rights which has been subject to a public consultation in 2021 to get insight of market participants

appetite for the introduction of new products called "year-ahead monthly blocks". Results of public consultation have been forwarded to NRAs for their assessment. Further developments and updates of relevant methodologies along 2022 will be undertaken following NRAs assessment of market participants' appetite for this evolution

ENTSO-E will review the FCA methodologies that may be affected by the implementation of flow based before its implementation.

Electricity Balancing Guideline

Regulation (EU) 2017/2195 establishing a guideline on electricity balancing (EB Regulation) lays down a detailed guideline on electricity balancing including the establishment of common principles for the procurement and the settlement of frequency containment reserves, frequency restoration reserves and replacement reserves and a common methodology for the activation of frequency restoration reserves and replacement reserves. 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 2022, ENTSO-E will continue advancing on the implementation of EB Regulation. In particular:

Co-optimised cross-zonal capacity (CZC) allocation process: in accordance with the methodology pursuant Art. 40(1) of the EB Regulation, all TSOs will use the findings from the investigations on the implementation impact assessment developed during 2021 to submit a set of business requirements to the NEMOs by June 2022.

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 CCR proposals submitted in accordance with Art. 41(1) and 42(1) EB Regulation.

Moreover, ENTSO-E will remain available to the CCRs to provide any needed support, as requested by them, for their drafting of the CCR methodology proposals on CZC calculation in the balancing time frame, in accordance with Art. 37(3) EB Regulation. ENTSO-E will ensure the necessary coordination and alignment among the CCRs and the stakeholders, when necessary.

In addition to drafting the all TSOs methodologies and supporting in the regional ones if requested, ENTSO-E will continue supporting the implementation and operation of the European balancing platforms. By early 2022, automatic Frequency Restoration Reserve Platform, and by mid-2022 manual Frequency Restoration Reserves Platform will go-live, completing the implementation of the four European balancing platforms. During 2022, TSOs will continue their accessions to the respective balancing platforms in accordance with the accession roadmaps being published bi-annually in the platforms' websites⁴. In addition, in Q1 2022 European balancing platforms shall implement the maximum and minimum price for all balancing energy product bids and the maximum and minimum value of the cross-border marginal price, in accordance with Pricing Methodology amendments (Art. 30(1) of EB Regulation) submitted for ACER approval in September 2021.

Moreover, all TSOs will continue working on the establishment on the capacity management module, a central module common to all balancing platforms proposed by all TSOs to increase the efficiency and robustness of the operation of the platforms. All TSOs will propose amendments to the implementation frameworks of the balancing platforms for their adaptation to consider the establishment of this capacity management module pursuant to Art. 12 of the manual Frequency Restoration Reserve and automatic Frequency Restoration Reserve Implementation Frameworks which were issued by ACER on 24 January 2020 and Art. 10.2 of the Imbalance Netting Implementation Frameworks which was issued by ACER on 24 June 2020, whereas the timing for these proposals will be determined in 2021. Following the regular practice, ENTSO-E will organise at least one public workshop on the European balancing platforms.

Capacity Mechanisms

On 5 July 2020, pursuant to Art. 26(11) IEM Regulation, ENTSO-E submitted a proposal to ACER containing the technical specifications (common rules, methodologies and terms of operation) for the implementation of direct cross-border participation in capacity mechanisms (CMs). On 22 December 2020, ACER published its Decision No 36/2020 approving the technical specifications, which include the terms of the operation of the registry for capacity providers as referred to in Art. 26(11)(e) IEM Regulation. Pursuant to Art. 26(15) IEM

Regulation, by 5 July 2021, ENTSO-E shall set up the registry and operate it.

In 2022, ENTSO-E will follow-up on the implementation of direct cross-border participation in CMs. This includes operating the registry developed by ENTSO-E for the storage, exchange and management of the data used in CMs relevant to cross-border participation processes.

⁴ The platforms' websites are accessible through www.entsoe.eu/network_codes/eb.

Inter-Transmission System Operator Compensation

The Inter Transmission System Operator Compensation (ITC) Agreement is a multiparty agreement concluded between ENTSO-E and ENTSO-E member countries. 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.

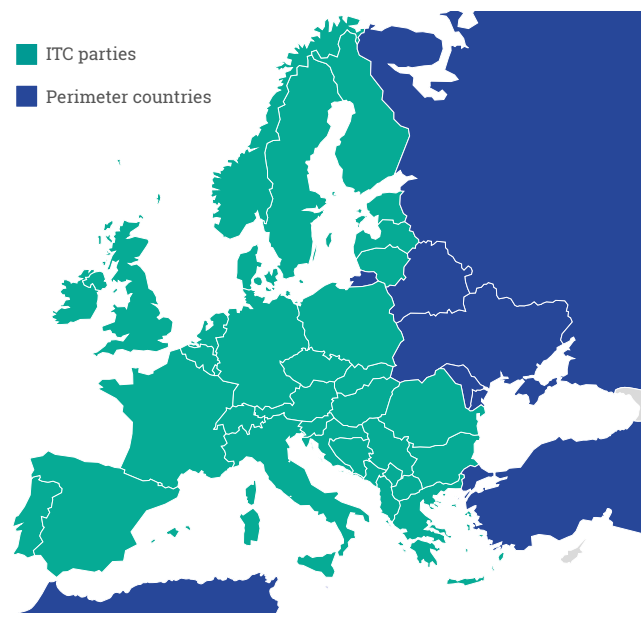


Figure 2: Map of ITC parties and Perimeter Countries

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, Turkey, 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 2022, 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.



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 347/2013 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. 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 2022 edition is expected to be published in December 2022. The TYNDP aims to provide 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 conditions of TSOs.

In the framework of the TYNDP 2022, the report on the Investigation of the System Needs will be developed, including both elements from the electricity and gas sector. This is in line with the holistic "one system vision" for system planning to

enable the development of efficient multi-layer, multi-player, cross-sector and cross-border coordination, cooperation, and integration.

In 2022, ENTSO-E and the European Network of TSOs for gas (ENTSO-G) will reinforce their collaboration with the EU DSO Entity in line with Art. 55(2)(b) IEM Regulation. ENTSO-E and ENTSO-G will also keep working on a new approach for the dual system assessment of relevant projects considering possible updates on TEN-E regulation (including a screening method to identify which electricity and gas projects have a significant impact on the each other sector and should be subjected to a dual system assessment). In the longer term, a multi-sectorial planning strategy in collaboration with the European industry should extend to considering how the Cost-Benefit Analysis (CBA) methodology should evolve to enable the assessment projects that link electricity with other sectors (in line with the "EU Strategy for Energy System Integration"⁵), for instance where synthetic gas made from renewables connected to the grid could be useful for a transport fleet, a peak electricity production unit or injected into the gas grid.



In the light of the reviewed TEN-E Regulation, the CBA methodology might be revised to include the new requirements by the end of 2022. The CBA methodology elaborated by ENTSO-E for electricity projects and approved by the EC – after consultation with ACER and the Member States – is meant to support the selection process of optimal solutions. They shall be fit for the future by providing clean, affordable, and secure energy for all Europeans. The potential work on the CBA Guideline will impact the redaction of the future editions of the TYNDP Implementation Guideline, and it will be considered starting from the version to be developed in 2023 for TYNDP2024.

The activity related to Scenarios building, in line with Annex V(1)(a) TEN-E Regulation, will see the public release of the final Scenario Building Report 2022 and the kick-off of the development of the storylines for the Scenarios 2024. Priorities in the scenario building process are an assessment of compliance with the Paris Agreement through an analysis of emission metrics and the continuous refinement of the inclusion of sectors, coupled within the whole energy system, through internal innovation and the interaction with the stakeholders.

5 COM(2020) 299 final.

Adequacy

The European Resource Adequacy Assessment

Under Art. 23 IEM Regulation, ENTSO-E has been mandated to perform a yearly European resource adequacy assessment (ERAA). 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 and will be the central reference point to take qualified decisions on strategic matters such as the introduction of CMs. '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 2022 will be the second 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 edition ERAA 2021. The latter is bringing significant methodological improvements comparing to the last mid-term adequacy forecast of 2020. As outcomes of the assessment, a report on ERAA 2022 will be released and consulted in November 2022. It will contain the findings of the study, provide a description of the process, input data, the main assumptions and methodological advancements.


ERAA 2022 main methodological improvements relate to further develop the economic viability assessment and the flow-based market coupling approach. The economic viability assessment evaluates the profitability of generators/flexible resources driving new build capacity or unit decommissioning decisions. The flow-based approach allows for better representation of the power flows in highly meshed grids where strong interdependences between interconnectors

exist. The CCRs showing these characteristics are already working in the implementation of this capacity calculation approach. The ENTSO-E foresees for ERAA a gradual implementation of the flow-based methodology in the relevant regions. Furthermore, ENTSO-E will continue building the pan-European Climate Database, a forward-looking climate projection database accounting for the impact of climate change. In the meantime, a temporary simplified climate change modelling will be used for ERAA 2022. ENTSO-E will as well evaluate approaches to model the sectoral integration in ERAA, building on the TYNDP experience.

The ERAA implementation roadmap to reach target methodology by 2023 is available on the ERAA page of ENTSO-E website and will be updated at yearly basis whenever needed, considering the ENTSO-E's gathered experience as well as ACER's and other Stakeholders' feedbacks. This roadmap shows the planned methodological improvements of following ERAA editions. It also considers the computational complexity of multiple target years and scenarios in which the target methodology is to be applied.

ENTSO-E endeavours to implement the ERAA in accordance with the timeline set out in the ERAA methodology. The implementation roadmap will be updated together with the release of the first European assessment (ERAA 2021), expected in November. This updated roadmap will highlight how ENTSO-E will involve all the relevant stakeholders (including ACER) in the long-term implementation process.

Seasonal outlooks

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 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 (e.g. the Climate Database, Pan-European Market Modelling Data base and demand forecast tool).

Long term planning and resource adequacy assessments provide mid-term monitoring as well as long term visions to achieve a carbon-neutral European energy system by 2050. This aims to support strategic orientations by authorities and investment decisions by various actors of the electricity market.



Grid 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 is preparing detailed proposals for amendments of the CNCs⁶. In 2022, ENTSO-E will liaise with ACER and the European Commission to discuss the proposals and identify the best possible process for the overall CNC amendments process in alignment with the relevant provisions of the IEM Regulation. Additional EGs will be initiated with a longer-term perspective.

ENTSO-E is planning to continue assessing the list of the Implementation Guidance Documents (IGDs) over 2022, according to Art. 58 RfG, Art. 56 DC and Art. 75 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 RfG, Art. 6.3.f DC NC and Art. 5.3.f HVDC NC. A continuous gap analysis will eventually support the overall CNC assessment, trigger the revision of some standards, and achieve better alignment between standards and Network Codes.

⁶ 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. This framework explains the intensive TSOs' work on preparing amendments to the CNCs.

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.

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.

Following the revision of the Manual of Procedure in 2021 aimed at integrating new TSO data publications stemming from the balancing implementation frameworks, and SOGL requirements, the TP will be populated with new datasets. New balancing datasets will appear from July 2022 while the SOGL related updated data publications will gradually become available on the TP in 2022.

The TP will be further used for monitoring activities according to the list of information required by Art. 82 CACM Regulation and Art. 63 FCA Regulation especially as more and more capacity calculation methodologies go live in the different CCRs.

Lastly, in order to facilitate the ever-increasing data publications, the architecture of the TP will also undergo some upgrades that will be delivered in subsequent packages and will not have an impact on data providers nor on the data users other than experiencing better performance with less frequent outages of the platform.

Publicly and freely available data play an important role in bringing transparency into the market. The datasets provide an easy opportunity to transparently follow the share of generation technologies of the different geographical areas.

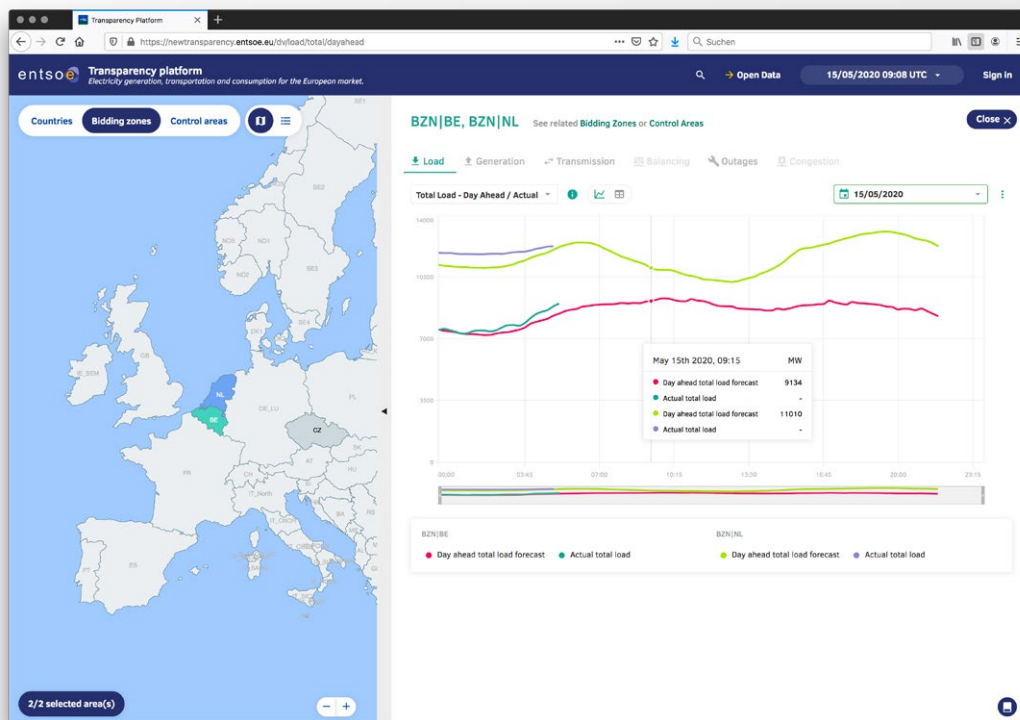


Figure 3: Transparency Platform

5. Research, Development & Innovation

From RDI Roadmap towards implementation

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. The RDI activities of ENTSO-E in 2022 will be based on the RDI Roadmap 2020 – 2030 (RDI Roadmap)⁷ reflecting the TSOs' research and innovation needs for the decade to come.

In 2021 as a continuation of the RDI Roadmap, ENTSO-E delivered the RDI Implementation Report 2020 – 2025⁸ to connect the milestones of the Roadmap with potential RDI projects. The Implementation Report examined the period of 2021 – 2025 to map the ongoing relevant European innovation projects, conduct a gap analysis and identify project ideas around agreed priority milestones.

The Implementation Report is followed by the RDI Monitoring Report, which aims to assess RDI activities in Europe's electricity sector against ENTSO-E's RDI Roadmap 2020 – 2030. In 2022 the preparation of the next RDI Monitoring Report will start by a gap analysis with the previous RDI Monitoring Report.

The Monitoring Report will also support the work of the newly set up Demonstration Innovation Coordination task force under the Research, Development and Innovation Committee of ENTSO-E. The role of this entity is to foster implementation of the RDI Roadmap by aiding Research, Development and Innovation Committee and the other business Committees of ENTSO-E to develop innovation programmes which can lead to real-life demonstrations and applications in the end. The RDI Roadmap 2020 – 2030, identified three major clusters and six Flagships for RDI activities (Figure 4). This framework will structure the Work Programme related to the RDI activities which will focus on the implementation of the planned actions through innovation flagship programmes:

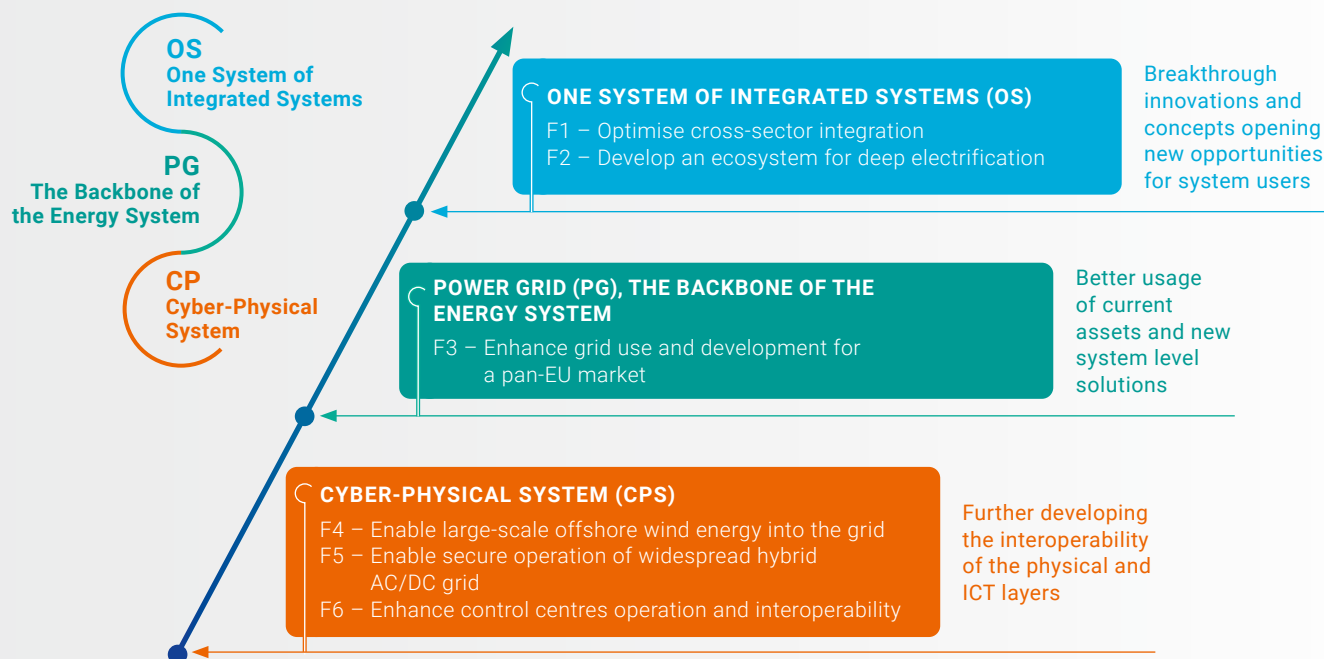


Figure 4: RDI Roadmap 2020 – 2030: 3 Clusters (One system of Integrated systems, Power Grid, Cyber-physical system) and 6 Flagships

⁷ RDI Roadmap was consulted with stakeholders in the period 29 June -20 August 2020 and received a positive informal opinion by ACER in October 2020.

⁸ Public Consultation in Q3 2021



The EU-level innovation flagship programmes led by TSOs will continue to be initiated in 2022. These programmes will be key to reach the milestones of the RDI Roadmap and to achieve a cyber-physical grid which serves as the backbone to support the EU Green Deal policy objectives.

In addition, ENTSO-E shall be working towards the uptake of innovative technologies in line with the TSOs needs. This objective must be further supported from the regulatory side as reconfirmed at the Infrastructure Forum of 29 October 2020 where its conclusions requested NRAs, ACER and Council of European Energy Regulators to follow on a holistic approach to develop a regulatory framework suitable to the use of innovative solutions. In 2022, ENTSO-E will support ACER on the development of a taxonomy based on the identified trends in the ENTSO-E's survey of the deployment of innovative and advanced transmission network solutions in the EU done in 2021. This workstream would allow room also to explore how far regulatory sandboxes can be deployed to try out new incentives and business models for sector coupling and energy sector integration – in order to assess existing regulatory barriers to investments.

ENTSO-E will also maintain strong cooperation with policy makers 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) under the umbrella of the European Commission's Strategic Energy Technology, as well as in the Horizon2020 calls. In 2022, ENTSO-E will continue to facilitate proposals for the Horizon Europe calls and foster TSO participation in European RDI projects and ETIP SNET together with strategic stakeholders.

ENTSO-E is involved in the following projects:

1. **INTERFACE (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 project builds upon the earlier research and innovation results carried out in projects such as INTERFACE.
- 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 INTERFACE project bringing closer the flexibility platforms' deployment into the business environment.
3. **BD4NRG (2021 – 2024)**, which consists of 34 partners, among those TSOs ELES and REN. The project aims at evolving, upscaling and demonstrating an innovative energy-tailored Big Data Analytics Toolbox.

The main driver for the development of ENTSO-E research plan (RDI Roadmap 2020 – 2030) was to identify the necessary innovation milestones for TSOs to reach the EU Green Deal policy objectives, thus achieving the green transition. The innovation building blocks to achieve this are: deep electrification, smart sector coupling, integration of massive deployment of RES including offshore through a reliable and secure cyber-physical system. All the activities stemming from this legally mandated document underline this purpose, so as the Horizon2020 projects.

6. Cooperation on the Transmission & Distribution Interface

ENTSO-E will cooperate with DSOs and EU DSO Entity on the development of EU rules, including new network codes and guidelines or proposals to update existing ones and the exchange of best practices on operation and planning of the transmission and the distribution systems pursuant to the IEM Regulation. The Associations will also cooperate on the monitoring of the implementation of network codes and guidelines (see chapter 8).

Development or amendment of network codes and guidelines

The Commission Implementing Decision (EU) 2020/1479 establishes a priority list for the development of network codes and guidelines for electricity for the period from 2020 to 2023 and for gas in 2020. Besides a new Network Code on Cybersecurity (see chapter 7), it refers to the development of rules regarding Demand-Side Flexibility, including rules on aggregation, energy storage and demand curtailment⁹. Building on the recommendations of the joint Roadmap on

Demand-Side Flexibility developed by ENTSO-E and the four European DSOs associations CEDEC, EDSO for Smart Grids, Eurelectric, and GEODE in 2021, ENTSO-E and EU DSO Entity will work together throughout 2022 on the development of rules which facilitate the participation of distribution-connected assets into the grid and system services with a focus on balancing, intra-zonal congestion management and voltage control services.

Cooperation on applying best practices on operation and planning of the transmission and the distribution systems

ENTSO-E will organise with EU DSO Entity a series of thematic workshops focusing on planning and operational issues such as observability and controllability of assets, exchange of grid data, cooperation in emergency state and defence plans, load frequency control, coordination of non-frequency ancillary services, among others.

ENTSO-E will also strengthen its cooperation with the DSO associations and possibly with EU DSO Entity on the joint scenario building for the next TYNDP as well as the exchanges of best practices regarding national coordination between TSO(s) and DSO(s) on grid planning.

ENTSO-E will also cooperate with EU DSO Entity as part of the editorial team in charge of developing implementing acts on data interoperability in accordance with the Directive (EU) 2019/944 on the internal market for electricity (IEM Directive) see chapter 7).

With the constant increase of renewable generation, storage and active customers which are largely connected to the distribution grid, DSOs and TSOs need to strengthen their coordination and exchange the necessary information for operating their networks securely while ensuring distributed flexibilities are used when and where they provide the most value to the whole electricity system.

⁹ These rules could take the form of amendments to existing Network Codes and Guidelines.

7. Cybersecurity, Interoperability, and Data

Cybersecurity

IEM Regulation acknowledges the importance of cybersecurity for the electricity sector, and the need to duly assess cyber-risks and their possible impact on the security of supply. In particular, IEM Regulation includes sector-specific rules for cybersecurity aspects of cross-border electricity flows among the areas on which the Commission may establish a Network Code.

In January 2020 the Commission launched a drafting process by requesting ACER to submit a framework guideline for the Cybersecurity Network Code development. The Commission will request ENTSO-E or EU DSO Entity (in this case in cooperation with ENTSO-E) to draft a proposal for the network code in accordance with the framework guideline. The new Network Code on Cybersecurity is expected to cover the following areas:

- › ISO 27001 Certification;
- › Common Functional Security Requirements;
- › Cross Border Cyber Risk Assessment and Management;
- › Product Assurance Scheme; and
- › Sharing of Technical Information.

The Network Code will apply to Critical Infrastructure Operators, meaning TSOs and DSOs.

In 2022 the drafting of the Network Code is expected to be already closed, following the European Commission guidance and set timeline for the Network Code on Cybersecurity. During 2022, the European Commission should perform an impact assessment on the proposed Network Code on Cybersecurity and follow adaptation procedure of the delegated act. The complete timeline, where the process of the Network Code on Cybersecurity is reflected, is illustrated below.

The transition towards a more sustainable society implies the electrification of sectors such as transport (e.g. electric vehicles) or heating. To work efficiently, this evolution will require more data to be collected, e.g. about individual behaviors and preferences. Cybersecurity will be the key to build the needed trust for all stakeholders to embrace this evolution.

After the European Commission adaptation process of the Network Code, the implementation phase will follow. TSOs and the DSOs will continue collaborating for the full implementation of the Network Code requirements.

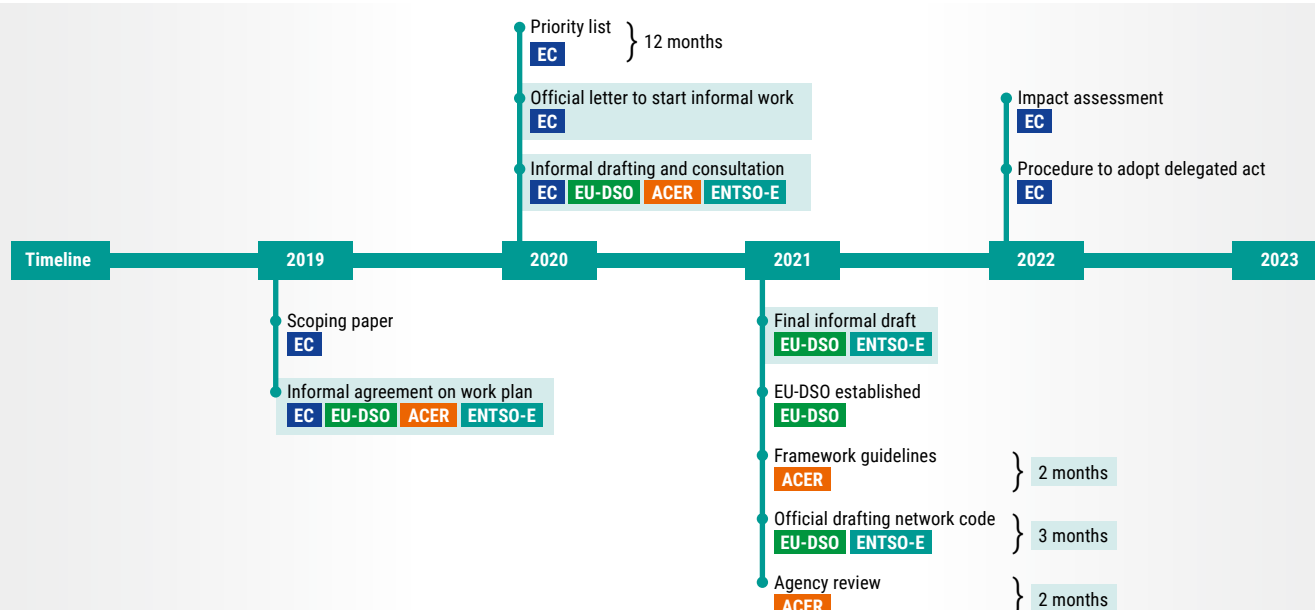


Figure 5: Tentative timeline for the Network Code on Cybersecurity

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.

Main activities in 2022 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 role model and training activities for the TSO-RSC community.

ENTSO-E is part of the drafting team writing the implementing acts on data access and data interoperability, implementing Art. 55(2)(a), (b) and (c) IEM regulation and Art. 24 IEM Directive. The implementing acts shall include:

- › a general interoperability requirement (due in 2021);
- › a part on metering and consumption data (due in 2021);
- › a part on customer switching (2022); and
- › a part on demand response and other services (2022).



8. Monitoring Activities

Related to the System Operation, ENTSO-E continues to fulfil the reporting obligations according to Art. 15 SOGL for the incident classification scale and Art. 16 SOGL for the load frequency control annual reports. ENTSO-E will also continue the monitoring, compliance and development of service provision of the EAS according to Art. 30(1)(i)(ii) of IEM Regulation. As started in October 2020 and every 6 months, ENTSO-E is delivering data to ACER satisfying the interim phase of the ACER-ENTSO-E agreement on data provision for Network Codes and Guidelines Monitoring (according to the Annex 2 – System Operation Regulation list of information and specific provisions). Further developments will take place in 2022 to start delivering the enduring solution.

Regarding the RCCs, ENTSO-E will deliver the annual report on regional coordination assessment in September 2022 in accordance with Art. 17 SOGL. Furthermore, several obligations for transparency and reporting according to the IEM Regulation will become relevant when the RCCs become operational in June 2022, i.e. 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.

Related to the Market activities in accordance with Art. 80 CACM Regulation, all relevant NEMOs and TSOs provide a yearly report to the regulatory authorities explaining the costs of establishing, amending and operating single day-ahead and intraday coupling. The publication of the report is expected by mid-2022. In accordance with Art. 59(2)(a) of the EB Regulation, ENTSO-E will publish the second edition of the

biennial Balancing report 2022, focusing on the integration of balancing markets within Europe. Besides, a set of performance indicators and the report structure will be agreed upon with ACER prior to the delivery of the report by June 2022. The publication of the report on the costs of establishing, amending and operating the European balancing energy platforms, pursuant to Art. 23 of the EB Regulation, is foreseen by mid-2022. Furthermore, the yearly market report will cover the implementation and operation of the different market timeframes, as prescribed by the EB, CACM and FCA Regulations for balancing, day-ahead and intraday and long-term markets.

Related to the Grid Connection Network Code, ENTSO-E continues monitoring the CNC Implementation in each Member State in accordance with the scope defined in Art. 59 RfG, Art. 57 DC and Art. 76 HVDC. 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 divergences of national implementation will be highlighted and an assessment of the validity of the CNC requirements will be included. In addition, and upon request by ACER, ENTSO-E compiles annually, by 30 June of each year, a list of information that shows the evolution of Power Generating Modules and HVDC installations compliant to CNCs.

Related to TSO-DSO interface, ENTSO-E will continue providing its technical expertise in the monitoring and contribute to the monitoring of implementation of the network codes and guidelines which are relevant to the coordinated operation of the transmission networks and distribution networks in cooperation with EU DSO Entity.

Annex 1 – List of Abbreviations

ACER	Agency for the Cooperation of Energy Regulators
AWP	Annual Work Programme
CACM Regulation	Regulation (EU) 2015/1222 establishing a guideline on capacity allocation and congestion management
CBA	Cost Benefit Analysis
CC	Capacity Calculation
CCR	Capacity Calculation Region
CGM	Common Grid Model
CGMES	Common Grid Model Exchange Standard
CM	Capacity Mechanism
CNC	Connection Network Code
CSA	Coordinated Security Analysis
CSAM	Methodology for coordinating operational security analysis
CZC	Cross-zonal capacity
DC	Regulation (EU) 2016/1388 establishing a Network Code on Demand Connection
DSO	Distribution System Operator
EAS	European Awareness System
EB Regulation	Regulation (EU) 2017/2195 establishing a guideline on electricity balancing
ECCo SP	ENTSO-E's Communication and Connectivity Service Platform
EG	Expert Group
ENTSO-E	European Network of Transmission System Operators
ENTSOG	European Network of Transmission System Operators for Gas
ERAA	European resource adequacy assessment
ETIP SNET	European Technology & Innovation Platforms on Smart Networks for Energy Transition Platform
EU	European Union
FCA Regulation	Regulation (EU) 2016/1719 establishing a guideline on forward capacity allocation
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

IEM Directive	Directive (EU) 2019/944 on the internal market for electricity
IEM Regulation	Regulation (EU) 2019/943 on the internal market for electricity
IGD	Implementation Guidance Document
IGM	Individual Grid Model
ITC	Inter Transmission System Operator Compensation
LMP	Local Marginal Pricing
NC ER	Regulation (EU) 2017/2196 establishing a network code on electricity emergency and restoration
NEMO	Nominated Electricity Market Operators
NRA	National Regulatory Authority
OPC	Outage Planning Coordination
OPDE	Operational Planning Data Environment
PCN	Physical Communication Network
RCC	Regional Coordination Centre
RDI	Research, Development and Innovation
RfG	Regulation (EU) 2016/631 establishing a network code on requirements for grid connection of generators
Risk Preparedness Regulation	Regulation (EU) 2019/941 on risk-preparedness in the electricity sector
RSC	Regional Security Coordinator
SOGL	Regulation (EU) 2017/1485 establishing a guideline on electricity transmission system operation
STA	Short-term Adequacy Analysis
TEN-E Regulation	Regulation (EU) No 347/2013 on guidelines for trans-European energy infrastructure
TP	Transparency Platform
Transparency Regulation	Regulation (EU) No 543/2013 on the submission and publication of data in electricity markets
TSOs	Transmission System Operators
TYNDP	Ten-Year Network Development Plan

Annex 2 – List of Deliverables

Topic	Regulation	Article	Level 1 Article content/ activity	J	F	M	A	M	J	J	A	S	O	N	D
SYSTEM OPERATION															
SOGL	Reg. 2017/1485	A 65	Common list of year-ahead scenarios against which TSOs assess the operation of the interconnected transmission system for the following year												
SOGL/CSAM	Reg. 2017/1485	A 75.1 / A 44.1	Report on status on probabilistic risk management approaches and maturity												
SOGL/CSAM	Reg. 2017/1485	A 75.1 / A 45.1	Definition of common hours												
SOGL	Reg. 2017/1485	A 17	Annual report on regional coordination assessment												
SOGL	Reg. 2017/1485	A 15	Annual report on operational security indicators												
SOGL	Reg. 2017/1485	A 16	Annual report on load-frequency control												
CGM	Reg. 2015/1222	A 64	Operating the CGM Build Process and ENTSO-E's OPDE												
RPP	Reg. 2019/941	A 6	RPP crisis scenarios identification (update every 4 years)												
RPP	Reg. 2019/941	A 6.2	Potential update of the RPP Methodology in result of the ECG comments to the 2020 report												
RPP	Reg. 2019/941 (RPP Methodology)	A 8.2 (Methodology)	Potential development of computational tools and methods to assess the RP scenarios in result of the 2021 report (RPP Methodology 8.2)												
SOGL Regional	Reg. 2019/943	Whereas 53	Transition from RSCs to RCCs												
SOGL Regional	Reg. 2017/1485 Reg. 2017/2195 Reg. 2017/2196	SOGL A13/A118 EBGL A 50, 51 E&R A 10	RG CE: Implementation of SAFA methodologies (including FSKar)												
SOGL Regional	Reg. 2017/1485 Reg. 2017/2196	SOGL A13/A118 E&R A 10	Agreement for Synchronous Operation between Continental Europe TSOs and TEIAS												
SOGL Regional	Reg. 2017/1485 Reg. 2017/2196	SOGL A13/A118 E&R A 10	Agreement for Synchronous Operation between Continental Europe TSOs and Ukrenrgo for Burshtyn Island												
SOGL Regional	Reg. 2017/1485 Reg. 2017/2196	SOGL A13/A118 E&R A 10	Agreements for Future Synchronous Operation between Continental Europe TSOs and Ukrenrgo/ Moldelectrica												
SOGL	Reg. 2017/1485	A 14.2	Comprehensive, standardised format, digital data archive of the information required by ACER												
RCC	Reg. 2019/943	A 30.1.e	Adopt a framework for the cooperation and coordination between regional coordination centers												
RCC	Reg 2019/943	A 41 (2)	ENTSO-E and RCCs shall operate transparently and Publish documents on websites, full transparency towards stakeholders												
RCC	Reg 2019/943	A 46 (3)	Receive the RCC Annual Report												
RCC	Reg 2019/943	A 30 (2)	Report to ACER on shortcomings identified regarding the establishment and performance of regional coordination centres.												
RCC	Reg 2019/943	A 37 (1)	ENTSO-E shall develop proposals for RCC tasks												
RCC	Reg 2019/943	A 37.1.k	RCCs' task on facilitation of regional procurement of balancing capacity												

TSO process for developing methodology	Public Consultation	TSO deadline for submitting proposal	Workshop
Implementation	Implementation Deadline	ACER Decision preparation	ACER Decision publication

Topic	Regulation	Article	Level 1 Article content/activity	J	F	M	A	M	J	J	A	S	O	N	D
MARKET															
CACM	Reg. 2015/1222	A 10	Day-to-day management of the single day-ahead and intraday coupling												
CACM	Reg. 2015/1222	A 55.3	Intraday auctions in accordance to ACER decision on Intraday capacity pricing												
CACM	Reg. 2015/1222		CACM amendments												
CACM	Reg. 2015/1222	A 15(1)	Capacity Calculation Region Assessment												
DA	Reg 2019/943	A 8.4	Implementation of 15 minutes products in ID and DA												
BZ	Reg 2019/943	A 14(2)	Bidding Zone technical report												
BZ	Reg 2019/943	A 14(6)	Bidding Zone review /LMPs												
EB	Reg. 2017/2195	A 20.6	Implementation of mFRR Platform												
EB	Reg. 2017/2195	A 21.6	Implementation of aFRR-Platform												
EB	Reg. 2017/2195	A 22.5	Implementation of IN-Platform												
EB	Reg. 2017/2195	A 23.1	Report on costs of establishing, amending and operating European balancing platforms												
EB	Reg. 2017/2195	A 40.1	Co-optimised CZC allocation: implementation impact assessment and business requirements												
CM	Reg 2019/943	A 26.15	CM registry: setup and operation of registry (IT tool)												
Monitoring CACM	Reg 1222/2015	A 31.2	Capacity Calculation and allocation report												
Monitoring CACM	Reg 1222/2015	A 82.2	Monitor the implementation of single day-ahead and intraday coupling/(a) progress and potential problems with the implementation												
Monitoring CACM	Reg 1222/2015	A 80.2	Annual CACM cost report												
Monitoring FCA	Reg 2016/1719	A 26.2	Capacity Calculation and allocation report												
Monitoring FCA	Reg 2016/1719	A 63.1	Monitor the implementation of forward capacity allocation and the establishment of single allocation platform/(a) the progress and potential problems with the implementation												
Monitoring EB	Reg 2017/2195	A 59.2.a	European report on integration of balancing markets (Detailed)												
Monitoring EB	Reg 2017/2195	A 59.2.b	European report on integration of balancing markets (High-level)												
Monitoring EB	Reg 2017/2195	A 63.1	Monitoring of the implementation of the EB												
FCA	Reg. 2016/1719		Update of the FCA methodologies to introduce Long Term Flow based												
EB	Reg. 2017/2195	A 38.3	Harmonisation of CZC allocation process for the exchange of BC or sharing of reserves												

TSO process for developing methodology	Public Consultation	TSO deadline for submitting proposal	Workshop
Implementation	Implementation Deadline	ACER Decision preparation	ACER Decision publication

Topic	Regulation	Article	Level 1 Article content/ activity	J	F	M	A	M	J	J	A	S	O	N	D
TYNDP															
TYNDP	Reg 2019/943	A 30.1b	Final release of TYNDP 2020 after ACER opinion												
TYNDP	Reg 2019/943	A 30.1b	Scenarios 2022: storylines and assumptions preparation												
TYNDP	Reg 2019/943	A 30.1b	Scenarios 2022: methodologies, building and preparation for draft release												
TYNDP			Scenarios 2022: final scenario report												
TYNDP			Scenarios 2024: storylines and assumptions preparation												
TYNDP	Reg 2019/943	A 30.1b	Addition of new multi-sectorial elements in the TYNDP												
TYNDP	Reg 2019/943	A 30.1b	Interlinked Model: Project screening and dual assessment methodologies												
TYNDP	Reg 2019/943	A 30.1b	Cost Benefit Analysis methodology continuous improvements												
TYNDP	Reg 2019/943	A 30.1b	TYNDP 2022 Projects Selection Guideline												
TYNDP	Reg 2019/943	A 30.1b	Call for TYNDP 2022 candidate projects												
TYNDP	Reg 2019/943	A 30.1b	Preparation of TYNDP planning studies: innovation, construction of models, methodologies												
TYNDP			TYNDP 2022 Identification of System Needs												
TYNDP			Submission of TYNDP 2022 to ACER												
SYSTEM DEVELOPMENT															
Adequacy	Reg 2019/943	A 23	ERAA (European Resource Adequacy Assessment)												
Adequacy	Reg 2019/943	A 30.1m	Summer Outlook												
Adequacy	Reg 2019/943	A 30.1m	Winter Outlook												
RfG	Reg. 2016/631	A 58	Non-binding guidance on implementation												
DC	Reg. 2016/1388	A 56	Non-binding guidance on implementation												
HVDC	Reg. 2016/1447	A 75	Non-binding guidance on implementation												
RfG	Reg. 2016/631	A 59.2	RfG List of information to ACER												
HVDC	Reg. 2016/1447	A 76.2	HVDC List of information to ACER												
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												
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												
RfG, DC, HVDC	Reg. 2016/631, 2016/1388, 2016/1447		CNC amendment												
TRANSPARENCY PLATFORM															
TP			TP MOP IT implementation												

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