

System Operation European Stakeholder Committee

Materials for meeting 1 December 2022



Agenda

Topic	Timing	Presenter
1. Opening <ul style="list-style-type: none">Review of the agenda, approval of last meeting minutesReview of actions	14.00 - 14.15	ACER, Uros Gabrijel ENTSO-E, Cherry Yuen
2. Update on the implementation actions at pan-EU level <ul style="list-style-type: none">Incl. update on NC E&R implementation	14.15 - 14.30	ENTSO-E, Cherry Yuen & Rafal Kuczynski
3. Update on operational preparation for Winter 22/23	14.30 - 14.45	ENTSO-E, Laurent Rosseel
4. Cybersecurity Network Code – Status update	14.45 - 15.00	EC & ENTSO-E (TBC)
5. Report on CGM Implementation	15.00 - 15.15	ENTSO-E, Jonathan Boyer
6. Update on Tmin FCR LER	15.15 - 15.25	ENTSO-E, Luca Ortolano
7. AOB <ul style="list-style-type: none">Approval of meeting dates for 2023Members list updated	15.25 – 15.30	

1. Review of actions

ENTSO-E, Cherry Yuen

1 Review of actions SO ESC

ACTION	ANSWER	STATUS
NC/GL Amendments: EC to inform about their planning and stakeholder involvement on SO ESC September meetings for updates in SO GL	Pending direct answer from EC	Ongoing
Administrative: ENTSO-E secretariat shall update the website	Pending - waiting for approval (today)	Ongoing
Administrative: All organisations are asked to update their list of members and respecting the number of seats dedicated to each organisation before the next ESC meeting	ENTSO-E send individual emails to facilitate the work Presented in AOB today	Ongoing
Invite stakeholders	ENTSO-E will check if COGEN (Gunnar Kaestle) and other stakeholders (e.g. WindEurope) can be invited as guest to the internal group within ENTSO-E in charge of analysis the “wind eclipse”. Update: the analysis is postponed due to the emergency synchronisation project.	Ongoing

1 Review of actions SO ESC

ACTION	ANSWER	STATUS
CGM: ENTSO-E to provide a slide with all the acronyms on the topic	Acronyms sent after the last meeting	Done
CGM: ENTSO-E to check if the software used by RCCs can be disclosed	Software list to be sent to participants via email (not to be made public)	Ongoing
Resilience: ACER to share the link of the policy paper to be published shortly and ahead of the full-fledged public consultation	Link sent by ACER	Done
Resilience: ENTSO-E to provide the slides from CG-ESC on CNC amendments	Link sent by ENTSO-E	Done
KORRR: ENTSO-E to organize a bilateral meeting with EU DSO Entity, involving also ACER	ENTSO-E initiated contact, pending EU DSO Entity reply	Ongoing
KORRR: ENTSO-E to share the documents for KORRR amendments	Documents sent; feedback gathered will be considered and integrated when applicable for the next release of the documents	Ongoing
LLEFD: ENTSO-E to organize a stakeholder workshop on LLEFD (Tmin FCR LER)	Workshop organised	Done

2. Update on the Implementation Actions:

SO GL/NC ER

ENTSO-E, Cherry Yuen & Rafal Kuczynski

Pan-European or regional deliverables 2022: SOGL/NCER

CSAm (Article 44.5)

Secure data collection and validation platform being set up for the PRA (Probabilistic Risk Assessment) methodology expected in 2027

- procurement process for data collection tool done
-

KORRR

Pending discussions with EU DSO Entity, involving also ACER
Revised version taking into account feedback received from stakeholders will be shared after conclusion

Operational Agreements

Ukraine/Moldova:
Discussions and work ongoing

Pan-European or regional deliverables 2022: SOGL/NCER

SO GL
Implementation -
art. 15

ENTSO-E published annual report on Incidents Classification Scale (ICS) end September 2022 ([link](#))

SO GL
Implementation
- art. 16

ENTSO-E published annual report on Load-Frequency Control (LFC) end September 2022 ([link](#))

SO GL
Implementation
- art. 17

ENTSO-E published annual report on Regional Coordination Assessment end September 2022 ([link](#))

Network Code Emergency & Restoration implementation

Article 4(2) of NC ER – summary (status on 31.10.2022)

	Y	N	NA
Article 4(2)(a) - defence service provider - contract	13	3	13
Article 4(2)(b) - restoration service provider - contract	21	4	4
Article 4(2)(c) - list of SGUs and list of measures	24	4	1
Article 4(2)(d) - list of high priority SGUs	19	3	7
Article 4(2)(e) - suspension and restoration of market activities	23	6	0
Article 4(2)(f) - imbalance settlement	23	6	0
Article 4(2)(g) - test plan (Transelectrica & IPTO missed)	19	8	0
29 EU (TSOs) - (NG ESO and SONI excluded)			
Y - approved by NRA			
N - submitted to NRA			
NA - not applicable			

Article 4(2) of NC ER – details (1)

	Article 4(2)(a) - defence service provider - contract
Approved by NRA	AT (APG, VUEN), BG (ESO), CZ (CEPS), DK (energinet), EE (Elering), FI (Fingrid), FR (RTE), HR (HOPS), IE (EirGrid), IT (Terna), LV (AST), SK (SEPS)
Submitted to the NRA, not yet approved	ES (REE), EL (IPTO), RO (Transelectrica)
Not Applicable	BE (Elia), DE (Amprion, 50Hertz, TenneT DE, Transnet BW), HU (Mavir), LT (Litgrid), LU (Creos), NL (TenneT NL), PL (PSE), PT (REN), SE (SvK), SI (ELES),

Article 4(2) of NC ER – details (2)

	Article 4(2)(b) - restoration service provider - contract
Approved by NRA	AT (APG, VUEN), BE (Elia), BG (ESO), CZ (CEPS), DK (energinet), DE (Amprion, 50Hertz, TenneT DE, Transnet BW), EE (Elering), FI (Fingrid), FR (RTE), HR (HOPS), HU (Mavir), IE (EirGrid), IT (Terna), LV (AST), NL (Tennet NL), PL (PSE), SK (SEPS)
Submitted to the NRA, not yet approved	ES (REE), EL (IPTO), PT (REN), RO (Transelectrica),
Not Applicable	LT (Litgrid), LU (Creos), SE (SvK), SI (ELES)

Article 4(2) of NC ER – details (3)

	Article 4(2)(c) - list of SGUs and list of measures
Approved by NRA	AT (APG, VUEN), BE (Elia), BG (ESO), CZ (CEPS), DK (energinet), DE (Amprion, 50Hertz, TenneT DE, Transnet BW), EE (Elering), FI (Fingrid), FR (RTE), HR (HOPS), HU (Mavir), IE (EirGrid), IT (Terna), LT (Litgrid), LV (AST), NL (Tennet NL), PL (PSE), SE (SvK), SI (ELES), SK (SEPS)
Submitted to the NRA, not yet approved	ES (REE), EL (IPTO), PT (REN), RO (Transelectrica)
Not Applicable	LU (Creos)

Article 4(2) of NC ER – details (4)

	Article 4(2)(d) - list of high priority SGUs
Approved by NRA	AT (APG, VUEN), BE (Elia), BG (ESO), CZ (CEPS), DK (energinet), EE (Elering), FI (Fingrid), FR (RTE), HR (HOPS), HU (Mavir), IT (Terna), LT (Litgrid), LV (AST), NL (Tennet NL), PT (REN), SE (SvK), SI (ELES), SK (SEPS)
Submitted to the NRA, not yet approved	ES (REE), EL (IPTO), RO (Transelectrica),
Not Applicable	DE (Amprion, 50Hertz, TenneT DE, Transnet BW), IE (EirGrid), LU (Creos), PL (PSE),

Article 4(2) of NC ER – details (5)

	Article 4(2)(e) - suspension and restoration of market activities
Approved by NRA	AT (APG, VUEN), BG (ESO), CZ (CEPS), DK (energinet), DE (Amprion, 50Hertz, TenneT DE, Transnet BW), EE (Elering), ES (REE), FI (Fingrid), FR (RTE), HR (HOPS), HU (Mavir), IE (EirGrid), IT (Terna), LV (AST), TennetT NL, PL (PSE), SE (SvK), SI (ELES), SK (SEPS)
Submitted to the NRA, not yet approved	BE (Elia), EL (IPTO), LT (Litgrid), LU (Creos), PT (REN), RO (Transelectrica)
Not Applicable	

Article 4(2) of NC ER – details (6)

	Article 4(2)(f) - imbalance settlement
Approved by NRA	AT (APG, VUEN), BG (ESO), CZ (CEPS), DK (energinet), DE (Amprion, 50Hertz, TenneT DE, Transnet BW), EE (Elering), ES (REE), FI (Fingrid), FR (RTE), HR (HOPS), HU (Mavir), IE (EirGrid), IT (Terna), LV (AST), TenneT NL, PL (PSE), SE (SvK), SI (ELES), SK (SEPS)
Submitted to the NRA, not yet approved	BE (Elia), EL (IPTO), LT (Litgrid), LU (Creos), PT (REN), RO (Transelectrica)
Not Applicable	

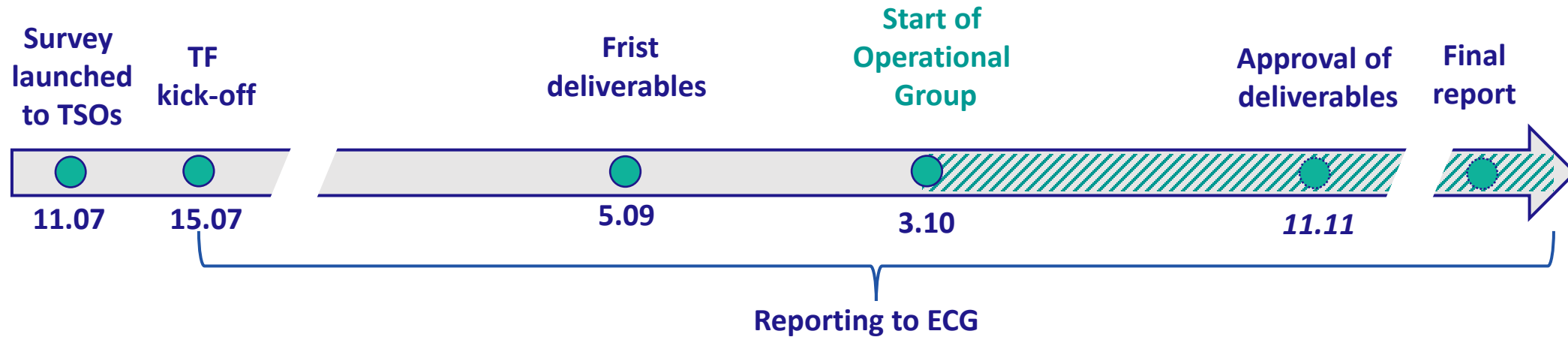
Article 4(2) of NC ER – details (7)

	Article 4(2)(g) - test plan
Approved by NRA	AT (APG, VUEN), BE (Elia), BG (ESO), CZ (CEPS), DK (energinet), DE (Amprion, 50Hertz, TenneT DE, Transnet BW), FI (Fingrid), FR (RTE), HR (HOPS), IT (Terna), LT (Litgrid), LV (AST), PL (PSE), SI (ELES), SK (SEPS)
Submitted to the NRA, not yet approved	EE (Elering), ES (REE), HU (Mavir), IE (EirGrid), LU (Creos), PT (REN), SE (SvK), NL (TenneT NL)
Not Applicable	

3. Update on operational preparation for Winter

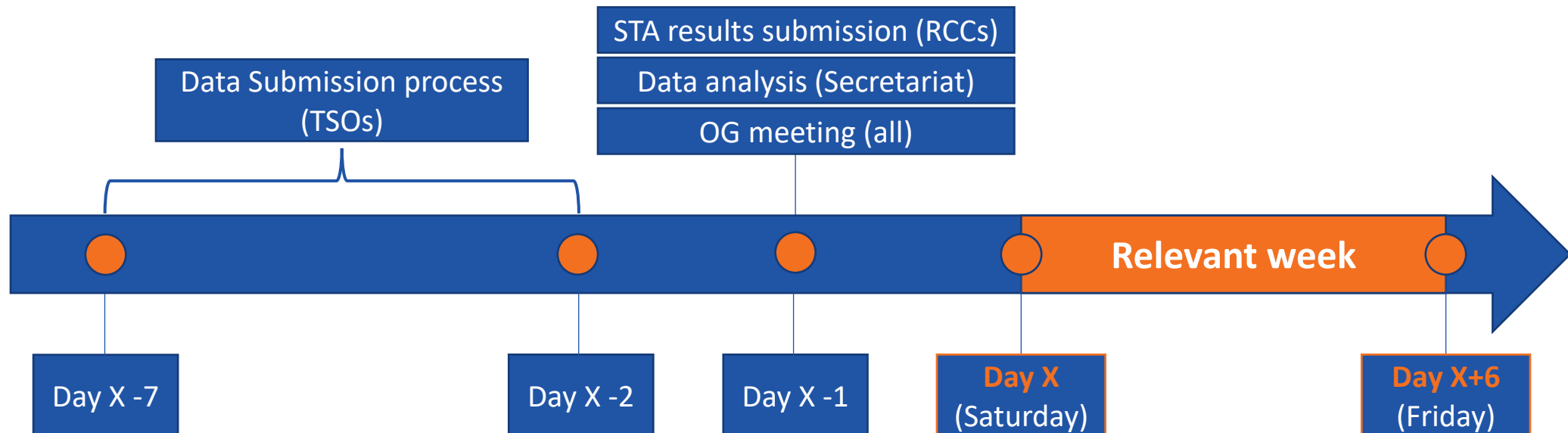
ENTSO-E, Laurent Rosseel

Task Force's work - summary



Operational Group

- **All interconnected TSOs and all RCCs** participate in the group.
- All TSOs submit the data in **weekly cycle** (fuel supply, status of operating reserves, need for assistance, available DSR, unplanned outages impacting cross-border exchange, weather information, ...).
- RCCs submit the results for **Short-Term Adequacy (STA) process**.
- The data is then analysed and used to prepare an overview of system's status for upcoming week.
- Operational Group meets weekly in order to align on the **forecast of system's situation**.



4. Cybersecurity Network Code – Status update

European Commission, Felipe Castro Barrigon

Intermediate update on NCCS

ENTSO-E

System Operation European Stakeholders Committee

Update NCCS

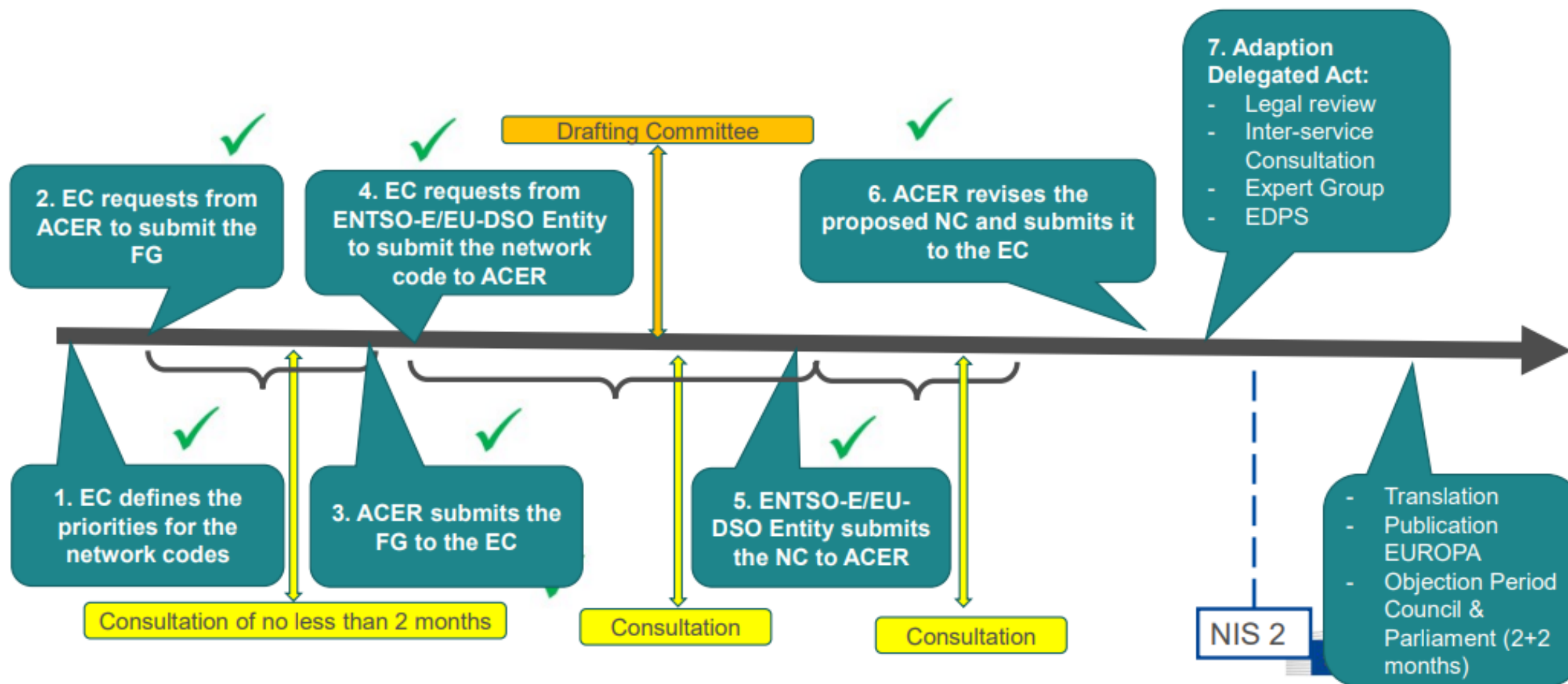
European Commission - DG ENER

01 December 2022

State of play

- ACER has reviewed the proposed network submitted by ENTSO-E and EU DSO Entity to ensure it complies with the relevant Framework Guidelines and contributes to market integration, non-discrimination, effective competition and the efficient functioning of the market.
- Commission (DG ENER) has received it and has started the adoption process. Currently the legal team from DG ENER and the Legal Service of the Commission are reviewing the text.
- **Bilateral discussions** with MS authorities and associations (DG ENER)
- Presented in WS energy **NIS Cooperation Group** on 17.3.22, 21.09.2022 and Council Horizontal Working Party on Cyber on 8.12.2021, 22.3.2022 (and 30.12.2022 to be confirmed)

Network code process



Scope and objectives

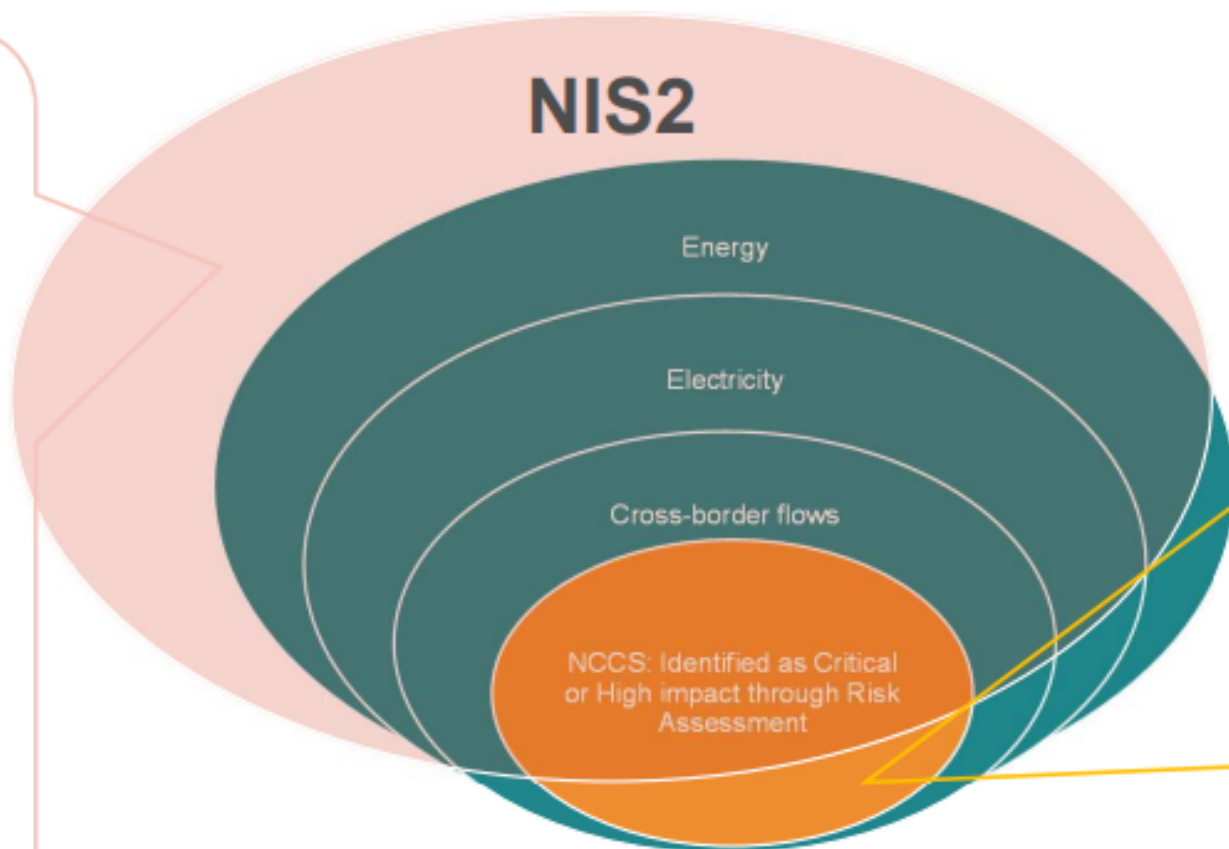
- Applies to a subsector of the Energy sector, **Electricity**. Within electricity subsector, the scope of applicability is limited to entities with impact on **cross-border** electricity flows. The **risk assessment** will identify which entities are most relevant and what **security measures** they need to apply.
- **Complementing and building upon NIS2** to include sector-specific cybersecurity requirements
- It provides more **precise instructions and procedures**, designed by electricity **stakeholders** together with cybersecurity **experts**, for the **electricity sector**.
- The NCCS specifies measures in a **coordinated way** with industry contribution and the outcome is ready to be used by different **Competent Authorities**.

NCCS: Scope of applicability

NIS2 Annex I:

- Electricity undertakings referred to in point (57) of Article 2 of Directive (EU) 2019/944 carry out the function of 'supply'
- Distribution system operators
- Transmission system operators
- Producers
- Nominated electricity market operators
- Electricity market participants providing aggregation, demand response or energy storage services

- **smart charging operators (new)**



Additionally to current NIS2 proposal, the NCCS covers the following entities (*):

- **Organised market place**
- NEMOs (nominated el. Market operators.
- ENTSO for Electricity, EU DSO entity
- European Union Agency for the Cooperation of Energy Regulators (ACER)
- National regulatory authorities (NRAs)
- **NCCS – National Competent Authority**
- National competent authorities for risk preparedness (RP-NCA)
- **RCCs**
- Critical service providers
- Managed security service provider (MSSP)
- National competent authorities on the security of network and information systems (CS-NCA)
- Computer security incident response teams (CSIRTs)
- The European Union Agency for Cybersecurity or (ENISA)
- **Any entity or third party to whom responsibilities have been delegated or assigned (*)** insofar as as their activities concern cybersecurity aspects of cross-border electricity flows

Content of the Network Code (current status)

TITLE I GENERAL PROVISIONS

TITLE II GOVERNANCE FOR CYBERSECURITY RISK MANAGEMENT

TITLE III RISK MANAGEMENT AT UNION AND AT REGIONAL LEVEL

TITLE V RISK ASSESSMENT AT MEMBER STATE LEVEL

TITLE VI RISK MANAGEMENT AT ENTITY LEVEL

TITLE IV COMMON ELECTRICITY CYBERSECURITY FRAMEWORK

TITLE VIII INFORMATION FLOWS, CYBERSECURITY INCIDENT AND CRISIS
MANAGEMENT

TITLE IX ELECTRICITY CYBERSECURITY EXERCISE FRAMEWORK

TITLE VII CYBERSECURITY PROCUREMENT RECOMMENDATIONS

TITLE X PROTECTION OF INFORMATION

TITLE XI FINAL PROVISIONS

Thank you



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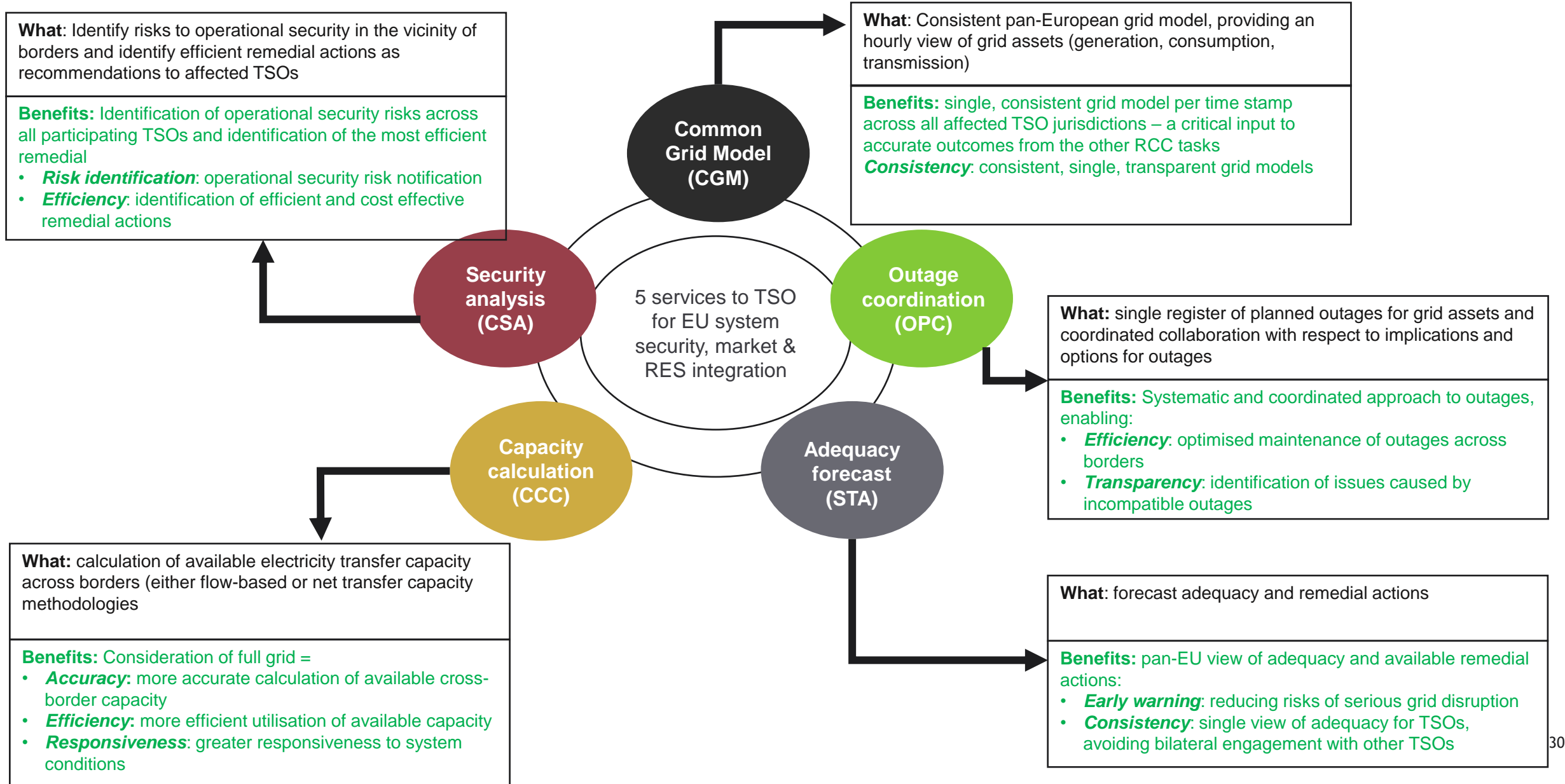
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5. Report on CGM Implementation

ENTSO-E, Jonathan Boyer

Enabling reliable and efficient grid operations via regional coordination



Importance of CGM and OPDE to facilitate coordinated RCC tasks

- IGMs/ CGMs are critical inputs to other RCC tasks
- OPDE is SOGL-mandated platform for the exchange of all relevant data for these services
- CGM and OPDE are therefore the basic enablers for reliable Grid Operations

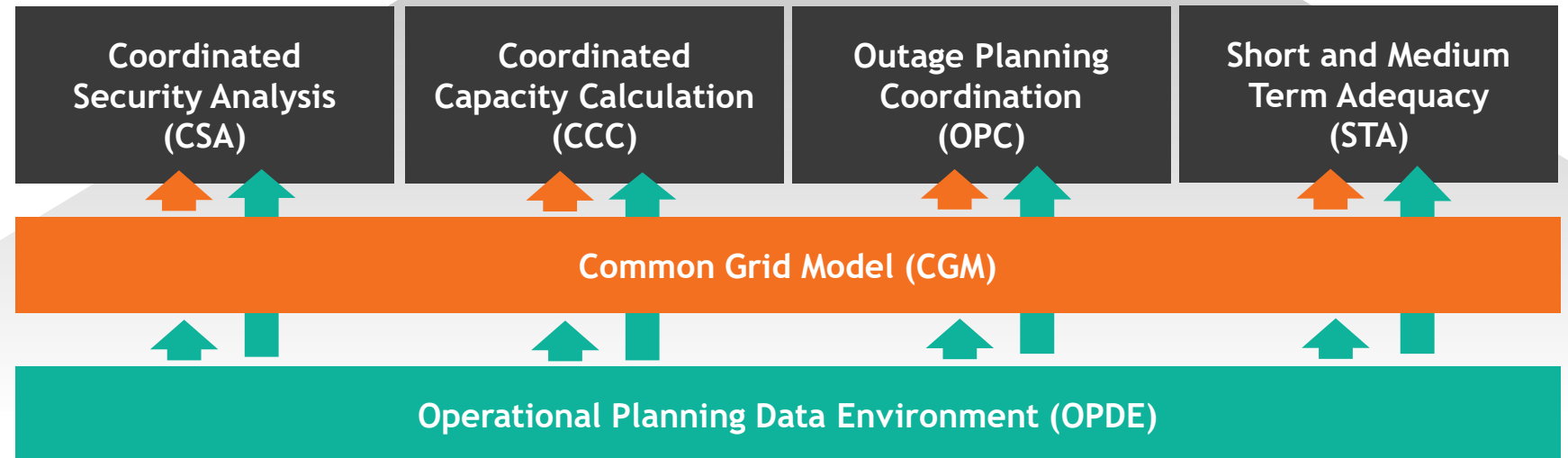
Regional coordination processes

ENABLED BY

Common and shared planning data

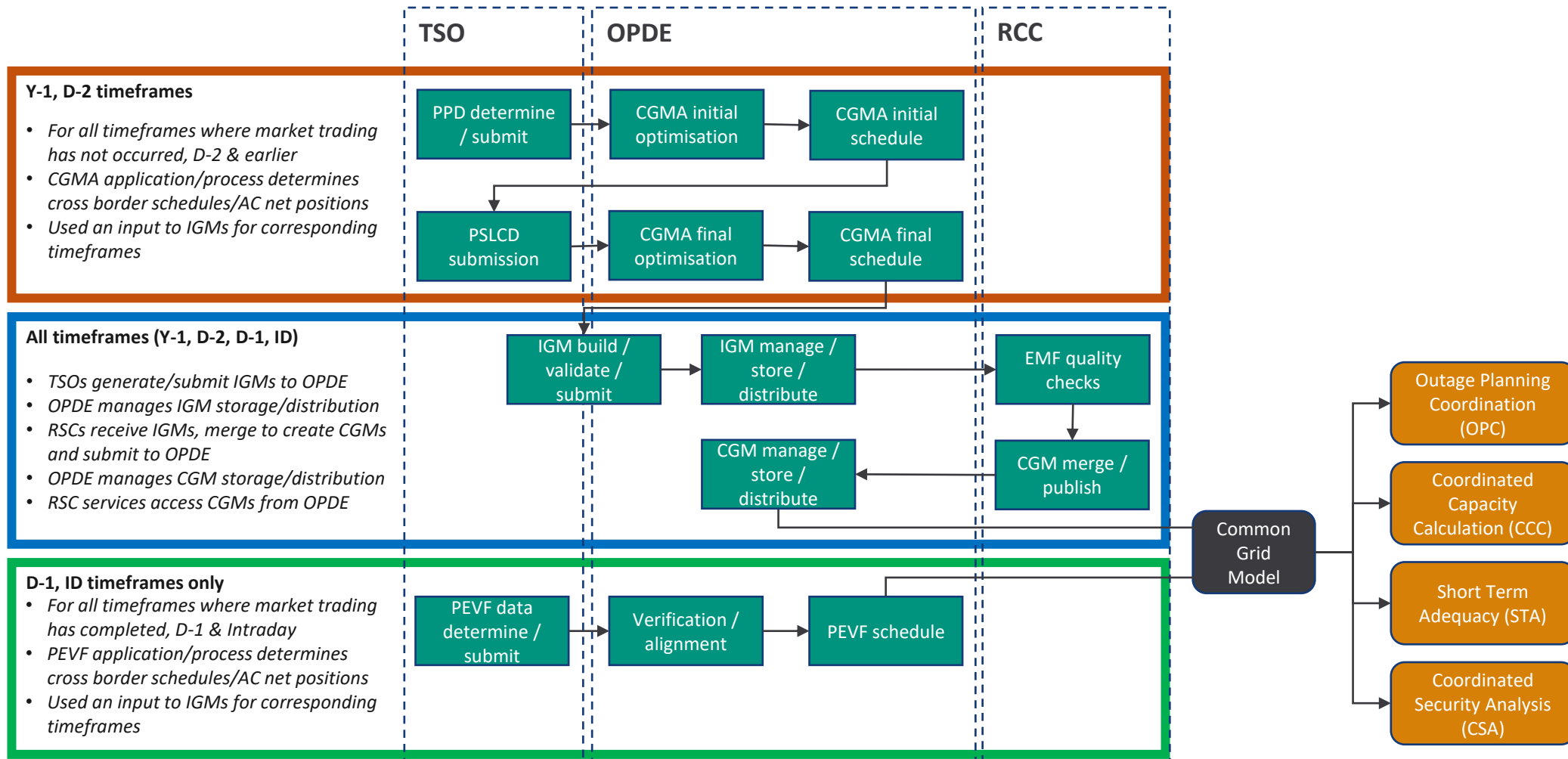
SHARED AND ACCESSED THROUGH

Digital infrastructure for pan-European data exchange & storage

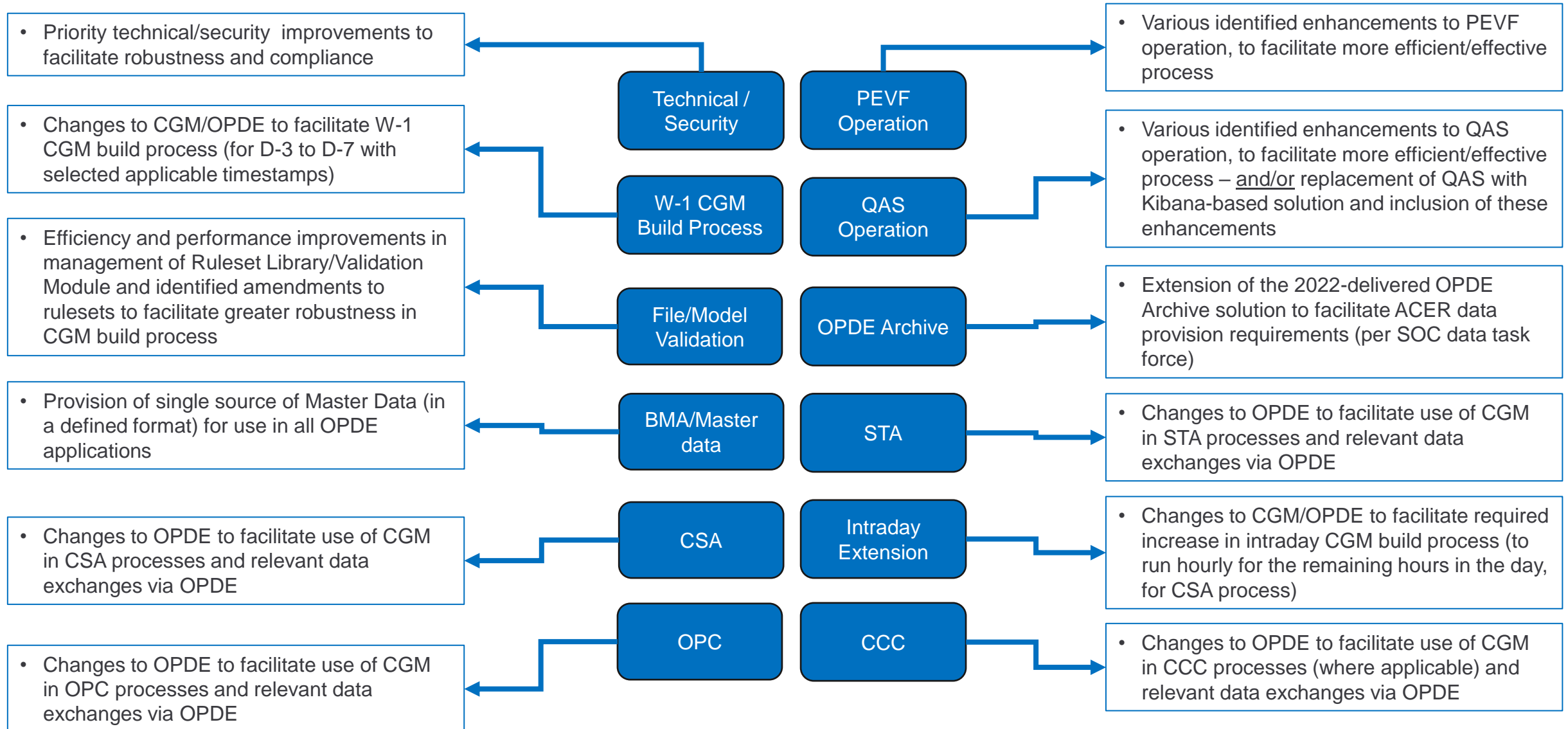


Overview of CGM build process

- The CGM build process produces a consistent pan-European grid model, rely on the data exchange network and applications within OPDE



Approved 2023 Priority Focus Areas



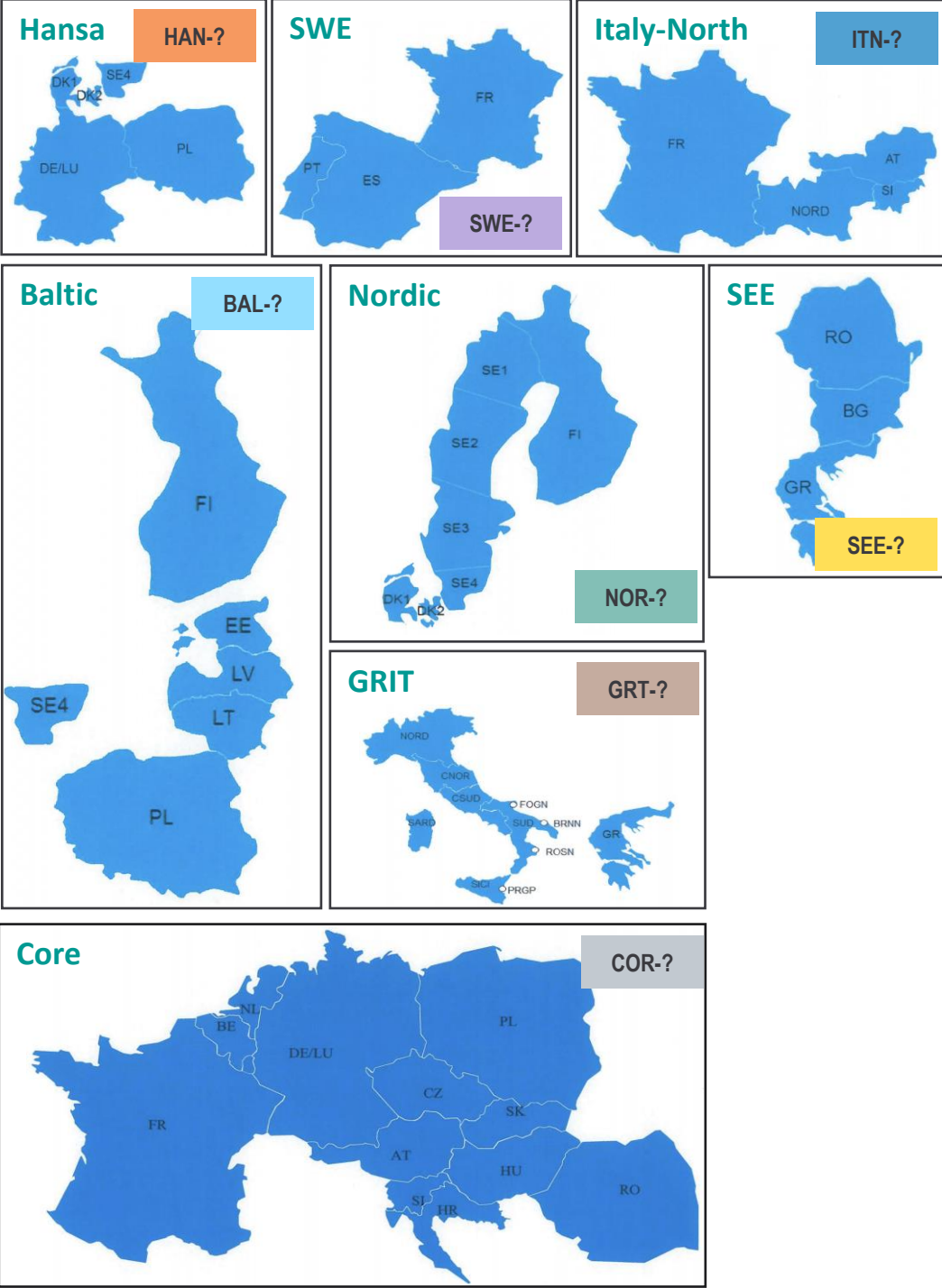
Roadmap for use of CGM OPDE in RCC Tasks

TARGET IMPLEMENTATION STAGES

	2022	2023	2024	2025	2026
CCC			COR - DA COR - ID	HAN - DA HAN - ID	COR - LT ITN - DA SWE - DA ITN - ID SWE - ID
CSA			COR - D1 COR - ID	SWE - D1 SWE - ID	HAN - D1 ITN - D1 HAN - ID ITN - ID
STA				REG-W1	
OPC			PAN-W1 GRT- Y1	PAN-Y1 GRT- W1	COR - Y1 SWE - Y1 SEE - Y1 BAL - Y1 ITN - Y1 SCC - W1

- Well coordinated planning across RCCs, CCRs, ENTSO-E and TSOs is critical to deliver benefits across the entire community, to avoid inefficiencies and to ensure successful migration.
- Note: where plans not confirmed or later than 2026, they are not displayed.

ID = Intraday | D1 = DA = Day Ahead | D2 = Two Day Ahead | W1 = Week Ahead | M1 = Month Ahead | Y1 = Year Ahead | LT = Long-Term



Regional Coordination

Key factors for migration of RCC tasks

1. CGM Readiness Status
2. Implementing additional timeframes (i.e., W-1, M-1) for RCC tasks
3. Requirements arising from regional methodologies
4. Harmonized migration planning between different regions and RCC tasks

Key activities to improve completeness and quality of IGMs/CGMs and to ensure harmonized migration

Coordinated RCC Tasks Planning

Overall objectives:

- *Gathering detailed, existing plans for each service and region*
- *Understanding all dependencies and their priorities, such as data/process timeframes, process timings, data formats, delivery timescales etc.*
- *Determining potential actions/mitigations (i.e., amendment of all TSOs CGM methodology to ensure alignment across methodologies and business processes)*
- *Aimed to significantly enhance what has been included in the Integrated Roadmap to date*

Interoperability Testing

- *Testing performed by ENTSO-E experts on the real data models, including rejected IGMs*

Overall objectives:

- *Providing support to TSOs to identify issues and improve IGMs/CGMs quality*
- *Assessing the impact of new rules for business continuity related to publication of IGMs and CGMs to OPDE; Improving the quality of QoCDC*

Bilateral calls with all TSOs

Overall objectives:

- *Analysing individual TSOs and RCCs issues*
- *Defining the possible mitigation actions and determining what assistance is needed*

Industry-wide Modelling Group

- *Modelling group initiated by Coreso to work on improving IGM/CGM in CGMES format*

Overall objectives:

- *Improving CGMES/OPDE readiness status on Pan-EU level*
- *Further assessing the quality by using EMF tools*
- *Inviting all TSOs and RCCs to participate*

CGM/OPDE Development

Overall objectives:

- *The prioritisation and delivery of changes to CGM/OPDE, in order to:*
- *Facilitate migration of RCC tasks*
- *Improve the efficiency or effectiveness of CGM/OPDE services*



Questions?



6. Update on Tmin FCR LER

ENTSO-E, Luca Ortolano

Outcome of the analysis of the LLEFD

Although all of the identified events have an energetic content potentially impacting LER, only 6 out of 20 have been previously investigated within ENTSO-E from SG SF analysis, since only those 6 events triggered the specific criteria for to make a specific check.

All the other events (ranging across the 50 mHz thresholds) **needed to be investigated from scratch:**

- Identifying the **involved TSOs**;
- Collaborating with personnel of involved TSOs to **find out the root causes and the amount** of the unbalances.

Here following are listed some of the general root causes identified so far :

- Several **LLEFDs occur at night at low load conditions**. In these conditions, in some TSOs, the generation park presents technical **limitations to the downward reserves which can be procured**. In such cases the imbalance is temporarily covered by FCR activation, due to lack of downward aFRR/mFRR.
- Extreme **weather condition**, drastically reducing the reserve availability in a Block;
- **Human error** in reconnecting the measuring the inter-area flow (after maintenance);
- **Human error** in the activation of tertiary reserve in the framework of limited mFRR;

Outcome of the analysis of the LLEFD

The key aspect emerging from the investigation is that very often the **LLEFD are due to a combination of several contributing factors which occur at the same time**: e.g. forecast errors, unusual load conditions, extreme weather, human error, power park inflexibility in low load condition,

RG CE TSOs then **confirmed** in a dedicated meeting with the NRAs that the **frequency profiles** used for the proposal made so far **are consistent**.

Beside that, TSOs renewed the availability on continuing the work with NRAs and ACER related to LLEFD and its implication.

NRAs acknowledged the TF study outcome during the meeting and then will give a feedback on the possible way forward.

7. AOB

7. 2023 Meeting dates proposal

Meeting	Date	Location
1	15 March PM (GC ESC: 16 March) (MESC: 9 March)	Online
2	14 June PM (TBC) (GC ESC: 15 June AM) (MESC: 5 July)	Brussels
3	29 September AM (GC ESC: 28 September) (MESC: 12 October)	Ljubljana
4	30 November PM (GC ESC: 1 December) (MESC: 7 December)	Online



EUTurbines

ENTSO-E Public Workshop – RoCoF

Online
30 November 2022



EUTurbines- ROCOF main areas of concern

- The specification of the RoCof withstand capability applied to Gas and Steam turbine generating units shall be realistic and take into account all specific features of these units (high power, high inertia, direct connection of the synchronous generator to the grid,...).
- Based on simulations performed for big gas and steam turbine and nuclear units, EUTurbines considers that the rocof value (for frequency dip) shall not exceed the limit of 1Hz/s during 500ms (not “measurement” rolling window, the statement is that the frequency dip of 1Hz/s ends after 500ms).
- Higher values or durations could put the unit and the grid at severe risk due to a trip of the unit resulting of the loss of synchronism of the generating unit (pole slip protection).
- This is absolutely NOT due to a problem of design or control of the unit, but this is simply due the features of these units (laws of physics...).
- On the contrary, the benefits for the grid stabilization of these high inertia units such as gas turbine and nuclear units shall be recognized by TSOs.



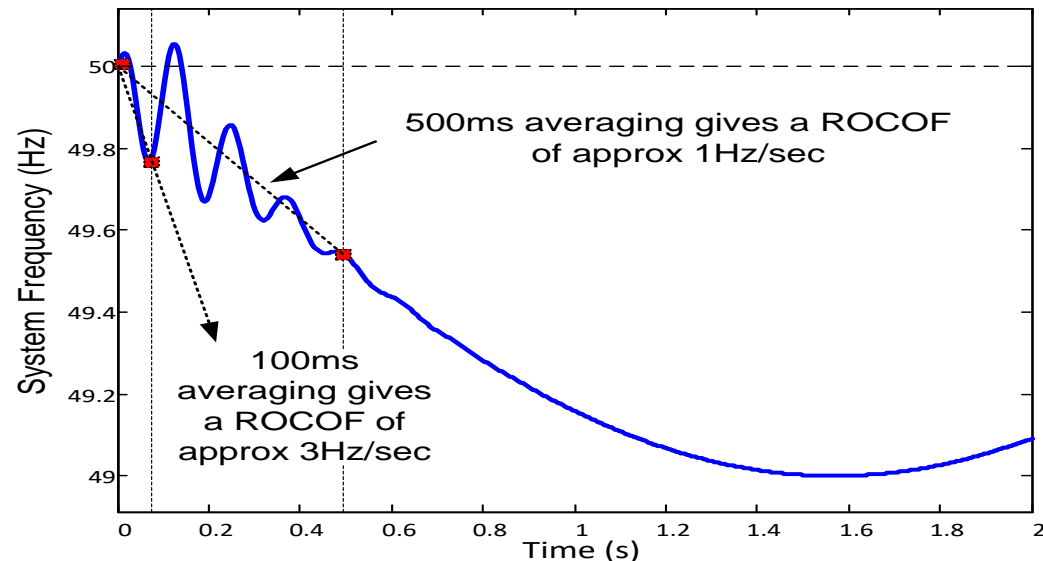
EUTurbines- ROCOF Max Value

- ENTSOE and TSOs stated in several meeting and presentation and the Maximum permissible ROCOF on the electrical system is 1Hz/s.
- EUTurbine recommends that 1Hz/s for a period of 500ms shall be adopted as a target value in the SOGL regulation for example as reference in the definition of Inertia evaluation for the synchronous areas, but also to be used in RfG Code as capability value for generating unit



EUTurbines- ROCOF as a single value

- ❶ EUTurbine is sponsoring the representation of ROCOF using a single value associated with a time duration as requirement: 1Hz/s for 500 ms.
- ❷ EUTurbine considers that the single value is already representative of ROCOF for shorter time interval; this was also the conclusion after the test campaign carried out in Ireland.





EUTurbines- ROCOF containment „local“ and „global“ based on inertia preservation strategy „local“ and „global“

- 🔊 A set of ROCOF values has been proposed to be adopted in the RfG **which** shall be considered a criteria for robustness of the generating unit
- 🔊 The values seems to be based on reports and studies presented during the **web conference** on ROCOF and where it has been mentioned a “global” ROCOF limit which corresponds to 1 Hz/s and “local” ROCOF which can be much higher from the “global” ROCOF
- 🔊 EUTurbine considers that “local” ROCOF are affected by “local” inertia; it is unlikely to expect high “local” ROCOF in presence of high “local” inertia. As a consequence imposing high ROCOF requirements to generating unit with high inertia is NOT technically correct, not even considering robustness criteria. It can risk to make specific generating unit not compliant for which derogation process is necessary
-> we consider this a WRONG approach



EUTurbines- ROCOF containment „local“ and „global“ based on inertia preservation strategy „local“ and „global“

- ROCOF is considered associated to inertia of the system, as a “global” definition and “local definition”
- In previous presentation ROCOF is expected to increase in the future
- SOGL defines as an obligation the evaluation of inertia of the system and associated containment strategy (driving 3 DSM meetings)
- EUTurbine has been requesting ROCOF webconf on inertia preserving strategy that are going to be put in place, since the topic is considered urgent
- Inertia containment shall be considered “local” as well as “global” like the ROCOF definition and the expectation is for frequency containment strategy “local” and “global”
- Note: EUTurbine does not consider a good solution the possibility to choose a ROCOF value at MSs. ROCOF concept is not a simple one and has sizing implication (robustness shall be properly factored)



EUTurbines- ROCOF compliance verification

ROCOF compliance verification is not a simple matter, hence **EUTurbine recommends to address the compliance requirements in technical standards with some caveat to be taken in consideration:**

- ❶ For small generating units (maybe up to 100 kW) ROCOF can be tested in laboratories that permits fast changing of frequency and associated measurements
- ❷ In 23.11 presentation a curve has been proposed that does not seem to be practical when it has to be created and measured in a laboratory



EUTurbines- ROCOF compliance verification

- 🔊 For generating that cannot test ROCOF requirement in a laboratory:
 - the phenomena can be simulated or
 - frequency deviation can be “injected” in the generating unit controller, but it is still difficult to make a very fast frequency change for limited period of time
 - an unbalance phenomena can be replicated (like load rejection when possible) not necessarily leading to the desired value, as part of supportive documentation. (Note the load rejection, corresponds to the maximum unbalance associated to the generating unit -> 100% load variation..)
- 🔊 ROCOF shall be considered a test on his own; present testing process at national level already consider tests associated to frequency and voltage limits capabilities and separately ROCOF
- 🔊 Present European standard was already working on ROCOF testing procedure.



Thank you!