High-Level Forum on European Standardisation

Proposals toward a "Green Electricity System."

Final Report of Work stream 9

Leader:	T&D Europe	
Supporting members:	France Italy Portugal Sweden AIOTI CEN CENELEC	ECOS EHI ELA Eu.bac Orgalim SBS SolarPowerEurope

Executive Summary

Proposal: **A collective vision of a "Green Electricity System" for a global benefit**

The energy transition is a holistic and global transformation. Decisions impacting this transition cannot be taken by only a fraction of the parties or by only looking at a part of the system. The proposals made by Work stream 9 (WS9) which gathered multiple parts of the electricity system were made in that spirit.

Our 21 active members proposed 30 actions to ensure the Green Electricity System will benefit all. For simplification these 30 actions were consolidated under 7 axes:

Specific to the Green Electricity System work-stream:

- 1- Contribute to European Electricity **Sovereignty**
  (including EU Grid Action Plan, action 13)
- 2- Generate a Global Electricity System **Flexibility for All**
  (for European Energy usage optimisation)
- 3- Ensure **Stability** of the Electricity System
  (for a better European Electricity Security)
- 4- Get a **Greener** Electricity System
  (for a real Low Carbon electricity System)
- 5- Foster **Energy Efficiency** at System Level
  (through sector Coupling cooperation)

More horizontal topics but critical for the WS9 members:

- 6- **Improvement & Simplification of Processes**
  a. Dedicated project fundings rules for standards creation
  b. Simplify Conformity Assessment when aggregating different components
- 7- **Broad inclusion,** to Provide Benefits for All
  (systematic guidelines, and selection tools to ease standards usage)

The WS9 recommends preparing dedicated standards in the related TCs of CENELEC (with the support of CEN when necessary) or IEC when appropriate.

Main Document

Introduction: Intent & Work Methodology

This document provides a summary of the deliberations aimed at identifying useful and specific standardisation and regulation proposals that would enable the European Electrical Sector to serve as the cornerstone of the Energy Transition.

The authors were highly motivated to position the Electrical Sector as THE backbone of the EU Energy Transition and to develop standardisation proposals which support the electrical initiatives of the EU.

This commitment is driven by a clear vision of the urgent need of a future-proof *End-to-End Electricity ecosystem*: from Generation (bulk and renewable), Transmission & Distribution Grid towards Smart Industry, Smart Homes, Smart Buildings, and all DER (Renewable Decentralised Energy Resources, EV), as well as prosumers.

All components of the end-to-end electrical system will have to be digitally connected and intelligently controlled to smartly generate, distribute, and use energy via a future proof backbone.

A unique, highly collaborative work methodology, based on brainstorming, question/ response approach in active roundtables was used:

A unique End-to-end Electricity Community

Four work-out sessions and three deep dives were conducted, that generated a set of **30 areas of investigation and around 500 contributions from participants.**

The work of WS9 was already recognized at the different levels of the European Commission, demonstrating the importance of the High-Level Forum, and the role of the Green Electricity System*:*

- *AUWP 2024, action 20, on European electricity grids (DG Grow, December 2023)*
- *EU Grid Action Plan (DG Ener), where the HLF[1] WS9 is required to bring inputs and cooperate on the action n°13 together with Grid operators, Manufactures and ESO's. (Nov 2023)*
- *European Energy Council (30th of May), where the HLF WS9 is required to accelerate the Work on Standards for the electricity infrastructure.*

[1] HLF (High Level Forum on European standardisation)

Main Deliverables:

1- Contribute to European Electricity **Sovereignty**

Action: **Contribute to EU Grid Action Plan action 13, for Market trend and Supply chain**

This action is part of the EU Grid Action Plan, action 13: "…In cooperation with the European Standardisation Organisations (ESOs), the High-Level Forum will identify standardisation gaps and propose a roadmap. The focus will be on strategic issues based on current market and business trends, including geopolitical constraints, impact on European business and facilitating global trade…."

"…European Standardisation Organisations (ESOs) to provide a Workshop Agreement deliverable, involving all relevant stakeholders …. that should be agreed by end-2024. The work should be closely coordinated with the High-Level Forum on European Standardisation's working group on green electricity system…."

Standards and technical specifications, both homegrown as well as international based, are linked and should comply with the European rules, needs and regulations. Therefore, it is important to ensure sufficient quality and quantity of European technical experts who can contribute to the standardization work at the European and international level.

To achieve this objective, all stakeholders need to contribute to and support education on standards (incl. young professionals) and find attractive ways to promote the impacts of standardisation work.

Recommendation from WS9:

The WS9 through its work on the 30 proposals is ready to provide input to the ESOs and the working group with well-structured proposals to generate a roadmap on future needs fitting with markets evolutions and will identify experts to support the discussions.

ENTSO-E is working on common specifications between TSOs. To do this, it exchanges with manufacturers' associations to ensure that the most efficient equipment is available. This common part of the specifications used for calls for tender is based on existing CENELEC or IEC standards, or on standards to be modified. HLF WS9 (Incl. CENELEC) will propose a gap identification of the standards to be implemented.

Who:
ESO's to organise a workshop with key stakeholders such as HLF WS9 members, under the supervision of DG Ener and DG Grow, on the EU Grid Action Plan deliverable.

2- Generate a global electricity system **Flexibility for ALL**

Action: An Electricity System **Flexibility benefiting ALL**

During the last decade flexibility was frequently used as a buzzword. Flexibility markets have not demonstrated maturity across Europe. However, the Ukraine war demonstrated the need to have an efficient solution quickly to ensure Europe's independence.

One of the challenges, identified by the WS9: a significant complexity is created per the fact of mixing technical requests (required per TSOs & DSOs), with new business models (from Demand Side, and Industries), while optimising the use of interoperable innovative technologies. This complexity generates multiple proposals of architectures and data models each depending on the involved stakeholders.

Recommendation of WS9:

The proposal of the WS9 is to define jointly with the different stakeholders the relevant electricity flexibility system roadmap and milestones and to implement them, based on needs, and solutions (standardisation will be clearly a lever). This inclusive approach creates a holistic framework for the whole Electricity « Flexibility » system generating benefits for ALL stakeholders. The project should be managed as a holistic system transformation indicating the relevant use cases (markets, technologies, priorities) and related benefits (€) for each party. This ensures that no one is "forgotten". (note: The future Network Code Demand-Response will be considered as "technical" solutions)

Who:

The European Commission in the context of preparation of Demand Response Network Code:

Gather the End-to-end Electricity Sector stakeholders (such as HLF WS9 Members) to ensure the diverse visions are integrated in the global perspective. CENELEC (in the lead, with CEN support where required) to ensure technical creation and coordination of the different standards and normative documents to be published to implement the flexibility use cases together with ENTSO-E & EU DSO Entity leading the Demand-Response grid Codes proposals.

3- Ensure **Stability** of the Electricity system

Action: **Stability of the Electricity system: new challenges to address**

In a system needing to integrate more renewable, and thus more power electronics, system stability becomes increasingly fragile. There is a need to develop and leverage new rules & solutions such as grid codes and the appropriate standards to implement them.

Recommendation from WS9:

R1: WS9 proposes to develop harmonized standards under NLF approach to promote implementation of network codes.

R2: WS9 proposes to develop standards for mass equipment which can maintain and reinforce the stability of the system.

Who:
The European Commission with the support of CENELEC (supported by CEN): Concerning the evolution of the status of the existing standards.
CENELEC TC8X to ensure technical development of the new standards required to improve stability.

N.B: The question of the resilience of the electricity system will be analysed next year.

4- Get a **Greener Electricity System**

Action: **Get a real Lower Carbon Electricity System**

When talking about low carbon, the focus is often limited to a single aspect of the equation, such as energy efficiency, low carbon components or local architectures. These solutions may address only one part of the energy transition journey and may not be suitable or optimal for the entire scope of the equation.

However, energy transition needs to take all factors into account, considering regional differences. This means addressing an equation that mixes various factors such as energy scarcity, high demand peaks, seasonality: winter -summer, rainy/dry periods etc.

From a regulatory point of view a holistic approach is also necessary both in legal proposals and in the implementation of the newly adopted regulations such as Ecodesign for Sustainable Product Regulation (ESPR), Carbon Border Adjustment Mechanism (CBAM) and Construction Product Regulation (CPR).

Recommendation of WS9:

To create a standardisation deliverable to assess Carbon footprint for the different sources of energy based on a systematic analysis performed at different geographical regions and across various timelines in cooperation with the critical stakeholders of the Electricity system.

Who:

The European Commission: gather the end-to-end Energy sector stakeholders (including HLF WS9 Members) to ensure that diverse visions are integrated into the holistic goal and program.

CENELEC to cooperate on technical creation and coordination of the proposal to define the stakes, and the various solutions to be implemented.

5- Foster **Energy Efficiency at system Level**

Action: **The Electricity System contributing to Sector Coupling**

All WS9 participants confirm the strong value of sector coupling, but with very different understandings, different definitions, and different solutions. They also acknowledged that they seldom, if ever, align.

Consequently, there is a need to align the vision and the challenges, otherwise, "Sector Coupling" will remain a dream and will create frustration among the different sectors involved.

- *Sector Coupling allows for system efficiency and resilience due to better usage and management of electric energy surplus. Sector coupling provides flexibility to the overall system.*
- *Heat, Hydrogen, Heat Pumps and Storage solutions (Heat, Cooling, Water) are the key domains highlighted, and can bring solutions.*

Recommendation of the WS9:

To develop a dedicated program at EU level for setting the general European policy (principles) for optimization and management of energy which will be based on electricity system as the leading one.

WS9 identified the need for a European perspective defining sector coupling and the intent (Goal, Timeline, Milestones) and to explore the real beneficial solutions, by, e.g. defining the use cases of interest for all stakeholders (smart District? Urban heat? Industry?) Eventually creation of standards will be required, to ensure common definitions & semantics agreement, as well as clear milestones developed.

Who:
The European Commission to organise a think tank with main stakeholders with leading sectors:
Electricity (such as HLF WS9 participants), Liquid Fuel: Gas (bio), Hydrogen, Heating/ Cooling; to analyse the different use cases beneficial for all, then the Industries should define the action to be taken to have a real benefit for all.

Some action may request Standardisation milestones, where CEN-CENELEC should be involved such as the existing Coordination Group Smart Grid / Smart energy, which is already working on a lot of issues in this field. See: (CEN-CENELEC-ETSI CG on Smart Grids - CEN-CENELEC (cencenelec.eu)

6- **Improvement & Simplification of Processes**

Action a: **EU funding should be able to generate standards more systematically.**

There is recognition of the numerous EU funding programmes or EU entities generating innovation (JRC, Horizon Europe, and per domains: Circularity, Sustainability) or amplifying factories (IPCEI projects etc.) but these activities do not always have an impact on the generation of standards.

As pilots or sandbox they miss the requirements of the mass market. Additionally, these projects often do not have the mandate to initiate standardisation activities. It would be useful for these projects to work within the standardisation system and initiate the drafting of standards. If useful to support legislation, they can become harmonised standards in response to a standardisation request at a later stage.

Consequently, the budget is there, the intention is there, but not the deliverables.

Recommendation of WS9:

- In relation to EU funded R&D and innovation projects (e.g. Horizon Europe …), to incorporate in the obligatory projects deliverables requirements to identify the standards needed to bridge the gap between R&D results and real market implementation (and to sustain the funded research for the future).
- Ensure funding projects set-up will have the appropriate dimensioning (mass market as a target, or "ready for deployment" mindset) as a basis to propose standards (not only sandbox), in line with Industry Strategy and ESO's capacity.
- Have a scope based on System or infrastructure that will evolve to become greener.

Who:
The European Commission to ensure that EU Funding (incl. EIB) has the appropriate scope and deliverables integrating the necessity to generate related standards, where appropriate and relevant and in line with the standardisation practices.

Action b: **Optimise and aggregate Conformity Assessment**

Conformity to the legal requirements is mandatory. Standards are given a detailed method for proof of compliance. But the conformity assessment procedure to be used is very important and needs to be coherent with the purpose. The conformity assessment might be through a notified body, third party testing or manufacturer's declaration. (there are even more conformity assessment procedures, see the modules as defined by the EC, see the blue guide). All these conformity assessment procedures have their pros and cons, in terms of independent judgement, time to market or cost. So, the choice of the conformity assessment procedure needs to be coherent with the risk to be covered. As an example, the conformity assessment procedure for electrical safety (LVD) is "manufacturer's declaration" while the compliance of

medical equipment with the legal requirements through standards is to be done by notified bodies.

For conformity assessment to be effective their implementation / adherence must be monitored, e.g., through market surveillance.

Recommendation from WS9:

- For new/revised regulations and standards, the choice of the conformity assessment needs to be made in coherence with criticality of the topic. These assessments could be included in the impact studies in new legislation made par the EC.
- Administration and costs of conformity assessment to be optimized and simplified through the availability of harmonised standards, where relevant.
- Simplify conformity assessment whenever possible among "devices", "equipment".

e.g.: provide a conformity assessment scheme for MV and HV cables in order to speed up the delivery and decrease their costs.

- Be specific on cyber security methodology perimeter.
- Third party verification to respect deadlines…

Who:

European Directorates to assess the risks for choosing the appropriate schemes of conformity assessment.

CENELEC together with the European Commission, should define the appropriate aggregation of a "system" possible to avoid multiplication of costs.

7- **Broad Inclusion, to provide benefit for ALL**

Action:

- **Equal chance of Usage through Systematic guidelines**

WS9 Members require regulation to provide sufficient visibility, clarity, and reasonable ambition to ESO's and Industry. They also require alignment between the regulation and related standards, ensuring consistent timelines.

In addition, SME's or implementers of the standards often face challenges in identifying the appropriate standards or they lack the knowledge to translate and implement them effectively.

Recommendation from WS9:

Create efficient solutions / simple tools for user and implementer (incl. SMEs, Contractors, technical engineers etc) of electricity standards.

Develop implementation guidelines for facilitation of implementation and usage of standards especially for emerging technology domains:

- Need to cover both physical safety aspects but also logical (digital, information, transfer protocols, etc.) safety and security issues (cybersecurity, data privacy, …)
- With a clear indication of the user profile (Manufacturer, SME, Installer, User, Implementer etc)
- On some ethical and social aspects, there should first be clear legislation to guarantee the common interests of citizens. Fundamental rights should be defined by legislators and not via standards.
- Guidelines from product to system, and service created per third parties, to align requests.
- to coordinate horizontal requests to vertical ones (sector, or infrastructures).

Who:

Professional associations, NGOs such as ECOS, SBS, ETUC, ANEC (knowing best what suits to their members and providing tailor made solutions)

- Create selection tools to facilitate the choice of standards for their stakeholders,
- Ensure that a guideline is generated when standards are interconnected.

In conclusion,

The Green Electricity System is confronted with numerous regulations and initiatives aimed at accelerating the decarbonization of Europe. To achieve this, it must leverage a multitude of standards across various sectors (Generation, Demand Side, Grid) and through different means (circularity, efficiency, etc). This complexity is further heightened by European initiatives emphasizing critical sovereignty with a certain sense of urgency by different parties. Consequently, a multitude of regulations and standards emerge, often focusing on specific parts or “Green Dots” within the electrification journey, such as Wind energy, Solar power, Heat Pumps, storage solutions, Grid infrastructure, EV, Home, Building, Industry, etc. However, there is a tendency to overlook the impact of these targeted initiatives on the entire electricity system.

HLF W9 sees the strong need to connect the “Green dots” and advocates for a systemic approach and coordination, emphasizing the inclusiveness of all stakeholders and simplification of processes.