

RESEARCH AND STANDARDISATION

RESPONSE FORM for Standardisation groups

Opportunity for standardisation to contribute to the *European Partnership on Metrology EPM* under Horizon Europe

Objective: to collect standardization needs and suggestions to develop research projects in testing and measurements for the upcoming European Partnership on Metrology (EPM) calls in 2021

In the frame of the cooperation agreement between CEN-CENELEC and EURAMET, CEN and CENELEC have been invited by the EURAMET Management to put forward their **testing and measurement needs in research** for consideration by metrology institutes for future calls under EPM.

Relevant technical groups (sector fora, advisory boards, coordination groups, TCs, WGs...) **are invited to contribute with**

- a short introduction or an overview paper of their unaddressed standardization needs for testing and measurement, and
- a contact person (secretary, chair, convenor, liaison officer, etc.) whom proposers for the Potential Research Topics can contact,

by using this Response Form and send it at STAIR EMPIR, Mr Ortwin Costenoble: empir@nen.nl

Deadline for the consultation: **11 December 2020.**

Source of the identified need (identification of TC, WG, etc, incl. title)	<input checked="" type="checkbox"/> CEN/TC 0/WG 0 / <input checked="" type="checkbox"/> CLC/TC 9X/WG 0 <input type="checkbox"/> ISO/TC 0/SC 0 / WG 0 / <input type="checkbox"/> IEC/TC 0/SC 0 / WG 0 <input checked="" type="checkbox"/> Other, namely <i>IEC TC9 AHG 19, Energy efficiency and IEC TC9 WG50, Fixed installations – Electronic power converter</i>
European entity responsible for submission of the need	<i>CEN/CLC TC 9X SC 9XC Electric supply and earthing systems for public transport equipment and ancillary apparatus (Fixed installations)</i>
Person that can be contacted for more detail	<i>Gianosvaldo Fadin E-mail: gianosvaldo.fadin@anie.it Telephone: +39 348 2717138 Adress: Cianosvaldo Fadin ANIE Assifer viale Lancetti, 43 20158 Milano - Italy</i>
Title:	<i>Specifications for non-conventional d.c. substation Performance assessment of non-conventional subs.</i>
Unaddressed need	<i>To define the methodologies for the analysis of the performances of the non-conventional d.c. substations. To define rules for the efficient management of the d.c. supply system.</i>
Further explanation of need (TC business plan, road map, formal decision, work item, etc.)	<i>In the railway/metro/tram systems supplied by conventional d.c. sub-stations, the energy regenerated by the traction units has to be consumed within the DC grids. The extra-energy generated by the braking is, thus, wasted. The</i>

evolution of the power electronics has made available new systems such as reversible substations/storage systems, even at high voltage, that allows the increase of the energy recovered.

- A) Coordination of traction unit regenerative braking and power supply receptivity:

One of the reasons that limits the energy recovered is the bad coordination between the voltage level of the supply system and the on-board braking rheostat control system that intervenes untimely. In fact, the actual trend of increasing the DC feed voltage, in order to reduce the losses along the line, is in contrast with the threshold voltage level that triggers, untimely, the insertion of the on-board braking rheostats; even when the receptivity of the line is good. A bad coordination between the voltage at the catenary and the braking rheostat control system can degrade the recovery capabilities provided by the installation of new infrastructures like reversible substations and or storage systems. In other words, the installation of a very efficient system that allows the reversibility of a substation does not guarantee, a priori, an adequate energy saving of the whole railway system.

In this contest, it is fundamental to provide rules for the implementation of the coordination between the supply voltage level and the intervention of the on-board braking rheostat.

This topic is treated in the WG 11. It is engaged for the publication of the new standard family EN 50388. The state of this standard is 40.98.0009 End of interruption of work – abandoned. A contribution that involves the new d.c. supply structure can be introduced in the EN 50388 family standard.

- B) performance/interface design specification

The knowledge of the actual performances of the installed non-conventional substations is fundamental in the evaluation of both the environmental impact and cost-benefit ratio of the new installation. They do not depend on the single device (e.g. the convertor or storage system) but on the whole railway system.

The CENELEC TC9X Business Plan (2012), in the market demand stated that: “standards should be drafted in a way that allows use of newer technology through a performance/interface design specification rather than a description of technology. Following this requirements, SC9xC intends to develop standardized methodologies for the assessment of the performance of the new installations that safeguard both the designer, the supplier, the installer and the railway infrastructure manager for the performance estimation is essential.

Starting from the published CLC/TR50646, TC 9X intent to run a new work item with the aim of publishing a new standard (a technical specification) that provides a collection of possible configurations for the non-conventional substations with means and methods for the estimation of the performance of the non-conventional substations in terms of:

	<ul style="list-style-type: none"> - <i>energy saving (comparison with the ante-opera energy consumption)</i> - <i>efficiency at different levels of the converter group</i> - <i>efficiency for different modes: traction, regeneration</i> - <i>harmonic content on both DC and AC side</i> - <i>fixes rules for a smart energy management of the entire railway/subway system.</i> <p><i>For what concern the storage systems (batteries, super-capacitors) that can be integrated in the non-conventional substations, a technical report that proposes measurement procedures for validation of the effects in terms of energy saving, charge – discharge efficiency declared in EN 62924 – stationary energy storage system for DC traction systems is of interest for the sub-committee.</i></p>
Proof of need by the TC/SC	<p><i>The before mentioned standardization need are declared in the Cenelec technical report CLC/TR 50646 " Railway Application - Fixed Installations - Specification for reversible d.c. substations" in section 9 "Further standardization needs".</i></p> <p><i>Moreover, there is a new work item proposed by the Chinese committee "</i></p> <p><i>Railway applications - Coordination requirements and energy-saving performance evaluation for Energy Feedback Systems in DC Traction Power Systems " with the aim of standardizing the non-conventional DC substation, the storage systems for fixed installation and to provide rules for the coordination of the feeder voltage level. Such proposal has been analyzed in the last plenary meeting of the IEC TC 9; here is reported the Decision 59/17: Noting the report of AHG 19 convenor, TC 9 decides to invite the Chinese NC to provide an updated NP on "energy feedback systems" for circulation by the TC 9 secretary before the next CAG meeting.</i></p> <p><i>Last but not least, the mentioned standardisation need shall be considered in the framework of the IEC TC9/ CLC TC9X merging strategy which implement the Frankfurt Agreement signed by IEC and CENELEC</i></p>
Enclosures	<input type="checkbox"/> Yes <input type="checkbox"/> No

*See more information or a link to the webinar at

[EMPIR website](#)

[CEN/CENELEC website "Standards and metrology"](#)