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Authors:

Davide Drago, Massimo Santarelli (Politecnico di Torino)

Contacts:

davide.drago@polito.it

massimo.santarelli@polito.it



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1. Introduction

This report has been thought as an addendum to the Position Paper drafted before the beginning of the installation phase. That document was produced with the aim to supply an overview of the European and national RC&S framework concerning the installation aspects of the FC-based microCHP systems. The work has been done in order to give the manufacturers an idea of what they should expect from each country considered for the installation.

The installation phase lasted for approximately three years, in which the target originally fixed by the ene.field project (around 1'000 units) has been reached. In details, **1046 units** have been installed in **10 european countries** with a distribution of **603 SOFC** and **443 PEM**.

Now, through the present work, manufacturers have been asked to share their experiences during the three-years installation phase, highlighting the differences between what was expected and what really was the interaction with the current European and national legislative system.

The survey has been conducted by submitting a questionnaire to all the manufacturers involved. The questionnaire possesses the same structure of those proposed during the draft of the Position Paper. According to the answers and additional comments supplied by the participants, it has been possible to understand the real impact that the current RC&S system had over the installation phase.

2. Description of the questionnaire

The questionnaire consists of three multiple-choice questions and a final open question.

The first two multiple-choice questions (Questions A and B) are referred to the direct manufacturers' experience during the period of the installation phase dealing with the current European and national standardization system. The topics considered for the answering of these questions are the same 15 included in the old questionnaires of the Position Paper rearranged in 4 macrotopics (Table 1). For each of the 4 macroareas defined, manufacturers have been asked to describe their "interaction" with the existing legislation (Table 2) and if the experience somehow led to change their original considerations on the current situation (Table 3).

Macrotopics	Topics included
Inlet fluids	<ul style="list-style-type: none"> • Natural gas quality • Natural gas supply system • Air supply system • Hydrogen production unit
Electrical system	<ul style="list-style-type: none"> • Electrical system installation • Power quality
Heat and hot water	<ul style="list-style-type: none"> • Thermal insulation • Hot water
Construction, siting and building	<ul style="list-style-type: none"> • Exhaust & Environment • Ventilation • Safety • Control system

Table 1. Partition of the 15 original topics in 4 macrotopics.

<p>Question A: <i>Referring to the macro-topics summarized in the Table of the next page and their related standards, how has been your experience in the installation process dealing with the currently existing standardization?</i></p>	<p>Very good: The currently existing standardization proves to be optimal in covering all the aspects related to the installation process.</p>
	<p>Quite good: The currently existing standardization proves to be sufficient in covering all the aspects related to the installation process, but additional improvements would be well accepted.</p>
	<p>Bad: The currently existing standardization proves to be not sufficient in covering all the aspects related to the installation process.</p>

Table 2. Question A about manufacturers' experience in the installation phase.

<p>Question B: <i>Is your opinion referred to the existing european and national standards changed with respect to the questionnaire submitted during the draft of the position paper (M15 of the project, last version 04.09.2014), after the experience of the installation phase?</i></p>	<p>Yes: The opinion referred to the existing european and national standards is changed after the experience of the installation phase.</p>
	<p>No: The opinion referred to the existing european and national standards is not changed after the experience of the installation phase.</p>

Table 3. Question B about manufacturers' experience in the installation phase.

The last multiple-choice question (Question C), instead, moves the attention to the energy labelling matter. One month ago, specifically the 1st of August 2017, a new European Regulation has been released repealing the **Directive 2010/30/EU “on the indication by labelling and standard product information of the consumption of energy and other resources by energy-related products”**. The new official document is the **European Regulation 2017/1369 “setting a framework for energy labelling and repealing Directive 2010/30/EU”**.

This new Regulation has been produced with the aim of a re-arrangement of the labelling system. Specifically, this document sets the elimination of the classes over A (A+, A++ and A+++) since they proved to be confusing for customers and a return to the original A to G scale considered as a clearer solution. In addition, the Regulation 2017/1369 foresees that, according to the development rapidity of the technology considered, at the moment of the introduction of the new label, products mustn't be included in class A or even in class B. In this way, the development of always more performing technologies is incentivized.

Referring to this evolution in the energy labelling field, an opinion has been asked to the manufacturers (Table 4).

<p>Question C: <i>A new European Regulation has been produced which date of effect is the 1st of August 2017. Its content sets a framework for energy labelling and this document repeals Directive 2010/30/EU. The main change is the rescaling of the labels into an A to G scale eliminating all the classes over A (A+, A++ and A+++). All the existings products will be then re-distributed in order to maintain, at least</i></p>	<p>Good idea: The rescaling of the labels to the most usual A to G scale will help customers to better identify the most efficient products.</p>
	<p>Nothing change: The rescaling of the labels to the most usual A to G scale will not produce any change in the customers behaviour.</p>

at the beginning, the highest classes (A and B) empty, encouraging in this way the introduction of always more performing products. What is your opinion about this initiative?

Bad idea: The rescaling of the labels to the most usual A to G scale **will not help** customers to better identify the most efficient products.

Table 4. Question C about manufacturers' opinion on the new Energy Labelling Regulation.

The last question contained in the questionnaire is open and has been thought to let manufacturers the chance to add further comments on aspects that, somehow, have not been covered by the other questions but that proved to be significant during the installation phase.

3. Results from the questionnaire

The answers supplied by the manufacturers have been analyzed and the main outcomes emerged are reported hereinafter divided according to the different arguments proposed. As a significant figure, the questionnaire had a **good participation** quantifiable as **around the 65%** of the interviewees.

3.1 Considerations from questions A and B

At a first glance, the opinions of manufacturers about their experiences with the current existing standardization system are **unanimous**. Specifically, they think that the current legislative scenario proves to be **sufficient** in covering all the aspects related to the installation process, but **additional improvements** would be well accepted.

Then, no surprises have been found during this three-years experience since the totality of those who responded **confirm their original opinion** on the available legislative documentation both at European and national level.

Moving into details, it is worth mentioning some comments:

- Answers collected confirmed the problem of a **lack of harmonization** among European and national standards, especially for what concerns **gas quality limits** and **electric connection codes**.
- Referring to each macrotopic, the documents with which every manufacturer had to deal with are not totally the same. This seems to mean that, except for some case (such as EN 50465 and the 62282 series as already stated in the previous questionnaires), different manufacturers give importance to different types of standards.
- Focusing on the Italian electrical scenario, manufacturers claimed that the **bureaucracy** and the **procedures** for the electrical connection result to be **too complex**.

3.2 Consideration from question C

Unlike the previous questions, in this case there has been **dishomogeneity** among the answers received. Specifically, manufacturers are completely divided into those who think that this initiative is a bad idea and those who claim the opposite.

The formers believe that the change of scale can cause confusion together with a lack of motivation in the R&D for the improvement of already existing devices once the highest labelling class is

reached. The latter, instead, are sure that the re-arrangement of the labelling scale will help customers giving rapid and clear information.

3.3 Additional comments

Finally, referring to the open question, not many additional comments have been received. Anyway, the general thinking is that a sort of **more close communication** between international authorities and EU, in order to avoid discordances among standards and directives and regulations, especially from Country to another, is needed.

4. Conclusions

The aim of the present work was to analyze the experiences of all the manufacturers that participated in the installation phase, in order to understand if what was expected by the surveys conducted around three years ago during the draft of the Position Paper, in terms of problems and barriers, corresponded to the reality of facts.

From feedback supplied by the interviewees, it seems that major problems are confirmed, such as the lack of harmonization among European and national standards, complexity of the bureaucracy, scarce communication among international authorities and EU.

Anyway, the current RC&S framework is in some way already well developed, and it can constitute a solid base for future useful improvements.

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