



HyLAW

Horizontal Position Paper Stationary Fuel Cells Support Mechanisms

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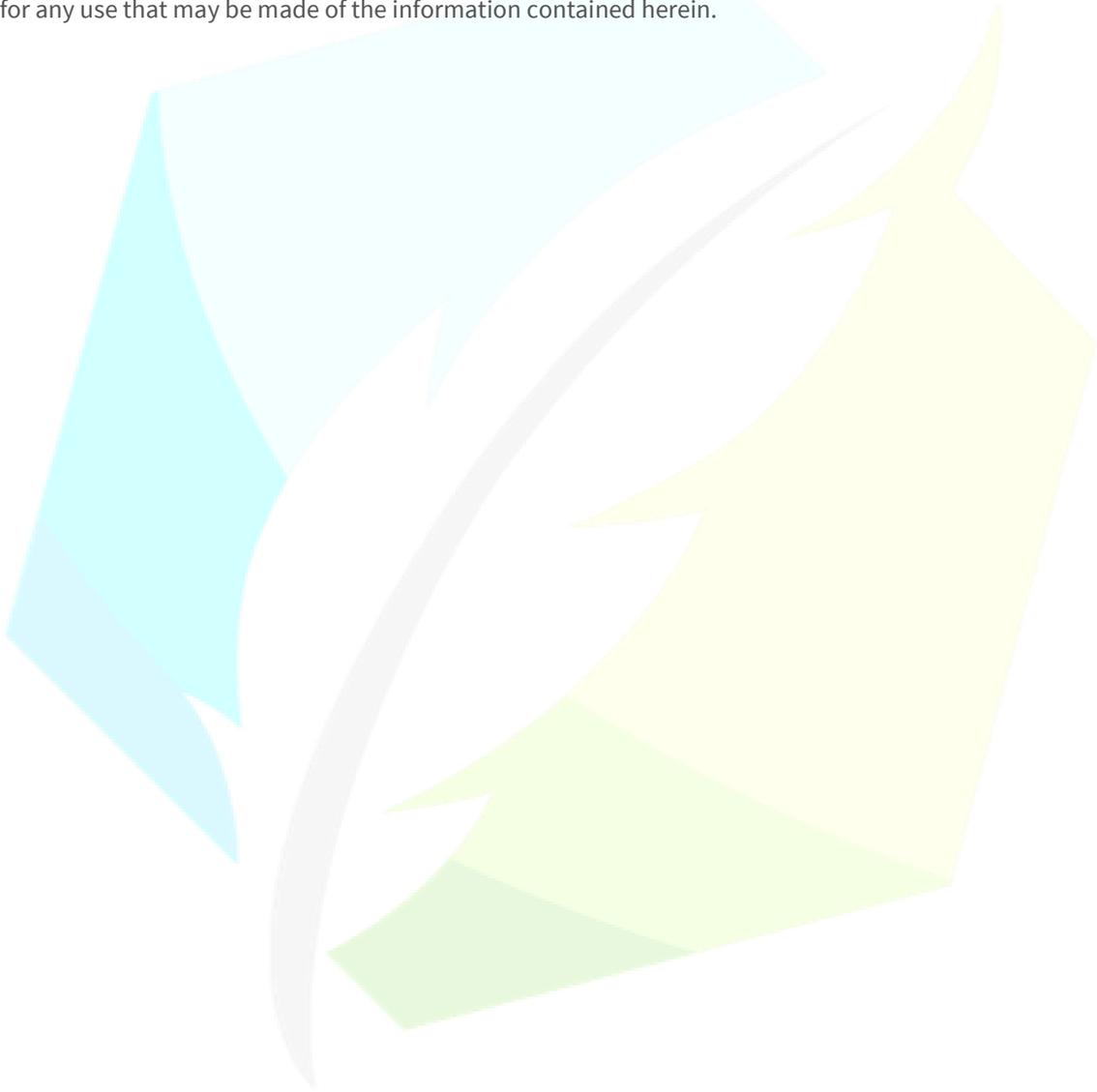




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1. Introduction and Summary

Residential stationary fuel cells (also known as Fuel Cell micro-CHPs, Fuel Cell micro-Cogenerations) are a highly efficient technology that uses hydrogen, biogas, natural gas or other gaseous hydrocarbons to produce heat and electricity for a single household up to small residential or commercial buildings. Stationary fuel cells are distributed generation technology i.e. they produce power and heat at the site of the consumers and for the purpose of their immediate supply with energy. The produced electricity can be used to cover the customers own demand or injected into the electricity grid and sold.

Micro-CHP is defined by the Energy Efficiency Directive as a cogeneration unit with a maximum capacity below 50 kW. However, the fuel cell units with a maximum capacity up to 5kW are sufficient for single homes or small residential or commercial buildings. The reduction in primary energy usage results in greenhouse gas (GHG) emission reductions and the mode of operation of the micro-Cogeneration unit can support the grid integration of renewable energy.

At present, a very small number of stationary FC micro-CHP units have been installed in Europe (about 2000), mainly in Germany. The practical experience is quite insufficient and therefore some issues related to a greater number of stationary fuel cell systems exporting electricity to the public grids cannot be foreseen and estimated today. Although the widespread deployment of residential FC micro- CHP systems is expected in the next few years in Europe, they are still in a market entry phase.

Ene.field and now PACE are the largest European projects aimed at ensuring the European FC micro-CHP sector makes the next step to mass market commercialisation through implementing innovations in products, which reduce unit cost, increase stack lifetime and improve the electrical efficiency of all units. PACE is a five-year project that will deploy more than 2,800 of the next generation Fuel Cell micro-Cogeneration units in 10 European countries by 2021¹.

The FC micro-CHP systems must compete with well-established technologies and therefore non-discriminatory and technology open policies and legal frameworks at EU and national level are needed in order to overcome the market roll-out phase. The residential stationary fuel cells working on natural gas have to be treated in a same way as any other high-efficiency micro-cogeneration units. In case FC micro-CHP systems operate on green gases incl. hydrogen, they have to get the same preferential treatment as power units generating electricity from renewable sources.

Presently, the most EU Member States do not provide any support mechanisms for FC-micro CHP systems. The existing support measures in the rest of the countries are very fragmented and unlikely to contribute substantially to the mass deployment of the residential stationary fuel cells. The most commonly used support measures available for all types of cogeneration units are feed-in tariffs, CAPEX support and incentives for electricity self-production.

Within the EU, Germany has put in place the most extensive support mechanism for FC micro-CHP systems. In addition to the financial incentives for high-efficiency cogenerations, Germany has established a dedicated programme KfW433 for funding the purchase of stationary fuel cells up to 5 kW.

An overarching support policy is crucial for the large-scale deployment of the FC micro-CHP systems. The serious economic barriers and regulatory gaps could be overcome through systematic long-term support approach including not only direct financial support but also the recognition and inclusion of the stationary fuel cells in the eligible energy efficiency improvement measures in buildings.

2. Overview of the legal framework

The main legislative acts promoting the improvement of the energy performance of buildings within the EU and of great importance for the commercialization of FC micro-CHP systems are the Energy Efficiency Directive 2012/27/EU² and the Energy Performance of Buildings Directive 2010/31/EU³.

The Energy Efficiency Directive establishes a set of binding measures to help reach the EU 20% energy efficiency target by 2020.

Each Member State shall set up an energy efficiency obligation scheme. This scheme requires energy companies to achieve yearly energy savings of 1.5% through the implementation of eligible energy efficiency improvement

¹ <http://www.pace-energy.eu/>

² Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC

³ Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on the energy performance of buildings

measures. These may include inter alia improvement of the heating systems in consumers' homes. EU countries may also implement alternative policy measures which reduce final energy consumption. These measures could include:

- energy or CO₂ taxes
- financial incentives that lead to an increased use of energy efficient technologies
- regulations or voluntary agreements that lead to the increased use of energy efficient technologies
- energy labelling schemes beyond those that are already mandatory under EU law
- training and education, including energy advisory programmes.

Under the Directive the high-efficiency cogenerations, including micro-CHPs are recognised as promising technologies with significant potential for saving primary energy. The Energy Efficiency Directive requires Member states to assess the potential for CHPs, including micro-CHPs and introduce policies to promote them.

In addition, Member States are obliged to renovate each year from 2014 on 3 % of the total floor area of the government buildings (optional all administration buildings) to meet at least the minimum energy performance requirements and shall ensure that public bodies purchase only products, services and buildings with high energy-efficiency performance.

The Energy Efficiency Directive requires Member States to adopt simplified grid connection 'install and inform' procedures for micro-cogeneration units. In addition, Member States shall ensure that the electricity grid operators in charge of dispatching the generating installations in their territory:

- provide priority or guaranteed access to the grid,
- guarantee the transmission and distribution, and
- provide priority dispatch of electricity from high-efficiency cogenerations.

When providing priority access or dispatch of the electricity from high-efficiency cogeneration, Member States may set rankings as between, and within different types of, renewable energies and high-efficiency cogenerations and shall in any case ensure that priority access or dispatch of energy from variable renewable energy sources is not hampered.

It is up to national political makers whether and how to implement support measures for the FC micro- CHP systems as high-efficient and low-emission technology.

Energy Performance of Buildings Directive obliges Member states to take measures to ensure that minimum energy performance requirements for buildings or building units are set with a view to achieve cost-optimal levels. For new and existing buildings shall be issued Energy performance certificates, when a building is sold or rented. The energy performing certificates include an energy performance rating and recommendations for cost-effective improvements. Under the Directive the EU countries shall draw up lists of national financial measures to improve the energy efficiency of buildings and ensure that all new residential buildings are "Nearly Zero-Energy Buildings" after 2020.

In April 2018 was adopted a new Directive 2018/844/EU⁴ amending the Energy Performance of Buildings Directive and the Energy Efficiency Directive. It aims to promote the use of smart technologies in buildings, to streamline existing rules and accelerate building renovation. Member States shall link their financial measures for energy efficiency improvements in the renovation of buildings to the energy savings achieved due to such renovation. These savings shall be determined by comparing energy performance certificates issued before and after renovation. The Directive introduces a "smart readiness indicator" which should be used to measure the capacity of buildings to use information and communication technologies and electronic systems, to adapt the operation of buildings to the needs of the occupants and the grid and to improve the energy efficiency and overall performance of buildings. The Directive entered into force as of 9 July 2018 and has to be transposed into national law of the Member States within 20 months.

It depends on national implementation of the Directives, whether the FC micro-CHP systems will be recognised as an eligible technology for reducing the CO₂ emissions of the buildings, achieving energy saving and providing smart grid solutions.

Further legal acts which possible positive impact on the market introduction of FC micro-CHP systems are the Energy Labelling Regulation (EU) 2017/1369⁵ and Ecodesign Directive 2009/125/EC⁶.

⁴ Directive (EU) 2018/844 of the European Parliament and of the Council of 30 May 2018 amending Directive 2010/31/EU on the energy performance of buildings and Directive 2012/27/EU on energy efficiency

⁵ Regulation (EU) 2017/1369 of the European Parliament and of the Council of 4 July 2017 setting a framework for energy labelling and repealing Directive 2010/30/EU

The Energy Labelling Regulation lays down a framework applicable to energy-related products placed on the market or put into service. It provides for the labelling of those products and the provision of standard product information regarding energy efficiency, consumption of energy and of other resources by products during use, and supplementary information concerning products, thereby enabling customers to choose more efficient products in order to reduce their energy consumption.

The Regulation provides for rescaling the energy labelling of space and water heating products, currently set out in Space Heaters Regulation (EU) 811/2013⁷. The Space Heaters Regulation introduces a labelling scale from A ++ to G for the space heating function of boiler space heaters, cogeneration space heaters, heat pump space heaters, boiler combination heaters and heat pump combination heaters with a rated heat output ≤ 70 kW. While classes A to G cover the various types of conventional boilers when not combined with cogeneration or renewable energy technologies, classes A + and A ++ should promote the use of cogenerations and renewable energy sources.

The Ecodesign Directive provides a framework for the setting of EU-wide ecodesign requirements for energy-related products with the aim to ensure the free movement of those products which comply with such requirements and improve their overall environmental impact. It aims to contribute to sustainable development by increasing energy efficiency and the level of environmental protection, while at the same time increasing the security of the energy supply.

The eco-design requirements are the basis for the labelling of the products.

The specific ecodesign requirements for space heaters and combination heaters are laid down in Regulation (EU) 813/2013⁸. It sets ecodesign requirements (aimed at improving energy efficiency) for the placing on the market and/or putting into service of space heaters and combination heaters with a rated heat output ≤ 400 kW, including those integrated in packages of space heater, temperature control and solar device or packages of combination heater, temperature control and solar device.

3. Conclusions

Despite the undeniable advantages of the FC micro-CHP systems (high energy efficiency, smart grid capability) their presence on the market is limited so far. Supportive policies and appropriate framework conditions can accelerate the transition of the FC micro-CHP sector from emerging technology to full-scale commercialisation.

The fuel cell micro-CHP systems have to be recognised as one of the key technologies capable to deliver greenhouse gas emission reductions, energy savings, integration of renewable energy sources and smart grid solutions.

Simplified grid connection procedures and guaranteed access to the grid for electricity produced from high-efficiency micro-CHP systems, as well as supportive measures for the produced electricity can further contribute to overcome the roll-out phase.

In addition, the FC micro CHP systems have to be accepted as an eligible technology in the national public procurement rules for purchase of products with high-efficiency performance in the government buildings. The public sector constitutes an important driver to stimulate market transformation towards high-efficiency technologies. Buildings owned by public bodies account for a considerable share of the building stock and have high visibility in public life.

4. Recommendations

Development and adoption of policies and concrete measures, recognising the energy efficiency and the smart grid functionality of the residential stationary fuel cells and promoting them as high-efficiency micro-cogenerations

Recognition of residential stationary fuel cells as an eligible technology under the Energy savings obligations according to Energy Efficiency Directive

⁶ Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products

⁷ Commission Delegated Regulation (EU) No 811/2013 of 18 February 2013 supplementing Directive 2010/30/EU of the European Parliament and of the Council with regard to the energy labelling of space heaters, combination heaters, packages of space heater, temperature control and solar device and packages of combination heater, temperature control and solar device

⁸ Commission Regulation (EU) No 813/2013 of 2 August 2013 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for space heaters and combination heaters



Inclusion of the FC micro- CHP systems as high-efficiency technology in national strategies and public procurement rules for decarbonisation of the building stock

Provision of guaranteed access to the grid, guaranteed transmission and distribution and priority dispatch of the electricity produced from high-efficiency FC micro-CHP systems and creation of support mechanisms for the uptake of this electricity

