Final report

1.1 Project details: EUDP – 13 - II

Project title	Participation in IEA Annex 25 extension
Project identification (program abbrev. and file)	IEA Annex 33
Name of the programme which has funded the project	EUDP
Project managing company/institution (name and address)	Dantherm Power A/S, Majsmarken 1, 9500 Hobro
Project partners	No additional partners
CVR (central business register)	30804996
Date for submission	20160425

1.2 Short description of project objective and results

After participating in international cooperation in the IEA working group Advanced Fuel Cells Annex 25, Stationary Fuel Cells for nearly four years the present project continues the participation in the following IEA work in Annex 33. The activities in the working group are centered on participation, preparation and reporting from the two annual meetings in the Working group.

Nærværende projekt er en fortsættelse af et internationale samarbejde i IEA arbejdsgruppen Avancerede Brændselsceller Annex 25 Stationære Brændselsceller, der har fundet sted de foregående fire år. Det nye kommissorium ligger i forlængelse af det tidligere og går under betegnelsen Annex 33. Aktiviteterne i projektet er centreret om deltagelse, forberedelse og rapportering fra de to årlige møder i arbejdsgruppen.

1.3 Executive summary

The IEA Annex 25 expired in February 2014, but a related mandate from IEA continued in IEA Annex 33 by the same group of people. IEA Working group for stationary fuel cell applications provides a good platform to gain insight into activities in the area of stationary fuel cell applications and specially micro-CHP worldwide. At the same time, the work have strengthened and maintained the relevant international networks and insight into the market in other countries. Participation has been a good platform for increasing international cooperation, both academically and commercially. The working group deals with different fuel cell technologies and how these can be utilized in stationary fuel cell products like micro-CHP. The reporting from the work was disseminated in presentations at different national Danish fora.

1.4 Project objectives

The project objective has to a large extend already have been met. The project has resulted in international contacts, which lead to the establishment of collaborating on start-up of EU projects and exchange of experience in the field beyond Europe. Fruitful international relationships were built through bi-annual meeting over a number of years. However the discontinuations resulting from the reduced EUDP funding rates to industry in this kind of projects resulted have prevented participation to finalize the IEA Annex 33 in 2019 from the Danish participation.

During the time of the project the Danish hydrogen and fuel cell community have been better informed on the development on the international scene and the relationship build has resulted in a number of international joint projects including European co-funding.

1.5 Project results and dissemination of results

The working group's updated mandate Annex'et changed number to 33.

The key messages from the work in the Annex are:

• To date, fuel cells are a competitive alternative to battery systems used in material handling equipment, telecom stations, back-up systems and APUs.

• Japanese fuel cell companies have begun to export to Europe in collaboration with European fuel cell developers for domestic scale installations.

• A high electric efficiency is essential for micro-CHP fuel cells as it enables more operating hours per year. In this case, micro-CHP is not dependent on the heat demand for the efficient operation of the plant. This will improve the economy and the environmental impact for the system. (The current Danish political focus on phasing out natural gas over time prevents micro-CHP of finding a foothold in the Danish energy picture!)

• SOFC for residential fuel cells in Japan and Europe is gaining market share.

• Fuel cells for CHP applications can have an important role in the energy system as they have high efficiency and can use local fuel, such as biogas, with high efficiency.

• The use of biogas as fuel for fuel cells has increased in the USA, especially California and the Northeast USA, supported by the available incentives.

• One third of all MCFC systems in operation in the world are running on biogas.

• MCFC is becoming more commercialized, reliable and competitive. The installations are growing in size and numbers, and are now manufactured in several places around the world.

• The possibilities of producing hydrogen, electricity and heat from biogas by MCFC technology is an interesting alternative for the coming hydrogen infrastructure.

The autumn 2014 IEA Annex 25/33 meeting was organized by Dantherm Power in Hobro. The meeting was held over two days in October with a total of 15 participants from Sweden, Switzerland, France, Japan, Israel, Italy, Germany and Denmark. As additional Danish participants we included representatives from AAU, CEMTEC and IRD. The meeting included a site visit at an uninterruptible power supply for fiber network in Randers and Aalborg University's Department of fuel cells.

In April 2015 the IEA Annex 33 gathered at the Austrian Energy Agency in Vienna. After the official meeting, Austrian Energy Agency organized a workshop for a wider range of local stakeholders, during which I made a presentation about fuel cells for emergency power supplies for a broader audience.

In November 2015 the IEA Annex 33 met in Los Angeles in connection with the Fuel Cell Seminar and Energy Exposition.

Information from IEA meetings about developments in the field stationary fuel cell systems with a focus on Europe and Japan were reported on a workshop for Danish micro-CHP in July 2014 and on the open final conferences for Danish micro-CHP September 2014.

The work in IEA Annex 33 was reported at a meeting on the IEA projects in Eigtveds Warehouse arranged by EUDP and DGC in March 2015.

The news from the LA meeting was reported in the stationary system and fuel cell strategy group of the Danish Partnership for Hydrogen and Fuel cells on 26th of November 2015 and again to the board of the Partnership on 10th of December 2015.

Pictures from the meeting in Hobro October 2014:

1.6 Utilization of project results

The IEA Annex 33 group has been an inspiring network for discussions of strategies for further development of the fuel cell strategy. The trusted network evolving out of the work in the Annex 33 was used to form fruitful consortia for further development of the fuel cell technology with support from EU.

No patents were persuading in the project.

1.7 Project conclusion and perspective

The insight in the international development gained is an important element in forming the company's future strategy.

The dissemination to the Danish hydrogen community has secured a continuous high level of awareness and transparency of the international status of the fuel cell technology and market. This is important in order to align the development with the Danish energy policy.

The discontinuations resulting from the reduced EUDP funding rates to industry in this kind of projects resulted have prevented participation to finalize the IEA Annex 33 in 2019 from the Danish participation. The international status of the industry will be more difficult to monitor without a seat in the IEA Annex 33.

Annex

Link to IEA Advanced Fuel Cell Implementing Agreement
http://www.ieafuelcell.com/annexdescriptions.php