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ComSos

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"Commercial-scale SOFC systems"

Deliverable number 5.11

Analysis of the public awareness of the potentials of FC-based solutions in the commercial sector

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Abstract:

Public awareness is the public's level of understanding about the importance and implications of a certain value proposition. The ComSos project increases public awareness by communications towards the broad society, with key messages on the environmental and energy advantages related to the SOFC-CHP systems. Potential market applications are many and widespread in different sectors: industrial, commercial and residential.

The term 'public' thus includes all potential customers for FC systems, from citizens to industry, and includes decision makers like policy actors and authorities. Furthermore, videos, online courses and social media will support the reaching of a broad audience.

The ComSos value proposition towards the public is that FC technology is not distant from people´s everyday life but a key solution related to many sectors, from the own house to the working environment and from sport centers to fast food restaurants, with the ability to provide a better use of resources and lower environmental impacts.

This report shows the Comsos activities which have been performed with the aim of increasing the public awareness.

Keyword list: SOFC systems, commercial sector, public awareness, communication activities, general public, target groups.

Summary

1. Introduction

This report includes the description of the activities, developed by the SOFC manufacturers and by the Comsos consortium, aimed at maximizing the public awareness toward fuel cell systems.

1. The first section is focused on the **activities of the SOFC manufacturers** involved in the Comsos project. Website sections and public materials are available on their website with the aim of simplifying the concept and underling the potential advantages of the SOFC installation in a commercial-industrial building.
2. The Comsos project has developed – together with the EU funded PACE project – **a shared Joint Declaration on Stationary Fuel Cells for Green Buildings**.
3. The project, through the academic partner POLITO, is actively developing **hydrogen and fuel cells focused curricula** for the education and training.
4. Simplified **3D motion videos** have been developed in the framework of the Comsos project focused on specific case studies, to reach the general public and possible customers interested in the fuel cell technology.
5. The Comsos activities have been explained by the partners during different sets of **video interviews** in which the partners explain their role in the project and their activities.
6. The Comsos concept has been also reproduced at the beginning of the project in a dedicated **infographic**, available on the website, to underline the potential benefits of fuel cells systems.
7. The results of the Comsos project are constantly published on the **website** (results and updates from the SOFC installations, pictures) and scientific activities are available through Gold Open Access publications which are shared, together with the deliverables, on social media platform.
8. Finally, at the beginning of 2022, a **survey** has been produced and used to understand the level of public awareness and interest toward fuel cells, and results are here presented.

2. Activities of the SOFC manufacturers

This section will show how the 3 SOFC manufacturers involved in the Comsos project are trying to increase social awareness.

- Convion Oy (Finland) has some “case studies description” available on the website, which can be useful for some potential customer or general public interested in discovering the SOFC technology. The 2 case studies are related to waste-to-energy by means of SOFC, and SOFC as cogeneration system for decentralized energy production. The company is also using LinkedIn to reach a more technical, but not fuel cell specialized, public.

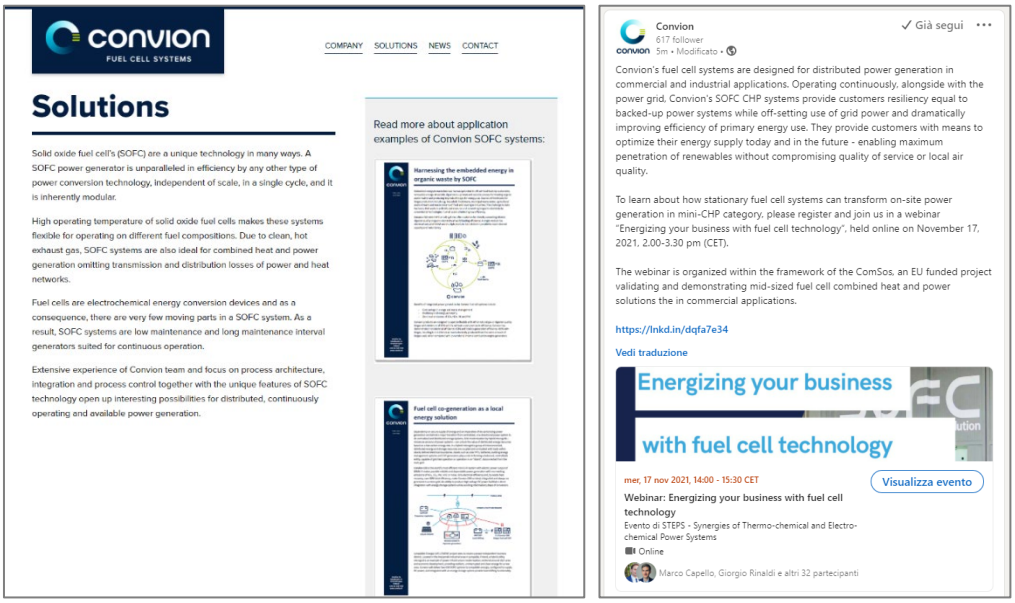


Figure 1. Convion website (left) and LinkedIn post (b).

- Solidpower (Italy, Switzerland) is one of the most active through the website and social media for what concerns the availability of materials and link with potential customers. Figure 2 shows a summary of the success stories which can be found on the website and include large homes, auto-port owners, restaurant owners and others. Some simple infographics are also available (Figure 3) to show the benefits of SOFC in terms of energy savings, environmental footprint, and operating principle. On the LinkedIn page, some dedicated posts related to the 2022 high energy prices are also available. Furthermore, videos on the technology can also be found on YouTube: https://youtu.be/TE3Kt7fcbAY.

Figure 2. Success stories on Solidpower website.

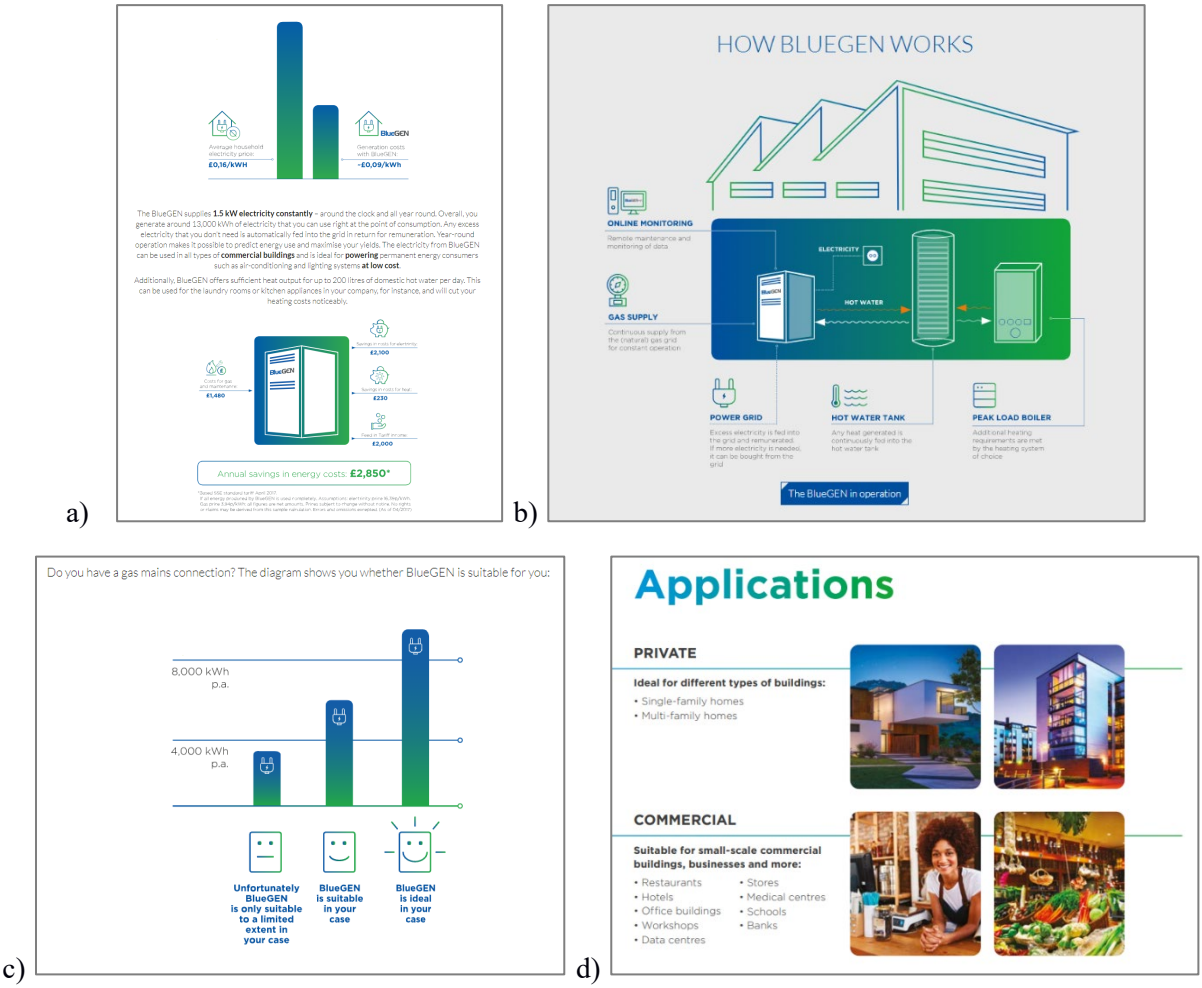


Figure 3. Infographic images available on the Solidpower website.

- Sunfire has recently interrupted the business on SOFC for cogeneration applications, but some material is still available on the Sunfire Home product, as can be seen on Figure 4.

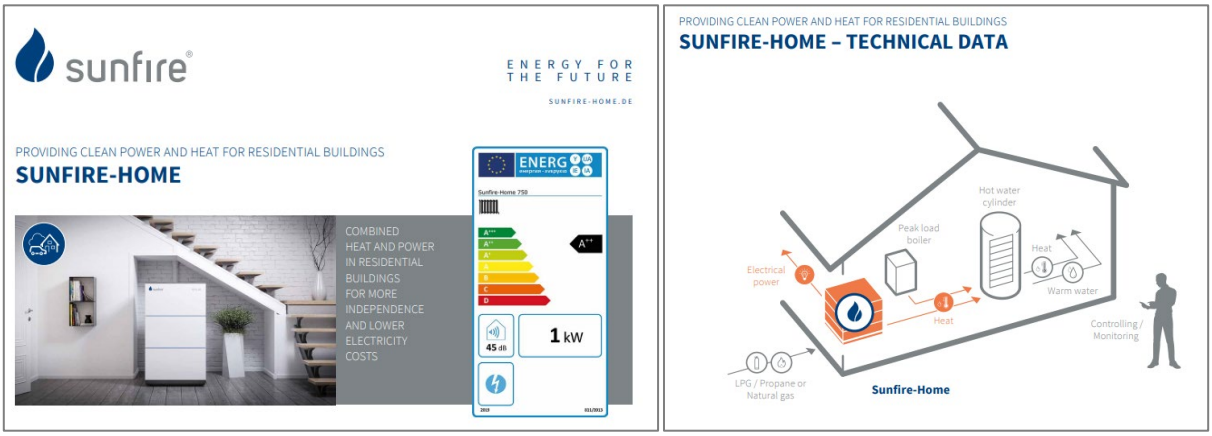


Figure 4. Sunfire Home product graphic.

3. Comsos-PACE Joint declaration

The Comsos project has developed – together with the EU-FCHJU funded PACE project – a shared Joint Declaration on Stationary Fuel Cells for Green Buildings. The declaration (Figure 5) is available at the following link: https://pace-energy.eu/sign-our-declaration/. The document was signed by different signatories (associations, authorities, industries and research institutes).

Figure 5. Joint Declaration Text.

Figure 6. Joint Declaration Signatories.

4. Hydrogen and fuel cell educational programs

The project, through the academic partner POLITO, is actively developing hydrogen and fuel cells focused curricula for the education and training. The activities are:

- *TeacHy project* (https://teachy.eu/) where POLITO is a partner. The TeacHy2020 project specifically addresses the supply of undergraduate and graduate education (BEng/BSc, MEng/MSc, PhD etc.) in fuel cell and hydrogen technologies (FCHT) across Europe. TeacHy2020 will take a lead in building a repository of university grade educational material, and design and run an MSc course in FCHT, accessible to students from all parts of Europe. To achieve this, the project has assembled a core group of highly experienced institutions working with a network of associate partners (universities, vocational training bodies, industry, and networks). TeacHy2020 offers these partners access to its educational material and the use of the MSc course modules available on the TeacHy2020 site. Any university being able to offer 20% of the course content locally, can draw on the other 80% to be supplied by the project.
- *Green Skills 4 H_2*: the project has been awarded in the Erasmus + calls during 2021 and will start in 2022. POLITO is a partner of the project.

5. Graphic materials

5.1 3D motion video

Simplified 3D motion videos have been developed in the framework of the Comsos project focused on specific case studies, to reach the general public and possible customers interested in the fuel cell technology.

The videos are focused on the following case studies:

1. Restaurant/ Fast food (https://youtu.be/iv0tK37UTmg)
2. Hotel (https://youtu.be/vURxkb-oaUY)

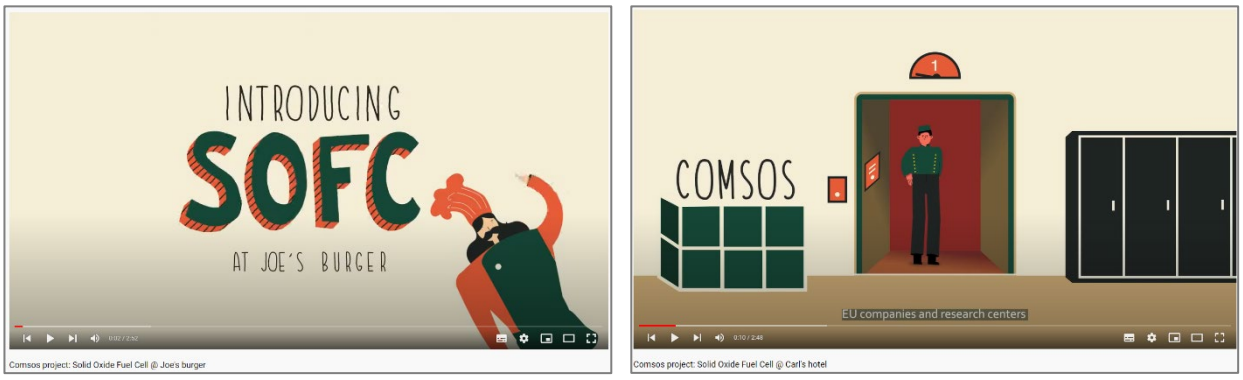


Figure 7. Comsos 3D motion video.

5.2 Video interviews

The Comsos activities have been explained by the partners during different sets of video interviews in which the partners explain their role in the project and their activities. The first set of videos (2019) was focused on the partners presentation, while the new videos (2021) are devoted to show to a general public the main Comsos achievement in terms of business analysis and results from the operation (Figure 8).

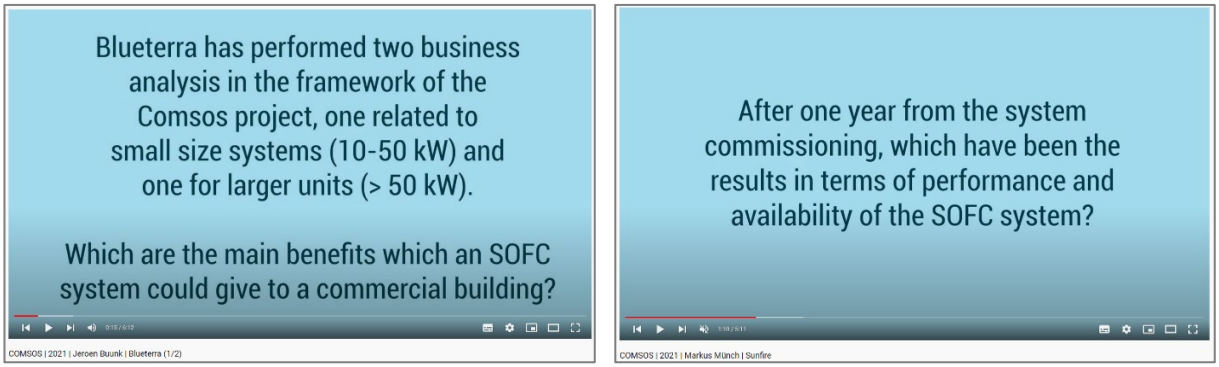


Figure 8. Comsos video interview to Blueterra (left) on the business opportunities for SOFC and Sunfire (right) on the results from the demo operation.

5.3 Infographic

The Comsos concept has been also reproduced at the beginning of the project in a dedicated infographic, available on the website, to underline the potential benefits of fuel cells systems.

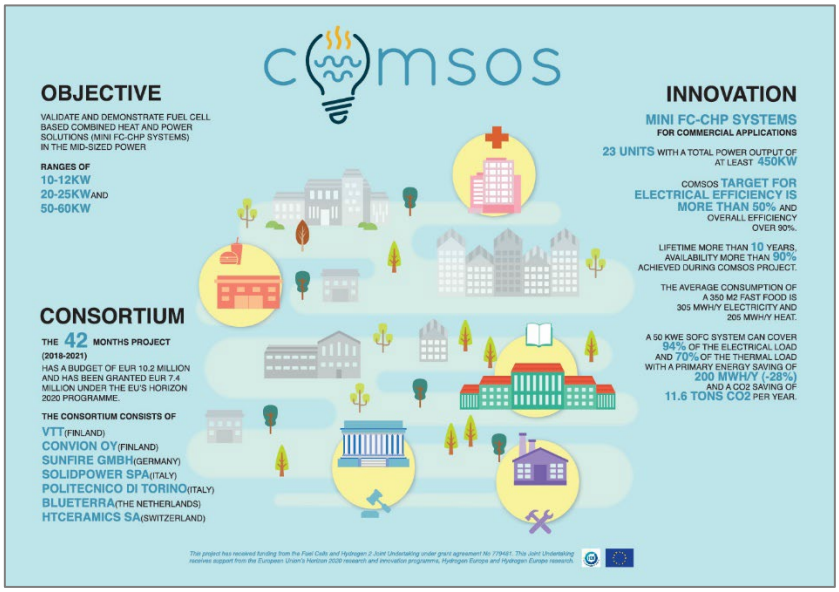


Figure 9. Comsos infographic.

6. Website

The results of the Comsos project are constantly published on the website (results and updates from the SOFC installations e.g. Figure 10, pictures) and scientific activities are available through Gold Open Access publications (Figure 11) which are shared, together with the deliverables, on social media platform.

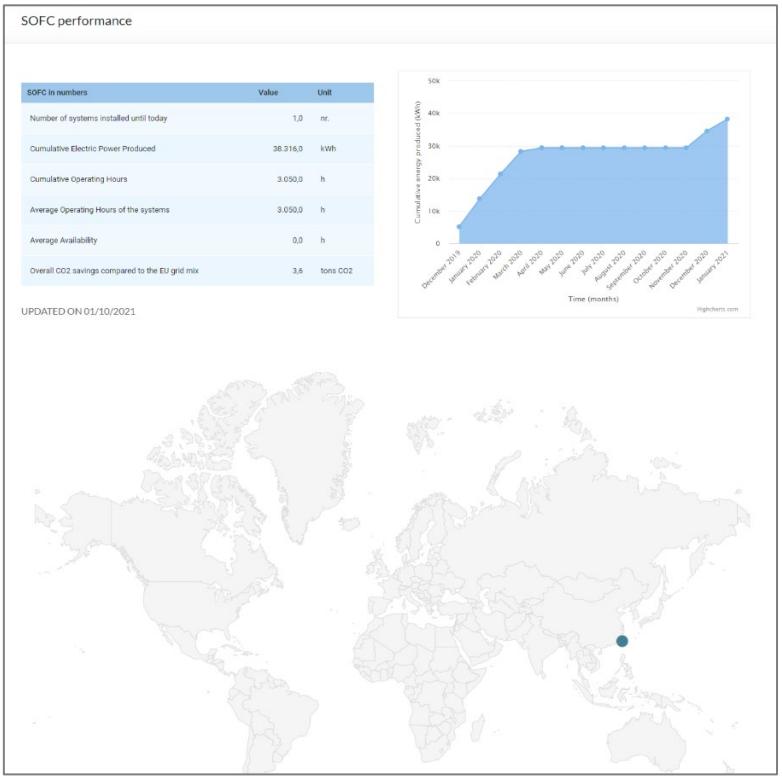


Figure 10. Comsos website section on SOFC system operation.

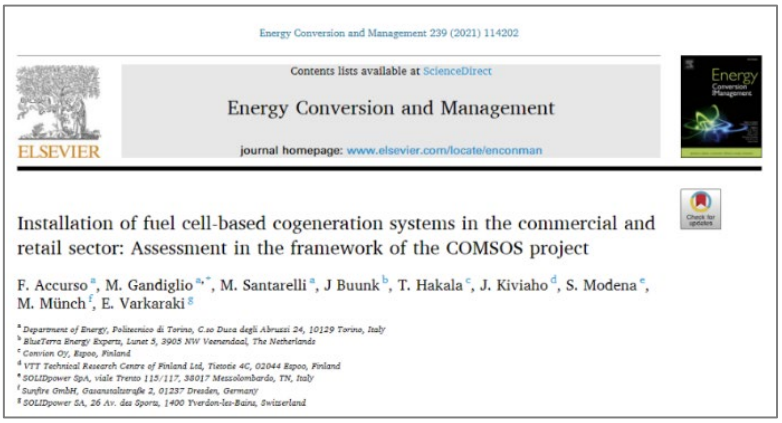


Figure 11. Comsos open access publication.

7. Comsos survey

Finally, at the beginning of 2022, a survey (Figure 12) has been produced and used to understand the level of public awareness and interest toward fuel cells, and results are here presented.

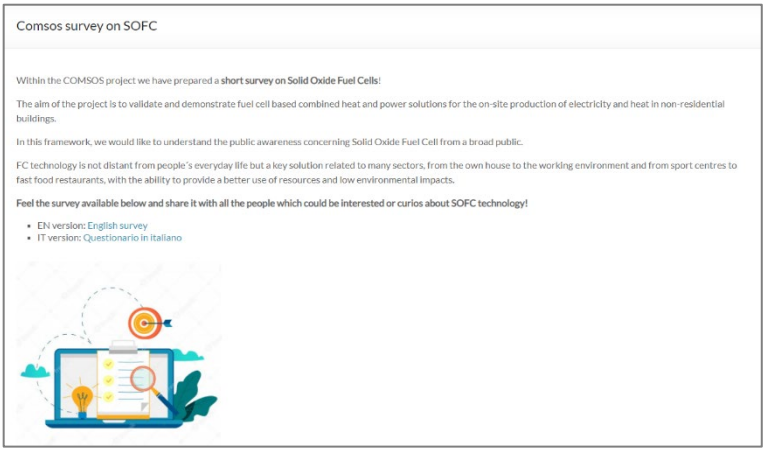


Figure 12. Comsos survey section on the website, https://www.comsos.eu/a-survey-on-sofc/.

The survey was composed of 17 multiple choice questions, and it was advertised on the Comsos website, through partners and 22 answers were collected. Results are presented in the integral form in the section below.

The answers are coming both from people working in the R&D and from general public (non-technical one). More than 75% of the answers are coming from young adults with an age between 18 and 40 years. Half of them is expert on "new technologies", while the other half not. The composition of the pole is quite heterogenous for what concerns their background, while most of them are in the 30s in terms of age (no students and few elder people answered).

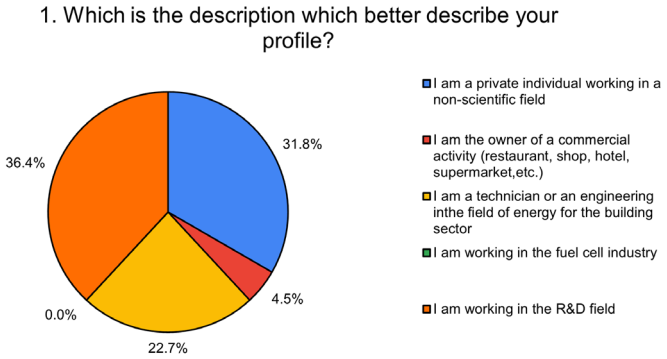
Only 59% of the pole knows what a fuel cell is and how it works, while the remaining part does not know what it is, or which is the working principle. Not all the pole knows that SOFC can be purchased and installed within their building or activity, in particular 45% is not aware of this opportunity. This answer, together with the previous one, points out that public awareness – in the general public – is still not enough developed and many people still do not know what a fuel cell is, and which advantages can bring to them. Furthermore, 40% of the pole does not know where to buy a fuel cell in its country. The remaining 60% is asked to provide the name of the producers and the first name is Solidpower, followed by Sunfire and others. This answer confirms the deep activity of the company Solidpower to reach potential customer and general public. Around 81% of the pole is anyway interested to know more about the fuel cell technology. The following question is related to "how much are you willing to pay more to have a more environmentally friendly system?" and the answer was quite heterogeneous, with 60% of the pole willing to pay between 10 and 20% more.

Anyway, few of them are also willing to pay 30 and 50% more, and these could be considered possible early adopters of the technology. A large part of the pole (71%) prefers to go into buildings and commercial activity which are thinking about environment and energy efficiency and decide to install a fuel cell, underlining a growing interest towards the sustainability concept. Furthermore, almost all of them (95%) agrees that policy makers should enforce the funding on fuel cell systems.

Another critical aspect is that 63.6% of the pole doesn't know that SOFC can be included in the Ecobonus and funding systems of Italy for example, and this is a missing opportunity for producers and sellers of SOFC products. Finally, 87% are interested in knowing more about fuel cells for non-residential building and has left the email (they are now included in the Comsos newsletter).

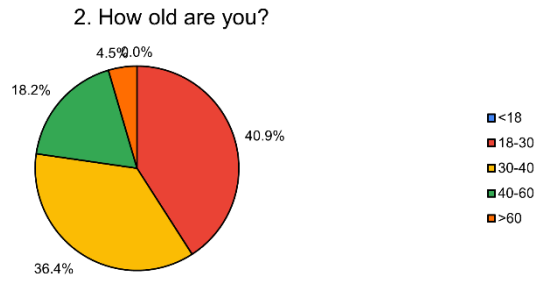
Survey on Solid Oxide Fuel Cell (SOFC)

1. *Which is the description which better describe your profile?*
   - I am a private individual working in a non-scientific field
   - I am the owner of a commercial activity (restaurant, shop, hotel, supermarket, etc.)
   - I am a technician or an engineering in the field of energy for the building sector
   - I am working in the fuel cell industry
   - I am working in the R&D field
   - Other



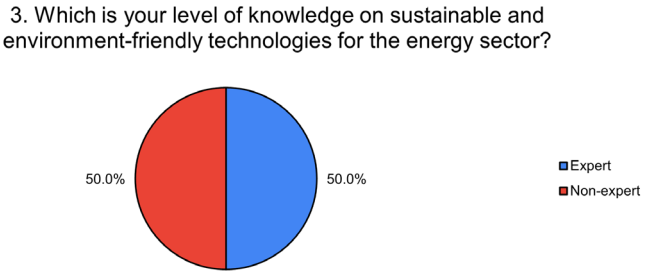
2. *How old are you?*
   - < 18

- 18-30
- 30-40
- 40-60
- 60



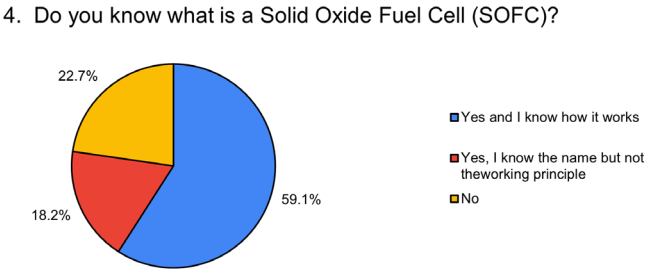
3. *Which is your level of knowledge on sustainable and environment-friendly technologies for the energy sector?*

- Expert
- Non-expert

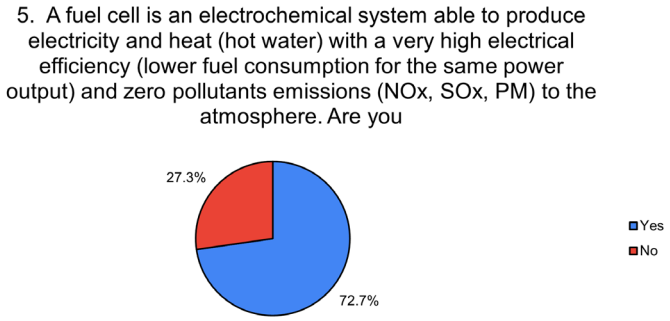


4. *Do you know what is a Solid Oxide Fuel Cell (SOFC)?*

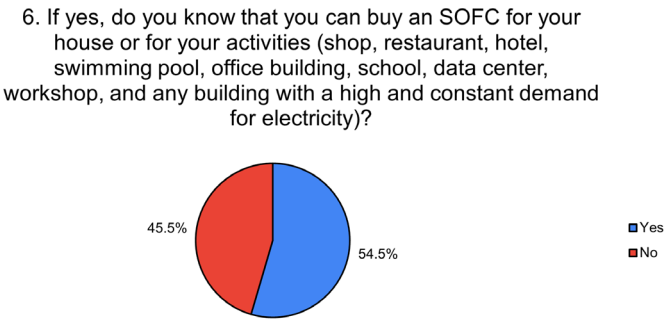
- Yes and I know how it works
- Yes, I know the name but not the working principle
- No



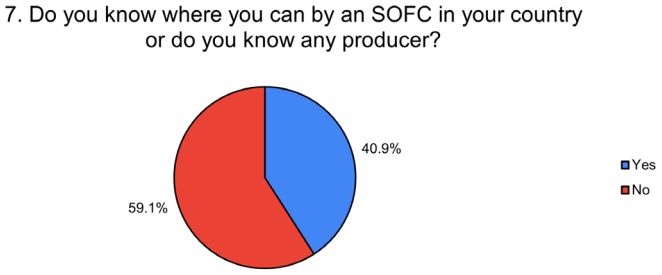
5. *A fuel cell is an electrochemical system able to produce electricity and heat (hot water) with a very high electrical efficiency (lower fuel consumption for the same power output) and zero pollutants emissions (NOx, SOx, PM) to the atmosphere. Are you aware of these adavantages?*
   - Yes
   - No



6. *If yes, do you know that you can buy an SOFC for your house or for your activities (shop, restaurant, hotel, swimming pool, office building, school, data center, workshop, and any building with a high and constant demand for electricity)?*
   - Yes
   - No



7. *Do you know where you can by an SOFC in your country or do you know any producer?*
   - Yes
   - No

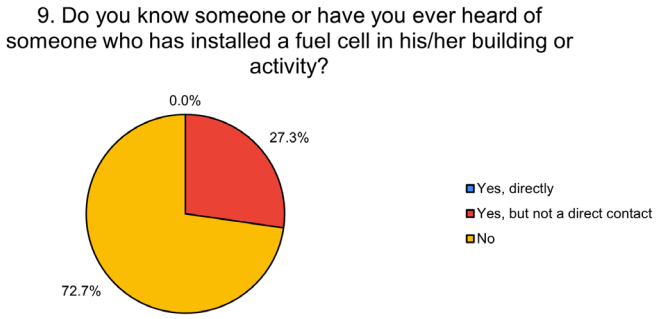


8. *If yes, which supplier do you know?*

8. If yes, which supplier do you know?
Sunfire
SOLIDpower
ARCO FC
Solidpower
SolidPower, Elcogen
Solidpower
ASPILSAN
SolidPower - Viessmann

9. *Do you know someone or have you ever heard of someone who has installed a fuel cell in his/her building or activity?*

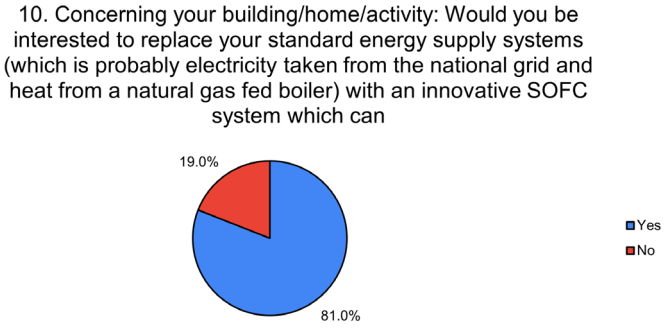
- Yes, directly
- Yes, but not a direct contact
- No



10. *Concerning your building/home/activity: Would you be interested to replace your standard energy supply systems (which is probably electricity taken from the national grid and heat from a natural gas fed boiler) with an innovative SOFC system which can generate yearly savings in your bill and a strong positive impact on the environment?*

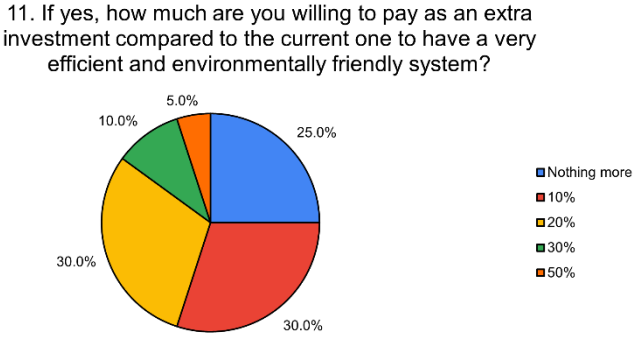
- Yes

- No
- Other



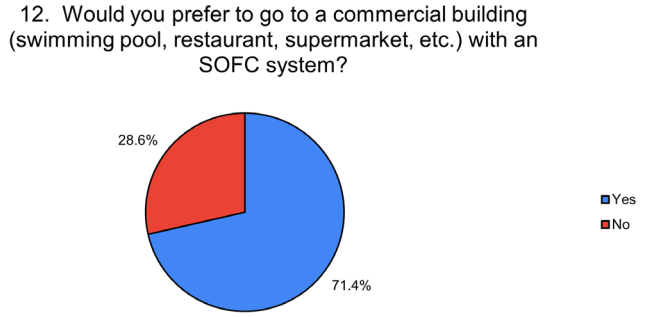
11. *If yes, how much are you willing to pay as an extra investment compared to the current one to have a very efficient and environmentally friendly system?*

- Nothing more
- +10%
- +20%
- +30%
- +50%



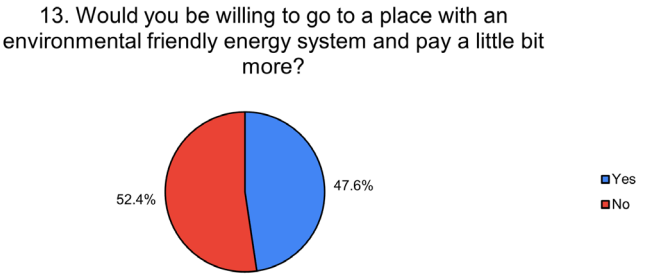
12. *Would you prefer to go to a commercial building (swimming pool, restaurant, supermarket, etc.) with an SOFC system?*

- Yes
- No



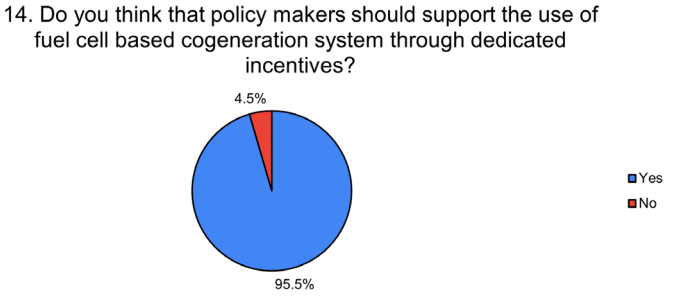
13. *Would you be willing to go to a place with an environmental friendly energy system and pay a little bit more?*

- Yes
- No



14. *Do you think that policy makers should support the use of fuel cell based cogeneration system through dedicated incentives?*

- Yes
- No
- Other

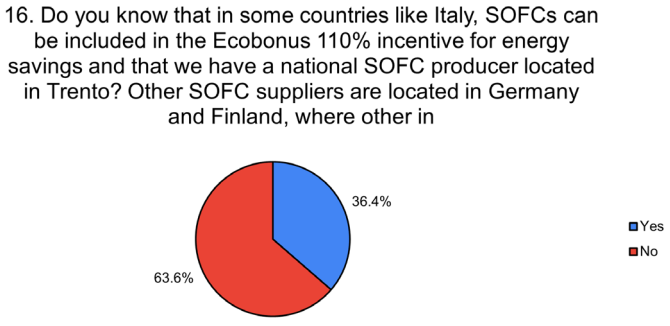


15. *Why?*

15. Why?
Because without the right incentive, I don't believe that technology alone can become competitive in the market, given the high cost.
Make the installation of these machines more accessible and therefore expand the market, but with targeted incentives that take into account the type of intervention
To promote market opening
support for circular economy
To incentivize manufacturers of these systems to increase their production volumes and consequently ensure a reduction in the costs of these technologies, making them competitive in the marketplace
In order not to burden end users
Savings
To reduce the impact on the environment
we need solutions that are economically viable
In general, I believe that at the political level, incentives should be given to encourage low environmental impact spluations because the responsibility and the burden should not be on the individual.
To premise the installation by individuals of a significant number of units, so as to start the market and thus reduce the cost of production by increasing the number of units produced.
To encourage a wider public to accept and adopt these sustainable technologies
CLIMATE CHANGE
To push a new technology, even if it's better for the Environment, is always necessary to use the finance leverage economy

16. *Do you know that in some countries like Italy, SOFCs can be included in the Ecobonus 110% incentive for energy savings and that we have a national SOFC producer located in Trento? Other SOFC suppliers are located in Germany and Finland, where other incentives are also available.*

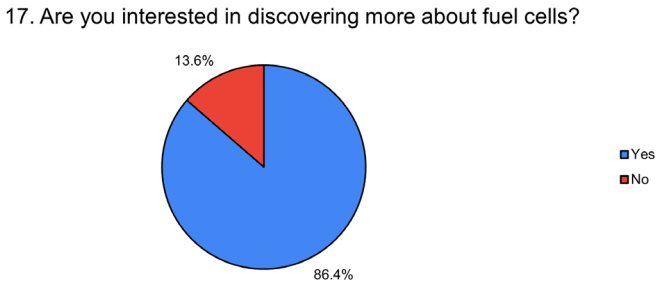
- Yes
- No



17. *Are you interested in discovering more about fuel cells?*

- Yes

- No



18. *If you are interested in receiving information (one newsletter every 2-3 months) related to SOFC installations in buildings within the COMSOS project (www.comsos.eu), you can leave us your email address.*

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8. Conclusions

The Comsos project consortium has worked at different levels to raise and analyse the public awareness of the potential of SOFC-CHP systems for the commercial sector. Different initiative, both at single partners level and at project level, have been developed to raise and increase the awareness toward fuel cell systems and their potential environmental and economic impact for the non-residential building sector. The current awareness level has been also monitored through a dedicated survey in order to understand the level of knowledge toward fuel cells systems. The survey, composed of 17 multiple choice questions, collected 22 answers. The answers, coming both from people working in the R&D and from general public (non-technical one), pointed out that not all the panel knows what a fuel cell is and how it works (only 59%). Furthermore, not all the pole knows that SOFC can be purchased and installed within their building or activity, in particular. Another critical aspect is that 63.6% of the pole does not know that SOFC can be included in the Ecobonus and funding systems of Italy for example, and this is a missing opportunity for producers and sellers of SOFC products. Anyway, 81% of the pole is interested to know more about the fuel cell technology. The survey pointed out a medium level of awareness from the pole and the need for keeping the activities of project communication and results dissemination.

This project has received funding from the Fuel Cells and Hydrogen 2 Joint Undertaking (now Clean Hydrogen Partnership) under Grant Agreement No 779481. This Joint Undertaking receives support from the European Union's Horizon 2020 Research and Innovation program, Hydrogen Europe and Hydrogen Europe Research.