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Integrating European Infrastructure to support science and development of Hydrogen- and Fuel Cell Technologies towards European Strategy for Sustainable, Competitive and Secure Energy

Deliverable

D3.5 European Technical School on Hydrogen and Fuel Cells 2013 Programme, content and statistics

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1 Outline: European Technical School on Hydrogen and Fuel Cells 2013

1.1 Introduction

This document reports on the European Technical School on Hydrogen and Fuel Cells organized within the H2FC project in 2013. The Technical School (TS) is a key element in the networking activity of the project and is organized within WP 3 'Technical School and Researchers Exchange Programme'.

According to the description of work TS is organized by the UU with the support of the School Board. The general structure of the TS and the list of the School Board members were reported by UU previously in the Deliverable D3.2 (available at the share point area of the project website). UU is responsible for dealing with the organizational, academic and financial aspects of all four TSs, including contacts with the members of the School Board, participants and keynote speakers, arrangements of the school locations, support to a local organization committee, renting of rooms, preparation of delegate packs, arrangement of a social programme etc.

This deliverable describes the details of the school as well as the scope, focus and content of the course that took place in 2013. It also contains the list of the participants to the TS 2013, an analysis of feedback received from the attendees and the recommendations for the events due to take place in 2014 and 2015.

1.2 Date and location of TS 2013

The European Technical School on Hydrogen and Fuel Cells 2013 took place from the 23rd to the 27th of September 2013. The dates for TS 2013 were selected to avoid possible conflicts with other courses and conferences that took place in September 2013. The dates were proposed at the H2FC general assembly in Cadarache November 2012 and agreed by all board members.

The school was held at the Agapi Beach Hotel, Heraklion, Crete, Greece (<http://www.agapibeach.gr/default-en.html>). This choice of venue was justified by the following factors:

- lower rates for the accommodation due to the end of summer season at the hotel;
- close proximity to the local airport and the availability of public transport from/to the airport;
- availability of frequent charter and scheduled flights to Heraklion from main European cities;
- accommodation was available on an all-inclusive (AI) basis.
- positive feedback on Crete and local organisation following the 2012 school

The summary of the rates is shown below:

	Agapi Beach Hotel (per person including 6 overnights and all other services)	
	Double Occupancy, Euro	Single Occupancy, Euro
Board Basis	AI	AI
Accommodation (6 nights)	435.00	795.00
Welcome reception	8.50	8.50
Posters	17.00	17.00
Course dinner	55.00	55.00
Excursion	41.20	41.20
Total	556.70	916.70

1.3 Registration fee

The registration fee paid by the participants was 935 Euro. This value covered 6 nights accommodation (Sunday 22–Saturday 28) on a single occupancy basis, meals, posters hire and excursion. The cost of delegate packs, USB drives and other relevant consumables was covered by the UU budget i.e. as the event was non-profit the fee reflected the exact cost of the accommodation.

UU was responsible for booking and paying for the accommodation for all participants, both partners and those external to the project in advance of the event. The cost was paid by UU via three pre-payments and one final payment to the Greek supplier of this service. Thus UU invoiced each partner of the H2FC project as well as any external participant attending. This invoice was for the sum of the registration fee (the cost of all inclusive accommodation).

1.4 Scope and focus

The sessions at the European Technical School on Hydrogen and Fuel Cells 2013 within the H2FC project (www.h2fc.eu) addressed the themes of hydrogen safety, hydrogen storage and fuel cells. The school was structured to ensure maximum complementarities between the themes to achieve synergy and cross-fertilisation between these areas. The structure of the TS 2013 included topical lectures, instrumentation workshop, expert panel sessions within Cyber-Laboratory, advanced research workshops, and poster session that included a few work-in-progress presentations. The main aim of TS is to stimulate the development and efficient use of the H2FC European Infrastructure and to share new knowledge generated within, or relevant to, the H2FC European Infrastructure project. There were some changes to the structure of the school based on feedback in 2012 (see Section 1.6). These changes were positively received as reflected in the 2013 feedback.

1.5 Attendees of TS 2013

This year 59 attendees to the school were officially registered (Annex 1), the same number as at last year TS 2012. One attendee (Ico Vinke) had cancelled his participation due to the serious illness just before the start of the event. There were 34 participants from H2FC partner organisations, 11 external participants funded by the project (selected, following a competitive application process, by the School Board) and 13 external participants who were self-funded. Thus 41% of participants were

external to the project (compared to 35% last year). Participants funded by the project represented both industry and academia. 16% of attendees were female compared to 13% last year.

This year 18 countries were presented at TS 2013. The vast majority of participants were from the EU states. However there were participants from other countries such as Turkey, South Africa, India and USA.

1.6 Structure and programme

Although such sessions as instrumentation and advanced research workshops remained the main building blocks of the school, there were a few new elements in the school structure and the programme this year. The changes were based on the feedback received following the TS 2012 and an analysis of the TS 2013 feedback forms indicated these changes were very positively received and TS 2013 quality improved further.

The programme for the TS 2013 was designed in line with the specifications outline in the description of work. 5 topical lectures were delivered by keynote speakers on the opening day of the course, including speakers from the European Commission, academia, and industry. A one hour webinar session was organized for a presenter from USA (Sandia National Laboratory). The three main pillars of TS, i.e. instrumentation workshop on the progress in experimental methods of HFC research, developments within Cyber-Laboratory, and advanced research workshop were organised during days 2-5 of TS 2013 (see Annex 2 for the programme details).

Work-in-progress session was organized as a poster session. Researchers presented their recent results of on-going research. Participants external to the project who received funding to attend the school were asked to present a poster. Posters have been displayed during the entire duration of the course. There was a date (24th of September) and time allocated in the programme for authors of posters to answer questions and to engage in discussions. The programme of the poster session is attached (Annex 3).

A social programme included an excursion (boat trip to Spinalonga Island) on Wednesday afternoon and a farewell dinner on Friday. The excursion was introduced following the previous year feedback comments from the participants. This change in the programme was very welcomed by the participants and facilitated further networking.

Overall, during the school 48 oral presentations and 10 posters were delivered. The contents of all sessions were replicated on USB drives and were given to the participants as a part of their delegate pack. In addition, all materials from the technical school were uploaded to the designated area of H2FC website (<https://iaikit-sp2.iai.kit.edu/h2fc/Documents/Forms/AllItems.aspx?RootFolder=%2Fh2fc%2FDocuments%2FNetworking%20Activities%2FN2-Techn-School-And-REP%2FH2FC%20Technical%20School%202013%20-%20Materials%20from%20USB>).

1.7 Promotion of the school

All information related to the school was made available on the project website on a dedicated page (<http://h2fc.eu/technicalschool>). The page was regularly updated as more information became available. It was requested that all partners within H2FC project circulate promotional materials and the link to the school within their networks. Promotional brochure was also developed (Annex 4).

1.8 Delegate pack

Partner UU prepared the delegate pack, which included a customised H2FC TS binder, H2FC USB with proceedings, pens etc.

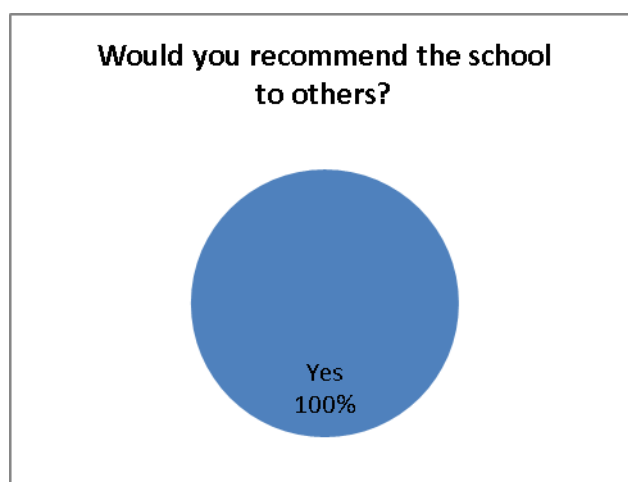
1.9 Application forms and selection criteria

UU prepared application forms with input from the school board. Funded applicants were taken from those working in a related field and were required to present their work.

2 Feedback

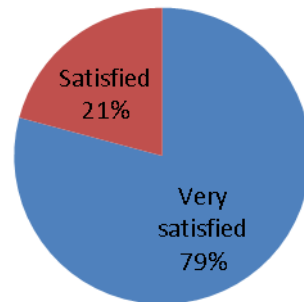
The new feedback form was developed for the course (Annex 5). This year over 85% of participants completed feedback forms, this was a significant increase on the 50% completion rate in 2012. The feedback from all the attendees was very positive. The venue, structure, organisation and content all received extremely favourable comments. It is clear from the feedback that the changes introduced in the 2013 school were well received and thus the suggested changes going forward are minor and will be implemented where possible by the organisers.

As indicated in the chart below 100% of attendees would recommend the school to others.

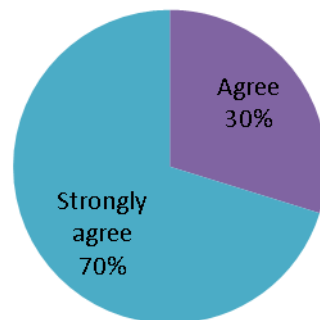


2.1 Organisation

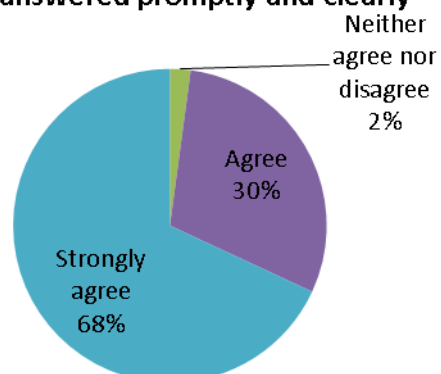
How satisfied were you with the registration process?

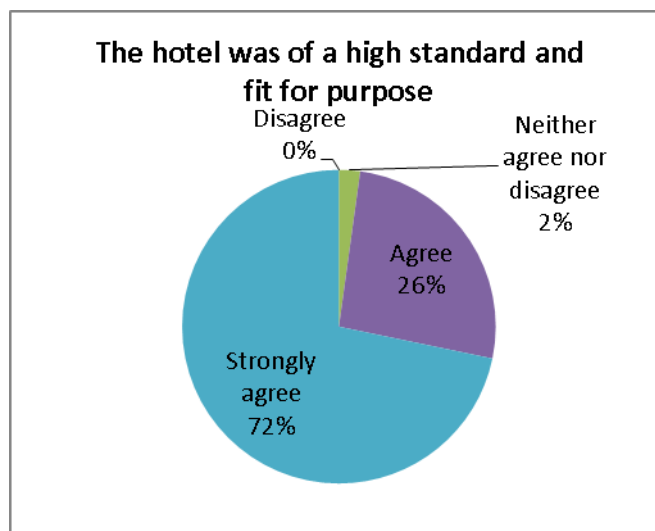
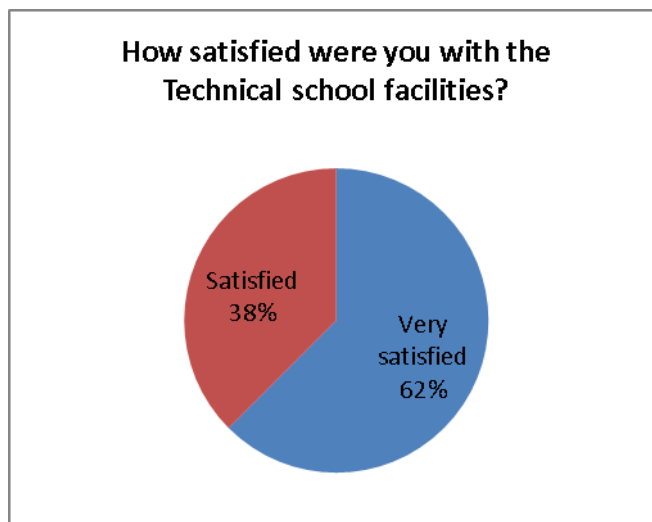
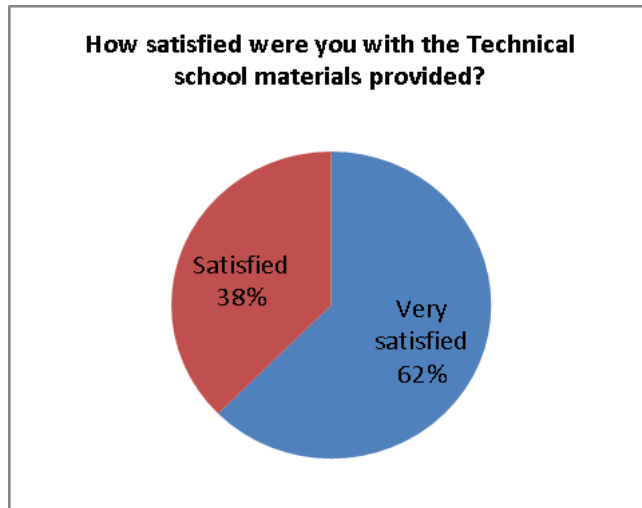


The technical school was well organised

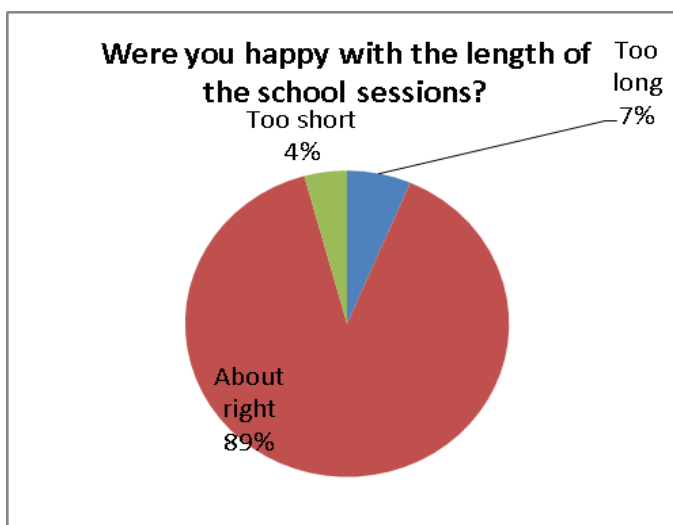
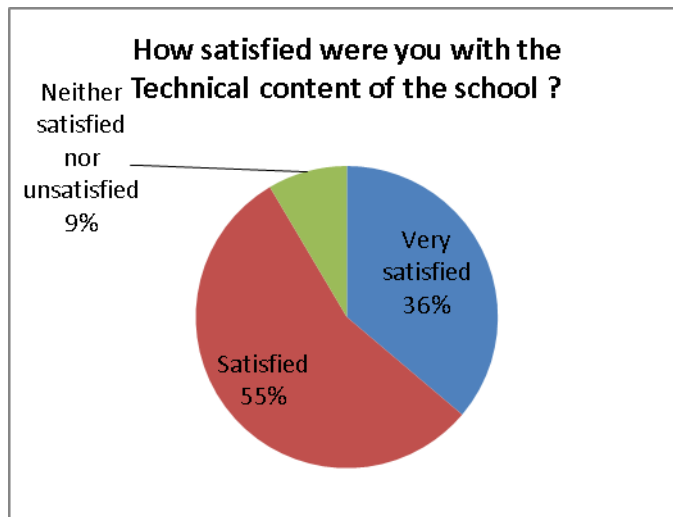
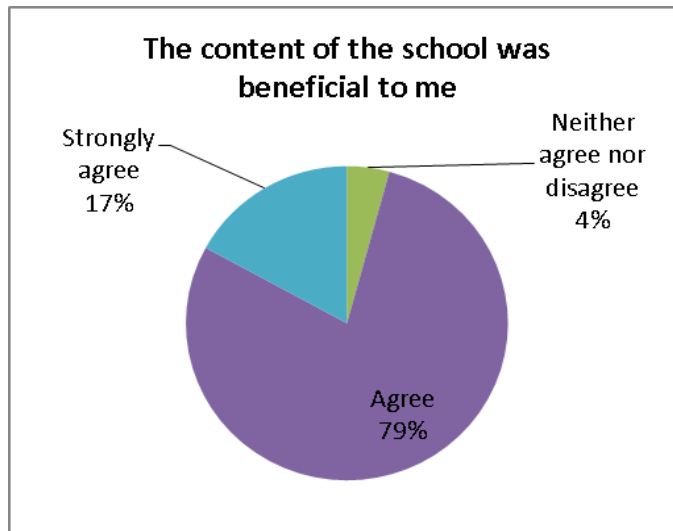


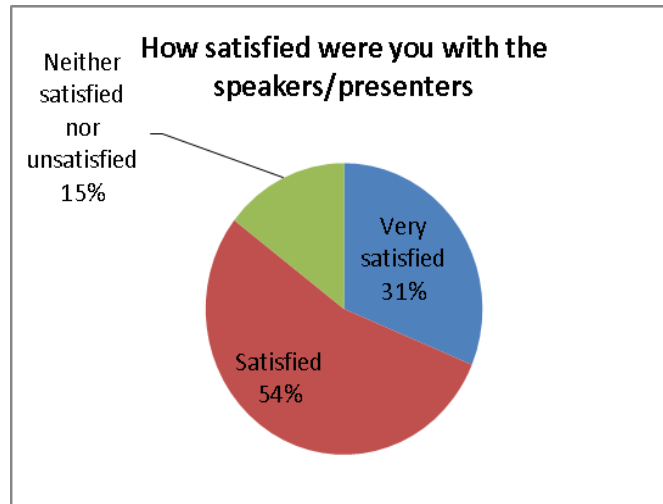
Any queries to the organisers were answered promptly and clearly





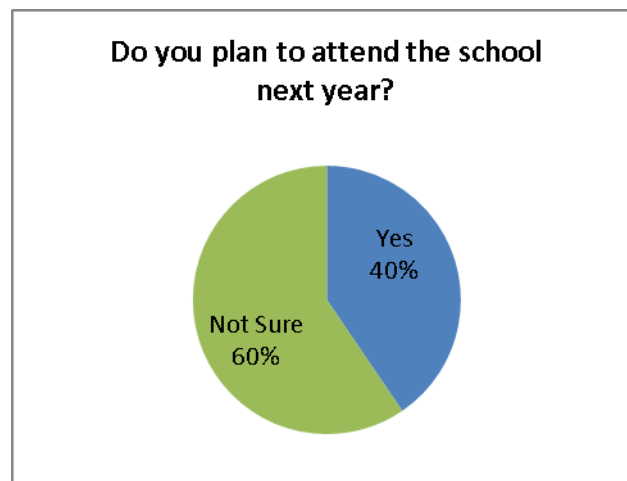
2.2 Technical Sessions



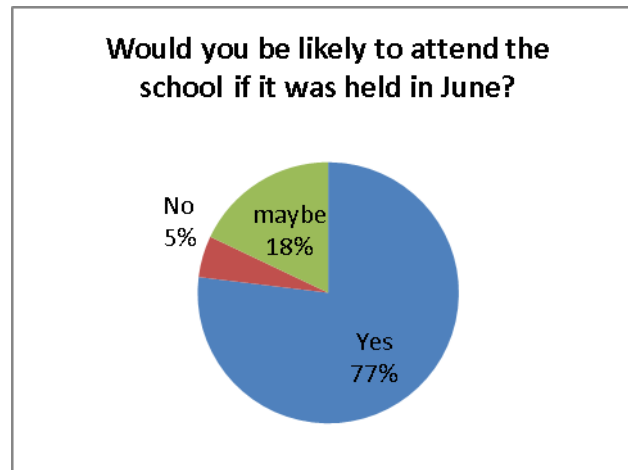


2.3 Future attendance

As indicated above 100% of attendees would definitely recommend the school to others. Whilst not all would attend again, discussions with attendees indicated, as in 2012 that they would advise colleagues to go or that they would attend themselves if the content was not repeated.



It is envisaged that the 2014 school will be moved to June to facilitate reporting and arrangements going forward. The opinion of attendees was gauged in this, the vast majority reacted favourably.



3 Recommendations for future Technical Schools

3.1 General positives

The feedback was overwhelmingly positive with over 20 separate comments citing the friendly atmosphere as being ideal for encouraging networking and informal discussions.

- 2 comments highlighted how the atmosphere encouraged participants to ask questions
- When asked on what they liked most 6 people mentioned organisation, and 4 the venue

3.2 Administrative and organisational suggestions

- Announce the school as far in advance as possible (6 months)
- Quality of internet connection is key (5 comments on this)
- Sunny location important with a number of people highlighting this as their favourite aspect!
- Audio system should be adjustable (2 people)
- Ensure it is located near a main airport
- Include a large clock or watch for speakers
- Include electronic list of participants on USB (this was emailed after the school this year)
- One suggestion that bios of all participants be included

3.3 General format and structure of the school

- Context of some talks was not easy to grasp for specialists in other areas, there should be background information and clear results, acronyms should be explained (13 comments)
- Excursion received very positive feedback
- Additional discussion time would be welcome (3 comments)

- Change posters to a work-in-progress session or include both and expand posters (3 comments)
- More overseas (non-EU) speakers (2 people)
- Keep fundamental lectures at the start of the school and more of them (5 comments)
- Some presentations were too specific given the diverse audience (4 comments)
- 2 comments that some presentations were like a catalogue of projects without technical content
- 6 people suggested arranging the sessions thematically, but in contrast 8 people stated they enjoyed the mixed programme
- Suggestion that talk be given by project coordinator

3.4 Topics suggested by participants

Suggested topics (open question)

FC applications, diagnostic tools, materials and testing, catalysts (all FC)

Industry group speakers - how they are commercialising the research

Deflagrations/detonations (including introduction)

SOFC and system design

More CFD and safety

High temperature fuel cells

Combustion

Case studies of H₂FC accidents and safety with real life examples

Absorption/desorption process

Hydrogen production and utilisation

Safety issues for each session addressed as a conclusion

Electrolysers

No of people

9
4
3
3
2
2
2
2
1
1
1
1

3.5 Lessons learnt for 2014

Overall the feedback was extremely positive. With this in mind a similar structure, venue and approach to organisation is envisaged for 2014. There is however still room for improvement. All reasonable administrative and organisational suggestions will be accounted for where possible. Care will be taken with the programme for 2014, specifically promotional presentations (without depth) will be avoided and presenters will be given guidance to ensure that all topics are appropriately introduced.

The overall structure will remain similar to that revised for 2013 i.e. with Topical lectures on day 1, and the inclusion of an excursion. However, the approach to work in progress will be revisited. Topics suggested by participants will be borne in mind when planning the content of the 2014 school.

4 Planning for the Technical School 2014

It was announced that the Technical School 2014 will take place in June (from 23 to 27 of June) 2014. The location for the next school will be announced soon.



Annex 1

European Technical School on Hydrogen and Fuel Cells 2013

List of attendees



	Surname	First Name	Company	Email address	Country
1	Armstrong-Brown	Max	Intelligent Energy	max.armstrong-brown@intelligent-energy.com	UK
2	Boaventura	Marta	Universidade do Porto	marta.boaventura@fe.up.pt	Portugal
3	Boeck	Lorenz	Technical University of Munich	boeck@td.mw.tum.de	Germany
4	Boillat	Pierre	PSI	pierre.boillat@psi.ch	Switzerland
5	Brennan	Sile	UU	sl.brennan@ulster.ac.uk	Northern Ireland
6	Brightman	Edward	NPL	edward.brightman@npl.co.uk	UK
7	Briottet	Laurent	CEA	laurent.briottet@cea.fr	France
8	Bujlo	Piotr	HySa Systems, University of the Western Cape	pbujlo@gmail.com	South Africa
9	Burr	Stephen	Gateshead College	stephen.burr@gateshead.ac.uk	UK
10	Chernyavskiy	Boris	UU	b.chernyavskiy@ulster.ac.uk	Northern Ireland
11	Christie	Carl	Intelligent Energy	carl.christie@intelligent-energy.com	UK
12	Cinti	Giovanni	UP	fclab@unipg.it	Italy
13	Delmelle	Renaud	EMPA	renaud.delmelle@empa.ch	Switzerland
14	Delplancke	Jean-Luc	FCH-JU	jeanluc.delplancke@fch.europa.eu	Belgium
15	De Echevarria Miguel	Nerea	JRC	nerea.de-miguel-echevarria@ec.europa.eu	The Netherlands
16	Di Sarli	Valeria	Istituto di Ricerche sulla Combustione	disarli@irc.cnr.it	Italy
17	Ezgi	Cüneyt	Turkish Naval Academy	cezgi@dho.edu.tr	Turkey
18	Forner Cuenca	Antoni	PSI	antoni.forner@psi.ch	Switzerland
19	Friedrich	Andreas	Pro-Science	andreas.friedrich@partner.kit.edu	Germany
20	Gallorini	Federico	University of Perugia	federico.gallorini@alice.it	Italy
21	Gebel	Gérard	CEA	gerard.gebel@cea.fr	France
22	Ghosh	Sudip	Bengal Engineering & Science University	sudipghosh.becollege@gmail.com	India
23	Goff	Richard	HSL	richard.goff@hsl.gsi.gov.uk	UK
24	Harris ^a	Aaron	Sandia National Laboratory	apharri@sandia.gov	USA
25	Ihonen	Jari	VTT	jari.ihonen@vtt.fi	Finland
26	Dahl	Paul Inge	SINTEF	paulinge.dahl@sintef.no	Norway
27	Iosub	Vasile	CEA	vasile.iosub@cea.fr	France
28	Jorcin	Jean-Baptiste	Tecnalia	jbaptiste.jorcin@tecnalia.com	Spain
29	Kannuchamy	Vasanth Kumar	University of Alicante/NCSRD	vasanth_vit@yahoo.com	Spain/ Greece
30	Keenan	James	UU	j.keenan@ulster.ac.uk	Northern Ireland
31	Kotchourko	Alexei	KIT	alexei.kotchourko@kit.edu	Germany
32	Kuznetsov	Mikhail	KIT	mike.kuznetsov@kit.edu	Germany
33	Ledin	Stefan	HSL	stefan.ledin@hsl.gsi.gov.uk	UK
34	Makarov	Dmitriy	UU	dv.makarov@ulster.ac.uk	Northern Ireland
35	Mao	Donglai	University of St Andrews	dm93@st-andrews.ac.uk	UK
36	McPhail	Stephen	ENEA	stephen.mcphail@enea.it	Italy
37	Mertens	Josef	Juelich	jo.mertens@fz-juelich.de	Germany
38	Molkov	Vladimir	UU	v.molkov@ulster.ac.uk	Northern Ireland
39	O'Sullivan	Louise	HSL	louise.osullivan@hsl.gsi.gov.uk	UK
40	Reisch	Toby	Intelligent Energy	toby.reisch@intelligent-energy.com	UK
41	Ribeirinha	Paulo	Universidade do Porto	pauloribeirinha@gmail.com	Portugal
42	Ross	Iona	University of St Andrews	icr9@st-andrews.ac.uk	UK
43	Schaefer	Sebastien	University de Lorraine	sebastien.schaefer9@etu.univ-lorraine.fr	France
44	Schmidtchen	Ulrich	BAM	ulrich.schmidtchen@bam.de	Germany
45	Schott	Pascal	CEA	pascal.schott@cea.fr	France
46	Shentsov	Volodymyr	UU	shentsov-v@email.ulster.ac.uk	Northern Ireland
47	Sorby	Magnus	IFE	magnuss@ife.no	Norway
48	Steriotis	Theodore	NCSRD	tster@chem.demokritos.gr	Greece
49	Stubos ^b	Athanassios	NCSRD	stubos@ipta.demokritos.gr	Greece
50	Topriska	Evangelia	Brunel University	evangelia.topriska@brunel.ac.uk	UK
51	Tretsiakova-McNally	Svetlana	UU	s.tretsiakova-mcnally@ulster.ac.uk	Northern Ireland

52	Ulmer	Ulrich	KIT	ulrich.ulmer@kit.edu	Germany
53	Vaclavu	Michal	Charles University Prague	michal.vaclavu@gmail.com	Czech Republic
54	Venetsanos	Alexandros	NCSR	venets@ipta.demokritos.gr	Greece
55	Vinke ^c	Ico	Juelich	i.c.vinke@fz-juelich.de	Germany
56	Volkov	Konstantin	Kingston University	k.volkov@kingston.ac.uk	UK
57	White	Kevin	Gateshead College	kevin.white@gateshead.ac.uk	UK
58	Yates	David	UU	yates-d@email.ulster.ac.uk	Northern Ireland
59	Züttel	Andreas	EMPA	andreas.zuettel@empa.ch	Switzerland

^a - Aaron Harris was not able to attend the school due to family emergency; he delivered topical lecture via the web.

^b – Thanos Stubos was substituted by his colleague Georgia Charalambopoulou

^c – Iko Vinke could not attend the course due to sickness.

PROGRAMME**European Technical School on Hydrogen and Fuel Cells 2013**

Agapi Beach Hotel, Heraklion, Crete, 23-27 September 2013

Sunday, 22 September 2013

After 15:00	Check-in
19:00-20:00	Registration and welcome drink
20:00-22:00	Dinner and get together evening

Monday, 23 September 2013**Topical Lectures***Topical lectures on the key themes: safety, storage and fuel cells*

09:45-10:00	Registration
10:00-10:10	Opening of the Technical School Vladimir Molkov, Sile Brennan, UU (Northern Ireland)
10:10-11:10	Priorities of Hydrogen and Fuel Cell Research in Europe Jean-Luc Delplancke, The Fuel Cells and Hydrogen Joint Undertaking, European Commission (Belgium)
11:10-11:30	<i>Coffee and networking</i>
11:30-12:30	Priorities of Hydrogen and Fuel Cell Research in USA Aaron Harris, Sandia National Laboratory (USA)
12:30-14:00	<i>Lunch</i>
14:00-14:45	State-of-the-art and research priorities in the hydrogen safety Alexei Kotchourko, KIT (Germany)
14:45-15:30	Hydrogen: production, storage, applications and safety Andreas Züttel, EMPA (Switzerland)
15:30-15:50	<i>Coffee and networking</i>
15:50-16:35	Fuel Cells: state-of-the-art and bottlenecks Toby Reisch, Intelligent Energy (UK)
16:35-17:05	Panel discussion

Tuesday, 24 September 2013**Instrumentation Workshop (Morning Session)***This session concentrates on recent advances in the research techniques and methods applicable for state-of-the-art research. 15 minutes presentation with 5 minutes for questions*

09:45-10:05	Measurement instrumentation at the KIT HyKa facilities Andreas Friedrich, Pro-Science (Germany)
10:05-10:25	Synthesis and characterization of hydrogen storage materials at KIT-INT Ulrich Ulmer, KIT-INT (Germany)
10:25-10:45	Challenges with neutron diffraction under high hydrogen pressure Magnus Sorby, IFE (Norway)
10:45-11:05	<i>Coffee</i>
11:05-11:25	HyMat: the hydrogen embrittlement testing facility! Presentation and possibilities Jean-Baptiste Jorcin, Tecnalía (Spain)
11:25-11:45	From research to industrial deployment - activities in ENEA on H₂ and HTFC Stephen McPhail, ENEA (Italy)

11:45-12:05	Probing the surface of a hydrogen storage material and making it functional Renauld Delmelle, EMPA (Switzerland)
12:05-12:25	Instrumented PEM fuel cell for innovative in situ measurement Edward Brightman, NPL (UK)
12:25-14:00	<i>Lunch</i>
14:00-14:20	Friction experiments in liquid hydrogen – how to set up a laboratory U. Schmidtchen, BAM (Germany)
14:20-14:40	Neutron imaging of liquid water in fuel cells Pierre Boillat, PSI (Switzerland)
14:40-15:00	User guidance and demonstration of UU numerical modelling tools available on Cyber Laboratory software suite James Keenan, UU (Northern Ireland)
15:00-15:20	Water management in PEM fuel cell: recent developments Gérard Gebel, CEA (France)
15:20-16:00	<i>Coffee</i> and Poster Display (reflecting work in progress)*
16:00-16:20	Physical adsorption characterisation of hydrogen sorbents Theodore Steriotis, NCSR D (Greece)
16:20-16:40	Hydrogen for transport from renewable energy in Mid-Norway Paul Inge Dahl, SINTEF (Norway)
16:40-17:00	Hydrogen sensors Stefan Ledin, HSL (UK)

*Note: posters will be displayed throughout the week; at this time the authors will be present to answer questions

Wednesday, 25 September 2013

Morning Session: Cyber Laboratory – addressing scientific bottlenecks through modelling and simulations

09:45-10:45	Expert Panel on Hydrogen Safety. Chair: Dmitriy Makarov (Northern Ireland) Rayleigh-Taylor instability modelling , James Keenan (Northern Ireland) Gaps in hydrogen deflagration modelling , Valeria Di Sarli (Istituto di Ricerche sulla Combustione) Hydrogen detonations and DDT , Alexei Kotchourko (KIT) Modelling of fires with CFD status of modelling , Stefan Ledin (HSL)
10:45-11:05	<i>Coffee</i>
11:05-12:05	Expert Panel on Hydrogen Storage. Chair: Georgia Charalambopoulou (NCSR D) Molecular simulation for hydrogen storage materials , Vasanth Kumar Kannuchamy (University of Alicante / NCSR D) Modelling and simulations for integrated hydrogen storage - fuel cell systems , Georgia Charalambopoulou (NCSR D)
12:05-13:05	Expert Panel on Fuel Cells. Chair: Gerard Gebel (CEA) MEA modelling at CEA/LCPEM , Pascal Schott, CEA (France)
13:05-14:35	<i>Lunch</i>

Afternoon

15:00-20:45	Excursion: a boat trip to Spinalonga island
20:45-22:00	Dinner at the hotel

Thursday: 26 September 2013

Advanced Research Workshop 1 (Morning Session)

This session is conference style. Researchers within and external to the project will showcase their latest research 20 minutes maximum presentation with 5 minutes for questions

09:45-10:10	A new mechanism of super-high pressure generation in hydrogen-oxidiser systems Valeria Di Sarli, Istituto di Ricerche sulla Combustione, Consiglio Nazionale delle Ricerche (CNR), Italy
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10:10-10:35	Experimental test of innovative materials based on calcium aluminates for SE-SR Federico Gallorini, University of Perugia (Italy)
10:35-11:00	PEM Fuel Cell activities of HySa Systems competence centre Piotr Bujlo, HySa Systems, University of the Western Cape (South Africa)
11:00-11:20	<i>Coffee</i>
11:20-11:45	Safety of hydrogen use indoors: recent progress at Ulster Vladimir Molkov, UU (Northern Ireland)
11:45-12:10	Investigation of glasses as hydrogen storage material U. Schmidtchen, BAM (Germany)
12:10-12:35	Advanced materials research in ENEA Stephen McPhail, ENEA (Italy)
12:35-14:00	<i>Lunch</i>
14:00-14:25	Flame propagation regimes in a stratified semi-confined layer of hydrogen-air mixtures Mike Kuznetsov, KIT-IKET (Germany)
14:25-14:50	Development of low-cost BCC hydrogen storage alloys Ulrich Ulmer, KIT-INT (Germany)
14:50-15:15	Investigation of fuel cell start-up and shut-down degradation mechanism Edward Brightman, NPL (UK)
15:15-15:35	<i>Coffee</i>
15:35-16:00	Operating PEMFC with low quality hydrogen Jari Ihonen, VTT (Finland)
16:00-16:25	Numerical simulation of gas releases in enclosed space Boris Chernyavskiy, UU (Northern Ireland)
16:25-16:50	Surface chemistry of Ti on NaAlH₄ studied by XPS Renauld Delmelle, EMPA (Switzerland)
16:50-17:00	Closing remarks

Friday, 27 September 2013

Advanced Research Workshop 2

This session is conference style. Researchers within and external to the project will showcase their latest research 20 minutes maximum presentation with 5 minutes for questions

09:45-10:10	Recent experimental results from the JRC-IET high pressure gas tanks testing facility Nerea De Miguel-Echevarria, JRC (The Netherlands)
10:10-10:35	High temperature membranes for hydrogen separation processes Paul Inge Dahl, SINTEF (Norway)
10:35-11:00	Combustion modelling using the ADREA-HF code Alexandros Venetsanos, NCSR D (Greece)
11:00-11:20	<i>Coffee</i>
11:20-11:45	Methods and results of MCFC test for CCS applications Giovanni Cinti, University of Perugia (Italy)
11:45-12:10	Influence of humidity on hydrogen embrittlement of steels Laurent Briottet, CEA (France)
12:10-12:35	Combining imaging with advanced electrochemical methods Pierre Boillat, PSI (Switzerland)
12:35-14:05	<i>Lunch</i>
14:05-14:30	Investigation of hydride powder bed breathing during cycling under hydrogen for different compressive stresses Vasile Iosub, CEA (France)
14:30-14:55	Novel approaches to venting Stefan Ledin, HSL (UK)
14:55-15:20	Contribution to the evaluation of the sensitivity of hydrogen embrittlement mechanisms for high strength steel alloys

	Jean-Baptiste Jorcin, Tecnalia (Spain)
15:20-15:40	<i>Coffee</i>
15:40-16:05	Tracking SOFC degradation Josef Mertens, Juelich (Germany)
16:05-16:35	Round table discussion and close of the School
20:00- 22:00	Gala dinner at the Greek Taverna

Saturday, 28 September 2013

12:00	Latest check-out time for all participants
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WORK-IN-PROGRESS, POSTER SESSION**Tuesday, 24th September 2013**

15:20 – 16:00

1. **The application of solar powered PEM electrolysis for the sustainable production of hydrogen gas as fuel for domestic cooking**, Evangelia Topriska, Brunel University (UK)
2. **Numerical simulation of reactive flows for hydrogen safety**, Konstantin Volkov, Kingston University (UK)
3. **Hydrogen and water interaction with sputtered Pt-CeO₂ based catalyst for fuel cell applications**, Michal Vaclavu, Charles University in Prague (Czech Republic)
4. **Enhancing the hydrogen storage on metallic-nanoparticles-doped amorphous carbon materials**, Mr Sébastien Schaefer, Institut Jean Lamour (IJL) UMR CNRS-Université de Lorraine (France)
5. **Deflagration-to-detonation transition in inhomogeneous hydrogen-air mixtures**, Lorenz Boeck, Technical University of Munich (Germany)
6. **Hydrogen transport economy for the North Sea region (HyTrEc)**, Kevin White, Gateshead College (UK)
7. **Numerical simulation of helium release and dispersion in an enclosure**, Volodymyr Shentsov, University of Ulster (Northern Ireland)
8. **Characteristics of underexpanded planar hydrogen diffusion flames**, David Yates, University of Ulster (Northern Ireland)
9. **Bonfire test protocols for on-board hydrogen storage systems**, Svetlana Tretsiakova-McNally, University of Ulster (Northern Ireland)
10. **Patterned wettability of was diffusion layers**, Antoni Forner Cuenca, PSI (Switzerland)

EUROPEAN TECHNICAL SCHOOL ON HYDROGEN AND FUEL CELLS

2013

The H2FC project is funded by the European Commission. The school is organised by the project partners and coordinated by the University of Ulster

The sessions at the School address the themes of hydrogen safety, storage and fuel cells.

Presentations will include details on research methods and instrumentation related to the state-of-the-art experimental facilities offering access within the H2FC project.

Topical lectures and discussions on modelling and CFD are also included.

23 / 27
SEPTEMBER 2013
CRETE, GREECE

Agapi Beach Hotel
Heraklion - Crete - Greece

935 Euro

The fee covers six nights (Sunday 22 – Saturday 28) accommodation on a single occupancy, all inclusive basis (i.e. meals and local beverages), attendance at all sessions, an electronic copy of course materials, attendance at the course dinner. A boat trip to Spinalonga Island on Wednesday 25th September 2013 is also included.

HOW TO APPLY FOR THE SUMMER SCHOOL

All participants must complete the registration form available at <http://www.h2fc.eu/technicalschool> and return it to Dr Svetlana Tretsiakova-McNally

(S.Tretniakova-McNally@ulster.ac.uk or H2FCTechnicalSchool@ulster.ac.uk).

**PLEASE SUBMIT YOUR REGISTRATION FORM AS SOON AS POSSIBLE!
PLACES ARE LIMITED!**

IMPORTANT

A limited number of applicants will be selected to receive funding; this funding covers the course fee only and not travel costs. Funding applicants must be from organisations outside the H2FC consortium. Please find instructions on how to apply for the school funding at <http://www.h2fc.eu/technicalschool>



H2FCtechnicalschool@ulster.ac.uk • Alternatively contact: Dr. Sile Louise Brennan, Lecturer, Hydrogen Safety Engineering and Research Centre (HySAFER), Block 27, Faculty of Art, Design and the Built Environment, University of Ulster, BT37 0QB, Northern Ireland, UK.
Phone: +44(0)289036875 • Email: sL.brennan@ulster.ac.uk • <http://www.h2fc.eu/technicalschool>

Annex 5

European Technical School on Hydrogen and Fuel Cells

2013

Feedback form



Your opinion is very important to us and will help us to improve our future schools. We would appreciate if you could complete this form and return it to us at the end of the week. Please feel free to write additional comments.

Please tell us how satisfied or unsatisfied you were with the following:

	Very Satisfied	Satisfied	Neither Satisfied nor Unsatisfied	Unsatisfied	Very Unsatisfied
1. How satisfied were you with the registration process?					
2. How satisfied were you with the Technical School materials provided?					
3. Overall, how satisfied were you with the speakers / presenters?					
4. Overall, how satisfied were you with the Technical School facilities?					
5. How satisfied were you with the Technical Content of the School?					

6. How did you feel about the length of School sessions?

Too long	Just about right	Too short

If you have any comments related to the above questions please let us know:

Please tell us how much you agree or disagree with the following statements.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
7. The content of School sessions was beneficial to me.					
8. The Technical School was well organized.					
9. Any queries to the organisers were answered promptly and clearly.					
10. The hotel was of a high standard and fit for purpose.					

11. What kinds of sessions or topics would you like to see included at future Technical Schools?

Page 1 of 2: Please turn over!

12. What did you like least about the Technical School?

13. What did you like most about the Technical School?

14. Are you familiar with the programme to access experimental installations within the H2FC project?

15. Have you applied, or do you intent to apply, for access to H2FC infrastructure facilities?

16. Do you plan to attend the Technical School again next year?

17. Would you recommend the Technical School to others?

Yes	No	Not Sure

18. In what ways could the Technical School be improved?

19. Would you be as likely to attend the school if it were held in e.g. June? (Please explain your answer)

20. Do you have suggestions on the location for future schools?

21. Any other comments

Thank you for taking your time to complete this questionnaire. Your feedback is valuable. This questionnaire is anonymous. However, if you would like us to respond to you regarding any of your answers then please include your name and indicate the questions you would like us to respond to.

Name (optional) _____