TANK HYDROGEN AUTOMOTIVE

Grant Agreement n° 779644

Deliverable D09.05 – Dedicated Workshop #1

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Duration: 42 months
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Document Validation

Partner	Approval (Signature or e-mail reference)
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Document Abstract

This deliverable is part of the TK09.01 “Dissemination activities” within the WP9 “Dissemination and exploitation strategy”. It was expected at M24, but it has been delayed at M35 (in the context of the approved amendment for a project extension of 6 months).
Due to the pandemic crisis, it has been decided with the consortium and the EC to convert the initially scheduled face-to-face event into a remote event (i.e. webinar).
The work reports the content of webinar delivered on the 10th of December 2020, illustrating the aim of the event, the organization strategy and the analytics of people who had participated.

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I. INTRODUCTION

As part of the attempt to reach stakeholders and public organization at local level, the consortium scheduled in the Grant Agreement to organize two workshops in Germany and Belgium during the project life in order to attract customers from the private sector.

In these events, the different technological solutions that TAHYA offers were presented, along with discussions on these solutions.

These workshops can be hugely beneficial for reaching stakeholders and public bodies and the same time important for the evaluation of the proposed solution in the framework of the exploitation strategy of the project. Furthermore, this activity is in line with the FCH 2JU mission, which aims to accelerate the market introduction of these technologies, realizing their potential as an instrument in achieving a carbon-clean energy system.

Therefore, the organization of these workshops is a practice that can be followed by the partners that will exploit TAHYA's solutions after the project end.

Due to pandemic crisis and to the difficulties in organizing a face-to-face local event, the consortium, with the agreement of the European Commission – FCH2 JU, decided to replace the workshop event by an online webinar.

In addition, these events are an important part of our dissemination and exploitation plan. The benefits of the webinar allowed the consortium to collect valuable evaluation feedback, but also were important for demonstrating TAHYA's solutions to a broader audience. A new workshop has already been planned at M41-M42 (May-June 2021): this event will be also switched into an online webinar if the pandemic crisis will persist in the future.

II. OBJECTIVE: REACHING TARGETED STAKEHOLDERS AND PUBLIC BODIES

For the success and the sustainability of TAHYA it is crucial to reach stakeholders interested to use the solutions developed within the project. For this reason, dissemination and communication tasks work in close collaboration to the exploitation and evaluation of the project with the aim to reach the target audience of TAHYA as final products.

Based on the initial planning of the project that is presented in the Grant Agreement, the primary target audience is the automotive industry (OEM's and TIER1 suppliers). These actors can take advantage of the H2 storage solution in the TAHYA project for a future deployment in the FCEVs automotive industry. This will help them to reduce costs and gain insight information on optimized design architectures.

Secondary audience, but also important in TAHYA, is public bodies involved in the standardization of regulations for improved safety of solutions. This will allow to understand possible regulatory gaps for the efficient and safe future utilization of proposed solutions in vehicles and to provide input for the regulatory framework (GTR13).

Although these are the main stakeholders of TAHYA, project results will be used also by any organization or company interested, including small and medium-sized enterprises (SMEs) or bigger enterprises. By using TAHYA solutions, any company or organization is able to extrapolate the results for their own specific requirements and deploy applications and services, e.g. for hydrogen transportation or other mobility applications (train, marine, …).

An important part of the activities done during the last year of the project and also the most important part of the exploitation approach agreed, is the connection with public organizations at international level and other targeted audience. These activities, as reported in the communication, dissemination and

exploitation plan, include the participation to conferences, exhibition events, work groups, face-to-face interaction during targeted thematic events, networking , …

The main purpose is to advertise the benefits and advantages offered by TAHYA to stakeholders, business partners and public bodies.

The exploitation task will continue on the basis of consortium specific agreements: each partner will seek for opportunities on their targeted market that could overall fit in the TAHYA framework.

III. WEBINAR DESCRIPTION

TAHYA's webinar are organized by AK in conjunction with OCPV and the support of the FCH2 JU. The webinar took place on December 10th, 2020 from 2pm to 5pm. Details of the webinar are reported in the table below.

Title	Storage of compressed H2: Improvements in view of an emerging market
Abstract	Presentation of TAHYA project's results While automakers have demonstrated progress with prototypes and commercial vehicles traveling greater than 500 km on a single fill, this driving range must be achievable across different vehicle makes and models and without compromising customer expectations of space, performance, safety, or cost. The TAHYA project (TAnk HYdrogen Automotive), mainly led by industrial partners -already involved in producing and manufacturing hydrogen solutions for the automotive and aviation industry-, focus on the development of a complete, competitive and innovative European H2 storage system (a cylinder with a mounted On-Tank-Valve with all integrated functionalities) for automotive applications up-performing the actual Asian and US ones. The TAHYA consortium composed of PLASTIC OMNIUM, Anleg, Raigi, Volkswagen, Chemnitz University of Technology, Bundesanstalt für Materialforschung und -prüfung, PolarixParner and Absiskey ensure that the development phase of the storage system remain in line with the expectations (cost, performance and safety) required by the market, end users' and car manufacturers.
Presenter	Lionel Boillot – Project Officer of TAHYA project & FCH2 JU project manager Axel Seifert – Coordination of TAHYA project – OCPV/PO Samy Strola – Consultant in Project Coordination – ABSISKEY
Date	10th December 2020
Duration	3 hours
Registration	Free of charges
Programme link	https://event.webinarjam.com/register/3/mq7x4hq
Access link	https://event.webinarjam.com/go/live/3/mq7x4hqf8srsg https://www.linkedin.com/events/storageofcompressedh2-improveme6741990329374928896/
Replay link	https://event.webinarjam.com/login/7qlk0hkfofnfq7c8

1. *The tool: WebinarJam*

Organizers decided to adopt WebinarJam tool. Among different options existent in the market, we converged to use a stable, intuitive, easy to use and ergonomic tool both for presenters and the public, with the possibility to customize the platform with the graphical visual identity of the TAHYA project. Moreover, WebinarJam allows to stream videos and content beforehand uploaded on different platforms (e.g. YouTube channel), to animate a live session and to propose polls to the participants.

To avoid technical difficulties that a "live" event can encounter and that can introduce consistent delays respect to a scheduled programme, organizers decided to pre-record all the speaker's contribution and then to stream the content using the private AK YouTube channel. Only the question/answer sessions were

diffused in “live” in order to interact with the participants. All the questions were collected during the event through the WebinarJam chatbox.

The figure below illustrates a printscreen of the interface of the WebinarJam tool as an example.

Figure 1: WebinarJam interface with the control panel options (right).

In parallel, the event was streamed in a dedicated LinkedIn page (see “access link” in the table above).

The webinar can be followed in replay mode and fully downloaded (see “replay link” in the table above).

2. *Advertising campaign*

The webinar was announced through various channels, especially using:

- Partner’s contact lists (emailing),
- Through LinkedIn accounts of people involved in the project and
- The project website (www.tahya.eu).

The advertising campaign started one month before the event and was reiterated each week feeding social medias. Figures below illustrates some examples of this campaign.

The organizers targeted to reach at least 100 attendees’ people to evaluate positively the event.

Figure 2: the advertising of the webinar done in the project website and published as a “news”.

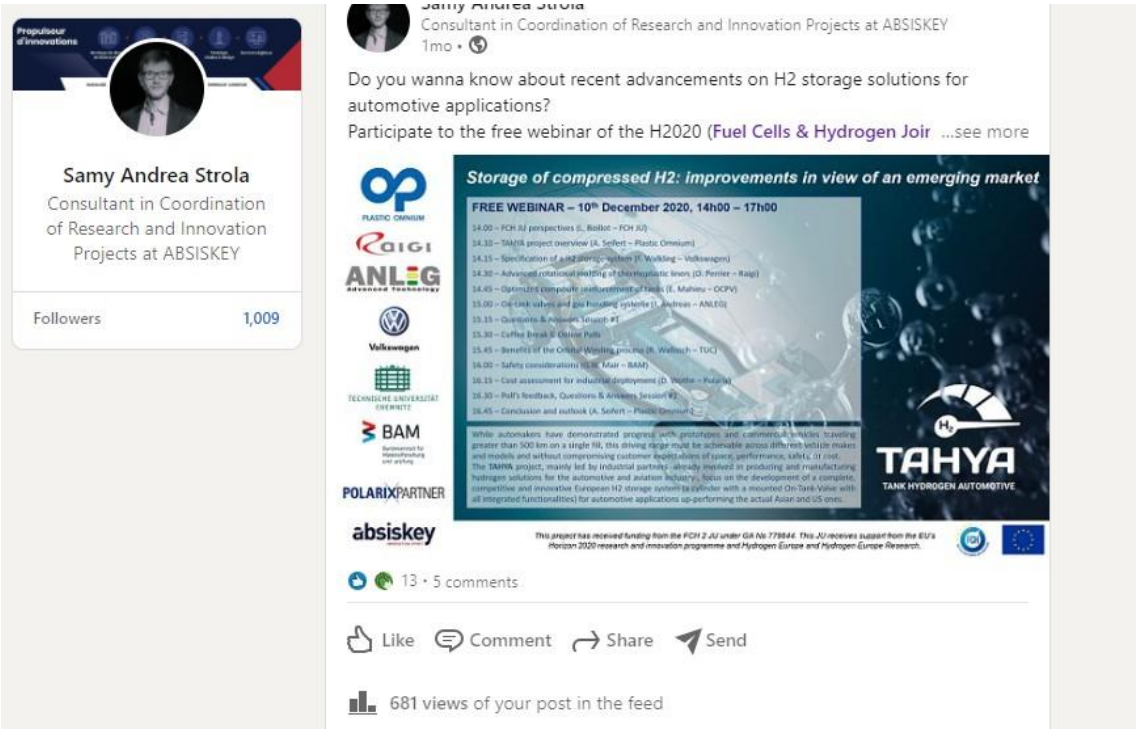

Figure 3: example of advertising done in LinkedIn.

3. *Programme*

The webinar involved the participation of all the partners involved in the TAHYA project and of the FCH2 JU, EC department supporting research, technological development and demonstration activities in fuel cell and hydrogen energy technologies in Europe.

The full program is here below reported:

Figure 4: full programme of the webinar.

After a short welcome, Lionel Boillot (Project Officer of TAHYA and project manager at the FCH2 JU) gave an overview of the FCH2 JU past and future EU programs in the domain of the H2 storage solutions for automotive applications.

Axel Seifert (Coordinator of TAHYA project) explained how TAHYA project born and illustrated key objectives, actual status and expected perspectives.

Technical presentations by each partner have followed with the objective to:

- Show and promote their activities and competencies in the H2 domains and related technologies;
- Explain the role, mission and involvement in the TAHYA project.

Two question/answer sessions were scheduled in the program. These sessions were used to answer to the questions collected by the WebinarJam chatbox during the webinar. They involved the participation of Lionel Boillot and Axel Seifert as key-contacts of the FCH2 JU and TAHYA project, respectively and with the moderation of Samy Strola. This "roundtable" format allowed to discuss on the different aspects of the project relying with the expectative of the EC funding program.
The list of the question is available in the Annex of this deliverable. Further questions can be treated by contacting the project coordinator via the project website.

Online polls were submitted during the "virtual coffee break" and discussed at the end of the webinar. The aim was to "take the temperature" of the external public about important topics that will impact future strategy of the H2 roadmap for automotive applications. Polls and questions per each proposed options are reported below.

As main takeaways of the pols, the following conclusions can be drawn:

- Over 90% of the attendees are convinced that FCEV's will play a role in clean mobility within the next 10 years which indicates that the audience was familiar with the potential of this technology;
- More than 25% of the audience have never heard of the FCH2JU, which leaves room for improvement and underlines the importance of such events for dissemination;
- Nearly 50% of the audience believes that significant effort is required with regards to cost reduction and safety enhancement.

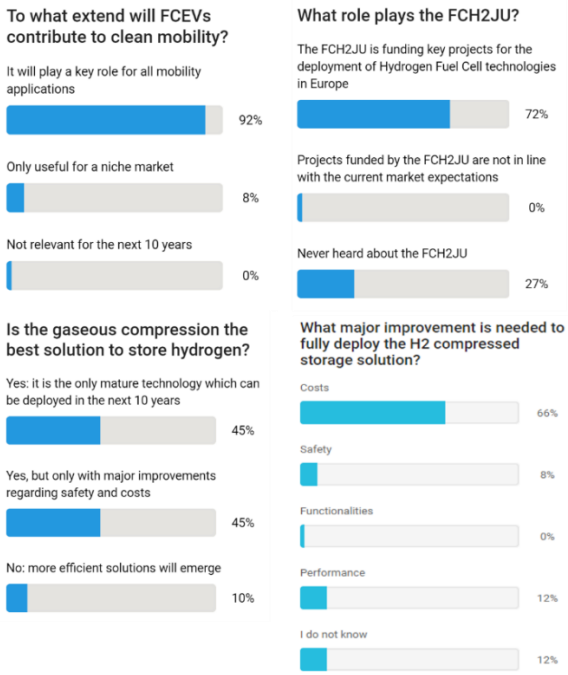

Figure 5: the 4 polls that were presented during the webinar and the percentage for the proposed options for each question.

4. *Webinar analytics*

Advertising campaign allowed to catch 1163 visitors through the used tools (emailing, LinkedIn pages, project website).

Effective registrants were 324 at the date of deliverable release: 177 participated to the "live" session and 59 (up to now) accessed to the "replay" one. Among total registrants, 46 were people affiliated to project partners and 52 people did the registration with a private email, with the impossibility to determine their sector category. The remaining 226 were divided in 4 different categories: automotive (ex. BMW, Toyota, Daimler, Bentley, …), mobility and H2 solution providers (ex. Faurecia), academic/institutional (ex. Universities, institutes of technology, …), other industry (i.e. chemicals, numerical modelling, energy, mechanicals, electronics, engineering, materials, ...).

CATEGORY	# PEOPLE REGISTERED	# PEOPLE REGISTERED IN %
AUTOMOTIVE	16	7,1
MOBILITY AND H2 SOLUTIONS	34	15,0
ACADEMIC / INSTITUTE	51	22,6
OTHER INDUSTRY	125	55,3
TOTAL	**226**	**100**
OTHER (PRIVATE EMAIL)	52	
PROJECT PARTNER	46	

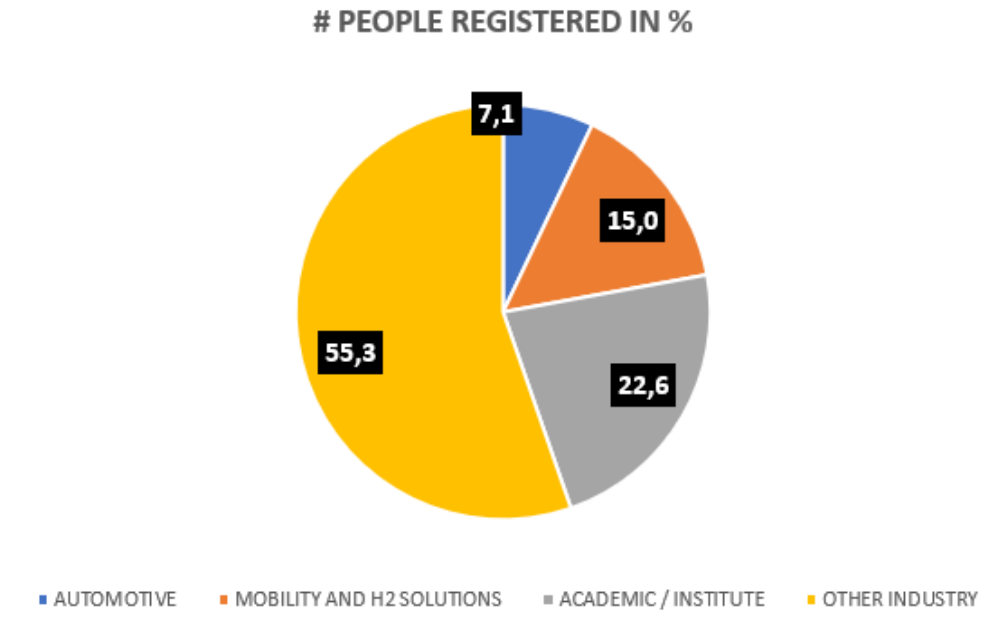

Figure 6: people registered to the webinar divided per sector category.

For the "live" session, 29% of the participants attended the whole webinar duration and the average participation time was of 2h over the 3h of the whole duration of the session. This can be justified by the fact that the second part of the webinar was more centered on the academic partner's contributions (TUC and BAM), which is probably resulting less interesting for industrial public that represented the mainly participation to the event.

Average time spent for the "replay" session, which is very short (about 30 min) shows that this session is mainly used to download the webinar. However, the 5% followed the whole webinar. Data on the "replay" session are only provisional and will vary on coming weeks.

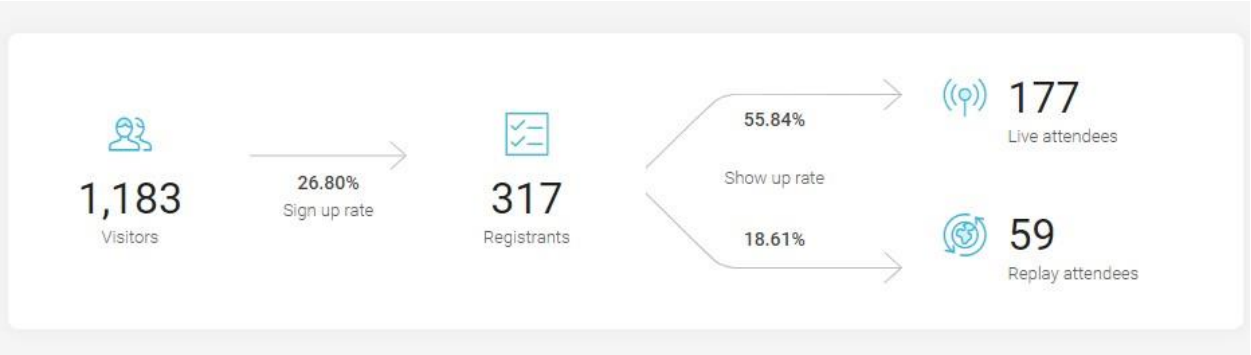

Figure 7: traffic analytics of the webinar.

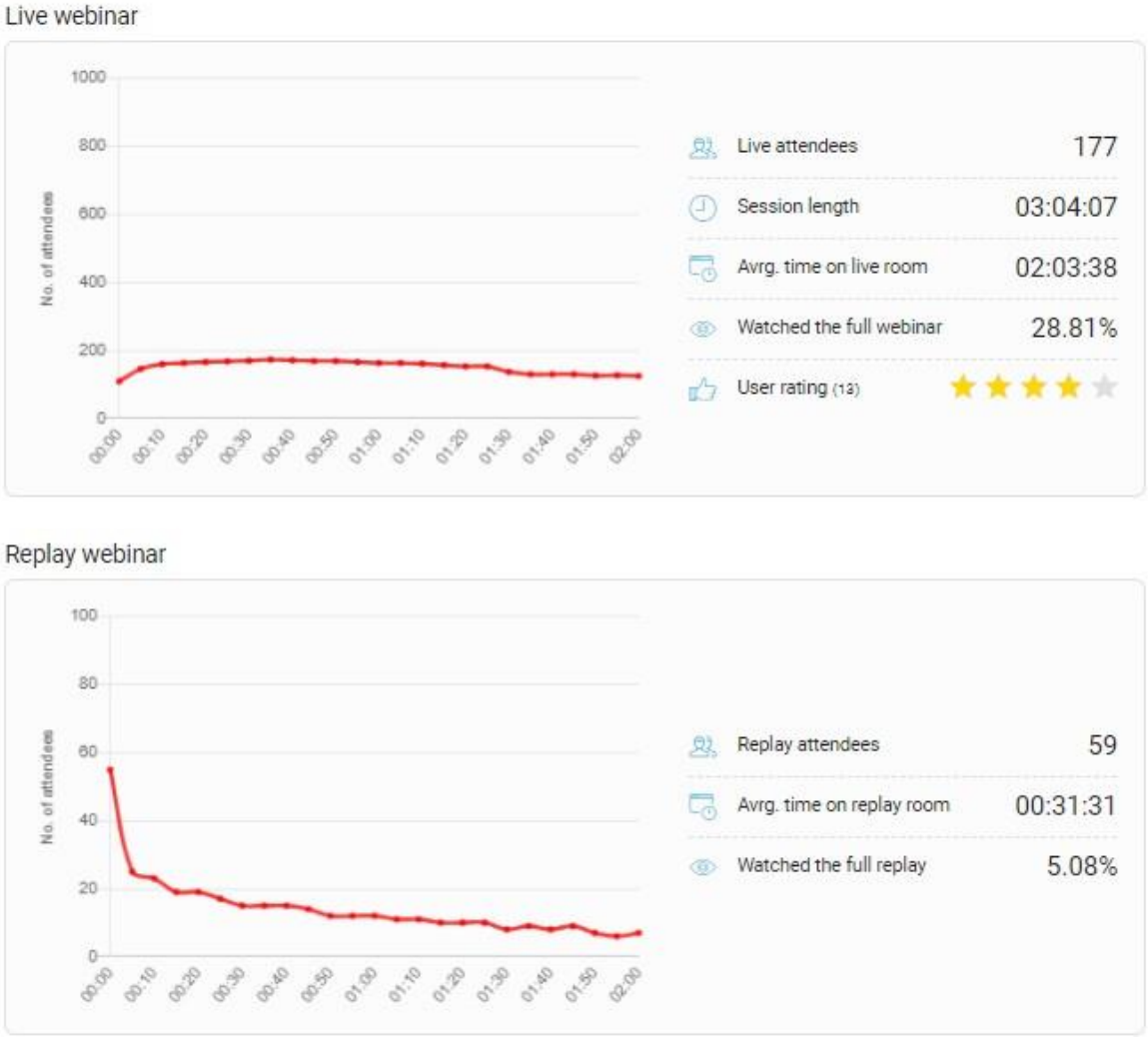

Figure 8: analytical data of attendees for the "live" and the "replay" sessions.

5. *Satisfaction questionnaire*

Participant to the webinar were contacted the day after the event by email. In this message we provided the link to access to the “replay” of the webinar and to propose a short questionnaire of satisfaction. 5 questions have been submitted: answers will be collected and analyzed in the future.

What did you thought about...

	very good	good	so so	bad
Communication before the webinar	☐	☐	☐	☐
Tool's ergonomy : WebinarJam	☐	☐	☐	☐
Technical support	☐	☐	☐	☐
Lenght & rythm	☐	☐	☐	☐
Content shared	☐	☐	☐	☐

Figure 9: satisfaction questionnaire proposed by email after the webinar.

IV. CONCLUSION

This deliverable presented the content of the first TAHYA webinar within the framework of the dissemination, communication and exploitation activities (WP9, TK09.01).

These activities aim at attracting potential supporters and users of the TAHYA results, and for this reason dissemination is executed in close partnership with project partners and funding institution. This represent the first step for further market activities.

In order to achieve this, all members of the consortium gave a presentation during the webinar with the aim to attract customers and spread their knowledge and expertise in the targeted domains. The non-confidential project's results were disseminated to help on the exploitation of the technical solutions developed in TAHYA.

As scheduled in the GA, dissemination activities include another workshop: it will be organized at M41-42 and D09.06 will summarize its content. This workshop will be tentatively done in face-to-face mode: it will be switched as webinar too in case of the duration of the pandemic crisis. More details on this forthcoming webinar will be available at the project website.

Other dissemination activities will continue, like the project website, the use of promotional material such as brochures, leaflets, posters, newsletters and social media.

The consortium will keep promoting project results in order to increase the dissemination and pre-marketing effectiveness of TAHYA.

V. ANNEX I: LIST OF THE QUESTIONS COLLECTED DURING THE WEBINAR

What about ACV of tanks? I have read that the main carbon footprint of FCEV is hydrogen tanks, more or less the same amount than for the battery of a BEV. What are then the perspectives about these emissions?

How is considered the end-of-life of H2 storage systems? (material recovery?)

Hello, what's the cycle time to produce a liner by rotational moulding?

How long is the cycle time for Rotation moulding?

What is the typical cycle time for producing one rotor molding liner?

What is the cycle-time of the rotational molding process of the shown cpv (2m in length)?

To Raigi: what is manufacturing time for advanced rotational molding of liner? Is this method suitable for mass market?

What productivity can be achieved with liner rotormolding?

What is the cycle time for one liner?

How is the wall thickness distribution?

What liner thickness did you achieve?

What kind of liner material did you use?

Would you have a rough estimation of the ratio overall weight of the tank/Hydrogen weight stored ?

Hello, how do you solve the safety issues for hydrogen tank storages? I mean during thermal expansion or overpressure situation in the tanks.

Where / when / how do you test the tanks please ? where do you test (burst test) your tanks please? What are the requirements from the EU standards in this field (number of test / when...)? Thanks.

How are the cycle tests performed? with H2 or with air or N2? is there a standard test method for this? Also for hoses you have the operating pressure and the test pressure. this last is 1.5x the operating pressure. Is this also the case for H2 tanks?

No resin producer involved ?

150 000km / 5500 filling cycles = 27km ?!

Is it possible to build and certify a conformable 700 bar system?

Is there any innovation in TPRD design in TAHYA?

Does the OTV include gas regulation?

Can You tell the aprox price of the final tank?

In the first presentation there were dimensions mention 357 x 2100 x what is te 3rd dimension?

Can you precise a bit more the role of the thermoplastic liner in the mechanical resistance of the tank (as presented in the first slides of Raigi)? Is it for improving impact properties of the carbon lay-up during crash conditions?

Is there a future for basalt and kevlar fibres in Type IV tanks for automotive applications?

Is there a next project related to implementation of sensors within the tank or within the OTV to ensure the SoH of the tank, leakage information, and also a connection with the filling station which could be able to know, that there is an issue on with the tank (temperature, leakage...) during filling process?

What are the thoughts regarding material specifications specifically Nickel equivalents?

R134 allows for 11,000 filling cycles ?

How many units for a vessel?

For cost and safety improvement : what about lowering storage pressure (500 bar?) What would be acceptable for automotive OEM in terms of "reduced" autonomy?

Regarding thermoplastic winding, what would be the winding time / winding speed?

Which carbon fiber costs have been assume in the cost model?

Cost study : does it take into account the new 2.0 burst pressure design factor?

Given feedback on poll 1, do you think the H2 refuelling infrastructure will develop for passenger cars by 2030 or focus mostly/solely on HDV? if so are you anticipating different fill station technologies for refilling / valves ... for smaller LDV and larger HDV systems that would impact on-board storage

Regarding cost: one of the first slide showed achievement of 501€/kgH2. It is different from the 398€/kgH2 showed later. Was the first number for 5000unit/year vs 20,000 for the second one?

What about rapid decompression test which damage the Liner and its adhesion ? Not mandatory today?

Cost reduction : do the OEM would accept a reduction of the H2 amount onboard ? (reduced H2 autonomy)? If yes, possibility to reduce the pressure (500 bars ?), leading to the possibility of absolute system cost reduction (even if "specific cost €/kgH2 remains at the same order of magnitude)

Why carbon fibre fraction cost does not decrease but increase with mass production? Good for Japan:-)

What about CcH2 cryo-compressed supecritical state with 70g/l as range extender?

=== End of the document ===