



## Deliverable D7.7

### 5<sup>th</sup> Project Meeting and Status Report

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## R E P O R T

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The 5<sup>th</sup> project meeting had to be held as a web conference due to the Covid-19 pandemic. It took place on 16<sup>th</sup> December 2021.

Enclosed is a summary of the meeting including the list of participants, the agenda and excerpts of the Minutes of Meeting (MoM), adapted for publication.



**PRHYDE consortium, Kick-off meeting, 5<sup>th</sup> February 2020, Paris**

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## **ACRONYMS AND ABBREVIATIONS**

CFD	Computational Fluid Dynamics
D	Deliverable
HD	Heavy Duty (Vehicle)
WP	Work Package

## 1 5<sup>TH</sup> PROJECT MEETING

Project PRHYDE – Protocol for heavy duty hydrogen refuelling  
Subject 5<sup>th</sup> General Assembly, 16 December 2021 3 - 6 pm CET  
Place Web Conference  
Date 16 December 2021

### 1.1 List of Participants

#### Participants (PRHYDE consortium):

Christopher Kutz, Susanne Goeritz / LBST (Project Coordinator)

Alexander Kvasnicka / ZBT, Fouad Ammouri / Air Liquide; Elena Vyazmina / Air Liquide, Quentin Nouvelot / ENGIE, Vincent Mattelaer / Toyota, Spencer Quong / on behalf of Toyota, Nick Hart / ITM, Weronika Boratynska / ITM, Claus Due Sinding / Nel, Benoit Poulet / Shell, Stephane Villalonga / CEA, Antonio Ruiz / Nikola, Elizabeth Saade / Nikola

#### Others:

Pietro Caloprisco / FCHJU (Project Officer) → Present during the first part of meeting

## 1.2 Agenda

### Agenda, 5<sup>th</sup> GA, 16<sup>th</sup> DEC 2021, 3:00 - 6:00 pm CET (1/2)



Time	Topic	Responsible
15:00 – 15:10	<b>Welcome</b>	FCH JU project officer
	Approval of agenda	Coordinator, LBST
15:10-15:40	<b>New (extended) project timeline</b> <ul style="list-style-type: none"> <li>▪ 2<sup>nd</sup> Contract Amendment (+9 months)</li> <li>▪ Overview: WP3-5 work plan // interactions</li> <li>▪ Overview: WP6 dissemination // communication // recommendations (ISO TC 197/WG24 update to provide total figure)</li> </ul>	Coordinator, WP leaders
	<b>Report from the WP leaders</b> Status of work; Ongoing activities and outlook	
15:40 – 16:00	<b>Status report: WP3 – Protocol development</b>	Nel (Shell, Toyota)
16:00 – 16:20	<b>Status report: WP4 – Simulations</b>	Air Liquide (ENGIE)
16:20 – 16:40	<b>Status report: WP5 – Experimental validation</b>	Nikola (ZBT, Toyota, CEA)
<b>BREAK</b>	<b>10 Minutes until 16:50</b>	

16<sup>th</sup> DEC 2021 – 5<sup>th</sup> project meeting Confidential [www.PRHYDE.eu](http://www.PRHYDE.eu)

Time	Topic	Responsible
16:50 – 17:10	<b>Status report: WP6 – Recommendations, dissemination and communication</b>	ITM
17:10 - 17:30	<b>Discussion – Outlook: PRHYDE follow-up activities (after project end)?</b>	ALL
17:30 – 17:55	<b>Others</b> <ul style="list-style-type: none"> <li>▪ Accept only digital / electronic signatures or original on-paper signatures (→ for future official (decision) documents) (→ no scanned signatures)</li> <li>▪ Internal review process of deliverables (→ timeline for reviews / approval by partners!)</li> <li>▪ Figures / Pictures for publications / dissemination</li> <li>▪ External Experts / details on NDAs / Acknowledgments</li> <li>▪ PRHYDE SharePoint / SharePoint backup (→ of WP draft documents)</li> <li>▪ Further Topics</li> </ul>	ALL
17:50 – 18:00	<b>Final Remarks and Close of 5<sup>th</sup> GA</b>	

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### 1.3 Overview on Topics of the Meetings

- Assessment of Project Officer Pietro Caloprisco (FCH JU) on project implementation (Pietro Caloprisco)
- Work package (WP) description and status of project deliverables (WP leaders)
- Status update on current activities on HD refuelling protocols in ISO TC 197 / WG24 (all)
- Summary of action items (LBST)

#### 1.3.1 Assessment of Project Officer on progress of project implementation

The 5<sup>th</sup> General Assembly took place on 16<sup>th</sup> December 2022 as an online meeting due to Covid-19 pandemic with the participation of the Project Officer Pietro Caloprisco.

In his welcome note the Project Officer summarized the outcome of the Midterm Review and assessed the improvement with regards to intensified interaction of the Coordinator Martin Zerta and the Project Officer, as well as the communication and interaction between the different important work packages. This way some delays and shortcomings identified during the Midterm Review could be mitigated.

Since the project extension till September 2022 had been accepted, a solid and successful finalization of the project and final results can be expected.

Again, Pietro Caloprisco emphasised the strategic importance of the project and a reliable refuelling protocol for heavy duty trucks for FCH JU.

Another important issue is the review of AFID/AFIR which includes binding targets for an HRS infrastructure in Europe: i.e. one HRS with a min. capacity of 2 t/day every 150 km along the TEN-T Core and comprehensive network.

Very important for the PRHYDE work is to forward the project results to standardization bodies at the end of the project (i.e. ISO TC197/WG24).

Pietro Caloprisco introduced the change of FCH JU (Horizon 2020) to the New Clean Hydrogen Joint Undertaking (CHJU). The multi annual workplan will be finalized and will include calls for proposal to be published in 2022.

#### 1.3.2 Overview, WP description and status project deliverables (Christopher Kutz, LBST)

The new timeline as part of the 2<sup>nd</sup> contract amendment was presented. 5 key deliverables were identified and a more intensive interaction between WP4 and WP5 (D3.3 and D3.5) and closer cooperation between WP3, WP4 and WP5 for D6.7 and D6.8 is planned in order to deliver in time and meet the project goals by September 2022.

Further options to gain stakeholder input in preparation of the WS in WP6 in May 2022 and the presentation of key messages for D3.5 were part of the discussion as well as the need for an intensive iteration process between January 2022 and May 2022.



Project Officer Pietro Caloprisco wants to be involved and will therefore receive the slides of the WP descriptions. He will stay in close consultations with the Coordinator Martin Zerta for the coming months.

#### **1.3.2.1 WP3 Description (Claus due Sinding, Nel)**

Ongoing activities on D3.4, Risk Assessment are in the final phase. A specific task force with project partners and external experts are working on this task and deliverable. The working group meets in regular, weekly web meetings coordinated by the WP leader.

In parallel, Task 3.4 for the optimisation of the refuelling protocol approaches described in D3.3. has started. Together with WP4 and WP5, common weekly web meetings are organised by WP4.

#### **1.3.2.2 WP4 Description (Fouad Ammouri, Air Liquide)**

D4.7 has been submitted, D4.4 is due in March 2022.

CFD calculations on NIKOLA tanks have not been finalized yet, treatment of ZBT refuelling tests for Toyota tank (244L) is in progress.

Publications on a comparison of different modelling methods and CFD modelling is planned (World Hydrogen Energy Conference, WHEC 2022), abstracts to be submitted by mid-January 2022.

#### **1.3.2.3 WP5 Description (Antonio Ruiz, Nikola)**

WP5 team summarized status of current test activities on ZBT (Single tank testing) an NREL test site (multiple tank CHSS).

500 and 700 bar tank testing ongoing at ZBT test site in Germany. 350 bar testing planned for Q1/2022. Test matrix with test conditions was presented for 700 bar tank. Close interaction with WP4 (modelling) to validate models with test results.

Mechanical measurements have been performed at CEA test site in 2021. Further test will be conducted during 350 bar fuelling tests at ZBT in 2022.

Further tests will start in Q1/2022 with HD vehicle simulator at the NREL fast flow facility.

Real-world validation is planned at Toyota's heavy duty vehicle stations in California using Toyota HD truck in 2022.

#### **1.3.2.4 WP6 Description (Nick Hart, ITM)**

Deliverable D6.2 had been updated and will be revised in the course of 2022.

WP6 will start to join the Task 3.4 task force meetings in the beginning of 2022.

Decision on how to present immediate results of TC 197 WG24 has to be made. The first meeting of WG24 group is planned for February 22. Several PRHYDE project partners will also participating the WG24 meeting, see below.

5<sup>th</sup> Workshop planned for May 2022. Stakeholder input, feedback and discussion within WP3 is required already in the months before the actual workshop. The partners are discussion an additional earlier workshop by end of March / beginning of April 22. This earlier workshop should present the proposed fuelling approaches described in D3.3 (not published as the D3.3. is confidential) to the stakeholders. The workshop in May should report on updates and should address specific issues to be discussed by stakeholders.

### **1.3.3 Status update on current activities – ISO TC 197 / WG24 (Antonio Ruiz, Nikola)**

Antonio Ruiz of the American project partner NIKOLA Corporation presented the current activities of the ISO TC 197/WG24 working group which consists of three task forces comprising: Design and development of refuelling protocols (Task Force 1), Communication for protocols (Task Force 2), and HD fuelling protocols for trucks (700 bar) (Task Force 3).

Activities in Task Force 3 will be launched in February 22. There will be strong alignment and information sharing with the ongoing work in PRHYDE, especially since some participants of PRHYDE are in the lead in this task.

### **1.3.4 Summary of action items**

There was a discussion on further activities that go beyond the development of positions and recommendations for H<sub>2</sub> refuelling protocols for HDV, when the project PRHYDE will have ended. It was agreed among the Consortium to further develop ideas and the discussion on this topic in January 2022 and during the following months.

Antonio Ruiz will continue to lead further discussions within the ISO task group to interlink the results of PRHYDE with the process in the ISO task force.

All project partners were asked to provide graphs and photos with the necessary high resolution and ownership rights to WP6 and the coordinator to be used for the newsletter, publications and other dissemination material. General aim is to intensify the dissemination activities towards the end of the project.



FUEL CELLS AND HYDROGEN  
JOINT UNDERTAKING

## What is PRHYDE?

With funding from the Fuel Cells and Hydrogen 2 Joint Undertaking (FCH 2 JU), the PRHYDE project is aiming to develop recommendations for a non-proprietary heavy duty refuelling protocol used for future standardization activities for trucks and other heavy duty transport systems applying hydrogen technologies.

Based on existing fuelling protocols and current state of the art for compressed (gaseous) hydrogen fuelling, different hydrogen fuelling protocols are to be developed for large tank systems with 35, 50, and 70 MPa nominal working pressures using simulations as well as experimental verification. A broad industry perspective is captured via an intense stakeholder participation process throughout the project.

The work will enable the widespread deployment of hydrogen for heavy duty applications in road, train, and maritime transport. The results will be a valuable guidance for station design but also the prerequisite for the deployment of a standardized, cost-effective hydrogen infrastructure.

Further information can be found under <https://www.prhyde.eu>. For feedback on the PRHYDE project or the published deliverables, please contact [info@prhyde.eu](mailto:info@prhyde.eu).

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## Members of the PRHYDE Consortium:

