

PRHYDE

PROTOCOL FOR HEAVY DUTY HYDROGEN REFUELLING



Project ID:	874997
PRD 2023:	Panel 5 – cross-cutting
Call topic:	FCH-04-2-2019: Refuelling protocols for medium and heavy-duty vehicles
Project total costs:	EUR 3 167 078.16
Clean H₂ JU max. contribution:	EUR 1 494 417.00
Project period:	1.1.2020–30.9.2022
Coordinator:	Ludwig-Bölkow-Systemtechnik GmbH, Germany
Beneficiaries:	Commissariat à l'énergie atomique et aux énergies alternatives, Engie, ITM Power plc, Air Liquide SA, NEL Hydrogen A/S, Nikola Corporation, Shell Deutschland GmbH, Toyota Motor Europe SA, Toyota Motor North America, Zentrum für Brennstoffzellen-Technik GmbH

<https://prhyde.eu/>

PROJECT AND OBJECTIVES

PRHYDE, running between January 2020 and September 2022, had the aim of developing recommendations for non-proprietary heavy-duty refuelling protocols used for future standardisation activities for trucks and other heavy-duty transport systems applying hydrogen technologies. Based on existing fuelling protocols and the current state of the art for compressed gaseous hydrogen fuelling, different hydrogen fuelling protocol concepts were developed for large tank systems with 35 MPa, 50 MPa and 70 MPa nominal working pressures using simulations, and experimental verification was carried out. A broad industry perspective was captured as a result of a comprehensive stakeholder participation process, with several workshops held throughout the project.

PROGRESS AND MAIN ACHIEVEMENTS

- PRHYDE has formulated four new fuelling protocol concepts for the heavy-duty segment.
- Complementary to the four PRHYDE fuelling concepts, a protocol feature that can apply to all concepts was also developed. This feature, called the SOC taper, can adjust the fuelling speed when the station encounters non-ideal situations such as low storage capacity or high-flow restrictions.
- Numerical approaches (thermodynamic and computational fluid dynamics modelling) and an experimental test campaign at different test sites were conducted to validate the modelling efforts and provide proof of concept that the protocol concepts work as intended.

FUTURE STEPS AND PLANS

The project has been completed.



QUANTITATIVE TARGETS AND STATUS

Target source	Parameter	Target	Achieved to date by the project	Target achieved?
Project's own objectives	Meetings with standards organisation groupings	4	4	
	Reports sent to standard-developing organisations	18	21	✓
	Publicly accessible workshops/webinars	6	6	