



- Call year: 2017
- Call topic: FCH-01.7.2017: Validation of Fuel Cell Trucks for the Collection of Urban Wastes
- Project dates: 2018- 2024 (June)
- % stage of implementation 15/10/2022: 73%
- Total project budget: 8,7mio
- Clean Hydrogen Partnership max. contribution: 4,9 m€
- Partners: Tractebel, Seab Servizi Energia Ambiente Bolzano SPA, Azienda Servizi Municipalizzati di Merano Spa,
  Suez Nederland Holding B.V., Gemeente Groningen, Gemeente Breda, Stad Antwerpen, Gemeente Amsterdam,
  Element Energy Limited, CEA, Waterstofnet VZW, E-Trucks Europe







### Revive will accelerate the development of hydrogen fueled refuse trucks in Europe

#### Key objectives:

- Develop a high-performance fuel cell refuse truck
- Deployment of 15 trucks
- At least 24 months of demonstration in their operating environment
- Raise the profile of the FC technology as a viable option for waste collection
- Analyze the future business models for zero emission waste collection using hydrogen produced from waste sources through a dedicated 'Waste-to-Wheel' study









### **Progress/Actions - Truck Construction** Europear Hydro 15 **Construction phase** 50% 75% 7 trucks completed the construction phase Breda (2) PreZero (2) Renova (1) Antwerpen (2) Other trucks in advanced stages of completion All remaining trucks expected by beginning of 2023 Delays in construction due to: • Delayed ordering

- $\circ$  Supply chain issues (covid-19, current geopolitical situation)
- $\circ$  Ongoing technological development



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Groningen truck under construction at E-trucks Europe Lommel







## Risks, Challenges and Lessons Learned

- Availability of HRS infrastructure -critical for project timing & truck operations
- TRL of European FC suppliers TRL of selected suppliers lower than non-EU suppliers
- Covid-19 & general supply chain issues
- No standard truck configuration
  - Every unique truck configuration needs to go through the homologation process and requires new testing
  - Additional delay for exporting vehicles (outside of the Netherlands)
  - "Keep it simple"
- Lack of regulation No EU/National directives to stall, maintain and repair H2 vehicles
- Stakeholder Expectation Management













- Project twitter account (@REVIVE H2) launched September 2019
- Project Website (<u>www.h2revive.eu</u>)
- Events (+15 events)

**Europea** 

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- European Research and Innovation Days (24-26/09/2019)
- EEF dinner debate (22/10/2019)
- Workshop E-trucks (06/12/2019)
- Hyvolution (Dec. 2021)
- IFAT (30/05/2022)
- Connecting Europe Days (28&29/06/2022)
- EMR H2 Booster event Limburg (12/10/2022)
- Wind Meets Gas (6&7/10/2022)
- Several Press Releases & Communications launched (+26)
  - Local & National Press release
  - Communication on project & partner website
  - National Television (NL)

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# **Events displaying REVIVE trucks**



Europea

- 2 Hydrogen refused trucks have been deployed and operated in the city of Breda (NL) since October 2020.
- Picture on the left shows Alderman M. Quaars refueling one of the trucks during a local event.

- On October 10<sup>th</sup> 2022 one of the two H2 refuse trucks operated by PreZero was displayed at the seminar "Hydrogen, the fuel of the future?", organized by POM Limburg in Genk, Belgium.
- One Prezero truck has been operating in Arnhem (NL) since May 2021.

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# Project Targets

European Hydroge

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Refuse trucks	MAWP 2017	Project Objectives
Gross Vehicle weight	16t≤≤26t	16 and 26 tons
FC power	≥40kW	>45kW
Operational lifetime	>20.000h	>25.000h
Availability	<b>90</b> %	90%
MTBF	≥2.500 km	>3.500
Tank to wheel efficiency	>42%	>50%



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#### Other objectives

- Series production ability
- Minimum operational period is 24 months or 8,000 hours
- Meet requirements of end-user
- Deployment of at least 10 FC refuse trucks
- ✓ Minimum 3 cities with 2 trucks