



REVIVE

Webinar Life and Grab Hy! – 30 March 2021

*A project co-funded by
under the Grant Agreement n.779589*



FUEL CELLS AND HYDROGEN
JOINT UNDERTAKING



Project Overview

- **Call year:** 2017
- **Call topic:** FCH-01.7.2017: Validation of Fuel Cell Trucks for the Collect of Urban Wastes
- **Project:** Refuse Vehicle Innovation and Validation in Europe
- **Project dates:** 1st of January 2018 – 31th of December 2021
- **% stage of implementation 25/03/2021:** 30%
- **Total project budget:** 8,7m €
- **FCH JU max. contribution:** 4,9m €
- **Project 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, Proton Motor, Powercell Sweden, Renova, Gemeente Noordenveld



Project Summary

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



Project Summary

Members of the REVIVE Consortium

Vehicle operator

SEAB SPA
 Stadtwerke Meran
 Suez Netherlands
 City of Groningen
 City of Breda
 City of Antwerp
 City of Amsterdam
 Renova
 Commune of Noordenveld

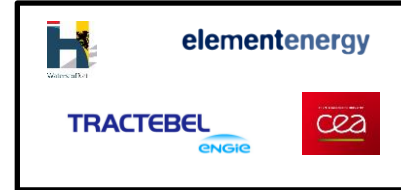
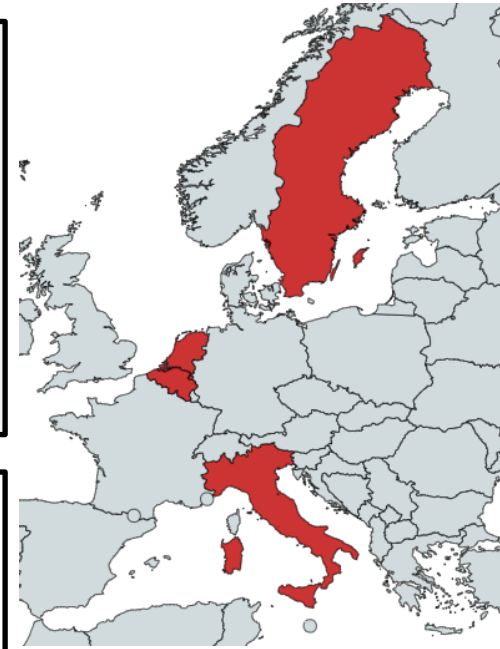
Manufacturers

E-trucks Europe
 Powercell
 Proton Motor

Experts

Tractebel Engie
 CEA
 WaterstofNet
 Element Energy

Deployment sites



Project Progress

Vehicles ordered
(#trucks)

14 ordered

Vehicles deployed
(#trucks)

1 deployed

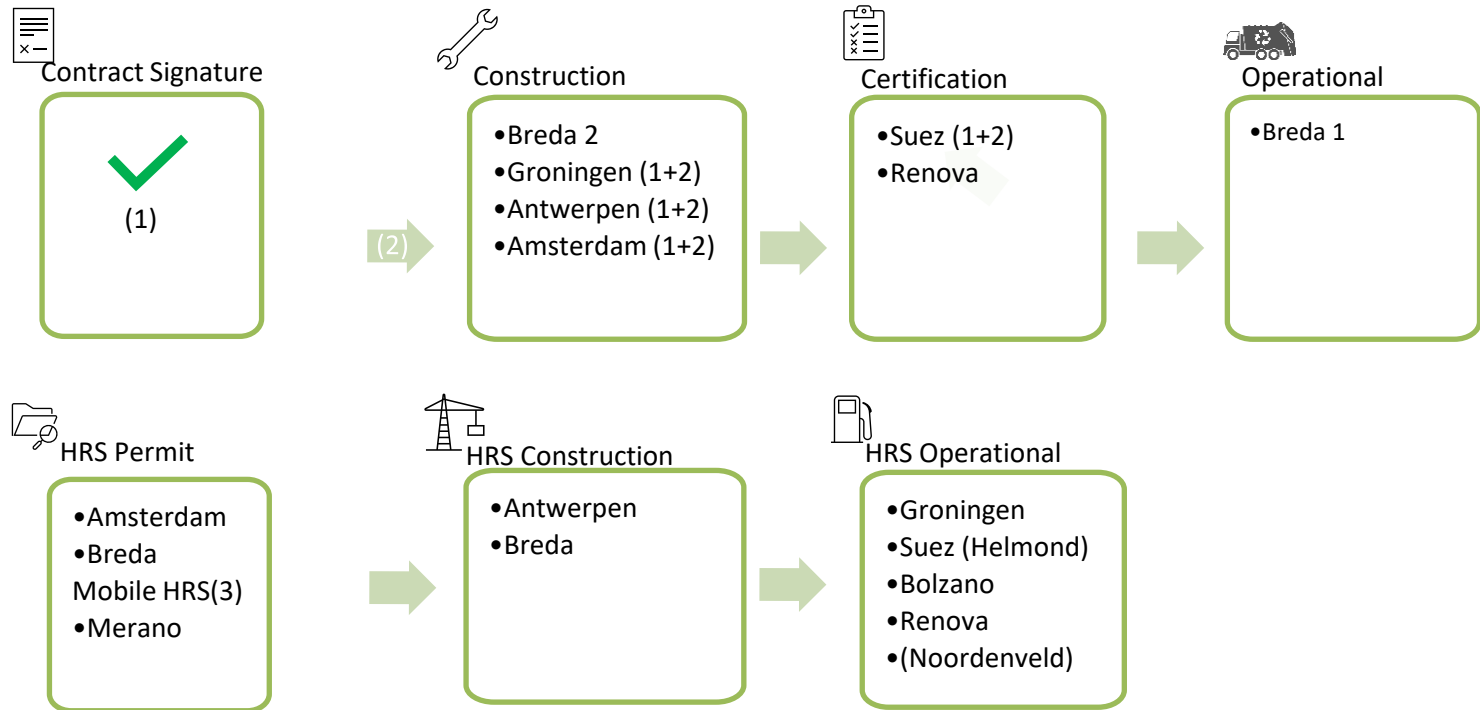


- A total of **14 trucks** are being built for delivery in 2021
 - First truck deployed already **in Q4 2020, in Breda**
- Several trucks close to deployment



Source: Breda, Breda truck deployment

Project Progress



- (1) Consortium will go for 14 implementations instead of 15
- (2) Chassis Noordenveld, Merano/Bolzano, Groningen (3rd truck) are ordered
- (3) Prolongation of WaterstofNet Mobile HRS

Truck manufacturing



Source: E-trucks, Breda truck testing

Truck manufacturing



Source: E-trucks, Suez truck



Source: Renova; Revive truck in Scania workshop



Source: E-trucks, REVIVE trucks under construction @E-trucks factory, Lommel Belgium

Main characteristics:

| | |
|-----------------|--|
| Truck chassis: | DAF(LF & CF) , Scania |
| Superstructure: | Backloader, sideloader Crane backloader |
| FC supplier: | Proton Motor (7), PowerCell (1), Ballard (2), Hydrogenics (4) |
| FC Power | 30 – 80 kW |
| H2 storage: | 15-28kg |











Truck manufacturing

REVIVE
PARTNER

Main equipment suppliers

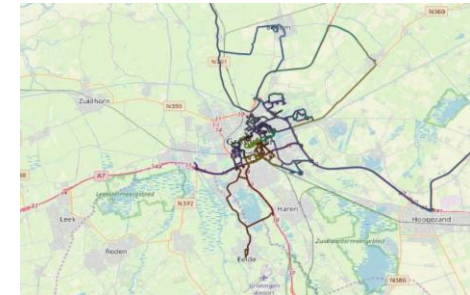
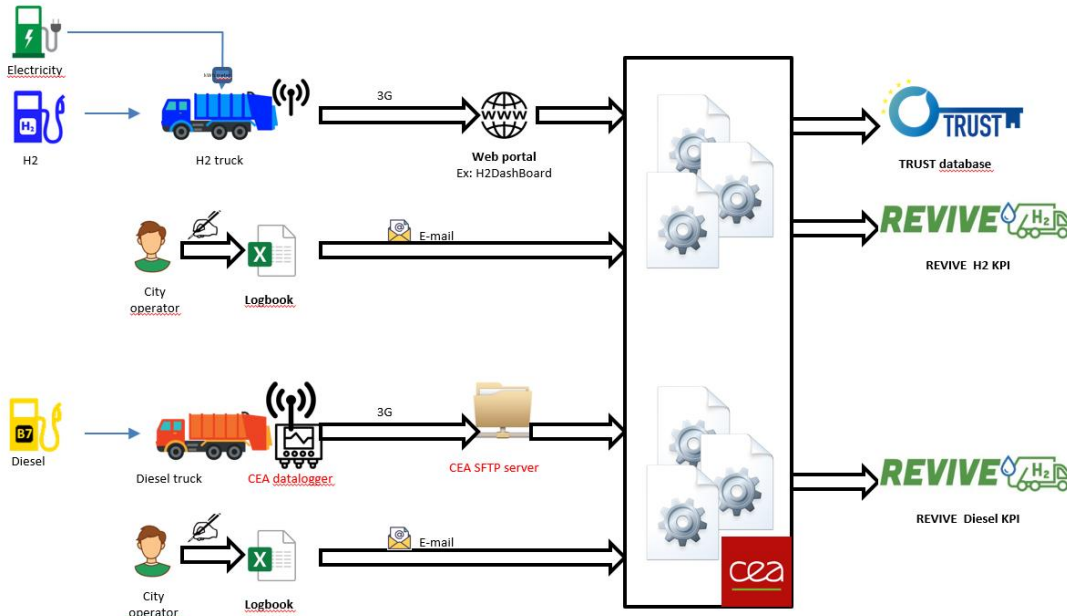
Final product integration & certification

Vehicle operators

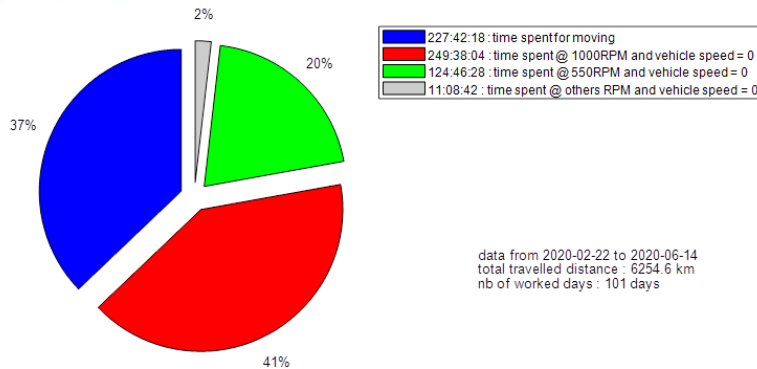
| Chassis | FC supplier | Superstructure |
|--|---|--|
|   |     |     |



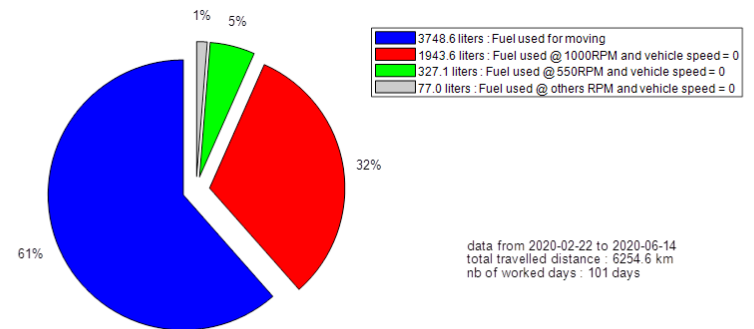
Data Monitoring



A screenshot of a software interface showing a table of data and a bar chart. The table has multiple columns and rows of data, and the bar chart shows a distribution of values.



data from 2020-02-22 to 2020-06-14
total travelled distance : 6254.6 km
nb of worked days : 101 days



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Challenges

- **Availability of HRS infrastructure** -critical for project timing & has caused delays in the project
- **TRL of European FC suppliers** - TRL of selected suppliers lower than non-EU suppliers
- **No standard truck configuration** – Every unique truck configuration needs to go through the homologation process and requires new testing
- **Lack of regulation** – No EU/National directives to stall, maintain and repair H2 vehicles
- **Lack of standardization for HD applications**– Safe fill protocol, communication cable



Source: E-trucks Europe



Synergies with other projects



Life N'Grab Hy



REVIVE



Letter of Cooperation for the

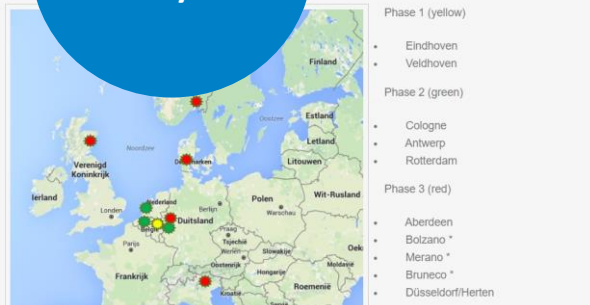
Life 'N Grab HYI, REVIVE & Hector - projects



Hector

Topics:

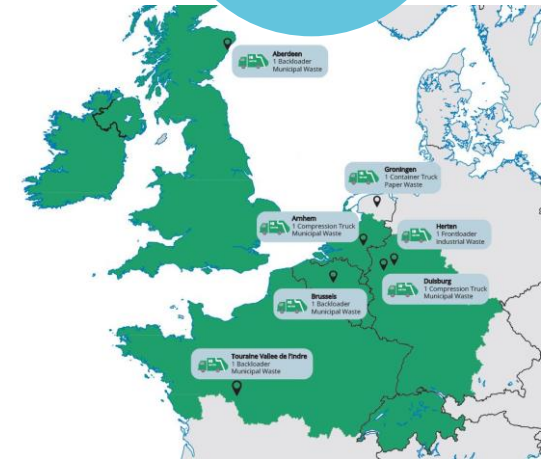
- ✓ Coordinate dissemination activities
- ✓ Common definition of policy recommendations
- ✓ Co-organisation of events



Source: WaterstofNet;
Demonstration in Hürth with Life 'N Grab Hy



Signature of collaboration agreement (06/12/2019)



Source: www.nweurope.eu/hector



REVIVE

**Refuse Vehicle Innovation
and Validation in Europe**

Dimitri Van den Borre



Tractebel

h2revive.eu

dimitri.vandenborre@tractebel.engie.com

Municipalities and vehicle operators



Manufacturers and experts



REVIVE

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