HORIZON EUROPE PROGRAMME
TOPIC HORIZON-CL5-2022-D5-01-08
Clean and competitive solutions for all transport modes
GA No. 101084046

Zero Emission flexible vehicle platform with modular powertrains serving the long-haul Freight Eco System

ZEFES - Deliverable report

Use case menu card - detailed plan and availability of relevant documents to support all demonstrations

Co-funded by
the European Union

Deliverable No.	ZEFES D7.1	
Related WP	WP7	
Deliverable Title	Use case menu card - detailed plan and availability of relevant documents to support all demonstrations	
Deliverable Date	2025-04-02	
Deliverable Type	REPORT	
Dissemination level	Public (PU)	
Author(s)	VUB/PTV/ALI/IDI/IRU ABB/HIT/CM-AP/CFL, FRD/REN/SCA/VOL/VET/KAE/ZF/MIC, DPD/EKOL/GBW/GSS/P&G/PRI	
Checked by	all authors	2025-03-17
Reviewed by (if applicable)	ALI RIC-DE	2025-03-31
Approved by	Omar Hegazy (VUB) – Project coordinator	2025-04-04
Status	Final	2025-04-07

Document History

Version	Date	Editing done by	Remarks
Draft 0.1	27/03/2025	VUB, ALI, IDI, PTV, IRU, FHG, AVL	
V01	17/03/2025	OEMs and LSPs, Shippers and Carriers	
V02	24/03/2025	VUB, PTV	
V1.0	28/03/2025	ALI, RIC-DE	
V2.0	04/04/2025	VUB	

Project summary

Within the Green Deal, Europe commits itself to be the first CO_2 neutral continent by 2050. To achieve this, a first milestone is defined as an overall CO_2 reduction of 55% by 2030. For the road transport sector, the target is set at 45% less CO_2 emissions by 2030, following Regulation (EU) 2019/1242. The regulation requires that manufacturers of heavy-duty vehicles (HDV) deliver t vehicles with reduced tailpipe emissions: a reduction of CO_2 emissions, base line 2019, for the newly produced fleet of 15% in 2025, 45% in 2030, 65% emissions reduction by 2035 and 90% emissions reduction by 2040. The use of zero tailpipe emissions vehicles (ZEV) for long distance heavy transport is an important part towards achieving the above targets. Such ZEV are, for example, Battery Electric Vehicles (BEVs) and Fuel Cell Electric Vehicles (FCEVs). Until now, these vehicles have a limited range and a lower payload: this makes it difficult to use them effectively as replacements for vehicles with an internal combustion engine (ICE). In the ZEFES project, OEMs, suppliers, logistics companies and research partners work together towards the overall goal of competitive ZEVs for

long distance heavy transport, by focussing on efficiency improvements, mass production capabilities and demonstrating the use of the technology in daily operations.
This deliverable shows the specifications of the ZEFES use cases and metrics defining operational mission plans for demonstrations of BEV and/or FCEV. Together, the 12 demonstrators, nine BEVs and 3 FCEVs operating at a maximum GCW of up to 64 tons under real operational conditions in 18 use cases, comparable to the VECTO long haul and regional-national mission profiles and meeting the range requirement of 750km unrefuelled or 400km un-recharged over a period of 15 months, covering 1,000,000 kilometres, representing 30,000 hours operational life. The total distance of all use cases combined represents road use of approximately 9,000 km along European corridors.

Publishable summary

ZEV, Battery Electric Vehicles (BEVs) and Fuel Cell Electric Vehicles (FCEVs) have, until now, a limited range and a lower payload, making it difficult to use them effectively as replacements for vehicles with an internal combustion engine (ICE) in long-haul, cross border, logistics fleet operation. To prove new technology concepts (vehicle, charging and HRS) demonstrations under real time conditions are the best way for the end users to gain trust and confidence when readying the ZEV for the market. ZEFES has put a lot of effort in setting-up real-life demonstrations, as described in this deliverable, showing the specifications of the 18 ZEFES use cases and metrics. 12 vehicles (9 BEV and 3 FCEV), 2 MCS concepts at 4 different locations, and 2 HRS concepts at 2 locations will be demonstrated under real life operational conditions comparable to the VECTO long haul and regional-national mission profiles and meeting the requirement of 750km unrefuelled or 400km un-recharged over a period of 15 months, covering 1,000,000 kilometres, representing 30,000 hours operational life. The total distance of all use cases combined represents road use of approximately 9,000km across European corridors.

This deliverable handles the first objective within WP7, “Preparation and coordination of the demonstration of the vehicle innovations and fast charging concepts”. Starting in Q2/2025, the demonstration of vehicles, fast charging concepts and HRS innovations will run over 15 months in real world conditions.

The Figure 1 below shows the structure of the work process, gathering all documents and assignments covering the needs and requirements from the viewpoint of the ZEFES OEMs, ZEFES logistics service providers, and ZEFES shippers and carriers, to execute the 12 demonstrations and 18 use cases across Europe starting Q2/2025 and ending Q4/2026.

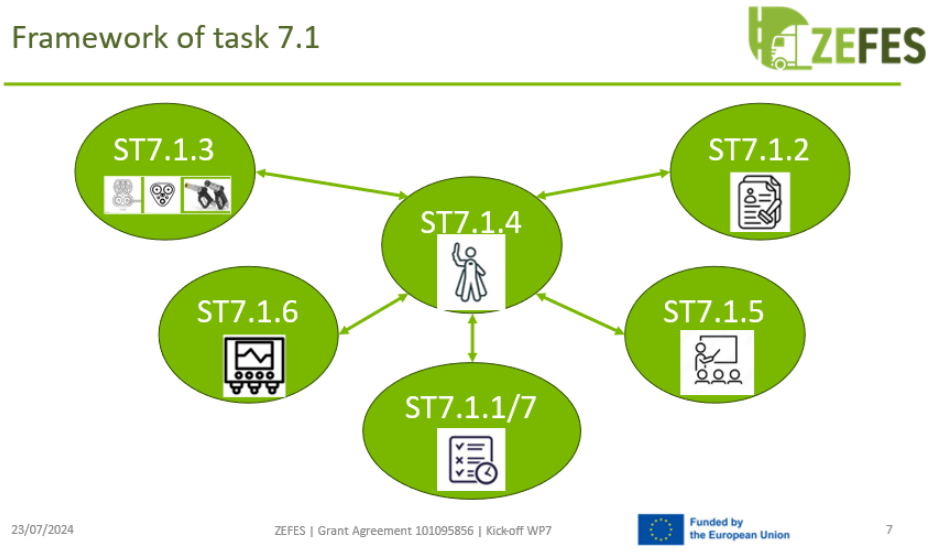


Figure 1 Framework needs & requirements

Seven subtasks are defined, to guarantee a smooth execution of the use cases.

- Detailed plan of the demonstration phase, covering all demonstrators and the missions.
- Preparation and preparatory activities for infrastructure permits and vehicle road allowances.
- Preparation of the charging and fuelling infrastructure and back office.
- Use case set-up, network planning and orchestration.
- Vehicle availability and instructions.
- Installation and testing of data loggers in demonstrator vehicles.
- Coordination of the demonstration of vehicle innovations and fast charging concepts over 15 months in real world conditions.

The conclusions and recommendations, Chapter 4, need the highest attention in the follow-up activities, guiding further preparation, during the demonstration periods and beyond the project end.

One main conclusion is that the demonstrations still contain uncertainties caused by mainly external events / dependencies. For both the energy (hydrogen refuelling and electric charging) infrastructure and road permits, many barriers still hamper every day the implementation of ZE-HDVs. Low awareness, low interest, long lead times, no budgets etc. on the part of the industry and mainly by local and national government have been and are still a huge challenge to bring the vehicles, the chargers and HRS on the road, even when the request is focused on a demonstration to learn and to create awareness and to build-up expertise in scaling the future implementation of ZE-HDVs.

Table 1 Overview remaining barriers

Remaining barriers	
Permits	No acceptance of revised directive on weight and dimensions
See chapter 2.3.1	No harmonised cross border rules
	No clear rules regarding length and weight of vehicle
Energy	No grid connection possible
See chapter 2.3.2	No harmonised strategy between DSOs and CPOs
	Extreme long procedures getting permits
	Availability of technology (e.g., 700bar filling system)

Contents

List of Figures

List of Tables

Abbreviations & Definitions

Table 2 Abbreviations & definitions

Abbreviation	Explanation
HDV	Heavy-Duty Vehicle
ZEV	Zero tailpipe Emission Vehicle
BEV	Battery Electric Vehicle
FCEV	Fuel Cell Electric Vehicle
ICE	Internal Combustion Engine
OEM	Original Equipment Manufacturer
VECTO	Vehicle Energy Consumption Calculation Tool
GCW	Gross Combination Weight
ZE-HDV	Zero tailpipe Emission Heavy Duty Vehicle
WPL	Work Package Leader within the ZEFES project
BE-HDV	Battery Electric Heavy-Duty Vehicle
FCE-HDV	Fuel Cell Electric Heavy-Duty Vehicle
ISO	Interchangeable container as defined in the ISO-Norm 668
SWAP	Interchangeable container accommodating Euro-pallets for road and rail transport
Reefer	Loading unit to transport temperature-controlled cargo
USP	Unique Selling Proposition (uniqueness of ZEFES use cases)
EMS	European Modular System, standardised loading units for intermodal freight transport
T	Tractor unit
R	Rigid unit
ST	Semi-trailer
TR	Trailer
D	Dolly
e-ST	Electric semi-trailer
e-D	Electric dolly
CCS	Combined Charging System
MCS	Megawatt Charging System
HRS	Hydrogen Refuelling Station
vkm	Vehicle kilometres
tkm	Tonne kilometres
DTP	Digital Twin Platform
DT	Digital Twin
CEDR	Organisation of European national road administrations
i.w.w.	Inland Water Ways
CPO	Charge Point Operator
DSO	Distribution System Operator

The Project partner's short names can be found in Chapter 8 – Acknowledgement.

1 Introduction

1.1 Context and progress monitoring

Based on the activities in WP1, a full matrix of use cases, partner´s responsibilities and planning are created. The main input is from D1.2, D1.1 and D1.6, followed by D1.3, D1.4 and D1.5.

Table 3 Overview deliverables as input for D7.1

Del No	**Deliverable Title -** description
D1.1	**Technical requirements** – needs and requirements for BEV and FCEV combinations (T1.1)
D1.2	**Defined Use Cases, Target metrics and needs** - KPIs per use case on energy savings and mission efficiency (T1.2)
D1.3	**ZEFES ecosystem specification** - use case KPI needs, stakeholder business needs, consolidation towards consistent system, TCO (T1.3, 1.4, 1.5)
D1.4	**Supply chain mapping** - mapping of ZEFES use cases at a supply chain level (T1.3)
D1.5	**Supply chain needs –** for reduced energy usage on the missions 1.7
D1.6	**Legal and administrative requirements** - for use cases related legal regulations on national and cross border level for HD ZEV (T1.6)

Out of D1.2 the conclusion was that the use case menu card, D1.2, still has a preliminary status as too many circumstances, caused by internal and external events and/or dependencies.

Internal dependencies (use case related)

- Carriers as contract partners of the shippers operating the demonstrators. To be covered under WP7, subtask 7.1.1
- Development of the e-trailer concept strategy. Decided is a task force led by VET, and partners KAE, SCA, VOL, ZF to follow up a feasible e-trailer strategy, WP5 task 5.3.
- Charging of e-reefers on the rail wagon. The partners CFL and UIC, under supervision of HIT, WP3, need to work out a solution.
- Concept of the ZEFES Digital Twin Platform. DTP must be an open platform to be user-friendly beyond the ZEFES project.
- Agreement of vehicle-data exchange between OEMs and ZEFES partners, e.g., IDI, RIC, PTV. Lead RIC, WP4; to agree with all relevant partners what and how data will be made available.

External dependencies (use case related)

- Market situation 2025 / 2026 with regard the planned logistics real time use cases
- Vehicle Type Approval and Road Permits for the demonstrators.
- Coverage of charging (CCS/MCS) and fueling (HRS) along the ZEFES corridors

These dependencies will occur during the period up to Q2 2025, the start of the real-life demonstrations. Internal dependencies are, for example, that the carriers, as contract partners of the shippers but also the CPOs operating in the demonstrations, are not completely part of the project consortium. Secondly, the development of the e-trailer is delayed making a rescheduling of the demonstrations necessary. Thirdly, the charging of e-reefers on the rail wagon involves external technology providers. Furthermore, the vehicle type approval and road permits for the demonstrators is delayed as the revised directive on weights & dimensions is not yet approved by all EU members states. Due to multi-dimensional complexity of the challenges, the preparation of the ZEFES pilots is delayed and the end date of this deliverable, D7.1, has been moved from December

2024, M24, to March 2025, M27. The detailed plan of all demonstrations will be the guideline for the execution and handed over to WP8, enabling a smooth evaluation and assessment of the demonstration.
A first important step to counter the challenges and to define mitigation activities was a face-to-face meeting, 10th July 2024, during which the baseline for a realistic demonstration plan was discussed. The reporting of the status of all mitigations, grouped along the WP7 Subtasks, was decided by means of a traffic light progress.

Table 4 D1.2 Overview status report use cases Task 7.1

Task 7.1 STx.x.x		Topic	7.2.1	7.2.2	7.2.3	7.2.4	7.3.1	7.3.2	7.3.3	7.3.4	7.4.1	7.4.2	7.6.1	7.6.2	7.6.3
7.1.1		Detailed plan													
7.1.2		Type approval & Permits													
7.1.3		Charging & Fuelling													
7.1.4		Orchestration													
7.1.5		Training & instructions													
7.1.6		Installation data logger													
7.1.7		Coordination execution													

Starting by 10th July 2024, with a traffic light status of red for all sites the present status reached, “green” meaning that all pilot sites are operational feasible and ready for implementation.

In chapter 4, conclusions and recommendations, the actual status, April 2025, is given.

1.2 Use case overview

Deliverable D1.2, "Defined Use Cases, Target metrics and needs" describes the use cases and related metrics on a general level. D 7.1 now is to specify

- Detailed operational plans per pilot, matching vehicle metrics, energy needs and logistics operational needs
- Develop and secure charging and fuelling possibilities along the ZEFES corridors
- Secure availability and orchestration of the ZEFES vehicles across the 15 pilots

Starting demonstration in M29 and running until the end of M47, specific use case documents have been produced and are available on the ZEFES Teams project platform. These specific documents are live documents, constantly updated by the use case owners, being the OEMs, the shippers and the carriers.

An overview of the geographical layout of the ZEFES pilots, as provided by D1.2, is given below.

Use Case			OEM/Shipper	M27	M28	M29	M30	M31	M32	M33	M34	M35	M36	M37	M38	M39	M40	M41	M42
				Mrz 25	Apr 25	Mai 25	Jun 25	Jul 25	Aug 25	Sep 25	Okt 25	Nov 25	Dez 25	Jan 26	Feb 26	Mrz 26	Apr 26	Mai 26	Jun 26
WP7																			
	T7.2			M27											M38				
		ST7.2.1	VOL/OVA																
		ST7.2.2	VOL/VOL																
		ST7.2.3	VOL/P&G/PRI																
		ST7.2.4	VOL/DPD																
	T7.3																		
		ST7.3.1	SCA/SCA			M29					M34								
		ST7.3.2	SCA/GRU																
		ST7.3.3	SCA/PRI									M35							
		ST7.3.4	SCA/GSS							M33					M38				
	T7.4																		
		7.4.1	REN/MIC	M27		M29													
		7.4.2	REN/REN				M30		M32										
		7.4.3	REN/DPD							M33					M38				
	T7.6																		
		7.6.1	FRD/EKO				??		M32		M34								
		7.6.2	FRD/GBW									M35		M37					
		7.6.3	FRD/P&G												M38				

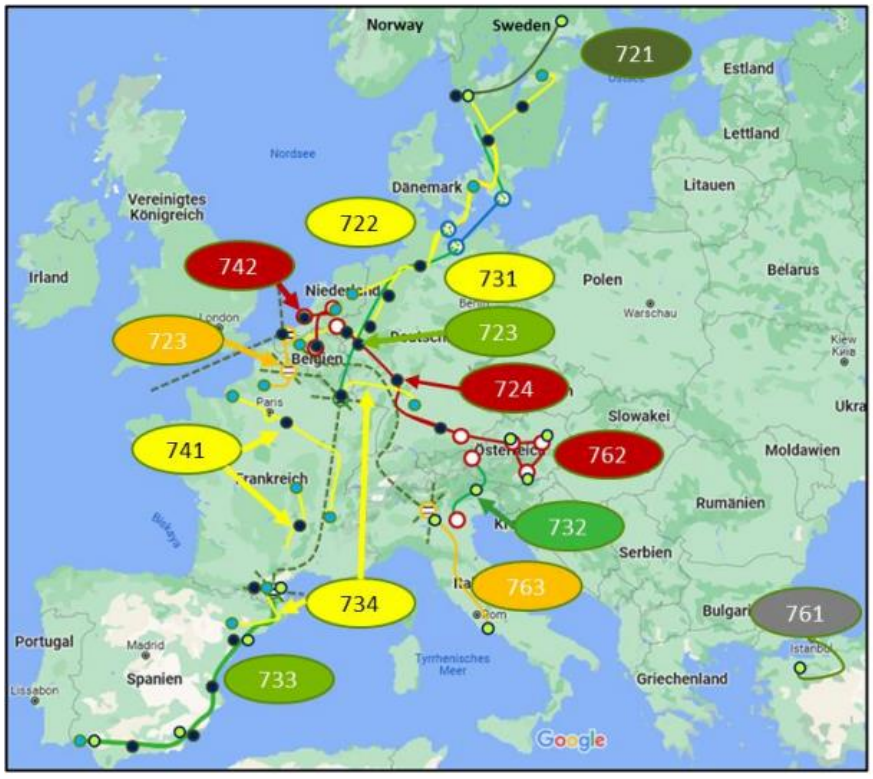


Figure 2 Overview of the use cases, as defined in D1.2

2 The method and process

2.1 Background and challenges

ZEFES pilots aim to demonstrate BEV and FVEV in real life operational missions, replacing ICE diesel propelled trucks. Various legal and energy supply challenges as well as logistics and legal requirements need to be considered and integrated while developing the demonstration plans. Specific challenges are, for example:

- As the shipper cannot guarantee or confirm yet a year ahead of demonstrations the details of the logistics tasks, due to internal purchase process and market dynamics, a fallback scenario is developed to enable a switch-off and on, an adaptation of use cases.
- Engagement with the Energy Infrastructure. Out of the ZEFES project objectives, the ZEFES project will never deliver the required number of MCS and HRS stations as needed along all pilot corridors. Enroute charging locations are in the hands of public investors. In some cases, ZEFES decided to use partners to invest in depot charging. The initiative call to action was necessary, “investment in charging (CCS/MCS) and fuelling (HRS) is needed now, as from 2025 - 2030 over 150,000 ZE-HDVs and over 1,000,000 units by 2040 will be running on European corridors!”. A working group, headed by ALICE, was founded searching for investors along the ZEFES corridors. As getting permits and funds for this kind of investment takes time, this working group got the highest support within the ZEFES project.
- Engagement with road authorities and policy makers. The initiative is undertaken to set-up a ZEFES Corridor Working Group, in close collaboration with CEDR and using the GRVA Geneva Working Group, a group of road and vehicle authorities willing to share their expertise and support in achieving the necessary type approvals and road permits.
- Engagement with digital service providers. A close collaboration with shippers, carriers and digital service providers started to optimize the usability of the digital twin platform beyond the ZEFES project.

2.2 Framework for demonstration preparation

A framework for the demonstration preparation was developed building upon the developments in the ZEFES work packages:

- WP1: Using the pilot design and metrics as a basis
- WP3: Integrating the charging and fuelling concepts and location plannings
- WP4: Making use of the Digital Twin developments and the related tools (Mission planning, and Buying tools)
- WP5 and WP6: Vehicle specification for BEV and FCEV

The input from the work packages was discussed and evaluated. **Technical requirements** for BEV and FCEV combinations, as from D1.1, Technical requirements – needs and requirements for BEV and FCEV combinations, provide a comprehensive overview of the requirements and needs of the vehicles and their powertrains/components. Important was the outcome of the specification of the e- and b-trailers (WP5), leading to a working group on a trailer concept for Europe, investigating market segments on the European market and a feasible e-trailer concept for Europe. As for the ZEFES pilots, it was decided to produce 2 e-tailers and test one (standard) e-Reefer.

The use case design is driven by a long-term BEV and FCEV deployment within the real-life logistical context. To measure the results of the performance of the demonstrators used for the logistics missions, KPIs are defined. KPIs, see Section 2.3.5, reflect the needs and requirements as described. The target-values need to be aligned between OEMs, shippers and research to enable a proper validation and assessment done through (WP8) between X and Y.
Dependencies on several levels need to be addressed:

- Internal dependencies. 1) Carriers as contract partners of the shippers operating the demonstrators, 2) Development of the e-trailer concept strategy, 3) Charging of e-reefers on the rail wagon, 4) Concept of the ZEFES Digital Twin Platform, 5) Agreement of vehicle-data exchange between OEMs and ZEFES partners.
- External dependencies. 1) Market situation 2025 / 2026 with regard the planned logistics real time use cases, 2) Vehicle Type Approval and Road Permits for the demonstrators, 3) Coverage of charging (CCS/MCS) and fuelling (HRS) along the ZEFES corridors.

Towards successful demonstration, several context parameters have been developed and integrated within the ZEFES pilot framework. Fallback scenarios had to be developed to adapt to changing conditions. For securing the energy Infrastructure, an initiative involving additional CPOs and investors along the ZEFES corridors has been established to synchronise planning. To establish a road authorities and policy makers initiative, a ZEFES Corridor Working Group in close collaboration with CEDR and using the GRVA Geneva Working Group was implemented.

One of the main conclusions from the identification of the needs and requirements of all ZE-HDV ecosystem stakeholders are that shippers and transport operators want to be able to define and integrate the capabilities of ZE-HDVs into the logistics missions they will perform. Truck and trailer OEMs want to learn from the truck operators what exactly are the needed ZE-HDV capabilities, so the vehicle battery capacity needed to be adapted during the pilot preparation process. In the same way, operators of the energy infrastructure (CPOs or HRS operators) want to learn what the expected demand profile is to be (location and daily power charged/mass refuelled) and how the profile will change during the day and in the coming years.

Companies developing logistics planning software, want to gather more insights into how routes can be optimized for ZE-HDV and are requesting connected ZE-HDV, so the vehicle parameters, such as location and State of Charge (SOC), are communicated directly to the logistics planning software.

The status of relevant legislation and guidelines for the vehicle approvals and road permits to allow the execution of the different routes was elaborated. With the current regulations, some technologies and vehicle characteristics could be out of scope or could have difficulties in getting type approved. As all vehicles will operate under real-life conditions, an approval is needed in such a way that the demonstrations during the period specified can be executed, allowing cross border, use of ferry and combined transport (rail / road) journeys. The type-approval authorities and road authorities of the 11 different countries are involved to achieve the granting of approval for the demonstrations.

To consolidate all those considerations for the pilot preparation in one view a pilot status and progress overview sheet has been produced, implemented and updated in monthly meetings.

A reporting framework is set up covering all subtasks and activities, see Figure 3 below.

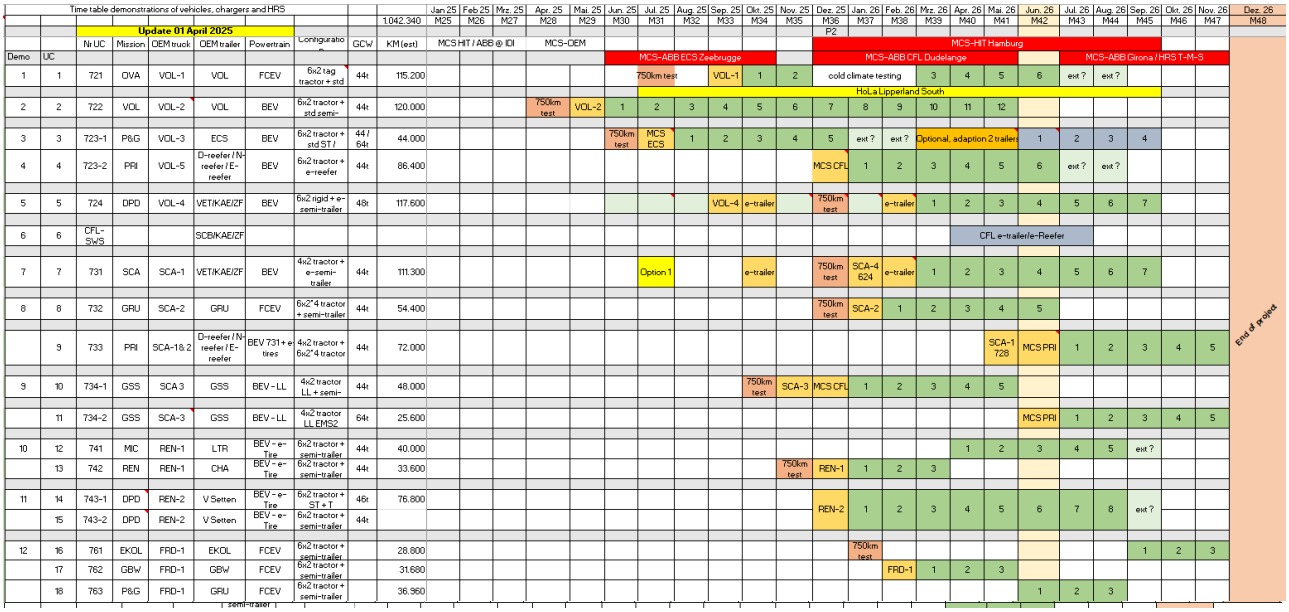


Figure 3 Overview status subtasks and activities

Each pilot case is documented in a live report, available on Teams and accessible by each pilot partner. Follow-up meetings for each use case were set and additional specific face-to-face workshops were organised to discuss the demonstrations at the locations along the corridors, start / end locations, led by PTV, lead orchestration and VUB, lead coordination.
In July 2024, a face- to-face meeting was held to evaluate the status of the outstanding issues, mainly: vehicle preparation and availability, road permits and charging & HRS locations; and to establish a new scenario and action plan executing the demonstrations starting Q2/2025, ending Q4/2026.
A new scenario, 12 demonstrations (vehicles) and 18 use cases (logistics missions), was presented and approved by the consortium at the 3rd GA, hosted by VOLVO Trucks in Gothenburg, Sweden. Consequently, the end date of the project needed to be extended by 6 months, from M42 to M48. An amendment was started straight afterwards ensuring a smooth execution of the demonstrations.

2.3 ZE-HDV preparation for the ZEFES pilots

In this chapter, a summary is given of all subtasks part of the preparations of the demonstrations.

2.3.1 Vehicle permits

The EU bases the weights and dimensions for current vehicles on the Directive (EU) 96/53, which stablishes some limits of lengths and weights of M2, M3, N2, N3, O3 and O4 vehicles and some different vehicle combinations. Further, each member state has its own regulation for the maximum

weights and dimensions allowed in their country, using the previously mentioned directive as a guideline.
In this Directive, the articulated vehicles (combination of T+ST) are limited to a maximum length 16.5m; regarding to the maximum tonnage of the combinations, the directive allows until 40T of GCW for T+ST combinations.

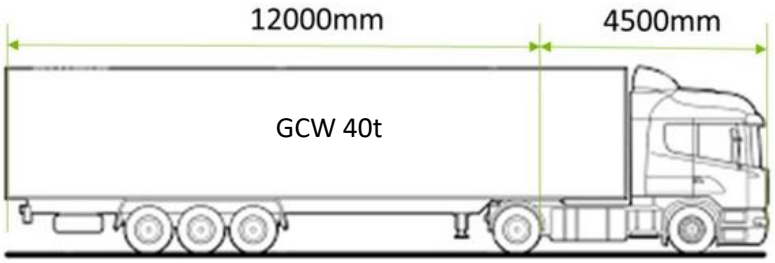


Figure 4 Current length of tractor and semi-trailer

Aero cabs are currently allowed, the current W&D directive allows to exceed the 16.5m maximum length if the truck is equipped with this kind of cabin. The maximum length due to the aero cabs is not explicitly defined in the regulation, but the requirement is to fulfil the turning circle requirements laid down on the same regulation (point 1.5 of Annex I in Directive 96/53). The new W&D[1] directive, allows in its draft version to extend the maximum length on ZEVs by 90cm, max. length: 17,400mm

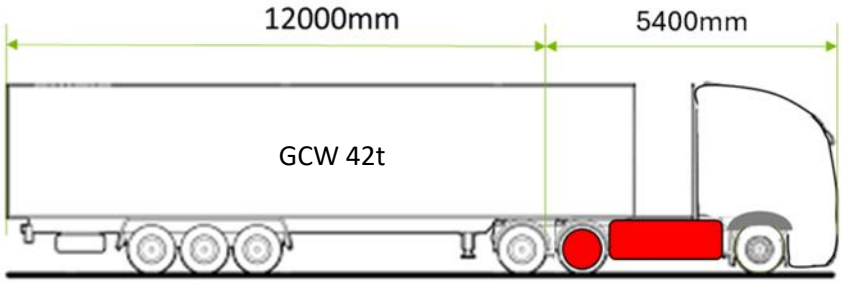


Figure 5 Proposed length for ZE-HDV tractor and semi-trailers

Also, it opens the possibility to increase the GVW by 2 tons for ZEVs, in total up to 44 tons in cases of road transport situations. It is remarkable that there are no provisions for European Modular Systems (EMS) combinations, which will be used in some use cases of this project.
Analysing ZEFES vehicles, the following challenges need to be solved:

- The combinations will have an increase of the total weight due to the Zero Emission powertrain. The objective is to achieve the maximum GCW of 44T for the combinations of T+ST.
- To achieve the needed range, the vehicles could need an increase of its length due to the REESS dimensions (in case of BEVs) or the positions and number of H_2 tanks (in case of FCEVs).

[1] https://oeil.secure.europarl.europa.eu/oeil/en/procedure-file?reference=2023/0265(COD)

- For cross-border operations, only 40T are allowed, even if in the countries involved the maximum GCW is higher (e.g. 44t in France and 42t in Belgium)

The EMS combinations are not included in the Directive (EU) 96/53, its allowance is depending on the national regulations and limited to those operations.
Some of these topics could be covered on the future amendment of the Directive (EU) 96/53, which is under discussion between Parliament and Council. The legislative proposal published on the document COM (2023)0445, under the procedure 2023/0265(COD). The follow-up of the proposal is updated on the Legislative observatory of the European Parliament.
The table below shows the main topics, ZEFES is confronted with.

Table 5 Overview main legal topics

Topic	Today allowed	Proposed rev dir. W&D
Weight GCW for ZE-HDV	40t	42t / 44t e-trailer
Weight drive axle	11,50t	12,50t
Overall length vehicle combination	16,5/18,75m	17,4/19,65m
Length king-pin front truck	4,50m	5,40m
Turning circle	12,50 / 5,30m	12,50 / 5,30m
Overall length EMS1	25,25m*	??
Overall length EMS2	34,5m**	??

* In Belgium, Germany and Netherlands

** In Denmark, Spain and Sweden

Once the Use Cases were defined and the different combinations analysed, exhaustive research of the status of weights and dimensions in each country involved in ZEFES Use Cases was made. The information was obtained in different ways:

- Researching on national regulations.
- Contacting with national road authorities.

Regarding to the first challenge, the 11 countries involved have commonly two different positions regarding to final weight of T+ST combinations: some of them are using the current Directive (EU) 96/53 and some of them are allowing the 44T in total. In general terms, great part should allow the weight conditions of ZEFES conditions, but some countries do not; for those in which do not, a permit is necessary, or this GCW is only allowed in case of intermodal transport.
The second challenge is pending the previously mentioned new Weights and Dimensions Directive (EU). This document includes a possibility of an extra-length allowance in case of Zero-Emission combinations of truck and semitrailer. If the combination was out the limits of the regulation, the vehicle will need a road permit.
The third challenge must be observed per each country individually. A few countries, such as Sweden or recently Denmark and some regions of Spain, allow the use of EMS without the need of a road permit. Some others, as the Netherlands or Germany, allow the use of EMS1 combinations but

always with a road permit for each trip. On the annexes, there is a review of the allowance of EMS on ZEFES involved countries.
The shippers have been informed about the different procedures to demand for road permits, and which are the contacts for each country or region. On the annexes, it is indicated the list of contacts for each use case.

2.3.1.1 CEDR

The CEDR organisation of European national road administrators has set up a working group, headed by RWS NL and Travikverket SE, to support the ZEFES partners in reaching out to national contacts, authorities and strategies how to engage them. This resulted in additional meetings with other working groups at BNL-NRW Group covering at least 5 use cases. The results are the creation of awareness among the authorities and understanding of the challenges having ZE-HDV on European roads. For the ZEFES project limited support is to be expected, however learnings and needed actions will be communicated to them helping to scale beyond the ZEFES project.

In the following paragraphs, an overview is given of the challenges to be solved per country during the ZEFES project.

2.3.1.2 Sweden

Sweden has its own regulations for EMS, allowing both EMS1 and EMS2. There is no need for a road permit while the combinations are below the limits of their regulation. As a general overview, there will be no issues expected with the ZEFES use cases in Sweden. IDIADA has been in contact with Trafikverket (Swedish Transport Administration), to support the use cases and confirm their allowance.

2.3.1.3 Denmark

In Denmark, the combinations T+ST are allowed up to 44T. If the combination is above this tonnage, a road permit will be needed. The most important challenge in Denmark will be the use of EMS2. IDIADA is contact with the Vejdirektoratet (Danish Road Directorate) and the Færdselsstyrelsen (The Swedish Transport Agency) to clarify the status of the EMS legislation in there. The Danish authority is doing the first EMS2 trials in some regions, but the ZEFES route is not on the trial area; if another route is not possible, road permits will be needed for the success of the use cases, and the collaboration of the national road authority will be important. The communication is opened between ZEFES partners and Danish authorities to achieve this objective.

2.3.1.4 Germany

German routes have the main issue in total GCW. German legislation only allows until 40T of GCW for all combinations (44T in case of intermodal transport). Furthermore, the EMS1 combinations are allowed until 25,25m of maximum length, but at 40 t GCW for road and 44 t for intermodal haulage. The most important challenges in German routes will be to achieve the increase of GCW (considering the new Zero Emission powertrains keeping the maximum payload in the truck) and the allowance of EMS2 combinations. SESE is performing a first test in Germany[2]. IDIADA has set up some conversations with BMDV and the BAST; their collaboration will be key to look for solutions to the allowance of the ZEFES routes.

[2] https://gruposese.com/en/sese-carries-out-first-duotrailer-test-in-germany/

The shippers will have to deal with the regional authorities in Germany, which are the institutions in charge of road permits. IDIADA has obtained the contact of the different German regions, described on the Annexes.

2.3.1.5 Benelux countries

The allowance of EMS1 and EMS2 will be most important topics to deal in Benelux region. The Netherlands is allowing some trial road permits for EMS1 up to 60T of GCW, as Belgium is doing too but only in certain routes of Flanders region. At first, contacts were made with the authorities in the Netherlands and Belgium to consider the allowance of EMS2, but it was out of their scope. From ZEFES partners, in collaboration with CEDR, there have been communications with the Benelux authorities to look for the allowances of some trials, not only for a single-day proof.
The allowance of some extra-length and extra-weight due to ZE systems, is another challenge pending to be solved in Belgium and in the Netherlands roads. The authority of Belgium confirmed the future approval of some trials in Belgium, waiting for the approval of the new Weights and Dimensions directive. From the Netherlands authority, the CEDR and the authorities were informed about the characteristics of the use cases.

2.3.1.6 Austria

As in Germany, the shippers will have to deal with the regional authorities in Austria, which are the institutions in charge of road permits. Analysing the use cases, the regional road authorities will have to allow the extra-length and the extra-weight in T+ST combinations with ZE powertrain systems. The conversation was started with some regional authorities, involving ZEFES shippers.
It is important to remark the possibility of cabotage in FRD Use case; the shipper should take it into account to not incur in high penalty fees.

2.3.1.7 France

In French region, the entrance into force of the new Weights and Dimensions regulation will be key to the development of ZEFES routes. A first contact was made with the French authority (Direction des Mobilités Routières; Direction Générale des Infrastructures, des Transports et des Mobilités) but it was accepted to study the use cases only when the revision of Directive (UE) 96/53 is closed.
Furthermore, the most important challenge in French routes will be the allowance of EMS2 by the authorities. ZEFES partners, in collaboration with CEDR and DG MOVE, are trying to involve French authorities in conversations for the allowance of EMS2.

2.3.1.8 Italy

The collaboration between ZEFES partners and their operators has been useful to confirm the allowances for the extra-length needed for the Italian routes. With the current regulations the application is needed for a road permit for the use cases conditions, and the operators and shippers involved have been requested to confirm their allowance.
Furthermore, it has been confirmed by the road operator of the Brenner Pass, that FCEV are allowed in the A22 tunnels.
Also, as in Austrian use cases, it is important to remark the possibility of cabotage in FRD Use Case; the shipper should take it into account to not incur in high penalty fees.

2.3.1.9 Spain

It has been confirmed with the General Traffic Directorate (DGT) in Spain that permits will be managed by the shipper to be allowed the development of some ZEFES routes. The extra-length and

the extra-weight due to the ZE powertrains will implicate the granting of those road permits by the Spanish road authorities, DGT and Servei Català de Trànsit (for Catalan region routes). Regarding the EMS2, it has been confirmed that a road permit will be needed by the Catalan region authority, following the national regulation.

2.3.1.10 Turkey

For the allowance of the ZEFES combination in Turkey, contact with the Turkish Ministry of Transport and Infrastructure (General Directorate of Transport Services Regulation) was established. The combination expected to be used will need a permit due to the extra-length and the extra-weight caused by ZE powertrain. The ZEFES partner involved in the use case and the shipper are in conversations with the Turkish authority to grant the allowance of the road permits.

Also, as in Austrian and Italian use cases, it is important to remark the possibility of cabotage in the FORD demonstration; the shipper should take it into account to not incur in high penalty fees.

2.3.2 Energy infrastructure

In this task, the necessary infrastructure for the ZEFES use cases is searched for and mapped. The selection is based on the capabilities of the truck and infrastructure, the drive and rest time schedules, and the logistic missions. The method and results of the search for infrastructure will be explained in detail in the deliverable of Task 3.5, Mapping and securing the charging and HRS for the use cases and their interaction with TEN-T corridors, led by ALICE. Task 3.5 will lead to two deliverables, one on charging infrastructure mapping by the VUB and one on HRS mapping led by ALICE, in M35.

In addition, to the mapping of existing infrastructure, locations for the projects MCS were searched for. Several external partners (CPOs, DSO, ESPORG secured parking operators, HRS operators etc.) were contacted and engaged in technical discussions. Spain, especially, showed a need for many interventions as from government side no actions were undertaken yet enabling investing in energy infrastructure for long-haul ZE-HDVs.

At the submission of the deliverable, not all the needed infrastructure was secured. Nevertheless, mitigation strategies are drafted, to assure that all use cases will be feasible.

Actions done:

- Set-up working group for charging and fuelling
- Set-up search of HRS operators and CPOs and contacts with relevant ZEFES partners
- Follow-up by technical and organizational meetings to realize installation and commissioning

2.3.3 Orchestration

The orchestration of all demonstrations turned out to be a complex and long iterative process, as with 12 demonstrators, 18 use cases must be managed and organised. With 3 demonstrations, two or more routings are defined, bringing the total number of use cases up to 17. This also shows the complexity of logistics and by that the use of ZE-HDVs in the daily freight transport in a combination of regional/national and national/cross border and multimodal settings.

Actions done:

- Set-up of the template collecting detailed information regarding the demonstrations and logistics missions

- Simulations of the demonstrations defining the needs to realize execution, weight of cargo, routing, charging and/or fuelling, time to destination, comparison ICE-Diesel
- Follow-up by meetings to detail and finalize the demonstration scenarios
- Confirmation of vehicle and equipment availability and agreements between OEM (truck / trailer) and operator (LSP, shipper or carrier) with respect to terms and conditions

The template is shown in the figure below.

Use Case Number	
Use case name	
Partners involved and roles	
Vehicle specification	
Trailer specification	

Permissions	

Charging a/o HRS involved	

Simulation	
Logistics mission	
Demo plan	
Stakeholders - governments - bodies	

Figure 6 Template Use Case

2.3.4 Vehicle availability and instructions

The months refer to the availability of vehicles, see figure 7 below, for the demonstration in the specific use cases, see figure 3 chapter 2.2 and figure 9 chapter 3.1. The technical vehicle availability is managed within WP5 BEV and WP6 FCEV, depending on commissioning, type-approval and road permits.

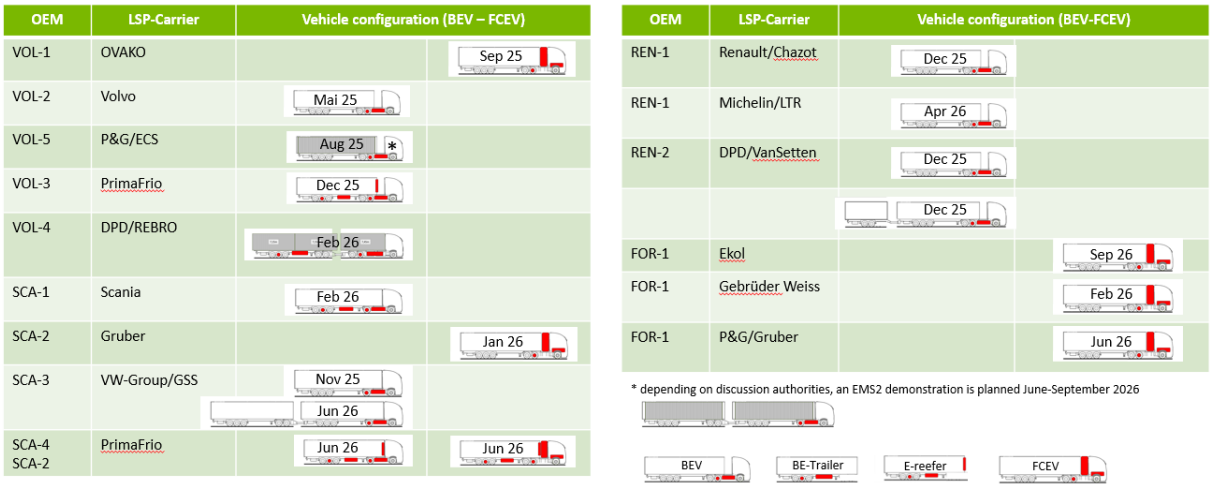


Figure 7 Availability of vehicles

This is all reported in the deliverables D5.6, “Realization and commissioning of all BEV demonstrators” and deliverable D6.3, “Commissioning of all FCEV demonstrators”.
The tables below, 2.3.4.1 – 2.3.4.5, summarize the current situation of vehicle availability and preparations for handover of the vehicles to the carriers.
The table is based on the input from IRU.
IRU, representing the users of commercial heavy-duty vehicles in commercial road transport will make sure that all the documentation necessary to facilitate the transport assignments will be handed over to the users and drivers. This will include:

- Document the process of the delivery of vehicles and preparation of truck demonstrations to be defined (with OEMs and operators),
- Documentation of the use case relevant information,
- Drivers’ training and instructions: OEMs driver training material (planned only for VOLVO – material expected by all OEMs and CPOs charging/fueling station description – limitations of the charging station, contact details etc.) focusing on efficient driving and the specificities of BEVs,
- Clear expectations to be defined and communicated for the evaluation of the pilots (surveys, explanation of the data requirements, feedback on the use of the truck etc).

2.3.4.1 Volvo

Use Case / vehicle	UC7.2.1/ VOL-1 FCEV 6x2 tractor
Vehicle status (March 2025)	Truck assembly in progress
Activities before handover to use cases	Build vehicle Install logger Registration of vehicle Test drive of vehicle
Handover to use cases	Handover September 2025 Discussion on-going to drive in one period instead of two, with start in Q1 2026.
Training & instructions	Volvo will train the drivers.
Agreement between OEMs & operators	As soon as the mission is set with the partners and operators, related contracts and agreement will be put in place.

Use Case / vehicle	UC7.2.2/ VOL-2 BEV 6x2 tractor
Vehicle status (March 2025)	Truck build in progress.
Activities before handover to use cases	Build vehicle Install logger Registration of vehicle Test drive of vehicle
Handover to use cases	June 2025
Training & instructions	Volvo will train the drivers.
Agreement between OEMs & operators	As soon as the mission is set with the partners and operators, related contracts and agreement will be put in place.

Use Case / vehicle	UC7.2.3-1/ VOL-2 BEV 6x2 tractor
Vehicle status (March 2025)	Vehicle build in progress
Activities before handover to use cases	Build vehicle Install logger Transport to BEL. Registration of vehicle Test drive of vehicle
Handover to use cases	Handover September 2025
Training & instructions	Volvo will train the drivers.
Agreement between OEMs & operators	As soon as the mission is set with the partners and operators, related contracts and agreement will be put in place.

Use Case / vehicle	UC7.2.3-2/ VOL-2 BEV 6x2 tractor
Vehicle status (March 2025)	Build in progress.

	Discussion to use another vehicle than for UC723-1, to save time with registration.
Activities before handover to use cases	Build vehicle Install logger Transport of vehicle Registration of vehicle Test drive of vehicle
Handover to use cases	Handover January 2026
Training & instructions	Volvo will train the drivers
Agreement between OEMs & operators	As soon as the mission is set with the partners and operators, related contracts and agreement will be put in place.

Use Case / vehicle	UC7.2.4/ VOL-3 BEV 6x2 rigid
Vehicle status (March 2025)	To be ordered when the vehicle specification is settled, latest in May 2026.
Activities before handover to use cases	Build vehicle Install logger Transport of vehicle Registration of vehicle Test drive of vehicle
Handover to use cases	March 2026
Training & instructions	Volvo will train the drivers
Agreement between OEMs & operators	As soon as the mission is set with the partners and operators, related contracts and agreement will be put in place.

2.3.4.2 Scania:

Use Case / vehicle	UC7.3.1 / SCA-1 BEV 4x2 tractor
Vehicle status (March 2025)	• Specification finished • Build slot secured
Activities before handover to use cases	• Build vehicle • Update to MCS charger • Stripping • Install logger • Register vehicle • Test run
Handover to use cases	Handover December 2025
Training & instructions	• No driver training needed; BEV already used • one test run with driver and vehicle responsible, done first week after handover
Agreement between OEMs & operators	• Discussion initiated regarding vehicle agreement • Scania workshops will handle vehicles in a regular way • Problems with MCS will be handled by Scania experts

Use Case / vehicle	UC7.3.2 / SCA-2 FCEV 6x2*4 tractor

Vehicle status (March 2025)	• Specification finished • Build slot secured
Activities before handover to use cases	• Build vehicle • Stripping • Install logger • Register vehicle in Spain • Test run
Handover to use cases	Handover January 2026
Training & instructions	• Drivers´ training needed • One test run with driver and vehicle responsible, done first week after handover
Agreement between OEMs & operators	• Discussion initiated regarding vehicle agreement • Scania workshops to be identified

Use Case / vehicle	UC7.3.3 / SCA-4 BEV 4x2 tractor & SCA-2 FCEV 6x2*4 tractor
Vehicle status (March 2025)	• FC vehicle reused from UC7.3.2 • Specification finished • Build slot secured
Activities before handover to use cases	• Build vehicle • Update to MCS charger • Stripping • Install logger • Register vehicle • Test run
Handover to use cases	Handover July 2026
Training & instructions	• Drivers´ training needed • One test run with driver and vehicle responsible, done first week after handover
Agreement between OEMs & operators	• Discussion initiated regarding vehicle agreement • Scania workshops will handle vehicles in a regular way • Problems with MCS will be handled by Scania experts

Use Case / vehicle	UC7.3.4 / SCA-3 BEV 4x2 Low Liner tractor
Vehicle status (March 2025)	• Specification finished • Build slot secured
Activities before handover to use cases	• Build vehicle • Update to MCS charger • Stripping • Install logger • Register vehicle • Test run
Handover to use cases	Handover November 2025
Training & instructions	• Drivers´ training needed • One test run with driver and vehicle responsible, done first week after handover
Agreement between OEMs & operators	• Discussion initiated regarding vehicle agreement • Scania workshops will handle vehicles in a regular way • Problems with MCS will be handled by Scania experts

2.3.4.3 Renault

Use Case / vehicle	UC7.4.1/ REN-1 BEV 6x2 tractor
Vehicle status (March 2025)	• Truck development in progress • Proto parts part procurement in progress • Truck assembly in Q2/2025.
Activities before handover to use cases	• Complete truck test • Certification and validation – H2/2025 UC 7.4.1 will be operated after 7.4.3 (same truck)
Handover to use cases	This demonstration will start in Q2/2026.
Training & instructions	Meeting with transport companies to detail operation and plan training are in progress (there is a usual way of working for field tests with RENAULT TRUCKS).
Agreement between OEMs & operators	As soon as the mission is set with the various partners and operators, related contracts and agreement will be put in place.

Use Case / vehicle	UC7.4.2/ REN-1 BEV 6x2 tractor
Vehicle status (March 2025)	• Truck development in progress • Truck assembly planned in December 2025
Activities before handover to use cases	• Complete truck test • certification and validation – H2/2025
Handover to use cases	The 1st demonstration will start in Q2/2026.
Training & instructions	Meeting with transport companies to detail operation and plan training are in progress (there is a usual way of working for field tests with RENAULT TRUCKS).
Agreement between OEMs & operators	As soon as the mission is set with the various partners and operators, related contracts and agreement will be put in place.

Use Case / vehicle	UC7.4.3/ REN-2 BEV 6x2 tractor
Vehicle status (March 2025)	• Truck development in progress • Proto parts part procurement
Activities before handover to use cases	• Complete truck test • certification and validation – H2/2025
Handover to use cases	The 1st demonstration will start in January 2026.
Training & instructions	Meeting with transport companies to detail operation and plan training are in progress (there is a usual way of working for field tests with RENAULT TRUCKS).
Agreement between OEMs & operators	As soon as the mission is set with the various partners and operators, related contracts and agreement will be put in place.

2.3.4.4 Ford

Use Case / vehicle	UC7.6.1 / FOR-1 FCEV 6x2 tractor
Vehicle status (March 2025)	Build is completed. Vehicle is under power train commissioning works.
Activities before handover to use cases	Functional tests, homologation tests, mini durability test and type approval.
Handover to use cases	Vehicle will be available by February 2026 for use cases. And will be directed according to project use case timing.
Training & instructions	Training & instructions will be planned - **tbc**
Agreement between OEMs & operators	An agreement will be signed between Ford and operators – **under study.** We will deal with potential technical problems or failures during use case except operator sourced failure, periodic maintenance and accidents. Operator will be responsible with servicing, insurance and local registration/plate etc. We will prepare detailed instructions after the vehicle is fully operational.

Use Case / vehicle	UC7.6.2 / FOR-1 FCEV 6x2 tractor
Vehicle status (March 2025)	Build is completed. Vehicle is under powertrain commissioning works.
Activities before handover to use cases	Functional tests, homologation tests, mini durability test and type approval.
Handover to use cases	Vehicle will be available by February 2026 for use cases. And will be directed according to project use case timing.
Training & instructions	Training & instructions will be planned - **tbc**
Agreement between OEMs & operators	An agreement will be signed between Ford and operators – **under study.** We will deal with potential technical problems or failures during use case except operator sourced failure, periodic maintenance and accidents. Operator will be responsible with servicing, insurance, and local registration/plate etc. We will prepare detailed instructions after the vehicle is fully operational.

Use Case / vehicle	UC7.6.3 / FOR-1 FCEV 6x2 tractor
Vehicle status (March 2025)	Build is completed. Vehicle is under power train commissioning works.
Activities before handover to use cases	Functional tests, homologation tests, mini durability test and type approval.
Handover to use cases	Vehicle will be available by February 2026 for use cases. And will be directed according to project use case timing.
Training & instructions	Training & instructions will be planned - **tbc**
Agreement between OEMs & operators	An agreement will be signed between Ford and operators – **under study.**

	We will deal with potential technical problems or failures during use case except operator sourced failure, periodic maintenance and accidents. Operator will be responsible with servicing, insurance and local registration/plate etc. We will prepare detailed instructions after the vehicle is fully operational.

2.3.4.5 Kaessbohrer / ZF

Use Case	**UC724 [VOL/DPD]** **e-trailer (Kaessbohrer container chassis + ZF Trailrax)**
Vehicle status (March 2025)	The trailer from Kaessbohrer is available at ZF Hannover. eBox case by Kaessbohrer arrived at ZF Alsdorf. The installation of the TrailTrax electrical system to the eBox is in progress. The subsequent step “mounting eBox and eAxle to trailer” is prepared to start in April at ZF Hannover.
Activities before handover to use cases	# Apr. 25-May 25: mounting of ZF TrailTrax system to trailer at ZF / commissioning / integration testing by ZF # Jun. 25-Jan. 26: Functional optimization and testing / mileage accumulation / ZEFES operational validation by ZF (charging at locations, running eTrailer on segments of the use-case mission with towing vehicle like VOLVO rigid 6x2) # Aug. 25-Nov.2 5: Homologation activities with IDIADA (detailed preparation, tests, reports, certificates, documentation) / application for vehicle road approval via Spanish authorities by Kaessbohrer # Feb. 26: Finalizing e-trailer for hand over (ZF final functional release of TrailTrax system for ZEFES / receiving licensing approval of e-trailer by Spanish authorities / Handover of e-trailer to VOLVO).
Handover to use cases	Mar. 26: after testing the e-trailer at VOLVO, it is handed over for operation in use-case mission.
Training & instructions	Preferably in timeframe Nov. 25-Jan. 26 the drivers of the vehicle are instructed to operate the e-trailer with TrailTrax system safely and efficiently. Also, the necessary information on how to deal with (unlikely) technical problems will be given. In parallel employees from selected service workshops will be informed how to handle the e-trailer, what actions are allowed and how to contact ZF expert team for support.
Agreement between OEMs & operators	The drivers will have the necessary information on hand, how to deal with potential technical problems and how to reach the next service workshop in case of breakdown during the use case. Workshops are available by the complementing service networks of Kaessbohrer (https://kaessbohrer.com/en/find-us?type=2) and ZF, potentially supplemented by VOLVO service

	locations. Before the use-case operation starts, selected workshops get the necessary tools for basic diagnosis of the TrailTrax system. The workshop is instructed, how to handle the e-trailer, what actions are allowed and how to trigger support from ZF expert team. ZF TrailTrax service/development experts are available via telephone and online for clarification and support on how to handle the problem. For technical problems regarding TrailTrax above the direct capabilities of the workshop service location, ZF service/development experts can be available rapidly for practical support at location. Kässbohrer takes care to prepare a vehicle agreement with use case operator, which will be active when the use case starts.

Use Case	**UC731 [SCA/SCA]** **e-trailer (Kaessbohrer curtainsider + ZF Trailrax)**
Vehicle status (March 2025)	The trailer from Kaessbohrer is available at ZF Hannover. eBox case by Kaessbohrer will arrive at ZF Alsdorf soon. The installation of the TrailTrax electrical system to the eBox is prepared to start in April. The subsequent step “mounting of eBox and of eAxle to trailer” is prepared to start at ZF Hannover directly after shipment of the eBox.
Activities before handover to use cases	# Apr. 25-May 25: mounting of ZF TrailTrax system to trailer at ZF / commissioning / integration testing by ZF # Jun. 25-Jan. 26: Functional optimization and testing / mileage accumulation / ZEFES operational validation by ZF (charging at locations, running eTrailer on segments of the use-case mission with towing vehicle like SCANIA tractor 4x2) # Aug. 25-Nov. 25: Homologation activities with IDIADA (detailed preparation, tests, reports, certificates, documentation) / application for vehicle road approval via Spanish authorities by Kaessbohrer # Feb. 26: Finalizing e-trailer for hand over (ZF final functional release of TrailTrax system for ZEFES / receiving licensing approval of e-trailer by Spanish authorities / Handover of e-trailer to SCANIA).
Handover to use cases	Mar. 26: after testing the e-trailer at SCANIA, it is handed over for operation in use-case mission.
Training & instructions	Preferably in timeframe Nov. 25-Jan. 26 the drivers of the vehicle are instructed to operate the e-trailer with TrailTrax system safely and efficiently. Also, the necessary information on how to deal with (unlikely) technical problems will be given.

	In parallel, selected service workshops will be informed how to handle the e-trailer, what actions are allowed and how to contact ZF expert team for support.
Agreement between OEMs & operators	The drivers will have the necessary information on hand, how to deal with potential technical problems and how to reach the next service workshop in case of breakdown during the use case. Workshops are available by the complementing service networks of Kaessbohrer (https://kaessbohrer.com/en/find-us?type=2) and ZF, potentially supplemented by SCANIA service locations. Before the use-case operation starts, selected workshops get the necessary tools for basic diagnosis of the TrailTrax system. The workshop is instructed, how to handle the e-trailer, what actions are allowed and how to trigger support from ZF expert team. ZF TrailTrax service/development experts are available via telephone and online for clarification and support on how to handle the problem. For technical problems regarding TrailTrax above the direct capabilities of the workshop service location, ZF service/development experts can be available rapidly for practical support at location. Kässbohrer takes care to prepare a vehicle agreement with use case operator, which will be active when the use case starts.

2.3.5 Data logging and KPIs

In D8.1, “Assessment framework”, a detailed overview is reported how to collect data and validate and assess the demonstration within the use cases.

Here we limit to the overview of the setup of KPIs, Figure 8, the definition of the KPIs, Figure 9, and the KPIs per use case, Figure 10.

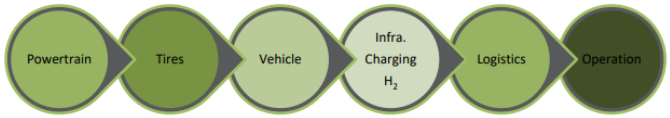


Figure 8 Overview set up KPIs, D8.1

No.	KPI Id.	KPI category	KPI short name	KPI source
1	KPI_P1	Powertrain	Energy consumption	D1.1, D1.2; 2Zero
2	KPI_P2	Powertrain	Energy intensity	D1.1, D1.2; 2Zero
3	KPI_P3	Powertrain	Average speed	D1.1
4	KPI_P4	Powertrain	Emissions WTW or CO_2 emissions	D1.4 [5]
5	KPI_T1	Tyre	Tyre wear	D1.1; D1.2
6	KPI_T2	Tyre	Tread depth loss	Michelin
7	KPI_V1	Vehicle	Range	D1.2, D1.4
8	KPI_V2	Vehicle	Charging during break	D1.2 D1.4
9	KPI_V3	Vehicle	Payload	D1.2 D1.4
10	KPI_C1	Infrastructure	Charging efficiency	Verification Criteria
11	KPI_C2	Infrastructure	Charging duration	D1.5; 2Zero
12	KPI_C3	Infrastructure	Charger Average power	D1.5; 2Zero
13	KPI_C4	Infrastructure	Charger Maximum power	D1.5; 2Zero
14	KPI_C5	Infrastructure	SoC at arrival	D1.5
15	KPI_C6	Infrastructure	SoC at departure	D1.4, D1.5
16	KPI_C7	Infrastructure	Charge energy	D1.5
17	KPI_C8	Infrastructure	Charge energy cost	D1.5
18	KPI_C9	Infrastructure	Moveable charger commissioning/disassembly time (Moveable ABB charger only)	ABB
19	KPI_H1	Infrastructure	Hydrogen refuelling speed	D1.5
20	KPI_H2	Infrastructure	Amount of refuelled H_2	D1.5
21	KPI_H3	Infrastructure	Amount of H_2 at arrival	D1.4, D1.5
22	KPI_H4	Infrastructure	Amount of H_2 at departure	D1.5
23	KPI_H5	Infrastructure	H_2 cost	D1.5
24	KPI_L1	Logistics	Duration of trip	D1.2, D1.4
25	KPI_L2	Logistics	Duration (un-)loading	D1.2
26	KPI_L3	Logistics	Delivered quantity during trip	D1.2
27	KPI_L4	Logistics	Delivery cost of trip	D1.2, D1.4
28	KPI_L5	Logistics	Number and Duration of stops and stop type (…)	D1.2
29	KPI_O1	Operator	Driver satisfaction - Driver acceptance of new drivetrains	D1.5
30	KPI_O2	Operator	Fleet manager satisfaction	D1.5

Figure 9 Overview definition KPIs, D8.1

KPIs		P1 – P4	T1 – T2	V1 – V2	V3	C1-C8	C9	H1-H5	L1 – L15	O1 – O2
		Powertrain	Tire	Vehicle		Charging		Hydrogen	Logistics	Operator
Use case number	Techn.									
721	FCEV	Y			Y			Y	Y	Y
722	BEV	Y		Y	Y	Y			Y	Y
723-1	BEV	Y		Y	Y	Y	Y		Y	Y
723-2	BEV	Y		Y	Y	Y	Y		Y	Y
724	BEV	Y		Y	Y	Y	Y		Y	Y
731	BEV	Y		Y	Y	Y			Y	Y
732	FCEV	Y			Y			Y	Y	Y
733	BEV/FCEV	Y	Y	Y	Y	Y	Y	Y	Y	Y
734-1	BEV	Y		Y	Y	Y			Y	Y
734-2	BEV	Y		Y	Y	Y			Y	Y
741	BEV	Y	Y	Y	Y	Y			Y	Y
742	BEV	Y	Y	Y	Y	Y			Y	Y
743	BEV	Y	Y	Y	Y	Y			Y	Y
761	FCEV	Y			Y			Y	Y	Y
762	FCEV	Y			Y			Y	Y	Y
763	FCEV	Y			Y			Y	Y	Y

Figure 8 Overview Verification Criterion per use case

The collection of data during the vehicle operation is by using data loggers, from the project partner FHG, installed in each demonstrator. This to ensure data is of the same quality and format, the

handling of the data is prescribed in deliverables D4.1, “Digital twin specification and architecture” and D4.2, “Infrastructure model/dataset (V2I Concept)”.

2.3.6 Coordination demonstrations

Task 717, “Coordination of the demonstration of vehicle innovations and fast charging concepts over 15 months in real world conditions”. A team of people who to contact will be established ensuring back up when under Task 7.2-7.6 “Demonstrations” unexpected events raise and support or interventions are needed. An important element for the management and coordination of the demonstrations is the agreement between the OEM, supplier of the demonstrator and the carrier, the user of the demonstrator within the use case. **Terms and conditions** need to be agreed and documented (In separate documents filed, as it contains sensitive information) as summarised in Section 2.3.4.

VUB will act as coordinator during the 15 months demonstration. VUB is only able to act as intermediate when unexpected events occur. The use case owner, LSP/ Shipper/ Carrier, and the OEM/suppliers are responsible for the follow-up of these unexpected events.

3 ZEFES uses case demonstrations specification and set up

3.1 Demonstrations framework and time planning

As mentioned earlier, the F2F meeting, on 10th July 2024, led to a revised framework of the demonstrations. The end date of the demonstrations will be November 2026, the end date of the project December 2026. The main barriers were the availability of the MCS-HIT charger at the location Hamburg, the availability of the e-trailer, the availability of the FOR demonstrator, the development of charger and HRS location in Spain. The final planning of all demonstrations of vehicles and charging and HRS concepts is shown in Figure 9, below.

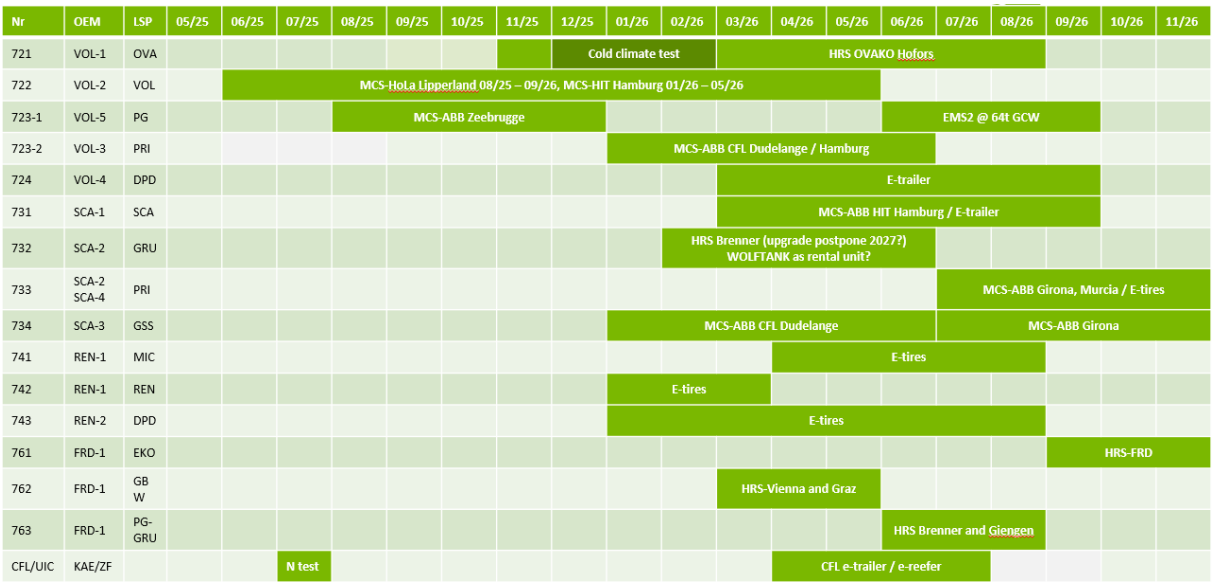


Figure 99 Overview planning ZEFES demonstrations

The logic of the sequence of the demonstrations is as follows.
The availability of the **MCS-HIT Hamburg** December 2025 led to planning of the demonstrations 723-1 with MCS-ABB in Zeebrugge July 2025 and 723-2 with MCS-ABB in Dudelange December 2026m followed by 733 with MCS-ABB in Girona June 2026.
The availability of the **e-trailer KAE/ZF** January 2026 led to planning of the demonstrations 724 and 731 February/March 2026 forcing partner SCA to re-allocate demonstrators. In addition, the use case "charging on rail by CFL/SWS" needed to reschedule to the period April-July 2026.
The availability of the **FRD demonstrator** forced the rescheduling of the use cases 761, 762 and 763. The last, use case 761, is at the end of the project and data will not be incorporated in the end validation of the project end-report.
The non-availability of **permits for EMS2** vehicle configurations has led to limiting the use case 722 to only demonstrating the std configuration tractor semi-trailer. Discussions are still ongoing safeguarding the use case 723-1 including the EMS2 vehicle configuration between P&G Amiens plant and Delta3 terminal at Dourges.
The development of the e-trailer and the recently introduced e-reefers and reefers with liquid nitrogen cooling systems has led to the separate test of these semi-trailers **"charging on rail"**, firstly a physical test followed by daily operations in the months April – July 2026.

3.2 Demonstrations, corridors and use cases

In Chapter 2.2, the justification of the use case is analysed. This was used to check and verify the use cases against the objectives and requirements of the ZEFES project.
For the demonstrations and use cases, objectives 2 and 4 are relevant. Each objective is also covering a verification criteria VC as defined in the call text for this project.
Objective 2, *demonstrate an interoperable Megawatt Charging System (MCS) and the location deployment strategy for hydrogen refuelling stations (HRS) to accommodate and make ZE HD transport possible along several corridors*.
VC 11: OEM agreed and demonstrated hardware and the communication interface for charging of prime movers and e-trailers.
VC 12: demonstrated overall charge efficiency of at least 80%, to add 400km range within 45 minutes, thanks to the fast-charging concept.
VC 13: digital tools for charging/refuelling strategies, based on the existing charging/hydrogen infrastructure, optimising the time spent on charging/refuelling and the energy costs.
VC 14: strategies show the cost-effective use of BEVs and FCEVs by logistic service providers, figure 12.

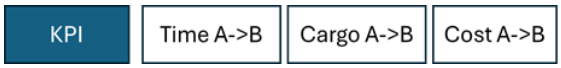


Figure 10 10 KPI logistics missions

VC 15: available charging/refuelling stations on the corridors for the demonstrations in ZEFES.

Objective 4, *demonstrate missions on cross-border, TEN-T corridors, fulfilling the requirements for range and payload, and comparing the deploy ability of BEVs and FCEVs for different mission profiles*.
VC 19: 9 vehicle combinations from 4 OEMs demonstrated for 6 months in real logistic missions.
A guide was the overview of verification criterion describing the project requirements and coverage by all demonstrations, shown in the table below.

Table 6 Overview VC of each use case

Verification criterion		VC11	VC12	VC13	VC14	VC15	VC19	
		e-trailer	400km/45min	DT	BEV/FCEV	corridors	missions	cargo
Use case number	Techn.			Time / Energy cost	Time/Cargo /Cost			
721	FCEV					SE	LH P&D	Heavy steel
722	BEV		Hamburg Lipperland			SE-DK-DE-NL-BE	Reg / LH P&D	Automotive
723-1	BEV		Zeebrugge			FR-BE	LH P&D	Containers
723-2	BEV		Dudelange, Hamburg			LU-DE-SE	LH P&D	Fresh fruits
724	BEV	e-trailer				NL-DE	LH P&D	Parcels
CFL-SWS		e-trailer				LU-FR	Intermodal	Fresh fruits
731	BEV	e-trailer	Hamburg			SE-DK-DE-NL	LH P&D	Automotive
732	FCEV					IT-AT	Regional / LH P&D	General
733	BEV/FCEV		Gerona, Murcia		BEV/FCEV	SP-FR	Regional / LH P&D	Fresh fruits
734-1	LL-BEV		Dudelange			DE-LU	LH P&D	Automotive
734-2	LL-BEV		Gerona			FR-SP	LH P&D	Automotive
741	BEV			e-tire		FR	LH P&D	Tires
742	BEV			e-tire		FR	LH P&D	Cabs
743	BEV					NL-BE	Grid scheme	Parcels
761	FCEV					TR	LH P&D	Automotive
762	FCEV					AT	A2B / LH P&D	General
763	FCEV					IT	LH P6D	Containers

3.2.1 TEN-T corridors and use cases

The ZEFES project is covering major freight transport corridors in Europe as the Figure 13 shows

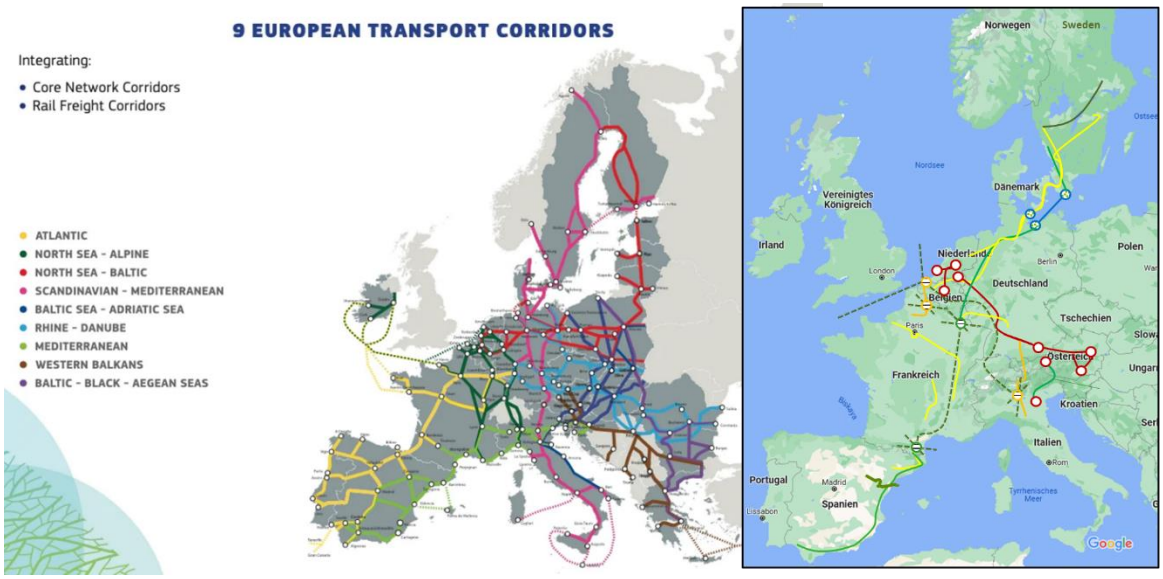


Figure 11 11 ZEFES coverage TEN-T corridors

The ZEFES use case are running on the

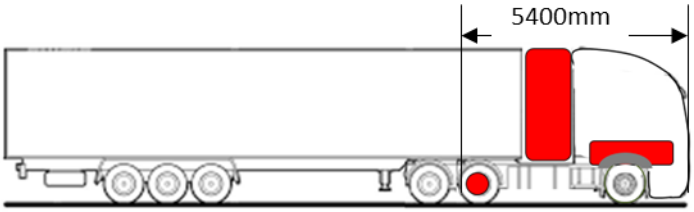
Atlantic,	Blainville – Bourg en Bress	use case 742
North Sea – Alpine,	Oirschot – Frankfurt being	use case 724,
	Lyon – Dudelange	use case 723-2/733/734
	Amiens – Zeebrugge	use case 723-1
Rhine – Danube,	Frankfurt-Aichach	use case 724
	München-Crailsheim	use case 763
	Heilbronn – Dudelange	use case 734
Mediterranean,	Lepe-Lyon	use case 733/734
Scandinavian – Mediterranean	Dudelange – Gothenburg / Södertälje	use case 722, 723-2, 731
	Milan – Munchen	use case 763

In total 9,000km road distance, 2,000km rail distance and close to 1Mio kilometres collection of data.

3.2.2 Use case specification

In this section an overview is given of each demonstration, the use case as logistics mission, the truck (BEV, FCEV &/or E-trailer), the MCS charging concepts (ABB, HIT) and/or HRS (CM/AP).
The information is as presented in the template, Section 2.3. 3.

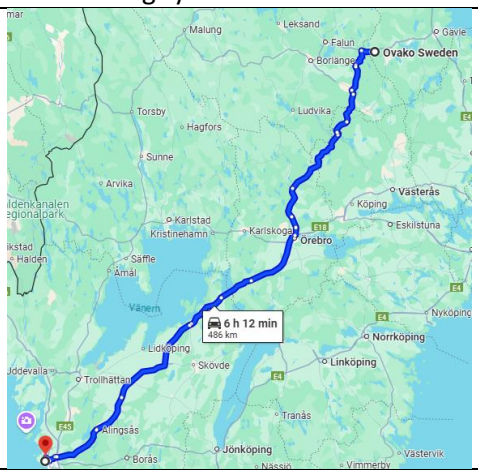
3.2.3 Volvo demonstrations

Use Case Number	**721**
Period	November 2025 – June/August 2026
Coordinator	Ted Lundstrom (OVA), Guran Nystrom (OVA), Johanna Axelsson (VOL)
Use case name	OVA Steel. Factory to factory of automotive products, Volvo Gothenburg SE – Hofors, SE
Partners involved and roles	OEM, Volvo Trucks SE, LSP / Shipper, OVAKO
Vehicle specification	Volvo tractor 6x2 tag axle,  - Estimated curb weight 14t - 26t GVW / 44t GCW, 385/55/22,5 – 315/70/22,5 – 245/70/22,5 - Technical weight, 44t GCW - Powertrain FCE with 300kW and 60kWh battery - Delivery month September 2025 - Swedish registration plate
Trailer specification	Standard trailer Delivered by OVAKO Swedish registration plate

Permissions	The Volvo FCE-vehicle is a test vehicle driven by VOL drivers on a defined route between Gothenborg SE and Hofors SE. No specific permits needed.

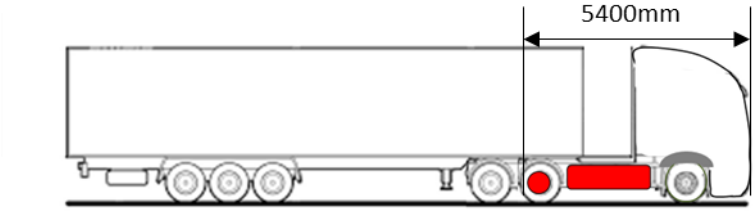
Charging station involved	2 new public filling stations will be used, planned ready Q2/2025. The Europe´s largest OVAKO electrolyser production facility will supply hydrogen out of renewable energy.
	Station in Ruskvädersgatan 418 34 Göteborg, Schweden

	Ovako Sweden Faluvägen, 813 82 Hofors, Schweden. Hydrogen plant makes Ovako unique in the world. On September 5, 2023, the world's first plant for fossil-free hydrogen for heating steel before rolling was inaugurated. The new plant in Hofors starts a new chapter in Swedish steel history with the potential for major emission reductions.

Simulation	
Logistics Mission	
Std tractor semi-trailer @ 44t GCW	Two hydrogen stations are available, Gothenborg and Hofors, both capable of a 700bar filling system
	
Comparison ICE	Tractor – semi-trailer and rigid Swedish trailer 
Simulation remark	Potential kilometres, 115kkm over 6 months

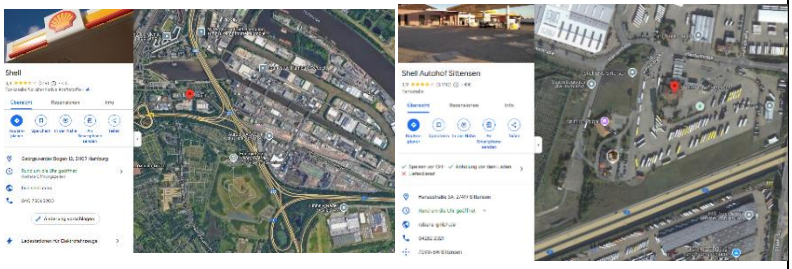
Demo plan	
Duration demonstration	Start demonstration is November 2025, end June/August 2026
Timetable routing	The route Gothenborg to Hofors is a daily round trip with a length of 510km. 5 trips per week are planned with a coverage of 4,800km per week.

<table>
<tr><td>Demonstration</td><td>Volvo has decided to deploy the first prototypes as tractors. The reason is that tractors do provide more flexibility with respect to customers' needs and applications. Volvo internal drivers will operate the vehicle in the first phase. The demonstration contains 2 phases. Phase 1 is the startup phase, running for 2 months between Gothenborg and Hofors. The second phase is an operation of 4 months, March – June/August 2026.</td></tr>
<tr><td>Cold climate test</td><td>During the months December 2025 and February 2026, the vehicle will operate in the north of Sweden, performing cold climate test, gathering data of the vehicle behaviour and FCE performance under extreme cold conditions.</td></tr>
<tr><td>ZEFES Verification criterion</td><td>
<table>
<tr><td colspan="2">Verification criterion</td><td>VC11</td><td>VC12</td><td>VC13</td><td>VC14</td><td>VC15</td><td colspan="2">VC19</td></tr>
<tr><td colspan="2"></td><td>e-trailer</td><td>400km/45min</td><td>DT</td><td>BEV/FCEV</td><td>corridors</td><td>missions</td><td>cargo</td></tr>
<tr><td>Use case number</td><td>Techn.</td><td></td><td></td><td>Time / Energy cost</td><td>Time/Cargo /Cost</td><td></td><td></td><td></td></tr>
<tr><td>721</td><td>FCEV</td><td></td><td></td><td></td><td></td><td>SE</td><td>LH P&D</td><td>Heavy steel</td></tr>
</table>
</td></tr>
<tr><td>ZEFES KPIs</td><td>
<table>
<tr><td>KPIs</td><td></td><td>P1 – P4</td><td>T1 – T2</td><td>V1 – V2</td><td>V3</td><td>C1-C8</td><td>C9</td><td>H1-H5</td><td>L1 – L15</td><td>O1 – O2</td></tr>
<tr><td></td><td></td><td>Powertrain</td><td>Tire</td><td colspan="2">Vehicle</td><td colspan="2">Charging</td><td>Hydrogen</td><td>Logistics</td><td>Operato</td></tr>
<tr><td>Use case number</td><td>Techn.</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>721</td><td>FCEV</td><td>Y</td><td></td><td></td><td>Y</td><td></td><td></td><td>Y</td><td>Y</td><td>Y</td></tr>
<tr><td>722</td><td>BEV</td><td>Y</td><td></td><td>Y</td><td>Y</td><td>Y</td><td></td><td></td><td>Y</td><td>Y</td></tr>
<tr><td>723-1</td><td>BEV</td><td>Y</td><td></td><td>Y</td><td>Y</td><td>Y</td><td>Y</td><td></td><td>Y</td><td>Y</td></tr>
<tr><td>723-2</td><td>BEV</td><td>Y</td><td></td><td>Y</td><td>Y</td><td>Y</td><td>Y</td><td></td><td>Y</td><td>Y</td></tr>
<tr><td>724</td><td>BEV</td><td>Y</td><td></td><td>Y</td><td>Y</td><td>Y</td><td>Y</td><td></td><td>Y</td><td>Y</td></tr>
</table>
</td></tr>
<tr><td>Stakeholders
- governments of cities of Gothenburg, Hofors
- bodies of motorways, parking's, HRS locations</td><td>Impact on infrastructure along corridor regarding FCEV performance.
Impact on traffic & accident management.
Impact on HRS at Gothenburg and Hofors
Impact on logistics & operations</td></tr>
</table>

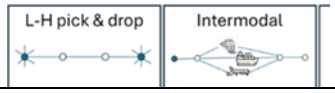
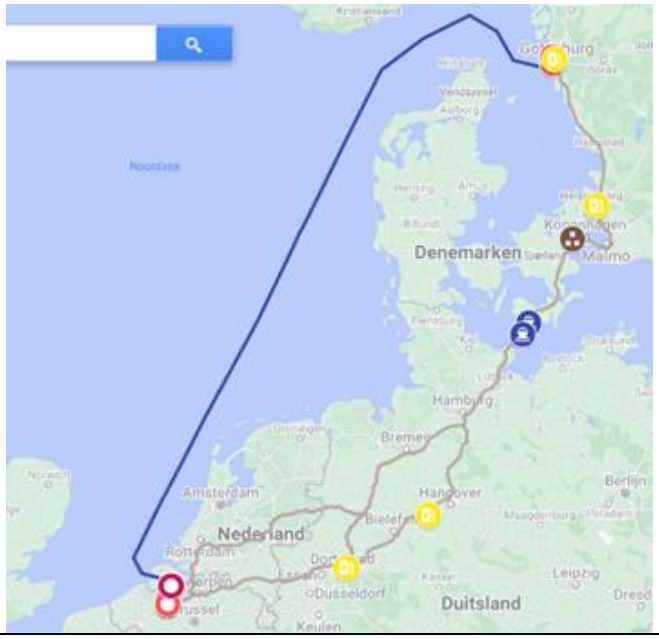
Use Case Number	**722**
Period	June 2025 – Mai 2026
Coordinator	Johnny Yngve (VOL Logistics), Johanna Axelsson (VOL)
Use case name	VOLVO Inter sites. Factory to factory of automotive products, Volvo Gothenburg SE – Volvo Gent BE v.v.
Partners involved and roles	OEM, Volvo Trucks SE, LSP / Shipper, Volvo Logistics Ferry, Scandline Puttgarden DE – Rödby DK
Vehicle specification	Volvo tractor 6x2 tag axle,  - estimated curb weight tractor 15t - 26t GVW / 44t GCW, 385/55/22,5 – 315/70/22,5 – 245/70/22,5 - Technical weight, 44t GCW – 60t GCW EMS2 - Powertrain BE with 728kW.h battery, CCS/MCS compatible - Delivery month May 2025 - Swedish registration plate
Trailer specification	Standard trailer Delivered by Volvo Swedish registration plate Optional adaptation trailer for EMS2 application by Volvo Group

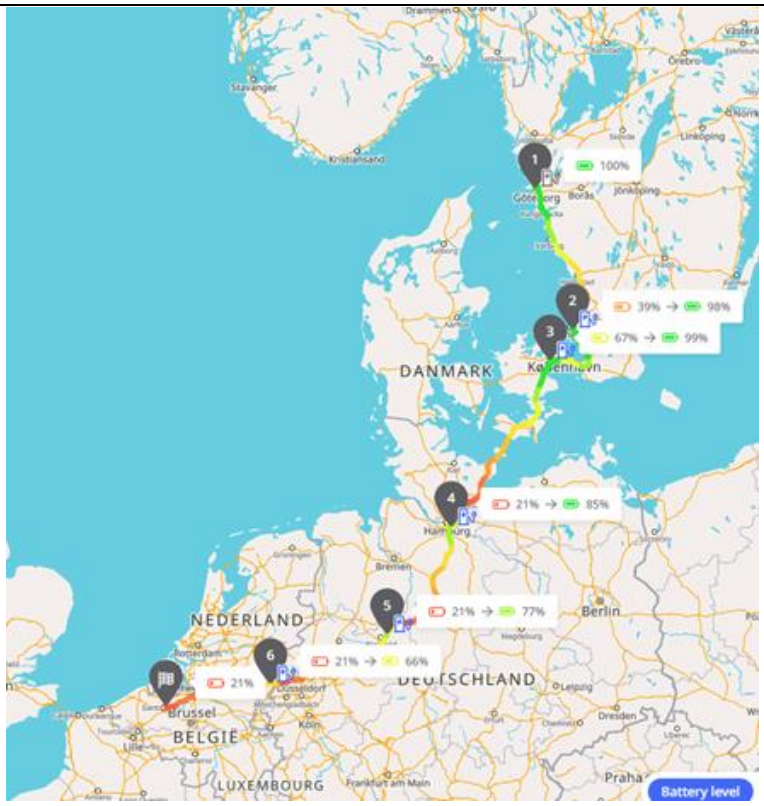
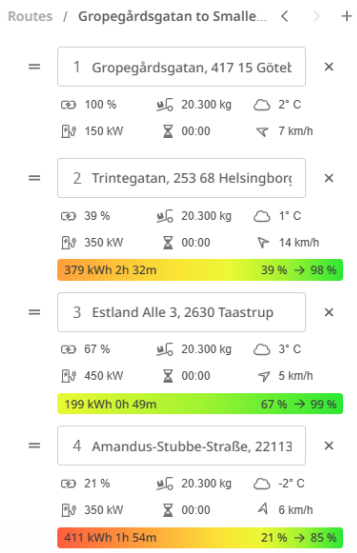
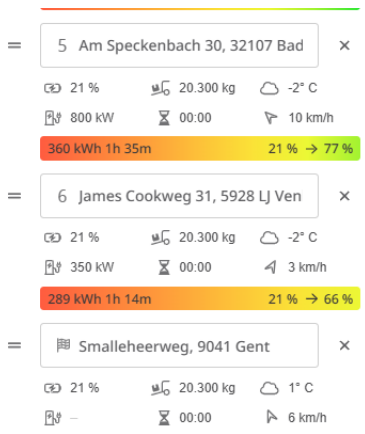
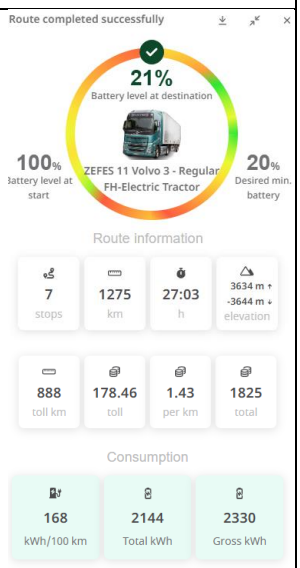
Permissions	See Demo plan for permit application of demonstrator Road permit to use ferry Puttgarden – Rödby vv., out of task 3.4 no need so far Road permit for 44t GCW cross border SE-DK-DE-NL-BE, 42t GCW allowed in Germany Discussion EMS2 with Belgium authorities ongoing. No real progress expected, **so no focus so far**. In case EMS2 it needs - road permit for EMS2 @ 64t GCW national and cross border SE-DK-DE-NL-BE - road permit for EMS2 @ 64t GCW Volvo factory Gent to harbour terminal Zeebrugge BE and Volvo factory Gothenburg to harbour terminal Gothenburg SE are needed.

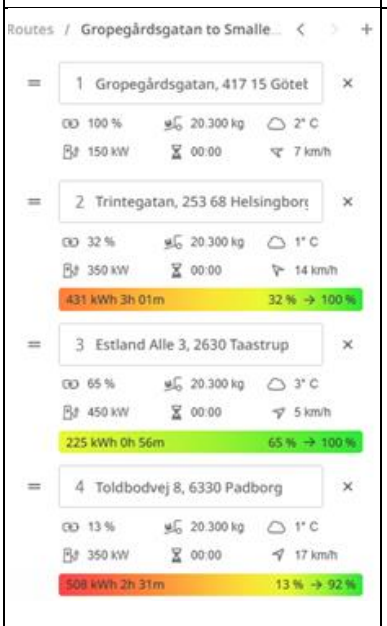
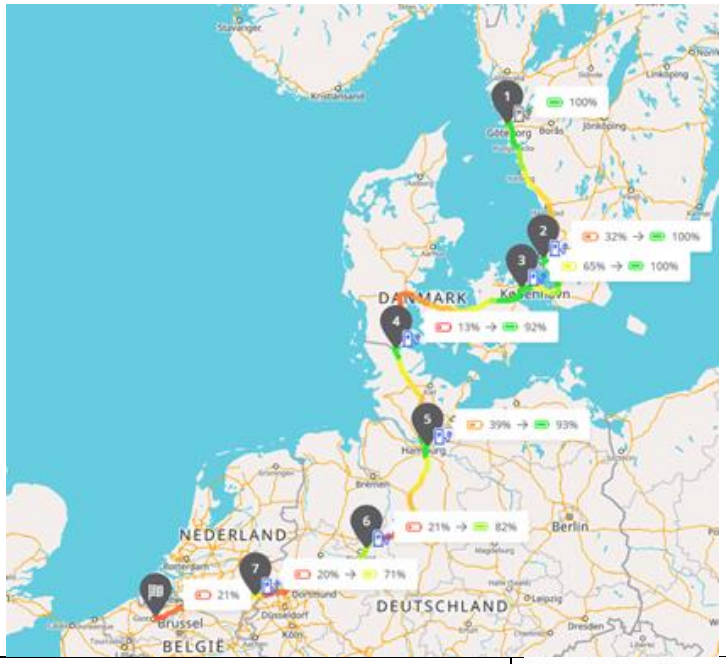
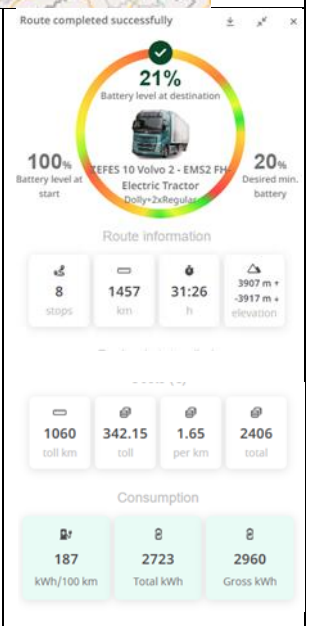
Charging station involved	
Volvo Truck, Gropegårdsgatan, 417 15 Göteborg	

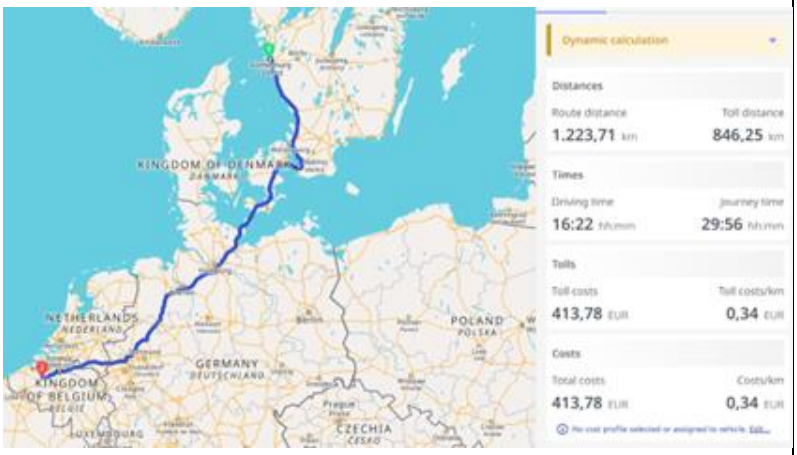
Volvo Truck Centre, Trintegatan, 253 68 Helsingborg	
EON Drive Infrastructure – Høje Taastrup, Estland Alle 3, 2630 Taastrup	
Aral Puls, Amandus-Stubbe-Straße, 22113 Hamburg. Discussions with SHELL to allocate 2 options for installation MCS-HIT, operation by Dec 2025. Georgswerder Bogen 12, 21109 Hamburg or Hansestraße 3A, 27419 Sittensen	 
Raststätte Lipperland, Am Speckenbach 30, 32107 Bad Salzuflen (HoLa project). **The HoLa MCS-ABB charger will be required July 2025 – September 2026**	

Milance charging hub Venlo, James Cookweg 31	
Volvo, Smalleheerweg, 9041 Gent	

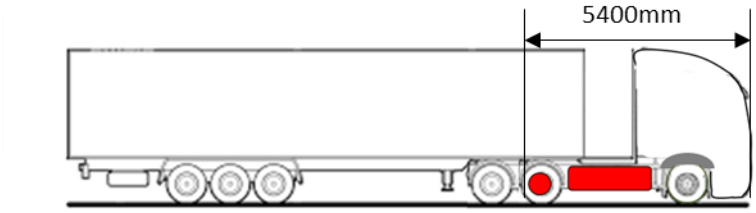
Simulation	
Logistics mission	
Route Gent Gothenburg is part of existing supply chain as short sea and road use. Depending on the time slots and destinations of the cargo, the choice will be made between short sea and road	

Std tractor semi-trailer @ 44t GCW		
		
Simulation remark	Potential kilometers, 120kkm over 12 months	
EMS2	Only valid in case Belgium authorities open the door to discuss an EMS2 demonstration.	
EMS2 Volvo Gothenburg – Volvo Gent vv.	EMS2 Volvo Gothenburg – Volvo Gent vv. Additional charging in Padborg, EON Tolbodvej 8, 6330 Padborg	

			
EMS2 Vol factory – harbour	Only valid in case Belgium authorities open the door to discuss an EMS2 demonstration.	

Volvo Gent – Harbour Zeebrugge vv. 	
Comparison ICE	 Potential distance 120 kkm over 12 months
Simulation remarks	**For std tractor semi-trailer @ 44t GCW,** dependencies on public CCS points along DK and DE motorway. Alternative CCS charging locations are available around Bremen and Venlo. No critical points along the route were expected. **For EMS2 Volvo Gent – Harbor Zeebrugge** no critical points expected as ZEFES MCS-ABB charger is available for this mission. (See use case 723-1 VOL/ P&G Amiens to Zeebrugge). **For EMS2 configuration,** a longer route due to permits DK and extra charging stops need to be planned.

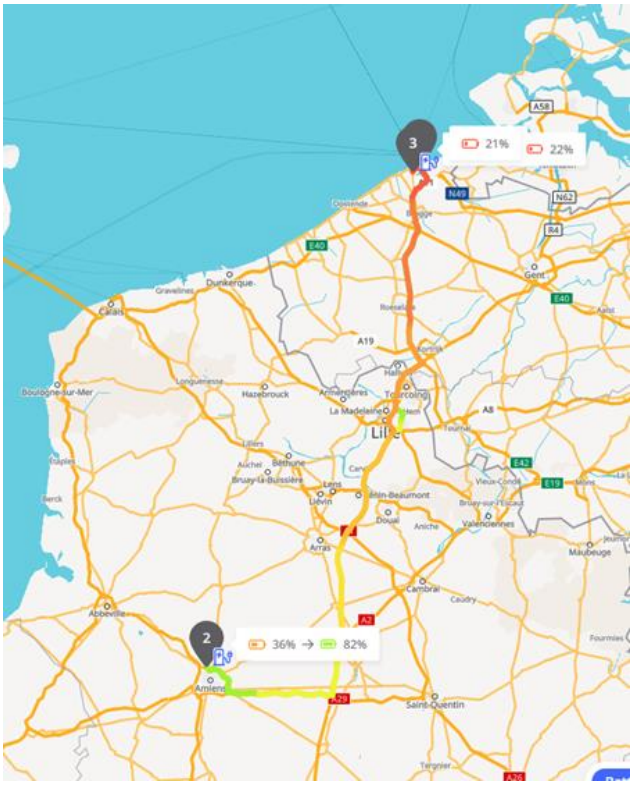
<table>
<tr><td>Demo plan</td><td></td></tr>
<tr><td>Duration demonstration</td><td>Route1, std tractor semi-trailer @ 44t GCW
Start June 2025 – End May 2026
Route 2, no realization at this point foreseen. EMS2 configurations between Volvo Gothenburg and Volvo Gent depending on discussions with authorities at city, regional and national level BE, NL, DE and DK
Route 3, no realization at this point foreseen. EMS2 configuration between Volvo Gent factory and Terminal Zeebrugge, short sea Gent Gothenburg vv. depending on discussions with authorities at city, regional and national level BE</td></tr>
<tr><td>Timetable routing</td><td>Routes 1 is a weekly round trip</td></tr>
<tr><td>Plan A</td><td>Route 1 is safeguard as this is a straightforward mission</td></tr>
<tr><td>Plan B</td><td>Route 2and 3 depend on permits and willingness collaboration local/regional authorities. In any case a theoretical simulation will be done demonstrating the benefits and impacts of an EMS2 application.</td></tr>
<tr><td>ZEFES Verification criterion</td><td>
<table>
<tr><td colspan="2">Verification criterion</td><td>VC11</td><td>VC12</td><td>VC13</td><td>VC14</td><td>VC15</td><td colspan="2">VC19</td></tr>
<tr><td colspan="2"></td><td>e-trailer</td><td>400km/45min</td><td>DT</td><td>BEV/FCEV</td><td>corridors</td><td>missions</td><td>cargo</td></tr>
<tr><td>Use case number</td><td>Techn.</td><td></td><td></td><td>Time / Energy cost</td><td>Time/Cargo /Cost</td><td></td><td></td><td></td></tr>
<tr><td>722</td><td>BEV</td><td></td><td>Hamburg Lipperland</td><td></td><td></td><td>SE-DK-DE-NL-BE</td><td>Reg / LH P&D</td><td>Automotive</td></tr>
</table>
</td></tr>
<tr><td>ZEFES KPIs</td><td>
<table>
<tr><td>KPIs</td><td></td><td>P1 – P4</td><td>T1 – T2</td><td>V1 – V2</td><td>V3</td><td>C1-C8</td><td>C9</td><td>H1-H5</td><td>L1 – L15</td><td>O1 – O2</td></tr>
<tr><td></td><td></td><td>Powertrain</td><td>Tire</td><td colspan="2">Vehicle</td><td colspan="2">Charging</td><td>Hydrogen</td><td>Logistics</td><td>Operato</td></tr>
<tr><td>Use case number</td><td>Techn.</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>721</td><td>FCEV</td><td>Y</td><td></td><td></td><td>Y</td><td></td><td></td><td>Y</td><td>Y</td><td>Y</td></tr>
<tr><td>722</td><td>BEV</td><td>Y</td><td></td><td>Y</td><td>Y</td><td>Y</td><td></td><td></td><td>Y</td><td>Y</td></tr>
<tr><td>723-1</td><td>BEV</td><td>Y</td><td></td><td>Y</td><td>Y</td><td>Y</td><td>Y</td><td></td><td>Y</td><td>Y</td></tr>
<tr><td>723-2</td><td>BEV</td><td>Y</td><td></td><td>Y</td><td>Y</td><td>Y</td><td>Y</td><td></td><td>Y</td><td>Y</td></tr>
<tr><td>724</td><td>BEV</td><td>Y</td><td></td><td>Y</td><td>Y</td><td>Y</td><td>Y</td><td></td><td>Y</td><td>Y</td></tr>
</table>
</td></tr>
<tr><td>Stakeholders
- governments of cities of Gothenburg, Gent, Zeebrugge
- bodies of motorways, parking’s, charging</td><td>Impact revised directive W&D on infrastructure, weight +2t GCW for std as well as EMS2 BNL, DE, DK and SE.
Impact on infrastructure along the corridor regarding charging, parking.
Impact on traffic & accident management.
Impact on depot charging at Volvo Plant Gothenburg and Gent
Impact on logistics & operations</td></tr>
</table>

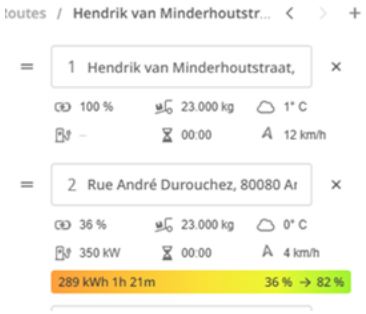
Use Case Number	**723-1**
Period	September 2025 – February 2026
Coordinator	Cédric Lanckriet (ECS), Frank Kressmann (P&G), Johanna Axlesson (Volvo Trucks), Daan Peters (Volvo Trucks Belgium)
Use case name	Container transport between ECS Zeebrugge (BE) and P&G Plant Amiens and back to Zeebrugge (BE)
Partners involved and roles	OEM, Volvo Trucks Belgium, LSP / Shipper, P&G Amiens France, Carrier, ECS European Container Services Zeebrugge Belgium
Vehicle specification	Volvo tractor 6x2 tag axle,  - estimated curb weight tractor unit 13,5t - 26t GVW / 44t GCW, 385/55/22,5 – 315/70/22,5 – 245/70/22,5 - Technical weight, 42t GCW - Powertrain BE with 728kW.h battery, CCS/MCS compatible - Delivery month September 2025 - Belgium registration plate
Trailer specification	Standard trailer Delivered by ECS Belgium registration plate Depending on the road permit to demonstrate an EMS2 configuration @ 64t GCW, the 2 trailers applied between Amiens and Dourges v.v. need to be adapted by VET to meet the turning circle. - Trailer 1, drawbar and Optiturn - Trailer 2 Optiturn.

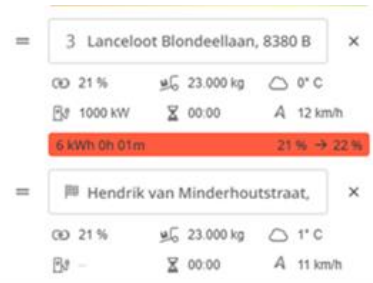
Permissions	For demonstration BEV in std configuration no specific permit is required. Road permit FR for EMS2 @ 64t GCW between P&G Plant Amiens and Rail Terminal Dourges is ongoing and awaiting approval. Decision if to drive EMS2 will be taken in January 2026 depending on circumstances.

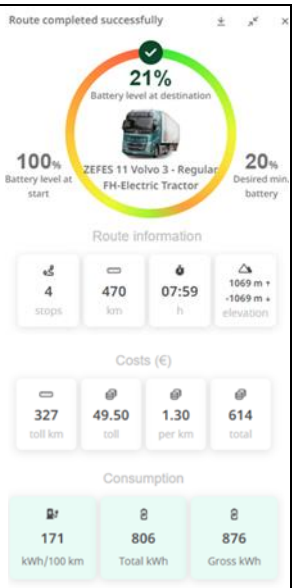
Charging stations involved MCS-ABB, ECS 5 Lanceloot Blondeellaan 10, 8380 Brügge	

CCS2 charging P&G Plant in Amiens	

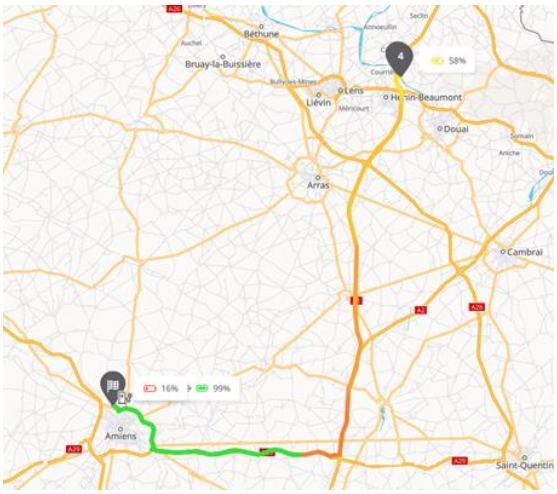
Simulation	
Logistics mission	
Simulation 1	
	
Simulation remark	Potential kilometers, 44 kkm over 5 months

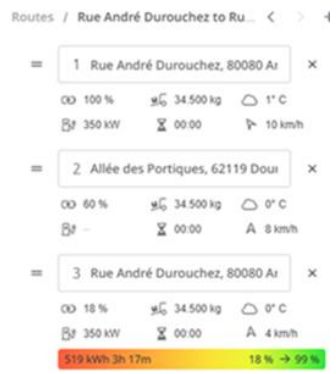


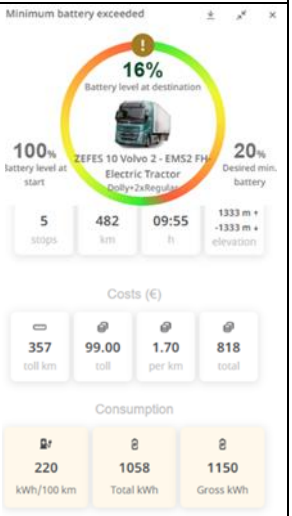




Simulation 2







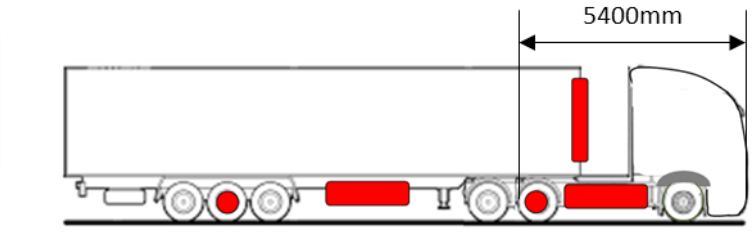
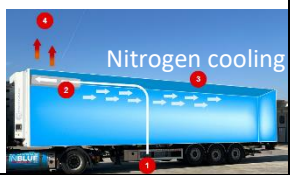
<table>
<tr><td>Demo plan</td><td></td></tr>
<tr><td>Duration demonstration</td><td>VOL transport to Zeebrugge, registration and training in August/September 2025.

Startup demonstrator in when all approval and trainings are done. Demonstration for 6 months after start.

Route 2 optional depending on permit VOL-EMS2 timing open
Adaptation ECS trailers by VET, timing open.

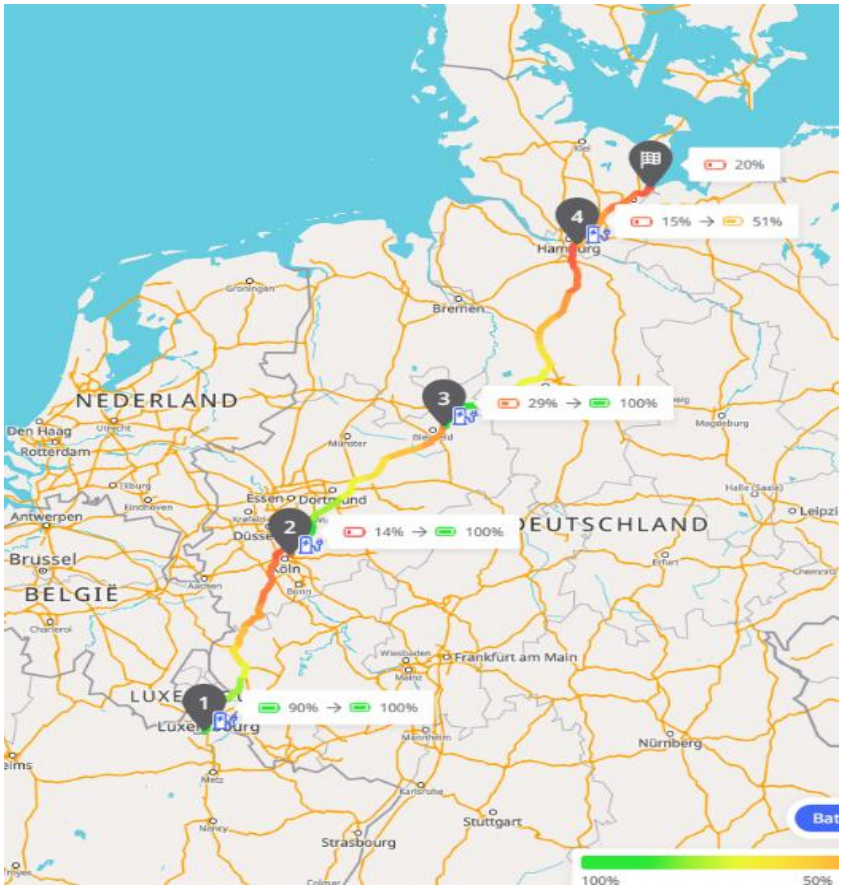
Decision in January 2026 if to go with route 2.</td></tr>
<tr><td>Timetable routing</td><td>Routes 1 and 2 are daily round trips
 
</td></tr>
<tr><td>Plan A
  </td><td>Route: Zeebrugge – Amiens – Zeebrugge (via Arras)
  </td></tr>
<tr><td>Plan B
  </td><td>Route 2 depending on permits and willingness collaboration local/regional authorities. A theoretical simulation has been done between Amiens – Dourges – Zeebrugge – Dourges – Amiens. Will be done independent a permit demonstrating the benefits and impacts of an EMS2 application.
Simulation has been done by Volvo to investigate the range and resting time.</td></tr>
<tr><td>ZEFES Verification criterion</td><td>
<table>
<tr><td colspan="2">Verification criterion</td><td>VC11
e-trailer</td><td>VC12
400km/45min</td><td>VC13
DT</td><td>VC14
BEV/FCEV</td><td>VC15
corridors</td><td>VC19
missions</td><td>cargo</td></tr>
<tr><td>Use case number</td><td>Techn.</td><td></td><td></td><td>Time / Energy cost</td><td>Time/Cargo /Cost</td><td></td><td></td><td></td></tr>
<tr><td>723-1</td><td>BEV</td><td></td><td>Zeebrugge</td><td></td><td></td><td>FR-BE</td><td>LH P&D</td><td>Containers</td></tr>
</table>
</td></tr>
<tr><td>ZEFES KPIs</td><td>
<table>
<tr><td colspan="2">KPIs</td><td>P1 – P4
Powertrain</td><td>T1 – T2
Tire</td><td>V1 – V2
Vehicle</td><td>V3</td><td>C1-C8
Charging</td><td>C9</td><td>H1-H5
Hydrogen</td><td>L1 – L15
Logistics</td><td>O1 – O2
Operator</td></tr>
<tr><td>Use case number</td><td>Techn.</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>721</td><td>FCEV</td><td>Y</td><td></td><td></td><td>Y</td><td></td><td></td><td>Y</td><td>Y</td><td>Y</td></tr>
<tr><td>722</td><td>BEV</td><td>Y</td><td></td><td>Y</td><td>Y</td><td>Y</td><td></td><td></td><td>Y</td><td>Y</td></tr>
<tr><td>723-1</td><td>BEV</td><td>Y</td><td></td><td>Y</td><td>Y</td><td>Y</td><td>Y</td><td></td><td>Y</td><td>Y</td></tr>
<tr><td>723-2</td><td>BEV</td><td>Y</td><td></td><td>Y</td><td>Y</td><td>Y</td><td>Y</td><td></td><td>Y</td><td>Y</td></tr>
<tr><td>724</td><td>BEV</td><td>Y</td><td></td><td>Y</td><td>Y</td><td>Y</td><td>Y</td><td></td><td>Y</td><td>Y</td></tr>
</table>
</td></tr>
<tr><td>Stakeholders
- governments of cities of Amiens, Lille, Zeebrugge
- bodies of motorways,</td><td>Impact revised directive W&D on infrastructure, length and weight for std as well as EMS2 in FR.
Impact on infrastructure along corridor regarding charging, parking, - France N25, A29, A1, N356, A22, - Belgium E403, N31
Impact on traffic & accident management.</td></tr>
</table>

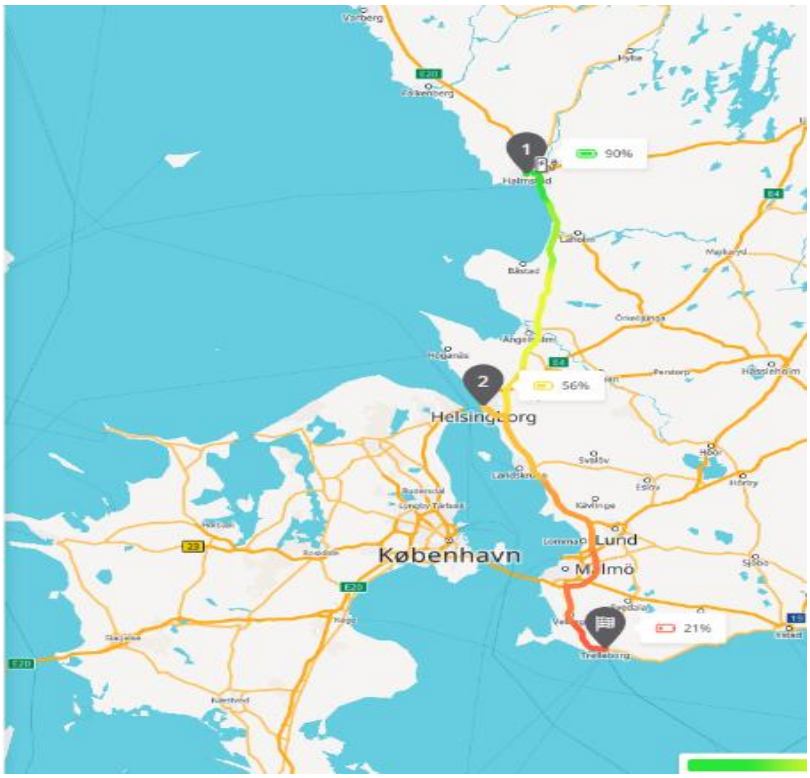
parking's, charging - plant Amiens, terminal ECS Zeebrugge, Delta 3 Dourges	Impact on depot charging at P&G Plant and Terminal Zeebrugge Impact on logistics & operations

Use Case Number	**723-2**
Period	January 2026 – June 2026 (optional November 2026)
Coordinator	Marina Forch and Adrian Valverde (PRI), Johanna Axelsson (Volvo)
Use case name	Multimodal transport of fresh fruits South of Spain to South of Sweden, corridor Dudelang LU to Halmstadt SE using a BE-HDV
Partners involved and roles	OEM, Volvo Trucks, LSP, PrimaFrio Murcia SP, Carrier, PrimaFrio Murcia SP
Vehicle specification	Volvo tractor 6x2 tag axle,  - estimated curb weight tractor unit 13,5t - 27t GVW / 44t GCW, 385/55/22,5 – 315/70/22,5 – 245/70/22,5 - Technical weight GCW 44t - Powertrain BE with 728 kW.h battery, CCS/MCS compatible - Delivery month January 2026 - German registration plate
Trailer specification See chapter 3.2.7	Reefer trailer, temperature-controlled cargo Three types, - conventional ICE operated unit, - e-reefer with e-operated unit, 400V CEE, - liquid nitrogen operated unit Delivered by SCB Spanish registration plate  

Permissions	Road permit for 44t GCW through DE and LU, 42t GCW allowed Permit to use ferry Travermünde – Trelleborg Permits to enter rail and ferry terminals

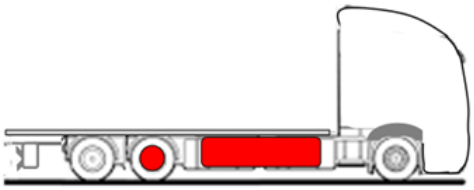
Charging stations involved	Charging of truck and trailer (e-reefer) Nitrogen reefer doesn´t need charging
Simulation	
Logistics mission	

CFL Terminal LU – Short Sea terminal Travermünde / Lübeck DE	
	 

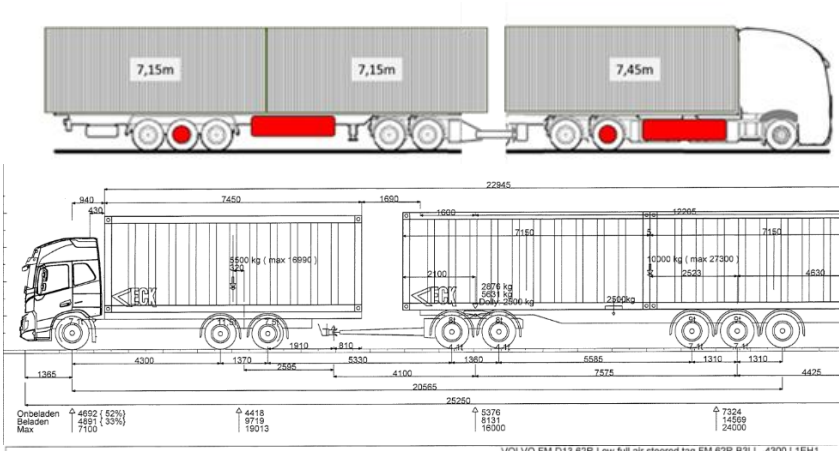
Short sea terminal Trelleborg SE to Halmstadt SE		
		
Simulation remarks	MCS chargers at Dudelange, Lipperland and Hamburg enable minimum loss of time for this 2-driver operation Potential kilometers, 85 kkm over 6 months	Ferry Travermünde-Trelleborg is drivers´ rest

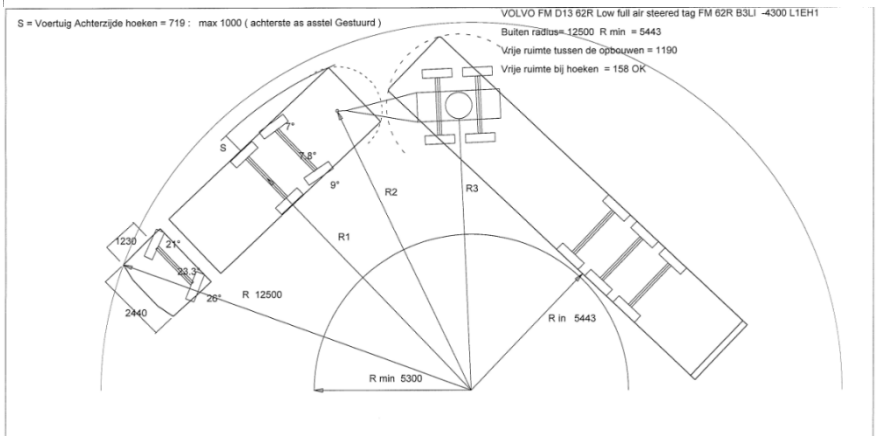
Demo plan	
Duration demonstration	Start January 2026, end June 2026 optional August 2026
Timetable routing	Use case 723-2 is part of a fresh fruits pipeline operated by PrimaFrio between Lepe, South of Spain and Halmstadt South of Sweden. **Use**

<table>
<tr><td></td><td>case 723-2 operates the pipeline from Dudelange LU to Halmstadt SE. Use case 733 operates the pipeline from Lepe SP to Le Boulou FR. Between Le Boulou FR and Dudelange LU, CFL Multimodal is operating the rail connection transporting the reefers by rail. For the total trip Lepe SP to Halmstadt SE, 5 days are allowed keeping the window date of sales. Depending on unplanned events, the reefers will receive an alternative destination keeping the window date of sales.</td></tr>
<tr><td>ZEFES Verification criterion</td><td>
<table>
<tr><th colspan="2">Verification criterion</th><th>VC11</th><th>VC12</th><th>VC13</th><th>VC14</th><th>VC15</th><th colspan="2">VC19</th></tr>
<tr><th colspan="2"></th><th>e-trailer</th><th>400km/45m in</th><th>DT</th><th>BEV/FCEV</th><th>corridors</th><th>missions</th><th>cargo</th></tr>
<tr><th>Use case number</th><th>Techn.</th><th></th><th></th><th>Time / Energy cost</th><th>Time/Cargo /Cost</th><th></th><th></th><th></th></tr>
<tr><td>723-2</td><td>BEV</td><td></td><td>Dudelange, Hamburg</td><td></td><td></td><td>LU-DE-SE</td><td>LH P&D</td><td>Fresh fruits</td></tr>
</table>
</td></tr>
<tr><td>ZEFES KPIs</td><td>
<table>
<tr><th colspan="2">KPIs</th><th>P1 – P4</th><th>T1 – T2</th><th>V1 – V2</th><th>V3</th><th>C1-C8</th><th>C9</th><th>H1-H5</th><th>L1 – L15</th><th>O1 – O2</th></tr>
<tr><th colspan="2"></th><th>Powertrain</th><th>Tire</th><th colspan="2">Vehicle</th><th colspan="2">Charging</th><th>Hydrogen</th><th>Logistics</th><th>Operator</th></tr>
<tr><th>Use case number</th><th>Techn.</th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th></tr>
<tr><td>721</td><td>FCEV</td><td>Y</td><td></td><td></td><td>Y</td><td></td><td></td><td>Y</td><td>Y</td><td>Y</td></tr>
<tr><td>722</td><td>BEV</td><td>Y</td><td></td><td>Y</td><td>Y</td><td>Y</td><td></td><td></td><td>Y</td><td>Y</td></tr>
<tr><td>723-1</td><td>BEV</td><td>Y</td><td></td><td>Y</td><td>Y</td><td>Y</td><td>Y</td><td></td><td>Y</td><td>Y</td></tr>
<tr><td>723-2</td><td>BEV</td><td>Y</td><td></td><td>Y</td><td>Y</td><td>Y</td><td>Y</td><td></td><td>Y</td><td>Y</td></tr>
<tr><td>724</td><td>BEV</td><td>Y</td><td></td><td>Y</td><td>Y</td><td>Y</td><td>Y</td><td></td><td>Y</td><td>Y</td></tr>
</table>
</td></tr>
<tr><td>Stakeholders
- governments of Luxembourg, Germany, Sweden bodies of motorways Autobahn GmbH, Rail CFL/UIC and Ferrie Stenaline</td><td>Impact revised directive W&D on infrastructure, weight +2t GCW.
Impact on infrastructure along main corridor regarding charging, parking.
Impact on traffic & accident management.
Impact on depot charging and charging at rail terminal and ferry terminals.
Impact on logistics & operations in multimodal transport</td></tr>
</table>

Use Case Number	724
Period	March 2026 – August 2026 (optional November 2026)
Coordinator	Roy Rens (REBRO), Maurice Loef (DPD NL), Johanna Axlesson (Volvo Trucks), Jan Schouten (Volvo Netherlands), Tugay Yilmaz (Kaessbohrer Germany)
Use case name	DPD parcel EMS1with BEV rigid and BEV e-semi-trailer Parcel transport between DPD depot Oirschot NL and DPD depot Aichach DE
Partners involved and roles	OEM, Volvo Group, LSP / Shipper, DPD Netherlands, Carrier, REBRO Transport en Trailer service
Vehicle specification	Volvo rigid 6x2 with steered third axle,  - Estimated curb weight rigid 14t - 26t GVW / 44t GCW, 385/55/22,5 – 315/70/22,5 – 315/70/22,5 - Technical weight, 44t GCW - Powertrain BE with 500kW.h battery, CCS compatible - Delivery month June 2025 - Dutch registration plate
Trailer specification	Kaessbohrer / ZF e-semi-trailer  - estimated curb weight semi-trailer 7,6t - Technical weight, 39t GVW, 385/65R22,5 on trailer axles, - Powertrain BE with 308kWh battery, CCS compatible - Delivery month by KAE / ZF February 2026 - Spanish registration plate Dolly is a std configuration and supplied by REBRO

Permissions	Road permit DE for EMS1 vehicle weight up to 46t GCW, 42 t GCW is allowed. For CT, 44t GCW is allowed, conditions for a higher GCW can be found in the link, 53. StVZOAusnV 53. Ausnahmeverordnung zur StVZO Road permit for cross border NL and DE for EMS1 with vehicle weight up to 46t GCW, 42t GCW is allowed
Vehicle concept	The vehicle is a EMS1 configuration, a BEV 6x2 rigid with steered third axle, a dolly and a e-semi-trailer The rigid can transport a swap body with a length of 7,45m. The semi-trailer can transport 2 swap bodies with a length of 7,15m or 7,45m. The total vehicle length 25,25m.

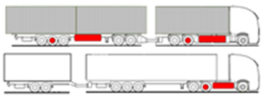




The vehicle layout is according to the Dutch and German turning circle.

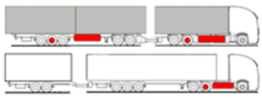
The estimated curb weight of the total configuration is appr. 24t (14+7,6+2,5t). The estimated weight of the swap bodies is appr. 7t (2,5 + 2x2,3). The estimated cargo (parcels) is 3-5t per swap body.
Max. GCW will be 40 – 46t.

EMS1 Netherlands



Length 25,25m
Loading length min 18m and max 21,82m for demountable bodies
Aero cab +500mm
GCW 60t
Turning circle 14,5 / 6,5m

EMS1 Germany

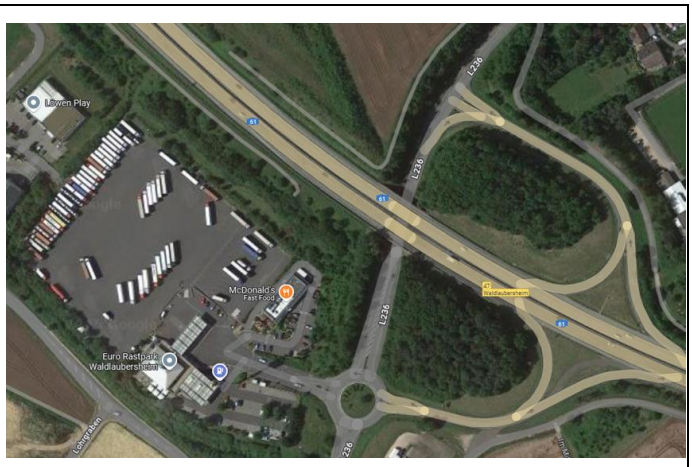
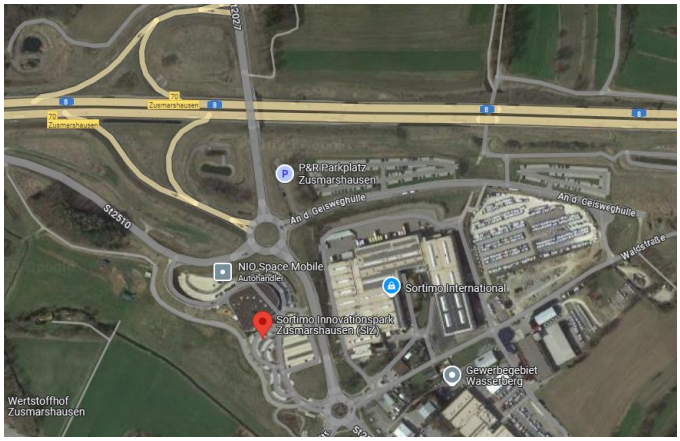


Length 25,25m
Loading length not defined

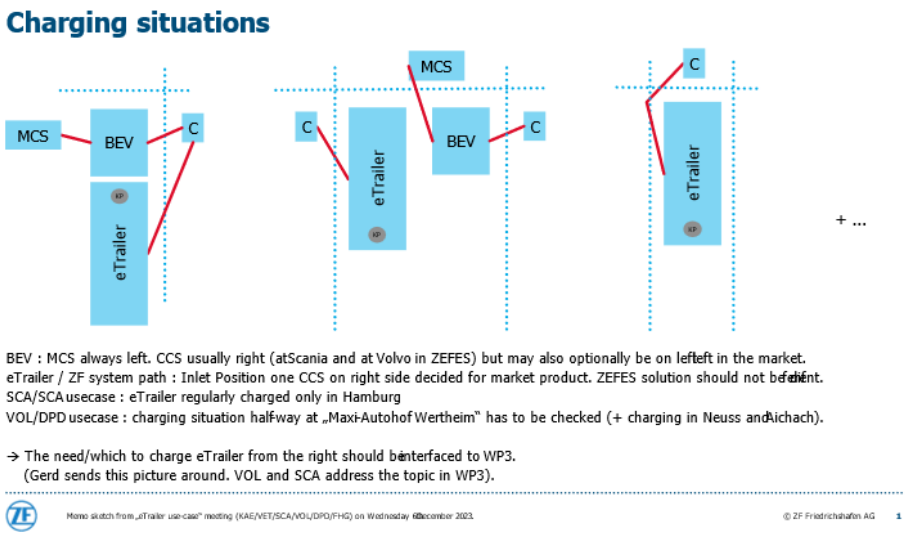
Aero cab 0mm
GCW 42t / 44-46t Combined Transport
Turning circle 12,5 / 5,3m

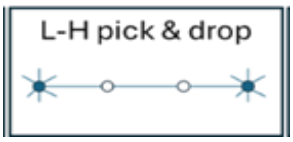
https://wetten.overheid.nl/BWBR0032533/2020-01-01/

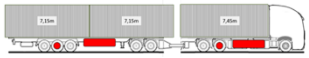
To run the demonstrator in both countries NL and DE, it must comply to both regulations. The figure below shows the important regulations for both countries. The vehicle layout, loading length, overall length and weight do meet the regulation enabling a cross-border demonstration.

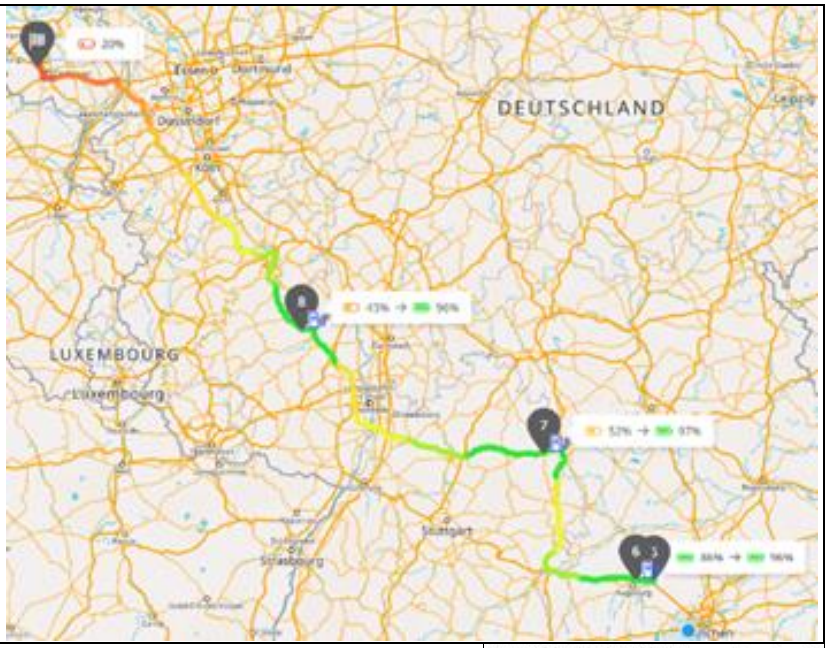
Charging station involved 55444 Waldlaubersheim-Gewerbepark Waldlaubersheim	
Marco-Polo-Straße 1, 74589 Satteldorf	
Am Innovationspark 2, 86441 Zusmarshausen	
	To support clarification on charging locations for the eTrailer find here the e-trailer charging needs for the ZEFES Use-cases 724 (VOL/DPD). E-trailer “724” Battery capacity 300kWh. Required energy for mission section (considering wintertime): ~215 kWh. CCS2 DC charging: 210 kW (potential to increase dependent on system- and environmental- conditions). Charging Stations considered:

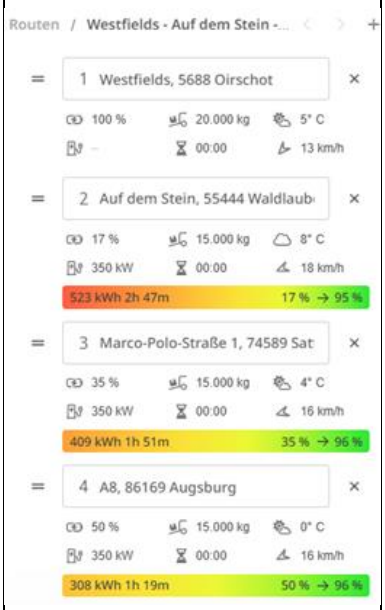
	- Around Neuss (Rebro) Fast charging coming from Oirschot before proceeding to Aichach via Würzburg (slow charging possible at arriving way back due to sufficient time till starting new mission cycle) - Halfway between Neuss and Aichach (before reaching Würzburg) Fast charging during rest. - Aichach Slow charging during mandatory 11h rest of driver.

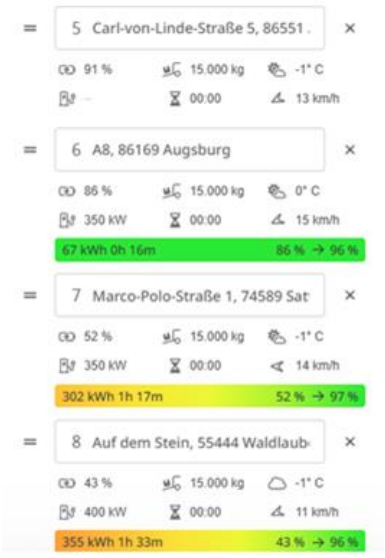


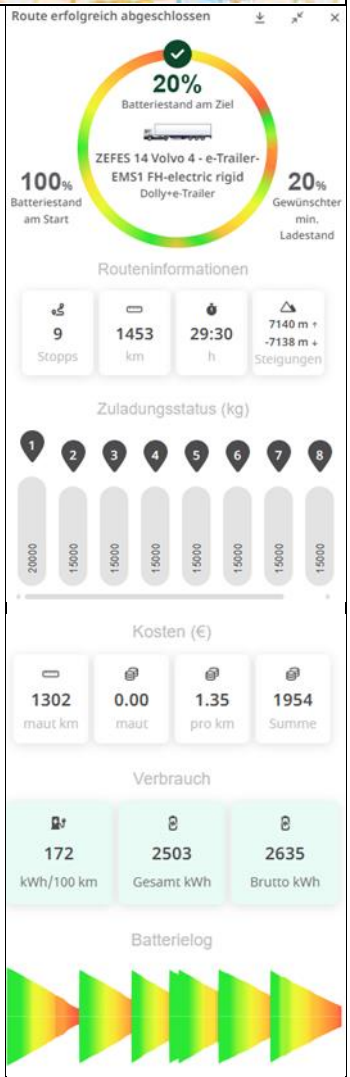
Simulation	
Logistics mission 	Mission Weekly long-haul pick & drop of swap bodies transporting parcel between DPD depots following a tight time scheme. The starting point is DPD Oirschot NL, from there to DPD Aichach DE and back to DPD Oirschot NL. Alternative charging points available to adapt routing and timing to meet timetable and driver / rest hours schedule and to charge the e-trailer.











Simulation remarks	Multiple charging stations available along route.	

	Potential kilometers, 115 kkm over 7 months	

Demo plan	
Duration demonstration	Start November 2025, End August 2026
Timetable routing of a one-week turn between Neuss-Oirschot-Aichach-Neuss	Carrier REBRO has its home base in Ettenleur NL. DPD Oirschot NL is starting point and drivers ´switch point, A 2 drivers' operation to DPD Aichach DE and back, multiple trips per week (up to 3 roundtrips).

Mo	Tu	We	Th	Fr	Sa
Oirschot	Aichach	Oirschot	Aichach	Oirschot	Aichach
Aichach	Oirschot	Aichach	Oirschot	Aichach	Oirschot

Rit ID	van	ETD	lading WB 1	lading WB 2	lading WB 3	naar	adres	PC	plaats	ETA	afstand	Uren	rij	werk	pauze
RB10		19:30	opbruggen							20:00		0,50	0,25	0,25	
RB10	Oirschot	20:00	RD52-186/1	RD52-186/2		DPD 186	Carl-von-Linde-Strasse 5	D-86551	Aichach	06:00	680	10,00	9,25		0,75
RB10		06:00	afbruggen	afkoppelen						06:30		0,50	0,25	0,25	
RB10											680	11,00	9,75	0,50	0,75

ZEFES Verification criterion

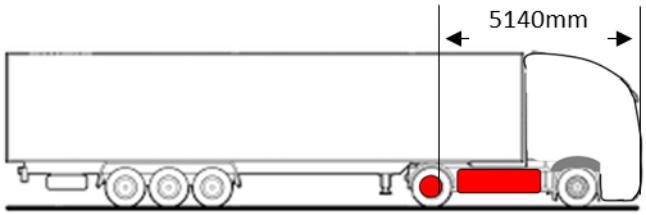
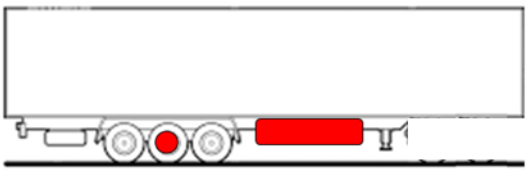
Verification criterion		VC11	VC12	VC13	VC14	VC15	VC19	
		e-trailer	400km/45min	DT	BEV/FCEV	corridors	missions	cargo
Use case number	Techn.			Time / Energy cost	Time/Cargo /Cost			
724	BEV	e-trailer				NL-DE	LH P&D	Parcels

ZEFES KPIs

KPIs		P1 – P4	T1 – T2	V1 – V2	V3	C1-C8	C9	H1-H5	L1 – L15	O1 – O2
		Powertrain	Tire	Vehicle		Charging		Hydrogen	Logistics	Operator
Use case number	Techn.									
721	FCEV	Y			Y			Y	Y	Y
722	BEV	Y		Y	Y	Y			Y	Y
723-1	BEV	Y		Y	Y	Y	Y		Y	Y
723-2	BEV	Y		Y	Y	Y	Y		Y	Y
724	BEV	Y		Y	Y	Y	Y		Y	Y

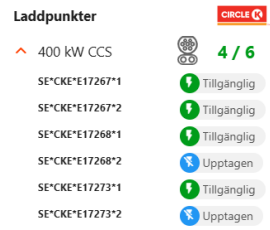
Stakeholders - governments federal states Germany, NRW, Rheinland-Pfalz, Hessen, Baden Wurttemberg, Bayern, province Brabant Netherlands - bodies of motorways Autobahn GmbH, BMDV, RWS, RDW	Impact of EMS1 vehicle on infrastructure, BEV rigid and BEV semi-trailer regarding vehicle behaviour, charging and parking along corridor. Impact on traffic & accident management. Impact on depot charging at DPD Oirschot and Aichach Impact on logistics & operations

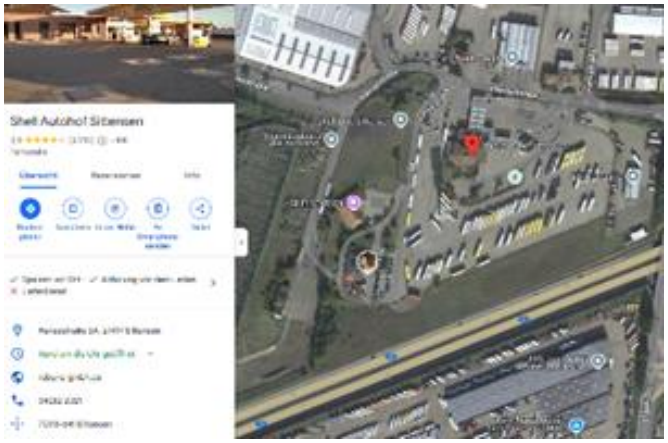
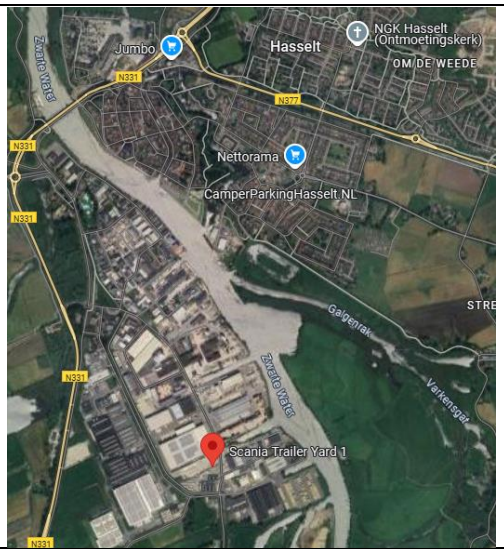
3.2.4 Scania demonstrations

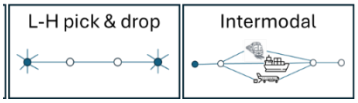
Use Case Number	**731**
Period	March 2026 – September 2026
Coordinator	Scania Logistics (SCA), Christer Thoren, Gustaf Malmström (SCA), Tugay Yilmaz (KAE)
Use case name	Factory to factory of automotive products, Scania Södertälje SE – Scania Zwolle NL v.v.
Partners involved and roles	OEM, Scania SE, Kaessbohrer/ZF LSP / Shipper, Scania Logistics Ferry, Scandline Puttgarden DE – Rödby DK
Vehicle specification	Scania tractor 4x2,  - estimated curb weight tractor 11t - 18,5t GVW / 64t GCW, 365/65/22,5 – 365/65/22,5 - Technical weight, 64t GCW - Powertrain BE with 624kW.h battery, CCS/MCS compatible - Delivery month February 2026- Swedish registration plate
Trailer specification	Kaessbohrer e-semi-trailer  - Curb weight e-semi-trailer 9,6t, 385/65/22,5 - Technical weight, 39t GVW - Powertrain BE with 200kW.h battery, CCS compatible - Delivery month by KAE / ZF February 2026 - Spanish registration plate

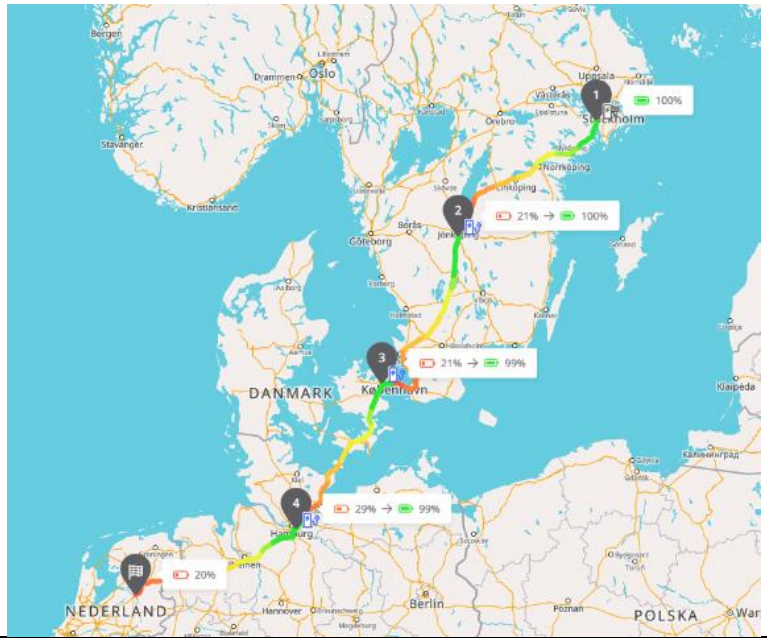
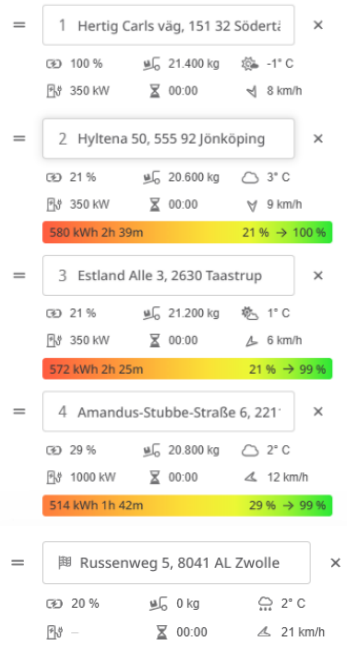
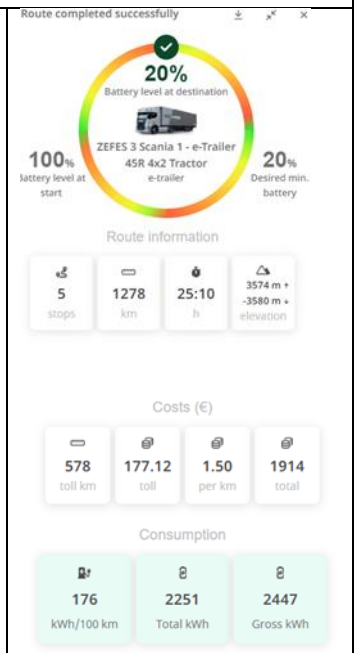
Permissions	Road permit 46t GCW through SE, DK, DE, NL, **allowed in Germany 42t GCW** Road permit 12t on drive axle tractor unit, no permit will be given. The analysis to be made is the % overload drive axle during the mission (% of time and % of weight in t)

Charging station involved	Charging at the Scania factory in Södertälje and Zwolle

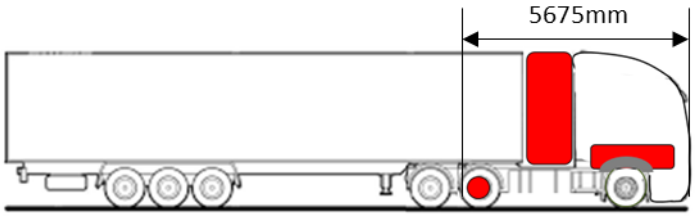
Location 2) CircleK Hyltena, Sweden  	
Location 3) Åstorp, Sweden	 Sweden Address Bronsgatan 12 26 539 , Åstorp Charging Charging bays 4 CCS 4 x 400 kW
Location 4) Hamburg	Aral Puls, Amandus-Stubbe-Straße, 22113 Hamburg  
Discussions with SHELL to allocate 2 options for installation **MCS-HIT in Hamburg, operation by Dec 2025**	**Georgswerder Bogen 12, 21109 Hamburg** (preferred option for 731 and 723-2)

	 or **Hansestraße 3A, 27419 Sittensen** 
Scania Randweg 7, 8061 RW Hasselt, The Netherlands	

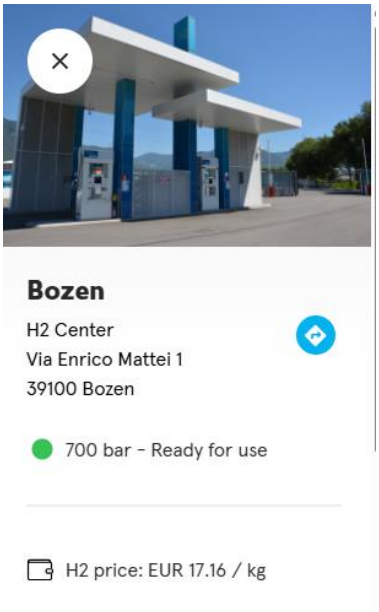
Simulation	
Logistics mission	

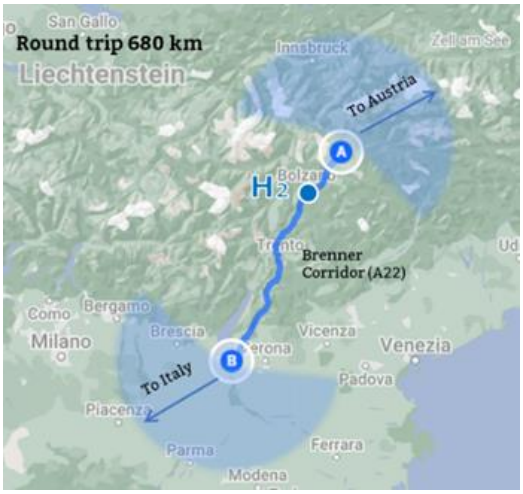
Std tractor e-semi-trailer @ 46t GCW	
	 
Comparison ICE	
Simulation remarks	Charging of the SCA BEV tractor on 3 locations and start / end of route. E-trailer “731” with a battery capacity of 200kW.h and CCS2 DC charging of 140 kW is an “on-demand support” for the towing vehicle, the eTrailer has not to be charged at every stop where the towing vehicle is charged. Scania expects necessity for charging in Södertälje (Scania facility / charger managed by Scania) and in Hamburg, before the most challenging distance Hamburg-Zwolle, and optionally in Zwolle before starting back to Hamburg. Potential kilometres, 110 kkm over 7 months

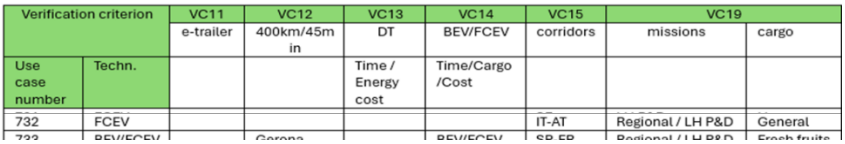
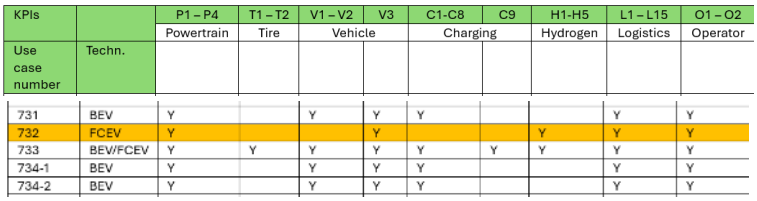
<table>
<tr><td>Demo plan</td><td></td></tr>
<tr><td>Duration demonstration</td><td>March 2026 – September 2026</td></tr>
<tr><td>Timetable routing</td><td>Routes 1 is a weekly round trip
<table>
<tr><th>Start point</th><th>End point</th><th>Distance</th><th>Consumption</th><th>Energy at destination</th><th>Charging</th><th>Time</th><th>Energy after charging</th></tr>
<tr><td>Södertälje</td><td>Jönköping</td><td>300km</td><td>465kWh</td><td>285kWh</td><td>262kWh</td><td>45min CCS</td><td>547kWh</td></tr>
<tr><td>Jönköping</td><td>Copenhagen (Ishöj)</td><td>288km</td><td>389kWh</td><td>258kWh</td><td>350kWh</td><td>60min CCS</td><td>508kWh</td></tr>
<tr><td></td><td>Driver change</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Copenhagen</td><td>Hamburg (Stillhorn)</td><td>297km</td><td>445kWh</td><td>63kWh</td><td>519kWh truck
168kWh trailer</td><td>42min MCS
29min CCS</td><td>750kWh</td></tr>
<tr><td>Hamburg</td><td>Zwolle</td><td>331km</td><td>463kWh</td><td>287kWh</td><td>350kWh</td><td>60min CCS</td><td>637kWh</td></tr>
<tr><td></td><td>Overnight rest</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Zwolle</td><td>Hamburg</td><td>331km</td><td>347kWh</td><td>290kWh</td><td>460kWh truck
0kWh trailer</td><td>37min MCS</td><td>750kWh</td></tr>
<tr><td>Hamburg</td><td>Copenhagen</td><td>297km</td><td>334kWh</td><td>416kWh</td><td>262kWh</td><td>45min CCS</td><td>678kWh</td></tr>
<tr><td></td><td>Driver change</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Copenhagen</td><td>Jönköping</td><td>288km</td><td>298kWh</td><td>380kWh</td><td>262kWh</td><td>45min CCS</td><td>642kWh</td></tr>
<tr><td>Jönköping</td><td>Södertälje</td><td>300km</td><td>342kWh</td><td>300kWh</td><td>450kWh</td><td>67min CCS</td><td>750kWh</td></tr>
<tr><td></td><td colspan="5">Note, charging of the trailer-battery need to be cleared as this implies a double charging connection!</td><td></td><td></td></tr>
</table></td></tr>
<tr><td>Plan</td><td>SCA will operate the BEV vehicle for 7 months on an existing transport flow of automotive components from Sodertalje to Zwolle and back. The return flow to Sodertalje is limited amount of goods. The round trip is around 1325km. Weight of the vehicle to Zwolle is 44ton GCW (25t load) and 25ton GCW on return (25% lower consumption).</td></tr>
<tr><td></td><td></td></tr>
<tr><td>ZEFES Verification criterion</td><td>
<table>
<tr><th colspan="2">Verification criterion</th><th>VC11</th><th>VC12</th><th>VC13</th><th>VC14</th><th>VC15</th><th colspan="2">VC19</th></tr>
<tr><td colspan="2"></td><td>e-trailer</td><td>400km/45min</td><td>DT</td><td>BEV/FCEV</td><td>corridors</td><td>missions</td><td>cargo</td></tr>
<tr><td>Use case number</td><td>Techn.</td><td></td><td></td><td>Time / Energy cost</td><td>Time/Cargo /Cost</td><td></td><td></td><td></td></tr>
<tr><td>731</td><td>BEV</td><td>e-trailer</td><td>Hamburg</td><td></td><td></td><td>SE-DK-DE-NL</td><td>LH P&D</td><td>Automotive</td></tr>
</table>
</td></tr>
<tr><td>ZEFES KPIs</td><td>
<table>
<tr><th colspan="2">KPIs</th><th>P1 – P4</th><th>T1 – T2</th><th>V1 – V2</th><th>V3</th><th>C1-C8</th><th>C9</th><th>H1-H5</th><th>L1 – L15</th><th>O1 – O2</th></tr>
<tr><td colspan="2"></td><td>Powertrain</td><td>Tire</td><td colspan="2">Vehicle</td><td colspan="2">Charging</td><td>Hydrogen</td><td>Logistics</td><td>Operator</td></tr>
<tr><td>Use case number</td><td>Techn.</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>731</td><td>BEV</td><td>Y</td><td></td><td>Y</td><td>Y</td><td>Y</td><td></td><td></td><td>Y</td><td>Y</td></tr>
<tr><td>732</td><td>FCEV</td><td>Y</td><td></td><td></td><td>Y</td><td></td><td></td><td>Y</td><td>Y</td><td>Y</td></tr>
<tr><td>733</td><td>BEV/FCEV</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td></tr>
<tr><td>734-1</td><td>BEV</td><td>Y</td><td></td><td>Y</td><td>Y</td><td>Y</td><td></td><td></td><td>Y</td><td>Y</td></tr>
<tr><td>734-2</td><td>BEV</td><td>Y</td><td></td><td>Y</td><td>Y</td><td>Y</td><td></td><td></td><td>Y</td><td>Y</td></tr>
</table>
</td></tr>
<tr><td>Stakeholders
- governments of cities of Södertälje, Jönköping Copenhagen, Hamburg, Bremen, Zwolle
- bodies of motorways, parking’s, charging, ferry terminal Puttgarden-Rodby</td><td>Impact revised directive W&D on infrastructure, weight +2t GCW, weight on drive axle 12t.
Impact on infrastructure along corridor regarding charging, parking, Södertälje – Jönköping – Copenhagen – Hamburg – Bremen – Zwolle
Impact on traffic & accident management.
Impact on depot charging at Scania plant Södertälje and Zwolle
Impact infrastructure Scandlines ferry terminal Puttgarden and Rodby, e-vehicle on ferry
Impact on logistics & operations</td></tr>
</table>

Use Case Number	**732**
Period	February 2026 – May/June 2026
Coordinator	Ettore Gualandi (GRU), Christer Thoren and Gustaf Malmström (SCA)
Use case name	GRU Forwarding using a SCA FCEV on the Brenner corridor Italy to Austria v.v.
Partners involved and roles	OEM, Scania Trucks, LSP / Shipper, Gruber, Carrier, Gruber
Vehicle specification	Scania tractor 6x2*4,  - Estimated curb weight tractor 13,8t - 26t GVW / 44t GCW, 385/55/22,5 – 315/70/22,5 – 315/70/22,5 - Technical weight, 64t GCW - Powertrain battery 416kW.h and FC 2x120kW - **Delivery month January 2026** - Spanish registration plate
Trailer specification	Gruber semi-trailers, type body and specification depending on the cargo

Permissions	Road permit 44t GCW for IT and AT, allowed 42t in AT Road permit for overlength king pin to front vehicle Status, March 2025*; feedback by Tiroler Landesregierung, they wrote the following:* *"No route for such test drives can be found in Tyrol. [..] Since the A12 - A13 route in question is a heavily used transit route, it is not suitable as a test route due to the increased traffic volume about road safety and maintaining smooth and fluid traffic flow. A total weight of more than 40 t cannot be approved. Tirol also agrees with the Styrian Governor's opinion that test drives, according to the last sentence of Section 45, Paragraph 1, are drives to determine the usability or performance of vehicles or their parts or equipment or drives to demonstrate vehicles. The purpose of a test drive is to determine the functionality of a vehicle, for which a relatively short distance is sufficient; testing the suitability of a vehicle for covering a relatively long distance exceeds the definition of a test drive (OGH 25.6.1987 ZVR 1988/69)."* *IVECO informed that by using a cabin with aerodynamic design to improve efficiency, should allow to have longer vehicle. IVECO will check and provide more info about this.*

Charging station involved Hydrogen filling station at the Brenner		Hydrogen filling station at the Brenner, 700 bar low flow for passenger car. Refuelling of 60kg takes 2hr. Upgrade of the station to accommodate 700bar high flow for truck expected in 2027

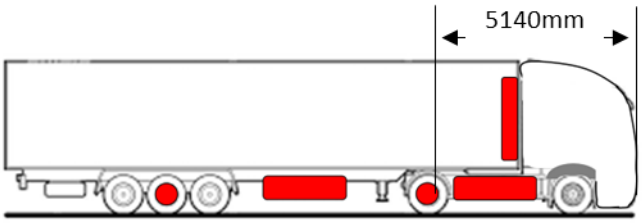
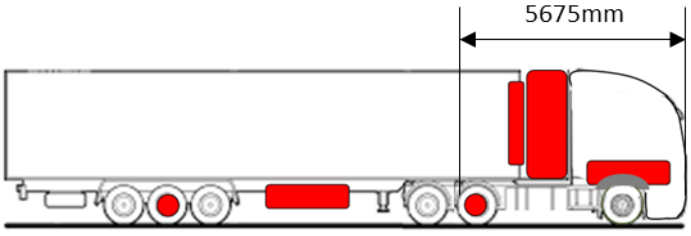
Simulation	
Logistics mission 	**GRU** will run a test for a 4-6 month-period using the Scania FCEV across the Brenner transporting a variety of goods to evaluate the performance of the vehicle into a real-life environment. The test will cover a daily distance of about 340km (680 km round trip) testing hydrogen stations along the Brenner corridor. The drives will be made in the Brenner corridor. Origins and destinations are shown in the picture as blue shaded areas. The fixed route links approximately Brixen to the road intersection between the Brenner Corridor (Highway A22) and the Highway A4. The operator has the possibility to choose different destinations on different days to probe the performance of the vehicle.
	 
Simulation remarks	The HRS Bozen gives vehicle deployment enough flexibility. Potential kilometers, 55 kkm over 5 months

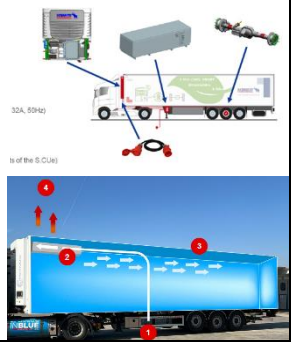
Demo plan	
Duration demonstration	Start February 2026, End May-June 2026
Timetable routing	Daily roundtrip of 680km crossing the Brenner
ZEFES Verification criterion	
ZEFES KPIs	

Verification criterion		VC11	VC12	VC13	VC14	VC15	VC19	
		e-trailer	400km/45m in	DT	BEV/FCEV	corridors	missions	cargo
Use case number	Techn.			Time / Energy cost	Time/Cargo /Cost			
732	FCEV					IT-AT	Regional / LH P&D	General

KPIs		P1 – P4	T1 – T2	V1 – V2	V3	C1-C8	C9	H1-H5	L1 – L15	O1 – O2
		Powertrain	Tire	Vehicle		Charging		Hydrogen	Logistics	Operator
Use case number	Techn.									
731	BEV	Y		Y	Y	Y			Y	Y
732	FCEV	Y			Y			Y	Y	Y
733	BEV/FCEV	Y	Y	Y	Y	Y	Y	Y	Y	Y
734-1	BEV	Y		Y	Y	Y			Y	Y
734-2	BEV	Y		Y	Y	Y			Y	Y

Stakeholders - governments Italy, Austria and possibly Germany - bodies of motorways and regional routes “Hinterland end points Brenner	Impact of FCEV vehicle on infrastructure along the Brenner and its “Hinterland” North and South. Impact on traffic & accident management. Impact on logistics & operations

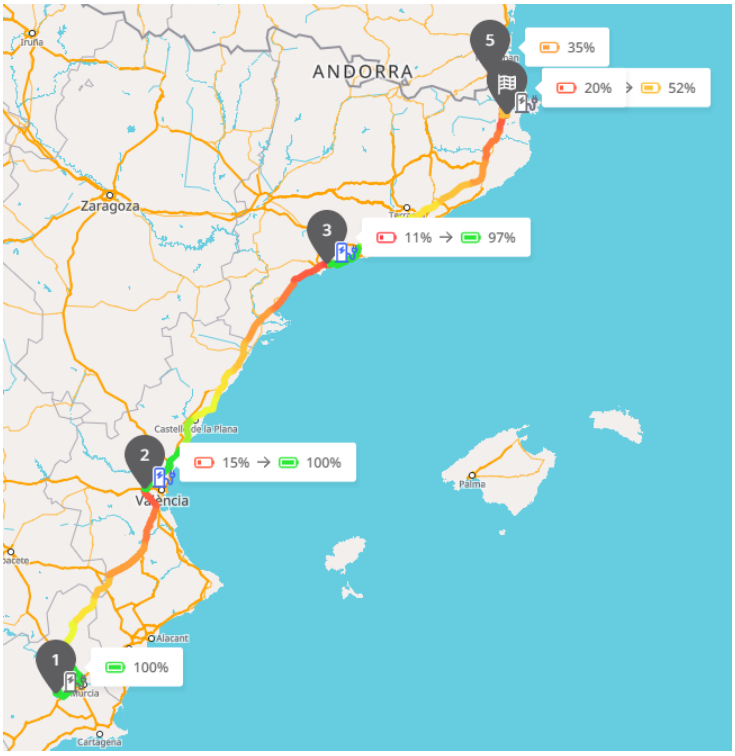
Use Case Number	**733**
Period	July 2026 – November 2026
Coordinator	Marina Forch and Adrian Valverde (PrimaFrio), Christer Thoren and Magnus (SCA)
Use case name	Multimodal transport of fresh fruits South of Spain to South of Sweden, corridor Lepe SP to Le Boulou FR comparing BE/FC-HDV
Partners involved and roles	OEM, Scania Trucks, LSP / Shipper, PrimaFrio Rail, CFL Multimodal LU and UIC FR
Vehicle specification	Scania tractor 4x2,  - estimated curb weight tractor 11t - 18,5t GVW / 64t GCW, 365/65/22,5 – 365/65/22,5 - Technical weight, 64t GCW - Powertrain BE with 728kW.h battery, CCS/MCS compatible - Delivery month June 2026 - Swedish registration plate Scania tractor 6x2*4,  - estimated curb weight tractor 13,8t - 26t GVW / 44t GCW, 385/55/22,5 – 315/70/22,5 – 315/70/22,5 - Technical weight, 64t GCW - Powertrain battery 416kW.h and FC 2x120kW - Delivery month June 2026 - Spanish registration plate

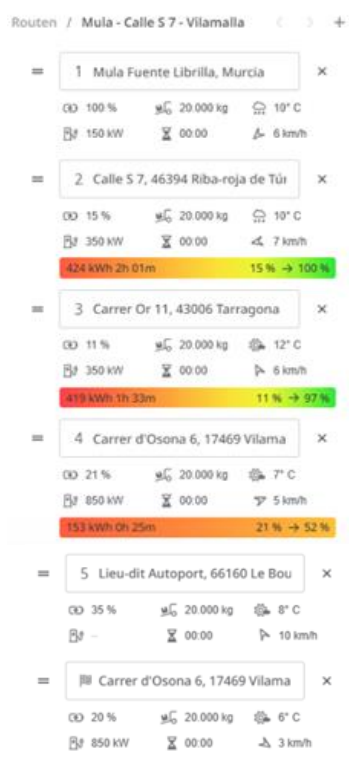
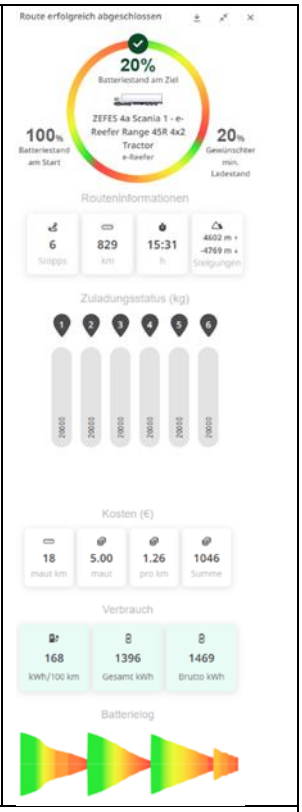
Trailer specification See chapter 3.2.7	Reefer trailer, temperature-controlled cargo Three types, - conventional ICE operated unit (PRI), - e-reefer with e-operated unit (SCB-PRI), - liquid nitrogen operated unit (SCB-CT-PRI) Delivered by SCB Spanish registration plate 

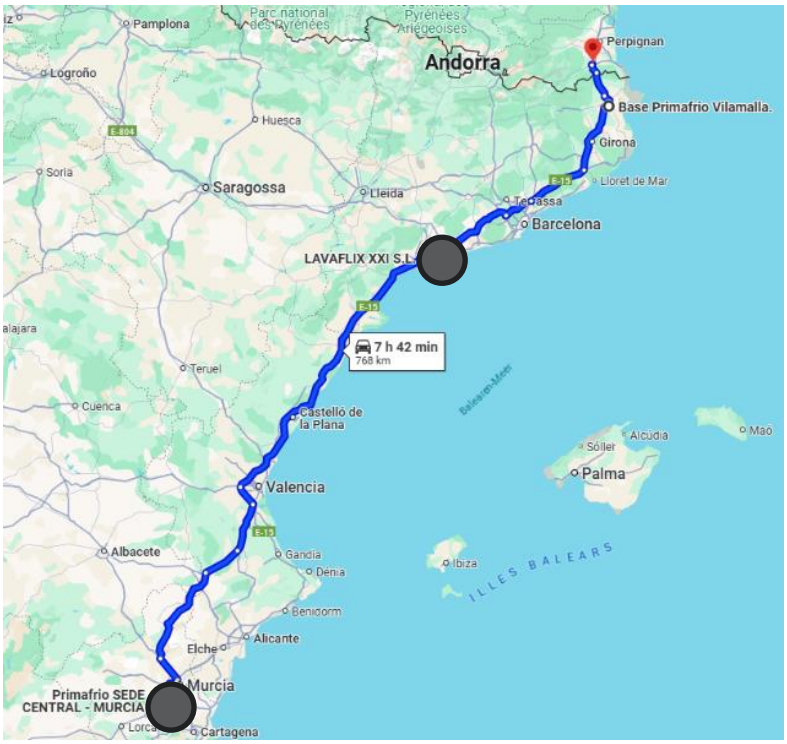
Permissions	Road permit overlength FCEV (king pin-front truck) Road permit 44t GCW SP

Charging station involved	Charging and HRS are in development. Partners involved are PRI, CM/AP, ABB, Moove, and IDI. The challenges are to have all charging and HRS locations operational by May2026 to test operation and start the demonstration June / July 2026. Focus of the demonstration is the fresh fruit chain from PrimaFrio Murcia to PrimaFrio Vilamalla to Rail terminal Le Boulou and back. The Lepe side is on hold as there is no demand for strawberries in the period June – December. On top, no infrastructure is available due to no demand of energy for ZE-HDVs. Depending on the demand for cargo, a one driver or two driver operation will be chosen by PrimaFrio HQ. This will of course influence the total milage driven June – November 2026. Optional, a routing from Murcia to Malaga will be investigated. Application will depend on access to the HRS station at the Michelin test circuit and availability of a charger (CCS) nearby.

Simulation	
Logistics mission Fresh fruits pipeline operated by PrimaFrio between Lepe, South of Spain and North of Europe. Collecting fruits along corridor ending in Vilamlla close to the French border.	

Std BEV tractor reefer @ 44t GCW	Charging locations are clarified, Murcia (CCS) –Valencia (CCS, maybe MCS) (2 options)-Vilamalla (MCS-ABB), Almeria is not seen as a real option (test centre Michelin). Alignment on going between ZEFES project partners ABB and PRI as well as with Moove regarding the charging location IONITY- Reus. At this side access for ZE-HDVs need to be clarified. Further a search for alternative charging locations is ongoing (GSS and PRI). Moove and IDI need to organise communication tests between charger and truck to ensure compatibility.
	 L

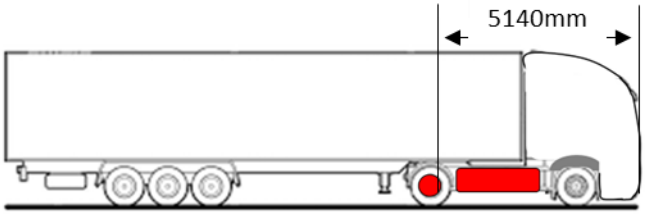
		
Std FCEV tractor reefer @ 44t GCW	HRS locations clarified, Murcia-Tarragona, HRS locations PRI Murcia and Tarragona, both CM in collaboration with a third party, e.g., Exolum is Europe's leading logistics company for liquid products and one of the largest in the world. Tarragona, CM with third party Almeria is a nice to have, however seen as critical as the station is on the test ground of Michelin. Ensured mussed be the availability of 700bar, compressor and power supply compressor.	

Hydrogen station	
Comparison ICE	
Simulation remarks	The challenge is to keep the time plan. The theoretical analysis shows a time difference for BEV up to 3,5hr and FCEV up to 1hr. In addition to extra hours of drivers, one additional truck-trailer transport to achieve same cargo weekly compensating loss of time. A risk management avoiding a/o solving unexpected events needed.
Simulation remarks	Due to lack of product demand and energy infrastructure, it is decided to focus on the corridor Murcia – Le Boulou France. Potential kilometers, 72 kkm over 4 months and 2 vehicles

2 drivers	ICE	hr	BEV	hr	FCEV	hr
Start Mo	Murcia	06:00	Murcia	06:00	Murcia	06:00
Stop			Valencia, charging CCS	09:00-10:15		
Stop	Driver change	10:30-10:45			Driver change	10:30-10:45
Stop			Tarragona, charging CCS	13:30-14:45	Tarragona hydrogen	12:15-13:00
Stop	Driver change (Vilamalla)	15:15-15:30	Vilamalla charging MCS	17:45-18:45	Driver change (Vilamalla)	16:00-16:15
Stop	Le Boulou	16:15	Le Boulou	19:30	Le Boulou	17:00
Km	770		770		770	

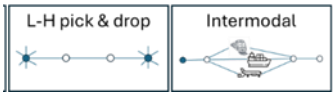
Demo plan	
Duration demonstration	Start July 2025 – November 2026 (due to project end December 2026, data will be used from the months July, August and partly September for the final project end-report. For PRI and SCA data until November 2026 can be used for own purposes.
Timetable routing	Use case 733 is part of a fresh fruits pipeline operated by PrimaFrio between Lepe, South of Spain and Halmstadt South of Sweden. Use case 723-2 operates the pipeline from Dudelange LU to Halmstadt

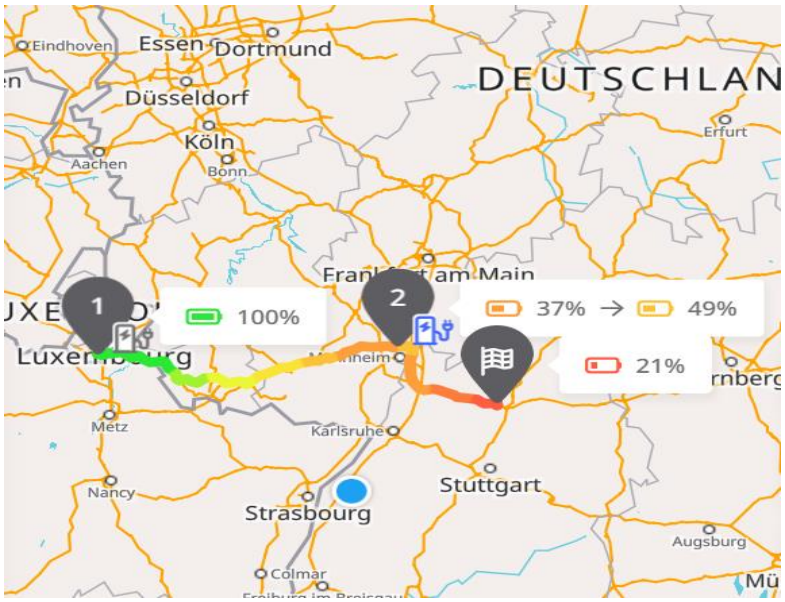
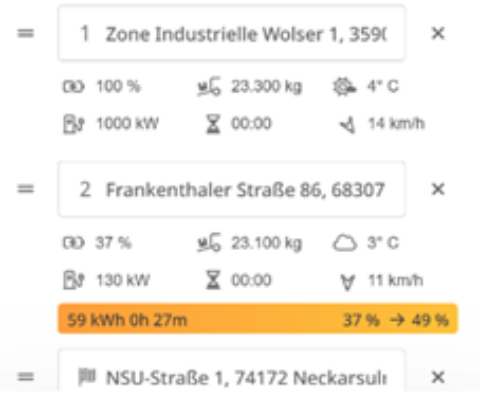
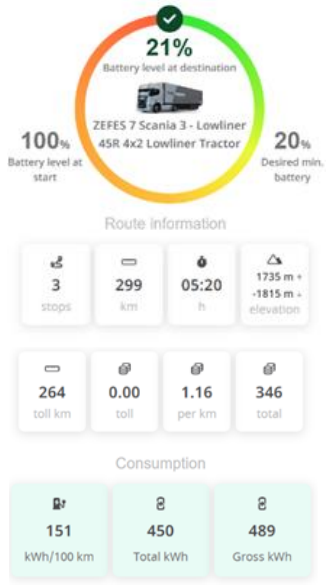
<table>
<tr><td></td><td>SE. Use case 733 operates the pipeline from Lepe/Murcia SP to Le Boulou FR. Two round trips, Murcia – Le Boulou, per week are planned. Between Le Boulou FR and Dudelange LU, CFL Multimodal is operating the rail connection transporting the reefers by rail. For the total trip Lepe SP to Halmstadt SE, 5 days are allowed keeping the window date of sales. Depending on unplanned events, the reefers will receive an alternative destination keeping the window date of sales.</td></tr>
<tr><td>Plan</td><td>PRI will operate both SCA BEV and FCEV vehicles up to 5 months on the existing route of temperature-controlled goods from PRI Murcia to the multimodal terminal, Le Boulou France.
This facilitates a direct comparison of both vehicles (BEV and FCEV) under identical conditions in a roundtrip of 1300km (1 or 2 driver operation depending on the demand for cargo).
IDI will also make a back-to-back comparison between the PWT technologies installed on demo vehicles (BEV, FCEV and ICE, if available) under controlled conditions in test track and standardized driving routes used in the previous EU project AEROFLEX.
It will allow to make a direct comparison in the same environment to confirm actual results versus defined targets and generating relevant data to be compared with previous and future projects and tested technologies.
IDI also captures the issues during the refuelling events, especially SoC <100% and fail initial starts.</td></tr>
<tr><td></td><td></td></tr>
<tr><td>ZEFES Verification criterion</td><td>
<table>
<tr><td colspan="2">Verification criterion</td><td>VC11</td><td>VC12</td><td>VC13</td><td>VC14</td><td>VC15</td><td colspan="2">VC19</td></tr>
<tr><td colspan="2"></td><td>e-trailer</td><td>400km/45min</td><td>DT</td><td>BEV/FCEV</td><td>corridors</td><td>missions</td><td>cargo</td></tr>
<tr><td>Use case number</td><td>Techn.</td><td></td><td></td><td>Time / Energy cost</td><td>Time/Cargo /Cost</td><td></td><td></td><td></td></tr>
<tr><td>733</td><td>BEV/FCEV</td><td></td><td>Gerona, Murcia</td><td></td><td>BEV/FCEV</td><td>SP-FR</td><td>Regional / LH P&D</td><td>Fresh fruits</td></tr>
</table>
</td></tr>
<tr><td>ZEFES KPIs</td><td>
<table>
<tr><td colspan="2">KPIs</td><td>P1 – P4</td><td>T1 – T2</td><td>V1 – V2</td><td>V3</td><td>C1-C8</td><td>C9</td><td>H1-H5</td><td>L1 – L15</td><td>O1 – O2</td></tr>
<tr><td colspan="2"></td><td>Powertrain</td><td>Tire</td><td colspan="2">Vehicle</td><td colspan="2">Charging</td><td>Hydrogen</td><td>Logistics</td><td>Operator</td></tr>
<tr><td>Use case number</td><td>Techn.</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>731</td><td>BEV</td><td>Y</td><td></td><td>Y</td><td>Y</td><td>Y</td><td></td><td></td><td>Y</td><td>Y</td></tr>
<tr><td>732</td><td>FCEV</td><td>Y</td><td></td><td></td><td>Y</td><td></td><td></td><td>Y</td><td>Y</td><td>Y</td></tr>
<tr><td>733</td><td>BEV/FCEV</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td></tr>
<tr><td>734-1</td><td>BEV</td><td>Y</td><td></td><td>Y</td><td>Y</td><td>Y</td><td></td><td></td><td>Y</td><td>Y</td></tr>
<tr><td>734-2</td><td>BEV</td><td>Y</td><td></td><td>Y</td><td>Y</td><td>Y</td><td></td><td></td><td>Y</td><td>Y</td></tr>
</table>
</td></tr>
<tr><td>Stakeholders
- governments of Lepe, Le Boulou
- bodies of motorways, parking’s, charging, rail terminal Le Boulou</td><td>Impact revised directive W&D on infrastructure, weight +2t GCW, weight on drive axle 12t for the SCA 4x2.
Impact on infrastructure along corridor regarding charging, parking, Murcia-Valencia-Tarragona-Gerona-Le Boulou
Impact on traffic & accident management.
Impact on depot PRI Lepe, Murcia and Gerona
Impact infrastructure rail terminal Le Boulou
Impact on logistics & operations</td></tr>
</table>

Use Case Number	**734-1**
Period	January 2026 – Mai 2026
Coordinator	Hector Cebrian Herrero (GSS), Christer Thoren, Gustaf Malmström (SCA)
Use case name	GSS International, automotive pipeline between factories (SP) and warehouses (DE) of the VW Group in Europe
Partners involved and roles	OEM, Scania Trucks SE, LSP / Shipper, VW Group Carrier, GSS Rail, CFL Multimodal
Vehicle specification	Scania tractor 4x2 low liner,  - Estimated curb weight low liner tractor 11t - 18t GVW / 64t GCW, 365/65/22,5 – 365/65/22,5 - Technical weight, 64t GCW - Powertrain BE with 624kW.h battery, CCS2/MCS compatible - **Delivery month December 2025** - Spanish registration plate
Trailer specification	Low liner semi-trailer - Delivered by GSS - Spanish registration plate

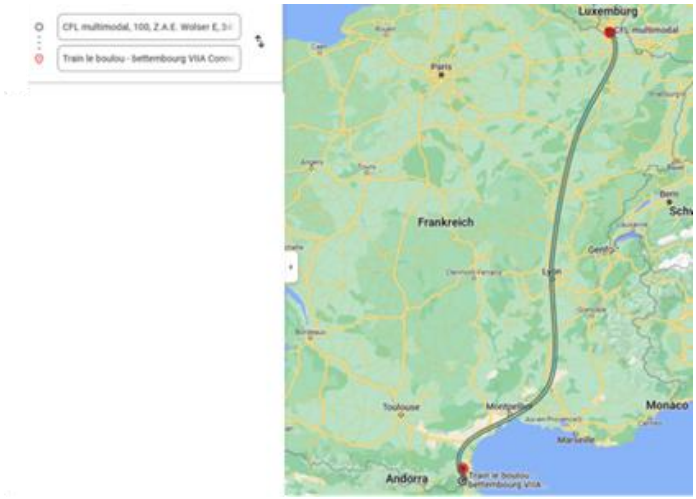
Permissions	Road permit 44t GCW Heilbronn DE to Dudelange LU vv, allowed 42t GCW in both DE and LU. Analysis to be made of overload drive axle % in weight and % in time.

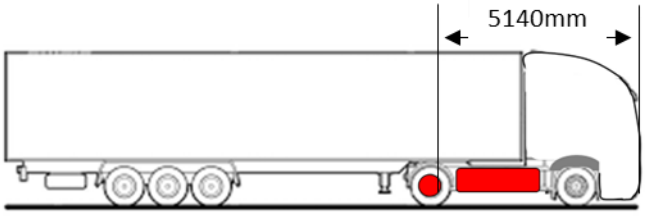
Route & Charging station involved	MCS Charger Dudelange, Zone Industrielle Wolser 1, 3590 Dudelange CCS charging at Raststätte Frankenthal

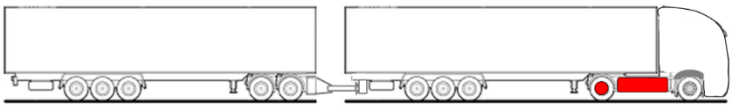
Simulation	Low liner tractor and semi-trailer @ 44t GCW
Logistics mission	Automotive supply chain within the VW Group, connecting factories in De and SP 

	
	 
Comparison ICE	
Simulation remarks	MCS-ABB Charging at CFL Multimodal, Dudelange LU. Raststätte Frankenthal with CCS charger makes the routing very flexible in time schedules and overnight stays. Potential kilometres, 48 kkm over 5 months

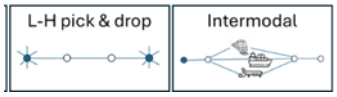
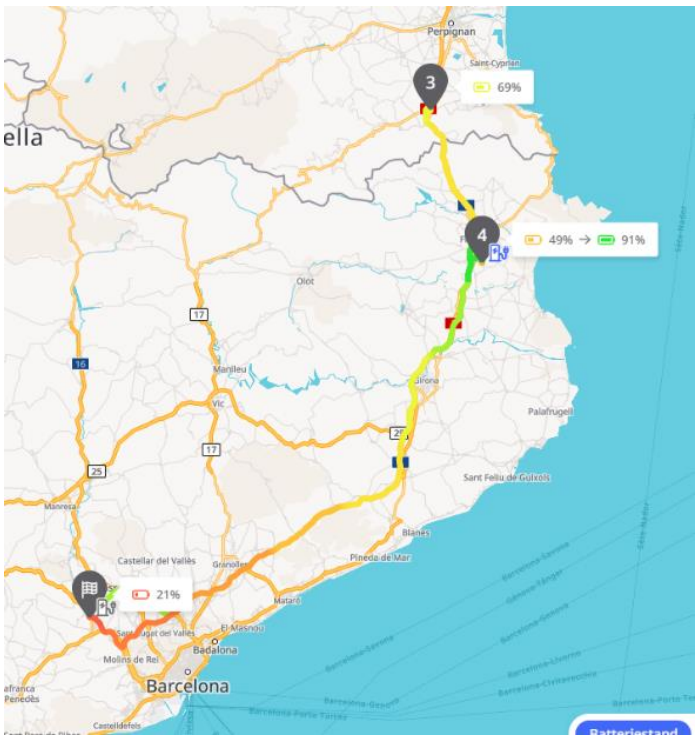
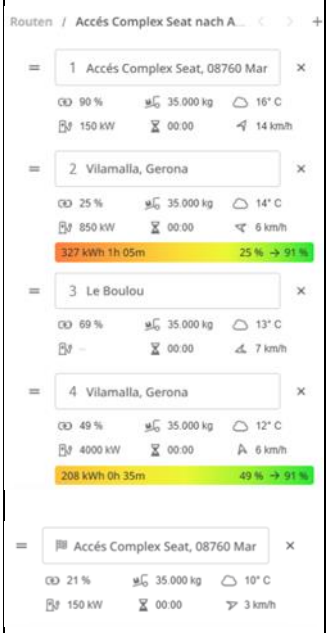
Demo plan	
Duration demonstration	Start January 2026 – End May 2026
Timetable routing	Route is a daily round trip Heilbronn DE to Dudelange LU v.v. with a length of 600km.

<table>
<tr><td>Plan
  </td><td>The demonstration is part of the automative chain between factories and warehouse of the VW Group in Europe. GSS will operate the vehicle for 3 months in Germany on an existing transport flow of automotive goods between KCC-Heilbronn-DE to Dudelange-LU, a round trip of 600km.
GSS will operate the vehicle for 3 months in Spain on this existing transport flow of automotive goods from Le Boulou-FR to SEAT Martorell-ES as tractor and duo semi-trailer combination (T+ST+D+ST @ 64t GCW), a round trip of 395km.
The stakeholder CFL Multimodal will operate the rail connection Dudelange-LU to Le Boulou-FR 1000km.</td></tr>
<tr><td> 
  </td><td>  </td></tr>
<tr><td>ZEFES Verification criterion</td><td>
<table>
<tr><th colspan="2">Verification criterion</th><th>VC11
e-trailer</th><th>VC12
400km/45min</th><th>VC13
DT</th><th>VC14
BEV/FCEV</th><th>VC15
corridors</th><th colspan="2">VC19</th></tr>
<tr><th>Use case number</th><th>Techn.</th><th></th><th></th><th>Time / Energy cost</th><th>Time/Cargo /Cost</th><th></th><th>missions</th><th>cargo</th></tr>
<tr><td>734-1</td><td>LL-BEV</td><td></td><td>Dudelange</td><td></td><td></td><td>DE-LU</td><td>LH P&D</td><td>Automotive</td></tr>
<tr><td>734-2</td><td>LL-BEV</td><td></td><td>Gerona</td><td></td><td></td><td>FR-SP</td><td>LH P&D</td><td>Automotive</td></tr>
</table>
</td></tr>
<tr><td>ZEFES KPIs</td><td>
<table>
<tr><th colspan="2">KPIs</th><th>P1 – P4
Powertrain</th><th>T1 – T2
Tire</th><th colspan="2">V1 – V2
Vehicle</th><th>V3</th><th colspan="2">C1-C8
Charging</th><th>C9</th><th>H1-H5
Hydrogen</th><th>L1 – L15
Logistics</th><th>O1 – O2
Operator</th></tr>
<tr><th>Use case number</th><th>Techn.</th><th></th><th></th><th colspan="2"></th><th></th><th colspan="2"></th><th></th><th></th><th></th><th></th></tr>
<tr><td>731</td><td>BEV</td><td>Y</td><td></td><td>Y</td><td></td><td>Y</td><td>Y</td><td></td><td></td><td>Y</td><td>Y</td><td></td></tr>
<tr><td>732</td><td>FCEV</td><td>Y</td><td></td><td></td><td></td><td>Y</td><td></td><td></td><td>Y</td><td>Y</td><td>Y</td><td></td></tr>
<tr><td>733</td><td>BEV/FCEV</td><td>Y</td><td>Y</td><td>Y</td><td></td><td>Y</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td><td></td></tr>
<tr><td>734-1</td><td>BEV</td><td>Y</td><td></td><td>Y</td><td></td><td>Y</td><td>Y</td><td></td><td></td><td>Y</td><td>Y</td><td></td></tr>
<tr><td>734-2</td><td>BEV</td><td>Y</td><td></td><td>Y</td><td></td><td>Y</td><td>Y</td><td></td><td></td><td>Y</td><td>Y</td><td></td></tr>
</table>
</td></tr>
<tr><td>Stakeholders
- governments of cities of Heilbronn, Dudelange
- bodies of motorways, parking’s, charging, rail terminal CFL</td><td>Impact revised directive W&D on infrastructure, weight +2t GCW, weight on drive axle 12t.
Impact on infrastructure along corridor regarding charging, parking, Heilbronn to Dudelange.
Impact on traffic & accident management.
Impact on MCS depot charging at CFL Multimodal
Impact on logistics & operations</td></tr>
</table>

Use Case Number	**734-2**
Period	July 2026 – November 2026
Coordinator	Hector Cebrian Herrero (GSS), Christer Thoren, Gustaf Malmström (SCA)
Use case name	GSS International, an automotive pipeline between factories and warehouses of the VW Group in Europe
Partners involved and roles	OEM, Scania Trucks SE, LSP / Shipper, VW Group Carrier, GSS Rail, CFL Multimodal
Vehicle specification	Scania tractor 4x2 low liner,  - Estimated curb weight low liner tractor 11t - 18t GVW / 64t GCW, 365/65/22,5 – 365/65/22,5 - Technical weight, 64t GCW - Powertrain BE with 624kW.h battery, CCS/MCS compatible - Delivery month December 2025 - Spanish registration plate
Trailer specification	Low liner semi-trailer - EMS2 configuration, 2 low liner semi-trailers - Delivered by GSS - Spanish registration plate

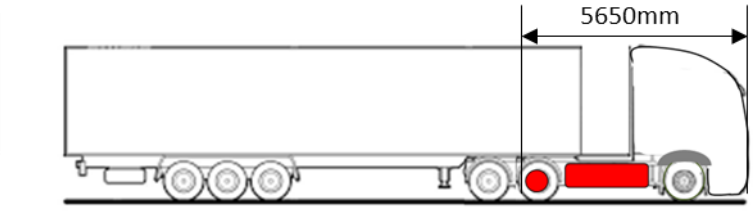
Permissions	GSS will use the tractor in a EMS2 configuration @ 64t GCW.  Road permit 64t GCW Spanish border to rail terminal Le Boulou FR. The estimated weight of the total vehicle will be appr. 50-55t GCW. Analysis to be made of overload drive axle % in weight and % in time.

Route & Charging station involved	MCS Charger PrimaFrio II Viamalla, ready by Q2 2026  CCS overnight charging at SEAT Plant in Martorell

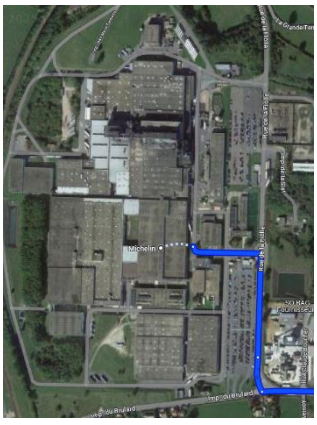
Simulation	Low liner tractor and semi-trailer @ 50-55t GCW
Logistics mission	Automotive supply chain within the VW Group, connecting factories in De and SP 
	
		
Comparison ICE	
Simulation remarks	MCS-ABB Charging at PRI Girona. Overnight charging at SEAT factory Martorell close to Barcelona. Potential kilometres, 25 kkm over 4 months

<table>
<tr><td>Demo plan</td><td></td></tr>
<tr><td>Duration demonstration</td><td>Start July 2026 – End November 2026</td></tr>
<tr><td>Timetable routing</td><td>Route is a daily round trip SEAT Martorell SP to rail terminal Le Boulou FR vv.</td></tr>
<tr><td>Plan</td><td>The demonstration is part of the automative chain between factories and warehouse of the VW Group in Europe. GSS will operate the vehicle for 3 months in Germany on an existing transport flow of automotive goods between KCC-Heilbronn-DE to Dudelange-LU, a round trip of 600km.
GSS will operate the vehicle for 3 months in Spain on this existing transport flow of automotive goods from Le Boulou-FR to SEAT Martorell-ES as tractor and duo semi-trailer combination (T+ST+D+ST @ 64t GCW), a round trip of 395km.
The stakeholder CFL Multimodal will operate the rail connection Dudelange-LU to Le Boulou-FR 1000km.</td></tr>
<tr><td></td><td></td></tr>
<tr><td>ZEFES Verification criterion</td><td>
<table>
<tr><th colspan="2">Verification criterion</th><th>VC11</th><th>VC12</th><th>VC13</th><th>VC14</th><th>VC15</th><th colspan="2">VC19</th></tr>
<tr><th colspan="2"></th><th>e-trailer</th><th>400km/45m in</th><th>DT</th><th>BEV/FCEV</th><th>corridors</th><th>missions</th><th>cargo</th></tr>
<tr><th>Use case number</th><th>Techn.</th><th></th><th></th><th>Time / Energy cost</th><th>Time/Cargo /Cost</th><th></th><th></th><th></th></tr>
<tr><td>734-1</td><td>LL-BEV</td><td></td><td>Dudelange</td><td></td><td></td><td>DE-LU</td><td>LH P&D</td><td>Automotive</td></tr>
<tr><td>734-2</td><td>LL-BEV</td><td></td><td>Gerona</td><td></td><td></td><td>FR-SP</td><td>LH P&D</td><td>Automotive</td></tr>
</table>
</td></tr>
<tr><td>ZEFES KPIs</td><td>
<table>
<tr><th colspan="2">KPIs</th><th>P1 – P4</th><th>T1 – T2</th><th colspan="2">V1 – V2</th><th>V3</th><th colspan="2">C1-C8</th><th>C9</th><th>H1-H5</th><th>L1 – L15</th><th>O1 – O2</th></tr>
<tr><th colspan="2"></th><th>Powertrain</th><th>Tire</th><th colspan="3">Vehicle</th><th colspan="2">Charging</th><th>Hydrogen</th><th>Logistics</th><th>Operator</th></tr>
<tr><th>Use case number</th><th>Techn.</th><th></th><th></th><th colspan="2"></th><th></th><th colspan="2"></th><th></th><th></th><th></th><th></th></tr>
<tr><td>731</td><td>BEV</td><td>Y</td><td></td><td colspan="2">Y</td><td>Y</td><td colspan="2">Y</td><td></td><td></td><td>Y</td><td>Y</td></tr>
<tr><td>732</td><td>FCEV</td><td>Y</td><td></td><td colspan="2"></td><td>Y</td><td colspan="2"></td><td></td><td>Y</td><td>Y</td><td>Y</td></tr>
<tr><td>733</td><td>BEV/FCEV</td><td>Y</td><td>Y</td><td colspan="2">Y</td><td>Y</td><td colspan="2">Y</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td></tr>
<tr><td>734-1</td><td>BEV</td><td>Y</td><td></td><td colspan="2">Y</td><td>Y</td><td colspan="2">Y</td><td></td><td></td><td>Y</td><td>Y</td></tr>
<tr><td>734-2</td><td>BEV</td><td>Y</td><td></td><td colspan="2">Y</td><td>Y</td><td colspan="2">Y</td><td></td><td></td><td>Y</td><td>Y</td></tr>
</table>
</td></tr>
<tr><td>Stakeholders
- governments of cities of Martorell, Gerona, Le Boulou
- bodies of motorways, parking’s, charging, rail terminal Le Boulou</td><td>Impact revised directive W&D on infrastructure, weight +2t GCW, weight on drive axle 12t.
Impact on infrastructure along corridor regarding charging, parking, Martorell, Girona, Le Boulou.
Impact on traffic & accident management.
Impact on MCS depot charging at PrimaFrio Vilamalla
Impact infrastructure rail terminal Le Boulou FR
Impact on logistics & operations</td></tr>
</table>

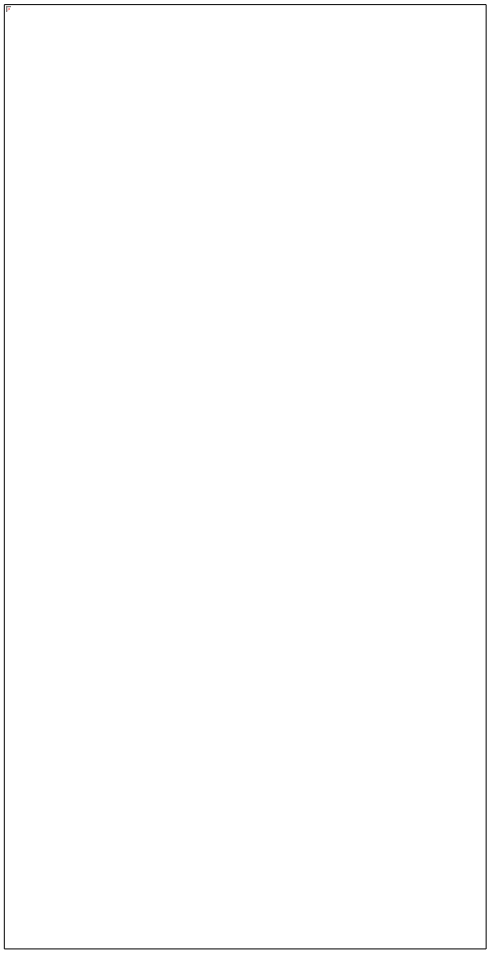
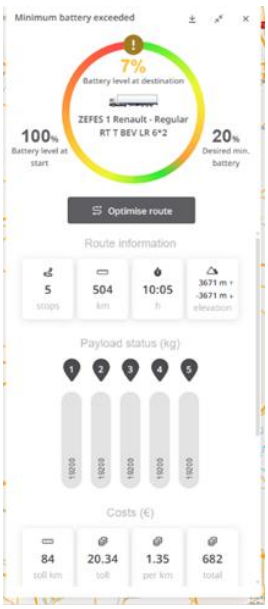
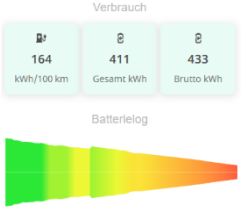
3.2.5 Renault demonstrations

Use Case Number	**741**
Period	April 2026 – August 2026
Coordinator	Louis Chavanna (Transport LTR Vialon), Celine Gallais (Michelin), Laurent Gonnet (Renault Trucks)
Use case name	MIC e-tire, plant-to-plant daily shuttle MIC Blanzy – Blavozy
Partners involved and roles	OEM, Renault Trucks France, LSP/shipper, Internal Michelin, Carrier, Transport LTR Vialon
Vehicle specification	Renault tractor 6x2 tag axle,  - Estimated curb weight tractor 13,33t - 27t GVW / 46t GCW, - 385/55/22,5 – 315/70/22,5 – 245/70/17,5 - Powertrain BE with 728kWh battery, CCS/MCS compatible - Technical weight GCW 46t - Delivery month for demonstration: May 2026 - French registration plate
Trailer specification	Standard semi-trailer - Delivered by LTR - French registration plate

Permissions	Road permit 1150mm king pin / front truck overlength, allowed 4500mm, pending approval W&D directive

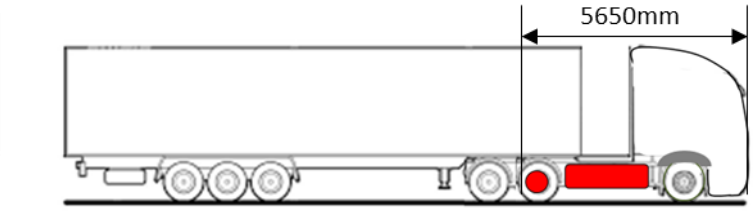
Charging station involved	  Michelin, ZI de la Fiolle, Rue de la Fiole, 71450 Blanzy, FR. Preliminary studies have been performed on both sites. In Blanzy, it has been rejected for safety issue.

	MFP Michelin, Avenue René Descartes, ZI Blavozy, 43700 Blavozy. In Blavozy, Michelin doesn't support the initial investment. LTR/Vialon is in the process of investing in charging stations on their site, in Andrezieu-Boutheon. It could be in Andezieu (42) or in Le Bosson (42). This installation should be ready by April 2026. As the infrastructure is very poor in the area, there is not any other choice than starting the fully charged mission from LTR depot, go to Blavozy, maybe top up back in Andrezieu before going north to Blanzy and come back to LRT.

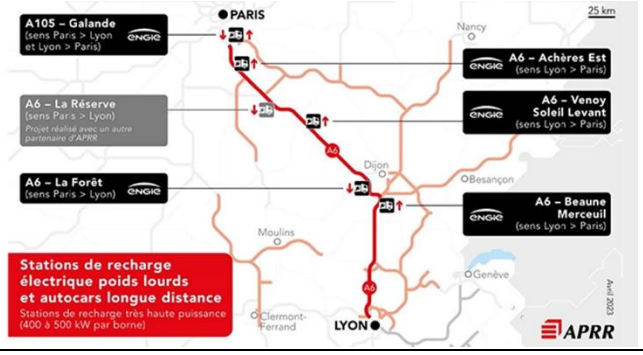
Simulation	
Logistics mission	The current flow will be reworked according to infrastructure. Starting from Andrezieu, the truck will climb to Blavozy, before going back to Andrezieu, potentially top-up and go to Blanzy. Plan and detailed operation will be discussed with LTR and Michelin to optimize the flow.     

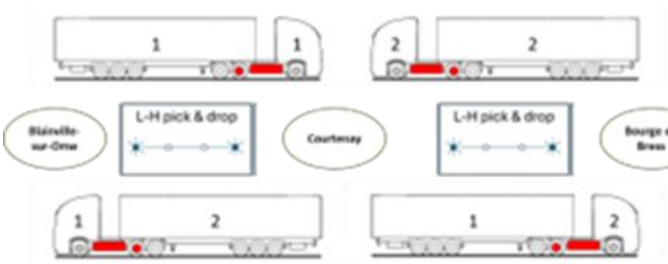
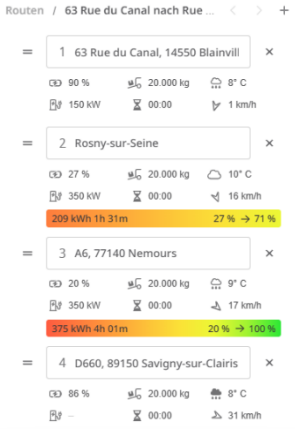
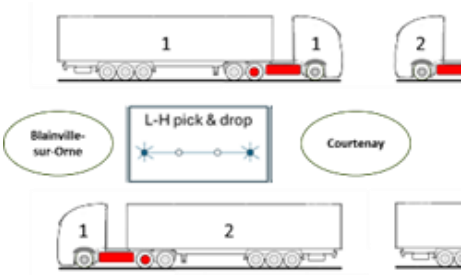
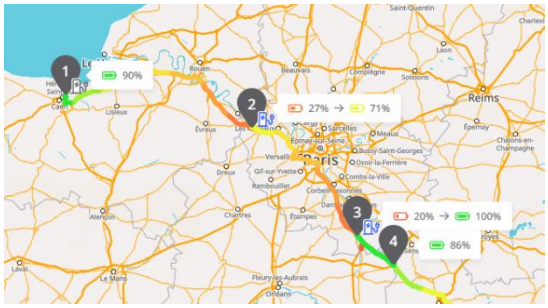
Simulation remark	Potential kilometers, 45 ´km over 5 months	

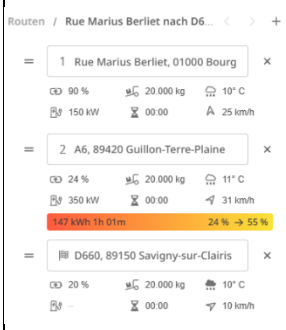
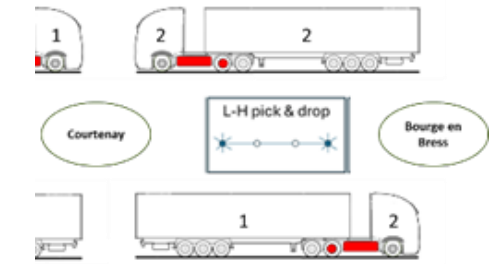
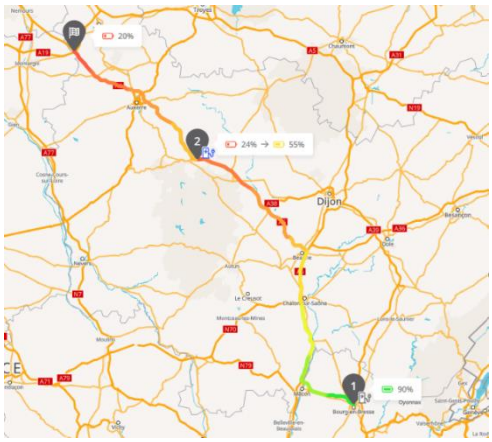
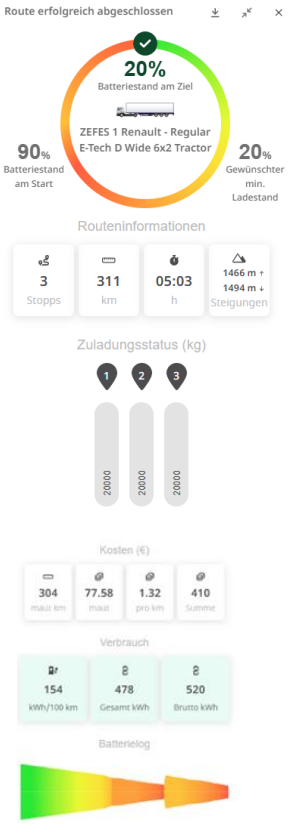
Demo plan	
Duration demonstration	Start April 2026, end August 2026
Timetable routing	Daily round trip of 500km **Use case MICHELIN internal flow** **Mission profile and metrics** / **City / (Inter)Urban / Regional / Highway (%)** / **Infrastructure (e.g., tunnels, ferry, rail)** / **Stops, driving & rest time** / **Topography** Round trip / Hilly roads Back & forth National roads: 20% Highway: 75% Other: 5% / 1 tunnel in Firminy / Rest time: 2 * 45 min Driving time: 2 * 3h45 / More than 245 m D+ Departure: Blanzy @ 5:15am – 6:45am Arrival: Blavozy @ 10:30 – 12:00 am Rest time @ Blavozy: 45 min Back to Blanzy: arrival @ 3.45- 4.45 pm
	MIC will operate a daily shuttle plant-to-plant MIC flow of semi-finished products on hilly national roads (Blanzy (71)– Blavozy (43)), back and forth
ZEFES Verification criterion	Verification criterion / VC11 e-trailer / VC12 400km/45m in / VC13 DT / VC14 BEV/FCEV / VC15 corridors / VC19 missions / VC19 cargo Use case number / Techn. / Time / Energy cost / Time/Cargo /Cost 734-1 / LL-BEV / Dudelange / DE-LU / LH P&D / Automotive 734-2 / LL-BEV / Gerona / FR-SP / LH P&D / Automotive
ZEFES KPIs	KPIs / P1 – P4 Powertrain / T1 – T2 Tire / V1 – V2 Vehicle / V3 / C1-C8 Charging / C9 / H1-H5 Hydrogen / L1 – L15 Logistics / O1 – O2 Operator Use case number / Techn. 741 / BEV / Y / Y / Y / Y / Y / / / Y / Y 742 / BEV / Y / Y / Y / Y / Y / / / Y / Y 743 / BEV / Y / Y / Y / Y / Y / / / Y / Y
Stakeholders - governments of cities of Blanzy, Blavozy - bodies of motorways, parking, charging - Michelin factories	Impact revised directive W&D on infrastructure, length +1150mm. Impact on infrastructure along main corridor A72 and regional roads Impact on charging, parking at public stations, Impact on traffic & accident management. Impact on depot charging (Michelin) Impact on logistics & operations

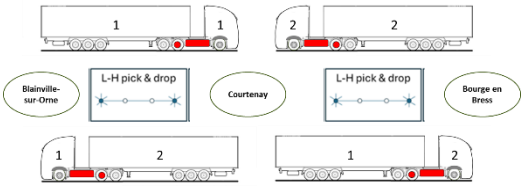
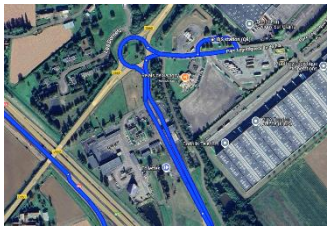
Use Case Number	**742**
Period	January 2026 – March 2026
Coordinator	Mr Chazot Fabien (Transports Chazot Lyon), Laurent Gonnet (Renault)
Use case name	**REN Rendez-vous,** an automotive supply chain between 2 Renault factories in a relay route
Partners involved and roles	OEM, Renault Trucks France, LSP/shipper, Renault Trucks France, Carrier, Transports Chazot Lyon
Vehicle specification	Renault tractor 6x2 tag axle,  - estimated curb weight tractor 13,3t - 27t GVW / 46t GCW, 385/55/22,5 – 315/70/22,5 – 245/70/17,5 - Powertrain BE with 728kWh battery, CCS/MCS compatible - Technical weight GCW 46t - **Delivery month December 2025 to operate in Q1 and Q2/2025** - French registration plate
Trailer specification	Standard trailer Delivered by Chazot French registration plate

Permissions	Road permit 1150mm king pin / front truck overlength, pending approval W&D directive

Charging station involved	Private charging station in our plants in Lyon and Venissieux. The carrier company has its own private charging station in Jonage (69), close to the starting point. E public ENGIE / APRR charging station are available along the A6 highway 2 South to North (Beaune/Merceuil – Venoy) 2 North to South (La Reserve – La Foret 

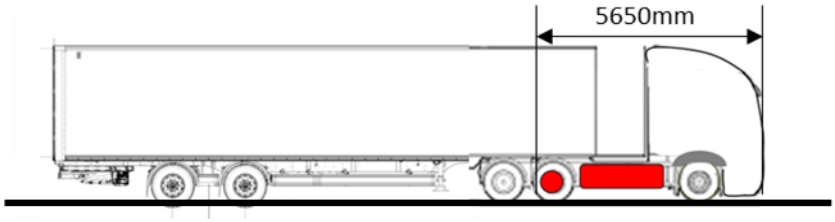
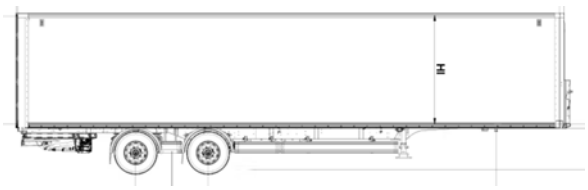
Simulation	
Logistics mission	An automotive supply chain between 2 Renault factories in a relay route. START: Renault Trucks Venissieux, Route de Lyon, Venisseux 69 SWAP of trailer: Centre Routier de Courtenay, Z.I Gâtinais – Yonne Parc Logistique Sud Ile de France, 89150 Savigny-sur-Clairis ARRIVAL: Back to Lyon. 
	 	

	 	
Simulation remark	Potential kilometers, 35 ´kmover 3 months	

Demo plan	
Duration demonstration	Start January 2026, end March 2026
Timetable routing	The route is a so-called relay route, meaning halfway the trailers are swapped so the driver is home the night. Trailer swap location is in Courtenay.  

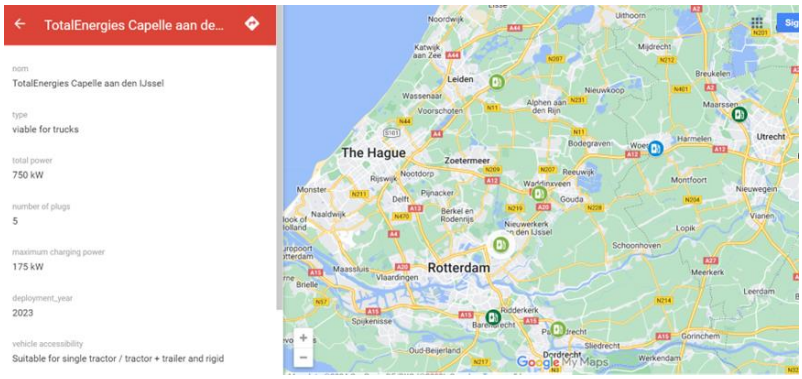
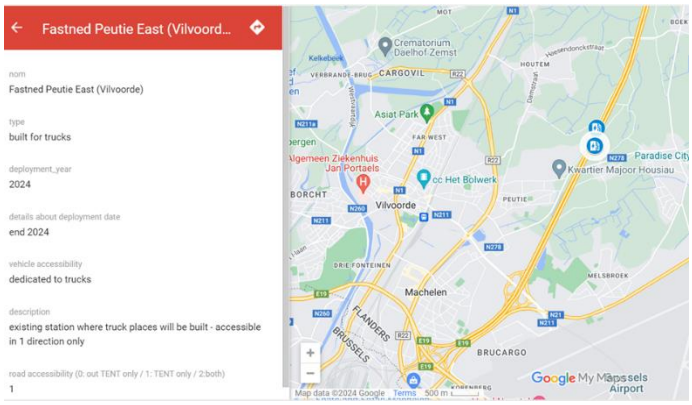
Plan	REN will operate the 1st vehicle during 3 months on an existing RENAULT TRUCKS logistic flow. RENAULT TRUCK is being electrified its logistic transports between Blainville sur Orne (France – 14), Venissieux plant (France – 69) and Bourg en Bresse (France – 01). The targeted flow will be between Venisseux and Blainville sur Orne. Every day, several synchronized rotations from Blainville and Venissieux are performed. The trailer is swapped from one tractor to the other at COURTENAY – FR 89. The tractors are going back home. The synchronized rotation stops, and trailer swaps happen in Courtenay (349km). The daily distance of 700 km mainly on French highways. New tires for ZE-HDV vehicles will be demonstrated in a real logistics operation for the project. Durability tests and checks will be performed during the demonstration. **Starting point address:** Renault-Trucks Usine de Venissieux RUE DES FRERES AMADEO – PORTE K 69200 VENISSIEUX **Current trailer swap** : Courtenay, Centre Routier de Courtenay Z.I Gâtinais – Yonne, Parc Logistique Sud Ile de France, 89150 SAVIGNY SUR CLAIRIS **End point address:** Renault-Trucks Usine de Venissieux RUE DES FRERES AMADEO – PORTE K 69200 VENISSIEUX The operation will be planned according to Renault Trucks standards and cadences. The internal Renault Trucks Range simulator is used to plan the mission and detailed truck operations. **Use case RENAULT TRUCKS internal flow** **Mission profile and metrics** / **City / (Inter)Urban / Regional / Highway (%)** / **Infrastructure (e.g., tunnels, ferry, rail)** / **Stops, driving & rest time** / **Topography** Round trip / 90% highway / No tunnel between Lyon and Courtenay / Two shifts • Blainville – Courtenay/Nemours: 4.5 Hr • Courtenay/Nemours – Macon : 4.5 Hr / Hilly
ZEFES Verification criterion	Verification criterion: VC11 e-trailer; VC12 400km/45min; VC13 DT; VC14 BEV/FCEV; VC15 corridors; VC19 missions; VC19 cargo Use case number: Techn.; Time / Energy cost; Time/Cargo /Cost 734-1 LL-BEV Dudelange DE-LU LH P&D Automotive 734-2 LL-BEV Gerona FR-SP LH P&D Automotive
ZEFES KPIs	KPIs: P1 – P4 Powertrain; T1 – T2 Tire; V1 – V2 Vehicle; V3; C1-C8 Charging; C9; H1-H5 Hydrogen; L1 – L15 Logistics; O1 – O2 Operator Use case number: Techn. 741 BEV Y Y Y Y Y Y Y 742 BEV Y Y Y Y Y Y Y 743 BEV Y Y Y Y Y Y Y

Stakeholders - governments of cities of Bourg-en Bresse and Blainville sur Orne - bodies of motorways, parking, charging	Impact revised directive W&D on infrastructure, length +900mm. Impact on infrastructure along main corridor A6 and regional roads Impact on charging, parking at public stations, Impact on traffic & accident management. Impact on depot charging (Renault) Impact on logistics & operations

Use Case Number	**743**
Period	January 2026 – August 2026
Coordinator	Hanno Hagendijk (Van Setten), Maurice Loef (DPD) Laurent Gonnet (Renault Trucks)
Use case name	DPD Deployment, parcel transport between 3 DPD depots located in Belgium, Vilvoorde and St. Niklaas, and Netherlands, Veenendaal and Berkel en Rodenrijs
Partners involved and roles	OEM, Renault Trucks France, LSP, DPD Pakket Service Veenendaal, Carrier, Van Setten Transport Ederveen
Vehicle specification	Renault tractor 6x2 tag axle,  - estimated curb weight tractor 13.3t - 27t GVW / 46t GCW, 385/55/22,5 – 215/70/22,5 – 245/70/17,5 - Powertrain BE with 728kWh battery, CCS/MCS compatible - Technical weight GCW 46t, optional up to 54t GCW? - **Delivery month Dec 2025 – in operation during Q1/2026.** - Dutch registration plate
Trailer specification	Standard 2 axle semi-trailer  Delivered by Van Setten Dutch registration plate

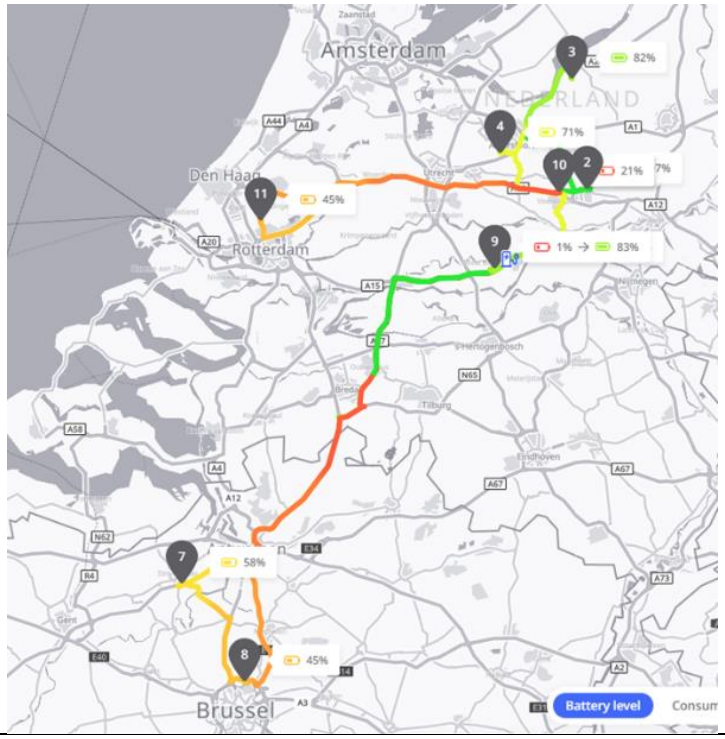
Permissions	Road permit NL and BE for overlength of vehicle (tractor +1150mm), - kingpin to front truck is 5650mm (according to revised directive W&D). The Flemish authorities have agreed to the Dutch change to 50cm extra length for the aero cab. Road permit BE for vehicle weight 27t GVW / 46t GCW. The competent authority is the Flanders region. Since 2021, higher vehicle weights are permitted in Flanders under certain conditions. See the link to the document regarding the conditions. https://www.vlaanderen.be/mobiliteit-en-openbare-erken/vrachtverkeer/tonnageverhoging-voor-vrachtverkeer https://wegenenverkeer.be/zakelijk/uitzonderlijk-vervoer/langere-en-zwaardere-vrachtwagens

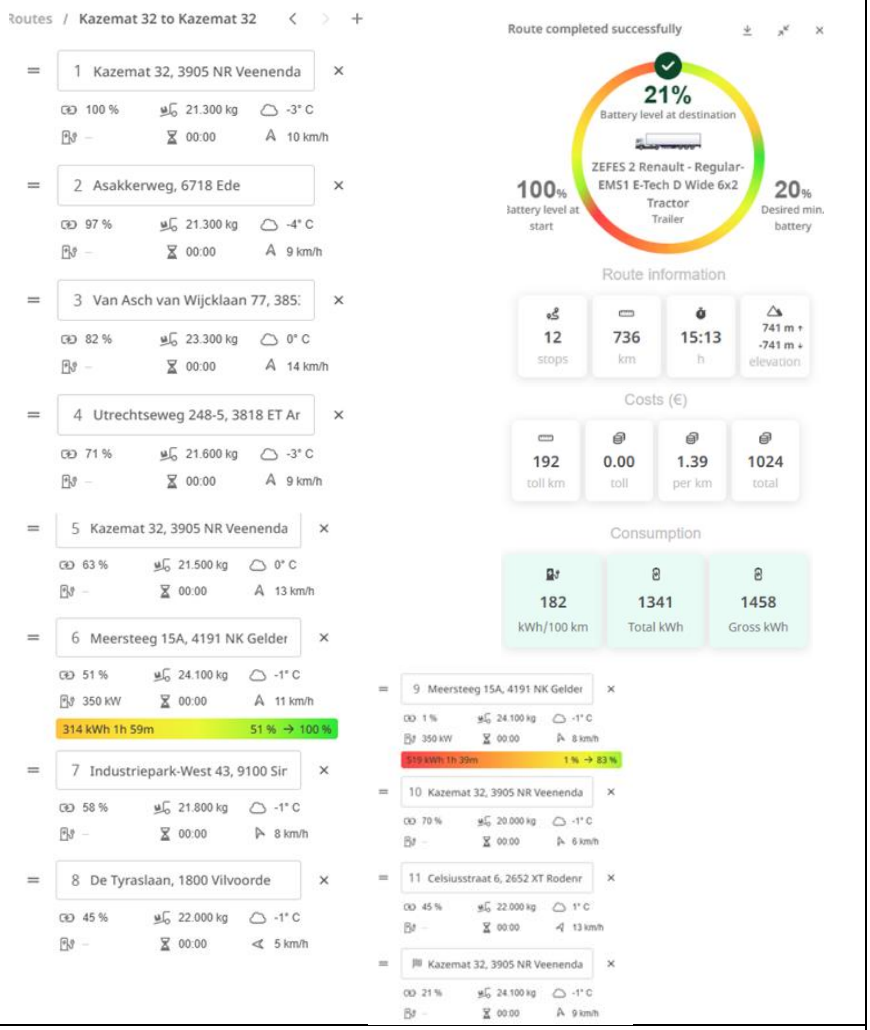
	No exemption needed for Netherlands, motorways Belgium and route between motorway and DPD depot Vilvoorde, provided that the EMS1 is not longer than a maximum of 25.75m.

Charging station involved Watthub Meersteeg 15A, 4191 NK Geldermalsen	
Total Energies Capelle a/d Ijsel	
Fastned Peutie East (Vilvoorde)	

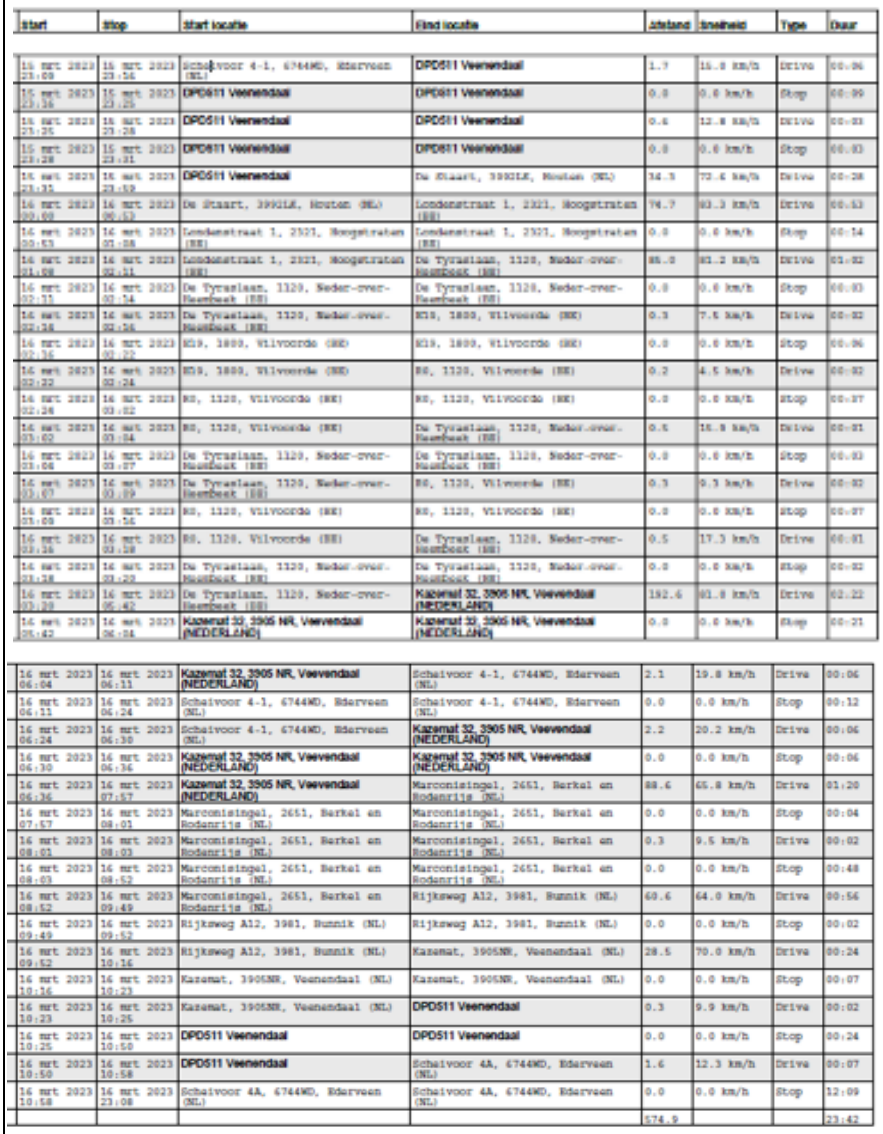
Simulation	
Logistics mission	
	Route 1: roundtrip around Veenendaal 100km Start – End; DPD Pakketservice, Kazemat 32, 3905 NR Veenendaal, NL **Route 2: Depot round trip**

	Start – End; DPD Pakketservice, Kazemat 32, 3905 NR Veenendaal, NL Stop; DPD Belgium Depot, Tyraslaan, 2800 Vilvoorde, Belgium, Stop; Depot, Industriepark West 43, 9100 Sint-Niklaas **Route 3: Shuttle trip** Start – End; DPD Pakketservice, Kazemat 32, 3905 NR Veenendaal, NL Stop; DPD Berkel en Rodenrijs, Celsiusstraat 2-6, 2652 XT Berkel en Rodenrijs

	
Simulation remark	Potential kilometres, 75 kkm over 8 months

Demo plan	
Duration demonstration	Start January 2026, end August 2026, covering appr. 76.000km
Timetable routing	For both routes 2 / 4, a tight timetable must be followed to guarantee depot slots

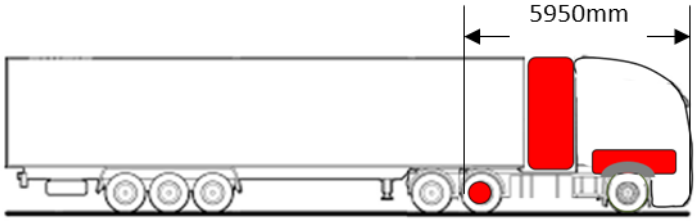
	
Plan A	Start will be running EMS1 in NL and cross border NL-BE with std truck Semi-trailer
Plan B	Depending on accessibility depot in BE, a cross border with EMS1 will be part of the demonstration
ZEFES Verification criterion	
ZEFES KPIs	

Verification criterion		VC11	VC12	VC13	VC14	VC15	VC19	
		e-trailer	400km/45min	DT	BEV/FCEV	corridors	missions	cargo
Use case number	Techn.			Time / Energy cost	Time/Cargo /Cost			
743	BEV					NL-BE	Grid scheme	Parcels

KPIs		P1 – P4	T1 – T2	V1 – V2	V3	C1-C8	C9	H1-H5	L1 – L15	O1 – O2
		Powertrain	Tire	Vehicle		Charging		Hydrogen	Logistics	Operator
Use case number	Techn.									
741	BEV	Y	Y	Y	Y	Y			Y	Y
742	BEV	Y	Y	Y	Y	Y			Y	Y
743	BEV	Y	Y	Y	Y	Y			Y	Y

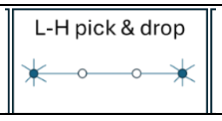
Stakeholders - governments of cities of Antwerp, Vilvoorde, St. Niklaas, Breda, Veenendaal, Berkel en Rodenrijs - bodies of motorways, parking, charging - DPD NL and BE	Impact revised directive W&D on infrastructure, length +1150mm, for std as well as EMS1 in NL and BE. Impact on infrastructure along main corridor E19 NL-BE regarding charging, parking, Impact on traffic & accident management. Impact on depot charging Impact on logistics & operations

3.2.6 Ford demonstrations

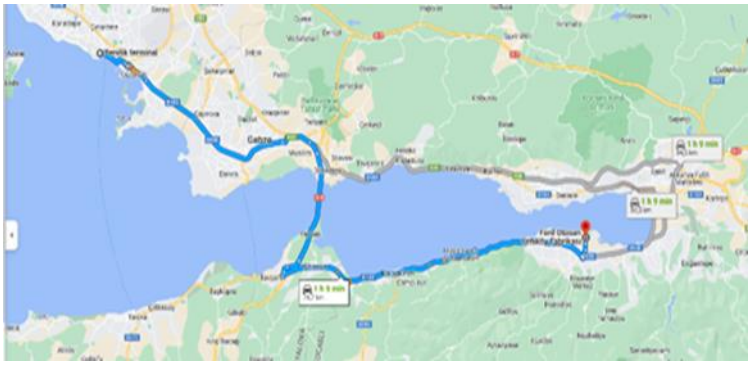
Use Case Number	**761**
Period	September 2026 – November 2026
Coordinator	Ceylan Cobantürk (EKO), Özcan Gül (FRD)
Use case name	EKO Shuttle Ford factory and Istanbul habour
Partners involved and roles	OEM, Ford Otosan, LSP / Shipper, Ford Otosan Carrier, EKOL Logistics
Vehicle specification	Ford tractor 6x2 tag axle  - estimated curb weight tractor 13,4t - 26t GVW / 44t GCW, 315/70/22,5 – 315/70/22,5 – 315/70/22,5 - Technical weight, 44t GCW - Powertrain FC 240kW, 200kW.h battery, 58kg hydrogen capacity - **Delivery month September 2026** - Spanish registration plate
Trailer specification	EKOL semi-trailers, curb weight appr. 7,5t, type body curtain sider. Cargo described as engines and vehicle parts for assembly, appr. 24t

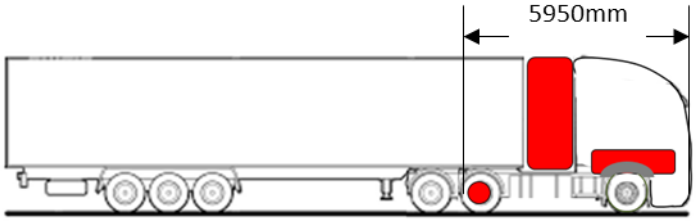
Permissions	Road permit 44t GCW for TR Road permit for overlength of 5.950mm king pin to front vehicle, due to the storage of hydrogen tanks behind the cabin.

HRS station involved	Mobile hydrogen filling station at the Ford Kocaeli Plant. At the time of writing this document the solution is still open.

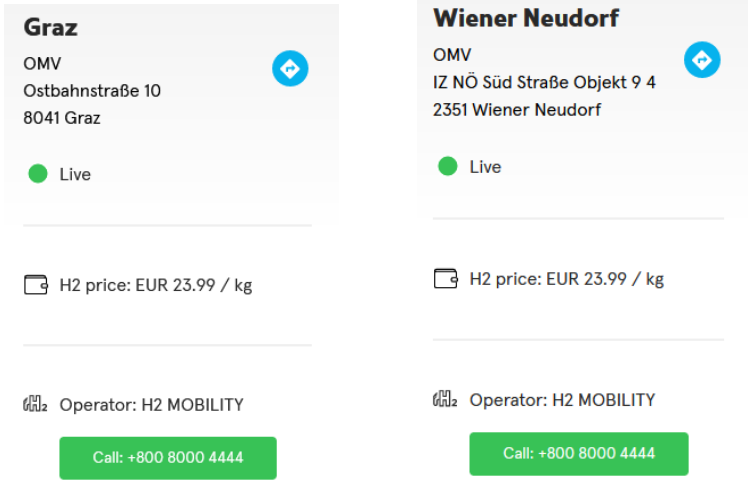
Simulation	Estimated consumption @ 44t GCW is 10kg/100km. With 58kg hydrogen, it should be possible to achieve a range of 580km. This means one filing per day at the factory plant. Potential kilometers, 30kkm over 3 months
Logistics mission	

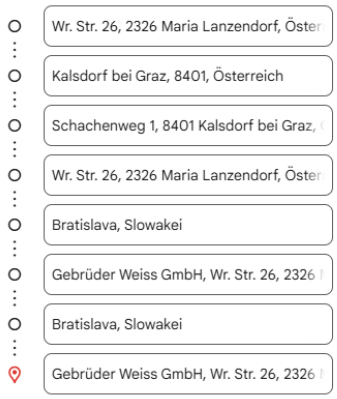
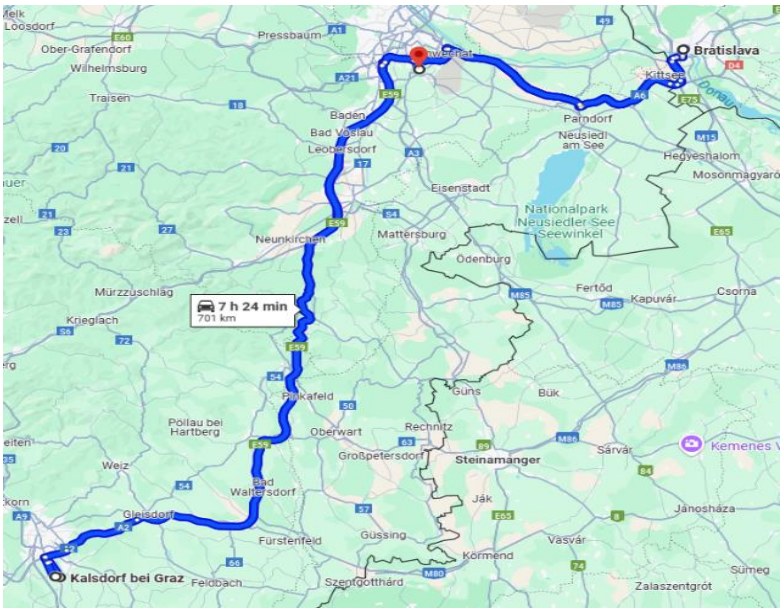
Demo plan	
Duration demonstration	Start September 2026, November 2026

<table>
<tr><td>Timetable routing</td><td>EKOL Logistics will operate the vehicle, on a regional-national long-haul profile, between Ford Kocaeli Plant and Istanbul Pendik Ports, daily 3 round trips ca. 500km for 2-3 Months transporting vehicle production parts used in the Ford Otosan plant.
  </td></tr>
<tr><td>ZEFES Verification criterion</td><td>
<table>
<tr><td colspan="2">Verification criterion</td><td>VC11</td><td>VC12</td><td>VC13</td><td>VC14</td><td>VC15</td><td colspan="2">VC19</td></tr>
<tr><td colspan="2"></td><td>e-trailer</td><td>400km/45m in</td><td>DT</td><td>BEV/FCEV</td><td>corridors</td><td>missions</td><td>cargo</td></tr>
<tr><td>Use case number</td><td>Techn.</td><td></td><td></td><td>Time / Energy cost</td><td>Time/Cargo /Cost</td><td></td><td></td><td></td></tr>
<tr><td>761</td><td>FCEV</td><td></td><td></td><td></td><td></td><td>TR</td><td>LH P&D</td><td>Automotive</td></tr>
<tr><td>762</td><td>FCEV</td><td></td><td></td><td></td><td></td><td>AT</td><td>A2B / LH P&D</td><td>General</td></tr>
<tr><td>763</td><td>FCEV</td><td></td><td></td><td></td><td></td><td>IT</td><td>LH P6D</td><td>Containers</td></tr>
</table>
</td></tr>
<tr><td>ZEFES KPIs</td><td>
<table>
<tr><td>KPIs</td><td></td><td>P1 – P4</td><td>T1 – T2</td><td>V1 – V2</td><td>V3</td><td>C1-C8</td><td>C9</td><td>H1-H5</td><td>L1 – L15</td><td>O1 – O2</td></tr>
<tr><td></td><td></td><td>Powertrain</td><td>Tire</td><td colspan="2">Vehicle</td><td colspan="2">Charging</td><td>Hydrogen</td><td>Logistics</td><td>Operator</td></tr>
<tr><td>Use case number</td><td>Techn.</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>761</td><td>FCEV</td><td>Y</td><td></td><td></td><td>Y</td><td></td><td></td><td>Y</td><td>Y</td><td>Y</td></tr>
<tr><td>762</td><td>FCEV</td><td>Y</td><td></td><td></td><td>Y</td><td></td><td></td><td>Y</td><td>Y</td><td>Y</td></tr>
<tr><td>763</td><td>FCEV</td><td>Y</td><td></td><td></td><td>Y</td><td></td><td></td><td>Y</td><td>Y</td><td>Y</td></tr>
</table>
</td></tr>
<tr><td>Stakeholders
- governments Turkye, Kocaeli and Pendik ports
- bodies of motorways and regional routes</td><td>The first impact of FCEV vehicles on infrastructure along the route Kocaeli and Pendik Port.
Impact on energy infrastructure, HRS station within the Kocaeli plant and in future the Pendik Port.
Impact on traffic & accident management.
Impact on logistics & operations</td></tr>
</table>

Use Case Number	**762**
Period	March 2026 – May 2026
Coordinator	Thomas Mazzurana (GBW), Özcan Gül (FRD)
Use case name	GBW Forwarding, shuttle between Graz and Vienna with A2B roundtrip Vienna area
Partners involved and roles	OEM, Ford Otosan, LSP / Shipper, GBW Carrier, GBW
Vehicle specification	Ford tractor 6x2 tag axle  - estimated curb weight tractor 13,4t - 26t GVW / 44t GCW, 315/70/22,5 – 315/70/22,5 – 315/70/22,5 - Technical weight, 44t GCW - Powertrain FC 240kW, 200kWh battery, 58kg hydrogen capacity - Delivery month February 2026 - Spanish registration plate
Trailer specification	GBW semi-trailers, type body and specification depending on the cargo

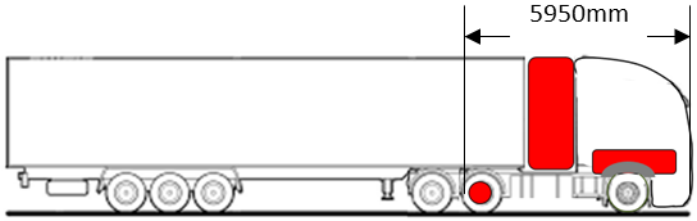
Permissions	Road permit 44t GCW for AT, 42t GCW is allowed according to revised directive W&D. Directive not yet implemented in Austria. Road permit for overlength of 5.950mm king pin to front vehicle. Vehicle type approval is still pending in Spain. Individual vehicle type approval in Austria is also still pending (the truck can only be driven with Spanish licence plates for one month). Vehicle registration – road approval – is still pending (so far, the authorities have rejected the application).

HRS station involved	Two hydrogen stations are available, one in Graz and one in Vienna 

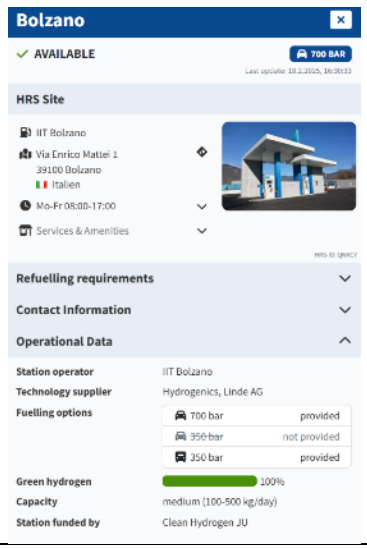
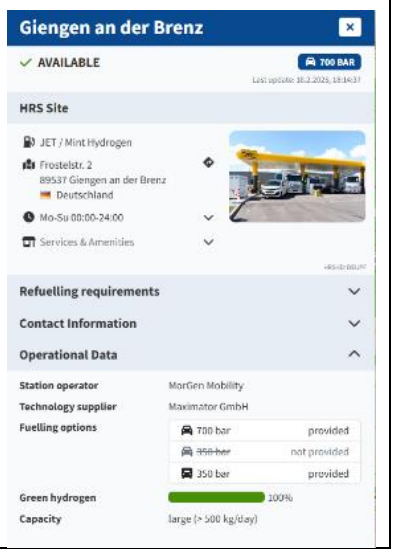
Simulation	
Logistics mission	
	
Simulation remark	Potential kilometres, 30 kkm over 3 months

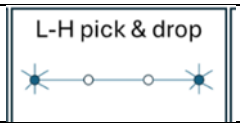
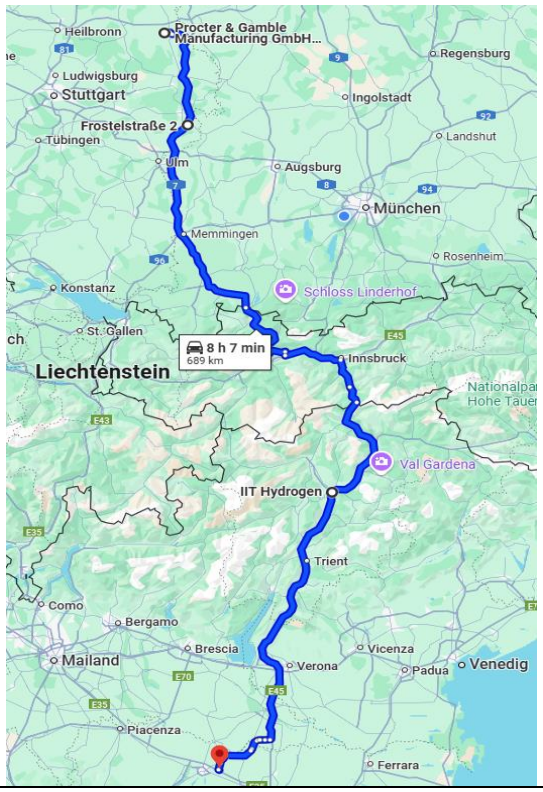
Demo plan	
Duration demonstration	Start March 2026, End May 2026 GBW act as freight forwarder for multiple shippers and operate the vehicle in a logistics network on a daily regional-national

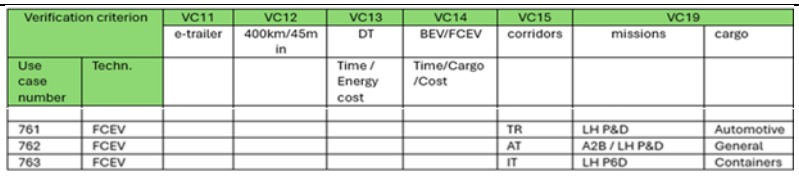
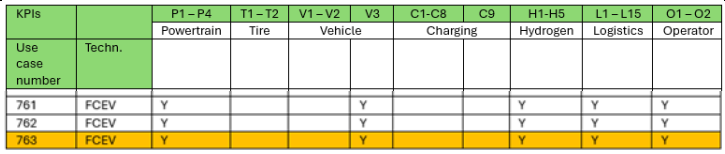
<table>
<tr><td></td><td>long-haul profile for general cargo between Vienna and Graz and in the area surrounding Vienna.
However, in specific conditions using the FRD vehicle, GBW will operate themselves with own drivers trained on this use case.</td></tr>
<tr><td>Timetable routing</td><td>Fix route at night plus flexible choice of route during the day, total length of 700 km.
Roundtrip Gebrüder Weiss branch in Maria-Lanzendorf (Wiener Straße 26, 2326 Maria Lanzendorf, Austria) to Gebrüder Weiss branch in Kalsdorf bei Graz (Schachenweg 1, 8401 Kalsdorf bei Graz, Austria) and back. Approximately 400 km.
On the night line, there is currently only swap body traffic; this must then be switched to semi-trailers. Equipment: ADR must be available, box body preferred.
Usual procedure: Departure in Maria Lanzendorf between 18:00-20:00 o’clock, arrival in Kalsdorf bei Graz between 21:00-23:00 o’clock, arrival back in Maria Lanzendorf until 03:00 o’clock max.
Flexible route during the day as required in the Vienna area.
Whether in the haulage/carriage, as a shuttle for a special job or even for another short distance trips. As of today, the truck will realistically cover in addition to the 400 km approximately 300 km during the day, which, taken together, amounts to a probable day tour of 600-700 km.</td></tr>
<tr><td></td><td></td></tr>
<tr><td>ZEFES Verification criterion</td><td>
<table>
<tr><th colspan="2">Verification criterion</th><th>VC11</th><th>VC12</th><th>VC13</th><th>VC14</th><th>VC15</th><th colspan="2">VC19</th></tr>
<tr><th colspan="2"></th><th>e-trailer</th><th>400km/45m in</th><th>DT</th><th>BEV/FCEV</th><th>corridors</th><th>missions</th><th>cargo</th></tr>
<tr><th>Use case number</th><th>Techn.</th><th></th><th></th><th>Time / Energy cost</th><th>Time/Cargo /Cost</th><th></th><th></th><th></th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>761</td><td>FCEV</td><td></td><td></td><td></td><td></td><td>TR</td><td>LH P&D</td><td>Automotive</td></tr>
<tr><td>762</td><td>FCEV</td><td></td><td></td><td></td><td></td><td>AT</td><td>A2B / LH P&D</td><td>General</td></tr>
<tr><td>763</td><td>FCEV</td><td></td><td></td><td></td><td></td><td>IT</td><td>LH P6D</td><td>Containers</td></tr>
</table>
</td></tr>
<tr><td>ZEFES KPIs</td><td>
<table>
<tr><th colspan="2">KPIs</th><th>P1 – P4</th><th>T1 – T2</th><th colspan="2">V1 – V2</th><th>V3</th><th colspan="2">C1-C8</th><th>C9</th><th>H1-H5</th><th>L1 – L15</th><th>O1 – O2</th></tr>
<tr><th colspan="2"></th><th>Powertrain</th><th>Tire</th><th colspan="3">Vehicle</th><th colspan="2">Charging</th><th>Hydrogen</th><th>Logistics</th><th>Operator</th></tr>
<tr><th>Use case number</th><th>Techn.</th><th></th><th></th><th colspan="3"></th><th colspan="2"></th><th></th><th></th><th></th><th></th></tr>
<tr><td>761</td><td>FCEV</td><td>Y</td><td></td><td colspan="2"></td><td>Y</td><td colspan="2"></td><td></td><td>Y</td><td>Y</td><td>Y</td></tr>
<tr><td>762</td><td>FCEV</td><td>Y</td><td></td><td colspan="2"></td><td>Y</td><td colspan="2"></td><td></td><td>Y</td><td>Y</td><td>Y</td></tr>
<tr><td>763</td><td>FCEV</td><td>Y</td><td></td><td colspan="2"></td><td>Y</td><td colspan="2"></td><td></td><td>Y</td><td>Y</td><td>Y</td></tr>
</table>
</td></tr>
<tr><td>Stakeholders
- governments of Graz, Vienna, Bratislava and along the route
- bodies of motorways and regional routes</td><td>Impact of FCEV vehicles on infrastructure along the route Vienna and Graz.
Impact on energy infrastructure, HRS station within the Graz and Vienna with 700bar filling system.
Impact on traffic & accident management.
Impact on logistics & operations</td></tr>
</table>

Use Case Number	**763**
Period	June 2026 – August 2026
Coordinator	Frank Kressmann (PG), Ettore Gualandi (GRU) Özcan Gül (FOR)
Use case name	P&G Inter sites, transport flow from Gattatico IT to Crailsheim DE of semi-products for further processing
Partners involved and roles	OEM, Ford Otosan, LSP / Shipper, P&G Carrier, GRU
Vehicle specification	Ford tractor 6x2 tag axle  - estimated curb weight tractor 13,4t - 26t GVW / 44t GCW, 315/70/22,5 – 315/70/22,5 – 315/70/22,5 - Technical weight, 44t GCW - Powertrain FC 240kW, 200kW.h battery, 58kg hydrogen capacity - **Delivery month June 2026** - Spanish registration plate
Trailer specification	GRU semi-trailers, type depending on the cargo

Permissions	Road permits are 44t GCW for AT and DE, 42t will be allowed. In IT 44t GCW is allowed. Road permit for overlength of 5.950mm king pin to front vehicle due to the storage of hydrogen tanks behind the cabin.

Hydrogen station involved	Hydrogen stations are available. To be checked whether 700bar filling system is available by Q1 2026  

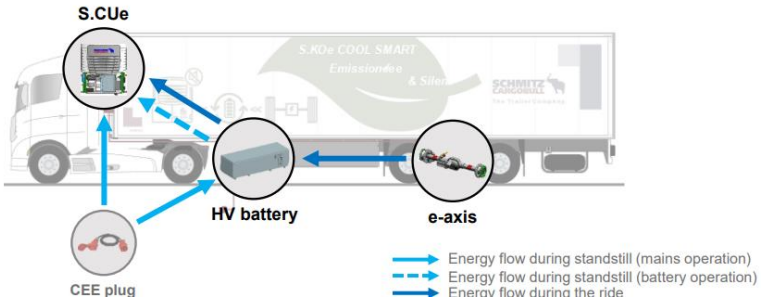
Simulation	
Logistics mission	
	
Simulation results	Potential kilometers, 35´ km over 3 months

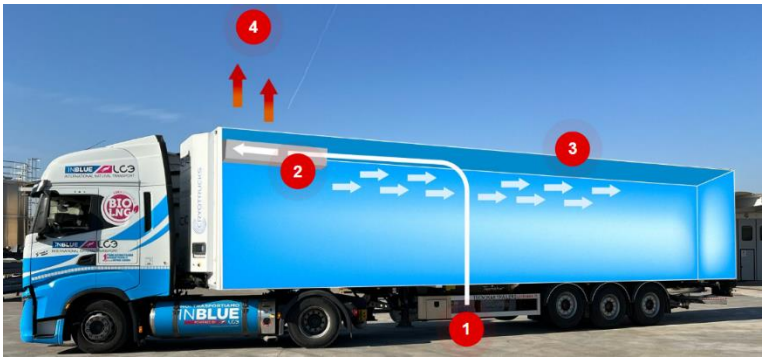
Demo plan	
Duration demonstration	Start June, End August 2026, eventually till November 2026
Timetable routing	GRU will operate the vehicle between the 2 P&G plants, Crailsheim DE and Gattatico IT. A daily route with a trip length of 700km.
ZEFES Verification criterion	
ZEFES KPIs	
Stakeholders - governments of - bodies of motorways and regional routes	Impact of FCEV vehicles on infrastructure along the route. Impact on energy infrastructure, HRS station Bozen, Brenner and Giengen. Impact on traffic & accident management. Impact on logistics & operations.

Verification criterion		VC11	VC12	VC13	VC14	VC15	VC19	
		e-trailer	400km/45min	DT	BEV/FCEV	corridors	missions	cargo
Use case number	Techn.			Time / Energy cost	Time/Cargo /Cost			
761	FCEV					TR	LH P&D	Automotive
762	FCEV					AT	A2B / LH P&D	General
763	FCEV					IT	LH P6D	Containers

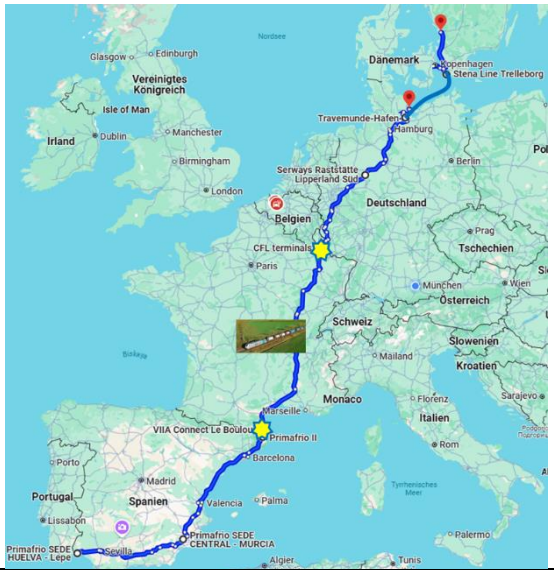
KPIs		P1 – P4	T1 – T2	V1 – V2	V3	C1-C8	C9	H1-H5	L1 – L15	O1 – O2
		Powertrain	Tire	Vehicle		Charging		Hydrogen	Logistics	Operator
Use case number	Techn.									
761	FCEV	Y			Y			Y	Y	Y
762	FCEV	Y			Y			Y	Y	Y
763	FCEV	Y			Y			Y	Y	Y

3.2.7 E-trailer charging on rail

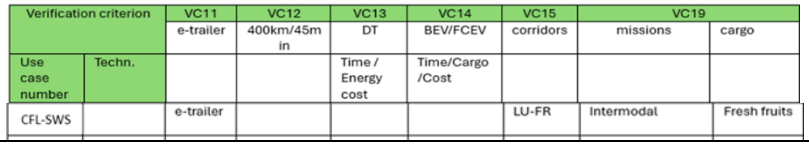
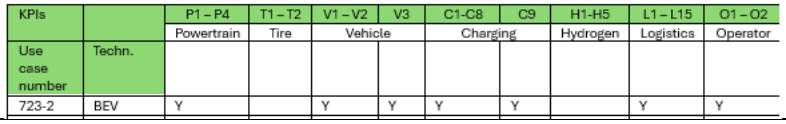
Use Case Number	**CFL-SWS**
Period	June 2025, May 2026 – July 2026
Coordinator	Marc Valete (CFL), Eric Lambert (PT),
Use case name	Multimodal freight transport, charging of BE-vehicles on rail wagon, rail corridor Dudelange LU to Le Boulou FR
Partners involved and roles	OEM, Kaessbohrer, ZF Rail operator, CFL Multimodal, UIC Suppliers, SWS, Cryotruck, SCB Shipper, PRI
Trailer specification	Kaessbohrer/ZF e-semi-trailer   - Curb weight e-semi-trailer 9,6t, 385/65/22,5 - Technical weight, 39t GVW - Powertrain BE with 200kW.h battery, CCS compatible Reefer trailer, temperature-controlled cargo Three types, - conventional ICE operated unit, delivered by PRI - e-reefer with e-operated unit, 400V EEC, delivered by PRI, SCB or KAE - liquid nitrogen operated unit, delivered by PRI or SCB or KAE Registration plate, not relevant e-cooling (example) **S.KOe Cool - fully electric refrigerated trailer from Schmitz Cargobull** Basic components and function 

	Liquid Nitrogen cooling (example)  1-nitrogen container 2-Evaporator 3-Cooling 4-Heat exhaust

Permissions	Permits to enter rail CFL terminals at Dudelange (LU) and Le Boulou (FR) Certification of charging a vehicle battery on the rail wagon equipped with SWS Powerbox. Certification of a semi-trailer equipped with a Liquid Nitrogen Cooling system for fresh food

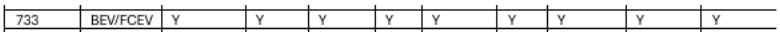
Simulation	Distance Dudelange – Le Boulou ca. 975km Physical test trailer fit on rail wagon for the 3 trailer types Test run with e-reefer charging battery LU -> FR Test run with e-trailer charging battery FR -> LU
	

SWS Powerbox	 POCKET WAGON** ✓ 2 x 45' Reefer trailer ✓ 2 x 45' (40') Reefer container ✓ 4 x 20' Reefer container ✓ 4 x 7.82m Cooling swap body   Axle generator  The SWS Powerbox is fitted on a rail wagon. A wheel motor produces electricity, feeding the Powerbox. The climate control system of the e-reefer will be connected with the Powerbox to operate during the route Le Boulou – Dudelange v.v.
E-trailer	The e-trailer developed in the ZEFES project uses ZF's proprietary AxTrax 2 e-Axle, trailer EBS and a battery system, transforming standard trailers into hybrid systems when paired with trucks, BEV or ICE-Diesel.
E-reefer	An e-reefer is a semi-trailer equipped with a climate control system electric operated instead of the traditional ICE-Diesel. An e-axle produces electricity, feeding the battery. The climate control unit is connected to the battery. This unit is fully zero emission free.
Liquid Nitrogen Cooling (LNC)	An LNC-reefer is a semi-trailer equipped with a climate control system operated fully autonomous using nitrogen as medium instead of the traditional ICE-Diesel. Nitrogen is used to keep the temperature in the reefer at a constant level. No additional power supply is needed, and its operation is emissions free.

Demo plan	
Duration demonstration	First test with LN-reefer June 2026 Second test with e-reefer and e-trailer May 2026, July 2026
Timetable routing 	Use case 723-2 and 733 is part of a fresh fruits pipeline operated by PrimaFrio between Lepe, South of Spain and Halmstadt South of Sweden. The intermodal pipeline is using the rail connection Le Boulou FR and Dudelange LU, operated by CFL Multimodal transporting the reefers by rail.
ZEFES Verification criterion	
ZEFES KPIs	

Verification criterion		VC11	VC12	VC13	VC14	VC15	VC19	
		e-trailer	400km/45m in	DT	BEV/FCEV	corridors	missions	cargo
Use case number	Techn.			Time / Energy cost	Time/Cargo /Cost			
CFL-SWS		e-trailer				LU-FR	Intermodal	Fresh fruits

KPIs		P1 – P4	T1 – T2	V1 – V2	V3	C1-C8	C9	H1-H5	L1 – L15	O1 – O2
		Powertrain	Tire	Vehicle		Charging		Hydrogen	Logistics	Operator
Use case number	Techn.									
723-2	BEV	Y		Y	Y	Y	Y		Y	Y

	
Stakeholders - governments of Luxembourg, France bodies of motorways/terminal CFL Dudelange and Le Boulou	Impact revised directive W&D on infrastructure. Impact on infrastructure along the main corridor. Impact on traffic & accident management. Impact on rail terminal. Impact on logistics & operations in multimodal transport.

4 Conclusions and recommendations

4.1 Conclusions

As overall conclusion, it can be stated that all 12 demonstrations and 18 use cases, described in Chapter 3, can be executed. A result of intensive work by the 4 working groups, logistics operation-energy infrastructure-road permits-data and digital twins, resulted in organising a PAN European demonstration of

- 12 vehicles (9 BEV, 3 FCEV),
- 2 MCS concepts at 4 different locations, and
- 2 HRS concepts at 2 locations,

In 18 use cases, supported by the digital platform under real life operational conditions comparable to the VECTO long haul and regional-national mission profiles and meeting the requirements of

- 750km unrefueled / 400km un-recharged over a period of 15 months,
- covering 1,000,000 kilometers, representing 30,000 hours operational life.

The total length of all use cases represents a road use of approximately 9,000km road and 2,000km rail across European corridors.

However, the conclusions out of deliverable D1.2 remain. The demonstrations of the use cases still have a preliminary status due to mainly external events / dependencies.

Table 7 overview status use cases April 2025

Task 7.1 STx.x.x		Topic	7.2.1	7.2.2	7.2.3	7.2.4	7.3.1	7.3.2	7.3.3	7.3.4	7.4.1	7.4.2	7.6.1	7.6.2	7.6.3
7.1.1		Detailed plan													
7.1.2		Type approval & Permits													
7.1.3		Charging & Fuelling													
7.1.4		Orchestration													
7.1.5		Training & instructions													
7.1.6		Installation data logger													
7.1.7		Coordination execution													

On top, risks are identified, see chapter 5 table 7. The energy infrastructure and road permits for the demonstrators are still causing huge challenges. All risks are split in three categories and mitigation actions are defined.

The challenges and main concerns remain, being the internal and external dependencies, the energy infrastructure and the permits for road demonstrations under real time conditions.
Internal dependencies.
1) Carriers as contract partners of the shippers operating the demonstrators, ST7.1.4 Use case set up, network planning and orchestration.
2) Development of the e-trailer concept strategy, ST5.5.1 Next level e-trailers as part of the distributed battery electric powertrain demonstrator.
3) Charging of e-reefers on the rail wagon, T3.4 Feasibility study charging opportunity Ferry or Rail-wagon.

4) Concept of the ZEFES Digital Twin Platform, Task 4.6 Tool validation and digital twinning.
5) Agreement of vehicle-data exchange between OEMs and ZEFES partners, Task 4.3 Interaction of tools, data and model, its control and realization of the digital twin platform.

External dependencies.
1) Market situation 2025 / 2026 with regard the planned logistics real time use cases, ST7.1.4 Use case set up, network planning and orchestration.
2) Vehicle Type Approval and Road Permits for the demonstrators, ST7.1.2 Preparation and Preparatory activities for infrastructure permits and vehicle road allowances.
3) Coverage of charging (CCS/MCS) and fuelling (HRS) along the ZEFES corridors, ST7.1.3 Preparation of charging and fuelling infrastructure and back office.

Energy infrastructure.
ZEFES is supplying 2 MCS chargers by ABB and HIT, 2 HRS by CM/AP, covering 6 locations. The majorities of the charging and hydrogen locations needed to execute the ZEFES demonstrations are public and at sides of ZEFES logistics partners.
The main concerns experienced during the past year are,

- Legislative issue regarding drive & rest schedules not aligned with charging vehicles,
- Poor interest of DSOs and governments investing in energy infrastructure,
- Concerns high and medium voltage concepts,
- Leadtime to build charging and hydrogen stations,
- Standards for filling and 700bar filling systems

Road permits
ZEFES will use demonstrators, developed by the OEMs in line with the revised directive “weights and dimensions” incorporating the new technologies for BE- and FC-HDVs. The proposed overlength and extra weight is used to build in all innovations making the vehicles technically road worthy.
The main concerns experienced the past year are,

- Not all EU member states will approve this revised directive,
- Overlength kingpin – front of truck (900mm) not enough to create space for all e-components,
- Extra weight of 2t GCW is not enough to compensate the extra weight of e-components (batteries and e-axle).

4.2 Recommendations

Recommendations can be grouped in 4 categories.

To do´s until the start of demonstration.

As uncertainties remain, the coordination between the involved partners of each demonstration is required to ensure that outstanding topics are solved, or a mitigation is found before start.

To do´s during the execution phase demonstrations.

An “A-Team” will be organised to guide the demonstrations enabling quick support when unexpected events turn-up. This team will be managed by VUB, team members are representatives from side the operators, the suppliers and the OEMs (truck & trailer).

To do´s regarding the assessment and validation (ref business model).

Involvement of demonstration-operators ensuring data of reference vehicles (mostly ICE) enabling a solid validation and assessment of the new technologies, their pro´s and contra´s, leading to clear recommendations beyond the ZEFES project.

Proposal beyond the demonstration phase and beyond the project.

Involvement of demonstration-operators and stakeholders supporting the creation of realistic and concrete recommendations beyond the ZEFES project scaling-up the use of ZE-HDVs. (Deliverable 1.7 for the implementation of the ZEFES ecosystem beyond the project, description of gaps and barriers and recommendations)

5 Risks and interconnections

5.1 Risks/problems encountered

As in the conclusion highlighted above, uncertainty in some demonstrations still occur. The probability of the risk is split in 3 categories, green when no outstanding issues occur or mitigation available, orange when uncertainties are defined, and mitigation might be available, red when uncertainties have no end date, and no mitigation is available yet.
The table below shows the status of all demonstrations.

Table 8 Overview type risks demonstrations

Use case	Energy (%)	Permits (%)	Remark	Mitigation
721				
722			Grid MCS Hamburg	Location or Trailer with generator
723-1				
723-2			Grid MCS Hamburg	See above
724			42t GCW DE	Reduce weight, increase volume
731			Grid MCS Hamburg	See above
732			Overlength	Shorter semi-trailer, less cargo
733			Space CCS Tarragona	De-couple semi-trailer
734-1				
734-2			EMS2 FR	De-couple EMS2 in Vilamalla
741			CCS depot LTR	Public charging nearby
742				
743			Overlength	Shorter semi-trailer, less cargo
761			Overlength	Shorter semi-trailer, less cargo
762			Registration, overlength	Shorter semi-trailer, less cargo
763			Overlength, 42t GCW	Shorter semi-trailer, less cargo
CFL SWS				

All mitigation actions will lead to more trucks and increased cost (EUR/tkm) for freight transport; due to loss of cargo (weight/volume).

Risk No.	What is the risk	Probability of risk occurrence[1]	Effect of risk[1]	Solutions to overcome the risk
1	Grid connection for MCS charging not granted, use case 722/723-2/731	2	No MCS demonstration possible	1) Search for alternative location 2) Use of trailer with generator and battery
2	Approval 42t GCW by EU member states, use case 724	2	Loss of cargo, estimated 2-4t depending on type of cargo (volume/weight)	Extra truck to compensate for losses of cargo, increasing cost of transport significantly
3	Approval overlength kingpin -front truck 900mm by EU member states, use case 741-743	2	Using shorter trailers with loss of cargo, volume/weight depending on type of cargo	Extra truck to compensate for losses of cargo, increasing cost of transport significantly
4	Approval overlength kingpin -front truck exceeding 900mm by EU member states, use case 732/761-763	1	Using shorter trailers with loss of cargo, volume/weight depending on type of cargo	Extra truck to compensate for losses of cargo, increasing cost of transport significantly
5	No registration of vehicle in Austria, use case 762	1	Limitation of demonstration down to ONE month	Combine demonstration 762 with 763 trying to de-route and adapt use case to a country where registration is possible

[1)] Probability risk will occur: 1 = high, 2 = medium, 3 = Low

5.2 Interconnections with other deliverables

The work within WP8, *UC evaluation, Impact Assessment and LCA,* depends on the quality of data delivered by the demonstrators and operators during the 15 months demonstration period. TNO stated to handle data for validation and assessment up to M44, August 2026. The data out of the demonstrations during M45-M48 can still be used by the owners, OEMs and operators to perform validations and assessments outside the deliverables D8.x for their own purposes.

The coordination of all demonstrations is therefore important to reduce the loss of data up to M44, meaning that the project should keep the deadlines of each demonstration as in this deliverable defined. See Figure 15, Section 3.1.

6 Acknowledgement

The author(s) would like to thank the partners in the project for their valuable comments on previous drafts and for performing the review.

Project partners:

#	Partner short name	Partner Full Name
1	VUB	VRIJE UNIVERSITEIT BRUSSEL
2	FRD	FORD OTOMOTIV SANAYI ANONIM SIRKETI
4	KAE	KASSBOHRER FAHRZEUGWERKE GMBH
5	REN	RENAULT TRUCKS SAS
6	SCA	SCANIA CV AB
7	VET	VAN ECK TRAILERS BV
8	VOL	VOLVO TECHNOLOGY AB
8.1	CPA	CPAC SYSTEMS AB
9	ABB	ABB E-MOBILITY BV
9.1	ABP	ABB E-MOBILITY SPOLKA Z OGRANICZONAODPOWIEDZIALNOSCIA
9.2	APG	ABB E-MOBILITY
10	AVL	AVL LIST GMBH
11	CM	SOCIEDAD ESPANOLA DE CARBUROS METALICOS SA
11.1	APG	AIR PRODUCTS GMBH
12	HEPL	HITACHI ENERGY POLAND SPOLKA Z OGRANICZONA ODPOWIEDZIALNOSCIA
13	MIC	MANUFACTURE FRANCAISE DES PNEUMATIQUES MICHELIN
14	POW	PLASTIC OMNIUM NEW ENERGIES WELS GMBH
15	RIC-CZ	RICARDO PRAGUE S.R.O.
15.1	RIC-DE	RICARDO GMBH
16	UNR	UNIRESEARCH BV
17	ZF	ZF CV SYSTEMS HANNOVER GMBH
18	ALI	ALLIANCE FOR LOGISTICS INNOVATION THROUGH COLLABORATION IN EUROPE
19	DPD	DPD (NEDERLAND) B.V.
20	COL	ETABLISSEMENTEN FRANZ COLRUYT NV
21	GRU	GRUBER LOGISTICS S.P.A.
22	GBW	GEBRUEDER WEISS GESELLSCHAFT M.B.H.
23	PG	PROCTER & GAMBLE SERVICES COMPANY NV
23.1	PGP	PROCTER AND GAMBLE POLSKA SPOLKA Z OGRANICZONA ODPOWIEDZIALNOSCIA
23.2	PGA	PROCTER & GAMBLE AMIENS
23.3	PGG	PROCTOR & GAMBLE SERVICE GMBH

24	PRI	PRIMAFRIO CORPORACION, S.A.
25	PTV	PTV PLANUNG TRANSPORT VERKEHR GmbH
26	Fraunhofer	FRAUNHOFER GESELLSCHAFT ZUR FORDERUNG DER ANGEWANDTEN FORSCHUNG EV
27	HAN	STICHTING HOGESCHOOL VAN ARNHEM ENNIJMEGEN HAN
28	IDI	IDIADA AUTOMOTIVE TECHNOLOGY SA
29	TNO	NEDERLANDSE ORGANISATIE VOOR TOEGEPAST NATUURWETENSCHAPPELIJK ONDERZOEK TNO
30	UIC	UNION INTERNATIONALE DES CHEMINS DE FER
31	CFL	CFL MULTIMODAL S.A.
32	GSS	Grupo Logistico Sese
33	HIT	Hitachi ABB Power Grids Ltd.
34	IRU	UNION INTERNATIONALE DES TRANSPORTS ROUTIERS (IRU)
35	RIC-UK	RICARDO CONSULTING ENGINEERS LIMITED

Disclaimer/ Acknowledgment

Co-funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Commission. Neither the European Union nor the granting authority can be held responsible for them.

.

7 Appendix - Glossary NST

Glossary: Standard goods classification for transport statistics (NST)

The Standard goods classification for transport statistics abbreviated as NST (2007), is a statistical nomenclature for the goods transported by four modes of transport: road, rail, inland waterways and sea (maritime). As NST 2007 considers the economic activity from which the goods originate, each of its items is strongly connected to an item of the European Union product and activity classifications Classification of products by activity (CPA) and Statistical classification of economic activities (NACE), which themselves are consistent with their counterparts at UN level, CPC and ISIC.

Example. This table contains only the first level classification of NST 2007, the complete classification is available in Eurostat's classifications database - Ramon (Eurostat metadata).

01	Products of agriculture, hunting and forestry; fish and other fishing products
02	Coal and lignite; crude petroleum and natural gas
03	Metal ores and other mining and quarrying products; peat; uranium and thorium
04	Food products, beverages and tobacco
05	Textiles and textile products; leather and leather products
06	Wood and products of wood and cork (except furniture); articles of straw and plaiting materials; pulp, paper and paper products; printed matter and recorded media
07	Coke and refined petroleum products
08	Chemicals, chemical products, and man-made fibres. rubber and plastic products; nuclear fuel
09	Other non-metallic mineral products
10	Basic metals; fabricated metal products, except machinery and equipment
11	Machinery and equipment n.e.c.; office machinery and computers. electrical machinery and apparatus n.e.c.; radio, television and communication equipment and apparatus; medical, precision and optical instruments; watches and clocks
12	Transport equipment
13	Furniture; other manufactured goods n.e.c.
14	Secondary raw materials; municipal wastes and other wastes
15	Mail, parcels
16	Equipment and material utilized in the transport of goods
17	Goods moved in the course of household and office removals. baggage and articles accompanying travellers; motor vehicles being moved for repair; other non-market goods n.e.c.
18	Grouped goods: a mixture of types of goods which are transported together
19	Unidentifiable goods: goods which for any reason cannot be identified and therefore, cannot be assigned to groups 01-16
20	Other goods n.e.c.

8 Appendix - Status of EMS combinations per country

Status of EMS combinations per country	
Sweden	EMS1 and EMS2 allowed, following national regulation TSFS 2023:42
Denmark	EMS allowed following the national announcement 2042: *Forøgede vægte og længder på lastbil og påhængskøretøj samt godkendelse af lastbil med øget vogntogsvægt til brug i dobbelttrailer-vogntog*
Germany	Longer combinations are allowed until 25,25m (EMS1), following the national regulation: *Verordnung über Ausnahmen von straßenverkehrsrechtlichen Vorschriften für Fahrzeuge und Fahrzeugkombinationen mit Überlänge* (LKWÜberlStVAusnV), of 19 December 2011 (eBAnz AT144 2011 V2), which was last amended by Article 1 of the Ordinance of 22 November 2023 (Federal Law Gazette 2023 I No. 318)
Belgium	Flanders region: It is allowed longer combinations until 25,25m and 60T (EMS1), demanding for a permit and accomplishing the conditions indicated in the following website: *https://www.vlaanderen.be/mobiliteit-en-openbare-werken/vrachtverkeer/langere-en-zwaardere-vrachtwagens-lzvs/een-vergunning-aanvragen*
The Netherlands	EMS1 allowed until 25,25m and 60T of GCW. Permits are required and delivered by RDW, following their instructions in website. *https://www.rdw.nl/en/exceptional-transport/requesting-an-exemption-for-lzv-ecocombi*
France	Not currently allowance of EMS combinations.
Spain	EMS combinations allowed, following the conditions indicated in the instruction MOV 2023/28.

9 Appendix - List of contacts per country

List of contacts	
Sweden	• Swedish Transport Administration - *Trafikverket*
Denmark	• Danish Road Directorate - *Vejdirektoratet* • The Swedish Transport Agency - *Færdselsstyrelsen*
Germany	• Department StV 22 - Automotive engineering (vehicle safety and innovative technologies), Federal Ministry for Digital and Transport - *Referat StV 22 - Kraftfahrzeugtechnik (Fahrzeugsicherheit und innovative Technologien), Bundesministerium für Digitales und Verkehr (BMDV)* • List of contact per regions. See attached.
Belgium	• Department of Mobility & Public Works Policy - *Department Mobiliteit & Openbare Werken Beleid*
The Netherlands	• Ministry of Infrastructure and Water Management - *Ministerie van Infrastructuur en Waterstaat, Rijkswaterstaat* • Directorate-General for Mobility and Transport - *Directie Mobiliteit* • RDW
Luxembourg	• Department of Mobility and Transport, Ministry of Mobility and Public Works
Austria	• ASFINAG – Austrian road operator of highways and motorways • Office of the Tyrolean State Government, Department of Transport and Cable Car Law - *Amt der Tiroler Landesregierung, Abteilung Verkehrs und Seilbahnrecht*
France	• Road Mobility Directorate. General Directorate of Infrastructure, Transport and Mobility - *Direction des Mobilités Routières. Direction Générale des Infrastructures, des Transports et des Mobilités*
Italy	• General directorate for Motor Vehicles and Drivers, Department for Sustainable Mobility, Ministry of Infrastructure and Transport
Turkey	• General Directorate of Transport Services Regulation, Ministry of Transport and Infrastructure - *Ulaştırma Hizmetleri Düzenleme Genel Müdürlüğü, Ulaştırma ve Altyapı Bakanlığı*
Spain	• Traffic General Directorate - *DGT* • *TRAZA* application - cau.traza@dgt.es • Catalan Traffic Service - *Servei Català de Trànsit* (for Catalan region)
Benelux	• General Secretariat of the Benelux Union - *Secretariaat-Generaal van de Benelux Unie*

10 Appendix – Summary of use cases, road permits and vehicle approvals

Nr Use Case		Truck approval	Trailer approval	Configuration	Length/ Weight	Road permit	Comments
7.2.1				T+ST 	16.5m 44T		• No issues foreseen.
7.2.2	Plan A			EMS2 	32m 64T		• EMS2 are **not** allowed in Germany, the Netherlands and Belgium. • Permit needed in Denmark.
	Plan B			T+ST 	16.5m 44T		• Germany is **not** allowing **44T**; the maximum tonnage allowed is **40T**, with an increase of **2T** due to Zero Emission Powertrain.
7.2.3-1	Plan A			EMS2 	32m 64T		• EMS2 are **not** allowed in France and Belgium.
	Plan B			T+ST	16.5m		• No issues foreseen.

			44T		
7.2.3-2		T+ST 	16.5m		• Germany is **not** allowing **44T**; the maximum tonnage allowed is **40T**, with an increase of **2T** due to Zero Emission Powertrain.
			44T		
7.2.4		EMS1 	25.3m		• Germany is **not** allowing **48T**; the maximum tonnage allowed is **40T**, with an increase of **2T** due to Zero Emission Powertrain. • EMS1 combinations require a permit in Germany and the Netherlands. • E-trailer approval: EU type approval is not currently possible. Possibility of approval using a particular application with Spanish authority.
			48T		

				16.5m		• Germany is **not** allowing **44T**; the maximum tonnage allowed is **40T**, with an increase of **2T** due to Zero Emission Powertrain. • E-trailer approval: EU type approval is not currently possible. Possibility of approval using a particular application with Spanish authority.
7.3.1			T+e-T 	44T		
				17.4m		• Austria is not allowing permits for this trial on this route. • Germany is **not** allowing **44T**; the maximum tonnage allowed is **40T**, with an increase of **2T** due to Zero Emission Powertrain. • Italy requires a permit for extra-length.
7.3.2			T+ST 	44T		
7.3.3 (BEV)			T+ST 	16.5m		• Permit required in Spain due to extra-weight.

			44T		
7.3.3 (FCEV)		T+ST 	17.4m		• France is **not** allowing extra-length until new amendment on directive EU 96/53 is approved. • Permits required in Spain due to extra-length and extra-weigth.
			44T		
7.3.4-1		T+ST 	16.5m		• Germany is **not** allowing **44T**; the maximum tonnage allowed is **40T**, with an increase of **2T** due to Zero Emission Powertrain.
			44T		
7.3.4-2	Plan A	EMS2 	32m		• EMS2 permit needed in Catalonia. • EMS2 are **not** allowed in France.
			64T		
	Plan B	T+ST 	16.5m		• Permit needed in Spain for 44T of tonnage.

			44T	
7.4.1-1		T+ST 	17.6m 44T	• France is **not** allowing extra-length until new amendment on directive EU 96/53 is approved.
7.4.1-2		T+ST 	17.6m 44T	• France is **not** allowing extra-length until new amendment on directive EU 96/53 is approved.
7.4.2-1		EMS1 	25.5m 54T	• EMS1 combinations require a permit in the Netherlands.
7.4.2-2		T+ST 	17.6m 44T	• Extra-length due to elongated cab, allowed in the Nertherlands. • Belgium confirmed trial for ZEVs with extra-length; no dates confirmed.

7.6.1		T+ST 	17.9m		• Permit required in Turkey for extra-length and extra-weight.
			44T		
7.6.2		T+ST 	17.9m		• Austria is not allowing permits for this trial on this route.
			44T		
7.6.3		T+ST 	17.9m		• Permit required in Italy for extra-length and extra-weight.
			44T		