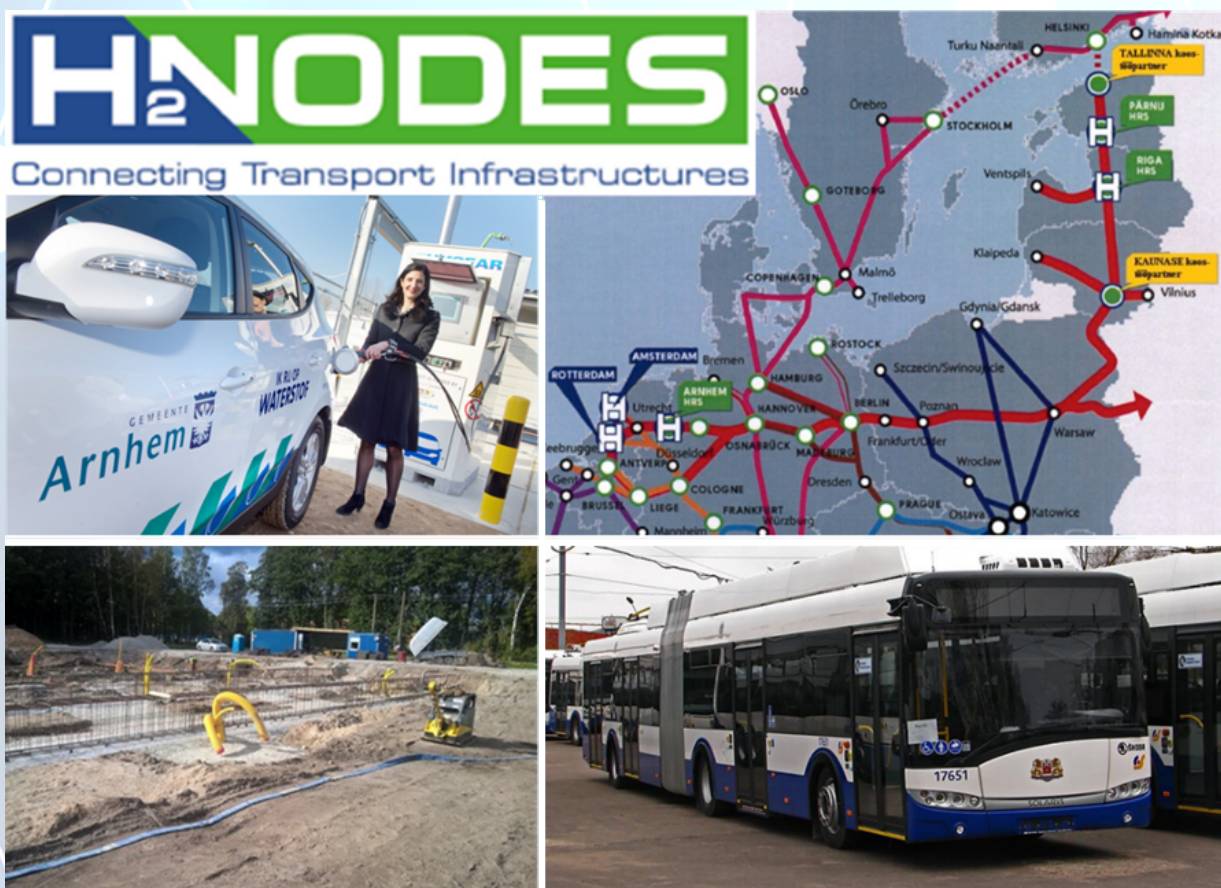


Milestones H2NODES

Milestone 16

Mobilising and engaging local and regional stakeholders



Co-financed by the Connecting Europe Facility of the European Union

Milestone 16 Report

Date: June 2021 (Final)

Author(s): Dainis Bošs (Trezors); Aivars Starikovs (Trezors); Ilvars Sirmais (Trezors); Jānis Fricsons (Trezors).

Table of Contents

1. Introduction	3
2. Engaging regional public transport operators	4
3. Engaging other stakeholders for potential FCEV deployment.	10
4. Lessons learned and Conclusion	12

1. Introduction

This Milestone report is about the mobilisation of local actors and fuel cell electric vehicle (FCEV) potential users during the H2Nodes implementation phase, in addition to the 10 HyTrolleybuses that served as a test vehicle for the new Riga hydrogen production and refuelling station (HRS).

This report focuses on local stakeholder management, increasing the interest in FCEVs and exploring potential deployment of additional HRSs. The stakeholder management is for the most part initiated and executed by local H2NODES partner LLC TREZORS.

This report describes how stakeholder management was carried out in subsequent phases along with the Riga HRS deployment.

Chapter 2 describes stakeholder management (Public transport operators) in the initial project phase, when public transport partners had to be found and interested in order to carry out the real-life tests of FCEVs.

Chapter 3 describes stakeholder management (other entities) in the initial project phase assessing potential FCEV deployment in near term. It also includes the description of hydrogen-fuelled mobility promotion for various groups of potential users.

2. Engaging regional public transport operators

2.1 The regional context of stakeholder management

For Riga Region the only available place to refuel FCEVs is the newly deployed Riga HRS located in Vienības gatve 6, Riga. The deployed hydrogen refuelling facility created the opportunity to refuel different types of FCEVs as the 350bar and 700 bar dispensers are available. The ability to refuel the FCEVs will potentially lead to the uptake of additional FCEV deployment in the Region. To increase the awareness a FCEV Toyota Mirai and FCE-bus Solaris Urbino 12 hydrogen was demonstrated along with the 10 HyTrolleybuses that already operate on daily bases and are used for public transport operations by RM LLC Rigas Satiksme.

As Riga Public transport operator (PTO) Riga Municipality LLC Rigas Satiksme has already deployed 10 HyTrolleybuses, the local and regional stakeholder management was divided in two parts:

- Actions performed with PTOs;
- Actions performed with private entities on potential hydrogen refuelling net development in Latvia and additional FCEV deployment.

Within this chapter the actions that were performed for three Public transport operators is described. Note that the actions were directly impacted by the COVID-19 outbreak in Europe and the national restrictions to perform business meetings and larger events. A bilateral approach was chosen in order to work directly with the specific entity.

2.2 Public transport operator of Jelgava “Jelgavas Autobusu parks”.

For Jelgava the public transport operator LLC “Jelgavas autobusu parks” is looking forward to deploy FCE-vehicles for public transportation. Unfortunately, the city of Jelgava is not located on the North-sea-Baltic Sea core network corridor.



Figure 1 Jelgava location in Latvia

One of the main drivers to deploy environmentally friendly public transport operations in Jelgava is the Jelgava city council ambition to decrease CO₂ emissions by 20% by 2020 when compared to 2005 levels.

107 706 tonnes of CO₂ were emitted in Jelgava city in 2005. Therefore, to meet their emissions reduction target, they must reduce emissions by 20 544 tonnes, by 2020. Jelgava municipality has also taken part in the “Covenant of Mayors”.

The public transport system in the city of Jelgava and its suburbs was developed 25 years ago accordingly to the city borders. As the city has expanded, the need to restructure the public transport routes will eventually occur and therefore environmentally friendly vehicles such as BEV and FCEV could be used.

For public transport operations in Jelgava (city buses together with intercity coaches) 71 different size buses are used (46 regular buses, 15 small size buses and 10 minibuses.) The average mileage for buses reaches 185km per day.

By restructuring the routes in 2019 the total number of Jelgavas Autobusu parks vehicle units that were used in public transport operations was cut to 55 units:

- 12 Mercedes Benz Sprinter 516 buses;
- 43 M3 category buses Amoplant Ambassador 180/200.

The last changes in the Jelgavas Autobusu parks fleet were made in September 2020, whereas 5 conventional fuelled buses were substituted with 4 BEV buses. Thus, as the range for some buses often reaches even 300km per day, the Jelgavas Autobusu parks required assistance in order to get more insight of the FCEV technologies, action H2NODES and Riga Hydrogen refuelling station. As the first Hydrogen refuelling station was deployed in Riga, Jelgavas Autobusu parks was interested in the operational aspects of the station and potential FCEV characteristics and deployment availability.

After conversations about FCEV technology potential and further development in the public transport operation segment, the Jelgavas Autobusu parks developed an intention to further evaluate the deployment of 30 FCE-buses that would be used within the city boundaries. As the Jelgavas Autobusu parks is a Municipality company, the Jelgavas Municipality requested to add in calculations the potential to refuel 4 FCE-waste treatment vehicles.

As for potential hydrogen demand it was calculated that Jelgavas Autobusu parks would require around 426 kg of hydrogen per day in order to cover the city routes. Additional demand would be seen from the 4 waste-treatment vehicles whereas the average consumption would reach 48kg/H₂ per day.

The Jelgavas Autobusu parks also made tests with Solaris Urbino 12 Hydrogen bus.



Figure 2 Solaris Urbino 12 Hydrogen in Jelgava¹

From 30th of January 2021 the FCE-bus was used for public transport operations on route 22nd. The Solaris Urbino 12 Hydrogen bus was refuelled at Riga HRS. Additionally, in collaboration with Toyota Baltic, the Toyota Mirai was tested by the members of city council and different municipality entities.

Jelgavas Autobusu parks also has the intension to deploy a hydrogen production and refuelling infrastructure at bus depot located in Meiju ceļš 64. The hydrogen production would be performed using water-electrolysis process with total production capacity of 1290 kg/H₂ per day. The potential hydrogen production amounts double the need of the Jelgavas Autobusu parks. This aspect was evaluated due to possibility to secure the hydrogen delivery to other (small scale) hydrogen refuelling stations in Region.

The FCE-bus tests were not successfully in Jelgava. A bus malfunction was recorded and the average consumption reached 14kg/H₂ per 100km. This issue raised due to heating problems in conjunction with the winter weather conditions. Currently Jelgavas Autobusu parks are preparing to perform additional FCE-bus tests and potentially use a different bus manufacturer.

2.3 Public transport operator of Dobeles “Dobeles Autobusu parks”

LLC “DOBELES AUTOBUSU PARKS” is the public transport operator in city of Dobeles. It performs intercity transport operations.

¹ <https://www.jelgava.lv/lv/jaunumi/zinu-arhivs/testa-braucienu-pa-pilsetu-sak-ar-udenradi-darbinams-autobuss/>



Figure 3 Dobeles location in Latvia

Dobeles autobusu parks was keen to obtain the possibility to deploy FCE-coach buses. Dobeles Autobusu parks is relatively small public transport operator. The vehicle fleet consists of 3 minibuses (M2 B class), 7 minibuses (M2 A class), 4 M3 II class buses, 3 M3 III class buses. The average age of the vehicle fleet is 6,3 years. Within the action H2NODES Dobeles autobusu parks was willing to obtain insight about hydrogen technologies and possibility to deploy a hydrogen refueling station at Dobeles Autobusu parks depot. By evaluation the Dobeles autobusu parks fleet it was calculated that the average daily mileage per bus is 360km (310km for M3 buses and 420 for M2 class buses). After conversations with the transport operator the Dobeles autobusu parks as the only zero-emission vehicle option sees the FCEVs due to the high mileage that is necessary to be covered. For calculations within the Action H2NODES it was set, that the whole fleet would eventually be replaced with FCEVs and all 17 conventional fueled vehicles would be substituted with analogue size FCE-buses. Dobeles Autobusu parks representatives also performed a test drives with the Toyota Mirai.

As the routes for Dobeles autobusu parks also covers line Dobeles -Riga, it was set that one option to refuel the FCE-coaches would be to perform the refueling at Riga HRS. Therefore a small scale (movable) refueling station could be deployed in Dobeles autobusu parks depot where the hydrogen would be delivered from the potential Jelgavas Autobusu parks hydrogen production and refueling station.

The eventual discussions and demonstration activities resulted as a ambition for Dobeles Autobusu parks to seek further the deployment of FCE-coaches. Dobeles autobusu parks also is a beneficiary within the action CoachHyfied² (co-funded by Fuel Cells and Hydrogen 2

² <https://coachyfried.eu>

Joint undertaking). Within the CoachHyfied project Dobeles Autobusu parks is participating in development of intercity fuel cell coach and it is foreseen that the demonstration of the first units will start in Latvia from 2023.

2.4 Public transport operator in Riga, RM LLC Rigas Satiksme

For Riga the public transport operator RM LLC “Rigas Satiksme” is one of the beneficiaries within the action H2NODES. Rigas Satiksme is the owner of the first hydrogen refuelling and production station in Latvia and also deployed 10 HyTrolleybuses within the Action H2NODES.

As the deployed hydrogen refuelling station hydrogen production capacity is 300kg per day, Rigas Satiksme is looking forward to deploy more FCEVs in order to fully use the available hydrogen amounts for zero-emission transportation.

During February 2021, Rigas Satiksme tested a Solaris Bus & Coach FCE-bus Solaris Urbino 12 hydrogen. The test unit was used in different routes.



Figure 4 FCE-bus Solaris Urbino 12 hydrogen tests in Riga

The overall range within the tests reached 960km. Within the tests the refuelling time of FCE-bus took 30 minutes and the average hydrogen consumption reached 16kg/H₂ per 100km. According to the tests, the significant impact on the hydrogen consumption was

the weather conditions (-20 C) and the fact that the heating temperature in the cabin was set at +22 C.³

Due to high hydrogen consumption it is set that more FCE-bus tests will be carried out. Currently Rigas Satiksme is seeking to obtain EU-funding in order to procure additional 12 FCE-buses to use for zero-emission public transport operations. The additional 12 FCE-bus units would allow to fully use the deployed Riga HRS capacity.

Within the conversations with Rigas Satiksme it was also set that a long-term possibility of zero-emission vehicle deployment should be prepared. Due to potential conventional fuelled bus substitution it was calculated that Rigas Satiksme could use a total of 231 FCE-buses for public transport operations. For the significant amount of buses, it would be necessary to produce and refuel up to 4,3 tons of hydrogen per day. Taking this into account the evaluation of Large-Scale Riga HRS production and refuelling facility was made and included in H2NODES Milestone 10 “Riga HRS upscaling” report.

³ <https://www.rigassatiksmelv/aktualitates/-rigas-satiksmenoslegusi-ar-udenradi-darbinama-autobusa-testesanu/>

3. Engaging other stakeholders for potential FCEV deployment.

3.1 The regional context for potential hydrogen refuelling and production infrastructure and additional FCEV deployment.

If previous actions were meant in order to mobilise the public transport operators to deploy FCE-buses, actions for private entities in order to secure the interest to deploy HRS infrastructure and other FCEV vehicles was made.

Within this chapter the results of the actions that were performed for a number of stakeholders is described. Note that the actions were directly impacted by the COVID-19 outbreak in Europe and the national restrictions to perform business meetings and larger events. A bilateral approach was chosen in order to work directly with the specific entity

3.2 Fuel distributor “Virši-A”

Virši-A JSC is a fuel distribution and retail company in Latvia. The overall conventional fuelling station net exceeds 60 stations. Virši-A expressed the interest in order to become the first entity that deploys a hydrogen refuelling net in Latvia. Within the conversations and Toyota Mirai tests Virši-A expressed the interest to deploy 5 movable hydrogen refuelling stations in Latvia, that would be enough to secure the hydrogen availability in different regions of Latvia.

As the long-term possibility of Rigas Satiksme established the possibility to seek for 231 FCE-bus deployment, Virši-A expressed the interest to deploy the Large-scale Riga hydrogen production and refuelling facility with hydrogen production capacity of 5000kg per day. The initiative to deploy the large-scale facility, five movable HRS and 231 FCE-buses was also submitted to European Clean Hydrogen Alliance on 7th of May 2021 by Virši-A, JSC Latvenergo and Latvian Hydrogen association. The initiative also includes the deployment of wind-farm that would provide the necessary electricity for hydrogen production.

The large-scale Riga hydrogen production and refuelling facility would be also used to secure the hydrogen for the smaller (movable) hydrogen refuelling stations that would be deployed in Regions. In order to secure the deliver up to 8 heavy-duty vehicles would be required. The intension of Virši-A is to implement a hydrogen valley in Latvia and to use zero-emission electricity from Wind farm park to produce green hydrogen that would be used as transport fuel.

3.3 Latvian Railway

Latvian Railway is the railway operator in Latvia. Latvian Railways expressed a interest to deploy a fuel cell shunting locomotive in order to perform zero-emission operations in places where electrification is not economically viable. Historically Latvian Railways had already made a feasibility study about possibility to retrofit shunting locomotive and to use Fuel cell technologies. Due to bilateral conversations it was set that one FC shunting locomotive would use up to 150kg/H₂. This amount would allow for the locomotive to perform the works for two days.

3.4 Other stakeholders

Actions with other stakeholders were performed since 2020. The hydrogen availability in Riga HRS opened a pathway to discuss the further hydrogen development activities in Latvia. The Toyota Mirai was used by numerous stakeholders from different public entities i.e. member of Valmiera City council, Jelgava City council, Minister of Environmental Protection and Regional Development Republic of Latvia, State secretary of Ministry of Economics Republic of Latvia. The main aspect was to demonstrate that hydrogen is available in Riga, and that it is necessary to seek further deployment in order to achieve the availability in Region.



Figure 5 Toyota Mirai in Valmiera

The representatives of Investment and Development Agency of Latvia was also interested in the actual situation of hydrogen sector and the potential development in Latvia. It was established that loans from national programme would be available for environmentally friendly technology implementation.⁴

The NGO “Auto Asociācija” that represents the different vehicle dealerships also expressed the interest to push for national level benefits for FCEVs that could include co-funding by national programmes.

⁴ <https://likumi.lv/ta/id/324615-noteikumi-par-aizdevumiem-ar-kapitala-atlaidi-investiciju-projektiem-komersantiem-konkuretspejas-veicinasanai>

4. Lessons learned and Conclusion

1. The deployed Riga HRS and 10 HyTrolleybuses has significantly increased the interest from numerous public and private entities and stakeholders to test, use and potentially implement the hydrogen technologies in Latvia.
2. The first FCE-bus tests in Latvia resulted with high hydrogen consumption due to malfunction of the specific FCE-bus unit. In order to conclude the further-term ambitions additional tests should be performed in different weather conditions.
3. If the large-fleet operator is dedicated to deploy a FCEV fleet, the hydrogen availability can be achieved rather quickly. The intension for Virši-A is to deploy and secure the hydrogen availability in different regions of Latvia. In order to mitigate the risks of lack of hydrogen demand or lack of hydrogen availability. The actors who are willing to deploy FCEVs or HRS should work together to align the deployment phases.
4. The COVID-19 outbreak significantly affected the possibility to mobilise the local actors. Due to national level restrictions it was forbidden to organise meetings and seminars. A round table discussions with potential vehicle deployers and hydrogen refuelling infrastructure stakeholders should be organised to move forward and achieve the zero-emission mobility in Latvia.

