

JIVE 2

JOINT INITIATIVE FOR HYDROGEN VEHICLES ACROSS EUROPE 2



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| Project ID | 779563 |
| PRR 2024 | Pillar 3 – H ₂ end uses: transport |
| Call topic | FCH-01-5-2017: Large scale demonstration in preparation for a wider roll-out of fuel cell bus fleets (FCB) including new cities' – phase two |
| Project total costs | EUR 89 972 571.29 |
| FCH JU max. contribution | EUR 25 000 000.00 |
| Project start - end | 1.1.2018–30.6.2025 |
| Coordinator | Environmental Resources Management (ERM) Ltd (previously Element Energy Ltd), United Kingdom |
| Beneficiaries | Brighton & Hove Bus and Coach Company Ltd, Communauté d'agglomération de l'auxerrois, Connexion Openbaar Vervoer NV, Connexion Vloot BV, Dundee City Council, EE Energy Engineers GmbH, Element Energy, Element Energy Ltd, ENGIE Energie Services, ERM France, Hydrogen Europe, Hyport, Kolding Kommune, Landstinget Gavleborg, Messer SE & Co. KGaA, Mestna občina Velenje, Noord-Brabant Provincie, Občina Šoštanj, Openbaar Lichaam OV-Bureau Groningen en Drenthe, Pau Béarn Pyrénées Mobilités, Petrogal SA, Provincie Zuid-Holland, RebelGroup Advisory BV, Regionalverkehr Köln GmbH, Rheinische Bahngesellschaft AG, Rīgas satiksme, Ruter AS, Société publique locale d'exploitation des transports publics et des services à la mobilité de l'agglomération paloise, Sphera Solutions GmbH, Straeto BS, Transdev Occitanie Ouest, Transports de Barcelona SA, Twynstra Gudde Mobiliteit & Infrastructuur BV, Union Internationale des Transports Publics, Vatgas Sverige Ideell Forening, WSW mobil GmbH, Zerobus OÜ |

<https://www.fuelcellbuses.eu/projects/jive-2>

PROJECT AND GENERAL OBJECTIVES

The JIVE 2 project aims to deploy 156 fuel cell buses (FCBs). Combined, the JIVE projects will deploy nearly 300 FCBs in 16 cities across Europe – the largest deployment in Europe to date.

NON-QUANTITATIVE OBJECTIVES

- JIVE 2 aims to demonstrate the suitability and provide experience of FCBs for wider roll-out. Through the publication of project deliverables such as a best practice and commercialisation report, information flows to interested observer parties have been established.
- The project aims to raise awareness of the readiness of fuel cell technology for wider roll-out, with a focus on bus purchasers and regulators. A strong observer group within the JIVE consortium has been established. This group monitors discussions and best practices emerging from the project. This will ensure that the momentum for the FCB uptake in Europe continues beyond the project.
- JIVE 2 aims to deliver positive environmental impacts by operating FCBs for extended periods. As per the project objective, all buses deployed thus far in the project are replacing diesel technology. This means that the buses will lead to CO₂ abatement and will not simply operate as a visible extra.

PROGRESS AND MAIN ACHIEVEMENTS

- To date, 122 buses have been ordered.
- To date, 98 buses have begun to operate, which represents 63 % of all the planned buses.
- To date, one site has been operating its FCBs for more than 3 years.
- In 2023, JIVE 2 FCBs travelled a total of 8 076 892 km.
- JIVE 2 fuel cells operated for 211 231 hours.
- At JIVE 2 hydrogen refuelling stations, 451 455 kg of hydrogen was dispensed across 29 229 individual fills.

FUTURE STEPS AND PLANS

- By the second quarter of 2023, all buses were ordered.
- By the third quarter of 2024, all buses will have been delivered and put into operation. To date, only one site does not yet have its buses in operation.
- By the end of the project in 2025, it is estimated that JIVE 2 FCBs will have travelled 15 522 872 km. The fuel cells are estimated to have been in operation for 314 932 hours.
- By the end of the project in 2025, it is estimated that the project's hydrogen refuelling stations will have dispensed 868 373 kg of hydrogen across 53 313 fills.
- It is expected by the end of the project that fuel consumption objectives will have been met by both the 12 m and the 18 m FCBs involved in the project.

PROJECT TARGETS

| Target source | Parameter | Unit | Target | Achieved to date by the project | Target achieved? |
|--------------------------|--------------------------------------|-------------|-----------------------------------|---------------------------------|------------------|
| Project's own objectives | Vehicle operational lifetime | years | 8 | N/A | |
| | Ensure availability >90% | % | 90 | <=80% | |
| | Distance travelled | km/year | > 50 000 | 27 627.3 | |
| | Operating hours per fuel cell system | hours | > 20 000 | 2 014.81 | |
| | Availability | % | > 90 | 82.3 | |
| | Efficiency | % | > 42 | N/A | |
| | Vehicle OPEX | € | ≤ 100 % more than diesel bus OPEX | N/A | |
| | MDBF | km | > 3 500 | 10 242 | |
| | Specific fuel consumption | kg / 100 km | < 9.0 | 7.49 | ✓ |
| | Vehicle CAPEX | € | < 625 000 | N/A | |