



JIVE / MEHRLIN / JIVE 2

Fuel Cell Electric Bus Training in Partnership with Clean Bus Europe Platform

Online Training hosted by GoToWebinar

3rd November 2020, 10:00 – 13:00 CET

The first UITP Fuel Cell Bus training was organised by JIVE projects in partnership with Clean Bus Europe Platform. During the online training, the attendees were asked to participate into online polls as well as submit their questions. Some of the questions could not be answered due to time limitations. However, the organisations team compiled some answers to the unanswered questions as well as polls' results. These results can be found accordingly in following pages.

In addition all presentations can be found as a single presentation deck at Clean Bus Europe Platform's Library: <https://cleanbusplatform.eu/toolkit/library>

For more information about fuel cell buses please do not hesitate to contact UITP team given below.

Training Contact

International Association of Public Transport (UITP)

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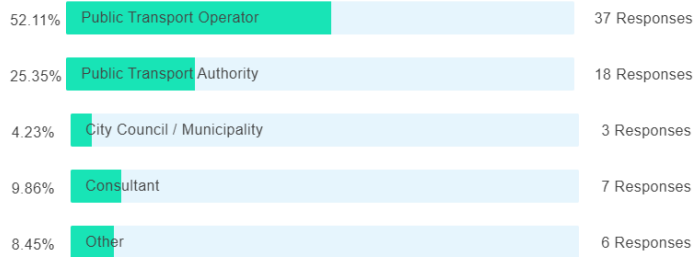
JIVE and Clean Bus Europe Fuel Cell Electric Bus Training - POLLS

Tuesday, Nov 03, 2020 10.00-13.00 CET

1 of 6. What type of company do you represent?

71 of 106 Attendees responded

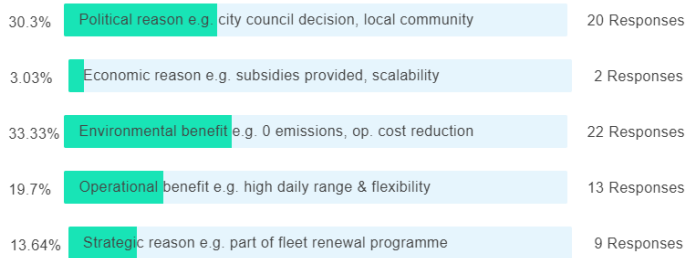
Multiple choice with single answer



2 of 6. Why are you considering including fuel cell hydrogen buses in your fleet (please select most suitable option in your case)?

66 of 106 Attendees responded

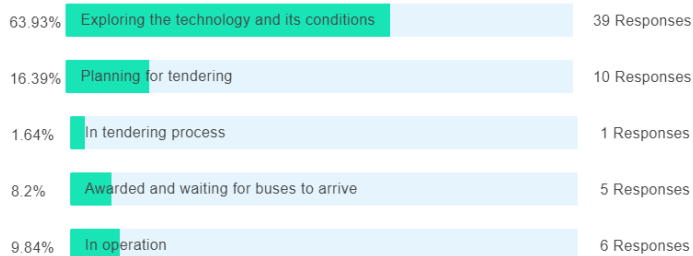
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3 of 6. What is your current progress towards fuel cell hydrogen bus procurement?

61 of 106 Attendees responded

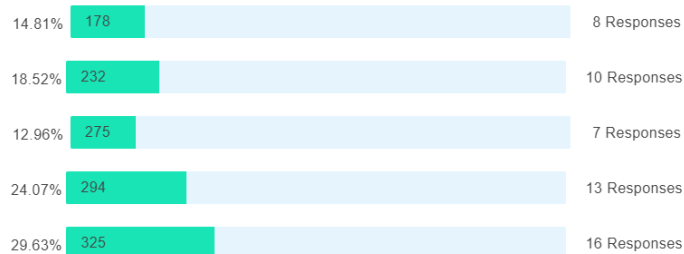
Multiple choice with single answer



4 of 6. How many new FC buses will JIVE and JIVE 2 deploy in Europe?

54 of 106 Attendees responded

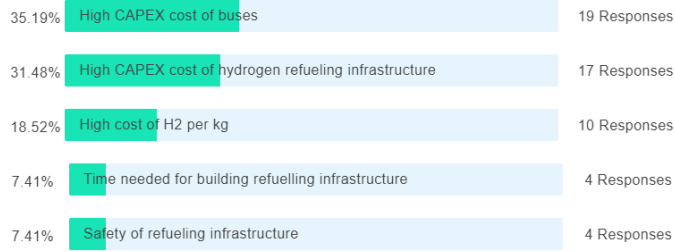
Multiple choice with single answer



5 of 6. What is the main challenge for deploying FCBs in your locality?

54 of 106 Attendees responded

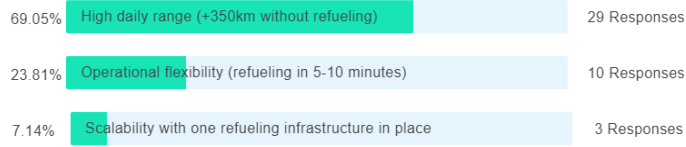
Multiple choice with single answer



6 of 6. What is the main advantage for operating FCBs in your locality?

42 of 106 Attendees responded

Multiple choice with single answer



QUESTIONS PANEL: JIVE- CBEP TRAINING - 3 NOVEMBER 2020

Q: James McHugh: Would it be possible for any of the stakeholders or existing FCEV Operators to share information on the key aspects of their risk assessments, particularly with reference to installation and operation of the refuelling infrastructure? One of the challenges we would face for certain bus depot locations is their proximity to residential accommodation, so would be good to understand the key considerations and how these could potentially affect planning approval from local authorities. RVK example of indoor refuelling is interesting! **PW:** Aberdeen is a great existing example of how safe hydrogen can be, with hydrogen production on site with refuelling and maintenance in a busy industrial estate, opposite residential property and adjoined by a busy main road.

Q: Florin Dragomir: What are the costs per km of the bus and separately of the hydrogen consumed? What is the efficiency of hydrogen production by electrolysis and what is the pollution at the source for its production? (power grid) **PW:** Electrolysis using renewable energy must be the cleanest with the only by product being current diesel tankers required to bring the fuel in trailers to the depot. Cost per km cost of hydrogen will vary depending on route profile so I recommend getting the manufacturer to carry out data logging exercise on the routes and on the most punishing duty cycle of that route to get an accurate impression. Target price to aim for on fuel is however as near as possible to £5 per kg.

Q: François Vauxion: Is the hydrogen 100% green in Aberdeen or Brighton? **PW:** Brighton/Crawley plan for their hydrogen to be from 100% green renewable electrolysis.

Q: Nathalie Geeraerts: You mentioned TCO, we have been talking a lot about CAPEX, but what about TCO? Are hydrogen buses more expensive than electric buses? **PW:** Recent downward movement in pricing has been far faster on hydrogen fuel cell electric than conventional electric with substantial range and efficiency benefits also to be considered. My view is that whilst currently the cost of operation when vehicles only are considered may favour conventional electric slightly, you need to consider range, efficiency, battery life and replacement costs and how both add up over the vehicle life. For example in our own case, we would need many more electric buses to do the work of either hydrogen or diesel buses with a substantial number of additional drivers as well to do the huge amount of work we currently do. With driver wages representing around two thirds of our operating costs, this is totally impractical and means that when looking at replacement of diesel, only hydrogen can deliver for us for the foreseeable future.