



Zero Emission Bus Regional Areas Scheme – 2021 to 2022 Application Form

Call for Expressions of Interest

Applicant Information

Local transport authority:	Liverpool City Region Combined Authority
(For joint bids only) Which local transport authority is the lead bidder:	N/A
Area within authority covered by bid:	Liverpool City Region: St Helens, Knowsley and Liverpool
Bid Manager Name and position:	Matthew Goggins, Assistant Director for Bus
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Submission of proposals:

Applications to the Scheme will be assessed against the criteria set out here and in the guidance document. Please adhere to word limits. We will not accept any additional information unless specifically requested.

Proposals must be received no later than 17:00 on the following days.

- 1. Fast track process** - 5pm on 21st May 2021
- 2. Standard process** – 5pm on 25th June 2021.

You will receive confirmation that we have received your proposal within 1 working day.

An electronic copy only of the bid including any supporting material should be submitted to buses@dft.gov.uk.

*Please include “**ZEBRA (Fast track Process) Local Transport Authority name**” in the subject line of the email if you are applying under the fast track process.*

*Please include “**ZEBRA (Standard Process) Local Transport Authority name**” in the subject line of the email if you are applying under the standard process.*

Enquiries about the Fund may be directed to buses@dft.gov.uk.

Transparency and privacy

Please refer to the guidance for this scheme before completing the application form to understand how DfT will manage your data.

SECTION A: Mandatory Questions

Areas must satisfactorily answer all of the questions in this section to be eligible to progress to Phase 2 of the scheme. If you would like further information, please contact the Department for Transport at buses@dft.gov.uk.

Areas must provide the information requested in questions A1-A5.

A1. In total, how many new zero emission buses will your proposal deliver?

If successful, this proposal will deliver a total of 40 hydrogen fuel cell electric buses (FCEBs) through the expansion of the existing Liverpool City Region (LCR) Hydrogen Bus (HyBus) project by an additional 20 buses.

The FCEBs will be procured and owned by Liverpool City Region Combined Authority (LCRCA) and leased to bus operators Arriva and Stagecoach to operate along the 10/10A bus route between St Helens and Liverpool district centres.

This volume covers the full peak vehicle requirement (PVR), for the route and therefore converts the most heavily used bus route in the Liverpool City Region from one which is diesel-based to an exclusive zero emission route.

All 40 buses will be double deck vehicles, each with a capacity to carry a minimum of 85 people and will have two wheelchair/buggy spaces.

A2. Total DfT funding sought (£m)

While there is no minimum or maximum size for bids the department is interested in supporting at least three areas across the ZEBRA scheme as a whole, so we expect to see schemes that are approximately £25m – £35m. This is designed to encourage a wide range of bidding areas to come forward and to ensure DfT are able to fund at least three areas across the whole scheme.

£13,200,000 (see Value for Money Proforma for breakdown)

A3. Third party funding contributions (£m)

The buses will operate under a leasing model, with the buses owned by the people of the LCR. Lease payments from operators will provide a revenue return to the LCRCA, which will help to offset some of the additional early costs of deploying zero emission buses – particularly subsidy disincentives - and support development and delivery of the City Region's wider decarbonisation programme.

A4. Funding from other government schemes (£m)

£12,800,000 from Transforming Cities Fund - (see Value for Money Proforma for breakdown)

A5. Total cost of the proposal (£m):

This should include DfT funding as specified in A2, any third-party contributions as specified in A3 and any funding from other government schemes as specified in A4.

£26,000,000

Lease charge levels are still subject to negotiation and agreement with bus operators

Areas must be able to answer yes to question A6-A12 to be able to progress to Phase 2.

A6. If your bid is successful, are you able to invest DfT funding within the time outlined by your scheme?

Yes

The LCRCA has already identified a suitable framework for the procurement of its first 20 hydrogen fuel cell electric buses (FCEBs) and the tender incorporates documented provision to further increase this by 20 buses should funding become available. The project can therefore be easily scaled-up at pace.

The procurement process is already open and closes in June.

Manufacturer dependent, the Liverpool City Region could take delivery of its first hydrogen fuelled zero emission buses from March 2022.

Running alongside the bus procurement process is an operator-led refueller tendering process, which should see the award of that contact in June 2021.

A7. If your bid is successful, are you able to capitalise DfT grant funding?

Yes

The value for money proforma lays out the capital expenditure for fleet and infrastructure.

A8. Have you considered whether additional zero emission buses are needed to replace existing buses?

Evidence suggests that replacing diesel buses with zero emission buses can require additional zero emission buses to provide the same level service as provided by diesel buses. Areas should set out how many additional zero emission buses are needed to replace existing buses. If areas are of the view that additional zero emission buses are not required please set out why.

Yes

There is a current Peak Vehicle Requirement (PVR) of 40 buses for the 10/10A route. As detailed in Appendix B (10A Route Analysis – 20210505) The FCEB Fleet will be a straight replacement for the Euro 5 and Euro 6 diesel buses that already operate along the route with the least polluting of these being cascaded within the Region’s fleet (therefore reducing the whole region’s average vehicle age and further improving local air quality).

In parallel with the roll-out of the FCEB fleet, the Green Bus Routes Programme is delivering a package of bus priority measures along the same route to improve reliability and deliver journey time savings. The Full Business Case for this TCF commissioned scheme is still being completed, but interventions are being delivered in a staged approach from Q2 2021 through to completion by Q4 2022/23. It is envisaged that these measures will provide operational savings, which can be reinvested elsewhere in the network to improve the bus offer across the whole of the Liverpool City Region.

It is envisaged that the bus priority measures to be introduced along the 10/10A route will reduce the PVR requirement there adding resilience into the project and ensuring that even if buses are out of operation for servicing and repairs, the route will remain operable at 100 per cent zero emission. This future resilience will also provide flexibility to promote, test and collect data on deploying hydrogen-powered buses elsewhere in the region, and potentially in other locations interested in this technology. This will be instrumental in further bid development along with decarbonisation plans and strategies.

This Relationship between the project will be explored future in the business case.

Reference: Appendix A: 10A Route Analysis - 20210505

A9. Have you provided a breakdown of infrastructure costs for your proposal?

Infrastructure costs could include (but are not limited to): cost of charging unit or refuelling stations electrical or other power components; civil engineering works, labour costs (for installation); hardware costs; capital costs of developing associated software systems; surveys at the point of procuring the infrastructure provided they can be capitalised; upgrades to the energy grid to cater for increased energy demand.

Yes

A breakdown of costs is outlined in the value for money proforma and further detailed in several hydrogen refuelling proposals (see Appendix D). At the time of writing, engagement on the refuelling options is ongoing, but the completed route analysis has identified hydrogen as the most suitable fuel for this route and that existing connections to the energy grid will sustain the refuelling infrastructure detailed in the referenced proposal.

Reference: Appendix B: Ryse Hydrogen Refuelling Proposal

A10. Does your proposal have the support of bus operator(s) in the area?

*The proposal requires the support of at least one bus operator operating in the area who will operate the zero emission buses. The bid does not, however, need the support of all bus operators operating in the area. If local transport authorities are not able to provide this evidence of support from operators, they **must** explain why.*

Yes

The project has support of both Arriva and Stagecoach who will jointly operate the buses along the 10/10A route.

Letters of support from both operators can be found as appendix E and the project also has a Memorandum of Understanding between all parties, agreed Heads of Terms for the fuel supplier and an agreed shared technical specification for the design and spec of the bus. All partner project meetings take place on a weekly basis and both Arriva and Stagecoach, alongside the LCRCA, are members of the LCR Bus Alliance (governed by a Voluntary Partnership Agreement) and have enjoyed a long history of collaborative working.

Reference; Appendix C: MOU with Arriva and Stagecoach

Reference; Appendix Di & ii: Supporting letters from Arriva and Stagecoach

A11. Have you spoken with any energy companies when preparing your proposal?

Energy companies could include Distribution Network Operators, Independent Distribution Network Operators, energy supplier, energy storage companies, smart charging providers or hydrogen fuel providers.

Yes

To date we have engaged directly with the following hydrogen fuel providers who have presented fuelling options to the LCRCA, Arriva and Stagecoach.

- 1. Air Liquide**
- 2. Air Products**
- 3. BOC**
- 4. INEOS**
- 5. Logan Energy**
- 6. Protium**
- 7. Ryse Hydrogen**
- 8. Element 2, and**
- 9. Octohydrogen**

Ryse Hydrogen have carried out assessments of the depots owned by both Arriva and Stagecoach and BOC have had a longstanding involvement in the project

through leading the initial consortium bid to OLEV, which DfT colleagues are aware of.

We have also approached Scottish Power Energy Networks to ascertain that there are no implications for, or upgrades required to, the local energy grid.

A12. Does your proposal comply with the accessibility requirements set out in the scheme guidance?

The scheme guidance sets out a number of accessibility requirements including: requiring buses to incorporate equipment to identify the route, each upcoming stop, and the beginning and end of diversions: providing an induction loop to aid direct communication between drivers and passengers who use a hearing aid and providing an additional flexible space in addition to the mandatory wheelchair space, suitable for a second wheelchair user and/or at least two unfolded pushchairs or prams.

Yes

The Bus Specification and Tender Requirements document developed for the LCR HyBus Trial Project buses specifies that any bus procured must be compliant with the Public Service Vehicles Accessibility Regulations 2000 (PSVAR) and must feature the following:

- **Buses to be fitted with audio and visual passenger information system with one enhanced TFT passenger information screen on each deck. The system should be capable of displaying the following features:**
 - **Audio/Visual Next Stop information combining previous stop, next stop and stop after that (next stop only on single line additional display)**
 - **Destination information adjacent to next stops (TFT screens only but including audio announcements), which can suggest "alight here for" large employers or major destinations of interest**
 - **Scrolling 24-hour news and weather feed (TFT screens only)**
 - **Rail or Metro Real Time Info on the approach to a bus stop that is located with a rail or metro station (TFT screens only) and this should show service information such as operator, end destination, platform number and number of minutes to departure/timetable time/delayed etc.**
 - **Countdown in mins and then seconds from fewer than 1 minute to bus departure at terminal points to be displayed on external blinds**
- **In addition to the two TFT flat screen monitors on both decks, a single line display is to be located front facing at the back end of the nearside wheelchair bay, which can be viewed by both wheelchair bays.**
- **An induction loop system linked to the passenger information system and for driver/passenger communication with T band electronic hearing devices covering the cab and entrance area, wheelchair bay and priority seats. A**

driver's cab microphone to allow drivers to communicate with passenger using T band equipment must also be provided.

- **An additional flexible space in addition to the mandatory wheelchair space, suitable for a second wheelchair user and/or at least two unfolded pushchairs or prams should also be provided.**
- **For evidence and further information see Appendix F: Merseytravel HyBus Project – Bus Specification & Tender Requirements**

Reference; Appendix E: Agreed shared technical specification for the design and specification of the bus

SECTION B. Defining the place

This section will seek a definition of the area to be covered by the Zero Emission Bus Regional Area. Areas should:

- 1. Include information setting out the extent of the area to be covered by the proposal – the **defined area**. If the defined area is different to the area covered by the local transport authority please make this clear. Please provide maps if required.*
- 2. Provide details on the bus sector including naming **all** operators who operate services in the defined area, their market share and fleet sizes. This should include both operators who are supporting your proposal and will be operating the zero emission buses and other bus operators in the defined b area.*
- 3. Clarify what proportion of bus services in the defined area will be operated using zero emission buses.*

Please limit your response to 500 words. Please provide maps as annex documents if required.

The Liverpool City Region (LCR) combines the six local authorities of Halton, Knowsley, Liverpool, Sefton, St Helens and Wirral, with a population of 1.6 million and a travel to work area population of 2.5 million.

This Proposal will see a fleet of 40 FCEBs operating along both the 10 and 10A route, which runs between Liverpool City Centre and St Helens, through the three local authorities of Liverpool City Council, Knowsley Metropolitan Borough Council and St Helens Borough Council (see Fig 1 below)

The 10/10A are two of a number of bus services running along the A57 (Prescot Road) Corridor in Liverpool with other services on this corridor being the 8/9 and the 10B, and key feeder services identified as 7, 12/13, 26/27, 33, 60, 61, 62, 68, 89, 217/227. All of these services along the corridor are operated by either Arriva or Stagecoach and there are 23 buses per hour that run along the A57 on its busiest section. It is one of five designated Green Bus Routes in the City region.

If successful, the proposal will see the delivery of one out of five routes operating along this key transport corridor as a full zero emissions route.

Route 10/10A is a high frequency commuter route with more than 2 million annual passenger journeys and in recent years has experienced considerable delays due to increased congestion; the round trip from St Helens to Liverpool taking 24 minutes longer (pre-COVID) than it did three years ago. The route is part of a 'Quality Bus Network' operated under an AQPS-type arrangement.

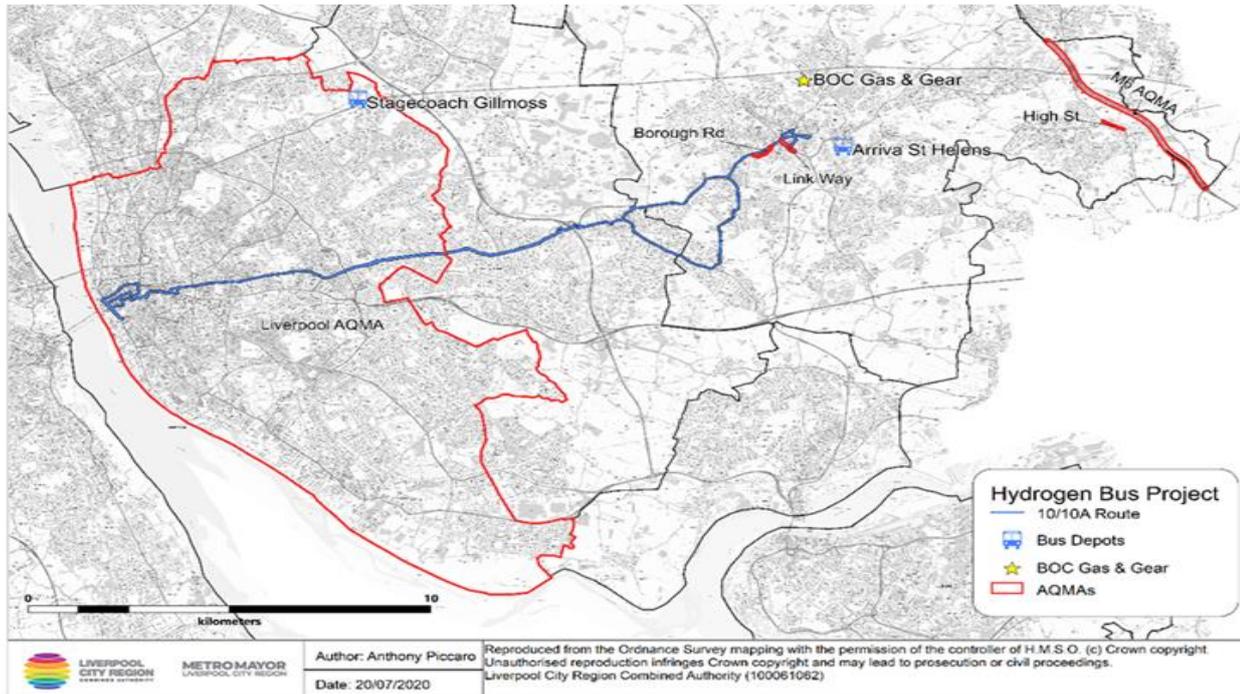


Fig 1: Map showing 10/10A bus routes, Air Quality Management Areas and location of Depots

The Green Bus Routes programme was developed as an improvement package to transform five key commuting corridors; the 10/10A route (A57) being the first in 2019, along the LCR Key Route Network. Its overarching aim is to improve journey time, service quality and enact transformational impacts to create an attractive and efficient mass transit alternative to the private car.

To identify Green Bus Routes:

- All bus routes were reviewed to identify those with high frequency and high patronage.
- Analysis of additional journey times on each route since 2013/14 was undertaken.
- A review of the number of services running along each corridor was conducted to review the wider impact of any improvements.
- Routes were placed in the context of areas of new development to ensure that routes identified connected key growth sites.
- A review of the strategic importance of the corridors and any other projects, which were being delivered along them, was conducted.

St Helens is located close to conurbations of Greater Manchester and Warrington. A number of cross-boundary bus services exist with the opportunities for utilisation of hydrogen from the proposed refuellers by nearby local Authorities.

SECTION C: Ambition

This section will seek evidence of the level of ambition from the local transport authority to decarbonise their bus fleets, support bus services and decarbonise transport.

C1. Public transport ambitions

Areas should:

1. Provide clear explanation of your ambition to decarbonise the bus fleet in the defined area and how this proposal will support this ambition. If the defined area is different to the local transport authority area please explain your ambitions to decarbonise the bus fleet in your local transport authority area and how this proposal will support this ambition.
2. Provide evidence of existing plans to support the provision and operation of local bus services in the area. This could include existing partnership working between the local transport authority and bus operators, bus priority measures, improvements to information about bus services.
 - Include complementary policies to decarbonise transport in the area.
 - Explain how the proposal supports wider ambitions to increase public transport use and active travel in the area.

Please limit your response to 500 words.

The LCRCA considers the need to increase the proportion of passenger journeys made by sustainable modes, including walking, cycling and public transport as an important priority.

LCR faces a substantial challenge in decarbonising its energy, industrial, housing and transport assets. The project supports the LCRCA's declared climate emergency and the Metro Mayor's pledge to be a net-zero-carbon region by 2040. It builds on a burgeoning low carbon sector and natural assets to make the city region a cleaner and greener place to live and work, and attractive for investment.

The project will provide a trial which, if successful, can be rolled out at pace in the future and has been structured to accommodate scalability. This project provides the opportunity to create and harness employment and skills opportunities in the City Region.

The project delivers two key objectives in the LCR's Investment Strategy and LCR's Vision for Bus; the phasing in of zero and ultra-low emission buses and responds to the consumer feedback from a wide-ranging engagement exercise - the *Big Bus Debate*. Alongside the Green Bus Routes project, it will help to drive modal shift by making buses a more attractive travel option and being zero-emission, contributing towards improving air quality along the route. Modal shift is essential to help decrease emissions across the region.

The LCRCA supports projects where there is a demonstrable market failure. Hydrogen as a fuel has great potential in public transport but is relatively new in the market. This project is one of the early-stage steps required to increase the market demand for hydrogen as a commercial fuel. Without public sector intervention in the low carbon sector and in projects like this, it is unlikely that the City Region will meet its environmental sustainability targets.

The LCRCA has developed this proposal and the HyBus Trial Project to align with city region and national policy, supporting wider initiatives to improve air quality and to help LCR achieve carbon neutrality by 2040. LCRCA regards the need to increase the proportion of passenger journeys made by sustainable means that include walking, cycling and public transport as an important priority.

On delivery, the project will be managed by the LCRCA's Bus Team, within the Integrated Transport Directorate, to ensure a seamless integration into the mainstream bus operating activities of the LCRCA.

Hydrogen is seen by government as a key lever to deliver decarbonisation and its potential is rapidly gaining momentum in the UK and globally. The time is opportune to accelerate the development of the LCR hydrogen economy. The region can be pivotal in being an early mover in the development of the use of hydrogen in the journey to net zero.

C2. Community benefits

The Liverpool City Region already has untapped opportunities for a Hydrogen Economy. The long established INOVYN plant in Runcorn has been producing Hydrogen as a by-product through salt-water electrolysis. Developing a demand for hydrogen as a transportation fuel will allow INOVYN an opening into the market, either through a supplier partnership with an existing refuelling infrastructure supplier or as a sole supplier of purchased infrastructure and Hydrogen. Developing this supply and demand relationship will have great economic benefits to the North West.

Although the ZEBRA bids prohibit retrofit FCEBs we have engaged with ULEMCo, a hydrogen dual fuel conversion company in North Liverpool. LCRCA see the further development of demand for Hydrogen as a vital catalyst for expansions in Hydrogen refuellers and the price reduction of Hydrogen per kilo. LCRCA's relationship with the operators and the proposed depot site as a refueller location will allow access by other commercial FCEVs such as dustbin lorries, for which we see ULEMCo as a strategic and economic asset to the region and for the generation of jobs and skills.

Train manufacturer Alstom have a presence in Liverpool through the Edge Hill West Coast Main Line Pendolino train maintenance facility and the train modernisation centre in Widnes – the largest and most sophisticated in the UK. Alstom's iLint train is the world's first Hydrogen train and LCRCA have engaged Alstom in Widnes on the potential for Hydrogen refuelling in the North West and the benefits it will bring to the UK skills development in Hydrogen propulsion for rail.

As part of the FCEB OEM engagements and tender, we have interrogated each manufacturer in the social value that their bid submissions can provide to the City Region. Our intention is to formulate a hydrogen skills economy to bridge the skills

gap as fuel cells and electric powertrains begin to phase out internal combustion engines. Further engagements through our Employment and Skills team and education establishments such as Riverside College in Runcorn have further structured this ambition.

The expansion of the FCEB trial through this bid will further improve the quality of the bus offer in the city region. ZEB are quieter, more comfortable and a necessary step to promoting a modal shift from car use.

The Hydrogen Bus project is a key influencer on the Liverpool City Region's Green Bus Routes programme and how we deliver bus services in the future and shapes our approach to an integrated transport network through clean air zones and bus reform.

The fulfilment of the PVR for the 10/10A routes will establish a completely zero-emission bus route. The demand and scalable supply principles on which the project, and this bid, are based, realise the ambitions to make ZEB and Hydrogen more affordable and accessible for the health, economic, jobs and skills benefits to the City Region.

C3. Support for your proposal and wider vision

Provide evidence of support for your proposal and wider vision, such as letters of support or evidence of engagement, from partners.

This **must** include evidence of support from the bus operator(s) who will operate the zero emission buses. You **do not** need to include evidence of support from all bus operators within the area, only the operator(s) who will be operating the zero emission buses. This evidence must be a signed letter by both the CEO/equivalent level of the company and the local MD, committing to investing in the buses and operating them in the defined area e for a minimum of 5 years.

Local transport authorities that have not included this evidence must clearly set out the reasons for this.

You **must** also include evidence of engagement with an energy company. Energy companies could include Distribution Network Operators, Independent Distribution Network Operators, energy supplier, energy storage companies, smart charging providers or hydrogen fuel providers.

Areas may also wish to include evidence of support from other relevant bodies, depending on the proposal, for example:

1. Other tiers of local government
2. Local Enterprise Partnerships
3. Local Energy Hub
4. Leasing companies
5. Finance companies

Please limit your response to 1000 words. Evidence of support, such as letter of support, can be included as annex.

Evidence of Support from Hydrogen Companies

Protium are pleased to support the proposal from Liverpool City Region Combined Authority (LCRCA) and their coalition partners for the Zero Emission Bus Regional Area (ZEBRA) funding opportunity in the North West. This project is important to Protium because working with LCRCA we can create a solution that considers the longer-term objectives of the City Region to decarbonise its transportation and industrial sectors. Protium is undertaking a green hydrogen development project in the area to supply zero emission fuel to an industrial consumer at the Knowsley Business Park. Protium's role in the ZEBRA project will be primarily as a hydrogen fuel supply and refuelling solution for the project and in the first phase of Protium's current project we are aiming to supply green hydrogen to LCRCA for their first 20 fuel cell electric buses. If the LCRCA and their coalition partners are successful in their ZEBRA bid, then the further deployment of an additional 20 – 23 fuel cell buses would support other potential end users in the region by creating additional long-term demand. This would allow Protium to expand our hydrogen production hub, which in turn would deliver cost savings and a more competitive hydrogen price for end users. This bid therefore aligns well with Protium's mission to enable UK industries and local government, such as the Liverpool City Region Combined Authority, to reach zero greenhouse gas emissions and to improve local air quality through deploying zero emission fuel cell buses.

Ryse Hydrogen

Ryse welcomes Liverpool City Region's ambition on their hydrogen bus projects and the increased scale of the trial through the ZEBRA scheme. We believe the forward-looking growth ambition will drive forward the hydrogen economy, clearly showing a route map to reduced prices for hydrogen buses and make green hydrogen comparable to diesel pricing in the medium term. Liverpool has a clear strategy to convert their entire bus fleet over the next 14 years and this helps bus manufacturers and green hydrogen gas producers and distributors when looking to invest in infrastructure, engineering and future growth plans.

The North West has a number of hydrogen projects already announced and Ryse are currently working with renewable developers and consultants to look at green hydrogen production sites in and around the North West of England to ensure green hydrogen is delivered to our customers in the medium term. The work on our site in Kent has clearly demonstrated an economic and regional benefit which we would be looking to replicate on our North West site, including creating over 25 green jobs and working with the university to put in place apprenticeship schemes to support the development of students in the green hydrogen industry.

Ryse is a strong supporter of the Liverpool City Region plans for hydrogen bus conversion and we are excited about working with the region and the bus operators to develop a clear plan for a hydrogen economy in Liverpool, starting with the buses and looking at all areas of public transport going forward.

See also Appendix G – Letter of support from Air Products PLC

SECTION D: Air Quality

This section will seek evidence of the air quality challenges in the area and how your plans tackle air quality in the area. Areas should:

Annex A: Set out the air quality challenge in the area, such as whether the area is identified in the national assessment as exceeding statutory limits.

Annex B: Set out how the proposal would address the local air problem.

1. Provide evidence of existing transport plans to tackle air quality and greenhouse gas emissions.

Please limit your response to 500 words.

We will not accept bids covering places that cannot show that they have air quality issues.

Air quality across the city region is of concern, often with the most vulnerable individuals in our communities being those more likely to be exposed to higher levels of air pollution. Liverpool City Region has eleven declared Air Quality Management Areas (AQMAs), including a mandated CAZ in Liverpool and four in St Helens (see Fig. 1). EU limits of nitrogen dioxide are exceeded in some parts of the City, in part due to the impact of transport in the City.

Despite the projected future improvements in air pollution concentrations from 2011 to 2030, the economic health impact costs in the Liverpool City Region over a lifetime are still between £170 to £480 million on average per year. 800 deaths are linked to air pollution every year in the Liverpool City Region.

Transport represents almost a quarter of Europe's greenhouse gas emissions and is the main cause of air pollution in cities. High air pollution concentrations increase the risk of cardiovascular and respiratory disease, cancer and adverse birth outcomes, and are associated with higher death rates.

To meet this challenge, in May 2019, the Metro Mayor declared a climate emergency for the City Region. There is a legal requirement to achieve EU legal limits for Nitrogen Dioxide and many parts of the UK are exceeding this. These drive the case for change across all subsectors of the economy. It is recognised by the UK Government (and globally) that hydrogen has the potential to play a critical role in meeting net zero targets. "Hydrogen is essential to the UK meeting its net zero emissions target. We must act now to scale hydrogen solutions and achieve cost effective deep decarbonisation." "The UK's commitment to a net zero greenhouse gas emissions target has sharpened the conversation around hydrogen. Most experts agree that net zero by 2050 cannot be achieved through electrification alone and as such, there is a need for a clean molecule to complement the electron." (source: Hydrogen Taskforce: the role of hydrogen in delivering net zero)

The LCR's journey to a zero-emission fleet has started. Today's fleet of 1,094 includes 106 (diesel/electric) hybrid vehicles, 19 CNG (Compressed Natural Gas) and 12 electric buses. Of the remaining 957 diesel and biodiesel vehicles, 267 are Euro 6, and 131 buses are being fitted with emissions traps to convert them to the Euro 6 standard. A further 3 buses are currently being converted to full electric powertrains. Euro 6 diesel legislation means that NOx (nitrogen oxide) emissions

are reduced to 0.26g/kwh, representing a 75% improvement on Euro 5 limits, with PM (particulate matter – the mixture of solid particles and liquid droplets found in the air) down to 0.01 g/kwh, around 95% lower than Euro 5.

The COVID-19 pandemic has highlighted the link between poor Air Quality and the severity of COVID, and recovery under the Build Back Better scheme has raised the profile of clean air and clean growth.

SECTION E: Value for Money

This section will seek evidence how you meet the Value for Money criteria, as set out in the guidance. Areas are also required to submit a separate value for money proforma that has been published alongside the application form. This spreadsheet requests basic information about the proposed investment to enable the value for money to be assessed using the Department's "**Greener bus model**".

The information in a completed pro forma, enables the model to estimate the greenhouse gases (GHG) emissions savings, other environmental & social impacts such as reduction in particulate matter (PM) and nitrogen oxide (Nox) emissions and savings & costs in the public and private sectors. By quantifying the key impacts of a proposed investment, this model helps provide decision-makers with as full a view as possible, about impacts on the environment, society, transport operators and the government finances.

The model provides a measure of the 'Value for Money', in the form of a benefit cost ratio (BCR) alongside other metrics such as the total estimated GHG savings and a cost effectiveness indicator estimating the net cost per tonne of carbon saved. These outputs will be used to score bids based on value for money.

The model does not capture every possible impact from a proposed investment, such as impacts from any resulting increases in patronage, improvement to the quality of journeys, or increased reliability. Where wider impacts (positive or negative) from investment are expected these should be stated, in the pro forma, as non-monetised impacts. These will be considered when making a value for money judgement, as set out in the Department value for money framework.

See Merseytravel value for money proforma.

SECTION F: Deliverability

This section will seek evidence of how the Zero Emission Bus Regional Area will be delivered, and demonstrate that plans are credible and deliverable.

F1. Method of delivery and timescale for implementation

Establish the method of delivery, to cover:

- How you will work with local bus operators and other partners to deliver the proposal
- Any public consultation or third-party permission that will be required (e.g. for infrastructure)
- Explain any mitigations put in place for SMEs.
- Timescales for implementation, including when orders will be placed for zero emission buses and when supporting infrastructure will be delivered.
- Please demonstrate how your plans are credible and deliverable in the time proposed, and that any risks have been understood and mitigated

Please limit your response to 1,000 words.

The Hybus project and this proposal to extend it, covers three key areas of activity:

- 1. The procurement of a fleet of up to 40 double deck FCEBs by the LCRCA;**
- 2. The establishment of refuelling facilities; and**
- 3. Leasing the vehicles to bus operators and introducing the buses into service.**

The HyBus project is one of the early activities that the LCRCA are undertaking to deliver their zero-emission objective. This fleet will be the first hydrogen-powered bus fleet in the North West of England. The project aligns to the strategic intent to decarbonise the LCR transport network and will provide the base evidence for expansion of the zero-emission fleet. The refuelling facility will be the first of scale in the North West.

The LCRCA has procured Arup as technical consultants and Sharpe Pritchard as legal advisors to assist with project development.

The project structure is:

LCRCA will:

- **Purchase the fleet using an OJEU compliant Procurement Framework;**
- **Lease the buses to the Operators on a commercial basis - terms and period are under discussion with the intent that diesel parity is achieved for operators and that LCRCA's operational (revenue) costs of the project are covered;**
- **Identify and deliver maintenance support and training packages over and above that included within the bus warranty; and**
- **Lead on all aspects of project delivery with support from its technical and legal consultants and the operators.**

The operators, Arriva and Stagecoach, will;

- **Each operate buses on the St Helens to Liverpool bus corridor;**

- **Either fully maintain the base vehicles, initially excluding the hydrogen elements (anticipated to be procured alongside the buses) or manage a full R&M contract with the OEM;**
- **Work with the LCRCA and its advisors, to co-develop the maintenance package requirement, including training needs assessments;**
- **Provide operational reports to LCRCA to provide evidence to support the evaluation of the Trial; and**
- **Negotiate the fuel contract (supported by LCRCA and Arup).**

The fuel provider will:

- **Provide refuelling facilities at or near to the bus depot(s);**
- **Be contracted by the operators to provide hydrogen fuel, at the agreed price, quantity and purity (contract not yet negotiated);**
- **Provide operational reports to LCRCA to provide evidence to support the evaluation of the Trial.**

Partnership working with the operators has been a key feature of the project development. The bus operators are very supportive of the project and are providing technical input to the project's development. As mentioned earlier, a Memorandum of Understanding has been signed between the LCRCA and the two operators.

The LCRCA has a well-documented and publicised rolling stock project, purchasing new trains for the Merseyrail Electrics network, that is currently in the delivery phase. The HyBus project utilises expertise within the rolling stock team to advise, guide and provide lessons learnt on transport procurement and asset management. Experienced Leads are embedded within the Governance Structure on the operational project board and can provide an independent view on the progress and developments of the HyBus project.

This resource has been key to positioning this project and shaping its structure and direction, allowing it to progress with efficiency and purpose. The project has also benefited from the experience of other LCRCA successful projects in various stages of completion.

The project's legal advisors have provided guidance to the LCRCA on the options for how the lease should be structured to be compliant with State Aid and the Subsidy Control legislation introduced 1 January 2021.

Both the LCRCA and the operators' preference would be to deploy a fleet of 40 buses, expanding the current 20-bus project. This would present the opportunity to undertake a full trial and would complement the work being undertaken by the LCRCA and the operators on the Green Bus Routes project (bus priority package). The exact number of buses that can be acquired is dependent not only on the unit cost per vehicle, but on the availability of funding and finance for the scheme, alongside other outcomes from the IFBC and associated processes.

These routes have been selected due to proximity to the:

- Existing bus depots;
- Green Bus Routes project; and
- Several designated Air Quality Management Areas (AQMAs), whose communities would greatly benefit from cleaner air quality.

Subject to the final fuel supply provider there may be an element of 'dead kilometres' to be considered. If the fuel supply is provided from a fixed (and predesignated location), this site is such that it helps to reduce 'dead' kilometres at the start and end of each operational day between route termini, refuelling and depots although an alternative delivery model would eliminate this. The joint operation by Stagecoach and Arriva is beneficial in helping maximise experience and lessons learnt for future phases.

F2. Monitoring and evaluation

Please provide indicative details of how monitoring and evaluation will be used to ensure learning about the project and inform future schemes. A detailed monitoring and evaluation plan is not required at this stage but should explain how the approach to delivering services will ensure that future learning is maximised.

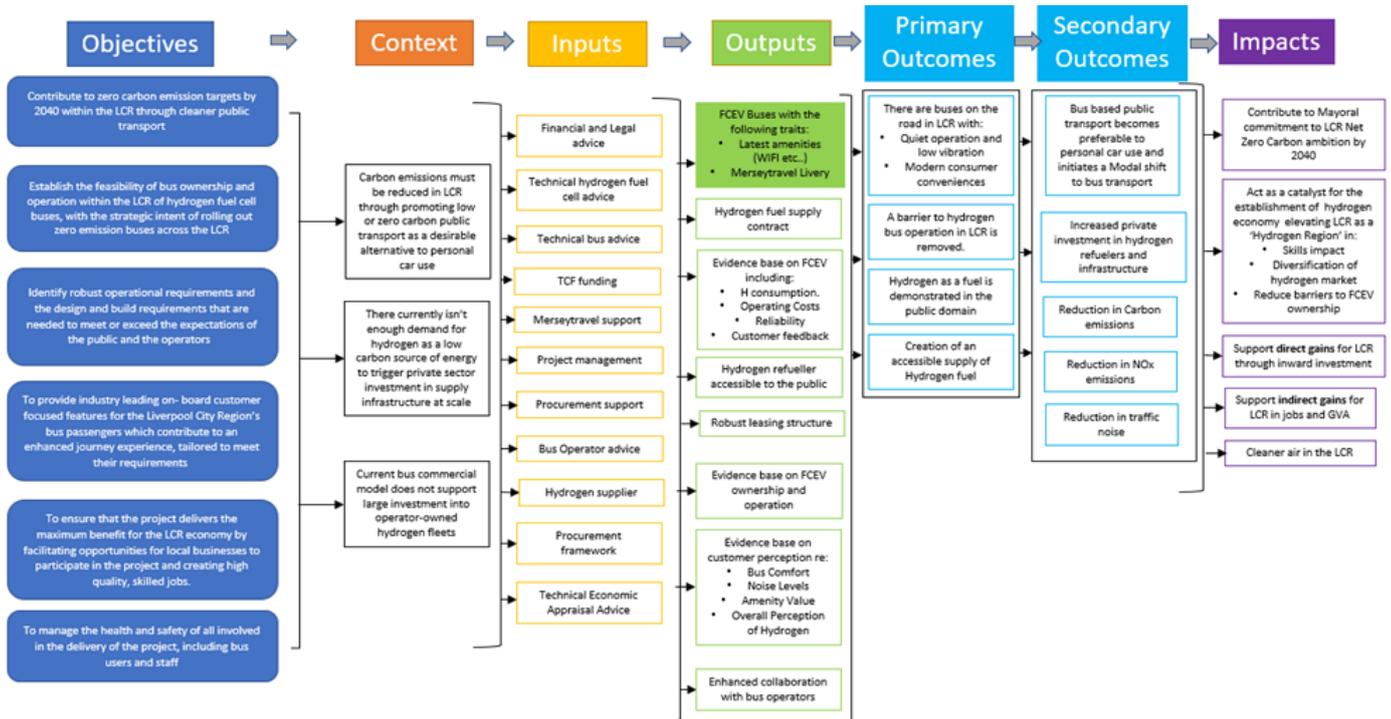
Please limit your response to 500 words.

The Hydrogen Bus Trial project objectives are as follows.

1. **Contribute to net carbon emission targets by 2040 within the LCR through cleaner public transport.**
2. **Establish the feasibility of bus ownership and operation within the LCR of hydrogen fuel cell buses, with the strategic intent of rolling out zero emission buses across the LCR.**
3. **Identify learnings from the fuel provider and the operators of the commercial viability of refuelling infrastructure.**
4. **Identify robust operational requirements and the design and build requirements that are needed to meet or exceed the expectations of the public and the operators.**
5. **To provide industry leading on-board customer focused features for the Liverpool City Region's bus passengers, which contribute to an enhanced journey experience, tailored to meet their requirements.**
6. **To ensure that the project delivers the maximum benefit for the LCR economy by facilitating opportunities for local businesses to participate in the project and creating high quality, skilled jobs.**

The logic map that follows demonstrates causal links between the intervention, its outcomes and longer-term impacts.

Fig ii : Logic Map



The Monitoring and Evaluation (M&E) plan will adopt an evidence-based evaluation approach. The 'before and after' design will assess how outcomes have changed during the trial and will consider the following elements:

a. Process evaluation

To monitor the progress of the project, through Programme Management Office (PMO) monthly dashboards, stakeholder feedback collected via interviews at key project milestones – on fleet order, fleet delivery, three months after delivery. This will provide the LCR an early objective assessment of what is working, lessons learnt; and obtain wider evidence from stakeholders on their experiences of project delivery, and whether it was delivered as intended.

b. Impact evaluation

This will form a substantial element of the project trial evaluation, seeking to assess what changes have occurred, the scale of those changes and an assessment on whether the anticipated benefits were realised and how impacts were achieved. This includes analysis of project outcomes against the original project objectives.

c. Economic evaluation

This part of the evaluation will consider the cost effectiveness and Value for Money of the trial project including:

An assessment of the outturn figures generated by the project against the appraisal assumptions, to verify the benefits against the costs of the scheme.

Wider economic benefits, such as the contribution made to economic growth and access to employment opportunities.

The project transition into mainstream LCRCA bus operating activities has generated the development of Key Performance Indicators (KPIs) to monitor project success against objectives, including utilising data collated through Telematics and the EP Morris data systems.

- **EP Morris:** This is a web-based application used for performance management of LCRCA’s bus contracts. The system will enable the generation of KPI’s on measures, such as cost per passenger mile, engine emission standards, vehicle age compliance. The system will also be utilised as a monitor for subsidy control compliance.
- **Telematics** can potentially include technical data on the fuel cells and vehicles; operational data such as vehicle location, speed, hydrogen fuel tank level and consumption; and GPS data

F3. Procurement, State Aid and subsidy rules

LCRCA employed Sharp Pritchard as legal consultants for the purposes of the Qty 20 FCEB Hydrogen Bus Trial. Over the course of the project they have provided structured advice on State Aid and public procurement – reference Appendix G Following the UK leaving the EU this advice encompassed the new regulations on Subsidy Control.

In order to ensure the operation of FCEB is economical for the operators LCRCA will offer a diesel parity compensation payment to ensure operators are ‘no better or worse off’ than if they were running an equivalent diesel bus.

LCRCA will facilitate this by lowering the price of Hydrogen (per kilo) at the Depot refueller via capital refueller infrastructure payments.

To comply with the Subsidy Control regulations brought about by this strategy LCRCA have consulted the bus software provider EP Morris to adapt our existing system to track, in addition to patronage and punctuality, the following:

Category	Data Set	Source	Purpose
Subsidy Control	Hydrogen Price (at pump)	Fuel Returns – Open Book Access	Required for benchmarking to ensure operators / CA are not been held at set price for Hydrogen when market hydrogen prices decrease over time. Also needed to provide Diesel Parity Value.
Subsidy Control	Diesel Price (Hedged value over 9 months – or Arriva / Stagecoach hedge duration)	Fuel Returns – Open Book Access	Needed to provide Diesel Parity Value. Will be key in tracking as diesel prices should increase as Hydrogen falls over time. This will need reflecting in the lease cost.
Subsidy Control	Hydrogen quantity (kg) dispensed at pump by buses – split into Arriva and Stagecoach	Fuel Returns – Open Book Access	Provide compensation amount for Hydrogen Usage vs Diesel Usage for Diesel parity value.
Subsidy Control	Hydrogen quantity (kg) dispensed at pump by any other fleet	Fuel Returns – Open Book Access	Evidence that overcompensation is not present. I.e. operators are not getting any additional collateral as a result of the subsidy. (Other fleets will pay for hydrogen at the unsubsidised rate)

Subsidy Control	Hydrogen Consumption by bus	Telematics	Monitor driver and bus efficiency to inform future ZEB decisions. Value is also a KPI as part of the bus purchase. Linked to the OEM KPI: Fuel Consumption
Subsidy Control	PVR Fulfilment (Hydrogen vs Diesel)	Telematics for Hydrogen – GPS for Diesel	Ensure that the Hydrogen fleet is been fully utilised to maximise data yield and visibility to the City Region. Linked to the OEM KPI: Vehicle off road (VOR) days

LCRCA have conducted a corporate risk evaluation on Subsidy Control and as part of the subsidy requirements LCRCA will publish details on the BEIS Subsidy Control Transparency Database details of our intention to Lease FCEB to the operators to enact the 30-day challenge period for challenge.

Reference: Appendix F – Subsidy Control – TCA Compliance

List of appendices:

- *Appendix A: 10A Route Analysis – 20210505*
- *Appendix B: Ryse hydrogen refuelling proposal*
- *Appendix C: MOU with Arriva*
- *Appendix D i & ii : Supporting letters from Arriva and Stagecoach*
- *Appendix E: Agreed shared technical specification for the design and specification of the bus*
- *Appendix F: Subsidy Control – TCA Compliance*
- *Appendix G: Letter of support from Air Products PLC*