Office for
Low Emission
Vehicles

Low Emission Bus Scheme
Application Form

Guidance on the application process is available on the DfT website[1].

Applicant Information

Are you a (Tick which of the following applies):

Local Authority ✔
Bus Operator

Local authority or bus operator name(s):

Essex County Council
Chelmsford City Council
Park and Ride Bus Operator (to be appointed following procurement)

If it is a joint bid, please enter the names of all bidders and specify who the lead will be. Only one proforma is expected to be completed for a joint bid, however your proforma should make clear who the individual partners are.

(For joint bids only) Who is the lead bidder?

Essex County Council

[1] https://www.gov.uk/government/publications/low-emission-bus-scheme

Bid Manager Name and position:

Helen Morris
Head of Commissioning, Connected Essex & Infrastructure

Name and position of the official with day to day responsibility for delivering the proposed bid

Contact telephone number: 07894 964518

Email address: helen.morris@essex.gov.uk

Postal Address:

Essex County Council
E1, Zone 1,
County Hall, Market Road
Chelmsford
CM1 1QH

Website address for published bid (if applicable):

http://www.essexhighways.org/Transport-and-Roads/Highway-Schemes-and-developments/Bids-and-Funding/Low-Emissions-Buses-Scheme-LEBS.aspx

When authorities submit a bid for funding to the Department, as part of the Government's commitment to greater openness in the public sector under the Freedom of Information Act 2000 and the Environmental Information Regulations 2004, they must also publish a version excluding any commercially sensitive information on their own website within two working days of submitting the final bid to the Department. The Department reserves the right to deem the bid as non-compliant if this is not adhered to. We welcome any bus operator that wishes to do so too.

SECTION A - Bid description and funding profile

A1. Headline description: (300)

Essex County Council (ECC) is investigating opportunities to reduce the emissions and subsidy requirements of our contracted public transport operations. Using the comprehensive re-tendering of Chelmsford Park and Ride, ECC, in collaboration with Chelmsford City Council (CCC), manufacturers and public transport operators will validate the operational and financial viability of electric busses' as real-world replacements for diesel vehicles on dynamic routes.

Whilst efforts to introduce electric buses in the UK have been piecemeal, the air quality benefits offered by the technology in urban areas are clearly evidenced. Running for approximately six years from April 2016, the key elements are;

- Replacement of nine Euro-5 Park and Ride vehicles with an equivalent number of zero-emissions Battery-Electric Vehicles via a competitive tendering process.
- Installation of four 50kw rapid-charge points at the Park and Ride sites.
- Installation of eight 15kw rapid charge points in the operator's depot.
- Introduction of a monitoring and evaluation regime to explore the benefits and real-world feasibly of electric bus operation, ultimately developing a model for further roll-out, focused on ECC's other site at Colchester, supporting the creation sustainable communities for Essex residents and businesses.
-Targeted publicity campaign to encourage a public shift to park and ride usage.

The key outcomes and improvements of the scheme will be;

- Seven million zero-emissions passenger journeys per year on the Park and Ride service.
- Financial benefits in excess of £300,000, derived from a competitive Park and Ride tendering process.
- A reduction in CO2 emissions of: 1,970,000kg *
- A Reduction in No2 emissions of: 9675kg*
- A Reduction in PM10 emissions of: 110.4kg*
- Delivery of cultural & political shift towards the delivery of more zero emissions journeys.
- Provision of a technical and financial feasibility study to support low emissions bus operation in Essex & wider UK

*Based on continued operation with Euro V buses.

A2. Geographical area:

This proposal covers the 25km Chelmsford Park and network operating between Chelmsford City Centre and two Park and Ride (P&R) sites located at;

Sandon - Junction 18 of the A12 (East of Chelmsford) Grid Ref: TL746055
Chelmer Valley – On the A130 (North of Chelmsford) Grid Ref: TL717117

Both Park and Ride routes are operated under contract to Essex County Council, serving an extensive population area including both urban and rural areas, providing a cross-city link between Chelmsford City Centre, Anglia Ruskin University and Broomfield Hospital. Approximately 1.2m passenger journeys operate annually composed largely of commuters from across Essex and wider region, but also a growing number of daytime leisure travellers.

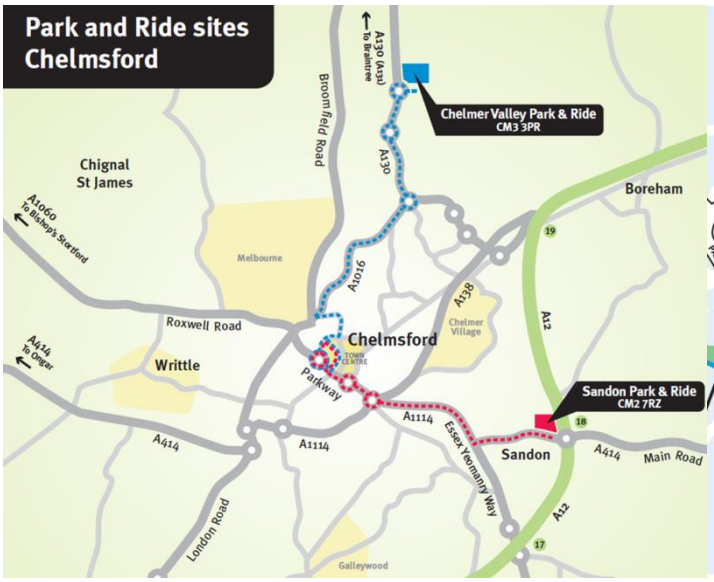

Fig 1. Chelmsford P&R Routes

Fig.2 City Centre Map

The route characteristics of the Park and Ride operation are dynamic with large variances in vehicle speeds and traffic conditions which traditionally pose a challenge for Electric Vehicle operations. Both Sandon and Chelmer Valley Park and Ride routes include long stretches of 50mph interurban running into the city centre running via dedicated bus-priority routes. Upon entering the city centre both routes encounter congestion and frequent stopping patterns running at speeds below 15mph.

A3. Total DfT funding sought (£m):

2016/17: £1,140,041.00
2017/18: £0.00
2018/19: £0.00

A4. Total DfT funding sought for second, scaled down, bid, if applicable (£m):

Not applicable to this bid.

A5. Total cost of your proposal (This should include DfT funding as specified in A3 + any 3rd party contributions) (£m):

2016/17: £2,538,636.00
2017/18: £4,560.00
2018/19: £8,400.00
2019/20: £8,400.00
2020/21: £8,400.00

Total: £2,568,396

A6. Total cost of your proposal for second, scaled down, bid, if applicable (This should include DfT funding as specified in section A4 + any 3rd party contributions) (£m):

Not applicable to this bid.

A7. Joint bids:

If this is a joint bid, please give further details of how you will work together and your reason for submitting a joint bid.

This is a joint bid being submitted by Essex County Council, in partnership with Chelmsford City Council and the future operator of Chelmsford Park and Ride services. Who this operator is will be determined following the result of a procurement process due for completion in March 2016.

In deigning this scheme we have investigated the outcomes of the 'Zeus' project and designed the bid to reflect the core principles of extending a fully electric solution to the core urban-bus network and facilitating the development of specialist support tools and guidelines for decision makers. We recognise that this is only achievable by having the multi-level and multi-sector partnership working that will be vital to ensuring the success of this project.

Essex County Council is committed to ensuring residents of Essex live in a high-quality and sustainable environment. We have a commissioning strategy which mandates us to work with partners to ensure this is possible. Through this partnership work with Chelmsford City Council we have identified specific yet significant pockets of pollution in the City. This majority of this pollution is attributed to private and public transport vehicles, resulting in the need to declare an Air

Quality Management Area (AQMA) with additional areas also at risk of breaching pollution regulations.

The direct implications of declaring an Air Quality Management Area and the need to identify solutions are legally the responsibility of Chelmsford City Council. Whilst this is true, Essex County Council's responsibility for highways and public transport allows us to play a part in resolving the situation for the benefit of residents and both authorities share the common goals of the bid outlined above. In order to appropriately respond to local needs, improve current service provision and meet these goals each authority is committed to working in partnership to ensure a measurable impact for Chelmsford.

Though working with operators and the City Council to reduce vehicle emissions in Chelmsford, we recognise that outside of our supported services, Essex County Council has little direct control over the type and quality of the public service vehicles operating in Chelmsford. Though options exist to combat emissions, for example setting-up a Low Emissions Zone, this is both a time-consuming and expensive process which both the County Council and City Council believe could be solved more efficiently through other opportunities.

Essex County Council's Park and Ride service has a significant impact on the air quality in Chelmsford, operating as both a cause and solution to the air quality problem. ECC has much greater influence in operator vehicles on our tendered services such as Chelmsford Park and Ride and these offer the ideal opportunity to test the feasibility of Electric Vehicles in partnership working.

Undertaking up to 16 journeys per hour through the city centre, the service is a major contributor to emissions whilst also providing the opportunity to reduce emissions by removing private vehicles from the city. Working in partnership with Chelmsford City Council and our future Park and Ride operator to convert Chelmsford Park and Ride to Battery-Electric operation we will share evaluation, publicity and resources. It is anticipated this will enable Chelmsford City Council to reduce emissions from both buses and private vehicles, significantly, improving Air Quality in the City, leading to improved health outcomes for Essex residents.

Essex County Council and Chelmsford City Council have worked together for a number of years on delivering an effective Park & Ride operation including the pooling of information and resources and collaborating on City Centre and Park and Ride charges to encourage use of the service for long-term stays and this partnership will extend this ongoing work.

Through our partnership with the tendered Park and Ride operator, Essex County Council will gain access to their expertise and operational experiences to ensure our operation achieves the maximum benefit. We will work with them to introduce electric buses as well as redeploy existing Park and Ride vehicles in Chelmsford, facilitating the cascade and or retirement of the most polluting vehicles away from the area, providing a double benefit. Additionally, this tendering operation and partnership will enable us to reduce costs Essex residents as a result of economies of scale in large group orders to be identified for vehicles to be identified by the new operator during their tender specification.

SECTION B – Evidence against the assessment criteria

B1. Ambition

Use the space below to set out (using a maximum of 1,000 words) how you meet the "Ambition" criteria, as set out in paragraph3.2 of the bidding guidance. It is highly recommended that you refer to this guidance when providing evidence against the assessment criteria, as this will be crucial to the success of your bid. Ambition has a weighting of 30%. Amongst other things, you may wish to consider:

Our vision is to encourage operators in Essex and across the UK to explore options for introducing low emission vehicles to their fleets, ultimately providing a greater range of sustainable travel choices, reducing carbon dioxide emissions, improving air quality and creating sustainable communities. Serving as a practical trial, this scheme will provide vital operational and technical learning, whilst seeking to validate the business case and cost-effectiveness of a local authority tendered service using electric buses.

If successful in this bid, our ambition is to become the UK's first 100% electric Park and Ride operation using nine battery-electric vehicles, providing customers the opportunity to undertake zero-emissions, home-to-work journey. The introduction of these nine vehicles will have a significant impact on the profile of the Chelmsford vehicle fleet, increasing the number of low-carbon buses to 32, representing approximately 23% of the public transport vehicles operating in the City daily. Our ambition is for this project to act as a catalyst towards a 100% low-carbon fleet in Chelmsford.

When designing the scheme, Essex County Council, working with its partners, evaluated a number of technology options including Diesel-hybrid, Hydrogen & electric vehicles. Whilst we recognise the choice of electric operation is not wholly innovative, we believe our application of the scale, economics and operation of the technology takes an innovative approach. Having evaluated the outcomes of the 'Zeus' project we have designed this scheme to reflect the core principles, through its mapping, scheme design and procurement to develop a fully-electric, high-capacity solution for an urban bus network.

The conversion to electric operation is made more innovative when the operational dynamics of Chelmsford Park and Ride are evaluated. The routes are unique in terms of current electric vehicle operation, both in length and variation of speed, ranging from 55mph interurban running through to stop-start City Centre traffic. These operating conditions typically pose a challenge in managing the battery life and will serve as a useful test-bed for future developments. Monitoring technology embedded within the charging infrastructure and on-board vehicles will be utilised to provide the Park and Ride operator, Council and manufacturers with insight into vehicle performance, driver behaviour and training effectiveness. Through partnership working and knowledge sharing our ambition is to use this data to enable battery technology and software developments of significance to the entire industry to be developed and shared through a partnership working approach.

It is anticipated this work will facilitate the development and deployment of additional vehicle fleets across the UK, allowing effective evaluation of the technical, operational and financial feasibility of electric buses to be completed, developing our understanding of the operating margins and increasing the attractiveness of EV's to operators where improvements are identified. We recognise that multi-level and multi-sector partnership working will be vital to ensuring the success of this ambition. We plan to work not only with our project partners but also seek wider connections with Government, successful bidders and other parties to share best practice and plan to run a one day conference, one year from scheme commencement to share our experience and provide a discussion forum for other operators or those seeking to operate electric buses.

In addition to the technical innovations outlined above, our re-procurement of the Park and Ride contract, will encourage bidders to identify opportunities to streamline operations in terms of cost, technical and passenger innovation whilst also providing the opportunity to test our as-yet unproven savings assumptions on EV's against Diesel equivalents. Chelmsford will be the first Park and Ride service in the UK to competitively tender for electric buses. This work is an attempt to encourage operators and manufacturers to provide competitive prices to win the contract, leading to further reductions in vehicle and operational costs for all operators over time as well as providing a model to be used by other local authorities.

In preparation for this project, Essex County Council working with APT controls has modelled options for scheduling, charging management and efficient positioning of infrastructure to derive the lowest price for an electric Park and Ride service whilst not adversely affecting quality or frequency. Early work with these models has allowed us to identify opportunities to facilitate an increase in frequency using the same number of buses and route miles, mitigating the loss of seats in the specified electric buses and provides scope to charge EV's at the start and end of every peak with no increase in the number of vehicles required to operate the route or reduction in frequency compared to current diesel operation.

This scheme builds upon an INTERREG IVC EU funded Sustainable Urban Mobility (SUM) programme. As part of this project four chargers were installed at Chelmsford Park & Ride sites, creating a network of rapid charging points across Essex. The overall aim of SUM (www.sumproject.eu/) was to promote the implementation of local and regional policies regarding sustainable travel, trying to minimise CO2 emissions, energy demand, and pollution of the cities.

This scheme contributes to ECC's responsibility as Highway Authority to facilitate low carbon transport and ensure we anticipate and facilitating consumer choice for electric vehicles. The Essex Local Transport Plan pledges to "support…use of emerging low-carbon technologies to reduce carbon emissions from transport sources" (Policy 7) and "encourage the use of more sustainable forms of travel" (Policy 8).[2]

[2] Essex Transport Strategy: The Local Transport Plan for Essex, Essex County Council, June 2011: http://www.essexhighways.org/Transport-and-Roads/Highway-Schemes-and-Developments/Local-Transport-Plan.aspx

Government is currently undertaking a consultation on draft plans to improve air quality, which proposes a framework to be set out for early 2016 for implementation by local authorities of new 'Clear Air Zones'. This provides a focus for bringing together local actions on air quality and will include setting out a standard control for vehicles entering an area, which could comprise of buses. The electric buses used in this project produce zero tailgate emission and will be below the proposed standard within the framework for buses NOx emissions limit of 0.4g.kWh, ensuring Chelmsford is well placed in the implementation of this legislation.

B2. Deliverability

Use the space below to set out (using a maximum of 1,000 words) how you meet the "Deliverability" criteria, as set out in paragraphs 3.3 to 3.6 of the bidding guidance. Deliverability has a weighting of 10%. Amongst other things, you may wish to consider:

ECC has 10 years' experience in delivering Chelmsford Park and Ride and will use the procurement exercise to ensure we partner with an experienced operator of electric vehicles to provide the necessary operational expertise to deliver the project. In developing this scheme we have worked with manufacturers (Optare, APT controls), operators (FirstGroup) local authorities (York City Council, TFL) and highways consultants to validate the feasibility and deliverability of the scheme, securing letters of support to this effect.

The table below outlies the key milestones, threats and mitigations affecting the Park and Ride deliverability of the scheme.

	Risk Outline			Analysis & Mitigation						
				Pre			Mitigation	Post		
Risk Number	Risk Type	Risk Description	Resulting in	Probability	Impact	Score		Probability	Impact	Score
1	Financial	Costs of vehicles in excess of those specified in the bid	Additional Financial cost for Essex County Council.	2	2	4	Quotations sought from manufacturers for vehicles at list price with agreements that multiple vehicle orders or those forming part of a larger group order.	1	1	2
2	Financial	Costs of infrastructure are higher than those specified in a bid.	Additional financial costs to Essex County Council.	3	2	5	Quotations sought from manufacturers for infrastructure at list price with agreements on discounts for multiple orders. Modelling undertaken to ensure sufficient infrastructure to support the costed operation.	1	1	2
3	Financial	Additional electrical supply infrastructure required	Additional Financial cost for Essex County Council and P&R operator.	3	3	6	Survey works undertaken by highways contractor for ECC P&R sites indicate no requirement for additional electrical supply. Operator depot infrastructure requirements unknown at present. Additional costs of supply infrastructure to be absorbed by the operator as part of tender specification.	2	2	4
4	Financial	Maintenance costs of infrastructure rise following expiration of 2 year warranty period.	ECC exposed to additional revenue costs.	3	2	5	Fixed price d for 3 year extended warranties agreed in principle with manufacturers - subject to procurement.	1	1	2
5	Financial	Delay in delivery of electric Vehicles	Additional Financial cost of leased vehicles.	2	3	5	Procurement specification to ensure operators provides commitment to delivery of vehicles or provides alternatives by contract start date. Any additional leasing costs to be borne by the operator.	2	1	3
6	Procurement	No operator meeting specification for P&R is found	Resulting in a delay in scheme implantation	2	2	4	Soft market testing undertaken for our approach - learning from this exercise incorporated into the scheme design and procurement. Robust procurement plan developed. Option to invoke current operator extension clause to ensure P&R continues with diesel vehicles.	1	3	4
7	Procurement	Delay in delivery of electric Vehicles	Delay introduction of EV's, reduced scheme benefits and poor customer service	3	3	6	Consultation with manufacturers on anticipated production. Procurement designed to ensure contract start is met. Bidders required to set out plans and are liable or ensuring alternative options in place.	2	2	4

8	**Delivery**	Vehicles do not achieve predicted charge mileage in service.	Passenger inconvenience, reduced air quality impacts if additional Diesel vehicles required.	2	3	5	ECC has worked with operators and manufacturers to model real-world range achievements. Planning for future operation modelled to ensure sufficient power remains to provide slippage. ECC will work with incumbent operator to trial Electric Vehicles to identify barriers prior to scheme start. Operator with experience of EV operation will be chosen.	**1**	**2**	**3**
9	**Delivery**	Drivers unfamiliar with the EV operation erode battery range	Passenger inconvenience from additional charging, reduced air quality impacts if Diesel replacements are required	3	3	6	Feedback from York City Council and First York highlights problems with this - ECC to work with the future operator to develop driver training prior to introduction.	**2**	**2**	**4**
10	**Delivery**	Current Emissions overestimated	Not meeting emissions target set out in the bid	2	2	4	Robust modelling undertaken by independent consultants using certified data based on vehicle test data.	**1**	**1**	**2**
11	**Delivery**	Lower than anticipated instances of zero-emissions running	Not meeting emissions target set out in the bid	1	2	3	P&R contracts specify vehicles to be used. If failure occurs spare P&R vehicle provided at the depot to mitigate failure.	**1**	**1**	**2**
12	**Delivery**	Reduction in Seating Capacity through EV introduction	Lower Passenger Satisfaction, lower than anticipated growth, not meeting emissions / Air Quality targets	3	2	5	Operator required to ensure there is no reduction in P&R seating capacity. ECC has modelled options or achieving this through introduction of cross-city routings allowing reductions in frequency	**1**	**2**	**3**
13	**Delivery**	Power failure means vehicles cannot charge	Unable to run a full park and ride service, passenger satisfaction loss, increased congestions	1	3	4	Infrastructure provided at P&R site & depot, Feedback from experienced operators is that we won't be able to operate a full service, resilience plans developed to ensure access to charging infrastructure.	**1**	**3**	**3**
14	**Delivery**	Charging infrastructure is unserviceable	Reduction in charging capacity and additional cost to ECC	2	2	4	Only supervisors at Park and Ride site authorised to operate charging equipment. Operator of P&R will assume liability for cost of damage. Additional charger available on site or top-up charge and spare Electric Vehicle can be used to fill service gaps. Extended warranty negotiated with supplier to ensure ongoing support / replacement where necessary.	**2**	**2**	**4**

In order to deliver the procurement required for the project a timeline has been set with the key dates as follows;

- Tender Issued January 2016.
- Operator Selected March 2016
- Trial & evaluation of Electric Vehicle Conducted April 2016
- Order or Vehicles placed by operator April 2016
- Order for Infrastructure placed May 2016
- Infrastructure Installed July/August 2016
- Vehicles Delivered and tested September 2016
- Electric Park and Ride Operation Begins 26th September 2016.

Essex County Council has secured match funding from a range of sources with contributions set-out in section C3 below as well as guarantees from manufacturers to reduce up-front costs of vehicles and infrastructure.

B3. Air Quality

Use the space below to set out (using a maximum of 1,000 words) how you meet the "Air Quality" criteria, as set out in paragraph 3.7 of the bidding guidance. Air Quality has a weighting of 25%.

The primary source of air pollution in Chelmsford is road traffic emissions, especially around the inbound and outbound approaches to the Army and Navy roundabout, which is a gateway to the city centre. An Air Quality Management Area (AQMA) was declared in 2005 and amended in 2012, incorporating several roads leading into the roundabout where concentrations of Nitrogen Dioxide (NO2) breach the annual mean air quality objective of 40ug/m3 as specified in the air quality regulations (England) 2000. Between 4,400 and 4,800 vehicles pass through the roundabout during weekday peak hours which creates a pinch point on the network.

There has been a significant increase in traffic passing through other access routes, such as Springfield Road and Victoria Road, which monitoring has identified that NO2 levels are at risk of breaching the annual mean air quality objective. Park and Ride (P&R) services were implemented in 2006 (Sandon) and 2011 (Chelmer Valley) to address congestion, improve access and address air quality and run along these key corridors.

Traffic passing through built-up areas of the city can lead to greatly increased pollutant concentrations at street-level with rows of tall buildings creating an urban habitat known as a street canyon. These canyons trap traffic pollutants, limiting their dispersal into the atmosphere. A Public Health report published in 2014 revealed that for 2010 an estimate of 72 deaths (age 25+) in Chelmsford were attributable to anthropogenic particulate air pollution.[3] Cambridge Environmental Research

[3] *Public Health England (2014) Estimating Local Mortality Burdens associated with Particulate Air Pollution, April 2014.*

Consultants (CERC) was commissioned to model emissions across the area to produce 'with' and 'without scheme' emissions calculations.

Based on the CERC modelling using OLEV methodology the scheme will save 167kg of NO_X per year and 2.1kg of PM_{10} per year, compared to a counterfactual case modelling a Euro VI fleet. Including emissions from idling at bus stops, the scheme will save 271 kg of NO_x per year and 2.1kg PM_{10} per year.

Although the Sandon P&R is the only route that runs through the AQMA, the modelling shows that replacing the entire P&R fleet with 100 percent electric will substantially reduce NOx, PM10 and CO2 emissions. This is preferential over a hybrid bus which uses a third less fuel and emits 30 percent less CO2 emissions than diesel equivalents.

Overall, electric buses will provide a smoother and quieter ride, improve access to the city centre, reduce number of cars, increase attractiveness of sustainable passenger travel, improve efficiency of traffic flow, and importantly contribute to improving air quality along the P&R routes. This scheme will assist in addressing the air quality issues and bring the NO2 concentrations at the Army & Navy roundabout below the mean NO2 objective, therefore removing it from being an AQMA in the future. It will reduce the pollution levels trapped in the street canyons of the city centre, reducing the risk of people being exposed and reduce the risk of another AQMA being declared in other areas of Chelmsford.

A survey conducted by Transport and Travel Research Ltd in 2013 was commissioned to get an indication of the market in Essex, including public acceptance and perceptions of electric vehicles, as well as barriers and support for their implementation. The survey revealed that the scope to use electric vehicles and charging points within Essex is potentially high. A modal shift from a car to electric bus offers a ‘greener and sustainable’ way to meeting our transport needs. For example, if we take the assumption of 1 electric bus with an 87 passenger capacity replaces the use of 87 cars (based on average car gCO2e/km) an approximate total of 145.8kgCO2e will be saved on the Sandon route and 192.1kgCO2e on the Chelmer Valley route.

The estimated annual total improvements in air quality from this LEB scheme (using Euro VI diesel buses as a counterfactual as specified in the bid criteria and assuming diesel vehicles were procured for the Park and Ride, will be 167.2 kg of NOx and 2.1 kg of PM10. This breakdown to 74 kg/year of and 0.9 kg/year of PM10 for the Sandon P&R route and 93.2 kg/year of NOx and 1.1 kg/year of PM10 for the Chelmer Valley P&R route. This will lead to a saving of 8.5kg of NOx, 0.077kg of PM_{10} in only the AQMA.

The current Park and Ride operation uses Euro V buses and we have undertaken modelling to estimate the total improvement in air quality before and after the introduction of electric buses assuming. Annual total improvements in air quality from this LEB scheme (using Euro V diesel buses as a counterfactual) will be 1935.1kg of NOx, 18.4kg of PM10 and 394,000kg C02 across both park and ride routes per annum. Assuming that the current Euro V vehicles were used for the

duration of next 5-year Park and Ride contract this will result in savings of 9675kg NO2, 110.4kg PM10 and 1,970,000kg CO2.

The replacement of the Park and Ride Euro V fleet with electric vehicles and associated infrastructure will lead to a five percent reduction in total NO_x emissions and particulate emissions are substantially reduced.

As well as direct improvements for the introduction of electric buses on Park and Ride duties, additional indirect benefits are also achievable. Displacement of Nine Euro V Diesel form the Park and Ride will enable Essex County Council to exercise its current contract powers to ensure that these vehicles are cascaded into the Chelmsford Fleet, facilitating the withdrawal of an equal number of polluting Euro II or III vehicles.

As well as a reduction in bus emissions, it is anticipated that through a refreshed brand and advertising campaign for Park and Ride services, there will be an increase in the number of journeys to being undertaken and a counterfactual reduction in City Centre car journeys.

B4. Value for Money

Use the space below to set out (using a maximum of 1,000 words) how you meet the "Value for Money" criteria, as set out in paragraph 3.8 of the bidding guidance. Bidders should make clear where they are referring to buses and where they are referring to infrastructure. Value for money has a weighting of 35%. Amongst other things, you may wish to consider:

In developing the costs for this bid we have worked with manufacturers to ascertain an accurate understanding of the costs of purchasing and operating low emissions buses and infrastructure. As we have yet to procure an operator for the Park and Ride service, costs outlined within the bid and evaluated below represent maximum list prices for single items. Following the award of tenders, manufacturers have confirmed further opportunities to reduce costs as part of a larger procurement order.

The primary costs of this bid are the 90% top-up grant for the electric bus purchase totalling £1,053,000.00 and, accounting for approximately 41% of the total costs of the project. Our request for infrastructure is comparatively small at only £87,041, including 32.5% match funding contribution to the infrastructure costs.

In preparing our bid we have used both the DfT low emissions buses calculator, as well as our independent modelling, factoring in all the operating costs, capital investment and depreciation costs to assess the financial viability of electric bus operation from a theoretical and real-world perspective. The real-world data has been used validate our investment in infrastructure through internal business cases and in addition to the air quality benefits has been a key driver in our decision to convert Chelmsford Park and Ride to electric operation. Crucially, we have built our scoring methodology for our Park and Ride procurement around these figures to ensure operators are delivering value to us in their tenders.

Additional revenue costs associated with maintaining the infrastructure, extended warranties and staff training will be absorbed by ECC as part of the Park and Ride contract. Based on financial modelling based on assumptions provided by APT controls it is anticipated the revenue savings associated with reducing fuel and maintenance costs of electric vehicles will surpass these additional capital costs of vehicles to deliver cost reductions compared to diesel, over the life of the contract in excess of £300,000.

This scheme has been designed to enable more effective use of our Park and Ride fleet by facilitating the rotation of vehicles in and out of charge throughout the day and utilising an otherwise spare vehicle Park and Ride vehicle not required in the off-peak. This has been achieved whilst not adversely increasing driver requirements and/or cost. We have worked with bus manufactures, operators of Electric Vehicles, Local Government Organisations and charging consultants APT controls to validate the infrastructure requirements for this bid. The understanding gained from these conversations has allowed us to develop a charging programme offering value for money and operational advantage including the number and type of charging equipment requested. We will operate two 50kw rapid chargers at each park and ride site with the additional capital cost of these vs fast chargers balancing against the capital, revenue and air quality implications of purchasing additional hybrid buses to fill the gaps in using a single rapid charger at each site or mix of fast and rapid chargers.

The nine Park & Ride buses being replaced are all Euro V rating, with an average age of 4.5 years old. All are single decker buses with current vehicle passenger capacity of 44 seated and 34 standing. They run on diesel and deliver fuel economy of 8.52 miles per gallon. Based on the LEB certificate an average Euro V diesel bus produces 998.1 gCO2e/km, therefore 9 Euro V buses produces a total of 8.98 kgCO2e/km.

The estimated total annual carbon saving for replacing the entire Park & Ride fleet in Chelmsford is 1,970,000kgCO2e (using Euro V diesel buses as a counterfactual). The total carbon saving by the LEB scheme for each P&R route is 180,722 kgCO2e/year for Sandon and 213,299 kgCO2e/year for Chelmer Valley.

The calculations are explained in the attached spreadsheets – 'Chelmsford Park and Ride LEB Calculations' for the annual carbon savings and air quality improvements, and 'CO2 savings from modal shift from cars to bus' calculates the estimated CO2 savings of replacing the same number of average petrol and diesel cars (using DECC percentage split) as the passenger capacity of one electric bus. The explanation behind the modelling data of emissions across the area to produce 'with' and 'without scheme' of annual average NO2 is explained in the CERC Emissions analysis Report. The report describes the methodology and provides an air quality assessment to investigate the impact of replacing the current bus fleet with electric buses and infrastructure, including quantification of the change in emissions and the resulting change in air quality.

Both Chelmsford Park & Ride sites have been accredited an HM Government Energy Performance Certificate rating of A+ through production of renewable

energy from an 11kw wind turbine at each site and sustainable design. In addition, the Chelmer Valley site has been accredited with the European BREEAM (Building Re-search Establishment Environmental Assessment Methodology) excellent.

The new buses will be 100 percent electric and even through the electricity will be drawn from the UK supply for both the depots and P&R, these buses being pure electric will produce up to 40 percent less CO2 than a similar diesel bus. The energy supplied to the P&R's is provided by SSE Energy Supply Limited, whose policy is to provide energy in a sustainable way. By working towards decarbonising its electricity generation and ensuring the environmental impact of producing energy is minimised. 37% of electricity supplied is sourced from renewable and 3% from nuclear.

There is also the potential for further energy efficiency from the buses, in turn ensuring reliability through driver training and the use of smart technology. This technology can provide drivers with information on remaining range available and to monitor the energy consumption per route, enabling the utilisation of up to 25% more without range anxiety. This will reduce the energy demand from the buses by eliminating the need for more frequent charging.

B5. The bid – supplementary information

Please use the space below to provide any further information about the bid not covered elsewhere (max 300 words):

We appointed our highways expert to provide investigation into the power requirements at our Park and Ride sites. There was no requirement for addition substation found. However, this finding is subject to detailed scheme design works and procurement of infrastructure. The power requirements at the operator's depot of course remain unknown, because the operator is unknown until after the procurement is completed.

We contacted First in York as they have experience with in-depot charging and they may require a new substation at their depot for charging that number of vehicles. If this is the case for us, it will be a condition of the Park and Ride procurement contract for the operator to identify the depot power requirements and will be incorporated into the service fee for the Park and Ride contract and no additional costs will be sought from the Low Emissions Bus Scheme or DfT.

In developing this bid we have worked closely with Optare and plan to design our tender specification so operates tender to operate the Park and Ride routes utilising 9 Optare electric vehicles for a period of 5 years. We realise that the tender process may lead to an operator bidding for vehicles from other manufacturers, providing they meet the tender specification and in this case any additional costs above those contained in this bid will be the responsibility of the operator.

SECTION C – Funding

C1. The Buses	
In total, how many new low carbon buses are you bidding for?	9
In total, how much grant are you seeking?	£1,053,000

For each separate bus type, please provide the following. The calculator will give you the "Base grant", "Top-up grant" and "Total grant eligibility": If needed, please copy and paste more tables below. All rows are mandatory.

Note – You **must** submit your completed 'calculator' alongside this bid.

Manufacturer's name[4]	Plug-in electric
Make and model of bus	Plug-in Electric single deck bus.
Low Emission Bus Technology (e.g. hybrid, plug-in electric, gas etc.)	Plug-in electric
Number of buses in bid	9
Anticipated date of order	04/2016
Anticipated date of entry into service	09/2016
Cost per low emission bus[5]	£ 259,798.00
Cost per bus of diesel equivalent	£ 129,798.00
Base grant per bus (as per the calculator)	£ 97,500
Top-up grant per bus (as per the calculator)	£ 30,000
Total grant eligibility[6] per bus (as per the calculator)	£117,000
Total grant being sought per bus	£117,000

[4] In exceptional cases where this may be unknown, for example where a local authority is yet to go out to tender, it is sufficient to state the type of technology sought (e.g. hybrid, plug-in electric, gas).
[5] In the case where local authorities are yet to go out to tender, an average cost can be given
[6] This is the total maximum grant you are eligible for as set out in your calculator (base grant + top-up grant, subject to any imposed caps)

C2. The Infrastructure

Please give a description of any infrastructure funding being sought over the period of funding (i.e. 2016-2019):

To support the running of electric vehicles on Chelmsford Park and Ride we are seeking support for both 15kw fast chargers to support overnight charging and 50kW rapid chargers to facilitate day-to-day charging whilst vehicles are operating in service.

Following consultation with Evalu8 we anticipate that we will require two 50kw rapid chargers at each site. One charger will be located at the passenger boarding point to allow a vehicle to be charged during its scheduled 10 minute layover before drawing forward to pick up passengers for the next duty. Modelling conducted on our behalf and based on anticipated energy consumption calculates this 10 minute charge will be sufficient to replace the charge used during the vehicles previous run, ensuring vehicles are able to remain at a consistent charge level, prolonging the time needed between full charges. In order to ensure all vehicles are operating with sufficient charge to move through the evening peak all vehicles will receive a two-hour charge at second rapid charger located in the park and ride site. Combined the use of these rapid chargers will enable the running of a 100% electric operation eliminating the need to add diesel or electric buses into normal service.

In order to provide a balancing charge for the vehicles batteries we will equip the park and ride depot with eight 15kW+ fast chargers to be used for overnight charging of vehicles. Whilst re recognize this bid is for nine buses we anticipate, in line with current practice to have one vehicle as a hot-spare to provide ad-hoq capacity increases and cover maintenance requirements, vehicles failures and accidents. This vehicle is rotated on a daily basis and will be charged during daytime to ensure there is always a vehicle with 100% available to operate a park and ride journey adding resilience to the operation and ensuring customer expectations of a high quality service are met.

Both variants of charging points will be equipped from build with RFID card access to prevent risk to public from tampering as well as 3G data connections and associated monitoring software. The data derived from the charge points will to enable Essex County Council and our partners to access live data on vehicle energy consumption and charging status highlighting faults with equipment ensuring responsive maintenance can be carried out by the manufacturer as part of the extended warranty. This data will also enable intelligent charging to take place, informing us when vehicles are fully charged ensuring that vehicles can be more effectively rotated through charge in the day creating an efficient operating environment. The revenue costs associated with this technology have been absorbed by Essex County Council.

In total, how much grant are you seeking for infrastructure?	£87,041.00

For each type of infrastructure[7], please provide the following. If needed, please copy and paste more tables below. All rows are mandatory.

Manufacturer's name[8]	To be decided following procurement.
Type of infrastructure	50kw DC Rapid Charge Point & associated Installation costs
Anticipated date of order	05/2016
Anticipated date of installation[9]	09/2016
Total cost	£ 97,960
Total eligible amount[10]	£ 73,470
Total grant sought	£ 68,572

Manufacturer's name[11]	To be decided following procurement
Type of infrastructure	15kw AC Fast Charge Point & associated installation costs
Anticipated date of order	05/2016
Anticipated date of installation[12]	09/2016
Total cost	£ 26,384
Total eligible amount[13]	£ 19,788
Total grant sought	£ 18,468

[7] Please refer to paragraphs 1.7 and 1.8 in the guidance
[8] Where a local authority is yet to go out to tender, the name may not be known. The remaining rows should be filled in however.
[9] This is the date after which buses will be refuelled using the infrastructure
[10] This will be 75% of the cost of your infrastructure
[11] Where a local authority is yet to go out to tender, the name may not be known. The remaining rows should be filled in however.
[12] This is the date after which buses will be refuelled using the infrastructure
[13] This will be 75% of the cost of your infrastructure

C3. Funding Profile

Please use the information in sections C1 and C2 to complete the following summary funding table:

Please complete the following tables. **Figures should be entered in £000s** (i.e. £10,000 = 10).

£000s		**2016-17**	**2017-18**	**2018 – 19**	**2019-20**	**2020-21**	**Total**
Buses							
Number of buses in bid		9	0	0			9
Total grant eligibility (as per your calculator)		1,053	0	0			1,053
Total grant being sought		1,053	0	0			1,053
Infrastructure							
Total cost							128
Total eligible amount (i.e. 75%)		96	0	0			93
Total grant sought		87	0	0			87
TOTAL grant sought (Bus and infrastructure)		1,140	0	0			1,140
Match funding (if any)[14]		159	5	8	8	8	188

Please provide more information below on any match funding, notably:
1. What it will buy
2. When it will be bought; and
3. The source(s)

Match funding will be provided as part funding for the capital items outlined above, as well as providing ongoing funding to support the ongoing revenue costs associated with maintaining the installed infrastructure. Match funding will provide the vast majority for the upfront infrastructure costs made in year one of the grant 2016/17 with further lesser amounts provided in years 2017/18 and 2018/19.

[14] This should include any 3rd party contributions that have been secured

Over the life of the grant £72,000 of match funding will be provided by Essex County Council. This is comprised of;

- £37,303 to match fund the capital purchase costs of the Rapid and Fast charging infrastructure and associated installation and commissioning costs to support the operation of electric vehicles.
- £23,520 to ensure the ongoing revenue costs of maintaining and operating the infrastructure are covered as well as purchasing extended warranty for the equipment.
- £10,800 to provide data connections for the charge points. In order to allow us to evaluate the charging habits and energy consumption of our driers and vehicles and provide learning intended to develop best operational practices on when and how long to charge our vehicles it is planned that we will procure charge points with data connections.

In addition to the Essex County Council match funding we have specified in the design of our Park and Ride contract that any future operator purchasing electric vehicles must provide the 10% top-up to the electric vehicle grant. The grant is currently estimated to be £1,053,000.00 at our preferred vehicles lease price however is likely to decrease proportionately as operators bid competitively and secure discounts for larger vehicle orders from manufacturers.

SECTION D – Funding (bid 2 – scaled-down)

Although there is no cap on bids, where they exceed £5m, bidders should demonstrate how their plans (and the amount sought) can be scaled down. In doing so, please complete tables D1-D3 below.

D1. The Buses (bid 2)

Not applicable to this bid

In total, how many new low carbon buses are you bidding for?	
In total, how much grant are you seeking?	

For each separate bus type, please provide the following. The calculator will give you the "Base grant", "Top-up grant" and "Total grant eligibility": If needed, please copy and paste more tables below. All rows are mandatory.

Note – You must submit your completed 'calculator' alongside this bid.

Manufacturer's name	
Make and model of bus	
Low Emission Bus Technology (e.g. hybrid, plug-in electric, gas etc.)	
Number of buses in bid	
Anticipated date of order	MM/YYYY
Anticipated date of entry into service	MM/YYYY
Cost per low emission bus	£
Cost per bus of diesel equivalent	£
Base grant per bus (as per the calculator)	£
Top-up grant per bus (as per the calculator)	£
Total grant eligibility[15] per bus (as per the calculator)	£
Total grant being sought per bus	£

Please give a description of how this scaled down bid still meets the objectives of the fund as set out in the guidance and helps deliver your longer term vision.

[15] This is the total maximum grant you are eligible for as set out in your calculator (base grant + top-up grant, subject to any imposed caps)

D2. The infrastructure (bid 2) *Please give a description of any infrastructure funding being sought over the period of funding (i.e. 2016-2019):* Not applicable to this bid

In total, how much grant are you seeking?	

For each type of infrastructure[16], please provide the following. If needed, please copy and paste more tables below.

Manufacturer's name	
Type of infrastructure	
Anticipated date of order	MM/YYYY
Anticipated date of installation	MM/YYYY
Total cost	£
Total eligible amount (i.e. 75%)	£
Total grant sought	£

Please give a description of how this scaled down bid still meets the objectives of the fund as set out in the guidance and helps deliver your longer term vision.

[16] Examples of the infrastructure most likely to be bid for under this fund are: standard, fast and inductive charging equipment, gas (this includes portable or fixed) and hydrogen re-fuelling systems.

D3. Funding profile (bid 2)

Please use the information in sections D1 and D2 to complete the following summary funding table:

Please complete the following tables. **Figures should be entered in £000s** (i.e. £10,000 = 10).

Not applicable to this bid

£000s		**2016-17**	**2017-18**	**2018 – 19**			**Total**
Buses							
Number of buses in bid							
Total grant eligibility							
Total grant being sought							
Infrastructure							
Total cost							
Total eligible amount (i.e. 75%)							
Total grant sought							
TOTAL grant sought (Bus and infrastructure)							
Match funding (if any) [17]							

Please provide more information below on any match funding, notably:
1. What it will buy;
2. When it will be bought; and
3. The source(s).

[17] This should include any 3rd party contributions that have been secured

SECTION E – Monitoring and evaluation

E1. Monitoring and Evaluation (optional)

While this section is optional, we encourage bidders to comment on how air quality could be monitored and evaluated as part of this scheme (as per paragraph 3.7 of the guidance). This will not form part of the assessment criteria, however, and will only be used to inform DfT on how best to monitor and evaluate this scheme.

Consideration of this could include any existing monitoring arrangements in place on the route(s) set out in the bid. Unless the route is bus-only, there can be difficulties in monitoring specific emission levels. As such, we may monitor and evaluate air quality through other parameters, such as the degree of zero emission running on the route.

Chelmsford City Council Monitoring will continue to monitor NO2 concentrations within the Army and Navy Roundabout AQMA and other sites linking to the AQMA and along sections of the P&R routes through the use if an automatic analyser and passive diffusion tubes. Air quality monitoring is carried out in line with the requirements of the Local Air Quality Management (LAQM) process as set out in Part IV of the Environment Act (1995), the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 and the relevant Policy and Technical Guidance documents.

Building upon the emissions modelling by CERC, there is a potential to fit a Portable Emissions Measurement system (PEMs) on the existing Euro V bus for both P&R routes to understand the current level of emissions, in order to create a baseline. The P&R routes are not bus only and this method will allow us to measure real world emissions and to quantify the reduction in emissions (NOx and particulates) and greenhouse gas (CO2) from replacing the vehicles with electric buses. It will also be possible to assess the fuel economy of the existing vehicles and to identify the improvements that the implementation of electric buses and level of success that the scheme will deliver over the three years.

There is also the potential to use the data gathered from the smart technology installed on the electric bus (if applicable) to monitor and evaluate vehicle and driver performance (i.e. monitor the energy consumption per route and CO2 savings against a EURO VI diesel vehicle). Further to this, data from the charging points on the usage, energy efficiency and CO2 is collected, enabling to monitor their performance and effectiveness over the lifetime of the scheme.

All the data provided will be collated and captured in an annual report, where the results will be presented to Essex County Council, Chelmsford City Council and the operators. Monitoring information will be used to inform the project evaluation, identify areas for improvement, acknowledge the achievements made and lessons learnt. Through a production of a cases study the learnings from the scheme can be shared with Essex Local Authorities, transport operators, members of the public and other key stakeholders to encourage the uptake of low carbon/ electric vehicles across Essex.

SECTION F - Declarations

F1. Section 151 Officer Declaration (for local authorities)	
As Section 151 Officer for Essex County Council I declare that the scheme cost estimates quoted in this bid are accurate to the best of my knowledge and that Essex County Council; - has allocated sufficient budget to deliver this scheme on the basis of its proposed funding contribution; - accepts responsibility for meeting any costs over and above the DfT contribution requested, including potential cost overruns and the underwriting of any funding contributions expected from third parties; - accepts responsibility for meeting any ongoing revenue and capital requirements in relation to the scheme; - accepts that no further increase in DfT funding will be considered beyond the maximum contribution requested and that no DfT funding will be provided after 2018/19; - confirms that the authority has the necessary governance / assurance arrangements in place and the authority can provide, if required, evidence of this.	
Name: Nicole Wood, Director of Financial Services	Signed: 

**This is only required from the lead authority in joint bids*

Submission of Bids

The deadline for bids is 5pm, **31 October 2015**

An electronic copy should be submitted to lebs@dft.gsi.gov.uk

Please also include the supporting documentation specified either within the guidance document or in this proforma. This should include, but is not limited to: a PSV licence (operators only) and quotes from the manufacturer(s) for the low emission bus and its' diesel equivalent. We also require evidence of the calculation of your base grant, top-up grant and total eligible grant. This will be given by the calculator as specified in the guidance. Where match-funding has been secured, evidence of this will strengthen a bid. Please also provide evidence that the LEB has been certified as such.

If, for any reason, you need to send hard copies of papers to DfT, please provide 3 copies to:

Low Emission Bus Scheme
Buses & Taxis Division
Department for Transport
Great Minster House
33 Horseferry Road
London
SW1P 4DR