LowCVP Low Carbon Vehicle Partnership | Connect Collaborate Influence

CITY OF YORK COUNCIL

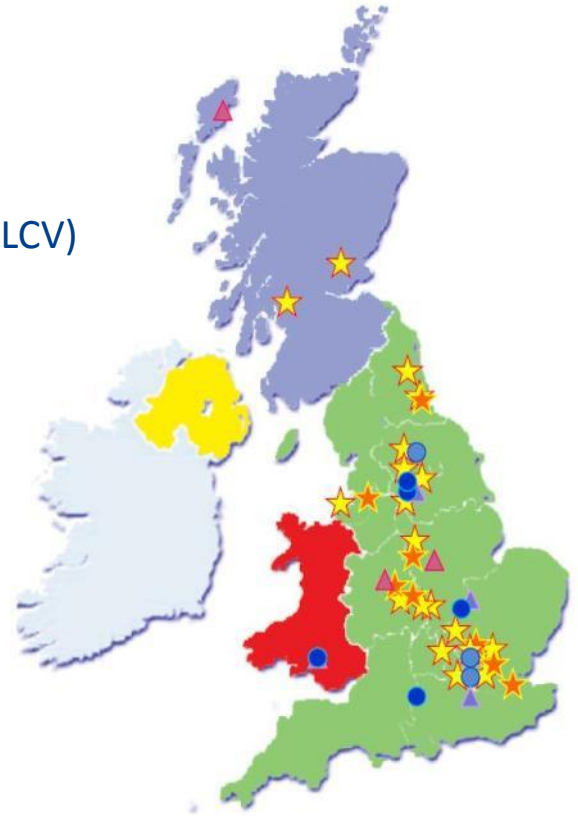
Low Emission Van Guide and Tool, Best practice fleet procurement case study

Steve Carroll, Senior Technical Specialist, Cenex

Introduction to Cenex

LowCVP Low Carbon Vehicle Partnership | Connect Collaborate Influence | cenex

- Running projects and programmes focused on accelerating the deployment of low carbon vehicles
  - Delivery of low carbon vehicle and infrastructure funding initiatives and programmes for UK government
  - Providing fleet carbon reduction consultancy
  - Low carbon vehicle deployment support and evaluation
  - Delivering the UKs national annual Low Carbon Vehicle event (LCV)

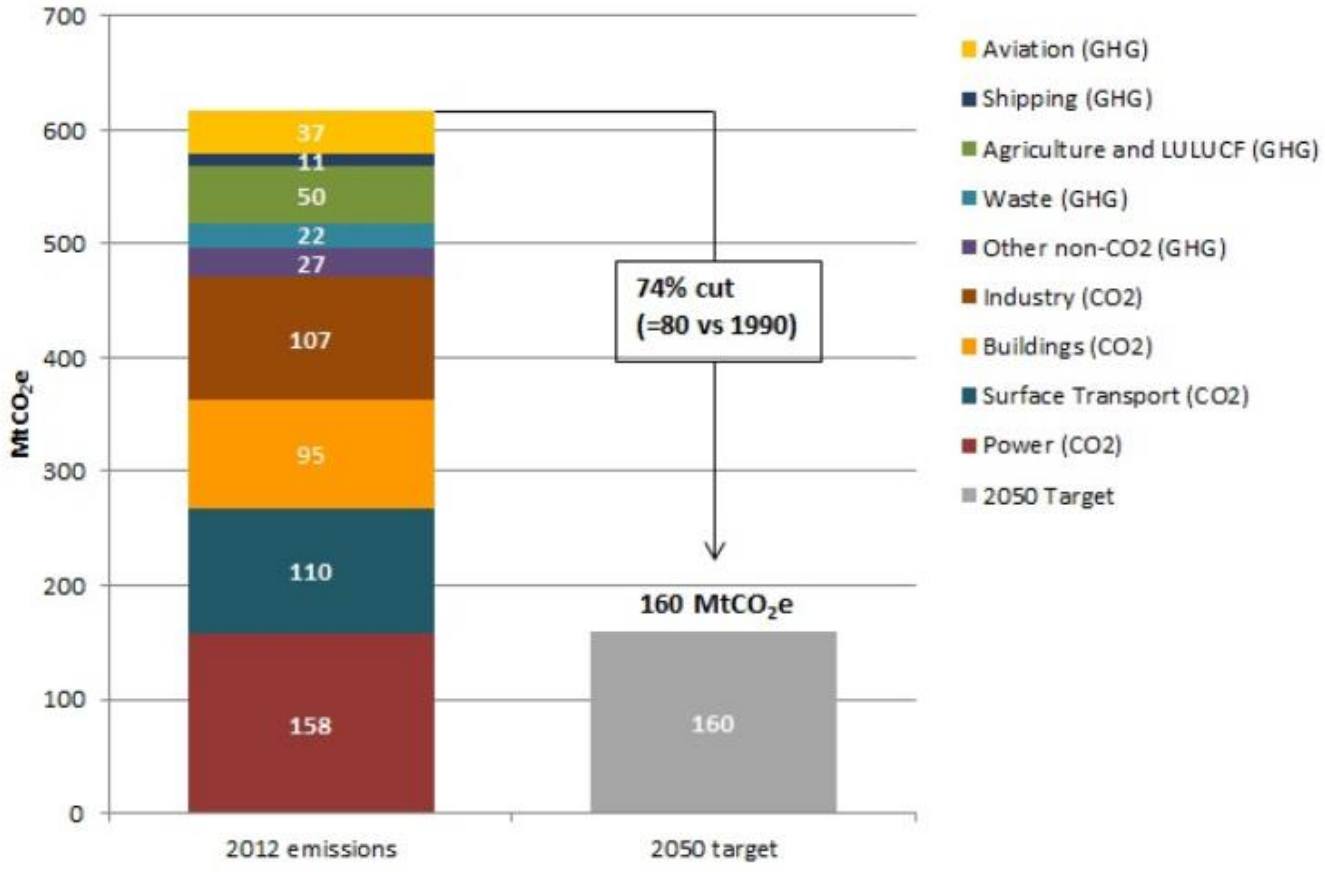


Contents

- Why a low emission van guide?
- Low emission van guide
- Low emission van tool
- Sustainability focus procurement framework

Why a LEV guide?

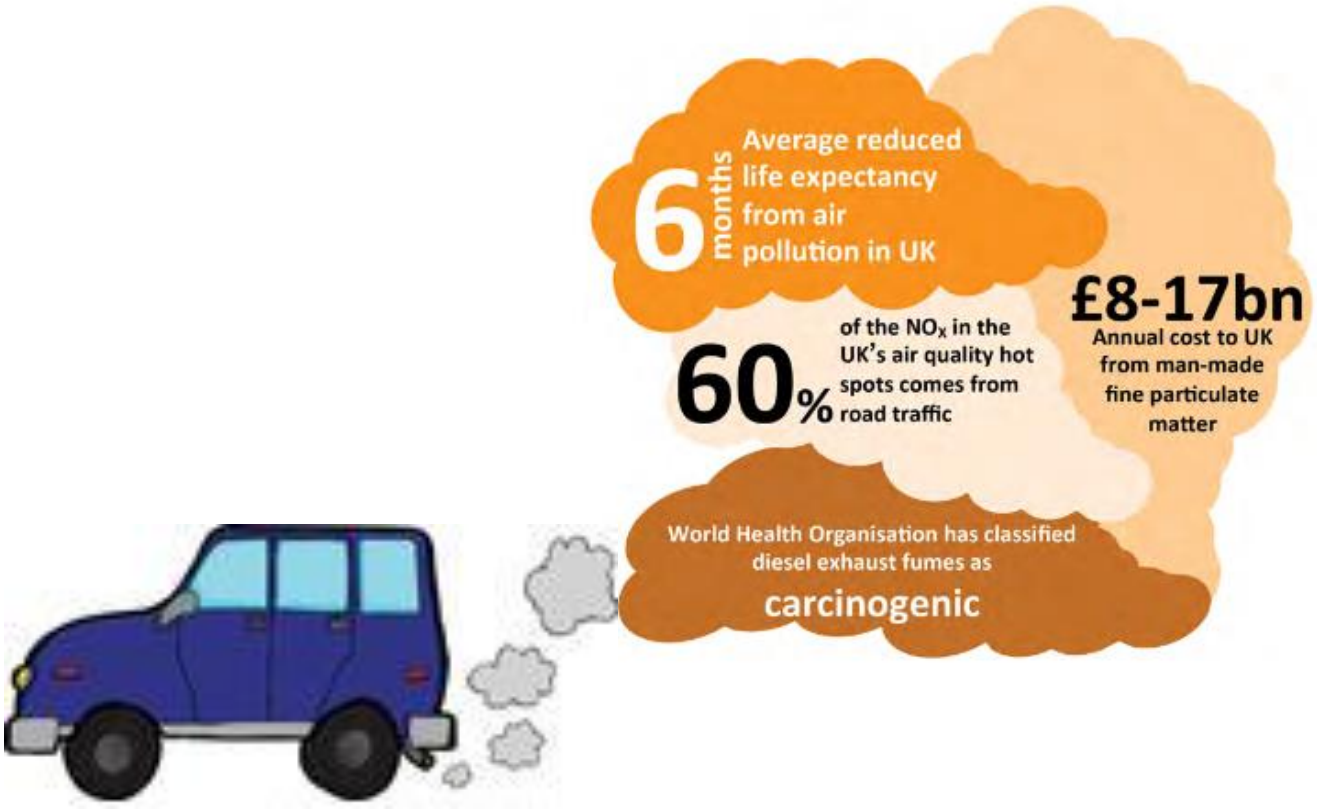
- Emission from transport are falling, but progress needs to be accelerated to meet the 2050 target



Source: Transport Emissions Roadmap 2014

Why a LEV guide?

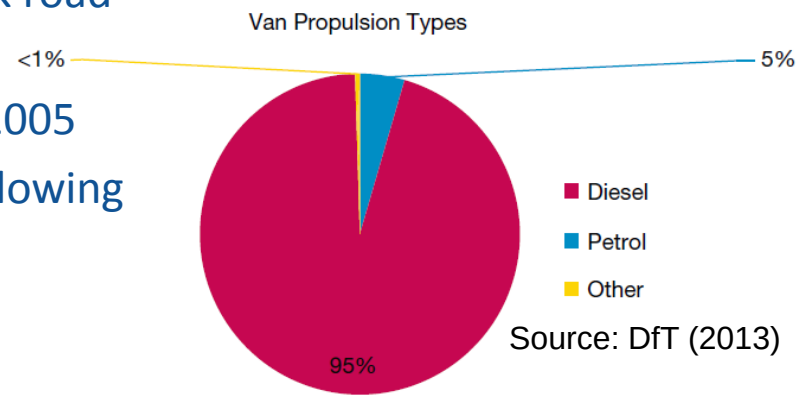
- Ever tighter Euro emission standards have not yet led to the expected improvements in air quality in urban areas in the UK or wider EU
- Legally binding values for NO2 are regularly exceeded in many UK cities, van are on of the contributors



Source: OLEV Strategy 2013

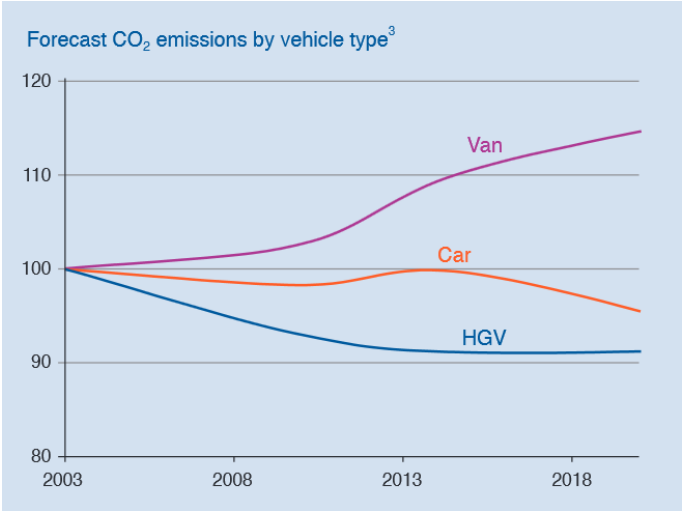
Why a LEV guide?

- Van market is the fastest growing sector of UK road transport (3.5% PA)
  - A 41% rise in van traffic between 1995–2005
  - Van sales and van sizes are increasing following the trend in increased home deliver
  - 14% total CO2
  - 95% diesel



Source: DfT (2013)

- Van CO2 is growing and predicted to increase future



Source: Cenex LCVPP Summary Report

Introduction to the LEV guide and tool

Low Carbon Vehicle Partnership | Connect Collaborate Influence | cenex

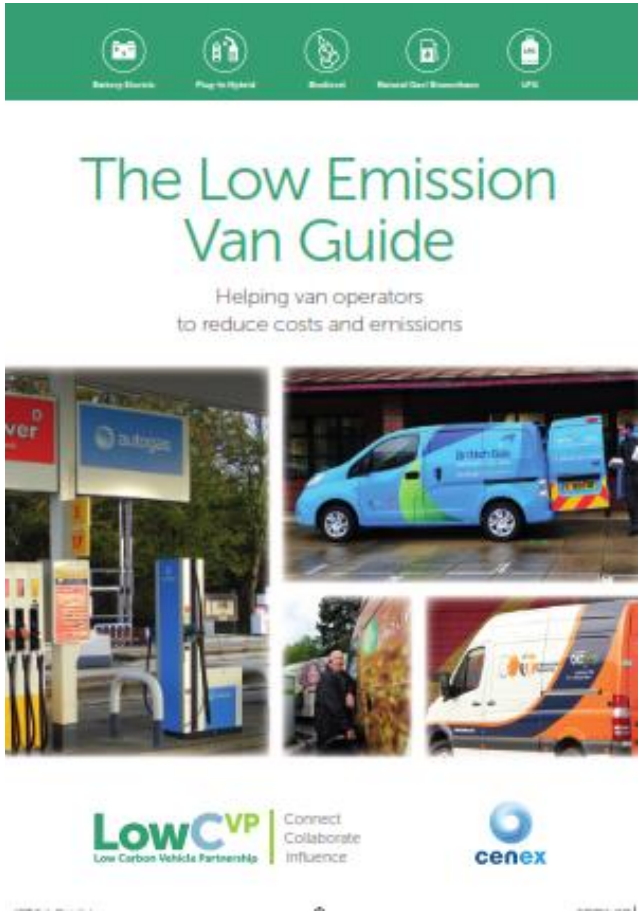
- Low emission van guide and tool
  - Sets out the **business, environmental and operational case** for using low emission vans
  - Gives van operators the **knowledge and resources required** to assess which vans are right for them
  - Provides **case studies showing the cost savings achievable** from different types of low emission fuels and technologies

Introduction to the LEV guide and tool

LowCVP Low Carbon Vehicle Partnership | Connect Collaborate Influence

cenex

- Why choose a low emission van?
- What to consider?
- Incentives
- Low emission van topic sheets
  - Battery electric vans
  - Plug-in hybrid vans
  - LPG vans
  - CNG / Biomethane vans
  - Biodiesel vans
- Van best practise
- What to do next?



Factors to consider

For a fleet of vans it may be possible to specify vehicles differently in order to arrive at a mix of van types to deliver the variety of duties required. This allows low emission vans to play a role in your fleet which is best suited to their capabilities.

Flexibility

- Technology options
- Daily / annual mileage
- Refuelling and recharging
- Emissions
- Cost
- Dealer support
- Vehicle size
- Payload

Factors to consider

Payload	**What type of goods will be carried, what is the maximum payload required?** Payload is often reduced slightly in alternatively fuelled vehicles due to the weight of additional components such as batteries, motors or gas tanks.
Vehicle size	**What load space is required?** The best way to reduce emissions and cost is to use smaller and lighter vehicles. Downsizing from a larger vehicle will also open doors to more low emission van options, for example most plug-in vans are only available in the smaller van range.
Daily / annual mileage (range)	**Local runs or long distance driving? Return to base for refuelling?** Refuelling station availability and the time taken to refuel/recharge can vary for the different low emission van options.
Fuel/technology options	**What are the benefits of low carbon fuels?** Apart from lower emissions and running costs, a quieter vehicle may be beneficial, or you may be looking to improve your company's image.
Local considerations	**Is any preferential treatment given for a particular type of vehicle, such as concessionary parking charges or access to low emission zones?** Low emission vans are often encouraged into cities by local authorities offering discounted access and parking fees.
Dealer support	**Where is my closest trained dealer? Will my warranty be affected?** Make sure your local service centre is able to support your alternatively fuelled vehicle. Different service frequencies have to be followed when running on biodiesel. An additional third party warranty may be needed to maintain full warranty cover of an LPG converted vehicle.
Buy or lease	**What discount can you get through your dealership? Do you want a guaranteed fixed cost for vehicle ownership?** The examples in this guide give whole life costs for vehicle ownership. You should look at both lease rates and ownership costs. Leasing companies can get much bigger discounts on buying vehicles compared to low volume van buyers. They offer convenient fixed monthly charges that can include maintenance. Plus many have specialists offering free advice for customers wanting to switch to lower carbon vehicles. Purchasing the vehicle yourself, especially if you can get a good dealer discount, can be cheaper, although you'll have to absorb some risk when it comes to estimating the value of an alternatively fuelled van in future years when you want to sell it.
Flexibility	**Finally, flexible thinking will help.** This guide will show you that the cost and emission savings are there, you may just have to rethink how you operate your vans to take full advantage of them.

Evaluating the cost

It's easy to fall into the trap of purchasing the lowest cost van available to you.

- Whole life cost
- Plug-in van grant
- Road tax
- Van benefit charge
- Enhanced capital allowance
- Fuel duty
- Free / discounted parking
- Congestion charge

INCENTIVE	INFORMATION	WHAT'S IT WORTH?
Plug-in van grant	The plug-in van grant currently gives 20% off the cost of a new Ultra-Low Emission Vehicle up to a maximum of £8,000. A van which emits less that 75g CO_2 per km driven is classed as an ULEV.	Up to £8,000
EV charging points	The government offers a grant of 75% towards the cost of charging infrastructure installed at residential addresses.	Up to £750
Road tax	The road tax rate for battery electric vans is £0.	Up to £225 per year
Van benefit charge	Using a company van for significant personal use is a taxable benefit. The government value this benefit at £3,150 per annum and a driver must pay their normal rate of tax on this. Further taxable benefits are imposed if the company also pay for the driver's fuel. The tax payable if a battery electric van is used is reduced and will increase steadily over 5 years before reaching the same level as a conventional van.	£630 for year 2015/16 basic rate (20%) tax payer
Enhanced capital allowance	Zero emission goods vehicles are eligible for 100% first year allowance until 2018. So if your business pays corporation tax at 20%, £20,000 spent on a battery electric van would reduce your tax bill in the year of purchase by £4,000. You cannot claim an enhanced capital allowance if you have received the Plug-in van grant.	£4,000 on a £20,000 purchase
Fuel duty	Some clean fuels such as natural gas, LPG and biomethane are cheaper than diesel and petrol because the government applies less fuel duty to them. In the case of electricity, there is no fuel duty applied at all.	Up to 70% reduction in fuel costs
Free or discounted parking	Some cities offer free or discounted parking at public charge points for electric vans.	Up to £10 per day
Congestion charge	Vans that emit 75g/km or less of CO_2 receive a 100% discount on the London Congestion Charge.	£11.50 per day, or £10.50 if using auto-pay

Topic Sheets

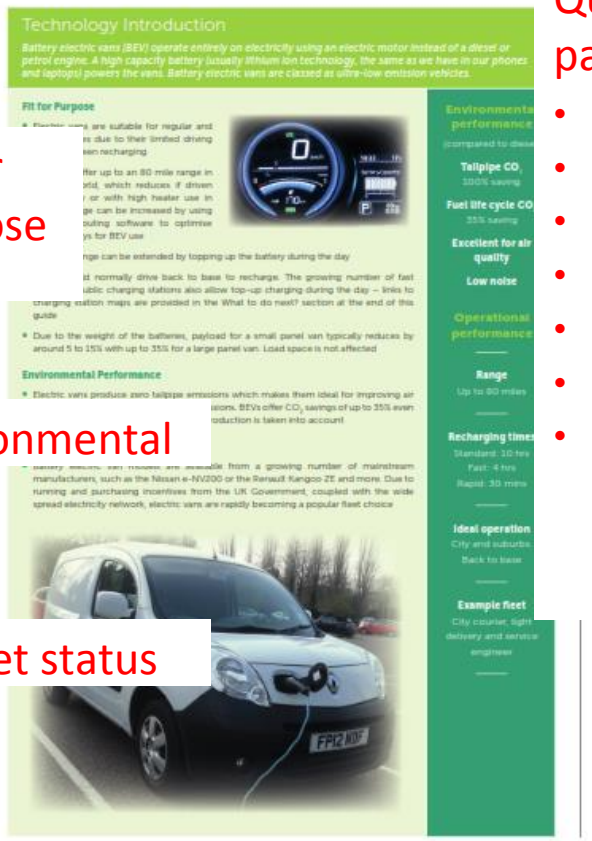
(Battery electric, PHEV, CNG / Biomethane, LPG, Biodiesel)

Technology introduction

Fit for purpose

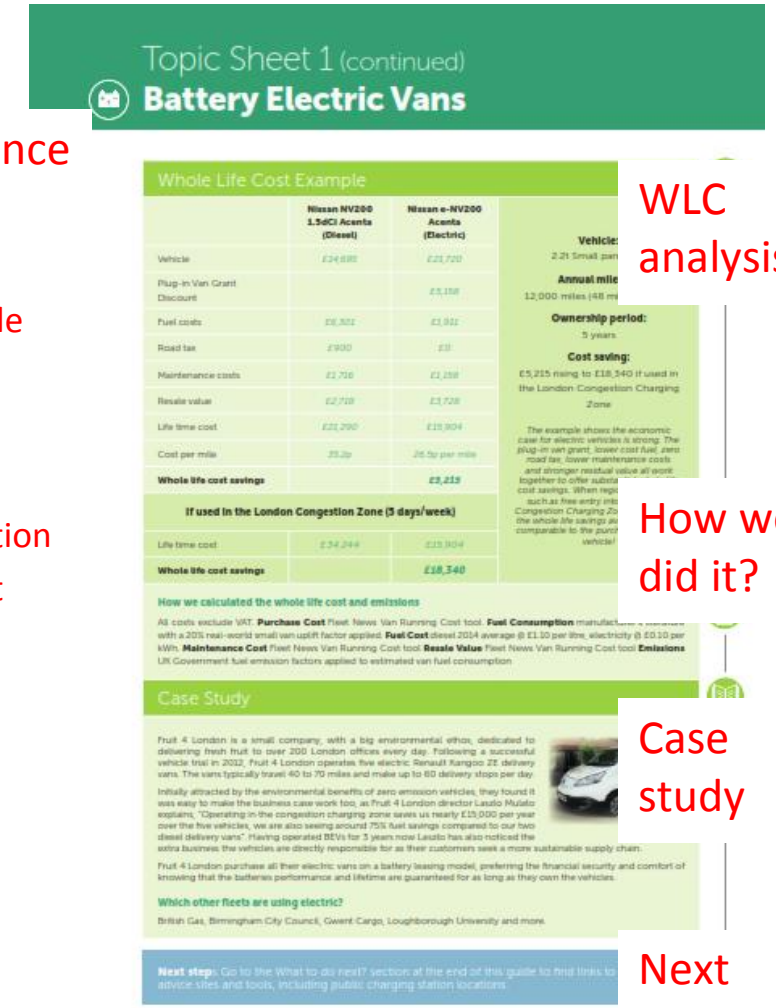
Environmental

Market status



Quick reference panel

- Tailpipe
- Fuel life cycle
- AQ
- Range
- Refuelling
- Ideal operation
- Typical fleet



WLC analysis

How we did it?

Case study

Next steps

Whole life cost example

Whole Life Cost Example

	Nissan NV200 1.5dCi Acenta (Diesel)	Nissan e-NV200 Acenta (Electric)
Vehicle	*£14,695*	*£21,720*
Plug-in Van Grant Discount		*£5,158*
Fuel costs	*£6,301*	*£1,911*
Road tax	*£900*	*£0*
Maintenance costs	*£1,716*	*£1,158*
Resale value	*£2,718*	*£3,728*
Life time cost	*£21,290*	*£15,904*
Cost per mile	*35.2p*	*26.5p per mile*
Whole life cost savings		***£5,215***
If used in the London Congestion Zone (5 days/week)		
Life time cost	*£34,244*	*£15,904*
Whole life cost savings		***£18,340***

Vehicle:
2.2t Small panel van

Annual mileage:
12,000 miles (48 miles per day)

Ownership period:
5 years

Cost saving:
£5,215 rising to £18,340 if used in the London Congestion Charging Zone

The example shows the economic case for electric vehicles is strong. The plug-in van grant, lower cost fuel, zero road tax, lower maintenance costs and stronger residual value all work together to offer substantial whole life cost savings. When regional incentives, such as free entry into the London Congestion Charging Zone are included the whole life savings available become comparable to the purchase cost of the vehicle!

How we calculated the whole life cost and emissions

All costs exclude VAT. **Purchase Cost** Fleet News Van Running Cost tool. **Fuel Consumption** manufacturer's literature with a 20% real-world small van uplift factor applied. **Fuel Cost** diesel 2014 average @ £1.10 per litre, electricity @ £0.10 per kWh. **Maintenance Cost** Fleet News Van Running Cost tool **Resale Value** Fleet News Van Running Cost tool **Emissions** UK Government fuel emission factors applied to estimated van fuel consumption

Other areas

- Finance cost
- Infrastructure
- Training
- Night time elec.
- Pollution cost

Some low carbon vans

1

2

3

4

5

6

7

8

Technology comparison

	Battery Electric	PHEV	CNG	LPG	B30 Biodiesel (30% Biodiesel blend in diesel)
Whole life cost	✓	✓	✓	✓	✓
	Cost improvements dependent on annual mileage and ownership period				
Financial incentives	Vehicle and infrastructure funding. 100% London congestion charge discount. Regional council schemes for discounted/ free parking.		Reduced fuel duty rate	Reduced fuel duty rate	None
	Enhanced capital allowance OR Van grant on purchase. Reduced van benefit charge until 2020. No fuel duty applied. £0 road tax	No fuel duty applied to electricity			
Market status	Available, around 15 models	One vehicle model only (Outlander 4Work)	Two models available	Conversions available for petrol vans	Some models warranted for biodiesel use
Example vehicles	Nissan e-NV200, Renualt Kangoo, Allied eBoxer	Mitsubishi Outlander 4Work	Merc Sprinter, Iveco Daily	Retrofit	Peugeot Partner, Boxer
Ideal operating location	City, suburbs	City, suburbs and occasional motorway	City, suburbs, motorway		
Ideal refuelling location	Back-to-base			No restrictions	Back-to-base

Technology comparison

	Battery Electric	PHEV	CNG	LPG	B30 Biodiesel (30% Biodiesel blend in diesel)
Range between refuelling	60-80 miles	Around 30 electric miles, then petrol reserve	≈ Up to 300 miles, then petrol reserve	≈ Up to 300miles, miles, then petrol reserve	≈ Similar
Payload impact	5-35% reduction (model dependent)	20% reduction	≈ 10% reduction	≈ Similar	≈ Similar
Refuelling considerations	Public charging available but limited. Variable charging times. Petrol reserve for plug-in hybrid		Limited public infrastructure	≈ Widespread infrastructure	Limited public infrastructure
Tailpipe CO_2 emissions from the vehicle	✓ Zero emission	✓ Zero emission when in battery electric mode	≈ Similar when using natural gas ✓ 100% when using biomethane	✓ 14% saving from petrol	✓ 28% saving
Fuel lifecycle CO_2 emissions	✓ 35% saving	✓ 35% saving when in battery electric mode	≈ Similar when using natural gas ✓ over 60% from biomethane	✓ 20% saving from petrol	✓ 26% saving
Air quality emissions	✓ Zero emission	✓ Zero emission when in battery electric mode	✓ Good for air quality emissions	✓ Good for air quality emissions	≈ Similar

Van cost and carbon calculator (VC3)

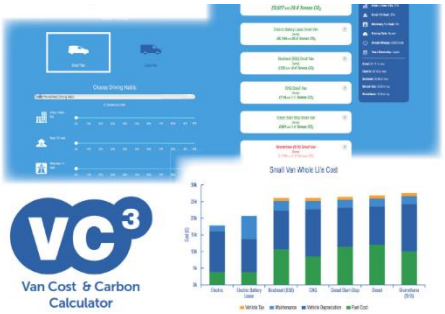
Van Cost & Carbon Calculator

- Cost and carbon performance of low emission vans over your operating conditions

- The tool will present you with a tailored report showing the cost and emission impact of operating different types of vans in your fleet

Pick your
- van size
- typical driving routes
- driving style
- number of years you want to own your vehicle
- annual mileage

Discover your
- whole life cost savings
- emission savings



Van cost and carbon calculator (VC^3)

Low Carbon Vehicle Partnership

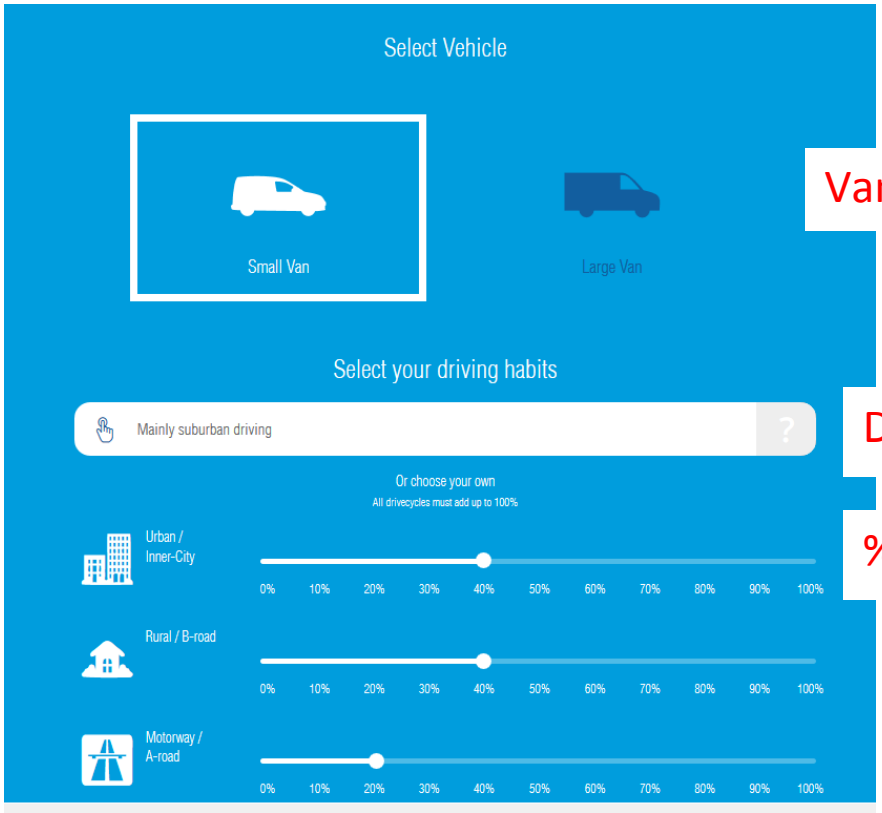
Van Cost & Carbon Calculator

www.lowcvp.org.uk/lev

Van cost and carbon calculator (VC³)

Low Carbon Vehicle Partnership

Van Cost & Carbon Calculator

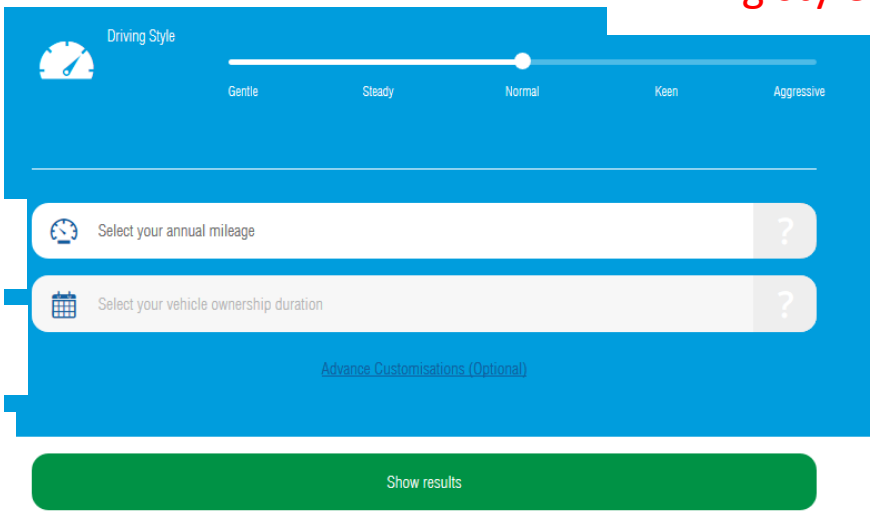


Van type

Driving habit

% Urban, % Rural, % Motorway

Driving style



Annual mileage

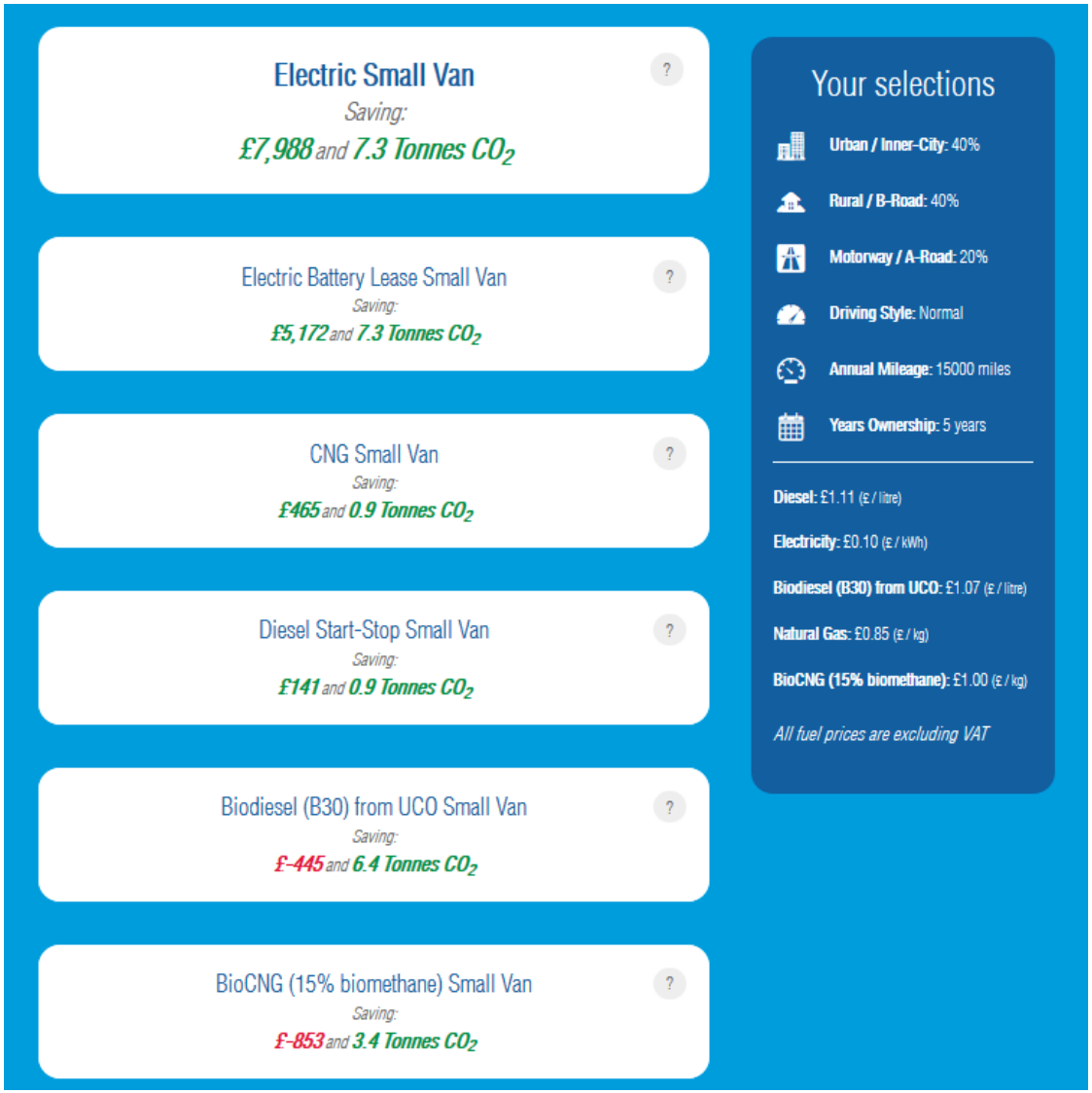
Ownership period

Advanced options

Van cost and carbon calculator (VC3)

Low Carbon Vehicle Partnership

Van Cost & Carbon Calculator

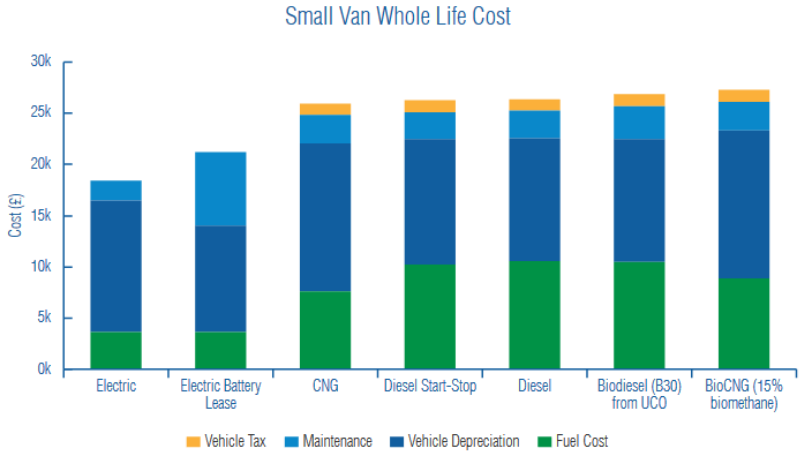


- Results splash screen
- Saving
- Increase

Van cost and carbon calculator (VC3)

Low Carbon Vehicle Partnership

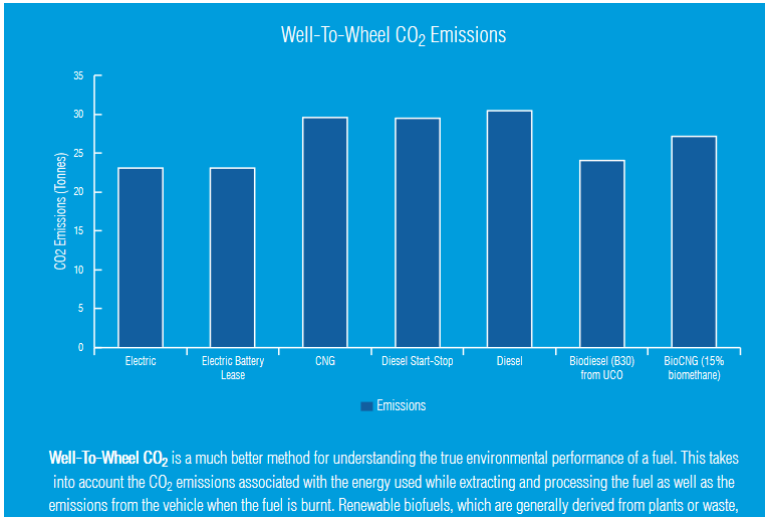
Van Cost & Carbon Calculator



It's easy to fall into the trap of purchasing the lowest cost van available to you. Since your choice of van will determine your business costs for years to come it pays to undertake a whole life cost analysis. This includes not only the purchase cost

Whole life costs

- Depreciation
- Tax
- Maintenance
- Fuel



Well-To-Wheel CO_2 is a much better method for understanding the true environmental performance of a fuel. This takes into account the CO_2 emissions associated with the energy used while extracting and processing the fuel as well as the emissions from the vehicle when the fuel is burnt. Renewable biofuels, which are generally derived from plants or waste,

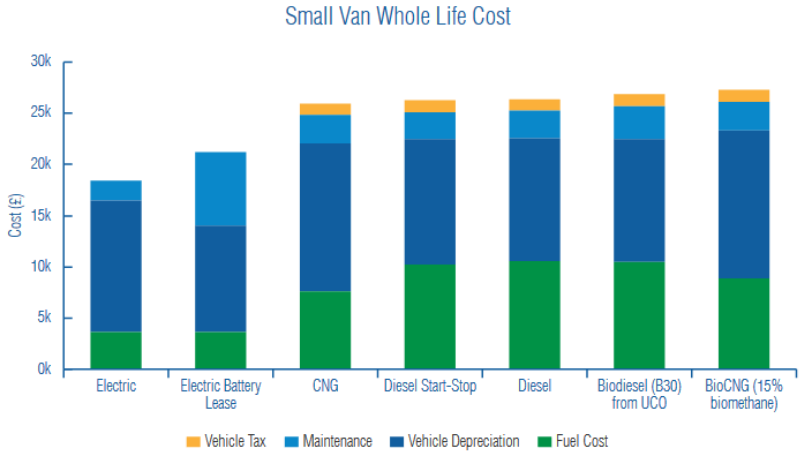
CO_2 Emissions

- Tailpipe emissions
- Well-to-wheel emissions

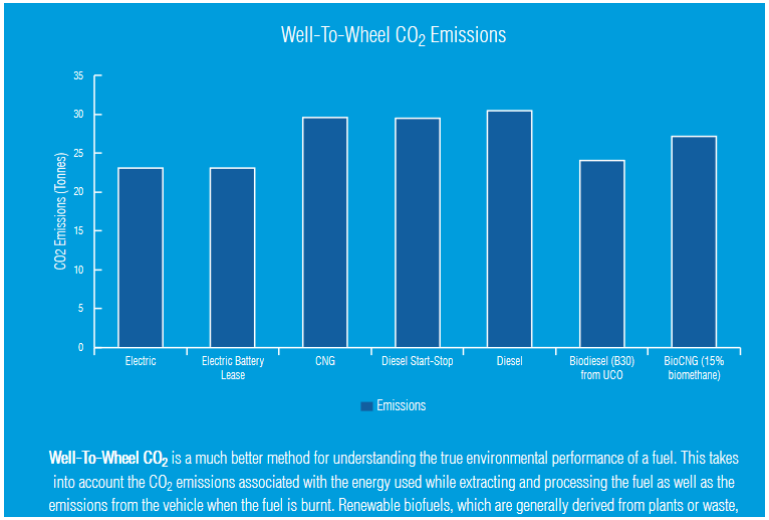
Van cost and carbon calculator (VC3)

Low Carbon Vehicle Partnership

Van Cost & Carbon Calculator



It's easy to fall into the trap of purchasing the lowest cost van available to you. Since your choice of van will determine your business costs for years to come it pays to undertake a whole life cost analysis. This includes not only the purchase cost



Well-To-Wheel CO_2 is a much better method for understanding the true environmental performance of a fuel. This takes into account the CO_2 emissions associated with the energy used while extracting and processing the fuel as well as the emissions from the vehicle when the fuel is burnt. Renewable biofuels, which are generally derived from plants or waste,

Whole life costs

- Depreciation
- Tax
- Maintenance
- Fuel

CO_2 Emissions

- Tailpipe emissions
- Well-to-wheel emissions

Next steps

- Van comparison sites
- Van advise sites
- Refuelling / recharging station locations
- Grants

General Advice And Calculator Tools	
www.cenex.co.uk/vc3	Cenex provide a tool for allowing operators to calculate emission and cost savings available from alternatively fuelled vans
www.lowcvp.org.uk/lev	The LowCVP provide an advice site for operators looking to make the switch to low emission vans
www.vanchooser.net	Van chooser allows users to search for a van type that meets their requirements and can display list price, emission performance, fuel costs and much more
www.fleetnews.co.uk/vans/tools/	The Fleet News web site has whole life cost and emission calculator tools, best practise case studies and much more
www.ukconversionfactorscarbonsmart.co.uk	The UK Conversion factors site provides official UK Government recommended factors for converting your fuel use into carbon emissions
Battery Electric And Plug-In Hybrid Electric Vehicles	
www.zap-map.com	Zap Map contains a list of publically available charge points, vehicle model availability and charge point provider contact details
www.goultralow.com/commercial-vehicles-fleet	The Go Ultra-Low web site provides information about switching to ultra-low emission vehicles and vehicle availability
www.ukevse.org.uk	UKEVSE, the electric vehicle supply equipment association, provide a guide for procuring charge points including equipment considerations and location choice
www.gov.uk/government/publications/plug-in-van-grant	The Office for Low Emission Vehicles (OLEV) provides a list of vans that are eligible for the Plug-in Van Grant
LPG Vehicles	
www.drivelpg.co.uk	Drive LPG provides advice and information about converting to LPG including a list of approved installers and UK refuelling stations
CNG Vehicles	
www.gasvehiclehub.org	The Gas Vehicle Hub provides a map of UK CNG refuelling stations, a list of vehicle model availability and gas vehicle case studies plus much more
Biodiesel Vehicles	
www.biodieselfillingstations.co.uk	Biodiesel Filling Stations provides a list of filling stations and biodiesel blends available by UK area, with links to suppliers websites where many show pricing and other information

Questions?

Connect
Collaborate
Influence

www.lowcvp.org.uk/lev

Sustainability focused procurement framework

www.cenex.co.uk

Mobility procurement challenge

- Current standard procurement tools, such as those developed for the clean vehicle directive , enable procurements to consider environmental factors . But, these are typically limited to considerations of fuel consumption and vehicle tail pipe emissions, and so this current procurement practice may result in a missed opportunity for a step change in sustainability performance.
- Therefore, there is a need for a procurement standards framework to enable the full sustainability impacts of a mobility procurement to be considered. Such a framework is developed at a high level in this report.
- The developed framework can be used for current procurements and to signpost an unmet mobility need against sustainability criteria, through setting the required response at current best practice or at an unmet but desired level.

Current practise procurement

Fiesta Ecoboost

- Stop-start
- 99gCO_2/km
- Euro 5
- NCAP 5
- Low cost

Innovation focused procurement

BMW i3

- Electric
- 0g CO_2/km
- LCA 50% less CO_2
- Low noise
- 25% Recycled content
- 95% Recycable
- NCAP 4

Future procurement

Sustainable vehicle

- 200 miles
- 5 min refuel time
- 0g CO_2/km
- No AQ emissions
- LCA >70% less CO_2
- 100% Recyclable
- NCAP 5

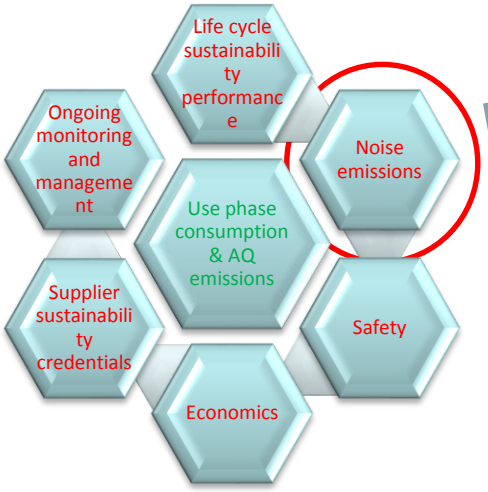
Sustainable mobility framework

- A triple bottom line[1] sustainability assessment of a mobility service requires not only the use phase fuel consumption and vehicle tail pipe emissions, but also consideration of factors throughout the vehicle life cycle related to human welfare, a full examination of environmental impact and the construction of a whole life cost economic model.
- A framework for this full sustainability assessment is shown opposite, where the areas that are additional to the traditional measures are indicated in red. Each one of these areas will be examined in this report and a proposal made for a relevant assessment approach when procuring a mobility service.

- **Note;** this framework is for a sustainability assessment and **does not include operational considerations** such as driving range or payload. Such operational considerations will need to be assessed in addition this framework.
- **Note;** this is a high level framework containing suggestions for levels within the framework, these suggestions may not be appropriate for all vehicle types and **the framework levels should be refined** for each specific tender for vehicles/ services.

1. encompassing factors relevant to people, planet and profit

Methodology - Procurement with built in improvement



Discussion of the relevant factors and standards pertinent to the sustainability area

Red: Poor or unacceptable performance

Amber

Dark Green: Excellent performance

Definition of the framework for the sustainability area

- The sustainable mobility elements are translated into a measurable standard assessment matrix where performance against each criteria is graded through red to dark green.
- The framework allows for local weighting by providing adjustment that ensure local priorities are addressed.
- The framework ensures continual improvement is built in.

Current procurement

Assessment factor					Local Weighting
Use phase consumption & AQ emissions	Poor performance	Acceptable performance	Good performance	Excellent performance	0 – 100%
Life cycle sustainability performance	Poor performance	Acceptable performance	Good performance	Excellent performance	0 – 100%
Noise emissions	Poor performance	Acceptable performance	Good performance	Excellent performance	0 – 100%
Safety	Poor performance	Acceptable performance	Good performance	Excellent performance	0 – 100%
Economics	Poor performance	Acceptable performance	Good performance	Excellent performance	0 – 100%
Supplier sustainability credentials	Poor performance	Acceptable performance	Good performance	Excellent performance	0 – 100%
Ongoing monitoring and management	Poor performance	Acceptable performance	Good performance	Excellent performance	0 – 100%

The sustainability areas are complied to provide the full framework

Methodology - Future procurement with built in improvement

Current procurement

Assessment factor					Local Weighting
Use phase consumption & AQ emissions	Poor performance	Acceptable performance	Good performance	Excellent performance	0 – 100%
Life cycle sustainability performance	Poor performance	Acceptable performance	Good performance	Excellent performance	0 – 100%
Noise emissions	Poor performance	Acceptable performance	Good performance	Excellent performance	0 – 1
Safety	Poor performance	Acceptable performance	Good performance	Excellent performance	0 – 1
Economics	Poor performance	Acceptable performance	Good performance	Excellent performance	0 – 1
Supplier sustainability credentials	Poor performance	Acceptable performance	Good performance	Excellent performance	0 – 1
Ongoing monitoring and management	Poor performance	Acceptable performance	Good performance	Excellent performance	0 – 1

- The framework allows the expression of unmet need in a future procurement, through setting criteria that are desirable but not current

Future Procurement +5 years

Assessment factor					Local Weighting
Use phase consumption & AQ emissions	Poor performance	Acceptable performance	Good performance	Excellent performance	0 – 100%
Life cycle sustainability performance	Poor performance	Acceptable performance	Good performance	Excellent performance	0 – 100%
Noise emissions	Poor performance	Acceptable performance	Good performance	Excellent performance	0 – 100%
Safety	Poor performance	Acceptable performance	Good performance	Excellent performance	0 – 100%
Economics	Poor performance	Acceptable performance	Good performance	Excellent performance	0 – 100%
Supplier sustainability credentials	Poor performance	Acceptable performance	Good performance	Excellent performance	0 – 100%
Ongoing monitoring and management	Poor performance	Acceptable performance	Good performance	Excellent performance	0 – 100%

Framework summary

- A summary of the suggested framework is shown below, including a weighting column to allow adjustment to local priorities

Measure	Poor	Average	Good	Excellent	Local Weighting
Use phase emissions and consumption (CO_2, NOx, PM, CO, NMHC)	Low emission vehicle performance is worse that the ICE comparator vehicle	Low emission vehicle performance 0-25% lower than the ICE comparator vehicle	Low emission vehicle performance 25-75% lower than the ICE comparator vehicle.	Low emission vehicle has zero emissions	0-100%
Life cycle sustainability performance	No consideration of LCA in the bid	Some consideration of LCA in the bid	An ISO 14040 & 14044 LCA presented for the proposed vehicles showing <200g/km CO2e (proposed cars only)	An ISO 14040 & 14044 LCA presented for the proposed vehicles showing <100g/km CO2e (proposed cars only)	0-100%
Noise emissions	Low emission vehicle performance is worse that the ICE comparator vehicle	Low emission vehicle performance 0-3dB(A) lower than the ICE comparator vehicle	Low emission vehicle performance 3-9dB(A) lower than the ICE comparator vehicle, in the relevant environment	Low emission vehicle performance >9dB(A) lower than the ICE comparator vehicle, in the relevant environment	0-100%
Safety	No consideration of vehicle safety	Some consideration of vehicle safety in the bid	The biding company provided evidence of safety (high NCAP, > EC SSTA as a minimum)	The bidding company provides highest safety standards to vehicles (EC WVTA, NCAP 5 vehicles, SAFED trained drivers)	0-100%
Economic Assessment	No consideration of vehicle WLC	Some consideration of vehicle WLC with basic evaluation of different technologies	The biding company provided evidence of WLC vehicle costing models	The bidding company provided full evidenced of thorough WLC model and calculations for appropriate technologies	0-100%
Supplier sustainability credentials	No consideration of sustainability reporting in the bid	Some consideration of sustainability reporting in the bid (e.g. UNGC, DJSI)	The biding company provides a GRI compliant sustainability report	The bidding company provides GRI compliant report to level A+	0-100%
Ongoing management and monitoring assessment	No consideration of ongoing monitoring	Some consideration of ongoing efficiency and low carbon tech. monitoring programme	The biding company has provided good detail of a monitoring programme for ongoing vehicle and operational review	The bidding company provides GRI compliant report to level A+	0-100%

End

E: steve.carroll@cenex.co.uk

T: +44 (0) 1509 635 750

W: Cenex.co.uk