Certification of dedicated gas buses as Low Carbon Emission Bus Guidance for bus manufacturers

Q1. What is a Low Carbon Emission Bus (LCEB) and what is the Bus Service Operators Grant (BSOG) incentive?

1. The new stricter definition of a Low Carbon Emission Bus (LCEB) emission bus has been introduced to achieve higher environmental standards for both climate change and air quality. A LCEB is one offering a more than 15% improvement on well-to-wheel greenhouse gas emissions as compared to an equivalent diesel Euro V bus of the same passenger capacity and which can achieve the Euro VI emission standard.

2. Existing guidance outlines the definition of a LCEB and details the full testing procedure and is outlined in the Bidding Document at Annex D.

3. Since April 2010, bus operators have been able to claim the LCEB incentive within the BSOG scheme. With effect from 1 April 2017, the new LCEB rate will be 24.5p per km (basic rate 14.4p + additional 10.1p). Any operator of a bus certified as a LECB is eligible to claim the BSOG LCEB incentive.

Q2. How are greenhouse gas (GHG) emissions for LCEB testing calculated?

1. Total well-to-wheel GHG emissions for a LCEB are calculated as the combination of a) the tank to wheel emissions and b) the well to tank emissions.

a) Tank to wheel emissions

The tank to wheel emissions and fuel consumption are measured by putting the bus through a whole vehicle test. The LUB (LowCVP UK Bus) cycle will be used for all tests. This was developed from the previous MLTB (Millbrook London Transport Bus Cycle) with the addition of a “rural” phase of operation on the front of the test to represent typical UK driving operation. This is outlined the LCEB guidance.

A greenhouse gas emissions shall be reported as CO2 equivalent g/km taking into account methane, carbon dioxide and nitrous oxide emissions.

The whole vehicle test will additionally measure the air pollutants NOx and PM to demonstrate conformity with the Euro VI emission standard.

b) Well to tank emissions

The fuel consumption measured during the LUB (LowCVP UK Bus) cycle is used to calculate the CO2 equivalent emissions of the vehicle on a well to tank basis, using the appropriate emission factor for the fuel intended to be used in service i.e. diesel or biomethane.

The well to tank emissions are determined using an appropriate analysis, such as that used in the JEC "*Well-to-Tank Appendix 4 – Version 4a: Description, results and input data per pathway"* from *"Well-to-Wheels Analysis of Future Automotive Fuels and Powertrains in the European Context*" (2014). Alternatively tank-to-wheel default factors provided on the LowCVP's website can be adopted. The well to tank emission are expressed in grams of carbon dioxide equivalent per MJ of fuel delivered. Knowing the fuel consumption of a vehicle in MJ/km, the well to tank CO2 equivalent figure can be expressed in g/km.

http://www.lowcvp.org.uk/initiatives/leb/TestingandAccreditation/WTTFactors.htm

c) Total greenhouse gas emissions – Well to wheel emissions

The tank to wheel emission figure (a) is added to the well to tank emission figure (b) to give the total well to wheel emission (c) figure with CO2 equivalent emissions expressed as CO2 equivalent grams per kilometre.

This total well to wheel emissions figure is then assessed against the LCB emission target, which is expressed as a function of total passenger capacity and is shown as:

LCEB target line WTW CO_2 = 408 + 8.00 x Number of Passengers

If the total well to wheel emissions figure for the bus is equal to, or less than, the LCB emission target then the bus is awarded full LCEB status.

Q3. How does a dedicated gas bus become fully certified as a LCEB?

1. Any bus operating using biomethane in dedicated gas buses will need to supply evidence of the biomethane purchased as part of their BSOG claim eg an REA Green Gas Certificate. In order for a dedicated gas bus to claim the BSOG LCB incentive, it will have to have:

a) been awarded **full** LCB status, based on it passing the LUB (LowCVP UK Bus) cycle using 100% methane. Where such a bus passes the test, an operator will be able to claim the LCEB incentive for **all** kilometres operated; **or**

b) been awarded **full** LCB status, based on it passing the LUB (LowCVP UK Bus) cycle using a set proportion (less than 100%) of biomethane. In such cases, LCB status is dependent on the bus being operated using **at least** the minimum proportion of biomethane used in the testing. This minimum proportion must be printed on the bus's LCB certificate which must be submitted with the corresponding BSOG claim. In such situations, an operator will be able to claim the LCB incentive for **all** kilometres operated and must supply evidence that biomethane has been purchased with the BSOG claim; **or**

2. In order to identify that a particular vehicle has been fully certified as a LCB, the vehicle's manufacturer will need to issue the bus operator with a certificateconfirming that the vehicle has passed the full LCB testing procedure. At the time of submitting a BSOG claim, operators of dedicated gas buses should supply the relevant LCEB certificate(s), along with evidence of the biomethane used to power the buses.