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Office for Low Emission Vehicles
Department for Transport
1/32 Great Minster House
76 Marsham Street
London SW1P 4DR
Direct Line:
Fax:
email:
Web Site: www.dft.gov.uk

Our Ref: E0005904
Your Ref: Energy Content 01

11 December 2009

Dear XXXX,

Re: Environmental Information Regulations request:

Thank you for your request for information about the whole life energy and carbon emissions associated with electric and plug-in hybrid cars. I am writing to confirm that the Department for Transport has now completed its search for the information which you requested on 16 November. As Sachin Suchak mentioned in his email of 16 November, your request has been considered under the Environmental Information Regulations 2004.

The information you requested was not held by the Department, or by any third party on its behalf. However, upon receiving your request, Sachin spoke with the consultancy firm Arup, who along with Cenex, prepared the report *Investigation into the Scope for the Transport Sector to Switch to Electric Vehicles and Plug-in Hybrid Vehicles*¹, to see if they would be able to answer your questions. Their response is listed below.

(1) The assumed percentage of the energy burnt in power stations that reaches end users, namely “the plug”, (excluding from the latter the electricity used by the generating industry itself or lost in transmission by the grid).

Using energy balance calculations within the GaBi 4 model the following table breaks down the figures for energy burned at the power station and the energy that reaches the plug. The GaBi data sets take into account transmission losses and electricity used by the generating industry itself and these will be included with the energy burned by the power station. The figures in the table are based on a car travelling 180000 km over a 10 year life.

	<i>Energy burnt at power station (MJ)</i>	<i>Energy at the plug (MJ)</i>	<i>% of energy burnt at power station which reaches end user (%)</i>
<i>2010 Grid mix (GaBi 4 Factors)</i>	330310	103680	31
<i>2010 CCGT scenario (GaBi 4)</i>	266940	103680	39

¹ The report is available online at <http://www.berr.gov.uk/files/file48653.pdf>

<i>Factors)</i>			
2020 Grid mix (GaBi 4 Factors)	161840	84239	52
2020 CCGT scenario (GaBi 4 Factors)	216890	84239	39
2030 Grid mix (GaBi 4 Factors)	143880	71279	50
2030 CCGT scenario (GaBi 4 Factors)	183520	71279	39

(2) The CO₂ per kWh at the plug.

The CO₂ / 'kWh at the plug' is effectively the "emissions" of the electric vehicle. The report uses figures from 2 sources: Defra and GaBi 4. The answer to this question for the various vehicle efficiency scenarios are those stated in the [Investigation into the Scope for the Transport Sector to Switch to Electric Vehicles and Plug-in Hybrid Vehicle] Report.

(3) The ratio of the energy delivered to the drive chain to the energy taken from the plug for the presumed electric vehicle.

We [Arup] used the vehicle efficiency factors by year stated in the report in terms of kWh per km. This includes vehicle losses. These figures came from manufacturers, some of which are widely publicised in the public domain. We [Arup] did not look at individual element losses within the vehicle, only the overall efficiency figures as supplied by manufacturers.

(4) The power (kW) delivered to the drive chain by the motor of the presumed electric car.

We [Arup] did not look at individual element losses within the vehicle, only the overall efficiency figures as supplied by manufacturers. This calculation was not necessary for the [Investigation into the Scope for the Transport Sector to Switch to Electric Vehicles and Plug-in Hybrid Vehicle] report.

(5) The assumed thermal efficiency of the presumed internal combustion engine.

We [Arup] did not look at individual element losses within the vehicle, only the overall efficiency figures as supplied by manufacturers. We looked at emissions at tailpipe as stated and publicly accepted, not energy consumption.

(6) The power (kW) delivered to the drive chain of the presumed petrol vehicle.

We [Arup] did not look at individual element losses within the vehicle, only the overall efficiency figures as supplied by manufacturers. This calculation was not necessary for the [Investigation into the Scope for the Transport Sector to Switch to Electric Vehicles and Plug-in Hybrid Vehicle] report.

(7) The energy used to manufacture and scrap an electric car's battery divided by the energy that the battery may deliver during its life.

Appendix B1 of the [Investigation into the Scope for the Transport Sector to Switch to Electric Vehicles and Plug-in Hybrid Vehicle] report details the information that was collected on the life cycle of lithium ion batteries.

We [Arup] could find no quantitative data on the energy required to manufacture a lithium ion battery.

Neither was there any data available on the energy required for recycling the battery.

I understand that the Energy Saving Trust (EST) has also looked the life cycle emissions of electric vehicle battery and motor technologies. You may wish to contact the EST directly to discuss their work – their contact details are available at:

<http://www.energysavingtrust.org.uk/Contact-us>

As stated above, the Department holds no further information that falls within the scope of your request. Please note that whilst Arup and the EST have kindly provided the information in this case, as private companies they are not under any obligation to do so.

If you are unhappy with the way the Department has handled your request or with the decisions made in relation to your request you may complain within 40 working days of the date of this letter by writing to the Department's Information Rights Unit at:

Zone D/04
Ashdown House
Sedlescombe Road North
Hastings
East Sussex TN37 7GA
E-mail: FOI-Advice-Team-DFT@dft.gsi.gov.uk

Please see attached details of DfT's complaints procedure and your right to complain to the Information Commissioner.

If you have any queries about this letter please contact me. Please remember to quote the reference number above in any future communications.

Yours sincerely,

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Your right to complain to DfT and the Information Commissioner

You have the right to complain within 40 working days of the date of this letter about the way in which your request for information was handled and/or about the decision not to disclose all or part of the information requested. In addition a complaint can be made that DfT has not complied with its publication scheme.

Your complaint will be acknowledged and you will be advised of a target date by which to expect a response. Initially your complaint will be re-considered by the official who dealt with your request for information. If, after careful consideration, that official decides that his/her decision was correct, your complaint will automatically be referred to a senior independent official who will conduct a further review. You will be advised of the outcome of your complaint and if a decision is taken to disclose information originally withheld this will be done as soon as possible.

If you are not content with the outcome of the internal review, you have the right to apply directly to the Information Commissioner for a decision. The Information Commissioner can be contacted at:

Information Commissioner's Office
Wycliffe House
Water Lane
Wilmslow
Cheshire
SK9 5AF