Expanding and strengthening the carbon accounting of renewables in transport

Response to the consultation of the European Commission on the accounting methods and conditions for the 10% renewable energy in transport target – and on the need for additional types of biofuels being listed in Annex III of the Renewable Energy Directive

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About Transport & Environment

Transport & Environment's mission is to promote transport policy that is based on the principles of sustainable development. That means minimising the use of energy and land and reducing harmful impacts on the environment and health while maximising safety and guaranteeing sufficient access for all to natural resources.

The work of our Brussels-based team is focused on the areas where European Union policy has the potential to achieve the greatest environmental benefits. Such policies include technical standards for vehicle fuel efficiency and pollutant emissions, environmental regulation of international transport including aviation and shipping, European rules on infrastructure pricing and environmental regulation of energy used in transport.

Naturally our members work on similar issues with a national and local focus. But their work also extends to public transport, cycling policy and other areas largely untouched by the EU. Transport & Environment's role in this context is to bring our members together, adding value through the sharing of knowledge and campaigning strategies.

Established in 1990, T&E represents around 50 organisations across Europe, mostly environmental groups and sustainable transport campaigners.

T&E is politically independent, science-based and strictly not-for-profit.

1 Introduction

According to the analysis of the 27 national renewable action plans (NREAPs), the overwhelming majority of the 10% target for renewables in transport will be reached by first generation biofuels (they will indeed account for 9.6% out of 10%). The 27 NREAPs indicate that by 2020 a total of close to 30 Mtoe (Million tonnes of oil equivalent) of biofuels will be used in the EU. The 2020 target is, therefore, stimulating a major increase in the use of biofuels by 2020, with biofuels remaining the primary approach for delivering renewable energy in the transport sector and for meeting the Renewable Energy Directive's (RED) 10% target.[1]

According to the IEEP report this will have a major impact on carbon emissions, leading to the anticipated conversion of between 4.7 and 7.9 million ha of Indirect Land Use Change (ILUC) by 2020. This additional ILUC was calculated to result in emissions of between 50 and 83 million tonnes of CO2 equivalent (MtCO2e) per year, i.e. between 1003 and 1668 MtCO2e in total. This means that the EU policy concerning biofuels will have large negative environmental impacts, unless indirect land use change is properly addressed with scientifically robust ILUC factors that discourage the use of high carbon biofuels.

Moreover, according to the NREAPs predictions, renewable electricity in electric cars, renewable hydrogen and biomethane will play a modest role in meeting the 10% target. Most of it, to the contrary, will be achieved by biofuels with questionable environmental performance. To sum up, the biofuel policy should be fixed, but it is also important to get the correct accounting for other renewables in the transport sector. Furthermore, it is important to expand the sustainability criteria for biofuels to their use in other sectors, such as aviation biofuels that could be used to comply with the ETS and shipping fuels that could help meet the obligations of the upcoming sulphur directive. It would be inconsistent to have strict criteria for road transport and nothing for other sectors. It would be therefore desirable for the Commission to set up binding rules also in this respect, setting sustainability criteria for biofuels displacing bunker fuels as well.

[1] http://www.ieep.eu/publications/2011/01/the-land-use-implications-of-eu-bioenergy-policy-going-beyond-iluc

Section A: Electricity from renewable sources in transport

Question A1: how do you value the impact of the 10% target for renewable energy in transport by 2020 on the development of electric vehicles?

The uptake of electric vehicles is happening slowly. A Communication on a European strategy for clean and energy efficient vehicles, published in 2010, estimates that electric vehicles will account for 1 to 2% of new vehicles sales in 2020, suggesting that, by then, 0.5 to 1% of the fleet will be electric. NREAPs show even smaller shares and, in any case, the use of renewable electricity in transport depends largely on the willingness of consumers to buy these vehicles and of energy suppliers to supply renewable electricity. **The impact of the RED on the development of electric vehicles will therefore not be significant,** as the main drivers will be national subsidies and CO2 standards for cars. In order to encourage the penetration of alternative vehicles, the CO2 target of 95 g/km by 2020 has to be maintained. A more ambitious post 2020 targets must also be envisaged, so to strengthen the overall emission reduction strategy.

According to the CE Delft study "Green power for electric cars",[2] the electrification of road transport will make it easier to reach the targets set in the RED, because electric vehicles are expected to be more energy efficient. Marginal analysis shows that the shift will result in lower primary energy consumption in the EU and, as a consequence, in a lower absolute value for renewables since the targets are defined as a percentage of the overall consumption. In addition, there are more methods available for large-scale renewable electricity production than for renewable and sustainable liquid or gaseous fuel production, especially in view of the apparently limited potential of sustainable biofuels.

Question A2: under what condition do you think it would be justified to count the whole amount of electricity in electric vehicles as renewable?

According to the CE Delft report "Green power for electric cars" there are different policy options that enable to assess the full amount of renewable electricity towards the 10% renewable energy target for transport. The study suggests a macro and a micro route to achieve this. The macro route implies that the policy instruments deployed address the overall electricity use and not only electricity for transport. The micro route encompasses instruments that address specifically electricity used in electric vehicles. It also looks at how current transport policies could be modified to maximise the share of sustainable electricity in the transport sector.

Macro route
The EU, or individual member states, could adopt a target for renewable electricity that could be implemented as a governmental target or as a mandatory percentage of renewable electricity production (or consumption). If this percentage is 'x', then every x% of additional electricity use due to EVs and PHEVs should be met by additional renewable electricity production.

[2] http://www.transportenvironment.org/Publications/prep_hand_out/lid/568

In other words, in order to ensure that the growing transport electricity demand is fully met by additional renewable electricity, a target could be implemented obliging member states to guarantee that every kWh of electricity consumption above a certain maximum volume should be met in full by renewable electricity production. In fact, such an approach would set a cap on electricity production from fossil fuels for transport.

One can even imagine that such a scheme will not be implemented on all surplus electricity consumption but only on electricity consumption for the transport sector with targets based on sales volumes of electric vehicles multiplied by the average electricity used by an electric vehicle (or on the actual monitoring of the electricity use).

Micro route
The renewable energy directive could provide a stronger drive for renewable energy use in electric vehicles, if MS were allowed to report their actual renewable energy use. This would be a preferred option compared to the one above, because it encourages accurate accounting of electricity used. However, it would have to be coupled with the technology for smart metering on board of vehicles. In our understanding the Commission has given the mandate to CENELEC (an EU standardisation body), which is currently developing a standard that will include smart charging and hopefully also enable on board metering of the electricity consumed.

This is a crucial moment to support a technology that can measure the quality of electricity supplied to electric cars and enable controlled charging. Besides ensuring environmental integrity, early common standardization of smart charging and smart metering technology would also save money, enable easier roll out of electric vehicles and new innovative business models, and provide the widest possible transparency for the consumer.

To guarantee that car manufacturers integrate smart meters in the electric vehicles and smart charging technology, coordinated effort at the EU level is needed. The standardisation and compatibility of such hardware and the ability of cars and electricity grids to exchange information would guarantee that:

- Electric vehicles contribute to the development of a flexible power system that enables the integration of a large share of renewables;

- Drivers of electric vehicles can charge up anywhere and use the electricity supplier of their choice, including suppliers of green power.

- Governments are in the position to regulate the quality of the power supply, as part of the EU's move to clean up road fuels, and to apply taxation.

The macro route would only be desirable in the initial stages of the uptake of electric vehicles. In the long term the Commission and Member states should aim to get the most possible accuracy on measuring the quality and quantity of electricity supplied and also to encourage business models that promote the uptake of renewable electricity in electric vehicles.

Main benefits of smart metering of electricity supplied (micro route)

1. Leave avenues open for taxation

One of the few demand management instruments for traffic reduction that governments currently have is the energy (petrol, diesel) taxation. Fuel taxation also rewards consumers that drive less or use more energy-efficient cars and provides re-financing of infrastructure and external costs. It is crucial that onboard metering and measuring of electricity is set from the beginning through the on-going standardisation procedure. Furthermore, taxation could also offer good opportunity for governments to offer tax reductions, if consumers decide to opt for renewable electricity in their cars.

2. Enable regulation of the green electricity used

As part of the climate and energy package adopted in 2008, the EU has set two binding targets for renewable and low carbon electricity in transport. Meeting the 10% renewable energy target in transport and the decarbonisation target under the FQD requires knowledge of the amount of electricity actually used by EVs and its carbon intensity. This can best be done with on-board measurement and regular reporting.

3. Ensure greater transparency for the consumer

It is likely that electric cars will be mostly recharged at home and also that the number of charging points (electricity sockets) will for a long time exceed the number of electric cars. It is also possible that electric vehicles will be attached to the grid most of the time as consumers would want to have their battery fully charged at all times. In order to ensure transparency of electricity used, enable the use of existing infrastructure and account for large number of small charges, putting a smart meter inside an electric car would be the best solution. Last but not least, it will offer greater privacy of data compared to measuring at the charging point.

Section B: Hydrogen from renewable sources in transport

Question B1: Which are in your view the most likely ways to produce hydrogen from renewable sources (partly or fully) by 2020?

B1: The use of hydrogen from renewable sources will likely not be significant by 2020, in particularas far as transport is concerned. However, considering the plans of major global carmakers to introduce early deployment of hydrogen-fuelled vehicles (in particular Fuel Cell Vehicles) from 2015, it is important to take into account the upstream impact of the small quantities of hydrogen that will be used to power these initial vehicles, in order to ensure that broader infrastructure investments are sustainable.

Based on current data, it is likely that the most cost-effective hydrogen production method will remain Steam Methane Reforming (SMR) from natural gas until at least 2020. Therefore using methane from renewable feedstocks to displace some of this natural gas could be a likely pathway to introduce renewables in hydrogen production.

Regarding electrolysis, the current roundtrip efficiency of electrolysers and fuel cells makes it very inefficient to use electricity as a feedstock for hydrogen production. In particular, grid electricity in most MS would lead to a considerable increase of well-to-wheel GHG emissions and should therefore be avoided. Until 2020 it is also unlikely that the penetration rate of renewable electricity production on the grid will make it cost- and energy-efficient to use hydrogen electrolysis as an energy buffer for intermittent power generation.

Question B2: For each option you selected under (2), if it would be used for transport, how would you suggest to calculate its contribution to the 10% target for renewable energy in transport?

B2: Based on the above comments (B1) T&E anticipates that very small amounts of renewable energy will make its way into hydrogen production for transport.

However, in order to discourage the use of inefficient feedstocks at an early deployment stage, it could be relevant to count towards the 2020 target any hydrogen certifiably produced from renewable biogas (cf. section C) or from renewable electricity (cf. section A).

Section C: Biomethane via the natural gas grid in transport

Question C1: how do you value the impact of the 10% target for renewable energy in transport by 2020 on the development of methane vehicles fuelled by methane from the gas grid?

RED will unlikely be a strong driver for methane vehicle roll out, other policies (feed in tariffs, vehicular feebates etc.) will likely be more important.

Question C2: under what condition do you think it would be justified to count the whole amount of methane extracted from the gas grid for the use in vehicles as renewable?

C2: Tradable methane volume certification could be a reasonable system to assign renewable status.

Regarding certification, it is important to stress the relevance of establishing the upstream impact of methane generation and delivery from all sources in the certification process, in particular leakage during extraction/processing/transport, since methane has a GWP of ~23 over a 100 year period.

This may involve revising the default factors in Annex 5 but should apply both to renewable methane and to conventional and unconventional (shale) natural gas feedstocks.

Section D: Energy content of biofuels

Question D1: Do you think additional types of biofuels need to be listed in Annex III of the Directive? If yes, which ones and could you provide values?

D1: No.

Question D2: Do you think more precision in terms of decimals is necessary in the values in the Annex? If yes, could you provide such values?

D2: No.

The Commission could decide to account for hydrogen (Lower Heating Value LHV = 120 MJ/kg)

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