THE INTERNATIONAL COUNCIL ON CLEAN TRANSPORTATION

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Memorandum on the equivalence value of electricity in the Renewable Fuel Standard

This memorandum explains why it would be appropriate for EPA to set the equivalence value of renewable electricity used for compliance with the Renewable Fuel Standard (RFS) at 1 Renewable Identification Number (RIN) per 5.24 kW-hour of renewable electricity that charges plug-in electric vehicles.

EPA counts biofuels differently towards compliance with the RFS depending on their energy content. For instance, one gallon of biodiesel contains more energy and can drive a given vehicle more miles than one gallon of ethanol, and so biodiesel receives more RINs per gallon than ethanol. One reason EPA gives for this differential treatment is that more energy dense biofuels displace more petroleum:

> *"Fossil fuels such as gasoline or diesel are only replaced or reduced to the degree that the energy they contain is replaced or reduced. We do not believe it would be appropriate to treat a renewable fuel with very low volumetric energy content as being equivalent to a renewable fuel with very high volumetric energy content, since the impact on motor vehicle fossil fuel use is very different for these two renewable fuels. The use of Equivalence Values based on volumetric energy content helps to achieve this goal."* (Renewable Fuel Standard 1 Final Rule, Section III.B.4.a)

Renewable electricity from biogas is currently credited in the RFS according to its energy content compared to ethanol: 1 RIN per 22.6 kW-hour. This conversion reflects the literal energy content in the electricity, but it does not reflect the amount of petroleum that is displaced. Electric vehicles have much more efficient drivetrains compared to internal combustion vehicles that consume gasoline and ethanol. While one gallon of ethanol can drive a typical new internal combustion car 16 miles, 22.6 kW-hour of electricity will drive the typical new electric car about 70 miles,[1] displacing 4.3 ethanol-equivalent gallons of gasoline.

If renewable electricity were to be credited according to the amount of petroleum it displaced, it would be awarded 1 RIN per 5.24 kW-hour. Crediting electricity on the basis of distance traveled rather than energy content would be consistent with the way renewable electricity is credited under other major low carbon fuel policies around the world, including California's Low Carbon Fuel Standard,[2] the European Union's Fuel Quality Directive, [3] and British Columbia's

[1] Based on 100 mpg gasoline equivalent fuel economy for battery electric and plug-in hybrid electric vehicles marketed in 2015. Information on fuel economy of new vehicles is available at https://www.fueleconomy.gov/
[2] California Air Resources Board. Final Regulation Order on Amendments to the Low Carbon Fuel Standard. November 26, 2012. Available at: http://www.arb.ca.gov/fuels/lcfs/CleanFinalRegOrder112612.pdf
[3] COUNCIL DIRECTIVE (EU) 2015/652 of 20 April 2015 laying down calculation methods and reporting requirements pursuant to Directive 98/70/EC of the European Parliament and of the Council relating to the quality of petrol and diesel fuels. Official Journal of the European Union L 107/26. Available at: http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32015L0652&from=EN

Renewable and Low Carbon Fuel Requirements Regulation.[4] Accounting for the efficiency of electric vehicles in renewable fuel lifecycle analysis is also supported by members of the scientific community.[5] ICCT, in its international research on fuel policy, considers the inclusion of all known lifecycle effects – including electric vehicle efficiency – for various fuels to be a critical best policy practice to fairly promote all transportation fuels on their relative merits.

Please contact Stephanie Searle at ICCT (stephanie@theicct.org) with any questions.

[4] Greenhouse Gas Reduction (Renewable and Low Carbon Fuel Requirements) Act: Renewable and Low Carbon Fuel Requirements Regulation. British Columbia regulation 394/2008. Available at: http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/394_2008

[5] For example, see: Yang, C. (2013). Fuel electricity and plug-in electric vehicles in a low carbon fuel standard. Energy Policy (56): 51-62; and Yeh, Sonia, Daniel Sperling, M. Griffin, Madhu Khanna, Paul Leiby, Siwa Msangi, James Rhodes, and Jonathan Rubin. 2012. National Low Carbon Fuel Standard: Policy Design Recommendations. Institute of Transportation Studies, University of California, Davis, Research Report UCD-ITS-RR-12-10.