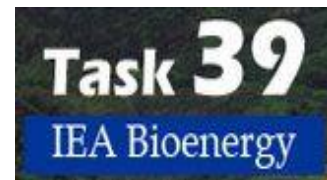




IEA Bioenergy
Technology Collaboration Programme



LCA Activities - Key metrics beyond GHG reduction

Update on Activities (including RenovaBio)

Don O'Connor, Adrian O'Connell

Virtual Meeting, April 20, 2021

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Technology Collaboration Programme

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Task 39 LCA History

- Task 39 has long been involved in biofuel LCA work.
 - 2008 Report “An Examination of the Potential for Improving Carbon/Energy Balance In Biofuels”
 - 2010 Report “Biodiesel GHG Emissions, Past, Present, & Future”
 - 2012 Advanced Biofuels - “GHG Emissions and Energy Balances”
 - 2015-2018 “Comparison of LCA Models”
 - LCA sub-group was led by Dr. Antonio Bonomi from Brazil’s Bioethanol Science Technology Lab (CTBE)
 - Compared biofuel pathways in the main LCA models in different world regions. Identified differences between models’ structures, calculations, and assumptions
 - Showed its possible to obtain similar LCA results once these differences are understood and accounted for
 - Their work helped explain why different LCAs on the same biofuel pathway can have seemingly different results
 - Extremely useful especially for policy makers who use LCAs to determine the GHG savings their policies may provide.

LCA work: Co-processed drop-in fuels & CI

- Huge interest in co-processing biogenic feedstocks in oil refineries to produce lower-carbon-intensity (CI) fuels.
- Competition for especially waste (used) cooking oils, waste animal fats as production facilities grow; UCOME producer's concerns in EU
- Gaining interest on the possible use of advanced bio-oils; generally more technologically challenging
- As final fuel is fungible, tracking (quantifying) the green molecules (or atoms) in the co-processed fuels *likely* to require book-keeping and some radio-carbon testing, with considerations required for each facility
- Next step: determining the CI of co-processed fuels is complex

LCA work: Advanced Alternative Fuels

- Advanced alternative fuels being considered as possible complimentary fuels with biofuels as options to help reduce GHG emissions in transport
- Electrofuels (such as hydrogen, or hydrogen + CO₂), recycled carbon fuels. Electrofuels holding promise due to very low GHGi of renewable energy input
- Caution recommended on undesired effects, or effects not properly considered in their LCA:
 - Existing use of the renewable energy, for example hydropower currently used as a critical grid stabilizing input
 - GHGi associated with manufacture and putting in place of renewable electricity (wind turbines) can be significant
 - Off-gases used for making recycled carbon fuels, may have an important existing use already
- How to track such fuels in the supply chain, radio-carbon testing won't work

Current work: Development of Regional Life Cycle Inventory Data

- Data acquisition is always a challenge for model developers and policy makers.
- Brazilian RenovaBio program is making data for sugar cane production and processing publicly available
- This work will aim to collect data from individual mills as it becomes available, and then aggregate and summarize these data and make this information available to LCA model developers.
- Data from 67 sugarcane-ethanol mills has been collected.

Renovabio Program

- Report preparation has begun.
- For each parameter that has been reported we will present the average value, the standard deviation, and a histogram of individual results.
- Parameters to be included are
 - Soil ammendments, limestone and gypsum
 - Fertilizer, Total NPK, individual fertilizer by type
 - Organic fertilizer, Vinasses, filtercake, ash and soot, other
 - Fuel use, diesel, biodiesel, ethanol
 - Ethanol plant, yield, biomass combusted, fuel oil, power exported.
 - RenovoBio calcuated CI.

Planned Work - Papers for policy makers

- “Summary Papers for Policy Makers” summarising key factors influencing biofuel LCAs planned
 - Co-product allocation
 - Soil Carbon

Future Work Considerations

- Next Triennium
 - Consider summarising “new” Advanced Alternative Fuels and highlight LCA critical points, including existing use of important inputs
 - Competition for resources between fuel sectors?

Questions?

Don O'Connor

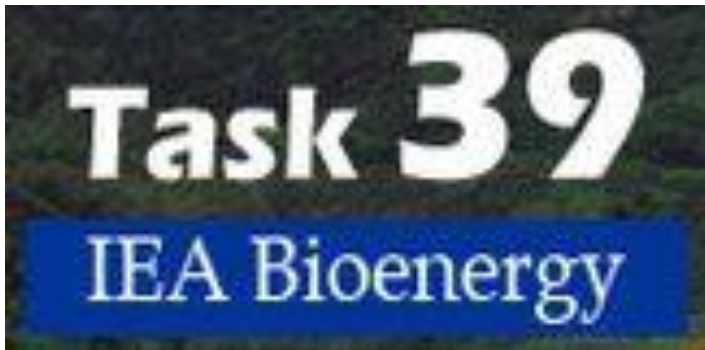
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