Book of Abstracts

11th International Conference on Life Cycle Assessment of Food 2018 (LCA Food)

in conjunction with

6th LCA AgriFood Asia

and

7th International Conference on Green and Sustainable Innovation (ICGSI)

"Global food challenges towards sustainable consumption and production"

16 – 20 October 2018

Bangkok, Thailand

Organized by

KU KASETSART UNIVERSITY KMUTT NSTDA

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Organized by

Centre of Excellence on enVironmental strategy for GREEN business (VGREEN), Faculty of Environment, Kasetsart University (KU)
The Joint Graduate school of Energy and Environment (JGSEE),
King Mongkut's University of Technology Thonburi (KMUTT)
and National Science and Technology Development Agency (NSTDA),
Ministry of Science and Technology

Dynamic carbon accounting applied to energy policy scenarios: accounting for full lifetime carbon

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Abstract

Energy modelling is a central instrument for energy system planning. However, assessment of climate change impacts use static approaches and do not account biogenic carbon (C_{bio}) emissions. The present study addresses dynamic assessment shortcomings of bioenergy systems to assist energy policy-making. We propose a coupling strategy combining the TIMES-MIRET partial-equilibrium model with dynamic C_{bio} accounting models, towards dynamic LCA. TIMES-MIRET represents scenario-dependent outputs over long timeframe exploring optimisation options with detailed technology database. The C_{bio} models estimate the dynamic C_{bio} fixation and release flows of the biomass commodities. A full carbon sequestration cycle was modelled for both, before and after the final harvest. We compared both approaches. The model coupling showed the importance of introducing time in climate change impact assessment. The results with a complete carbon balance differed from fossil-based only, depending on the accounting approach used for C_{bio} modelling. The consideration of technological innovation and market dynamics in a transitioning energy system expands the assessment boundaries providing insights into optimisation and low carbon options driven by policy and decision-making.

Keywords: *C_{bio} model, coupling, carbon accounting, dynamic, partial-equilibrium, time.*

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