

March 29-30, 2018
Edinburgh, Scotland

Nathanial Cooper et al., Arch Chem Res 2018, Volume 2
DOI: 10.21767/2572-4657-C1-002

DATA AGGREGATION TOOL FOR USE IN MILP BIOMASS SUPPLY CHAIN OPTIMIZATION

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Alternative energy options have increasingly been the focus of research and development efforts in recent years, due to concerns over the impact of fossil fuels on the environment and security. The biomass and biofuel industry has shown promise in its potential to partially supplant the fossil fuel industry through ethanol and other products, while simultaneously lowering the environmental burden. As a nascent industry, the capital and operating costs of the biomass and biofuel industry can be significant, making it difficult for the industry to gain market share. Further, the disparate nature of biomass growth can raise transportation and aggregation issues, further raising costs. Supply chain optimization (SCO) is a proven technique which can improve logistics and infrastructure planning, to maximize overall profits, or to minimize overall costs or environmental impact. Supply chain optimization models use information from geographic and logistic data in their analyses, as this is important to biorefinery and transportation pathway distribution. Due to the optimisation's dependence on map data, a map data extraction tool has been developed to assist in the connection between these models and the associated maps. This tool is written in a python fork specifically for the open source platform QGIS. This tool was tested using data from the UK and fed to an MILP supply chain optimization as a case study. The supply chain optimisation this tool was employed with uses cellular optimisation, meaning all data is aggregated into cells. One potential use would be to update a

supply chain model in real time or with little turnaround time, should updated map data become available.



Biography

Nathanial Cooper is a postdoctoral scholar in the Centre for Process Systems Engineering in Chemical Engineering at Imperial College London. His research focuses on supply chain management for biomass. He performed his doctoral research on the design of reactant distributors in PEM fuel cells, in the Mechanical and Aerospace Engineering department at the University of California, Davis, graduating in 2016. His undergraduate work was in Mechanical Engineering at Brown University, graduating in 2012. Nathanial's research interests lie mainly in the areas of renewable energy and sustainable engineering.

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