

## **Biofuel Assessments in the Australian IELab**

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Growing concerns about energy security and climate change have prompted interest in Australia and worldwide to look for alternatives of fossil fuels. Among the renewable fuel sources, biofuels are one such alternative that have received unprecedented attention in the past decade. Cellulosic biofuels, derived from agricultural and wood biomass, could potentially increase Australia's oil self-sufficiency. In this study, we carry out a hybrid life-cycle assessment (LCA) of a future cellulose-refining industry located in the Green Triangle region of South Australia. We assess both the upstream and downstream refining stages, and consider as well the life-cycle effects occurring in conventional industries displaced by the proposed biofuel supply chains. We improve on conventional LCA method by utilising multi-region input-output (MRIO) analysis that allows a comprehensive appraisal of the industry's supply chains. In particular, we construct a MRIO table on the Australian Industrial Ecology Virtual Laboratory, and hybridise that with detailed engineering process data on cellulose refining. Using MRIO-based hybrid LCA, we evaluate the social, economic and environmental impacts of lignocellulosic biofuel production. Our results reveal that a lignocellulosic biofuel industry will create significant new jobs and enhance productivity and economic growth by initiating the growth of new industries in the economy.