Incorporating water quality considerations into Life Cycle Assessment (LCA) with application to Shale Natural Gas Development.

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Background
Current life cycle assessment methodologies are not designed to deal with water consumption and water quality impacts. Indeed, comprehensive data on water withdrawals, water re-use and water emissions are difficult to obtain. Moreover, the use, scarcity and quality of water varies significantly from region to region. However, water management is a growing issue, particularly for unconventional energy sources such as Shale Gas. New methods and data for assessing water management alternatives are needed.

Project Plan
Blackhurst et. al. (2010) developed a vector of water withdrawals by economic sector in the United States which could be used as part of the Green Design Institute’s economic input-output life cycle assessment tool (www.eiolca.net). This permits tracking the supply chain water withdrawals associated with production of goods and services. They found that indirect or supply chain water use exceeded direct water use for most economic sectors.

An application to Marcellus Shale Natural Gas Production will be performed to assess the life cycle water impacts of this unconventional energy source. Shale gas production requires stages of hydraulic fracturing and the returned water typically has significant amounts of dissolved solids.

Processes for Shale Gas Production

Reference

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