WARM Summary and Possible Alternatives Report to Estimate Potential GHG Emissions, Energy Savings, and Economic Impact of Drywall Life Cycle

Executive Summary

For engineers and policymakers alike, it is not always clear what waste management strategy is optimal for a given product or material. Systems may produce favorable outcomes in some areas but not in others. To predict how choices made today will affect outcomes tomorrow, the planning and analysis of the components that form a waste management strategy is vital. To accomplish this life cycle analysis is used.

Life cycle analysis (LCA) is a term commonly used to refer to a methodology for assessing environmental impacts associated with all the stages of the life cycle of a material, product, process, or service. The environmental impacts of a typical commercial products might encompass the raw material extraction and processing (cradle), through the product's manufacture, distribution and use, and finally disposal (grave). The associated resources and processes that are necessary for that process to occur are recorded and converted into impact categories. Using universal metrics to quantify these impact categories is crucial as it allows for comparison between strategies. Examples of impact categories include greenhouse gas emissions, ocean eutrophication potential, ozone depletion and resource consumption.

LCAs are commonly conducted with software for convenience and efficiency. The Construction and Demolition Recycling Association (CDRA) has developed this report to provide policymakers and engineers with insight into one such software: the environmental protection agencies (EPA) waste reduction model (WARM). This report primarily summarizes the details of how WARM calculates the outputs for its impact categories when drywall is landfilled and recycled. It also compares the two waste management pathways in a hypothetical scenario where 100 tons of drywall requires disposal. The impact categories considered are greenhouse gas emission, energy use and economic impact.

In addition to WARM, this report briefly considers alternative software's and articulates how the outputs of an LCA software can vary drastically based on the assumptions made, data used, and waste flows considered. To illustrate this, the report utilizes a widely cited LCA report conducted by the waste resource action program (WRAP). The reports data and methodology are used in the same hypothetical disposal scenario that the WARM model addresses earlier in the report: 100 tons of drywall landfilled vs. recycled. Only the greenhouse gas emission impact category is calculated and compared. The result is a drastically different outcome. Where WARM shows that landfilling drywall serves as a mean to sequester carbon, WRAP's report suggests that carbon dioxide emissions when landfilling are significantly larger than when recycling. This appears to be a result of WARM's assumption that the paper facing present in drywall does not degrade in a sulfate rich environment.

Prepared for the Construction and Demolition Recycling Association

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