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The Circularity of Re-Refined Used Motor Oils: Measuring Impacts and Ensuring Responsible Procurement

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Abstract : Blue Tide Environmental is a company focused on developing a network of used motor oil recycling facilities across the U.S. They initiated the redesign of its recycling plant in Texas, and aimed to establish an updated carbon footprint of re-refined used motor oils compared to an equivalent product derived from virgin stock that is not re-refined. The aim was to quantify emissions savings of a circular alternative to conventional end-of-life combustion of used motor oil (UMO). To do so, they mandated an ISO-compliant carbon footprint, utilizing complex models requiring geographical and temporal accuracy to accommodate the U.S. refinery market. The quantification of linear and circular flows, proxies for fuel substitution and system expansion for multi-product outputs were all critical methodological choices and were tested through sensitivity analyses. The re-refined system consisted of continuous recycling of UMO and thus, end-of-life is considered non-existent. The unique perspective to this topic will be from a life cycle i.e. holistic one and essentially demonstrate using this example of how a cradle-to-cradle model can be used to quantify a comparative carbon footprint. The intended audience is lubricant manufacturers as the consumers, motor oil industry professionals and other industry members interested in performing a cradle-to-cradle modeling.

Keywords : circularity, used motor oil, re-refining, systems expansion
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