

Development and Assessment of Strategies to Ensure Economic Sustainability of the U.S. Automotive Recovery Infrastructure

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Abstract

Currently, 95% of all the vehicles discarded in the U.S. enter the recovery infrastructure. The material recovery efficiency of the infrastructure is approximately 80% by weight. Significant changes are being pursued by automotive manufacturers to reduce the environmental impact of vehicles during the use phase. However, the effect of these changes on the automotive recovery infrastructure is uncertain. In addition to vehicle changes, calls for higher material recovery efficiencies from the government and society also add to the uncertainty. In order to characterize the effects of these uncertainties, a Material Flow and Economic Exchange (MFEE) model has been established. The model-predicted results showed that higher material recovery rates can only be achieved if the business entities within the recovery infrastructure employ new technological strategies such as increased plastic recovery rates. However, the economic sustainability or profitability of the business entities was found to be jeopardized. This paper will focus on certain profit-enhancement strategies that may be employed to ensure the economic sustainability. The MFEE model is used to assess the adequacy of these strategies to improve the profitability of the business entities within the recovery infrastructure. Based on the analysis of these strategies it is shown that the economic burden of achieving higher material recovery rates will have to be shared by all the stakeholders within the recovery infrastructure. A discussion on the potential government policies that may be enacted to implement the technological and profit-enhancement strategies is presented.

Keywords: Dismantler; Shredder; Non-ferrous Operator; Material Flow and Economic Exchange Model; Profit-enhancement approaches; Technological Strategy; Environment; Economics

