



Remanufacturing and Energy Savings

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ABSTRACT

The substantial growth in industrial production, demand for materials, and population has led to an increasing need for sustainable manufacturing processes to mitigate the negative impacts on the environment and meet the needs of future generations. Remanufacturing is a process whereby used-products (referred to as cores) having reached their end-of-life, are restored back to useful service-life. Remanufacturing utilizes the energy and embedded value retained in a product upon reaching end-of-life. This avoids the need for many manufacturing processes, hence, saving energy in production phase. A critical issue to consider when evaluating energy savings in remanufacturing is the product use phase: how well does the remanufactured device perform in the use phase compared to a similar new product from an energy standpoint? To answer this question, our study utilizes Life Cycle Energy Analysis as well as Life Cycle Cost Analysis. Our energy assessments conclude that remanufacturing is a net energy saving as well as net energy expending end-of-life option. Our second conclusion is that it is necessary to take into account not only the production phase in the system boundary of analysis, but also include subsequent phases, especially use phase, to accurately and holistically evaluate the environmental impacts of remanufacturing. This requires accounting for several other prevailing drivers that influence use phase such as governmental policies and technological changes in time.