

Process Energy Allocation of Petroleum Refining Products

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Abstract

In this paper, we present a refinery process-based approach to allocate energy use to petroleum refining products according to mass and energy flows through refining processes. The approach accounts for the process-specific energy use and emissions by tracking product stream mass and energy use within a refinery. Energy use is distributed to product streams in each individual process using the product mass, product energy content, or product market values as weighting factors. The energy use allocated to individual refinery products using this process-level approach shows that product-specific energy use differs considerably from that obtained by allocation of energy use at the aggregate refinery plant level. The allocated energy use for individual refinery products is then used to estimate fuel-cycle energy use and emissions associated with petroleum-based fuels such as gasoline, diesel, liquefied petroleum gas, residual oil, and naphtha.