

Energy Conservation and Pollution Prevention Benefits of Residential Curbside Recycling Vs. Landfill Disposal or Waste-to-Energy Incineration Disposal

Jeffrey Morris

Sound Resource Management, jeff.morris@zerowaste.com

This study compared life cycle energy consumption, as well as releases to air, water and land of greenhouse gases, acidifying compounds, eutrophying compounds, and substances that are toxic to humans, for materials collected through residential curbside recycling programs versus disposal of those materials via landfill or via waste-to-energy (WTE) incineration with landfill disposal of combustion ash. Waste management systems in Washington state were examined, with separate analyses completed for systems in urban west, urban east, rural west and rural east regions of the state. The LCA boundaries were defined to include virgin resource extraction, resource refining and product manufacturing for 100% recycled- versus 100% virgin-content products, plus management of solid wastes at the end of product life, including the processing of recycled materials to specifications required for manufacturing of recycled-content products. Northwest energy grid offsets were included for energy and emissions reductions credited to energy generated from waste-to-energy disposal of recyclable materials. Landfill disposal practices for Washington state waste typically involved landfill gas collection and flaring, so no energy or emissions offsets were included for landfill.

Results show that curbside recycling conserves energy and reduces emissions versus either landfill or WTE disposal. This is due to reductions in energy usage and emissions for recycled-content production compared with manufacture of products from virgin materials. These upstream reductions outweigh the additional energy usage and emissions associated with curbside recycling trucks, cleaning and packaging of collected recyclables for sale on recycling markets, and shipping of packaged recyclables to end-use markets for use in manufacture of recycled-content products. In general, upstream energy and emissions reductions associated with recycled-content production are an order of magnitude larger than the increased energy usage and pollutant releases associated with curbside recycling collection trucks, material processing facilities and shipments of processed materials to end users.