Actionable Science for Communities

Tracking the Flow of Used Electronics in the U.S. SHC 3.63

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Purpose/Utility of Research

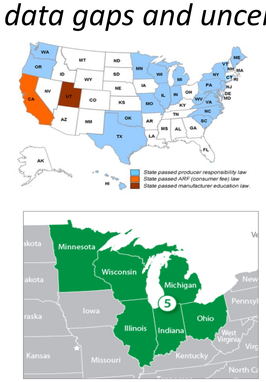
The improper disposal of e-waste has environmental, economic, and social impacts, both domestically and internationally. The primary goal of this project is to conduct a national assessment on the flow of historic, current, and potential future quantities of used electronics and electronic waste. A material flow analysis model for estimating the movement of used electronics and electronic waste within the U.S. has been developed.

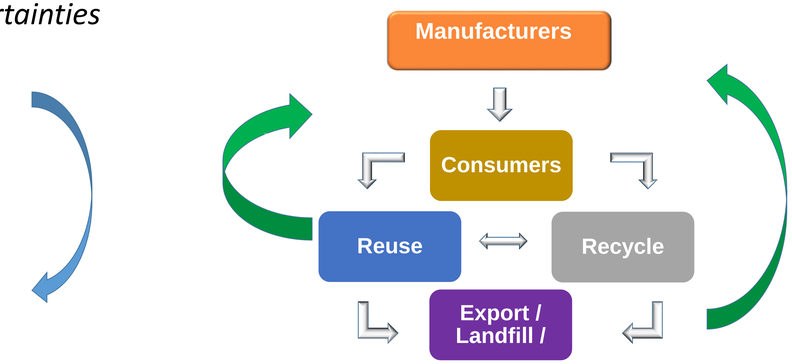
Once the framework for the material flow analysis model has been established for a cluster of Midwest states, the research will then focus on additional states and regions of the U.S. This will enable the comparison of model estimates with collected data to assess national electronics material flows and highlight areas of concern and opportunities for improvement.

The ability to track used electronics across their life cycle provides a significantly informed ability to facilitate environmentally sound use of sustainable disposition practices.

Highlights

- Developed quantitative material flow analysis (MFA) model for flow and stocks of used electronics throughout a specific temporal, and geographic boundaries.
- Annual e-waste generation was estimated based on national sales data and improved assumptions regarding product life spans, recycling, storage, and disposal used to reflect consumer behavior in the disposition of used electronic devices
- MFA evaluates the performance of different states programs and *provides a predictive tool for estimating future flow*
- E-waste flow model provides state-level, regional, and national estimates → *large data gaps and uncertainties*





Application & Translation

- The flow and stocks of used and waste electronic materials are studied for the development and analysis of state-level data to determine the sustainable stewardship of these resources.
- The analysis strategy seeks to utilize and develop a database to evaluate holistic approach for, electronic material flows contributing to the life cycle of electronic materials.
- MFA tool can help to change the attitude towards used electronics from waste management to resource recovery, and to achieve protection of human health and the environment.

Intended End Users

- An effort will be made to collaborate with regions, states, local municipalities, stakeholders for tracking and information systems in place.
- The critical information concerning the fate of used electronics and the effectiveness of current practices will provide information that may used to inform planning and decision-making.

Lessons Learned

- Products use-life time follow Weibull distribution and differ by economic sector
- Available information is tightly held by industrial parties
- Uncertainty in commodity markets , rate of technological change, heterogeneity in state programs

E-Waste Flow Model Tool