



# Used Electronics in the United States: Material Flow Analysis

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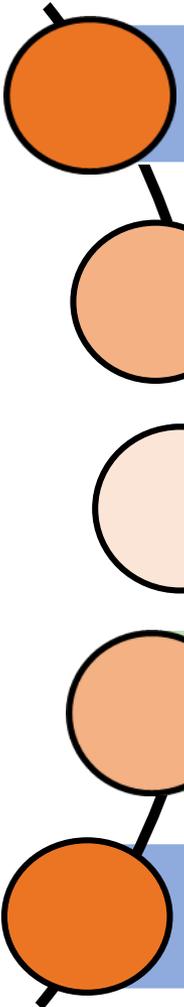
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# Project Objectives



**Conduct a national study to assess the flow of historic, current, and potential future quantities of used electronics and electronic waste**

**Evaluate the existing methods for quantifying and tracking used electronics**

**Assess the potential effects of the state-level electronics recycling requirements (e.g., benefits and drawbacks)**

**Develop an information-based method for estimating the flow of used electronics and electronic waste within the U.S. using data generated at the state level**

**Provide information and support for decision making**

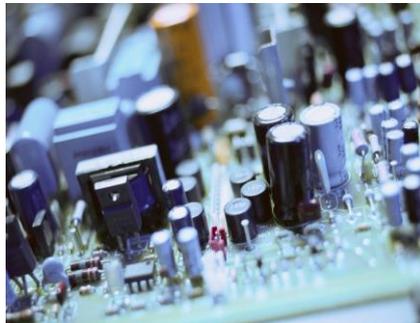
# Tracking Used Electronics - Project Specific Goals



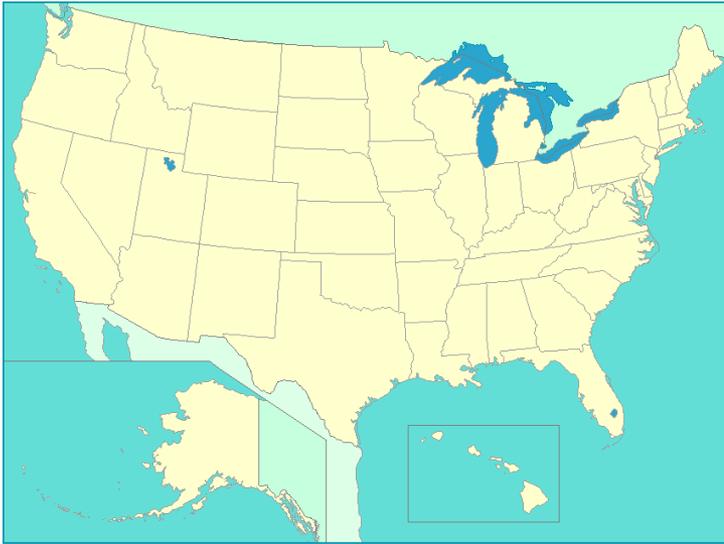
- Assess domestic flows and stocks of used electronics, effectiveness of current legislation, sustainable management practices for used electronics
- Identify the information gaps for the stewardship of electronics products across their lifecycle
- Develop a quantitative procedure for material flow analysis to display available information and estimate unavailable data for the flow of electronic materials across their life cycle
- Develop a method that will enable users to evaluate and compare information related to best management practices for the flow of used electronics

# Approach

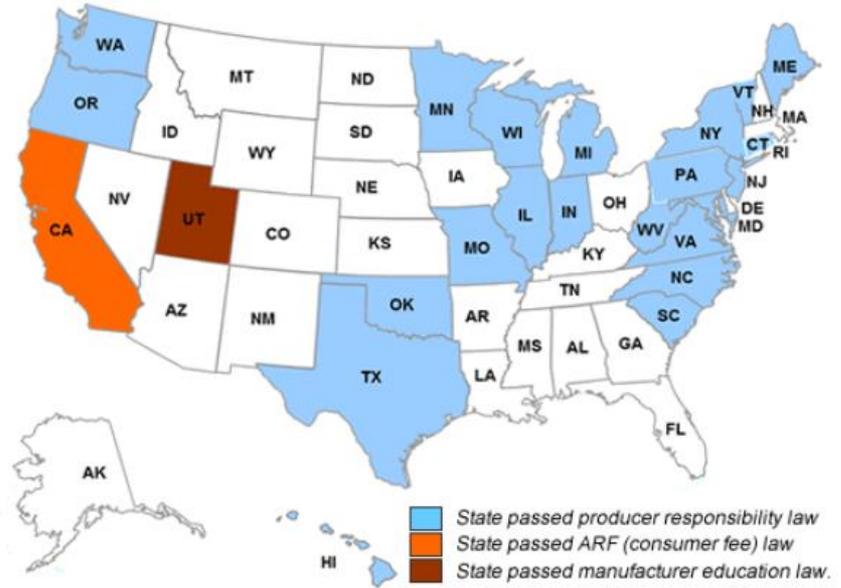
- Select a representative sampling of states that will serve as the proxy for assessing the practice of used electronics management across the U.S.
- Collect available information about the generation, recycling, export, recovery, reuse, and downstream flow of used electronics
- Develop a flow model, identify data gaps, and devise methods to estimate, or ascertain, unavailable data
- Assess environmental and economic impacts of the e-stewardship programs for the selected states.



# Selection of Research Area



**50 states**

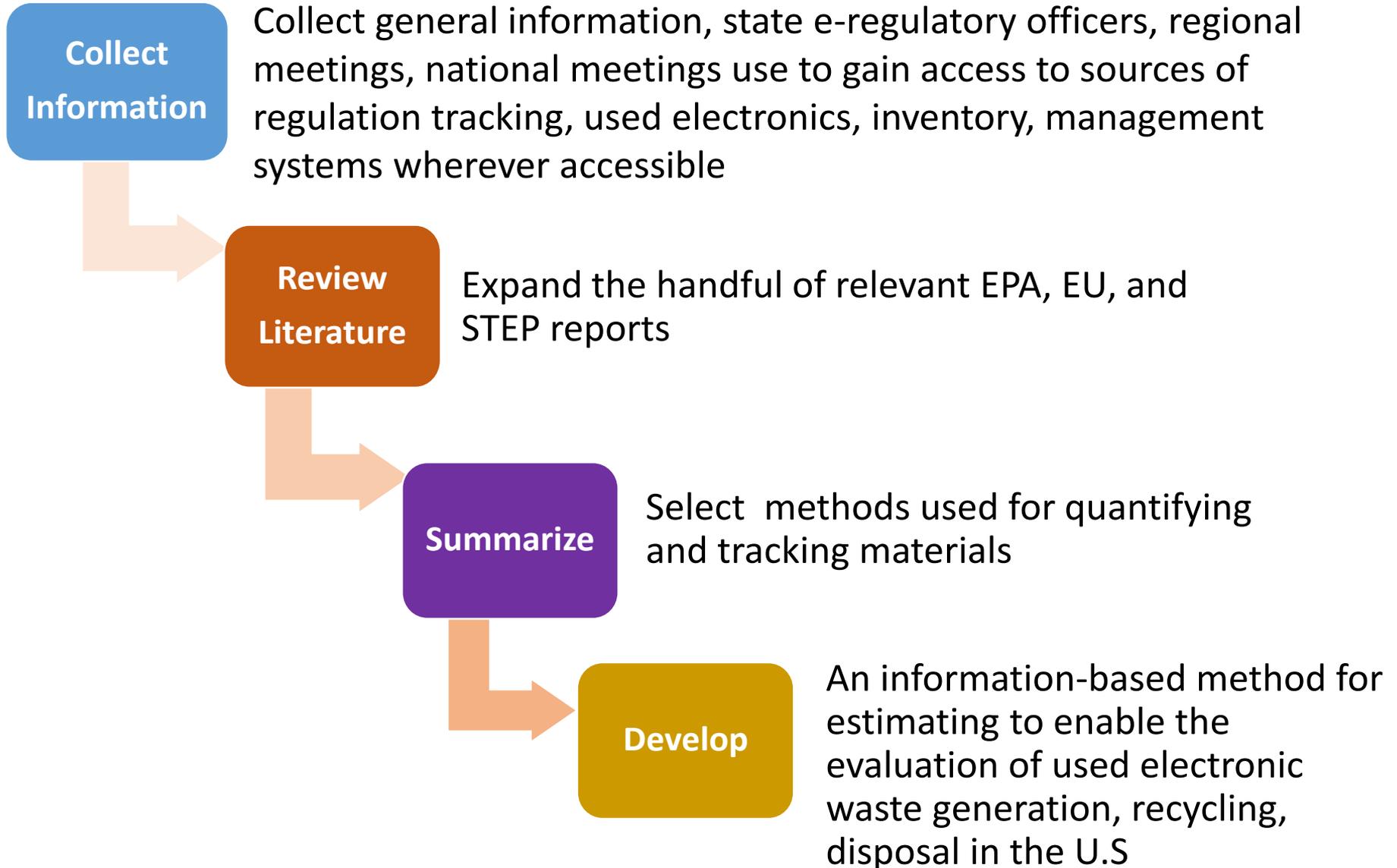


**26 states with e-laws**



**5 selected for  
assessment study**

# Material Flow and Tracking Methodology



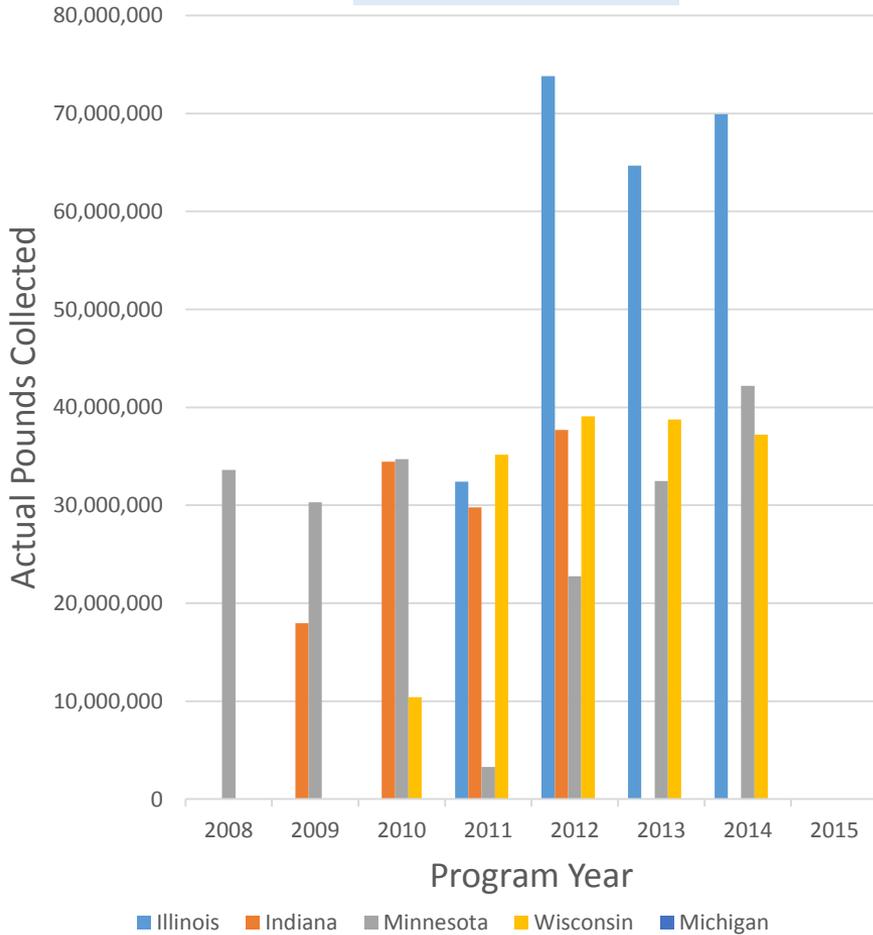
# Registration Requirements for Midwestern State Programs

State	Manufacturers must register?	Collectors must register?	Recyclers must register?	Refurbishers must register?
IL	✓	✓	✓	✓
IN	✓	✓	✓	x
MI	✓	x	✓	x
MN	✓	✓	✓	x
WI	✓	✓	✓	x

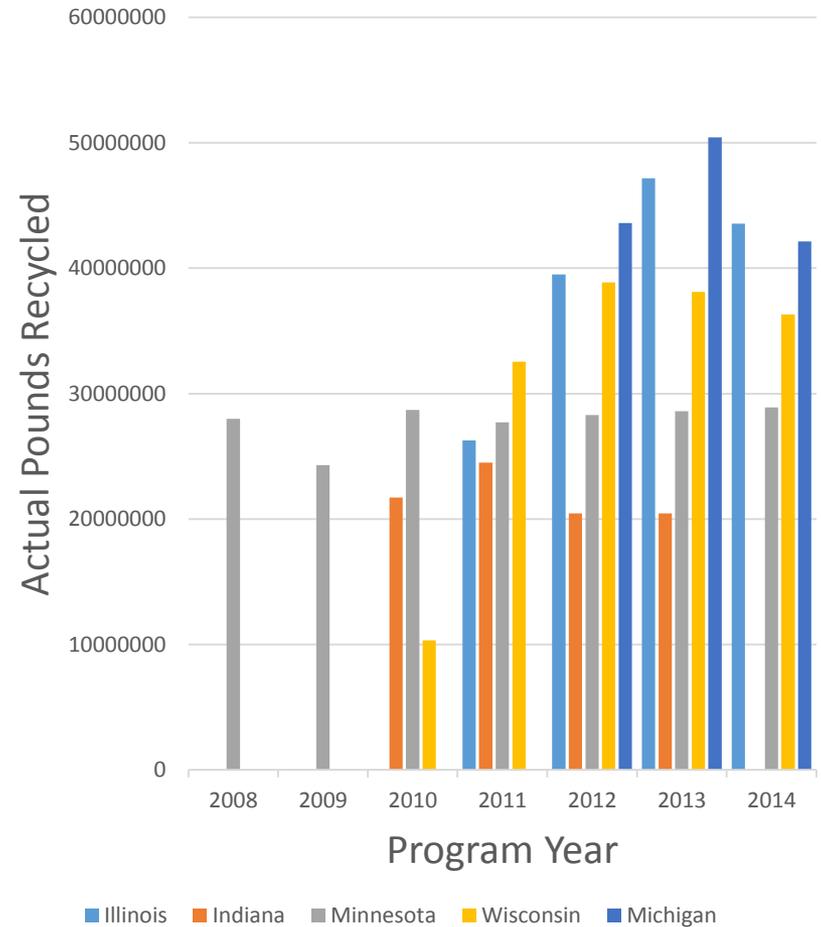
→ The requirements for OEMs, collectors, recyclers, and manufacturers fees differ from state to state.

# State-Reported Collection and Recycling Electronic Devices

## Collected



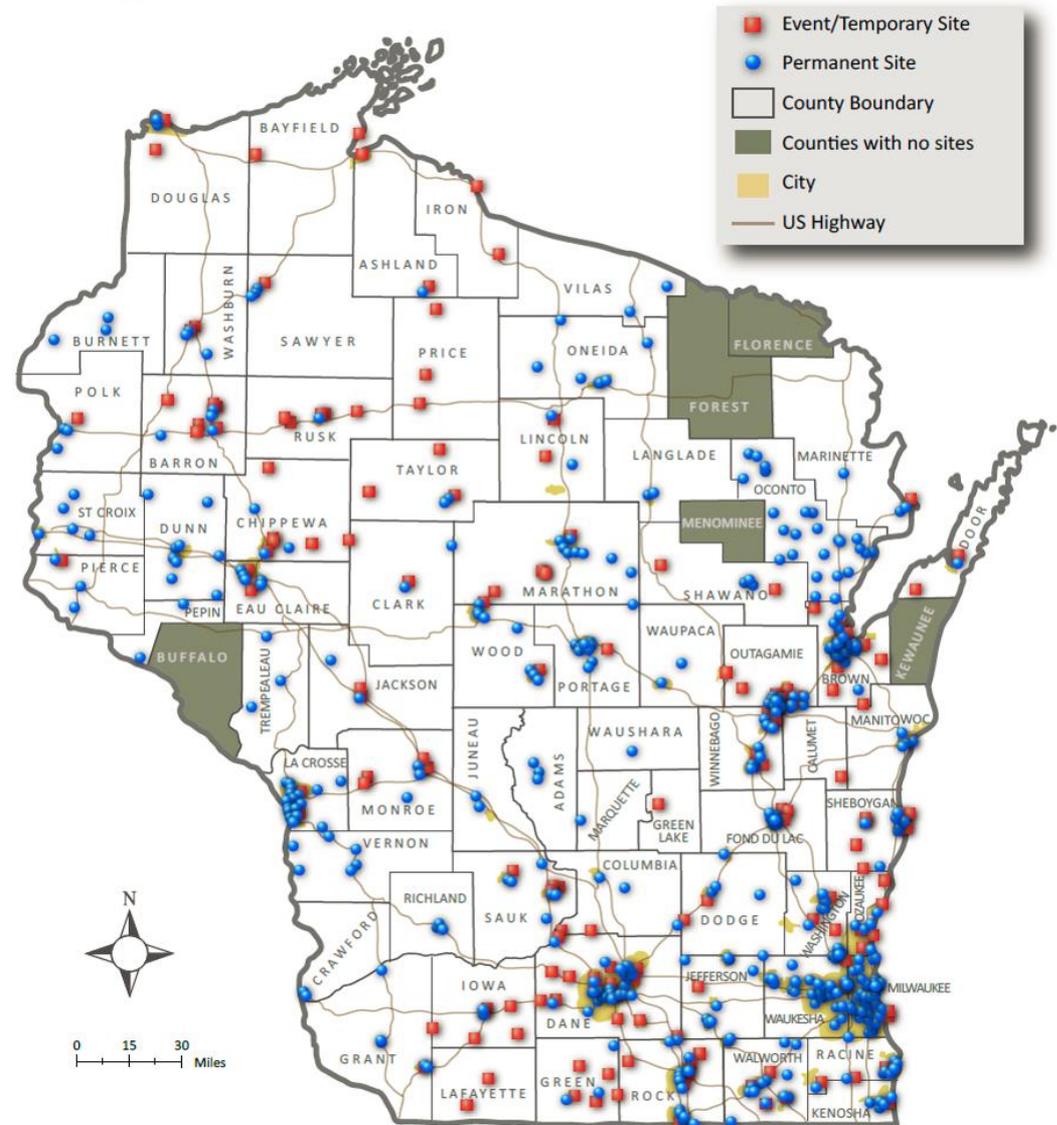
## Recycled



Data collection varies by state, Better data on recycled material, data incomplete

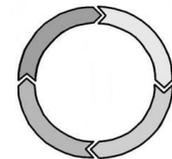
# Wisconsin E-Cycle Program Collection Sites

- Landfill and incinerator bans for:
  - TVs, computers, computer monitors and accessories, desktop printers and fax machines, e-readers with a 7" screen, DVD players, VCRs, DVRs, cell phones
- 130+ registered collectors with about 400 collection sites
- 25 registered recyclers
- 115+ registered manufacturers with nearly 200 brands

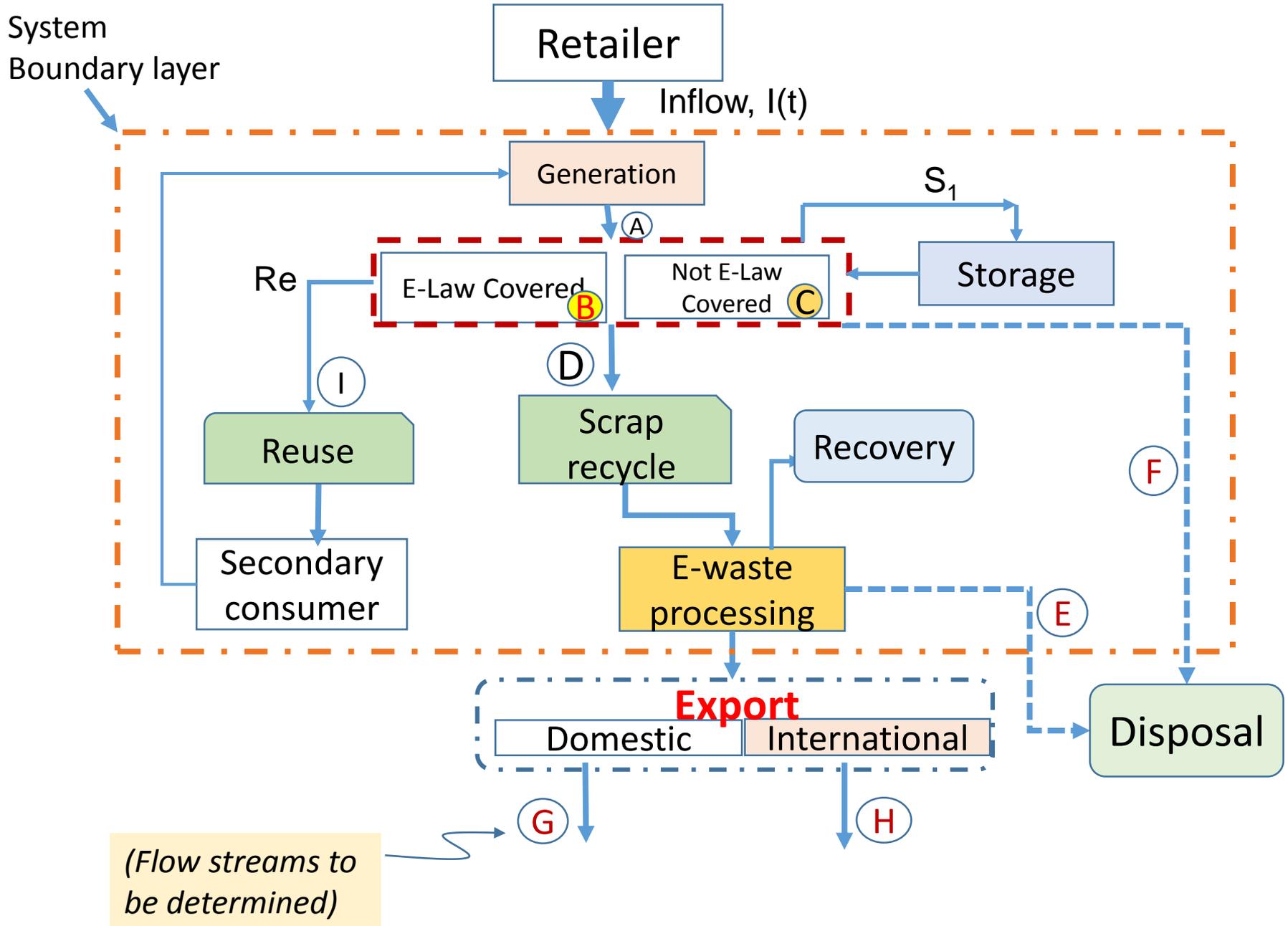


# Objectives of a Material Flow Analysis

- Track the flow of electronic materials through to end use or disposal
- Implement a guidance tool which serves as a proxy for a regional environmental management and audit platform
- Identify data gaps
- Define the basis for evaluation
- Assess data requirements in a decision-oriented manner in concert with other complementary tools.
- Examine short- and long-term flows and volumes as well as potential accumulated stockpiles



# Electronics Material Flow Analysis



# Information input to MFA

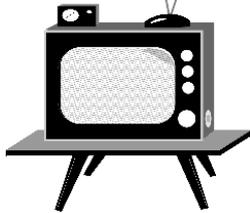


Quantity of the Material Flow

Costs and economic effect of the material flow

Toxicity of the material flow

Legal aspects of the electronic material flow



# FY16 Directions

- Complete the midwest region study
  - **Conduct a detailed material flow analysis for the states and the region, Identify data gap**
- Finish writing the project report – showing quantities of electronic movement for midwest region
- Provide recommendation for the projection of waste composition and how to close the recycling gap.

# Future Directions

- Find alternate sources to complete data gap
- Assess the economic effects of recycling
- Outline the challenges of designing a national program for used electronics
- Examine short- and long-term loadings to highlight the current and potential accumulations of material stocks (e.g. CRT tubes and environmental problems or potential future resources for urban mining)

# Questions and Discussion

