

## 1.1 Introduction

R. W. Beck, Inc., in conjunction with David Swenson Consulting, was retained by the Iowa Department of Natural Resources (IDNR) to study the economic impacts of recycling on Iowa's economy. Specifically, there were four objectives of the Economic Impacts of Recycling in Iowa Study (Study) including:

- Measure the current economic impacts of recycling activities (collectors, processors, end-users, remanufacturers and reuse establishments, and recycling equipment manufacturers) on Iowa employment, income, and tax revenue;
- Compare the results of the current Study to the results of the Economic Impacts of Recycling Study completed in 2001 (2001 Study);
- Identify specific recyclable material market development opportunities that maximize beneficial economic impacts upon the state of Iowa's economy; and
- Characterize the greenhouse gas savings associated with Iowa's recycling activities.

## 1.2 Key Definitions

Prior to initiating the Study, the definitions for a set of key terms were agreed upon by the R. W. Beck Project Team and IDNR staff. These definitions provide a baseline for initiating the Study analysis.

### 1.2.1 Recycling Activities

The following definitions were used for this Study:

**Collectors:** Establishments which pick-up or transfer materials through curbside recyclable materials collection, drop-off recyclable materials collection, redemption centers, and/or commercial on-site collection. This category may include for-profit organizations, non-profit organizations, local governments, and redemption centers.

**Processors:** Establishments that bale, crush, pelletize, compost, de-manufacture or otherwise change the form of the recyclable material for sale to an intermediate market or end manufacturer.

This category may include materials recovery facilities, scrap metal dealers, etc.

**End-Users:** Establishments that use recyclable materials as feedstock in the production of a new product that is placed into the stream of commerce. This category may include paper mills, steel mills, etc. This category does not include companies which generate recycled materials internally and reuse these materials.

**Broker:** Individuals or establishments that purchase a recyclable commodity, other than an end-user or processor, for the purpose of commodity resale. Both collectors and processors may use brokers to sell recyclable materials to end-users.

**Remanufacturing/  
Reuse** Remanufacturers and reuse establishments include businesses that remanufacture or reuse materials such as: computers and electronic appliances, used motor vehicle parts, tires, (e.g., retreaders), wood (e.g., pallet rebuilders), and other materials such as toner cartridges. This category also includes retailers that sell used merchandise (e.g., thrift stores).

**Recycled  
Equipment  
Manufacturers:** Establishments that manufacture equipment used solely for the purpose of collection and/or processing of recyclable materials for recovery and reuse. These companies are perceived as composing a unique, well-defined niche within the Iowa economy.

### 1.2.2 Material Types

Commodity material types selected for this Study include paper, plastics, glass, metals, wood, construction and demolition debris, organics, electronics, and tires. The types of materials within each commodity group targeted for this Study included the following:

**Paper:**

- Old Newspaper (ONP)
- Old Corrugated Containers (OCC)
- High Grade Office Paper
- Other Paper (Other grades and Mixed)

**Plastics:**

- Polyethylene Terephthalate (#1 – PET)
- High Density Polyethylene (#2 – HDPE)
- Polyvinyl Chloride (#3 – PVC)
- Low Density Polyethylene (#4 – LDPE)
- Polypropylene (#5 – PP)
- Polystyrene (#6 – PS)
- Mixed Plastics (unknown breakdown)

**Glass:**

Clear (Flint)  
Brown (Amber)  
Green or Blue  
Mixed

**Metals:**

Steel Cans  
Aluminum Cans  
Ferrous Non-Container Scrap  
Non-Ferrous Non-Container Scrap

**Wood:**

Wood includes non-yard wood by-products such as pallets, stumps/tree trunks, sawdust, sawmill scrap, and manufacturing scrap.

**Construction & Demolition (C&D):**

Asphalt  
Concrete  
Drywall  
Carpet  
Carpet Pad  
Asphalt Shingles

**Organics:**

Food  
Yard Trimmings  
Other Organic By-Products

**Electronics:**

End-of-life electronics includes computers and peripherals (CPUs, keyboards, monitors), televisions, VCRs, stereos, cell phones, etc.

**Tires:**

Total Tire Scrap

A glossary of definitions is included in Appendix A.

## 1.2.3 Economic Measures

The economic impacts upon Iowa's economy will be estimated using the following measures:

- Industrial output;
- Total income;
- Value added; and

- Number of jobs.

These outputs will be characterized as:

- Direct values (firm specific);
- Indirect values (inter-industry linkage as measured by the purchase of intermediate commodities or industrial inputs);
- Induced values (economic change stemming from personal consumption or household values); and
- Total impacts (the sum of direct, indirect, and induced).

In addition, total income and job multipliers will be generated for various recycling activities by commodity type. A multiplier is calculated by dividing the total values (impacts) by the direct values (impacts).

### 1.3 Key Assumptions

The following key assumptions are critical to the Study's analysis:

- The estimated current impacts are based on 2005 calendar year survey data from Iowa recycling establishments and reasonable extrapolation of the quantities by materials type.
- All incremental benefits that may accrue as a result of recycling collection activities are considered nominal, when compared to the collection activities associated with these materials if they were not diverted from disposal.
- The processor level is the point at which initial value is added to the recyclable commodities.
- The economic analysis does not account for the avoided disposal costs of the recyclable materials.
- The economic analysis for end-users measures the economic "importance" of the recycling industry to Iowa's economy, as opposed to a measure of the current economic impacts. The term "economic impact" represents production destined for export sales or for production that clearly substitutes for a commodity that must be imported. Economic importance represents overall value to the Iowa economy.
- Where net state and local fiscal impacts reflect a positive value, the impacts on population, employment, and income are likely to generate more fiscal revenues than costs.

#### 1.3.1 Approach

The project tasks and approach are summarized below.

### 1.3.1.1 Task 1: Project Kick-Off

A Kick-Off Meeting was held to confirm the Scope of Work (tasks detailed below) and the schedule, and discuss IDNR staff responsibilities.

### 1.3.1.2 Task 2: Collect Data

The task to collect data included the following subtasks:

**2A: Design Survey.** R. W. Beck revised the survey used in the 2001 Study and forwarded it on to the IDNR for comments. A copy of the final survey and cover letter is attached in Appendix B.

**2B: Administer Survey.** R. W. Beck sent out the surveys which included a cover letter from the IDNR.

**2C: Data Analysis and Fill Data Gaps.** Because a certain percentage of contacted establishments declined to participate in the survey, R. W. Beck filled the data gaps in one of three ways:

1. If the establishment provided data to R. W. Beck for the 2001 Study, that data was used as a frame of reference for developing a 2005 estimate. In other instances, IDNR staff assisted the project team in gathering survey data through direct contacts with various recycling establishments.
2. R. W. Beck requested assistance from the IDNR to estimate the size of the non-responding establishments. The IDNR provided information on certain companies, such as the number of employees. R. W. Beck used that information in combination with average per-employee throughput, payroll, and receipts data from reporting establishments to estimate overall economic values.
3. R. W. Beck determined average per-establishment employment, payroll, and receipts. These statistics, along with available U.S. Census data, were used to estimate data for non-responding establishments.

### 1.3.1.3 Task 3: Commodity Flow Analysis

The Commodity Flow Analysis is the same procedure that R. W. Beck used in the previous two studies:

**3A: Iowa Commodity Flow Analysis.** Using survey data, R. W. Beck summarized estimated processed supply, imports, exports, and end-users for each commodity type.

**3B: Supply/Demand Balance for Recyclable Commodities.** R. W. Beck developed a “processed supply/demand matrix” to estimate the balance of recovered supply and demand.

### 1.3.1.4 Task 4: Economic Impact Analysis

The Economic Impact Analysis utilized the same procedure used previously by R. W. Beck and its subconsultant, David Swenson Consulting, with three minor modifications:

1. Industrial classification systems have changed since the last effort (discussed in Section 4.1 of this report);
2. The current Study included additional categories for consideration (end-of-life electronics and tire scrap), as well as an additional survey to the remanufacturing and reuse industry; and
3. The procedures for calculating economic multipliers have been modified to include elements of the economy that were excluded in earlier models.

**4A: Construct I-O Model.** The IMPLAN model was used to produce direct, indirect and induced economic data and multipliers for commodity categories (collection, processing, recycling equipment manufacturing, remanufacturing, etc.).

**4B: Interpretation of Results.** A written summary of the economic impacts of recycling was provided by R. W. Beck.

### 1.3.1.5 Task 5: Fiscal Impact Analysis

Because an estimate of the direct, indirect, and induced effects of recycling activities provides only a portion of the financial impacts associated with current recycling activities, an analysis was completed of the fiscal aspects of government in the context of revenues and expenditures. This task analyzed the fiscal impacts using a fiscal impact model for determining the changes in own-source revenues for state and local governments that are due to labor income changes in economic impact analyses. Own-source revenues reflect all property, income, sales, and business taxes; all charges for services; and all miscellaneous revenue sources and are the elements of state and local finance that are directly linked to area economic activity.

**5A: Local Government Revenue Analysis.** Fiscal impacts of recycling activities in Iowa were estimated based on locally-generated tax and non-tax revenues. In addition, the results included urban and rural summaries on a statewide basis.

**5B: State Government Revenue Analysis.** Own-source revenue impacts of recycling activities were estimated based on state income, sales, and use taxes.

**5C: Interpretation of Results.** R. W. Beck characterized the fiscal impacts of current recycling activities on Iowa local and state government.

### 1.3.1.6 Task 6: Comparison of 2005 Impacts to 1999 Impacts

R. W. Beck compared the 2005 data with the 1999 data and summarized the changes that have occurred, unmasked by inflationary and commodity price fluctuations.

### 1.3.1.7 Task 7: Greenhouse Gas Emissions Impact Analysis

R. W. Beck assessed greenhouse gas emissions reductions associated with Iowa's recycling industry using the U.S. Environmental Protection Agency's Waste Reduction Model (WARM). The aggregated recyclable materials data, by material type, were used as a basis for calculating the GHG savings using WARM. The final analysis summarized the estimated statewide greenhouse gas emissions reductions as a result of recycling activities in the state.

### 1.3.1.8 Task 8: Project Report

A draft project report summarized the information and included R. W. Beck's analyses. Collaboratively, R. W. Beck and the IDNR finalized the report. R. W. Beck presented the results to the IDNR and the Iowa Department of Economic Development.

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