

Case Study

A study for the Aluminum Association helps shed light on energy use and emissions

The Client

ICF's client, the Aluminum Association, is the leading trade association for the aluminum production, fabrication, and recycling industry and its suppliers. It represents U.S. and international companies and their suppliers throughout the value chain and helps manufacturers produce sustainable and innovative products. Heavily involved in the establishment of the U.S. aluminum can recycling infrastructure in the 1970s, today the Association advocates for increased energy efficiencies and reduced emissions through a sustainability initiative launched in 2008 for the production and distribution of aluminum-based products. It also currently continues this advocacy through the establishment of global standards as well as providing industry statistics, sustainability research, and expert knowledge to member companies and policy makers nationwide.

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Helping Fill Environmental Data Gaps in the Use of Aluminum Cans

The Challenge

The Aluminum Association plays a key role in providing research that helps the industry understand the full environmental impact of aluminum products at all phases of their life cycles. As environmental scrutiny has steadily increased, the Association is looking to help companies better understand the environmental impact of all steps of their supply chains, including packaging and distribution—with a goal of shedding light on ways to increase efficiencies and reduce impacts.

One method the Association uses is life-cycle assessment (LCA); this approach is used to assess the environmental impacts from the entire life of a product or service from raw material production and manufacturing through product use and ending with recycling or disposal. Through the Association's use of LCA, the environmental impacts from product manufacturing and recycling are relatively well understood. However, far less attention has been paid to the use-phase impact of aluminum materials. So, the Association needed a reputable, objective study that would examine greenhouse gas emissions and energy consumption during the use phase of beverage packaging products. Specifically, they needed to address how packaging influences transportation and refrigeration processes and related impacts of aluminum cans versus plastic and glass bottle alternatives.

The ICF Solution

To address the client's challenge, ICF designed a study to assess transportation space efficiency during distribution as well as the efficiency of refrigerating aluminum can packed beverages versus bottle alternatives at retail points of sale.

Designing the study

ICF carefully designed an objective study not as a full LCA, but one that would be taken into account along with other studies that assess the manufacturing and end-of-life phases of aluminum cans for a more holistic view of the impact of all phases. The study planning and design included:

- Defining information and data needs to make sure the data gathered would cover national transportation practices on the most common types of aluminum beverage containers and bottle alternatives
- Gathering additional industry-relevant information, including a literature search for initial estimates of energy use and emissions as well as gathering information from industry groups and associations
- Identifying data gaps in the leading industry insights to determine where best to focus resources on gathering additional information; this included interviews with leading stakeholders in beverage, distribution, and retail industries



Case Study

"While the Aluminum Association has studied the production and recycling of beverage cans previously, we knew less about other phases of the beverage lifecycle, particularly the GHG impacts and energy use associated with the transportation and refrigeration of aluminum beverage containers. We turned to ICF to develop this new research considering emissions associated with the service life of the product – the so-called "use phase." We valued their perspective and experience to objectively assess any potential sustainability advantages of the aluminum can during this portion of the beverage lifecycle."

- Marshall Jinlong Wang
Senior Sustainability Specialist
The Aluminum Association

About ICF

ICF (NASDAQ:ICFI) is a global consulting and technology services provider with more than 5,000 professionals focused on making big things possible for our clients. We are business analysts, policy specialists, technologists, researchers, digital strategists, social scientists, and creatives. Since 1969, government and commercial clients have worked with ICF to overcome their toughest challenges on issues that matter profoundly to their success. Come engage with us at icf.com.

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Study deliverables

ICF finalized energy use and emissions estimates of aluminum beverage container transportation, distribution, and retail refrigeration compared with other bottle alternatives based on the information gathered from extensive research and interview processes. Deliverables were carefully designed to help the Association client clearly understand all findings and easily translate them into actionable recommendations. ICF provided:

- A memorandum of key initial findings to serve as a summary for communication purposes as well as providing information about additional future research needed
- A detailed final report, providing all goals, methodologies, and results of the study
- A parameter-based spreadsheet model of relevant lifecycle stages (such as distribution and retail) for each beverage type (plastic bottles, glass bottles, and aluminum cans); the spreadsheet generated results for both energy demand and greenhouse gas (GHG) emissions, and provides the client with comparative results between different types of beverage containers
- Representative distribution and refrigeration scenarios, providing real-world examples to illustrate key findings (e.g., a scenario in which beer and soft drinks are shipped an average distance in a large truck to a small market or convenience store)

The Results

While ICF's study does not take the place of a full LCA, it provided significant data and findings that help the Aluminum Association improve its understanding of the use phase (distribution and refrigeration) of aluminum cans versus other alternatives.

Key findings include:

- Space efficiency during transportation of aluminum cans allows for roughly 83% lower GHG emissions compared to glass bottles per liter of beverage transported a given distance
- Plastic bottles show similar transportation emissions impacts as aluminum cans
- Space efficiency during beverage cooling of aluminum cans allows for lower GHG emissions compared to both glass bottles and plastic bottles
- The largest GHG emissions savings from aluminum cans compared to other containers are seen in supermarket refrigerators
- There are negligible differences in the cooling efficiency of aluminum, glass, and plastic containers based on material properties

ICF's study was designed to address a very specific phase of the aluminum can lifecycle, thereby helping the Aluminum Association fill significant data gaps in its understanding of the emissions impacts during transportation and distribution. These findings may help the Association focus its communication and outreach efforts around the estimated advantages that aluminum cans provide. Finally, the study also helps shed light on remaining data gaps and areas for future research. This will be of tremendous value as the Association plans for future studies, and can help them guide communication around both the value and limitations of the data—all of which will ultimately aid their knowledge base and credibility as an organization.

