

Executive Summary:

# Beer Keg Management and Alternative Packaging Comparative Life Cycle Assessment

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## Introduction

Deloitte was commissioned to conduct a Life Cycle Assessment (LCA) study considering the environmental impacts associated with various beer container options. Life Cycle Assessment (LCA) is an ISO-standardized biophysical accounting framework used to 1) compile an inventory of material and energy inputs and outputs characteristic of each stage of a product life cycle and 2) quantify its contributions to a specified suite of resource use and emissions-related environmental impact categories.

## Study Goal and Intended Use

The primary purpose of this study is to provide the necessary robust assessment to enable a public product comparison of owned reusable steel kegs, glass bottles, and aluminum cans. The comparative nature of this study seeks to determine if there are environmental advantages of owned kegs vs. other packaging solutions (e.g., glass bottles, aluminum cans).

This study contributes to the ongoing shift in thinking in the packaging industry to engender the complete life cycle in comparative studies. This methodology transcends common LCAs that focus on a portion of the full life cycle, such as gate-to-gate or cradle-to-gate. The cradle-to-cradle approach used in this assessment addresses all steps of package manufacture, maintenance and/or end-of-life management. This study informs dialogues as diverse as the policy relevance of product eco-labeling and the identification of key leverage points for reducing emissions related to beer production and consumption.

## Summary Results

The major findings of this study include:

- Steel kegs generally perform better from an environmental perspective across multiple impact categories when considering the benefits of the circular economy unique to this packaging option
- While the emissions associated with the single use of a keg are higher than glass bottles and aluminum cans (due to carbon intensive steel production processes), the production emissions are distributed over the lifetime of a keg, resulting in lower per use emission than both glass bottles and aluminum cans
- From a GHG perspective, steel kegs become environmentally preferable to single-use glass bottles after 3 use cycles and overtake aluminum cans after 5 use cycles
- In the U.S., steel kegs save over 400,000 metric tons of greenhouse gases (GHGs) and keep roughly 500,000 tons of packaging out of landfills each year

## Systems Studied and Functional Unit

Using the ISO 14040 standard series, this study documents the life cycle impact assessment results for a functional unit of a 12 ounce serving size of beer consumed on-premise. The packaging options considered in this study include single-use 12oz. glass bottles, single-use 12 oz. aluminum cans and reusable steel kegs. The cradle-to-cradle LCA inventory of steel kegs addresses all inputs and outputs for the production of a steel container. All product systems include production of raw material inputs, processing, packaging, distribution, maintenance processes (if applicable) and end-of-life.

This analysis includes multiple life cycle impact categories including climate change as measured by the emission of GHGs, expressed as carbon dioxide equivalents (CO<sub>2</sub>-eq), as well as a range of other environmentally relevant impacts, including landfill waste. The US EPA TRACI, ReCiPe USEtox™, and WARM life cycle impact assessment methodologies are used to calculate environmental impacts from the life cycle inventory data.

## **Data Sources and Assumptions**

Wherever possible, primary data were provided by MicroStar, members of the Steel Keg Association, and other expert interviews. When primary data were not available for foreground processes, secondary data were used, including published peer reviewed studies, life cycle inventory databases and other literature sources.