

# Aluminum Builds Sustainable Communities

The  
**Aluminum**  
Association



## Aluminum Builds Sustainable Communities

Aluminum is a material of choice for green buildings. Use of aluminum in buildings can help save energy, reduce the use of other materials, increase comfort, and lower emissions and wastes throughout the life of the structure. All of these are achieved through aluminum alloys' unique characteristics: their light weight, durability, malleability, corrosion resistance, thermal and electrical conductivity, and infinite recyclability.

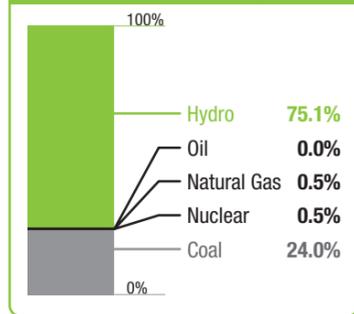
### Responsible Production

- The raw material of aluminum production is either bauxite ore or recovered aluminum scrap.
- Bauxite mining activities are carried out to the highest possible social and environmental standards. These include minimizing ecological impacts, bringing economic and social prosperity to local communities, and **100 percent rehabilitation of mining sites**. A biannual report documenting global bauxite mining practices can be found at the website of the International Aluminium Institute (IAI), [www.world-aluminium.org](http://www.world-aluminium.org).
- Aluminum scrap recovery benefits communities and municipalities. It creates jobs, generates income, and produces funds for social and economic causes. From a life-cycle point of view, aluminum recycling is one of the cleanest and most sustainable industries in the world.
- The major energy source for primary aluminum metal production is electricity. In North America, more than **70 percent of the electricity used in primary aluminum production comes from renewable hydropower sources**.
- On a per-unit basis, total primary energy demand associated with both primary and secondary aluminum productions has been significantly reduced during the past 15 years, as have cumulative greenhouse gas emissions.
- Most aluminum products made in North America contain recycled metal. Our newest industry-wide survey shows that the **overall recycled content of extruded, flat-rolled (not including foil), and shape-casted products is more than 50 percent**, and the majority is from post-consumer sources. Additional details will be available upon the release of our newest Semi-Fabricated Products Life-Cycle Report.

### Sustainable Use

- The use of aluminum in road vehicles reduces their weight, saving fuel while maintaining safety and performance. In 2009, the use of aluminum in road vehicles in North America **helped save 108 million barrels of crude oil equivalent of energy and reduced**

### Power Consumptions By Primary Aluminum Smelters In North America (2010)

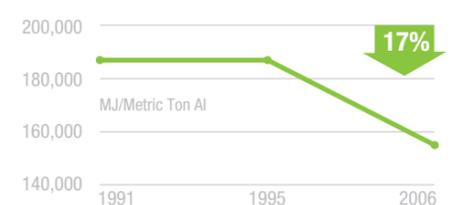


### Energy Used for All Aluminum Production Offset By Downweighting Automobiles Through Aluminum Use (millions of barrels of crude oil equivalent)

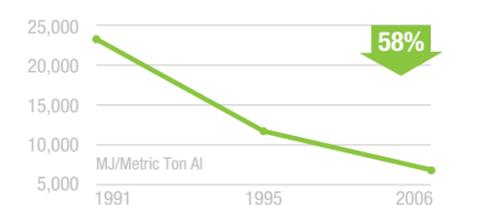


### Energy Footprint and GHG Emission Reductions in North American Aluminum Industry

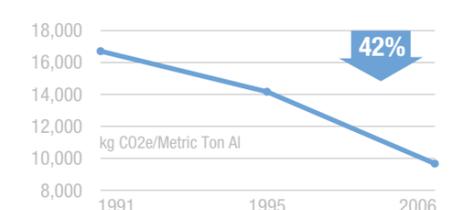
Primary Energy Demand for **Primary Aluminum Production** Has Been Reduced (1991–2006)



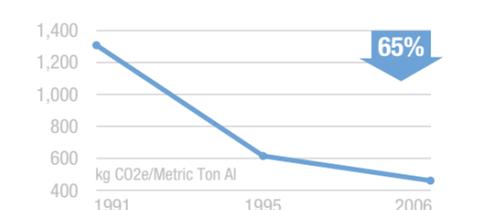
Primary Energy Demand for **Secondary Aluminum Production** Has Been Reduced (1991–2006)



Cumulative (Scope I+II) Greenhouse Gas Emissions Caused by **Primary Aluminum Production** Have Been Reduced Sharply (1991–2006)



Cumulative (Scope I+II+III) GHG Emissions Caused by **Secondary Aluminum Production** Have Been Reduced (1991–2006)



**greenhouse gas emissions by 44 million tons.** The savings in this single market sector have largely offset the total energy demand and related emissions of the entire industry, making it unique among material industries as energy- and GHG emission-neutral.

- Energy savings through the use of aluminum in other market sectors are also significant. For instance, tens of millions of barrels of oil equivalent of energy is saved through aluminum's protection of food from spoilage. Similar levels of energy savings are attained in the beverage storage, transport, retailing, and consumption processes through the use of lightweight aluminum cans and bottles.
- Aluminum use in buildings can help achieve a range of architectural solutions, providing insulation, allowing daylight and fresh air into a building's interior, and permitting architects design flexibility. Thanks to aluminum, doors and windows, curtain walls and facades, roofs and siding, sun screens and shades, and solar energy harvesting devices can be engineered and manufactured to yield optimal energy-efficiency performance and occupant comfort. Aluminum's contribution to energy savings during the use phase of buildings is estimated at the level of hundreds of millions of barrels of crude oil equivalent annually.
- Aluminum's exceptionally **high strength-to-weight ratio** makes it especially useful as a structural material in buildings, significantly reducing the use of other materials such as steel, cement, and plastics in buildings—particularly in skyscrapers and large-span structures. The modern skyscraper was made possible by aluminum.
- Once incorporated into a structure, aluminum can serve its designated function for many decades—and in many cases, as long as the building itself exists—with little or no upkeep. **This helps reduce buildings' operating and maintenance costs.**

### Recycling for Future Generations

- Aluminum and its alloys can be **recycled infinitely** and without any loss in quality. Recycled aluminum has the same chemical properties and can perform the same functions as primary aluminum.
- Recycling aluminum **saves 95 percent of the energy** associated with primary metal production. Similarly, it **reduces 95 percent of the environmental footprint**. In North America, post-consumer aluminum recycling helps save about 70 million barrels of oil equivalent of energy and reduces greenhouse gas emissions by about 27 million tons each year.
- Globally, about **73 percent of all the aluminum ever made is still in functional use** in society. In the United States, our initial study reveals the same levels of aluminum still in use. The building and infrastructure sector contains the largest amount of in-use stocks of aluminum. These metals will almost certainly be recycled and reused sometime in the future, either by our generation or future generations.

- A study sponsored by the aluminum industry investigating building demolition sites in the area of Seattle, Washington found that approximately 98 percent of aluminum is collected and recycled during the demolition process.
- Buildings represent aluminum resource banks for future generations.

### Pioneer in Transparent Life-Cycle Analysis

- The North American aluminum industry has been a pioneer in the use of life-cycle analysis to quantify—objectively—the potential environmental impact of the metal through its entire life-cycle, from the extraction of the raw materials, through its production, distribution, use, disposal, and recycling. Our first industry-wide product LCA study was released in 1991. Ours is the only material industry that discloses detailed input and output inventory information on all of the major production unit processes—a practice that was instituted with the first industry LCA over 20 years ago.
- LCA is a central pillar of the North American aluminum industry’s sustainability program. The metrics we use to monitor the industry’s progress and assess its performance are largely drawn from life-cycle assessment results.

Follow us at [www.aluminum.org](http://www.aluminum.org) to receive updates on our newest LCA study and Environmental Product Declarations, to be published in spring 2013. Also due for release at that time will be

the aluminum industry guidance on sustainable building rating and certification systems.



### Why Do Commercial Building Owners Prefer Aluminum Windows?

Aluminum is far and away the most popular material used in commercial fenestration. Ever wonder why? First and foremost, building owners want to install their windows once—and only once. Unlike windows made from competing materials, aluminum frames will not warp, rot, corrode, or become misshapen due to weather, water, or insect infestation. Sporting crisp, clean good looks, aluminum windows are easy to maintain—no painting is required—and are likely to last as long as the building itself. Think about that the next time you have to replace a half dozen or more rotted or warped windows throughout your house.

