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LIFE-CYCLE STUDIES

Aluminum Cans

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Aluminum Cans

Overview

In 1964, Reynolds introduced one-way aluminum cans as a convenient alternative to returnable glass bottles and to steel cans, which still required a can opener. Until the 1980s, aluminum cans were used only for beer and soda, but now juice, energy drinks, and iced tea are also commonly packaged in cans. People like cans because they're light and unbreakable, and chill drinks quickly. Global consumption is estimated at 190–210 billion cans a year. That's 3 million tons of metal—about 10 percent of the world's aluminum supply—for a product with a useful life measured in minutes.

Americans consume about 100 billion cans a year, or 340 per person, 10 times more than the average European and twice as much as the average Canadian, Japanese, or Australian. Consumption in emerging economies (including China, India, and the Former Soviet Union) hovers around 10 cans per person per year. As they develop, consumption will certainly rise.

Closing the Loop

Perhaps you've heard that cans are 100-percent recyclable, that recycling saves more than 90 percent of the energy used to make aluminum from ore, or that recycled cans are back on supermarket shelves in 60 days.

That's all true. But recyclable doesn't always mean recycled. In 2004, only 45 percent of U.S. cans were recycled—better than U.S. rates for glass and plastic bottles (20–25 percent), but worse than can recycling elsewhere. Poverty and high scrap values have produced a 96-percent recycling rate in Brazil, while

Japan has an 82-percent rate thanks to national values of cleanliness and civic participation. Refundable deposits produce can recycling rates of 75–95 percent in Germany, Denmark, Sweden, Norway, 11 U.S. states, and seven Canadian provinces.

In 2004, 810,000 tons of cans were landfilled in the United States and about 300,000 tons in the rest of the world. That's like five smelters pouring their entire annual output—a million tons of metal—straight into a hole in the ground.

Had those cans been recycled, 16 billion kilowatthours

could have been saved—enough electricity for more than two million European homes for a year. Recycling just one soda can saves enough electricity to run a laptop computer for over 10 hours.



In Norwegian: "Look for the refund-label!"

Manufacturing Aluminum

Each ton of primary aluminum requires about five tons of bauxite ore to be strip-mined (two-thirds of the total in Australia, Brazil, Guinea, and Jamaica), then refined into alumina, producing several tons of caustic red mud waste. The alumina is dissolved in cryolite and zapped with an electric current to produce molten aluminum. This is poured into ingots, then rolled into thin sheets used to make cans.

Primary aluminum production uses 2 percent of the electricity generated worldwide. One of the most overlooked impacts of aluminum production is habitat loss, not only from strip mining but from large hydroelectric dams built to supply primary smelters. These reservoirs have flooded thousands of square kilometers. As

global demand rises, more dam and smelter projects are on the drawing boards in wilderness areas as disparate as Malaysia and Brazil.

About a third of global primary smelting uses coal-generated electricity. Air pollution from primary smelting includes hundreds of thousands of tons of carbon monoxide and carbon dioxide, as well as sulfur dioxide and nitrogen oxide, contributors to smog and acid rain. Perfluorocarbons, potent greenhouse gases which linger in the atmosphere for thousands of years, are also released by primary smelting.



When California raised the refund value on cans from 2.5¢ to 4¢, recycling jumped from 70% to 75%.



Chor Sakunthea/REUTERS © 2001
A family affair: one cent per can in Phnom Penh, Cambodia.



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Site of Kárahnjúkar dam, Iceland. It will inundate 57 square kilometers of pristine wilderness to generate hydropower to run an Alcoa smelter.