

SUSTAINABLE  
STEEL

- 92% of steel is recycled in the US each year. That's more than paper, glass and plastic combined.
- For every ton of steel recycled, 2500 pounds of iron ore, 1400 pounds of coal and 120 pounds of limestone are conserved.
- Since 1990, technical advances in steel production have reduced energy intensity by 27% and CO2 emissions by 33% per ton of steel produced
- Steel is the world's most recycled material, with 80 million tons recycled annually in the United States alone.
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Steel is recyclable and durable. Many water storage tanks have been in continuous use for more than 100 years.



## Steel Facts

NUMBER 5

## Sustainable Steel

**A point of pride**

Environmental and resource conservation issues rose to prominence in the public policy arena in the 1970's. Now, in the 21<sup>st</sup> century, managing resources sustainably is a growing concern.

While legislation and regulation are often sources of controversy, the US Congress recognized the importance of sustainable manufacturing with Senate Resolution 251 in 2011, "Expressing support for improvement in the collection, processing, and consumption of recyclable materials throughout the United States."

According to a 2011 study, almost 55% of US businesses now have a formal sustainability strategy.



*92% of steel is recycled in North America each year, more than paper, aluminum, plastic and glass combined.*

It's a point of pride for the steel industry that it has always been in the forefront of sustainable manufacturing.

**Highest recycling rate**

Steel is the world's most recycled material, with 80 million tons recycled annually in the United States alone. Ninety-two per cent of steel is recycled in North America each year, more than paper, aluminum, plastic and glass combined.

Steel products are among the most recycled consumer goods: the recycling rate for cars is 95%, for appliances more than 90% and for steel packaging 71%.

For every ton of steel recycled, 2500 pounds of iron ore, 1400 pounds of coal and 120 pounds of limestone are conserved, as well as the energy to mine these resources.

**Reducing "embodied energy"**

Embodied energy includes the manufacture, shipment, transport, and all other aspects of producing a product.

Since 1990, technical advances



*Steel can be recycled repeatedly without loss of its inherent strength and durability.*

in steel production have reduced energy intensity by 27% and CO2 emissions by 33% per ton of steel produced.

Steel's embodied energy is lower than most other materials due to its high recyclability, reduced energy intensity, re-processing of manufacturing by-products, and the inherent strength and durability that gives steel high life-time value.

**Scrap for sustainability**

Steel scrap is the single largest source of raw material for the fabrication industry. Not only does this conserve resources, it makes economic sense to save the costs of mining and processing raw ores.

The industry recycles its by-products, too. Mill scale, steelmaking slags, water and

processing liquids are all treated and returned to the manufacturing stream.

### Technology for sustainability

Over recent decades, the industry has designed furnaces specifically to consume steel scrap. Contemporary technologies produce steel in two ways, both of which require old steel to make new:

- The basic oxygen furnace (BOF) process uses 25-30% old steel to make new.
- The electric arc furnace (EAF) process uses more than 80% old steel to make new. It produces products— such as structural beams, steel plates, and reinforcement bars— whose major required characteristic is strength.

These days, steel recycling is close to the limits of the laws of physics. That's why the steel industry continues to invest dollars in research and development of new production and recycling processes.

### Saving energy with recycling

The steel and iron industries enjoy an "open-loop" recycling capability, meaning that available scrap typically goes to the closest melting furnace. This allows energy savings on transportation, too.



*Steel is strong and durable. This steel water storage tank in Aberdeen, Mississippi, has been in continuous use for more than 100 years. STI/SPFA's Century Club recognizes many tanks like this throughout the US.*

Open-loop recycling allows, for example, an old car to be melted down to produce a new soup can. Then, as the soup can is recycled, it's melted down to produce a new storage tank, new steel pipe, a new bridge, a new car, or a new appli-

ance. New steel products contain a minimum of 25% recycled content. There are nearly 20,000 steel consumer goods recycling options in the United States. Manufacturing scrap is also recycled into the steel stream over and over, making steel a highly sustainable material.

### Inherent physical qualities extend steel's value

Fabricated steel products have high life-time value, too. For example, there are many steel water storage tanks and pipes that have been in continuous use for 100 years or more.

Steel's recyclability reduces life cycle costs. After a tank or pipe has met its desired lifespan, the steel it contains has value in the steel scrap market.

Steel is three times stronger than plastic under external pressures, making it a safer, longer-lasting option than plastic for storage tanks and infrastructure pipes. It's also more elastic, so it can expand and contract without cracking; at the same time, its inherent hardness resists penetration.

Steel can be repeatedly recycled without losing these characteristics.

### You can feel good about steel

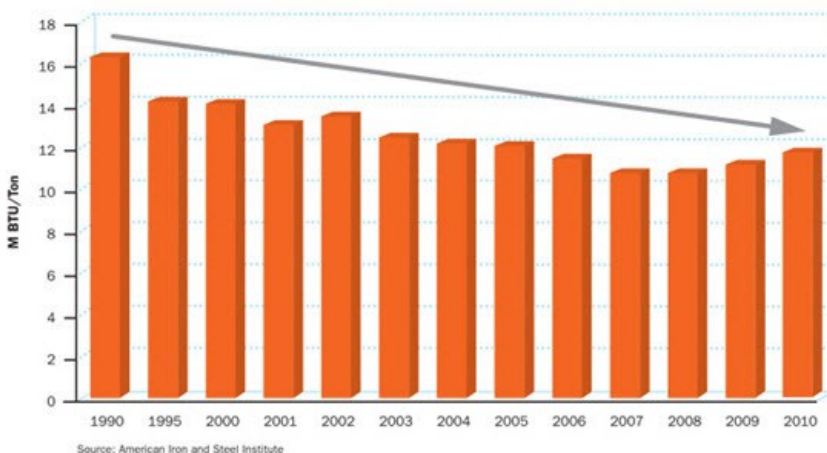
We must all be conscious of conserving our resources and protecting our environment.

That's why steel is the material of choice for fabricated products and infrastructure: When you buy steel you're *always* buying recycled, contributing to sustainable business practices.

### Sources

- AISI, "Profile of the American Iron and Steel Institute," 2013
- KPMG, "Corporate Sustainability: A Progress Report," April 2011
- Steel Recycling Institute, [www.recycle-steel.org](http://www.recycle-steel.org)

The Steel Industry Improved its Energy Efficiency by 27% Since 1990



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