

The Recycled Rubber Industry: America's Most Successful Recycling Story



Report developed by:

RECYCLED 
RUBBER COALITION

December 2022

One Billion Stockpiled Tires: How America Recycled Them All

Rubber products are designed to be long-lasting, providing consumers with valuable, cost-effective goods. Because they are so durable, however, rubber items can be difficult to dispose of responsibly—that's where recycling comes in.

As recently as the 1990s, the majority of end-of-life tires (ELTs) in the U.S. were dumped into landfills or illegally discarded, with little to no recycling occurring ([EPA](#)). Discarded tires, whether in regular landfills or illicit dumps, were often breeding grounds for mosquitos, rats, and diseases carried by these pests, creating serious health hazards for communities. In the 1980s, it was estimated that more than a billion ELTs were being housed in stockpiles ([USTMA](#)).

Due to the environmental and public health effects of illegal tire dumping, the U.S. government began a serious push in the 1990s to clean up the hundreds of millions of illegally scrapped tires ([EPA](#)).

This effort jump-started the rubber recycling industry that we know today and led to the recovery of hundreds of millions of ELTs across the country.

From the mid-1990s to the mid-2000s, the U.S. led the world in rubber recycling or secondary use of rubber. American companies drove the innovation needed to help tires come closer to a circular life cycle, which is marked by the product's ability to be put into reuse once its original purpose is served. After the government's initial push, the private sector took the lead and, with assistance from government and NGO clean-up programs, decreased the U.S. backlog of stockpiled scrap tires by over 95% from 1990 to 2021 ([USTMA 2021 U.S. Scrap Tire Management Summary](#)).

Once recycled, rubber can be turned into many beneficial products with a variety of applications.

Today, most rubber is recycled into crumb rubber which can then be used as infill in playgrounds, sports fields, or as a mixing agent in surfacing such as flooring, poured-in-place rubber, and race tracks. Other companies have also seen success using recycled rubber in building materials such as advanced flooring, rubberized concrete, paver stones, and more.

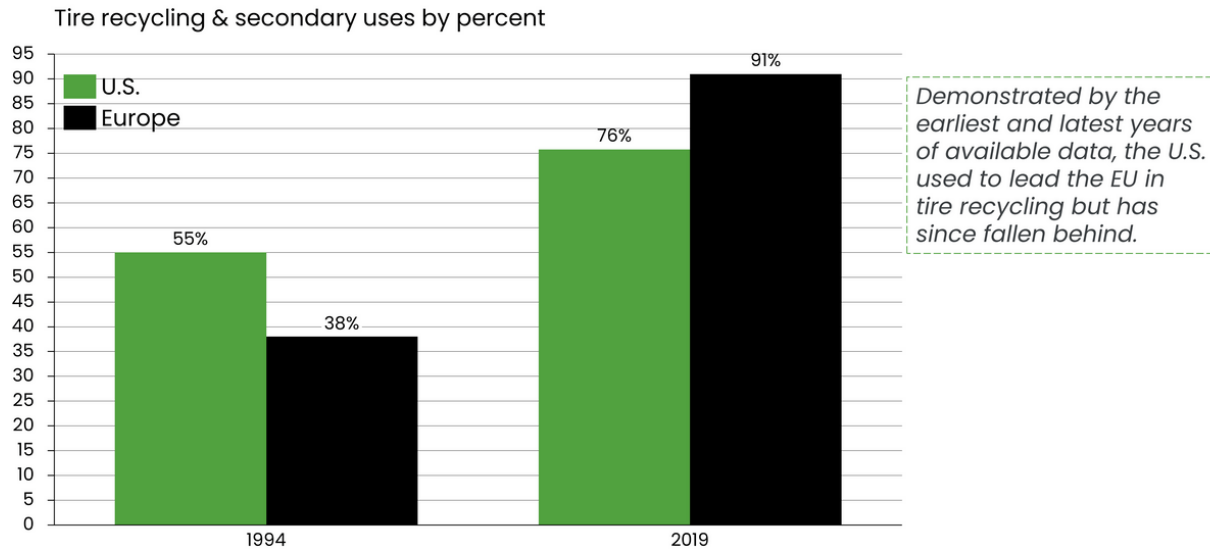


Fig. 1. Source: U.S. Tire Manufacturers Association, European Tyre & Rubber Manufacturers Association

Despite the incredible efforts to recycle the stockpiles of tires, America has lost its edge in global tire recycling in recent years. For instance, in 2019 (the most recent year data is available for both Europe and the U.S.), Europe recycled 91% of its ELTs (ERTMA) while America was only able to recycle 76%, a 21% decrease from the U.S. peak just a few years prior (see Fig. 2) (USTMA).

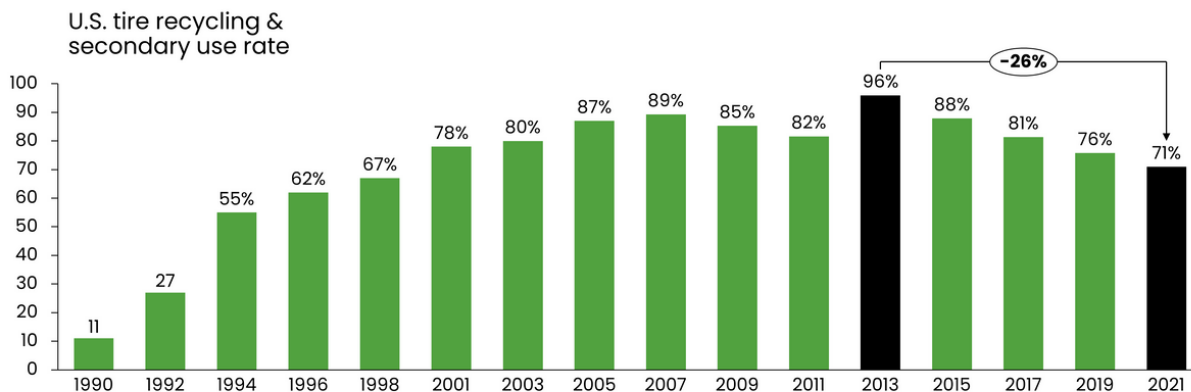


Fig.2. Source: U.S. Tire Manufacturers Association, European Tyre & Rubber Manufacturers Association

The main reason for this decline is that tire production has been outpacing the potential markets for recycled rubber, so there are limited real-world uses for recycled tire products in the U.S. The industry is ripe for expansion, as experts agree that recycled rubber products are safe, and environmentally friendly options that often have significant performance benefits.

The industry is able to recycle far more rubber tires than there are current uses for recycled rubber. The supply is there, but if a sustainable economy is the goal, policymakers need to explore additional usage to increase demand for recycled materials.

Current State Of Recycled Rubber: An Industry Primed For Expansion

Each year, almost 300 million scrap tires, estimated to be over six billion pounds, are generated in the United States—that's more than the average weight of every elephant in the world combined. Rubber recyclers and end-market users are critical to finding a secondary life for those millions of tires. This system of recovery, recycling, and secondary usage keeps more than 220 million tires out of landfills each year and supports nearly 8,500 jobs with an estimated economic impact of \$2.47 billion, a marked improvement from before rubber recycling began (ISRI Scrap Industry Yearbook 2019).

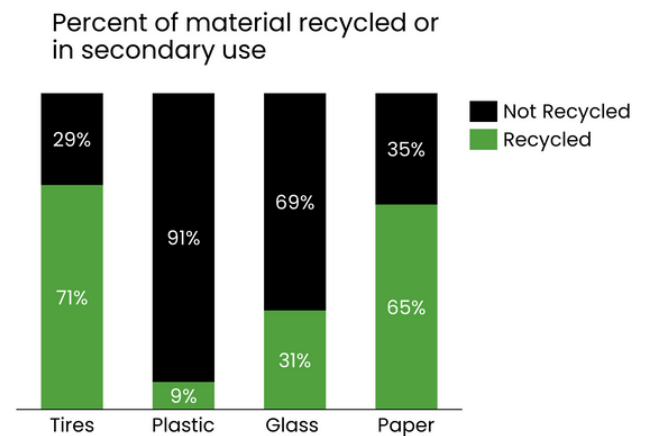


Fig.3. Sources: Environmental Protection Agency, U.S. Tire Manufacturers Association. All data from 2018–2021.

However, with the number of ELTs generated rising by 7% annually, the rubber recycling industry is not able to keep up with the rapidly growing supply ([TriplePundit](#)). According to the U.S. Tire Manufacturers Association (USTMA), the limited number of end markets for recycled tires remains one of the strongest limiting factors in preventing the industry from reaching a higher recycling rate. "In just 30 years, we eliminated nearly one billion tires that were stockpiled around the country—but since then, progress has stalled and we have failed to keep up with the growing number of tires," said Stratton Kirton, spokesperson of the Recycled Rubber Coalition.

Case Study: RMA In The U.S.

A perfect example of a promising end-market for recycled tires, that otherwise have limited field use, is rubber modified asphalt (RMA).

In many instances, the first step to recycling ELTs is to remove the metal components of the tire and grind the remaining rubber into "crumb rubber." Crumb rubber can then be combined with traditional asphalt materials to produce RMA.

RMA has a host of benefits compared to traditional asphalt

"However, through enacting the right policies and incentives, America can once again become the number one tire recycler in the world."

The industry needs consistent support from policymakers, industry leaders, and the public to expand the market for recycled tire materials. By supporting the recycling industry, these stakeholders can play a critical role in keeping tires out of landfills and illegal dumping sites that cause serious environmental harms while also creating more durable products for consumers.

mixtures alone such as increased longevity, pavement noise reduction, optimized surface grip, lifetime cost savings, and emissions benefits ([USTMA RMA State of Knowledge Report](#)).

RMA is just one type of modified asphalt. Asphalts can be modified by multiple materials and methods, and modified asphalts are often generically called "polymer modified asphalts."

Due to the myriad benefits RMA offers over traditional asphalt, state and local governments have been experimenting with the use of RMA in the U.S. since the 1960s. However, extensive market adoption of RMA has yet to occur. RMA currently constitutes less than 20% of modified asphalts globally, with much of that concentrated in a few particular areas ([Asphalt Pro](#)).

Transportation agencies often limit potential RMA use applications, resulting in unintended consequences throughout the supply chain. Despite RMA's benefits over polymer modified asphalts, such as increased resistance to potholes, contractors often use polymer modified asphalts instead of RMA since it is approved for more applications ([Asphalt Pro](#)).

However, change is coming. More and more states, such as Florida, Louisiana, and Tennessee, are approving RMA for wider uses and enabling broader RMA adoption ([Asphalt Pro](#)).

Leveraging RMA in ongoing infrastructure investments is a critical avenue to ensuring those projects are high-quality and long-lasting; additionally, increasing the use of RMA in the U.S. could be a game changer for the recycled rubber industry. By expanding an existing, but limited, market for recycled rubber, there is the potential to help the U.S. get back to leading the world in tire recycling.

Next Generation Use Cases

In addition to RMA, the tire and tire recycling industries are putting efforts into the development of new markets and emerging technologies that leverage recycled rubber products.

Micronized Rubber Powder / Carbon Black: Carbon black is a virtually pure elemental carbon in

the form of fine powder or pellets. Carbon black is an essential component in the production of rubber and plastic, and is in the top 50 industrial chemicals manufactured worldwide (ICBA).

Recent technological advances have enabled recovered carbon black (rCB) to be derived from ELTs. This advancement will enable tire manufacturers to take used tires and transform them into rCB to produce new tires without any performance issues ([Recycling News](#)). While still a costly endeavor, the process of turning ELTs into rCB is becoming increasingly economically viable and will be another big step toward a circular economy. Michelin, Bridgestone, and Continental all already use rCB to produce new tires, and as costs continue to decrease, manufacturers will likely be able to expand rCB adoption ([USTMA](#)).

Crumb Rubber Concrete: Crumb rubber, or rubber produced from scrap tires, can be used as a partial replacement for fillers such as gravel and sand. When used in concrete mixtures, this produces a material called rubberized concrete.

Having a more sustainable alternative to concrete is imperative to addressing climate change. While concrete is great for infrastructure because of its versatility and durability, the concrete industry also accounts for at least 8% of human-caused emissions ([Nature](#)). Rubberized concrete is not only viable for use in most construction projects, it also recycles end-of-life tires in concrete, conserving valuable natural resources, and reducing the environmental impacts of concrete compared to traditional mixes ([Eltayyed et al.](#)).

By investing in research, emerging use cases, such as micronized rubber powder/carbon black and crumb rubber concrete, could become important new markets for ELTs. Investing in the development of these markets is an important step on the path to rubber circularity, as well as a step toward ensuring that the U.S. is leading the world in reducing tire waste through recycling.

Policy Recommendations

Sustainable practices are only going to become more of a priority for government and consumers alike. Bolstering the rubber

recycling industry is a logical next step for policymakers, especially considering that the U.S. used to lead the way on circularity for rubber products.

In order to make America the leader in circularity once again, the public and private sectors must work together to implement policies that increase the number of tires recycled.

Below are a series of policies that, if adopted, could have swift, positive impacts on the tire recycling industry in America.

Federal:

- Increase Research Funding: The U.S. EPA and Department of Energy should prioritize grants for expanding the uses of recycled rubber—similar to existing programs for plastics recycling. Prioritizing research that supports market expansion is a necessary step to help the industry achieve higher levels of recycling and secondary use, ensuring the industry can increase recycling rates.
- Enforce U.S. Standards: While all U.S. tires adhere to high safety standards, tires from other nations with lower environmental standards often contain harmful chemicals. To keep recycled rubber safe, the U.S. should ensure that any imported rubber meets U.S. chemical and material standards to ensure that rubber can be recycled safely.
- Establish Preference in Federal Purchasing: The EPA maintains a list of recycled products that gain preference in federal procurement. While some recycled rubber goods have been included on the list, more should be added. There are many more areas where the federal government can use recycled scrap tire products to cut waste and emissions.

State and Local:

- Implement New Tire Fees: Only 35 states have imposed fees on new tires. These fees are critical to funding new recycled rubber research and products, while also reducing illegal tire dumping. All 50 state governments should enact a fee of at least \$1.50 on all new tires purchased and use the funds generated on recycling and cleanup grant programs.
- Create Tax Incentives For Equipment and Facilities: Rubber recycling facilities create good-paying jobs and are centers of manufacturing and innovation in many communities. State and local governments should provide tax incentives for facility construction and the purchase of new equipment, such as tire shredders.

Call To Action

By leading on rubber recycling, the U.S. has the opportunity to lead on environmental stewardship at home and drive toward a more circular global economy. This is not only a chance to do right by the environment, but also an opportunity for policymakers to encourage the growth of good-paying jobs and position American companies at the center of international sustainability efforts.

The rubber recycling industry has done its part in proving its scale and continues to develop next-generation forms of recycling. Now, policymakers have the opportunity to enact a set of complementary policies to help bring rubber recycling in America to the next level and lead the future.

By leading on rubber recycling, the U.S. has the opportunity to lead on environmental stewardship at home and drive toward a more circular global economy.

Visit the Recycled Rubber Coalition's [website](#) to learn more about emerging uses for recycled rubber and how rubber recyclers play an important role in the circular economy.

Please reach out to the Coalition's spokesperson, K. Stratton Kirton, at Stratton.Kirton@pentagroup.co with any questions.