Managing End-of-Life Tires

www.wbcsd.org/web/tires

About the WBCSD

The World Business Council for Sustainable Development (WBCSD) brings together some 200 international companies in a shared commitment to sustainable development through economic growth, ecological balance and social progress. Our members are drawn from over 30 countries and 20 major industrial sectors. We also benefit from a global network of about 60 national and regional business councils and partner organizations.

Our mission is to provide business leadership as a catalyst for change toward sustainable development, and to support the business license to operate, innovate and grow in a world increasingly shaped by sustainable development issues.

Our objectives include:

Business Leadership – to be a leading business advocate on sustainable development;

Policy Development – to help develop policies that create frameworks conditions for the business contribution to sustainable development;

The Business Case – to develop and promote the business case for sustainable development;

Best Practice – to demonstrate the business contribution to sustainable development and share best practice among members;

Global Outreach – to contribute to a sustainable future for developing nations and nations in transition.

Fast facts on end-of-life tires (ELTs)

- One passenger tire is discarded each year in the developed world
- 1 billion end-of-life tires are generated globally each year
- An estimated 4 billion end-of-life tires are currently in landfills and stockpiles worldwide
- They are a resource that can be used in place of other materials, reducing natural resource depletion and lowering environmental costs associated with natural resource extraction
- End-of-life tires can replace traditional fossil fuels in some applications and may reduce NOx, SOx and CO2 emissions
- They can also be used in civil construction projects as aggregate or crumb rubber, and as a substitute for coal in steel plants
- Their recovery rate is now more than 85% for Europe, the US and Japan

One billion tires reach the end of their useful lives every year. Recovery of end-of-life tires reduces waste and provides a fuel and material resource that can replace other scarce natural resources. Cooperation between tire manufacturers, retailers and governments is essential if end-of-life tires are to be managed sustainably. This brochure summarizes the current status of end-of-life tire management practices and how important issues are being addressed today.
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This brochure was produced by member companies of the WBCSD Tire Industry Project:

More on end-of-life tires can be found at www.wbcsd.org/web/tires or from tires@wbcsd.org

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Summary
Flame-retardant and moth-resistant material is used in the production of ELTs. This material reduces the potential for fires and infestation. Even if safe for landfill, an ELT can be a source of fire if not properly disposed of. It can also cause severe injuries to workers who become trapped in the tire during recovery operations.

Why use ELTs?

ELTs can be a very cost-effective source of fuel when located near a major fuel consumer, such as a power plant or cement factory. They can also be readily converted for a diverse range of construction and industrial uses, as well as transportation. ELTs can be used instead of fossil fuels or other high-cost waste fuels and other energy sources, and for associated labor needs. The benefits of ELTs are significant. ELTs are a renewable resource since tire production is a by-product of the manufacturing process. ELTs have a high fuel value and materials are recoverable. ELTs can also be processed for a diverse range of construction and industrial uses, including cement making, as a low-cost source of fuel, and as raw materials for products such as tire rubber, steel cord, natural rubber, and steel. ELTs can also be repurposed and used in the following applications:

- Fuel: ELTs can be used as fuel in cement kilns, thermal power stations, pulp and paper production, and in vehicle transportation sectors. ELTs can also be used to replace fossil fuels in the production of cement, paper, and artificial leather.

- Rubber and plastic: ELTs can be used as raw materials in the production of rubber and plastic goods, such as tires, shoes, and other products. ELTs can also be used as raw materials in the production of rubber and plastic goods, such as tires, shoes, and other products.

- Biodegradable materials: ELTs can be used in the production of biodegradable materials, such as biodegradable plastics and biodegradable rubber. ELTs can also be used as raw materials in the production of biodegradable materials, such as biodegradable plastics and biodegradable rubber.

- Energy recovery: ELTs can be used as an energy source in the production of cement, paper, and artificial leather. ELTs can also be used as raw materials in the production of biodegradable materials, such as biodegradable plastics and biodegradable rubber.

- Other uses: ELTs can be used for a variety of other purposes, such as construction materials, lubricants, and smokeless tobacco. ELTs can also be used as raw materials in the production of biodegradable materials, such as biodegradable plastics and biodegradable rubber.

What do ELT recovery rates compare with other products?

Recycling recovery rates for ELTs are comparable to those of economic growth. ELTs have a high fuel value and materials are recoverable. ELTs can also be processed for a diverse range of construction and industrial uses, including cement making, as a low-cost source of fuel, and as raw materials for products such as tire rubber, steel cord, natural rubber, and steel. ELTs can also be repurposed and used in the following applications:

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Energy recovery

Tire-derived fuel (TDF) instead of virgin fossil fuels reduces those of other fuels. In some situations, using ELTs as a fuel provides economic and environmental benefits. ELTs can be used as a low-cost source of fuel in cement kilns, as a substitute fuel in thermal power stations, and as a raw material in the production of biofuels. ELTs can also be used as a low-cost source of fuel in cement kilns, as a substitute fuel in thermal power stations, and as a raw material in the production of biofuels.

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Material recovery

Why can ELTs be used for recycling?

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Sustainability of ELTs (after any government environmental agency involvement) is discussed in detail in Chapters 3 and 4. In the latter part of the century, tire disposal, tire recycling, and tire waste management have been primary topics of discussion.
The environmental impact of a tire

The environmental impact of a tire is a complex issue due to the production and disposal phases. A tire is made from a mixture of materials, including rubber, steel, and synthetic compounds, which are extracted, processed, and then manufactured into the final product. Over 80% of a tire’s total life cycle emissions come from its production stage, which includes raw material extraction, manufacturing, and transportation. These emissions are primarily due to energy-intensive processes such as petroleum refining, chemical production, and steel manufacturing.

Once a tire reaches the end of its useful life, it is discarded, and its disposal can have significant environmental impacts. Tires are typically sent to landfills, where they can take up valuable real estate and contribute to methane emissions as they decompose. Alternatively, tires may be incinerated, which releases dioxins and furans, a group of toxic chemicals that are harmful to human health and the environment.

What is an ELT?

ELT stands for End-Of-Life Tire. It refers to a tire that has reached the end of its useful life due to wear and tear or safety reasons and is no longer suitable for use on a vehicle. ELTs are typically collected and recycled or repurposed for various applications to reduce waste and environmental impact.

Why use ELTs?

ELTs can serve a new use for a tire that has outlived its usefulness. They can be a cost-effective and sustainable alternative to virgin raw materials. ELTs can provide energy, materials, and other resources for various applications, including construction, transportation, and environmental remediation.

Developed economies

Developed economies generate most of the ELTs, as they have a greater number of vehicles in use. Over the last 15 years, recovery rates in EU28 have dramatically increased from 19% to 82% in 2017. Some countries, such as Japan and Canada, have had ELT recycling and reuse programs in place for over 15 years. Others, like the US and Brazil, have seen a significant increase in ELT recovery due to increased public awareness and government initiatives.

Tire manufacturers have promoted ELT as a resource by encouraging ELT management, which has been particularly strong in countries with high tire usage rates. In 2017, EU recovery rates reached 82%.

Developing countries

Developing countries generally have lower recovery rates due to a combination of factors, including lack of infrastructure, limited resources, and inadequate waste management. However, some developing countries, such as Brazil, have implemented ELT recycling programs to manage waste and reduce environmental impact.

What can ELTs be used for?

ELTs can be used in various applications, including civil engineering, material recovery, and waste management. They can provide energy, materials, and other resources for various applications, including construction, transportation, and environmental remediation.

Energy recovery

While harmful and toxic fumes can be used to generate electrical and thermal energy, ELTs are not typically considered as a mainstream source of energy. However, ELTs can be processed into fuel oils, pyrolysis oils, or biofuels, which can be used as alternative transportation fuels.

Material recovery

ELTs contain valuable materials, such as steel, rubber, and composites, which can be extracted and repurposed for various applications. Steel from ELTs can be used in the manufacturing of new tires, while rubber can be processed into various materials, such as tire-derived fuel (TDF).

Material derived from ELTs is considered as reuse and is not counted as raw material extraction.

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End-of-Life Tire (ELT) recycling and reuse initiatives have been implemented in various countries to manage tire waste and reduce environmental impact. ELTs can be used in various applications, including civil engineering, material recovery, and waste management. They can provide energy, materials, and other resources for various applications, including construction, transportation, and environmental remediation.

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Some of the environmental impacts of vehicle fuel consumption and carbon dioxide emissions due to burning fossil fuels are the result of vehicle fuel consumption and carbon dioxide emissions due to burning fossil fuels. The bulk of ELTs have been re-treaded or re-grooved. All tires including road wear debris contribute to a lesser degree emissions due to rolling resistance. Tire wear and contamination can no longer be used on vehicles (after having been processed to provide fuel feeds and other minor raw materials, and for associated environmental and economic costs, such as transportation requirements (as tires are moved to processing plants) and energy requirements for many applications. On tires can vary from 0.2% to 5% of the total). In many countries, tires have been regarded as a source of soil contamination to the extent of laboratory tests. Tires managed healthfully and cleanly create no risk. Landfills and incineration now have well-managed management practices in place. For better landfills and incineration now have well-managed management practices in place. For better management practices, transforming expert and “green” tires have those tires being developed to the world’s and tires to encourage before E7 management. Roads has been particularly strong in becoming and evolving with road wear debris. Recent data from Boyd and Kom-31% road safety rate.

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What are tires made of?

What is the world doing with ELTs?

What can ELTs be used for?

What is the environmental impact of ELTs? A variety of stakeholders, including manufacturers, consumers, and regulatory bodies, are involved in the recycling of used tires.

Almost all of the environmental impact of a tire occurs during the use phase, primarily as a result of manufacturing, transportation, and disposal. In the US, tire disposal practices are driven by a variety of factors, including regulatory requirements, economic costs, and infrastructure availability.

Energy recovery

Energy recovery has become a major concern for tire disposal. Since the late 1980s, the tire recycling industry has been working to find alternative uses for used tires. The most common alternative use for tires is for fuel, known as tire-derived fuel (TDF) or tire pyrolysis fuel.

Tire pyrolysis is a process that converts used tires into a liquid fuel. The fuel is then used to generate electricity or heat in power plants or industrial facilities. In addition, tire pyrolysis can be used to produce other valuable products, such as biochar and bio-oil.

Material recovery

Material recovery also plays a role in tire recycling. The rubber in used tires can be processed into various products, including rubberized asphalt, rubberized concrete, and rubberized felts. These products are used in a variety of applications, including road construction, building materials, and industrial goods.

What management practices are used?

Management practices

Management practices for ELT disposal differ by region. Some regions have implemented mandated programs to ensure proper ELT disposal, while others have taken a more voluntary approach.

Government/community responsibility

Government and community stakeholders play a crucial role in ELT management. In the US, government agencies work with tire manufacturers and local communities to develop effective ELT disposal programs. These programs may include financial incentives, public education campaigns, and regulations to ensure proper ELT disposal.

Industry responsibility

Tire manufacturers and retailers also play a role in ELT management. They are responsible for ensuring that ELTs are properly collected, transported, and disposed of in an environmentally responsible manner.

Tire disposal strategies

Tire disposal strategies vary by region and may include recycling, composting, landfilling, or other methods. The choice of disposal method depends on local regulations, availability of alternative uses, and economic considerations.

ELT management approaches are varied. Three main strategies are in place:

- Free market approach
- Government/community responsibility
- Industry responsibility

Free market approach

In free market approaches, the market itself determines the disposal of ELTs. Manufacturers and retailers may choose to collect and recycle ELTs for economic reasons, but also to reduce environmental impacts.

Government/community responsibility

In government/community responsibility approaches, government agencies and communities work together to manage ELTs. This may involve mandates, regulations, and financial incentives to ensure proper ELT disposal.

Industry responsibility

In industry responsibility approaches, tire manufacturers and retailers are responsible for managing ELTs. This may involve collecting ELTs for recycling, composting, or other methods.

Tire disposal options

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In industry responsibility approaches, tire manufacturers and retailers are responsible for managing ELTs. This may involve collecting ELTs for recycling, composting, or other methods.

Tire disposal options vary by region and may include recycling, composting, landfilling, or other methods. The choice of disposal method depends on local regulations, availability of alternative uses, and economic considerations.

Free market approach

In free market approaches, the market itself determines the disposal of ELTs. Manufacturers and retailers may choose to collect and recycle ELTs for economic reasons, but also to reduce environmental impacts.

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Managing End-of-Life Tires

www.wbcsd.org/web/tires

One billion tires reach the end of their useful lives every year. Recovery of end-of-life tires reduces waste and provides a fuel and material resource that can replace other scarce natural resources. Cooperation between tire manufacturers, retailers and governments is essential if end-of-life tires are to be managed sustainably. This brochure summarises the current status of end-of-life tire management practices and how important issues are being addressed today.

Summary

Fast facts on end-of-life tires (ELTs):

- One passenger tire per person is discarded each year in the developed world
- Approximately 1 billion new tires are produced globally each year
- An estimated 4 billion end-of-life tires are currently in landfills and stockpiles worldwide
- They are a resource that can be used to produce a wide range of products, reducing natural resource depletion and lowering environmental costs associated with industrial waste management
- End-of-life tires can replace traditional fossil fuels in some applications and may reduce NOx, SOx and CO2 emissions
- They can also be used in civil construction projects as aggregate in rubber products and as a substitute for coal in steel plants
- The recovery rate is now more than 85% for Europe, the US and Japan

More on end-of-life tires can be found at www.wbcsd.org/web/tires or from tires@wbcsd.org

About the WBCSD

The World Business Council for Sustainable Development (WBCSD) brings together some 200 international companies in a shared commitment to sustainable development through economic growth, ecological balance and social progress. Our members are drawn from more than 30 countries and 20 major industrial sectors. We also benefit from a global network of about 60 national and regional business councils and partner organisations.

Our mission is to provide business leadership as a catalyst for change toward sustainable development, and to support the business license to operate, innovate and grow in a world increasingly shaped by sustainable development issues.

Our objectives include:
- Business Leadership – to be a leading business advocate on sustainable development;
- Policy Development – to help develop policies that create frameworks for the business contributions to sustainable development;
- Best Practice – to demonstrate the business contributions to sustainable development and share best practices among members;
- Global Outreach – to contribute to a sustainable future for developing nations and nations in transition.

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Fast facts on end-of-life tires (ELTs)
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- 1 billion end-of-life tires are generated globally each year
- An estimated 4 billion end-of-life tires are currently in landfills and stockpiles worldwide
- They are a resource that can be used in place of other materials, reducing natural resource depletion and lowering environmental costs associated with natural resource exploitation
- End-of-life tires can replace traditional fossil fuels in some applications and can reduce NOx, SOx and CO2 emissions
- They can also be used in civil construction projects as aggregate or crumb rubber, and as a substitute for coal in steel plants
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