



FIS Waste Management Handbook for Snow Sports Events



INDEX

Introduction.....	3
The Reason Why.....	3
How to Use This Guide.....	4
Section A	5
Document Types of Waste	6
Section B.....	11
Waste Management Strategy	12
Reduce Waste	12
Reuse Materials	18
Minimize Resource Recovery, Incineration and Landfill Use.....	20
Section C.....	22
Waste Handling Plan.....	23
Implement an Effective Waste Handling Plan	23
Section D.....	31
Involve Key Stakeholders.....	32
Annex 1.....	36
Compare the Pros and Cons of Different Materials.....	37
Simplify Your Waste Stream	40
Annex 2.....	41
Support Waste Management with SMART Technologies	42
Monetize Your Waste Management Processes	43

FIS WASTE MANAGEMENT HANDBOOK FOR SNOW SPORTS

Reducing waste throughout the production, processing, and distribution of resources is a major global challenge. It affects several United Nations Sustainable Development Goals (SDGs), especially Goals 1 (No Poverty), 2 (Zero Hunger), and 3 (Good Health and Well-being). To help tackle this issue, the [International Ski and Snowboard Federation \(FIS\)](#) has created this **Waste Management Guide**, promoting better waste management in winter sports.

This guide comes at a crucial time, as an increasing number of sports organizations are beginning to address event waste. Building on the IOC's [Sustainability Through Sport: Implementation of the Agenda for the Olympic Movement for the 21st Century](#), this guide provides step-by-step guidance to help National Ski Associations (NSAs) and Local Organizing Committees (LOCs) reduce waste at their events.

By using this guide and taking action, the snow sports industry has an opportunity to lead the way in low-impact production and consumption, creating a more sustainable future for sports worldwide.

The Reason Why

Poor waste management is a driver of climate change, pollution, and biodiversity loss. Landfills pollute soil and water, while burning waste releases greenhouse gases. A 2016 report by [McKinley](#) found that at large outdoor events, each participant generates nearly 2 kg of waste per day – most of it ending up in landfills. Snow sports events, with large crowds and taking place over short timeframes, face the same challenge.

Effective waste management delivers clear benefits:

- **Environment:** Recycling and reuse can cut global CO₂ emissions by up to 5% by 2030, equal to taking millions of cars off the road.
- **Economy:** Even simple recycling programs can reduce waste costs by 20% and create revenue opportunities, as shown by initiatives like Tecnica's ski boot recycling program.
- **People and Communities:** Waste management creates jobs, improves event experiences, and strengthens community engagement through shared responsibility.

The message is clear: managing waste at snow sports events is not optional – it's urgent, impactful, and brings environmental, economic, and social benefits.

How to Use This Guide

This guide is designed for snow sports events of any size and provides a complete waste management plan to help reduce landfill waste and move towards Zero Waste. It combines practical solutions, clear explanations, and an **ACTION ITEMS** summary to support effective implementation.



The guide is divided into **four main sections**:

- **Section A:** Understanding the types and sources of waste at your event.
- **Section B:** Applying the **six key principles of waste management**, ranked by impact and importance:
 1. Waste Minimization
 2. Repair and Restoration
 3. Reuse of Goods and Materials
 4. Maximum Recycling and Composting
 5. Minimal Incineration
 6. Minimal Landfill Disposal
- **Section C:** Practical steps for handling waste effectively during your event.
- **Section D:** Complementary aspects of waste management, such as education, communication, and stakeholder engagement.

Together, these sections provide both the strategic framework and the practical tools needed to improve waste management at snow sports events.

SECTION



SECTION A

Document Types of Waste

A.1 List and Categorize Waste Items

Create a list of the main functional areas – such as food zones, restrooms, and spectator stands – at your event, similar to the example shown in [TABLE 1](#).

TABLE 1: Examples of Key Functional Areas at Snow Sport Events

FUNCTIONAL AREA	PLASTIC AND PACKAGING FILMS	GLASS	METAL	PAPER	WOOD	FOOD WASTE	LIQUIDS, CHEMICAL WASTE, BATTERIES, OIL, AND OTHER WASTE
Checkpoints and Inspection Zones	Bottles, food packaging, medical supply packaging waste	Bottles	Aluminum cans	Food and medical supply packaging waste	N/A	Food waste and residues	Liquids
Public Eateries	Bottles, packaging, and plastic cutlery	N/A	Cans	N/A	N/A	Food waste, residues and compostable cutlery	Cleaning products, used vegetable oil, and fat
Logistic Areas	Packaging waste from goods and equipment, including plastic film and foam	N/A	Metal structures and fasteners	Paper, cardboard, and corrugated packaging	Boxes and pallets	N/A	Oiled rags and sorbents; batteries (from walkie-talkies, flashlights, and equipment); broken electronic devices (radios, scanners, power banks); leftover wristbands, tickets, event credentials; spent fuel canisters (heating and snow machines); used motor oil and lubricants (snowmobiles, maintenance vehicles); empty de-icer and salt bags; lost or damaged gloves, hats, and jackets; used towels and blankets; broken ski poles, snowboards, ice skates; damaged signage, banners, and promotional materials; used zip ties, rope, and tape (setup and takedown)
Medical Service Area	Plastic packaging and dishes	Bottles and glasses	Cans and broken medical equipment	N/A	N/A	N/A	Medical waste (bandages, gauze, bodily fluid-contaminated items); vomit bags and contaminated clothing; disinfectant and antiseptic solutions; expired or used medical sprays (pain relief, cold sprays)
Equipment Control and Maintenance	Empty wax containers and applicators; old or damaged padding and foam inserts; packaging materials (plastic wrap, cardboard); protective covers; broken storage containers	N/A	Metal filings; broken or worn-out bindings, screws, and fasteners	Cardboard boxes	N/A	N/A	Broken or damaged skis, snowboards, and bindings; worn-out ski poles and boots; used ski wax, shavings, and residue; used disposable rags and cleaning cloths; used adhesives, glues, and epoxy materials

ACTION ITEMS

- **Identify Key Functional Areas:** Use a map of the event area to pinpoint key functional areas where waste will be generated.
- **Analyze Event Activities:** For each functional area, list the types of waste expected to be produced by considering key activities.

A.2 Categorize Event Waste for Better Management

Each waste type listed in **Step A.1** must be managed and collected separately. How this waste is managed and collected is dependent on the composition of the waste.

Using the information in **TABLE 2**, organize the waste items identified in **Step A.1** into a new table, which will be referred to as the waste classification table. For additional guidance, refer to **TABLE 3** (note that this example is a general guide and not exhaustive). You will be referring to your waste classification table throughout this guide.



TABLE 2: Criteria for Classifying Waste

WASTE PROPERTIES	QUESTIONS TO ASK
Physical State	Are the waste items solid, liquid, or gas?
Materials	What materials are the waste items composed of? E.g., glass, paper, plastic, and organic material.
Properties	Is the waste hazardous, biodegradable, general garbage, or recyclable? These waste types are defined below.
Hazardous Waste	Hazardous waste is waste that is dangerous or harmful to human health or the environment (e.g., chemicals, and batteries). Hazardous waste can be further categorized as follows: • Ignitable Waste (Flammable): Easily catches fire under normal conditions. • Examples: Solvents, alcohol-based cleaners, gasoline, and oil-based paints. • How to Identify: Check for labels with “flammable,” “combustible,” or a fire hazard symbol. • Corrosive Waste: Can dissolve materials or cause severe burns to the skin. Often has a very high or low pH. • Examples: Battery acid, drain cleaners, and rust removers. • How to Identify: Look for “corrosive” warnings or extreme pH levels (below 2 or above 12.5). • Reactive Waste: Unstable under normal conditions; may explode or release toxic gases when mixed with water or other substances. • Examples: Some pesticides, peroxides, and lithium batteries. • How to Identify: Check safety data sheets (SDS) for “reactive” or “unstable” warnings. • Toxic Waste: Harmful to humans and the environment, even in small amounts. Can leach into soil and water. • Examples: Lead and alkyd paints, pesticides, mercury-containing lamps, and certain medications. • How to Identify: Look for hazard labels, toxic symbols, or chemical ingredient lists.
Biodegradable Material	Organic waste is biodegradable. This includes food scraps, lawn clippings, leaf litter, and coffee grounds.
Recyclables	These are items that can be converted into new materials and objects through commercial or government recycling services. You can check an item’s material composition to determine whether it is recyclable. Items such as glass, paper flyers, and posters, cardboard, some hard plastics, and metal are all recyclable. Specialist recycling services also exist for various objects, including batteries, electronic waste, plastic bags, and chemical containers.
General Garbage	This includes waste that cannot be recycled, reused, or sold second-hand. Examples include polystyrene, some soft plastics, broken crockery, textiles, and streamers. Your goal is to minimize the amount of general waste created by your event.

TABLE 3: Example of a Waste Classification Table

WASTE PROPERTIES		HAZARDOUS WASTE				BIODEGRADABLE MATERIAL				RECYCLABLES				GENERAL GARBAGE			
Food Zones	Waste Identification	Cleaning Products				Waste Identification				Waste Identification				Waste Identification			
	Physical State	Liquid				Physical State				Physical State				Physical State			
	Usage	Cleaning				Usage				Usage				Usage			
	Material (Toxicity Classification)	Ammonia (Corrosive and Toxic), Chlorine (Corrosive and Toxic), and Sodium Hydroxide (Corrosive)															
Areas for the Sale of Goods and Provision of Non-Food Services	Waste Identification					Waste Identification				Waste Identification				Waste Identification			
	Physical State					Physical State				Physical State				Physical State			
	Usage					Usage				Usage				Usage			
	Material					Material				Material				Material			
Media Center and Organizer Activity Areas	Waste Identification					Waste Identification				Waste Identification				Waste Identification			
	Physical State					Physical State				Physical State				Physical State			
	Usage					Usage				Usage				Usage			
	Material					Material				Material				Material			
Design and Signage	Waste Identification					Waste Identification				Waste Identification				Waste Identification			
	Physical State					Physical State				Physical State				Physical State			
	Usage					Usage				Usage				Usage			
	Material					Material				Material				Material			

ACTION ITEMS

- **Create a Waste Classification Table:** Refer to [TABLE 3](#) and include the following information for each waste item listed in [Step A.1](#)
 - The physical state of the waste item (solid, liquid, gas).
 - The usage of each waste item.
 - The properties of each waste item.
 - The materials that make up each waste item.
 - Identify any hazardous waste items and classify them as ignitable, corrosive, reactive, or toxic.
- **Use Your Classification Table:** The information gathered in your waste classification table will be referred to throughout this guide. This table will help you, and your team, determine the types of waste produced during the event and how to handle each waste item properly.

CASE STUDY

2025 FIS Nordic World Ski Championship in Trondheim, Norway

The organizers of the 2025 FIS Nordic World Ski Championship in Trondheim set two ambitious waste management goals: to generate no more than 97 tons of waste and to achieve a 70% waste sorting rate.

To meet these targets, organizers focused on reducing waste at the source, reusing materials when possible, and carefully sorting the remaining waste to recover valuable resources for recycling into new products.

A key part of this effort was tracking and categorizing waste throughout the event. The identified waste streams included plastic, food waste, cardboard and paper, general residual waste, deposit bottles and cans, and glass and metal packaging. By categorizing the waste items, the organizers were able to effectively track and manage their waste reduction efforts.

SECTION

PB

SECTION B

Waste Management Strategy

Reduce Waste



The most effective waste management strategy is waste minimization. By reducing waste, you will lower collection costs, conserve resources, and minimize your event's environmental impact. Follow the steps below to strengthen your waste reduction efforts.

B.1 Identify Waste Items to Remove from the Event

Begin by reviewing your list of waste items identified in [Section A](#) to determine which can be avoided. To help you with this step, consider the below strategies for waste reduction:

- Set up water refill stations so attendees can refill their own bottles (see [Step B.8](#)).
- Serve food with compostable plates and bamboo cutlery (see [Step B.8](#)).
- Offer reusable plates and cutlery for on-site dining (see [Step B.8](#)).
- Buy supplies in bulk to reduce packaging waste.
- Donate leftover food to charities.
- Serve drinks in pitchers instead of single-use bottles.
- Provide condiments in bulk dispensers rather than individual packets.
- Use reusable signage with changeable details like dates.
- Opt for digital tickets or encourage RFID wristbands to reduce paper ticket waste.
- Make announcements verbally instead of handing out printed instructions.
- Replace paper or plastic confetti with biodegradable options like rice or flower petals.
- Decorate with reclaimed or recycled materials.
- Use recycled paper for any necessary printed materials.
- Set up a deposit system for reusable containers to encourage returns.
- Avoid unnecessary giveaways or choose sustainable materials for any giveaways.
- Provide reusable name tags and collect them after the event.
- Include a reusable event-branded cup in the ticket price to reduce disposable cup use.
- Send electronic invitations and documents instead of paper.
- Use duplex printing and smaller fonts when printing is necessary.
- Reduce or eliminate disposable straws, tea bags, and sugar stirrers.
- Use paper or cardboard packaging over plastic, or ensure all plastic packaging is recyclable (e.g., PET or PP).
- Limit promotional items and reduce the number of sponsor flyers.
- Use digital tools like email and video calls for communication instead of paper.
- Install hand dryers instead of paper towels in bathrooms.
- Aim to eliminate single-use plastics, as discussed in [Step B.3](#).

ACTION ITEMS

- **Implement Waste Reduction Strategies:** Implement the strategies listed above to reduce waste at your snow sports event.
- **Review and Further Minimize Waste:** Review the waste items identified in [Section A](#) and identify any further ways waste can be reduced at your event.

B.2 Give Special Consideration to Food Waste

Food waste is a major global problem, contributing approximately 8% of worldwide greenhouse gas emissions. The primary causes of food waste are overproduction and leftover meals. Therefore, the action items in this step focus on addressing these key factors.

ACTION ITEMS

- **Educate and Communicate:**
 - Teach vendors, customers, and staff about portion control and waste reduction.
- **Control the Menu:**
 - Offer different portion sizes and menu options to suit various tastes.
 - Use demand forecasting to predict food needs more accurately:
 - Analyze past attendance data.
 - Consider factors like ticket sales and weather.

- **Implement Flexible Menu Planning:**
 - Offer more made-to-order food to reduce waste from pre-prepared dishes.
 - Use ingredients that can be repurposed across multiple dishes.
- **Monitor Food Quality:**
 - Buy food from trusted, ethical suppliers to ensure quality and reduce waste.
 - Choose local and seasonal food to ensure freshness.
- **Compost and Recycle:**
 - Set up compost bins for unavoidable food scraps.
 - Partner with local farms or composting facilities to turn waste into fertilizer.
- **Redistribute and Donate Waste Food:**
 - Work with food rescue organizations like [WRAP EU](#) to donate surplus food.
 - Partner with local shelters and charities to distribute unsold but still safe-to-eat food.

CASE STUDY**2023 FIS Alpine World Ski Championships in Courchevel and Méribel, France**

The 2023 FIS Alpine World Ski Championships in Courchevel and Méribel, France, took significant steps to reduce food waste. One key initiative was sourcing local and seasonal produce, which ensured fresher food and reduced emissions from transportation.

As part of their sustainability efforts, staff were also trained to implement effective waste management and reduction initiatives. These initiatives helped support the event's larger goal of preserving the surrounding natural sites and green spaces, and reducing food waste played a crucial role in this effort.

CASE STUDY**2024-2025 FIS Nordic Combined for Change**

For the 2024–2025 World Cup season, FIS has partnered with eight Nordic Combined Local Organizing Committees (LOCs) to highlight their sustainability efforts through the #CombinedForChange series. With a focus on waste reduction, Ramsau, for example, showcases smart solutions by using reusable cups at spectator stands and implementing a well-organized system for waste separation and recycling. In another example, Seefeld contributes to food-related sustainability by donating surplus meals to charity, designing menus to minimize leftovers, and repurposing old bread as animal feed.



Use Recyclable and Organic Materials



Recycling is the process of converting waste materials into new, valuable products. It takes advantage of the energy already stored in these materials, reducing the need for additional energy to produce new products. For a more detailed explanation of how to compare the environmental impact of different material options, see Annex 1.

B.3 Switch from Single-Use Plastics to Recyclable Alternatives

The primary goal of recycling is to reduce the amount of single-use materials, such as plastic, that end up in landfills. Plastics currently make up 12% of global solid waste, yet not all of that plastic (only 9%) is recycled.

Common examples of single-use plastics include:

- Plastic straws
- Plastic bags
- Food packaging (e.g., plastic wrap, chip bags)
- Disposable cutlery (forks, spoons, knives)
- Plastic cups and plates

The good news is that there are many alternative materials to single-use plastics. Below, you can explore some of these alternatives and evaluate which ones might be the best choice for your needs.

To help you distinguish between recyclable and non-recyclable plastics, refer to [TABLE 4](#). For added convenience, remember this general rule: the lower the plastic's categorization number (Resin Identification Code or RIC), the easier it is to recycle.

TABLE 4: Types of Plastic and Their Recycling Potential

RECYCLABLE PLASTICS	COMMON USES
PET (Polyethylene Terephthalate) – #1	Water bottles, soft drink bottles, food containers, etc. – widely recycled
HDPE (High-Density Polyethylene) – #2	Milk jugs, cleaning product bottles, etc. – widely recycled
PVC (Polyvinyl Chloride) – #3	Pipes, window fittings, etc. – not recycled at the moment
LDPE (Low-Density Polyethylene) – #4	Plastic bags and wrapping, etc. – recycled at specialist points
PP (Polypropylene) – #5	This is a thermoplastic polymer used for straws and food packaging, etc. – recycled at specialist points
PS (Polystyrene) – #6	Disposable cutlery, foam cups, packaging materials, and take-away boxes, etc. – not recycled at the moment
Other (Various Plastics) – #7	Others used for crisp packets, rice packets, etc. – recycled at specialist points

ACTION ITEMS

- **Identify and Redirect Plastic Waste for Recycling:** Review the plastic items listed under “General Garbage” in [Section A2](#). Refer to [TABLE 4](#) for alternative products made from more easily recyclable plastics. This will help you redirect those items into the recycling stream.

B.4 Consider Using Biodegradable Polymers

Biodegradable polymers (like PLA, cellulose-based packaging, and biodegradable films) are an alternative to conventional plastics. Unlike biodegradable polymers, conventional plastics can be recycled only a limited number of times.

Key benefits of biodegradable polymers:

- Break down faster under industrial composting conditions, reducing landfill waste.
- Can be composted with food waste, simplifying waste streams.
- Made from plants, offering potential carbon neutrality.

ACTION ITEMS

- **Review Plastic Items:** Review the plastic items listed under “General Garbage” in [Section A](#) and identify which plastics can be replaced with alternatives made from biopolymers.
- **Research Biopolymers:** Research biopolymers thoroughly. Simply replacing plastics with these organic alternatives does not automatically reduce environmental impact. Ensure that systems are in place to fully realize the benefits of these materials. alternatives does not

automatically reduce environmental impact. Ensure that systems are in place to fully realize the benefits of these materials.

B.5 Explore Other Material Alternatives to Plastic

Metals

Aluminum and other metals can be recycled indefinitely, making them a great alternative to plastic. Whenever possible, opt for metal over plastic.

Cardboard and Paper

Advances in packaging have made cardboard and paper effective substitutes for plastic in many cases. Consider these alternatives:

- Serve takeaway food in cardboard containers.
- Use paper bags instead of plastic ones.
- Package merchandise with paper-based bubble wrap.
- Store liquids in cardboard cartons.

ACTION ITEMS

- **Review Current Waste:** Review the plastic items, or other materials, listed under “General Garbage” in [Section A](#).
- **Identify Opportunities:** Look for opportunities to replace non-reusable materials like plastic with metal or cardboard alternatives to help reduce waste.

CASE STUDY**FIS Nordic World Ski Championships 2025 in Trondheim, Norway**

Event organizers at the 2025 FIS Nordic World Ski Championships collaborated with Retura, NorEngros, and Stora Enso to remove single-use plastics at the event. Packaging materials were carefully selected based on research into their production processes, recyclability, and overall environmental impact to support a circular economy. By working closely with local partners, organizers managed to streamline the recycling processes.

Additionally, the championships replaced disposable plastic utensils and food packaging with biodegradable alternatives, such as biodegradable plates, cutlery, and napkins, all designed with waste reduction in mind.

// Our partners see themselves as part of the championship, actively collaborating and discussing solutions instead of getting stuck on challenges.

Haakon Jensen, Head of Commercial at Trondheim 2025 //



Reuse Materials



B.5 Transform Recycled Materials to Give Them a Second Life

Think about how recycled materials can be reused in creative and practical ways. For example, they can be turned into sports-related items like trophies, promotional merchandise, or decorations for event venues.

ACTION ITEMS

- **Collaborate to Find Creative Reuse Ideas:** Involve your team and brainstorm creative ways to repurpose recycled materials into new and valuable products.

B.6 Apply Best Practices in Designing and Preparing Temporary Event Infrastructure and Venue Decorations

Event infrastructure is often temporary, which makes waste management a significant challenge. This step focuses on reducing waste by choosing smarter materials that are designed for reuse, and planning for responsible disposal.

ACTION ITEMS

- **Use Renewable or Recycled Materials:** Opt for bamboo, sustainably sourced wood, recycled steel, or aluminum. Avoid non-recyclable materials like PVC.
- **Design for Reuse:** Choose modular, durable structures that can be dismantled, reconfigured, and reused for future events. Select materials that can be used multiple times.

- **Support Local Sourcing and Construction:** Partnering with local suppliers helps reduce transportation-related emissions and supports the local economy.
- **Use Efficient Methods:** Work with suppliers who apply energy-efficient techniques during setup and dismantling.
- **Donate to the Community:** Reusable items like tent fabric, electronics, or staging can be donated to schools or community centers.

B.7 Apply Best Practices for Infrastructure and Venue Decorations

Apply the following sustainability standards when designing or selecting venue decorations and structural elements:

ACTION ITEMS

- **Apply Best Practices for Surface Coatings:** Use coatings that are free from hazardous substances and contain no more than 5% Volatile Organic Compounds (VOCs).
- **Apply Best Practices for Adhesives and Glues:** Choose low-VOC adhesives and glues:
 - Water-based adhesives: Maximum 10% VOC.
 - Solvent-based adhesives: Maximum 30% VOC.
- **Apply Best Practices for Padding Materials:** Avoid materials containing HFCs or methylene chloride.
- **Apply Best Practices for Wood Products:** Choose materials that are FSC- or PEFC-certified.
- **Apply Best Practices for Metal Content:** Use aluminum or steel with at least 20% recycled content.

- **Apply Best Practices for Plastics:** Any plastic component weighing 50 g or more must be recyclable and free from additives that hinder recycling.
- **Apply Best Practices for Textiles:** Ensure textiles do not contain halogenated flame retardants, phthalates, or heavy metals.

B.8 Implement Reusable Items for Food and Beverage Service

Use event merchandise as a tool for reducing waste from food and beverage services. Consider coffee cups as an example.

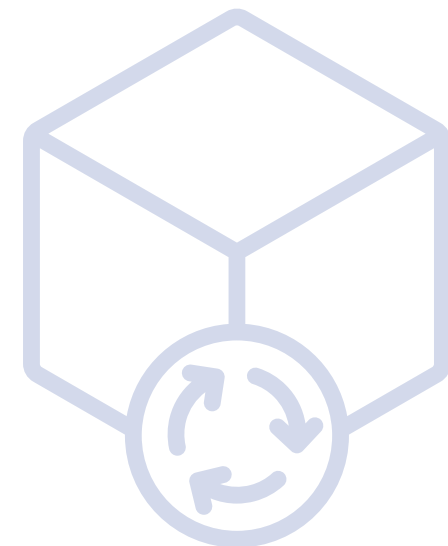
ACTION ITEMS

- **Switch to Reusable Food and Beverage Containers:** Use durable cups, plates, and utensils instead of disposable ones.
- **Offer Reusable Drinkware:** Give attendees the option to buy, rent, or receive reusable cups as part of your event merchandise.
- **Set up Collection Points:** Place stations around the venue to collect, wash, and return reusable items throughout the event.
- **Partner with Sustainable Vendors:** Choose food and beverage vendors who already use reusable or compostable products.
- **Encourage Participation:** Create incentives for attendees to use reusable items – such as offering drinks from dispensers and providing refunds for returned reusable cups.

CASE STUDY

2017 Nordic Skiing World Championships in Lahti, Finland

The 2017 Nordic Skiing World Championships embraced a circular economy by choosing recyclable and reusable materials. For example, organizers replaced plastic water bottles with paperboard alternatives to reduce plastic waste. 50% of waste was converted into energy, and the remaining 50% was transformed into raw materials for future use. In addition, leftover infrastructure and materials were sold or creatively repurposed for future events.



Minimize Resource Recovery, Incineration and Landfill Use



Resource recovery means turning waste into something useful – like energy or compost – instead of sending it to a landfill. Common methods include incineration and anaerobic digestion. The goal is to reduce landfill use and recover value from waste.

Incineration involves burning waste at high temperatures to reduce its volume, converting it into ash, gases, and heat. While this method helps minimize the amount of waste sent to landfills, it does not repurpose the waste, making it less sustainable than resource recovery strategies. Additionally, incineration is highly polluting.

Landfilling is the absolute last resort for waste disposal. Due to the limited capacity of landfill sites and the continuous influx of waste, this option is the least preferred after incineration.

B.9 Use Waste-to-Energy Systems

Waste-to-energy systems convert organic and combustible waste into heat and electricity. Depending on the type of waste, different methods can be used.

- **Anaerobic digestion:** Anaerobic digestion is best for food waste, producing both biogas for energy and compost for agriculture.
- **Gasification:** Gasification converts organic waste into syngas, which can be used for electricity or fuel. Landfill gas recovery captures methane from decomposing waste in landfills and uses it to generate power.

ACTION ITEMS

- **Partner with Waste-to-Energy Providers:** Partner with experienced waste-to-energy providers to convert suitable waste into fuel, energy, or compost.
- **Ensure Proper Waste Sorting:** Ensure waste is sorted properly during your event to make energy recovery systems more effective.

B.10 Use Incineration and Landfills as a Last Resort

While some waste may still end up in incinerators or landfills, these should be used only when no better option exists. Even then, there are ways to reduce environmental harm.

- **Cleaner Incineration:** Modern incinerators often include exhaust cleaning systems to reduce pollution. These systems filter out harmful emissions such as particulate matter, sulfur dioxide (SO₂), nitrogen oxides (NO₂), and carbon monoxide (CO).
- **Methane Capture from Landfills:** Organic waste in landfills releases methane, a powerful greenhouse gas. Many landfills now install systems to collect this gas. It can either be flared (burned off) to reduce its impact or used to generate electricity.

ACTION ITEMS

- **Use Incinerators Equipped with Exhaust Cleaning Systems:** Work with waste partners who use incinerators equipped with exhaust cleaning systems.
- **Select Landfills with Methane Capture Technology:** Choose landfills that utilize methane capture technology to reduce emissions.

CASE STUDY**2010 Vancouver Winter Olympics, Canada**

The 2010 Vancouver Winter Olympics utilized innovative green technology to reduce the environmental impact of waste sent to landfill sites. One standout innovation was the use of methane gas captured from a former landfill site, turning waste into a resource to power the Olympic Village. Additionally, heat was recovered from the city's wastewater treatment system and used to warm buildings. This serves as a prime example of effective resource recovery systems in action.



SECTION



SECTION C

Waste Handling Plan

Implement an Effective Waste Handling Plan



After designing your waste management processes to prioritize waste reduction, recycling, and reuse, the next step is to create a clear waste handling plan. This ensures that materials are properly directed to recycling and reuse when appropriate. This section of the guide will help you build that plan.

C.1 Manage Each Waste Type Effectively

A successful waste management system relies on a clear process for sorting and collecting waste based on the best disposal methods for each type of material. To guide you in this step, refer to [TABLE 6](#), which outlines the best methods for disposing of common waste materials.



TABLE 5: Common Waste Disposal Methods

TYPE OF SOLID WASTE	COLLECTION TECHNOLOGY	TREATMENT TECHNOLOGIES		
		LIQUIDATION	RECYCLING	ENVIRONMENTALLY FRIENDLY "GREEN TECHNOLOGIES"
Plastic and packaging films	Sorting in the proper container during the accumulation phase.	Burning.	Pressing followed by briquetting.	Automated sorting, mechanical grinding (granulation), and high-temperature pyrolysis (breaking down of material using high temperatures).
Glass	Sorting in the proper container during the accumulation phase.	--	Sorting, recycling.	Recycling of intact glass containers and high-temperature remelting of broken glass.
Metal (Including Cans)	Sorting in the proper container during the accumulation phase.	--	Recycling	
Paper	Sorting in the proper container during the accumulation phase.	Burning.	Recycling through contractual agreements with waste paper processing plants.	Automated sorting and recycling.
Wood (Pallets, Containers, Packaging)	Separate Storage	Burning.	Recycling, obtaining building materials.	Fuel briquette production.
Food Waste	Collection at catering facilities.	Removal to landfills.	Composting in landfills.	Stadium composting and contractual agreements with farmers.
Frying Oil	Collection in designed containers at food processing facilities.	--	Additional processing through contractual agreements with companies.	--

Refer to [TABLE 5](#) to complete your waste classification table from **Section A** (see [TABLE 3](#)). For each waste item you've classified, add a new column labeled "End-of-Life Processing". You can use [TABLE 6](#) as an example, although it is incomplete and intended for reference only.

TABLE 6: Add End-of-Life Processing Information to Your Waste Classification Table

SOURCE	HAZARDOUS WASTE				BIODEGRADABLE MATERIAL				RECYCLABLES				GENERAL GARBAGE			
Food Zones	Waste Identification	Cleaning Products			Waste Identification				Waste Identification				Waste Identification			
	Physical State	Liquid			Physical State				Physical State				Physical State			
	Usage	Cleaning			Usage				Usage				Usage			
	Material (Toxicity Classification)	Ammonia (Corrosive and Toxic), Chlorine (Corrosive and Toxic), and Sodium Hydroxide (Corrosive)														
	End-of-Life Processing	Use biodegradable, non-toxic, refillable cleaning products. Refill bottles at zero-waste stations. Dispose of hazardous cleaners (bleach, ammonia) at hazardous waste sites. Recycle properly: Plastic bottles (PET/HDPE) – Plastic recycling bins. Empty aerosol cans – Metal recycling (check local rules). Cardboard – Paper recycling.			End-of-Life Processing				End-of-Life Processing				End-of-Life Processing			
Areas for the Sale of Goods and Provision	Waste Identification				Waste Identification				Waste Identification				Waste Identification			
	Physical State				Physical State				Physical State				Physical State			
	Usage				Usage				Usage				Usage			

ACTION ITEMS

- **Review Your Waste Classification Table:** Refer to the waste classification table you created in [Section A](#).
- **Add an “End-of-Life Processing” Row:** Add a new row titled “End-of-Life Processing.”
- **Use [TABLE 6](#) for Guidance:** Use [TABLE 5](#) as a guide to determine how each waste item will be managed.
- **Prioritize Waste Management Methods:** When determining what end-of-life processes to implement, prioritize waste reduction, recycling, reuse, resource recovery, incineration, and landfills, in that order.

C.2 Determine Waste Volume

To estimate how much waste your event will produce, start by looking at the number of competitors and tickets sold. Break down your estimate into three categories: recyclable, organic, and garbage waste. Be sure to consider the impact of any new materials, procedures, or processes you’ve introduced earlier.

When making your estimates, keep these factors in mind:

- **Event size:** Larger venues typically generate more waste.
- **Attendance:** More attendees – whether ticket holders or participants also means more waste.
- **Back-of-house operations:** Consider the waste generated behind the scenes.

ACTION ITEMS

- **Estimate Total Attendance:** Include everyone – athletes, staff, and spectators.
- **Calculate Average Waste per Person:** Use data from similar events. For example, outdoor events typically generate between 1.89 and 2 kg of waste per person per day.
- **Apply Waste Reduction Strategies:** Based on the strategies you introduced in [Section B](#), estimate how much waste is reduced per person. Apply that percentage to adjust your totals.
- **Estimate Recyclable and Organic Waste:** Use the changes made from [Section B](#) to estimate how much of the total waste will be recyclable or organic.
- **Calculate Remaining Waste:** The remaining waste is what will go to resource recovery, incineration, or landfill.
- **Plan Bin Placement and Collection:** Use your estimates to determine:
 - How many bins you’ll need (don’t forget you’ll need separate bins for recyclables, organic waste, and general garbage).
 - How often they’ll need to be emptied during the event.
 - These steps will support you in completing [C.4](#).



C.3 Implement an Effective Bin Strategy

To manage waste effectively, always use separate bins for dry and wet waste. Dry bins should be used for recyclables like plastics and paper, while wet bins are for items such as food scraps and napkins. To make sorting easy and intuitive for everyone, use color-coded bins that are clearly labeled with both icons and bilingual text. This helps ensure each item ends up in the right place.

While color-coded bins are helpful, you still need to raise awareness about how to sort waste correctly. Even the best waste system won't be effective if people aren't sure what goes where. Be sure to provide clear information to staff, vendors, and attendees to support proper sorting. This topic is explored in more detail in [Section D.1](#).

Next, assess the layout of your event venue. Consider factors such as player movement, exit gates, and the overall structure of the stadium to plan routes for garbage vehicle access and identify key waste-generating zones. Areas like food stalls, kitchens, and reception sites typically produce the most waste and should receive extra attention when it comes to bin placement. Use your site map to mark bin locations, ensuring they are placed in visible and convenient spots to prevent littering. Don't forget about back-of-house areas such as caterers' kitchens and vendor stalls - they need proper access to bins as well.

ACTION ITEMS

- **Separate Dry and Wet Waste:** Use separate bins for dry and wet waste.
- **Use Clear, Color-Coded Labels:** Label color-coded bins for each waste type with clear icons and bilingual text to help sort recyclables, organics, and general waste.
- **Source Specialized Bins if Needed:** If larger or specialized bins are needed, such as wheelie bins or skips, source them from hire companies or your local council.
- **Plan Bin Placement Using a Site Map:** Use your venue map to mark where garbage, recycling, and other bins will be placed. Choose locations that are easy to access and highly visible, especially in high-traffic areas.
- **Equip Back-of-House Areas:** Make sure back-of-house areas, including food vendors and caterers, are also well-equipped with bins.
- **Plan Ahead:** Plan ahead for hiring bins, skips, and waste teams – these services often need to be booked in advance.
- **Ensure Bins Are Large Enough and Well-Ventilated:** Use bins that are large enough to avoid frequent overflow, and place them in well-ventilated areas to reduce odors.
- **Pair Recycling and Garbage Bins Together:** Pair recycling and garbage bins together so users can make the right choice without having to walk further.
- **Focus on High-Traffic Areas:** Focus particularly on busy areas such as food zones, kitchens, and receptions to ensure enough bins are provided to manage waste effectively.

C.4 Waste Management Coordination and Implementation

To keep your event clean and organized, it's important to prevent waste from piling up around bins and to replace full waste bags promptly. Achieving this requires having a large enough waste management team to handle gathering, sorting, and clearing waste, as well as cleaning the stadium after the event. Your ideal team should include:

- Waste collectors
- Waste organizers
- Sanitation workers
- Senior supervisors
- Drivers for transporting waste

In addition, you'll need a dedicated garbage room or storage unit for efficient waste management. Divide this space into zones, each designated for a specific type of waste. Be sure to have enough staff to manage this process effectively.



ACTION ITEMS

- **Prevent Waste Buildup Around Bins:** Create systems to regularly monitor bins and prevent overflow. Replace full waste bags promptly to avoid clutter.
- **List Waste Management Team Members:** Compile a list of team members and their contact details. Assign specific responsibilities before, during, and after the event.
- **Assign Waste Collectors:** Use your waste volume estimates (from [Step C.2](#)) to determine the number of waste collectors needed. Assign them to gather, sort, and clear waste during and after the event.
- **Clean the Stadium After the Event:** Assign a cleaning team to clear all waste from seating areas, aisles, and common spaces once the event ends.
- **Set Up a Dedicated Garbage Room or Storage Unit:** Choose a secure, easily accessible location to store waste temporarily before it's transferred for disposal.
- **Monitor Waste Collection and Sorting:** Monitor bin use and the waste collection process during the event. Adjust bin locations as needed based on high-usage areas.
- **Brief Your Team:** Hold a briefing session to ensure your team is prepared for their roles.
- **Set Waste Reduction Targets:** Set specific goals for your waste management team to reduce the overall waste produced at the event.

C.5 Implement an Effective Waste Sorting System to Separate Recyclables, Organic Waste, and Garbage

Properly sorting recyclables from non-recyclables is crucial for maximizing recycling efficiency. This is especially important for plastics, as different types require different recycling methods. Improper sorting can lead to plastics being sent to landfills instead of recycling centers.

To address this, you need an efficient waste sorting system in place, ideally located in your designated garbage room (as outlined in [Step C.4](#)). This system can be managed manually by assigning team members to properly separate materials, directing them to recycling, composting, or landfilling.

ACTION ITEMS

- **Assign Personnel to Oversee Waste Management:** Assign personnel to oversee waste management in each functional area (as identified in [Section A](#)). Provide access to your waste classification table (from [Step A.2](#)) so they understand how to handle different types of waste.
- **Define Roles and Responsibilities:** Clearly define the roles and responsibilities of each staff member.
- **Ensure Sufficient Staff for Cleanliness:** Ensure there is enough staff to maintain cleanliness without overburdening workers.
- **Create a Schedule and Work Plan:** Create a schedule and work plan to ensure smooth operations.

C.6 Waste Collection

To manage waste efficiently and responsibly at your event, it's essential to coordinate with the right waste collection services. The steps below will help you identify suitable providers, understand their requirements, and plan for the proper collection and disposal of all waste types before, during, and after the event.

ACTION ITEMS

- **Identify Waste Collection Services:** Use your waste classification table (see [TABLE 6](#) and [Step C.1](#)) to determine which service providers will manage each type of waste your event generates.
- **Review Provider Requirements:** Check your agreements with each provider for any specific conditions – this might include bin sizes, pickup times, or other service requirements. Make note of these details to avoid any issues on the day.
- **Check for Additional Bin Options:** Some providers may offer extra bins for hire or loan. If you anticipate needing more, contact them in advance.

C.7 Stallholders and Other Event Service Providers

To ensure smooth and effective waste management at your event, it's important to clearly communicate expectations to all stallholders and service providers.

ACTION ITEMS

- **Create a Contact List:** Make a list of all stallholders and service providers, including their contact details for easy communication.
- **Clarify Waste Responsibilities:** Identify what each stallholder is responsible for before, during, and after the event. Outline both the tasks and the materials or equipment needed. Be clear about which waste services your event will provide and which the stallholder must handle themselves. For example, whether they need to bring their own garbage bags or if you'll supply them.
- **Work with Like-Minded Partners:** Choose to work with stallholders and suppliers who support your event's waste goals. Collaborate with them to set realistic waste reduction targets.
- **Recommend Sustainable Suppliers:** When possible, suggest or prioritize suppliers known for good waste management. For instance, especially those who use sustainable or certified compostable materials.
- **Share Waste Rules and Limits:** Make sure stallholders know which materials are banned (e.g., single-use plastics), any limits on how much waste they can generate, and your overall waste management goals. You might consider having a stallholder agreement that outlines these expectations.
- **Hold a Pre-Event Briefing:** Plan a meeting with all stallholders to understand their needs and explain your waste management expectations and procedures.

- **Provide a Site Map:** Give stallholders a copy of the event site map that clearly shows bin locations and the garbage room.
- **Share Key Contact Details:** Provide the names and phone numbers of staff or volunteers responsible for waste management so stallholders know whom to contact if they need help.

In addition to the strategies outlined above, SMART technologies and waste monetization offer further opportunities to improve efficiency, cut costs, and generate new revenue streams, turning waste into value. For more details, see [Annex 2](#).



SECTION

D

SECTION D Involve Key Stakeholders



D.1 Educate Spectators About Waste Management

At many events, 73–93% of spectators believe it's the event organizer's responsibility to manage waste. This highlights a significant gap in awareness, with a majority failing to recognize their own role, especially when it comes to separating waste.

Simply providing bins isn't enough to ensure effective recycling. Education, clear sorting guidelines, and proper procedures are essential for success. For instance, using signage and demonstrations can significantly influence people's sorting habits.

ACTION ITEMS

- **Position Trained Staff or Volunteers at Key Bin Locations:** Use your employees and/or volunteers to guide spectators in proper waste disposal. Treat these helpers as "bin ambassadors" or "waste educators" who are friendly, visible, and ready to assist.
- **Provide Clear, Color-Coded Bins with Prominent Signage:** As explained in [Section C](#). But don't rely on signage alone; ensure proper guidance.
- **Include Waste-Related Guidelines in Event Promotions:** Include waste-related guidelines, such as what's allowed or not, in your event promotions. This can be shared on your website, social media, or through announcements at the event. If certain items (like single-use plastic bottles) are banned or discouraged, let people know ahead of time so they can bring reusable alternatives.

D.2 Empower Your Team with Thorough Training and Communication

Behavior change begins with your team. Ensure that all employees and volunteers are properly trained so they feel confident and prepared. Start with the basics: teach them about the different types of waste, how to handle it safely, what to do in emergencies, and how to document their work correctly.

Next, bring the training to life with hands-on practice. Take your team to key areas such as garbage rooms and bin zones. When your team knows exactly what to do, everything will run smoothly.

ACTION ITEMS

- **Provide Theoretical Training:** Teach your team about waste categories, safety protocols, emergency procedures, and how to document their work. Share the Waste Classification Table (see [TABLE 6](#)), which outlines the properties and safe disposal methods for each waste item.
- **Provide Practical Training:** Run simulations and test the equipment.

D.3 Use Digital Platforms to Communicate with All Stakeholders

Use social media and your website to engage your community, share knowledge, inspire action, and encourage participation.

To effectively communicate your waste management successes and challenges, refer to the International Ski and Snowboard Federation's [Communication Guide](#).

ACTION ITEMS

- **Create Engaging Social Media Posts:** Share behind-the-scenes insights on platforms like Instagram, X (formerly Twitter), Facebook, and LinkedIn. Use relevant hashtags and tag partners to expand your reach and foster community involvement.
- **Send Regular Email Newsletters:** Keep your audience updated on your waste management and sustainability initiatives. Highlight key milestones and offer tips for reducing waste at your event.
- **Produce Educational Content:** Use your website's blog and downloadable resources (e.g., white papers) to educate your community about waste management and sustainability. Share simple, actionable tips for reducing waste and recycling properly during the event.
- **Showcase Sustainability Throughout the Event:** Highlight your waste management efforts in event materials, such as programs and signage, to keep sustainability front and center.

CASE STUDY

2016 Rio Olympics, Brazil

At the [Rio Olympics in 2016](#), an innovative recycling education program was introduced. Trained waste collectors teamed up with volunteers to guide and educate spectators on proper recycling. Both groups wore eye-catching "lollipop backpacks" that displayed simple, clear sorting instructions.

To boost engagement, 2,000 bilingual stickers – printed in English and Portuguese – were placed in high-traffic areas. These stickers encouraged spectators to "Embrace the Recycling Challenge", making recycling feel fun, easy, and accessible for everyone.



D.4 Review and Report on the Waste Management System's Effectiveness

After your event, create a detailed waste management report and share it publicly. This is a great way to celebrate your achievements, provide useful insights to others, and encourage collaboration within the winter sports community.

ACTION ITEMS

Record Data and Feedback During the Event:

- **Track and Record Waste Produced:** Track and record all waste produced and divide it into categories (e.g., recyclables, organic waste, and landfill). Record how much waste was diverted from landfill and highlight this in your report.
- **Identify Efficiencies and Inefficiencies:** Observe how efficient your sorting stations and garbage rooms are. Ask your team for feedback and take note of any issues.
- **Review Waste Collection Processes:** Review how waste is collected (e.g., timing, locations, and signage). Again, gather feedback from your team on what worked and what didn't.
- **Keep Detailed Notes:** Keep detailed notes on the entire disposal process – from collection to final processing.
- **Gather Information from Service Providers:** Ask your waste contractors for data on the total waste collected and contamination levels. Use this information to refine your waste management strategies.

Write Up Your Report After the Event:

- **Summarize Your Goals:** Write a short summary outlining your waste management goals and planned strategies. Include this at the beginning of your report.
- **Summarize Areas for Improvement:** Summarize any issues or inefficiencies. Include these findings in your report to help identify gaps and areas for growth.
- **Highlight Key Successes:** Highlight key successes, such as the percentage of waste diverted from landfill or reductions in single-use plastics.
- **Document Innovative Solutions:** Mention any creative solutions you used, like biodegradable materials, SMART technologies, or partnerships with local recycling centers.
- **Include Stakeholder Voices:** Collect feedback from partners, suppliers, food vendors, spectators, athletes, and sponsors involved in your sustainability efforts. Share quotes or testimonials in your report to add credibility and different perspectives.
- **Make the Data Clear:** Use visuals such as charts, graphs, and tables to show your results and key takeaways in a clear, easy-to-read way.
- **Document Your Costs and Savings:** Review your costs and note any savings from your waste reduction strategies.
- **Look Ahead:** Suggest improvements or best practices for future events. Propose new sustainability initiatives you could try next time.
- **Publish and Share:** Make your report public – post it on your website, share it on social media, and submit it to relevant publications or organizations.

CASE STUDY

2017 Epic Races – Michigan, United States

The Frosty Freestyle Ski Races Sustainability Report offers a real-world example of how waste can be effectively managed at a smaller ski event. Organized by Epic Races in 2017, the event successfully implemented a Zero Waste program, diverting an impressive 96.7% of waste from landfill.

The report breaks down the total waste by type, making the results easy to understand:

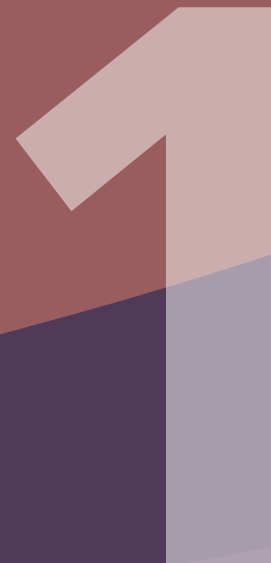
- **Compostables:** 41.7 lbs (45%)
- **Recyclables:** 48 lbs (51.7%)
- **Landfill Waste:** 3.1 lbs (3.3%)

In addition to sharing the strategies that worked, the report also discusses challenges and lessons learned – valuable insights for other event organizers. The report includes the following three helpful sections:

- **What Went Right:** This section highlights successes, like the number and placement of Zero Waste stations.
- **Opportunities for Improvement:** This section addresses problems, such as incorrect waste sorting.
- **What We'll Do Differently Next Time:** This section focuses on improving the visibility of Zero Waste stations, especially during the busiest parts of the event.



ANNEX



ANNEX 1

Compare the Pros and Cons of Different Materials

In this step, you need to evaluate the material options you identified in [section B](#) for each waste item. Focus on the following environmental impact areas:

- **Global Warming Potential (GWP):** Measures the volume of greenhouse gases (such as CO₂ and CH₄) released.
- **Air Pollution:** Tracks harmful emissions such as NO_x, SO₂, and fine particulate matter.
- **Water Pollution:** Assesses harmful substances entering water sources, such as landfill leachate or chemical runoff.
- **Energy Use:** Compares how much energy is required to produce, use, and dispose of the material.
- **Resource Depletion:** Assesses the amount of natural resources used and whether materials can be reclaimed, compared to how much material is permanently lost during disposal.
- **End-of-Life Processing:** Considers whether the material breaks down naturally, can be reused, or is recyclable.

To better understand this process, refer to [TABLE 7](#), which compares plastic bags with alternatives like paper, jute, and other biodegradable options. This table is designed to highlight the complexity involved in evaluating the environmental impact of different materials, demonstrate the level of detail required for such assessments, and serves as a reference to guide your own evaluations.

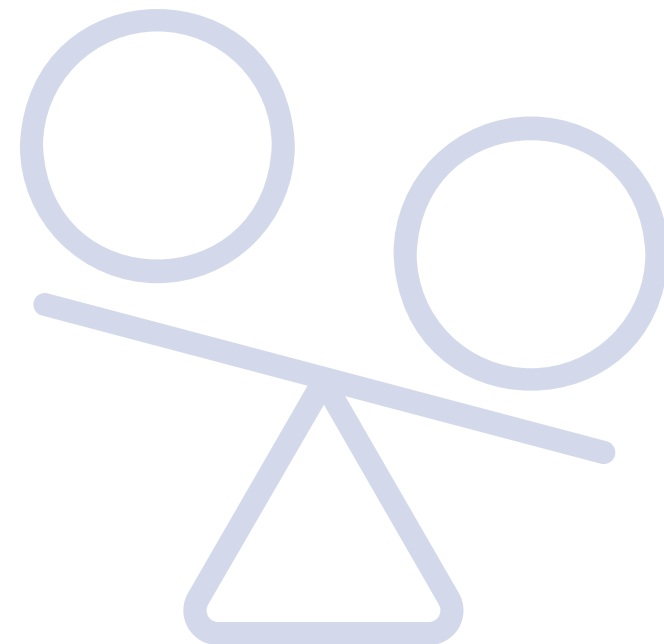


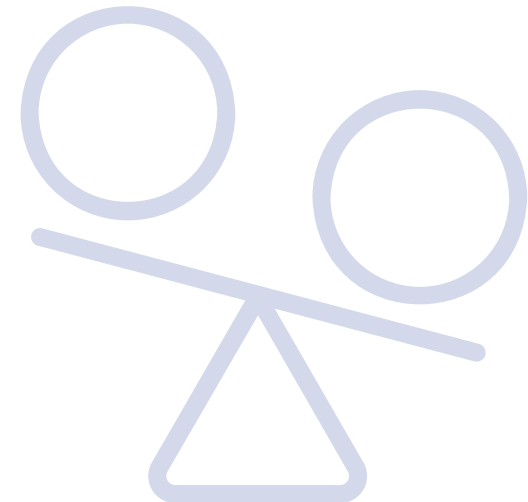
TABLE 7: Example Material Assessment

ALTERNATIVE	ENVIRONMENTAL IMPACT CATEGORIES
Plastic Bags	Global Warming Potential: Making one plastic bag uses about <u>14.9 kg</u> of fossil fuels, contributing to greenhouse gas emissions. Air Pollution: The production and burning of plastic bags <u>release</u> harmful pollutants like black carbon, dioxins, and furans. Water Pollution: Microplastics from plastic bags can end up in waterways, harming both humans and wildlife. Energy Consumption: Producing a single plastic bag uses around <u>0.5 kWh</u> of energy. Resource Depletion: Plastic bags are made from non-renewable petroleum, a resource that cannot be replaced once used. End-of-Life Processing: Plastic bags are rarely reused and typically last just <u>12 minutes</u> before being thrown away. They can be recycled at specific collection points. If not recycled, it's noted plastic bags take up to <u>1,000</u> years to break down in the environment.
Paper Bags	Global Warming Potential: Paper bags have higher emissions than plastic. • Uncomposted paper bags produce <u>39%</u> more greenhouse gas emissions (GHG) than plastic. • Composted paper bags produce 68% more GHG emissions than plastic. However, the trees used to make paper absorb CO₂ as they grow which, in theory, leads to carbon neutrality. • One paper bag requires <u>23.2 kg</u> of fossil fuels to produce. Air Pollution: The production of paper bags releases emissions such as nitrogen oxides (NO_x) and sulfur oxides (SO_x). Water Pollution: The wastewater from paper production contains <u>chlorine</u>, which is both <u>corrosive</u> and toxic. Energy Consumption: Producing one paper bag uses <u>1.1 kWh</u> of energy, which is twice the energy needed to make a plastic bag. Resource Depletion: Making paper bags uses wood from trees. Sustainable forestry practices can help reduce tree loss. Paper bags are typically reused for about a <u>month</u>. End-of-Life Processing: Paper bags can be <u>recycled</u> up to seven times, and most are <u>compostable</u>.

Table continues on the next page.

CONTINUATION TABLE 7:

ALTERNATIVE	ENVIRONMENTAL IMPACT CATEGORIES
Jute Bags	Global Warming Potential: Jute bags are stated to have <u>23 times</u> less impact on global warming than plastic bags, especially when used <u>multiple times</u> (up to 10 times). Air Pollution: The production of jute bags <u>does not</u> release harmful chemicals or pollutants into the air. Water Pollution: The dyeing process used for jute bags may create <u>wastewater</u> pollution. Energy Consumption: Jute bags use <u>less energy</u> to produce compared to paper and plastic. However, transporting the same number of jute or cotton bags as plastic bags would require <u>80 times</u> more ships and trucks, consuming much more fuel. Resource Depletion: Jute is a renewable resource that can be grown <u>alongside</u> other crops, supporting farmers without requiring additional land. End-of-Life Processing: Jute bags last <u>2–3 years</u> on average. They are biodegradable and cause no harm when they break down, releasing emissions that are balanced by the CO₂ absorbed during the growth of jute.



ACTION ITEMS

- **Conduct an Analysis of Material Alternatives:** When considering alternative materials to divert waste from landfills to recycling, compare each option based on the following factors:
 - Greenhouse gas (GHG) emissions
 - Air pollution
 - Water pollution
 - Energy consumption
 - Resource depletion
 - End-of-life disposal
- **Select the Most Effective Option:** Select the most effective options that help maximize waste diversion from landfills while minimizing other environmental impacts, such as air pollution, water pollution, energy consumption, resource depletion, and end-of-life disposal.

Simplify Your Waste Stream

The goal of procurement is to simplify your supply chain. One way to achieve this is by implementing a single-stream waste system, where all waste goes into one bin. This makes waste management easier and more efficient by reducing contamination and streamlining collection and handling.

However, the only truly landfill-free single-stream system is one that uses only compostable materials. This can be challenging, as it requires vendors and service providers to meet strict standards. Additionally, there's the question of who will cover the extra costs of using only compostable materials.

ACTION ITEMS

- **Aim to Simplify Your Waste Stream:** Limit the types of materials you use. This will improve recycling efficiency and make waste management easier.



ANNEX

2

ANNEX 2

Support Waste Management with SMART Technologies

SMART technologies are advanced tools that use sensors, data, and internet connectivity to make systems work more efficiently. In waste management, these tools help you respond to real-time needs, reduce waste, and improve overall operations.

Here are some SMART technologies you can use to boost efficiency:

- **SMART Bins:** These bins have sensors that track how full they are. This helps your team:
 - Plan better collection routes
 - Avoid unnecessary pickups
 - Cut emissions from waste trucks
 - Prevent bin overflows with timely action
- **RFID Technology:** RFID tags are small devices that use radio waves to automatically identify and track objects - such as waste bins - by transmitting data to a reader. Placing these tags on bins helps reduce errors, improve accountability, and enhance the accuracy of waste tracking throughout the entire process.
- **Chipless RFID for Recyclables:** This newer type of RFID doesn't use traditional microchips. Here's how it works:
 - Each recyclable item (like a can or bottle) gets a chipless RFID tag
 - The tag identifies the material – plastic, metal, paper, etc.
 - A reader scans the tag at the recycling facility
 - The item is automatically sorted based on the information in the tag

- **Data Analytics:** Advanced analytics and machine learning tools can process data from various sources - such as waste generation rates and recycling trends – to support smarter decision-making. With this information, you can allocate resources more efficiently and identify areas that need improvement.
- **Predictive Analytics:** A form of data analytics that uses past data specifically to forecast future waste trends – helping you better prepare for the waste and recycling needs of each event.
- **Remote Monitoring and Control:** Remote monitoring systems enable waste management teams to monitor and control waste infrastructure remotely. These systems can regulate waste compaction, optimize storage, and ensure timely collection which reduces the risk of waste overflow.

ACTION ITEMS

- **Review SMART Technologies for Waste Operations:** Review the SMART technologies listed above to see which could benefit your waste operations.
- **Conduct a Cost-Benefit Analysis for Practical Tools:** Conduct a cost-benefit analysis to choose the most practical and impactful tools for your event or facility.



Monetize Your Waste Management Processes

Waste management and recycling can be a source of income. Here are a few examples:

- **Recyclables:** Recyclable materials still hold value. For example, recycled plastic in Europe was worth around € 454 per tonne in 2022. Consider selling recyclables to waste collectors to generate income from your waste management process.
- **Solid Waste:** After sorting, solid items like metal, glass, and plastic can be sold to junk shops or recycling facilities. These materials can be reused for manufacturing new products, and many scrap yards are willing to pay for them.
- **Paper Waste:** If there's a waste-to-energy plant nearby, paper waste can be converted into electricity instead of being sent to landfills.
- **Food Scraps:** Food waste can be composted and turned into nutrient-rich fertilizer. This compost can be sold to gardeners, landscapers, or used in local agricultural projects, helping create a sustainable waste cycle.

There may also be grants, sponsorship, and other funding opportunities to support your zero-waste policies.

ACTION ITEMS

- **Monetize Your Waste Management Strategy:** Explore ways to turn your waste management strategy into a source of revenue. You can use this revenue to fund further investments in sustainability initiatives, both within waste management and beyond.
- **Explore Grant Opportunities:** Check if local councils or organizations offer grants to support your event waste management initiatives.
- **Attract Sponsorships and Funding:** Consider whether your event's strong waste management practices could attract sponsorships or additional funding.



CASE STUDY

2025 FIS Alpine World Ski Championships, Saalbach

The 2025 FIS Alpine Ski World Championships has partnered with Saubermacher to implement its innovative e-truck, which features the SCANTEC GmbH recyclables scanner. This cutting-edge technology uses multispectral cameras and AI to identify incorrectly sorted waste, such as glass or plastic. The scanning results are displayed on a large screen at the event's finish line, helping to raise awareness and encourage better waste sorting among visitors. This initiative highlights the role of SMART technologies in achieving efficient waste management.

Plus, Saubermacher ensures that all recyclable materials are returned to the production cycle in the most effective way possible. Plastic and metal packaging are sent to sorting plants for recycling, while paper and cardboard are processed in paper mills to create new paper products. Organic waste is converted into biogas to replace fossil fuels, and glass is sorted by type for reintegration into the material cycle. Any residual waste is sent for thermal recycling. These initiatives demonstrate the repurposing of waste within a closed-loop system.

Our aim is to organize an event that conserves resources as much as possible and provides sustainable momentum for the region and skiing in general. As a Green Event, the FIS Alpine World Ski Championships Saalbach 2025 is set to become a showcase project for future major winter sports events. We are delighted and very grateful that the "Circular World Championships Concept" with Saubermacher is possible, and that we are working together sustainably for the future...

Roswitha Stadlober, ÖSV President



**INTERNATIONAL
SKI AND SNOWBOARD
FEDERATION**

Blochstrasse 2
CH-3653 Oberhofen am Thunersee
Switzerland

E-mail: sustainability@fis-ski.com
Website: www.fis-ski.com