Welcome to the Environmental Performance Section of the Ontario Snow Resorts Association's Best Management Practices Manual.

The materials found within this section cover topics including energy and water use, solid and hazardous waste, transportation, purchasing, natural environment and outreach and education. Within each topic are actions that Ontario ski areas can incorporate into their day-to-day operations that will result in improved efficiency and/or financial savings.

To help get you started a short "Getting Started Factsheet" is included to provide direction to ski areas towards easy to implement initiatives that will improve their environmental performance. Once these initiatives have been achieved, ski areas can move on to more involved pollution prevention opportunities within the 3 best practices templates on water conservation and use; energy conservation and use; and, waste management opportunities.

Choose the actions in these materials that are most applicable to your ski area and don't feel as if you have to do everything at once. To assist you in deciding which initiatives to tackle, the task force has rated them based on 'Ease of Implementation' and 'Resulting Savings'. However the initiatives you ultimately choose will depend on technical considerations, costs, time to implement and environmental priorities specific to your own ski area. Data collection templates are also provided and can be easily customized to suit your ski area's unique challenges and opportunities.

Once you have undertaken some initiatives, share your experiences with your peers! Submit your success story using the template provided. The information you provide will be included as part of an online database accessible to members of the Ontario Snow Resorts Association.

Legend: The following symbols are used within the factsheet and best practices templates.

	Policy / Procedure		Energy savings		Efficient transportation
	Water savings		Waste reduction		Education / Outreach
	Financial savings		Toxics reduction		Regulatory compliance
	Web-based resources				

Acknowledgements:

These materials were jointly prepared by the Canadian Centre for Pollution Prevention and Environment Canada with assistance from the members of the Ontario Snow Resorts Association Pollution Prevention Task Force. This task force serves as a forum for exchanging information on best management practices, ideas, concerns and for providing feedback on potential projects for the industry. Members of the task force include:

- Blue Mountain Resort
- Hockley Valley Resort
- Osler Bluff Ski Club
- Snow Valley Ski Resort
- Georgian College
- Ontario Snow Resorts Association
- Environment Canada
- Canadian Centre for Pollution Prevention.

Numerous experts were consulted in preparing the materials, including:

- Caitlin Bowman and Michael Keefe, Tetra Tech EM Inc.
- Sarah Evans, New York Department of Environmental Conservation
- Stephen Dixon, TdS Dixon Inc.
- Evan Jones P.Eng. of Canada's Climate Change Voluntary Challenge and Registry (VCR Inc.)
- Sean Kelly, Georgian College
- Kirk Mills, Colorado Department of Public Health and the Environment

Disclaimer:

These materials are not intended to be a comprehensive list of all techniques that could be used to reduce waste and pollution at your ski area. These materials will continue to be refined and updated to reflect user feedback and new developments. Stay alert for these improvements and continue to reassess your operations periodically.

Getting Started

These quick start ideas provide easy to implement actions that have environmental benefit and potential cost savings. Once these quick start ideas have been achieved your environmental team can move to more opportunities found in the environmental performance chapters of Best Management Practices Manual.

	Quick Start Opportunity	Completed
	Create an Environmental Team at your ski resort with representatives from operations, hospitality, purchasing and food services.	☐
	Write an Environmental Policy for your ski resort and have it signed and approved by senior management.	☐
	Set achievable environmental priorities, goals and objectives for your ski resort to work towards over the next few years. It is important that you track environmental performance in each of the areas below – establish baseline data and collect data to demonstrate progress towards reduction or conservation goals.	☐
	Develop a staff training program that will support and communicate the environmental priorities, goals, objectives, roles and responsibilities as well as encourage the participation from staff in all areas of your facility. Develop a plan to communicate results to internal and external stakeholders.	☐
Water Use		
	Conduct water use audits throughout facility. Keep careful records of water use, read the water meter once a week, and compare the weekly water volume used to the various activities at the facility (i.e. amount of laundry, dishes washed or guest visits).	☐
	Inspect and repair all leaking faucets, taps and pipes throughout the resort.	☐
	Install flow restrictors and aerators on all taps and low flow showerheads in guest rooms.	☐
	Implement an irrigation schedule. Water grounds at night when the temperature, solar radiation, and wind speed are lower. Consider vegetation, soil type, slope, site use, and specific vegetation management practices when developing the irrigation schedule.	☐
	Install flow meters on all snowmaking systems to accurately measure water usage. Document water use and costs and compare with water uses throughout the resort.	☐
Energy Use		
	Conduct energy use audits throughout facility. Keep careful records of energy use, and review monthly utility charges with departments to identify energy saving opportunities.	☐
	Replace lights with energy efficient bulbs.	☐
	Install motion detectors and timers where appropriate.	☐
	Educate staff to turn off lights and electronic equipment when not in use and when leaving at the end of the day.	☐
	Weather-strip all exterior doors and windows or replace them with new airtight windows and doors to reduce heat loss in the winter and heat gain in the summer.	☐
Solid Waste		
	Conduct a waste audit of your facility to quantify the location and amount of waste generated in all areas of the resort (including lodges, offices, staff rooms etc).	☐
	Establish a designated central recycling collection system (including bottles, cans, paper) with easy to follow signs and directions. These should be located in high volume areas of the resort – lodges, staff areas, offices, parking lot. Ensure that the bins are well labeled.	☐
	Replace disposable items such as plates, cups and utensils with reusable or recyclable materials where possible.	☐
	Start a composting program to include food waste, grass clippings and wood for use in landscaping and re-growth areas.	☐
	Donate unwanted materials (building materials), furniture (tables, chairs)or equipment (i.e. computers) to a local charity, schools, non-profit organizations for reuse.	☐
	Use a waste exchange for solid waste materials that are no longer required or in use at your facility.	☐
Hazardous Materials		
	Complete an inventory of all hazardous materials in use or being stored throughout your facility. Ensure that all materials are being used, stored and disposed properly (i.e. according to the Material Safety Data Sheet and provincial regulations).	☐

	Replace toxic cleaning products with non-toxic, biodegradable products. Request that cleaning contracts include non-toxic substances.	☐
	Refill toner cartridges used in photocopiers and laser printers. Ask your manufacturer or dealer for details. Used cartridges can also be donated to charitable programs.	☐
	Use integrated pest management and organic practices on landscaping and grounds maintenance. Avoid applying chemical insecticides, pesticides and herbicides.	☐
Transportation		
	Encourage staff to take alternative transportation options to and from work (bike, walk, bus). Set up a rewards program (i.e. bus passes, preferred parking for van pools) to recognize staff. Strive towards standard offerings of these benefits to all staff.	☐
	Complete regular maintenance on resort vehicles to increase fuel efficiency (i.e. regular oil changes, check tire pressure)	☐
	Provide carpooling incentives for visitors and staff such as discounts or preferred parking close to lodges. Set up a car pooling bulletin board.	☐
	Provide ski area visitors a shuttle or bus service throughout the ski resort or local community. Team up with the local community to establish transit/shuttle incentives.	☐
Natural Environment		
	Identify sensitive vegetation areas and install signs to inform visitors of these areas. Use traffic control measures (i.e. rope fences) to protect these sensitive areas.	☐
	Re-vegetate disturbed areas with native plant and grass species.	☐
	Avoid the use of chemical pesticides, herbicides or insecticides on natural areas.	☐
Purchasing		
	Purchase in bulk rather than individually packaged products (i.e. condiments).	☐
	Encourage your suppliers and vendors to ship purchases in reusable packaging, to reduce the amount of packaging or to take back the packaging.	☐
	Establish a purchasing policy and guidelines for staff who are responsible for purchasing. Guidelines should include preferences toward products made of recycled material, are biodegradable, energy efficient, non-toxic, more durable and/or reusable.	☐
Outreach and Education		
	Educate your staff and management about the Sustainable Slopes program and participate in "Keep Winter Cool Day" at your ski area to educate staff and guests on the impact of Climate Change on winter activities.	☐
	Partner with schools, community/environmental groups, businesses on programs and initiatives that benefit and protect the local environment and economy. Participate in SKE-COLOGY™ an education program offered through NSAA for ski areas that combines children's ski lessons with information on the local eco-system.	☐
	Promote the ski area's environmental successes to employees and visitors. As well submit a success story to OSRA's Environmental Best Practices Task Force.	☐
	Ask visitors for their opinions, suggestions and ideas about ski area environmental programs and opportunities. Use their feedback to improve your programs and services. Communicate your progress to the community, and staff.	☐

Success Story Template:

Please provide a summary of your progress on [name of topic] during the past year. Highlight your best achievements and also indicate any goals you hope to achieve during the next year. The information you provide will be included as part of an online database accessible to members of OSRA.

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1.0 Water Conservation and Use Opportunities

Water is an important resource for ski areas as well as the surrounding natural environments and communities and should be used as efficiently and effectively as possible. National and local concerns over water supply and permits to take water place ski areas under pressure to reduce the large volume of water used for snowmaking. In addition, water-taking permits issued through the Ontario Ministry of the Environment require high volume water users to closely monitor the amount of water that they take on a daily basis in order to be considered for permit renewal. Snowmaking requires about 175,000 gallons of water to create a 12-inch deep layer of snow over an acre (200- by 200-foot area). Snowmaking requires extremely high volumes of water over short periods of time and can convert between 1500 to 15000 gallons of water into snow in about a minute. Ski areas also use water for food preparation, building operations, and hotel/condominium guests, so it is possible for ski areas to benefit financially from implementing water savings techniques and technologies in all of these areas as well.

Developing a Water Management Plan

Developing a water management plan is a logical, step-by-step process. It involves more than just conducting a cost-benefit analysis and preparing a report. To be successful, a water management plan should not only consider the technical side, such as installing efficient plumbing fixtures, but also the human side, such as changing employees' long-standing operating procedures and water use habits. It is also important to look at managing water use to comply with the law, make cost-effective decisions, and to document your savings. In terms of measurement, correlate water savings and use to skier visits.

Water management techniques generally fall into three categories:

1. Waste: Reducing losses (for example, fixing leaky faucets and pipes)
2. Total Volume: Reducing the amount of water used by equipment or processes (for example, using ultra low-flow toilets and automatic shut-off faucets)
3. Recycling: Reusing water that would otherwise be discarded (for example, treating water for use in snowmaking or in landscaping irrigation)

For virtually every use of water at a ski resort, managers can choose from a wide variety of water management options. Some options simply involve altering the water use of resort employees and visitors. Other options involve changing the way fixtures and equipment are operated and maintained. The most significant long-term savings, however, will probably require the retrofitting or replacement of fixtures and equipment. In some instances, one option alone might achieve the desired savings (such as replacing showerheads with low-flow models). In others, a combination of options may be needed (for example, inserting flow restrictors and providing automatic sensor controls for bathroom faucets). A comprehensive water management plan should explore all water management options. This plan should recognize that a building's water system, and changes to it, will have an impact on other systems in the building, such as heating. For example, installing a flow restrictor on a faucet not only will reduce the amount of water consumed, but also will lower energy costs associated with heating this water for use and lower sewerage costs based on consumption. The following topic areas should be considered when developing a water management plan for your ski resort.

(A) In Snowmaking

Does this apply to my facility?	Already in place at my facility	Sub topic:	Water Use for Snowmaking		Ease of implementation (easy ●, intermediate ■, expert ◆)	Resulting savings (see legend)
		Applicable Sustainable Slopes Principle(s):	• Optimize efficiency and effectiveness of water use in snowmaking operations • Conduct snow making operations in a manner that protects minimum stream flows and is sensitive to fish and wildlife resources			
		Considerations:		**Useful Resources**: Please refer to snow equipment manufacturer's guidelines for guidance on operating efficiencies.		
☐	☐	Complete an inventory of the resort's water resources and monitor seasonal variations that impact snow making activities.			●	
☐	☐	Inspect, pressure test and monitor water distribution lines that feed snow making systems for leak detections to reduce water loss. Water leaks can be caused by corroded underground pipes, faulty piping, or faulty pipe installation.			●	
☐	☐	Train staff responsible for snow making and grooming activities on water use, conservation opportunities and the benefits associated with conservation activities. Staff must know the trail topography of each trail (i.e. How much snow is required?)			●	
☐	☐	In urban areas, ski areas need to abide by municipal watering restrictions. For instance: watering between 7pm and 9pm. Contact your municipality for more information.			●	
☐	☐	Repair any leaks found during inspection of water distribution lines.			●	
☐	☐	Build an onsite reservoir to draw water for the snow making process rather than drawing water from local water sources (i.e. creeks, rivers). Route all water system bypasses, and overflows back to storage site. Funnel any surface runoff back in to storage reservoir to use again.			◆	

☐	☐	Install a water cooling system to cool the water supplied to snowmaking systems. Reducing the temperature of the water increases the efficiency of the snowmaking process by reducing evaporative losses when the water is released to the atmosphere.	■	
☐	☐	Install new high efficiency snowmaking guns or retrofit/recondition older guns with new nozzles to further reduce snowmaking water and energy consumption. Install high efficiency pumps and compressors for snow making.	■	
☐	☐	Use a water additive (Snowmax) as a catalyst to increase the speed of crystalization of the water to snow. Making larger, dryer snow-crystals and also minimize losses from drift off the trail and evaporation.	■	
☐	☐	Install flow meters on all snowmaking systems to accurately measure water usage. Document water use and costs from these meters to compare with water uses throughout the resort.	■	
☐	☐	Install a system monitoring or control automation to increase efficiency of the snowmaking system. Will allow snowmaker to accurately modify the snowmaking systems by using computer controls to quickly respond to changing weather conditions on the slopes and avoid pumping excess water. Consider wet bulb and dry bulb temperature to determine when to make snow and maximize snowmaking efficiency.	■	

Success Story 1: Telluride Ski and Golf Resort, Colorado
In 2011 Telluride Ski and Golf Resort obtained five new SV-10 high efficiency snow making guns with a grant from the National Ski Area Association. The guns replaced older, inefficient models in two sections on the resort's ski hills. Telluride estimated that the guns cut electricity use by 69% compared to the old guns, but importantly they also reduce water use. The new guns have a variable flow nozzle that can be moved in different directions to best match existing weather conditions, and this reduces the amount of water required to make snow compared to the old guns.

(B) In Facilities

Does this apply to my facility?	Already in place at my facility	Sub topic:	Water Use in Facilities		Ease of implementation (easy ●, intermediate ■, expert ◆)	Resulting savings (see legend)
		Applicable Sustainable Slopes Principle(s):	• Conserve water and optimize efficiency of water use in ski facilities • Develop outreach that enhances the relationship between the ski area and stakeholders and ultimately benefits the environment			
		Considerations/ Scope:	• Hotel/lodging • Kitchen Activities • Laundry Activities • Building Operations (cooling towers)	**Resources**: Green Leaf™ Eco-Rating Program: Click here Project Planet: Click here		
☐	☐	Conduct water use audits throughout facility. In terms of measurement, correlate water use to skier visits. Keep careful records of water use, read the water meter once a week, and compare the weekly water volume used to the various activities at the facility (i.e. amount of laundry, dishes washed or guests staying at the lodge).			●	
☐	☐	Remind employees and visitors to conserve water – public education campaign. Make water use figures known to employees.			●	
☐	☐	Develop outreach events to communicate waste initiatives to members.			●	
☐	☐	Regularly check facility for leaks and water waste activities. For instance shut everything off and see if the meter stops.			●	
☐	☐	Install water efficient equipment such as low flow faucets, showers, urinals and toilets throughout the facility.			■	
☐	☐	Retrofit faucets by installing aerators with flow restrictors to slow the flow of water or faucets with censors.			■	
☐	☐	Implement an optional linen and towel laundry program at lodging and conference facility.			■	
☐	☐	Purchase and use water saving equipment/appliances for kitchens and lodges (i.e. Energy Star dishwashers and clothes washers).			■	
☐	☐	Control bleed off from ice making machines. Use bleed off for condenser unit.			■	
☐	☐	Use air cooled water fountains and ice making machines.			■	

Success Story #2: Osler Bluff, Ontario
In 2009, Osler updated the design in its clubhouse and orchard lodge washrooms to include explicit water savings measures. Solar-powered, electronic faucets with low flow rates of 1.9 litres per minute (lpm) deliver a pre-tempered water supply that saves on water and energy use. Flushometers for the toilets reduce water use per flush by 30% from 6 litres per flush (lpf) to 4.2 lpf, while automatic flushers reduce water use further by almost 70% to 1.9 lpf. While payback is difficult to determine because of increased usage and occupancy in all of Osler's buildings, it is estimated the water conservation measures have already paid for themselves several times.

(C) Landscaping and Summer Activities

Does this apply to my facility?	Already in place at my facility	Sub topic:	Water Use for Landscaping and Summer Activities		Ease of implementation (easy ●, intermediate ■,	Resulting savings (see legend)
		Applicable Sustainable Slopes Principle(s):	• Maximize efficiency in water use for landscaping and summer activities			
		Considerations:	• Soil conditions • Surface conditions • Vegetation (water needs, adaptability)	**Resources:** Audubon Cooperative Sanctuary Program: Click here Golf Course Superintendents Association of America: Click here Golf Course Pollution Prevention: Click here		
☐	☐	Implement an irrigation schedule. Water grounds at night when the temperature, solar radiation, and wind speed are lower. Make use of rain gauges or computerized weather stations as a means of determining how much watering is needed. Consider vegetation, soil type, slope, site use, and specific vegetation management practices when developing schedule.			●	💧
☐	☐	Inspect and repair irrigation system regularly to ensure that there are no leaks and that heads are not broken or misaligned.			●	💧 💰
☐	☐	Install timers, soil moisture sensors and rainfall shutoffs for irrigation system.			●	💧
☐	☐	Plant heat resistant, drought tolerant vegetation in landscaped areas to reduce maintenance. Improve water retention of soil through use of compost.			●	💧
☐	☐	Collect water (i.e. filter backwash from pool, rain) for non-potable water use (i.e. lawn watering).			●	💧

Success Story #3: Monterra Golf: Certified Audubon Cooperative Sanctuary (at Blue Mountain Resort, Ontario)
This is an international program that is designed to help landowners preserve and enhance the environmental quality of their property. Monterra Golf was one of the first 10 golf courses in the province (there are now 48) to receive this coveted designation. To achieve this, Blue Mountain had to meet rigid standards of management as set out by the Audubon Program. Golf courses earn their designation when they have organized, implemented and documented projects in each of the following categories: environmental planning, wildlife and habitat management, outreach and education, water conservation, water quality management and integrated pest management. For example as established by the Audubon Society water conservation management is sufficient when it includes maximizing irrigation efficiency; determining proper irrigation times and rates; reducing hectares irrigated; recapturing and re-using water; and incorporating drought tolerant plant species.

(D) Wastewater and Stormwater Management

Does this apply to my facility?	Already in place at my facility	Sub topic:	Wastewater and Stormwater Management		Ease of implementation (easy ●, intermediate ■, expert ◆)	Resulting savings (see legend)
		Applicable Sustainable Slopes Principle(s):	• Manage wastewater in a responsible manner			
		Considerations:	• Local municipalities sewer use by-laws	**Resources:** Stormwater Pollution Prevention Handbook: Click here Mt. Ashland Ski Area Stormwater Pollution Control Plan: Click here		
☐	☐	Monitor wastewater quality and plan with local communities for present and future wastewater needs.			■	
☐	☐	Implement a stormwater management plan to collect and re-use water from various sources.			■	
☐	☐	Reuse treated wastewater/greywater for non-potable uses (i.e. landscaping, golf course irrigation).			■	
☐	☐	Create hydration stations that collect snow runoff to fill members' water bottles.			■	
☐	☐	Construct a treatment system for reusing wastewater in snowmaking activities.			◆	

Success Story #4: Mt. Ashland, Washington
In May 2013, Mt. Ashland obtained a Sustainable Slopes grant to help implement 20 projects related to stormwater management erosion prevention and restoration. The projects are varied and include re-vegetation in bare areas with native flora such as grasses and trees, placing jams in rivers to prevent sediment moving, and placing rocks along riversides to combat erosion. The projects span across four different watersheds, and both staff and volunteers have helped with implementation.

Water Use Data Collection Template

Surveyed by:				**Date:**	
A. Snowmaking					
Number of guns		Volume of water used			
Water source					
B. Facilities					
Meters/					
Kitchens	Any energy efficient				
Guest rooms					

C. Landscaping						
Type of Irrigation:	**# hours used/day**	**Units**	**Make & Model**	**Avg. flow rate**	**Avg. Uses**	**Comments**
Drip						Flow Restrictors Used? ☐ Yes ☐ No Adjustable Water Pressure? ☐ Yes ☐ No
Sprinklers						
Other						

Timers used on Sprinkers: ☐ Yes ☐ No	If Yes: Morning: from _____ am to _____ am Evening: from _____ pm to _____ pm
Any leaks? ☐ Yes ☐ No	Description:
Condition of irrigation equipment: ☐ Good ☐ Warn	Description:
Other Equipment: ☐ Yes ☐ No	Description:
D. Wastewater	
Building wastewater is currently: ☐ Treated on site ☐ Connected to the municipal water system ☐ Other	

Potential Water Conservation Actions								
Description of the Action	Annual Water Savings		Other Savings (e.g. energy, diesel fuel)	Total Savings	Annual Costs	Net Savings	Capital Cost	Payback Period
	Litres/ year	$/year		$/year	$/year	$/year	$/year	$/year
TOTAL								

Success Story Template:

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2.0 Energy Conservation and Use Opportunities

Ski areas consume large amounts of energy to make snow, operate lifts, pump snowmaking water, and operate vehicles. Ski area buildings such as lodges, rental shops, administrative buildings, restaurants, ticket sales, and retail shops consume significant amounts of energy for illumination, heating, cooling and ventilation. Consequently, energy use can be among a ski area's largest regular expenses. Ski areas that focus on energy conservation opportunities can significantly reduce monthly operating costs and greenhouse gas emissions.

Developing an Energy Master Plan

Developing an energy master plan involves integrating energy management into every aspect of your organization—from goal setting to training, tracking and reporting. To be successful, an energy master plan should not only consider energy efficient equipment, but also consider the way the equipment is used and maintained as well as the energy use habits of employees and guests. It is also important to communicate your energy savings and greenhouse gas emission reductions, and to look for opportunities to increase the use of renewable energy sources; to document and communicate your energy savings; and, reduce greenhouse gas emissions and contribute to a safer, healthier environment.

Energy management techniques generally fall into four categories:

1. Eliminating waste by turning it off, turning it down or controlling it (for example, turning off lights when not in use, setting back thermostats at night)
2. Reducing the amount of energy used by equipment or maintenance processes (for example, purchase energy efficient equipment)
3. Recovering energy that would otherwise be lost (for example, heat recovery on refrigeration and other equipment)
4. Purchasing renewable forms of energy (for example, ethanol blended gasoline, wind generated electricity)

Among a ski area's operating costs, energy utilities are one of the most controllable. In most cases, a successful energy master plan will require some basic changes in the way equipment is used, the way employees and guests use energy, and the way internal policies or procedures are set. The greatest benefits of such a plan will be realized only when you have senior management support and implement the following changes concurrently throughout your entire operation.

(A) On-hill Operations

Does this apply to my facility?	Already in place at my facility	Sub topic:	Energy Use for Snowmaking, Lifts and Lighting		Ease of implementation (easy ●, intermediate ■, expert ◆)	Resulting savings (see legend)
		Applicable Sustainable Slopes Principle(s):	• Reduce energy use in snowmaking operations • Use cleaner energy in snowmaking operations where possible • Reduce energy use in lift operations • Use cleaner energy in lift operations where possible			
		Considerations:	• Lighting for night skiing	**Useful Resources**: Please refer to snow/lift equipment manufacturer's guidelines for guidance on operating efficiencies.		
☐	☐	Develop a snowmaking plan that includes most efficient methods for each set of weather conditions.			●	
☐	☐	Use most efficient equipment first, adding less efficient equipment as the need to increase capacity rises. This applies to pumps, air compressors and lifts.			●	
☐	☐	Optimize the performance of air compressor systems used for snowmaking – finding and eliminating leaks, choosing the best operating pressure, designing efficient piping systems, etc.			●	
☐	☐	Install new high efficiency snowmaking guns or retrofit/recondition older guns with new nozzles to further reduce snowmaking water and energy consumption. Maximize the use of most efficient snowmaking guns.			■	
☐	☐	Install a water cooling system to cool the water supplied to snowmaking systems. Reducing the temperature of the water increases the efficiency of the snowmaking process by reducing evaporative losses when the water is released to the atmosphere.			■	
☐	☐	Install a system control automation to increase efficiency of the snowmaking system. Will allow snowmaker to accurately modify the snowmaking systems by using computer controls to quickly respond to changing conditions on the slopes and avoid pumping excess water. Consider wet bulb and dry bulb temperature to determine when to make snow and maximize snowmaking efficiency.			■	
☐	☐	Purchase new, energy efficient motors. Rewinding commonly yields motors with poorer energy performance than prior to rewinding, and multiple rewinding typically reduces performance further.			■	
☐	☐	Reduce peak energy demand. For example, when some ski lifts are closed down, start snowmaking activities.			●	
☐	☐	Install timers on all electric heaters used to provide heat for lift related structures, so that heaters operate only when needed, i.e. 9 hours per day.			●	

☐	☐	Schedule lighting for night skiing to optimize daylight hours. Consider adding photocells and/or timers for additional savings.	●	
☐	☐	Replace high-pressure sodium lamps used for night skiing with metal halide fixtures. Fit lamps with hoods to minimize light pollution (i.e. indirect light to woods and sky).	■	
☐	☐	Purchase green power, such as wind-generated power, from energy providers.	◆	

Success Story #1: Burke Mountain, Vermont
Burke Mountain has installed several initiatives that have significantly reduced its energy use on the hills. In 2012 the resort replaced its old diesel rental plant with a more efficient electric compressor plant, which saves an estimated 224,000 kWh of electricity per year and also eliminates over 150,000 litres of diesel and associated greenhouse gas emissions. The resort implemented an updated snowmaking control system that more closely monitors snowmaking operations, thus reducing required energy use even further. With a Sustainable Slopes grant from the National Ski Areas Association, the resort installed 5 low energy HKD snow guns in 2012 and plans to eventually replace all of its snow guns (over 100) with models that will be 4 to 10 times more efficient. The five snow guns obtained with the grant reduced costs by approximately 86% and were expected to save the resort US $10,500 every season.

(B) In Facilities

Does this apply to my Facility?	Already in place at my facility	Sub topic:	Energy Use in Facilities		Ease of implementation (easy ●, intermediate ■, expert ◆)	Resulting savings (see legend)
		Applicable Sustainable Slopes Principle(s):	• Reduce overall energy use in ski area facilities • Use cleaner or renewable energy in ski area facilities where possible • Meet or exceed energy standards in new or retrofit projects • Develop outreach that enhances the relationship between the ski area and stakeholders and ultimately benefits the environment			
		Considerations/ Scope:	• Hotel/lodging • Kitchen Activities • Laundry Activities • Building Operations	**Resources**: Green Leaf™ Eco-Rating Program: Click here EnergyStar program: Click here Saving Energy Dollars in Hotels, Motels and Restaurants: Click here		
☐	☐	Conduct energy use audits throughout facility. Keep careful records of energy use, and review monthly utility charges with departments to identify energy saving opportunities.			●	
☐	☐	Remind employees and visitors to conserve energy. Make energy use figures known to employees.			●	
☐	☐	Develop outreach events to communicate waste initiatives to members.			●	
☐	☐	Shut down office equipment, such as photocopiers and computer monitors, when not in use.			●	
☐	☐	Place tent cards and decals in guest rooms to offer specific energy efficiency suggestions for guests. For example: turning off lights, changing temperature when they are leaving the room. These are often effective when written as a descriptive norm, for example,'75% of guests who stay in this room turn off the lights'.			●	
☐	☐	Train staff to always keep curtains in guest rooms closed during the summer.			●	
☐	☐	Fill hotel rooms on the north side of a building first (and south side last) decreases air conditioning loads. Similarly, filing on the south side first in the winter reduces heating loads.			●	
☐	☐	Reduce energy needed for illumination. Convert incandescent lighting to compact fluorescent. Convert incandescent exit lights to LED. Upgrade fluorescent tubes to T8 or newer, and ballasts from magnetic to electronic.			■	
☐	☐	Use motion sensors to control lighting and HVAC in areas commonly unoccupied can minimize operating waste. Install sunlight sensors that will adjust to the amount of daylight throughout the seasons.			■	
☐	☐	Install programmable thermostats and use night setback for heat control in any and all areas not used at night. Time-clocks to limit HVAC operation eliminates waste.			■	

☐	☐	Turn off heat and air conditioning in unused areas at all times, i.e. in hotel rooms that are unoccupied.	●	
☐	☐	Replace your incandescent or mercury vapour lighting for your parking area with high-pressure sodium or metal halide lighting (add photocells and/or timers for additional savings).	■	
☐	☐	Pool covers are very effective for reducing heat losses from swimming pools. Cover pools when not in use to limit evaporation and reduce heat loss.	●	
☐	☐	Maintain caulking and weather stripping. Keep duct work well sealed.	●	
☐	☐	Dirty condensers increase energy use by as much as 50%. Clean your refrigerator and freezer condenser coils every 3 months. Clean air conditioning unit condensers at least once a year. Check and clean air conditioner filters once each month during periods of heavy use. Cover the outside of air conditioning units during the winter.	■	
☐	☐	Clean out dust out of registers and heat exchangers in baseboard heaters by blowing them out at least once per year; after each unit is blown out, make sure the detachable front panel is reattached properly to ensure efficient air flow.	■	
☐	☐	Replace an old oil or gas boiler or furnace with a high-efficiency oil or gas boiler or furnace or ground source energy.	■	
☐	☐	Minimize energy used to heat water by using low-flow showerheads, efficient laundry equipment, and linen and towel re-use programs.	■	
☐	☐	Refrigerators and freezers operate most efficiently when the refrigerator is set at 3.2° C (37° F) and the freezer is set between –18° C and –15° C (0° and 5° F)	●	
☐	☐	Use the lowest washing temperature that cleans satisfactorily. Wash only full laundry loads.	●	
Purchasing				
☐	☐	Purchase energy efficient water heaters or insulate older water heaters well. Insulate hot water pipe runs. Locate water heaters as close as possible to the primary sites of hot water use.	●	
☐	☐	Purchase and use energy saving equipment/appliances for kitchens and lodges (i.e. Energy Star dishwashers and clothes washers)	●	
☐	☐	Purchase new, energy efficient motors. Rewinding commonly yields motors with poorer energy performance than prior to rewinding, and multiple rewinding typically reduces performance further.	●	
☐	☐	Purchase green power, such as wind-generated power, from energy providers.	◆	

Success Story #2: Calabogie Peaks, Ontario

In 2011, Calabogie Peaks purchased two large, highly efficient wood furnaces that make use of waste wood from the resort's clearing activities to heat 18 buildings. The furnaces heat roughly 85% of the resort's space heating, and 50% of the domestic water use including the hot tub, pool and laundry. Glycol transfers the heat through the 2,130 metres of pipeline (itself mostly constructed from reused steel), and depending on the glycol temperature, it is either pumped faster or slower to obtain optimum efficiency. When the glycol is hot for example, less energy is required to pump the fluid. The resort estimates this new wood furnace system will payback in four years, and it eliminates the need for 75,000 litres and 850,000 kWh of electricity every year.

Success Story #3: Jiminy Peak Mountain Resort, Massachusetts
In 2007 Jiminy Peak became the first North American ski resort with an industrial size (1.5MW) wind turbine to help power its electricity needs. The wind turbine, named Zephyr, supplies a third of Jiminy Peak's electricity needs across all facilities and operations per year, and this percentage climbs to almost 50% during winter. During summer when the wind turbine generates more electricity than Jiminy Peak requires, this goes to the local community. The wind turbine cost US $4 million to construct, and a grant from the Massachusetts Technology Collaborative and an ongoing program selling renewable energy credits help offset that cost. Currently the wind turbine saves the resort US $450,000 per year in energy use, and payback was calculated at seven to eight years. Because the energy is renewable, the resort eliminated over 427,000 litres of annual diesel fuel and its associated 3,220 tonnes of carbon dioxide.

(C) Vehicle Fleets

Does this apply to my Facility?	Already in place at my facility	Sub topic:	Energy Use for Vehicle Fleets		Ease of implementation (easy ●, intermediate ■, expert ◆)	Resulting savings (see legend)
		Applicable Sustainable Slopes Principle(s):	• Reduce fuel use in vehicles used for ski area operations • Use cleaner fuel where possible			
		Considerations / Scope:	• Snowcats • Snowmobiles • Fleet vehicles • Shuttles	**Resources:** FleetSmart: Click here The Canadian Renewable Fuels Association: Click here Clean Snowmobile: Click here Hydraulic Line Inspection template (chapter 7): Click here		
☐	☐	Train staff to eliminate unnecessary idling of vehicles, minimizing trips and reducing speed.			●	
☐	☐	Implement an anti-idling campaign in the resort parking lot (e.g. by posting signs). This will not only reduce the amount of exhaust emitted but also increase fuel efficiency.			■	
☐	☐	Use ethanol-blend gasoline or bio-diesel fuel wherever possible in fleet vehicles including shuttles, trucks, snowmobiles, and other pieces of equipment.			■	
☐	☐	Conduct regular maintenance on fleet vehicles, including monthly tire pressure checks.			●	
☐	☐	Use energy efficient vehicles.			◆	
☐	☐	Provide shuttles or transportation for guests and employees.			■	
☐	☐	Replace two stroke engine snowmobiles with four stroke engine snowmobiles.			■	
☐	☐	Use alternative lubricants (i.e. synthetic low particulate or synthetic biodegradable) in snowmobiles to reduce toxic emissions.			■	
☐	☐	Conduct hydraulic line preventive maintenance on snowcats. Use biodegradable hydraulic oil in snowcats to address environmental concerns associated with on-hill hydraulic line breaks if they do occur.			■	
☐	☐	Practice daily trip planning to reduce the number of deliveries or pickups that are made each day. Complete pre-trip or delivery checklist to avoid doubling back. Consolidate deliveries and pickups.			●	

Success Story #4 – Mount Hood Meadows Ski Resort, Oregon
Mt. Hood Meadows Ski Resort, company trucks display battery-powered message boards. Before 2012, the trucks had to keep idling as the truck batteries themselves were not sufficient to keep a charge for the signs. This was contrary to the resort's 'Know Idling' policy. With a Sustainable Slopes grant, Mt. Hood added a new battery charger, cable and a new battery to every message truck, as well as a power outlet at their facilities so the trucks can charge overnight. Now the trucks no longer need to idle, which has reduced diesel costs and associated pollution, and cut greenhouse gases by

Success Story #5 – Steven's Pass Ski Area, Washington
Stevens Pass is the first ski resort in the United States to have public electric vehicle charging stations. In 2011, helped with a grant from the American government, the resort installed 2 stations that allow for four cars to be per charged at any time. Both stations have the capacity to charge 120 or 220 volts. Stevens Pass has had a positive feedback from the installation, with an estimated 25 vehicles using the charging stations every month.

Calculate Your Lighting Paybacks

A. Number of new units = _____ units
B. Purchase and installation costs per unit = $_____
Multiply A x B **Total cost** = $_____

C. Number of new units* = _____ units
D. Old wattage – New wattage / 1000 = _____ kW saved
E. Usage in hours per day = _____ hours per day
F. Usage in days per week = _____ days per week
G. Usage in weeks per year = _____ weeks per year
H. Average local cost per kWh of electricity = $ _____ (including demand charges)
Multiply C through H **Annual Savings** = $_____

Simple payback = Total cost / Annual Savings = ____ **years**

*This assumes that the number of new lights is the same as the number of old lights.

Success Story Template:

Please provide a summary of your progress on [name of topic] during the past year. Highlight your best achievements and also indicate any goals you hope to achieve during the next year. The information you provide will be included as part of an online database accessible to members of OSRA.

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○Facilities
○Landscaping and Summer Activities
○Wastewater and Stormwater Management</td><td>☐ Energy Conservation

○On-hill Operations
○Facilities
○Vehicle Fleets</td><td>☐ Waste Reduction

○Offices/Lodge Areas
○Cafeteria/Kitchen
○Maintenance</td><td>☐ Education/Outreach

○Keep Winter Cool Day
○Other</td><td></td></tr>
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<tr><td colspan="2">Phone number:</td></tr>
<tr><td colspan="2">Email:</td></tr>
<tr><td colspan="5">Website:</td></tr>
<tr><td colspan="5">Summary/Description of Achievement:</td></tr>
<tr><td colspan="5">Future Goals/Targets:</td></tr>
<tr><td colspan="3">Start Date:</td><td colspan="2">End Date:</td></tr>
<tr><td colspan="3">Time to Implement: years</td><td colspan="2">Estimated Cost to Implement Project: $</td></tr>
<tr><td colspan="3">Total Savings (quantity):</td><td colspan="2">Total Savings (dollars):</td></tr>
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</table>

3.0 Waste Management Opportunities

Waste management is a daily concern for ski resorts. In the past it was relatively inexpensive for ski areas to dispose of solid waste however it is now becoming a significant cost as the landfill tipping fees increase. For many ski resorts the potential financial savings provide sufficient stimuli to embark on a waste reduction project.

Developing a Waste Management Plan

Waste management plans will assist ski resort operators and staff in reducing the volume and toxicity of waste generated throughout the resort. To successfully reduce waste disposal costs, conduct an audit to determine the types and volume of waste currently generated throughout all areas of the resort. Incorporate the "reduce, reuse and recycle" philosophy of waste management to help ensure that materials are being used efficiently and disposed of only after consideration is given to the 3 Rs.

Waste management techniques generally fall into the following categories

1. Reducing – decreasing the amount of a product being consumed or used, therefore reducing the amount of waste generated.
2. Reusing – using a product again for its original purpose without any treatment or modification (i.e. wooden pallets, signs).
3. Recycling – reusing an item by converting it to another state or by reclaiming resources for another use
4. Recovery – extracting and using materials and energy from the waste stream products.
5. Refurbish – repairing a product to bring it back to its original state so that it can be reused (i.e. retreading tires).
6. Remanufacture – modifying a product so that it is more durable and lasts longer.

Waste management is an ongoing process that can be as wide reaching as is necessary. Focus on 'easy wins' first to realize benefits of the program early. This will provide something tangible to report back to senior level staff. If you are thinking of embarking on a waste reduction program, it may be necessary to contact other local businesses or Recycling/Waste associations in your municipalities who can provide more specialist advice.

(A) In Offices/Lodge Areas

Does this apply to my facility?	Already in place at my facility	Sub topic:	Waste Reduction		Ease of implementation (easy ●, intermediate ■, expert ◆)	Resulting savings (see legend)
		Applicable Sustainable Slopes Principle(s):	• Reduce waste produced at ski area facilities • Reuse products and materials wherever possible • Increase the amount of materials recycled at ski area wherever possible • Develop outreach that enhances the relationship between the ski area and stakeholders and ultimately benefits the environment			
		Considerations:	• Purchasing practices – bulk, packaging and recycling content • Staff programs – training, incentives, recognition • Community/municipality – will impact recycling options	**Useful Resources**: • Recycling Council of Ontario: Click here • Waste Reduction Week: Click here		
☐	☐	Conduct a waste audit of your facility to identify and quantify the location and amount of waste generated in all areas of the resort (including guest rooms, lodges, offices, staff rooms etc).			●	
☐	☐	Educate employees on waste management opportunities and goals. Ensure staff are aware of and familiar with all company waste reduction programs, policies and objectives. Education program could include posters, lunchtime information sessions, video programs, newsletter articles.			●	
☐	☐	Develop outreach events to communicate waste initiatives to members.			●	
☐	☐	Consult your municipality and waste hauler on what materials can be recycled in your area. Contact the Ontario Recycling Council for assistance on setting up recycling programs.			●	
☐	☐	Review past invoices from waste haulers to understand what useable information is present on the invoice (in some instances, a landfill tipping fee may be listed on the invoice that can be correlated to solid waste mass or volume). Contact waste hauler to modify invoice if necessary information is not being provided.			●	
☐	☐	Establish a designated central recycling collection system with easy to follow signs and directions. These should be located in high volume areas of the resort – lodges, staff areas, offices, parking lot. Ensure that the bins are well labelled.			●	
☐	☐	Recycle old electronic equipment (i.e. computers, printers, cell phones) by donating to local charities, schools or non-profit groups. Locate a waste exchange program in your community.			■	
☐	☐	Recycle office paper, cardboard, newspaper, aluminium, glass, plastic where possible.			●	
☐	☐	Plan follow-up campaigns to reinvigorate employees and keep the waste reduction program going.			●	

☐	☐	Replace disposable products with reusable, durable products wherever feasible.	■	
☐	☐	Reuse incoming packaging for outgoing shipments. Envelopes and folders can be reused for routing in house mail and correspondence.	●	
☐	☐	Donate unwanted materials (building materials), furniture (tables, chairs) or equipment (i.e. computers) to a local charity, schools, non-profit organizations for reuse.	■	
☐	☐	Install hand dryers or linen roll towels in the bathroom in place of paper towels.	■	
☐	☐	Reuse wooden shipping pallets – if they cannot be reused (i.e. in poor condition) they can be sent to a waste-wood recycler. Request re-usable shipping pallets.	●	
☐	☐	Set up a print on demand system with printers for brochures, pamphlets and flyers to avoid having large amount of waste after a season, event.	●	
☐	☐	Use a centrally located or electronic bulletin board for messages to staff rather than making multiple copies of memos. Set up an e-mail distribution list to send staff memos and bulletins to staff through email or set up an internal website for employees to fill out forms and post information.	●	
☐	☐	For printed products, such as trail maps and brochures, request that all printers give quotes for the product using non-chlorine bleached paper with post-consumer content. Consider purchasing only Forest Stewardship Council Certified paper (https://ca.fsc.org/). Replace all toilet paper, paper towels, tissues and napkins with 100% recycled materials that have at least 15% post-consumer waste and are unbleached paper products.	●	
☐	☐	Eliminate fax cover sheets by using a stamp or post it note designed for fax use.	●	
Purchasing/Leasing				
☐	☐	Review existing purchasing practices to determine how purchasing decisions impact the ski resorts waste management quantities and costs.	●	
☐	☐	Request that vendors avoid excessive boxes, bags and wrappings when shipping to your property, i.e. Encourage suppliers to reduce the amount of packaging or to deliver goods in returnable packages.	●	
☐	☐	Purchase remanufactured toner cartridges for office machines (i.e. copiers, laser printers, fax machines, cash registers and ATM machines).	●	
☐	☐	Purchase furniture, carpet, padding, trash cans and recycling containers made from recycled plastic.	■	
☐	☐	Purchase or lease a double sided photo-copier. Allocate one of the trays in the photocopier and printer for used paper. Use this tray to print or copy draft reports or memos.	■	
☐	☐	Purchase printers capable of double siding. Set the default on all office printers to double sided.	■	
☐	☐	Purchase in bulk wherever possible, i.e. combine office supply orders into one large order – ordering in bulk reduces packaging waste and saves time, energy and money.	■	
☐	☐	Purchase products in refillable, reusable or at least recyclable containers, and ask your suppliers to take back containers.	■	
☐	☐	Purchase a shredder to shred office paper. Shredded paper can then be recycled or used to package shipments.	■	
☐	☐	Check the manufacturer's claims for terms such as non-toxic and biodegradable before making purchasing decisions.	●	

Success Story #1: Beaver Valley Ski Club, Ontario
The installation of two Dyson air blade hand driers in 2009 has reduced BVSC paper towel waste by 50% annually. BVSC will continue to work in reducing their paper towel use by installing one more dryer in a different building at the ski hill. Additionally, this initiative was combined with the inclusion of educational signage around the clubhouse. For example in one bathroom a sign reads: "If you use paper towel for one weekend, it takes 1 tree 1 whole year to absorb the pollution you've created. The Dyson driers create no pollution and use 80% less energy than standard driers". (Sustainable Slopes, 2012).

(B) Cafeteria/Kitchen

Does this apply to my facility?	Already in place at my facility	Sub topic:	Waste Reduction in Cafeteria/Kitchen		Ease of implementation (easy ●, intermediate ■, expert ◆)	Resulting savings (see legend)
		Applicable Sustainable Slopes Principle(s):	• Reduce waste produced at ski area facilities • Reuse products and materials wherever possible • Increase the amount of materials recycled at ski area wherever possible • Develop outreach that enhances the relationship between the ski area and stakeholders and ultimately benefits the environment			
		Considerations/ Scope:	• Composting • Purchasing • Reducing and/or Reusing Materials	**Resources**: • Food for Thought - A Restaurant Guide to Waste Reduction and Recycling: Click here • Sorting it out - A Guide to Waste Reduction, Recycling & Composting in the Food Service Industry: Click here		
☐	☐	Develop outreach events to communicate waste initiatives to members.			●	
☐	☐	Compost food wastes, grass clippings and wood debris for use in landscaping and re-vegetation areas. Composting can be done both on and off site; however, for restaurants where space is limited, the most feasible option is to collect food scraps for an off-site composting program.			■	
☐	☐	Use reusable cups, dishes and utensils in the cafeteria and staff room.			■	
☐	☐	Investigate the use of biodegradable plastic products such as cups, plates, utensils for use in cafeteria and snack bar operations.			◆	
☐	☐	Use washable hats and aprons for kitchen staff rather than disposable paper ones.			●	
☐	☐	Reuse stained tablecloths and napkins.			●	
☐	☐	Request that all fruits, vegetables and meats purchased are packaged and delivered in reusable crates or recyclable boxes.			●	
☐	☐	Purchase dispenser beverages (i.e. juice) in concentrate or bulk and pour into reusable serving containers.			■	
☐	☐	Purchase condiments (i.e. ketchup, mustard) in bulk and supply to visitors at a central location rather than individually wrapped condiment packages.			■	

Success Story #2: Steamboat Ski & Resort Corporation, Colorado

Since 2009, the resort has operated a Zero Waste Initiative which diverted approximately 80% of organic waste from food and beverage locations during 2012. The resort uses the resulting compost material for gardening and re-vegetation projects during the warmer weather. At these food and beverage locations, the resort also emphasizes reusable and compostable items for the guests. The resort has also reduced packaging by returning over 1,310 metres of cardboard and over 2,190 metres of single stream items in 2012 alone. For its efforts Steamboat won NSAA's Silver Eagle in 2010 for Waste Reduction and Recycling (Sustainable Slopes, 2012).

(C) Maintenance & Housekeeping

Does this apply to my Facility?	Already in place at my facility	Sub topic:	Waste Reduction in Hotel and Guest Rooms at Ski Resort		Ease of implementation (easy ●, intermediate ■, expert ◆)	Resulting savings (see legend)
		Applicable Sustainable Slopes Principle(s):	• Reduce waste produced at ski area facilities • Reuse products and materials wherever possible • Increase the amount of materials recycled at ski area wherever possible • Develop outreach that enhances the relationship between the ski area and stakeholders and ultimately benefits the environment			
		Considerations:	• Guest Rooms • Housekeeping • Purchasing procedures • Vehicle maintenance shops	**Resources:** • Guide to Greening Hotels through Waste Management & Green Purchasing: Click here • Green Hotels Program: Click here • Hazardous Waste Information Network: Click here		
☐	☐	Develop outreach events to communicate waste initiatives to members.			●	
☐	☐	Determine whether any solid waste generated at your ski area is hazardous. Hazardous waste is defined as any waste that is corrosive ignitable or toxic and harmful to human health and the environment. Ensure that all hazardous substances are disposed of according to Regulation 347 of the Environmental Protection Act. Waste manifests must be completed and waste should be hauled off site by a registered waste hauler.			●	
☐	☐	Store all hazardous substances in proper containers and away from furnace, heating ducts or drains. Ensure that they are securely contained, properly labelled and that there is spill containment and clean up equipment readily available.			●	
☐	☐	Train cleaning staff on the proper use of cleaning supplies and the ski resort's waste management policies. Encourage staff to suggest additional opportunities to reduce waste throughout the ski resort and lodging facilities.			●	
☐	☐	Encourage guests to recycle by providing accessible containers and signs with descriptive norms specific to each guest room, such as '75% of guests who stay in this room place recyclable items in the container provided'.			●	
☐	☐	Only provide complimentary newspapers to those guests requesting one and avoid placing them in bags.			●	
☐	☐	Provide glasses for guest use in place of disposable cups.			●	
☐	☐	Ensure that all recyclables generated in guest rooms are source separated. This can be accomplished by providing each room with a blue box type receptacle or making the housekeeping staff responsible for source separating recyclable materials from the general waste in each room.			●	
☐	☐	Remanufacture or donate worn mattresses. Mattress manufacturers will rebuild to your specifications and charities will accept worn mattresses as long as they are in good condition.			●	
☐	☐	Provide amenities such as shower caps, shoe wipes upon request.			●	
☐	☐	Replace tissues in guest rooms when they are almost empty or leave new rolls for guests to replace themselves. If company policy to replace half rolls of toilet tissues, save them and donate to shelters or use in staff restrooms.			●	
☐	☐	Dye old or stained bath towels and wash cloths for use in as pool towels or cleaning cloths.			●	
☐	☐	Use baskets or plastic containers for guest laundry rather than plastic bags.			●	
☐	☐	Instead of replacing used or worn parts anywhere, attempt to rebuild or buy reconditioned parts when available. This will help reduce machine waste.			■	
☐	☐	Use refillable spray bottles in the vehicle maintenance shops replacing aerosol cans of brake cleaner, carburetor cleaner, lubricant, and other products.			●	
☐	☐	Install an oil bottle draining system to ensure all oil residue is drained from the bottle. "Empty" quart oil bottles contain oil residue, which not only represents wasted oil, but can prevent recycling of the bottles.			●	
☐	☐	Use water based paints instead of oil based. Look for paints that meet the EcoLogo Standard (www.environmentalchoice.ca).			●	
☐	☐	Use a waste exchange for solid waste materials that are no longer in use or required at your resort.			◆	
Purchasing						
☐	☐	Purchase cleaning supplies (preferably non-toxic or less toxic cleaners) in bulk/concentrated forms. Dispense/dilute into smaller reusable containers for cleaning staff to use.			●	

☐	☐	Purchase toilet paper, tissues, paper towels etc made from recycled paper products.	●	
☐	☐	Purchase housekeeping carts, waste containers, recycling bins, buckets etc made from recycled products.	●	
☐	☐	Purchase carpet, padding, mats, blinds and furniture made from recycled products.	●	

Success Story #3: Sun Valley, Idaho
Since 2010, Sun Valley has donated its used guest room items such as shampoos, bath gels and creams to low income and homeless people in Seattle and Boise. In the first two years of operation, Sun Valley donated over 700 kilograms of items that otherwise would have ended up in the landfill, thus reducing its own waste and providing a benefit to the local community.

Waste Management Template

Complete the following to profile waste generated in your ski resort and related waste reduction goals.

	For Period: _____ **to** _____	
Name of Ski Resort:	**Contact Person:**	**Telephone number:**
Resort Location	**Total Waste Diverted Last Year:**	

Waste Type	Location	Waste Generated (volume)	Amount Recycled (volume)	Amount Reused (volume)	Waste Reduction Goals	Start Date	End Date
Fine Paper							
Corrugated Cardboard							
Newsprint							
Other Paper							
Office Supplies							
Food Waste							
Aluminum							
Metal							
Glass							
Plastics							
Packaging							
Toner – Cartridges							
Textiles							
Grease							
Motor Oil							
Batteries							
Tires							
Construction							
Wood							
Other							

Success Story Template:

Please provide a summary of your progress on [name of topic] during the past year. Highlight your best achievements and also indicate any goals you hope to achieve during the next year. The information you provide will be included as part of an online database accessible to members of OSRA.

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○On-hill Operations
○Facilities
○Vehicle Fleets</td><td>☐ Waste Reduction

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4.0 Green Purchasing Opportunities

Ski resorts purchase numerous products from a variety of sources. Virtually all items purchased will result in the generation of waste over the product's lifetime. In addition, some products require energy or water in order to function. By focusing our attention on identifying the products we use, it is possible to identify opportunities and strategies to reduce significantly the environmental impact of our ski resorts.

Green purchasing involves the integration of environmental considerations into purchasing decisions. Purchasing decisions can reduce the costs associated with waste management, improve worker health and safety, reduce energy and water use and more.

This best practices template on green purchasing is designed for everyone who has purchasing authority or whom are able to influence decision-making with respect to purchasing, i.e. purchasing managers and managers in food/beverage services, lodging, and building/facilities management.

Creating and Implementing Green Purchasing Guidelines

Green purchasing guidelines present an opportunity for ski resorts to reduce their costs associated with waste management, energy and water use while improving worker health and safety. Successfully developing and implementing green purchasing guidelines involve seven key steps:

1. Enlist Management Support – without management commitment, green purchasing typically occurs on an adhoc basis
2. Develop a Committed Team – a team committed to creating and implementing green purchasing guidelines should be established.
3. Decide on an Overall Purchasing Strategy – the team must evaluate how items are currently purchased and whether that system is effective.
4. Create Guiding Principles and Objectives – should be relevant, measurable and attainable.
5. Determine Focus Areas – the team needs to identify commonly purchased items and develop guidelines for their purchase.
6. Establish a Baseline – it is important to measure the impact of the new purchasing system. The team should establish a baseline of products purchased prior to the implementation of green purchasing guidelines.
7. Implement Guidelines and Track Progress – enlisting management support is critical to ensuring that everyone who has purchasing authority follows the guiding principles. The team will also need procedures to track progress and publicize successes.

(A) Purchasing Procedures

Does this apply to my facility?	Already in place at my facility				Ease of implementation (easy ●, intermediate ■, expert ◆)	Resulting savings (see legend)
		Applicable Sustainable Slopes Principle(s): • Reduce waste produced at ski area facilities • Reuse products and materials where possible • Reduce air pollution and greenhouse gas emissions as feasible				
		Considerations / Scope:	• Staff programs – training, incentives, recognition • Community/municipality- will impact recycling options • Across all ski resort departments	**Useful Resources**: Chapter 6 of Greening Your Ski Area – A Pollution Prevention Handbook: here Guide to Green Purchasing: here EnergyStar program: here Environmental Choice: here		
☐	☐	Review existing purchasing practices to determine how purchasing decisions impact the ski resorts waste management quantities and costs.			●	
☐	☐	Establish a purchasing policy and guidelines for staff that are responsible for purchasing. Guidelines should include preferences toward products made of recycled material, are biodegradable, energy efficient, non-toxic, more durable and/or reusable.			■	
☐	☐	Work with all departments to discuss and improve purchasing procedures, criteria and efficiency.			●	
☐	☐	Communicate environmental purchasing criteria/requirements to marketing staff, employees, suppliers, customers and other stakeholders.			■	
☐	☐	Purchasing decisions are based on a total cost or best value approach (i.e. looking at the total cost of purchasing, use and end of life for a particular material, substance or product).			●	
☐	☐	Provide education/assistance to suppliers on environmental matters. Ask suppliers to find new products that meet your environmental criteria. Encourage your supplier to inform their other customers regarding green purchasing and green products available.			■	
☐	☐	Require suppliers to provide environmental information about their company and products.			◆	

☐	☐	Require the use of environmentally preferable transport (i.e. shipping via train versus plane, using propane-fuelled trucks versus diesel and carrying full loads as oppose to half empty one).	■	
☐	☐	Minimize or phase out the purchase, use, handling and disposal of materials and substances that are hazardous or toxic. Check the manufacturer's claims for terms such as non-toxic and biodegradable before making purchasing decisions. Look for recognized scientifically based biodegradability/compostability specifications, such as the USA standard ASTM D6400-99 and the European standard EN 13432. Biodegradation is the process of converting organic materials back to carbon dioxide and water.	●	
☐	☐	Buy locally produced products whenever possible, this not only supports the local economy but it helps to decrease fuel use and emissions associated with transporting products.	●	
☐	☐	Replace disposable products with reusable, durable products wherever feasible	■	
☐	☐	For printed products, such as trail maps and brochures, request that all of printers give quotes for the product using non-chlorine bleached paper with post-consumer content. Consider purchasing only Forest Stewardship Council Certified paper (http://www.fscus.org/paper/). Replace all toilet paper, paper towels, tissues and napkins with 100% recycled materials that have at least 15% post-consumer waste and are unbleached paper products.	●	
Green Purchasing Techniques				
☐	☐	Making smarter purchases – can be used as a means of eliminating inefficiencies. Ways to undertake smarter purchasing include: minimizing the number of different products that serve the same function; ordering appropriate quantities in circumstances when products have a limited shelf life (i.e. food) or pose increase risk when stored (i.e. chemicals); and, purchase in bulk when savings in packaging and delivery costs can be achieved.	●	
☐	☐	Green specifications – can be used to require that products exhibit certain attributes such as product or packaging content, labelling, design features, reusability of the product and take-back at end-of-life. Optimize the purchase of products/material that exhibit eco-logos, environmental labels, or contain recycled/renewable material.	■	
☐	☐	Prohibit or limit certain substances – such that their use in products purchased is reduced or eliminated.	●	
☐	☐	Develop a list of environmentally preferred products – from which a purchaser can select from.	■	
☐	☐	Qualify suppliers – by requiring them to have a corporate environmental policy or be certified to a set of environmental standards (such as ISO 14001 or eco-logo certification).	■	
☐	☐	Working collaboratively with suppliers – to avoid excessive boxes, bags and wrapping when shipping your purchases. Encourage suppliers to deliver goods in returnable packages. Enhance the service component, where the supplier retains ownership and responsibility for certain pieces of equipment.	●	

Success Story #1: Hockley Valley, Ontario
One of the most unique green purchasing initiatives of this resort is its organic, four-acre garden, first begun in 2009 right at the resort. In 2013 the garden supplied a full 60%-70% of all the resort's fruit and vegetables. The garden not only emphasizes Hockley's commitment to local food, but it improves guest satisfaction, reduces Hockley's CO_2 footprint, and creates a cradle-to-cradle solution as 70 tonnes of food waste is diverted from landfills and reused as garden compost. Hockley has also created its own local vineyard which will further strengthen its commitment to local produce, with wines expected for 2015. As well, by using 100% recycled paper products such as napkins, toilet paper and paper towels, every year Hockley does away with 21,370 kilograms of wasted paper, almost 75,000 litres of water, and 32 cubic metres of landfill space.

Success Story #2: Deer Valley, Utah
Deer Valley has made an effort to commit to green purchasing across all of its operations. The resort uses washable linens for guests and uses environmentally friendly detergent, and approximately 70% of the cost of paper products (tissues, hand towels, and toilet paper) is for products with recycled content. The resort upcycles its 28 year old wood from Silver Lake Lodge for new projects such as picnic tables or stairs, and the resort eliminated the waste of 23,000 disposable cups by simply using reusable glassware in all employee dining areas. In their cafeteria, Deer Valley serves local vegetables, cheese, meat and chocolate, and only has sustainably-sourced fish and fair trade coffee. The resort also buys liquids such as juice and tea in bulk to lessen packaging.

(B) Cafeteria / Kitchen

Does this apply to my facility?	Already in place at my facility	Applicable Sustainable Slopes Principle(s): • Reduce waste produced at ski area facilities • Reuse products and materials where possible • Reduce air pollution and greenhouse gas emissions as feasible			Ease of implementation (easy ●, intermediate ■, expert ◆)	Resulting savings (see legend)
		Considerations/ Scope:	• Kitchen Activities • Hotel/Lodging • Reducing/Reusing materials	**Resources**: Environmental Choice: here Canadian Organic Growers Inc.: here		
☐	☐	Request that all fruits, vegetables and meats purchased are packaged and delivered in returnable crates or recyclable boxes.			●	
☐	☐	Purchase dispenser beverages (i.e. juice) in concentrate or bulk and pour into reusable serving containers.			■	
☐	☐	Purchase condiments (i.e. ketchup, mustard) in bulk and supply to visitors at a central location rather than individually wrapped condiment packages.			■	
☐	☐	Purchase products in refillable, reusable or at least recyclable containers, and ask your suppliers to take back containers			■	
☐	☐	Use reusable cups, dishes and utensils in the cafeteria and staff room.			■	
☐	☐	Purchase furniture, carpet, padding, trash cans and recycling containers made from recycled plastic.			■	
☐	☐	Investigate the use of biodegradable plastic products such as cups, plates, utensils for use in cafeteria and snack bar operations. For example, Seeker Green Products Limited (http://www.seekergreen.com/) has undergone the verification process of the Environmental Choice Program. Consider charging customers an additional fee for the use of single use, disposable items that must be sent to landfills.			◆	

Success Story #3: Burke Mountain, Vermont
Burke Mountain has introduced several new green purchasing decisions. It now requires the acquisition of only post-consumer recycled-content paper napkins and towels, soup bowls, Eco-hot cups, and compostable drink cups for its dining rooms, and only has re-usable utensils instead of plastic disposables. Burke is a member of the Green Mountain Farm Direct, which sources Vermont-local food such as fresh meat and vegetables to the resort's restaurants; this commitment to green, local food purchases earned Burke the award for "Green Restaurant in the Green Mountain State" from the Vermont Business Environmental Partnership.

(C) Housekeeping / Operations / Maintenance Activities

Does this apply to my facility?	Already in place at my facility	Applicable Sustainable Slopes Principle(s): • Minimize the use of potentially hazardous materials, the generation of potentially hazardous wastes and the risk of them entering the environment • Reduce waste produced at ski area facilities • Reuse products and materials where possible • Use cleaner fuel where possible • Use cleaner or renewable energy in ski area facilities where possible • Reduce overall energy use in ski area facilities			Ease of implementation (easy ●, intermediate ■, expert ◆)	Resulting savings (see legend)
		Considerations / Scope:	• Hotel / Lodging • Building Operations • Vehicle Maintenance Shops	**Resources:** Cleaners and Toxins Project – Labour Environmental Alliance Society: here The Canadian Renewable Fuels Association: here Clean Snowmobile: here		
☐	☐	Purchase cleaning supplies (preferably non-toxic or less toxic cleaners) in bulk/concentrated forms. Dispense/dilute into smaller reusable containers for cleaning staff to use.			●	
☐	☐	Purchase toilet paper, tissues, paper towels etc. made from recycled paper products.			●	
☐	☐	Purchase housekeeping carts, waste containers, recycling bins, buckets etc. made from recycled products.			●	
☐	☐	Use water based paints instead of oil based. Look for paints that meet the EcoLogo Standard (www.environmentalchoice.ca).			●	
☐	☐	Convert incandescent lighting to compact fluorescent. Convert incandescent exit lights to LED, upgrade fluorescent tubes to T8 or newer, and ballasts from magnetic to electronic.			■	
☐	☐	Replace your incandescent or mercury vapour lighting for your parking area with high-pressure sodium or metal halide lighting (add photocells and/or timers for additional savings).			■	
☐	☐	Replace an old oil or gas boiler or furnace with a high-efficiency oil or gas boiler or furnace or ground source heating.			■	
☐	☐	Purchase energy efficient water heaters or insulate older water heaters well. Insulate hot water pipe runs. Locate water heaters as close as possible to the primary sites of hot water use.			●	
☐	☐	Purchase new, energy efficient motors. Rewinding commonly yields motors with poorer energy performance than prior to rewinding, and multiple rewinding typically reduces performance further.			●	
☐	☐	Investigate and purchase a renewable energy source to add to your ski resort's conventional electricity supply.			◆	
☐	☐	Use ethanol-blend gasoline or bio-diesel fuel wherever possible in fleet vehicles including shuttles, trucks, snowmobiles, and other pieces of equipment.			■	
☐	☐	Use alternative lubricants (i.e. synthetic low particulate or synthetic biodegradable) in snowmobiles to reduce toxic emissions.			■	
☐	☐	Purchase and plant heat resistant, drought tolerant vegetation in landscaped areas.			●	

Success Story #4: Whistler-Blackcomb, British Columbia
Whistler-Blackcomb, the largest mountain resort in North America, has committed to not only green purchasing, but also thinking more deeply about reusing items so they have a second life. The resort has a mountain materials exchange (MMEX) where staff donate used items such as skis, clothes and equipment, and old uniforms are sent to economically disadvantaged mountain communities worldwide. In the last 13 years, the resort has sent over 31,000 winter jackets and pants, 85% of which have gone to Romania.

(D) In Offices / Lodge Areas

Does this apply to my facility?	Already in place at my facility	Applicable Sustainable Slopes Principle(s): • Reduce overall energy use in ski area facilities • Meet or exceed energy standards in new or retrofit projects • Reduce waste produced at ski area facilities • Reuse products and materials where possible • Reduce air pollution and greenhouse gas emissions as feasible			Ease of implementation (easy ●, intermediate ■, expert ◆)	Resulting savings (see legend)
		Considerations / Scope:	• Reducing / reusing materials	**Resources:** Project Planet: here EnergyStar program: here Environmental Choice: here		
☐	☐	Purchase in bulk wherever possible, i.e. combine office supply orders into one large order – ordering in bulk reduces packaging waste and saves time, energy and money. Investigate whether establishing a buying cooperative with other nearby businesses is an option.			■	
☐	☐	Purchase remanufactured toner cartridges for office machines (i.e. copiers, laser printers, fax machines, cash registers and ATM machines).			●	
☐	☐	Consider purchasing only Forest Stewardship Council Certified paper (http://www.fscus.org/paper/). Replace all toilet paper, paper towels, tissues and napkins with 100% recycled materials that have at least 15% post-consumer waste and are unbleached paper products.			●	
☐	☐	Purchase furniture, carpet, padding, trash cans and recycling containers made from recycled plastic.			■	
☐	☐	Purchase or lease a double sided photo-copier. Allocate one of the trays in the photocopier and printer for used paper. Use this tray to print or copy draft reports or memos.			■	
☐	☐	Purchase printers capable of double siding. Set the default on all office printers to double-sided. Have one central printer shared by all employees rather than desk top printers.			■	
☐	☐	Purchase a shredder to shred office paper. Shredded paper can then be recycled or composted or used to package shipments.			■	
☐	☐	Purchase office equipment that is ENERGY STAR certified.			■	
☐	☐	Purchase and use energy and water saving equipment for lodges (i.e. ENERGY STAR labeled televisions and dishwashers). Install automatic shut off controls or motion detector switches.			■	

TOOL #1: Green Purchasing Checklist

Once you have established that a purchase should be made, there are a number of specific product characteristics that can help identify a greener alternative.	**Response**		
Is the product:	Yes	No	N/A
• Designed to minimize waste?			
• Energy efficient?			
• Less polluting during its use than other competing products (e.g. non-toxic cleaning products, biodegradable, no volatile organic compounds)?			
• Manufactured from recycled materials including a high percentage of post-consumer recycled content?			
• Free from restricted or banned substances (e.g. no cholorfluorocarbons)			
• Durable, with a long service life warranty?			
• Accompanied by clear and comprehensive operating instructions? (this will help ensure it is used efficiently)			
• Easy to maintain in good operating condition?			
• Economical to repair or have replaceable parts?			
• Easy to upgrade?			
• Reusable or includes reusable parts?			
• Produced locally?			
Is the product packaging:			
• Designed to minimize waste?			
• Refillable?			
• Reusable by the end-user?			
• Recyclable locally?			
• Made from recycled materials containing a high percentage of post consumer waste?			
• Accepted by the supplier for reuse, recycling or recovery?			
At the end of the product's useful life can the product or its parts:			
• Be reused?			
• Be resold?			
• Be returned to the supplier for reuse, recycling or recovery?			
• Be recycled locally?			

Calculate the product's green score:

_____ divided by (22 - ___) = _____ multiplied by 100 = _____

[Total Yes] **[Total N/A]** **[Total Score]**

Green Score: 0-33% (Not Green) 34-66% (Light Green) 67-100% (Dark Green)

TOOL #2: GREEN PURCHASING OPTIONS RANKING TABLE

How to Use the Green Purchasing Options Ranking Table:

The purpose of the ranking table is to determine which of the potential purchasing actions can provide your ski resort with the greatest benefit for the least cost.

Transfer your potential purchasing actions to the attached Green Purchasing Options Ranking Table. With input form team members and management, identify all foreseeable costs and benefits associated with each purchasing action. Aspects of costs and benefits can include, but are not limited to the following (a more comprehensive list can be found in tool #3):

- Monetary: investment requirements
- Personnel: training, health + safety
- Customers: corporate image
- Product Use and Maintenance: re-tooling, inventory, durability, energy requirements, serviceability, user operating costs
- Environmental: toxic emissions, waste management costs

Example of Potential Purchasing Action

	Benefits	Costs
Integrate energy use requirements into purchasing decisions	• Lower energy requirements for equipment and machinery	• Research • Possible relationship costs associated with changing suppliers • Administrative costs

After listing the costs and benefits for a purchasing action, assign a numerical ranking of 3, 2, or 1 (high, medium or low) to describe that action's total benefits and costs. Lastly, calculate the benefit-cost ratio using the formula in the attached ranking table. The result will be either:

Greater than 1: benefits are greater than costs; purchasing action should be given a high priority;

Equal to 1: benefits are equal to costs; purchasing action should be given a lower priority; or

Less than 1: costs are greater than benefits; actions should only be implemented on compelling, non-financial grounds.

TOOL #2: GREEN PURCHASING OPTIONS RANKING TABLE

Potential Purchasing Actions	Benefits	Benefits High = 3 Med = 2 Low = 1	Costs	Costs High = 3 Med = 2 Low = 1	Ratio Benefits/Costs	Rank

TOOL #3: FINANCIAL ANALYSIS METHODS

It is possible to measure cost savings from green purchasing using traditional financial data that measures direct cost savings such as capital costs, raw materials, and utilities. Yet, unlike other purchasing decisions, green products may offer significant indirect savings in areas of waste management, worker health and safety, and other often overlooked expenses. By solely focusing on direct cost savings, organizations have a tendency to underestimate the financial benefits and long-term qualitative benefits of green purchasing.

The table presented below provides a list of important costs to consider when comparing and evaluating green products with the current products your ski resort uses.

Direct Costs: Capital and Operating	
• New Equipment / Product • Installation / Site Preparation • Start up Training • Parts • Space Needs • Utility Systems and Connections	• Materials / Supplies • Labour (process operations, time spent, monitoring) • Maintenance (labour & materials) • Protective Equipment • Utilities
Indirect Costs: Capital and Operating	
• Permit fees • Monitoring • Remediation • Demolition and Salvage • Installation and Construction • Training • Taxes • Insurance	• Marketing and Public relations • Emergency Plans • Material reuse • Waste handling (labour and fees) • Waste disposal (transport and fees) • Paperwork (tracking information and reporting) • Storage • On-going Safety and Equipment Training • Legislative compliance • Fees • Taxes • Insurance
Future Liability Costs	
• Fines • Personal injury claims • Site remediation	
Intangible / Less Quantifiable Costs	
• Negative image (customers, investors, staff, insurers, regulators) • Employee and community health and safety	
External Costs	
• Societal costs associated with production, use and disposal of product	

Financial Analysis Methods for Assessing Green Products

Payback and Net Present Value are the two most common financial analysis methods. Payback can be a quick method for comparing alternatives while Net Present Value offer the advantage of accounting for the time-value of money.

Resources to help use financial analysis methods:

Environmental Management Accounting Topic Hub:
http://www.newmoa.org/prevention/topichub/toc.cfm?hub=105&subsec=7&nav=7

Success Story Template:

Please provide a summary of your progress on [name of topic] during the past year. Highlight your best achievements and also indicate any goals you hope to achieve during the next year. The information you provide will be included as part of an online database accessible to members of OSRA.

Resort Name:				
Title of the Project:				
Category of Project (check one):				
☐ **Green Purchasing**	☐ **Water Conservation**	☐ **Energy Conservation**	☐ **Waste Reduction**	☐ **Education/Outreach**
○ Purchasing Procedures ○ Cafeteria/Kitchen ○ **Housekeeping** ○ Operations/Maintenance Activities ○ Offices/Lodge Areas	○**Snowmaking** ○**Facilities** ○**Landscaping and Summer Activities** ○**Wastewater and Stormwater Management**	○**On-hill Operations** ○**Facilities** ○**Vehicle Fleets**	○**Offices/Lodge Areas** ○**Cafeteria/Kitchen** ○**Maintenance**	○**Keep Winter Cool Day** ○**Other**
Address:			**Contact Name:**	
			Phone number:	
			Email:	
Website:				
Summary/Description of Achievement:				
Future Goals/Targets:				
Start Date:			**End Date:**	
Time to Implement:	**years**		**Estimated Cost to Implement Project: $**	
Total Savings (quantity):			**Total Savings (dollars):**	