

NATIONAL
SKI AREAS
ASSOCIATION



2005 Assessment Tool

DUE:
Friday, May 27, 2005



Acknowledgements

The NSAA wishes to again sincerely thank the following resorts for their cooperation and information regarding sample calculations for use in this year's instructions:

- Breckenridge Ski Resort
- Deer Valley Resort Company
- Grand Targhee Ski & Summer Resort
- Keystone Resort
- Massanutten Ski Resort
- Mt. Hood Meadows Ski Resort
- Whiteface

Thank you for taking the time to complete the streamlined Assessment Tool. Your responses will be used to assess the environmental performance of the ski industry as a whole, and will guide continued positive environmental actions for the industry.

No changes have been made to the 2005 Environmental Charter Assessment Tool from the 2004 version. NSAA purposefully did not change the Tool this year in an effort to give resorts advanced notification of all the information requested this year. NSAA hopes that this effort will further ease the reporting process for resorts and, ultimately, lead to an increased response rate.

In 2004, significant changes were implemented for the Assessment Tool that reduced the number of questions to answer by over 200. Qualitative reporting of the 177 best management practices across the 21 Principles of the Charter (formerly located on Forms 1-21 of the Assessment Tool) is no longer required. However, because resorts have relayed that this portion of the assessment tool is a valuable method for internal benchmarking, this portion continues to be available on the NSAA web-site for optional use by resorts. Separate instructions, titled *2005 Assessment Tool Instructions Optional Forms Only*, for these optional forms are available along with all the other forms for the Tool at <http://www.nsa.org/ss>. (As in 2004, data from these forms will not be compiled and analyzed as part of the Annual Report.)

Again this year, the Environmental Indicators Form (formerly Form 22) only asks for the sum of energy, water, solid waste, and transportation *reductions* from individual projects; *total* utility usage (energy and water) and waste generation data is no longer requested. Note that the optional worksheet for the Environmental Indicators Form remains a part of the Tool this year. Again, this worksheet helps resorts explain the basis of their responses and simplify reporting from year to year. This instructional document again includes examples of completed forms and sample savings calculations from individual projects to help resorts complete the Environmental Indicators Form.

Steps to Complete the Assessment Tool

- ***Forms 1 (Environmental Indicators) and Form 2 (Summary) are mandatory*** for successful completion of the Tool. The Form 1 worksheet and Form 3 (Green Room entries) are optional.
- If you have questions while completing the forms, please contact Judy Dorsey at 970-207-0058 or jdorsey@brendlegroup.com.
- Once your hard copy forms are completed, enter the data onto the web site forms. Alternatively, if you don't have web access, you can fax your completed forms to Judy Dorsey at 970-207-0059. Once your data has been entered into the web site forms (either by you directly or by The Brendle Group), you will receive an email confirmation and a customized "Summary Report" of your responses, along with related climate change information.

- The Form 1 Worksheet is not available as a web-based form, rather only as a hard copy. We again highly encourage you to complete the form by hand and fax (970-207-0059) or mail it to Judy Dorsey, The Brendle Group, Inc., 2138 Sunstone Drive, Fort Collins, CO 80525. Although this form is optional, it will help you to explain the basis for the numbers provided in Form 1 and make reporting easier from year to year. A number of resorts utilized this optional worksheet to successfully complete the Tool in 2004.
- In addition to the email confirmation, a complete copy of your 2005 responses will automatically be sent to you at a later date.
- Forward any suggestions for improving the tool or these instructions to jdorsey@brendlegroup.com or mail to Judy Dorsey, The Brendle Group, Inc., 2138 Sunstone Drive, Fort Collins, CO 80525.

Form 1 Environmental Indicators (and Worksheet)

Form 1 is mandatory to successfully complete the Assessment Tool for your resort.

Note: For Form 1 responses, do not use commas in any numbers entered online.

As in the 2004 Assessment Tool, reporting of resorts' Environmental Indicators for 2005 is completed on Form 1. The tool again includes a Form 1 Worksheet (optional) to help resorts explain the basis of their Form 1 responses and also simplify reporting from year to year. The 2005 Assessment Tool again includes four quantitative indicators to characterize the environmental state of the industry: 1) water conservation; 2) electric energy conservation and renewable energy; and 3) waste reduction and recycling; and 4) transportation demand reduction.

Because of strong resort interest, and in continued support of the "Keep Winter Cool" campaign, information that allows energy, solid waste, and transportation savings to be converted to climate benefits is required. In the automated email response to your assessment form, your answers to these climate benefit questions will again be converted into pounds of CO₂ emissions that have been reduced at your resort.

For Form 1, the instructions are organized as follows:

1. General Instructions Applicable to all Media Types
2. Water Savings Instructions
3. Electric Energy Savings and Renewable Energy Instructions
4. Waste Management Instructions
5. Transportation Instructions

Before proceeding with the section on General Instructions Applicable to all Media Types, fully completed examples of Form 1 and Form 1 Worksheet are presented. In

addition to showing completed examples, these forms relay that the savings totals entered in Form 1 are most often a summation of savings from multiple individual projects. In the example, the individual projects are described on the optional Form 1 Worksheet and the overall savings totals are entered in the mandatory Form 1. Note that the data represented in these two forms are examples only and should not be interpreted literally. Additionally, these sample savings do not relate directly to the sample calculations shown later in this instructional document.

Instructions for 2005: Environmental Charter Assessment Tool

Form 1. Environmental Indicators																																																	
<p>Purpose</p> <p>The Charter recommends that endorsing resorts gather data to measure, document, and report their progress toward implementing the Principles of Sustainable Slopes. As in previous years, the Environmental Indicators Form (formerly No. 22, now revised to No. 1 below) had been used to assist resorts and the industry with that goal. This year, the Environmental Indicators Form has been simplified to only quantify the savings, both in terms of resources and climate benefits, of your water, energy, waste, and transportation reduction projects. Resorts are encouraged to utilize the Form 1 Worksheet to assist them in determining Form 1 values to explain the basis for their responses here and to make reporting easier from year to year.</p>																																																	
<p>Water Savings</p> <p>1a. Estimate the amount of water in gallons that your resort saved last year in snowmaking operations (non-consumptive use) through water conservation efforts. Please refer to the 2004 Assessment Tool Instructions sample calculations under Water Savings for more assistance. 360000 gallons</p> <p>1b. Estimate the amount of water in gallons that your resort saved last year in all other operations (consumptive use) through water conservation efforts. Please refer to the 2004 Assessment Tool Instructions sample calculations under <u>Water Savings</u> for more assistance. 143000 gallons</p>																																																	
<p>Electric Energy Savings and Renewable Energy Use</p> <p>2a. Estimate the amount of electric energy in kWh that your resort saved last year through energy conservation efforts. Please refer to the 2004 Assessment Tool Instructions sample calculations under Electric Energy Savings for more assistance. 215000 kWh</p> <p>2b. Estimate the amount of renewable electric energy in kWh that your resort generated for onsite use last year (i.e., wind turbines, photovoltaic panels, micro-hydro, etc.). Please refer to the 2004 Assessment Tool Instructions sample calculations under <u>Renewable Energy</u> more assistance. (Note that this item does NOT include transportation applications.) 0 kWh</p> <p>2c. Estimate the amount of renewable electric energy in kWh that your resort purchased from a Utility or green power provider for onsite use last year (i.e., wind power, hydro power, etc.). Please refer to the 2004 Assessment Tool Instructions sample calculations under Renewable Energy more assistance. (Note that this item does NOT include transportation applications.) 90000 kWh</p>																																																	
<p>Waste Reduction</p> <p>3a. Estimate the amount of waste that your resort diverted from the landfill last year through waste reduction, reuse, or recycling efforts. Please refer to the 2004 Assessment Tool Instructions sample calculations under Waste Management for more assistance. 52 tons</p> <p>3b. To convert waste reduction to greenhouse gas benefits, please estimate what portion of total waste diverted (question 3a) can be allocated to each of the following categories. Your responses to both columns for question 3b should total 100% .</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;"></th> <th style="width: 20%; text-align: center;"><u>Reduction</u></th> <th style="width: 20%; text-align: center;"><u>Recycling</u></th> <th style="width: 10%;"></th> </tr> </thead> <tbody> <tr> <td>Paper (office paper, newspaper, magazines, phonebooks) _____ %</td> <td></td> <td></td> <td style="text-align: right;">26 %</td> </tr> <tr> <td>Aluminum _____ %</td> <td></td> <td></td> <td style="text-align: right;">6 %</td> </tr> <tr> <td>Glass _____ %</td> <td></td> <td></td> <td style="text-align: right;">18 %</td> </tr> <tr> <td>Plastic _____ %</td> <td></td> <td></td> <td style="text-align: right;">6 %</td> </tr> <tr> <td>Cardboard _____ %</td> <td></td> <td></td> <td style="text-align: right;">43 %</td> </tr> <tr> <td>Food Waste (composting only) _____ %</td> <td></td> <td style="text-align: center;">N/A</td> <td style="text-align: right;">%</td> </tr> <tr> <td>Landscape/vegetative materials (composting only) _____ %</td> <td></td> <td style="text-align: center;">N/A</td> <td style="text-align: right;">%</td> </tr> <tr> <td>Metal _____ %</td> <td style="text-align: center;">N/A</td> <td></td> <td style="text-align: right;">0 %</td> </tr> <tr> <td>Construction Lumber and Wood Pallets _____ %</td> <td></td> <td></td> <td style="text-align: right;">1 %</td> </tr> <tr> <td>Other (specify): _____ %</td> <td></td> <td></td> <td style="text-align: right;">%</td> </tr> <tr> <td style="text-align: right;">TOTAL (Both Columns)</td> <td></td> <td style="text-align: center;">100%</td> <td></td> </tr> </tbody> </table>			<u>Reduction</u>	<u>Recycling</u>		Paper (office paper, newspaper, magazines, phonebooks) _____ %			26 %	Aluminum _____ %			6 %	Glass _____ %			18 %	Plastic _____ %			6 %	Cardboard _____ %			43 %	Food Waste (composting only) _____ %		N/A	%	Landscape/vegetative materials (composting only) _____ %		N/A	%	Metal _____ %	N/A		0 %	Construction Lumber and Wood Pallets _____ %			1 %	Other (specify): _____ %			%	TOTAL (Both Columns)		100%	
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<p>Transportation Demand Reduction</p> <p>4a. Estimate the number of vehicle miles traveled (VMT) that were avoided last year through your various transportation demand reduction initiatives. Please refer to the 2004 Assessment Tool Instructions sample calculations under Transportation for more assistance. (Note that this item does NOT include use of alternative fuels.) 425000 VMT</p> <p>4b. To convert transportation demand reduction to greenhouse gas benefits, please estimate what portion of total transportation demand reduction (question 4a) can be allocated to each of the following categories. Your response to question 4b should total 100%.</p> <table style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td style="width: 60%;"></td> <td style="width: 20%; text-align: center;">Buses - diesel</td> <td style="width: 20%;"></td> <td style="width: 10%; text-align: right;">0 %</td> </tr> <tr> <td></td> <td style="text-align: center;">SUV/light truck/passenger van - gasoline</td> <td></td> <td style="text-align: right;">76 %</td> </tr> <tr> <td></td> <td style="text-align: center;">SUV/light truck/passenger van - diesel</td> <td></td> <td style="text-align: right;">0 %</td> </tr> <tr> <td></td> <td style="text-align: center;">Car - gasoline</td> <td></td> <td style="text-align: right;">24 %</td> </tr> <tr> <td>Other (specify): _____</td> <td></td> <td></td> <td style="text-align: right;">0 %</td> </tr> <tr> <td style="text-align: right;">TOTAL</td> <td></td> <td></td> <td style="text-align: right;">100%</td> </tr> </tbody> </table>			Buses - diesel		0 %		SUV/light truck/passenger van - gasoline		76 %		SUV/light truck/passenger van - diesel		0 %		Car - gasoline		24 %	Other (specify): _____			0 %	TOTAL			100%																								
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Instructions for 2005: Environmental Charter Assessment Tool

Form 1. Worksheet (Optional)					
Purpose					
<p>This worksheet is optional. It provides a place to document the individual projects that contribute to the sums reported on Form 1, including subtotals by project, and the methods and assumptions used to develop subtotals. Please refer to the 2004 Assessment Tool Instructions for an example of a completed worksheet.</p>					
Water Savings - Non-Consumptive					
Project Title/Description	Subtotal (gallons)	Year Implemented	Calculation Method/Assumptions	Resort Contact Person/Phone	
1	Installation of more water efficient air/water type snowmaking guns	10,000	2004	2 new guns installed; Old/new equipment ratings - 4/3.75 gpm; Guns operate 333 hrs/yr.	J Sieving 970-207-0058
2	Snowboard park use dirt foundations rather than snow	350,000	2003	Savings are ongoing; Quantity per historical records of snow used for this purpose	J Sieving 970-207-0058
TOTAL (should equal Form 1 Line 1a)		360,000			
Water Savings - Consumptive					
Project Title/Description	Subtotal (gallons)	Year Implemented	Calculation Method/Assumptions	Resort Contact Person/Phone	
1	Installed low flow showerheads	45,500	2004	25 heads; Old/new - 3/2 gpm; Assume shower use 10 min/day, 182 days/season	J Sieving 970-207-0058
2	Replaced old clotheswasher	1,500	2002	Ongoing savings; Old/new ratings - 2.5/1.0 gals per lb; 1000 lbs/yr for 1 new washer	J Sieving 970-207-0058
3	Installed new commercial dishwasher	96,000	2004	Savings based on vendor calculations for water usage in a 3-tank vs 4-tank unit.	J Sieving 970-207-0058
TOTAL (should equal Form 1 Line 1b)		143,000			
Electric Energy Savings					
Project Title/Description	Subtotal (kWh)	Year Implemented	Calculation Method/Assumptions	Resort Contact Person/Phone	
1	Compressed air operating pressure reduction	3,500	2004	Pressure reduced to match load (5 psig); Savings from kW logger data, 4,380 hrs/yr use	J Sieving 970-207-0058
2	Lighting improvements in mtn restaurants	211,500	2002	1000 4-lamp T12 fluorescent fixtures replaced with 4-lamp T8 fixtures; xxxx hrs/yr use	J Sieving 970-207-0058
TOTAL (should equal Form 1 Line 2a)		215,000			
Renewable Energy - On-Site					
Project Title/Description	Subtotal (kWh)	Year Implemented	Calculation Method/Assumptions	Resort Contact Person/Phone	
1	No projects				
TOTAL (should equal Form 1 Line 2b)		0			
Renewable Energy - Purchased					
Project Title/Description	Subtotal (kWh)	Year Implemented	Calculation Method/Assumptions	Resort Contact Person/Phone	
1	Wind power purchased to run ski lift	90,000	2001	Per utility records, 18,000 kWh/mo purchased during 5-month ski season.	J Sieving 970-207-0058
TOTAL (should equal Form 1 Line 2c)		90,000			
Waste Reduction					
Project Title/Description	Subtotal (tons)	Year Implemented	Calculation Method/Assumptions	Resort Contact Person/Phone	
1	Plastic	4	1997	Based on tracking records from recycler.	J Sieving 970-207-0058
2	Paper	20	1999	Based on tracking records from recycler.	J Sieving 970-207-0058
3	Glass	28	1994	Based on tracking records from recycler.	J Sieving 970-207-0058
TOTAL (should equal Form 1 Line 3a)		52			
Transportation Demand Reduction					
Project Title/Description	Subtotal (VMT)	Year Implemented	Calculation Method/Assumptions	Resort Contact Person/Phone	
1	Employee shuttle program	100,000	2001	Avg 20 employees/day (one vehicle), trip is about 30 miles/day; Pgm runs 167 day/yr.	J Sieving 970-207-0058
2	Carpooling board	325,000	2004	Avg 500 ppl/day use mass transit; Trip avg 5 mi; Service runs during ski season (130 days).	J Sieving 970-207-0058
TOTAL (should equal Form 1 Line 4a)		425,000			

With these example forms presented, the methods to determine numbers to report are further discussed.

1. General Instructions Applicable to All Media Types: The Environmental Charter recommends that resorts gather data to measure, document, and report progress. At the same time, NSAA recognizes that detailed measurement of resource consumption takes time and money that may not be available for all resorts. To assist resorts, these instructions again contain enhanced guidance on possible methods for quantifying the data requested in Form 1, including actual sample calculations from resorts that submitted information in 2003 and 2004. Regardless if the media to be quantified is water, energy, waste or vehicle-miles-traveled (VMTs), the following general steps towards quantification are recommended:

- Step A. Calculate savings by project.
- Step B. Verify results are reasonable through utility baseline.

Steps A and B are expanded on as follows:

Step A: Calculate savings by project. Only savings quantities by project must be reported for successful completion of the Tool again this year. Savings from individual projects related to each media type are to be summed to determine the overall savings total for Form 1 entry. Depending on the nature of the projects, the method of quantifying savings will vary. Several typical methods are briefly described below for consideration in your efforts to quantify savings from resort projects. The methods are generally listed in the order of increasing complexity and expense for a typical resort:

- **Savings through Vendor Representatives:** Equipment vendors often have expertise available to help resorts determine utility savings from conservation projects. Resorts should especially fully utilize this assistance if their project involves the purchase of equipment from the vendor. With information based on original and/or replacement equipment as applicable, savings can be determined from documentation on equipment ratings and specifications. For example, if a resort upgrades its dishwasher in a restaurant, most major dishwasher manufacturers have calculations and data readily available on the savings (both in terms of water and energy) for a particular project.
- **Savings through Utility Representatives:** Often times, Utilities have energy services staff who are available to their customers. If this type of resource is available to resorts, the Utility staff can assist resorts in determining project savings. Utility Energy Services staff may also have dataloggers and/or other meters available for customer use (see the “Savings through Monitoring and Verification” method below). Resorts may already be engaged with Utility staff for various other purposes (e.g., rebates, etc.) and can utilize their expertise in the efforts to complete the Assessment Tool.

- **Savings through Equipment Data:** Project savings can often be determined from documentation on equipment ratings and specifications. Information is required for both equipment used prior to any efficiency projects and equipment installed as part of a project. Depending on the measure, engineering calculations may be required to determine actual savings from a project based on equipment ratings and specifications. For example, in projects where water conserving devices were installed, you will need to know the water use rating of the new equipment, compared to the originally installed system, as well as operating hours of the system.
- **Savings through Utility Meters or Sub-meters:** This approach requires a solid understanding of the resort's utility accounts and meters configuration. Multiple energy uses at a resort are most often consolidated to one utility meter. This case is often the same for water meters. However, if particular processes or equipment from a resort have dedicated utility meters or sub-meters, this data may be directly used for savings quantifications, as long as it is normalized for year-to-year changes in weather, hours of operation, etc. (See Step 4 under Step B, 'Normalize and Convert Data'). To further clarify any potential savings, multi-year normalize data from any meters or sub-meters are encouraged for comparison to annual data after a project has been completed. For example, if a sub-meter is in place on a cooling tower that was recently retrofit with improved drift eliminators for the purpose of water conservation, the data from the sub-meter could be used to establish water savings from the improvement project.
- **Savings through Monitoring and Verification:** While this method is likely the most accurate, it is also likely the most expensive for a resort to undertake, especially if the purchase of instrumentation is required. Possible costs associated with this option are due to the purchase or rental of required data logger and/or other meter instrumentation necessary for temporary installment. (Note that some Utilities may have this type of equipment available for customers use - see the previous method of "Savings through Utility Representatives"). This method uses actual measured data through the logging/recording of actual data (e.g., power, water, etc.) before and after a completed project to quantify savings. Engineering calculations may be required to determine actual savings from a project, depending on the type of data that is logged/recorded.

Step B: Verify Results are Reasonable Through Utility Baseline. While baseline usage information is not required to be reported in the 2005 Form 1 as it was in past years, baseline information provides a good reference point to compare results from the required savings calculations (for example, project savings quantities should not exceed total annual usage quantities). Considering the inherent variability of each media, determining the baseline for each can take anywhere from 20 hours for

small, simple, organized data to over 100 hours for large, complex, disorganized data. However, after baseline information is gathered, charted, and analyzed, calculating savings and determining payback times for equipment changes are more straightforward.

For specific steps to establish a utility baseline, ski resorts are recommended to refer to the manual: “Greening Your Ski Area: A Pollution Prevention Handbook.” This manual can be accessed at the NSAA web-site (www.nsaa.org). In particular, Chapter 3 “Environmental Performance Measurement and Reporting” provides five specific steps toward establishing energy, water, and solid waste baselines (including more specific steps for waste management baseline development). The general baseline steps recommended by this manual are:

1. Determine Focus Areas
2. Collect Information
3. Create Data Management Spreadsheets
4. Normalize and Convert Data
5. Continue Data Collection, Recordkeeping, Review and Reporting

While each of the above 5 steps is described in much more detail in the referenced manual, two particular items are pivotal for resorts completing this year’s tools. First, establishing baselines during a consistent annual period for all media is a must. As a resort that endorses Sustainable Slopes, you should consider aligning your reporting year with your annual reporting to NSAA. A second key element to establishing baselines is the creation of data management spreadsheets. Data collected in Step 2 should be entered in software capable of manipulating and charting the data such as Microsoft Excel. Within the program, keep data as separate as possible and use summary tables to consolidate information. For example, fuel consumption can be organized by type of use (snowmaking, buildings, vehicles, and equipment, etc.). Assumptions made during “data crunching” (for example, unit costs or estimates for missing data) should be carefully documented in the spreadsheets. Establishing a data management tool in this general step can lend to the ease of determining project savings.

Information collection is fundamental to completing Form 1. This step may require meetings and/or input with various resort staff or external contacts (from those aware of utility billing to those that have a solid understanding of various operational processes) to fully understand how resources are consumed or wastes are generated. For example, multiple energy uses are most often consolidated to one utility meter; therefore, discussions with both individuals at the local utility and within ski area departments are usually necessary to “unscramble” electrical use by key operations.

Information to be collected may include:

- Information on the resort's use of various resources,
- Energy and water utility meter information,
- Energy and water utility bill information (for an annual period),
- Recycler/waste hauler invoices (for an annual period),
- Documentation on equipment ratings and specifications (i.e., shower heads flow rates)
- Equipment operation logs
- Hours of operation for resort equipment and/or processes

Unique aspects and considerations in quantifying savings for a particular media are considered in the following Items 2 – 4, as well as sample individual project savings calculations specific to media type. Note that these samples do not necessarily represent the totals that should be entered on Form 1. For example, if a resort has 3 savings projects related to a particular media, the total savings from all 3 projects should be entered on Form 1.

2. Water Savings Instructions: Questions 1a and 1b of Form 1 query the reader about water use in two different categories: 1) snowmaking (non-consumptive use) and 2) other uses (consumptive only). Question 1b requests quantification of consumptive uses only; do NOT include irrigation quantities in this response. Consumptive uses in ski areas typically occur in buildings (offices, restaurants, and lodging) operations.

Resorts are encourage to utilize and submit the optional Form 1 Worksheet to assist them in determining Form 1 values to report for Questions 1a and 1 b, to explain the basis for the numbers provided in Form 1 and to make reporting easier from year to year.

Sample savings calculations for an individual project related to Questions 1a and 1b are shown in the following two examples:

**Sample Individual Project Savings Calculation: Water Savings – Nonconsumptive Use
(Form 1 Environmental Indicators, Question 1a)**

Scenario: Whiteface Resort reuses compressor cooling water by injecting it into their snowmaking system, rather than draining it into the resort’s sewage system. The flow of this compressor cooling water is continuous and rated at 600 gallons per minutes (gpm). This water is reused whenever the compressor is in operation, about 818 hours/yr (49,080 mins/yr).

Calculation:

$$\text{Annual Water Savings (gals)} = \text{Water Flow Rate (gpm)} * \text{Annual Usage} \left(\frac{\text{min}}{\text{year}} \right)$$

$$\text{Annual Water Savings (gals)} = 600 * 49,080 = 29,448,000$$

**Sample Individual Project Savings Calculation: Water Savings – Consumptive Use
(Form 1 Environmental Indicators, Question 1b)**

Scenario: Keystone Resort has a new laundry facility designed to conserve water through reuse of rinse water and water recovered from pressed linen. The new washer uses 0.9 gallons per pound of linen compared to 2.5 gal/lb for previous conventional washers. During their busy season (December through March), the resort washes about 28,000 lbs/day. Throughout the remainder of the year (about 244 days), the resort processes an average of 15,000 lbs/day.

Calculation:

$$\text{Ann. Water Savings (gals)} = \left[\text{New Rate} \left(\frac{\text{gal}}{\text{lb}} \right) - \text{OldRate} \left(\frac{\text{gal}}{\text{lb}} \right) \right] * \text{Daily Load} \left(\frac{\text{lb}}{\text{day}} \right) * \text{Usage} \left(\frac{\text{days}}{\text{yr}} \right)$$

$$\text{Annual Water Savings (gals)} = (2.5 - 0.9) * [(28,000 * 121) + (15,000 * 244)] = 11,276,800$$

3. Electric Energy Savings and Renewable Energy Instructions: Question 2a – 2c address two categories related to electric energy: (1) savings from conservation projects and (2) use of renewable energy sources. Note that this question is purposefully limited to electric energy and does not include all forms of energy (e.g., natural gas, propane, fleet fuel, etc.).

Questions 2b and 2c are specific to renewable energy usage and both ask for an annual kWh load. The two questions decipher renewable energy use between that energy generated onsite and renewable energy purchased from a Utility or green power provider. Likely examples of onsite renewable energy generation include photovoltaic solar panels, wind turbines, or micro-hydro applications. Examples of renewable energy purchased from a Utility or green power provider include wind power, hydropower, or some “green power mix” of renewables. Note that ground source heat pumps (GSHP) applications are not considered to be a renewable energy source; alternatively, the energy efficiency savings of GSHP projects would be considered as part of Question 2a quantifications. Also note that these Questions 2a – 2c also do not include any transportation applications.

Resorts are encourage to utilize and submit the optional Form 1 Worksheet to assist them in determining Form 1 values to report for Questions 2a – 2c, to explain the basis for the numbers provided in Form 1 and to make reporting easier from year to year.

Sample savings calculations for an individual project related to each of the three types of energy questions are shown in the following three examples:

**Sample Individual Project Savings Calculation: Electric Energy Savings
(Form 1 Environmental Indicators, Question 2a)**

Scenario: In the 2002-2003 season, Grand Targhee Resort completed a project to improve energy efficiency through the installation of compact fluorescent light bulbs in a variety of lodging and retail locations. The project replaced 680 incandescent bulbs rated at 60 watts each with an equivalent number of compact fluorescents rated at 18 watts each. The fixtures are estimated to be turned on an average of 1,275 hours/year.

Calculation:

$$\text{Annual Energy Savings (kWh)} =$$

$$\text{Ann. Energy Savings (kWh)} = \text{FixtureCount} [\text{OldFixture (W)} - \text{NewFixture (W)}] * \text{Ann.Hours} * \text{Conv. Factor} \left(\frac{\text{kW}}{\text{W}} \right)$$

$$\text{Annual Energy Savings (kWh)} = 680 \times (60 - 18) \times 1,275 \times (1/1000) = 36,414$$

**Sample Individual Project Savings Calculation: Renewable Energy Use – Onsite Generation
(Form 1 Environmental Indicators, Question 2b)**

Scenario: Breckenridge Ski Resort operates a ticket scanning program that uses solar photovoltaic panels to power the scanner at C Chair on Peak 9. The panels provide 2.9 kW of electric power to run the equipment. The scanner is in operation for 6 hours/day and 165 days/year during the resort’s winter ski season (an equivalent of 990 hours/year).

Calculation:

$$\text{Ann. renewable energy generated (kWh)} = \text{Load (kW)} * \text{Annual Operation} \left(\frac{\text{Hours}}{\text{Year}} \right)$$

$$\text{Annual renewable energy generated (kWh)} = 2.9 * 990 = 2,871$$

**Sample Individual Project Savings Calculation: Renewable Energy Use – Purchased
(Form 1 Environmental Indicators, Question 2c)**

Scenario: Deer Valley Resort began purchasing renewable wind power in 2003 from Utah Power and Light. The amount of renewable energy purchased is 44,094 kWh/month.

Calculation:

$$\text{Ann. renewable energy purchased (kWh)} = \text{Monthly Load (kWh)} * \text{Annual Operation} \left(\frac{\text{Months}}{\text{Year}} \right)$$

$$\text{Annual renewable energy purchased (kWh)} = 44,094 * 12 = 529,128$$

4. Waste Management Instructions: Question 3 focuses on the total amount of waste diverted from the landfill by source reduction, reuse, or recycling projects.

- For part (a), calculate the diversion quantity using one of the following methods:
 - Add up the actual or estimated savings from each of the applicable reduction and/or recycling projects.

OR

- o Roughly estimate the percent diversion by comparing the number, size, and frequency of pick-ups for recycling containers versus containers for solid waste, then multiply the total waste in tons that your report disposed of during the annual period by the estimated percentage to determine the amount diverted.

OR

- o If the recycling service provider is the same company that provides trash-hauling services, it may keep records of recycling volumes for your resort.
- Part (b) will help NSAA estimate greenhouse gas benefits by using your estimates of waste diverted to calculate equivalent CO₂ savings. On the basis of the mix of reductions indicated in this part of the form, the Assessment Tool will convert tons of trash to greenhouse gas emissions. In order for the calculations to be accurate, the total for both columns together must be 100%. NSAA understands that not all resorts may track their waste reduction by mix.
- Resorts often have occasion to convert the weight of recyclable materials to volume quantities for the Environmental Indicators Form responses. The table on the next page provides weight to volume conversions for most typical recyclable materials. This table is extracted from *Appendix B: EPA Standard Volume-to-Weight Conversion Factors of Measuring Recycling: A Guide for State and Local Governments*. If other material conversion factors are required, a more detailed table can be found at the following website:
http://www.epa.gov/epaoswer/non-hw/recycle/recmeas/docs/guide_b.pdf

Instructions for 2005: Environmental Charter Assessment Tool

Material Category	Recyclable Material	Volume	Estimated Weight (lbs)
Food	Food scraps, solid/liquid fats	55 gal drum	412
Glass	Whole bottle	1 cubic yard	500-700
	Semicrushed bottles	1 cubic yard	1,000 – 1,800
	Crushed (mechanically)	1 cubic yard	1,800 – 2,700
	Uncrushed, manually broken	55 gal drum	300
Metals	Whole aluminum cans	1 cubic yard	50-75
	Compacted al cans	1 cubic yard	250-430
	Whole steel cans	1 cubic yard	150
	Flattened steel cans	1 cubic yard	850
Paper	Newspaper, uncompacted	1 cubic yard	360-505
	Newspaper, compacted/baled	1 cubic yard	300-500
	Office, flat – uncompacted	1 cubic yard	380
	Office, flat - compacted	1 cubic yard	755
	Office, crumpled – uncmptd.	1 cubic yard	110-205
	Office, crumbled - compacted	1 cubic yard	610
Corrugated Cardboard	Uncompacted	1 cubic yard	50-150
	Compacted	1 cubic yard	300-500
	Baled	1 cubic yard	700-1,100
Plastic – PET	Soda bottles, whole, uncmptd.	1 cubic yard	30-40
	Soda bottles, whole, compacted	1 cubic yard	515
	Soda bottles, baled	30 in x 62 in	500-550
Plastic – HDPE	Dairy, whole/uncmptd. containers	1 cubic yard	24
	Dairy, whole/compacted containers	1 cubic yard	270
	Dairy, baled containers	30 in x 62 in	400-500
	Mixed, baled containers	30 in x 62 in	900
Wood	Pallets	1 pallet	30-100 (40 avg.)
Landscape/ Vegetative Materials	Grass clipping, uncompacted	1 cubic yard	350-450
	Grass clipping, compacted	1 cubic yard	550-1,500
	Leaves, uncompacted	1 cubic yard	200-250
	Leaves, compacted	1 cubic yard	300-450
Municipal Solid Waste	Residential waste (uncompacted at curb)	1 cubic yard	150-300
	Commercial-industrial waste (uncompacted)	1 cubic yard	300-600
	Waste compacted in truck	1 cubic yard	500-1,000

Resorts are encourage to utilize and submit the optional Form 1 Worksheet to assist them in determining Form 1 values to report for Questions 3a and 3b, to explain the basis for the numbers provided in Form 1 and to make reporting easier from year to year.

Sample savings calculations related to the waste reduction questions are shown in the following example:

**Sample Individual Project Savings Calculation: Waste Reduction
(Form 1 Environmental Indicators, Questions 3a and 3b)**

Scenario: Massanutten Resort has its own recycling department with recycle stations located throughout the resort. A dedicated staff collects recyclables at remote centers, transports it to a central station and then deposits the materials with a local recycler. As the resort is paid by weight, all recyclables are weighed. Based on tracking documentation, the resort recycled 189 tons in 2003. Tracking documentation also indicates the breakdown of recycled material in terms of percentage is as follows: 23% paper, 1% aluminum, 26% glass, 4% plastic, 38% cardboard, and 8% metal.

Calculations:

Question 3a (amount of waste diverted):

$$\text{Amount of Waste Diverted (tons)} = 189$$

Question 3b (% of reduction or recycling):

	<u>Reduction</u>		<u>Recycling</u>	
Paper	_____	%	23	%
Aluminum	_____	%	1	%
Glass	_____	%	26	%
Plastic	_____	%	4	%
Cardboard	_____	%	38	%
Food Waste (composting only)	_____	%	N/A	%
Landscape/vegetative materials (composting only)	_____	%	N/A	%
Metal	N/A	%	8	%
Construction Lumber and Wood Pallets	_____	%	0	%
Other (specify):	_____	%	0	%
	TOTAL (Both Columns)		100%	

5. Transportation Demand Reduction Instructions: This section addresses the estimated savings in VMT (avoided miles). Applicable measures include practices related to fleet and public transit vehicles. Savings that result from fuel conversions or other energy saving measure are not applicable for this section.

Please add up the actual or estimated savings from each of the applicable measures that your resort has implemented to estimate total VMT conserved. That is, reduced car/bus miles that occurred as a result of route optimization, car pooling, etc. This item is strictly an indicator of miles NOT traveled, which will automatically be converted to CO₂ emissions reduced by the Sustainable Slopes Assessment Tool. The reporting year should coincide with the year selected for the other data provided on this form.

- For part 4(a), add up the VMT avoided last year because of individual transportation demand reduction initiatives.
- For part 4(b), estimate what portion of your response to part 4(a) can be allocated to each fuel type listed. Remember that these allocated numbers must total 100% when combined.

Resorts are encourage to utilize and submit the optional Form 1 Worksheet to assist them in determining Form 1 values to report for Questions 4a and 4b, to explain the basis for the numbers provided in Form 1 and to make reporting easier from year to year.

Sample calculations related to the transportation demand reduction questions are shown in the following example:

**Sample Individual Project Savings Calculation: Transportation Demand Reduction
(Form 1 Environmental Indicators, Questions 4a and 4b)**

Scenario:

Mt. Hood Meadows Ski Resort operates commuting buses for both their employees and the resort's patrons throughout the entire ski season. For the 2003-2004 season, the resorts logged 967 bus trips of an average round-trip length equal to 150 miles. The resort estimates that about 50 people are typically on each bus trip. Assuming an individual car driving to the resort carries an average of 2.5 people, one bus trip avoids 20 individual car trips. All vehicles participating in the program were buses vans that use diesel.

Calculations:

Question 4a (VMTs quantity):

$$Annual\ VMT = \frac{bus\ trips}{year} * \frac{riders}{bus} * \frac{individual\ car}{riders} * \frac{miles\ avoided}{individual\ car}$$

$$Annual\ VMT = 967 * 50 * (1/2.5) * 150 = 2,901,000$$

Question 4b (% of vehicles by type):

Buses - diesel	_____	%
SUV/light truck/passenger van - gasoline	_____ 100	%
SUV/light truck/passenger van - diesel	_____	%
Car - gasoline	_____	%

Form 2 Summary Paragraph

This form is mandatory to successfully complete the Assessment Tool for your resort.

We continue to ask resorts for a summary of resort progress on topics related to the Environmental Charter for the *Annual Report* (Form 2, formerly Form 23 of the Assessment Tool). The information you provide for this form will be used in the *Annual Report* and will be edited, as necessary.

- Provide a one-paragraph summary (200 words or less) describing your resort's environmental progress during the past year under the Environmental Charter.
- Include any environmental goals you hope to achieve during the next year.

Form 3 Green Room Entries

For purposes of the Sustainable Slopes Annual Report and updating the NSAA Green Room database, we would like to highlight examples of successful resort environmental projects or programs. This Form provides an opportunity for your resort to share positive environmental experiences. These stories will be extremely important in providing examples of efforts that yield real and positive results. These projects should include cost savings and environmental benefits, where possible. Selected stories will be presented in the *Annual Report* and on NSAA's Green Room web site to show stakeholders and the public at large how ski areas are doing their part for the environment. NSAA reserves the right to edit your entry for consistency of detail and may elect not to include your example in the database or final report. Therefore, resorts should only share their most successful projects or programs and are encouraged to limit the total number of submittals to 3 projects or programs. Please submit one Form 3 for each success story that you'd like to have considered for the Green Room database.