

RESEARCH REPORT

Measuring Sustainability in Victoria's Alpine Resorts: Identification of Potential Environmental Key Performance Indicators

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1 Introduction

1.1 Purpose

The purpose of this report is to identify potential environmental Key Performance Indicators (KPIs) that can be used to measure the progress of the six Alpine Resorts towards environmental sustainability.

1.2 Background

The *Alpine Resorts (Management) Act 1997* establishes five Alpine Resort Management Boards ('Boards') to manage Victoria's Alpine Resorts. The Boards report to the Minister for Water, Environment and Climate Change. Section 1A of the Act specifies that the resorts are to be developed, promoted, managed, and used on a sustainable basis and in a manner that is compatible with the alpine environment.

The State Government's Alpine Resorts Reform Package of 2003 commits the Boards to reporting on these legislative requirements by way of a set of economic, environmental and social KPIs. An associated document, titled *Reporting and Planning Arrangements 2004-2009: Information Paper* was released by the Minister in December 2004, ('Reporting and Planning Arrangements Paper'). This document specified the economic KPIs to be used, the reporting format and timeframe for the KPIs and the requirement to develop targets at the 3 year, 5 year, 10 year and 20 year marks.

In response to a Ministerial request to facilitate the preparation of environmental and social KPIs, the Alpine Resorts Co-ordinating Council ('Council') initiated this research project to develop potential environmental KPIs.

1.3 Project Scope

The research and consequent development of the potential KPIs, as documented in this report included the following key tasks:

- A review of the literature on the development and application of environmental sustainable indicators - see chapter 2 and 3.
- A review of key priorities defined in Government policies that are relevant to environmental sustainability at the Alpine Resorts – see chapter 4.
- A review of environmental reporting by the Boards and identification of the main environmental issues faced by the Resorts - see chapter 5.
- Development of the key themes and priorities of environmental sustainable development at the Resorts – see chapter 6.
- Selection of potential environmental KPIs - see chapters 7 to 10.
- Consultation with the primary stakeholders to discuss the applicability of the themes and feasibility of the potential KPIs – see chapter 5.

1.4 Stakeholders

The primary stakeholders consulted during this project included:

- Alpine Resort Co-ordinating Council;
- Alpine Resort Management Boards; and
- Department of Sustainability and Environment.

2 Concepts in Measuring Performance using Indicators

This chapter discusses key concepts of performance indicators and how they are typically applied to measure the progress of an organisation towards achieving set goals.

Indicators are used by all sectors of governments, private industry and communities for the purpose of communicating and reporting on the state or condition of the environment.

To effectively measure performance and progress, the indicator is compared against targets. The targets are usually derived from long term objectives which are in turn derived from high level goals or policy.

Thus indicators alone cannot be used to measure performance. It is through an indicator framework, composed of the key elements mentioned above, that are most effective in measuring performance. These key elements are discussed in more detail within this chapter.

Figure 2-1 conceptually demonstrates how these key elements relate within a indicator framework. Each of the elements is discussed in detail below.

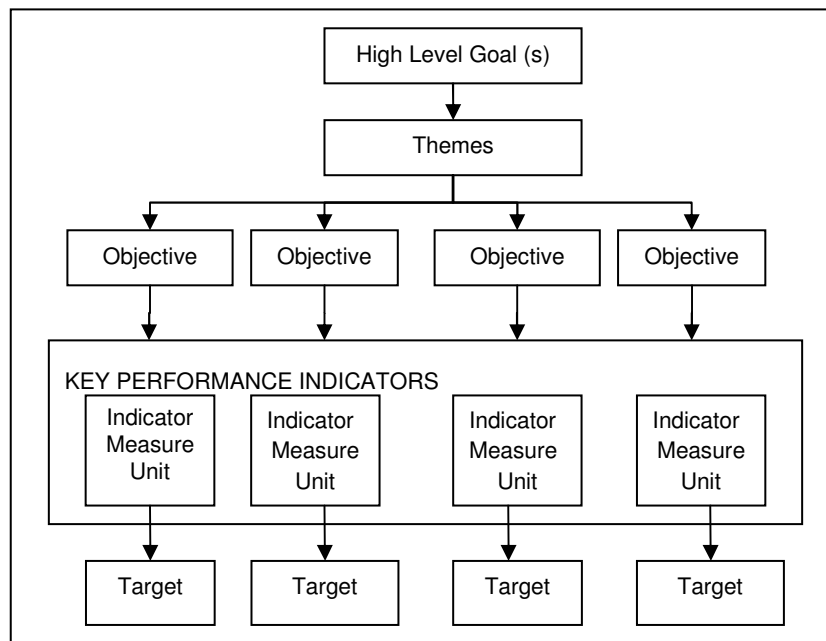


Figure 2-1 Indicator Framework

2.1 High Level Goal

The high level goal provides the sense of direction for improvement or change. It is typically strategic vision for the future of the organisation. For this project it will describe what is consider to be the desired state in environmental sustainability at the Alpine Resorts. The high level environmental goal will be developed from government policies and the *Alpine Resorts 2020 Strategy*.

2.2 Themes

The themes are derived from the goal. They assist in selecting and organising the objectives and indicators in a way that clearly relates to the goal. The themes can be seen as the main priority areas for the organisation. In the case of environmental sustainability, themes are typically related to physical elements of the environment that are of most concern (e.g. air, water, land); or anthropogenic activities that impact on the environment (e.g. transportation, waste generation). The choice and number of themes is dependent on what priorities are to be communicated.

Structuring objectives and indicators under themes is called a thematic framework. The use of a thematic framework in developing environmental indicators is discussed in section 3.2.

The suggested themes for environmental KPIs have been developed by drawing on international recognition of what is considered to be environmental sustainable development and the key priorities in government policies.

2.3 Objectives

The objectives are sub-goals developed under each of the themes. They provide more clarity and direction as to what it is being desired to be achieved. The objectives are usually achievable and quantifiable.

The objectives will be derived from best practice in environmental sustainable development and government policy priorities.

2.4 Indicators

Performance indicators are a tool for analysing change in a system. They are ideally measurable and quantifiable. Inherently associated with indicators is the measure and unit. The measure is the physical aspect of the indicator, i.e. what is actually recorded, and the unit is the metric or scale. One example of an indicator is potable water consumption. Its measure is annual potable water delivered from the pump station. The unit is ML/year.

For complex system, more than one indicator may be selected to adequately represent if the objective is being achieved. However, too many indicators can be counter productive. Typically there are two approaches to selecting indicators comprehensive indicator sets and headline indicators.

Large comprehensive sets of indicators cover all issues considered as material, providing a very detailed picture of the condition of the environment. They are typically used in environmental accounting or state of the environment reporting. For example The Australian State of Environment Report is published every 7 years and includes information on over 160 environmental indicators. Whilst comprehensive sets of indicators can be informative, the reporting process is often time consuming and resource intensive. The detail in these sets tends to distract from the real priorities, and policy concerns.

Headline Indicators also called core indicators are a small set of indicators, typically less than 20 in number, which represent the main policy concerns or priority issues in environmental sustainability. They are used to: assess the effectiveness of policies; provide early warning on emerging trends; and communicate to the public on key issues.

The choice of headline indicators should reflect what is considered as the main priorities in environmental sustainability. These priorities may be different depending on the organisation's goals and objectives. Headline indicators are generally easier to understand, easier to measure and therefore easier to communicate.

Headline indicators have been employed by the Australian Government to monitoring the implementation of the National Strategy for Ecological Sustainable Development. The World Bank, the European Environmental Agency and the United Nation Commission for Sustainable Development have also developed headline indicators to report on environmental policy implementation.

The indicators developed for the Alpine Resorts are proposed to be headline indicators and will reflect the main priorities in environmental sustainability for the Victorian Alpine Resorts. These indicators will also be suitable for use as a communication tool to and by the Minister.

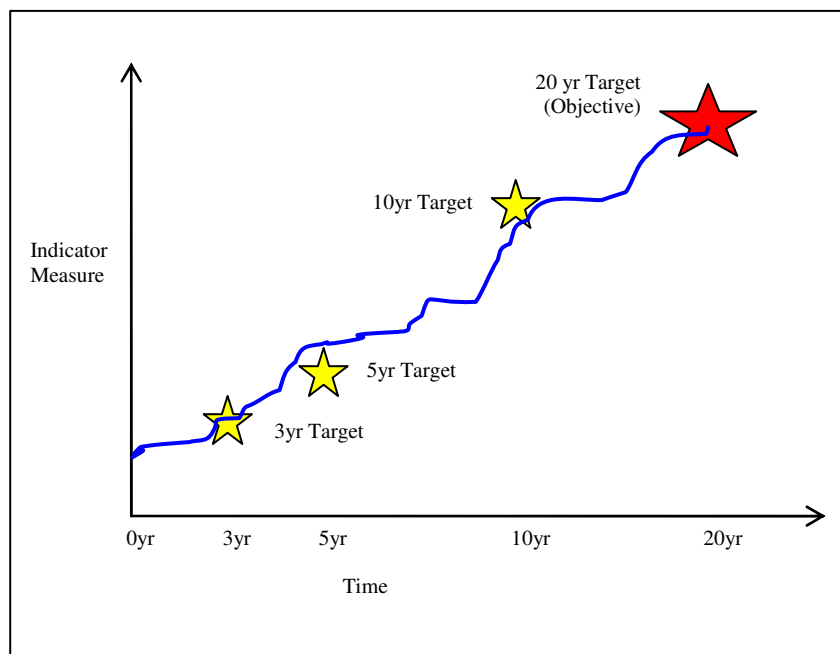
2.5 Targets

To assess the performance of an organisation, targets are set for each indicator. If the indicator meets or exceeds the target then the organisation is shown to be performing well. Targets are also useful in planning, as they provide a map of how the organisation plans on reaching the objective.

The targets will be used to demonstrate each resort's progress towards reaching the environmental objectives. For each objective a series of targets are to be defined (3, 5 and 10 year). Under the 2003 Alpine Resorts Reform Package, it is the responsibility of the Alpine Resorts to develop these targets.

Figure 2-2 provides a graphical representation of how targets can be used to assess performance and track progress. As demonstrated in this figure, the objective can be interpreted as the long term 20 year target.

Figure 2-2 Graphical Representation of KPI measures, environmental objectives and targets



2.6 Monitoring, Reporting and Review

An integral part of measuring performance is to ensure that an adequate system of recording and reporting is in place. Such monitoring enables the assessment of whether targets have been met and consequently, the success or otherwise in achieving environmental objectives.

If the targets have not been met the organisation has two options a) review the targets (perhaps they were too optimistic) or b) review the operational programs (i.e. change the level of resources being applied or develop new policies that will better assist reaching the targets).

3 Trends in Indicator Development and Application

This section we discuss the driving forces behind environmental and sustainability indicators, trends in the development and organisation of these indicators and their application in the industry.

This section draws on research and activities undertaken by the following organisations

- United Nations Commission for Sustainable Development
- World Bank
- European Environmental Agency
- Organisation for Economic Corporation and Development (OECD)
- Global Reporting Initiative (environmental sector supplement)
- Sustainable Slopes
- Ski Area Citizens
- GreenGlobe 21
- Ecotourism Australia

These organisations were researched as they either represented the forefront in the development, and or application of sustainability or environmental indicators in general and or within the alpine or tourism industry.

3.1 Driving Forces of Sustainable and Environment Indicators

Over the last decade, there has been a proliferation of sustainable development indicators and indicator sets. This has been driven by the realisation of the economic impact of environmental and social degradation and the need to incorporate these impacts into decision making. Incorporation of these impacts into decision and policy making was reiterated in Agenda 21 (a global agreement between members of the United Nations) which was adopted at the 1992 Rio Earth Summit.

Agenda 21 is considered the “blueprint” on how to make development socially, economically and environmentally sustainable in the 21st century. It encourages all countries, governmental and non governmental organisations to develop and identify indicators of sustainable development that can provide a solid basis for decision making at all levels.

Sustainable development encourages the conservation and preservation of natural resources and of the environment, the management of energy, waste and transportation. It is, as defined in the Brundtland Report, “*development which meets the needs of the present without compromising the ability of future generations to meet their own needs*”.

Agenda 21 calls for a coordinated action of sustainable development and represents a global commitment to the monitoring and reporting of actions towards sustainable development goals. More specifically Agenda 21 called for the harmonisation of efforts to develop sustainable development indicators which could be commonly applied across all countries and sectors. A common set of indicators would allow country and organisations to be compared, be accountable and therefore foster a common and coordinated action in sustainable development.

However, countries, organisations and communities are not necessarily faced with the same environmental or sustainability issues, or do they have the necessarily

have the same capacities for action. After a decade of research and testing by the United Nations Centre for Sustainable Development ('UNCSD'), it was concluded that a common set of indicators does not automatically lead to a coordinated action in sustainable development. There is still a strong commitment for global sustainable action and acknowledgement of the need to be accountable but there is also a requirement to recognise the variations in existing levels of sustainable development between countries, organisations and communities.

Rather than adopting a universal set of common indicators, it was concluded by the UN CSD and other organisations that to effectively foster sustainable action:

- *Indicators should be selected to represent what is considered to most important in sustainable development for the organisation; and*
- *Indicators should be aligned with the local policy objectives or goals.*

3.2 Application of Thematic Indicator Frameworks

The association between policy goals and indicators can be demonstrated in a thematic framework. The framework arranges the indicators in themes that are reflected in the relevant policies.

Whilst the policy and indicators are specific to the organisation, the themes developed through the framework generally tend to cover what is globally considered to be the main aspects of environmental sustainability. Developing indicators using the thematic framework provides a robust methodology which ensures the main aspects of environmental sustainability are addressed.

The next section discusses the emerging themes in environmental sustainability.

3.3 Emerging Themes of Environmental Sustainability

In conjunction with the work by the UNCSD, a variety of other prominent organisations have applied the thematic framework to assist in developing environmental sustainability indicators and the link with policies.

The emerging themes in environmental sustainability tend to be elements of the environment (i.e. air, water, land) or anthropogenic activities which effect elements of the environment (i.e. waste generation, greenhouse gas emissions) or a combination of both.

Typically the themes for indicators used to measure national and international environmental performance tend to be broader and focused on these main elements of the environment such as land, water, air etc. The themes for industry based indicators tend to be focused on specific activities such as waste management and transportation. The main themes addressed in indicator sets developed by some key organisations are listed in Appendix A.

3.4 Attributes of Effective Environmental Indicators

There is a myriad of literature available on what constitutes an effective environmental performance indicator. Of the material reviewed, the general consensus was that effective indicators are:

- aligned with policy goals;
- are globally relevant;
- easy to understand and are reliable; and
- are feasible to measure.

Aligned with policy goals

As discussed previously, the proliferation of indicators has been fuelled by the need to include environmental issues in decision making. Extensive trials and testing by the UNCSO concluded that a universal set of core indicators does not necessarily result in a coordinated action in sustainable development. The research also concluded that the most effective indicators are ones which are closely linked to policy goals and have an objective or target against which they are measured.

It is considered best practice to develop core indicator sets that are specific to the organisation and its key priorities. Pre-defined set of indicators should only be adopted by an organisation if the priorities on which they were developed are the same as those of the organisation. In most cases, organisations opt to develop their own indicators for these reasons.

Whilst the indicator sets are not universally applicable, they provide a useful library from which to draw ideas on indicator selection.

Consistent with national and international practice, the indicators for the Alpine Resorts will be selected to align with the relevant policies and priorities of environmentally sustainable development.

Global Relevance

For indicators to be relevant, and a useful means of comparison and communication, they must be globally relevant (comparable with other organisations). Green Globe 21 meets this requirement by presenting its indicators per equivalent person, recognising that in the tourism and travel industry, the magnitude of the impact on the environment is directly linked to the amount of people partaking in the activity.

Green Globe's system for accounting for a transient population allows 1 day visitor to be equivalent to 0.33 of an equivalent person. This system is highly relevant for developing KPIs for our resorts which the majority of the population is transient and as such has been adopted.

Easy to understand and reliable

The indicators need to be familiar to the audience and easy to understand what they are representing. They should be reliable, that is each time it is measured it is representing the same aspect of the system.

Feasible to measure

One of the biggest problems in selecting indicators is that frequently the best indicators are those for which there is no data. In these cases indicators are selected that can be used as proxies or substitutes

On the other extreme, environmental indices, such as the ecological footprint, are an excellent way of reporting on the total environmental impact associated with an activity. However indices are time consuming and resource intensive to measure. Depending on the capacity of the organisation and the reporting requirements, environmental indices may not be feasible, and a similar picture can be painted using indicators that are less demanding to measure.

3.5 Summary of Global Indicator Trends and Sustainability Reporting

In summary, the global trend in the development and application of environmental indicators is as follows:

- Common set of indicators does not necessarily lead to a co-ordinated action
- Environment indicators should represent what is considered to most important in environmental sustainability
- Indicators should be closely linked with policy goals – which can be demonstrated through the use of a thematic framework
- The use of a thematic framework is a good check that the main aspects of environmental sustainability have been considered.
- The themes represent the main areas of concern or focus for the organisation.
- Linking indicators to objectives and targets enables their use in tracking performance and helps link them to policy priorities.
- Effective indicators are also relevant, have a global context, reliable and easy to measure and understand.

4 Government Policies & Priorities

This section discusses the main priority areas in environmental sustainability that is captured in the existing State and Federal government policies. These are:

Federal Government Documents:

- *National Strategy for Ecological Sustainable Development ('NSES D')*

Victorian Government Documents

- *Growing Victoria Together*
- *Our Environment Our Future*
- *Alpine Resorts 2020 Strategy*

4.1 National Strategy for Ecological Sustainable Development (NSES D)

The NSES D was developed in 1992 based on the conclusions from the report titled "*Our Common Future*" (the Brundtland Report) and the commitment by the UN in implementing Agenda 21.

The NSES D was adopted by all levels of government in 1992 with the key purpose of integrating the environment into policy. The strategy highlights the national issues in ecological sustainable development and provides direction within the NSES D framework to assist in the inclusion of these issues in decision and policy making.

Whilst the strategy is aimed at all levels of government, it can also provide useful guidance for communities businesses and NGOs within Australia wishing to implement Ecological Sustainable Development ('ESD) principles.

ESD is defined as using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained and quality of life for both present and future generations is increased.

The NSES D is aligned with other national strategies that are specifically targeted at sustainability issues, such as the *National Greenhouse Response Strategy*, *Waste Management Strategy* and *The Environment Protection and Biodiversity Conservation Act 1999 ('EPBC Act')*. At the state level, the NSES D is aligned with the priorities of the Victorian Governments Sustainability Policy "*Our Environment, Our Future*".

In 2001 the Commonwealth Minister endorsed a set of headline indicators for the NSES D. The 24 indicators were selected to collectively measure Australia's national performance against the three goals of the NSES D. Comparing successive sets of indicators will help to determine Australia's progress towards sustainability.

These indicators were developed using a thematic framework, similar to the methodology employed by the UNCSD and the Organisation for Economic Cooperation and Development with the purpose of reporting on sustainability at the national scale. The indicators are grouped under three policy goals:

1. To enhance individual and community well-being and welfare by following a path of economic development that safeguards the welfare of future generations.
2. To provide for equity within and between generations.

3. To protect biological diversity and maintain essential ecological processes and life support systems.

The NSESD indicators are listed in Appendix C.

In developing the indicators for the Resorts, the opportunities to contribute to the reporting on the NSESD will be explored. At the least, environmental KPIs should have synergies with the policy goals of the NSESD.

4.2 Growing Victoria Together (GVT)

The overarching Victorian Government Policy is “Growing Victoria Together”. This provides a 10 year vision for Victorians, and identifies what is considered important to Victorians. The policy has 10 goals, 2 which are directly relevant to environmental sustainability:

- (a) efficient use of natural resources; and
- (b) protecting the environment for future generations.

Each goal has a set of measures which the government will report on annually to demonstrate the progress towards achieving these goals. The table below summarises the goals and measures relevant to environmental sustainability. GVT does not set quantitative objectives or targets, however these measures can be interpreted as objectives.

Table 4-1 Growing Victoria Together Measures

Goals (important issues)	Priority Actions	Demonstrating Progress Measures
Efficient use of natural resources (Promoting sustainable development)	Increase recycling and effective waste management and increase the development and use of renewable energy sources. Facilitate the planting of more trees.	Renewable energy efforts will increase. Waste recycling efforts will increase and the use of landfill as a waste disposal method will be reduced.
Protecting the environment for future generations	Improve the health of our rivers and waterways and take effective action to reduce salinity. Increase and provide greater protection for areas of high conservation value. Encourage increased use of public transport.	The quality of air and drinking water will improve. The health of Victoria’s catchments, rivers and bays will improve. The area covered by native vegetation will increase.

It is important that the environmental objectives and indicators for the Alpine Resorts are closely aligned with these Victorian Government progress measures.

4.3 Our Environment Our Future

The policy goals in environmental sustainability from the ‘Growing Victoria Together’ are implemented through the Victorian Government action plan “*Our Environment Our Future*”.

This action plan was released in 2006 and consists of five key strategies to help make Victoria a sustainable state. These strategies are:

1. Responding to the Challenge of Climate Change
 - ACTION 1 – Renewable Energy Target
 - ACTION 2 - Improving our Energy Efficiency
 - ACTION 3 - Adapting to Impacts of Climate Change
2. Maintaining and Restoring Our Natural Assets
 - ACTION 4 - Health and Productive Land
 - ACTION 5 - Healthy and Productive Water Systems
 - ACTION 6 - Healthy Marine and Coastal Areas
 - ACTION 7 - Flourishing Biodiversity in Healthy Ecosystems
 - ACTION 8 - Clean Air
 - ACTION 9 - Comprehensive Network of Parks
3. Using Our Resources More Efficiently
 - ACTION 10 - Less Waste and Increased Resource Efficiency
4. Reducing Our Everyday Impacts
5. Government Leadership

This Action Plan is aligned with the NSESD however, unlike the NSESD, and similar to GVT, it does not have performance indicators. The Plan focuses Victoria’s attention on what is considered to be the key actions that are required to make Victoria more environmentally sustainable. The first three strategies are relevant to the Alpine Resorts.

The key actions under these strategies 1, 2 and 3 are summarised in Appendix D.

4.4 Alpine Resorts 2020 Strategy

The *Alpine Resorts 2020 Strategy* has been prepared to guide the sustainable long term planning and management of Victoria’s six Alpine Resorts. The strategy is developed around the vision of ‘**Four season, vibrant sustainable resorts**’ and addresses six board themes:

- *Climate change*
- *Resort use and visitation*
- *Development of the resorts*
- *Vibrant Resorts*
- *Environmental management*
- *Stewardship of public land*

The priority environmental issues identified in the strategy under environmental management are as follows:

- *The rare and fragile communities of alpine flora and fauna living in and adjacent to the resorts will be effectively managed and protected from the impact of resort use and development.*
- *Pest plant and animal species will be proactively controlled and where possible eliminated, to minimise their impact on native species.*
- *Soil disturbance and earthworks will be managed to maintain slope stability and minimise erosion.*
- *The quality of waste water discharge and drainage from the resorts will be improved to minimise downstream impacts.*
- *Vegetation and revegetation programs, including habitat restoration, will be prioritised as an essential component of resort management.*

Similar to the *Growing Victoria Together Strategy*, the *Alpine Resorts 2020 Strategy* is directional but not definitive as it does not specify quantitative objectives or targets.

Developing environmental indicators for the Resorts will draw on this focus and direction in the *Alpine Resorts 2020 Strategy* and the other government policies discussed above (i.e. *NSESD*, *Growing Victoria Together* and *Our Environment Our Future*).

4.5 Summary of policy priorities

The following table summarises what are considered as priority issues in environmental sustainability which are encapsulated in government policies and are relevant to the Alpine Resorts. These priority issues are also reflected in the emerging themes in the international practice of environmental sustainability, discussed in chapter 3.

Table 4-2 Key issues in environmental sustainability

	NSESD	Growing Victoria Together	Our Environment Our Future	Our Water Our Future	Greenhouse Gas Strategy	Alpine Resorts 2020 Strategy
Sustainable Water Management (includes water conservation and reuse)	√			√		√
Sustainable Energy Resources Management (includes energy efficient and renewable and green energy)	√	√	√		√	√
Protection and Improvement of Biodiversity (includes native vegetation and endangered species)	√	√	√			√
Reduction in Greenhouse Gas Emissions Climate Change (addressed in detail in the Victorian Greenhouse Gas Strategy and includes reducing emissions, carbon offset and carbon trading)	√		√		√	√
Improve Water Quality (includes in-stream biodiversity, restoration of rivers and wetlands)	√		√	√		√
Sustainable Waste Management (includes zero waste strategy, recycling, and ECObuy)	√	√	√			√

5 Environmental Management & Reporting by Boards

This chapter discusses the current status of environmental sustainability at the Resorts and the responsibilities of the Boards in environmental management.

5.1 Environmental Responsibilities of the Boards

The Boards were formed in 1998 after the proclamation of the Alpine Resorts (Management) Act 1997. They provide municipal type services to the Resort including water supply, drainage, sewerage, garbage disposal, electricity, roads, fire protection and transport services.

They are the referral authority for servicing infrastructure under the planning scheme including planning permits. The Boards provide advice to the Minister on all areas of the planning scheme, through which they can influence developments based on their strategic visions and objectives. They have little control in the implementation of building controls such as 5 star energy ratings, as these are matters specified in the Building Act.

The Boards are the designated manager of the land, being Crown land, permanently reserved as 'alpine resorts' and therefore have a general requirement to manage the land in the interest of the Crown. This includes the implementation of the environmental protection policies such as the *Flora and Fauna Guarantee Act 1988* ('FFG Act') and the *Environmental Protection Biodiversity Conservation Act 1999* ('EPBC Act').

The Boards, subject to Minister's consent, have control over the issue and renewal of leases within the Alpine Resorts. The Boards specify the terms of the lease and enforce requirements in line with their strategic vision and objectives. However this window of opportunity arises principally when leases expire. As many leases have terms in excess of 40 years, this opportunity is not often available.

Whilst the Boards have limited powers in enforcement within the Alpine Resorts, they have a significant influence over the all areas of Resort operation and management. The Boards can:

- Exhibit an environmental influence in planning permits through advice to the Minister.
- Specify environmentally sustainable conditions on service infrastructure through the planning scheme.
- Implement activities that are in the interested on conserving and enhancing the value of Crown land with authority as the land manager (i.e. implement the environmental policies).
- Specify terms and conditions of new leases that require the lessee to act in an environmentally sustainable manner.

5.2 Annual Reporting

Annual reports provide a starting point for understanding the monitoring and reporting activities which occur at the Alpine Resorts. All five Boards produce a separate Annual Report. The content of the environmental information within these Annual Reports is non homogenous. This variation is most likely due to the following factors:

- the development of each resort from separate origins;
- unique alpine environment at each of the resorts;
- preferred style of the Resort Management Boards; and
- size of the resort and activities and services on offer.

The table below provides a brief summary of what environmental aspects were reported in the 2004/2005 Annual Reports for each of the Alpine Resorts.

Table 5-1 Summary of Environmental Reporting in the 2004/2005 Annual Reports

Resort Aspects	Activity Reported	Baw Baw ARMB	Falls Creek ARMB	Lake Mountain ARMB	Mount Buller & Mount Stirling ARMB	Mount Hotham ARMB
Planning	Progress on implementing Environmental Management Plan	√	√	√	√	√
Programs / Affiliations	Ecobuy Activities		√			
	Membership development towards Green Globe 21		√			
	Is the Resort a participant of NevRwaste		√		√	
Water Supply and Use	Water Consumption		√			√
	Compliance of supply with WQ standards					√
Snow making	Volume of water used for snow making					
Stormwater	Progress on Stormwater Management Plan				√	√
	Treatment and management activities				√	√
Wastewater	Annual Volumes Generated and Treated		√		√	√
	EPA Discharge Licence Compliance		√		√	√
	Recycling Programs					√
Solid Waste	Annual Tonnage Generated		√		√	
	% Recycled	√			√	√

Resort Aspects	Activity Reported	Baw Baw ARMB	Falls Creek ARMB	Lake Mountain ARMB	Mount Buller & Mount Stirling ARMB	Mount Hotham ARMB
	Recycling Initiatives				√	
	Litter Management		√		√	√
Energy	Total Energy Use					√
	CO2 emissions					
	Renewable Energy					
	Energy Efficiency Programs Implemented		√		√	
Native Vegetation	Revegetation Programs	√	√		√	√
	Annual Trees Planted				√	
Native Fauna	Progress on Endangered species programs	√		√	√	√
	Specific habitat works	√		√	√	√
	Pest management activities				√	
Weeds	Weed Control Activities	√		√	√	√
Education & Awareness	Staff Awareness and Training					√
	Community Education / Awareness programs				√	
Development	Ecological Sustainable Design Principals	√				√

There is no doubt that the Resorts face common issues in environmental management and ESD. However, as shown in the table above, the reporting on these issues is not consistent across the Resorts. It is difficult to determine from this information alone, what are common activities or elements of the environment that are currently measured across all resorts which could be utilised as suitable indicators.

The inconsistency also extends to the measurement units, where for instance: wastewater for Mount Hotham is presented as m2 of digested sludge where as Falls Creek report on effluent in ML p.a.

5.3 Environmental Management Plans

All Resorts have developed an Environmental Management Plan (EMP) in which is included an environmental policy. The purpose of the EMP is to focus the efforts in environmental management by Resort staff on priority areas and provide a plan to implement actions to address the key impact areas in a timely manner.

A summary of the Resorts' environmental policies are contained in the table below.

Table 5-2 Environmental Policies of the Alpine Resorts

Resort	Policy	Source	Date of EMP
Baw Baw	<i>To proactively manage our environment... focusing on areas of flora and fauna management, water and water quality management, wastewater treatment and land stability</i>	SMP, 2006	Being Update in 2007.
Falls Creek	<i>To ensure that the environmental values of Falls Creek are maintained and enhanced whilst continuing to encourage balanced development of the Resorts and its community through increased sustainable tourism throughout the year.</i>	EIP, 2003	2003
Mount Hotham	<i>All current and future management and development of Mount Hotham is to be undertaken within an ecologically sustainable framework</i>	SMP, 2006	1998
Mount Buller & Mount Stirling	<i>The Mount Buller and Mount Stirling Alpine Resort Management Board will strive to manage the Resort's natural and cultural values in an ecologically sustainable framework that protects, enhances and restores those values.</i> Natural values at the Resort are defined as flora and fauna, land, water, air, culture and landscape.	EMP, 2006	2006

There is considerable variation in the detail, scope and age of the EMPs. Some EMPs provide more detail; cover more areas of operations as opposed to others. This variation could be attributed to the same reasons for variation between the Annual Reports, but also could be related to the development of the environmental management industry at the time of creation.

Despite this variation in detail, the EMPs address in some form the following environmental areas:

- water use and water quality;
- energy efficiency and air quality;

- native vegetation;
- native fauna;
- pests and weeds;
- solid wastes;
- community awareness and involvement;
- noise;
- visual amenity; and
- fire management.

The EMPs are an operational tool for the Resort. They address the environmental impacts from Board activities, focusing on those areas which are managed by the Boards, and are guided by environmental protection policies such as the *FFG Act* and the *EPBC Act*. The EMPs are, in general, a response to these statutory requirements of protecting the environment.

This environmental KPIs project is a response to the global awareness of the economic impacts from environmental degradation and the need for all nations, companies and communities to act in an environmentally sustainable manner.

Because the EMPs precede this project, they may require updating to ensure the focus of the plan incorporates the vision of environmental sustainability defined by the KPIs and objectives.

The Annual Reports and the EMPs have provided a baseline indication of the current commitment (resource availability and attitude) to environmental monitoring by the Resorts. This commitment and capacity was considered when selecting the indicators as were the parameters that are currently monitored.

5.4 Summary of Environmental Issues at the Resorts

Whilst the Annual Reports and EMPs provide some insight into the environmental issues encountered by the Resorts, they do not paint the complete picture. The Annual Reports and EMP are typically focused around activities that are directly controlled by the Board.

Table 5-3 summarises the main activities within the Resort, which impact on the environment, and if they are under direct control from the Board.

The development of the environmental KPIs and objectives needs to focus on those areas of environmental sustainability that the Boards have control or influence.

Education and peer pressure are the key tools for facilitating change when there is no direct control. Promoting environmental awareness is a key element in *Alpine Resorts 2020 Strategy* and all policies on environmental sustainability. It is also considered to be key responsibility for the Boards as environmental stewards of the alpine environment.

It would be a waste of time and resources for the objectives and KPIs to address activities of which the Boards have no control or influence over, now and in the future.

Table 5-3 Summary on Key Activities and degree of control by the Boards

Theme	Activity	Direct or Indirect Impact by the Boards		
		Direct Control	Influence	No influence or Control
Water Management	Extraction, Treatment and Distribution	All water extraction activities		
	Potable Consumption	ARMB Activities,	Hospitality, Accommodation, Retail Businesses & Lift Companies	
	Non Potable Use (ie class A, rainwater)	ARMB Activities	Hospitality, Accommodation, Retail Business & Lift Companies	
	Wastewater Treatment & Disposal	All wastewater treatment activities		
Energy Management	Sourcing and Supply	Mt Baw Baw & Lake Mountain		Mt Hotham (although can supply LPG), Mt Buller & Falls Creek
	Energy Consumption	ALL ARMB activities	Hospitality, Accommodation and Retail Businesses	Lift Companies & Bus Companies
	Purchasing of Renewable Energy or Green Power	All ARMB activities	Hospitality, Accommodation and Retail Businesses & Lift Companies	
Solid Waste Management	Generation of Solid Waste	All ARMB Activities	Hospitality, Accommodation & Retail Business	
	Collection of Solid Wastes & Disposal	All waste collection activities		
	Recycling	All ARMB Activities	Hospitality, Accommodation and Retail Businesses	
Biodiversity	Flora Management Activities – includes revegetation, vegetation removal etc	All activities in flora management are to be approved by the ARMB		
	Fauna Management Activities	All activities in fauna management are to be approved by the ARMB		

6 Suggested Framework, Goals, Themes & Objectives

This chapter describes the key tasks and elements involved in the development of the environmental KPIs for the Victorian Alpine Resorts.

6.1 Framework

As demonstrated in Chapter 2 and 3, it is considered to be best practice that indicators, which measure the progress towards sustainable development, are closely aligned with sustainability policies and goals. This is commonly demonstrated using a thematic indicator framework¹. The application of the thematic framework included the following key tasks:

- development of the high level goal;
- identification of the main themes;
- development of the objectives; and
- indicator selection.

These are discussed below. A conceptual representation of the thematic indicator framework is presented in Figure 6-1 below and each key element discussed in detail in section 2.

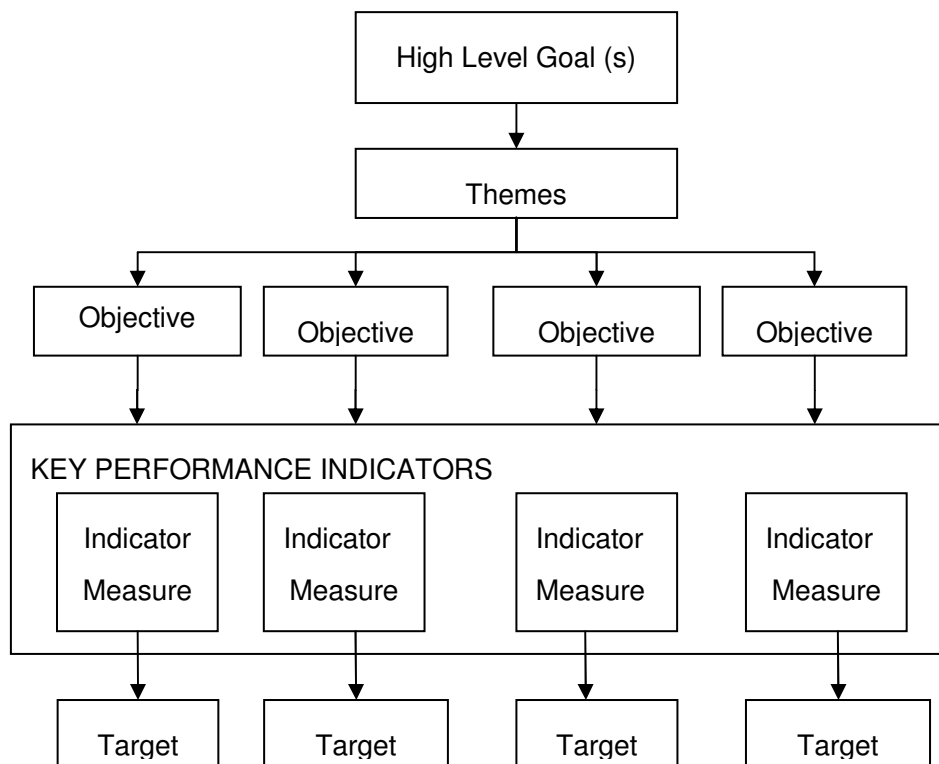


Figure 6-1 Thematic Framework

¹ The application of a thematic framework in industry to develop environmental and sustainability indicators is discussed in section 3.

The development of the 3 year, 5 year and 10 year targets is the responsibility of the Boards and is not addressed in this report. It is envisaged that the Boards will develop targets in consultation with the Council and DSE.

6.2 High Level Environmental Goal

The high level environmental goal was derived from the Victorian Government's *Alpine Resorts 2020 Strategy*.

The Strategy commits the five Victorian Alpine Resort Management Boards to progress towards operating and managing in an environmentally sustainable manner. Environmental sustainability can be defined as "...the ability to maintain the qualities that are valued in the physical environment." (quoted from the Commissioner for Environmental Sustainability, Victoria).

More specifically, the *Alpine Resorts 2020 Strategy* outlines a more wide ranging descriptive vision for the Alpine Resorts, from which the high level environmental goals were discerned.

High Level Environmental Goal:

Well designed and managed Resorts that blend in with the natural environment, known for their clean air, offering convenient access throughout the year to the broader alpine environment and remote wilderness. Rich biological diversity, together with a well managed fragile alpine environment for now and future generations. Waste water treated to a high standard, improved water quality downstream and improved energy efficiency in construction, with lower greenhouse emissions"

This high level environmental goal provides a clear definition of what are the key physical elements of an environmentally sustainable Resort that can be managed and/or influenced through the activities of the Boards.

6.3 Key Themes

The following emerging themes in environmental sustainability were identified from the high level environmental goal, international understanding of environmental sustainability (refer to section 3), environmental issues at the Resorts (refer to section 5) and key priorities in relevant government policies (section 4).

These themes have been identified as:

1. Water Management
 - a. Water Resources
 - b. Water Quality
2. Energy Management
 - a. Energy Efficiency
 - b. Greenhouse Gas Emissions
3. Solid Waste Management
4. Biodiversity Management

These themes represent what are considered to be the key issues/qualities of the environment specified in the high level environmental goal.

6.4 Objectives

An objective was defined for each of the themes. The objectives focus the Resorts on what is considered the key outcomes of the goal. The proposed objectives have been developed to address activities in which the Boards have direct control and influence.

The objectives quantitatively define environmental sustainability at the Resorts. When these objectives are achieved, the Resorts are considered to be managed and operated in an environmentally sustainable manner.

The proposed objectives are listed below and elaborated under each theme in the following chapters.

Water Management Objective

To manage all water sources within the resort (potable, wastewater and stormwater) to ensure future water demands are met without degrading the health of the rivers and creek and to encourage water conservation practices in all areas of the Resorts.

Energy & GHG Emission Management Objectives

To increase the proportion of renewable energy consumed by the Board to 20% by the year 2020 (State wide target); encourage businesses to do the same and adopt energy efficient practices.

To reduce net greenhouse gas emissions from Board activities within the resorts to 60% of the levels in 2000, by the year 2050, and to encourage businesses within the resort to do the same.

Solid Waste Management Objectives

To move towards zero waste in the Alpine Resorts – by consistently reducing the amount of solid waste per capita disposed to landfill.

Biodiversity Management Objectives

To implement actions that aim to recover threatened species and communities (actions specified in Action Plans pursuant to the Fauna and Flora Guarantee Act 1988 ('FFG Act 1988') and Recovery Plans pursuant to the Environment Protection Biodiversity and Conservation Act 1999 ('EPBC Act 1999'))

To conserve and increase habitat quality within the Resort.

The targets and KPIs are the tools to measure how the Resorts are progressing towards the proposed objectives.

6.5 Environmental Key Performance Indicators

The environmental KPIs were selected to measure the performance of the Resorts in achieving the above objectives. The proposed indicators are not intended to provide a detailed account of performance but rather to inform decision and policy makers on the progress of the Resorts towards environmental sustainability. On this basis, a small set of indicators was suggested. The benefits of a small set of indicators (often referred to as Headline Indicators) is discussed in section 0.

The KPIs selected were developed in consultation with the Boards and satisfied the generic criteria of an effective indicator (discussed in section 3.4). This included:

- aligned with the goals and objectives;
- to be globally relevant;
- easy to understand;
- informative; and
- feasible to measure by the Boards.

To adequately account for impacts that are directly correlated to visitor numbers, the indicator measure was specified as 'per equivalent person'. Recognising that the Resorts population is heavily skewed by its transient population (season worker and visitors), 'per equivalent person' was defined to include both permanent and transient residents and visitors.

This approach was based on the same system employed by Green Globe 21 where an equivalent persons is defined as 365 people days at the Resort for that year. A day visitor is expected to equal 0.33 of one day of an equivalent person, therefore three daytime visitor's equal one day of an equivalent person. An equivalent person may consist of a season worker, day visitors and overnight visitors. A permanent resident is considered to be equal to one equivalent person.

Measuring the indicator per equivalent person accounts for the large flux of visitors and allows the indicator to be compared across years and between Resorts. The equation to calculate total equivalent persons is provided below.

Total Equivalent Persons = # of permeant Residents + (# of day visitors/365) + (# of overnight visitors/365)

The potential indicators are presented and discussed under each of the themes and objectives in the following chapters.

7 Sustainable Water Resources Management

7.1 Relevance

As stated in *'Our Water Our Future'*, sustainable water resources are vital to Victoria's long term prosperity. Water is necessary for drinking and it is essential to the health of our natural environment, which supports everything we do.

Victoria's water resources are already over allocated with competing demands for human consumption, agricultural production and environmental preservation. Combined with the implications of climate change (hotter days and reduced average annual streamflows) the pressure on our water reserves will increase.

The key challenge for all of Victoria and Australia is to partake in sustainable water management activities to enable us to secure reliable water supplies for home, farms and industry in the future whilst protecting the environment. A key outcome of the *'Our Water Our Future'* is for communities to have a stronger ethic of water conservation and to make choices which promote sustainable water management practices.

Engaging in sustainable water management practices is a priority captured in the following government policies:

- *NSESD;*
- *Growing Victoria Together;*
- *Our Water Our Future; and*
- *Our Environment Our Future.*

River health is also a key driver for sustainable water management practices. Water extraction and discharge can alter flow regime and water quality in creeks and rivers. These changes cause stress on the river ecology often leading to degradation in river health. By managing the volume and timing of water extracted and discharged to creeks and rivers, the stress on these ecological systems can be reduced.

7.2 Current Water Management Practices

The Alpine Resorts are located at the headwaters of some of Victoria's most valuable rivers. Water is extracted from these upper tributaries for use within the Resort. The extraction of water is managed by the Boards and occurs in accordance with the water entitlement conditions.

The Boards are the responsible authority for the collection, treatment and distribution of this water. They deliver water to residences, hotels, commercial businesses and also supply water for snow making.

The volume of water consumed within the Resort is strongly linked to the number of visitors on the Mountain, with peak demand occurring in Winter during peak visitor season. This also coincides with the peak streamflows periods these tributaries.

The Boards are also responsible for the collection, treatment and discharge of wastewater. Wastewater is treated and discharged to local creeks and rivers in accordance with the EPA discharge licence conditions. The receiving waters are regularly tested for compliance.

Again, peak wastewater volumes occur during peak visitor season.

Although the Boards supply water to Resort, they do not have direct control over the use of the water apart from Board specific activities. They can, however, influence

attitudes and decision regarding water consumption and provide support and mechanisms to encourage businesses and visitors to engage in water conservation practices

It is also the responsibility of the Boards to manage the creeks and streams within the Resorts. This includes protecting the riparian zone, bank stability and managing stormwater runoff.

The management of water within the Resorts has to meet requirements specified in the following legislation:

- *Water Act 1989;*
- *Heritage Rivers Act 1992;*
- *Environmental Protection Act 1970 – SEPP Waters of Victoria 2003;*
- *Catchment and Land Protection Act 1994; and*
- *AS NZ Drinking Water Standards.*

7.3 Suggested Objective

The following is the suggested objective for the long term sustainable water management at the Resorts:

To manage all water sources within the resort (potable, wastewater and stormwater) to ensure future water demands are met without degrading the health of the rivers and creek and to encourage water conservation practices in all areas of the Resorts.

The aim of long term sustainable water management is to ensure water supply for the future of the Resort without degrading the health of the rivers that water is extracted from or discharged to.

The pressures on water resources at the Resorts are likely to increase with increasing demands from snowmaking. Combined with future development and reduced streamflows, demand could soon exceed supply. This is particularly the case in summer, were the low flows in the tributaries could limit the summer development in the Resort. It is very unlikely that in the current climate of the drought and the predicted reduced streamflows from climate change, that the Resorts will be able to increase their entitlements to meet these increasing demands.

Whilst the Boards cannot directly control the use of water within the Resort, they can, through the planning act, control the installation of water efficient appliances in new developments. They can also educate and remind the community, visitors and businesses on their responsibility to use water sustainability.

The Resorts, as should everyone, recognise the national water crisis and see that the implementation of water conservation practices is not only for the benefit of the environment and Resort, but also for the Nation.

7.4 Suggested KPI's to Measure Sustainable Water Management

The following KPIs are suggested to measure the objective in sustainable water management.

INDICATOR 1:	Compliance with Discharge Licence
Description of Indicator	This indicator was developed on the assumption that if the Resorts complied with the EPA discharge licence conditions (wastewater discharge) then wastewater was being managed such that it is not degrading the health of the waterways
Measure:	The proportion of times the Resort has complied with the EPA discharge licence conditions.
Unit:	%

INDICATOR 2	Compliance with Water Extraction Licence
Description of Indicator	This indicator was developed on the assumption that if water is extracted from the creeks in accordance with the Resorts Licence Requirements, then the health of those creeks is not being degraded.
Measure:	The proportion of times the Resort has complied with the water extraction licence conditions
Unit:	%

INDICATOR 3	Potable Water Consumption (excluding snow making)
Description of Indicator	<p>This is defined as the total volume of potable quality water consumed within the Resort, excluding water consumed for snow making.</p> <p>The aim here is to achieve a downward trend on the use of potable water per equivalent resident in domestic and commercial activities over time. This demonstrates that the Boards have been active in education and influencing the adoption of water conservation practices.</p> <p>Snow making has been excluded from the indicator because water consumption per season is highly variable, as are the snow making facilities between the Resorts.</p> <p>The indicator is measured per equivalent person as the consumption of water is directly related to the population at the Resort. Population is calculated based on the Green Globe 21 system discussed in section 6.5.</p> <p>Presenting the information per equivalent person allows the water consumption to be directly comparable between the Resorts and also to water consumption figures across the state, satisfying the requirement for indicators to be globally relevant</p>
Measure:	Annual Potable Water Consumption within the Resorts (excluding snow making) per equivalent person.
Units	L / equivalent person / year

7.5 Suggested Activities

A reduction in potable water consumption at the Resorts could be achieved through the following activities:

- installation of water efficient appliance in facilities owned and operated by the ARMB;
- encourage the installation of water efficient appliances in buildings within the resort;
- collection and reuse of stormwater for activities which do not require potable water;
- treatment and reuse of wastewater effluent for non potable water activities;
- installation of rainwater tanks to substitute non-potable water use (ie toilet flushing etc); and
- incorporate and enforce water efficiency and conservation practices into new developments and retrofits of buildings.

8 Sustainable Energy Management

8.1 Relevance

There is now scientific consensus that climate change is happening and the emissions of greenhouse gasses such as CO₂ from human activities are accelerating this change.

The majority of greenhouse gas emissions derived from human activities are associated with the use of fossil fuels. Reduction in greenhouse gas emissions can be achieved through avoiding or minimising activities which use fossil fuels, use of alternative fuels or increasing energy efficiency.

Reducing our greenhouse gas emissions requires a global effort, and in the *'Our Environment, Our Future'*, it is Victoria's goal is to play its part in international efforts to reduce greenhouse gas emissions and fight climate change.

Australian Business Roundtable on Climate Change has recently called for Australia to adopt the target to reduce greenhouse gas emissions by 60% below 2000 levels by the year 2050. This proposal was supported by economic modelling done by the Allen Consulting Group and confirmed by the CSIRO. This commitment would require energy consumption to shift to less greenhouse intensive fuel such as including natural gas, wind and solar power.

Replacing the consumption of fossil fuels by greater use of renewable energy and implementing energy efficiency is to be encouraged, as it not only reduces greenhouse gas emissions but also preserves our natural resources.

Reducing greenhouse gas emission and promoting energy efficiency is a priority captured in the following government policies:

- *NSESD;*
- *Growing Victoria Together;*
- *Our Environment Our Future; and*
- *Victorian Greenhouse Gas Strategy.*

8.2 Current Energy Management

The supply of energy to the businesses within the Resorts are not controlled by the Boards, except at Mount Baw Baw Alpine Resort and Lake Mountain Alpine Resort.

These businesses consume energy using a variety of fuels (e.g. grid electricity, natural gas, gasoline, diesel and wood). There are often more than one energy service provider, and multiple fuels which are consumed. Without a central distribution system, it would prove very difficult to measure the consumption of all fuels.

The main energy consuming activities within the Resorts are thought to be:

- Heating;
- Lighting;
- Lift operation; and
- Snow making.

Visitor transport to and from the Resorts is also a major contributor to energy consumption and greenhouse gas production.

The Boards are responsible for the energy consumed from Board related activities and also for the enforcement of the energy rating through the building regulations.

The alpine climate and relatively poor energy efficiency of many existing facilities in the Resorts results in high per capita energy use. With the implementation of the new building regulations, which require that any new buildings must meet a 5 star energy rating, this trend should decrease.

Many Boards have started to educate the Resorts on energy efficiency and promoting the use of renewable energy to reduced GHG emissions.

8.3 Suggested Objective

There are two suggested objectives for energy management. These are:

To increase the proportion of renewable energy consumed by the Board to 20% by the year 2020 (State wide target); encourage businesses to do the same and adopt energy efficient practices.

To reduce net greenhouse gas emissions from Board activities within the resorts to 60% of the levels in 2000, by the year 2050, and to encourage businesses within the resort to do the same.

By reducing greenhouse gas emissions, the Resorts are contributing to the global efforts in slowing climate change. The long term benefits for the Resorts are a possible reduction of the predicted impacts of climate change on the snowfall and reduced stress on alpine ecological communities.

The Boards cannot control the source and consumption of fossil fuels within the Resort, apart from Board activities. However they can educate the businesses and visitors to the Resort on their responsibility to fight climate change and inform them of their greenhouse emissions when staying at the Resort. If the Boards can meet the nation wide greenhouse gas emissions target, and the state wide renewable energy target, they are setting an excellent example for the businesses and community to follow.

8.4 Suggested KPIs to Measure Energy Management

The following KPIs are suggested to measure the objective in sustainable energy management.

INDICATOR 4:	Renewable Energy Consumption by Boards
Description of Indicator	This indicator measures how the Boards are progressing towards the state wide target on renewable energy consumption. It is presented as a percentage of total energy consumption so as not to encourage energy use, but rather encourage substitution of existing fossil fuels with renewable energy sources.
Measure:	Renewable Energy (Joules) / Total Energy Consumption (Joules) by the ARMB related activities.
Unit:	%

INDICATOR 5:	Greenhouse Gas Emissions from Board Activities
Description of Indicator	This indicator measures the amount of greenhouse gas that is produced from Board activities.
Measure:	Total weight of CO ₂ produced to from the Board's energy consumption per annum
Unit	Tonnes CO ₂ per year

INDICATOR 6:	Greenhouse Gas Emissions from All Activities in the Resort
Description of Indicator	<p>This indicator measures the amount of greenhouse gas that is produced from all Resort activities. It is recognised that the Boards do not control all energy consumption within the Resorts. However by reporting the annual energy consumption of the Resorts as a whole, it increases accountability within the Resort Community. A decreasing trend in total annual emissions will demonstrate the Boards ability to educate and influence.</p> <p>The increase in renewable energy consumed at the Resort is also reflected in the greenhouse gas emissions.</p> <p>Energy consumption figures could be collected from lodge holders and businesses either from electricity meters or fuel bills.</p> <p>Using standard emission calculators from the Australian Greenhouse Office, the energy consumed can be easily converted into greenhouse gas emissions, represented as CO₂ equivalents.</p> <p>Presenting the information per equivalent person allows the indicator to be directly comparable between the Resorts and also to figures across the state, satisfying the requirement for indicators to be globally relevant. Definition of an equivalent person is provided in section 6.5.</p>
Measure:	Total annual weight of CO ₂ produced per equivalent person per annum
Unit	Tonnes CO ₂ / equivalent person / year

8.5 Suggested Activities

These indicators will hopefully encourage the resort to partake in the following sustainable energy management practices:

- purchasing of green energy or use of an alternative cleaner fuel;
- retrofitting with energy efficient appliances;
- participate in carbon trading;
- plant trees to offset carbon emissions;
- actively promote education of greenhouse gas through KWC programs;
- encourage the 5 star energy rating on all buildings and renovations; and
- installation of solar energy systems.

9 Sustainable Waste Management

9.1 Relevance

The State's vision for our communities is to become a zero waste society, in which products are routinely reused or their materials recycled at the end of their useful life.

Under the *'Our Environment Our Future'*, the Victorian Government has released *Towards Zero Waste Strategy* with 3 aims: a) to generate less waste, b) increase the amount of material for recycling and reprocessing and c) reduce the damage to the environment. This plan addresses waste generation across the whole product life cycle. It provides incentives to produce products with less waste and which are longer lasting, encourages consumers to buy these "green" products (labelled as ECObuy) and sets recycling and reuse targets for waste.

By 2014 the strategy aims to:

- cut waste generation by 12%;
- recover 75% of solid waste (by weight) to be reused, recycled and converted to energy; and
- improve 2003 levels of littering by 25%.

9.2 Current Waste Management Practices

The Boards are responsible for the collection and disposal of solid waste generated at the Resorts. Some of the Resorts do not have recycling or landfill facilities on the Mountain. In these cases solid waste is transported off mountain to a suitable landfill.

Visitors are the main contributor to waste and litter generated at the Resorts. As a consequence, the peak visitor period results in a peak in waste generation.

Many Resorts have already developed and are implementing education programs aimed at businesses and visitors to reduce waste and litter. Some Resorts are a member of NevRwaste (North East Regional Waste Management Group) and support ECObuy².

9.3 Suggested Objective

The suggested objective for solid waste management is:

To move towards zero waste in the Alpine Resorts – by consistently reducing the amount of solid waste disposed to landfill.

Reducing solid waste disposed to landfill has benefits for the Resorts and the environment by lowering costs, reducing pollution from landfill activities and reducing the consumption of our natural resources.

This solid waste objective focuses on achieving a downward trend in the weight of solid waste disposed to landfill. This was preferential to a setting an absolute

² ECO-Buy is a government funded organisation established to encourage the purchasing of green products. More information on ECObuy can be obtained from www.ecobuy.org.au

percentage target reduction in solid waste as the Boards can only influence, not control, activities by visitors and businesses. Whilst the objective is directional only, the targets are quantitative and will define the weight reducing to be achieved. It is envisaged that the Boards will set targets for solid waste reduction based on previous records. Targets may vary between the Resorts pending on the waste disposal arrangement. This recognises that a common level of sustainable waste management may not be feasible at all Resorts.

The increased use of recycled materials at the Resort would be represented by the decrease in solid waste to landfill. Because waste is correlated to the number of people at the resort, the figures are reported in per equivalent person. This allows the waste generation to be compared across the years, between the Resorts and throughout the state.

9.4 Suggested KPI to Measure Solid Waste Management

The following KPI is suggested to measure the objective in solid waste management.

INDICATOR 7:	Solid waste disposed to landfill
Description of Indicator	<p>This indicator provides a consistent measure that can be compared between the Resorts and other industries and communities.</p> <p>As the generation of waste is directly proportional to the number of visitors on the mountain, this indicator presents the information in weight and per equivalent person (discussed in section 6.5).</p> <p>Tracking the trend in this indicator will determine whether a reduction in solid waste generation is being achieved.</p>
Measure:	Annual Weight of Solid Waste Disposed to Landfill per equivalent person.
Unit:	Tonnes / equivalent person / year

9.5 Suggested Activities

Suggested activities which the Boards could engage in to achieve a downward trend in solid waste disposed to landfill include:

- adopt a No Plastic bag policy;
- encourage businesses to participate in ECObuy;
- encourage recycling; and
- waste and litter education programs.

10 Biodiversity Management

10.1 Relevance

The Victorian Alps are home to a rich diversity of native fauna and flora species, with the presence of 64 known threatened species. They include the critically endangered species:

- snow patch community;
- alpine bog community;
- the Mountain Pygmy Possum at Falls Creek, Mount Hotham and Mount Buller;
- the Baw Baw Frog;
- several Species of Stonefly at Mount Stirling and Mount Buller; and the
- Leadbeater's Possum and the Barred Galaxias, a small native fish found at Lake Mountain.

The survival of many alpine species will be under increased pressure due to climate change. As the cool climate vegetation and snowline migrate upward due to temperature increase, the alpine habitat contracts. Warmer temperatures result in alpine species losing their competitive advantage and becoming increasingly stressed and vulnerable. Many of the alpine species, under the current temperatures are at their upper limit of survival. Even an increase of +1 degree in mean annual temperatures could render a species extinct.

A warmer climate regime also makes the current alpine environment more attractive to pests, including feral animals, and weed invasion from sub alpine areas. It is for these reasons that the alpine environment is considered to be one of the three most vulnerable ecosystems under potential climatic warming.

10.2 Current Management of Biodiversity

The ARMB are responsible for management of native alpine flora and fauna within the Resort. Management activities are undertaken in accordance with the following:

- *Flora and Fauna Guarantee Act 1988 ('FFG Act')*
- *Planning and Environmental Act 1987*
- *Catchment and Land Protection Act 1994*
- *Environment Protection and Biodiversity Conservation Act 1999 ('EPBC Act')*
- *Victoria's Biodiversity Strategy.*

The Boards are actively involved in pest and weed control programs and most Resorts have developed a Pests and Weeds Strategy. The Resorts are currently developing and implementing a Native Vegetation Strategy in line with Victoria's Native Vegetation Management Framework.

The conservation and protection of threatened species is specified in Recovery Plan under the *EPCB Act* and the Action Statement under the *FFG Act*.

Originally the co-ordination and implementation of activities under the *FFG Act* and the *EPBC Act* was left to the individual land manager. This meant that the activities

implemented depended on the priorities of the individual land manager and were often inconsistent across a population and bioregion. Activities were also typically focused on those species of higher conservation status, i.e. critically endangered species.

It has since been recognised that much gain could be achieved through greater co-ordination of the implementation of the Recovery Plans and Action Statements . Recognising this, DSE have developed “Actions for Biodiversity Conservation” (ABC) system. This system aims to achieve a greater benefit from the current investment by land managers through improving communication, consistency in priority setting of activities and monitoring of implementation of these action statements and recovery plans. The ABC system is based on the premise that a central agency (DSE) will assist in setting the priority actions under the *FFG Act* and the *EPBC Act*, of which will be communicated to the land manager via the web. Depending on the resources available to the land manager, they can commit to all or most of the activities. Reporting on the implementation of these activities is also web based.

10.3 Suggested Objective

The suggested objective for biodiversity is:

To implement actions that aim to recover threatened species and communities (actions specified in Action Plans pursuant to the Fauna and Flora Guarantee Act 1988 (*FFG Act*) and Recovery Plans pursuant to the Environment Protection Biodiversity and Conservation Act 1999 (*EPBC Act*))

To conserve and increase habitat quality within the Resort.

There are two objectives for biodiversity. The first objective focuses on the protection of threatened species and communities and the responsibilities of the Boards as land managers with respect to the *FFG Act* and the *EPBC Act*.

The second objective is focused on native vegetation extent and quality. By increasing the extent of good quality habitat, the Resorts are assisting in relieving some of the pressures on all native alpine species that are under threat from climate change and thereby contributing to the National Biodiversity and Climate Change Action Plan.

10.4 Suggest KPIs to Measure Biodiversity

The following KPIs are suggested to measure the biodiversity management.

INDICATOR 8:	Activities implemented that are specified in the Action Plans and Recovery Plans for threatened species and communities identified to exist within the Alpine Resort Boundary.
Description of Indicator	<p>There are many factors which attribute to the pressures on threatened species and communities, some of which are outside the control of the land manager. This indicator focuses on relieving pressures that are under control of the Boards, by reporting on the implementation of the Recovery Plans and Actions Plans from the <i>EPBC Act</i> and the <i>FFG Act</i>. It does not measure the outcome of the activities, i.e. the increase in threatened species population.</p> <p>By reporting more generally on management activities, bias towards one endangered species is avoided.</p> <p>This indicator could be measured using the “Actions for Biodiversity Conservation” (ABC) system. This is a relatively new system developed by DSE. Activities in the Recovery Plans and Action Statements are prioritised by DSE and communicated to the Boards through a web based system. The Boards log into this system, receive information about what priority actions should be implemented. These activities are incorporated into their corporate plan and implemented in that year. Once the activities are completed, a completed status is entered into the ABC system, which is fed back to DSE. Whilst the primary aim for the ABC system is for a more coordinated and effective approach to management of our threatened species and communities, it has many advantages for the Resorts, namely as an information source and data collection tool.</p> <p>By participating in this program, the Boards will improve the effectiveness of activities aimed at protecting threatened species; allow the Resorts to have access to technical knowledge and experience within DSE; and provide a credible and transparent record of activities implemented at the Resorts.</p> <p>As these activities with the ABC system are derived from the <i>FFG Act</i> and the <i>EPBC Act</i>, reporting on the number of activities implemented demonstrates how committed the Boards are to protecting our threatened species and communities.</p>
Measure:	No of activities implemented / no. of activities specified.
Unit:	% of activities implemented

INDICATOR 9:	Extent of Good Quality of Habitat within the Resort
Description of Indicator	<p>The quality and extent of vegetation within the Resort can be represented by habitat hectares. The number of habitat hectares is defined as the hectares of good quality habitat which is equivalent in value to the vegetation within the Resort. For example 10 hectares of medium quality vegetation could be equivalent to 1 habitat hectare (example only). This approach and habitat hectares concept was developed by DSE and implemented in the Victorian Native Vegetation Framework.</p> <p>The methodology for assessing habitat quality and calculating the habitat hectares is described in the Vegetation Quality Assessment Manual.</p> <p>This indicator will require an initial habitat hectare assessment of each of the Resorts to establish a baseline. It is then proposed that the habitat hectares assessment is reassessed at the 5 year, 10 year and 20 year mark. The assessment would be undertaken by a trained professional in native vegetation. Most Boards would have to hire a consultant to undertake the assessment or obtain training for a suitably qualified member of staff.</p> <p>An increase in habitat hectares at the resort represents an increase in the quality and or extent of native vegetation,</p> <p>This indicator is measured as a percentage of the total Resort area. The percentage allows large Resorts to be compared to smaller Resorts.</p> <p>For annual reporting of habitat hectares, the Boards can use a predictive tool (developed by the DSE) to calculate the increase in habitat hectares from completing native vegetation management activities.</p>
Measure:	Habitat Hectares / Total Resort Hectares
Unit:	%

10.5 Suggested Activities

Suggested activities which the Boards could engage in to meet the objective could include:

- development and implementation of a Weed and Pest Control Strategy;
- development and implementation of a Native Vegetation Strategy;
- applying the Net Gain Principles in the Victorian Native Vegetation Strategy;
- become involved in a local landcare group; and
- participate in the ABC program.

11 Putting it all into Place

This chapter discusses how the objectives and indicators will fit into the existing reporting framework.

11.1 Targets

As discussed in section 2, inherent to the use of performance indicators is targets against which they are measured. While the objectives represent the long term targets (20 years), the 3 year, 5 year and 10 year targets need to be set. These interim targets will demonstrate how each of the Resorts plan to meet the objectives and also each resort's progress towards reaching the environmental objectives.

Under the 2003 Alpine Resorts Reform Package, it is the responsibility of the Boards to develop these interim targets. In some cases the Boards may initially have different interim targets for the same indicators because they are starting from different baselines. In these situations, the disparity between the targets should decrease as progress is made.

11.2 Program

It will be important for the Resorts to identify what activities or actions they propose to undertake to meet the environmental objectives and more specifically what activities or actions should be implemented sooner rather than later to meet the interim targets. These activities and time frames will be developed as part of the corporate planning processes.

11.3 Monitoring and Reporting

The indicators will be measured as part of the annual reporting process of the Boards and included in the Annual Reports. A consistent reporting format should be adopted with the Annual Reports to present the environmental sustainability performance. The 'Reporting and Planning Arrangements Paper' specifies a reporting format including a score card template for such reports. This scorecard is to give a brief overview of the Board's sustainability performance with respect to the defined KPIs.

11.4 Assessment

The annual review of the Corporate Plan will assess if the actions are effective and the Resorts are on track to meet the targets.

11.5 Review

Whilst the indicators are reported annually and the assessment of the Boards action are also assessed annually, the review of the Boards performance occurs at the 3 year, 5 year and 10 year marks. The review involves the comparison of the indicator against the 3 year, 5 year and 10 year targets. It is during these reviews that any issues with the suitability of the objectives and indicators can be addressed.

The environmental KPIs are not intended to be reviewed in isolation but rather collectively with the social and economic KPIs. These KPIs represent a family of indicators which, when taken together, represent a credible sign of the resorts progress towards sustainability.

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Appendices

Appendix A Environmentally Sustainable Themes in Practice

Summary of themes adopted by organisations to arrange environmental sustainable indicators

Summary of Environmental Themes used to arrange environmental indicators

Name of organisation	United Nation Commission for Sustainable Development (UNCSD).	
Responsibilities of the Organisation	Formed in 1992 following the adoption of Agenda 21, Its mission is to provide leadership and an authority source of expertise in sustainable development and is responsible for the implementation of Agenda 21.	
Purpose and Scope of Indicators	To measure the progress of the United Nations in implementing Agenda 21. Core Indicator Set is derived from Core Indicator Framework based on a thematic approach. The themes define, what the UN considers to be, the key aspects of Sustainable Development (Economic, Social and Environmental) across all united nations.	
Pillar	Theme	Sub-theme
Environmental	Atmosphere	Climate change
		Ozone Layer Depletion
		Air Quality
	Land	Forests
	Fresh Water	Water Quantity
		Water Quality
Biodiversity	Ecosystem	
	Species	
Economic	Consumption and Production Patterns	Energy Use
		Waste Generation and Management
Name of organisation	World Bank	
Purpose and Scope of Indicators	The World Bank has developed a series of indicator sets to help in more effectively tracking the progress of its environmental activities. It has developed a set of headline indicators to measure the environmental performance of countries. These indicators consider the environment and economics and are annual reported in The Little Green Book.	
Themes		
Forests and Biodiversity		
Energy		
Emissions and pollution		
Water and sanitation		

European Environmental Agency	
Name of organisation	European Environmental Agency
Responsibility of the Organisation	Responsible for the strategic management and preservation of the environment within the countries of the European Union.
Purpose and Scope of Indicators	Developed core indicator sets in ecological sustainable development that addressed the priorities of the EU in sustainable development. The core indicators provide a consistent method of how to measure the progress of environmentally sustainable development across the countries of the European Union against environmental policy priorities.
Pillar	Themes
Environmental Themes	Air Pollution and Ozone depletion
	Climate Change
	Waste
	Water
	Biodiversity
	Terrestrial Environment
Sectors	Agriculture
	Energy
	Transport
Organisation for Economic Co-operation and Development (OECD)	
Name of organisation	Organisation for Economic Co-operation and Development (OECD)
Responsibility of the Organisation	
Purpose and Scope of Indicators	Developed key, core and sectoral sets of environmental indicators to be used in reporting on the countries environmental performance and assist in integrating environmental concerns into policy making
Pillar	Themes
Pollution Issues	Climate Change
	Ozone Layer
	Air Quality
	Waste Generation
	Freshwater Quality
Natural Resources and Assets	Freshwater Resources
	Forest Resources
	Fish Resources
	Energy Resources

Global Reporting Initiative (GRI)	
Name of organisation	Global Reporting Initiative (GRI)
Responsibility of the Organisation	GRI was formed to provide a universally acceptable and accountable framework for sustainability reporting for all organisations.
Purpose and Scope of Indicators	The indicator set was developed to provide a consistent and accredited way to report on sustainability performance of an organisation, with the main focus on the environmental sustainability.
Pillar	Themes
Environmental	Materials
	Energy
	Water
	Biodiversity
	Emissions, Effluents and Waste
	Products and Services
	Compliance
	Transport
	Overall (environmental expenditures and investments)
Sustainable Slopes	
Name of organisation	Sustainable Slopes
Responsibility of Organisation	<p>Sustainable Slopes is an Environmental Charter developed by the National Ski Areas Association (NSAA) in North America to raise the collective environmental performance of the ski industry. It formed in 2000 as an industry initiative, facilitated by NSAA.</p> <p>The Sustainable Slopes vision is for the ski areas to be leaders among recreation providers by managing their businesses in a way that demonstrates commitment to environmental protection and stewardship while meeting public expectations,</p>
Purpose and Scope of Indicators	The indicators measure the Resorts performance in meeting its environmental principles. The environmental principles represent the main impact areas on the environment from Resort Activities.
Themes	
Planning, Design Construction	
Design trails with less tree removal, veg disturbance	
Operations	
Water Resources	
Energy Conservation and Clean Energy	
Waste Management	
Fish and Wildlife	
Forest and Vegetative Management	
Wetlands and Riparian Areas	
Air Quality	
Visual Quality	

Transportation	
Education and Outreach	
Name of organisation	Green Globe 21
Responsibility of Organisation	Green Globe is the global Affiliation, Benchmarking and Certification program for sustainable Travel & Tourism and Communities. It is based on the principles (agenda 21) for Sustainable Development endorsed by 182 Heads of State at the United Nations Rio De Janeiro Earth Summit. Certification is achieved This system is also endorsed by Ecotourism Australia.
Purpose and Scope of Indicators	To measure the performance of a business in meeting or exceeding environmental performance in 9 key areas listed below. These are based on the patented Earth Check indicator system which focuses mainly on the environmental pillar of sustainable development.
Pillar	Themes
Environmental	Greenhouse Gases
	Energy Management
	Air Quality
	Fresh Water Resources
	Wastewater Management
	Waste Minimisation
	Social and Cultural impact
	Land Use management
	Ecosystem Conservation

Appendix B Performance Indicators in Practice

Summary of KPIs employed by some key organisations to measure performance in environmental sustainability

	KPI Description			
Source	Energy	Greenhouse	Water Consumption	Waste
GreenGlobe - EarthCheck	Energy Consumption / person year	CO2 generated / person year	Water Consumption / person year	Weight of waste / person year
NSED	Total & % Renewable Energy Consumption	Total net GHG emissions	surface water units within 70% of sustainable yield, groundwater management units within 70% of sustainable yield	Nothing specific - incorporated into other indices.
OECD	Intensity of Energy Use and Energy Efficiency Index	CO2 emissions, Index of greenhouse gas emissions, CH4,N20, CFC emissions	Intensity of use of water resources, Frequency and duration and extent of water shortages, Water p[rices and user charges for sewerage treatment	Generation of wastes, movements of hazardous waste, waste minimisation, recycling rates
EEA Core Set	Final Energy Consumption, Total Energy Consumption, Total Energy Intensity, Renewable Energy Consumption, Renewable Electricity	Greenhouse gas emissions and removal, projections of greenhouse gas emissions removals and policy and measures	Use of freshwater resources	Water generation, generation and recycling of packaging waste
GRI	Direct Energy Consumption by primary energy source, Indirect energy consumption by primary source, energy saved due to conservation and efficiency improvements, Initiatives to provide energy-efficient or renewable energy based products and services and reductions in energy requirements as a result of these initiatives	Total direct and indirect greenhouse gas emissions by weight, other relevant indirect greenhouse gas emissions by weight, initiatives to reduce greenhouse gas emissions and reductions achieved, emissions of ozone depleting substances by weight	Total water withdrawal by source, Water sources significantly affected by withdrawal of water, Percentage and total volume of water recycled and reused	Total weight of waste by type and disposal method, weight of transported, imported, exported or treated waste deemed hazardous
Ski Area Citizens	Utilizing wind and solar generated power(1-2% of annual electricity: 3pts, 3-4%: 6pts, >5%: 9pts), Employing energy efficient retrofits (pts system)	Addressing climate change through an official policy, promoting or sponsoring commuter buses and shuttles, providing incentives for car pooling and or use of mass transit, using bio-diesel	Pts for employing water conservation and use minimisation measures,.	Use of non-disposable or composting compostable products for food, recycling customer products

	KPI Description			
Source	Energy	Greenhouse	Water Consumption	Waste
Sustainable Slopes	Energy Use for Facilities, Energy Use for Snowmaking, Energy Use for Lifts, Energy Use for Vehicle fleets - Reduce overall energy use in ski area facilities, cleaner and renewable energy in ski area facilities, strive to exceed energy standards in new or retrofit projects.	Reduce activities which produce GHG	Water use efficiency in snow making water use in facilities, water use in landscaping and summer activities	Waste Reduction, product reuse, recycling, potentially hazardous wastes, wastewater management
UNCSD	Note under economic, Annual energy use, share of consumption of Renewable Energy Resources, Intensity of energy use	Emissions of Greenhouse gases	Annual Withdrawal of Ground and Surface Water as a Percent of Total Available Water,	Note classified under economic, consumption and product patterns, Generation of types of wastes, waste recycling and reuse

	KPI Description			
Source	Biodiversity	Water Quality	Air Quality	Other
GreenGlobe - EarthCheck	Habitat Conservation area / Total Area	Samples quality passed / samples tested	Nox generation, SO2 generated, Particulates generated / person year	Sustainability Policy, Resource Conservation: Weight of paper purchased / Employee, Travel and Tourism: Environmentally accredited operations / Total operations
NSED	Extent and condition of native vegetation, freshwater habitats, coastal habitats, estuarine habitats and marine habitats including extent to which represented in reserves and non reserve systems (% of biogeographical sub regions with greater than 30% of original vegetative cover, % of biogeographical sub-regions with greater than 10% of the sub regions area in protected areas) Number for extinct endangered and vulnerable species and ecological communities	River condition index as an indicator high instream biodiversity	Total SO _x and NO _x and particulate emissions	Land health - catchment condition index
OECD	Habitat alteration and land conversion from natural state, threatened or extinct species as a share of total species known, Area of key ecosystems, protected areas as % of national territory and by type of ecosystem, protected species.	Emissions of N and P in water, BOD/DO, concentrations of N and P,	SO _x and NO _x emission intensities	
EEA Core Set	Threatened species, designated area, species diversity	Oxygen consuming substances in rivers, nutrients in freshwater, bathing water quality	Emissions of ozone precursors, emissions of primary particulates, exceedance of air quality limit, consumption of ozone depleting substances	

	KPI Description			
Source	Biodiversity	Water Quality	Air Quality	Other
GRI	Location and size of land owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas, Description of significant impacts of activities, products and services on biodiversity in protected areas and areas of high biodiversity value outside protected areas, habitats protected or restored, strategies, current actions and future plans for managing impacts on biodiversity, Number of IUCN Red List species and national conservation list specified habitats in areas affected by operations, by level of extinction risk.	Total water discharge by quality and destination, Identity, size, protected status and biodiversity value of water bodies and related habitats significantly affected by the reporting organisations discharges of water and runoff.		<p>Materials: Materials used by weight or volume, % of materials used that are recycled input materials.</p> <p>Products and Services: Initiatives to mitigate environmental impacts of products and services, and extent of impact mitigation, % of products sold and their packaging materials that are reclaimed by category,</p> <p>Compliance: Monetary value of significant fines and total number of non-monetary sanctions for non-compliance with environmental laws and regulations.</p> <p>Transport: Significant environmental impacts of transporting products and other goods and materials used for the organisations operations and transporting members of the workforce.</p> <p>Overall: Total environmental protection expenditures and investments by type.</p>
Ski Area Citizens	Scoring on activities which may impact or benefit federal and or state threatened, endangered, sensitive animal species.	Points based on activities which have resulted in water quality violations		

	KPI Description			
Source	Biodiversity	Water Quality	Air Quality	Other
Sustainable Slopes	Maintain and improve habitat	Water quality management and compliance	reduce pollutants (particulates and GHGs)	Visual Amenity, Education, Planning, policy
UNCSD	Area of Selected Key Ecosystems, Protected Area as a % of Total Area, Abundance of Selected key species	BOD in Water Bodies, Concentration of Faecal Coliform in Freshwater	Ambient Conc of Air Pollutants in Urban Areas	National SDS, implementation of ratified global agreements

Appendix C KPIs for the NSESD

Headline Indicators employed by the National Strategy for Ecological Sustainable Development

To enhance individual and community well-being and welfare by following a path of economic development that safeguards the welfare of future generations.

Theme	Indicator
Living standards and economic well being	Gross National Income (GNI) per capita
	Gross per capita disposable income
Education and skills	Percentage of people aged 25-64 who have attained upper secondary and/or attained post secondary qualifications including vocational training
Healthy Living	Disability adjusted years of life expectancy
Air Quality	Number of occasions where concentrates of pollutants exceeded NEPM standards for ambient air quality in major urban areas
	Total SO _x , No _x and particulate emissions
Economic capacity	Multi-factor productivity (gross product per combined unit of labour and capital)
Industry performance	Real GDP per capita
Economic security	National Net Worth
	National Net Worth per capita
Management of water	Surface water units within 70% of sustainable yield
	Groundwater management units within 70% of sustainable yield
Management of forests	Total area of all forest types
Management of fish	Percentage of major Commonwealth harvested wild fish species classified as fully or under fished
Management of energy	Renewable energy use as a proportion of total
	Total renewable and non renewable energy use
Management of agriculture	Net value of rural land

<i>To provide for equity within and between generations</i>	
Theme	Indicator
Economic and gender equity	Adult female full time (OT) average weekly earnings as a proportion of adult male full time (OT) average weekly earnings
Economic and educational equity	Percentage difference in the year 12 completion rate between bottom and top socio-economic decile
Economic and health equity	Percentage difference in burden of life years lost due to disability between bottom and top socio-economic quintile Percentage difference in burden of life years lost due to mortality between bottom and top socio-economic quintile
Locational equity	Percentage difference in the year 12 completion rate between urban and rural locations

To protect biological diversity and maintain essential ecological processes and life support systems

.Theme	Indicator
Biodiversity and ecological integrity	<p>Extent and condition of native vegetation, freshwater habitats, coastal habitats, estuarine habitats and marine habitats including extent to which represented in reserves and non reserve systems. Actual indicators used:</p> <p>Proportion of bio-geographic sub-regions with greater than 30 percent of original vegetative cover</p> <p>Proportion of biogeographical sub-regions with greater than 10 percent of the sub region's areas in protected areas.</p> <hr/> <p>Number of extinct, endangered and vulnerable species and ecological communities. Actual indicators used:</p> <p>Number of extinct, endangered and vulnerable species</p> <p>Number of endangered ecological communities</p>
Climate change	Total net greenhouse gas emissions
Coastal and marine health	Estuarine condition index – proportion of estuaries in near pristine or slightly modified condition
Freshwater health	Proportion of assessed sites which are with high in-stream biodiversity, based on macro-invertebrate community structure (Interim indicator –river condition index)
Land health	Catchment Condition Index – proportion of assessed catchments that are in moderate or good condition

Appendix D Summary of “Our Environment, Our Future”

Summary of relevant actions under the Victorian Government Strategy “*Our Environment Our Future*”

Responding to the Challenge of Climate Change

ACTION 1 – Renewable Energy Target

Proposed to increase the state-wide renewable energy target (RET) from 4% to 10% by 2016. The increase demand for Green Power will reduce greenhouse gas emissions and support the renewable energy industry. The Renewable Energy Action Plan (REAP) was launched in August 2006 to accelerate the development of renewable energy in the state.

The Victorian government has been working with the other states and territories in developing a National Emissions Trading Scheme. The scheme would allow companies to become “neutral” by financing offset activities such as tree planting, implementing energy efficiency technology / processes.

The government is pursuing mandatory reporting on greenhouse gas emissions inline with the National Pollutant Inventory (NPI).

The government is also funding Green Communities, a program which aims to convert communities to renewable or green power.

ACTION 2 - Improving our Energy Efficiency

Benchmark Victorian Energy Performance in key sectors of the economy. The government will then target major energy users in each sector, working with them to improve their energy efficiency. At the other end of the scale, government will assist local councils in cutting greenhouse gas emissions.

Focuses on education programs facilitated by the government.

ACTION 3 - Adapting to Impacts of Climate Change

Benchmark Victorian Energy Performance in key sectors of the economy. The government will then target major energy users in each sector, working with them to improve their energy efficiency. At the other end of the scale, government will assist local councils in cutting greenhouse gas emissions.

Focuses on education programs facilitated by the government.

Maintaining and Restoring Our Natural Assets

ACTION 4 - Health and Productive Land

Establish and promote market based systems which assist in places a market value on ecosystem services: Bush Tender, Eco Tender, Carbon Tender and River Tender. This will help counteract un avoidable activities which produce carbon or use water.

Environmental Accounting – work with the ABS to show how much water, energy and materials are used to produce goods and services (modelled on the same systems as the National Accounts).

ACTION 5 - Healthy and Productive Water Systems

Protect our heritage rivers

Protect and restore riparian vegetation

Protect and restore wetlands

ACTION 6 - Healthy Marine and Coastal Areas

n/a

ACTION 7 - Flourishing Biodiversity in Healthy Ecosystems

The Victorian Government are currently developing a 'White Paper' to provide broad scale long term vision for biodiversity. This will sit above the existing protection and enhancement policies. The White Paper will also assist in understanding the importance of biodiversity on our industries and provide an investment strategy in land and biodiversity.

Native Vegetation Trust will continue and expand and will enable offsets to be provided for urban and other developments that remove vegetation. This is particularly relevant for any future development in the Alpine Resorts.

Expand the successful Southern Ark Project (management and eradication of foxes and rabbits).

ACTION 8 - Clean Air

Reduce exhaust emissions

Sustainable Heating – reduce smoke from wood heaters, have accredited wood heaters only

ACTION 9 - Comprehensive Network of Parks

n/a focused on urban parks and creating new parks

Using our Resources More Efficiently

ACTION 10 - Less Waste and Increased Resource Efficiency

Ban the use of lightweight plastic bags by large retailers by the end of 2008.

For small retailers – allow a min charge of 10c per bag, or a phase out plan accredited by the EPA.

Exemptions allowed for health and safety reasons.

Towards Zero Waste Strategy was released by the Government in Sept 2005

3 aims: to generate less waste, increase amount of materials for recycling and reprocessing, reduce damage to environment

By 2014 the strategy aims to:

1. Cut waste generation by 12%
2. Recover 75% of solid waste (by weight) to be reused, recycled and converted to energy
3. Improve 2003 levels of littering by 25%

Sustainable Consumption and Consumer taskforce – which allows companies that are sustainable to register. ECO Buy which promotes green purchasing