



NTNU – Trondheim
Norwegian University of
Science and Technology

Environmental certification of Lillehammer Youth Olympic Games

Torje Nedland Molnes

Safety, Health and Environment

Submission date: June 2013

Supervisor: Annik Magerholm Fet, IØT

Norwegian University of Science and Technology

Department of Industrial Economics and Technology Management

MASTERKONTRAKT

- uttak av masteroppgave

1. Studentens personalia

Etternavn, fornavn Molnes, Torje Nedland	Fødselsdato 28. jul 1987
E-post torjenm@gmail.com	Telefon 40200208

2. Studleopplysninger

Fakultet Fakultet for Samfunnsvitenskap og teknologiledelse
Institutt Institutt for Industriell økonomi og teknologiledelse
Studieprogram Helse, miljø og sikkerhet

3. Masteroppgave

Oppstartsdato 15. jan 2013	Innleveringsfrist 11. jun 2013
Oppgavens (foreløpige) tittel Environmental certification of Lillehammer Youth Olympic Games	
Oppgavetekst/Problembeskrivelse Contribute to the development of the Environmental Management System of Youth Olympic Games at Lillehammer in 2016. The focus will be to see which environmental certification systems that can be relevant and applicable to large sports events like the Youth Olympic Games.	
Hovedveileder ved institutt Professor Annik Magerholm Fet	Medveileder(e) ved institutt
Merknader 1 uke ekstra p.g.a påske.	

4. Underskrift

Student: Jeg erklærer herved at jeg har satt meg inn i gjeldende bestemmelser for mastergradsstudiet og at jeg oppfyller kravene for adgang til å påbegynne oppgaven, herunder eventuelle praksiskrav.

Partene er gjort kjent med avtalens vilkår, samt kapitlene i studiehandboken om generelle regler og aktuell studieplan for masterstudiet.

Trondheim 15/1 2013

.....
Sted og dato

Torje V. Molnes
.....
Student

Aunne Magerholm Fjell
.....
Hovedveileder

Originalen lagres i NTNUs elektroniske arkiv. Kopi av avtalen sendes til instituttet og studenten.

Preface

This thesis was written as a finalizing project of a Master degree in Health, Safety and Environment at Institute of Industrial Economy and Technology Management, Norwegian University of Science and Technology (NTNU). The project was carried out during the spring 2013.

The research questions of the project are based on a request from the Lillehammer Youth Olympic Games Organizing Committee, represented by Tomas Holmestad and Magne Vikøren, to support them in the development of an Environmental Management System for the event that will be arranged in February 2016.

Supervisor for the thesis was prof. Annik Magerholm Fet, at the department for HSE at the institute of Industrial Economy and Technology Management, NTNU.

As a sports idiot I found the subject interesting and wanted to contribute to what will hopefully be a fantastic event for the future stars of winter Olympics. I want to thank Tomas Holmestad and Magne Vikøren at Lillehammer for their infectious enthusiasm and for all their help opening doors and providing information. I would also like to thank my supervisor Annik for keeping me on track and providing useful input.

I want to wish LYOG good luck with their work and hope for a successful event in 2016.

Trondheim 11. June 2013

Torje Nedland Molnes

Abstract

This master thesis was an initiative of the Lillehammer Youth Olympic Games Organising Committee administration, represented by Tomas Holmestad and Magne Vikøren.

The main research question is:

Which environmental certification systems can be relevant and applicable to large sports events like the Youth Olympic Games?

The Youth Olympic Games (YOG) is an initiative by the International Olympic Committee. The vision of the YOG is to inspire young people, between 15 and 18 years old, around the world to participate in sport, and to live by the Olympic Values. It is meant as a sporting event of the highest level for young people, integrating education and culture. Lillehammer was presented as the host city of the second Youth Olympic Winter Games in December 7, 2011. The games will be held for ten days in February 2016 and it is estimated that 1100 athletes from 70 nations will be competing in more than 60 exercises.

The thesis gives a thorough presentation of Sustainability, Environmental Management and Corporate Social Responsibility and connects this to the context of an event. Different environmental certification schemes are presented and evaluated with regard to their relevance to the event industry, adaptability and credibility. To support these evaluations the thesis also analyses how environmental certifications were applied to former events. It is also evaluated how an audit can secure the proper implementation of the Environmental Management System.

This thesis recognizes the ISO 2012 as the most relevant standard for an event like the YOG. Despite its low age, the standard passed the test of the 2012 London Olympics with flying colours. The fact that it is backed by the International Organization for Standardisation, who has long experience with environmental standards through the ISO 14000-series, strengthens the impression.

Sammendrag

Denne masteroppgaven startet som et initiativ fra arrangementskomiteen til Ungdoms-OL Lillehammer 2016, representert ved Tomas Holmestad og Magne Vikøren.

Problemstilling for oppgaven var:

Hvilke miljøsertifiseringssystemer kan være relevante og anvendelige for store idrettsarrangementer som Ungdoms-OL?

Ungdoms-OL (Youth Olympic Games, YOG) er et initiativ iverksatt av den Internasjonale Olympiske Komite. Visjonen er å inspirere unge mennesker, mellom 15 og 18 år, verden rundt, til å delta i idrett og leve etter de Olympiske verdier. Arrangementet er ment som en idrettskonkurranse for ungdom på høyeste nivå som også inkluderer utdanning og kultur. Lillehammer ble presentert som vertsby for andre utgave av vinterlekene den 7. desember 2011. Lekene vil bli arrangert over ti dager i februar 2016 og det er ventet at over 1100 utøvere fra 70 nasjoner vil delta i over 60 øvelser.

Oppgaven gir en grundig gjennomgang av begreper som bærekraftig utvikling, miljøstyring og samfunnsansvar og setter disse i sammenheng med arrangementer. Ulike sertifiseringsordninger for miljø blir presentert og evaluert i forhold til deres relevans til arrangementsindustrien, tilpasningsevne i forhold til kontekst og resurser samt troverdighet. For å støtte disse evalueringene går oppgaven også gjennom noen tidligere arrangementer og hvordan miljøsertifiseringer ble benyttet i disse. En evaluering av hvordan revisjoner kan være med å sikre at miljøstyringssystemet blir tilstrekkelig implementert i organisasjonen er også gjennomført.

Oppgaven anser ISO20121 som den mest relevante standarden i forhold til et arrangement som Ungdoms-OL. Til tross for at standarden er ganske fersk har den vist seg som svært konkurransedyktig etter at OL i London i 2012 ble sertifisert etter denne standarden. At standarden er utgitt av ISO, som har lang erfaring med miljøstyringsstandarder gjennom deres 14000-serie, styrker dette inntrykket.

Table of Contents

Preface.....	i
Abstract	ii
Sammendrag	iii
Table of Contents	iv
List of Figures.....	vi
List of Tables.....	vi
Appendixes	vi
Abbreviations	vii
1. Introduction	1
1.1 Background	1
1.2 Goals	3
1.3 Limitations	3
2. Research Methodology	4
2.1 Literature Study	4
2.2 Systems Engineering.....	4
2.3 Case Study research.....	5
2.4 Semi-Structured interviews	6
3. Theoretical Foundation.....	7
3.1 Sustainability.....	7
3.2 Sustainability and events.....	7
3.3 The IOC and Sustainable Development	10
3.4 Environmental Management Systems (EMS)	11
3.5 Corporate Social Responsibility (CSR).....	13
3.6 Value Chains	16
3.7 Supply Chain Management.....	17
4. Lillehammer Youth Olympic Games (LYOG) 2016	19
4.1 The Youth Olympic Games	19
4.2 Lillehammer 2016	19
4.3 Organisation	20
4.4 Venues	21
4.5 The Youth Olympic Village (YOV).....	23

4.6	Culture and Education Programme	24
5.	Environmental Certifications	25
5.1	The Value of Certification	25
5.2	Environmental Certifications and Schemes.....	25
5.2.1	ISO 14001	25
5.2.2	ISO 20121	28
5.2.3	Miljøfyrtårn (Eco-Lighthouse)	30
5.2.4	Eco-Management and Audit Scheme (EMAS).....	31
5.2.5	UN Global Compact.....	34
5.3	Environmental Labels (Eco-Labels) and Declarations.....	35
5.4	Environmental Auditing.....	41
6.	Former Events	46
6.1	FIS Nordic World Ski Championships 2011, Holmenkollen, Oslo	46
6.2	Innsbruck YOG 2012	47
6.3	London 2012 Summer Olympics.....	48
7.	Evaluation.....	51
7.1	Environmental Certifications	51
7.2	Former Events.....	53
7.3	Lillehammer 2016	54
7.4	Environmental Auditing.....	55
7.5	Certification as a means towards sustainable events	55
7.6	Summary of discussion	56
8.	Conclusion and recommendations	57
8.1	Suggestions on future work.....	57
9.	Bibliography	58
	Appendix A: Stadium visits YOG Lillehammer 2016.....	1

List of Figures

Figure 1: Steps in the Environmental Management system	12
Figure 2: A model showing the areas of CSR.....	15
Figure 3: The Procurement Cycle	17
Figure 4: The LYOG system.....	20
Figure 5: A draft of the projected YOY.....	23
Figure 6: The International Organization for Standardization logo	25
Figure 7: The ISO 14001 process (ISO/TC207, 2004).....	27
Figure 8: The event sustainability management system model for ISO 20121	29
Figure 9: The Eco-Lighthouse logo	30
Figure 10: The responsibility of being Eco-Lighthouse certified.....	31
Figure 11: The EMAS logo	32
Figure 12: ISO14001 as an integral part of EMAS	33
Figure 13: The UN Global Compact Logo	34
Figure 14: ICC Guide to Effective Environmental Auditing (Welford, 1998).....	41
Figure 15: Stages of an environmental audit (Welford, 1998)	43

List of Tables

Table 1: Examples of Environmental and Sustainable Voluntary Guidance Tools Implemented Worldwide (Tinnish, 2012)	9
Table 2: CSR framework from WBCSD (Hohnen, 2007)	14
Table 3: possible tools for assessing CSR (Hohnen, 2007)	16
Table 4: Cooperative Institutions and themes - culture and education (Norges Idrettsforbund, 2010).....	24
Table 5: Some eco-labels with a high reputation.....	39
Table 6: Example of adopted charters, codes, principles or other initiatives of London 2012 (LOCOG Sustainability team, 2012)	50

Appendixes

Appendix 1: Stadium Visits

Abbreviations

CEP – Culture and Education Programme

CSR – Corporate Social Responsibility

EMAS - Eco-Management and Audit Scheme

EMS – Environmental Management System

GRI – Global Reporting Initiative

ICC - International Chamber of Commerce

IOC – International Olympic Committee

ISO – International Organization of Standardization

KPI – Key Performance Indicator

LCA - Life Cycle Assessment

LOCOG - London Organizing Committee of the Olympic and Paralympic Games

LYOG – Lillehammer Youth Olympic Games

LYOGOC – Lillehammer Youth Olympic Games Organizing Committee

NOC - National Olympic Committee

OCOG – Organising Committee for the Olympic Games

PDCA – Plan Do Check Act

TOROC – Torino Organizing Committee

UNCED – United Nations Conference on Environment and Development

UNEP – United Nations Environment Programme

WCED - World Commission on Environment and Development

YOG – Youth Olympic Games

YOGOC – Youth Olympic Games Organizing Committee

YOV – Youth Olympic Village

1. Introduction

1.1 Background

The modern Olympic Games started in Athens, Greece in 1896 and have developed from a small scale event, with about 300 participating athletes, to the biggest and most successful sports event in the world. The Games have experienced a tremendous growth the last twenty years and the extent has exceeded being just a sports event. The Games are now functioning as a showcase for the host cities and countries. Hosting the Games is a major project which can leave an enduring mark on the host city/region. There can be physical, economic, environmental, social, cultural, psychological, political or even ideological impacts. This mark could be both positive and negative. With the legacy of new or renovated venues and infrastructure, the Games may represent a facelift for the host region. But it could also put huge pressure on the city's accommodation stock, on its waste management system, land use, on its energy supply, water consumption, sewage system, transport and security networks and lead to increased environmental pressure, risks and damages. Bigger Games means greater pressure (Furrer, 2002).

Although this knowledge is widely accepted, the Olympic Games have hardly been a part of the sustainability debate until recent years. In Rio de Janeiro in 1992, at the UN Conference on Environment and Development (UNCED), most of the world's nations committed themselves to the pursuit of economic development in ways that would protect the Earth's environment and non-renewable resources and adopted Agenda 21 as a global action plan to fulfil this commitment. In June 1999, in Seoul, this Agenda 21 was adopted by the IOC at its Session and subsequently endorsed by the entire Olympic Movement at the Third World Conference on Sport and the Environment in Rio de Janeiro in October 1999 (IOC, 1999). The Olympic Movement Agenda 21 establishes an action programme allowing members of the Olympic Movement to play an active part in promoting sustainable development, particularly in relation to sports activities (Furrer, 2002).

The two central pillars of Olympism have traditionally been "sport" and "culture." In the 1990s, the International Olympic Committee (IOC), officially added "environment" as the third pillar of Olympism. And with the Olympic Winter Games in Lillehammer in 1994 environmental considerations and more general concerns for sustainable development took on a new dimension. These games are considered the first "ecological" games. Since then, sustainable development has tended to take on growing importance among the concerns and strategies of event organisers. The Lillehammer Games were the first Olympic Winter Games to initiate and implement a comprehensive, co-operative environmental programme (Furrer, 2002).

With the Youth Olympic Games (YOG) IOC wanted to go back to focus on the three Olympic values; Excellence, Respect and Friendship. With the modern Olympic Games being so much

more than just a sporting event the YOG are a sporting event of the highest level for the youth. The event targets to bring together the world's best young athletes to celebrate them and to offer a unique and powerful introduction to Olympism. The YOG is supposed to require less organisational effort from the host city than the Olympic Games, and should for example not require construction of new venues for the competitions (IOC, 2012).

When Lillehammer hosts the YOG in 2016 it will only be the second version of the Youth Winter Olympic Games. With the great success of the first games in Innsbruck in 2012, and the Winter Olympics in Lillehammer in 1994, the expectations for a great event are high. With the development within the field of sustainability and the Olympic Games in mind, the Organizing Committee of the games contacted NTNU to ask for assistance with the development of an Environmental Management System to ensure that the games will be as sustainable as possible. This led to at least four Master theses at the Department for Industrial Economics and Technology Management, including this one, which will try to illuminate the field of Environmental Management Systems and Environmental Certification of a sports event.

1.2 Goals

The goal of the thesis is to contribute to the development of the Environmental Management System of Youth Olympic Games at Lillehammer in 2016. The main focus will be kept on environmental certification schemes and how they can contribute to a sustainable event.

The Main Research Question is:

Which environmental certification systems can be relevant and applicable to large sports events like the Youth Olympic Games?

To reach the main goal, some sub-goals have been set:

Sub-Goals

1. Map the relevant background theory for EMS and CSR of sports events.
2. From a systems perspective give an overview of existing labelling systems and certification systems that can be relevant to an event of this type, and evaluate the relevance to this certain event.
3. Evaluate former events and their certifications.
4. Evaluate requirements to the management system of the event to secure internal audit programs and auditing procedures to be implemented
5. Evaluate the certification as a means towards criteria for sustainable sports events.

1.3 Limitations

The comprehensiveness of the YOG System puts some restrictions on the scope of the thesis. The thesis will mainly focus on the certification of the management system, and the elements of the sub-system will therefore not be described in very much detail. The thesis does, however, have a chapter about environmental labelling related to procurement. This is included because Supply Chain Management is an important part of an EMS. Since the LYOGOC won't be leading any construction work, certifications related to construction and buildings are not included.

2. Research Methodology

The research design of this thesis is based on qualitative research methods. A qualitative method can be defined as a method for obtaining and processing information that emphasizes on interpreting observations, statements and sources (Flick, 2009). A comprehensive literature study as well as case study methodology and semi-structured interviews are the main foundation for the research.

2.1 Literature Study

A literature review can be defined as a “systematic, explicit and reproducible method for identifying, evaluating, and synthesizing the existing body of completed and recorded work produced by researchers, scholars and practitioners” (Fink, 2010). Bryman (2008) gives two descriptions of literature reviews; a systematic review and a narrative review. The systematic review is based on using a procedural approach, with the intention of reducing bias and increasing reproducibility. This type of review can be used to identify knowledge gaps in an existing research field, thus providing research direction. The purpose of the systematic review can be seen as accumulation of knowledge. The narrative review is more like a process of discovery and can be used when the research field is not defined in advance or there is a multitude of overlapping approaches. The purpose of the narrative review can be seen as generating understanding (Bryman, 2008).

The literature study is used to gain insight and to provide an overview of theory that is relevant and necessary to understand the further research. The field of CSR and Environmental Management is dynamic and diffuse. It is therefore a challenge to find established and acknowledged literature. Searching for literature involves both how to search (keywords, search phrases) and where to search (libraries, peer reviewed journals, scientific search engines, online archives, etc.) (Bryman, 2008). The ability to search for, evaluate and use information is therefore important.

2.2 Systems Engineering

It is hard to give just one definition of systems engineering. It can be seen as a profession, a process and a perspective and can be described with the three following definitions:

- Systems engineering is a discipline that concentrates on the design and application of the whole (system) as distinct from the parts. It involves looking at a problem in its entirety, taking into account all the facets and all the variables and relating the social to the technical aspect.
- Systems engineering is an iterative process of top-down synthesis, development, and operation of a real-world system that satisfies, in a near optimal manner, the full range of requirements for the system.
- Systems engineering is an interdisciplinary approach and means to enable the realization of successful systems.

These definitions tell that systems engineering is about understanding the whole and keywords like *interdisciplinary*, *iterative* and *socio-technical* emerge from these descriptions. (International Council on Systems Engineering, 2003)

Systems engineering is based on system thinking. System thinking is a perspective that sharpens our awareness of wholes and how the parts within it work together. When thinking in systems it is easier to see how things work in the larger context, how they behave and ultimately how to manage them. System thinking recognizes circular causation and its iterative nature supports learning and continuous improvement in both technical and management processes (International Council on Systems Engineering, 2003).

“Systems of systems” can be defined as an interoperating collection of component systems that can achieve results that is not achievable by an individual system alone. The system of systems concept describes the large-scale integration of many independent, self-contained systems in order to satisfy a global need (Purdue University, u.d.).

Systems engineering is applied to the organisation of the Youth Olympic Games to get an overview and understanding of how the organizing committee, venues, accommodation, logistics and all the other parts of an event of this magnitude can work together as a system of systems.

2.3 Case Study research

Case studies are often used for ‘how’ and ‘why’ questions, and according to Yin (2003) there are three main types of case studies: explanatory, exploratory and descriptive. Yin defines case study as an empirical inquiry that investigates a phenomenon where boundaries between the object of the case study and its surroundings are unclear. There is no singular agreed upon case study methodology; it is adapted to the situation at hand and can use qualitative methods, quantitative methods, or a combination of the two (Yin, 2003).

This thesis utilize the comparative research methodology

Comparative research

Comparative research is descriptive and compares one or more cases in place and time. It could for example be comparing countries, organisations etc. It could be both quantitative and qualitative, but in this case it is used as a qualitative method. The underlying goal of comparative analysis is to search for similarity and variance. The challenges when performing a comparative research can be reliability and replicability. The internal validity is weak and it is more likely to find correlations than causal relations (Mills, et al., 2006). The comparative research is used to compare former events and how they have benefited from the use of certifications.

2.4 Semi-Structured interviews

The semi-structured interview is a kind of qualitative research that gives the researcher a better flexibility so that data that is created during the interview affects the follow-up questions. The advantage of this compared to a more structured interview is that the researcher can unveil and investigate new aspects of the case during the research process. The semi-structured interview provides for more conversation and gives a better opportunity to capture the context of what is being told, and by that get a better understanding of the interviewee. It is possible to make discoveries that weren't expected (Berg, 2009).

The semi-structured interviews were performed to obtain unpublished information about the different venues of the event. Because the venues had different management systems and environmental aspects the method was chosen to be able to adjust the follow-up questions to different venues. A summary of the interviews is provided in Appendix A.

3. Theoretical Foundation

3.1 Sustainability

According to Timothy O’Riordan, Emeritus Professor at the School of Environmental Sciences, University of East Anglia, defining sustainability is like “exploration into a tangled conceptual jungle where watchful eyes lurk at every bend” (The Economist Intelligence Unit, 2008)

In 1987 the report *Our Common Future* (also called *The Brundtland Report*) was published by the World Commission on Environment and Development (WCED). The report linked environmental and social sustainability to each other and to economic stability using the term “sustainable development”. Sustainable development was defined as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (WCED, 1987).

A sustainable state creates and maintains the conditions under which humans and nature can exist in productive harmony, fulfilling social, economic and other requirements of present and future generations. Sustainability is vital to ensure the accessibility of natural resources, and that it continues so in the future. (United States Environmental Protection Agency, u.d.)

To meet the needs of the increasing population requires drastic changes, either in the way of living or the developing new and more sustainable technology. Meeting basic needs and at the same time preserving the life support systems of the earth will also require an acceleration of slow progress, which has recently reached a vital point in the re-negotiations of the Kyoto treaty. (Kates, 2010)

Also widely accepted is the so-called triple bottom line. It describes the three-dimensional nature of sustainable development: economic, social and environmental. It refers to a path of socio-economic development that would be financially balanced, socially equitable, ethically responsible and adequately integrated in the long-term ecological balance of the natural environment. Sustainable development is also a dynamic process that will continue to evolve and grow as lessons are learnt and ideas re-examined (Furrer, 2002).

3.2 Sustainability and events

Since the beginning of human history, celebrations, contests and gatherings have been a part of all cultures. Getz defines events as transitory in nature, infrequent in occurrence and limited in time (Getz, 1991). A planned event has one or more purposes over its limited duration. Each event is unique in its conception, management, setting and participants. Events may be recurring or held one-off and can be as extensive as The Olympic Games or the FIFA World Cup, or be as basic as summer county fairs. Today, events of different types have a vital role in daily life and the event sector has seen an exceptional boom in popularity the last decades. As well as having an impact on the hosting community’s economy, events

could also have a positive or negative impact on the community itself, its culture and its natural environment. Like in other industries the growth in the number and size of events have made their impacts more visible and raised the question of responsibility for both positive and negative consequences on the local environment. The interest for a sustainable event industry has increased swiftly the last few years, and the progress is still accelerating (Ferdinand & Kitchin, 2012).

Events differ greatly however, and common classifications distinguish events by size and content. In size, events could vary from birthday parties that involve your home and some friends, to mega-events like the Olympic Games that affect whole economies and command global media coverage. Content wise, events can be distinguished either as business, cultural or sporting events. This diversity means that different events will have different impacts, and will require specific indicators. There are, however, some general issues that apply to most events. These include transport, energy and water use, food consumption, accommodation and communication.

The information currently available to guide planners interested in event sustainability are checklists and guides, textbooks featuring case studies, and the burgeoning efforts to create standards in the industry. The most famous standard related to event sustainability management is a standard developed by the British Standards Institute, known as BS 8901. This standard was also the predecessor to the ISO standard 20121. There is also a variety of policy instruments available worldwide related to sustainability (Tinnish, 2012). Some examples of such instruments that can be related to the planning of sustainable events are given in table 1.

Table 1: Examples of Environmental and Sustainable Voluntary Guidance Tools Implemented Worldwide (Tinnish, 2012)

United Kingdom	<ol style="list-style-type: none"> 1. BS 8901:2009 (Specification for a Sustainability Management System for Events) 2. Green Tourism 3. Industry Green (IG) by Julie’s Bicycle: 2007(JB) – Voluntary Measurement Tool 4. London Olympics Sustainability Plan
Nordic	<ol style="list-style-type: none"> 1. Good Environmental Choice (Sweden) 2. Swan Eco-label 3. Swedish Standards Institute (SIS), Luger, Live Nation – developing a new environmental manual for festivals 4. Eco-Lighthouse (Norway)
Europe	<ol style="list-style-type: none"> 1. EU Eco-label 2. European Eco-Management and Auditing Scheme (EMAS) 3. Green Hospitality Programme/Green Hospitality Eco Label or Award (Ireland) 4. The Green Key
Other	<ol style="list-style-type: none"> 1. DEFRA Sustainable Events Guide 2. Eco Labeling – A Greener Festival Awards: 2006 3. Global Reporting Initiative (GRI) G3 Reporting Framework Events Sector Supplement: 2011 4. Hanover Principles 5. India's Ecomark Scheme 6. ISO 14001:2004 Environmental Management Systems (EMS) 7. ISO 26000: 2010 Guidance on Social Responsibility 8. SEXI: The sustainable Exhibition Industry Project 9. Singapore's Green Label Scheme 10. Sustainable Sport and Event Toolkit 11. The Sustainable Music Festival – A Strategic Guide 12. UK Sport 13. UN Global Compact

3.3 The IOC and Sustainable Development

The International Olympic Committee was founded on 23 June 1894 by the French educator Baron Pierre de Coubertin who was inspired to revive the Olympic Games of Greek antiquity.

The IOC is an international non-governmental non-profit organisation and the creator of the Olympic Movement. The IOC is intended to serve as an umbrella organisation of the Olympic Movement. They own all rights to the Olympic symbols, flag, motto, anthem and Olympic Games. Their primary responsibility is to supervise the organisation of the summer and winter Olympic Games.

In their role as a guide to the Olympic Movement, the IOC has decided to completely integrate environmental protection within its philosophy and programmes.

The IOC considers the environment as the third dimension in Olympism, in addition to sport and culture. Its environmental policy is based on the duties of the Olympic Movement in relation to the well-being of humanity and society at large.

Because of this The IOC has been committed for years to a series of initiatives in order to make the sports community more aware of the need to include the principles of environmental protection within its activities. Some of the initiatives are:

Cooperation with UNEP: A collaborative agreement was signed between UNEP (United Nations Environment Programme) and the IOC in 1994. Since then, the two organisations have worked together to promote the incorporation of environmental considerations in the events of the Olympic Movement.

World Conference on Sport and the Environment: The first IOC World Conference on Sport and the Environment was organised in July 1995 in Lausanne in Switzerland. The fifth one has been held in Turin on 2/3 December 2003.

Sport and Environment Manual: In August 1997, as part of its promotion and education campaign, the IOC drafted the Sport and Environment Manual addressing all members of the Olympic Movement, from the most important bodies to the basic organisations and even individuals who practice sport.

The Olympic Movement Agenda 21: The Olympic Movement Agenda 21 was adopted in 1999 and establishes an action programme allowing members of the Olympic Movement to play an active part in promoting sustainable development, particularly in relation to sports activities.

The IOC have also developed a guide on environmental management with the objective of providing directions to an Organising Committee for the Olympic Games' (OCOG) Environment function through the presentation of a series of sequenced key tasks, that together constitute likely program elements of an Environment function over the course

of an Olympic Games' project lifecycle. The guide presents five key areas for a sustainable event (IOC, 2010):

- Protection of biodiversity and habitat
- Energy conservation/efficiency and greenhouse gas reduction
- Reducing impacts to local and regional air quality
- Water conservation and the protection of water quality
- Waste reduction and management

In the same context, the IOC also decided to set up a specific Sport and Environment Commission comprising representatives of the Olympic Movement and experts in environment-related issues, with responsibilities for drafting recommendations to the President and the Executive Committee of the IOC regarding environmental policy. There has also been set up a special section of Environmental Affairs responsible for all educational programs in this sector within the administration of the IOC (TOROC, 2004).

3.4 Environmental Management Systems (EMS)

In the last decade there has been a radical change in terms of grasping the relationship between environmental practices and corporate performance. Pursuing environmental goals has been considered as antithetical to sound business performance. The introduction of new ways of thinking, treating pollution as a matter of waste management regardless of its source, states that eliminating pollution/waste would not weaken but strengthen corporate competitiveness. This change of focus has contributed in the development of an environmental management system (EMS).

EMS refers to the management of an organisations environmental program in a comprehensive, systematic, planned and documented manner (Stuart, 2000). EMS is not to be interpreted as government regulation, where requirements are imposed on organisations from the outside. EMS consists of a regulatory structure that arises from within an organisation. EMS requires organisations to assess their environmental impacts, establish goals, and continually monitor and review these. Establishment of well-functioning feedback loops throughout the whole organisation, both "top down" and "bottom up", are essential for EMS to properly achieve its competitive advantage. These systems of management processes enable organisations to continually improve and reduce their impact to the natural environment (Melnyk, et al., 2003). The Plan-Do-Check-Act (PDCA) model describes the basics of an EMS, and is shown in figure 1.

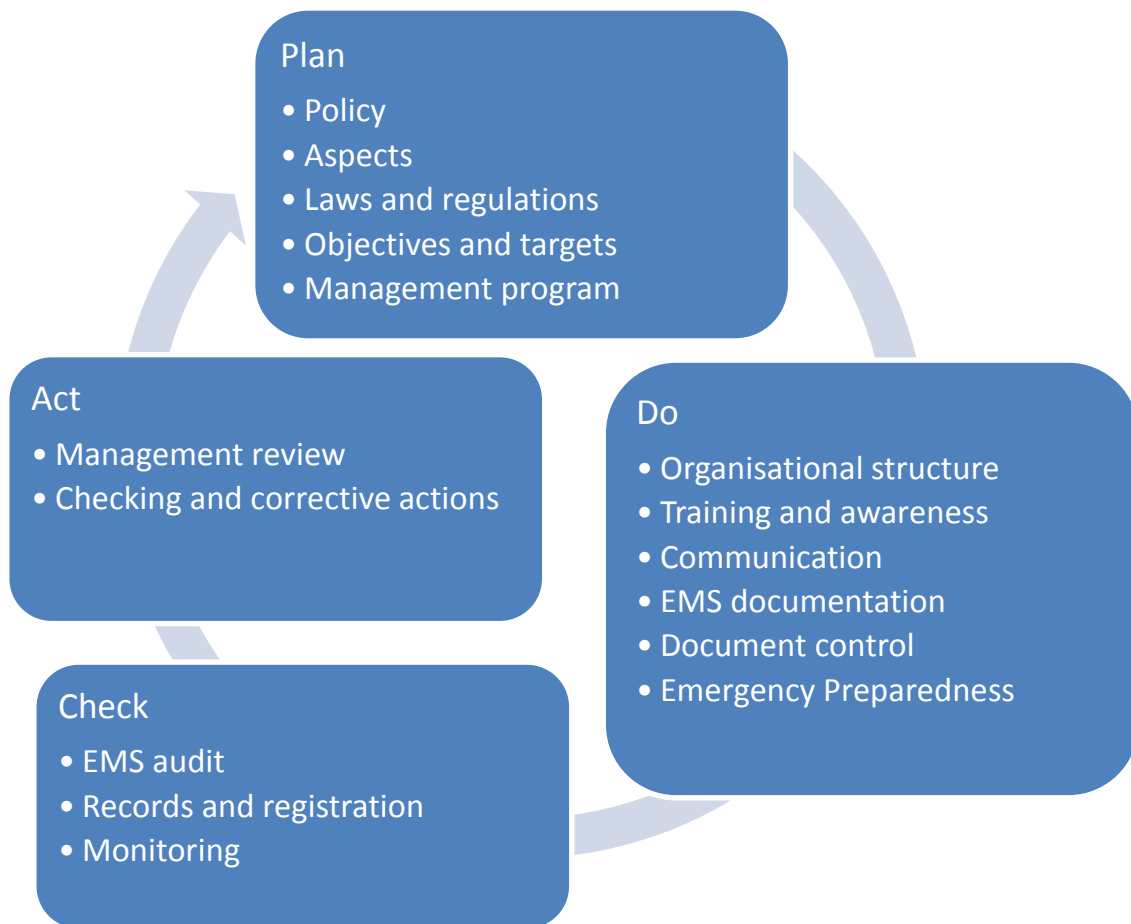


Figure 1: Steps in the Environmental Management system

There are several steps to adopt an EMS. The first step is creating an environmental vision, a policy that is made public and states the organisations general philosophy for environmental improvement, this in order to incorporate commitments for continual improvements for pollution prevention, and for complying with the relevant legislation. The second step is to evaluate and set goals. The policy defined in the first step is set into action. Following, the third step, the organisation creates a management structure to realize its environmental goals. This structure promotes and enhances communication both within and outside the organisation. The employees are also trained to better develop their awareness of reducing the environmental impact, and thus enhancing the business performance. During the fourth stage the organisation monitors for discrepancies within the system, this by recording and documenting the routine operations and audit their activities. Identified discrepancies are thus corrected to maintain the continual environmental improvement. Finally the last step is to review the management, creating a report that identifies the EMS’s shortcomings and highlights needs for tighter control and propositions for improvement. The PDCA model is not explicitly an environmental model, but is also adaptable to internal control and risk management systems. The EMS tool, or “way of thinking”, can be considered as an innovative drive in reaching for a sustainable world. (Darnall & Edwards Jr, 2006)

The most recognized application of EMS is the ISO 14001 (ISO 14001, 2004), which is an effective tool to guide managers in their efforts to capitalize on the cost reduction potential of waste reduction (Darnall & Edwards Jr, 2006). A further description of this standard will be given in chapter 5.

3.5 Corporate Social Responsibility (CSR)

There are several definitions of Corporate Social Responsibility. The European Commission defines Corporate Social Responsibility (CSR) as:

“A concept whereby companies integrate social and environmental concerns in their business operations and in their interaction with their stakeholders on a voluntary basis.” (European Commission, 2011)

ISO 26000, on the other hand, is slightly more precise:

“Social responsibility is the responsibility of an organisation for the impacts of its decisions and activities on society and the environment through transparent and ethical behaviour that is consistent with sustainable development and the welfare of society; takes into account the expectations of stakeholders; is in compliance with applicable law and consistent with international norms of behaviour; and is integrated throughout the organisation.” (ISO, 2010)

How should a company address these challenges? A strategic approach to CSR has become increasingly more important for the competitiveness of a company. A functional CSR model in a company requires engagement with both internal and external stakeholders. The World Business Council for Sustainable Development (WBCSD) has described CSR as the *“businesses contributions to sustainable economic development”*. It builds up on a base of compliance with legislation and regulations, and typically includes “beyond the law” commitments and activities pertaining: (Hohnen, 2007)

Table 2: CSR framework from WBCSD (Hohnen, 2007)

1.	Corporate governance and ethics
2.	Health and safety
3.	Environmental stewardship
4.	Human rights (including core labour rights)
5.	Sustainable development
6.	Conditions of work (including safety and health, hours of work, wages)
7.	Industrial relations
8.	Community involvement, development and investment
9.	Involvement of and respect for diverse cultures and disadvantaged peoples
10.	Corporate philanthropy and employee volunteering
11.	Customer satisfaction and adherence to principles of fair competition
12.	Anti-bribery and anti-corruption measures
13.	Accountability, transparency and performance reporting
14.	Supplier relations, for both domestic and international supply chains

Figure 2 shows a structured overview of the different fields and aspects of CSR within a company, and can in many ways be seen as an overall summary of the framework from WBCSD.



Figure 2: A model showing the areas of CSR

Issues and challenges mentioned in table 2 are often connected to a specific stakeholder. Some stakeholders are more obvious (such as customers and the authorities), while others might be more difficult to identify (such as NGOs and financial markets). In order to understand how the daily operations of the company affect different stakeholders it is necessary to understand their needs, objectives, as well as their opinions about the company. When developing and implementing a corporate responsibility it is essential to understand your context and surroundings. There has been a lot of discussion on whether or not SR is beneficial for an organisation. A study from the International Institute for Sustainable Development (Hohnen, 2007), claims that CSR improves several areas of the business, if used in the right context, and benefits in terms of risk management, cost savings, access to capital, customer relation, HR management and innovative capacity. These qualities give a shorter reaction time in anticipating fast changes of societal expectations and operational conditions. It can therefore drive the development of new markets and create opportunities for growth (Watts & Holme, 2000).

There are already many tools available for assessing CSR in the firm. Because of many definitions and aspects of CSR it may have created some confusion on the subject. ISO created the guideline ISO 26000, in November 2010, on how to set up and assess the CSR issues after demands from businesses and organisations. (ISO, 2010)

Table 3: possible tools for assessing CSR (Hohnen, 2007)

The Organization for Economic Co-operation and Development (OECD) Guidelines for Multinational Enterprises;
The International Labour Organization (ILO) Tripartite Declaration of Principles concerning Multinational Enterprises and Social Policy and Core Labour Standards
The UN Global Compact Principles
The Global Reporting Initiative (GRI) Sustainability Reporting Guidelines
The International Organization for Standardization (ISO) standards
The Accountability AA1000 Series
The Social Accountability International SA8000 standard.

3.6 Value Chains

Human creations usually result in environmental impacts throughout the life cycles, from manufacturing to disposal. The essence is to look at the whole system, looking at the big picture. The reason is to understand how products or services are created, used and disposed. The approach gives an advantage in terms of identifying where environmental and social impacts occur, and gives the possibility to improve the design of the system.

A value chain can be described as the range of activities that is necessary to bring a product or service to conception, through all the different phases of production, including the various inputs from suppliers, to the delivery of the final product and the final disposal after use. The broad field of a complete value chain is complex, and there tend to be more links in a value chain in practice than in the theoretical framework (Kaplinsky & Morris, 2002)

Life Cycle of an Event

An analytical variant of value chain analysis is Life Cycle Assessment (LCA), which is concerned with material flows related to the value chain. The life cycle of an event is often divided into four stages; Conception, Organisation, Staging and Closure.

1. **Conception:** The event is determined in terms of its overall aims, scope, possible location(s), etc. The type of event will provide a broad framework for identification of the potential environmental impacts and gives a first indication as to the focus for the Environmental Management System.
2. **Organisation:** At this stage, the issues which may have negative consequences for the environment are examined. This includes issues such as the exact location(s), the number of participants and visitors, the infrastructure and services. In addition the organising committee considers indirect impacts, such as suppliers and contractors, public transport and procurement issues.

3. Staging: The event usually lasts between a few hours (e.g. a marathon or a football match) and two to four weeks (e.g. the Olympic Games). This phase also includes the activities immediately after the sporting event itself, such as the departure of athletes and spectators and the collection of rubbish bags and road signs.
4. Once the event has finished, there are usually a number of activities remaining to be undertaken, such as the dismantling of temporary structures, reassigning fixed structures, and carrying out corrective measures prescribed by environmental impact assessments (TOROC, 2004).

3.7 Supply Chain Management

According to ISO20121 Supply Chain Management is the practice of improving the way a company finds the products or services it needs for its customers. Since the majority of the production activities during and event is performed through the supply chain's provision of products, material and contracted services, procurement is an area where the environmental performance can be improved. A company's success is intertwined with the actions, practises and products of its suppliers.

Sustainable procurement is the integration of sustainable development issues into all aspects of the procurement cycle (figure 3). Practicing Sustainable procurement can lead to improved environmental performance in the form of e.g. lower waste-disposal, reduced material costs or fewer environmental-permitting fees. The practice could also result in better social awareness and economic returns (ISO, 2012).

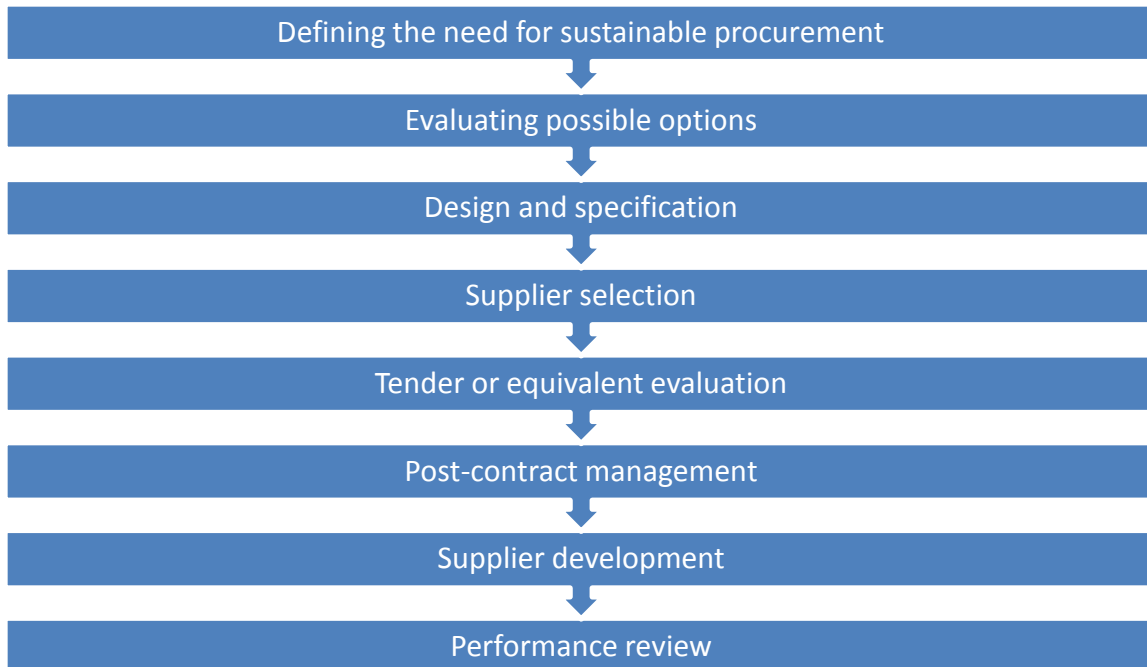


Figure 3: The Procurement Cycle

Already from the earliest stage of the procurement process, sustainable development should be taken into consideration. This can be done by building relevant criteria into the

product/service specifications. This approach avoids potential conflicts between environmental, social and economic issues arising later in the procurement process.

The strategy implementation should be monitored throughout the implementation stage using appropriate Key Performance Indicators (KPI) and benchmarks. The information gathered should then be assessed and reported upon. To identify improvements for future activities the lessons learned should be documented and implemented into the review process (ISO, 2012).

4. Lillehammer Youth Olympic Games (LYOG) 2016

4.1 The Youth Olympic Games

The Youth Olympic Games (YOG) was approved as a project at the 119th IOC Session in Guatemala City, 5. July 2007. The initiative was proposed by the president of the International Olympic Committee, Jacques Rogge. In 2008, the IOC announced Singapore as the first host city for the Summer YOG (2010) and Innsbruck as the first host for the Winter YOG (2012).

The vision of the YOG is to inspire young people, between 15 and 18 years old, around the world to participate in sport, and to live by the Olympic Values. It is meant as a sporting event of the highest level for young people, integrating education and culture. The education and culture program aims to introduce young athletes to Olympism and the Olympic Values, and to raise awareness of important issues such as the benefits of a healthy lifestyle, the fight against doping, global challenges and their role as sports ambassadors. The Summer and Winter YOG alternate every four years. The Summer YOG are staged in the years of the Olympic Winter Games and vice versa (IOC, 2012). YOG is the biggest innovation within IOC since the Winter Olympic Games was introduced in 1924.

4.2 Lillehammer 2016

Lillehammer was presented as the host city of the second Youth Olympic Winter Games at December 7, 2011. The city did also apply for the 2012 games, but Innsbruck pulled the straw on that occasion. The games will be held for ten days in February 2016 and it is estimated that 1100 athletes from 70 nations will be competing in more than 60 exercises.

The participants will compete against the best athletes in their generation. In addition the IOC wants to reach out to young people on levels beyond sports. The organizing committee's ambition is to make the 2016 Youth Winter Olympic Games in Lillehammer a global event in both senses of the word: Global in that it gathers athletes from all continents, but also global in that it will span athletics, education and culture in equal measure.

The event will have most of its headquarters, all technical facilities and most of its sports venues in the town of Lillehammer. The towns of Hamar, Gjøvik and Lillehammer, together with the Hafjell Alpine Venue will be the sites for the exercises. This means that the maximum distance from any one venue to others will be 80 kilometres. The region has a well-developed railway and road system, which can provide effective and safe transport between the venues.

System Thinking is used to define the system for the event. The system of an event like LYOOG is complicated because there are many sub-systems involved and many of them are connected. For example can logistics be seen as both a procured service and a direct sub-system of the organizing committee. The latter is selected for this system to take it out of the rest of the supply chain. An overview of the system of LYOOG 2016 is given in figure 4.

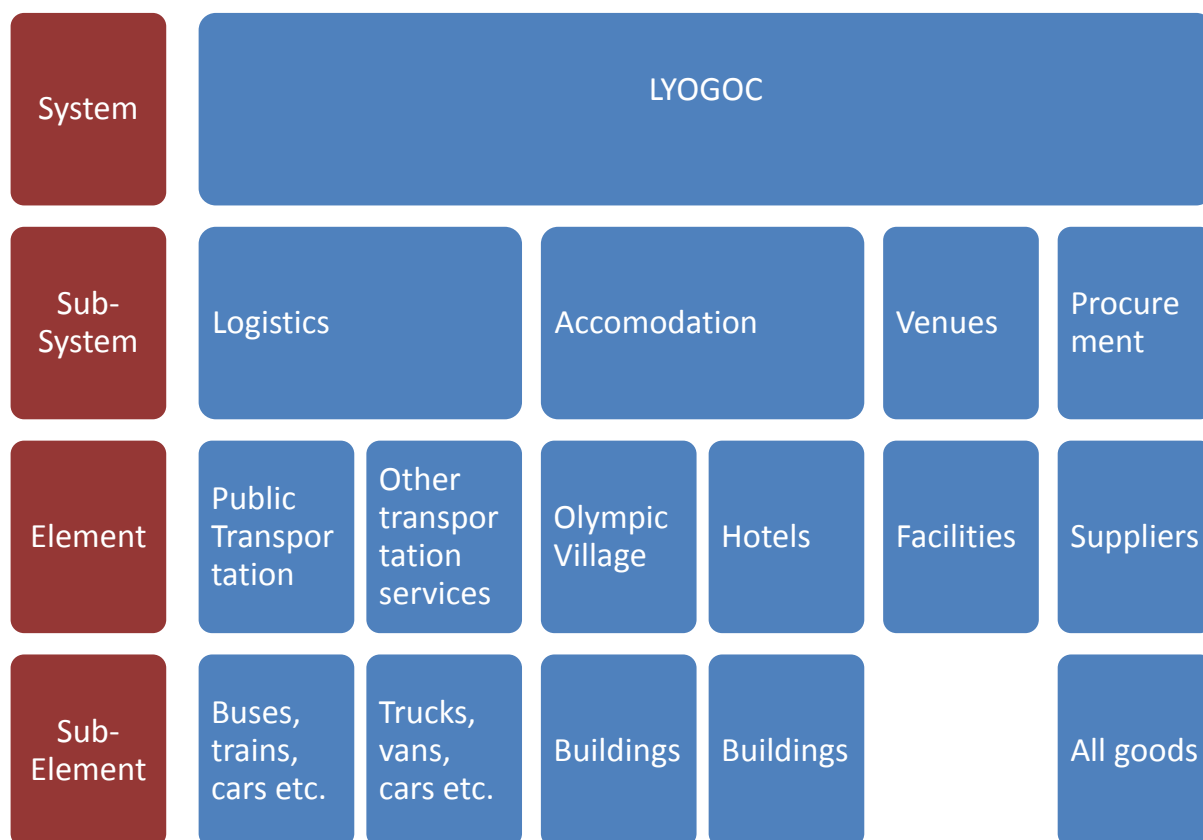


Figure 4: The LYOG system

4.3 Organisation

The Lillehammer Youth Olympic Games Organizing Committee LTD (LYOGOC) was incorporated as a private limited liability company on 26.03.2012 by The Norwegian Olympic and Paralympic Committee and Confederation of Sports (National Olympic Committee, NOC), the City of Lillehammer and the Norwegian State. The share capital of LYOGOC is NOK 100,000 with a total of 1,000 shares at a par value of NOK 100. The ownership of shares is as follows:

The Norwegian State: 510 shares (51 %)

The NOC: 245 shares (24,5 %)

The City of Lillehammer: 245 shares (24, 5%)

This structure follows the same example as the well-proven organisation of the Winter Olympic Games of Lillehammer in 1994. The LYOGOC is responsible for planning and implementation of the Youth Olympic Games 2016. The company is officially called Lillehammer 2016. The company currently consists of a board, an advisory board and a small administration. The administration will continue to grow as the planning of the event develops (LYOGOC, 2012).

4.4 Venues

All the main venues to be used in the games are already in place and are mostly the same venues that were used for the Lillehammer 94 Olympic Winter Games. Most of the supporting facilities in Lillehammer, Hamar, Gjøvik and Hafjell are also in place. This chapter gives a short presentation of each venue. To supplement the information from the Candidature file (Norges Idrettsforbund, 2010) of LYOG and the venues' web-sites, a trip to Lillehammer was carried out to interview the managers of the different venues. The interviews focused on the environmental aspects of the venues and a summary is presented in Appendix A.

Lillehammer Olympic Park

The ceremony venue will be located next to the Youth Olympic Village at Stampesletta Sports Park. The venue will have a spectator capacity of between 6000 and 8000 and both the opening and closing ceremony will take place here. The venue is located with walking distance to the city centre of Lillehammer where the Medal Ceremonies will be held. There will also be cultural entertainment in connection with the ceremonies (Norges Idrettsforbund, 2010).

Håkons Hall

Håkons Hall, which was the main venue for Ice Hockey during the Winter Olympics in 1994, will be the focus point for the Youth Olympic Village as well as for the YOG 2016 in its entirety, and as such will be a natural gathering point for participants and leaders from all nations. The venue will be used for the Culture and Education programme and as a dining hall.

The venue will replace its oil heating system with district heating before the YOG. Håkons Hall is the main office of Lillehammer Olympiapark AS and is certified by Eco-Lighthouse.

Hamar Olympiske Anlegg

Hamar will be host to most of the skating disciplines. The city was of central importance during the XVII Olympic Winter Games in 1994. The Viking Ship is a landmark in the region, and the indoor speed skating facility in Hamar. Major events such as World Championships, European Championships and World Cups are held here on a yearly basis, and the venue will host the speed skating competitions of LYOG. Figure skating events will be staged at the Hamar Olympic Amphitheatre, "Nordlyshallen", a venue that has been host to numerous national and international figure skating events during the last 15 years. Hamar is located about 65km from Lillehammer, or about 55 minutes by bus. There will be an Olympic Village at Hamar, where the ice skaters will be accommodated. The venues have been severely upgraded with more effective power management systems, and it is planned to perform further investments towards year 2020 (Appendix A).

Gjøvik Olympic Cavern Hall

Gjøvik will be the host of the short track skating disciplines. Gjøvik Olympic Cavern Hall is the world's largest underground sports venue and one of Norway's most spectacular arenas. The

venue is built deep within the mountains and has a capacity of 5000 spectators. The hall has been upgraded the last few years, with new lighting and better ice surface control systems. Gjøvik is located about 45 minutes from both Hamar and Lillehammer.

Lillehammer Olympic Bobsleigh and Luge track

The Bobsleigh and skeleton disciplines will be staged at Lillehammer Olympic Bobsleigh and Luge track, Hunderfossen, about 15 minutes north of Lillehammer. The venue has been maintained at a high level since the 1994 Winter Olympics, and the management system for the cooling system was recently upgraded. The venue also plans to install LED lighting during 2013. As a part of Lillehammer Olympiapark AS the venue has an ambition of being certified by the Eco-Lighthouse label during 2013 (appendix A). The venue has been host to a number of World Cup events.

Lysgårdsbakkene Ski Jumping Arena

The ski jumping competition will be held at Lysgårdsbakkene Ski Jumping Arena. The two jumping hills have a rating of HS 138 and HS 104. The 120 meters jump was modernized in 2007 with a new hill profile, and is highly rated internationally by both jumpers and trainers (Norges Idrettsforbund, 2010). The facility is a part of Lillehammer Olympiske Anlegg AS and plans to be certified by Eco-Lighthouse during 2013. There is also planned a new LED lighting system in the hills (Appendix A). The venue is located only five minutes walking distance from the Youth Olympic Village.

Kanthaugen Freestyle Venue

The half-pipe competitions (both snowboard and ski) will be staged in the Kanthaugen Freestyle Venue, an intimate venue that is integrated as part of the Lysgårdsbakkene Ski Jumping Arena. This venue is concerned with the big energy and water consumption needed for constructing the half-pipe for the snowboard competition (Appendix A).

Birkebeineren Ski Stadium

Birkebeineren Ski Stadium is located just five minutes from the YOV and will be the host of the Biathlon and Cross Country competitions. The venue is a core training and competition venue for local and regional athletes, and is used actively by many cross-country athletes on the Norwegian national team who live and train in Lillehammer. The venue is directly connected to a five kilometre floodlit ski track and it is the start point for over 300 kilometres of maintained cross-country ski tracks (Norges Idrettsforbund, 2010). The venue is a part of Lillehammer Olympiapark and will most probably be certified by Eco-Lighthouse during 2013.

Kristins Hall

The ice hockey competitions will be staged at Kristins Hall, a venue that is located just 300 meters from the Youth Olympic Village, next to Håkons Hall. The venue is the home to Lillehammer Ice Hockey Club and has a capacity of about 3000 spectators. Kristins Hall will also be the venue of the curling competitions. Four new ice curling sheets were added to the facility in 2012, making it a total of five sheets for the YOG 2016. The new curling hall has a

spectator capacity of 500. It is also decided to build a new training hall for ice hockey connected to Kristins Hall, estimated to be finalized in June 2013 (Norges Idrettsforbund, 2010).

Hafjell Alpine Center

Hafjell is one of Norway's most popular winter sports areas. The area is well developed with hotels and cabins for those interested in winter sports, and is visited by people from all over the country. The venue will be host to the alpine events of the games as well as ski cross and slope-style snowboard. The center was developed for the 1994 Olympic Games and has been considerably developed with new slopes, lifts and commercial activities the last ten years (Norges Idrettsforbund, 2010). Hafjell has been certified to Eco-Lighthouse since 2003.

4.5 The Youth Olympic Village (YOV)

The Youth Olympic Village in Lillehammer represents the one major building project directly related to YOG 2016. The Youth Olympic Village will be the most visible legacy in Lillehammer after the YOG 2016. According to plan the Village will be converted into dormitory units for students at Lillehammer University College and the Norwegian College of Elite sports after the Games.



Figure 5: A draft of the projected YOY

The building project is managed by the Student Welfare Organisation of Oppland and the housing cooperative USBL. LYOGOC is not directly involved in the process. 300 dormitory units will be built for the students at Lillehammer University College and 60 for the Norwegian College of Elite Sports. During the games the athletes will live four in each room, which means a total of 1440 beds are made available through the project. In addition 360 beds at the existing Birkebeineren Hotel & Apartments, located next to the planned village, will be part of the YOY in Lillehammer. There will also be a hotel working as a YOY in Hamar for the ice skating athletes (LYOGOC, 2012).

4.6 Culture and Education Programme

The Culture and Education Programme (CEP) is a fully integrated part of the Youth Olympic Games. This fundamental component of the YOG is an opportunity for athletes and participants to share experiences build new skills and learn about community values.

The CEP programme of Lillehammer 2016 will contain tailor-made options for the various groups of participants. It is planned to develop educational programs with the different regional, national and international partners, with cooperation with the IOC Staff when required. In table 4 there are given some examples of potential themes and partners of this program (Norges Idrettsforbund, 2010).

Table 4: Cooperative Institutions and themes - culture and education (Norges Idrettsforbund, 2010)

Nr	Theme	Examples of Main Partners	Examples of Secondary Partners
1	Olympism / Olympic values	<ul style="list-style-type: none"> • The Nansen Academy 	<ul style="list-style-type: none"> • Gausdal VGS - Coubertin School
2	Sports relations and threats within Sport	<ul style="list-style-type: none"> • Lillehammer University College • Norwegian School of sport sciences • Anti-doping Norway • Norsk Tipping 	<ul style="list-style-type: none"> • Other national and regional partners
3	Welfare and a healthy lifestyle	<ul style="list-style-type: none"> • The NOC elite sports center • Norwegian School of sport sciences 	<ul style="list-style-type: none"> • Other national and regional partners
4	Engagement of youth towards a career in Sport	<ul style="list-style-type: none"> • Lillehammer University College • Norwegian School of sport sciences • The Norwegian College of Elite Sport 	<ul style="list-style-type: none"> • E.g various sports federations
5	Social Responsibility	<ul style="list-style-type: none"> • Lillehammer University College • The Nansen Academy 	<ul style="list-style-type: none"> • Volunteer and enviromental youth organisations in Norway
6	Expression - Digital Media	<ul style="list-style-type: none"> • Lillehammer University College 	<ul style="list-style-type: none"> • Volda University College • International and national techology experts

5. Environmental Certifications

5.1 The Value of Certification

Environmental certification can be a good tool for integrating environmental focus in an organisation. Both management systems and products can be certified, and there are hundreds of different national and international schemes that focus on different businesses and products.

There can be many advantages with getting a certification. More focus on consumption of resources will reduce expenses, and more and more companies are setting higher requirements to environmental performance when it comes to procurement of goods or services. A certification shows that a corporation takes social and environmental responsibility and can therefore be a competitive advantage.

Which solution is best for the individual business depends on what you want to achieve with the certification, what the competition is doing and how much resources the business wants to lay down in a certification.

For a big sports event like YOG it will be relevant to consider a certification of the management and the event itself, but it will also be of interest to see if venues, accommodation and procured goods are in compliance with relevant standards and certifications.

5.2 Environmental Certifications and Schemes

This chapter gives a presentation of some of the most recognized local and international standards for environmental management. The logos of the schemes are found on the respective organisation's web-pages.

5.2.1 ISO 14001

ISO 14001 is an international standard that gives guidelines for how an organisation can implement an effective environmental management system (EMS). The design of the standard is intended to make it possible to address both the aspect of maintaining profitability, at the same time as reducing the environmental impact. If the entire organisation is committed to this standard, it should be possible to achieve both objectives at the same time.



Figure 6: The International Organization for Standardization logo

As environmental issues are increasing in importance across the globe, the importance of the ISO-standard will increase consequently. The pressure from different stakeholders in society, be it either national governments, Non-Governmental Organisations (NGOs) or consumers, to assess the environmental impact of an organisation, makes the focus on environmental impact relevant to all companies, from small voluntary organisations to major leaders in the market. The standard is generic and does not apply to any particular industry or business sector. It provides a strategic framework that can be used to meet internal and external objectives for Environmental Management. A management system standard like ISO 14001 is not a checklist or a reporting framework or a method of evaluating the sustainability performance of the organisation (ISO/TC207, 2004).

The standard specifies requirements for an environmental management system that makes an organisation able to develop and initiate policies and goals that comprehend with major environmental aspects. The success of this management system is dependent on commitment from all levels and functions of the organisation, and top management in particular. This will enable an organisation to develop an environmental policy, establish objectives and processes to achieve the policy commitments, take action as needed to improve its performance and demonstrate the conformity of the system to the requirements of ISO 14001, presented in figure 7.



Figure 7: The ISO 14001 process (ISO/TC207, 2004)

What separates the ISO14001 from other guidelines and standards in the ISO series is that it can be used as certification of the business' environmental management system. To demonstrate their voluntary conformity with the standard the organisation can either;

1. Self-declare conformity (first party)
2. Get confirmation of conformity from parties having an interest in the organisation, such as clients (second party)
3. Get an independent thirds party confirmation from e.g. a certification body

It is important to distinguish this standard, which describes the requirements for an organisation's environmental management system and can be used for certification or self-declaration of this, and non-certifiable guidelines that are intended to provide general assistance to an organisation for establishing, implementing or improving an EMS. By demonstrating successful implementation of ISO 14001 a company or organisation will be able to clearly demonstrate their commitment to reducing their environmental impact and

that an appropriate EMS is in place. ISO14001 is one of the best known environmental certifications globally and will therefore be a strong signal internationally (BSI, 2012).

To supplement the ISO14001 there is developed a series of environmental standards. The ISO 14004 gives a general guideline on principles, systems and support techniques on environmental management systems. The standard is a part of the series of environmental management standards. In this series, only ISO 14001 contains requirements that may be objectively audited for certification. Even though the guidelines in this international standard are consistent with the ISO 14001 environmental management systems model, they are not intended to provide interpretations of the requirements of ISO 14001 (ISO, 1996).

5.2.2 ISO 20121

ISO 20121 is a management system standard that is designed to improve the sustainability of events. The standard is based on the British Standard “BS8901 Specification for a Sustainability Managements System for Events”. Because of a high level of interest in BS8901, it was decided to create an international version to coincide with the London 2012 Olympics. ISO20121 covers all types and sizes of organisations involved in the event industry (ISO20121, u.d.).

The standard specifies the requirements of an event sustainability management system to improve the sustainability of events. It is applicable to all types and sizes of organisations involved in the planning and delivery of an event. It is adaptable to different geographical, social and cultural conditions, at the same time as it requires organisations to recognize their relationship with and impact on society and society’s expectations of events. Like for ISO 14001 this standard is not a tool for measuring performance, a checklist or a reporting framework (ISO, 2012).

The intention of the standard is to be applied flexibly and will allow organisations to implement an event sustainability management system, whether they already have a management system or not. The complexity of the system, extent of documentation and the resources devoted to it will be proportional to its defined scope, the size of the organisation and the nature of the organisation’s activities, products and services.

Like for ISO 14001 the success of the system is dependent on the commitment from the different parts of the organisation and the top level in particular. Another factor for success is that the system is flexible and integrated into the rest of the management system and not just regarded as a component that is added on. The system must extend throughout the supply chain and identified stakeholders.

The standard is based on the principle of Plan, Do, Check, Act, as all organisations will benefit from the process of continual improvement. Figure 8 gives an overview of the event sustainability management system model for the standard.

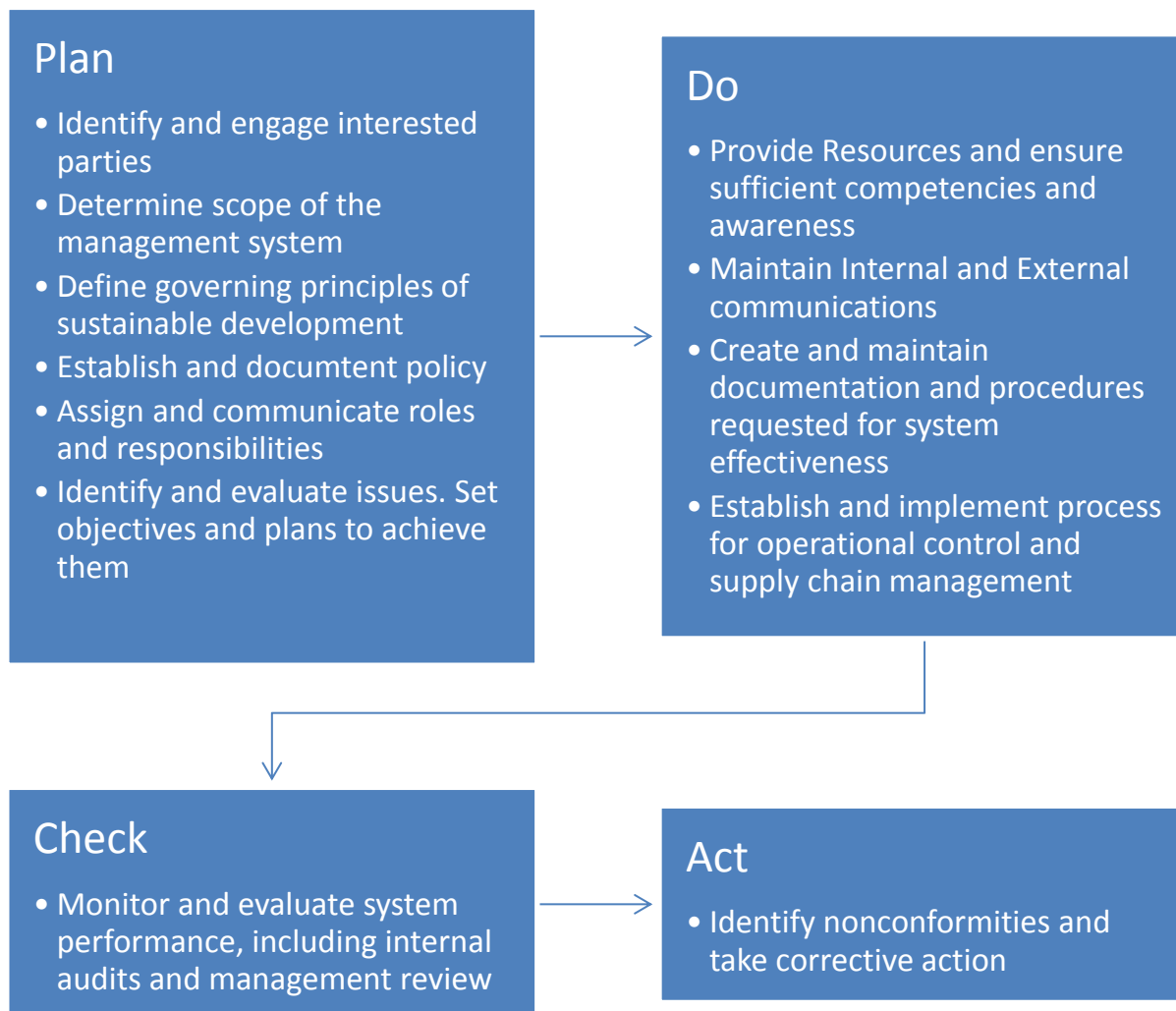


Figure 8: The event sustainability management system model for ISO 20121

Organisations can seek to achieve independent certification to ISO 20121 to demonstrate that they meet the requirements of the standard or they could self-declare like for ISO 14001. The certification process consists of an inspection of the organisations managements system as well as interviews with key personnel in order to verify that the management system is in accordance with the requirements of the standard and operating well in the organisation. It is important for the organisation to be able to prove that the environmental managements system is an integral part of the event management process, and not just an additional component to meet certain requirements (ISO20121, u.d.). By today, it is not established a certification body that can issue certification for ISO20121 in Norway and the standard is still considered as a guideline. There is however a pilot-project started by Oslo2022 that seeks to establish a system for this. If Oslo is selected for applying to the 2022 Winter Olympics this project can be initiated and LYOG could be involved in this process (Myrholt, 2013).

5.2.3 Miljøfyrtårn (Eco-Lighthouse)

Eco-Lighthouse is a Norwegian certification scheme for small and medium-sized private and public enterprises. The program was started in 1996 by the municipality of Kristiansand and local enterprises, and soon started to spread. In 2000 Eco-Lighthouse was established as a 3-year national program supported by the Ministry of the Environment. The project was a big success and was rewarded with several prizes during 2001 and 2002. In 2003, Eco-Lighthouse was established as a permanent national environmental certification program managed by the Eco-Lighthouse foundation. (Miljøfyrtårn, u.d.)



Figure 9: The Eco-Lighthouse logo

The main focus of Eco-Lighthouse is environmental issues related to internal processes of the organisation. That includes management, working environment, purchasing and material use, energy consumption, transportation, and emission and waste management.

To be certified by Eco-Lighthouse a corporation must meet some general requirements that are applicable to all types of enterprises. In addition to this the corporation must meet some industry-specific demands. Some bigger corporations must be certified by many industry-specific requirements. Within the industry-specific requirements there are both “must-demands” and “should-demands”. To be certified, all “must-demands” must be satisfied. (Miljøfyrtårn, u.d.)

The process of becoming registered as an Eco-Lighthouse consists of six steps:

- Initiate. Contacting a consultant to guide the organisation through the certification process.
- Environmental analysis. Establishing an internal team that works with the consultant to perform an environmental analysis of the current situation and the requirements that apply to the specific organisation.
- The environmental team works with the consultant to establish a plan of action to achieve the goal of becoming Eco-Lighthouse certified.
- Report. The environmental analysis is completed and a schedule for the process established.
- Implementing measures in the organisation to meet the branch specific demands.
- Approval. The organisation is certified by an independent auditor.

After the organisation has been approved it can promote its status as an Eco-Lighthouse. The Eco-Lighthouse is based on continuous improvement of performance and the organisation has to submit a yearly report where the improvements are documented.



Figure 10: The responsibility of being Eco-Lighthouse certified

The Eco-Lighthouse certification is valid for three years and run out automatically. The organisation is responsible for arranging a meeting for recertification well in advance of the expiry date of the certification.

5.2.4 Eco-Management and Audit Scheme (EMAS)

Eco-Management and Audit Scheme is a voluntary environmental management instrument that enables organisations to assess, manage and continuously improve their environmental performance. The goal of EMAS is to lead to enhanced environmental and financial performance, credibility and transparency to registered organisations. The scheme can be applied to any type of private or public organisation globally, and currently more than 4600 organisations and more than 7900 sites are EMAS registered.

EMAS can be connected to the following key principles (TOROC, 2004):

- Transparency i.e. organisations shall be responsible for a clear communication with interested parties and appropriate actions shall be taken to avoid misleading the public.
- Management control, i.e. organisations must be capable of monitoring and controlling all their significant environmental aspects.

- No selection of good areas only, i.e. organisations are not allowed to register parts of a unique production process or service with the intent to exclude parts of the site/service which could not be registered according to EMAS.
- Public accountability, i.e. organisations should be able to demonstrate an open dialogue with the public and other interested parties including local communities with regard to the environmental impact of their activities, products and services.
- Local accountability, i.e. organisations covering a number of different geographic locations should make sure that the significant environmental impacts of each site are clearly identified and reported within their environmental statement.



Figure 11: The EMAS logo

To receive EMAS registration an organisation needs to comply with several steps.

- First of all the organisation needs to conduct an environmental review to identify the aspects of its activities, products and services. It also needs to consider the methods used to assess these, relevant legal and regulatory framework and existing environmental management practices and procedures.
- Adopt an environmental policy that contains commitment to continuous improvements in environmental performance as well as compliance to relevant environmental legislation.
- Develop an environmental program that specifies environmental objectives and targets. This is to help the company in its everyday work when planning and implementing improvements.
- Establish an effective environmental management system based on the results of the initial review. The EMS should lead to achieving the organisations environmental policy and continuous improvement on environmental performance. The European Commission recognizes ISO 14001 as a stepping stone for EMAS and has made it an integral part of the latest revision (EMAS III).

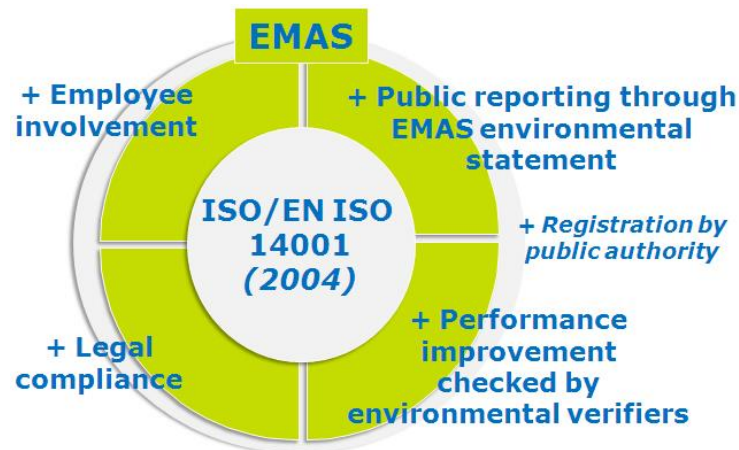


Figure 12: ISO14001 as an integral part of EMAS

- Perform an environmental audit assessing the EMS and how it complies with the organisations policy and program as well as legislation.
- Provide an environmental report on its environmental performance which presents the results achieved against the set objectives and the future steps to be undertaken to continuously improve the organisation's environmental performance.
- All the former steps need to be approved by an accredited environmental verifier. The validated statement needs to be sent to the EMAS Competent Body for registration and made publicly available before an organisation can use the EMAS logo. The EMAS competent body for Norway is "Brønnøysundregisteret".

EMAS was successfully used as a basis for the EMS of the Turin Olympic Winter Games in 2006. In relation to this the Turin Olympic Organising Committee (TOROC) developed a guide for how to implement EMAS into a sporting event (TOROC, 2004).

5.2.5 UN Global Compact

The UN Global Compact is a strategic policy initiative to encourage businesses to adopt sustainable and socially responsible policies, and to report on how it is implemented in the organisation.



Figure 13: The UN Global Compact Logo

The framework is based on ten principles in areas of human rights, labour, the environment and anti-corruption;

Human Rights

Principle 1: Businesses should support and respect the protection of internationally proclaimed human rights; and

Principle 2: make sure that they are not complicit in human rights abuses.

Labour

Principle 3: Businesses should uphold the freedom of association and the effective recognition of the right to collective bargaining;

Principle 4: the elimination of all forms of forced and compulsory labour;

Principle 5: the effective abolition of child labour; and

Principle 6: the elimination of discrimination in respect of employment and occupation.

Environment

Principle 7: Businesses should support a precautionary approach to environmental challenges;

Principle 8: undertake initiatives to promote greater environmental responsibility; and

Principle 9: encourage the development and diffusion of environmentally friendly technologies.

Anti-Corruption

Principle 10: Businesses should work against corruption in all its forms, including extortion and bribery.

The UN Global Compact is not a certification in the same sense as ISO 14001, Eco-Lighthouse, and EMAS, but more like a tool or network for corporations that want to work actively and seriously with CSR. Joining Global Compact means that the corporation will do its best to do business in compliance with the ten principles.

Joining Global Compact is free and could bring several advantages. As the world's biggest initiative for CSR with more than 7000 members from 130 countries, Global Compact gives an opportunity to meet and share experience with other businesses. Joining Global Compact will also send out a signal that the corporation is taking CSR seriously and could improve reputation and long-term profits.

Global compact requires that the company implements the ten principles into its strategy and daily business, and works continuously to improve in those areas. The company must provide a yearly report regarding its activities and improvements of practice related to the ten principles. The scope and contents of the report is decided by the company. As a member of Global Compact, the company is committed to promoting knowledge about the initiative and CSR (UN Global Compact, 2013).

5.3 Environmental Labels (Eco-Labels) and Declarations

Environmental labels and declarations provide information about a product or service in terms of its overall environmental character, a specific environmental aspect, or any number of aspects. Purchasers and potential purchasers can use this information when choosing the products or services they desire based on environmental, as well as other, considerations (ISO/TC207, 2000).

As consumers and businesses have begun to seek green products in recent years, the field of environmental certifications and declarations has become increasingly crowded and contested. There are more than 600 different labels and declarations worldwide, issued by companies and non-profit organisations that offer environmentally friendly qualities (Eilperin, 2010). The different labels cover almost every imaginable category and are used for all types for products (where products are understood as any goods or service). There are positive, neutral and negative Eco-Labels.

- Negative Labels functions as warnings e.g. about risks regarding health and environment.
- Positive Labels promote the positive environmental qualities of a product compared to other competing products.
- Neutral Labels give concrete information on the products environmental properties without focusing on risks or advantages

The provider of the product or service hopes that an environmental label or declaration will help influence the purchasing decision in its favour. This effect could increase the market share of the product or service and force other providers to respond by improving their product's environmental aspects in order to use environmental labels. The result is a reduced environmental stress from that product or service category (ISO/TC207, 2000).

The international Organization for Standardisation describes three different types of declarations; Type I, II and III. The ISO standards for environmental labels and declarations are:

- ISO 14020 Environmental labels and declarations – General principles
- ISO 14021 Environmental labels and declarations – Self-declared environmental claims (Type II environmental labelling)
- ISO 14024 Type I environmental labelling-principles and procedures
- ISO 14025 Environmental labels and declarations – Type III environmental declarations – Principles and procedures
- ISO 21930 Sustainability in building construction-environmental declaration of building products

Type I Environmental Labelling

Type I Environmental Labelling are Eco-labels that meet the requirements in ISO 14024 "Environmental labels and declarations – Type I environmental labelling – Principles and procedures". They provide a 'seal of approval' where a Type I environmental labelling programme issues a licence to use their eco-label logo on products or services which have met the programme's specifications. ISO14024 defines Type I environmental labelling programmes as "voluntary, multiple -criteria-based third party programmes that awards a licence which authorizes the use of environmental labels on products indicating overall environmental preference of a product within a particular product category based on life cycle considerations. Type I eco-labels are thus an indicator of overall environmental preference in that product category. They are based on publicly available specifications, are operated by third parties, involve independent audits and consider life-cycle environmental impacts (Department for Environment, Food and Rural Affairs, 2011).

Type II Environmental Claim

Eco-labels that meet ISO14021 "Environmental labels and declarations – Self-declared environmental claims (Type II environmental labelling)" requirements are self-declarations, not involving independent audit. ISO14021 sets out principles and requirements for all self-declared claims. These requirements cover the use of particular words and symbols and specific requirements about accuracy, relevance, explanation and substantiation/verification of claims. Not all self-claims or declarations will meet ISO14021 requirements (Department for Environment, Food and Rural Affairs, 2011).

Type III Environmental Declaration

Specifications and requirements for a Type III Environmental Declaration are given in ISO 14025 Environmental labels and declarations-Type III environmental declarations – Principles and procedures. Characteristics of Type III EPDs are that they give objective and quantified environmental information, and that they shall allow comparison of products fulfilling identical functions. Type III eco-labels are based on publicly available product category rules, are operated by third parties and involve independent audits (Department for Environment, Food and Rural Affairs, 2011).

Social Labels

A social label is a broad term relating to the social capacity of a company and can cover both 'fair' and 'ethical' trade. It can be used in reference to goods produced in line with standards aimed at securing fair terms of trade for suppliers in the developing world or general business practice which is deemed to be carried out in an ethical manner through promotion of certain labour and environmental standards. There is no common standard for Social Labels.

Evaluating a label

To find out if a labelling scheme can be trusted, there are five indicators to look for:

Can the manufacturer choose whether the product should be labelled or not?

Some labels are self-declaring. This means that the producer decides whether the product qualifies to the requirements of the label. CE marking and energy labelling are examples of such schemes.

If the producer decides whether the product can be labelled or not, this could impair the quality of a labelling system. There are examples of such errors in the labelling of appliances, where the producers want as good grades as possible on the energy consumption of their devices. A third party test of the energy consumption and labelling would improve the quality of the label, and give it more credibility.

Some labelling schemes - such as hazard labelling of chemicals - are self-declaring. This system is driven and controlled by the public authorities, and the credibility is therefore considerably increased.

Does the label provide open information on the requirements that needs to be met to be approved?

Accountability is important for the credibility of a labelling system. The rules should be the same for everyone to make it easier to measure and compare.

What exactly are the requirements for the label? Where are the requirements formulated? Are the requirements identical in all countries? Are there requirements for objective testing

or can the producer choose its own methods? Does the label have an expiration date, or can the producer keep it forever?

These are some relevant questions about labelling systems. The answers can only be acquired if the label gives open, public information on how it works. This means that it should be easy to find out exactly which criteria a given product needs to meet if it is to be labelled.

Does the label provide open information on price?

Also when it comes to costs, it is transparency that apply. It should be easy for both manufacturers and others to find out what it will cost to label a product. It is not necessarily a requirement that the price should be the same everywhere. For example, the price varies on forest certification in all countries. This is related to the accessibility of the forest, size of the actual area, how many people are working to certify etc. If the labelling scheme doesn't provide information on neither requirements nor price there is reason to be sceptical. This could mean that it is possible to buy a label no matter the qualities of the product.

Does the label cover more than one environmental issue?

In the nature, everything is connected and there is no universal key that solves all problems in one turn. There is no single answer to all questions. When a label tries to tell what is a good environmental choice it is therefore not sufficient that it only applies to on factor. A refrigerator that has a low use of energy is not a good choice if the cooling agent utilized is harmful to the ozone layer. Energy labelling only counts for energy consumption in the use phase and nothing about the other properties of the refrigerator.

Does the label count for the entire life-cycle of the product?

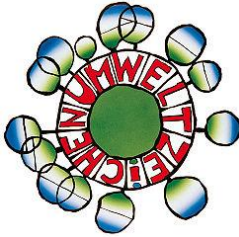




If a label should point the way to what is the best choice for the environment, it must consider the entire production process, and the relevant requirements based on a life cycle perspective. Are the raw materials taken out in a sustainable way? Does the producer waste energy? Are there any harmful chemicals involved in the production? How are the workers treated? Is the product safe to use? What is the expected life time of the product? Can the product be recycled?

An environmental label should consider the complex reality of modern production, and make it easier to understand for the customers (Svanemerket, 2012).

Table 5 gives a few examples of environmental and social labels to look for when planning purchasing. The information and logos are gathered from the respective certification's web pages. This is just a small selection of some of the most recognized labels.

Table 5: Some eco-labels with a high reputation

Label	Name	Description
	FSC – Forest Stewardship Council www.fsc.org	FSC certification ensures that products come from well managed forests that provide environmental, social and economic benefits.
	Nordic Eco-label – “Svanemerket” http://www.nordic-ecolabel.org/	Products carrying the Nordic Eco-label meet extremely high environmental and often climate requirements. A life-cycle perspective of the product is analysed, i.e., the product's impact on the environment from raw material/source to waste. Criteria are also set with regard to quality, health aspects and performance/functionality.
	EU Eco-Label http://ec.europa.eu/environment/ecolabel/	The EU Eco-label helps identify products and services that have a reduced environmental impact throughout their life cycle, from the extraction of raw material through to production, use and disposal. The label is well recognized throughout Europe.
	Blue Angel – “Der Blaue Engel” http://www.blauer-engel.de/en/	The Blue Angel is the first and oldest environment-related label for products and services in the world. It was created in 1978 on the initiative of the German Federal Minister of the Interior and approved by the Ministers of the Environment of the federal government and the federal states. It considers itself as a market-conform instrument of environmental policy designed to distinguish the positive environmental features of products and services on a voluntary basis.
	PEFC - Programme for the Endorsement of Forest Certification schemes http://www.pefcnorge.org/	The PEFC label is an international labelling system for wood and paper products that will ensure sustainable forestry. PEFC is a pure raw material label.
	Energy Star http://www.energystar.gov/	Energy Star is a well-known environmental label focused on energy efficiency. It identifies and promotes energy-efficient products that have the same quality standards of equivalent models, and in

		addition reduce energy-related CO ₂ emissions.
	<p>Österreichische Umweltzeichen</p> <p>http://www.umweltzeichen.at/</p>	The Austrian Eco-label is a guarantee for environmentally friendly products and services that was initiated by the Austrian minister of the environment in 1990. It provides the public with information on the environmental impact of goods by their manufacture, use and disposal. The label is also used to certify meetings, and from 2012 also events.
 Bra Miljöval	<p>Bra Miljöval (Good Environmental Choice)</p> <p>http://www.naturskyddsforeningen.se/bra-miljoval/</p>	Swedish label administered by the Swedish Natural Conservation Association. The criteria are close to the Nordic Swan Label criteria, but they differ in certain product areas. For example does the Nordic swan have stricter criteria for makeup and skin care, and Good Environmental Choice has more stringent criteria for paper.
	<p>Ecocert</p> <p>http://www.ecocert.com/</p>	Ecocert is a French organisation that certifies products according to the standards of organic production, fair trade and good agricultural practices. The Ecocerts label is found on cosmetics and cleaning products, food products, textiles and fair trade products.
	<p>GOTS</p> <p>http://www.global-standard.org/</p>	GOTS stands for Global Organic Textile Standard. The brand was introduced in 2008, and considers all relevant environmental problems in the textile lifecycle. Only fabrics consisting of at least 70 % organic fibres can become certified. Today there are about 3,000 GOTS certified textile manufacturers around the world.
	<p>CE Marking</p> <p>http://ec.europa.eu/enterprise/policies/single-market-goods/cemarking/index_en.htm</p>	The CE marking is a mandatory conformity marking for products sold in the European Economic Area (EEA) since 1993. The CE marking is a self-declaring label that shows that the product meets the requirements of the applicable EC directives.

5.4 Environmental Auditing

The definition of the environmental audit is given within EMAS and is based on a definition provided by the International Chamber of Commerce (ICC):

“A management tool comprising a systematic, documented, periodic and objective evaluation of the organisation, management system and processes designed to protect the environment with the aim of: (1) facilitating management control of practices which may have impact on the environment; (2) assessing compliance with company environmental policies.”

Environmental Management Systems and the Environmental Audit

The auditing process is an important part of implementation of an EMS, and the different EMS Standards put much emphasis on the importance of the audit when controlling and monitoring the process of continuous improvement of performance. In a model by the ICC the environmental audit is seen as the controlling function of the EMS where planning, organizing, implementing and controlling the audit need to be seen within their own cycle of activity (figure 14).

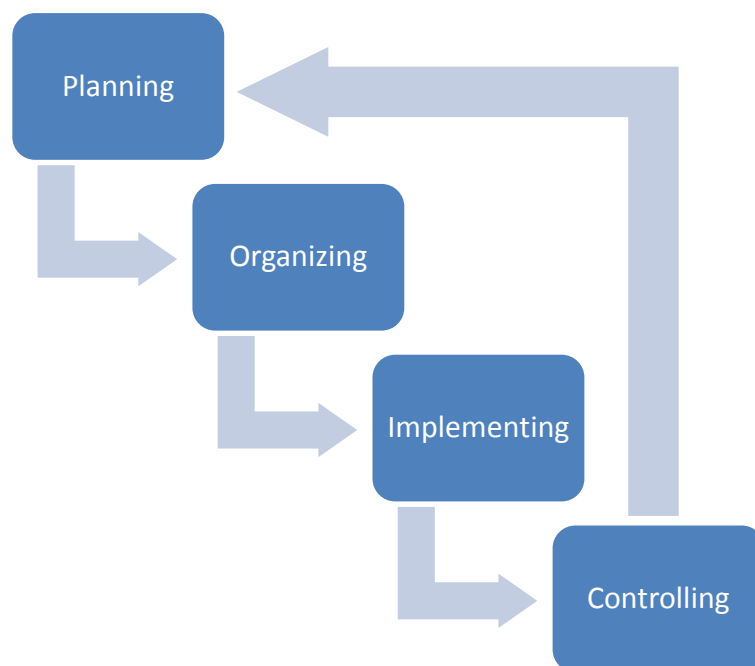


Figure 14: ICC Guide to Effective Environmental Auditing (Welford, 1998)

Other definitions than the one given within EMAS does however emphasize that the environmental audit is not merely a control function, but at the very core of the EMS. According to Welford (1998) it would definitely be wrong to see the environmental audit in isolation. It is one very important part of a comprehensive approach to environmental management and is recognized as this in standards like ISO 14001. As with much of environmental management the role of senior management in the audit process is crucial. Without top management support an internal environmental audit programme will not

succeed. Moreover, the management needs to be fully committed to being in compliance environmentally and to correct any deficiencies uncovered by the audit programme (Welford, 1998). ISO 19011 "Guidelines for auditing management systems" provides guidance on the management of audit programmes, the conduct of internal or external audits of environmental management systems, as well as on the competence and evaluation of auditors (ISO/TC 176; ISO/TC207, 2002).

An environmental audit is more comprehensive than an inspection or assessment which offers an opinion based on professional judgement. The audit should be a methodological examination of a company's procedures, including analyses and testing in order to verify that legal requirements and internal policies are met. In this context the judgement of the auditor will be based on evidence gathered during the audit. An audit can look at particular issues facing the company or it can be a wide-ranging audit which includes a full assessment of the effectiveness of an EMS as well as compliance, safety and quality control (Welford, 1998).

The audit must neither be seen as a one-off activity. It must be an on-going activity with periodical audits where the audit is also developed in terms of scope and sophistication over time. Seeing just one audit as a universal tool would probably lead to more problems than it solves. The concept of continuous improvement is applicable to the audit as well as the EMS. In effect, an auditing system will help the firm to identify hazards and anticipate environmental damage, and put it in a better position to prevent this. Before a company can start auditing it needs to establish a baseline performance which is achieved via the environmental review and to begin to implement an action plan through a clearly structured EMS.

Implementing the Audit

All environmental audits involve gathering information, analysing that information, making objective judgements based on evidence and a knowledge of the industry and of relevant environmental legislation and standards. The results of the audit must also be reported to the top management with recommendations and possible strategies for how to implement the findings. All this work takes time and the work needs to be prepared as well as follow-up. The audit can therefore be divided into three clear stages as shown in figure 15.

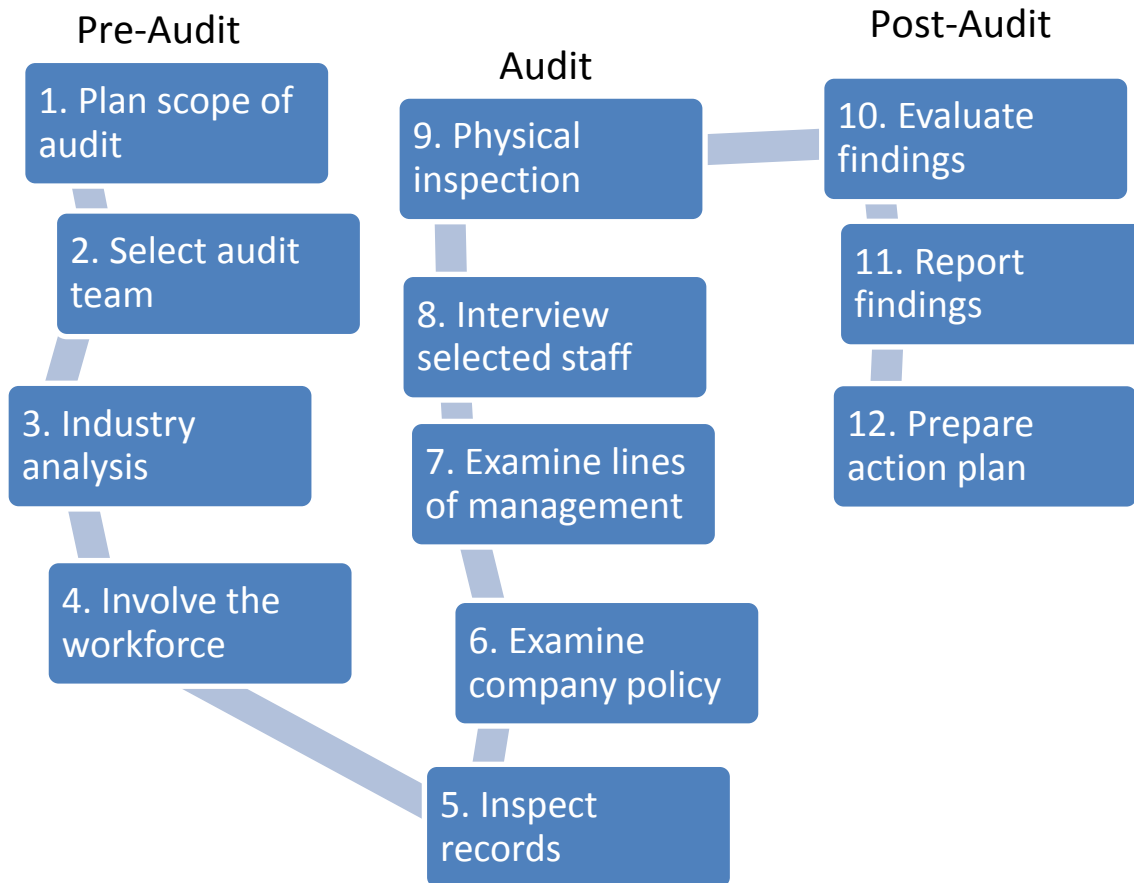


Figure 15: Stages of an environmental audit (Welford, 1998)

The stages are described below:

1. Planning the scope and nature of the audit and generating a framework for setting goals and objectives, developing a plan for how these are achieved and allocating responsibility for accomplishing the work, and scheduling of the audit process. The objectives of the audit programme can be based on the consideration of (ISO/TC 176; ISO/TC207, 2002)
 - a) Management priorities
 - b) Commercial intentions
 - c) Management system requirements
 - d) Statutory, regulatory and contractual requirements
 - e) Need for supplier evaluation
 - f) Customer requirements
 - g) Needs of other interested parties
 - h) Risks to the organisation

This stage also involves gathering of information from secondary sources like previous audit reports, reviews and other corporate reports. When scheduling the audit, the facilities should be prioritized according to the risk involved.

2. Selecting team members and allocating resources to the different policies and strategies planned in 1. The team should be picked not just with regard to environmental expertise but also their knowledge of the industry in which a company operates. The responsibility should be allocated according to the experience and competence of the team.
3. An analysis of the industry is performed to achieve better knowledge of the industry and company audited. This could be done by using a pre-survey questionnaire submitted to the management. This could be useful to get familiar with the type of instalment, site and location of the company. This will make it easier to define what needs to be done and how much time that needs to be allocated to conducting the audit.
4. The workforce of the company could be involved in the process by sending out questionnaires to a representative sample, asking about key issues such as health and safety, working conditions, communication and planning.
5. Inspection of records kept by the company, certificates of compliance, discharge consents, waste licences etc.
6. Maintenance and inspection programmes and the company's policy on accident response should be examined. The auditors have to evaluate the soundness of internal controls and the risk associated with the failure of those controls. This involves both the management procedures and equipment and engineering controls that could affect the environment.
7. Line of management and responsibility, systems of authorization, and competence of personnel are examined to reveal if there is a working understanding of the facility's internal management system and its effectiveness.
8. Confidential interviews of selected members of staff at all levels to collect information, especially in the area of effectiveness of systems and waste handling.
9. An inspection of the plant itself, working practices, office management systems, surrounding areas, monitoring procedures, safety equipment etc. Taking samples of waste, liquids, soil, air and noise where necessary.
10. The audit team meets to discuss all facets of the audit and to confirm that there is sufficient evidence on which to base and justify a set of findings and evaluating the audit information and observations.
11. The findings of the audit are reported to the management by discussion and by a written report. The report is reviewed to avoid misinterpretation. Based on the report a discussion on how the firm can improve its environmental performance is performed and the management is provided with information about compliance status and recommendations regarding which action which should be taken.
12. Development of an action plan that includes assigning responsibilities for corrective action, determining potential solutions and establishing timetables. Planning of the next audit (Welford, 1998).

Success factors

The audit is more likely to succeed if the philosophy of the firm is supportive to the success of the programme and the welfare of the company. Some characteristics that provide foundation for a successful audit program could be:

- Comprehensive support for the audit programme throughout the management. Top management support is regarded as the most crucial factor for the success of an environmental audit program, and lack of it could also be the biggest hindrance encountered in the implementation of one.
- Acceptance that an auditing program is for the benefit of the management and will improve effectiveness in time.
- The audit is useful and information revealed by it is helpful and needs to be shared and acted upon.
- Encouraging responsible participation and considering suggestions and comments at each level of the workforce and management. Staff involvement and participation is important for the success of an audit because the cause of any problems or deficiencies in a particular facility or operation can best be understood by the people working there.
- A commitment to following up on findings.
- Clearly defined roles and responsibilities and clear operational systems.
- Recognition that the audit is linked to the wider EMS which in turn is in the spine of the company. An environmental audit must not be considered in isolation, but as an integral part of the EMS.

It is of great importance that the audit is seen as a positive help rather than a threatening or hostile exercise. The company must create a positive culture with the main board directors in front that recognizes the positive benefits of environmental management and the auditing system.

6. Former Events

When evaluating the different certification schemes and labelling it can be interesting to see what has been done in other events in the past. Three events of different magnitude, location and environmental aspects are evaluated. One Norwegian event to see which local initiatives are available, another YOG event to compare possible magnitude and to see where the bar is placed, and the London summer Olympics to see what is done in mega-events and what can be adopted from this. This chapter could have included more events to improve the basis for discussion. Events like Turin 2006 and Vancouver 2010 are two relevant events that both developed their own EMS implementation guides based on different existing standards (IOC, 2012).

6.1 FIS Nordic World Ski Championships 2011, Holmenkollen, Oslo

FIS Nordic World Ski Championships 2011 took place from 23 February to 6 March 2011 in Oslo Norway, at the Holmenkollen National Arena. This was the 48th World Ski Championships, and the 5th time it was arranged in Norway. Before the event the main venue “Holmenkollbakken” was demolished and rebuilt to meet the requirements from the International Ski Federation (FIS). It was also built a new ski stadium next to the hill and the smaller hill, “Midtstubakken” was also demolished and rebuilt to meet the modern requirements. The total cost of the event is estimated to 2,4 billion NOK.

The events vision was to be to most environmentally friendly skiing-event ever. Through all of the process from early planning to implementation and initiation, the environmental perspective was integrated. An additional ambition for the environmental work of the event was to establish a permanent focus on sustainability in Norwegian sports.

Already from the planning phase Oslo 2011 had a strong focus on certifications to ensure that the administration’s operations and daily practices were environmentally and climate friendly and to send out a signal that the event was serious about organizing a sustainable event. The event was certified by Eco-Lighthouse and participated in the Nordic Swan Shopping Club (innkjøperklubben) to ensure environmentally friendly procurement. In the pre-games environmental plan it is specified that it should be a focus on selecting products based on climate and environmental impact criteria and that as many suppliers as possible should have environmental management systems in place. The Nordic Swan, ISO, EMAS and Eco-Lighthouse are mentioned as examples on certifications to look for (Oslo 2011 Environment Committee, u.d.).

Some of the most important environmental initiatives taken by Oslo 2011 initiatives were:

Transportation

- Facilitation of the use of public transport for 90% of transportation needs using buses with new engine technologies and the metro
- Use of biodiesel in the transport of snow to the arenas.

Waste

- Waste separation systems throughout the arena and the cafeterias

- Food was served using compostable plates etc. This contributed to a more environmentally friendly disposal of up to 180000 plates, 60000 drinking cups and 170000 knives, forks and spoons.
- Distribution of personal World Cup coffee mugs to the 4000 workers, the press and media saved the use of more than 100000 disposable cups during the Championship
- Recycling of at least 70% waste.
- Facilitation of waste collection to the public and tent dwellers along the forest trails through the project 'World Championship in the Forests'
- Special exhaust ventilation and recycling of solvents in the wax cabins

Energy

- Oslo 2011 used electricity from renewable energy sources documented with Guarantees of Origin.
- Environment friendly generation of heat in the public tents using generator technology that met the requirements of the future emission standard Euro6

Food

- Focus on buying locally produced Norwegian food in the Oslo 2011 Norwegian Food Project

6.2 Innsbruck YOG 2012

The first Winter Youth Olympic Games were arranged in Innsbruck, Austria from 13th to 22nd of January, 2012. Approximately 1100 athletes from 70 countries competed in the games. All venues used for the games, except the athlete's village already existed when Innsbruck was awarded the games in 2008. Some of the venues were later upgraded. The games hosted more than 110 000 spectators during the event and used the public transport system to travel between the different venues. The operational budget for the event was €23,7 million.

From the very early stages of the planning process all three sustainability dimensions – ecological responsibility, financial benefit and social balance – were incorporated. The event does not promote any environmental label or certification but the organizing committee benefited from the Austrian Institute for Ecology's expertise as a part of Green Events Austria, an initiative launched by the Austrian Environment Ministry to promote sustainable events. (IYOGOC, 2012).

The athlete's village which was built before the games is the largest passive-house complex in Europe and was built using the latest passive-house technology (Mackay, 2012). The furniture was also procured from local suppliers. The village doesn't however promote any environmental certification. The main Innsbruck 2012 Competition Venue, Olympiaworld Innsbruck, was also the venue of the 2008 UEFA European Football Championship. Before the championship an environmental management system was established and verified for the venue, and the facility was also upgraded in 2010 (IYOGOC, 2012). The other venues were all upgraded to a modern standard but do not promote any certifications. The exception is the Innsbruck Exhibition Centre, used for the curling competition, which holds a certification from The Austrian Eco-label for meetings (Das Österreichische Umweltzeichen).

This is a certificate for environmentally friendly services and products, verified by the Austrian Ministry of the Environment.

Overall the event had a strong focus on sustainable development and the environment. The organizing committee was determined to surpass the requirements from IOC. Certification of the environmental performance is not used actively to promote the work on sustainability in the official report of the event, and the venues with certifications have chosen to do this in their own right.

6.3 London 2012 Summer Olympics

The 30th Olympic Summer Games was arranged in London, GB, from July 27th to August 12th 2012 and with that, London became the first city to arrange the games three times after being host city in 1908 and 1948. More than 10000 athletes from 204 countries participated in the games. The London Organizing Committee of the Olympic and Paralympic Games (LOCOG) was the organisation responsible for overseeing the planning and development of the event.

The games used a mix of new venues, temporary facilities and existing venues. Existing venues were used wherever practical, and new permanent venues were built only where there was a strong legacy case. Temporary structures were erected for all other needs (Lambert, 2013). Construction for the games involved significant redevelopment of urban areas, with a strong focus on sustainability. The main focus was a large new Olympic Park, constructed on a former industrial site at Stratford, East London. This included the athletes Olympic Village, The Olympic Stadium, The London Aquatic Centre, The Olympic Media Centre and several of the other sporting venues. After the games the park will be transformed into one of the largest urban parks created in Europe for than 150 years, designed to enrich the local ecology by restoring wetland habitats and planting native species (LOCOG Sustainability team, 2012). To make use of the sporting facilities and high-tech infrastructure that was developed for the Olympic Games the Olympic Village will be converted into 3600 apartments, and a new university, specializing in sport science, digital media and green technology, will be founded.

The event had an ambition to be the first truly sustainable Olympic Games and to achieve this they had a strong focus on certifications and environmental labelling. The LOCOG identified the need for an effective sustainability management system as part of their bid to host the Olympic Games in 2004/5. At the time they identified a gap in the market for a sustainability management system that addressed sustainability in the context of events. From the first stage of the development of the organizing committee, they started to develop their EMS, which pre-dated the British Standard BS 8901: Specification for Sustainability Management Systems for Events. In 2011 LOCOG became the first Organizing Committee to be certified to the standard. The sustainability team of LOCOG was also involved in the development of ISO 20121 and the event worked as a catalyst for the new

standard. In June 2012 the event achieved a third part certification to ISO 20121 (Lambert, 2013).

“London 2012 is proud to have been the catalyst for ISO 20121. This is a piece of legacy with the potential to transform how events around the world consider their economic, environmental and social impacts.”

David Stubbs, Head of Sustainability at LOCOG (Lambert, 2013)

The challenge with implementing the standard was the scale of the project and the constant growth of LOCOG from a very small enterprise to a major corporation in the space of seven years. It is easiest to implement sustainability from the outset, rather than to retrofit it at a later stage (Lambert, 2013).

In the pre-games sustainability report the focus on certifications in the value chain is also strong. Clear and consistent policies have been employed to mitigate the impacts of the manufacture, supply, use and disposal of all materials for the Games. The LOCOG has also developed a separate Sustainable Sourcing Code. Predominantly aimed at internal buyers, suppliers and licensees, the code will enable the organisation to make informed decisions with regards to environmental, social and ethical issues, when procuring the products and services needed for the Games and meet the ambitions laid out in the wider London 2012 Sustainability Plan.

“Our vision:

Suppliers and licensees will ensure that products and services are sourced and produced under a set of internationally acceptable environmental, social and ethical guidelines and standards.”

(LOCOG, 2011)

In the Appendix 1 of the Pre Games Sustainability report there is given a comprehensive list of different charter, codes, principles and other initiatives adopted by LOCOG. A short example of this is given in table 6.

Table 6: Example of adopted charters, codes, principles or other initiatives of London 2012 (LOCOG Sustainability team, 2012)

Title	Description
Ethical Trading Initiative Base Code (ETI Base Code)	Internationally recognized code of labour practice and is founded on the conventions of the International Labour Organisation (ILO)
BS 8901:2009 Specification for a sustainability management system for events	Sustainability management system standard for the events sector and was inspired by London 2012
Forest Stewardship Council (FSC) certification	Voluntary, market-based tool that supports responsible forest management worldwide
Fair trade	Product certification system designed to allow people to identify products that meet agreed environmental, labour and developmental standards
Rainforest Alliance certification	Certification system designed to allow people to identify products that meet agreed environmental and social standards, including agrochemical reduction, ecosystem conservation, and worker health and safety
Eco-Management and Audit Scheme (EMAS)	Voluntary initiative designed to improve companies' environmental performance and requires those participating to publicly report on their performance
EU Energy Label	EU wide programme which rates energy efficient products
Energy Star	US programme which rates energy efficient products and practices
GLOBALGAP Certification	Non-governmental organisation that sets voluntary standards for the certification of agricultural products around the globe

7. Evaluation

7.1 Environmental Certifications

When evaluating the different environmental certification it could be useful to define some common characteristics to look for. The certifications will in this case be considered in the light of three characteristics;

- Relevance: How can the certification scheme be applied to an event?
- Adaptability: Is the certification scheme able to adapt to the scope of the event, and the resources available?
- Credibility: How is the reputation of the certification? Will this certification send out the desired signals?

Eco-Lighthouse

The Eco-Lighthouse certification differs from the two ISO-certifications because it gives more concrete requirements. The requirements of the certification are divided into general and branch-specific. One of the branch-specific sets of requirements is called “Green Events”, and is designed for bigger cultural and sports events and conferences. This makes the applicability very good, and the implementation of Eco-Lighthouse is probably the easiest because the requirements are so clearly defined and more like a checklist. The Eco-Lighthouse is implemented into the general HSE plan, and doesn’t require a separate EMS document and Environmental policy.

The scheme is meant for small and medium-sized businesses, but it does also provide a main office model for bigger corporations. The first general requirement for Eco-Lighthouse is that the corporation have established a working HSE system that meets the requirements of the Internal Control Regulations. As long as the company is big enough to have this, the Eco-Lighthouse is adaptable. The Eco-Lighthouse requires a yearly report, and this could occupy resources, and affect the effectiveness of smaller companies in periods. This could be a challenge for the LYOGOC who only counts four persons at the moment (June 2013).

The Eco-Lighthouse is a national certification scheme in Norway, supported by the Ministry of the Environment. The scheme has existed in its current state since 2003 and has become the most common certification for Norwegian organisations who want to document their environmental performance. The national credibility is good, but it is not very well known outside the borders of Norway. For an international event like the YOG it could be desirable to be able to communicate their environmental performance internationally.

ISO 14001

The ISO 14001 specifies requirements for an EMS for corporations and it must be adjusted if it is to be applied to an event. The design of the standard facilitates for such adjustments as it leaves the aspect identification and planning open and doesn’t give any concrete requirements, like the Eco-Lighthouse. This means that the application of the standard would require more planning than the Eco-Lighthouse and ISO 20121. However, as a well-

established standard, the competence available for consulting is good, and with standards like 14004 to supplement it the applicability is probably not a problem.

Implementation of ISO 14001 seizes a lot of resources in planning and training. This could be a big load for a small organisation. On the other hand, with a smaller organisation it will be easier to identify aspects, implement an environmental policy and to monitor and measure the performance. The challenge with the YOG is that the organisation will grow towards 2016, and the EMS must be able to adapt to this. The aspects of the events must be predicted. It is crucial that the EMS is well planned so that the initial system facilitates for such a growth.

ISO 14001 is one of the best known standards for EMS, and is applied to businesses all over the world, and Europe in particular. A third party certification to ISO 14001 will probably be the strongest signal that environmental performance is taken seriously.

ISO 20121

The ISO 20121 is developed especially for events, and the process of implementing it would probably be straight-forward. The standard comes with a guide for planning and implementation and there were released many guidelines for sustainable event planning in relation to the London 2012 Olympic Games. Since the guideline is designed for an event it will be easier to apply than for example ISO14001.

The required resources for implementing the standard will be proportional with the scope and size of the organisation. The standard is designed to be flexible and adjustable to organisations of all sizes.

As a standard by the International Organisation of Standardization the credibility is pretty good. The standard is still pretty fresh, and doesn't have the weight of for example ISO 14001, but was considered as a success after the London Olympic Games. At the moment the standard cannot be certified by a third party in Norway, so if the standard is chosen the LYOG must base the conformity on self-declaration or second party approval. This could weaken the signal effect of the standard.

EMAS

EMAS is an environmental management instrument for all types of businesses. The requirements to the company are the same as for ISO14001 and the process of implementation would be similar. EMAS has been applied successfully to big winter events before, and would, just like ISO14001 be applicable to almost any kind of organisation. EMAS also has some additional requirements compared to ISO 14001, for example periodically reporting

Like the other standards a registration to the EMAS will require resources, especially in planning and training. The scheme does not require that much when it is established, but it

is focused on continual improvement of performance and requires periodically reporting on environmental performance and this could cause some bureaucracy.

As a European Commission initiative the credibility of EMAS is very strong, especially in Europe. The periodical reporting makes the transparency of the registered companies very good, and it is easy to evaluate their environmental improvements.

Global Compact

Global Compact is not a standard or certification like the other considered alternatives, but more like a tool for communicating and sharing experiences and knowledge on CSR. By that Global Compact goes beyond just environmental issues, and includes social aspects as well. The requirement is that the business implements the ten principles into their existing management system and reports on their performance.

The Global Compact is flexible and could be applied to any company of any size. The Global Compact actively works to involve more small and medium-sized companies and has developed several guidelines to accelerate this process.

As a UN initiative the Global Compact is a good label to promote for a company. The scheme could however be criticized since there is no control and follow-up on the reports. This means that a company registered to Global Compact could submit fabricated and misleading reports, so-called Green-washing.

7.2 Former Events

Innsbruck 2012

When comparing the former events it would be most obvious to measure the Lillehammer YOG with the games in Innsbruck. It will be rational to think that the scale of the events are about the same, even though Innsbruck is a significantly bigger city than Lillehammer and could expect more spectators and in that case would require better infrastructure. Lillehammer will share the games with the cities Hamar and Gjøvik which triples the population base. The games in Innsbruck did not use environmental certifications as promotion of their environmental performance, but their EMS was developed in cooperation with Green Events Austria which is an initiative from the Austrian Ministry of Environment. Although it would be reasonable to assume that the EMS of the event was of a good quality, it would have been easier to communicate how good by using a standard or certification scheme. The Innsbruck games were the hardest to obtain information from, and the evaluation is based on the official report that was published after the games and other publicly available sources, many of them in German.

Oslo 2011

The Nordic World Ski Championship, Oslo 2011 was clearer in the use of certifications and promoted use of the Eco-Lighthouse certification in office and corporate event categories, as well as a focus on buying from suppliers with certifications. It will be natural for LYOG to compare themselves with Oslo 2011, as this is one of the last international winter event in

Norway. Although a senior event will attract much more people than a youth event (and the world ski championship was arranged in Oslo), the context and legislation is pretty much the same, and there could be something to learn from the environmental initiatives of the event. Being a member of the Nordic Eco-Label shopping club should be considered, as well as the Eco-Lighthouse certification. The Eco-Lighthouse is well known in Norway, but less known abroad. If LYOG wants to set an example internationally they should consider supplementing the Eco-Lighthouse with a standard that is better known in the rest of the world.

London 2012

The London games used the BS 8901, and later ISO 20121 as the core of their EMS with great success. The games set a new standard for sustainable Olympic Games. Although the magnitude of the London games is in another league than the YOG, there are several similarities between the events and lessons to be learned. The games started out as small organisation and grew to be gigantic during the games. The games at Lillehammer will of course not reach the same dimensions, but the organisation will grow towards 2016 and needs to take this into consideration when developing their EMS. London proved that ISO 20121 worked well with such a development. The LYOGOC have released a lot of documentation on their environmental strategy in addition to the ISO20121, including guidelines and reports. A challenge for the games was that they didn't start out with the ISO 20121, but developed a standard on the way.

The overall impression after studying the three events is that the London games are in a class of their own, and they should be, considering the scope and resources of this event. It is always good to learn from the best, and the amount of documentation and the ISO20121, makes it possible to learn from the London games, and build on their experience.

7.3 Lillehammer 2016

The YOG doesn't require the construction of any new venues, and the organising process is therefore far less complicated than the one for "adult" Olympic Games. The challenge for the LYOGOC will be to have a strong control of their supply chain and to develop a flexible EMS that can adapt to the continual growth that the organisation of the event will have. The event will have its biggest impact during the staging phase, and the main challenges are waste handling and water- and energy consumption. It is important that this phase is well planned and that suppliers are carefully selected. Oslo 2011 registered with the Nordic Eco-Label shopping club, and this could be something to consider for LYOG as well, to get access to their network of competence on sustainable procurement.

The range of available venues for arranging Olympic Games is obviously not very large, and the venues that are selected for the event are pretty much given ahead of the application for the event. The LYOGOC is not involved in the management of the venues and can only put pressure on them to improve their performance. The most significant environmental aspects of the venues are energy consumption related to making ice and heating of the

arenas as well as waste handling. Hafjell Alpine Center and the venues connected to the Lillehammer Olympiapark will all be certified by Eco-Lighthouse within the end of 2013. This is definitely positive since this means that the venues have taken some serious efforts to improve their environmental performance. As of today there are just three Eco-Lighthouse certified sports venues in Norway.

A cause for concern is that the most energy consuming ice halls doesn't have any certifications. They have however been upgraded with better energy management systems over the last years, and the interviews with the technical managers of the venues gave a strong impression that environmental issues were taken seriously. This can of course be just an act, but since the cost of energy is their highest expense they do have a lot to save on improving performance.

7.4 Environmental Auditing

The audit will be important for making sure that the EMS is sufficiently implemented in the organisation of the event. There are several success factors connected to the different phases of the audit. Through all the theory and standards there is an emphasis on the top management commitment and that the audit is seen as something positive within the organisation. That it is seen as value added and not wasted time.

As mentioned earlier in the evaluation, a challenge for the organisation of the event is that the organisation will grow towards the games, and this will also apply to the auditing of the EMS. The advantage of this is that the organisation can be done from scratch. This means that the EMS doesn't need to be implemented into an existing strategy, but can be established in the core of the organisation from the beginning and that employee involvement can be done already in the phase of hiring. This can secure that the hired staff takes sustainability seriously and that they are given sufficient training.

The LYOG will probably involve many young employees, who are more conscious about the environment and can come with creative input to improvements. To encourage this it is important that the employees can see that their meanings count, and could make a difference. As pointed out in the theory, staff involvement is an important success factor.

The fact that the organisation will grow and develop will make the concept of continual improvement even more important. The audit must be performed periodically to see if the EMS is capable of adapting and that the strategy is implemented sufficiently. The process will be quick, and things can easily be forgotten, and it is therefore important that a schedule for audits is established.

7.5 Certification as a means towards sustainable events

The event industry differs from other industries since it is not selling a product in physical sense. The need for a certification will therefore not be to attract more customers or increase sales. The product of LYOG is an event over two weeks and the potential customer will be the local community and possible spectators. There could of course be some people

who wouldn't go to an event without environmental certification, but it is not likely that there are too many.

The benefit of an environmental certification will be that it ensures that sufficient action is taken in accordance to arrange a sustainable event. An EMS that complies with the requirements of a good environmental certification scheme will make sure that all the environmental aspects of the event is planned for and that the needed measures are taken to deal with this. The economic benefit will come from better control of resources like energy and thus money saved.

The most important about a certification is not the label itself, but the assurance that the event is sustainable in all three dimensions: Economic, social and environmental. This is of course the case with all companies, but especially events since they don't use the certification as promotion in the same degree.

7.6 Summary of discussion

Overall the ISO20121 is the most relevant standard for an event since it is designed especially for this cause. The Eco-Lighthouse and EMAS has been successfully used in other events and would probably be good alternatives. The Eco-Lighthouse probably has the lowest threshold for implementation because of its specified requirements compared to the other standards that leave more of the planning up to the organizers themselves. The Eco-Lighthouse also differs from the ISO-standards since it doesn't require an environmental policy. If a company has developed an EMS that meets the requirements of ISO 20121 or ISO 14001 it will probably be very close to the requirements of the Eco-Lighthouse.

The evaluated events where all very environmentally conscious, but communicated this differently. The Oslo games showed that the Eco-Lighthouse worked well for arranging bigger winter events, and the London 2012 was the catalyst for the development of ISO 20121. The big amount of released documentation from the London games makes it a good resource for the development of an own event.

The research could have included more events to have a broader basis for comparison, but because the development within the sustainable events industry has been so swift over the last few years, major events from the last two years were chosen.

The audit will be extra important for the successful implementation of the EMS because of the constant growth of the event organisation. The focus on continual improvement and PDCA will be important to secure internal audit programs and auditing procedures to be implemented.

A certification of environmental performance will first of all be an assurance that the event is taking its measures to be sustainable in all three dimensions, and not so much a tool for promoting the product.

8. Conclusion and recommendations

This thesis recognizes the ISO 20121 as the most relevant standard for an event like the YOG. Despite its low age, the standard passed the test of the 2012 London Olympics with flying colours. The fact that it is backed by the International Organisation for Standardisation, who has long experience with environmental standards through the ISO 14000-series, strengthens the impression.

Although it isn't eligible for a third party certification in Norway it is recommended that the EMS of LYOG is based on this standard. After all the most important part is that the EMS of the organisation is able to control the environmental aspects of the event, and to minimize its impact.

Should the LYOGOC, however, wish to get a third party certification and the right to put a label on their wall, the proper implementation of ISO 20121 will bring them very close to the requirements of the Eco-Lighthouse certification, and the cost of the Eco-Lighthouse is not significant. The Eco-Lighthouse certification is not known outside Norway, but would send a signal to the local community, who also is one of the most obvious customer and stakeholder.

To ensure that the EMS is implemented properly throughout the life cycle of the event, it is important that this is done from the beginning of the planning of the event and that periodical audits that involve the entire organisation are performed at all stages of the event.

8.1 Suggestions on future work

Since the LYOGOC wants to involve young people in the event organisation, the implementation of the EMS could be audited by another master student at the HSE program at NTNU, as a second party confirmation of conformity.

9. Bibliography

- Berg, B., 2009. *Qualitative Research Methods for the social sciences*. Boston: Allyn & Bacon.
- Bryman, A., 2008. *Social Research Methods*. 3 ed. s.l.:Oxford University Press.
- BSI, 2012. *www.bsigroup.com*. [Online]
Available at: <http://www.bsigroup.com/en-GB/iso-14001-environmental-management/>
[Accessed November 2012].
- Darnall, N. & Edwards Jr, D., 2006. Predicting the cost of environmental management system adoption: the role of capabilities, resources and ownership structure. *Strategic Management Journal*, Januar.
- Department for Environment, Food and Rural Affairs, 2011. *gov.uk: National Sustainable Public Procurement Programme*. [Online]
Available at: <http://sd.defra.gov.uk/documents/NSPPP-LA-mod2-EcoLabelsHandout.pdf>
[Accessed 2 June 2013].
- Eilperin, J., 2010. Environmental certification becoming and increasingly crowded and contested field. *The Washington Post*, 3 May.
- European Commission, 2011. *A renewed EU strategy 2011-14 for Corporate Social Responsibility*, Brussels: European Commission.
- Ferdinand, N. & Kitchin, P., 2012. *Events Management: An International Approach*. London: Sage Publications Ltd..
- Fink, A., 2010. *Conducting Research Literature Reviews*. 3. ed. s.l.:Sage.
- Flick, U., 2009. *An Introduction to Qualitative Research*. 4 ed. s.l.:Sage Publications Ltd.
- Furrer, P., 2002. Sustainable Olympic Games, A dream or a reality. *Bollettino della Società Geografica Italiana*, April.
- Getz, D., 1991. *Festivals, special events and tourism*. New York: Van Nostrand Reinhold.
- Handfield, R., Sroufe, R. & Walton, S., 2005. Integrating Environmental Management and Supply Chain Management. *Business Strategy and the Environment*, Issue 14, pp. 1-19.
- Hohnen, P., 2007. *Corporate Social Responsibility: An Implementation Guide for Business*, s.l.: International Institute for Sustainable Development.
- International Council on Systems Engineering, 2003. *INCOSE Systems Engineering Handbook v.3*. s.l.:International Council on Systems Engineering.
- IOC, 1999. *Olympic Movement's Agenda 21*, s.l.: s.n.
- IOC, 2010. *Guide on Environmental Management*. s.l.:s.n.

IOC, 2012. *Factsheet Legacy of the Games*. s.l.:s.n.

IOC, 2012. *Factsheet Youth Olympic Games*. s.l.:s.n.

ISO/TC 176; ISO/TC207, 2002. *ISO19011:2002 Guidelines for quality and/or environmental management systems auditing*. s.l.:Standard Norge.

ISO/TC207, 2000. *ISO 14020:2000*. s.l.:s.n.

ISO/TC207, 2004. *ISO 14001:2004*. s.l.:Standard Norge.

ISO, 1996. *ISO 14004*. s.l.:ISO.

ISO, 2010. *NS-ISO 26000*. s.l.:Standard Norge.

ISO20121, n.d. <http://www.iso20121.org/>. [Online]
Available at: <http://www.iso20121.org/>
[Accessed May 2013].

ISO, 2012. *ISO 20121*. s.l.:Standard Norge.

IYOGOC, 2012. *Innsbruck 2012 Official Report*, s.l.: s.n.

Kaplinsky, R. & Morris, M., 2002. *A handbook for value chain research*. s.l.:Institute of Development Studies.

Kates, R. W., 2010. *Readings in Sustainability Science and Technology*. s.l.:Center for International Development at Harvard University.

Lambert, G., 2013. *Iso.org*. [Online]
Available at:
http://www.iso.org/iso/home/news_index/news_archive/news.htm?refid=Ref1690
[Accessed 24 May 2013].

LOCOG Sustainability team, 2012. *Pre-games Sustainability report, Delivering Change*, s.l.: s.n.

LOCOG, 2011. *Sustainable Sourcing Code*, s.l.: s.n.

LYOGOC, 2012. *2nd Winter Youth Olympic Games 2016 in Lillehammer; Report to the 124th IOC session*, s.l.: s.n.

Mackay, D., 2012. *www.insidethegames.biz*. [Online]
Available at: <http://www.insidethegames.biz/olympics/youth-olympics/2012/15420-innsbruck-2012-olympic-village-officially-opened>
[Accessed 20 May 2013].

Melnyk, S. A., Sroufe, R. P. & Calantone, R., 2003. Assessing the impact of environmental management systems on corporate and environmental performance. *Journal of Operations Management*, May, pp. 329-351.

Miljøfyrtårn, n.d. *Bransjekrav*. [Online]
Available at: <http://www.miljofyrtarn.no>
[Accessed 25 April 2013].

Miljøfyrtårn, n.d. *Om Stiftelsen*. [Online]
Available at: <http://www.miljofyrtarn.no>
[Accessed 25 April 2013].

Mills, M., Bunt, G. G. v. d. & Bruijn, J. d., 2006. *Comparative Research Persistent Problems and Promising Solutions*. s.l.:Sage.

Mindtools.com, n.d. *www.mindtools.com*. [Online]
Available at: <http://www.mindtools.com/pages/article/gap-analysis.htm>
[Accessed November 2012].

Myrholt, O., 2013. *Overordnet Miljøstrategi Oslo2022*. Oslo: Oslo Kommune.

Norges Idrettsforbund, 2010. *Lillehammer 2016 Candidature file*. s.l.:s.n.

Oslo 2011 Environment Committee, n.d. *Oslo 2011 Environment plan*, s.l.: s.n.

Patton, M. Q., 2001. *Qualitative Research & Evaluation Methods*. 3. ed. s.l.:Sage publications.

Purdue University, n.d. *Research: College of Engineering: Initiatives: System of systems*. [Online]
Available at: <https://engineering.purdue.edu/Engr/Research/Initiatives/SoS>
[Accessed May 2013].

Stuart, R., 2000. Environmental management systems in the 21st century. *Chemical Health and Safety*, November-Desember, pp. 23-25.

Svanemerket, 2012. *ABC om merkeordninger*. [Online]
Available at: <http://www.svanemerket.no/om-svanemerket/livslopet/svanemerket/abc-om-merkeordninger/>
[Accessed 10 June 2013].

The Economist Intelligence Unit, 2008. *Doing Good; Business and the sustainability challenge*. s.l.:s.n.

Tinnish, S., 2012. *Barriers and Enablers to the Adoption of the ISO 20121 Standard for Event Sustainability Management*, s.l.: s.n.

TOROC, 2004. *Guidance document on the implementation of EMAS in sporting events*. Torino: s.n.

UN Global Compact, 2013. *Home: About Us*. [Online]
Available at: <http://www.unglobalcompact.org/AboutTheGC/index.html>
[Accessed 29 May 2013].

United States Environmental Protection Agency, n.d. *www.epa.gov*. [Online]
Available at: <http://www.epa.gov/sustainability/basicinfo.htm>
[Accessed December 2012].

Watts, P. & Holme, L., 2000. *Corporate Social Responsibility*, s.l.: World Business Council for Sustainable Development.

WCED, 1987. *Our Common Future*, s.l.: Oxford University Press.

Welford, R., 1998. *Corporate Environmental Management; Systems and Strategies*, London: Earthscan Publications Ltd.

Yin, R. K., 2003. *Case study research design and methods*. 3. ed. s.l.:Sage.

Appendix A: Stadium visits YOG Lillehammer 2016

The stadium tour was performed on Thursday the 21th and Friday the 22nd of March. The scope of the stadium tour was to establish a deeper understanding of each venue and the field of use under the youth Olympic Games. At each venue the researchers met with one, or several, personnel from the venue visited. The respondent gave an introduction of the site and specific data, before the researchers started a semi-structured interview. The main content of each interview is given below in table 1. This is a summary of the key information acquired.

Table 1: Key questions of interviews

Nr.	Question
1	What is the most significant environmental aspect at the venue?
2	How are these aspects measured and controlled?
3	What is done to reduce the given values measured?
4	Is there any form of documentation of environmental performance at the site?
5	Does the site have an environmental certification?
6	Does the site have a plan to improve the environmental performance within the next three years?
7	What can be done to improve the environmental performance?
8	Are there any weaknesses at the arena?

Program

21.03.2013 Thursday:

10.30-12.00 Hamar Olympic Hall, "The Viking Ship"

14.00-15.30 Gjøvik Olympic Cavern Hall

22.03.2013 Friday:

09.00-10.45 Håkon Hall

11.00-11.35 Lysgårdskene Ski Jumping Arena

11.45-12.45 Birkebeineren Ski Stadium

13.30-14.30 Lillehammer Olympic Bobsleigh and Luge Track, Hunderfossen

15.30-17.30 Meeting with Inge Aarhus, director at Environment Lillehammer, and Kristin Nilseng, chief of staff and Coordination.

Hamar Olympic Hall "The Viking Ship"

The venue will be used for speed skating under the youth Olympic Games. The competitions will be performed on the 26th, 27th and 29th of February.

Interviewing object: Viggo Sundmoen, managing director at Hamar Olympiske Anlegg (HOA)

What is the most significant environmental aspect at the venue?

- Energy consumption due to heating of air and cooling of the ice
- Water consumption due to ice production, showering etc.
- Waste generation due to spectators
- Ammoniac and brine due to the cooling of ice
- The stadium is also placed next to a bird's reservation area

How are these aspects measured and controlled?

The amount of energy, water, ammoniac and brine is measured and noted electronically.

Waste generation is handled by HRR (Hedmark Renovation and Recycling)

What is done to reduce the given values measured?

The site has a strategy to reduce consumption of energy (ENØK)

Is there any form of documentation of environmental performance at the site?

Environmental performance is published in the annual report to the municipality of Hamar, based on the accounting measures of consumption.

Does the site have an environmental certification?

No certification at the given time, and it is not planned achieve one within the next three years either.

Does the site have a plan to improve the environmental performance within the next three years?

There are several investments planned towards 2020

What can be done to improve the environmental performance?

The site has undergone a lot of improvement over the past years. The policy is to always have a continuous improvement.

Are there any weaknesses at the arena?

No certification

Gjøvik Olympic Cavern Hall

The venue will be used for short track under the youth Olympic Games. The competitions will be performed on the 28th of February and the 1th of March.

Interviewing object: Anders Motrøen, Driftsleder at Gjøvik Olympic Cavern Hall

What is the most significant environmental aspect at the venue?

- Energy consumption due to heating of air and cooling of the ice
- Water consumption due to ice production, showering etc.
- Waste generation due to spectators
- Ammoniac and brine due to the cooling of ice

How are these aspects measured and controlled?

The amount of energy is tracked through Eidsiva's network portal

Water, ammoniac and brine is measured and noted manually.

Waste generation is handled by GLØR (Gjøvik Lillehammer and Øyer Renovation)

What is done to reduce the given values measured?

It is installed frequency regulation on the ventilation system.

Is there any form of documentation of environmental performance at the site?

Internal control

Does the site have an environmental certification?

No certification at the given time, it is however a wish to get an environmental certification in the near future.

Does the site have a plan to improve the environmental performance within the next three years?

Evaluating the possibilities to achieve an environmental certification, need managed light steering and improved surveillance of the energy consumption at the site.

What can be done to improve the environmental performance?

Light regulations and improved surveillance of energy consumption

Are there any weaknesses at the arena?

No certification and old light installations

Håkons Hall

The venue will be used for the Culture and Education programme and dining hall for the participants under the youth Olympic Games. The venue will be used every day throughout the event period, from the 26th of February to the 6th of March.

Interviewing object: Frode Linnerud and Roar Olsen

What is the most significant environmental aspect at the venue?

- Energy consumption due to heating of air
- Waste generation due to dining and stand activities
- Procurement of food

How are these aspects measured and controlled?

Energy consumption is tracked.

Waste consumption needs to be arranged with GLØR and the LYOGOC in the event period.

Procurement of food is not settled yet, an alternative could be the catering firm stationed in the arena?

What is done to reduce the given values measured?

Tracing of energy consumption is acquired to manually judge witch of the 8 levels of the ventilation system (four aggregates with two levels each) that should be used at the given time.

Is there any form of documentation of environmental performance at the site?

The environmental performance is communicated through reports to the board at Olympiaparken. Yearly report to "Eco-Lighthouse".

Does the site have an environmental certification?

"Eco-Lighthouse" certified in 2012 and "Grønt punkt"

Does the site have a plan to improve the environmental performance within the next three years?

Oil heating will be replaced with district heating.

What can be done to improve the environmental performance?

"Earth heating", light technology, frequency convertor on the ventilation system

Are there any weaknesses at the arena?

Not mentioned

Lysgårdskene Ski Jumping Arena and Kanthaugen freestyle arena

The venues will be used for the ski jumping and half pipe competition under the youth Olympic Games. The ski jumping competition is placed of the 2nd and 4th of March. The half pipe competitions will be used on the 29th of February and 3rd of March.

Interviewing object: Olaf Pedersen

What is the most significant environmental aspect at the venue?

- Water consumption due to building the half pipe.
- Energy consumption due to lighting of the outdoor arena. The Competitions will however, most likely, be performed in daylight.
- Waste generation from spectators.

How are these aspects measured and controlled?

Energy consumption is tracked.

No tracing of water consumption in connection to building the half pipe

Waste consumption needs to be arranged with GLØR and the LYOGOC in the event period.

What is done to reduce the given values measured?

Planned LED-lighting, 4 levels on lighting, waste sorting.

Is there any form of documentation of environmental performance at the site?

The environmental performance is communicated through reports to the board at Olympiaparken, and eventually through the Eco-Lighthouse requirements.

Does the site have an environmental certification?

“Eco-Lighthouse” is planned in 2013

Does the site have a plan to improve the environmental performance within the next three years?

LED-lighting. The profile on the small ski jump will be changed.

What can be done to improve the environmental performance?

Insulation of the school building.

Are there any weaknesses at the arena?

Not mentioned

Birkebeineren Ski Stadium

The venues will be used for the cross-country, biathlon and combined CC competitions under the youth Olympic games. The cross-country competitions is placed of the 28nd and 29th of February (optional dates are given to 1st and 4th of March). The Biathlon competitions will take place on the 1th, 3rd, 4th and 5th of March. The combined CC will take place on the 6th of March.

Interviewing object: Lars Nes

What is the most significant environmental aspect at the venue?

- Making tracks in the slopes.
- Water consumption due snow production (not likely)
- Energy consumption due to lighting of the outdoor arena. The Competitions will however, most likely, be performed in daylight.
- Waste generation from spectators.

How are these aspects measured and controlled?

The environmental performance is communicated through reports to the board at Olympiaparken, and eventually through the Eco-Lighthouse requirements.

What is done to reduce the given values measured?

Litra gathering of shell cases and lead. The new Snow Groomers meets the requirements.

Is there any form of documentation of environmental performance at the site?

The environmental performance is communicated through reports to the board at Olympiaparken, and eventually through the Eco-Lighthouse requirements.

Does the site have an environmental certification?

“Eco-Lighthouse” is planned in 2013

Does the site have a plan to improve the environmental performance within the next three years?

New bullet catchers at the shooting range

What can be done to improve the environmental performance?

LED-lighting at the central area of the arena

Are there any weaknesses at the arena?

Not mentioned

Lillehammer Olympic Bobsleigh and Luge Track, Hunderfossen

The venue will be used for bobsleigh and skeleton under the youth Olympic games. The competitions will be performed on the 26th, 27th and 29th of February.

Interviewing object: Jan Oddvar Tangen,

What is the most significant environmental aspect at the venue?

- Energy consumption due to cooling of ice on the track
- Water consumption due to ice production
- Ammoniac due to the cooling of ice
-

How are these aspects measured and controlled?

The amount of energy, water, ammoniac and brine is measured and noted electronically.

What is done to reduce the given values measured?

Recently improved management system of the cooling machine

Is there any form of documentation of environmental performance at the site?

The environmental performance is communicated through reports to the board at Olympiaparken, and eventually through the Eco-Lighthouse requirements.

Does the site have an environmental certification?

“Eco-Lighthouse” is planned in 2013

Does the site have a plan to improve the environmental performance within the next three years?

LED lighting on the track is planned in the summer of 2013

What can be done to improve the environmental performance?

The site has undergone a lot of improvement over the past years. The policy is to always have a continuous improvement.

Sites not visited but, included in the event period

Hamar Olympic Amphitheatre

Usage: figure skating

Days in use: 2

Certified: No certification

Similar to: Hamar Olympic Hall, "The Viking Ship"

Kristin Hall

Usage: hockey and Curling

Days in use: 4

Certified: Planned in 2013

Similar to: Hamar Olympic Hall, "The Viking Ship"

Lillehammer Olympic Alpine Centre, Hafjell

Usage: Alpine skiing, freestyle (ski-cross and snowboard slope style)

Days in use: 7

Certified: Planned in 2013

Similar to: Birkebeineren ski stadium

Lillehammer Olympic Park

Usage: Opening/closing ceremony. Including medal ceremony

Days in use: 10

Certified: Not certified

Similar to: place is not given at the moment