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BREEAM NOR

&

NORDIC SWAN

NORWAY'S MAIN ECOLABELS:

A COMPARISON

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AAR4817 Zero Emission Buildings Theory – Dr. Aoife Houlihan Wiberg

Summary of paper

This paper is about certification schemes in Norway. At first, there is an explanation of what a certification scheme actually is and there will be an overview of some very important schemes from all over the world.

After that, the focus will be on Norway. Norway has an ecolabel for products, Nordic Swan, but it can be awarded to certain building types as well now. There is an introduction to the process of being awarded, the different criteria will be given and also some examples.

At the moment, there is also a certification scheme for buildings under development. It is called BREEAM NOR and it is an adaptation of the previous existing BREEAM scheme that originates from the U.K. There will be an explication of the application procedure and the criteria as well, however, extra attention will be given to the modifications that were made when changing from the original to the Norwegian version.

In the end we can say that they have a very similar system, but that they are very different when it comes to requirements as Nordic Swan is still mainly used for products. They are both very useful, necessary and complementary, although improvements for the future should still be made as well.

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1. Introduction

In this paper, a comparison will be made between different ecolabels/certification schemes. A certification scheme is a way of assuring that a product, production process or building meets a certain standard when it comes to reducing the negative environmental impact. The level of environmental impact is determined by taking into consideration different criteria, which can differ per certification scheme. Many environmental assessment tools have been developed over the past ten to twenty years. This is because the awareness for environmental issues has grown a lot during this period of time.

When a certification scheme has been completed successfully and has reached the demanded standard, this gets validated by an award.

This paper will have the following structure:

- At first, a general explanation of ecolabels and their organisation will be given, followed by an overview of some very important labels worldwide. This will include ecolabels for products as well as for buildings.
- Secondly, two ecolabels of Norway will be discussed in depth, covering the way they work and their criteria. Relevant case studies are included to illustrate each label.
- Then, a comparison of the two will be made. What are the differences and similarities? How do they complete each other? What are the strong and weak points? Those are some of the questions we hope to solve.
- In the end, a conclusion will be drawn and future perspectives will be discussed.

2. Certification schemes and ecolabels

In this paragraph, there will be a short introduction to some of the most important ecolabels and certification schemes. To understand how they work, a distinction has to be made between process based schemes and performance based schemes.

Process based schemes are all about environmental management. A yearly report is written where the performance of the building is compared against itself over time.

A performance based scheme, on the other hand, measures the performance of the building or product against a fixed checklist of benchmarks. This benchmark is a performance indicator, a measurable line of the environmental impact.

Most of the certification schemes are hybrid.

Overview

Green Globe (International): The Green Globe is a worldwide certification standard that encourages sustainable development and operations. It was founded in 1993. It consists of 41 categories, of which the main ones are sustainable management, social/economic impact, cultural heritage and environmental impact. Quantitative data are set as benchmarks. The performance is compared to products/buildings with similar standards. There is a third-party independent auditor.

EU Flower (European): The EU Flower ecolabel was established in 1992 to encourage products and processes to meet higher standards of environmental performance voluntarily. This is a process based-only scheme that doesn't use benchmarks. It can be awarded to products ranging from washing liquid to buildings. There are different categories: energy, water, chemicals, management, waste and other. They consist of both mandatory and optional requirements with a total of 84. The categories cover the whole life cycle of the products. This ecolabel is not as rigorous yet as it should be. There is an independent 3rd party.

LEED (United States): The Leadership in Energy and Environmental Design certification was founded by the U.S. Green Building Council in 1998 to design and operate buildings with a better environmental performance. There are several rating systems, such as LEED for New Construction, for Existing Buildings, for Commercial Interiors, for Homes, for Core Shells and for Neighbourhood Developments. There are six categories in which the building can score points. There are mandatory and optional points (69 in total), and when a certain number is reached, the building gets certified. When a building performs better than just the criterium to get certified, it can get the Silver, Golden or Platinum award. The six important categories of certification are: sustainable sites, water efficiency, energy and atmosphere, materials and resources, indoor environmental quality and innovation in operation. Of course there is a third party here too.

BREEAM (U.K.): BREEAM was established in the U.K. in 1990 as a voluntary measurement rating for green buildings by BRE (Building Research Establishment). Since then, its importance has grown a lot and especially in Europe. Several national adaptations have been made, such as a Norwegian version, which will be presented in the next paragraphs. Although LEED and BREEAM have the same target, they are quite different: 34% of the BREEAM requirements are not in LEED and 16% of the LEED requirements are not in BREEAM.

CASBEE (Japan): CASBEE (Comprehensive Assessment System for Building Environmental Efficiency) is a Japanese assessment and rating tool for buildings and the built environment, launched in 2001. Like the LEED certification (they are very similar) there are different rating systems such as CASBEE for Existing Buildings, New Construction, Renovation, Urban Development etc. English manuals have been released as well. There are four assessment fields: energy efficiency, resource efficiency, local environment and indoor environment.

Green Star (Australia): This voluntary environmental rating system was established in 2003 for buildings by the Australian Building Council. There is a total of 100 points, and according to how high the building scores, a Best Practice, Australian Excellence or World Leadership certification can be obtained.

As a general critique on this certification schemes we see that in certain cases an award can be reached, while the scores on the energy criteria are bad. In the future, they should be adapted so that the energy criteria and CO₂ emission criteria are mandatory in every scheme.

3. Norway

As an exchange student trying to learn as much as possible about Norway, I decided to focus mainly on the most important ecolabel for products (and buildings) and certification system for buildings in Norway. The ecolabel that will be discussed is Nordic Swan. Nordic Swan is the official regional label for the Nordic Countries (Norway, Sweden, Denmark, Finland and Iceland) and was established in established in 1989 by the Nordic Council of Ministers. The most important green certification system for buildings in Norway is BREEAM NOR, which is a version of BREEAM International especially adapted to the national Norwegian conditions and climate.

At first, there was a discussion whether to adapt LEED or BREEAM to Norway. BREEAM turned out the easiest one to adapt because of the differences between Europe and the United States (f.e. concerning materials and vegetation).

They are both very interesting to take a closer look at, because BREEAM NOR (2011) is so recent that it is still under development (a draft version has been made now), and Nordic Swan for buildings is also quite recent. It was possible for hotels first, and in December 2003, criteria for small houses were established (this are the ones that will be discussed further), with a first background document published in 2005.

4. BREEAM NOR

Introduction

Since its establishment in 1990, BREEAM (Building Research Establishment Environmental Assessment Method) had certified 200.000 buildings. It has become one of the most widely used measures for the environmental performance of a building. The general version that will be discussed here, is based upon the recent 'BREEAM Technical Manual – New Construction' of 2011 (New Construction is one of the rating schemes). Throughout the years, BREEAM has been adapted to make country specific schemes, such as BREEAM for Spain, The Netherlands, and most recently Norway. BREEAM NOR is still under development, but a draft version is already available (October 2011).



Process

When applying for a BREEAM Certification, one must be able to complete an application with a lot of criteria in several categories in order to deal with environmental issues on a global, local and indoor impact level. BREEAM New Construction consists of nine environmental categories and a tenth category for Innovation. Each of the categories consists of requirements. Credits are assigned to the categories. Some of the credits are obligatory and some are optional. In general, the more important the requirement is, the more credits are attached to this. The number of credits that is obtained in the end, demonstrates the performance level of the building and are translated into an overall BREEAM rating. The credits benchmarks for each rating are as seen in the following table.

BREEAM Rating	% score
OUTSTANDING	85
EXCELLENT	70
VERY GOOD	55
GOOD	45
PASS	30
UNCLASSIFIED	<30

There are two assessment stages: The Design Stage and the Post Construction Stage.

The assessment process is controlled by an independent third party auditor, called the BREEAM Assessor (These Assessors get licensed).

In general, BREEAM certificates do not expire. This means that one has to be careful: a building that was excellent 5 years ago might not be anymore today. But there are some exceptions. BREEAM In-Use Certificates (this is a scheme to help building managers reduce the running costs and improve the environmental performance of existing buildings) expire after three years (for single asset assessments).

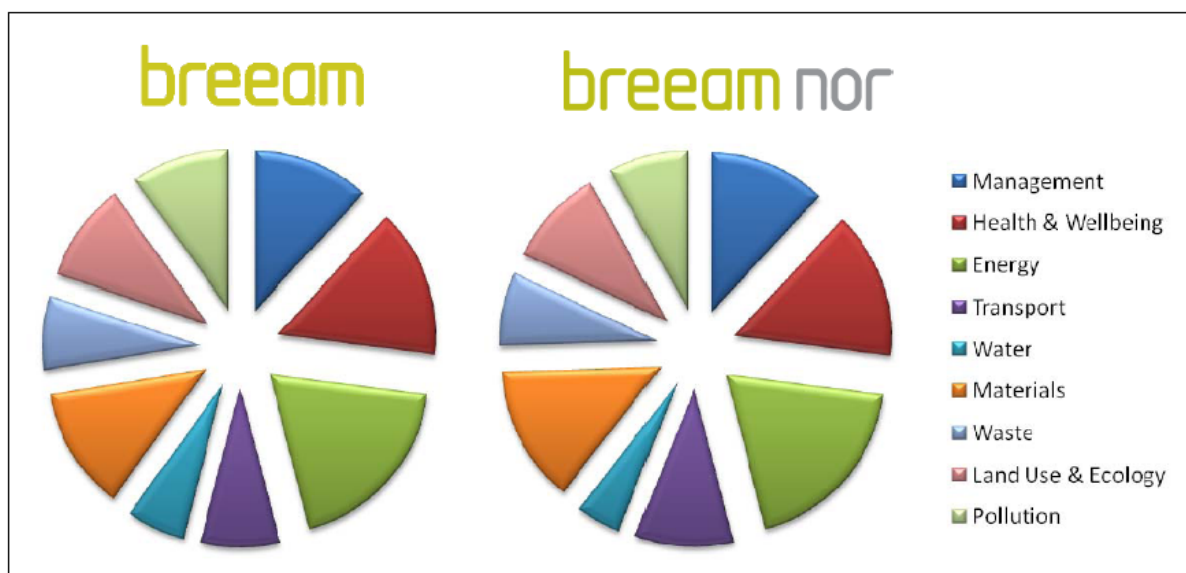
Requirements and criteria

The main categories in BREEAM (New Construction 2011) are as listed below.

1. Management
2. Health and wellbeing
3. Energy
4. Transport
5. Water
6. Materials
7. Waste
8. Land use and ecology
9. Pollution
10. Innovation

Each of them is further divided into several criteria subjects, and to each of those a certain amount of credits is attached.

As we can see on the following charts, some of the weighing factors (percentage of credits attached to each category) are adapted for the Norwegian version.



A part of the content and regulations has been adapted as well, but standards were only raised (more severe). Some examples of this are:

- Hea 08: Indoor Air Quality
This requirement has been made more severe and one credit extra is added.
- Hea 09: Pollutants in the indoor environment
One product has been added and it has been stated that building materials for new buildings in Norway need to be of class M1 (emission class) or better.
- Hea 13: Acoustic performance
This is adapted to the Norwegian standard NS8175.

- Hea 20: Moisture protection

This is a completely new requirement that was added.

- Ene 01: Energy efficiency (this is the most important one: 15 credits)

This requirement has a higher threshold than in the BREEAM International version. It is more ambitious.

- Ene 05: Energy supply with low climate gas emissions

This requirements wasn't stated as individually as in the Norwegian version yet. It has become more important.

- Ene 23: Energy performance of building structure

This is completely new as well and based on 'Prosjektrapport 42' by SINTEF.

- Mat 01: Materials specification

Also this category has been made more severe for Norway. Swan labelled products (see next paragraph) are ok to use without further checking.

Examples

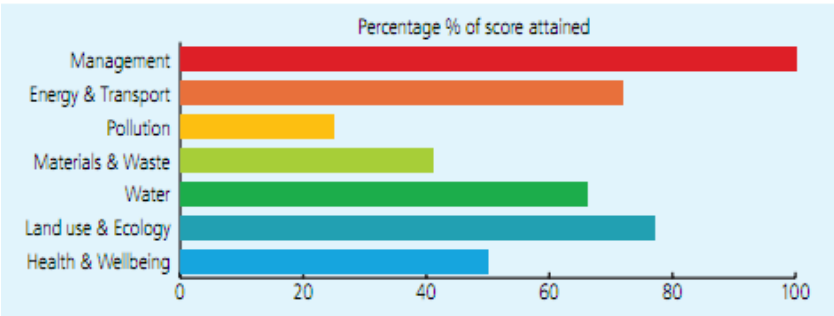
As BREEAM NOR is still under development, there are no examples of Norwegian buildings with this certification yet. However, as the UK version is so similar, it is possible to show 2 small dwelling projects that won a BREEAM award in the category 'Code for Sustainable Homes'.

In 2008, 2 attached houses at 32 & 33 Tewitt Close Windmill View, Illingworth won the award. They were the first real homes to be certified with the Code for Sustainable homes, which was launched in April 2007.



Some of the techniques that were used to make this sustainable homes include: solar panels, an air heat pump, water-saving measures such as controlled flow rate taps, improved U-values for the windows and external doors, and the use of Green Guide-rated materials.

On the following chart, we can see how well the houses scored in each category.



In 2011, the award was won by a new dwelling on 103 Tindal Street Birmingham, which retains the façade of a pre-existing Victorian terrace.

This was the first zero-carbon house in the U.K. that was created by renovating an existing building. PV-panels generate the electricity.



5. Nordic Swan

Introduction

The Nordic Swan ecolabel covers a whole range of products and processes that can be certified. It can vary from furniture, office machines and equipment, cleaning products, detergents, building materials, paints, fuels, tyres, toys, lawn mowers and so on. There are 67 different product groups in total. It is also possible to label hotels and, more recently, some other buildings too. The label is usually valid for three years. After this time, the company must re-apply.

The rating system that will be discussed from now on is Version 2.2 of 'Nordic Ecolabelling of Small Houses, Apartment Buildings and Pre-School Buildings', valid from 15th of December 2009 until 31st of December 2014.



Process

In order to get the Nordic ecolabel, several criteria are taken into consideration. Some requirements are obligatory (O): they must always be met. There are also point score requirements (P). The minimum total score has to be reached (9 out of 22 or 40%).

The application is done by sending it to the Nordic Ecolabelling office of the country in which the building will be sold. (In Norway this is done by The Foundation for Ecolabelling, in Sweden by Ecolabelling Sweden AB, in Denmark by Ecolabelling Denmark at the Danish

Standards Foundation, in Finland by Finnish Standards, and in Iceland by the Environment Agency that operates under the direction of the Ministry for the Environment.) This contains a completed application form and all the documentation that is required to prove that the criteria have been fulfilled.

After the application, the Nordic Ecolabelling does a severe inspection. They check the procedure of the applicant, the material lists, the data used for calculation, test records and many more documents that had to accompany the application. An independent third party organisation verifies if everything is correct.

There are some costs to get the ecolabel: an application fee is charged and there is also an additional annual fee.

Requirements and criteria

An overview of the requirements and their main content will follow.

1. Overall requirements for the licence applicant

These requirements are about the general description of the building and the responsibility for the construction process.

2. Energy and indoor environment

1. Energy

There are criteria and points for the air tightness, energy consumption, light sources, low-flow showers and taps.

2. Indoor environment

This section covers the ventilations requirements, daylight factors, illumination intensity, and demand-controlled lighting.

3. Material requirements

1. Chemical building products

A material safety data sheet has to be made, a classification, certain substances are prohibited, there is an obligation how these products must be handled.

2. Chemical substances permanent building products

There is a list of substances that are prohibited.

3. Timber and fibre-based materials

The wood material has to be derived from sustainable sources (certified forests).

4. Other requirements on building products, materials and interiors

These are requirements for cladding and roofing, windows and exterior doors, containers, waste recycling stations.

4. Quality management and control of the construction process

1. Requirements on the construction process

There are a lot of obligated requirements in this section. They concern management of building waste, measurement of waste fraction protection from damp, approved water installations, inspections during construction and of the finished building, and a quality control.

2. Points score

Apart from the obligated criteria, at least 9 out of the 11 points have to be gained by the applicant.

3. Quality management

There must be a quality management system that takes care of providing information to parties involved in the construction process, laws and regulations, complaints etc.

5. Instructions to residents/property managers

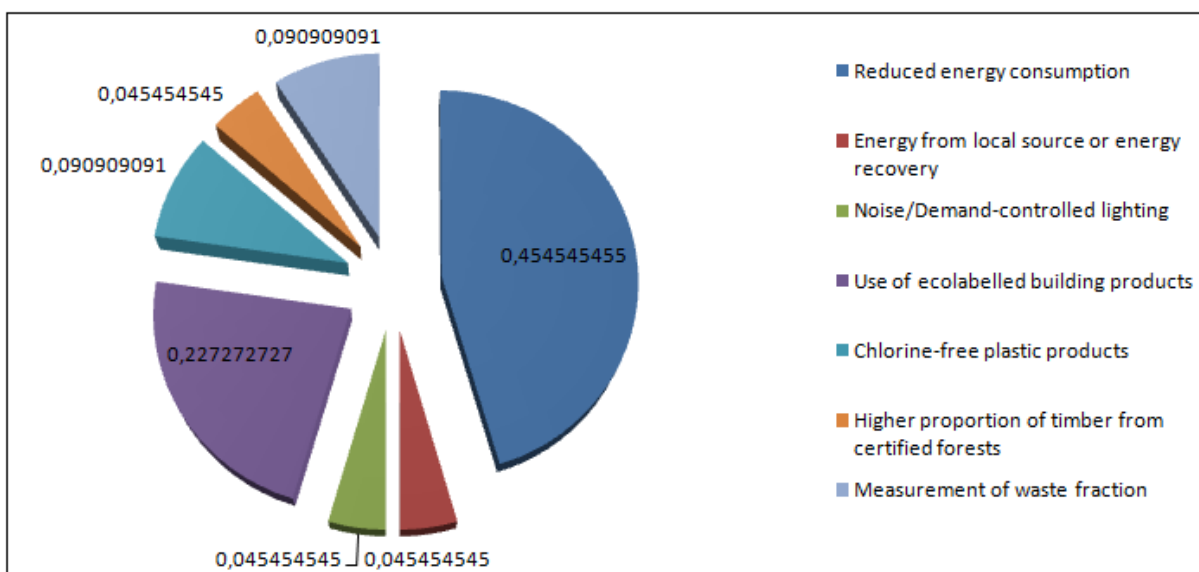
A general information and maintenance plan has to be prepared.

6. Appendices 1 – 15

There must be additional appendices to the application. They consist of a list of materials, usage of ecolabelled products, the calculation of the daylight factor, declarations regarding (chemical products) and substances, and the quality controls that have to be performed by the independent third party.

Overview of available points score		
	<u>Points</u>	<u>Percentage</u>
Reduced energy consumption	10	0,454545455
Energy from local source or energy recovery	1	0,045454545
Noise/Demand-controlled lighting	1	0,045454545
Use of ecolabelled building products	5	0,227272727
Chlorine-free plastic products	2	0,090909091
Higher proportion of timber from certified forests	1	0,045454545
Measurement of waste fraction	2	0,090909091
Total	22	1

When an overview of the available points is made, we can see that half of these points are regarding the energy: reduced energy consumption + energy from local energy source or energy recovery.



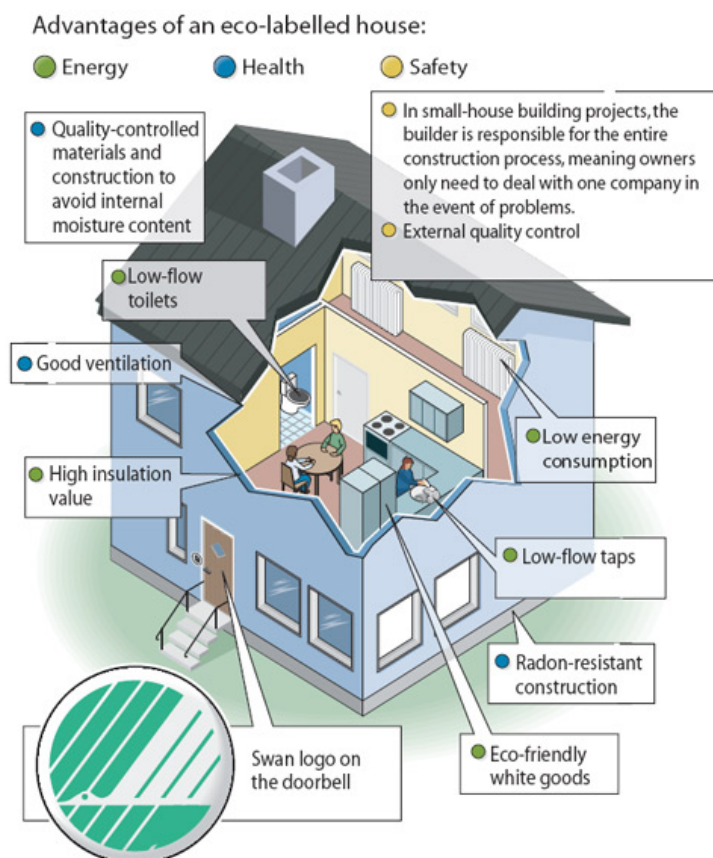
Examples

The Nordic ecolabel is still mainly used for products, and there are not many examples of labelled buildings yet. In Sweden however, there is a project that is called Veidekke's TellHus ('The Climate Intelligent House'), which works with the Nordic Ecolabel. The energy requirement for a Swan apartment can be 55 to 65 kWh per square meter of heated area at most. This provides both low heating costs and reduced CO₂ emissions.

The first apartments are under construction now.

There are a lot of measures to make this an eco-friendly building. They include:

- Very good insulation in walls and ceilings and windows with super-insulating glass
- A display that shows the energy consumption
- A central switch to turn off machines with a stand-by function
- Balanced ventilation with heat recovery
- Environmentally-friendly concrete and low-carbon cement



In Norway, there was a single dwelling project finished in 2007 in Lommedalen near Oslo. This was the first Swan-marked house in Norway (there were already Swan-marked houses in Sweden and Denmark). In this building, the thermal bridges are minimized and heat recycling and solar technology is used. Also, only eco-friendly materials are used for the construction.

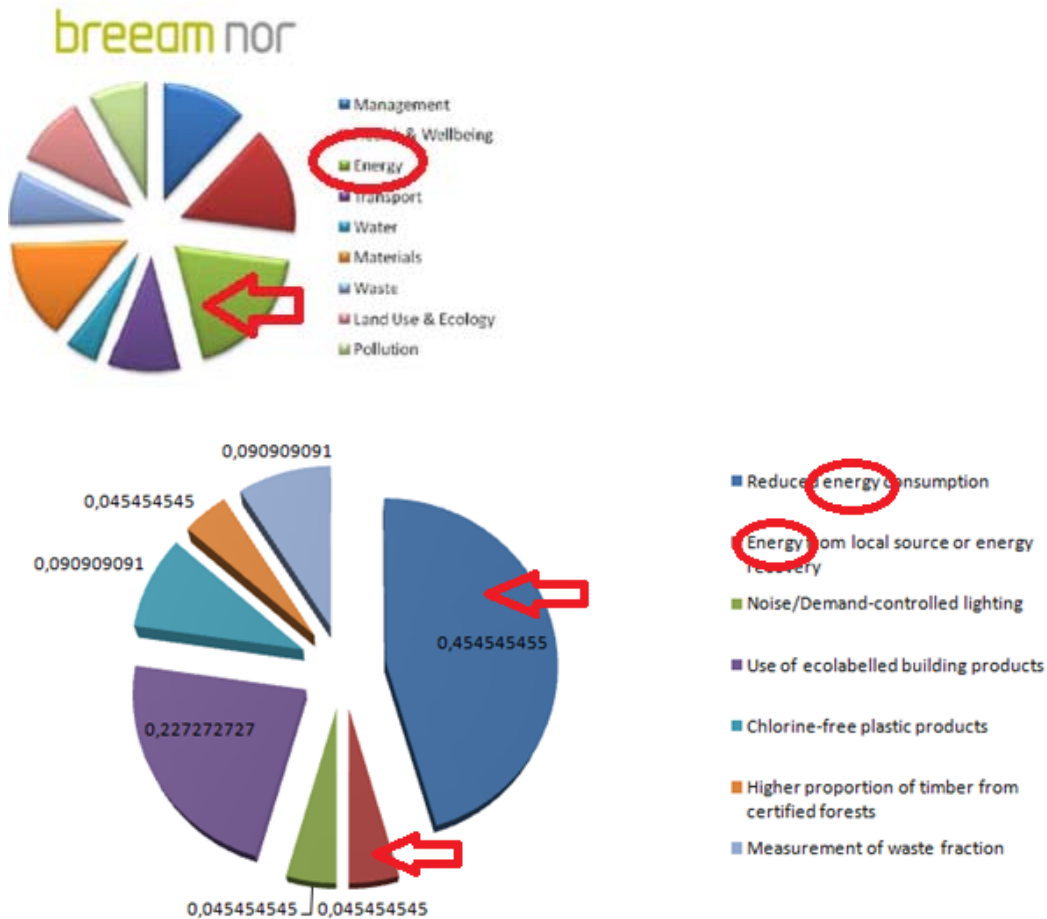


6. Comparison

As we have seen in the previous paragraphs, both the Nordic Swan Label and BREEAM NOR have an application system where requirements have to be met and verified by a third party in order to get certified. In fact, there are many more similarities between them. The schemes both consist of a number of categories, including energy consumption, management, and used products. They work with a system of points/credits that have to be earned. Some of the credits are optional and some of them are obligated. They are both adapted to the (more severe) Norwegian national regulations.

There are some very important differences as well. BREEAM Norway is much more expanded and adapted to buildings than Nordic Swan is. Nordic Swan is still mainly used for products, although there are some exceptions.

On the following pie charts, one can also see that there is a big difference in the importance of the Energy category.



There seems to be a much bigger part taking the energy into account in the Nordic Swan scheme than in BREEAM. However, it must be taken into consideration that there is a difference in counting certain points between the systems. In BREEAM NOR, the obligated credits are also being taken into account for the total sum. In Nordic Swan, they just have to be fulfilled, and only the optional points are summed up. This means that the many obligated requirements concerning management in the Nordic Swan scheme, are not represented in the chart, while they are very clearly represented in the chart of BREEAM NOR.

Nordic Swan is still optimized for products and materials, and BREEAM for buildings, but we have seen that in the material part of BREEAM NOR, Nordic Ecolabels are accepted without any further checking. The two schemes complete each other.

Another big difference is that in BREEAM NOR we can find categories about the reduction of CO₂-emissions and usage of low carbon technologies. In the Nordic Swan scheme, we can't find anything about this.

7. Conclusion

We can conclude that both schemes are very important and that they complete each other. It is a good thing that they have been developed, especially because of the fact that they have been adapted to the local climatic conditions (recently). Still, we shouldn't hold on to them too tightly. They have their limitations and problems, as do all the certification systems. There are still many improvements that can be made when it comes to reducing energy losses and CO₂-emissions (especially in Nordic Swan) and how to compare them universally. However a good basis to start from has been made and awareness has risen.

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