

Integrating health & comfort into building design. How Active House and other labels can help improve buildings

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Abstract. In the current real estate market, sustainability and wellbeing are no longer seen as something extra, but rather as a point of departure. However, there is a plethora of different sustainability labels focussing on the built environment. This can lead to confusion for architects, developers, commissioners, contractors, and users in general: what label should I use, what label is best suited for my project, why use this or that label, what is the difference? This paper discusses the five best known labels in The Netherlands: BREEAM, WELL, GPR, Active House and Passive house. It explores how they are used, how they differ, and how using them at the design stage can help create more sustainable buildings.

Keywords. BREEAM, WELL, GPR, Active House, Passive House, sustainability, label, design, tool.

DOI: <https://doi.org/10.34641/clima.2022.86>

1. Introduction

For many people, both end users and professionals in the building industry alike, sustainable building equals energy efficient building. And while it is true that the energy performance is an important aspect of a sustainable building, ultimately we build for people, and buildings should reflect that. This means that, for a truly sustainable building, we should create buildings that offer a healthy and comfortable indoor climate, within the boundary conditions of energy performance and environmental load of the building materials.

Unfortunately, this is less obvious than it should be. Many professionals in the building industry, such as designers, builders, building owners, have insufficient knowledge about healthy and comfortable indoor environments to be able to create truly sustainable buildings, either for new construction or for renovation.

Fortunately, there are instruments to help them make choices beyond adhering to the minimal building code. This paper explains how labels such as Active House, WELL and BREEAM, help create better buildings. All labels have different focus, in this paper we will explain the similarities and differences between them. The aim of this comparison is to inspire and to assist designers and builders in

choosing the adequate measures to implement in their sustainable project.

2. Short overview of most relevant labels in the Netherlands

2.1 BREEAM

BREEAM(-NL) is one of the most well-known building labels, aimed at developers and investors. Founded by the BRE in the UK in 1990, it was introduced to and translated for the Dutch market in 2008 by the DGBC (Dutch Green Building Council). The label is internationally recognised as a measure for sustainability and assesses nine categories: energy, health and wellbeing, land use and ecology, materials, management, pollution, transport, waste, and water. A tenth category: innovation, can be used for solutions not covered in the nine previous categories.



Fig. 1 – Example of a BREEAM label.

The tool mainly focuses on commercial real estate, although it is increasingly used by municipalities and to obtain government grants as well. At the building level it is comprehensive and the applicant has to collect a lot of information as a burden of proof to get a label. An independent assessor checks the burden of proof before the DGBC issues a label after a random second check. This complex burden of proof is one of the reasons BREEAM is popular with investors and developers: it offers a degree of assurance about the sustainability of the building. The BREEAM(-NL) label (see also fig. 1) is awarded once for a New construction and Renovation certificate. After that the asset can aim for a certification for BREEAM-in-use which is an assessment method in the operational performance of buildings

2.2 WELL

WELL was launched in 2014 by the International WELL Building Institute (IWBI) in the US and is now also receiving a lot of attention in the Netherlands. It is aimed at developers and building owners and focuses entirely on the health and well-being of the users of a building.



Fig. 2 – Example of a WELL label.

There are ten assessment categories: air, water, nourishment, light, movement, thermal comfort, sound, materials, mind and community. In addition, there is an eleventh category to add innovations that have a positive influence on the wellbeing of the building users. The ambition level set determines how many parameters are tested and achieved.

A certificate is valid for a maximum of three years (see also fig. 2). After that, a new assessment must show whether the building still meets the standard. This ensures that the label is not just a snapshot, but that the building retains the qualities for its users. The burden of proof requires a lot of documentation, including checks in the building itself, before the label is issued. In the Netherlands, this has been done since 2018 by the Blue Building Institute, WELL's local partner, or by DGMR since 2019.

2.3 GPR

GPR has been available since 1995 and is aimed mainly at municipalities (the abbreviation translates as Municipal Practice Guideline) and is used to obtain government grants such as 'MIA/VAMIL'. GPR is the only label that focuses only on the Dutch market. Five categories are assessed: energy, environment, health, user quality and future value. The tool is relatively easy to use and consists of a digital checklist where you can tick building measures. The simplicity of the tool makes it suitable to use as a checklist during the design phase and thus provide insight into the sustainability ambitions and associated measures.

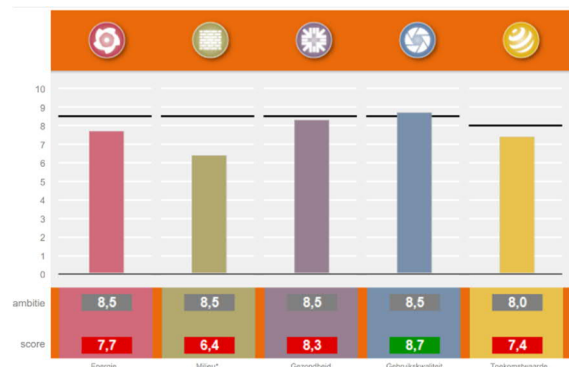


Fig. 3 – Example of a GPR score.

2.4 Active House

Active House celebrated its 10th anniversary in 2021. It is a label aimed at architects, developers and end users. It approaches the categories comfort, energy and the environment as a holistic whole, with the user as the starting point. Active House mainly focuses (in comparison to the other labels) on dwellings, but is also used for other building types, including museums, schools, offices, etc. Nine quantitative aspects are defined for the assessment, in addition to a number of qualitative aspects. Active House is the only label that includes a weighting to distinguish between little and intensively used

spaces in the comfort category.



Fig. 4– Example of an Active House radar.

The performance of a building is visualised in a radar diagram (see fig. 4), that can be used as a communication instrument. The label is relatively simple and accessible and can also be used as a design tool to provide insight into sustainability ambitions.

2.5 Passive House

Passive house is mainly applied to residential buildings, although other building types can also meet the passive standard. The principles date from the 1970s, but the methodology was officially released in Germany in 1996. Passive building is aimed at building as energy-efficiently as possible.



Fig. 4– Example of a passive house label.

Strict limit values are imposed that a passive house must meet if it is to be eligible for a label. A passive

house uses as little energy as possible to achieve a pleasant indoor climate, and prescribes which measures must be taken in the field of installations, thermal insulation and crack sealing. Certificates are issued by the Passief Bouwen Foundation.

3. Use in practice

Why is there a market for all these different labels, if the overarching theme is to promote sustainability? In practice, each label is aimed at a different part of the real estate market.

3.1 BREEAM and WELL

For developers of large scale commercial real estate and large commercial companies, often internationally oriented, a sustainable building has more monetary value than a non-sustainable building. Being sustainable, or being associated with sustainability, has transgressed from something for idealists to an image situation, where *not* being associated with sustainability is detrimental to one's credibility and therefore marketability. This is especially important to large corporate companies where the public opinion is vital to their bottom line. Being housed in a building that has a widely accepted sustainability label serves as 'proof' that the company is responsible, trustworthy, and takes care of its employees and the planet as a whole. Because of its monetary importance, the label for these types of buildings needs to be as objective and comprehensive as possible: they need to prove without dispute that the building is sustainable. BREEAM and WELL are the labels of choice for these types of building, because of the large amounts of proof, in the form of data, information, and processes that need to be collected and adhered to before a label is awarded. At the same time, because of the amount of work involved to achieve the label, these labels are the most expensive. The whole process associated with a BREEAM or WELL label can cost upwards of tens of thousands to over a hundred thousand euros, making it viable only for commercial real estate where these added costs can be recovered through higher rent and/or improved public image. This is reflected in the market value of buildings with these labels: in Amsterdam, large scale commercial real estate is expected to have a BREEAM label, not having one will reduce its value, while buildings with a WELL label can command a €50/m² higher rent than regular offices, and still experience a waiting list.

In addition, companies are increasingly obliged to record in their policy and to demonstrate which measures they take in the field of ESG. Over the years, this development has shifted from voluntary to obligation and companies have to demonstrate this by means of reports. BREEAM and WELL are then internationally recognized labels to demonstrate that you meet the Environment (E) and Social (S) aspects.

3.2 GPR

Municipalities have a different approach towards labelling of sustainability. They are publicly funded and therefore do not have the deep pockets commercial developers might have. They have a controlling and guiding role in the building process: they can demand better than minimum performance for (mostly) new construction projects. At the same time, dependent on the type of project, they must be careful not to impose higher than necessary costs for building projects, by demanding, for example, a BREEAM label. GPR offers a comprehensive and accessible tool to assess the sustainability of five categories, that can be individually scored. A municipality may, for example, demand a minimum score of 8 (out of 10) for energy and environment, but only a score of 7 for the remaining categories. Or an average score of 7,5 across all categories. The burden of proof for achieving these scores lies with the applicant through textual motivation of the individual measures taken. As such, GPR offers municipalities the possibility to tailor sustainability demands to different projects, while at the same allowing developers and designers a certain level of freedom to choose how they aim to meet the requirements set. Many times, an official GPR label is not even required, just the motivation how the score is achieved is sufficient to substantiate the sustainability potential in the design process. This makes GPR an ideal tool for non-commercial and/or non-corporal real estate, or dwellings that may not have an intrinsic desire to be sustainable, but where the municipality has a clear guiding role. It is relatively low key, low cost, and leads to the required sustainable result.

3.3 Active House

Active House differs from BREEAM, WELL and GPR in that it is aimed more towards the end user, rather than to the rest of the world. Like the previous labels, it reflects a measure of sustainability, but unlike the other labels, its resulting label is a radar diagram where the performance of different aspects of the building is visible at a glance. This radar then can be used as a communication tool towards the building owner, commissioner or potential end-user. Similar to GPR, the tool is relatively straightforward to use. GPR however, is similar to a checklist, where applicable aspects that are included in the building (design) are checked, resulting in a score. Active House defines performance levels, varying from level 1 (best) to 4 (worst), for nine different aspects. It is up to the commissioner or designer to determine where the emphasis lies and how it is met, which leaves a lot of freedom to come up with custom solutions. In addition, Active House puts a weighting on the use of spaces; intensively used spaces are valued more than little used spaces. This means that, in an optimal situation, the user of the building has a direct impact on the layout of the radar diagram, which could change with a different user. Because the creation of an Active House radar is much less complicated and time consuming, making use of

many aspects that are part of a regular building permit application, the collection of the required burden of proof, and consequent validation, involves much lower costs than BREEAM or WELL labels. Since end users usually are not interested in investing large sums of money in a label, just for the sake of having one or proving to the outside world how sustainable their building is, Active House is especially suited for buildings that have limited funds (such as dwellings, schools, or other non-commercial buildings), but are intrinsically interested in having better performance than what the building code dictates.

3.3 Passive House

In many respects, Passive House is similar in use to Active House, and many Passive Houses meet the requirements for an Active House. It started in the eighties of last century, when it was founded as a voluntary standard for energy efficiency in buildings. This is still the main driving force behind the label: buildings should use as little energy as possible for climatization, by applying high quality insulation, air tight construction, and heat recovery mechanical ventilation. There are strict limits set for maximum energy requirement for heating and cooling. When properly executed, the resulting building has a comfortable indoor climate all year round, while consuming very little energy. To prove the building is a passive house according to the standard, elaborate energy simulations need to be performed, that give a quite reliable prediction of the real world energy consumption. Similar to Active House, the label is relatively cheap and aimed at non-commercial buildings. It differs from Active House in that it focusses solely on energy performance (and, by extension, thermal environment and air quality), bypassing a number of comfort and environmental aspects that Active House includes. Also, it is more dogmatic in its approach to energy performance: there are strict values that need to be met, whereas Active House allows more leniency, where mediocre energy performance can be offset by very good environmental performance, for example, if desired. The passive house label is widely known for its energy performance, and may even be awarded with lower interest rates for a mortgage at certain banks in the Netherlands.

4. Labels as a design tool

Sustainability is increasingly becoming a commodity. Where it used to be that a building could distinguish itself by being energy efficient, and as such de facto sustainable, this is no longer the case. Sustainability is no longer limited to energy performance alone, but may include topics such as health or wellbeing, social sustainability, and environmental performance. This makes designing sustainable buildings harder, as there is more to choose from, and more to be assessed by.

How then, can the labels described in this paper be

used as a design tool?

4.1 Include the methodologies very early in the design process.

Determine your focus and take a moment at the start of your project to scan through the credits/features of the label(s) of your choice. This will make you aware of many ways in which a building can be sustainable. Some examples:

- Location: BREEAM for instance focusses on the location of the building. Choosing a location which has low ecological value (a location within the city instead of in the middle of a nature reserve), being closer to public transport or close to services such as lunch spots, day care centres or a dry cleaner prevents the need for additional motorised traffic movements and thus increases the sustainable potential of a building.
- Construction site: When judging the sustainability of a building it would not be correct to only assess the completed building. The building process itself can have serious environmental impact as well. Energy management with ambitious goals for energy used on the construction site, responsible use of building materials and meticulous separation and high-quality reuse of waste should also be included in the scope of a sustainable building project, according to BREEAM.
- Materials: WELL, BREEAM, GPR and Active House all put great emphasis on the need to select good materials. Some examples.
 - o To reduce environmental impact BREEAM, GPR and Active House reward selecting materials with low 'shadow costs' (Dutch definition for all environmental costs that have to be made in order to produce a material) and for locally produced materials.
 - o To minimize the impact on the health of building users, WELL, BREEAM and GPR reward selecting materials with low to no volatile organic compounds (VOCs).
- Energy: An energy efficient building design, based on the trias energetica, is awarded additional credits in BREEAM, GPR, Active House and Passive House. Next to building related energy efficiency, energy-efficient equipment such as elevators and (kitchen) equipment are rewarded too.
- Comfort: A building that is not comfortable

will most likely not be sustainable. This applies to all indoor environmental criteria: indoor air quality, thermal comfort, light conditions and acoustics. All labels have standards to provide improved levels of comfort in the building, thus guiding the designer towards sustainable choices. However, the WELL Building Standard is primarily focused on this.

- Measuring building performance: a sustainable building, designed according to the recommendations mentioned above, might function very well. This however is not guaranteed. Detailed commissioning is always recommended to ensure that all design measures are applied correctly and work well together. BREEAM awards credits when commissioning has been carried out and the results have been included in a detailed report. WELL requires measurements in the building to demonstrate that the measures have led to the required standards.
- Movement and nourishment: Healthy food and sufficient exercise are important to stay healthy. BREEAM and WELL support exercise for instance by rewarding credits to buildings in which signs are placed near elevators that show where the nearest stairs are (BREEAM) and by rewarding buildings that place stairs central and very visible in the entrance area to encourage people to exercise. WELL also encourages to provide healthy food and sufficient tap water spots throughout the building
- Ecology: BREEAM stimulates the mapping of the ecological value of the environment using an ecologist. And to additionally look at which measures can be used to increase the ecological potential of the site and the building.
- Future-proofing: Flexibility and robustness are crucial for sustainable buildings. Both BREEAM and GPR award credits to implementing measures such as:
 - o separating core and shell from interior walls for example, making it much easier to transform a building into a new function,
 - o designing a building in a way which makes it possible to easily and efficiently be detached at the end of its use,
 - o implementing climate adaptation measures: performing overheating calculations using a stricter climate year than usually applied,

preventing the building, even in a warmer future climate, to overheat. And/ or providing sufficient unpaved/ green surfaces for water retention on the building or on site,

- o and designing robust buildings where heavily used areas (entrance areas or areas used for internal transport) are extra protected against possible damage through the use of robust materials or through applying protective measures.
- Use: Active House distinguishes between intensively used spaces in a building, and little used spaces. By differentiating measures according to the intended use, buildings can be designed to make optimal use of resources, such as heating, or daylight.

4.2 Commit and make it official

By entering into the obligation to obtain a sustainability label for a building, it is much more likely that the sustainable ambition will be realised than if only the wish to realise a sustainable building has been expressed.

Obtaining a sustainability label is often seen as a cumbersome and overly time-consuming process and one wonders whether all that paperwork is really necessary. Practice however shows that without contractual obligations it is much more difficult to reach the same level of quality. At the end of the design process, unfortunately there are almost always more wishes than available budget left.

5. Case study

The relevance of labels in sustainable building design becomes apparent in a case study in Amsterdam. Amsterdam has some of the highest real estate prices in The Netherlands, and competition for high profile tenants is high. In this case (the name of the relevant parties shall remain anonymous) the developer purchased an existing building that they planned to renovate and upgrade to appeal to high profile tenants. The building provided a solid basis for a sustainable certificate (accessible location close to a train station, minimal use of materials because of renovation, ample space for PV).

The ambition set by the developer was to use BREEAM Excellent as a guideline. This ambition provided the design team, contractor and, at a later stage, the tenants, with a list of measures that needed to be incorporated not only into the design, but also into their working practice. The measures incorporate a wide range of topics, including and not limited to the energy performance, dimensions of passageways and doors to ensure accessibility, use of

non-toxic and sustainably sourced materials, and biodiversity of the surrounding terrain. Because the ambitions increased during the design process, when prospective tenants came into focus, part of the design had to be redone or revised a number of times, to account for changed requirements. Had the ambition been clear from the start, this would have streamlined the design process.

The initial ambition for BREEAM increased from Excellent to Outstanding, and WELL was included at a later stage, (originally Gold but increased to Platinum). The decision to include WELL at a later stage was mainly financial: it was not included from the start because it was still unclear whether it would be a sound financial investment. An early quickscan was made to determine implications for the design, but the decision to obtain a label came later, based on the desire to better distinguish the qualities of the building from its competitors. Because of the increased BREEAM and WELL level ambitions, it was no longer enough to focus on the core and shell of the building alone. The future tenants had to be involved in the decision making process, and the tenants had to sign contracts obliging them to use, for example in this case, sustainable and removable inner walls, and offer healthy and organic alternatives to the regular offerings in their cafeteria. At the same time, the prospective tenants already had their own ambitions (which is partly why they were interested in this development), and want to rent very sustainable office space. The BREEAM and WELL ambitions stimulated them and gave them tools to make their business operations more sustainable.

6. Conclusion

In this paper we discussed the differences and similarities of the main independent sustainability labels in The Netherlands. Although at first glance, they all seem to promote a higher building standard than the building code, and can all be applied to all types of building, in practice there is a clear distinction in how and where each label is most optimally used. BREEAM and WELL are the most commercial labels, which translates to application in mostly commercial real estate, can be used for ESG-reporting and obtaining government grants, but the labels are very expensive to obtain. On the other end of the spectrum, Active House and Passive House are mainly aimed at dwellings and non-commercial real estate, where there is less money, but an intrinsic desire for sustainability present. GPR sits somewhere in the middle, being used mainly by municipalities that wish to impose a certain level of sustainability on a project or by profit driven companies to obtain government grants.

To condense the breadth of these label into a single sentence is a gross underestimate of the complexity and wealth of knowledge contained in these labels. But for the sake of simplification and comparison, an attempt is made: BREEAM has a very broad sustainability focus, WELL is aimed mainly at health and wellbeing, GPR is somewhat similar to BREEAM,

but far less complex or strict, Active House focusses on the end user and Passive House on energy performance.

Regardless of the type of label used, setting an ambition at the design stage and meeting that ambition in the finished building, is greatly supported by pursuing an official label. This way, ambition is not only limited to good intentions, but transferred to concrete actions and achievements, because otherwise the desired sustainability level required for the label is not met.