Guidelines

Living Lab:
Circular
Hospitality
Leeuwarden

green
IS THE NEW
black

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Team Green is the new Black

Guidelines

Living Lab: Circular Hospitality Leeuwarden

0: Introduction

The research aims to gain insight into how hospitality can operate more circular and how food-, material- and energy & water waste can be reduced. These insights are used to develop a guideline that provides information for hospitality about the topics in question and how they can tackle this through quick wins on an operational, tactical and strategic level. Therefore, the research is intended for hospitality entrepreneurs. The guideline can be used for implementing the quick wins.

1: Food waste

Food waste is the use of food that is safe and nutritious for (human) consumption. Any food what is thrown away, discarded, or any other alternative for this product, is considered as food waste. The Food Recovery Hierarchy prioritizes actions humans can take to prevent and divert wasted food on practical, tactical and strategic level.

2: Material waste

Material waste is the waste of companies and consumers. The most common types are packaging materials (cans, plastic bottles, cigarettes, chewing gum), papers, plastics and take away materials. Companies have to change habits in order to implement quick wins on an operational level. Circular economy can be a solution for material waste. Hospitality industry can implement sustainable management which reduces waste and operates more circular.

3: Water & energy waste

Saving energy and water is one of the simplest ways to increase profits in hospitality: it will directly increase revenue without the need to increase sales. Money saved on energy goes straight to the bottom line which makes businesses more competitive – and with rising energy prices, this is more important than ever. The use of too much water and water waste have an economic disadvantage because the cleaning process of water is expensive.

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01: Food waste

Figure 2. Businesses find appetite to cut food waste (Post)

Outcomes of research

According to the Food and Agriculture Organization of the United Nations (© FAO, 2019), an estimated one third of the total amount (globally) food produced is either wasted or lost. This amount is ridiculous, about 1.3 billion tonnes of food per year for human consumption is considered as either lost or waste. Food waste is represented as misuse of labour, land/capacity, water, energy and all natural resources included in the process of food production. However, there is a difference between *food waste* and *food loss*.

Food loss is any kind of food that is lost in the supply chain between producer (farmer) and the market (most common retailers). Pre-harvest errors, such as pest infestations, or other problems in harvesting, storing, packing and/or transportations are ways to create food loss.
Food waste, on the other hand, is the use of food that is safe and nutritious for (human) consumption. Any food what is thrown away, discarded, or any other alternative for this product, is considered as food waste (© FAO, 2019).

The United Nations (United Nations, 2018) have made sustainability goals in the **Sustainable Development Goals**. These goals include a halving of food waste in 2030 compared to 2015:

SDG 12.3 By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses (United Nations, 2018).

This applies to consumers and also to supermarkets and other corporations. To reduce food waste at consumption level, the EU has agreed to this. The Netherlands also supports these goals.

Figure 3. Food Recovery Hierarchy (United States Environmental Protection Agency)

Quick wins

The Food Recovery Hierarchy prioritizes actions humans can take to prevent and divert wasted food. Each tier of the Food Recovery Hierarchy focuses on different levels and strategies for your wasted food. The top levels of the hierarchy are the best ways to prevent and divert wasted food because they create the most benefits for the environment, society and the economy (United States Environmental Protection Agency, 2017).

Operational level

✓ ***Source reduction***

Everyone creates wasted food, but it is just as simple to not create it. Both businesses and individuals can learn to effectively prevent the flow of wasted food by taking simple steps such as making grocery lists, inventorying supplies, and buying less. *In appendix 1 is a prevention list of food waste for restaurants and in appendix 2 for manufacturers.*

Tactical level

✓ ***Feed hungry people***

We can be leading in our communities by collecting unspoiled, healthy food and donating it to our neighbours in need. By donating food, we're feeding people, not landfills, supporting local communities, and saving money (United States Environmental Protection Agency, 2017).

Large manufacturers, supermarket chains, wholesalers, farmers, food brokers, and organized community food drives typically give food to food banks. Restaurants, caterers, corporate dining rooms, hotels, and other food establishments promptly distribute perishable and prepared foods to hungry people in their communities. Many local food banks will pick up food donations free of charge, saving you warehouse storage and disposal costs.

✓ ***Feed animals***

Farmers have been doing this for centuries. With proper and safe handling, anyone can donate food scraps to animals. Food scraps for animals can save farmers and companies money. It is often cheaper to feed animals food scraps rather than having them hauled to a landfill. Companies can also donate extra food to zoos or producers that make animal or pet food. There are many opportunities to feed animals, help the environment and reduce costs.

Strategic level

✓ ***Industrial uses***

Food can be used to not only feed people and animals, but also power your car or generator. There is increasing interest in finding effective means to obtain biofuel and bio-products from wasted food. These options aim to alleviate some of the environmental and economic issues associated with wasted food while increasing the use of alternative energy sources (United States Environmental Protection Agency, 2017).

Liquid fats and solid meat products are materials that should not be sent to landfills or disposed of in the sanitary sewer system. Fats, oils, and grease can clog pipes and pumps both in the public sewer lines as well as in wastewater treatment facilities. This prevents combined sewer overflows, which protects water quality and lowers bills.

Fats, oil and grease should be sent to the rendering industry to be made into another product, converted to biofuels, or sent to an anaerobic digester. *Anaerobic digestion* is a process where microorganisms break down organic materials, such as food scraps, manure, and sewage sludge. This is done in the absence of oxygen. Recycling wasted food through anaerobic digestion produces biogas and a soil amendment, two valuable products.

- **Rendering** - Liquid fats and solid meat products can be used as raw materials in the rendering industry, which converts them into animal food, cosmetics, soap, and other products. Many companies will provide storage barrels and free pick-up service.
- **Biodiesel** - Fats, oils and grease are collected and converted by local manufacturers into environmentally friendly biodiesel fuel. Biodiesel is an alternative fuel produced from renewable resources such as virgin oils (soybean, canola, palm), waste cooking oil, or other biowaste feedstock. Biodiesel significantly reduces greenhouse gases, sulfur dioxide in air emissions, and asthma-causing soot. Along with creating less pollution, biodiesel is simple to use, biodegradable and nontoxic.
- **Anaerobic Digestion** - Fats, oil and grease can be added to anaerobic digesters at wastewater treatment plants to generate renewable energy in the form of biogas (United States Environmental Protection Agency, 2017).

Figure 4. Industrial uses for material waste (SeekPNG)

✓ ***Composting***

Even when all actions have been taken to use your wasted food, certain inedible parts will still remain and can be turned into compost to feed and nourish the soil. Like yard waste, food waste scraps can also be composted. Composting these wastes creates a product that can be used to help improve soils, grow the next generation of crops, and improve water quality.

Gardeners and farmers add compost to soil to improve its physical properties. They may even use compost instead of soil to grow plants. Mature compost is a stable material with a content called humus that is dark brown or black and has a soil-like, earthy smell.

Compost is created by:

- Combining organic wastes, such as wasted food, yard trimmings, and manures, in the right ratios into piles, rows, or vessels.
- Adding bulking agents such as wood chips, as necessary to accelerate the breakdown of organic materials; and
- Allowing the finished material to fully stabilize and mature through a curing process.

Mature compost is created using high temperatures to destroy pathogens and weed seeds that natural decomposition does not destroy (United States Environmental Protection Agency, 2017).

02: Material waste

Figure 5. A loggerhead sea turtle entangled in a plastic fishing net off the Spanish Mediterranean coast. The photographer managed to free him, otherwise he would suffocate. Waste nets are a great danger for sea turtles (Chias)

Outcomes of research

Material waste is the waste of companies and consumers. The most common types of waste are packaging materials, for example cans and plastic bottles, cigarettes and chewing gum. Other examples of waste are paper, plastics and take away materials (NederlandSchoon, 2018).

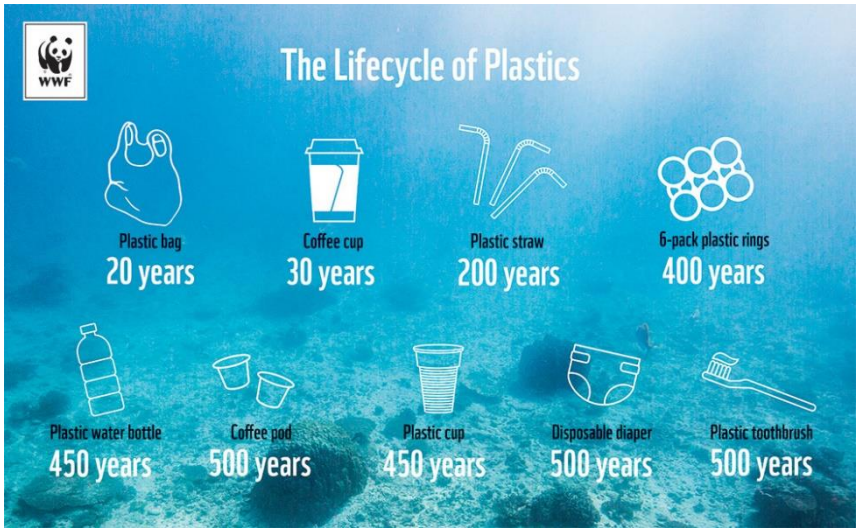

Figure 6. The lifecycle of plastics (Mercurio)

The biggest problem of material waste is the pollution it causes for the environment. Parts of the waste will get into the ocean and is damaging animals, nature and people. Besides that, certain materials take a very long time to disappear or do not disappear at all because of their long lifecycle (NederlandSchoon, 2018):

Material waste can be divided into four subgroups, namely (4Waste, 2019):

1. **Liquid waste**
   This waste includes dirty water, organic liquids, wash water, waste detergents and even rainwater.
2. **Solid Rubbish**
   a. Plastic waste – this consist of bags, containers, jars, bottles and many other products that can be found in households or companies. Plastic should not be mixed with other waste streams, it should be sorted and places in a separate recycling bin.
   b. Paper/card waste – this includes packaging materials, newspapers, cardboards and other products.
   c. Tins and metals – this can be found in various forms throughout households and companies. Most metals can be recycled. Most of these items are recycled at a scrap yard.
   d. Ceramics and glass – This contains bottles, jars, tableware and many more products. These products can be recycled easily (4Waste, 2019).
3. **Organic waste**
   Organic waste includes all food waste, garden waste, etcetera. Every household has a green bin to dispose their organic waste. The hospitality branch does not have a green bin. Which means they have to put their organic waste in the same bin as all their other waste. In the next chapter this will be explained further.
4. **Hazardous waste**
   This includes all types of rubbish that are flammable, toxic, corrosive and reactive. These items can harm persons as well as the environment and must be disposed correctly (4Waste, 2019).

   Another waste stream that can be included to those previous four is e-waste. This includes discarded electronic appliances such as mobile phones, computers, and televisions. This sort of waste is growing and growing in the recent years. In 2018 the worldwide e-waste generation have been hit a record of 49.8 tons, with an annual 4 to 5 percent growth (The Balance Small Business, sd).

Figure 7. Most common types of rubbish (Paul's Rubbish)

Quick wins

Operational level

✓ ***Changing habits***

To reduce material waste, a lot of people need to change their habits. Examples of that are:

1. Use refillable water bottles, no PET-bottles
2. Always take your own bag with you, do not buy plastic bags
3. Always put your waste in the waste bin
4. Separate your trash in residual, organic, paper, glass and plastics
5. Do not use any balloons
6. Do not use plastic straws
7. Do not use cleaning products full of chemicals

A lot more examples can be given which depends on different sectors. **The main factor is to reduce the use of plastic in companies but also as a consumer** (Milieucentraal, 2017).

Tactical level

✓ ***Four preconditions***

According to Bolck (Bolck, sd), there are four important preconditions that allows the circular economy to grow in the coming decades:

1. **Materials must be designed in such a way that they can be recycled**.
2. **Companies have to take a look at the available collection and processing methods.** This starts with labelling products and informing consumers: the better the information supply, the better the waste separation.
3. **Separating contaminants in residual and waste products** as much as possible in order to enable the production of qualitative products.
4. **All residual and waste streams have their own unique functionalities which must be retained** as far as possible in the recycling process (Bolck, sd).

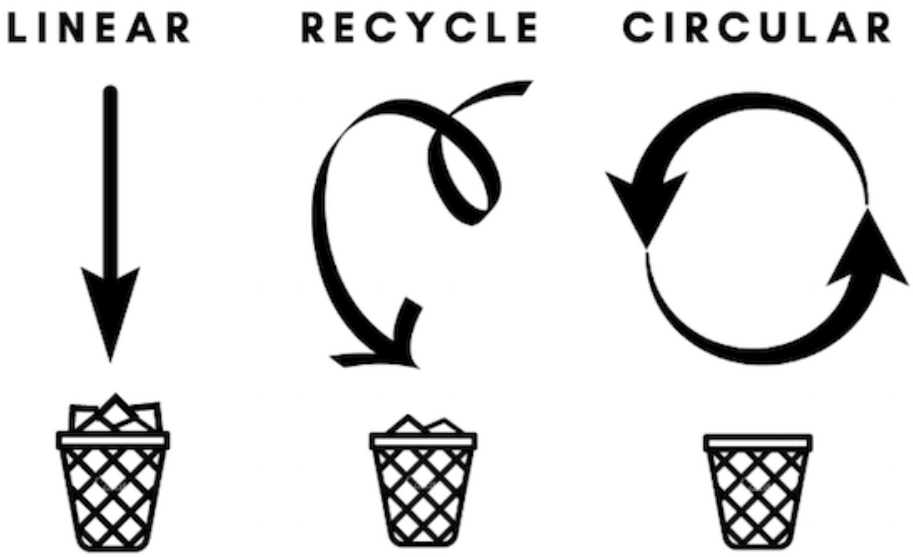

Figure 8. A circular mindset (Passentino)

Strategic level

'Green hospitality' with eco-friendly food and naturalistic marketing are gaining popularity among consumers (Pizam, 2009). Restaurants in the Netherlands are introducing sustainable management, which reduces material waste such as plastics, wrapping paper, trash, and wastewater.

According to Atlas Natuurlijk Kapitaal (Atlas Natuurlijk Kapitaal, sd), there are six types of material waste in hospitality: concrete sector, packaging sector, phosphate sector, wood sector, textiles sector, and biotic materials sector. In the United States, the Green Restaurant Certification System, which supports green management, is gaining popularity. It is hosted by the Green Restaurant Association (GRA), a private organization established in Boston in 1990. According to GRA, what eco-friendly restaurants can do with material waste is listed in Table 1.

Figure 9. Green Restaurant Association (Association)

Tabel 1. Reducing material waste in hospitality

	Details
Building Construction Products	Use of eco-friendly materials such as chairs, desks, booths, carpets, beaches, floors, restrooms cubicles, roofs and doors
Cleaning Service	Non-toxic laundry, chemical products can be disassembled, risk-free items
Limited Disposable Products	Limit the use of disposable products as much as possible (eg, use towels and mugs, limit disposable plates), recycle of paper products
Waste reduction	Recycling and fertilizer processing, recycling of construction materials, disposal of hazardous materials, reduction of waste of office supplies, disposable products and food, composting of food waste

The hotel industry is moving away from the goal of short-term profit, and it is increasingly eco-friendly management to implement and carry out long-term environmental preservation policy and social responsibility (Yaiza, 2007).

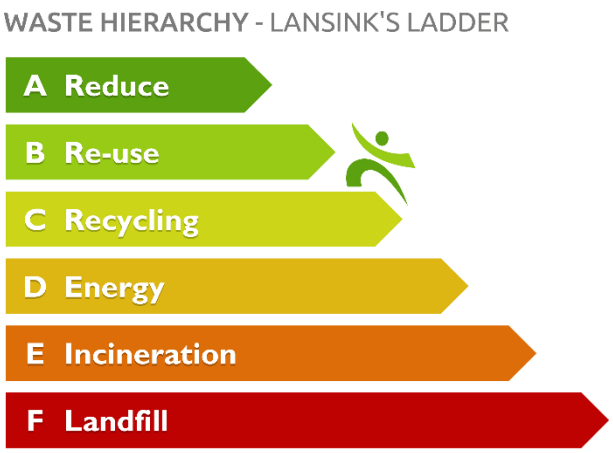

Figure 10. Waste Hierarchy - Lansink's Ladder (Code)

03: Energy & water waste

Figure 11. Ocean pollution (Rock-cafe)

Outcomes of research

Energy waste

Saving energy is one of the simplest ways to increase profits (The Carbon Trust, 2012). Within the hospitality sector, energy costs may only be a small percentage of turnover, but reducing them can directly increase revenue without the need to increase sales. Money saved on energy goes straight to the bottom line which makes businesses more competitive – and with rising energy prices, this is more important than ever. Purchasing energy sources that are recognized as 100% renewable will help achieve long term cost savings, alongside ensuring that the company's **carbon footprint** is being reduced. The implementation of simple energy efficiency measures can further increase levels of staff and customer comfort as well as improving general morale.

Controlling energy use often makes conditions more comfortable for guests and customers – and comfortable customers will be encouraged to return. In addition to financial and customer service benefits, there are of course, social and environmental advantages to reducing energy consumption. Increasing awareness about these issues has seen customers and guests becoming more discerning about the environmental credentials of the businesses they deal with. Being energy efficient can enhance business reputation and help to attract more customers (The Carbon Trust, 2012).

Fact: Energy used in catering accounts for between 4 and 6% of operating profits. Saving energy can directly increase revenue and profitability without the need to increase sales (The Carbon Trust, 2012)

Water waste

The Netherlands is the land of water, where it rains often, so there is enough water available (Van Breda, 2018). But why is it not desirable to consume a lot of water? The problem is that all the water that is used must be processed and cleaned. Processing and cleaning costs energy and that is why it is bad for the environment. To make drinking water, it is prepared by the use of chemicals that have a bad influence on the environment. In addition, the use of too much water and **water waste** also have an economic disadvantage. Cleaning the water is also a process that costs a lot of money.

The Netherlands is a country with reliable, clean tap water. As described, it is important to use it sparingly, to reduce water and energy waste. In addition, saving water can also be beneficial for saving on the water bill. Practical tips and water saving investments can take immediate action in the hospitality industry to save water (Van Breda, 2018).

Quick wins

Operational level

Energy

In each of the areas identified in Figure 11, there are three main opportunities to save energy (The Carbon Trust, 2012):

1. **Switching off Policy**
   All energy consuming equipment should be switched off when not required. This can be done by staff, or by using automatic switches or building control systems.
2. **Maintenance**
   A number of energy efficiency measures can be carried out as part of routine maintenance.
3. **Refurbishment**
   The hospitality industry renews and refurbishes premises on a regular basis. Most professional establishments refurbish every 7-10 years and this provides a significant opportunity for energy savings. Some hospitality businesses have seen energy costs reduce by as much as 40% when energy efficiency opportunities are maximized during refurbishment. Within the hospitality sector, an establishment can typically achieve a 10% or more reduction in energy use by implementing some simple efficiency measures (The Carbon Trust, 2012).

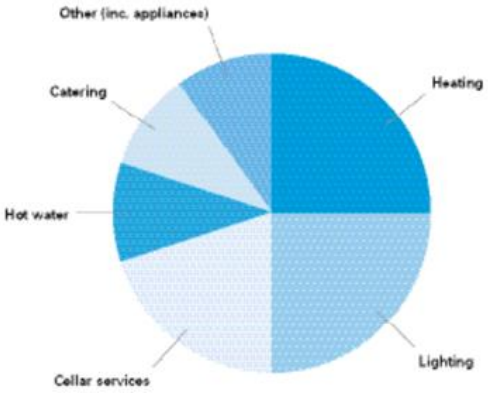

Figure 12. Areas with opportunities to save energy

Water

- ✓ **Ensure that there are no faucets in your company which are leaking**. A tap that continues to drip or a toilet that is not properly infused can cause many liters of water wastage every day. It is therefore important to check that all taps and toilets do not leak (Van Breda, 2018).
- ✓ In the kitchen, saving can also be achieved by **reusing the cooking liquid**. If vegetables have just been cooked, do not throw the cooking liquid into the sink. There are still a lot of vitamins in the cooking fluid. The cooking fluid can be reused in, for example, a soup or a smoothie.
- ✓ Water can also be saved in the kitchen by **ensuring that there are lids on the pans**. If you don't put a lid on your pans, your water will evaporate and fly away. When you cook with lids on the cooking pots, you have a closed circuit. Your water will evaporate but hit the lid and then drip back into your pot. Only little water is lost in this way. Moreover, it is also possible to cook faster when there is a lid on the pan. Gas or electricity is therefore also saved (Van Breda, 2018).

- ✓ Savings can also be made when doing the dishes. This can be done by not rinsing at a continuous run, but by **filling the faucet and pre-washing it**. In addition, it also saves water to only run the dishwasher when it is completely full. Because even the same amount of water is used for a half-full machine.
- ✓ A lot of water is also often used to clean the case. To save water here the trick is to **use water as long as possible**. Start with things that are the least dirty, such as the furniture or figures and finish with the ground (Van Breda, 2018).

Tactical level

Energy

Figure 12 showcases the right temperatures that the hospitality industry should follow in order to reduce high or too low temperatures in their business (The Carbon Trust, 2012); which can have an influence on their energy bill but as well as guest satisfaction. Heating costs can be reduced by maintaining appropriate temperatures and ensuring that heating equipment and controls are operated and managed correctly.

In fact, it is possible to save up to 20% on heating costs through the implementation of some simple energy saving measures (The Carbon Trust, 2012).

Room Type	Temperature (ºC)*
Bars, lounges	20-22
Guest bathrooms	26-27
Guest bedrooms	19-21`
Restaurants & dining rooms	22-24
Corridors	19-21
Kitchens	16-18

Figure 13. Recommended temperatures for specific areas in hospitality business

Water

- ✓ **Look at the consumption of the machines in your company** (© Mapa, 2017). A more economical washing machine or dishwasher reduces your annual consumption considerably. When purchasing machines, it is good to pay attention to the energy label, a machine with an A-label use the least energy and water.
- ✓ In order not to pollute drinking water, it is important that **no small chemical waste such as oil ends up in the water**. Everything that you flush down the sink or toilet can get into the ground or surface water and cause problems with drinking water extraction. To ensure that this does not happen, it is good to make a fixed point where small chemical waste is collected (© Mapa, 2017).

Strategic level

Energy

Improving building isolation can result in (The Carbon Trust, 2012):

- ✓ **Better temperature control** – it can lower ventilation costs and prevent overheating.
- ✓ **Improved comfort for customers** – the guest experience can be enhanced by providing a more comfortable environment through reducing draughts, solar glare, overheating and noise.
- ✓ **Lower running costs** - reheating the space to offset heat losses can be an expensive waste of energy
- ✓ **Lower capital expenditure** – a more efficient, well-insulated building needs smaller heating and cooling systems.
- ✓ **Good investment** – better insulation can increase a building's value and attractiveness to staff, guests and prospective buyers of the business.

Wasting heated water is throwing money down the drain (The Carbon Trust, 2012). All hospitality businesses' could benefit from the installation of water conserving devices such as:

- **Tap controls** – these switch taps off in the bathroom after a certain time and are useful in communal areas such as toilets and leisure facilities in restaurants & pubs.

- **Urinal flush controls** – these help to reduce unnecessary flushing in toilets, saving on cold water. Before investing in these technologies, a trial is recommended to ensure that savings are achievable whilst maintaining the customer experience (The Carbon Trust, 2012).

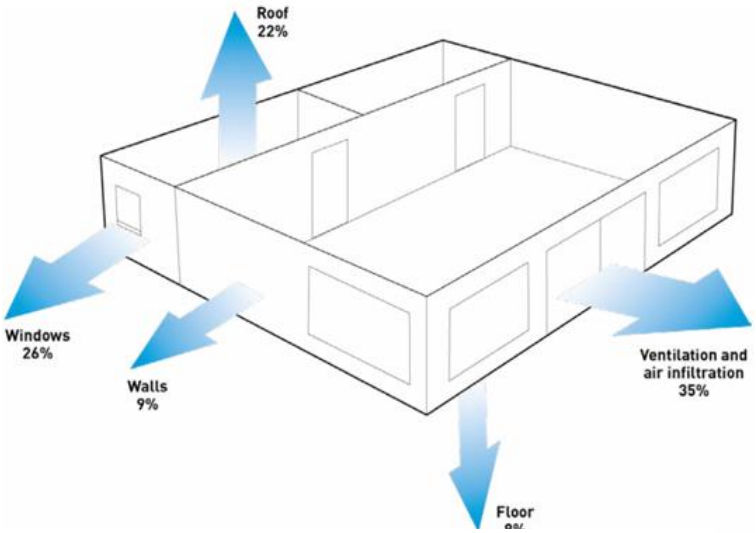

Figure 14. Heat loss from a typical building

Water

- ✓ If no **"flushing circuit breaker"** is present on the toilet dumps in your company (Posthumus, 2017), install it. By investing around seven euros, 8,000 liters of water can be saved per year. Consider a **water-saving toilet** when renovating or replacing your toilet. That is just as functional but much better for the environment, because you save 30,000 liters of water per year.
- ✓ When renovating the toilets, **waterless urinals** can also be considered. These consume, as the name suggests, no water. When used 15 times per hour for 2,500 hours per year, 187 m3 of water is saved per year compared to a normal urinal (Posthumus, 2017).
- ✓ With a renovation, more points can be taken into account. It is good to look at **energy-efficient heaters** such as: the solar water heater combination, the heat pump water heater, the Ultra High Efficiency combi boiler and the Gaskeur HRww combi boiler. Which device is the best choice for you depends on your situation. So it is good to be well informed about this (Water.nl, 2008).

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