

02 – Training content for environmental management of tourist accommodation

Content for managers



Water management			
General issue			
<p>Water is one of the most critical natural resources. The tourism industry can adversely affect water resources of natural areas in any destination either directly or indirectly, due to overusing for accommodation and personal use by tourists but also due to pollution by these accommodation facilities. This can result in water shortage and degradation of water supply, which necessitate good management to conserve our water resources.</p> <p>In Naxos, a Greek island in the South Aegean, an amount of 4,607,100 cubic meters of water is consumed by the 75 hotels of the island per day – only slightly less than the 5,057,100 cubic meters needed to irrigate 1270 hectares of agricultural land on the island (Azilah et al., 2014).</p> <p>The average water consumption of a tourist is higher than a resident’s water consumption. A tourist staying in a hotel uses on average one third more water per day than a local resident (WWF, 2004). Therefore, reducing water consumption and preventing water pollution can only be achieved if the tourism industry stakeholders take concrete measures.</p> <p>As a result, the tourism industry has a great potential to contribute to water conservation through many measures including raising awareness on this topic.</p>			
Learning Outcomes			
On successful completion of the module participants should be able to...			
KNOWLEDGE	SKILLS	RESPONSIBILITY and AUTONOMY	
You should know about: <ul style="list-style-type: none"> - the impact of tourism on water resources - the risk of water scarcity - the main issues concerning water resources 	You will be able to: <ol style="list-style-type: none"> 1. Implement solutions to reduce water consumption 2. Implement solutions to prevent water pollution 3. Implement solutions to save water 	You will be willing and able to: <ul style="list-style-type: none"> - spread awareness regarding water issues - monitor your water consumption - develop a general water management plan for the facility 	

Commenté [1]: After this sentence, a pop-up window will appear in the platform with the following text:

Did you know that experts of the WWF estimates that water consumption in the tourism sector can be reduced by up to 50% if appropriate measure are taken by the tourism industry, the government and the individual tourist?

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Estimated duration: 60 minutes

Managerial solutions

Reducing water consumption

1- Adapting practices for reducing water consumption

Tourist accommodations have both an economical and environmental interest in reducing water consumption. Within each area of your facilities, there are several practices that can reduce the amount of water used in operations.

Kitchen:

Dishwashing is one of the highest water-consuming activities. You can reduce water used in your kitchens by:

- a) **Filling the dishwasher to maximum capacity:** dishwashers are designed to run with a full load, you get the most water efficiency out of your machine by only running it when you have enough dirty dishes.
- b) **Keeping water flow rates as low as possible:** by reducing the flow of water from your taps you will use less water for every minute the tap is on. You can check section technical solutions, water saving, efficient fittings to identify the processes available to you.
- c) Do not let the water run while you are cleaning the dishes or laundry and use a water tub to clean the food. The collected water can be used to water your plants.
- d) For cleaning surfaces and floors, use microfiber cloths rather than sponges or the like: more effective, no rinsing, no trace.



Garden:

Irrigation and gardening activities at many hotels are important factors in water use. However, you can take some measures in your hotel that can minimize the need to irrigate your garden:

- a) **Selection of drought tolerant native plants:** native plants are generally adapted to the local conditions; therefore, they need no or little watering (EPA, 2002) – For example, in the Mediterranean climate, choose species like olive and chestnut trees, succulent plants such as cactus, aloe, crassula that thrives in almost drought conditions, and you need to water them only little once established.
Check with local nurseries to find what qualifies as a drought-tolerant native in your growing zone. In the Mediterranean climate for example, thyme, sage, rosemary, and parsley will grow well).
- b) **Mulching of garden beds to reduce evaporation:** Mulching is the technique of covering the soil surface around the plants with an organic or synthetic mulch – coating material spread over the soil surface – to create favorable conditions for the plant growth and proficient crop production and to help optimize water use. Organic mulches are typically composed of natural substances such as wood bark chips, nut shells, grass clippings, etc. (Patil et al., 2013).
With mulching you will use less water for irrigation and still keep your garden healthy. Mulching conserves soil moisture by reducing surface evaporation and suppressing weed growth which decreases irrigation demand (EPA, 2002).
- c) **Using rainwater for irrigation:** You can collect rainwater from your facility roof or any impermeable surfaces (terraces, yards, etc.) for use on your garden. (See technical solutions)
- d) **Using drip irrigation:** For most plants, drip irrigation is possible and greatly contributes to limiting consumption
- e) **Irrigation controllers:** Weather-based irrigation controllers (WBICs) are one option for homeowners and businesses to achieve water-efficient irrigation scheduling. By using local weather data and landscape conditions to tailor watering schedules, weather-based irrigation controllers determine when and how much to water.



Have a look to this example: <https://www.epa.gov/watersense/weather-based-irrigation-controllers>

Swimming pools:

Pools can be responsible for a considerable amount of water consumption, since they require a large amount of water for filling and maintenance. Taking some measures, you can reduce water use for the pool in your accommodation facility:

- a) **Pool night covers to reduce evaporation:** by covering your swimming pool when not in use, you lower the rate of water evaporation, and you will need to fill it back up again less.
- b) **Installing drainage barriers:** you can install pool drainage barriers to collect overflows and direct them back to the pool.
- c) **Setting up intelligent water cycle management systems:** a good solution to optimize recovery cycles, and the use of inputs (Chlorine).

Laundry:

Laundry facilities are one of the areas where more water is consumed in hotels. On the other hand, laundry represents a major potential source of saving for water and chemical consumption. You can follow the below tips to reduce water usage for laundry in your hotel:

- a) **Optimum washing machine programming:** when machines are not full, adjust settings to lower water level to minimize water and chemical use. Spin cycles can also be reduced if weather conditions permit, to save energy.
- b) **Requesting guests to reuse towels during their stay:** you will minimize laundry loads by reducing the volume of bedclothes and towels for laundry if requesting your guests to reuse linen and towels (unless otherwise desired by them).
- c) **Washing only full loads of laundry:** when you use your washing machine only with full capacity, you reduce the number of loads therefore you save water and detergents.
- d) **Weighing of laundry:** among the new technologies to require on your next equipment, this one makes it possible to reduce just the right amount of water for best results.
- e) **Considering products that require less water for laundering:** choose products with a lighter weight because they require less water than those with a heavier weight. Consider environmental performance when planning to change your equipment, referring to the energy/water label. A class A +++ washing machine consumes 40 liters of water per cycle compared to 70 liters for a C class.
- f) **Using recycled water or rainwater for laundry:** You can collect rainwater from your facility roof for use in your laundry. (See technical solution)



Guest areas:

Guest areas include bedrooms, toilets, and changing rooms in accommodation facilities. Water consumption in these areas is highly variable depending on the services provided in the facility, but also on the number of days visitors spend there. Therefore, water consumption in these areas can make a considerable contribution to the total water consumption in the whole accommodation. Hence, it is vital for you as a tourism accommodation owner or manager to establish some solutions to reduce water consumption in these rooms:

- a) **Installing timers or sensors:** In the case of collective toilets (campsites), you can install timer systems or sensors to control showerheads and faucets in public areas (toilets and changing rooms).
- b) **Lowering volume of the cistern:** you can lower the volume of the cistern by adapting smaller volume cisterns and by equipping your toilets with dual flush and flow rate systems.
- c) **Installing low-flush toilets:** you can install flow reducers for flushing. Pay attention to the type of flush: it is surprising to note that 1/3 of the total consumption of drinking water is used for the toilets while the use of drinking water is not essential for them.



You can find more details on efficient fittings in the section technical solutions, saving water, and efficient fittings.

2- Monitoring and leak detection

Reducing water loss through leak detection is a major way to minimize water consumption in your facility. One leaky faucet dripping one drop per second can waste 135 liters of water daily – (UNEP, 2003).

To prevent leaks in your toilets, it's important to descale the toilets regularly, depending on the hardness of the water in your accommodation facility – if the water is hard, which means contains a lot of minerals and mainly calcium and magnesium, the minerals can cause limescale deposits within your pipes that create tiny pinhole leaks.

You can inspect the water leakage in your facility by regularly checking for dripping taps and leaky toilets.

The objective of leak detection is to identify possible measures to reduce consumption and maximize efficiency.

Monitoring and maintenance are applicable as a best practice technique for all types and sizes of accommodation.

In small hotels or guesthouses, monitoring may simply involve recording total water consumption (at least) monthly - or per 3 months - intervals based on meter readings.



Ways to detect leakage:

- a) You can periodically check the toilet tanks if they have leaks, by pouring a dye into the tank and checking if the bowls change color, this indicates a micro-leak that needs to be fixed.
- b) If your installation is brand new, you can measure periodically flow rates from taps and showers, for example, every month and compare the records, if you notice that the flow rate is getting lower this means that there is an amount of water that is lost before arriving to the tap which

indicates a leak in the pipes that you have to ask the help of a professional to fix it to reduce your water consumption.

You can easily measure flow rates from taps and showers according to the following procedure:

1. Turn on the tap or shower to full flow
2. Place a container of known volume (e.g. 5 liters) under the flow
3. Time how many seconds it takes to fill the container to the indicated volume mark
4. Calculate the flow rate using the following equation (Styles et al., 2013):

$F = (V/t) \times 60$		
F	Flow rate	L/minute
V	Volume of water in container	L
t	Time taken to fill container	Seconds

For more detailed auditing of water consumption and leak detection in larger accommodation facilities sub-metering is required. Inexpensive mechanical water meters can be fitted at fixed positions within the distribution system and require periodic replacement.

Water meters	cost
Mechanical flow meter	Around 300 EUR
Flow monitor	Around 400 EUR

Source for prices: (Styles et al., 2013)

Preventing water pollution

1- Staff involvement

Disseminating knowledge and awareness on water pollution prevention with your staff is also a key factor for reducing water pollution at your facility. To ensure that everyone is aware, motivated, and committed to preventing water pollution and water consumption in general, you can engage your staff in preventing water pollution through training and visuals:

- a) You can hold regular meetings with your staff (can be weekly or monthly) to discuss water pollution and how it affects marine life but also human health, and that everyone of us can have a role in preventing it.
- b) Explain to your staff that you use eco-friendly detergents and natural substitutes when possible (like vinegar and baking soda) because all commercial cleaning products with toxic chemicals deteriorate the quality of water.
- c) You can remind them always not to overuse detergents but to use only as much as needed.



d) It's good to give your staff the opportunity to suggest ways to avoid water pollution in the hotel (this will make them feel more involved and motivated).

e) It's good to use visuals (Stickers, posters, reminders) where staff are spending time (i.e. kitchen, recreational area, smoking area) on avoiding putting hazardous wastes, process chemicals down the drain).



2- Clients' awareness to reduce water consumption and pollution

To prevent water pollution and reduce water consumption at your facility, it's vital to educate tourists about the importance of these topics. You can engage with guests during their stay at your accommodation facility in many ways:

a) Placing stickers in the toilets with messages for tourists about water saving in showers such as: "we all love singing! Try a 3–5 minutes shower song to spend less time in the shower and save water! Do you know that showers consume an average of 80L VS baths consume 200L?!", "take cold showers and dance like a bird! It's good for both your health and water resources".

b) Suggest to your guests washing towels only when dirty and upon their request (every 3 days for example).

c) Leave for tourists messages in the rooms and in toilets about water saving while brushing their teeth: "Your smile, no doubts, is very precious! but water resources are precious too! A good brushing of the teeth lasts between 2 to 3 minutes so remember to turn off the tap while you brush your teeth and use a water glass".



d) You can add tips concerning water pollution prevention for tourists in your facility's toilets, such as: "Marine life appreciates you not flushing medicines", "The entire ocean is very happy when you reduce the use of soap".

e) Uploading videos on the website of your facility about the sources of water in the area is very important to show tourists water value and encourage reducing water consumption.

f) You can consider adding a section about water consumption and pollution in your guest feedback form.

3- Choose ecological cleaning products

Minimizing the use of harmful chemicals by substituting them with environmentally friendly alternatives is a great way for you to prevent water pollution at your hotel or accommodation facility. You can consider buying NF labelled eco-friendly products- detergents without phosphates instead of the regular ones.



4- Properly manage the establishment's wastewater

Proper management of your facility's wastewater is an essential solution that you can implement to prevent water pollution. Gray and black water represent factors of diffuse pollution in the environment. In natural areas, most of the time settlements has their own sanitation system, and for such kind of sanitation systems, there are different levels of intervention:

- a) Checking the sanitation system of the facility (septic tank) to make sure that their content is not nearing the inlet or outlet baffles and carried out to the drainfield.
- b) Control leaks in the networks within the establishment to make sure that there is no pollution diffusion happening.
- c) Separate black water from grey water when possible. Grey water can be decanted, treated, and reused for many purposes including watering gardens, toilet flushing, firefighting, and car washing.
- d) Implement an ecological sanitation system in your facility like phytoremediation (find more technical details in the section Technical Solutions, Water saving, phytoremediation).



Technical solutions

Saving water

1- Efficient fittings

Reducing water use in guest areas by installing low flow fittings or retrofitting existing fixtures is a fundamental and cost-effective best practice for your hotel. This strategy applies to guestrooms, toilets, showerheads, and faucets, where flow restrictors can be replaced with efficient ones.



The most proper environmental indicator for water efficiency of taps and showers is flow rate expressed in L/min. For example, flow rates of less than 7 L / min for showers (low-flush showerheads) and 6 L / min for taps (low-flow faucets) and a maximum effective flush volume of 4.5 L per flush for toilets are considered as benchmarks of excellence for water use in guest areas (Styles et al., 2013).

Proposed benchmarks of excellence for water use in guest areas

Aspect	Best practice	Quantitative benchmark
Shower fittings	Low-flow showerheads and aerators	Average shower flow rate ≤ 7 L/min
Retrofitted tap	Aerators and flow-restrictors	Average tap flow rate ≤ 6 L/min
New tap fittings	Spray taps	Average flow rate ≤ 4 L/min
Toilet	Low-flush, dual-flush	Average effective flush ≤ 4.5 L/min
Urinal	Waterless urinals	Average urinal water use ≤ 2.5 L/person ^(*) /day
Guest information	Prominent notices in all bathrooms on water-saving measures	NA
Total water use in guest areas	Implementation of all above measures	Average water use in guest areas ≤ 100 L/guest-night.

(*) Based on average use rate.

These benchmarks do not apply to accommodation where most bathrooms are shared across rooms.

Aerators are water saving devices that control the amount of water flowing through the tap without affecting the water pressure as they mix the water with air. Inexpensive and easy to install (UNEP, 2003).

Fitting	Cost	Saving			Payback
		Water	Heating (Oil)	Total	
	EUR	EUR/Year			Months
Low-flow basin taps	100 - 200	305	252	557	2 - 4
Low-flow showerhead	170 - 250	305	377	682	3 - 4
Low-flush toilets	150	99	-	99	18

Source for prices: (Styles et al., 2013)

Commenté [2]: After this sentence, a pop-up window will appear in the platform with the following text:

Did you know that installing low-flow showers throughout all guest rooms in your facility can reduce guest water consumption by almost 10%?

Commenté [3]: After this table, a pop-up window will appear in the platform with the following text:

Did you know that installing water saving devices is an investment that can result long term economic as well as environmental benefits?

(Prices in this table could vary depending the type of fittings and the country)

2- Rainwater harvesting



The Greek philosopher Aristotle (384-322 BC) gave the first lessons of rainwater harvesting and sustainability. He wrote 'cities should have plenty of natural sources of water, otherwise large reservoirs should be used for the collection of rainwater' (Aristotle, Politics, Book 7, Section 1330b) (Angelakis, 2016).

Rainwater harvesting is the practice of collecting and storing rainwater runoff for valuable functions. The overall objective of this technique is to overcome the increasing demand for water and ensure the sustainability of all beneficial uses (Angelakis, 2016).

You can install a simple rainwater collection system from your roof and store water in a tank until you need it. If you want to use the harvested water for your garden, you might need only a 500-liter water tank with a connection to a soak hose or a tap.

Commercial prefabricated tanks are available in sizes of up to 7m³ for underground types and 10m³ for above-ground types. (Styles et al., 2013).

You can use the harvested rainwater for:

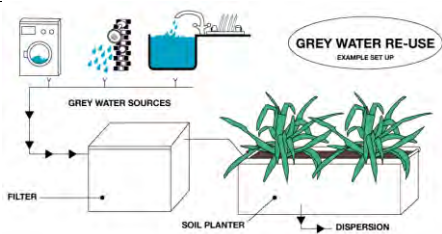
Irrigating your hotel garden
Flushing the toilets
Laundry

Costs of installing a basic rainwater collection tank vary depending on many factors:

- Tank material
- Tank size
- Installation and delivery requirements
- Pipes, filters, or treatment
- Any plumping requirements
- Annual inspection fees.

3- Reusing greywater

Greywater is the wastewater produced in washbasins, kitchen sinks, laundry, showers, and baths. Once collected separately from blackwater, treated, and disinfected it can be reused as a non-potable water source (Pacific Institute, 2010).

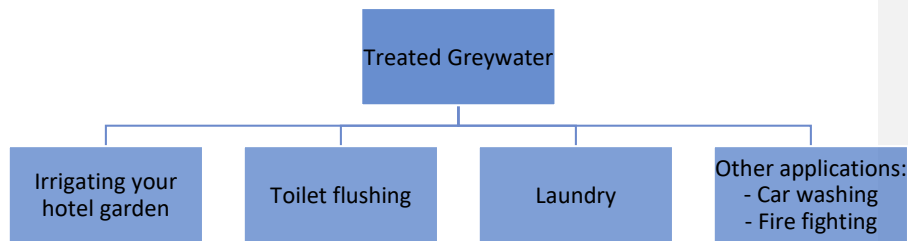


Source: <https://genesiswatertech.com/blog-post/can-reuse-gray-water/>

Installing a greywater reusing system that supplies internal or external water demand in your hotel, can reduce your need on the main water supply system.

(Before you install a greywater system, contact your local authorities. There is diversity in the approaches of greywater regulations internationally, it can be legal with few restrictions to prohibit in all circumstances.)

You can use the treated greywater at your hotel for:



Water recycling can reduce water consumption by 10%. (Styles et al., 2013)

Greywater treatment methods vary from simple, low-cost devices that route greywater directly to applications such as garden irrigation and toilet flushing, to highly complex and expensive treatment processes incorporating sedimentation tanks, bioreactors, filters, pumps, and disinfection units (Pacific Institute, 2010).

Greywater treatment is an economical solution for your facility only if you plan for a major renovation. The payback of this system when installed in the new building, is over 2 to 14 years depending on water prices (Styles et al., 2013).

4- Natural swimming pools

Because swimming pools consume a large amount of water and chemicals, installing natural swimming pools or optimization of conventional ones at your guesthouse would be a great solution to reduce water consumption and to prevent water degradation due to the use of chemicals.

Natural swimming pools are defined as pools that clean themselves via a self-cleaning ecosystem within the pool.

Natural swimming pools:

- Use biologically treatment methods and water filtration

- No use of chemical treatment
- To give clean water.

They use naturally occurring biological treatment methods and water filtration to provide clean bathing facilities without the use of disinfectants or devices to sterilize the water (Styles et al., 2013). In these types of pools, the water is circulated between a plant-free swimming area and the regeneration zone, in which aquatic plants are hydroponically rooted. The 2 zones are physically separated by a submerged retaining wall.



This solution is a great safe and sustainable alternative to chemical and mechanical treatments used in traditional swimming pools worldwide.

The number of hotels and guesthouses installing these eco-friendly green alternatives is increasing around the world.

5- Phyto-purification of wastewater

Phyto-purification is an autonomous sanitation utility for people who are not connected to the sewer system, like in most natural areas where most accommodation facilities and hotels have their own sanitation system. Therefore, implementing a Phyto-purification system is a very good solution to get rid of wastewater by treating it ecologically to avoid polluting nature. It uses the depolluting power of certain plants, by using bacteria present in the root systems of these plants to purify water. It's a great way to treat wastewater polluted by chemicals like phosphates and nitrates (Schröder et al., 2007).

Steps of implementing Phyto-purification system in your accommodation facility:

- Make a basin- pond with horizontal flow.
- Fill it with aggregates (LECA- lightweight expanded clay aggregate).
- Plant it with plant species capable of absorbing the polluting loads.
- Make a second pond, or a ditch planted with semi-aquatic species.
- Install a drain to evacuate water from the first basin to the second one.
- The first basin must be located higher than the second so that the water drains naturally.



By the action of bacteria present in the roots of purifying plants, water passes through the filters and is treated progressively.

Most common plants used for Phyto-purification:

- Bamboos
- Reeds
- Cattails
- Sedges

- March Iris

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Case studies

1- A global Water Preservation Plan for Camping

The Camping “La Fontaine du Hallate, Bretagne - France has developed a complete policy for water preservation and sobriety.

The plan includes:

- Installation of economical and timed taps
- installation of a pressure reducer at the entrance to the campsite to lower the pressure to less than 3 bar
- To improve performance: on each arrival at the tap (hot and cold water), a valve to limit the flow was inserted (eg. showers: 5 liters / minute, compared to the ‘normal’ flow of between 15 and 20 liters per minute).
- Hot water: installation of 45 m² of thermal solar panels, completed by 6 mixing valves at the hot water tank to distribute water at different temperatures according to use (shower, sink, laundry...).
- Rain water harvesting with a 10,000 liter tank which is used for washing the outside of the mobile homes at the start of the season and the floor of the sanitary facilities during the season.

This policy helped them to stabilize water consumption at 65/70 liters per night since 2010, compared to the 94 liters / night in 2007.

By reducing water consumption, they also reduced the volumes of wastewater. The camping managers decided to use green technology for wastewater treatment and chose a phytoremediation method.

- Water from sanitary facilities (showers, washbasins, toilets, sinks, laundry) and mobile homes arrives in the sanitation area (approximately 3,000 m²).
- Firstly, unwanted items (plastic bags, wipes and other objects that cannot decompose) are captured by a filtering grid.
- The second station is a 60,000 liter tank at the bottom of which the heavy and solid materials are ‘caught’, then the liquid comes out to pass through a volcanic rock filter with a volume of 3 m³, in order to retain the fine particles.
- Then, a flushing system stores 1,500 liters before releasing them into a 200 m² filter tray which will complete the filtration.
- The clear water that emerges is then poured into an open ditch before being absorbed in an area planted with wicker and wetland plants (approximately 5,000 m²).



photo: ATD

Discover this experience on ATD-Bonnes pratiques: <https://www.tourisme-durable.org/bonnes-pratiques/hebergement/item/403-les-eaux-usees>

And the camping La Fontaine du Hallate on: <https://www.camping-morbihan.bzh/en/>

2- Rainwater harvesting, reusing greywater, adapting practices for reducing water consumption, and reducing harmful chemicals' use

AGRIKEA is a boutique farmhouse located in the Greek Cycladic Aegean Island Kea. The farmhouse proves its commitment to environmental protection issues including water conservation. The water used in the guesthouse is mostly collected from rainwater in an 80,000L tank. In addition, the guesthouse recycles its greywater biologically and uses it in watering the farm. The gardens are planted with native drought tolerant plants and trees that require minimal irrigation. Furthermore, all the cleaning products used in the rooms of the facility and for laundry are biological. The swimming pool of the guesthouse is ecologically designed.



Link to article: <https://www.agrikea.com/images/Environment%20Protection.pdf>

Source: <https://ecotourism-greece.com/hotels/agrikea/> (ecoclub.com label)

3- Natural pool, Rainwater harvesting

Chaumarty is an ecological lodging located 40km south of Toulouse, Southwest France, that offers a panoramic view of the Pyrenees mountains. The lodging offers its visitors the chance to swim in a natural freshwater swimming pool of 40m² size and 2m deep, plus a smaller and shallower space for children (80cm) with no chemicals used in it like chlorine or other chemicals, which means skin of swimmers and the lodging garden remains healthy and no itchy eyes!

Tourists' swim surrounded by aquatic plants and flowers like water Lilies, irises and papyrus that naturally purify the water.



The swimming pool has very limited ecological impact, a large underground tank of a 30m³ size collecting rainwater from the roof of the shelter to go directly into the pool, makes it unnecessary to add tap water to it.

Link to the lodging website: <https://www.chaumarty.com/fr/un-lieu-preserve/le-bassin-naturel>

Source: <https://www.greentraveller.co.uk/post/hotels-natural-swimming-pools>

(Ecogîte labeled)

Waste Management

General issue

The literature review on the theme of waste in hospitality in any type of hotel, in general management has focused on the practices that give rise to food waste, with special focus on the kitchens of the hospitality. There are several case studies on the perceptions of staff involved in the food waste chain using a quantitative approach. The results revealed that the staff involved generally show a positive perception of the environmental issues related to food waste production. With this positive basis, the studies recommend that general hospitality initiatives focus on food waste policies and procedures that capitalise on the positive perceptions involved by helping staff to create a better balance between their beliefs and working practices. However, waste is not limited to food, but there is also waste in other areas of hotels. There must be a generalised concern for recycling in all areas of the hotel and it is recommended that from the rooms to the public and operational areas, waste is separated into at least 5 fundamental areas: Glass, Paper, Packaging, Organic and Unidentified.

Learning Outcomes

On the successful completion of the module, participants should be able to...

KNOWLEDGE

You will learn:

1. About the impact of tourism on waste production
2. How to reuse food
3. How to better manage the waste produced
4. Different uses for food waste other than being garbage.

SKILLS

You will be able to:

1. Save money by reusing the "waste"
2. Prevent waste
3. Help the environment
4. How to implement good practices in order to prevent food waste

RESPONSIBILITY and AUTONOMY

To perform this task, you need to:

1. Create an environment of individual good practices in your accommodation
2. Implement new methods to prevent food waste
3. Implement new practices inside the kitchen with the staff
4. Create a conscious dialogue with your guests.

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Guest awareness

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Estimated duration: 75 minutes

Managerial solutions

1- Analyze and estimate your waste

A good first step is to be mindful and conscious of the waste your accommodation produces. In order to better manage your tourism accommodation, start by identifying the waste you produce, in the best way you can. This step may include identifying waste by type (plastic waste, paper waste, food waste, etc) or topic (kitchen waste, rooms waste, etc), and you should strive to be as precise as you can, even when it comes to volumes. Making a simple excel sheet with a table where you can visualize the waste you have, would be a great idea. Also, in the **technical solutions** section, it will be shown how to extensively analyse your waste. [Did you know that, although there is enough food produced in the world to feed everyone, approximately one in ten people does not have enough food to eat?](#)

2- Reducing food waste in the kitchen

Inside the tourism sector, the majority of the food waste tends to happen inside the kitchen. According to [Alice Platform](#), two-thirds of food waste occurs even before it gets to the consumer's plate. This waste could (and should) be avoided. The same source mentions that we can find that accommodations' kitchens waste between 5% and 15% of the purchased food. This has a negative impact not only on the environment, but also on the accommodation's finances. A possible solution to this problem would be to hire a chef that specialises in recipes that avoid food waste. As a matter of example, some recipes can use carrot and potato peels. The chef can also be responsible for teaching the rest of the kitchen staff how to prepare these recipes and avoid food waste.



An example of a chef that avoids food waste is Natália Finger in Lisbon. Finger has been the head chef of *Ortêa Vegan Collective* for 2 years and is a postgraduate in Quality Management in Gastronomy. Reducing food waste is one of the priorities in her kitchen. She developed a course focusing on gaining new skills to avoid food waste, learning the importance of avoiding food waste, and new ideas for new solutions in the kitchen such as the purchase of different products. The following table has all the information regarding this course.

	Category: Small hotel / guest house / small accommodation / under 200 bedrooms / zero stars / 1 star / 2 stars	Category: Big accommodation / big hotel / resort / 200 rooms minimum / 3 stars / 4 stars / 5 stars
Duration	16 hours split in 2 days	16 hours split in 2 days
Goal	Develop new skills using food that is usually wasted. Learn new recipes.	Develop new skills using food that is usually wasted. Learn new recipes.
Maximum number of participants	6	12
Price	1500€ - 2000€	4000€ - 5000€

With that said, if you don't have the resources to hire a chef specialising in food waste, you could instead offer training to your staff.

3- Redistribution of unused food among workers

As aforementioned, accommodations waste around 5% to 15% of purchased food. An easy and quick to implement solution is to split and give away this food to the employees at the end of the day.

4- Non-Governmental Organisations

Your accommodation can contact NGOs or charities and donate food they would, otherwise, waste. In different parts of the world, there are organisations/initiatives that collect food that would be wasted and redistribute them to people in need. An example is [Re-Food](#), from Portugal. Looking for these organisations is not only good for the environment, but it also helps society as it helps ensure food poverty is eradicated. Another example is [Boroume](#), a Greek NGO that developed a network to reduce food waste and increase food donations to charities and their beneficiaries using the easiest, fastest and most immediate way: the [Boroume food saving & offering method](#)! The NGO maps and documents the food needs of charities all over Greece and is contacted by all kinds of food donors for potential donations. It connects food donors with recipient charities based on their geographical proximity and the relevance of the donation to the current needs of the charity and coordinates the pick-up of the donation by the recipient charity. In addition, the organisation has developed the first Certification Scheme for companies and organizations to reduce food waste "NO FOOD WASTE", in cooperation with TÜV Austria Hellas. The "NO FOOD WASTE" Certification Scheme applies to organizations operating along the entire food chain (from primary production, to processing, and retail distribution or provision of services such as catering, hospitality, health, educational structures, etc.) regardless of the size of the structure. [Did you know that throwing away one burger wastes the same amount of water as a 90-minute shower?](#)

Remember that donating is not only exclusive to food. You can also donate (or sell) items that you will not use in your establishment anymore.

5- Partnering with organisations/networks that sell food waste at a discount price

Another solution is to join organisations/networks such as [Too Good To Go](#) which sell food that would otherwise be wasted at a lower price. This could still make your accommodation some money, thus reducing the financial impact of food waste, and can be paired up with the two previously mentioned options, in case there is still some food left.

6- No self-service breakfast (buffet) or lunch

It is common for tourism accommodations to have a large and varied self-service breakfast (buffet) or lunch. Whilst guests are often appreciative of this, it can cause issues regarding food waste as guests will oftentimes get too much food and not finish it. Another issue is that this food cannot be reused. Thus, having a breakfast/lunch menu with a quantity limit where guests can order what they want within said limit can be a potential solution.

If you wish to maintain a buffet, it will be necessary to raise awareness among your customers, and to discourage excessively large portions (for example, by charging more for everything that is not consumed).

Technical solutions

1- Recycled packaging

Choose less packed products and prioritise recycled packaging. When shopping, many items are made from at least 30% recycled materials. Furthermore, they are often reusable (e.g., glass bottles or even bottles made from recycled plastic). In Addition, you can favour local production in order to give the packaging back. But also buying ingredients for your accommodation and your restaurant from local suppliers typically minimizes packaging while also costing less and supporting producers' economy.

2 - No plastic

Opt for buying plastic-free products. For instance, you can purchase soap instead of shower gel as they use less plastic. Also, some brands have soaps in plastic packaging and in cardboard packaging. not only is Cardboard is more environmentally friendly, and furthermore, products with cardboard packaging are often cheaper (e.g., three Nivea soaps in plastic packaging in Portugal cost 2,67€, three soaps from the same brand in cardboard packaging cost 2,49€). Additionally, some places allow you to buy some items without any packaging at all, see for instance [Original Unverpackt](#) in Germany. In addition, buying ingredients for your accommodation's restaurant from local suppliers typically minimizes plastic packaging while also costing less and supporting producers' economy.

3- Limiting your offering of single-use items

One of the most important solutions to reduce your accommodation's waste is to avoid offering single-use products, particularly plastic ones. You can think about all the single-use items used in your facility and replace them with multi-use items. For example, in rooms and restrooms, you can put natural and ecological liquid soaps in refillable dispensers instead of offering packed single-use soaps, furthermore, you can replace the little bottles of shampoos and conditioners with big ones.

In rooms and restrooms:

- Soap and detergent: you can replace the packed single-use soaps with natural and ecological liquid soaps in refillable dispensers.
- Shampoos and shower gel: you can replace the little single-use bottles with big refillable dispensers.
- Avoid any other disposable item: avoid offering little packs of body lotions, or slippers with plastic bags.

For breakfast and lunch/dinner:

- Honey, jams, and chocolate: instead of offering these products with little plastic packages, you can use glass and stoneware plates and bowls
- Homemade sweets: you can avoid plastic packaging of pastries by introducing cakes and biscuits made by local bakeries
- salt, oil, condiments: here too, prefer packaging in reusable and washable containers.

(You can see an assessment report on Greece, Portugal, France, Italy, and other European countries moving on from single-use plastics:

<https://rethinkplasticalliance.eu/wp-content/uploads/2021/06/SUP-Assessment-Design-final.pdf>)

In general, sanitary regulations in the hotel industry impose strict standards which are sometimes incompatible with the reduction of waste. However, whenever possible, use bulk supplies (sugar, soap, etc.) that you distribute in reusable containers in rooms or common areas.

4- The 3Rs – Reduce, Reuse, and Recycle

Waste minimization can be achieved in an efficient way by focusing on the first of the 3Rs, “reduce”, followed by “reuse” when the first is not possible, and then followed by recycling when reusing is not possible.

- Reducing your facility’s waste is done by choosing to use things with care to reduce the amount of waste generated, for example replacing single-use products with reusable ones (see above).
- Reusing or upcycling items is one of the best ways to deal with waste at your facility. For example, old furniture could be repaired or modified into other items, old jars, glass bottles, pallets and car wheels can decorate your gardens and rooms. You can also involve your staff in this process, as they will likely be happy to take on more creative tasks.
- Having an efficient recycling program at your facility will ensure that plastics and other waste materials are correctly identified, sorted, and collected to be delivered to the appropriate processing plants. You can contact the municipality in your area for this matter, or simply your staff can dispose of the sorted waste in the appropriate recycling bins near your facility. Waste sorting is a process that everyone can get involved in, including your guests. For this reason, it's important to add recycling bins within rooms and shared spaces and to make sure they are clearly labelled for specific types of waste, and you can also add some simple information on waste sorting and recycling and post them next to the bins, and your guests will naturally participate in sorting! It's important that waste is sorted correctly to ensure that everything is recycled, if possible, or else disposed properly. [Did you know that there is also the "5 R's : refuse, reduce, reuse, recycle, rot \(compost\)"? This is an alternative to the 3 R's that might interest you!](#)



Find out about the sorting instructions

To avoid any errors, remember to consult the informative logos most often placed on the back of the product packaging.



The Triman

The product or packaging must be sorted at home or brought to a specific collection point for recycling.



The crossed-out bin

The product is collected separately. It can be taken back to the shop or to the waste disposal centre and must not be thrown away with the household waste.



The Möbius Ring

Products or packaging with the empty Möbius ring are recyclable! When a number is indicated inside the triangular symbol, it indicates the percentage of recycled material that goes into the product. As an example, here the product or packaging contains 65% recycled material but is not necessarily recyclable.



The green dot

Please note that the Green Dot does not mean that the product is recyclable. It appears on 95% of the packaging and just ensures that the company financially supports the national household packaging recovery programme.



Today, only bottles and flasks (PET and PE-HD) are recycled in all countries of the European Union.

Bottles for food products (drinks, oil bottles), hygiene products (dishwashing liquid, bleach) or beauty products (shampoo, shower gel).

5- Repairing goods

The best way to manage waste, is not producing them! It's a good principle that you can follow to reduce waste production in your accommodation facility. For example, before getting rid of an old washing machine or any electrical device in your facility as a waste, look to the possibility of repairing it. Some

professions focus on the repair of electronics but also everyday goods, therefore, when one of your devices or objects is broken, don't hesitate to visit a local shop that could repair them.

In most countries, there are now recycling centers that allow you to both donate/sell items you no longer use and buy new ones from reused/recycled materials.

The repair café for example, is an attractive initiative which proposes to people to help in the repair of their goods and equipment. Some professionals offer an equivalent service of supervision and accompanied repair by training you to do most of the repairs yourself.

(See in Greece and many European countries:
<https://www.repaircafe.org/en/visit/>).



6- Transforming from waste to social inclusion

If you have objects in your facility that are no longer needed, and you can't find for them a second use, a good solution is to give them away to help people around and to support initiatives run by social economy structures that promote social inclusion and employment, by doing that you will be supporting both the society and the environment through reducing the amount of waste produced. You can find below some options where you can donate these objects:

- Second-hand shops.
- Charity and local associations such as "Thrift or Charity Shop" collects objects to restore them and give them a second life.

(see: <https://thriftstore.gr/>).



7- No waste for the reception

Tourist accommodation receptions can be a major source of waste due to paper waste. You can cut down on unnecessary paper waste through the following:

- Using digital resources such as emails and electronic invoices.
- Printing documents, when necessary, only and making sure of choosing double-sided printing.
- When printing can't be avoided, use recycled paper.
- Creating a digital option for guest's information instead of flyers.

8 - Expiration dates

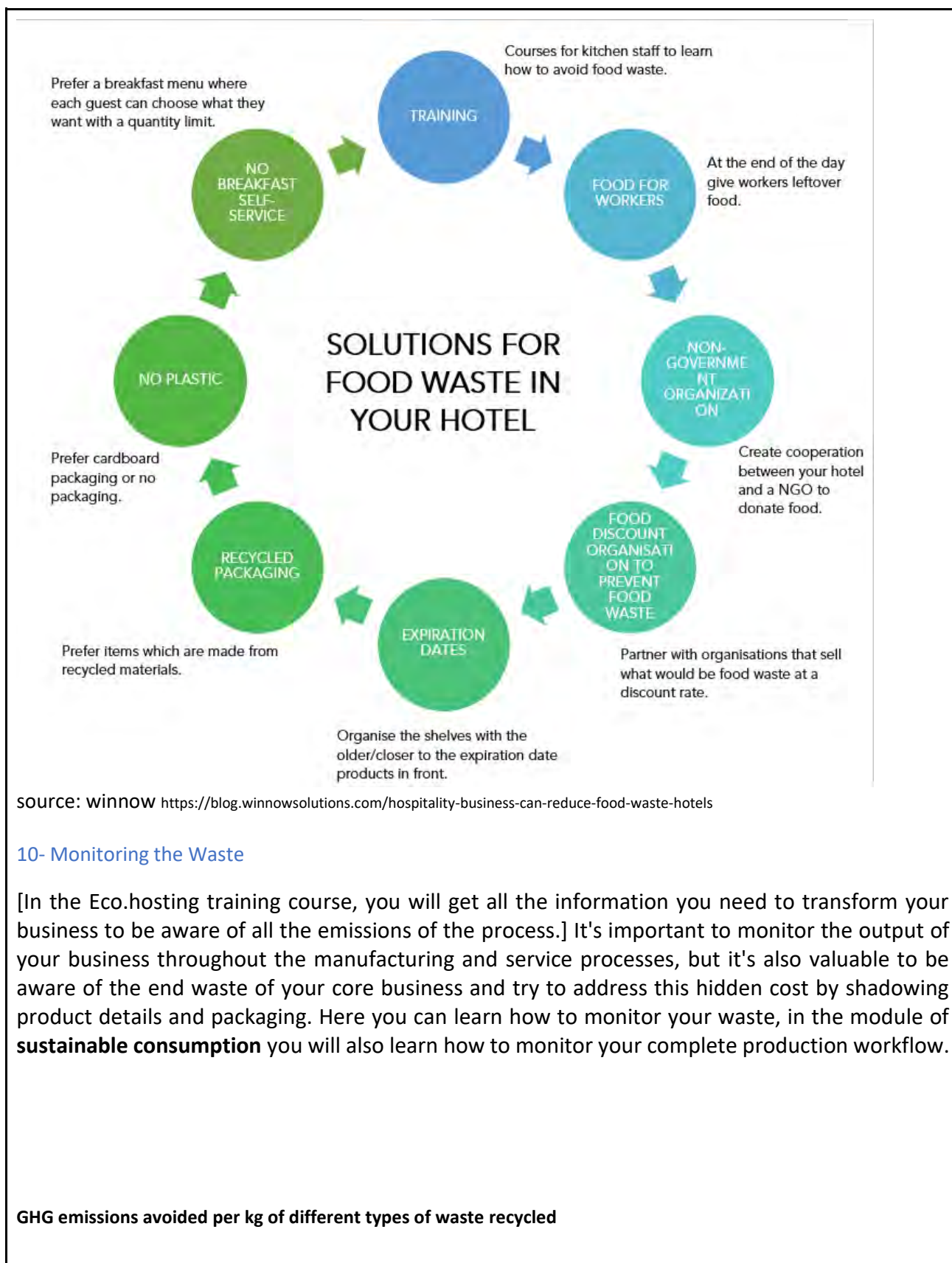
Try to organise your food storage by expiration date. Keeping the older and closer to the expiry date in an easily accessible and visible place. This way you can avoid wasting food until it is past its expiration date.

9 - Food composting

Composting is the process involving the managed decomposition of organic material (such as vegetable and fruit peelings, eggshells, coffee bags, etc.) (Urban waste, 2020). Composting produces fertiliser which can be used for green roofs, decorative plants, urban gardens, vegetable gardens etc. It also results in cost savings in fertilisers and it contributes to closing the nutrients' cycle (by returning nutrients from vegetables and fruits back to the soil). Also, the compost you produce can be either used in your accommodation, sold or donated to farmers, non-profit organisations, etc.

If you want to compose your waste, there are two main ways to do it. The first one is through offsite collection, and the second is through onsite composting. If you have limited space, offsite collection might be the preferable solution, and it consists of sending your compostable materials to another location where it will be then composted. If you see this as the best option for you, you could search for composting services near you or search if your local municipality offers that service. In case you have the space to compost yourself, you can either invest in an electric composter or you can compost outside. Regarding the former solution, electric composters can be easily installed in the kitchen or maintenance room of your accommodation, and do not require any labour-intensive activities. Regarding the latter solution, if you want to build your natural composter outside and/or want to know more about composting in general, you should check the following website: [Garden Organic | Composting](#).

Food Waste Scheme



Material	Glass	Board	Wrapping paper	Dense plastic	Plastic film
kg CO2	0.92	1.60	1.51	3.32	2.63

Every kilogram of this material we save allows us to economize the relative amount of CO2 listed in the table above. However, it also allows you as a tourist accommodation manager to save a lot of money. For example, using a soap dispenser halves the expense for this piece of furniture in one year. It's not just about offering a different choice for waste. It's about measuring your waistline before and after implementing green action in your management. First, you need to print out a map of your hotel and figure out what kind of waste you have and where it is located.

You can prepare a table like this one, applying it to each space or service type you have in your hotels, any spas, gym, etc. This table allows you to record and calculate the amount of waste you are producing.

Area	Waste Type 1 – landfilled 2 – recycled	Conversion Factor CF	No. bins A	Bin volume (litres) B	% volume of each bin filled with waste C	Frequenc y of bin emptying	No. times bins emptied each week D	% volum e of each bin filled with waste E	Weekly waste volume (WWV) (litres) AxBxCxDxE	Estimate d weight per week (kg) WWV x CF
Bins serviced by hotel staff										
Reception & offices	Garbage1									
Kitchen	Garbage1									
Restaurants	Garbage1									
Hotel bar	Garbage1									

Conversion factor: attention should be paid to conversion factors. The reference bin used in this research is approximately 1.28m³. Multiplying the volume of the bin by this conversion factor gives the total tons of waste.

Material type	Conversion factor (m3 to tonnes)	Material type	Conversion factor
Garbage	0.21	Edible oil and fat	0.61
Paper and cardboard	0.21	Wooden packaging	0.23
Plastic bottles	0.05	Textiles	0.27
Plastic film	0.01	Concrete	1.27
Tins and cans	0.06	Bricks	1.20

Biodegradable kitchen and canteen waste	0.20	Tiles and ceramics	0.59
Electrical equipment	0.21	Mixture of concrete, bricks, tiles and ceramics	1.24
Garden waste / Green waste	0.28	Wood	0.34
Glass	0.61	Furniture and bulky items	0.18

Here you can find the complete guide to the research: [Waste Management](#)

Guest awareness

To fight waste, one can't forget guests and their role in this process. For instance:

- If your accommodation has a self-service breakfast/restaurant, ensure that you don't make too much food for the number of guests, and reduce/remove items from the self-service area which few guests enjoy;
- Buy rechargeable and refillable products. Opt for eco-refillable products. Eco-refills are often available for household products, cosmetics, as well as certain foodstuffs;
- Advise your guests to eat in eco-friendly restaurants, and make your own restaurant, if you have one, eco-friendly;
- If your accommodation has rooms with their own kitchen/kitchenette and/or has a shared kitchen area, raise awareness about not buying food/leaving food they will not eat.

For a better guidance of your guests on the waste they produce see the following guide:

https://www.oneplanetnetwork.org/sites/default/files/from-crm/WWF_FoodWaste_GuestComms_Toolkit.pdf

List of solutions illustrated with video

- Chef teaching how to cook with food that is usually wasted
- Giving food waste to workers and NGOs

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Case studies

1. Composting of organic waste, guests are invited to buy organic produce from the gardens

Monte da Cunca - ECO Apartments are short-term rentals in the Algarve region of Portugal. These apartments are located next to beaches known for being surf spots. The smallest apartment has only 18 m² and hosts 2 persons and the largest has 42 m² and hosts 4 persons. They were restored by hand and using traditional Portuguese elements such as mud bricks and stone walls, as well as using materials like clay, reed, and eucalyptus.



These eco apartments also have their own organic produce garden which guests can purchase. Organic waste is used for composting, energy comes from solar panels, and the water comes from a well and is periodically tested. A glass bottle is provided and guests are given a flyer about the environmental impact of plastic waste from plastic bottles. Furthermore, all cleaning supplies used and provided in the apartments are eco-friendly and they buy soap from a local artisan.

Link to the lodging website:

<https://carrapateirasurf.com/>

Source:

1- <https://anaqoslowly.com/2020/01/monte-da-cunca/>

2. Selective waste treatment and composting

Cocoon are luxury eco lodges in the Alentejo region of Portugal. They are situated in a rural area in a pine forest next to the beaches of Carvalhal and Pego. Guests can rent a suite or a 1-bedroom or 2-bedroom lodge. They are one of the few touristic accommodations in the area having Environmental certification. They meet the Green Growth 2050 Global Standard, have been recognized as the best ecotourism project by Portugal Trade Awards in the years of 2015, 2016, 2019, 2020 and 2022, and were awarded the 2017 Green Project Award in Tourism. The reason for this is due to their compromise to sustainability and environmental protection whilst offering a luxurious environment for their guests. They manage and optimised their water and energy consumption by using thermal solar and photovoltaic technologies as well as having a biological pool, they have a selective waste treatment implemented and compost

their organic waste. They also have their own organic vegetable garden where they get their produce from and guests have bicycles available free of charge.

Link to the lodging website:

<https://www.cocoonlodges.com/>

Source:

<https://www.simbiotico.eco/ecospot/cocoon-eco-design-lodges>



Energy Management			
General issue			
<p>Energy consumption is a huge issue, and it can result in unwanted consequences for the economy of your accommodation but also for the environment, with climate change being a devastating consequence that we must combat. By better managing your accommodation and applying better practices in regards to energy, you will be able to, not only save your resources and money, but also help the planet. You will also potentially increase the motivation of your employees, and increase your market visibility, amongst other positive outcomes.</p>			
Learning Outcomes			
On successful completion of the module, participants should be able to...			
	<p>KNOWLEDGE You will learn:</p> <ol style="list-style-type: none"> 1- About the impact of tourism on energy consumption 2- About sustainable solutions to reduce energy consumption 3- About the impact of energy consumption on climate change 4- About cost reduction related to better energy management 	<p>SKILLS You will be able to:</p> <ol style="list-style-type: none"> 1. Save a considerable percentage of energy, resulting in savings for your business; 2. Help the environment by developing new renewable practices. 3. How to apply new practices in your accommodation, and how to choose the best option for your accommodation based on its dimension; 4. How to install and choose 	<p>RESPONSIBILITY and AUTONOMY To develop this task, you will need to:</p> <ol style="list-style-type: none"> 1. Create an environment of individual good practices in your accommodation; 2. Have a budget for investment in order to implement some of the new practices (e.g. solar panels and runners sensor); 3. Enhance the consciousness of your team about energy waste and thus promote energy saving.

		new types of equipment according to the specificities of different areas of your business (e.g.rooms, laundry, pool, bathrooms).	<ol style="list-style-type: none"> 4. Develop a general energy management plan for your facility 5. Monitor your energy consumption
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Estimated duration: 70 minutes			

Managerial Solutions

1. Energy Monitoring

Monitoring the energy you consume is crucial if you want to better understand how you consume it and how you could optimize it. For that, a plan that includes the monitoring of energy consumption across the major energy-consuming processes and areas in your accommodation is vital. Try to draw up the inventory of main energy-consuming devices. Then, monitor the energy consumption at least on a seasonal basis and calculate the energy consumption per m². The free [toolkit](#) developed by the [World Tourism Organization \(UNWTO\)](#) could be a start for the development of your energy plan. If you want a simpler approach, you can also use the [Monitoring platform](#) of [EchoTourism](#). There you are able to monitor your consumption and your improvement only with some basic data from your electricity bills.

2. Energy efficiency plan

Try to identify priority measures in order to reduce your energy consumption. Propose concrete and appropriate benchmarks for particular processes, and do not forget to base it on energy consumption per m². Define your targets to drive continuous improvement for your accommodation. Some advice is to:

- Regularly clean your air conditioner filters (every 2 weeks), because when dusty or clogged, they hardly allow cold air to pass through, and therefore visitors will need to reduce the temperature which will consume more energy.
- Replace your air-con's air filters once every three months.
- Maintain clean refrigerator condenser coils. If they are not, it will be harder to eliminate heat, and consequently, spend more energy. Also, you can leave at least 5 cm of space between the back of the refrigerator and the wall to allow proper air circulation for the refrigerator condenser coils.
- Be aware of your refrigerator temperature. It should be between 3 and 4 °C, whereas the freezer should be between -17 and -15 °C. If they are more or less than these temperatures, they can spend more than 25% of their energy.

But, why should you have an energy efficiency plan? These are 3 good reasons to implement one:

- Good energy practices automatically generate cost savings.
- Medium and long-term investments in energy efficiency help with long-term profitability.
- It improves the reputation of your accommodation with customers and might give you a competitive advantage.

Since you probably will not be able to implement everything you would like to, the following table shows some sustainability practices that have the most impact on the environment:

Tools to encourage sustainability practices	Environmental Impact
Processes	

Include sustainability measures in operating agreements	High
Sanctions for not respecting the sustainability measures	High
Include sustainability measures in brand standards	High
Communication	
Communicate sustainability best practices and measures taken towards employees	High
Communicate sustainability best practices and measures taken towards the industry	High
Communicate sustainability best practices and measures taken towards owners/investors	High
Communicate sustainability best practices and measures taken towards guests	High
Training	
Staff training High	High
Raise guests' awareness	Medium
Monitoring	
Use of a monitoring system	High
Publication of sustainability reports	Medium
Set up of sustainability targets	High
Certification	
Apply for international certification	Medium
Encourage accommodations to apply for national certifications	Medium
Table 1. Sustainability practices' Impact (Upadhyay, A., & Vadam, C.,2015)	

3. Periodic Maintenance

Periodic maintenance is one of the most important solutions to apply in your tourist accommodation to reduce energy consumption. This practice may seem very easy, but it can save

a lot of energy. Having periodic maintenance in every part of your tourism accommodation, including lights, sensors, kitchen and laundry equipment, AC cleaning, isolation of the rooms, regulating the temperature of the water (if it is higher than normal), and others, can help prevent energy waste that usually occurs due to lack of maintenance, but also it can prevent equipment breakage and needing replacement by identifying what needs repairing. Did you know that installing external wall insulation can prevent up to 40% of heat loss in your accommodation?

4. Staff training and guest awareness

Another good solution towards reducing energy consumption in your accommodation facility, is training your staff to turn off unnecessary lights and devices on standby. It is important to note that staff training has a direct and immediate positive impact on the energy consumption and efficiency of your accommodation. In order to train your staff you can:

- raise awareness on efficient use of energy in the facility; and
- train your staff on energy-saving practices.

Do not forget to engage your staff by holding regular meetings to discuss energy waste and possible ways to reduce it.

You can also inform and engage your guests in simple actions to reduce their energy consumption. Raise awareness by, for instance, showing them some of the ideas we have on the ECO Hosting.net resources for tourists. You can also communicate with them through leaflets in the room, stickers on appliances or switches, etc. Just make sure the information is not too technical.

Technical solutions

5. Shifting from Incandescent lights to LED

As you may know, incandescent light bulbs are becoming out of the market all around the world. The European Union began the phase-out of incandescent light bulbs in 2009. With that, the transition to LED lights seems the right move by allowing you to save energy and, therefore, money. There is however another type of light bulb: the CFL light bulb. The table below shows you why the transition towards LED lights is the right choice:

	LED	CFL	Incandescent
Light bulb lifespan	25 000 hours	10 000 hours	1 200 hours
Watts per bulb in order to give the same amount of light (equiv. 60 watts)	8,5 watts	14 watts	60 watts
Cost per bulb	5€	2€	1€

KWh of electricity used over 25 000 hours	212,5 KWh	350 KWh	1 500 KWh
Bulbs needed for 25 000 hours of use	1	2,5	21
Total cost for 25 000 hours	26,25€	40€	171€

Table 2. Differences between LED CFL and Incandescent light bulbs (Source: Viribright and Earth Easy)

* The prices serve only as examples as they may vary. LED light bulbs' lifespan may also evolve as technology progresses.

As can be concluded by observing the table, LED lights are the optimal choice in the long run. Furthermore, to compare how much energy can be saved by switching, see the table below comparing how many watts are required according to the type of bulb in order to produce the same level of brightness.

LED watts	CFL watts	Incandescent watts
6-7 w	8-12 w	40 w
7-10 w	13-18 w	60 w
12-13 w	18-22 w	75 w
14-20 w	23-30 w	100 w
25-28 w	30-55 w	150 w

Table 3. Watts required to generate the same amount of brightness in LED, CFL and Incandescent light bulbs (Source: Viribright)



(Source: viribright.com)

Furthermore, for outside lighting, you can potentially implement solar lights as a solution. These lights do have the initial investment but because they are solar-powered they can save money in the long run.

6. Turning off unneeded lights

One important step to reduce the energy consumption in your accommodation facility is to turn off the lights you don't need. As an example, ensure that exterior lighting is turned off during daylight hours. Also, make use of natural sunlight when possible. For instance, your housekeeping staff should, whenever possible, take advantage of natural daylight when cleaning rooms. Did you know that only 5% of the power drawn by a phone charger is used to charge the phone? So remember to turn it off when you are done!

Source: <https://www.thegreenage.co.uk/15-surprising-energy-facts/>

7. Reducing lighting requirement

You can optimize the internal layout of the rooms in your tourist accommodation by taking into account the location of glass windows to make the best use of natural lighting and reduce the use of artificial lights.

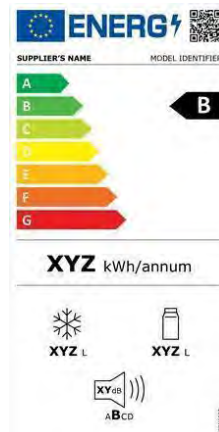
You can select the appropriate luminaires depending on the size of the room, and instead of installing large luminaires in a large space, you can choose multiple little ones because maybe visitors will not need to have them opened altogether, and therefore you can reduce the amount of energy consumed.

You can avoid dark colors of wall paints and furniture since light spreads by reflection in a room, and you can also avoid indirect light lamps in your decor where the light reflects off the walls or ceiling, so it's less effective! A good idea is to replace them with lamps with clear shades that let the light pass through.

8. Buying or replacing electrical equipment

When buying or replacing electrical equipment, try to use products with EU ecolabel or the top energy label classes whenever possible. To know more about the current EU energy labels applicable from 1 March 2021, follow the following link from the European Commission's website: [New EU energy labels applicable from 1 March 2021 \(europa.eu\)](https://ec.europa.eu/new-energy-labels/). Take into consideration that this label was slightly changed on 1 March of 2021. As an example, the labels A+ and A++ no longer exist if you are going to buy a new appliance. A good way to reduce energy consumption at your accommodation facility is to choose your appliances according to their energy performance, and the best way to do that is to refer to the information on the energy label of the appliance, the most efficient one being class A. Moreover, indicative consumption levels in kWh/year are included in these labels, which will help you select appliances with the highest energy efficiency.

Source https://ec.europa.eu/commission/presscorner/detail/en/ip_21_818



9. Smart Climate control

Every business has the need for climate control, and the truth is that, if you pay attention to multiple examples of smart climate control, you will understand that, by installing those in your accommodation you will be able to save money and reduce the impact on the environment. The use of smart heating, ventilation and air-conditioning (HVAC) systems you can save up to 38% on your heating and cooling bills (US Energy Agency, 2012). In the air-conditioning (AC) and heating market, there are other types of smart systems that could be more appropriate for your accommodation, and reduce energy consumption. But one thing you should keep in mind is to always have the AC filters clean, which will result in more efficiency. You should search more about what smart system you can use in your accommodation. Also, do not forget to close doors and windows when these systems are turned on. Another potential solution is to use sensors in the windows ensuring that when a window is opened the AC turns off.

Furthermore, if you want to optimize your HVAC system, you should pay attention to the following procedures:

- Try to zone your HVAC system by distributing it among the different areas of your accommodation. Since these often have different temperatures, by finding the optimal temperature range for each one, you will be able to save up to 8% in HVAC energy use per

1°C in reduced heating or cooling.

- If you can, try to minimize the number of appliances and lights unnecessarily in use. This means less heat generated and, therefore, less work and energy consumed by your HVAC system to balance it.

Source: <https://www.energy.gov/energysaver/central-air-conditioning>



10. Smart lighting

Installing sensors in common areas, such as the halls and gardens to just turn the lights in someone's presence, or abstinence of light, can decrease a lot of the energy waste and is a very cheap installation. Some accommodation facilities reported savings of up to 70% with the use of smart lighting systems (GovTech, 2021). Of the different types of sensors, movement sensors are the best option for halls, where they detect movement by infra-red sensors. A regular movement sensor's price can vary between 20 and 65€.

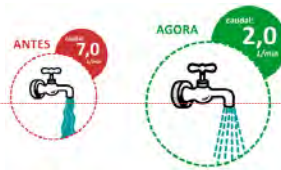


For outside sensors, the best option is twilight detectors. Without the presence of light, they automatically turn the lights on. Their price can vary between 11 and 20€.

Source: <https://www.govtech.com/sponsored/how-smart-lighting-technology-can-provide-valuable-insights-and-cost-savings-to-your-community>

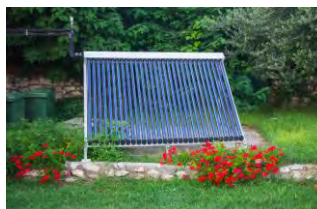
11. Hot Water

It is known that the process of warming water is one of the major factors that influence energy waste in the hospitality sector. And it can be even higher if the accommodation facility has a thermal pool/jacuzzi.



One solution that would impact directly on the guest's consumption, is to install systems of low consumption in the showers. For the installation you don't need to change or buy new showers, you just need to add tail reducers. In the product boxes, they have the values so you can identify which tail you should buy. To know these values and be able to buy the correct one, you should know two values: how much water your shower spends and the pressure of your shower.

To discover how much it spends, you will need to count how long it takes for your shower to fill a one-liter recipient. Then, let's imagine that it took 20 seconds to fill the recipient, you will need to divide 20 by 60 ($20/60=0,33$). This is how much your shower spends. After that is discovered, you will need to know the pressure of the water.



After knowing the pressure number, you need to subtract 3

Commenté [1]: image source?

m.w.c. (meter of water column) of this value, if you have a tourism accommodation with more than one floor. If it has just one, you need to subtract 7 m.w.c (the minimum pressure for the sink needs to have at least 3 bars).

Another solution to warm water without energy consumption is to install thermosiphon solar panels, being solar panels with the goal of warming the water from the showers, thermal pools, laundry, or any source of hot water the accommodation can need. It can cost 1000 € to 3000€ and can be installed on the roofs, so it doesn't take space.

Source: <https://basc.pnnl.gov/resource-guides/solar-hot-water-heater-thermosiphon>

12. Installation of renewable energy

a. Solar Panels

If the area where your accommodation is established has a lot of potential when it comes to hours of sun during the year, then it might be interesting for you to install some solar panels that are becoming more affordable with the years. Remember that solar power technology may help your business, not only by saving you money in the long run, but could also be a source of income, since you can sell the excess production of solar energy you might have.

b. Wind

Additionally, if the area where your accommodation is established has potential when it comes to wind, perhaps installing a wind turbine could be a solution. These s require periodic inspections and preventative maintenance. Depending on the turbine's design, its lifespan could go around 10 to 15 years. Like solar energy, wind energy is a carbon-neutral technology, since it doesn't produce emissions.

c. Other sources of renewable energy to be studied depending on the location/capacity of the establishment: hydropower, geothermal energy, biomass energy, etc.

13. Automatic Shutdown Sockets

There are probably multiple devices in your accommodation that, when not in use, are in standby mode. If you think about how many devices you have in standby mode at this present moment you can probably identify quite a few. Although devices are not being used whilst in standby, and although standby mode uses less energy than the devices actually being turned on, they are nevertheless using and therefore wasting energy. In order to avoid this to happen, you can install smart power outlets. Smart power outlets use timers or infrared sensors to cut power to any connected device when the device is not in use or when a room is unoccupied. You can find these devices starting from 10€.

Even without these automatic systems, try to ensure that all equipment is turned off when not in use.



Source: <https://www.hoteliermagazine.com/>

Guest awareness

For the guests, the main practices they could make, besides a self-awareness and consciousness:

- Have a bath for 5 minutes max. The preferable number is 3-4 minutes.
- Don't turn the light on, and prefer to natural light in the rooms
- Prefer opening the windows despite turning the air-conditioning
- Provide them information on the hospitality business energy policy and engage them to contribute and make their accommodation more sustainable.

Additional content

The [World Tourism Organization \(UNWTO\)](#) has developed a toolkit to provide tourism managers with a report assessing their energy usage, as well as recommendation for renewable energy and energy technologies they can use. Link for the toolkit: [Hotel Energy Solutions - Web Toolkit: Home page \(hes-unwto.org\)](#)

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Case studies

1. Sustainability is a DNA part of Eco Soul Ericeira Guesthouse.

We are a sustainable accommodation, awarded by Green Key since our first year of life and from then on we have followed for five consecutive years receiving this recognition. This international award is given to accommodation and other hotel facilities that are committed to sustainable business practices. Our relationship with sustainability is so serious that, in January 2022, we won the Biosphere Sustainable Lifestyle Certification for having successfully demonstrated compliance with the 17 Sustainable Development Goals of the United Nations 2030 Agenda. We were the first accommodation in Ericeira and in the Mafra Municipality to obtain this certification. These recognitions were achieved due to the fact that our dream project was designed following ecological guidelines and bioclimatic standards, among them are: conscious use of land, water efficiency and energy efficiency. We take advantage of available resources (sun, vegetation, rain, wind) to decrease environmental impacts, reduce energy consumption and CO2 emissions.



To transform our house into an eco-friendly accommodation we had to make decisions about equipment, materials and sustainable refurbishment techniques. All our choices are in every detail of the house and are often imperceptible but we know they are there, they are in the soul of the house. That's why we called it Eco Soul. This way, if you chose Eco Soul Ericeira Guesthouse for your holidays, you also assumed a commitment with the environment and with the society. Congratulations on your choice! We hope that you share our commitment and that together we can make a sustainable stay.

Link to the lodging website: <https://www.ecosoulericeira.com/pt-pt/>

2. 100% renewable energy, LED lights, and reminding guests about energy waste

Impact House is a hostel where guests can sleep in dormitories or private rooms and have shared bathrooms. This hostel is a part of ImpacTrip which is a social business internationally certified as B-Corp that promotes Responsible Travel Experiences in Portugal, Spain, Croatia, and Italy. Considering this, Impact House invests in sustainability and the circular economy.



When it comes to their energy consumption, it comes entirely from renewables and they use LED lights throughout the hostel. Additionally, to make guests mindful of energetic waste, they have signs over light switches stating “switch off, save energy”.

Link to the lodging website: <https://impacttrip.com/impact-house/>

Source: <https://www.startuplisboa.com/startups-news/inaugurao-da-impact-house?msclkid=ba235bb5cf8511ecbc3087f94987e51a>

Sustainable Consumption

General Issues

Sustainable consumption has multiple dimensions. Those most often taken into account are: environmental sustainability, social sustainability and economic sustainability. There is no consensus on a single definition of sustainable consumption. The UN Environment Programme puts it simply: sustainable consumption and production means “doing more and better with less”, by decoupling economic growth from environmental degradation, increasing resource efficiency and promoting sustainable lifestyles ([European Parliament: Sustainable Consumption](#)).

Economic and social progress over the last century has been accompanied by environmental degradation that is endangering the very systems on which our future development and very survival depend.

It’s in businesses’ interest to find new solutions that enable sustainable consumption and production patterns. A better understanding of the environmental and social impacts of products and services is needed, both of product life cycles and how these are affected by use within lifestyles.

There are two main ways to contribute to sustainable consumption: 1. Reducing your waste and 2. Being thoughtful about what you buy and choosing a sustainable option whenever possible. Making informed purchases also helps ([UN Goal 12 Responsible Consumption and Production](#)).

We will explore these topics in more detail below.

Learning Outcomes One successful completion of the module participants should be able to...

	Knowledge	Knowledge skills	Responsibility and autonomy
	<p>You will learn:</p> <ol style="list-style-type: none"> 1- General information on sustainable consumption and green procurement. 2- The main issues concerning sustainable consumption. 3- more about the impact of tourism on resources. 4- to have some information about sustainability solutions for business design. 	<p>You will be able to:</p> <ol style="list-style-type: none"> 1- Implement solutions for sustainable consumption of resources at your facility. 2- Adapt your services to visitor’s new demands for sustainability. 3- Strengthen your purchases and relations with the local market and local community. 	<p>To perform this task, you need to:</p> <ol style="list-style-type: none"> 1- Monitor your facility’s consumption of resources 2- improve entrepreneurship competences (analysis, holistic approach of your business, critical thinking, etc.)



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- **Technical solutions**
 - **Become Sustainable**
 1. Define an Official Eco Communication plan for your hotels
 2. Make your shop green
 3. Promote sustainable transport

List of solutions illustrated with video

Additional content

Bibliography

Estimated duration: 60 minutes

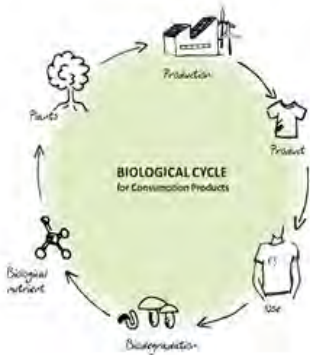
Managerial solution

- **Sustainable consumption for business**

1- Some Sustainable business management solutions

Any kind of solution that lowers your accommodation facility's use of materials and resources is considered an action toward sustainable consumption. Making green procurement to furnish your rooms, buying sustainable building materials to be used during renovation works, and purchasing only environmentally friendly paints with European Ecolabel, are important examples of green solutions that you can apply in your facility to move towards sustainable consumption.

One of the most important approaches of the green tourism business is the circular economy approach. The circular economy allows you to think about the whole life cycle of the service and product you offer to customers. Here are some tips for consuming resources in a more sustainable way while running your accommodation facility using the circular economy approach

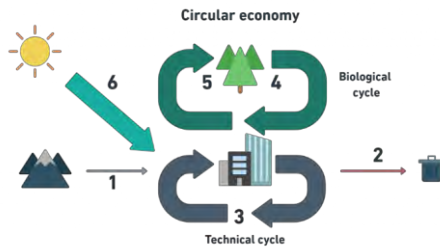


Circular economy:

Circular economy means the production and consumption of goods and services in a sustainable way, by using fewer materials and resources while manufacturing new products, but also using waste as a resource to produce new goods and products (Einarsson and Sorin, 2020). More specifically, circular tourism means reducing the consumption of natural resources and energy factors in the process of creating tourists' goods and services and reusing the waste generated in the tourism activities.

The circular economy, in fact, is not just a philosophy, but can inspire your approach to sustainable management of your touristic accommodation facility. You can find some suggestions below:

- Buy local non or less processed food for better quality and to avoid transportation pollution and avoid chemical additives in food.
- Reduce the waste generated throughout the lifecycle of a service, cleaning, cooking, washing the rooms' bed sheets, and reducing the production of food more than your clients' needs.
- Try to make "green procurement" and limit your purchases to environmentally friendly goods and services. For example, buy eco-friendly cleaning products.
- Be aware of your main energy source. Slowly making a sustainable transition is possible. Use a renewable energy source if you can, eg. install a solar panel on your roof.



Building a circular economy, a waste-conscious economy, can help to reduce CO2 pollution by 3.7 billion tons by 2050.



A) Buy food supplies in your local market, make agreements with local farmers.

Circular economy starts with an approach to food stocks and ingredients that can avoid pollution and reduce food waste, considering that 1/3 of the human population lives in food shortage.

A good solution to consume sustainably in your tourist accommodation facility is to buy supplies and raw materials from local producers or at a local market. Doing so can help local economies while reducing CO2. Chemical additives in food can be avoided if you limit transportation and storage duration. Food supplies can be purchased at the local market or you can make an agreement with farmers to buy a healthy,

Commenté [1]: Did you know that it is estimated that buying local food could reduce the gas emissions of the average consumer by 4-5% (<https://news.climate.columbia.edu/2012/09/04/how-green-is-local-food/>)



sustainable product year-round, and only offer your guests seasonal goods. Through this kind of agreement, you will ensure a food supply of good quality all year long, and farmers will guarantee their incomes by selling their products.

B) Reduce waste by digitizing your business (but be aware of electronic waste!)

Use an IT tool to produce the documentation needed for your business, avoid printed documents and use a digital tool to share information, digitize your system to communicate with guests and staff. Paper is still required, but try to minimise its use and try to purchase and use recycled paper. Digital tools can also help you to better manage your procurements and prevent overconsumption and additional waste.

Don't forget that technology also produces waste. Try to repair your electronics before throwing them away; if you need to buy new electronics, try to find the best ones in terms of electricity consumption.

C) Make the guest room greener.



Make guest rooms more sustainable through less consumption by using digital technology. You can install sensors in the room to adjust the brightness of the light bulb, reducing electricity consumption. Moreover, you can install sensors connected to a digital app, to regulate temperature levels automatically in guest rooms. It would be a good solution to furnish guests' rooms with furniture that comes from sustainable materials. It is even better if you choose products made by local artisans using local materials and techniques for furniture to be built to last and to be easy to repair. If the furniture is made of wood, make sure to buy wood that comes from sustainable forestry.

D) Re-thinking your textile purchases

Textiles play an important role in the hotel and restaurant industry: comfortable bedding, household linens, tablecloths and employee uniforms...

Did you know that greenhouse gas emissions from the textile industry are higher than those of international flights and maritime traffic combined? The water equivalent of 70 showers is needed to make a t-shirt and 285 showers for a pair of jeans. An organic cotton tote bag has to be reused at least 149 times to have a positive impact on climate change.

Less than 1% of textiles are currently recycled, the real difficulty lies in their collection.

Below are some examples of actions to be taken to limit the impact:

D.1) Rent - or buy second hand

Always the best solution if possible! Look for local second hand shops and suppliers: you can buy pre-loved furniture at a fraction of the price of new.

D.2) Buying fabrics made from natural organic materials

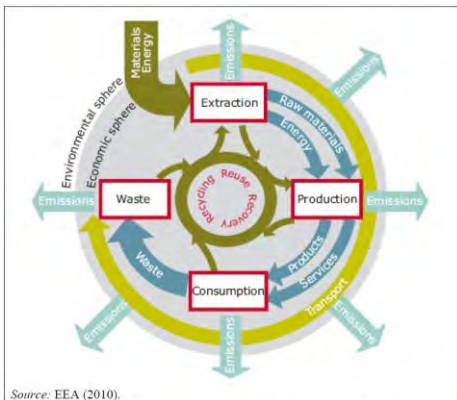
The environmental impact of fabrics can vary considerably depending on how they are mixed, dyed, transported and processed. Synthetic fibres made from petrochemicals are the worst of all. They consume more resources and release microfibers into the wild. Therefore, go for natural organic materials.

D.3) Donate to reuse, recycle or recover

Do you throw away your employees' old uniforms? old mattresses? Talk to people around you, especially to charities committed to zero waste, who will certainly put you in contact with a charity or company in the circular economy that will be happy to recover your old textiles to give them a new life.

Commenté [2]: Did you know about the Circular Economy and the 6 REs? Have a look here: <https://www.retrace-itn.eu/2019/07/15/the-6-res-of-the-circular-economy-reduce-reuse-repair-remanufacture-recycle-and-recover/>

2- Awareness: Mapping business consumption to be really sustainable



Source: EEA (2010).
Figure 6.9: The lifecycle chain for extraction, production, consumption, waste management

All the products obtained from the main activities in your tourist accommodation uses energy and raw materials which means consuming resources. For this reason, mapping the different levels of resource consumption in your facility can help minimise them. Therefore, it's important to check where the areas of big consumption are in your tourist accommodation and try to reduce the use of materials and resources and replace them with green sustainable ones.

The hotel management could choose to buy energy from renewable sources to reduce consumption in tourists rooms, and to buy food from the local market to support the consumption

of "non-traveling food" in the kitchen, which means choosing the product that needs fewer miles to get to your place. For the toilets and laundry, you could choose for example eco-friendly detergents and cleaning products.

Data from a European study shows the results of a survey conducted on 189 sustainable hotel rooms showing a 30% reduction in waste impact using various measures. Here's a checklist. Analyse your business. Check off the measures you have and the ones you don't. Look to implement the one you still lack.

Department	Measure	Description	Presence
All (management led)	Develop waste inventory	Survey all areas and processes to identify types and sources of on-site waste generation	
Procurement	Efficient ordering and storage	Order perishable products frequently in quantities required. Store perishable products in appropriate conditions. Order non-perishable products in bulk	
Housekeeping	Efficient bathroom toiletries	Replace individually wrapped soaps and shampoos with soap and shampoo dispensers. Provide additional toiletry items only on request	
Catering	Provision of low impact drinking water	Avoid bought-in bottled water where possible. Provide guests with tap water in rooms and dining area (may be filtered and bottled), and provide reusable glasses for drinking	

Reception	Efficient document management	Print documents only when absolutely necessary, double-sided in small font. Use electronic billing.		
Local sourcing and packaging return	Source food locally where appropriate, and return packaging for reuse			
Select low packaging products	Select products with less packaging where possible and consistent with other green procurement criteria– e.g. purchase chemicals in concentrate form			
Efficient housekeeping	Avoid use of bags in bins, or where used, replace only when soiled			
Efficient breakfast provision	Avoid single-portion servings as far as possible within hygiene constraints, and cook to order. Avoid single-use plates, cutlery, etc.			

Monitor actions are taken to implement better sustainable action. Monitoring the results of your green actions can allow management to be aware of the success of this action and strategy, helping to improve these actions.

- **Tips for sustainable business management**

- 1. Staff involvement**

Having green communication is good and having a green team is even better! Training your staff on sustainable consumption can implement customer relations skills and can help your staff to deliver good messages on this topic to tourists. You can hold periodic meetings with your staff to discuss with them about the source of the products that you are buying in your facility and to explain to them that you are making your purchases only from green sustainable resources, and to train them on how to communicate this message to clients. In this way your staff can become teachers on green living, helping to change tourists' actions. Investing in training your staff is a key element toward sustainable consumption.

- 2. Sustainability as a label**

One of the top solutions to adopt sustainable consumption in your accommodation facility is to apply for eco-labeling, which means prioritizing sustainability across the facility's procurement and consumption of resources. After you have already applied the ecological solutions regarding the reduction of the environmental impact of your facility's purchases, then you can contact the national green certification body like EU Ecolabel or Green key and go through the procedure of getting an eco-label for your facility. Getting EU Ecolabel means that the products that you are buying and offering in the different areas of your tourist accommodation are certified with a guaranteed low environmental impact, for example, it guarantees that you are buying organic eco-friendly textile for your guest rooms like bedsheets and towels and electronic equipment with best energy efficiency classes, high durability, reparability, and recycling. EU Ecolabel guarantees also that you are buying long-lasting bed mattresses with high-quality and with reduced hazardous substances, but it also guarantees that you are using soil improvers and mulch products for your guesthouse's garden, and that you are buying green rinse-off cosmetic products like organic shampoos and soap for your guests.



Getting an eco-label is important for your tourist accommodation because it offers your clients a reliable eco-friendly alternative to conventional products of consumption, and it empowers them to make informed green choices and therefore plays an active role in the transition towards sustainable consumption.

You can check here the EU Ecolabel Product Catalogue:
[EU Ecolabel: Ecolabel Products - European Commission \(europa.eu\)](http://ec.europa.eu/ecolabel/)

- **Technical solutions**

- **Become Sustainable**

Last but not least, communicate your sustainable approach and design. Monitoring lifestyle waste is good, however communicating is actually really important to encourage other people also on following sustainable measures in their daily life. It's essential to communicate and train staff on the sustainable circular economy.

1- Define an Eco Communication plan for your accommodation facility.

Claim you are green. Once you have implemented actions across all life cycles to reduce your impact and have become sustainable, follow a certification process in order to have the chance to put an ECOLABEL in your marketing.

Investing in sustainable consumption solutions has great benefits not just for your tourist accommodation, but also in reducing the tourism impact on the environment. Moreover, defining an eco-communication plan for your facility is one of the most important solutions that you can apply for your business to be sustainable.

- Making your events sustainable:

You can choose an eco-friendly venue with smart room temperature controls, eco-friendly toiletries and a waste recycling system if you are organizing workshops for tourists, to reduce the consumption of energy and water and the production of waste. Moreover, you can organize events with local people to promote the cultural and natural heritage of the area and you can arrange touristic packages and offer them to your guests, like visiting historical and natural places with local guides, attending live music concerts with local bands, arranging cooking lessons with local chefs to promote local recipes. In this way, you can communicate to your guests your commitment to sustainable consumption and inspire them to support local people, services, and products.



2- A green souvenir shop to promote sustainable consumption

You can open a store with eco-friendly souvenirs in your tourist accommodation to promote the consumption of sustainable products among your guests. You can sell sustainable gadgets, such as hemp toothbrushes, or notebooks made from recycled paper, water bottle flasks crafted from recycled plastic, as well as books themed on sustainability or including tips on green traveling. In addition, you can try to supply your shop with products from green certified businesses and offer only recyclable bags. Once a week, you can also participate in local markets to strengthen partnerships with local producers and support the local economy.

3- Limiting chemicals :

3.1) Limiting chemicals

Hygiene is key in the hotel and catering industry, particularly in kitchens, waste storage areas, rooms and gardens, not only for obvious hygiene and regulatory reasons, but also for commercial reasons. The attractiveness and comfort of a place is linked to its cleanliness. Chemical-based plant and sanitary products are widely used, but they can have adverse effects on human health and the environment.

So what to do?

3.2) Opt for steam cleaning

Since steam cleaning only uses water to disinfect a surface, you won't have to use any chemical cleaners to disinfect a surface.

3.3) Buy environmentally friendly products

Choose suppliers that offer products free of hazardous substances and/or based on natural ingredients. Go beyond marketing claims and check the list of ingredients...

3.4) Reasonable product use

Reduce the amount of substances used by eliminating non-essential products and using them at the correct frequency and concentrations.

3.5) Re-fill the containers

Avoid disposable containers and rather fill them whenever possible. However, for safety reasons, do not reuse the containers for different products!

3.6) Recycle leftover paints and varnishes

Some varnishes can be returned to their supplier, check with the brand. In addition, specialist companies are now able to recycle unused, excess or dirty paints and transform them into many renewable products.

3.7) Never flush-down the sink or down the toilet

Take your leftover chemicals to a specialized collection centre. This is the only way to ensure safe disposal and to avoid pollution, which is very bad for our health and the environment.

- **Guest awareness**

1. Promote sustainable consumption through your website:



Technology is growing so fast today as well as the ecotourism sector, for this reason promoting sustainable consumption through your facility's website is an important solution to reduce the environmental footprint of tourism. Since tourists are booking more and more their accommodation online it's a good idea to use your website as a communication channel to include the names of shops with local sustainable products like restaurants with local organic food ingredients and souvenir shops with eco-friendly materials (if your facility doesn't have one), but also you can include the agenda of the local cultural markets and activities to promote sustainable consumption of local products and services in your area. It's also important to include your facility's eco-label as a green image on your website and you can check the EU Ecolabel branding section that explains to you how to properly use the EU Ecolabel logo on any type of marketing materials or publications.

Check here: [EU Ecolabel - Branding \(europa.eu\)](https://europa.eu/eu-ecolabel/branding)

2. Client's awareness

Sustainable consumption solutions can lead to improved business production and marketing factors, but most importantly works on customer awareness. As an accommodation manager, you can show your guests how your hotel is following sustainable consumption approaches. For example, on the menu of your restaurant, you can write the source of food ingredients to ensure your guests that you are buying mostly (or strictly if possible) sustainable local products. In addition, you can explain to your guests about the eco-friendly solutions that you are applying in your facility to reduce the consumption of water and energy, therefore you can write on your website that you are harvesting rainwater to water your garden and that you are using only LED lamps in your facility which consume very little electricity. Having such information on your facility's website creates a potential to increase tourists' appreciation of the resources that they are consuming during their stay at the facility, and therefore it will bring them into closer contact with nature and the environment to consume less of these resources. Moreover, you can also set up a little space in the facility's garden, with magazines, scientific newspapers and brochures made of recyclable paper to offer guests a space to learn some new tips regarding sustainable consumption in their daily lives.

Additional content

"EU Strategy for sustainable products - A proposal for an updated sustainable products initiative was adopted as part of a circular economy package on 30 March 2022."

[Sustainable product policy & ecodesign \(europa.eu\)](https://europa.eu/eu-ecolabel/branding)

The European project CEnTOUR – Circular Economy in Tourism, supported by the EU program COSME, provide you with a lot of good practices and other source of information <https://circulartourism.eu/database-of-best-practices/>

The EU Ecolabel for Tourist Accommodations services factsheet:

[PowerPoint Presentation \(europa.eu\)](https://europa.eu/eu-ecolabel/branding)

Webinar on circular economy: Closing the Loop: The Circular Economy, Business & Sustainability (Stanford university) <https://www.youtube.com/watch?v=WDNh10JxXBM>

Videos:

- [The Circular Economy: a new way to design, make and use things](https://www.youtube.com/watch?v=WDNh10JxXBM)



- [Best practices of circular economy Webinar](#)
- [Why eat local?](#)
- [Field to Fork - Why Local Food Matters](#)
- [Before the Flood - Full movie National Geographic](#)
- [The struggle of Zero-Waste Restaurant](#)

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[new_circular_economy_action_plan.pdf \(europa.eu\)](#)

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Waste Mapping Guidance for Hotels in Cyprus: Saving money and improving the environment
[Waste Mapping Guidance Hotels.pdf \(tourism.gov.cy\)](#)

World Resource Institute (How to build circular economy)
[3 Ways to Transition Toward a Circular Economy | World Resources Institute \(wri.org\)](#)

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[Hotel Accommodation Management - Google Libri](#)

EcoBNB Green Hotel Actions
[Green Hotel: 20 actions for a more sustainable accommodation \(ecobnb.com\)](#)

Best Environmental Management Practice in THE TOURISM SECTOR 6 Waste and Waste Water Management in Tourist Accommodation
[Sustainable consumption and production \(un.org\)](#)

How to be more eco friendly? Green match
[40 Ways to Be More Eco Friendly in 2022 | GreenMatch](#)

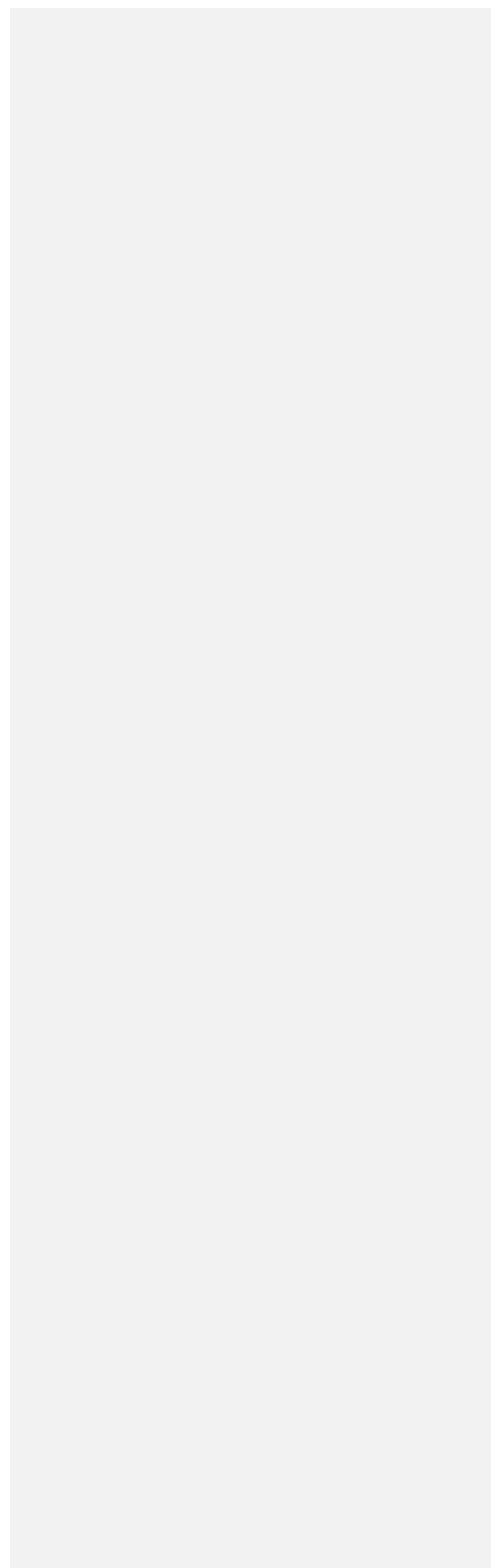
Cvent, 25 Idea to build and eco friendly ideas
[25 Eco-Friendly Hotel Ideas for Sustainable Properties | Cvent Blog](#)

Impronta wwf: [Calcolatore dell'impronta di carbonio \(improntawwf.it\)](#)

Einarsson S. and Sorin F. Circular Economy in travel and tourism: A conceptual framework for a sustainable, resilient, and future proof industry transition". CE360 Alliance, 2020.



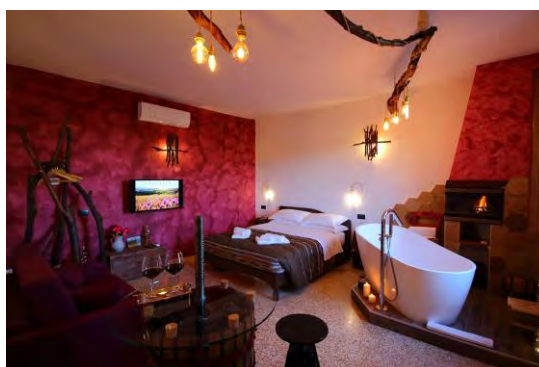
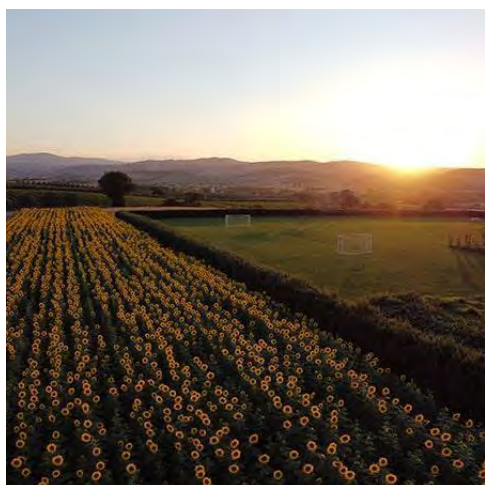
Co-funded by the
Erasmus+ Programme
of the European Union



Case studies

1- Sustainability and responsible tourism – Sustainable Consumption

Essentia Dimora is a small country house in the countryside of Larino, Molise region.



Essentia has 8 rooms, named with local foods, and an authentic showcase of the territory. Essentia aims to make agritourism an outpost of environmental protection and territorial enhancement, based on sustainable consumption concepts:

- A (very) short supply chain: the raw materials for food are grown in Essentia's own neighbouring fields. Their transformation is done in Molise in highly specialized laboratories. The other raw materials that they cannot produce come from local producers. They also organize tours (especially e-bikes) showing guests all the steps that take their products from garden to table.
- A closed waste cycle: The accommodation provides containers for door-to-door waste collection to be recycled, while wet waste becomes compost.
- A conscious use of water: irrigation of fields and plants is not done with drinking water.
- A charging station for electric cars, installed in 2021, which will soon be implemented by a fast-charging station and a parking lot with solar panels.
- The guesthouse is planning to organize events aiming to spread awareness regarding environmental issues, especially through meetings for families and young guests, as well as cleanup days of the surroundings.

Link to video: [Agriturismo bike Essentia Dimora Rurale - YouTube](#)

Source: [Il tuo Agriturismo bike in Molise - Essentia Dimora Rurale \(agriturismoessentia.com\)](#)

2- Self-producing and Circular Economy

La Fanciulla Bio B&b is located in the Tuscan countryside in an old farmhouse from the 18th century and preserves traditional architectural elements.

Electricity: Since 2010 they have had a 2.3 kwp photovoltaic plant, using directly from ¼ to 1/3 of the electric energy that produces. The rest comes from a company which certifies it as 100% coming from renewable fonts.

Water: they built a system for gathering and re-using the rainwater coming from the roofs: it's about 20 m³ of water, used for toilet flushing and garden watering.

Heat: from 2014 they use a wood-burning boiler stove, which allows them to prepare food and to have domestic hot water; the wood comes from their tree trimming and from some friends' garden keepers.

Self-producing: grow themselves a part of fruits and vegetables they eat, they produce olive oil and make part of the detergents they use. The rest comes from local producers, and they buy them as part of a buyers group.

Waste: they try to produce a small quantity of waste, starting with cooking their meals. When they buy some products for the guesthouse, they choose to bring their containers, choosing products with simple packing, possibly recyclable. They differentiate waste while the organic waste is composted.



Link to article: [Home ENG - La Fanciullaccia](#)

Source: [A holiday in nature dedicated to spontaneity - Ecobnb](#)

Mobility and Accessibility			
General issue			
<p>Eco-Mobility and Accessibility concepts are currently acknowledged as key elements in the world in view of promoting environmental protection, sustainability, and social inclusion. In parallel, growing demand in the tourism market for eco-friendly services has been registered.</p> <p>Currently, 75% of emissions generated by tourism come from transport activity, and forecasts indicate that these will increase. Transport is positively correlated with the promotion of a destination, supporting tourism and economic activity, but there is a clear negative impact due to traffic congestion, overcrowding, noise, air pollution and deterioration of the natural beauty of a destination. It is the largest producer of CO2 emissions because air, road, rail and water transport use fossil energy sources. (The nexus between tourism activities and environmental degradation).</p> <p>Your choice of providing eco-friendly services can empower your business to be sustainable, allowing you to increase tourist awareness and grow in the tourism market while protecting the environment.</p> <p>On the other hand, accessible mobility solutions can allow all the people, including those with special access needs, to improve their accessibility standards and consequently obtain better and more inclusive services.</p>			
Learning Outcomes			
On successful completion of the module participants should be able to...			
	KNOWLEDGE	SKILLS	RESPONSIBILITY and AUTONOMY
	<p>You should know about:</p> <ol style="list-style-type: none"> 1- The impact of tourism transportation on the environment. 2- General information on eco-mobility. 3- Different faces of the accessibility's meaning. 	<p>You will be able to:</p> <ol style="list-style-type: none"> 1- Implement solutions to minimize the impact of tourism mobility on the environment. 2- Implement solutions to prevent negative impacts of transportation on the environment . 3- Understand the meanings of the accesibility's requirements. 	<p>You will be willing and able to:</p> <ol style="list-style-type: none"> 1- Provide your guests with services to reduce the impact of tourism mobility on the environment. 2- Spread awareness regarding transportation issues among tourists and staff members. 3- Develop a general eco-friendly transportation plan. 4- Develop an accessibility plan for the accommodation.
Content			
Content with page number	Managerial solution		
	Action to Eco-mobility		
			2

Providing recharge service for electric vehicles or a choice to rent them	2
Providing bikes, e-bikes, and electric scooters to rent	3
Providing maps with public transport solutions	3
Recommend eco-friendly activities	3
Offer sustainable transportation services and incentives	3
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Map your communication accessibility	4
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Become sustainable	5
Implement a charging infrastructure for electric vehicles	5
Provide information on sustainable mobility	7
Staff involvement	8
Offer sustainable transportation services and incentives	8
Train you staff members on eco-mobility topics	9
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Estimated duration: 60 minutes

Managerial solutions

1- Action to Eco mobility

Eco-friendly transportation is crucial to minimize the environmental impact of the tourism sector by reducing gas emissions. So, offering your guests green alternatives is a great way to contribute to environmental protection.

Green transportation is that which is less harmful to the environment than conventional transportation, which uses internal combustion engines and runs on fossil fuel. Green transport does not use any kind of fuel or use alternative fuels such as ethanol, natural gas, clean diesel, hydrogen, and electric vehicles. Green transportation such as bicycles and electric vehicles are becoming popular among the masses as the world has started experiencing the effects of climate change due to greenhouse gas.

Transports heavily affect the environmental impact of travel. That's why promoting sustainable mobility is so important even for hosts. Traditional public means of transport, such as trains and buses, or the more innovative systems such as carpooling are effective measures to reduce carbon dioxide emissions in the atmosphere. A green hotel should facilitate the sustainable journey of its guests.

Commenté [1]: After this table, a pop-up window will appear in the platform with the following text:

Did you know that the CO2 emissions per km for a passenger using an airplane is about 255 g? While an (average) electric vehicle emits about 53 g of CO2 per km per passenger?

<https://www.visualcapitalist.com/comparing-the-carbon-footprint-of-transportation-options/>

- **Providing recharge service for electric vehicles or a choice to rent them.**

Provide your guests with the possibility of charging their electric car in the accommodation.

1. Electric cars help us lower emissions, and more and more people are going electric.
2. Enter into an agreement with electric car rental providers.
3. «In over a year, just one electric car on the roads can save an average 1.5 million grams of CO2. » Going electric is a good practice.



In many rural communities, the development of electric charging

points is supported by local authorities. If you wish to install such equipment, find out what funding you may be entitled to.

In addition, do not hesitate to point out to your customers the public charging points available in the surrounding villages.

Commenté [2]: Did you know that electric cars have different benefits on the environment? Have a look here: <https://www.edfenergy.com/for-home/energywise/electric-cars-and-environment#:~:text=Put%20simply%2C%20electric%20cars%20give,flights%20from%20London%20to%20Barcelona.>

- **Providing bikes, e-bikes, and electric scooters to rent.**



Biking is an excellent solution to let your guests discover the surroundings in an eco-sustainable way. In addition to being an incentive to turn off the car during the holiday, the bike offers several other advantages and allows your guests to live all the benefits of an active holiday.

Add bike share, bike rack, valet or bike parking to provide your guests with a complete biking experience. For those who cannot cycle, offer the chance to rent an e-bike or electric scooter via partnerships with the nearest service provider.

- **Providing maps with public transport solutions.**

If your accommodation is located close to an urban center with a public transportation offering for your guests to get to your accommodation and/or to use public transportation to visit the city center, you can provide them with a detailed public transportation map solution with all the information to enable your guests to visit places of interest near your hotel or to get to the events they have come to see.

You can organize a comprehensive mapping of rail solutions, public buses, bicycle routes, and walking routes. Write a comprehensive eco-mobility guide for your accommodation, then post it on your official website and social networks and send a comprehensive information package to your guests.

- **Recommend eco-friendly activities.**

- a) Suggest guests walk on foot, and provide guides and maps for all levels of trails in the region.
- b) Propose ecological activities they can do around your accommodation, enjoying the leisure time.

c) Prepare maps of safe walking routes between the accommodation and attractions.

- **Offer sustainable transportation services and incentives.**

Provide group shuttles (using hybrid or electric vehicles) to public transit hubs to cut down on the number of low-occupancy car trips to and from your hotel.

You can offer free shuttles (using hybrid or electric vehicles) from and to your facility to the nearest tourists' attractions, to encourage tourists on sharing transport means and to avoid using their cars as much as possible, and therefore reducing CO2 emissions.

- **Share videos and good practices.**

Show attendees how easy it is to use transit by making and uploading a fun video. Consider weaving in local information that may be of interest to your attendees, so they are encouraged to explore your host destination.

2- Accessible infrastructures and services

It's really good don't pay attention exclusively to physical accessibility, and think about all kinds of disabilities or, even better, to think about all specific problems related to accessibility.

- **Physical accessibility**

Pay attention to all the spaces of your hotel. Are they reachable for a person with a wheelchair?

Place a ramp map 8% max slope.

Have adequate toilets 180x180cm and with an entrance of 85cm. How many spaces in my hotel can be reached without a chair? How wide is the elevator?



- **Other kinds of accessibilities**

Design your accommodation spaces according to suggestions from [universal design principles](#).

Universal design focuses on every kind of accessibility, such as physical accessibility or the accessibility of information.

When thinking about accessibility and related solutions, keep the following key point in mind:

1. The accessibility of public transport
2. The environmental barriers
3. Barriers in the own accommodation
4. The barriers in natural spaces

Gather complete information and then take adequate decisions in order to remove barriers and ensure accessible services in your business.

• **Map your communication accessibility**

Mapping your communication accessibility with website check tools. Deaf and blind persons also use web tools to discover travel possibilities and choose in the market. It is really important to your business to have communication tools (see [Communication Tools](#)) capable of reaching every kind of person with every kind of accessibility need.

Some tips:

- Develop a website or application that makes all functionality available from a keyboard.
- Make it easier to see and hear content, for example separating the foreground from the background.
- Create content alternatives to images, like large print braille speech symbols or simplified language.



• **Transportation and accessibility**



Get an agreement with some transportation services providers, who have available a vehicle with ramp and understand in local transport what is the true offer of accessibility. Check out if the ramps are functioning. Also, get an agreement with companies that can provide leisure activities that are viable for people with disabilities. For example, a specific wheelchair for hiking to make the trail accessible also for people with disabilities. You can also link your clients with trained local guides that can support people with disabilities in the hiking trails available in the area.

Commenté [3]: Did you know that you can map your communication accessibility through specific tools? Have a look to the following tools:
 - WCAG 2.0 https://www.siteimprove.com/toolkit/accessibility-checker?utm_campaign=it_ppc_accessibility&utm_medium=ppc&utm_source=google&utm_content=wcag&utm_term=wcag%202.0&campaign_id=13423981348&ad_group_id=128836813568&ad_id=526200525574&match_type=e&target=kwd-302680549322&gclid=CjwKCAjwsJ6TBhAlEiwAf14TWI089VatsWd-NZT2E5kmRTmk1tzyQiJA8Z1_rbas9yZmefoYP2_fHBoCE7YQAvD_BwE
 - WAVE: <https://wave.webaim.org/>
 - Viewer: <https://www.tpgi.com/free-accessibility-testing-tools/>

Technical solutions

Become Sustainable

1- Implement a charging infrastructure for electric vehicles

- Building permits for charging stations for electric vehicles.
 The intention of building a charging station may have to be permitted by considering building law or has to be reported to the authority responsible. Thus, before starting implementation work, it is important to check whether building permits are required in your region.
- The electrical system.
 Before buying a charging station for electric vehicles it is essential to pay attention to:
 - Load capacity of the electrical system.
 - Available load. Usually, from 7.4 kW upwards, a three-phase network connection is required.
 - Available space in the electrical cabinet.

- Furthermore it is essential to take into consideration the peaks of use of the electrical system, considering all the devices used inside the hotel and the energy required for recharging, which will depend on the power of the station.
- Consider the charge times. On average, a full charge requires these times:
 - at 3.7 kW: 5-6 hours,
 - at 7.4 kW: 3 hours,
 - at 11 kW: 2 hours,
 - at 22 kW: 1 hour.
- It is necessary to be followed by a specialized electrician.

C. Technical equipment for charging stations.

The charging stations should be equipped with the European standard plug (Type 2 IEC62196), in order to be able to recharge as many electric vehicle models as possible. If the vehicle is not equipped with a Type 2 plug, an adapter cable may be used.

It is recommended to choose a charging station equipped with all the necessary protection devices and a recharge counter, so you'll be able to measure individual energy uses and the related tariffs.



D. Positioning of the charging station.

Where to place the charging station? The first things you need to think about are the safety, accessibility, and comfort of your guests.

E. Payment system.

In general, the cost of the service can be counted in these ways:

- Free (free service to attract new customers).
- Cost measured based on the electric current used (in KWh).
- Cost measured based on recharge time.
- A mix between KWh and time.
- One-time parking fee.

You are not selling energy, but a recharge service, so you are free to choose the price. It may be reasonable to ask for € 5 more per night for those who intend to park and recharge in the parking space reserved for electric vehicles, but it might be even smarter to offer the service for free, considering the cost to recharge a car is minimal. By doing so, you will guarantee an ever-increasing number of electric car tourists in the coming years, who will select your hotel because it is in line with their needs.

F. Load management.

Consider buying a charging station that has integrated the load management function. The load management system analyzes load peaks and starts the vehicle recharging process when other connected users need little energy.

G. Use of electricity from renewable sources.

To be truly respectful of the environment, electric vehicles must be recharged with clean energy, that is coming from renewable sources (photovoltaic, wind or hydroelectric). For this, the installation of a charging station must be accompanied by the choice of a 100% clean electricity supplier, or by the installation of a clean energy production plant.

H. Investment costs.

The main costs to consider are:

- costs for connection to the network or for its extension (if necessary) and for increasing the network power.
- preparatory work by the electrician.
- if necessary, excavation and foundation work.
- purchase of the charging station (hardware and software).
- maintenance.

I. Financing opportunities.

There are numerous opportunities for contributions and funding, check which ones are available in your region.

J. Communication and promotion.

Adequately communicating the presence of the electric vehicle charging service is essential to attract new customers and to let guests know the details of the service offered. You can use numerous channels: you can report it on your accommodation facility's website, on your platform, on the various tourist promotion sites, with press releases and on social media. Furthermore, it is essential to publish your own recharge point on dedicated maps and web-apps.

Staff involvement

- **Offer sustainable transportation services and incentives**

If rail/bus is accessible for your staff, encourage them to travel this way.

You can consider group shuttles for staff if you have a large number of onsite crew, and venue parking is limited.

It's good to offer them a recharge service for electric vehicles for free.

You can provide bike share, bike rack, valet, or bike parking to give your staff the chance to reach the workplace by cycling.

Providing subsidies to encourage your staff buying/using eco-friendly transportation is a good gesture towards reducing their environmental footprint.

Provide rewards for participating in green events or vacations.

- **Train your staff members on eco-mobility topics**

Offer them free training in order to increase their awareness on sustainability and transportation themes, so that they can make conscious decisions on mobility issues and raise their guests's awareness on eco-friendly choices while traveling.

Additional content

European Concept for Accessibility CCPT (March 1996)

[Microsoft Word - Eca96 plus images.doc](#)

CIVITAS Sustainable and smart mobility for all

<https://civitas.eu/projects/create>

The nexus between tourism activities and environment degradation:

<https://www.mdpi.com/2071-1050/13/16/9210/pdf?version=1629334736>

Videos:

- [Make Technology Work for Everyone: introducing digital accessibility - YouTube](#)
- [Air pollution in cities - YouTube](#)
- [Understanding EV Charging Stations: Watts, Amps, and Volts - YouTube](#)
- [Accessibility & Inclusion For All - YouTube](#)
- EV Charging Infrastructure Design & Installation Recommendations:

https://www.youtube.com/watch?v=1QEG_I7eOEK

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[Green Hotel: 20 actions for a more sustainable accommodation \(ecobnb.com\)](#)

Universal Design Principles: [The 7 Principles | Centre for Excellence in Universal Design](#)

Website Accessibility Checker: [Website Accessibility Checker - Free Instant Accessibility Check \(siteimprove.com\)](#)

Case studies

1- Bike hotel – Eco-mobility solutions

Sant'Egle Eco BIO Resort & Glamping is an ancient customs house from the 17th century transformed into a charming organic farmhouse, glamping and bike resort, which offers virtuous examples of energy saving, organic breakfast and original works of art with reused materials.



They focus particularly on eco-mobility.

- **Mobility and Transportation:** they have a LPG car for our Green journeys. Being an area where there is no train station or a good public bus service, they offer free electric charging for all new hybrid and electric cars. They offer maps, GPS tracks and downloadable tracks and can be consulted off line to enjoy the trails and nature trails, river routes, cycle paths that depart from their structure, without having to take the car.
- **Sant'Egle is a bike hotel and bike point, where they offer:**
 - Protected areas parking. Alternatively, it is possible to bring the bicycle into the room.
 - Free and green e-bike recharge. Free charging station for e-bike powered by our solar panels. 100% GREEN energy.
 - Repair shop
 - Bike wash
 - E-bike rental
 - Guided e-bike tours
 - Other services for cyclists

Link to video: [Agriturismo Biologico Sant'Egle - YouTube](#)

Link to hotel: [Agriturismo biologico Sant'Egle \(agriturismobiologicotoscana.it\)](#)

Source: [Sant'Egle Eco BIO Resort & Glamping – Green Farm house in Sorano, Grosseto, Toscana, IT \(ecobnb.com\)](#)

2- Hospitality without barriers – Accessibility

Casetta Don Carlino is a farmhouse located in the countryside of Campomarino (Cb), near the Molise coast.

The house is part of the family farm and has been recently renovated in order to be accessible to all.

The farmhouse is structured as follow:

- a spacious hall, with facilities conveniently and fully accessible;
- the kitchen is large and accessible to everyone, especially people in wheelchairs;
- all rooms and common areas have accessible toilets for people with disabilities;
- a multi-purpose sports field, with attached showers and locker rooms that are fully accessible;
- relaxing area and garden easily accessible for people with disabilities;
- thanks to the assistance of specialized professionals, it is possible to organize physical and psychological rehabilitation therapies through pet therapy activities, educational farms, summer camps, events and other events.

The facility particularly provides the following services related to accessibility:

Emergency bell in the bathroom

Lower washbasin

WC with higher seat

WC with grab bars

Wheelchair access

Entire unit accessible to the disabled

Link to hotel: [Casetta Don Carlino | Turismo Sociale](#)

3- Hospitality without barriers – Accessibility

Open Hotel Folgaria is located in Folgaria, in Trentino on Alpe Cimbra. It is a certified accessible Open Hotel, a barrier-free hotel, fully accessible, with an entire room floor dedicated to special needs.

The Open Bronze Certification they have, guarantees that the hotel is 100% barrier-free for its access from the outside, in the living area, restaurant, and bar located on the ground floor, as well as in the rooms and wellness center reachable by lift.

Their free services for people with special needs are:

- Barrier-free rooms with wheelchair access
- Showers accessible in wheelchair, shower chair available and anti-slip devices
- Wheelchair accessible lifts; Braille keypad
- Wheelchair and walkers on request
- Raised toilet cover with front opening and support handle
- Discounts for dedicated outdoor professionals
- Special activities such as pet therapy on request

Link to Hotel: [Hotel Vittoria Folgaria](#)

Biodiversity

General issue

Human activities including tourism are causing massive harm to ecosystems and species around the globe. Disruption of wildlife breeding cycles, changing of migratory routes of wildlife, in addition to air, water, and soil pollution all are different shapes of negative impact of tourism activities on biodiversity in natural areas. The tourism sector contributes to the loss of natural habitats through urbanization and land clearance, participates in the biological invasion - introduction of invasive alien species, and plays a role in climate change, which are all main reasons for the loss of biodiversity

On the other hand, biodiversity is the prime element and the keystone for ecotourism and nature-based tourism activities and tourism is usually considered as an economic justification for valuing biodiversity. For instance, tourism and wildlife-watching as part of it, support the protection of some charismatic animals such as European brown bears, whales, wolves, and specific ecosystems which are a great attraction point for tourists, and it also plays a vital role in the creation of national parks and natural reserves that attract tourists.



As a manager of a tourist establishment in a natural area, you have a particular responsibility to minimize the negative impact of your activities on the main source of economic attractiveness of your territory. You can find in this training module some solutions and recommendations to help you reduce this impact.

Learning Outcomes

On successful completion of the module participants should be able to...			
KNOWLEDGE	SKILLS	RESPONSIBILITY and AUTONOMY	
How to learn more about biodiversity in your area How to better protect biodiversity?	You will be able to better preserve biodiversity	To be able to analyze and prevent the impact of your activities and your decisions on biodiversity.	

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Estimated duration: 60 minutes

Managerial solutions

1- Selecting indigenous plants

The use of invasive species that cause significant damage to native species as well as using pesticides are reasons why maintaining the garden or the outdoor space of your guesthouse can have a great negative effect on biodiversity.

A new and aggressive species is harmful to biodiversity because when introduced into an ecosystem, it may not have any natural predators or controls and it can outcompete native species for nutrients or prevent native species from reproducing or even killing them young (IUCN, 2000).

As part of your contribution to biodiversity protection, you can create a garden in your guesthouse that respects biodiversity by planting indigenous native species and plants that can be maintained with low or no use of chemicals and by avoiding invasive ones, the objective of selecting these plants is to preserve local biodiversity and to avoid pollution resulting from the use of pesticides and chemicals that leads to biodiversity loss.

- Examples of indigenous plants that can be maintained with low or no chemicals:

Lavender – <i>Lavandula</i> (Mediterranean areas)
Culinary herbs (ex. Basil, oregano, thyme, and rosemary) (Mediterranean areas)
Borage or starflower – <i>Borago officinalis</i> (Mediterranean areas)
<i>Phragmipedium guianense</i> (French Guiana)
Bushy lippia - <i>Lippia alba</i> (French Guiana)



- Examples of common invasive species:

Alligator weed - <i>Alternanthera philoxeroides</i> (Europe)
Tree of heaven - <i>Ailanthus altissima</i> (Europe)
English Ivy – <i>Hedera helix</i> (Europe)
White bottlebrush tree - <i>Melaleuca</i> (French Guiana)
Lightwood or Hickory wattle - <i>Acacia Mangium</i> (French Guiana)

In addition to using indigenous plants, you can also have pollinator-friendly plants in your accommodation facility's garden to attract bees and butterflies, but also you can house local fauna using ornamental green spaces in your garden to serve as shelter for local species, like setting up a little pond or leaving a pile of stones for small mammals and invertebrates. Furthermore, you can have nesting boxes for birds on the trees. Having the most diversified garden with some green ornamental spaces will make it easy for insects and small animals to find shelter in your place and therefore you will be helping in protecting biodiversity.

This solution is applicable for most types and sizes of accommodation.

2- Protecting biodiversity in your restaurant

Biodiversity for food and agriculture represents all the plants and animals that provide food and support food production; therefore, it is vital for you as a guesthouse owner to protect biodiversity in your guesthouse's kitchen or restaurant. There are many solutions that you can implement in your facility to help protect biodiversity:

- a) **Purchasing food from sustainable sources:** when you buy food for your hotel's kitchen you can try to ensure that your purchases are produced using environmentally friendly techniques, for example, to be organically grown or grown in small farms. Because intensive food production

uses large land spaces and a lot of pesticides leading to pollution and therefore increasing biodiversity loss.

- b) **Offering locally produced food:** you can help protect biodiversity by offering your visitors a menu with local food taking advantage of local products that will add to your visitor's travel experience and will make your restaurant a special place to visit. Local food doesn't have to travel as far to reach your kitchen, therefore it helps reduce greenhouse gas emissions that increase climate change driving to biodiversity loss.



- c) **Buying seasonal products:** one of the top things that you can do to help protect biodiversity in your hotel's restaurant is to keep your menu seasonal. For example, you can change your menu 4 times a year – one for each season. Seasonal food uses less energy for production (and fewer pesticides), while out of season food needs artificial heating, lighting and storage which increases the emission of greenhouse gasses.
- d) **Produce your own compost as a nutrition for your plants:** You can compost your organic wastes or simply take them right back into your hotel's garden, by that you will be reducing the amount of waste produced and giving good nutrition to your green space. Waste disposal can impact biodiversity because of loss of habitat through direct land take for landfills in addition to leachates affecting groundwater and therefore marine life, but also through release of greenhouse gasses by incineration (IUCN, 2012). You can find more information and solutions regarding waste management in your tourist accommodation in the specific module "Waste Management".

3- Making responsible choices in guest rooms and public areas

Wood is by far the dominant and most important forest product. Therefore it's a key element for biodiversity, by providing shelters, food and hiding spots from predators for many species. Hence, responsible choices for guest rooms and public areas furniture in your guesthouse are a great chance for you to protect biodiversity.

You can make responsible choices when buying wood products for furniture in your guesthouse and select timber from sustainable sources that has been harvested responsibly. For some references on this matter, you can check the following links:

- Sustainable Forestry Certification with Bureau Veritas:
<https://certification.bureauveritas.com/needs/sustainable-forestry-certification>
- The Program for the Endorsement of Forest Certification:
<https://www.pefc.org/find-certified>



When buying wooden furniture for your guesthouse rooms, always look for official certification of the wood's sustainable source. The wood can be sustainable or not depending on its origin. For instance, you can choose species that come from well-managed plantations in Europe.

To be more eco-friendly and protect biodiversity you can:

- Choose furniture made from recycled wood from old furniture and fences etc.
- Re-use wood that you already have whenever possible.

Re-using wood is a green way to maximize resource efficiency.

Commenté [1]: After this sentence, a pop-up window will appear in the platform with the following text:

Did you know that experts of the WWF estimates that the removal of forest cover during logging has in some instances resulted in the scarcity or out-right extinction of many important plant and animal species?

4- Training your staff

A really good way to help protect biodiversity is to inform your staff through training what biodiversity means, its importance, and ways to help protect it.

You can also provide them with information on local biodiversity.

You can also present to them your guesthouse's commitment to biodiversity protection through any solution and action that you follow in your guesthouse to limit your impact on biodiversity like limiting the purchase of non-local food for your kitchen, limiting the use of non-native plants in your garden, and tell them also about your furniture responsible choice.

Provide your staff with communication skills training to be able to communicate with visitors on this issue and to be able to provide first-hand information to them.



5- Promoting local natural heritage and responsible recreation activities

Biodiversity protection is a common responsibility for you as a guesthouse owner but also for your visitors, for this reason, you can promote in your guesthouse local natural heritage protection through responsible recreation activities.

First of all, ask yourself if you know enough about the natural heritage of your area, and if not, try to learn more information about it because understanding the values of local biodiversity is a key factor to protect it and to communicate this action to your visitors.

The goal of promoting local natural heritage is to avoid damaging biodiversity that could result from irresponsible tourism activities but also to contribute to the preservation or restoration of this heritage. There are different ways that you can follow to promote natural heritage including:



1. Inviting cultural groups to your accommodation to promote their local products (handcrafts, jams, natural herbs, and soaps).
2. Organizing local cooking workshops for tourists to promote local food heritage.
3. Developing food tours packages and local farm visits.
4. Organizing hiking tours focused on identification of plants and animals' species on the trail.
5. Organizing animal trace tracking tours like bears and wolves tracking, or other less emblematic species but endemic ones (in Crete, Greece, the "Kri kri" local goat species; in Portugal the wild pig; etc.) .

One of the most important steps to follow when organizing local tours for your visitors is to arrange with local guides and tour operators because they:

Have good information on local biodiversity to communicate it to tourists.

Have the best communication with local communities.

Have the best communication with tourists.

6. Promoting local biodiversity using different communication channels including your guesthouse's website, sharing videos on local species protection in the visitor's area, and brochures listing the endemic plant and animals' species in the area.
7. Learning about conservation storytelling! Stories based on natural protection including biodiversity protection, especially those provided by local people will attract visitors to your place because they will create a connection between them and natural areas. So, you can tell visitors stories about animals and plants and how important their homes are which will inspire them to connect and act for nature.
8. Offering volunteering opportunities to those of your visitors who wish to participate in activities and events related to local biodiversity protection (you can organize such events, or you can even link your visitors with local environmental protections associations).

For more information on biodiversity protection:

- You can use the platform from the European Environment Agency to find species and habitats across Europe.

<https://eunis.eea.europa.eu/>

- You can learn about biodiversity news and events in the EU through this link:

https://ec.europa.eu/environment/nature/index_en.htm

- It's also important to learn about the Natura 2000 EU network, the largest coordinated network of protected areas in the world that offers habitat to Europe's endangered and valuable species and habitat.
https://ec.europa.eu/environment/nature/natura2000/index_en.htm

Technical solutions

6- Installing bee pollinator hotel

Bees are so vital to preserve biodiversity, they simply pollinate plants, which means they carry pollen between plants to fertilize them and help them to reproduce ensuring that the surrounding habitat continues to thrive.

Despite their ecological, economical, and social key role, bees are increasingly under threat from human activities including habitat loss (IEEP, 2017).

Therefore, the relationship between humans, plants and bees is so important. So as an owner of a guesthouse in a natural area, you can support wild bees that help forests around your guesthouse and by that you are supporting biodiversity which is the key attraction to your visitors.



Commenté [2]: After this sentence, a pop-up window will appear in the platform with the following text:

Did you know that pollinators, which are economically, ecologically and socially important, are increasingly under threat from human activities, including climate change and habitat loss?

To build a bee hotel you need the following:

Hollow tubes for example bamboo stems
Scissors or secateurs
A wooden container or called nest box – or frame to hold the nest materials
Metallic wire
Some stones to be used as a container base.

Hotel building steps:

1- Use a cane – tube to measure from the bottom of the wooden container to the top.
2- Cut the tubes with a clean opening to the length that you measured.
3- Bundle the tubes together using a metallic wire
4- Fill the container with the tubes until it is tightly packed
5- Find a shelter in your garden, a sunny spot and make a base out of stones.

It is important to make sure that the open ends of the tubes- stems face out of your container, and that you choose a good location for the container in your garden to be protected from rain, insect predators and moisture wind. You can also choose to construct your bee hotel as a wood nest block, which is simply applied by using an old tree stump and drilling a series of holes of varying diameters in it to attract a diversity of bee species. This solution can be applied to any type of accommodation because it can be constructed at any budget. Bees don't care how fancy the hotel looks!
You can even search for a ready bee hotel to buy for around 30-35 euros.

See the video:

<https://www.youtube.com/watch?v=0s9sD3aXJk&list=TLGGxCoogDQWsgMyOTEyMiAyMQ>

Safety measures to apply this solution in your guesthouse:

- Keep the bee hotel away from visitors' space
- Train your staff in using the first aid
- Keep first aid kit and swelling creams in an area that is easily accessible when the need arises.

You can also ask your visitors not to walk barefoot and to cover their food when they are in the garden.

Additional content

	<ul style="list-style-type: none"> • The European Nature Information System. Find species, habitat types and protected sites across Europe. https://www.eea.europa.eu/themes/biodiversity/eunis • Natural History Museum. London. How to make a bee hotel video. https://www.nhm.ac.uk/discover/how-to-make-bee-hotel.html • Eurosite. Pollinators in Europe. https://www.eurosite.org/brussels/pollinators-in-europe/
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Case studies

1- Selecting indigenous plants, offering locally grown food, growing seasonal products, and promoting responsible recreation activities

Eumelia is an organic agrotourism farm and guesthouse located in Laconia, southeastern part of the Peloponnese peninsula, Greece. The farm is committed to biodiversity protection through growing only local trees and plant species, following sustainable farming techniques like permaculture that includes “practices respecting the flora and fauna and creating ground for regenerative healing of the soil” written on their website. In addition, the farm hosts local animal breeds like the indigenous Greek black pig.

Moreover, the farmhouse works with a local NGO that rescues animal breeds from extinction and finds places to raise them like Eumelia organic farm. And because “farm to table rocks”, the guesthouse also benefits from these animals using their fresh organic eggs, cheese, and milk along with the local seasonal organic vegetables growing in the farm for the restaurant all year round. Mulching and composting is held in the farm creating healthy soil to grow these vegetables.



The farmhouse also organizes hiking tours around Mount Pernonas to learn about local wild herbs and walks at the nature protected area and the sanctuary of wildlife, the delta of Evrotas river.

The farmhouse also offers its visitors classes about organic olive oil production, but also it welcomes schools to teach students about sustainable organic farming. In addition, the farmhouse offers volunteering opportunities and internships to work in the farm that is organic and hosts local animals and plant species.

Eumelia is a part of the WWOOF Greece (<https://wwof.gr/>) and [Helpex global volunteering](#) internship networks.

Link to the guesthouse website: <https://www.eumelia.com/farm/sustainable-regenerative-green-practices/>

(Certified as sustainable tourism hotel accommodation by Global Sustainable Tourism Council GSTC).

2- Promoting responsible recreation activities

Porfyron hotel in Ano Pedina, one of the mountainous villages in central Zagori, northwestern Greece, located at 1000m altitudes promotes responsible recreation activities by organizing to its tourists' hiking tours to many national protected areas and parks like Vikos Gorge, one of the deepest in the world.

The boutique hotel also promotes the great diversity of fauna and flora in Zagori on its website, mentioning local animals and plants species like unique orchids, European brown bear, Greek tortoise, reptiles, and deer.



Link to the hotel's website: <https://porfyron.gr/en/arrangements-trekking-rafting-argaleios-drasthriothtes-zagorochoria/>

Natural hazard prevention in my tourist accommodation

General issue

Many managers of tourist's accommodations are skeptical about getting involved in natural hazard prevention although accommodation facilities like any other establishment, can face a natural disaster at any moment and therefore it's crucial to take proactive measures in your facility to protect yourself, your staff, and your visitors from a possible natural hazard.

However, experience shows us that tourist information and well-explained preventive measures are likely to reassure tourists, in a context where the increase in the frequency of natural disasters (floods, fires, etc.) linked to climate change is less and less debatable. It is in this spirit that, for example, the UNDRR (United Nations Office for Disaster Risk Reduction), which is part of the UN, has been setting up a certification scheme for hotels since 2014: www.hotelresilient.org, which aims to develop internationally recognized standards to help accommodation managers to reduce the degree of exposure of their businesses and their customers to disaster risks.

Learning Outcomes

	KNOWLEDGE	SKILLS	RESPONSIBILITY and AUTONOMY
	<ul style="list-style-type: none"> - To know the natural risks present on your territory - To know the tools and actors of prevention 	<ul style="list-style-type: none"> - To learn about the alert - To assess the vulnerability of your structure 	<ul style="list-style-type: none"> - To inform customers - To implement vulnerability reduction measures

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Estimated duration: 180 minutes

Managerial solutions

1 Major hazard prevention actors and tools in the world, in Europe (and in France)

There are many organizations worldwide that spread awareness, education, preparedness and implement warning systems and works closely with local authorities and businesses

before, during and after disasters occur to reduce the disruptive impacts of a natural disaster on communities.

1.1 At the international level

The UNDRR¹ supports and encourage initiatives for natural disaster reduction with the aim of promoting the resilience of nations to major hazards.

1.2 In Europe:

The European Union, for its part, finances cooperation projects on research, the development of a risk culture, transfers of know-how on crisis management, etc. It also finances territorial prevention projects, particularly through the European Regional Development Fund ERDF (e.g. flood prevention action programs in France).

The EU has also legislated for flood prevention via the European Flood Directive. (see chapter on flooding).

Finally, a common emergency number for the whole EU has been established: **112**

1.3 Within the different EU member states

There is a great disparity of competences according to the level of decentralization. Some countries, such as France, rely mainly on the state and the municipalities. Others, such as Italy, Spain, and Germany, entrust the regions with significant powers in civil protection.

- Civil security organizations, such as the fire brigade/department, also implement preventive information activities in many countries.

- Civil society, such as the International Red Cross, is also heavily involved in this field, whether in post-disaster management or in raising public awareness.

- Other humanitarian associations, specialized in certain missions, also intervene regularly during major crises. For example, the "emergency architects" (<https://www.archi-urgent.com/>), who work on buildings and supporting populations affected by natural disasters in many countries around the world. In some countries, such as Italy, there are groups of civil security volunteers who intervene with the population during crises but also on prevention actions.

- Many universities and research institutes also collaborate on different aspects (knowledge of phenomena, crisis management, risk culture). Some of them deliver information and warning messages directly to citizens (e.g. Météo France).

- Finally, social networks have now become essential as a complement to traditional media, particularly during crises and at different levels. Citizens themselves become useful informers on the evolution of situations.

Therefore, it is very important that managers learn about the responsible bodies in their area. They will take from them the requested information on preventive and alert measures.

2. The different natural risks and their prevention

A major natural risk is the conjunction in a territory of a phenomenon of natural and random origin (**ALEA or HAZARD**) and **the vulnerability of the stakes** in this territory.

¹ United Nations Office for Disaster Risk Reduction

The more intense the hazard is and greater the vulnerability, the greater is the risk and the more serious and lasting the consequences.

Vulnerability can be **direct** if the structure is directly affected by the hazard, or **indirect** (e.g. when hazards paralyze the functioning of the establishment more or less permanently).

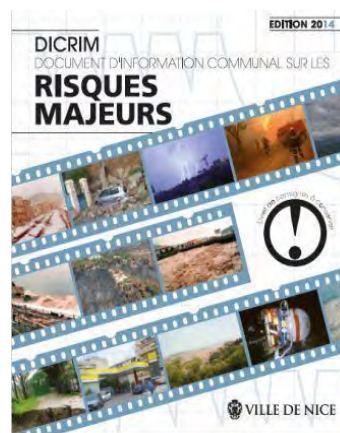


Source : UN knowledge portal

2.1 Be informed and spread awareness among guests:

Preventive information is a major tool for the avoidance of natural risks.

The authorities which intervene at different levels to prevent natural risks have the responsibility to provide this tool, and, depending on the European country, these authorities can be the State, the municipalities or, as in some countries, at regional level (Italy, Spain, Germany, etc.)



A preventive information document in Nice, France

In case of an alert, call servers and smartphone applications are made available locally by the prevention actors. They can be dedicated to give general information to people for example, or to communicate about major risks.

Other territories are equipped with specific alarms and mobile loudspeaker announcements.

It is important to highlight to your guests that you are following preventive actions in your facility regarding natural hazards to make them feel safe.

2.2 Reducing your facility's vulnerability to natural risks

Since natural risk is the combination of a hazard and a vulnerability, reducing risk requires action on at least one of the two components. However, reducing the hazard is

often complex and sometimes impossible. Acting on one's own vulnerability is therefore the first line of intervention. These measures are specific to each type of hazard and may even conflict with each other. Depending on the hazards and the countries, these measures can be accompanied by the managers of the accommodation facilities. These measures, both organizational and technical, must first be the subject of a vulnerability assessment. Proposals for reducing vulnerability are set out below, with the different families of risks.

2.3 Basic safety guidelines

For all types of hazards, there are basic safety guidelines to be followed.



You can have available in your facility a radio and a supply of batteries. Since networks can be interrupted, it is important to be informed during the crisis. Also provide emergency lighting and train your staff on emergency situations to support themselves and the guests when needed.



Only call for help in an emergency case (112). Do not clog up the networks and switchboards

3. Training of staff and information of tourists

Training staff on protection against natural hazards is essential to optimize their own safety and their involvement in the protection of guests. They must be actors in crisis management and therefore must be prepared. This involves training on the different possible scenarios of natural hazards and risks and the role and actions that each person should take.

These training sessions should target the different stages related to the emergence of a natural risk: pre-alert, alert (depending on the information available), crisis, post-crisis management and return to normal. And In order to be effective, it must be practiced regularly (especially in structures where the staff changes frequently). They should focus on a particular scenario each time, prioritizing the most likely to happen ones.

It is also essential to provide each member of the staff with a document compiling all the elements of the plan and the action sheets.

Furthermore, informing tourists about what to do in case of a natural hazard is also an additional guarantee of safety. This action is even obligatory in some countries (in campsites and furnished accommodation in France).

Several tools can be used to inform tourists about safety regulations to protect themselves in case of a natural hazard:

- Posting notices in the common areas and rooms, as its explained in the fire risks section.

- At the reception desk, a few basic instructions can be given, particularly in campsites, regarding the risks of flooding and forest fires.

its good to invite visitors to check applications using their smartphones, that inform about possible occurrence of a natural hazard, blocked roads during the hazard, and tips for protection against it. These applications and social networks specific to the area are becoming increasingly useful, as these tools serves important information to help people protecting themselves during natural hazards

- More detailed documentations can be made available in certain common places, such as books related to local risks anid old ones that have affected the region.

- Finally, as it is very often the case in tourist facilities, useful information on a case-by-case basis can be given orally by the host on the precautions to be taken into consideration when tourists ask for information on a planned excursion, and outdoor activities (hiking, off-piste skiing, etc.).

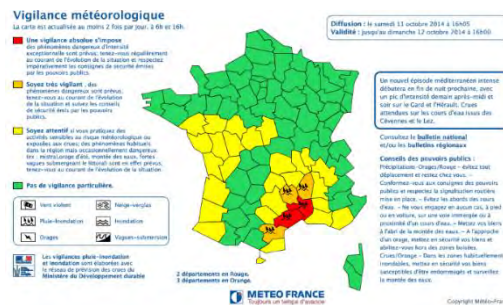
- Working on all these different tools increases the possibility of a tourist getting the real message about protecting himself against natural hazards, since people listen differently to the different modes of information.

Technical solutions

1. Meteorological hazards

The risks of climatic origin are directly linked to the climates of the different territories but also to the topography. There are thus risks of all kinds (cold, heat waves, exceptional snowfall, lightning, storms, and cyclones, etc.).

It is essential to be informed in advance, and this is done by weather forecasting organizations, often relayed by the territorial actors (states, regions, municipalities, etc.).



Weather alert map in France

1.2 Storms and cyclones

Storms (gusts exceeding 100 km/h) and cyclones (gusts up to 350 km/h and accompanied by very heavy rainfall) represent a major risk over Europe (storms) and tropical regions (tropical storms and cyclones).

Storms and cyclones can have destructive impacts due to throwing up heavy objects, destroying roofs, and can also make trees and electricity poles and pylons falls which can hurt people around.

Prevention and safety instructions:

You can follow certain safety instructions and prevention steps in your tourist accommodation to protect yourself and visitors against storms:

Check that doors, shutters, and windows are functioning properly in your tourist accommodation and reinforce them if necessary. Reinforce chimneys likely to collapse by strapping to make them more persistent to storms.

As the event approaches you can follow the below steps:

- Put away all objects likely to fly away (chairs, tables, blinds, tumble dryers, etc..).
- Prepare a supply of water and food and an emergency kit.
- Store useful equipment and tools (hammers, spikes, boards, blankets) in an accessible place.
- Go to any shelters provided by the authorities if you are invited to do so.
- Stay indoors and do not go outside under any circumstances!

1.2 Thunderbolt

A lightning bolt transmits an electrical charge of 300 million volts, enough to cause major damage to a house with a 230-volt electrical system.

Prevention and safety instructions: If your building is insulated and quite high, it may be useful to install a **lightning conductor**. Depending on the model and the configuration of the premises, installation costs are between **500 and 3,000 €**.

You should also provide lightning protection sockets and power strips that costs an average of 20€ .

An interesting site allows you to follow storms news in real time, it is useful for both lightning and flooding: <https://www.lightningmaps.org/>

1.3 Snow and extreme cold

While for many natural areas, especially in the mountains, winter snow and cold are a normal part of the climate, they can be very problematic in areas where they rarely occur. These events represent above all a danger for travel and sometimes for certain residences.

Prevention:

Its always important to take some preventive measures for snow and extreme cold.

- Protect water pipes from freezing with thermal insulation which costs about 20 euros for a 0.40 x 5 m roll)
- Favor public transport
- Take special equipment for your vehicles (chains, snow tires, socks) in case you had an urgent need to leave from your place.

Safety instructions:

Some safety instructions to follow in case of extreme cold or snowstorm.

- Avoid travelling and stay at your facility.
- If you have to travel, inform your friends and family of your departure and destination.
- Respect traffic diversions and instructions.
- Facilitate the passage of road clearing equipment.
- Clear and salt the pavements and accesses in front of your establishment (approximately 13 euros per 25 kg bag of de-icing salt).

- Never climb onto the roof of your house to clear it and never touch electrical wires that have fallen to the ground.

1.4 Heatwave

A heatwave occurs when temperatures are high day and night for three days in a row. As the different territories are more or less used to and therefore adapted to heat, the alert thresholds are not the same everywhere. For example, in Paris, these thresholds are 31°C during the day and 21°C at night, and in Marseille 35°C during the day and 24°C at night. This hazard particularly affects vulnerable people such as children and elderly.

Prevention:

installing air conditioners at your tourist accommodation rooms is a vital action that can help during heatwaves, because room air conditioning is the essential tool for temperature control. The purchase price varies enormously according to the models and performances. Thus for a building of 100m² the approximate costs of different models of air conditioners are:

Fixed monobloc: 1 000 to 2 000 Euros

Monosplit: 1 500 to 3 500 Euros

Multisplit (5 rooms): 8 000 to 10 000 Euros

Ductable (5 rooms): 12 000 to 25 000 Euros

A mobile air conditioner costs between 300 and 400 Euros.

Moreover, reducing heat islands, is an important prevention action against heatwaves. Heat islands occurs due to the difference in ground cover between cities and the countryside, where the thermal amplitude can be significant (between 4° and 12°C depending on the case). Maintaining or increasing the vegetation cover, especially trees, in the environment close to the tourist structure or in a campsite is a factor in reducing the heat wave hazard.

Safety instructions:

You can check the below safety instructions to apply in case of heatwave:

- Limit physical exercise to avoid the risk of dehydration or heat stroke.
- Choose shady places, cool down, drink water even if you are not thirsty.
- Do not drink alcohol or sugary drinks.
- Avoid going out during the hottest hours (12-5pm).
- Get some fresh air during the cooler hours of the day.



2 Flood risk

Flooding is the submergence, either rapid or slow, of an area usually out of water. It is a seasonal phenomenon that originates from long-lasting precipitation, but it can also originate from the sea or from groundwater.

A distinction is made between:

- Flooding by river overflows, which occur usually in Mediterranean, tropical and mountainous environments and depending on the river catchment area, flooding can be rapid and therefore leaves very little time (a few hours) to react.
- Runoff that takes place mostly in urban areas.

- Rising water tables, slow but long-lasting.
- Marine submersion, which can be caused by storm tornados or a tsunami.

Prevention:

A/ Assessing the hazard:

The first preventive action against flood risk is the assessment of the areas with notable risk of flooding. The European directive no. 2007/60/EC of 23 October 2007 (known as the "flood directive") requires that Member States must identify their territories at significant risk of flooding.

The directive provides that the Member States carry out a "preliminary flood risk assessment" to estimate people and property at risk. These assessments are therefore the subject of useful maps for information about the hazard. When they exist, you can access these documents on your town hall's website or request them from the local authorities.

Some other indicators are also useful to give information that serves flood risk assessment, in particular the old flood markers and information panels which allow to estimate the possible water heights if they are near the surface.



Moreover, testimonies of long-time neighboring residents, information provided by experts (e.g. river unions), press articles and chronicles, archives, are also considered as good indicators to get information on flood risks.

B/ Assessing your vulnerability

After developing a good knowledge of the hazard, it is necessary to evaluate the probable consequences of a flood on people and goods. Based on a potential water level in case of flood, it is therefore necessary to identify all the equipment vulnerable to flooding in your accommodation facility and, if necessary, to devise an appropriate safety plan.

C/ Reducing vulnerability:

You can take some measures before a flood to reduce your facility's vulnerability:

- Provide a refuge area (terraces, equipped rooms, etc.) for people and a possible evacuation point.
- For campsites, if necessary, provide a mound – little hill to enable campers to be out of the water and easily evacuated by the emergency services. In addition, in areas exposed to rapid-onset flooding, provide an adapted evacuation plan (based on a single direction

of traffic for vehicles) and equipped with signposting to guide people on the evacuation routes.

Example of a camping in Fréjus (France), which provides a collection of good practices to reduce vulnerability on sites welcoming tourists. <http://www.paca.developpement-durable.gouv.fr/recueil-de-bonnes-pratiques-risques-d-inondation-r2779.html> (see p 56)

- Protect the furniture and networks, this means moving furniture where possible (provide a storage room and if possible a pallet truck) or covering it with a tarpaulin. For the networks, put the electrical panel out of water.

Furthermore, flooding can also occur through the wastewater drainage system, so you can install non-return valves, the simplest models of which cost about 300 € (including installation) if this operation does not require construction works. This equipment requires regular maintenance.



- If you have tanks, moor them so that they are not swept away.

- If you have a swimming pool, provide a system of vertical rods high enough to mark out its contour in case it is submerged (and therefore invisible) and represents a danger for people, including for the emergency services.

- Avoid or slow down direct flooding of your accommodation facility :

You can install cofferdams (movable, temporary dams installed across ground floor openings) that can reduce the hazard. Their price depends on the size of the openings.



Example of a cofferdam sold at a price of 268 € <https://www.batardeau.shop/>

D/ Safety instructions

Here are some safety instructions to be followed before, during and after the flood:

- *Before the flood*

Move valuable furniture and objects, foodstuffs, and dangerous products, to a place with greater altitude to protect them before water reaching out your place.

- *During the flood*

- Inform yourself on the rise in water levels and the instructions for evacuation using the radio

- Disconnect electrical devices.

- Use temporary protection devices, if necessary, like cofferdams.

- Take refuge in a high point previously identified: floor, hill, and refuge area.
- Do not go down into basements and in particular underground car parks.
- Do not evacuate the premises unless ordered to do so by the concerned authorities or if you are forced to do so.
- Do not go on a flooded road (on foot or by car).
- Signal your presence and wait for help.
 - *After the flood*
- Ventilate and disinfect with bleach your accommodation facility.
- Heat your place as soon as possible.
- Do not turn on the electricity until the installation is dry.



3. The risk of forest fires

A forest fire occurs when a fire covers a minimum area of 0.5 hectares in a single block of land and at least part of the shrub and/or tree layer is destroyed. This hazard is particularly high in Mediterranean areas, but climate change is now having the effect of extending and aggravating its occurrence in previously less exposed areas.

Campsites are tourist structures that are particularly vulnerable to this major risk.

A/ Assessing the hazard

The hazard depends on the nature (types of tree species), density and dryness rate of the vegetation cover. The relief services also play a role as well as the weather conditions (wind). Moreover, fire intensity depends on 3 factors: oxygen, fuel, heat source, and it can spread in different ways, like direct conduction by contact or indirectly by fire debris, radiation, convection.

Concerning communication towards the population, the authorities need to inform the population of the level of risk and launch prevention messages by various means (leaflets on motorways, in public places, etc.). Access to the vegetated areas may be forbidden or regulated depending on the period (summer periods in particular). Territory managers can also rely on volunteer organizations that are often involved in spreading preventive information and monitoring of massifs (e.g. communal forest fire committees in France, Hellenic Volunteer Firefighters Association in Greece).

B/ Assessing your vulnerability

At the local level, assessing your vulnerability is done first of all by evaluating the hazard, which consists of taking into account the density and nature of the vegetation cover that surrounds the structure and which, in the event of fire, could spread to the structure itself. Some species are more sensitive to fire than others, such as mimosa and Aleppo pine for example, which are extremely flammable, unlike other deciduous and coniferous trees (cork oaks, cedars, etc.).

http://www.foret-mediterraneenne.org/upload/biblio/FORET_MED_1992_1_31.pdf

The second step is the assessment of the essential vulnerability of buildings:

- Nature of the building materials.

- Vulnerability of accesses to the building
- Inventory of water facilities.
- Inventory of likely heat sources.

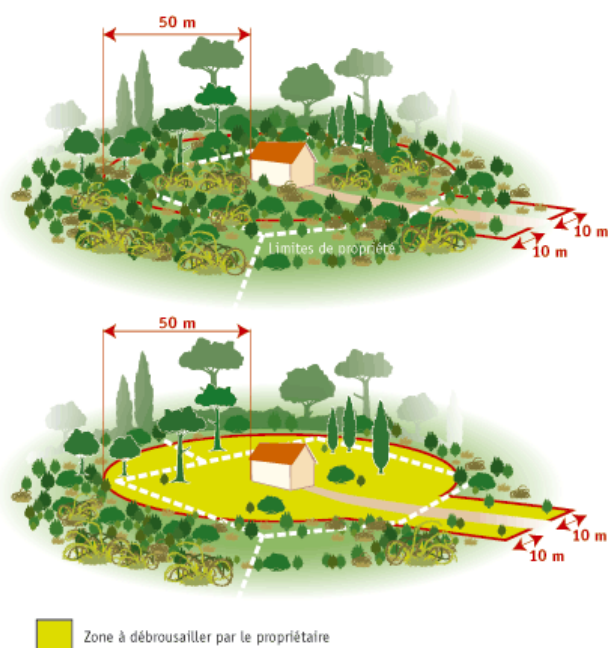
For campsites, this vulnerability is extreme, and many of them are thus obliged, as for floods, to set up an internal evacuation plan with dedicated signposting.

C/ Reducing vulnerability

The essential practice here is to clear the undergrowth from one's plot of land, and it is sometimes mandatory depending on the territory. Its principle consists in eliminating or reducing as much as possible the intermediate layer between the ground and the top of the trees and to isolate the trees from each other to avoid any vertical or horizontal propagation of fire.

Depending on the country, the rules and obligations for brushwood clearance vary, and it may concern the entire plot of land or it could be obligatory within a radius of 50 meters around a building. Brushwood clearing is also recommended or obligatory along access roads, over a width of 10 m, to secure the evacuation of the premises and that of the emergency services.

Examples of clearance standards



<https://www.savasse.fr/securite/debroussailement>

D/ Safety instructions

Before the fire

- Do not store flammable materials between buildings.
- Check the condition of the roof, closures, doors, and shutters.
- If necessary, prepare the means of firefighting (water points, equipment: motor pumps and hoses) and protect them with covers when the fire approaches.

- In sensitive fire seasons, avoid all possible sources of fire (barbecue, cigarettes, etc.).

During the fire

If you see a start of fire, inform the emergency services (call 112) and try to be calm and describe to them the situation precisely.

A well-protected house/premise is the best shelter:

- Evacuate only after orders of the authorities
- Open the gate of the property
- Close gas cylinders and keep them away from fire
- Park vehicles away from the fire
- Remove combustible items (linen, PVC furniture, pipes, etc.)
- Close and throw water on shutters, doors, and windows
- Cover vents between rooms with wet cloths

After the fire

- Go out protected (leather shoes and gloves, cotton clothes, hat)
- Extinguish residual fires without taking unnecessary risks
- Inspect your home, and check if there are any fire embers anywhere and watch out for re-starts
- Inform the emergency services of any practical difficulties when they are near your home



4. Seismic hazard

An earthquake is caused by a sudden break in the rocks along a fault line that generates seismic waves. When these waves reach the surface of the ground, they cause vibrations whose intensity depends on several factors including the following:

- The magnitude: which is the clear energy released and it is evaluated on the Richter magnitude scale.

The strongest earthquake recorded on earth have exceeded magnitude 9.

- The distance to the epicenter (point on the earth's surface vertically above the focus of an earthquake).
- The nature of the site (nature of the ground, relief, etc.)

The intensity of the earthquake in a specific location is assessed from the damage of buildings and how intense people felt it. It is evaluated on the European EMS 98 scale, which ranges from degree I to degree XII.

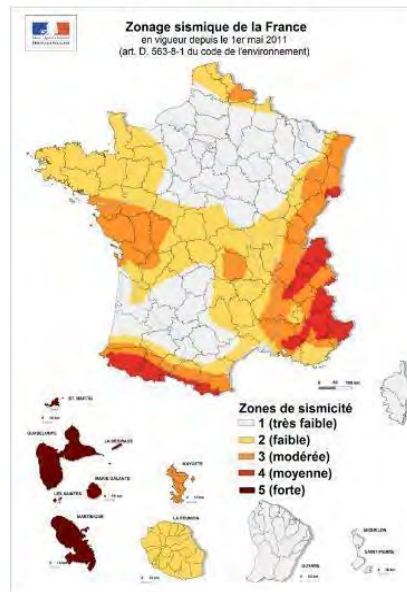
https://en.wikipedia.org/wiki/European_macroseismic_scale

Some earthquakes are caused by volcanic eruptions or by human activities (filling of dams, explosions, etc.).

Finally, earthquakes can have induced effects (domino effect) such as land movements, soil liquefaction, avalanches, tsunamis, industrial or nuclear accidents, fires, and dam failures.

A/ Assessing the hazard

For all EU countries, a common seismic zoning has been established and it defines 5 hazard zones, from very weak to strong and It is therefore necessary to find out from local authorities in which zoning your structure is located.



Seismic zoning of France

B/ Assessing your vulnerability

The major risk during an earthquake is the total or partial collapse of the building. Knowing your building's vulnerability requires the expertise of architects specialized in earthquake engineering. Some organizations can offer this service, such as "emergency architects": <https://www.archi-urgent.com/>

Furthermore, if the structure is resistant to earthquakes, the furniture itself can represent a threat in case they fall and people are around.

Finally, in a building, some areas are less vulnerable than others, particularly the main walls and the areas furthest from potential fall points. On the other hand, certain areas such as stairwells and openings (especially windows) are more vulnerable. Therefore, it's important for you to:

- Identify furniture and objects likely to fall in case of an earthquake.
- Identify the safest places to keep yourself and your guests if an earthquake happens.

C/ Reducing vulnerability

Reducing vulnerability means first and foremost adapting the structure itself to seismic factors. In the case of current construction or rehabilitation project, it is therefore obligatory in Europe, to take into account the seismic risk in the architectural plan of the project.

In the European Union, reducing vulnerability of building against earthquakes is the subject of a regulation that imposes seismic standards for all construction projects (Eurocode 8 - <https://eurocodes.jrc.ec.europa.eu/>). These standards, regulate for example, the dimensioning of wall ties and the placing of lintels around frames, which vary

according to the seismic zone, and the additional costs of applying them for a standard building are approximately 2% of the project cost.

During a construction project, it is therefore important to ensure that these standards are considered and well implemented.

In an existing building, it is possible to reduce vulnerability to earthquakes through reinforcement works. However, the additional costs of these works are much higher than if they were carried out at the design stage of the building.

It is also possible to reduce vulnerability to earthquakes considering furniture by securing objects that may pose a threat.

D/ Safety instructions

During the earthquake

Inside:

- Do not try to get out but stand near a wall, a supporting column or under solid furniture (to avoid falling objects).
- Stay away from windows.
- Do not use stairwells under any circumstances.

Outside:

- Do not stand under electrical wires or under things that could collapse (bridges, ledges, roofs, etc.).

After the earthquake

Beware of aftershocks: there may be more

- Evacuate the building
- Do not use lifts to leave from a building
- Check gas, water, and electricity devices. If there is a leak, open windows, and doors, and leave the premises and notify the authorities
- Move to a place away from buildings and powerlines
- Stay away from coastal areas, even long after the earthquake has stopped, because of possible tidal waves (tsunamis)
- If you are trapped under rubble, stay calm and signal your presence by knocking on an object (metallic if possible) within reach.



5. Avalanche hazard

An avalanche is a rapid movement of a mass of snow down a slope, caused by a break in the snowpack. This mass varies from a few tens to several hundred thousand cubic meters, for speeds between 10 km/h and 400 km/h, depending on the nature of the snow and the flow conditions. The slopes that are favorable for avalanches to start are between 30 and 55°.

A/ Assessing the hazard











The avalanche risks are usually represented in numerous maps, some of them are old,

which can identify the avalanche corridors. these maps are drawn up by the local authorities (e.g. PPR avalanches in France) .

In ski resorts, it is the site managers who represents the focal point to know the local avalanche hazard, moreover, some organizations are dedicated to identifying and assessing this risk.

You can find here some examples of such organizations In France: Association Nationale pour l'Etude de la Neige et des Avalanches- <https://www.anena.org/>, In Italy: Fondazione Montagna Sicura - <http://www.fondazionemontagnasicura.org/>

The daily risk level is assessed by local authorities and are developed in specific publications (e.g.: Météo France's vigilance map).

Pictogramme	Niveau de risque	Couleur	Message sur les conditions de pratique, l'importance et l'étendue du risque	Dispositif d'alerte (facultatif)	Correspondance Drapeau avalanche
	5 – Très fort		Conditions très défavorables	[Oui]	
	4 – Fort		Forte instabilité sur de nombreuses pentes (*)	[Oui]	
	3 – Marqué		Instabilité marquée, parfois sur de nombreuses pentes (*)	[Oui]	
	2 – Limité		Instabilité limitée le plus souvent à quelques pentes (*)		
	1 – Faible		Conditions généralement favorables		

B/ Assessing your vulnerability

The vulnerability of a building to avalanche risk depends on its location in relation to the likely point of impact of the avalanche. In the case of an aerosol avalanche, the openings of the accommodation facility (doors and windows) will be points of vulnerability to the avalanche blast. The more openings you have in your facility, the easier will be for the snow to go inside. The rooms behind these openings are therefore the most vulnerable. On the other hand, certain rooms such as basements can represent an effective refuge zone. It is therefore necessary to identify and prioritize the vulnerability of the various rooms.

C/ Reducing vulnerability

To reduce the vulnerability to avalanches, land managers usually equip areas at risk in a significant way with various technical means, like installing protective structures that prevent the start of avalanches or protect against their effects. In the avalanche starting zone, these structures can be nets, racks, wind barriers, while in the flow and stopping zones, the structures can include braking or stopping structures (paravalanches). It is important to mention here that tourists can also have an impact on the hazard, especially in touristic areas, by triggering artificial avalanches.

Here are some measures that you can take in your facility:

- Protection of openings by solid shutters on the exposed façade(s).
- Installation of arches to divert the avalanche upstream. Their cost depends on the chosen material (soil, concrete...) and their dimensions.



Example of arche in Switzerland

D/ Safety instructions

If you are inside:

- Stay inside!
- Protect yourself and tourists in your facility by closing the shutters and do not stay in the most exposed rooms.
- Take refuge in the basement.

If you are outside:

- Enter the nearest building and protect yourself by closing the shutters.
- Make sure that your vehicle does not block the intervention of local authorities.



6. The risk of ground movement

Ground movements are natural phenomena of very diverse origins and of varying sizes and granulometry. Depending on the speed of movement, two types of ground movement can be distinguished:

- Slow movements, which lead to a progressive deformation of the land, not always perceptible to humans. They mainly include subsidence, settlement, and landslides and shrink-swell.
- Rapid movements, which occur suddenly and quickly. They include collapses, rock and boulder falls, landslides, and mudflows.

Landslides and boulder falls are rapid ground movements resulting from the action of gravity on rocky elements.

Mudflows are rapid movements of materials in more or less fluid form. In the mountains, they can take the form of debris flows, particularly loaded with rocks.

Collapses are ground movements that occur more or less suddenly and result from the rupture of the roof or the supports of an underground cavity.

Clay shrinkage and swelling: The volume of superficial clay soils can vary as a result of changes in their water content, in relation to weather conditions. They 'shrink' during

periods of drought ('shrinkage') and swell when its rainy (swelling). These variations are slow, but they can reach an amplitude large enough to damage buildings located on these grounds. They do not threaten people but can affect the whole of a building to the point of making it unusable.

A/ Assessing the hazard

As for avalanches, the knowledge of the hazard can be obtained by the cartography proposed by the official national authorities. In addition, private and public geo-technical research organizations also propose avalanches maps that are often online (in France the Bureau de Recherche Géologique et Minière - BRGM and the Office National des Forêts - ONF/RTM in mountain areas).

Locally, some hazards may be obvious to assess, notably block falls if the structure is located at the foot of a rocky cliff.

Landslides, even slow, can also show signs on the surface (appearance of cracks in the ground, formation of counter-slopes, change in the inclination of trees, etc.). Concerning the phenomena of swelling-shrinkage of clays, a study of the soil by an engineering office can make it possible to evaluate its clay content and thus the probable hazard.

B/ Assessing your vulnerability

This operation is particularly delicate because of the variety of hazards, where each hazard corresponds to a particular vulnerability.

Some movements may concern the whole building (landslides, swelling/shrinkage, etc.), or only part of it (block falls, mudflows, etc.).

C/ Reducing vulnerability

Here again, reducing vulnerability to land movement correspond to the existing types of this hazard. Most often it is geotechnical work carried out by land managers that is implemented through active (stabilization of unstable escarpments, soil drainage, mountain stream management, etc.) or passive (protective nets and walls) measures.

At the individual level some practical measures can be taken:

- Organization of the occupation of the building or structure according to the exposure to block falls for example.
- Drainage of the soil to reduce the water content and/or increasing the vegetation cover around your building.
- Concerning swelling/shrinkage, as it is the case for the seismic risk, specific equipment can be used for the foundations during the construction works of the facility.

D/ Safety instructions

In the case of a landslide

Outside:

- Run sideways, don't turn back
- Get to a high point
- Do not enter a damaged building.

Inside:

- Take shelter under a solid piece of furniture away from windows.

In case of collapses

Outside:

- At the first sign of trouble, evacuate the building and do not return
- Do not take any lifts

Inside:

- Move away from the danger zone
- Go to a safe place

In the event of a mudslide, follow the "flood" instructions

After a ground movement

- Turn off water, gas, and electricity devices if possible
- Do not return to the building until the authorities have given their approval
- Prevent public access to a perimeter twice the size of the affected area

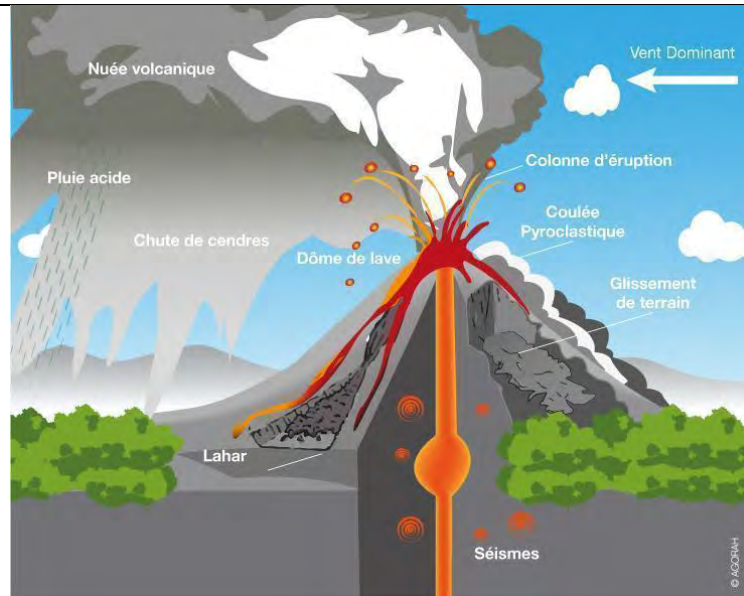


7. Volcanic risk

Volcanic risk is a major natural hazard, due to the violence of the different risks that characterize it and the difficulty of predicting eruptions. Volcanoes can produce very different hazards and may change quickly depending on the type of building and/or eruptions. Volcanic risk is thus specific to a given structure and varies in time and space: each volcano is therefore different.

Today, volcanologists count seven main categories of volcanic hazards:

- Lava flows which are outpourings of molten rocks that are set up on the sides of volcanoes under the influence of gravity.
- Aerial fallout of bombs and volcanic ash
- Pyroclastic flows which are complex mixtures of gases and rock fragments at high temperatures (250 - 800 °C) that flow down the sides of volcanoes.
- Lahars (Indonesian term) which are mud or debris flows consisting of a mixture of water and volcanic material.
- Gas emissions
- Debris avalanches are large-scale cataclysmic phenomena in which a large part of a side of a volcanic structure (or even an entire side) collapses under its own weight.
- Tsunamis and 'volcanic' earthquakes



A/ Assessing the hazard

Initial knowledge of the hazards of different volcanoes is based on the knowledge of past eruptions and on the observation of the volcano's activity by various instruments.

In Italy, this monitoring is carried out by the INGV (Istituto Nazionale di Geofisica e di vulcanologia). <https://www.ingv.it/it/monitoraggio-e-infrastrutture-per-la-ricerca/sorveglianza/servizio-di-sorveglianza-vulcani-attivi>

in Greece this monitoring is carried out by the Institute for The Study and Monitoring of The Santorini Volcano (ISMOSAV) <https://www.santorini.net/ismosav/>

B/ Assessing your vulnerability

The magnitude of most of the hazards posed by volcanic eruptions make buildings extremely vulnerable, sometimes leading to sudden and total structural destruction. From the probable hazards identified, some particular vulnerabilities can be identified:

- Resistance of roofs to impact from splash or ash weight.
- Tightness of the structure to external gases
- Proximity to a watercourse or thalweg that could guide a lava flow or lahar.
- Density and proximity of vegetation that can spread a fire.

C/ Reducing vulnerability

For most extreme hazards, such as flash floods, reducing vulnerability may seem unsuccessful. However, based on the vulnerabilities listed above, some measures can be taken by strengthening roofs and providing buildings with waterproof membranes that could keep out the toxic gas emissions, as was recently the case in Les Canaris (Cumbre Vieja).

Possible evacuation routes should also be identified, away from rivers which can carry lots of sludge or debris. In the event of a volcanic eruption, the main measure taken by the authorities is the evacuation of exposed sites and confinement in dedicated shelters.

It is therefore essential to find out about the shelters planned beforehand.

D/ Safety instructions

Before a volcanic eruption:

- Stay away from active volcanic sites.
- Carry in your emergency bag, in addition to the basics, a pair of plastic goggles with good eye coverage (e.g. large swimming goggles) and a disposable breathing mask for each family member (available from pharmacies).

During a volcanic eruption:

- Follow the instructions of the local authorities.
- Do not approach the eruption areas.
- Immediately evacuate areas near the volcano to be safe from flying debris, hot gases, and lava flows.
- Beware of mudflows in case of heavy rain

If an ash cloud hits your living area:

- Stay indoors until the volcanic ash has settled unless there is a risk of roof collapse.
- Close doors, windows, and - ventilation openings in your facility (including air conditioning).
- Place wet cloths under doors or other gaps to prevent ash from entering your place.
- Clean thick ashes (10 cm) from roofs and gutters (risk of collapse).

If you must go out of your facility:

- Stay away from downwind areas of the volcano to protect yourself from volcanic ash.
- Use protective eyewear and avoid contact lenses (use prescription glasses instead).
- Use a respiratory protection mask. If you do not have one, protect yourself with a wet cloth.
- Wear long-sleeved clothing and trousers. If possible, avoid using your vehicle, because volcanic ash is generally volatile, so driving through it can clog and damage the engine. If you have to drive over thick volcanic ash, do not exceed 50km/h.

After the eruption:

- Change the oil and filters of the vehicle, and keep in mind that. It is not advisable to clean the ash from your vehicle with water, as the ash is abrasive and may damage the paintwork.
- If you have to leave your home, post a message in a visible and protected place indicating where you can be found.

Other resources

Handbook on Natural Disaster Reduction in Tourist Areas: edited by the World tourism organization in 1999 – Downloadable here : <https://www.e-unwto.org/doi/epdf/10.18111/9789284402397?role=tab>

The web portal of UNESCO for hazards prevention proposes some “good practices” focused on the prevention of disasters in natural or urban areas : <https://en.unesco.org/drr-sites/good-practices>

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Case studies

1- Creation of communication tools on natural risks in the Queyras campsites (Hautes-Alpes).

Within the framework of the national plans supporting the management of natural risks (PAPI and GIRN), the Regional Natural Park of Queyras (Alps) wishes to help the managers of campsites in the Guil river catchment area in the management of natural risks. The plan is focused on the preventive information to be given to campers and the training of the managers of campsites.

This work, still in progress, is divided into two stages:

1. To identify the preventive information tools that have already been put in place by all campsite managers and owners and to evaluate their effectiveness,
2. To develop, with volunteer managers, communication tools for campers, in order to ensure that they react appropriately in the event of a civil protection event affecting the campsite, and not just to provide a simple regulatory response in terms of preventive information.

Among the many tools envisaged, and in parallel with the organization of civil security exercises, a comic book devoted to four types of local risks (slow floods, rapid floods, earth movements and forest fires) has been created and made available in 2022 to the guests of a dozen campsites of the area.



Contact : Bérengère CHARNAY, **Water and Natural Hazards Officer**
Parc naturel régional du Queyras 33 4 92 46 88 89 b.charnay@pnr-queyras.fr

2- Geoguide for tourists “Gardons et gardonnades”

This geoguide was produced at the initiative of the interregional mission "Floods of the Mediterranean Arc". (<http://www.paca.developpement-durable.gouv.fr/inondations-arc-mediterraneen-r2225.html>) and Sudaléa in partnership with local stakeholders involved in the management of the Gardon river - EPTB Gardons, “Syndicat Mixte des Gorges du Gardon” and the municipality of Collias (Department of Gard)-.

In the Mediterranean region, water has often shaped the landscape and guided the management of lands. Floods are part of the ancient and contemporary history of our living areas. Often rapid, powerful and destructive, they are a defining feature of the watersheds that surround us.

Without catastrophism and with realism, this guide invites both tourists and local residents to explore the river Gardons basin (Gard department) and discover this magnificent area on foot, looking at the impact of water and past floods as well as the risk of flooding. A French version and a version for English-speaking tourists are available for download.

The "flooding" geoguide is a 52-pages downloadable field booklet with explanations of the local history and the tangible and intangible heritage linked to flooding in the Gardons catchment area. The booklet is accessible to all and is written in simple and educational language, making it possible to organise or follow easy and demonstrative walks in the area. It allows the reader to raise awareness of the risks of flooding, to cultivate the memory of events and to discover the countryside in a different way.

The guidebook is not a simple collection of knowledge but a means of encouraging visitors to question and reflect on their environment. Thus, games, questions and interpretation diagrams punctuate the routes. It also includes practical information on the matter of flood risks (safety instructions, bibliographic and internet resources, DICRIM, PAPI productions, etc.).

After a detailed description of the watershed, two walking routes are proposed in the commune of Collias. The format developed is reproducible on other territories.



Download the guide:

<http://www.paca.developpement-durable.gouv.fr/geoguide-gardons-et-gardonnades-r2533.html>

Contact : Jean-Marc DECOMBE –
SUDALEA 33 6 15 87 12 03
jmdecombe@sudalea.eu

Landscape management			
General issue			
	<p>Mass tourism often has a negative impact on landscapes. Whether coastal, mountain or natural, many landscapes have been profoundly affected by the appearance of hotel complexes, tourist residences, and related infrastructures (parking, traffic flows, etc.) often disproportionated. The main consequence of these developments has been the disappearance of landscapes' characteristic elements (reshaping of the topography, felling of trees, diversion of watercourses, etc.) and the disproportionate use of sites that have seen their resources depleted or metamorphosed over time.</p> <p>The integration of eco-tourism in the landscape depends above all on a good understanding of the latter. Whether in the sense of a large landscape or on a human scale, the various infrastructures will have to be specifically adapted to the place in which they are inserted. The various recommendations below should be adapted to the context and local regulations in force in the different partner territories of the EcoHosting.net project.</p>		
Learning Outcomes			
	On successful completion of the module participants should be able to...		
	KNOWLEDGE	SKILLS	RESPONSIBILITY and AUTONOMY
	<p>You should know about:</p> <ul style="list-style-type: none"> - The impact of tourism on the morphological modification of landscapes - The impact of tourism on biodiversity and the environment 	<p>You will be able to:</p> <ul style="list-style-type: none"> - Integrate an eco-tourism project into the wider landscape - Integrate an eco-tourism project into its local landscape - Accompany the various developments with an appropriate plant range and materials 	<p>You will be willing and able to:</p> <ul style="list-style-type: none"> - To practice a differentiated management of outdoor spaces in response to maintenance problems - Raising awareness of good landscape conservation practices among tourists

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Estimated duration: 90 minutes

Managerial solutions

1. Landscape diagnosis of the site

Whatever the site in which a project is to be implemented, its landscape integration will first of all depend on the proper consideration of the initial site conditions. Carrying out a landscape diagnosis is essential in the process of understanding the existing situation, which will then lead to the creation of a project that is coherent with the site on which it will be built.

This diagnosis, in the sense of the great landscape, will be based on the identification of five main axes: topography, green and blue webs, existing flows, the history and heritage of the site and finally the problem of co-visibility.

1.1 Topography

The topographical analysis of a site enables the different reliefs of a landscape to be highlighted. These can be quite varied and can include plains, plateaus, rocky promontories, steep slopes, etc., whether they are natural or man-made: e.g. the terraced landscape.

A topographical survey will allow the general level of the land to be defined quite precisely and thus to adapt the architectural and landscape project to its base as well as possible, limiting the raising and

scouring of the ground. Limited earthworks will allow the project to be integrated into its territory and also to manage the operation's budget by avoiding costly operations.

A project on a sloping site can either follow the slope by orienting the direction of the ridge and the longest part of the building parallel to the contour lines, or it can be embedded in the slope by burying part of the building (e.g. a car park), or it can be accompanied by various support structures and thus work on the levels of the building in a staggered manner, following the contour lines.



In the case of a project located on a plain, the architecture must be designed to respect the horizontality of the site and consequently not exceed one level (R+1).

1.2 Green and blue frames

The presence of green and blue frames in the form of different vegetation layers and various watercourses gives a landscape its characteristics.

Sometimes inseparable from each other, these two webs must imperatively be preserved. Thus, the implementation of an eco-tourism project should be kept sufficiently far away from watercourses so as not to disturb their flow and biodiversity.



The tall trees must be maintained in their entirety as far as possible. If it is impossible to maintain certain trees, they must be replaced by a tree of the same species and of sufficient size (e.g. a stem tree, minimum size 20/25 cm).

These two frameworks can, however, constitute an interesting tourist landscape heritage to be enhanced and displayed through the creation of soft paths, promontories and belvederes in natural materials, etc.

The green grid could also be extended by planting species similar to those present on the foreseen site to accompany the architectural project.

1.3 Existing flows

In order to avoid multiplying travel flows and to make the best use of the existing potential of the installation site, the mobility flows that existed prior to the construction of the establishment must be studied in order to create relevant connections and continuity of roads, pedestrian and cycle paths. The issue of public transport and existing or future links from strategic stops will also have to be integrated into the development of an Eco-tourism site.



The development of car parks could be separated from the accommodation but linked by a system of shuttles or soft paths, in order, for example, not to waterproof large areas on a natural site and not to generate noise or light pollution or hydrocarbon discharges.

1.4 History and heritage of the site

Many resources concerning the history of a place are now available and easily accessible. These can take the form of old maps, postcards, aerial photography campaigns, a census of existing heritage, etc.

This data can be consulted in order to learn more about the morphology of the site from the past to the present and can thus provide interesting avenues for development in connection with Eco-tourism.



It can be a question of telling the story of how the landscape was shaped, whether artificially (example of old quarries rehabilitated as diving sites) or not (geological formations), through a path punctuated by explanatory urban furniture which will also aim to raise awareness of the preservation of the landscape in place.

1.5 Dealing with co-visibility

In the case of a landscape with a marked topography or a good view of the surroundings, the notion of co-visibility must be carefully studied.

In fact, it will be necessary to analyse from where the various eco-tourism facilities will be perceived so as not to impact on distant views of the site, but also to study the views from the site which give a glimpse of interesting elements (mountain range in the distance, historical heritage, etc).



It is a question of visual openings and perspectives to be worked on in relation to the developments to be carried out, the existing green network and the heritage in place.

2. Adapting to the local context

In order not to create a rupture between the surrounding built environment and the facilities to be created in the context of ecotourism accommodation, it may be interesting to identify the specific architectural characteristics of the region. The outdoor areas will be treated differently depending on their use.

2.1 Architecture

a) Implantation

The architectural layout of the future Eco-site will depend on its location, i.e. whether it is connected to an existing built environment or isolated, in the middle of nature.

In the first case, it is a question of observing the layout and urban morphology of the existing buildings in the area of the study site or in its nearby geography.

Also, the ground surface, the implantation of the frontages in alignment of ways or in withdrawals, the distinct forms of the frontages or on the contrary in continuous built frontage, the semi-detached character or not of the buildings, the choice of materials are so many aspects which it is advisable to identify in order to appropriate the architectural identity of the micro-region to adopt certain codes.



In the second case, the location of the building(s) must nevertheless be adapted to the site and deal directly with its different morphologies (presence of watercourses, trees, rocks, marked topography, etc.).

b) Façades

In the case of an implantation of the project in connection with an urban grid, the aesthetic aspect of the existing facades will also have to be analysed on various points: traditional or more contemporary local architecture, materials used such as stone facings, smooth renderings, ironmongery materials, joinery, etc. in order to be able to punctually take back certain elements to serve the integration of the project:

Examples:

- Spandrels, wooden shutters and joinery and wrought iron railings can be evidence of traditional architecture;
- On the other hand, sleeker railings combined with a more minimalist façade will evoke a more contemporary architecture.



The study should also determine the predominant volumetry of the surrounding facades: horizontal or vertical, aligned or not.

Generally speaking, however, the orientation of the development will have an impact on the aesthetics of the facades: generally open to the south, and more closed to the north.

North-facing facades may also be conducive to leaning against the relief if the terrain lends itself to it, or to the extension of green screens to accompany the architecture.

To the south, the more "furnished" façade is the most popular. It is the façade that naturally has the most balconies, terraces and openings.



c) Roofs

Roofs are a key feature to be taken into account in the case of existing co-visibility. In the distant landscape, it is the presence of roofs that indicates the existence of a village.

On the other hand, the morphology of roofs is generally quite characteristic depending on the region. Therefore, in addition to their colour and the material used, if they are to be visible, they must take into account the slope traditionally used in the project area, as well as the depth of the roof overhang.

In the context of a more contemporary architecture, a green roof terrace can be interesting both in terms of biodiversity and in terms of integration into its surrounding landscape.

In all cases, the presence of technical equipment (air-conditioning, VMC, satellite dishes) that is highly visible in the landscape when placed on the roof should be excluded.

d) Colour and materials matching

Another characteristic element of local architecture is the color profile of the existing traditional building : even in the case of isolated buildings, it is important that it can be built in the traditional colors and used in the region. For example: natural stone, ochre plastered facades, visible wooden framework, etc.



The principle will be to analyze the different colors of facades in the region, particularly those with a historical character, in order to determine the predominance of certain colors, both in terms of rendering and in terms of metalwork, shutters, etc.

In combination with the roof colors, this profile can be used as a monochrome or in a series of touches within the project, in order to establish a link with the existing architecture and heritage.

The project should however adopt rather neutral and natural colors so as not to overpower the landscape in which it is inserted. Natural materials and their color should be preferred to plaster.

2.2 Outdoor areas

a) Private spaces

Private outdoor spaces must be able to find a good size, whether they are gardens or terraces, balconies where a minimum depth can be defined.

In the case of private gardens, these must have a durable, permeable and trample-resistant floor covering. This may include wooden decking, hard-wearing ground cover, or any other covering that allows water to seep into the ground. The gardens must provide shade, either in the form of vegetated pergolas or by planting tall trees.



b) Common areas

The common outdoor spaces will be largely vegetated and permeable and will be able to accommodate meeting and relaxation areas: Open-air dining areas, a green amphitheatre for shows and exhibitions, a children's play area, sports trails in the heart of nature, etc.

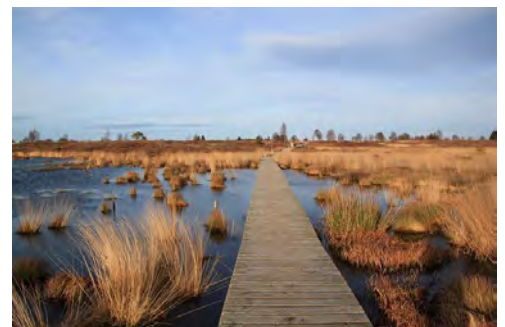
Small public squares and / or certain targeted spaces may be laid out in hard materials (deactivated concrete, stone flooring, etc.) in order to highlight an entrance, an interesting heritage, a particular viewpoint, etc.



c) "Soft paths"

In order to link the different parts of the site to each other and to the various transport hubs located in the vicinity, soft paths, i.e. those that are not too artificial, will have to be developed in order to preserve the natural areas as much as possible.

These paths dedicated to cycles and pedestrians may have a permeable surface (e.g. stabilised surface, wood walk, etc.) and be accompanied by planted areas.



These paths should also have a minimum of appropriate lighting at night in order to remain practicable while respecting the fauna and flora in place

d) Motorised routes

The road network on the site should be designed to reduce the speed of motorised vehicles as much as possible so as not to disturb the wildlife in place.

Motorised roads may serve parking areas located away from the landscape to be preserved both visually and in terms of biodiversity. In the event that the road system continues to the heart of the Eco-tourism site, it could be developed as a shared roadway: i.e. an access road without distinction of use, where pedestrians and cycles have priority over motorised vehicles.

The aim of this development is to drastically reduce the speed of motorised vehicles, and consequently their nuisance.



The flooring may be in the form of bush-hammered asphalt (less dark than conventional asphalt) or reinforced stabilised asphalt, depending on the nature of the soil in place and its discretion in the surrounding landscape. These paths shall be accompanied by planted areas.

e) Parking facilities

In order to blend in with their overall environment, the parking areas should have a floor surface identical to that of the site's roadway and be extensively vegetated, which will also help to provide shade for the parked vehicles. This will also help to provide shade for parked vehicles. Thus, wide strips of vegetation planted with tall trees and shrubs may be found within the car park.



Similarly, some parking spaces may be voluntarily replaced by planted areas of the same size, at random within the car park. These arrangements will give a certain naturalness to this space while maintaining the ecological corridors that are essential for maintaining biodiversity.

In the context of parking spaces developed in the heart of the site, these must also be able to find a vegetated response on either side of them, at the rate of at least 1 high-stemmed tree accompanied by low to medium vegetation every two spaces in order to avoid, for example, a linear parking area.

f) Rainwater management

Rainwater management should be directly linked to the landscaping.

Surface run-off will be favoured: examples of stone gutters on the squares or in the planted areas accompanying the paths

In the latter case, these spaces would take the form of landscaped ditches leading to retention basins which can be made compatible with the development of common vegetated spaces (children's play area, sports course) subject to a dimensioning and implementation allowing the safety of all users. A suitable plant palette should be designed accordingly.

g) Fences

Different types of fences may be found within the project depending on their role and positioning:

- Fences at the edge of private spaces which give onto the access paths. These fences have a strong qualitative aspect and must be in keeping with the architecture of the project and the facade they accompany.
- The main purpose of fences located between private spaces is to ensure a certain degree of privacy between private gardens, balconies, etc. For example, they could be openwork wooden fences with or without planted containers.
- Fences at the site boundary should be as unobtrusive as possible and take the form of grey mesh, which is easier to integrate into the landscape than green, or wooden roll fencing. They should be accompanied by "natural" vegetation. Rigorously linear hedges should be avoided in favour of a more random planting plan, mixing species, spacing and plant size.



h) Materials and furniture

Natural materials and furniture should be used as much as possible in the project. This could include wooden seats, kerbs and street furniture (children's games, sports courses, litter bins, etc.) or natural stone benches, gutters and flooring (gravel). The architectural project can also use wood as the main material.

The signage and lighting equipment should have a homogeneous and discreet architecture in the landscape. Bright colours should be avoided in favour of more natural, darker shades (e.g. totem poles in powder-coated corten steel).



The lighting furniture should offer soft, warm, non-dazzling lighting. A lighting study should be carried out in this sense to respect the fauna and flora in place.

2.3 Landscape integration through a specific plant palette

NB: This paragraph complements the chapter on biodiversity

In order to integrate the project into its surrounding landscape, a work of landscape gradation could be carried out by working on the development of different strata of vegetation with variable heights according to the spaces to be planted. All the plants chosen must be adapted and acclimatised to the region in which the project is located and must not require watering as far as possible.

a) Low stratum and ground cover

The low and ground cover layer corresponds to the vegetated areas that are intended to be open and visible. This layer is composed of ground cover species that are resistant to trampling, meadows, perennials, grasses and small shrubs.

This layer is mainly found in common areas (meeting areas, relaxation areas, etc.) as well as in private gardens.



b) Middle stratum

The middle stratum corresponds to the planting of shrubs and trees, sometimes accompanied by climbing plants, to accompany pathways, parking spaces or fencing systems.



c) Upper stratum

The high stratum corresponds to the planting of tall trees to accompany paths, fences at the edge of the site, parking and sometimes to provide shade in the heart of private gardens or on mineralized plots.

In the case of multi-level landscaping, existing predominant vegetation can be reinforced by planting and by playing with the height and density of the plants added to the existing vegetation.

Example of an architectural project below a pine forest:

The aim is to gradually bring the pine forest down to the building by planting similar trees (pines) behind the new building. The plants will gradually decrease in height and volume (planting of trees in the vicinity of the building), to reach a low stratum in front of the building (planting of ground cover, small shrubs and perennials). The reading near the building is then clear but less impactful in the wider landscape, thanks to the implementation of this landscape gradation.



3. Differentiated management as a response to the problems of site maintenance

The problems of landscape preservation in Eco-tourism also require a change in mentality with regard to the upkeep and appearance of tourist establishments, particularly their exteriors.

Some good practices of differentiated management can thus be implemented in the framework of an Eco-tourism accommodation project:



- Make a quantitative and qualitative inventory of the areas to be maintained. This will involve defining the areas that we want to be maintained, from the most well-maintained (for example, the mineral plots if they exist) to the most rustic areas (requiring minimal maintenance).
- Practice differentiated mowing in common areas laid out as flower meadows in order to mow only the paths necessary for movement in order to preserve the biodiversity in place as much as possible. These paths can also become a source of attraction if they change regularly and become a leisure area (labyrinth for example).
- Tolerate weeds and highlight their advantages by means of explanatory panels. Favour selective weeding of invasive plants only.
- Opt for natural, gentle weed killers that do not harm the fauna and flora.
- Adopt a punctual pruning of the plants while preserving their volume and natural appearance.
- Mulch ¹planted areas to reduce water evaporation. You can recycle green pruning waste as mulch to cover the soils, once the branches have been shredded.

Other resources

Guide “Siting and Design of Hotels and Resorts” edited by IUCN: This guide proposes a number of principles for action to improve the integration of hotels into natural sites and their impact on the landscape and biodiversity. It includes a large number of case studies of hotels and lodges in sensitive natural sites around the world.

<https://portals.iucn.org/library/sites/library/files/documents/2012-013.pdf>

¹ covering the soils with chopped wood waste or straw to limit evapotranspiration

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Case studies

1- A successful landscape integration in the heart of the trees

The garden village in Bled, Slovenia, is a unique holiday resort whose architectural design has been fully adapted to its overall environment. Thus, the main restaurant is crossed by a stream, the cabins are located in the heart of the tree tops and the tourist activities are directly linked to the existing environment: rafting, canoeing, etc. The cabins and various pathways are made of wood and the entire colour palette of the project adopts neutral tones, which blend discreetly into the landscape.



The architectural project was thus established in direct relation to the height of the existing canopy. Rather than cutting down trees to build the hotel complex, it is cleverly integrated into the canopy in the form of huts just below the trees. The existing vegetation is thus preserved, as are the existing ecological corridors. The heights of the huts vary according to the development possibilities that were offered, and they lose height as they approach the river. The paths created in wooden footbridges follow this dynamic and serve the different huts thanks to a wooden post structure. This layout aims to preserve what is on the ground and what existed beforehand. The fauna and flora are thus little impacted, especially as most of these facilities are permeable and made with natural and sustainable materials.

Source: [Garden Village Bled](#)

[Garden Village Bled, Bled – Tarifs 2022 \(booking.com\)](#)

2- A successful landscape integration in the heart of the plain.

Tierra Patagonia is an Eco-tourism place set on a vast plain, close to the Rocky Mountains. Its wooden building, with its large windows, is integrated into the plain without trying to go upstairs. Indeed, the very open views on this territory give us to see both the nearby massifs and the lakes. In this grandiose landscape, the architecture is as minimalist as possible. Its appearance, claiming an architecture shaped by the wind, benefits from a wooden base and roof between which are large glass openings. These provide incredible views of the landscape from the hotel, but also serve to break up the height of the façade, with the windows reflecting the surrounding landscape. In general, an effort has been made to work on co-visibility, with what can be seen from the hotel on the wider landscape and, conversely, the perception of the hotel from the wider landscape. In the distance, the hotel complex has a very organic form, whose natural wood tones blend perfectly with the steppe vegetation on which it stands. Thus, by its shape, its height, and the materials used, this Eco-tourism site is perfectly and humbly integrated into its landscape.



Link to the lodging website: [Durabilité - Tierra Patagonia \(tierrahotels.com\)](https://www.tierrahotels.com)