

"Boosting Sustainable Tourism Development and Capacity of Tourism SMEs through Transnational Cooperation and Knowledge Transfer"

GRO/SME/19/C/077 (COS-TOURCOOP-2019-3-01)

Project Logo:



Name of the Project: Improving sustainability of tourism SMEs through knowledge transfer, international cooperation and multi-stakeholder engagement

Acronym of the Project: TOURISME

Proposal Number of the Project: 951103

Project Duration and start date: 30 months, 16th September 2020

Lead partner/coordinator:

1. Consulta Europa Projects and Innovation S.L / CE (Spain)

Partners:

2. Instituto Tecnológico de Canarias, S.A. / ITC (Spain)

3. Association Des Villes Et Regions Pour La Gestion Durable Des Ressources / ACR+ (Belgium)

4. Regione Autonoma Della Sardegna / RAS (Italy)

5. Sistemi Formativi Confindustria SCPA / SFC (Italy)

6. Scuola Superiore Di Studi Universitari E Di Perfezionamento Sant'Anna / SSSA (Italy)

7. Institut D'amenagement Et D'urbanisme De La Region D'Île De France / L'InstParisReg (France)

8. Nicosia Development Agency LTD / ANEL (Cyprus)

Contact:

(email:) michelle.perello@consulta-europa.com

(website:) www.tourisme-project.eu

Deliverable Number:3.1

Title of Deliverable: Transnational and cross-sectoral schemes

Version of Deliverable: v1

Date of Submission of Deliverable: 15/09/2021

Transnational and cross-sectoral schemes

Support for sustainable growth of SMEs

TOURISME

Improving Sustainability of Tourism SMEs
Through Knowledge Transfer, International
Cooperation and Multi-Stakeholder Engagement



Co-funded by the COSME programme
of the European Union



Sant'Anna



TOURISME

Improving sustainability of tourism SMEs through knowledge transfer, international cooperation and multi-stakeholder engagement

D3.1 – Transnational and cross-sectoral schemes

Grant Agreement No	951103	Project Acronym	TOURISME
Project Title	Improving sustainability of tourism SMEs through knowledge transfer, international cooperation and multi-stakeholder engagement		
Deliverable No	3.1		
Deliverable Full Title	Transnational and cross-sectoral schemes		
Work Package No. and Title	WP3 - Design of transnational and cross-sectorial support schemes to build SMEs capacity		
Lead beneficiary	L'Institut Paris Region		
Authors	Maxime Kayadjanian, Marion Tillet, Dominique Riou, Franziska Barnhusen, Madeleine Noeuevglise, Brigitte Guigou		
Contributors	Michelle Perello (CE); Javier López-Murcia (CE); Ancor Armas Martín (CE); Cira Mendoza (CE); Lucía Dobarro (ITC); Alma Cruz (ITC); Francesco Lembo (ACR+); Erneszt Kóvacs (ACR+); Roberto Doneddu (RAS); Antonio Agabio (RAS); Ivana Russiello (SFC); Chiara Senfett (SFC); Eleftherios Loizou (ANEL); Anna Andreou (ANEL)		
Planned delivery date	16.07.2021		
Actual delivery date	15.09.2021		
Dissemination level	Public		
Document version	V1		
Project start date	16 September 2020	Project duration	30
Document description	Transnational and cross-sectoral schemes for sustainable growth of SMEs		

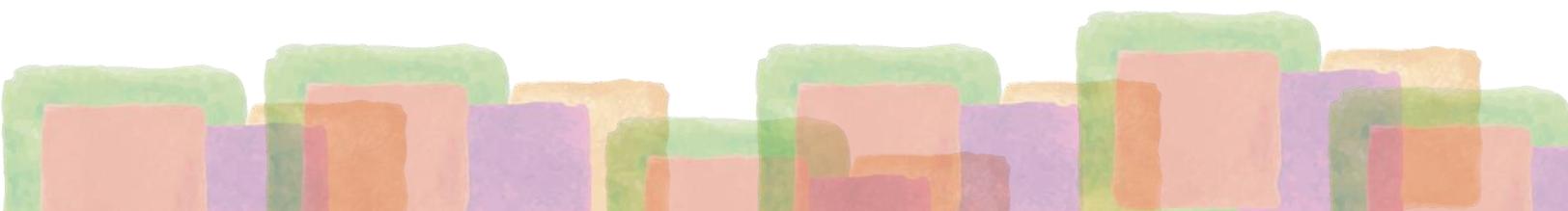


Table of content

1	Introduction	5
2	Organisation of the support schemes	6
3	Training toolkits.....	9
3.1	Introduction to sustainable tourism	10
3.1.1	Capacity of the tourism industry to adapt to climate change	10
3.1.2	The low-tech approach, a tool for a more sustainable tourism	17
3.2	Hotels and similar accommodations & Holidays and other short-stay accommodation.....	23
3.2.1	Awareness and behavioural change.....	24
3.2.2	Corporate social responsibility	45
3.2.3	Energy conservation.....	59
3.2.4	Green procurement.....	119
3.2.5	Sustainable mobility	144
3.2.6	Waste management.....	158
3.2.7	Water conservation.....	218
3.3	Travel agencies, tour operator reservation service and related activities.....	264
1.1.1	Awareness and behavioural change.....	265
1.1.2	Developing sustainable tour	270
4	Access to environmental certifications.....	292
4.1	A Label or Certification for your sustainable development	292
4.2	Label & Certifications	292
4.3	EU ECOLABEL	293
4.4	GREEN KEY LABEL.....	294
4.5	E.M.A.S.....	295
4.6	E.D.E.N.....	296
4.7	AND NOW	297
4.7.1	What to do?	297
4.7.2	Competent bodies in each country	298
5	Guidelines to organize matchmaking events.....	299
5.1	Recommendations and scenarios for matchmaking events (one-day format)	299
5.2	Organizing sustainable match making events	305
6	Table of figures.....	310

1 Introduction

This report (Deliverable D3.1) was prepared in the context of Work Package 3 of a European Project – TOURISME: Improving the sustainability of tourism SMEs through knowledge transfer, international cooperation, and multi-stakeholder engagement.

Over the past decades, tourism has become one of the largest business sectors worldwide, currently employing more than 200 million people (Bohdanowicz, Churie-Kallhauge, Martinac, & Rezachek, 2001). In many parts of the world, tourism is indeed the most important source of income. According to most prognoses, the numbers of people traveling for business or pleasure will continue to increase, in some regions very rapidly. While providing a significant boost to many local and national economies, tourism has been shown to pose a significant environmental and socio-cultural threat to many of the environments in which it is developed and pursued.

In the EU, tourism is one of the major economic activities with a high impact on economic growth, employment, and social development, and thus it is a powerful means to pursue broader EU employment and growth objectives. The competitiveness of the European tourism industry is closely linked to its sustainability, which is understood as environmental, economic, and socio-cultural aspects of tourism development. Achieving sustainable tourism development can bring numerous benefits derived from the competitive advantage provided by cost savings and the improvement of the quality of the offer. In this sense, to achieve sustainability and improve competitiveness, TOURISME aims at fostering SMEs' capacities and skills to explore and uptake solutions through a reinforced transnational and cross-sectoral collaboration amongst tourism SMEs and operators in Spain, Italy, France, and Cyprus.

More specifically, the objectives of TOURISME are as follows:

- To design and implement trans-national and cross-sectoral support scheme including capacity building knowledge
- transfer and scaling-up activities to enable sustainable growth of SMEs in the tourism sector
- To support the uptake of innovative solutions for sustainable tourism
- To support the participation of SMEs in certification schemes

The scope of this report relates to the design and development of the transnational and cross-sectoral schemes that will support SMEs to uptake of sustainable solutions and access to certifications through the three main activities in which SMEs will participate:

- 1) Face-to-face and online capacity building trainings and mentoring
- 2) Matchmaking of SMEs
- 3) Access to environmental certifications.

2 Organisation of the support schemes

The design of the transnational and cross-sectoral support schemes integrates the outputs produced in work package 2 in particular the development of a compendium of best practices (deliverable D2.3) to ensure the application of the schemes in all countries where SMEs will receive the support.

They are built around 3 core activities, involving face-to-face trainings and webinars for capacity building and knowledge transfer, matchmaking events for transnational and cross-sectoral cooperation as well as knowledge exchanges, and training and mentoring to promote the implementation of environmental certifications and other sustainability initiatives.

1) Face-to-face and online capacity building trainings and mentoring

The training material for the Face-to-face and webinars have been designed as *Training toolkit* on the basis of practices identified in WP2. Each *Training toolkit*, written in a concise way in 4 pages maximum, gives the necessary information to implement the different practices as follows:

- the description and the scope of the practice
- the description of the operational steps to be followed to implement the practice
- the type of stakeholders to involve for implementing the practice
- the economic aspects to consider: costs, cost savings, revenues, possible solutions for the financing
- a set of indicators to assess and monitor the performance of the practice as input for WP5

The level (1 or 2) is also mentioned for each *Training toolkit*. *Level 1* targets SMEs that have implemented zero or few sustainable practices. Practices labelled *Level 1* are quite easy to implement and are supposed to produce rapid results such as the replacement of old bulbs with LED bulbs to decrease electricity consumption.

Level 2 targets SMEs that have already implemented sustainable practices and the willingness to implement new practices or deepen existing practices e.g. LED lighting already implemented, willingness to install solar panels which can require important investments depending on the size of the building.

Some *Training toolkits* regroup two or more practices, close in their objectives and unnecessary to differentiate from the methodological point of view, identified in WP2 to ensure a coherent pedagogical approach. For example *Purchase of energy efficient equipment* regroups the following practices identified in WP2: *Purchase of efficient electrical equipment*, *Purchase of energy-efficient appliances for the kitchen*, *Purchase and use of efficient dishwashers* and *Purchase and use of high-efficiency laundry equipment*.

In addition, 6 new practices have been developed to ensure that all the necessary steps to achieve each objective are taken such as: *Knowing your energy supplier and contract - optimizing your choices*, *Manage external lighting*, *Switching to a green energy supplier*, *Tracking and measuring waste*, *Promotion of tap water consumption* and *Food waste prevention at buffets and restaurants*.

The whole *Training toolkits* is organized according to the following structure:

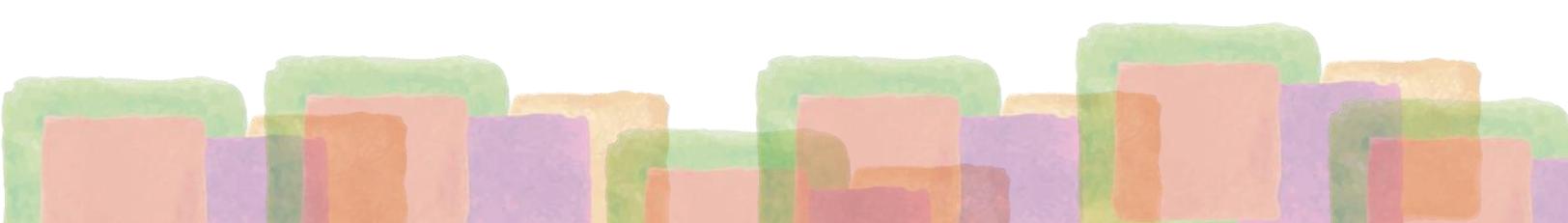
- General introduction to Sustainable Tourism including the description of the low-tech approach raising the question of technological discernment by encouraging sobriety in consumption and production
- Domain of activity: they are the two main sector of activity on which TOURISME is focused:
 - Hotels and similar accommodation & Holiday and other short-stay accommodation
 - Travel agencies, tour operator reservation service and related activities
- Topic: from the best practices identified in WP2, 7 topics have been selected for the first domain (Hotels and similar accommodation) and 2 topics for the second domain (Travel agencies & tour operator)
- Objectives: for each topic, different objectives have been set in order to define a sufficiently pedagogical and progressive approach with logical steps

List of objectives ranked by domain of activity and topic:

<i>Hotels and similar accommodation</i>	
<p>Awareness and behavioural change</p> <ol style="list-style-type: none"> 1 Raising awareness to visitors 2 Raising awareness to employees <p>Corporate Social Responsibility (CSR)</p> <ol style="list-style-type: none"> 1 Knowing its carbon footprint 2 Compensating employees for environmental initiatives <p>Energy conservation</p> <ol style="list-style-type: none"> 1 Knowing your energy consumption 2 Think lighting strategy, matching well-being and energy saving 3 Upgrading household equipment and optimizing their uses 4 Design building and interiors, design systems 5 Diversifying your energy sources <p>Sustainable mobility</p> <ol style="list-style-type: none"> 1 Promote eco-mobility 	<p>Green procurement</p> <ol style="list-style-type: none"> 1 Changing cleaning products, using ecological labels 2 Developing short circuits and responsible consumption 3 Promoting reuse and products made of recycled 4 Purchasing efficient household equipment <p>Waste management</p> <ol style="list-style-type: none"> 1 Knowing its waste volume 2 Preventing waste production 3 Improving waste sorting 4 Fighting against food waste 5 Promote recycling and reuse <p>Water conservation</p> <ol style="list-style-type: none"> 1 Knowing its water consumption 2 Reducing its consumption 3 Diversifying its water supply 4 Optimizing pool maintenance
<i>Travel agencies & tour operators</i>	
<p>Awareness and behavioural change</p> <ol style="list-style-type: none"> 1 Raising awareness to customers 	<p>Developing sustainable tour</p> <ol style="list-style-type: none"> 1 Promote eco-mobility 2 Promoting eco-friendly activities

2) Matchmaking of SMEs

A guide has been drafted and proposes, in a first part, recommendations and scenarios for the organisation of matchmaking events. It deals with the different types of sessions (conferences, workshops, stand areas), the different types of workshops, the methods of participation and interaction, the partners involved according to



the topics, the existing resources that can be organised. Steps for the operational organisation of the matchmaking events are also described.

In a second part, recommendations are provided to organize sustainable matchmaking events that reduce pressure on the environment and natural resources via concrete actions from the venue to the catering and the reduction of waste to show visible evidence of environmental commitment to participants that are expected to improve their own company's sustainability performance.

3) Access to environmental certifications

A guide has been drafted to introduce the access to four environmental certifications: three are European (ECOLABEL, EMAS and EDEN) and one is international (GREENKEY). It has been recognised by the World Tourism Organization (UNWTO).

ECOLABEL and GREENKEY are certification programs designed to cover more specifically tourist accommodation services while EDEN aimed at rewarding sustainable tourism destinations in Europe. EMAS is open to every type of organisation eager to improve its environmental performance.

Each environmental certification is described in the same form to easy the comparison: objectives and purpose, the main domains concerned, the procedure cost, the procedure length, the period of validity, the intervenors during the proceeding, etc. Resources are also provided to carry out a self-diagnostic to see how an establishment measures up under the label or certification.

3 Training toolkits

List of chapters:

- **Introduction to sustainable tourism**
- **Hotels and similar accommodations & Holidays and other short-stay accommodation**
- **Travel agencies, tour operator reservation service and related activities**
- **Access to environmental certifications**
- **Guidelines to organize matchmaking events**

3.1 Introduction to sustainable tourism

3.1.1 Capacity of the tourism industry to adapt to climate change

Tourism activity in Europe

On a European scale, tourism activity generated nearly 710 million international arrivals in 2018 according to the World Tourism Organization (UNWTO). Among the European countries, France (89 million arrivals), Spain (83 million) and Italy (62 million) are among the top 5 tourist destinations in the world with attendance that was growing steadily until the crisis of the COVID. Identified as the third largest economic sector in Europe, in 2017 it was estimated that 17 million people were employed by the tourism industry and that the sector contributed nearly 10% of the European Union's GDP.

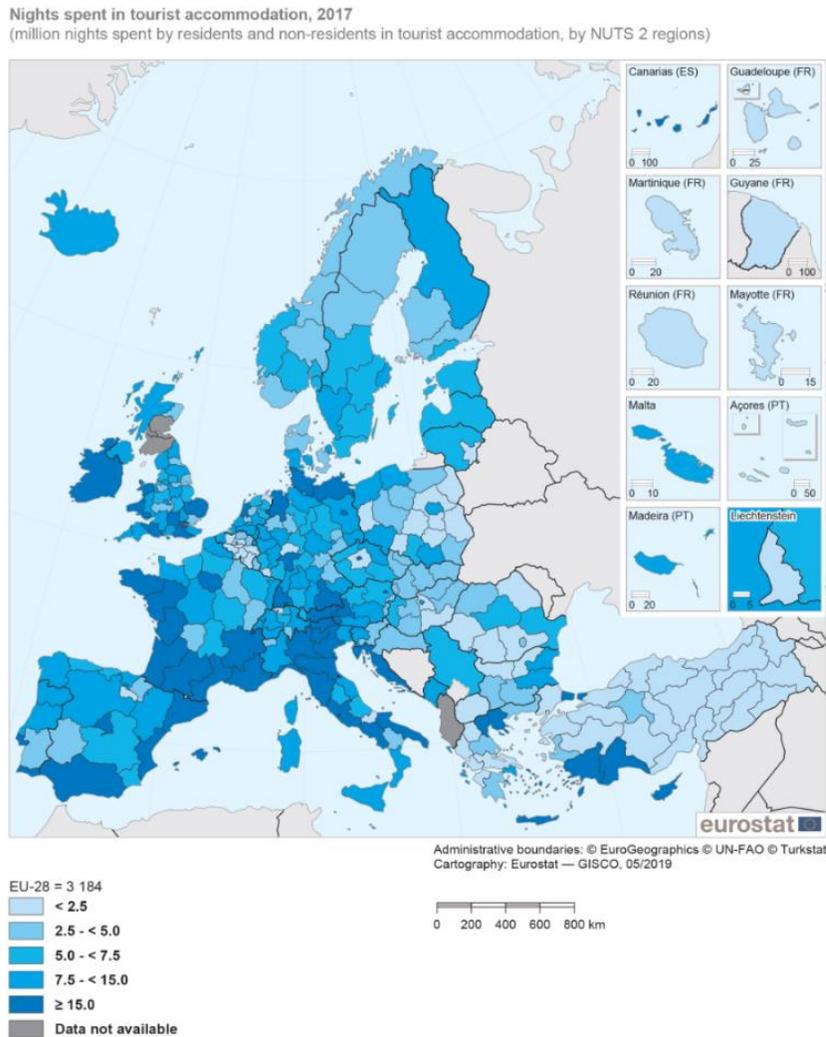


Figure 1 Nights spent in tourist accommodation (source: Eurostat 2017)

TouriSME countries' tourism attendance in 2018:

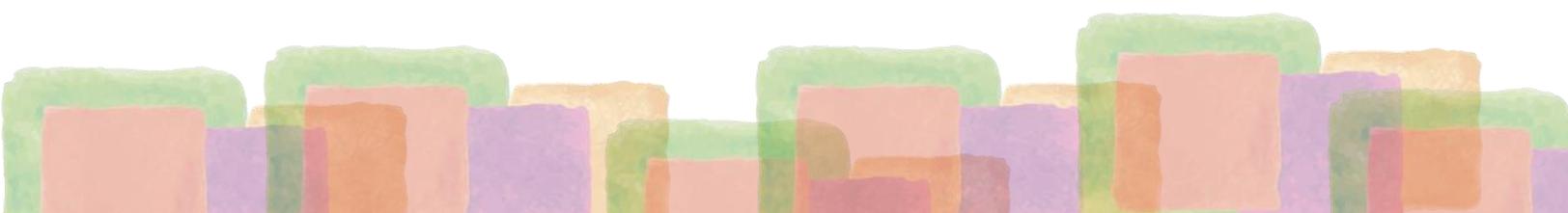
- France: 89.4 million tourist arrivals
- Cyprus: 3.9 million tourist arrivals
- Spain: 83 million tourist arrivals
- Italy: 62 million tourist arrivals

If the local economic spin-offs and jobs generated by the activity have long been valued and encouraged by local policies, the pressures and constraints exerted on the environment and the welcoming populations are significant: impacts on landscapes, pressures on natural resources, pollution, greenhouse gas emissions... tourism also generates a degradation of ecosystems and often an exasperation of the receiving territories.

The sustainability of the activity is at stake: cultural and landscape attractions are fundamental, they are the ones that trigger tourist visits and encourage visitors to return. It is now clear that the activity cannot continue in a massive and unconscious orientation, it must evolve, the pressures being all the more harmful as they are exercised particularly on restricted territories.



Figure 2 Highest number of tourists (source: Eurostat 2017)



These pressures are caused by the different components of the activity which are:

- Transport and mobility: this concerns arrival in the region (by train, plane, bicycle, etc.) as well as mobility within the destination. It is one of the main sources of GHG emissions in tourism, accounting for 49% of tourism emissions. The modal choice has a strong influence on the carbon footprint, with CO₂ emissions from air transport being significantly higher than those from other modes of transport.
- Accommodation: The accommodation sector (including construction) and the food sector (including catering) account for 14% and 17% respectively of the activity's carbon footprint. The construction materials used, the operation of buildings (energy consumption, purchase of consumables, waste management, water management...), all the actors of the reception (commercial accommodation, restaurants, museums, cultural and tourist sites, trade fairs, conventions, tourist offices...) are to be considered, as well as the modes of supply (short circuits, seasonal products) of the restoration.

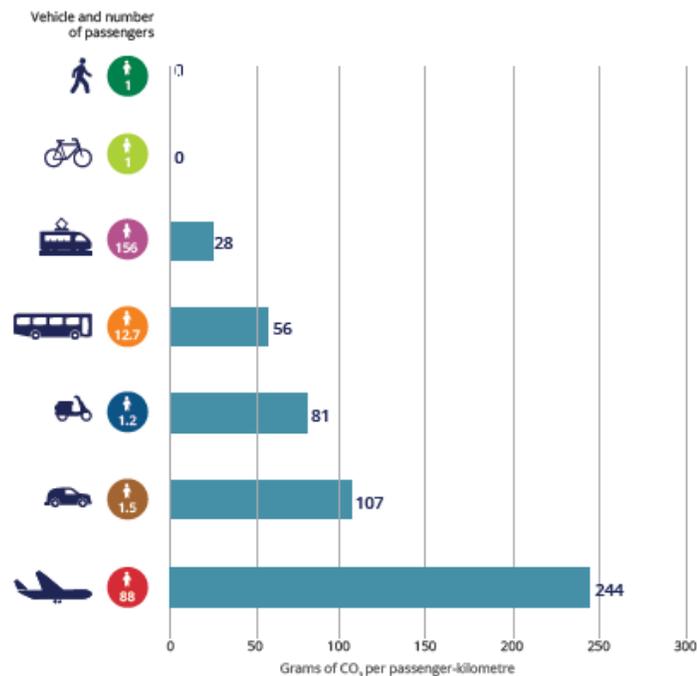


Figure 3 Specific CO₂ emissions at average occupancy for various transport modes, 2014 (source EEA report No 34/2016)

- The activities and leisure: activities offered within the destination also have an impact on the activity's greenhouse gas emissions.

Numerous initiatives have already been undertaken by the sector's players with the aim of reducing their environmental impact, but also in response to the changing expectations of customers. If these actions are more or less simple to put in place, taken individually, they all have the common objective of starting the transition of the tourist activity, to implement actions in favour of its sustainability. Investing in sustainable tourism is no longer an option, the sustainability of the activity depends on it.

Sustainable tourism, foundation and levers for action

Faced with these challenges, the concept of sustainable tourism development emerged in 1995 with a view to applying the precepts of sustainable development set out since 1987 (Brundtland report). Sustainable tourism is then defined by the World Tourism Organization (WTO) as *"tourism that takes fully into account its current and future economic, social and environmental impacts, by meeting the needs of visitors, professionals, the environment and host communities"*.



Figure 4 Sustainable tourism principles (source: www.devalt.org)

Basically, sustainable tourism is an approach that can be applied by all tourism actors and travelers. It aims to find a balance between the three principles of sustainable development which are¹ :

- The social principle: by encouraging intercultural tolerance and respect for the lifestyles of local populations,
- The environmental principle: by placing the preservation of nature at the heart of tourism development and supporting the safeguarding of its natural resources,
- The economic principle: by applying an equitable sharing of the economic spin-offs from tourism and viable and sustainable employability.

These principles of sustainable tourism were defined in 1995 by the Committee 21 and updated in 2004 by the Committee for Sustainable Tourism Development of the World Tourism Organization (UNTWO): they are

¹ <https://www.tourisme-durable.org/tourisme-durable/definitions>

applicable to all forms and niches of tourism up to mass tourism, in all types of destinations. Sustainable tourism is also the individual responsibility of the traveller who in his choice of travel, service providers, transport, his behaviour ... will influence the "sustainability" of his stay.

The development of sustainable tourism requires the informed participation of all stakeholders, as well as strong political leadership to ensure broad participation and consensus in the construction. Achieving sustainable tourism is a continuous process and requires constant monitoring of impacts, introducing the necessary preventive and/or corrective measures whenever necessary.

Sustainable tourism must also maintain a high level of satisfaction among tourists and guarantee them a meaningful experience, making them aware of sustainability issues and promoting sustainable tourism practices among them.

Action levers identified in TouriSME

If managed and practiced in a responsible and sustainable manner, tourism can contribute to the preservation and sustainable development of the natural environment and the entire ecosystem of the local destination. The competitiveness of the tourism sector is closely linked to its sustainability, as the quality of tourist destinations is strongly influenced by their natural and cultural environment but also by their integration into a local community. In this context, TouriSME strives to promote the capacities and skills of tourism SMEs to explore and adopt sustainable solutions. These solutions have been grouped into seven major themes corresponding to the UN Sustainable Development Goals:



Figure 5 Sustainable Development Goals (source: UNWTO)

- Awareness and behaviour change: If there are many practical measures that tourism actors, especially accommodation providers, can put in place to move towards an environmental approach, technical solutions alone remain insufficient. Indeed, any approach requires a strong will and involvement of the management as well as an awareness of both staff and customers to the implementation of an environmental policy.

Several studies show that, despite their declared positive attitudes towards sustainable tourism, only a few tourists act accordingly by purchasing responsible tourism products, choosing environmentally friendly means of transport or adopting responsible behaviour towards the destination communities (Budeanu, 2007). It is therefore important that tourism organizations, especially hotels and similar accommodations, also address how to raise awareness of sustainability among tourists and/or positively influence the behaviour of their customers.
- A CSR approach: Social responsibility of tourism companies (CSR): by integrating social issues in their management and in the activities they offer. Involves all the stakeholders linked to the company's activity, both internally and externally (notably suppliers and customers)

By practicing CSR, organizations can be aware of the kind of impact they have on all aspects of society, including economic, social and environmental. Many organizations see CSR as an integral part of their brand image, believing that customers will be more likely to do business with brands that they perceive to be more ethical. In this sense, CSR activities can be an important component of corporate public relations. At the same time, some founders or senior managers of organizations are also motivated to engage in CSR because of their personal beliefs.

In recent years, travel agencies and tour operators have become increasingly involved in implementing CSR measures due to growing consumer awareness and sensitivity to ecological and social behaviour. Tour operators, who typically combine different travel elements such as transportation, accommodation, site visits, etc. to create a travel package, face extraordinary challenges when implementing CSR in their operations, as they must not only evaluate CSR measures within their own organization, but also along the value chain (Lund-Durlacher, 2015).
- Energy conservation: Implementing measures to save energy in its entirety, knowing and controlling it. The tourism industry contributes significantly to global energy consumption and associated carbon emissions (Styles, Schönberger, & Galvez-Martos, 2013). In particular, hotels and similar accommodations use significant amounts of energy to provide comfort and services to their guests, usually with alarmingly low energy efficiency (HES, 2011). Environmental impacts include emissions and pollution of water, soil, and air resources, noise, and excessive use of locally available and/or imported natural and other resources.

There is considerable potential for energy savings in this sector, helping to reduce costs and carbon emissions. In short, there is great potential for energy conservation in the hotel industry. Hotels and similar establishments can adopt several technological and non-technological practices to reduce energy consumption in guest areas, laundries, kitchens, etc.
- Green Procurement: Choosing to purchase products that have the most positive environmental, social and economic impacts over their entire life cycle and striving to reduce negative impacts as much as

possible is an integral part of an establishment's environmental approach. The concept of green procurement stems from the principles and activities of pollution prevention. Green procurement involves the purchase of products and services that cause minimal negative impacts on the environment. It integrates human health and environmental concerns in the search for high-quality products and services at competitive prices (EPD, 2018). Green procurement strongly discourages the purchase of single-use disposable items; instead, it encourages the purchase of products that have the following characteristics (EPD, 2018):

- improved recyclability, high recycled content, reduced packaging and greater durability
- improved energy efficiency
- use of clean technologies and/or clean fuels
- reduced water consumption
- emission of less irritating or toxic substances during installation or use or production of less toxic substances during disposal

Green procurement programs reduce expenses and waste, increase resource efficiency, protect natural resources, and improve organizational reputation (StopWaste, 2020).

- Sustainable mobility: Integrating sustainable mobility into its offer, by facilitating car-free travel for customers and staff, allows accommodation providers to confirm their commitment to sustainable development and can also attract a new clientele sensitive to these issues.
The objective of sustainable mobility is "to ensure that our transport systems meet the economic, social and environmental needs of society while minimising their undesirable impacts on the economy, society and the environment" (EC, 1992). Sustainable mobility can play an important role in the development of sustainable tourism, as tourism-related transport, especially road and air traffic, is increasing and contributes significantly to greenhouse gas emissions, pollution and climate change. Developing and encouraging the use of different modes of transportation with low environmental impact, such as cycling, walking, carpooling, fuel-efficient transportation systems, and the use of electric vehicles, is a key to reducing the ecological footprint of tourists (DestiNet, 2020).
- Waste management: Most of the waste produced in the hotel industry is similar to household waste. It contains the same components as household waste in different proportions. A hotel-restaurant can also generate hazardous waste that presents a particular risk for the environment: special lamps, batteries, ventilation filters, but also cleaning products such as solvents, paint cans...
Waste management consists of the implementation of activities or actions required to manage waste from its creation to its final disposal. It includes, but is not limited to, collection, transportation, treatment and disposal of waste, as well as monitoring and regulation. It is essential for the hospitality industry to develop an efficient waste management system: treatment techniques are currently being developed to recover waste (recycling, composting, incineration in factories, landfill - subject to extremely strict regulations).
- Water conservation: The water consumption of a tourist is generally higher than that of a resident. Indeed, a European tourist consumes about 300 liters per day, compared to 100 to 200 liters per day for a European resident (EC, 2009; EEA, 2009). Although statistical data on water consumption in the

tourism sector (as a whole) is lacking, it is clear that water consumption in hotels and similar accommodations is the highest compared to other tourism organizations. Reasons for the higher water consumption of tourists in hotels and similar accommodations include grounds maintenance (irrigation), daily room cleaning, daily laundry, pool maintenance, intensive cooking activities, and a pleasure approach to showers and baths (Eurostat, 2009).

The main areas of water consumption in accommodations are guest bathrooms, kitchens, laundry rooms, and shared toilets. Swimming pools and irrigation of green areas can contribute an additional 10-15% and 20-25%, respectively (Eurostat, 2009), and room cleaning approximately 12-47 liters per guest per night (Gössling et al., 2012). Employees can also contribute significantly to water consumption, with the average office worker's water consumption reported at 16 liters per day (Waggett & Arotzky, 2006). There is great potential for water conservation in the hotel industry. Hotels and similar establishments can adopt several technological and non-technological practices to reduce water consumption.

Although there are many technical measures that the tourist industry, particularly accommodation providers, can put in place, there is a prior consideration that must be given to the environmental approach: the question of technological discernment.

3.1.2 The low-tech approach, a tool for a more sustainable tourism

The low-tech approach raises the question of technological discernment by encouraging sobriety in consumption and production. It questions first of all the needs. It favours the development of simple technologies, accessible to all and easily repairable, using common and locally available means. Low-tech takes into account the social and environmental dimensions in the design and manufacture of products and services, in a context of tension over resources. It puts individuals in a position to act in society and allows a reappropriation of tools, less complex, and favours human creativity.

Low-tech is not a refusal of technology, it aims at its fair and sufficient use, a balanced technological mix between simple and complex technologies.²

We can thus see in low-tech a systemic approach to innovation. They can help to reduce the complexity of our economic systems with two aims:

- to contribute to carbon neutrality
- to organize the resilience of territories through sustainable projects.

The low-tech approach is an evolutionary process (we are never 100% low-tech) and can be applied to all sectors of activity or to any technical problem. It starts from what already exists and shows an economy of means: it often rearranges proven technical solutions in an innovative way and integrates technology where it

² Lopez, C. & Soulard, O. 2020. Les low-tech, des innovations pour la résilience des territoires. NR 837, Éd. Institut Paris Region

is essential. It aims for sobriety of means and resources, accessibility to all and user-friendliness, it finds the right scale.

The low-tech approach proposes a compass, a strong marker: technical discernment but also spatial, social and environmental discernment. It questions the criteria for arbitration to make cities more sober, more accessible, more convivial. Applied to tourism as a true systemic approach, it can contribute to a general recovery of meaning.

Its method of use is simple. The Low-tech approach is based on four questions or pillars, to be applied to any project:

- Questioning the need (or the praise of the sufficient),
- To seek sobriety in the use of resources,
- Make it accessible to all
- Find the right scale

Questioning the need, or the praise of the just enough

How essential is the use of technology in the operation of the organization (hotel, agency...) in view of the need it is supposed to satisfy? Is the environmental damage "worth" the utility of the infrastructure or the resources mobilized to develop, transport, manage urban services...? Do we need a robot to park cars at the airport, sensors to optimize all the energy, water, waste flows...?

Low-tech meets essential individual and collective needs. It contributes to making possible healthy and relevant ways of living, producing and consuming for all in fields as varied as energy, food, water, waste management, materials, housing, transport, hygiene and health. By encouraging people to go back to basics, it gives meaning to action.

With minimalist (but quality) solutions, we meet the needs of our customers. Ask yourself what your customers' needs are and look for simple answers: no need for electric blinds or sensors, no unnecessary interfaces: comfort without overabundance and unnecessary options. Sort out and choose the simplest solution to meet the need, the one that is most economical in terms of resources and that values human work (craftsmanship).

Seek sobriety in the use of resources (here and elsewhere)

Where do the resources used to run the hotel come from? How can we reduce the volume of these flows? Where is the waste? What can we do with the waste to valorise these resources? What are the most important supply risks? How can we work towards better governance of essential flows...?

Eco-designed, resilient, robust, repairable, recyclable, agile, functional: low-tech invites us to think about and optimize the ecological, social and societal impacts of using technology at all stages of its life cycle (design, production, use, end of life), even if this sometimes implies using less technology and more sharing or collaboration.

Resource saving: the low-tech solution (product or service) must therefore be manufactured and/or repaired locally. Zero waste. Food wastage. Waste recovery. Reuse, repair of equipment. Energy efficiency. Mutualization of spaces and modularity.

Making it accessible to all

Do the infrastructure and organization in place preserve and encourage the empowerment of individuals? Is the hotel experience user-friendly and accessible? Does it encourage autonomy and appropriation of the territory by individuals? How can the sensitive approach to the environment be taken into account in the tourism offer (modes of travel, potential interactions with local populations)?

Reduce unnecessary complexity, the interfaces of technologies to feel things. The tools that surround us are of great technical complexity, which cuts us off from any sensitive experience (smartphone...). We find ourselves too often at the service of the machine, which we do not understand how it works, which we have a limited use, with many functions, ultimately useless. The effects are deleterious on our ability to do things, to imagine, to create. A low-tech product or service must be appropriable by the greatest number of people. Its functioning can be understood simply and its cost accessible to the greatest number. Low-tech thus favours greater autonomy (and responsibility) of populations at all levels, as well as a better distribution of value or work.

Putting meaning back into life.

Finding the right scale

Where do the issues of scale lie? What can be the indicators of a fair proportion between the purpose and the means used? How can scalar discernment promote a better understanding of the territories we live in, an economy on a human scale, and greater autonomy? Reclaiming space and time. Slowing down (doing less but with more meaning, not wanting to do everything).

Size of the hotels. Links with suppliers (restaurants, craftsmen...): local ecosystem of actors. Cultivate proximity. Favouring short-distance, soft modes of transportation.

Finally, the low-tech approach focuses on the environmental footprint of the need it meets while relying on the human being, placing him at the centre of the approach.

Example of a low-tech approach applied to water management in a bathroom:

a) What is my need?

I am in charge of a tourist accommodation and I would like to save water in the shower while preserving the comfort of my customers. I choose to make my customers aware of the impact of water consumption in relation to the time spent in the shower.

b) Seek sobriety in the use of resources,

I have two solutions to measure the time of the shower:

- Install an hourglass in the bathroom that will specify in a given time, the number of liter of water consumed.
- Install a connected shower head that will indicate exactly the volume of water consumed for the shower that has just been taken, regardless of its duration.

The hourglass versus the connected showerhead



Figure 6 Hourglass (source: www.turbosquid.com)



Figure 7 Connected shower head (source: www.absmarthealth.com)

If we are looking for sobriety in the use of resources, it appears that the hourglass fully meets this expectation. It can be produced by a craftsman, locally. The materials used are glass, wood, sand are available resources. The manufacture of the hourglass consumes little energy. The hourglass is easily repairable and recyclable.

The connected pommel is an "intelligent", connected object. Its manufacture is complex and will require various resources, numerous, possibly rare, of expensive extractions in energy. Its repair will necessarily require the intervention of the manufacturer and cannot be ensured by the hotel employees. Composite, its recycling will be all the more complicated.



Figure 8 Ad for hourglass "5 minutes of precious water" (source: www.espritparcnational.com)

c) *Make its use and repair accessible to all*

The hourglass is very simple to use and to manufacture. For its use, it would be useful to specify the consumption of water used in proportion to its duration: a 5 minutes shower is equivalent to 75 l of water

The connected shower head will be more complex to use. If a variation of colour can indicate a quantity of water used (from green to red for example according to the duration of the shower), its optimal use will mobilize the use of a smart phone. It can indicate very precisely the amount of water used per shower. It will therefore be very precise, and in a hotel, it could replace the possible installation of a sub-meter. To obtain the precision it provides, it will be necessary to use human time to process the data transmitted by the shower head. A significant amount of data will be generated every day, which will also need to be stored on computer servers.

d) Finding the right scale

The scale will intervene at several levels. That of the manufacturing of the product, the more it will be manufactured in the vicinity the less its carbon footprint will be important. The right scale will also be found in the quantity of room to equip with an hourglass or a connected shower. The right scale is also related to the use of the object, in particular will it require man-time?

This hypothetical case illustrates the different possible answers for a simple need which is the necessity to save water. The use of the hourglass is based on a low-tech approach, providing a simple answer, economical in manufacturing, easy to use, repairable and recyclable.

The connected shower head offers a rich and precise answer, but in the end seems too complicated compared to the need. Will the manager of a tourist accommodation need so much information just to make his customers aware?

The low-tech approach was born from the proposal to find a simplicity in the answers brought to our needs in order to adapt the answers brought to us without being in an overbidding of information which often exceeds us. Do we really need a programmable washing machine? Who weighs the laundry? Who identifies the components of the laundry, its stains and adapts the temperature?

Don't we just need a washing machine that washes clothes, that is sturdy, durable, and that we can repair ourselves and recycle?

References:

- Bihoux, Philippe, 2019. Le bonheur était pour demain : les rêveries d'un ingénieur solitaire, Éd. Seuil
- Bihoux, Philippe, 2014. L'Âge des low tech : vers une civilisation techniquement soutenable, Éd. Seuil
- Le Corvoisier Laurent, Lopez Cristina, Soulard Odile, 2021, La vie low-tech en 2040, un récit prospectif, Institut Paris Region
- Lopez, Cristina & Soulard, Odile, 2020. Les low-tech, des innovations pour la résilience des territoires. NR 837, Éd. Institut Paris Region
- Low Tech Lab : <https://lowtechlab.org/fr/la-low-tech>
- <https://www.touteurope.eu/l-europe-et-moi/10-chiffres-sur-le-tourisme-europeen/>
- [https://www.europarl.europa.eu/RegData/etudes/BRIE/2017/599327/EPRS_BRI\(2017\)599327_FR.pdf](https://www.europarl.europa.eu/RegData/etudes/BRIE/2017/599327/EPRS_BRI(2017)599327_FR.pdf)
- EEA, «Transitions towards a more sustainable mobility system», 2016

- <http://geoconfluences.ens-lyon.fr/doc/typespace/tourisme/TourScient4.htm>
- <https://www.tourisme-durable.org/tourisme-durable/definition>

3.2 Hotels and similar accommodations & Holidays and other short-stay accommodation

Topics covered:

- **Awareness and behavioural change**
- **Corporate Social Responsibility (CSR)**
- **Energy conservation**
- **Green procurement**
- **Sustainable mobility**
- **Waste management**
- **Water conservation**

3.2.1 Awareness and behavioural change

There are several technical measures that tourism organizations, particularly hotels and similar accommodations, may undertake for energy conservation, water conservation, waste management, and so on. However, technical measures alone are insufficient to achieve these objectives at the maximum level. Put differently, technical solutions alone cannot develop sustainable tourism since psychological and behavioral traits often undermine the viability of technical solutions (Heidbreder, Bablok, Drews, & Menzel, 2019). In short, both the technical solutions and pro-environmental human behavior are essential for developing sustainable tourism.

Several studies show that despite their declared positive attitudes towards sustainable tourism, only a few tourists act accordingly by buying responsible tourism products, choosing environmentally friendly transportation, or behaving responsibly towards destination communities (Budeanu, 2007). Hence, it is important for tourism organizations, particularly hotels and similar accommodations, to also pay attention to how to raise sustainability awareness among tourists and/or how to positively influence the behavior of their guests.

To this end several practices are proposed according to the following objectives:

- 1. Raising awareness to visitors**
- 2. Raising awareness to employees**

Objective 1 - Raising awareness to visitors

To ensure the successful implementation of a sustainable policy, it is essential to involve customers and encourage them to follow simple steps to support this effort. To achieve this goal, the first practice proposes a general methodology for raising visitor awareness and three other practices describe practical actions for involving customers:

- **Raising awareness of the visitors (level 1)**
- **Reuse of towels and bed linen (level 1)**
- **Encouraging guests to take away their leftover food (level 1)**
- **Encouraging guests to explore attractions by public transport/foot (level 1)**

Raising awareness of the visitors

Topic: Awareness and behavioural change

Objective: Raising awareness to visitors

LEVEL 1

Description

For your environmental performance policy to be successful, it is essential to involve customers and to let them know you care about the environment and encourage them to follow simple steps to support this effort.

Most customers will be delighted to know that your hotel is taking action to reduce its negative impact on the environment and will want to know more about the simple measures they can implement to avoid wasting energy and reduce the environmental impact of their stay.

A holiday spent in tourist accommodation can be a good opportunity to provide guests with information, documentation and/or learning activities related to the natural environment, preservation of biodiversity and conservation of land and natural resources. A space devoted to environmental documentation, instruction and educational activities for guests can be an asset that attracts customers to the establishment.

Steps to follow to implement the practice

Inform prior to arrival

- let your customers know that you care about the environment and communicate the establishment's commitment to prospective customers via the website, for example on accessibility and local mobility without cars
- Describe existing actions on the different pages of the website (e.g. use of dispensers to reduce waste production, a 75% local product offer in the restaurant to limit transport, etc.)

Provide information on site

- Encourage respectful behaviour by customers through oral or written information at the reception desk or left in the rooms, for example by suggesting eco-actions to be taken in terms of saving energy and water, reducing and sorting waste (including the fight against food waste), and even preserving biodiversity during outings.
- State the environmental objectives for your hotel and provide information on the actions you are taking to reduce your impact on the environment. Example message: "*Large amounts of energy are used by hotels around the world, much of it from fossil fuels, which generates large amounts of greenhouse gases. By improving our hotel's energy efficiency and avoiding energy waste, our hotel is taking a big step towards reducing its greenhouse gas emissions and helping to preserve our planet's natural resources.*"

Work on form

- Communicate positively to guests about the impact of their actions and responsible behaviour. Inform your customers that energy saving measures can greatly contribute to limiting the impact of your activity and their stay on the environment
- Use communication based on nudges (play on psycho-sociological decision-making levers such as the pleasure of playing or the gaze of others). Example: a message stating that 75% of guests in a room had reused their towel reduced towel use by almost 40%.

Incentives through commercial offers

- X% green discount or accumulation of points: by arriving by bike or train, by leaving their car keys at the reception for a stay of more than 8 days, by not having their room cleaned every day, etc.

Reward guests for responsible behavior

- If they act with responsible behavior and generate savings, then you should reward them. For instance, you may give them discounts on future or actual booking, in hotel's extras (spa, buffet, etc.) or tour activities. In this way, guests/clients/visitors will follow the responsible behavior in the future too.

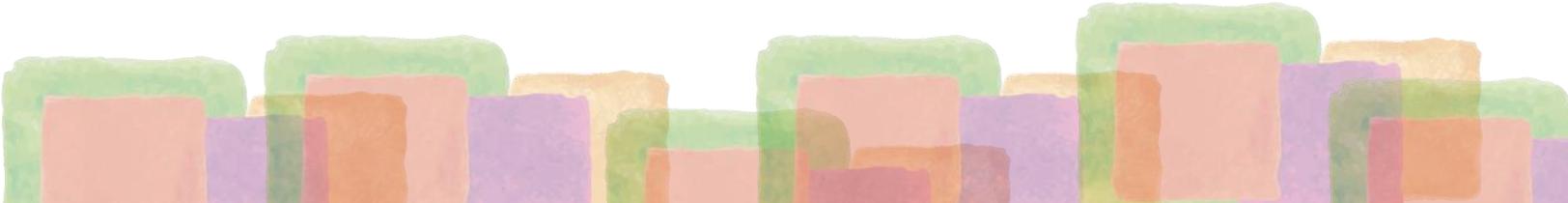
Consider customer feedback

- Record the opinion of customers to assess their overall level of satisfaction and the relevance of the actions carried out, and even their expectations. For example: satisfaction survey left in the room or the accommodation or sent by email at the end of the stay, suggestion box at reception and/or on the website, monitoring of online opinions, etc.
- Make tests to determine what is best for the guests
- Summarise and give feedback to staff at the annual review, then implement any corrective actions

Environmental education actions to go further

- Initiate customers to local flora and fauna via documentation, books, posters, pictures etc.
- Make binoculars, scopes and other viewing equipment available to customers for observation activities
- Propose activities in conjunction with nature parks, environmental initiation centres, bird-watching reserves, local environmental groups, relay information on their nature outings
- Set up bird houses and insect hotels to encourage biodiversity within the establishment and explain these steps to guests
- Plant a demonstration vegetable garden where guests can pick herbs, fruit and vegetables; label the various species cultivated
- Offer nature walks, on foot, bicycle or horseback, to observe birds, plants, butterflies etc.
- Organise a mini club for children, with different activities each day (making bird houses, identifying animal tracks, catching butterflies etc.)
- Host events with local producers

Stakeholders to involve



Hotel managers and staff

Marketing department

Health, safety and environment responsible within the hotel, restaurant, etc.

Tourists/customers

Costs aspects

Costs:

- Staffing costs to implement your policy

Cost savings:

- Make this criterion into a competitive advantage for your establishment, setting it apart from others.

Reduced CO2 emissions

- It is difficult to quantitatively evaluate the reduction of CO2 emissions obtained when customers participate in your efforts, but you can be sure that it is substantial.
- For a hotel of 1,000 m² that uses 350 kWh/m² of energy annually (47% electricity, 53% gas), and applying emission factors for France, a 10% savings in energy consumption represents:
 - 4.05 t CO2 eq of avoided emissions each year
 - Emission factors for electricity in France: 84.3 g CO2 / kWh.
 - Emission factors for natural gas in France: 331 g CO2 / kWh (Source: ADEME).

Monitoring the implementation

- Monitoring on energy and water consumption, waste production
- Percentage of rewarded guests

Resources

<https://www.ecolabeltoolbox.com/en/solutions-techniques/information-des-clients-74>

Hébergeurs touristiques : quelles actions mettre en place pour un tourisme durable ? ADEME, 2021

Reuse of towels and bed linen

Topic: Awareness and behavioural change **Objective:** Raising awareness to visitors

LEVEL 1

Description

This practice involves raising the awareness of customers. Until recently, bed linen, towels and bath mats were changed every day. This practice leads to a high consumption of water. Indeed, it can be estimated that a classic room requires the use of about 4 kg of linen. The cleaning of the room requires an estimated 60 litres of water. It is therefore possible for customers who stay several days in a row not to change the linen every day but to propose to change it once or twice a week. This usage allows for considerable water savings.

This practice is only a proposal made to the client, who is free to decide whether or not to implement it. However, there are ways to encourage them to do so. It is becoming more and more common to see this practice internationally accepted.

This practice needs to be made available to customers with accurate information about the possibility of reusing towels and bed linen, to facilitate the hanging of towels, to allow for efficient air drying and to inform staff about this use.

In addition, the choice of quality, material and weight of the linen has an influence on the amount of water used during washing and drying.

Steps to follow to implement the practice

Inform the customer about the possibility of keeping their elite linen and towels for several days in case of a medium or long stay. This is usually done by means of posters encouraging this reuse. They are placed in a visible place in the room or in the bathroom.



Figure 9 Panel encouraging reuse

They can contain the following information:

- The importance of water and the need to conserve it
- The amount of water saved through the practice of reusing their laundry

A request from the institution to help them conserve water

A clear description of the procedure to be followed with the implementation of a change of towel on request of the client. For example: *towels hanging on towel rails will not be changed.*



Figure 10 Poster encouraging reuse

It is very important that an accessible and easy/quick to use towel rack is provided for the customers. It should allow for efficient storage and drying of towels between uses. They should be placed within easy reach of customers (ideally at an average height between waist and shoulders if space permits).

This practice will be all the more effective if the staff in charge of cleaning the rooms are informed of the established procedures: a towel should not be changed if it is hung up. For medium and long term stays, it is necessary to specify in the control register the date of the change of sheets.

It is also important to communicate the impact of this practice in the environmental programme of the store. It also helps to raise customer awareness of their involvement in the environmental policy.

Stakeholders to involve

- Hotel managers and staff
- Health, safety and environment responsible within the hotel, etc.
- Tourists/customers

Costs aspects

Costs

- Printing of labels, signs, etc.

Costs saving

- Water and energy savings are achieved, as well as a reduction in washing products. Example : For a room with 75 % occupancy and 4 kg of laundry per room night open year around, and at a laundry service cost of EUR 0.50 per kg, annual laundry costs would equate to 479 €. Thus laundry costs for a 100-room hotel could be EUR 47 900 per year, and a textile reuse rate of just 5 % could save almost 2 400 € per year.

Monitoring the implementation

The monitoring of meter readings and water bills are the indicators to be followed to measure the impact of this practice.

Resources

Hébergeurs touristiques : quelles actions mettre en place pour un tourisme durable ?, Ademe, 2021

<https://www.mada-hotels-consultant.com/dix-astuces-limiter-consommation-deau-hotel>

<https://www.voyageons-autrement.com/communication-tourisme-durable-actions>

www.ademe.fr/sites/default/files/assets/documents/guide-pratique-economiser-eau-energie.pdf

<https://www.guidebatimentdurable.brussels/fr/accueil.html?IDC=1506>

<http://www.greentourism.eu/en/BestPractice/Details/1>

Encouraging guests to take away their leftover food

Topic: Awareness and behavioural change **Objective:** Fighting against food waste

LEVEL 1

Description

There are always times when guests are not able to finish all the food that they have ordered, and yet, more often than not, they perceived that it might be awkward asking the staff to pack up uneaten food, and indeed many luxury hotels do not even do so.

The distribution and promotion of small food containers to take home leftovers in restaurants, also called “doggy bags”, is an efficient way to reduce the production of food waste, considering that it is an important part of the waste produced by restaurants. Indeed, an average of 125 grams of edible food products are wasted per meal served in commercial restaurants. Hotel catering service can propose doggy bags or other food and drink containers to their customers when they have leftovers to avoid producing food waste.

A related measure would consist on the delivery of reusable bags to take away food from restaurants and other establishments offering food to take away. Interested restaurants and food providers could adopt this measure to reduce the amount of packaging and encourage customers to consider the benefits of waste prevention. In order to encourage customers to reuse these bags, every time they would take it to the restaurant and reuse it they would get a stamp on it. After reaching a certain number of stamps, the restaurant would reward them by, for instance, offering free desserts. This measure will result in a win-win situation that contributes to waste prevention, as customers obtain a reward from their good practices and restaurants will save money from the reduced number of bags to be purchased.



Figure 11 Doggy bag in preparation (source: Ici.fr)

Steps to follow to implement the practice

Depending on the type of stakeholders behind the initiative of doggy bags, several actions can be established to develop and promote the use of doggy bags in restaurants:

- selection of the type of containers/boxes/doggy bags
- equipment and training of the staff on the use of doggy bags
- awareness raising of the customers on the use of doggy bags (and system for reuse, stamps and rewards)

The information of the customers on this practice and its benefits, and the information of the restaurant owners, especially on the regulatory framework, are key factors during the implementation of this measure.

The EC has taken measures to clarify EU legislation related to facilitate donations without compromising food safety. In this sense, the Commission has published in June 2020 a series of EU-wide food donation guidelines for donors and receivers of food surplus.

Sanitary precautions:

- Advise the customer against giving the doggy bag food to any high risk group or persons with food allergies
- Food which is not eaten within 24 hours should be thrown away
- Some foods may not be suitable for a doggy bag e.g. If it has been outside temperature control for a given period (for service or display), or if it has already been reheated
- Refrigerate the food as soon as possible. Food left out of the fridge for longer than two hours may become unsafe due to bacterial growth and should be discarded

Stakeholders to involve

- Hotel managers and staff
- Kitchen staff (i.e. chef, kitchen assistants, etc.)
- Tourists/customers
- Waste management department of local authorities or suppliers of containers, boxes or bags

Costs aspects

Costs

- Costs of a container, box or bag: less than 1€

Costs savings

- Some municipalities provide the restaurants and hotels with doggy bags in order to avoid municipal treatment costs.

- Implementing doggy bags would reduce the amount of food waste generated and, hence, the costs of treating this fraction would be reduced/avoided. In average, the general costs of incineration and landfilling of residual waste in EU are:
 - Incineration of residual waste: 64€/ton
 - Landfilling residual waste: 56€/ton

Monitoring the implementation

- Quantity of organic waste produced per capita: $\text{Quantity of waste produced} / \text{Number of customers}$ [kg / customer]

The amount of organic waste generated can be estimated by the number of garbage cans or bags used as a unit of measurement; if it is not possible to weigh the waste generated, the average weight of a filled garbage can or bag should be estimated beforehand for later calculation.

- Doggy bags distributed to customers [number]

Time frame

Start the monitoring at least one week before doggy bags are distributed to assess the effect of the measure on waste production.

Resources

<http://www.urban-waste.eu/eco-innovative-measure-forms/>

https://ec.europa.eu/food/safety/food-waste/eu-actions-against-food-waste/food-donation_en

<https://www.finehotelsandsuites.com/media/fine-hotels-and-suites-sustainability-policy-stadsvilla-mout.pdf>

<https://www.lci.fr/societe/video-les-doggy-bags-deviennent-obligatoires-dans-les-restaurants-2190308.html>

Encouraging guests to explore attractions by public transport/foot

Topic: Awareness and behavioural change

Objective: Raising awareness to visitors

LEVEL 1

Description

Sustainable mobility has become very important not only for residents but also for tourists to promote sustainable tourism. Hotels and travel agencies may contribute to the sustainable tourism agenda in several ways. For instance, hotels and travel agencies may encourage and guide guests on how to explore the city through public transport or bicycle or on foot.

The Stadsvilla Mout in Schiedam (the Netherlands) requests their guests to leave the car on their premises and explore the city by bike or on foot. Moreover, the hotel is located nearby multiple tram stations and, thus, very easy to reach by public transport.

AX The Victoria Hotel in Sliema (Malta) is committed to sustainable tourism and thus encourages its guests to adopt more sustainable and green mobility options.

The Hotel Ciutat de Girona (Spain) offers a 4% discount to guests who take any means of public transportation to get to their hotel.

Steps to follow to implement the practice

- Information : provide documents and maps to the guests (City maps / touristic map / PT plans / Routes planner / fare); guide to rates and reductions on public transport (and museums)



Figure 12 City map (source: www.santorinidave.com/banff-hotels)

- Services: ticket sale, travel passes / reductions, umbrella loan...



Figure 13 Visit London card (source: www.visitlondon.com)

- Promotion : free ticket or voucher, discount on the price of rooms for all those who arrive on foot or public transport (or bike also)
- Agreement with public transport operators and tourist transport operators



Figure 14 Touristic bus (source: www.visitberlin.de)

Stakeholders to involve

- Hotel managers and concierge staff
- Tourist offices
- Public transport authority
- Transport operators: bus, train, river services, on-demand buses, taxis...
- Mobility services: to rent or free-floating system of e-scooters, bikes or e-bikes, etc.

Costs aspects

- Time to meet the stakeholders
- Compensations for the discount offers
- On-demand shuttle bus for the hotel (or for a group of hotels) to the next train or bus station: a private service will be very expensive (driver-s). Less expensive if the costs are shared with other hotels of the same area, or negotiated with public transport authority / public transport operator.

Monitoring the implementation

Information:

- Number of flyers distributed per month

Services:

- Number of passengers or transport tickets and cards sold per month

Promotion:

- Total cost of voucher and discount per month

Resources

<https://www.finehotelsandsuites.com/media/fine-hotels-and-suites-sustainability-policy-stadsvilla-mout.pdf>

<https://victoriahotel.com/green-mobility/>

<https://www.hotelciutatdegirona.com/en/specialoffers/sustainable-mobility>

Objective 2 - Raising awareness to employees

Any environmental approach requires on one hand a strong commitment and involvement from management through the formulation of a sustainability policy, on the other hand employees are key stakeholders in the implementation of environmental measures.

Therefore, to reach this objective the following practices are proposed:

- **Formulation of a sustainability policy (level 1)**
- **Training employees on sustainability practices (level 1)**

Formulation of a sustainability policy

Topic: Awareness and behavioural change

Objective: Raising awareness to employees

LEVEL 1

Description

A very important step towards sustainability for an organization is the formulation of a policy or management plan. A sustainable management plan:

- can guide decision-making, management, and the daily operations of the business
- can develop the business considering the environmental, socio-cultural, quality, and health & safety issues
- demonstrates management commitment to comply with environmental regulations
- develops a monitoring and audit program to ensure compliance
- outlines mitigation measures to minimize the impact of the business activities on the surrounding environment
- presents mitigation strategies and actions for the control of pollution, waste minimization, and resource conservation by effectively practicing sustainable practices

It is worth mentioning that a concise policy can help hotels navigate difficult times. The hospitality industry is currently facing difficult times due to the Coronavirus pandemic. Nevertheless, hotels with a sustainability policy and/or management plan may sustain their business.

Steps to follow to implement the practice

Management commitment and staff involvement

Any environmental approach requires a strong commitment and involvement from management. Without this commitment and without a real conviction of the environmental, social and economic interest of such an approach, other projects will supplant the approach, even if it generates financial savings (energy, waste, water), mobilises staff, and responds to the growing awareness of consumers towards new consumption patterns.

A system for receiving feedback from employees can be put in place in various forms (cards, table in the staff room, notebook, etc.). The acceptance and sustainability of such a process depends on whether or not management responds positively to the suggestions. The aim is to use the existing grey matter within the establishments and to encourage it to be a source of proposals to enrich practices.

Appointing an internal green team

It is recommended that green team (or at least one a person) is appointed to coordinate and monitor the process in support of management. A green team is usually responsible for coordinating environmental audits for water, waste, energy, carbon emissions, and purchasing and monitoring of performance against

established goals. **The key to the success of a green team is ensuring that there is representation from all levels of seniority and that is well gender balanced.**

The team will benefit from the enthusiasm and fresh ideas of junior staff members who are closely attached to the hotel's working practices, but it must be balanced by senior staff members who have the authority to ensure that proposed initiatives are effectively implemented. A well gendered balanced team avoid favouring one sex or another in the staff and will benefit from more diverse point of views.

A green team should have a reach that extends throughout the entire hotel. Most importantly there should be representatives from different departments such as Facilities, Housekeeping, Purchasing, Catering, and Front of House. This will make sure that the whole spectrum of the hotel's operations is considered. Senior management must stand behind the actions of a green team. This means more than just agreeing on a budget for their activities.

Make a pre-diagnosis to better target future actions

Before drawing up an environmental policy, it is necessary to take the time to evaluate all the departments and services of the establishment and their environmental impacts. If the establishment has not instituted an environmental management system (EMS) with analysis of the establishment's impacts, a simple self-audit under the European Ecolabel scheme will provide a vision of the establishment's strengths and weaknesses and highlight relevant objectives and actions to be taken.

A simple self-audit under the European Ecolabel scheme will provide a vision of the establishment's strengths and weaknesses and highlight relevant objectives: <https://www.ecolabeltoolbox.com/en/espace-de-travail>

By assessing themselves criterion by criterion, the accommodation manager identifies strengths and areas for improvement.

Definition of an action programme

Based on the data collected during the pre-diagnosis, the accommodation manager determines the environmental actions to be implemented as a priority. He/she organises them in an action programme to facilitate monitoring over time. **It is recommended to define the action programme over 2 years with realistic objectives.**

Implementation of actions and communication

Raising the awareness of all staff is essential to ensure the successful implementation of the approach in the accommodation. The commitment of the staff will enable the expected results to be achieved and will ensure that the environmental approach is part of the company's long-term project.

The approach creates a virtuous dynamic, with employees feeling involved and committed to a project that speaks to them.

Monitoring and measuring actions

The aim of this final stage is to ensure that the actions are properly implemented and to be able to quantify the economic and environmental benefits. To do this, it is necessary to define indicators such as:

- the measurement of energy, water and detergent/disinfectant consumption

- the volume of waste produced, including food waste
- measuring customer satisfaction through a survey.

It is important to communicate the results to the staff in order to promote the results and motivate the teams. After 2-3 years of monitoring, it is interesting to communicate the results to customers to give visibility to the results of the actions implemented.

Stakeholders to involve

Hotel managers and staff

External experts/auditors that might help the company draft the policy

Tourists/customers

Costs aspects

Costs:

- Staffing costs to implement the policy

Cost savings:

- Increase margins by reducing costs (water, energy, waste, cleaning products, food waste, etc.)
- Better position on the market in response to the growing expectations of customers

Monitoring the implementation

- Monitoring on energy and water consumption, waste production, carbon emissions
- Monitoring on customer satisfaction

Resources

Hébergeurs touristiques : quelles actions mettre en place pour un tourisme durable ?, Ademe, 2021

<https://www.ecolabeltoolbox.com/en/solutions-techniques/politique-environnementale-et-plan-d-action-96>

<https://www.environmentalleader.com/2010/03/environmental-mission-statements-a-list-of-hotel-sustainability-policies/>

Training employees on sustainability practices

Topic: Awareness and behavioural change

Objective: Raising awareness to employees

LEVEL 1

Description

Employees' efforts key to the successful implementation of green practices. Therefore, hotels that are looking to implement sustainable or green practices should consider the knowledge, awareness, attitudes, and behavior of their employees. Attempting to implement new policies with employees who are unwilling to change their behavior could increase staff turnover and reduce the success of the programme. Selecting the right employees and providing in-depth training on environmental issues are thus important strategies for ecologically conscious hotels.

Although some employees appreciate and derive greater job satisfaction from working for environmentally-conscious organizations, there is concern among hotel managers that the introduction of environmental policies can "result in resistance from employees" who are unwilling to change their routines. They emphasize that this resistance to change is normal, as most people prefer to stick to what they call "habitual behavior".

Training employees on sustainability issues do not necessarily need to give ecological or chemical knowledge about substances and liquids used in a hotel. Indeed, the hospitality industry does not recycle used materials, but rather participates in the process of preparation for recycling and cleaning, or in reducing the negative effects which appear in a hotel's daily operations. In this regard, it would be more important to elaborate a proper approach towards nature, that would eventually grow into a holistic attitude and become part of the hotel's corporate culture. Such training by default should include knowledge of the dangers and risks, inherent to any activity, combined with proactive behavior to avoid or minimize the negative impacts on all concerned parties – the hotel, the guests, nature, the destination, and other stakeholders.

Steps to follow to implement the practice

Raising awareness / Training:

Informing staff is an essential step in encouraging their involvement in the process, making them active in its implementation, but also in informing customers.

Inform the staff on the impact of hotels on the environment: first of all, information must be provided on the global environmental impact of the hotel industry in order to raise staff awareness. The main point here is to recognise and show that many of the services offered by hotels are resource intensive, whether it is energy, water or raw materials. In addition, various types of pollution result from hotel operations: greenhouse gas emissions from energy consumption, solid waste, wastewater, chemical pollution from the extensive use of disinfectants and detergents, etc. This results in a considerable ecological footprint.

Inform the staff about the impact of your establishment: provide convincing figures about the environmental footprint of your accommodation. You can report on the amount of energy and water used per year, solid waste produced, the amount of CO2 emissions generated by your establishment.

On the establishment's environmental action plan: state the environmental objectives set for your establishment and provide information on the actions taken (or those you intend to take).

Explain to everyone their role

Explain to everyone their role and the benefits of their involvement in preserving the environment by indicating the eco-gestures to be implemented in terms of:

- energy saving (lighting, heating/air conditioning, ventilation in the kitchens, etc.)
- saving water (leak detection, reasonable watering, changing sheets and towels on request, filling machines, etc.)
- saving chemical substances (use of products with a minimum impact, respect of dosage)
- waste management (reduction, sorting, fight against food waste, etc.)
- preservation of biodiversity
- responsible purchasing
- sustainable mobility, etc.

Create sheets for each department listing eco-gestures

Facilitate these eco-gestures through various actions: trolleys equipped for sorting, incident reporting sheets (leakage, missing light, etc.). Define precisely the objectives, the means available and the key players to ensure that the practice is successful and feasible

Organise the training policy

- Identify training provided by external trainers and integrate it into a staff training plan
- Organise a visit to a department by a member of staff from another department and/or a newcomer in order to encourage exchanges or even the sharing of practices and to collect proposals for improvement
- Facilitate access to information for staff, particularly seasonal workers, by means of a welcome booklet containing the environmental policy, common eco-gestures and those specific to each department, a floor plan (indicating the locations of sorting areas and fire extinguishers, the assembly point, etc.), the Social Charter, the internal regulations, etc.
- Renew the awareness / for a refresher course, not forgetting the seasonal workers

Take into account the opinions of staff

- Encourage the collection of proposals from staff by making a support available (sheet, table in the break room, suggestion box) and by systematically providing a response. The commitment to respond on the part of the management and/or managers demonstrates the interest in each proposal
- Organise a challenge for the best implemented action proposal of the month/year with prizes
- Lead the change of practices by using periods of experimentation allowing the staff to adapt and even make improvements
- Ensure men and women been consulted in deciding how best actions can be implemented

Reward your staff

- Employees who adopt responsible behavior and/or contribute significantly in the implementation of green practices should be rewarded. Such management will help them in gaining long-term environmental and economic benefits. For instance, they may announce bonuses or extra holidays to compensate employees for their environmental initiatives.

Stakeholders to involve

Hotel managers and staff

External auditor or trainer

Costs aspects

Costs:

- Staffing costs
- Costs of training carried out by an external trainer (if needed)

Cost savings:

- Increase margins by contributing to the reduce costs (water, energy, waste, cleaning products, food waste, etc.)

Monitoring the implementation

- Monitoring on energy and water consumption, waste production, carbon emissions

Resources

Hébergeurs touristiques : quelles actions mettre en place pour un tourisme durable ?, Ademe, 2021

<https://www.ecolabeltoolbox.com/fr/solutions-techniques/formation-du-personnel-73>

<https://insights.ehotelier.com/insights/2015/06/19/hotel-employees-efforts-key-to-successful-implementation-of-green-practices/>

3.2.2 Corporate social responsibility

Corporate social responsibility (CSR) is a type of international private business self-regulation (Sheehy, 2014) that aims to contribute to societal goals of a philanthropic, activist, or charitable nature by engaging in or supporting volunteering or ethically-oriented practices (Kotler & Nancy, 2004). CSR helps an organization be socially accountable—to itself, its stakeholders, and the public. By practicing CSR, organizations can be conscious of the kind of impact they are having on all aspects of society, including economic, social, and environmental. Many organizations view CSR as an integral part of their brand image, believing that customers will be more likely to do business with brands that they perceive to be more ethical. In this sense, CSR activities can be an important component of corporate public relations. At the same time, some founders or top managers of organizations are also motivated to engage in CSR due to their personal convictions.

CSR in tourism can be defined as a guiding business policy whereby tourism organizations integrate social and environmental concerns in their own business mission, strategies, and operations as well as in their interaction with their stakeholders. Simply put, CSR is a tourism organization's contribution to sustainable development (Lund-Durlacher, 2015).

CSR was first implemented in the tourism sector in the late 1990s by international hotel corporations. Many international hotel chains have integrated CSR measures such as Marriott International with the program "Spirit to Serve Our Communities" and NH Hotel Group with the program "Street Children" (Lund-Durlacher, 2015). Today, many hotel chains publish annual CSR reports on their websites (e.g. Accor, Hilton Hotel Corporation, InterContinental Hotels, NH Hotel Group, etc.). There are many best practice examples of hotels implementing CSR into their strategies and operations, among them "the Planet 21 program" of Accor hotels and "the Spirit to Serve our Communities program" of Marriott.

In the past few years, travel agencies and tour operators have become increasingly engaged in implementing CSR measures due to growing consumer awareness and sensibility towards ecologically and socially compliant behavior. Tour operators, which typically combine different travel components such as transportation, accommodation, site visits, etc. to create a travel package, face extraordinary challenges when implementing CSR into their business as they not only have to evaluate CSR measures within their own organization but also along the value chain (Lund-Durlacher, 2015).

The practices related to CSR are proposed according to the following objectives:

- 1. Knowing its carbon footprint**
- 2. Compensating employees for environmental initiatives**

Objective 1 – Knowing its carbon footprint

The carbon footprint is an indicator that measures the amount of carbon dioxide (CO₂) in the atmosphere. It thus makes it possible to assess the impact of human activities on the environment. Measuring its environmental impact is the first step before taking action against global warming, even if there is no legal obligation for SMEs, particularly those in the tourist accommodation sector.

The following practices describe the main steps to follow in order to carry out a carbon assessment within the company or when organising an event:

- **Measuring the carbon footprint of the organization (level 2)**
- **Calculating carbon footprint for each event (level 1)**

Measuring the carbon footprint of the organization

Topic: Corporate Social Responsibility **Objective:** Knowing its carbon footprint

LEVEL 2

Description

Combating climate change has become a major issue which is being addressed by more and more stakeholders. Increased anthropogenic greenhouse gas (GHG) emissions play an undeniable role in the acceleration of climate change. Today, 85% of the energy sources used worldwide are not renewable. This concerns oil (40%), coal (20%), natural gas (19%) and uranium (6%). There is therefore a core dependence on fossil fuel sources.

To progress towards more sustainable development, more understanding is necessary. To reach this understanding, concise measurement is necessary. If an organization has a clear view of where the problem is, then that organization may effectively strive to mitigate the associated impacts. Learning how to calculate carbon footprint is the first step in reducing the negative impact generated by organisations and goes a long way to help our collective efforts in tackling climate change.

Carbon footprint refers to the amount of greenhouse gases (GHG) emitted directly or indirectly by a company or organisation in particular via the amount of carbon dioxide (CO₂) produced through the burning of fossil fuels. It is expressed as a weight of CO₂ emissions produced in tonnes.

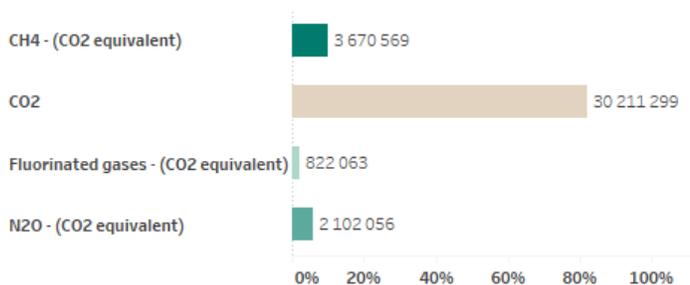


Figure 15 Gaz shares in the EU-27 in 2019 (source EEA)

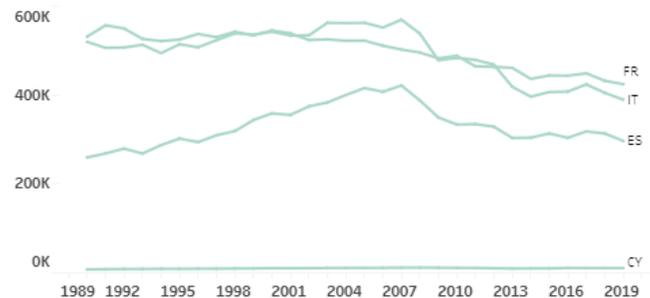


Figure 16 Emissions over time in France, Italy, Spain and Cyprus in 2019 (source EEA)

The greenhouse gas emissions of a company must be measured taking into account the direct or indirect effect generated by the development of its economic activity.

The formula to calculate the carbon footprint of a business is simple: the result is obtained by multiplying the activity (or consumption) data by its corresponding emission factor.

Carbon Footprint = Activity Data x Emission Factor

Activity data: the parameter that defines the level of activity that generates greenhouse gas emissions.

Emission Factor: amount of greenhouse gases emitted for each activity.

Activity data is divided into three main scopes:

Scope 1: This is defined as the direct greenhouse gas emissions controlled by a company. Examples of this include fuel consumption - heating, process equipment, and vehicles - as well as manufacturing, refrigerant systems, on-site waste facilities and fugitive emissions.

Scope 2: These are the indirect emissions associated with the energy consumption acquired and consumed by the organisation. Examples include lighting, equipment, water heaters, etc.

Scope 3: These are the greenhouse gases emissions that an organisation can influence but does not control. In this category are things such as transporting raw materials to make products, business travel, employees commuting to work in vehicles not owned by the company, and transportation of purchased fuels. It is often the largest scope and hardest to quantify.

Steps to follow to implement the practice

The steps to follow to calculate the carbon footprint are the following:

1/ Assign a project manager

2/ Decide if the inventory is to be carried out internally or via an external service provider

3/ Determine the year of reference for the inventory

4/ Establish organisational and operational limits

There are two types of perimeter to be taken into account before drawing up the balance sheet:

- **organisational perimeter:** entities of the structure (subsidiaries, establishments spread over other sites, activities for which the structure is responsible, etc.)
- **operational perimeter:** source of emissions generated by the activity, whether they are directly or indirectly emitted by it. The selection of the scope of study depends on the desired target of the assessment, as well as on the available resources of the organization for carrying out the GHG inventory and implementing the relevant actions (see Figure 17: emission categories to be selected). Although their proportion varies from one hotel to another, the items that emit the most GHGs remain the following: **infrastructure, energy consumption, water consumption, management, laundry service, catering service, waste treatment**

5/ Collect activity (consumption) data

In order to carry out a GHG assessment, it is necessary to gather data on the organisation's activities. This can be information already available in the organisation (primary data), but also external data to be collected from suppliers, customers, users, etc., or statistical data or studies (generic or secondary data). **In general, all you need is the hotel's energy supplier invoices for the year under review.**

6/ Carry out the calculations by multiplying the activity data by the emission factors

This data will then be associated with an emission factor allowing you to calculate its carbon equivalent. Emission factor database for the GHG Protocol can be found here: <https://www.ipcc-nggip.iges.or.jp/EFDB/main.php>

This is a technical step and it is preferable to have received training in greenhouse gas emissions accounting. It can be carried out either internally or with the help of an external service provider.

The simplicity of the calculation and the accuracy of the results will depend on the data collected and the method used. It is recommended to identify the associated uncertainties for each item of information.

Scopes	No.	Categories
SCOPE 1 / Direct GHG emissions	1	Direct emissions from fixed combustion sources
	2	Direct emissions from mobile sources with internal combustion engines
	3	Direct emissions from processes excluding energy
	4	Direct fugitive emissions
	5	Emissions from the biomass (soils and forests)
SCOPE 2 / Indirect emissions associated with energy	6	Indirect emissions linked to electricity consumption
	7	Indirect emissions linked to the consumption of steam, heating or refrigeration
SCOPE 3 / Other indirect GHG emissions	8	Emissions linked to energy not included in the "direct GHG emissions" and "indirect GHG energy emissions" scopes
	9	Purchasing of products and services
	10	Amortization of assets
	11	Waste
	12	Upstream goods transportation
	13	Professional travel
	14	Upstream leasing assets
	15	Investments
	16	Transportation of visitors and clients
	17	Downstream transport of goods
	18	Use of sold products
	19	End-of-life of sold products
	20	Downstream franchise
	21	Downstream leasing
	22	Home-work commuting
	23	Other indirect emissions

Figure 17 SCOPES broken down into 23 subcategories (ISO-TR 14069, March 2011). Source: www.bilans-ges.ademe.fr

7/ Prepare a reduction plan including the measures to be carried out

Accounting for your organisation's GHG emissions allows you to identify sources where the business may have room for improvement in order to develop appropriate reduction plans. Plans may take several forms:

- Rethinking your activities (marketing, customer priorities, etc.) to reduce greenhouse gas emissions and dependence on fossil fuels

- Improving energy efficiency and saving money on energy expenses
- Consuming renewable energy
- Carrying out awareness campaigns, changing of behaviour, etc.

Stakeholders to involve

- Hotel managers
- External service provider performing GHG assessment

Costs aspects

Costs depend on the size of the hotel, the number of employees and the type of balance sheet required and its degree of accuracy. If the budget is limited, it may be better to limit the scope of the assessment and avoid failure:

- Costs of staff involved
- In average, a GHG assessment performed by an external service provider takes in average 5 days with an average daily rate of 550€ (source: association bilan carbone, enquête flash 2018).

Cost savings:

- Make this criterion into a competitive advantage for your business, setting it apart from others.
- Indirect cost savings get thanks to the reduction of energy expenses

Monitoring the implementation

- Total GHG emissions in t CO₂ eq over one year and year-on-year changes
- Total GHG emissions in t CO₂ eq over one year and year-on-year changes per scopes' category
- Performance of reduction of GHG emissions year-on-year: [Total GHG emissions in t CO₂ eq over one year] / [number of overnight stays over one year]

Resources

<https://www.climfoot-project.eu/>

<https://www.climfoot-project.eu/en/bilan-carbone%C2%AE-clim%E2%80%99foot-tool>

<https://climate.selectra.com/fr/entreprises/bilan-carbone/hotel>

<https://www.bilans-ges.ademe.fr/en>

<https://ghgprotocol.org/>

<https://www.ipcc-nggip.iges.or.jp/EFDB/main.php>

Calculating carbon footprint for each event

Topic: Corporate Social Responsibility **Objective:** Knowing its carbon footprint

LEVEL 1

Description

In order to carry out the carbon footprint of an event, it is necessary to add up the greenhouse gas emissions linked to energy, participants' travel, transport of equipment, catering, accommodation and waste management in accordance with the rules of a classic carbon footprint (see *Measuring the carbon footprint of the organization*).

The scope of the calculation of a carbon footprint for an event is that of SCOPE 3, which takes into account all emissions produced, both direct and indirect. This includes water, energy and raw material consumption, waste generated during the event, purchases of food and equipment, and the transport of participants, staff, suppliers and service providers.

At an event, the main sources of carbon include:

- Participant travel
- Hospitality
- Catering
- Powering the event space

Steps to follow to implement the practice

1/ Assign a project manager

2/ Decide if the inventory is to be carried out internally or via an external service provider

3/ Collect activity data on the different categories

- General information: number of attendees of people expected to attend or who have attended and duration of the event
- Participant travel: mode of transport (air travel, car, train, etc.) and travel distance of participants to the event. TO collected during registration.
- Hospitality: number of overnights: number of participants staying in hotels for the event x number of nights they are each staying.
- Catering: number of participants who ate each meal type over the event.
- Powering the event space: estimated energy consumed during the event
- Waste: total waste produced

4/ Carry out the calculations by multiplying the activity data by the emission factors

This data will then be associated with an emission factor allowing you to calculate its carbon equivalent. Emission factor database for the GHG Protocol can be found here: <https://www.ipcc->

nggip.iges.or.jp/EFDB/main.php. This is a technical step and it is preferable to have received training in greenhouse gas emissions accounting. It can be carried out either internally or with the help of an external service provider.

However, online carbon calculators of events are available to facilitate this step:

- https://www.climatmundi.fr/carbon-calculators-1-EN_r_12.html
- https://co2.myclimate.org/en/event_calculators
- <https://evenementresponsable.ademe.fr/home>
- <https://www.goodplanet.org/en/carbon-calculator/event/>

5/ Prepare a reduction plan including the measures to be carried out

- Accounting for your event's GHG emissions allows you to identify sources where the business may have room for improvement in order to develop appropriate reduction plans and eco-design an event (see *Guidelines to organize matchmaking events*).

Stakeholders to involve

- Event managers
- External service provider performing GHG assessment

Costs aspects

Costs depend on the size of the event and the number of partners involved

- Costs of staff involved
- In average, a GHG assessment performed by an external service provider takes in average 5 days with an average daily rate of 550€ (source: association bilan carbone, enquête flash 2018).

Cost savings:

- Indirect cost savings get thanks to the reduction of energy expenses

Monitoring the implementation

- Total GHG emissions in t CO2 eq relating the event
- Total GHG emissions in t CO2 eq relating the event per category:
 - travel of participants
 - freight transport
 - accommodation of participants
 - catering for participants
 - space planning

- communication
- intangible services
- energy
- water
- waste
- other items
- Performance of reduction of GHG emissions: $\frac{[\text{Total GHG emissions in t CO}_2 \text{ eq relating the event}]}{[\text{number of participants in the event}]}$

Resources

<https://communication-responsable.ademe.fr/>

<https://energy.zerowastescotland.org.uk/content/how-plan-and-deliver-environmentally-sustainable-events>

<https://www.myclimate.org/information/about-myclimate/calculation-principles>

Carbon calculator of events:

https://www.climatmundi.fr/carbon-calculators-_I_EN_r_12.html

https://co2.myclimate.org/en/event_calculators

<https://evenementresponsable.ademe.fr/home>

<https://www.goodplanet.org/en/carbon-calculator/event/>

Objective 2 - Compensating employees for environmental initiatives

A corporation's success in adopting green practices depends not only on corporate attitudes towards environmental issues but also on its employees' personal beliefs and everyday actions. Employees are an important stakeholder in organisational environmental initiatives. By engaging in eco-initiatives, employees facilitate the development of ecological innovations at workplace.

To this purpose of the following practice is proposed:

- **Compensating employees for environmental initiatives (level 1)**

Compensating employees for environmental initiatives

Topic: Corporate Social Responsibility

Objective: Compensating employees for environmental initiatives

LEVEL 1

Description

A corporation's success in adopting green practices depends not only on corporate attitudes towards environmental issues but also on its employees' personal beliefs and everyday actions. Employees are an important stakeholder in organisational environmental initiatives. By engaging in eco-initiatives, employees facilitate the development of ecological innovations at workplace.

Pro-environmental behaviour (PEB) or ecological behaviour of employees includes (1) conserving: these are behaviours that avoid waste and preserve resources such as reusing, recycling and reducing use; (2) avoiding harm: these are behaviours that mitigate or reduce environmental damage. These include pollution reduction and steps to restore the environment after damage; (3) transforming: this involves changing to be more sustainable through green products, and renewable energy; (4) influencing others through behaviours that motivate green behaviour; and (5) taking initiatives: these include behaviours that change the status quo such as activism for the environment.

Employee PEB at the workplace is mainly voluntary. There are three main factors favouring or improving employees' PEB:

- Managers or leaders can only motivate and encourage rather than force employees to engage in such behaviours. One of the ways to achieve employees' PEB is for managers to demonstrate their own commitment to the environment. Managers or leaders can send positive signals to employees through environmental leadership.
- Organisational support to show concern for the environment such as the provision of recycling bins, trainings and communication about the company's environmental commitment and sustainability policy.
- Rewards and recognition to demonstrate the appreciation of green behaviours and encourage employees PEB. These are one of the strongest motivators for encouraging employees to participate in the efforts to improve the environment.

The Hotels and similar accommodations may adopt a policy to compensate employees who adopt responsible behaviour and/or contribute significantly in reducing the carbon footprint. This practice will help them in gaining long-term environmental and economic benefits.

Steps to follow to implement the practice

Developing a social policy for employees

Working conditions that respect the work of employees and their health are a prerequisite for adhering to environmental actions through the quality of its CSR policy. Depending on the situation, this may include:

- training leave
- two consecutive days off
- communication of schedules one month in advance
- free meals or meal vouchers
- free uniforms and work clothes
- a subsidised sustainable travel plan: bicycle loan, reimbursement of public transport costs
- encourage seasonal workers to be accommodated on site or in nearby accommodation such as boarding schools not used in the summer, in partnership with the local authorities.
- limit risks: protect cleaning staff, reduce staff exposure to risks related to moving loads, etc.
- promote professional equality between women and men in terms of salary and career development

Raising staff awareness

All the staff of the establishment must be the subject of specific awareness-raising actions to develop an environmental policy (see Formulation of a sustainability policy & Training employees on sustainability practices).

Management/leadership: Management must support the process for it to be successful. Some actions require the involvement of managers, who must be convinced of the value of such actions for their organisation.

Employees: Raising awareness among employees should also be a priority and a recurring action. Their role in waste management, in the use of cleaning products or in the use of equipment is essential. Any action developed will impact on their work and their work will directly impact on the success of the actions initiated. Employees must be involved and made aware of the issue from the outset in order to ensure their full support throughout the process. Staff can be made aware of this when they are hired or when new actions are taken.

Seasonal staff: this group can be problematic in terms of compliance with the actions put in place. It is therefore essential to put in place a rapid training procedure.

Arrange the space and facilitate initiatives

Provide explicit signage (pictograms, directional arrows) in the waste storage areas describing what should be put in the containers. Preferably this signage will be identical in each sorting area in order to homogenise communication and simplify understanding.

Integrate awareness-raising into the professional training plan.

Include the establishment's environmental rules in the welcome guide for new employees and explain the importance for the company of its brand image, economic issues and environmental impacts.

Highlight concrete responses, good practices and their impacts, display posters urging good practices or provide checklists detailing sorting instructions, product use and energy savings.

Link good housekeeping practices to improved health and safety conditions and accident prevention

Provide a specially equipped room or permanent wall panel for awareness sessions and mobilisation meetings.

Encourage volunteering and personal initiative, set up an idea box, discuss proposals.

Display barometers describing the evolution of environmental management and its results (financial gains, regulatory compliance, sorting performance, energy and water savings, purchasing policy, etc.) with immediately accessible indicators.

Adopt an employee compensation policy

Hotels and similar accommodation can adopt a policy of compensating employees who behave responsibly and/or contribute significantly to reducing the carbon footprint.

Compensation is a key monetary lever, motivating employees with immediate benefits such as monthly salary or extra holidays.

Collective remuneration can be an option for rewarding collective projects through profit-sharing and company savings schemes.

Remuneration is certainly an important motivating factor for employees, but there are also non-monetary motivating factors such as

- the level of responsibility and autonomy granted to employees
- hierarchical recognition, career development, training,
- honorary rewards.

Stakeholders to involve

- Hotel managers
- Representatives of the personal
- Staff

Costs aspects

Costs:

- Costs of staff involved
- Salary costs and costs of compensations
- Purchase costs of purchasing materials, bicycles, etc.

Cost savings:

- Indirect cost savings get thanks to the reduction of energy expenses
- Saving on recruitment effort thanks to staff retention and talent attraction
- Make this criterion into a competitive advantage for your business, setting it apart from others

Monitoring the implementation

- Number of eco initiatives over a year
- Number of employees taking eco initiatives over a year
- Number of employees taking eco initiatives / Total number of employees

Resources

Determinants of employee eco-initiatives in Indian hotel industry, Mercy Tom, Devi Soumyaja, International Journal of Environment Workplace and Employment, January 2019

Hotel Employees' Pro-Environmental Behaviour: Effect of Leadership Behaviour, Institutional Support and Workplace Spirituality, Olawale Fatoki, sustainability, July 2016

La Responsabilité Sociale des Entreprises (RSE) appliquée au secteur de l'hôtellerie, Bérengère Clamens, Mémoire de Mastère, 2019

Hébergeurs touristiques : quelles actions mettre en place pour un tourisme durable ? ADEME, 2021

Gestion des déchets : Guide pratique pour le secteur hôtelier, Brussels Hotels Association, 2015

3.2.3 Energy conservation

The tourism industry is a significant contributor to global energy consumption and associated carbon emissions. Notably, hotels and similar accommodations use substantial amounts of energy for providing comfort and services to their guests, typically with an alarmingly low level of energy-efficiency. The effects on the environment include emissions to and pollution of water resources, soil, and the air, noise, as well as the excessive use of locally available and/or imported natural and other resources. Whilst the 5.45 million hotel rooms in Europe represent half the global total number, European accommodations are estimated to be responsible for just 21% GHG emissions arising from accommodations globally, suggesting better than average energy-efficiency in the European accommodations. However, energy-efficiency has traditionally represented a low priority for most accommodations, and there is considerable scope for energy savings in this sector, contributing to cost and carbon emission reductions.

The total energy consumption for a typical hotel and the proportion of energy sourced from electricity compared with fuels such as natural gas, propane, liquid petroleum gas, and fuel oil, varies considerably across accommodations depending on the level of services offered, building design, climate occupancy, local energy infrastructure, and local regulations. Electricity accounts for approximately 40% of the energy consumed in a hotel. Of this, approximately 45% is used for lighting, 26% for HVAC, 18% for other, 6% for water heating, and 5% for food services. Kitchens and laundries typically account for approximately 10% and 5% of energy consumption, respectively, in a large hotel, although these figures vary considerably depending on the size of the hotel restaurant and the amount of laundry that is processed on-site. Kitchens may represent up to 25% of energy consumption. In short, there is a great potential for energy conservation across the hospitality industry.

To minimize energy consumption in Hotels and similar accommodations several technological and non-technological practices are proposed according to the following objectives:

- 1. Knowing your energy consumption**
- 2. Think lighting strategy, matching well being and energy saving**
- 3. Upgrading household equipment and optimizing their uses**
- 4. Design building and interiors, design systems**
- 5. Diversifying your energy sources**

Objective 1 - Knowing your energy consumption

Energy monitoring is highly recommended to provide essential information about energy use in the hotel. Monitoring can reveal problems (abnormal changes in consumption, etc.), enable to identify opportunities for energy savings and verify the effectiveness of the energy saving measures you have implemented. In addition, negotiating a new electricity contract with a supplier can be an opportunity to optimize electricity bill and also to identify potentials to reduce electricity consumption as described in the following practices:

- **Keeping track of energy consumption of equipment and systems (level 1)**
- **Knowing your energy supplier and contract, optimizing your choices (level 1)**

Keeping track of energy consumption of equipment and systems

Topic: Energy conservation

Objective: Knowing your energy consumption

LEVEL 1

Description

Monitoring the energy consumption of a hotel's equipment and systems is a key step allowing you to better understand the main sources of energy consumption in your establishment and thus develop a strategy to optimise or reduce the consumption of these systems and equipment.

Energy consumption is monitored through meters for electricity and gas consumption. The installation of sub-meters is also useful in order to specifically monitor the consumption of certain equipment allowing you to better understand the equipment's impact on overall energy consumption. In a typical hotel, kitchens for example or energy intensive systems, which are responsible for approximately 15% of energy consumption. While there is a strong correlation between the number of food covers served in hotel restaurants and total hotel energy consumption, kitchen energy consumption is only rarely monitored separately.

Steps to follow to implement the practice

- Appoint an energy manager for the hotel. This member of staff will be responsible for the regular verification of electricity meters, sub-meters and other equipment for energy consumption monitoring. They will also be responsible for keeping track of the evolution of energy consumption over time.
- Install sub-meters in order to specifically monitor energy consumption of energy intensive systems, for example the kitchen or the clients' rooms, laundry areas, spa and pool areas and hallways.
- Choose a suitable unit of measurement and weigh it. Measure energy consumption in kWh, using a conversion coefficient if necessary. Then compare the results by the frequency of the hotel by dividing the energy consumption by the corresponding number of stays (number of nights x number of customers).
- Determine the frequency of energy data collections: annual, monthly, weekly, daily, etc. The minimum is once a year, but it may be appropriate to collect some data more frequently, especially meters and sub-meters should be verified at least monthly.
- Analyse the energy data: Compare the results obtained from one year to the next, month by month, using a spreadsheet and more visual tools like graphs. Analyse changes to ensure the relevance of the actions taken and, in the event of deterioration, identify areas for progress that could enrich the action plan.
- Share results and achievements with the staff and with the clients
- Have a professional expert carry out an energy audit of the hotel in order to identify easy and cost-efficient measures to reduce energy consumption. An energy audit involves the compilation of an inventory of energy-using equipment, combined with estimated usage patterns, to estimate the main

sources of energy demand. This can help identify unusual excessive consumption that may point to dysfunctional equipment.

Stakeholders to involve

- Hotel managers and staff
- External energy experts to perform an energy audit of the hotel
- Clients

Costs aspects

Costs:

- Salary cost related to the time spent by the energy manager and other staff involved in the practice.
- Installation of sub-meters for electricity: from 35 to 350€ (prices may vary depending on the functions).

Cost savings: Keeping track of and optimizing energy consumption is an opportunity to negotiate a better contract with your supplier. For example potential cost savings as estimated by the French ADEME (2017) for simple measures that optimize energy consumption are:

- Reduce energy costs by 31 % for electricity
- Reduce energy costs by 47 % for gas

Monitoring the implementation

- Monthly energy consumption in kWh (overall energy consumption and the consumption of specific systems)
- Evolution of energy consumption month to month and year to year

Resources

<https://atee.fr/document/calculette-de-conversion-des-unites-energetiques>

Knowing your energy supplier and contract, optimizing your choices

Topic: Energy conservation

Objective: Knowing your energy consumption

LEVEL 1

Description

Since the beginning of the 1990s, the European Commission has gradually opened up the energy markets of the Member States. As a consequence, the electricity offers available have expanded considerably, giving rise to a multitude of new energy suppliers.

It can be difficult to navigate the market of energy suppliers but the variety of offers available has the advantage that you can find a contract, which is adapted to the needs of your hotel while also supplying you with energy from more sustainable sources. Recently, the majority of energy suppliers offer an option for a “green” energy contract.

In order to distinguish themselves from each other, many suppliers have developed specific offers, aiming to be more competitive: some insist on the “green” nature of their energy, others emphasize the quality of the support and advice provided, while some provide the possibility of having a customized electricity offer.

For most professional contracts the suppliers work on the basis of a B2B model, meaning that you contract directly with the supplier for the energy of your hotel. In some cases, professionals can decide to call on an energy service provider, who will handle the relationship with the supplier, for example to negotiate the price of electricity and gas or to negotiate contractual terms.

Contract prices depend on a number of terms and conditions, as pricing varies depending on whether or not you have a subscription and whether you choose to differentiate electricity pricing according to seasons (summer/winter) or according to hours of peak and off-peak demand. Electricity prices may also vary depending on the size of your establishment, as suppliers can offer individualized pricing to big professional customers.

Negotiating a new electricity contract with a supplier can be an opportunity to optimize your electricity bill and also to identify potentials to reduce your electricity consumption. Specifically, optimizing the maximum contract power in accordance with the hotel’s needs can be an opportunity to save money. Your energy supplier may also offer services, such as energy audits or energy advising, to help you reduce your energy consumption and eliminate energy losses, thus also saving money.

Steps to follow to implement the practice

- Create a task force including staff responsible for procurement, the designated hotel energy manager and a member of management and start by reading through the terms and conditions of your current energy contract. The contract, as well as the electricity or gas bills should provide information on the pricing scheme applied, the maximum contract power, the sources of electricity production related to

the offers that your supplier has marketed during the previous year and the share of electricity from renewable sources.

- The next step is to determine what your immediate and long-term needs are. When defining your needs, ask yourself the following questions:
 - Do I want to optimise my electricity bill?
 - Do I want to change my pricing scheme?
 - Is the maximum contract power subscribed to in accordance with the real needs of my hotel?
 - Do I want to switch to a green electricity offer?
 - What additional support and advice services do I want for the energy management of my hotel?

- For a professional, it is especially important that your energy contract gives you access to information on actual consumption and the history of energy consumption of the establishment. This is crucial information to optimize energy management. Get in touch with your energy supplier if you cannot find this information on your contract.

- When examining the terms and conditions of your current energy offer, you should verify if the maximum contract power you have subscribed to is sized according to the real needs of your hotel in terms of electricity consumption. Contract power determines the maximum amount of electricity that can be used simultaneously by electrical equipment. To calculate the maximum and minimum power needed, you can measure the power of all your electrical appliances, then consider which appliances will work simultaneously and add up the power of these appliances. This is the minimum power you need to keep your hotel functioning correctly.

- If you wish to change your energy supplier, it is recommended to use an online service to compare the different electricity and gas offers and suppliers on the market. They offer information on subscription cost, cost of consumption and characteristics of the different energy suppliers, including “green” energy offers. While there are many websites that offer these services online, most Member States have set up an “official” site to compare energy offers, which work in partnership with the energy or another national agency.
 - In France: <https://comparateur.energie-info.fr/compte/profil>
 - In Spain: <https://comparador.cnmc.gob.es/>
 - In Italy: <https://www.ilportaleofferte.it/portaleOfferte/>

Once you have made a first selection of potential suppliers and offers, ask several suppliers to send you offers so that you can compare them in detail.

- When comparing different offers, it is recommended to not just focus on the prices but to also look at their evolution, customer service, payment methods, late payment fees, etc. In the case of a combined

electricity and gas offer, the price of electricity and gas should be compared separately, as some offers may be cheaper for one energy and more expensive for the other. Always look at the price of the kWh and the subscription and not at the monthly instalments offered by the suppliers that are only estimates of your annual bill.

- Once you have chosen the offer that best fits the needs of your hotel, changing your energy supplier is free the new supplier usually helps you cancel your old contract.

Stakeholders to involve

- Hotel management
- Staff responsible for procurement
- Designated energy manager of the hotel
- Energy supplier

Costs aspects

Costs:

- Staff costs related to the time spent on this practice.
- Switching your energy supplier or offer does not represent any additional costs.
- However, subscribing to a “green” energy offer may be more expensive, than a conventional offer.

Cost savings:

- Renegotiating your energy contract can result in cost savings, especially when reducing maximum contract power, or decreasing the cost per kWh of electricity or m³ of gas.

Monitoring the implementation

- Monitor evolution of electricity and gas prices
- Monitor actual energy consumption of the establishment
- Electricity bills provide information regarding the sources of electricity production your supplier has marketed, allowing you to monitor the evolution of the part of renewable energies

Resources

https://www.energie-info.fr/fiche_pratique/je-souhaite-changer-de-fournisseur-delectricite-ou-de-gaz-naturel/

https://www.energie-info.fr/fiche_pratique/comment-comparer-les-offres-delectricite-et-de-gaz-naturel/

<https://comparateur.energie-info.fr/compte/profil>

<https://comparador.cnmc.gob.es/>

<https://www.ilportaleofferte.it/portaleOfferte/>

Objective 2 - Think lighting strategy, matching well-being and energy saving

Limiting lighting to areas that are occupied or really need light can be achieved with automatic devices. The use of presence detectors in sanitary blocks, entrances, corridors, underground garages, etc., generates savings of 50% to 80% on the consumption of the equipped areas.

In addition to the implementation of minimal lighting with compact fluorescent lamps or LEDs, a motion detector can control the switching on and off of the entire lighting system. In rooms, the installation of an automatic light switch-off system when guests leave their rooms is recommended.

Finally, daylight is the most economical and should be used to the best advantage. The quality of the lighting is also a guarantee of the well-being of the guests and the staff.

To reach this objective the following practices are proposed:

- **Think lighting strategy, reduce needs (level 1)**
- **Reduce consumption, efficient lighting (level 1)**
- **Manage lighting, control systems (level 2)**
- **Manage external lighting (level 1)**

Think lighting strategy, reduce needs

Topic: Energy conservation

Objective: Think lighting strategy, matching well being and energy saving

LEVEL 1

Description

Electrical energy and lighting are one of the greater source of energy use in accommodations, beside hot water, kitchen and cold rooms, just behind process heating, this depending on location, local climatic conditions, construction's type and activities. There can be significant savings in energy as there is permanent lighting and over-lighting in many areas; outdoor lighting is also significant. Daylight and artificial lighting solutions, at the minimum, require to be designed according to the visual comfort and conservatory standards. They are linked to architectural design and well-being. Not only lighting performance has to be taken into account, but also uses, health and well-being, light pollution and products' life cycle impacts. Light is linked to solar gain, ventilation for passive strategy, and to the window design.

Steps to follow to implement the practice

Make a plan, and assess existing building and project

- Make a plan early in the process (new building or part of, refurbishment)
- Identify the need for council, support to project and create the good conditions to collaboration
- Define the lighting concept, the guidelines and the character
 - Identify building location's climatic conditions and perspective with climate change
 - In new building parts of it, define early the lighting and daylight concept and ambiances
 - **Identify the needs and the right quality and quantity of light for each areas**
 - In existing buildings, assess the lighting quality and the needs for different tasks
 - In **existing** buildings, Identify lighting systems, passive and active, equipments, maintenance, and also behaviour, identify hidden consumptions (common and storage areas, corridors, standby mode for electrical appliances...);
 - Identify conditions, ceiling's height, windows, and surface's finitions
- **Assess light quality and performance and daylighting**
 - Take in account external lighting
 - Take in account embodied energy, life cycle, zero waste objectives
 - Use or ask for computer simulation
 - Foresee the control
- In all cases, use and optimize natural resources as daylight, increase natural light, it can provide considerable savings in energy, pay great attention to circulation, hallways and common spaces.

Reduce needs and set the right quantity and quality of light

- Make sure the design favour passive strategy, in existing building don't lower daylighting with your project
 - Favour passive strategy, and low consumption strategy
 - Access to daylight and outside views, increase daylighting in design strategy, making nothing to decrease natural lighting with new design
 - Windows, glazing design, volume and depth, reflectance of surfaces, light shelf, roof lighting...
- No overlighting (artificial light)
 - Reduce lighting level matching quality of light and uses for all times of day and night and all areas
 - Meeting combined lighting levels with desired design level
- **Ovoid glare and overheating:** forms of controls are necessary to limit the potentially excessive levels of daylight, a wide range of devices are available,
 - Glare control for workspace, leisure or rest rooms, solar shading and nature based solutions
- Choose high performance lighting systems
- Take in account control lighting / occupancy, schedule, daylight harvesting (dimmers, switches), adaptative levels with times light density of the days
 - Daylighting devices and complementary artificial lighting
- Use light colors for ceilings and walls, choosing material and surface
- Preserve capacity for setting lighting (intensity colors...)

Stakeholders to involve

- Owners and Hotel managers and staff
- Project manager
- External experts to perform a lighting audit, contractors
- Lighting designers
- External project team (architects, engineers, designers, economists, energy consultants..)
- Contractors
- Clients
- Municipality

Costs aspects

The cost depend of the project (size, technologies,...) or of the upgrading choice for existing building. The costs could be partly covered up by the energy and maintenance savings, these improved the return on investment. Some incentive systems are based on intracting (Internal performance contracting³).

In new project (construction or extension) taking in account at the early stage the lighting strategy reduce costs, save energy and match better with the marketing and character goals

Cost savings:

- Cost simulation is important, and operating costs for lighting has to be included in the cost simulation (right actions at the better planning time, easier maintenance...)
- Examine intracting solution

Monitoring the implementation

- Assess in a global approach the opportunities to reduce needs, reduce light levels, improve confort, and choose the way to implement, replacing lamps or more, choosing newer technologies for efficient lamps and luminaires, choosing whole design approach
- Set a passive approach to consider the opportunities for daylighting, to minimize the lighting needs, this will allow to benefit from interactions between design concept, daylighting improvement, lighting design, and also lighting monitoring and maintenance
- Make global costs estimations, and prioritize the actions
- Make the point with visual confort and thermal summer confort
- For existing installation or building, make an assessment not only quantitative but qualitative at early stage
- Appoint a referent for the lighting project, and identify his tasks (coordinate assessment of occupants and staffs, managers, consultation, following of goals and expectations...)
- Set multicritéria assessment including carbon footprint, zero waste, life cycle...
- Identify the needs for external skills and contractors and identify or set the framework's monitoring and maintenance

Resources

<https://ec.europa.eu/environment/emas/takeagreenstep/09-article.html>

<https://www.nogreyarea.me/blog/4-reasons-why-many-hotels-are-switching-to-led-lighting/>

Working place (staff), Code du travail français / lighting level / Section 1: lighting (Articles R4223-1 à -12)

Arrêté du 20 avril 2017 / lighting provisions in establishments open to public

³ <https://energy-cities.eu/publication/intracting-internal-performance-contracting/>

Reduce consumption, efficient lighting

Topic: Energy conservation

Objective: Think lighting strategy, matching well being and energy saving

LEVEL 1

Description

Whatever time of the day, lights are usually on and shining within a hotel. Typically, lighting accounts for 15 - 45% of electricity consumption in small hotels. With so much electricity being utilized every hour, hotels could benefit by investing in LED lighting. Installing LED lights in lobbies, guest rooms, bars, and even in the basement will all yield surprising results.

LEDs have a great number of benefits – they are energy efficient (uses 75% less energy), emit low heat radiation, are dimmable, start instantly, and can provide directional light.

Lighting is also part of the accommodation's style (it could be a signature, a part of the traveler experience) and of the guest's wellness, a global approach is a win-win objective.

Considering the whole system, design, light sources and daylight, lamps, luminaire, the different occupancies and the control but also the maintenance could save more energy and costs.

Steps to follow to implement the practice

Plan

It's not wasting time to lead a lighting strategy, depending on the building type, setting qualitative guidelines (uses, needs, management, ambient lighting, colors...) and objectives that will guide the project implementation and it's planning.

If the strategy covers light pollution, it could cater not only green travelers, meeting new requirements, new travel experiences. In harmony with territories, it could be a specific thematic linked for example to sky, stargazing, for tour operators...

- Use or ask for computer simulation
- Include carbon footprint and ACV approach

Reduce consumption and implement efficient lighting

- Reduce the lighting level (overlighting)
- Replace or use bulbs with newer technology, adds sensors, use daylight
 - Compact fluorescent lamps, CFL
More energy efficient than traditional bulbs, CFL have a long lamp life, however they contain mercury.

- High pressure sodium and halide lamps, HID, commonly in outdoor lighting (contain mercury also)
- Led emitting diodes, LED highly energy efficient
LED bulbs will last at least 50,000 hours after being installed that denotes a noticeable decrease in output frequency (about 6 years). The increase of service life helps significantly to cut down the maintenance costs. The electricity savings of LED is about 85% compared to incandescent lighting. LEDs are used indoor and outdoor.
- Choice of low energy lamp in common and circulation areas and sensors
Lighting control systems such as motion sensors in corridors can reduce the corridor lighting demand by around 70 percent compared to 24-hour operation.

Label have to be considered for the best quality of lighting equipments, the most common are energy star and the category A to G.

Stakeholders to involve

- Hotel managers and staff
- External experts to perform a lighting audit, contractors
- Lighting designers
- Clients
- Municipality

Costs aspects

Costs:

- Depend of the nature of the project and of the building, the type and number of bulbs and the need for using new luminaires, the sensors, dimmers, the control system. It includes the need of electrical wiring and the labor costs. The LED's bulbs became more and more affordable and more and more efficient. They have the lowest running costs.
- In new project (construction or extension) taking into account at the early stage the lighting strategy reduces costs, saves energy and matches with the marketing aspect.

Cost savings:

- About 50 % on energy costs could be obtain, Cost simulation is important, and operating costs for lighting and labor maintenance has to be included in the cost simulation (easier maintenance, no return to old lamps, better light levels, global maintenance management)
- Examine intracting solution

Monitoring the implementation

- Set a strategic approach to consider the whole system, making global costs estimations, and prioritize and plan the actions; this will allow to include opportunities in interactions such as daylighting improvement, lighting design, and also lighting monitoring and maintenance
- For existing installation or building, make an assessment not only quantitative but qualitative at early stage
- Appoint a referent for the lighting project, and identify his tasks (assessment of occupants and staffs, managers, consultation, following of goals and expectations...)
- Set multi criteria assessment including carbon footprint, zero waste, summer comfort...
- Identify the needs for external skills and contractors and set the framework monitoring

Resources

<https://ec.europa.eu/environment/emas/takeagreenstep/09-article.html>

<https://www.nogreyarea.me/blog/4-reasons-why-many-hotels-are-switching-to-led-lighting/>

Manage lighting, controls system

Topic: Energy conservation

Objective: Think lighting strategy, matching well being and energy saving

LEVEL 2

Description

Reducing operating time of lamps can be a large energy saver combined with appropriate light levels, energy efficiency lamps and luminaires as daylighting harvesting and occupancy change along the day and night and in different areas. Switching off lights when no need and no occupancy, as in guestrooms, or Installing lighting controls systems to take in account daylight and his diffusion in all parts of a room (restroom, restaurant, breakfast area, hall...) reduce use of lighting.

Installation of motion sensors in hallways and pathways is a simple and cost-effective approach. Lighting control systems such as motion sensors in corridors can reduce the corridor lighting demand by around 70 percent compared to 24-hour operation.

Controlled systems are the heart of energy savings and daylight linking is essential.

Steps to follow to implement the practice

Think lighting strategy, reduce needs

- Passive solutions in building design
- Plan and schedule controls as choosing or replacing equipment
- Identify the occupancy, the daylight harvesting and the supposed activities by area and the needs for controls, involve staff and take in account guests' advice, make measures in existing buildings
- Identify the goals for ambient levels, and the specific activities or working tasks
- Identify project management organisation
- Identify systems,
 - Use different strategies and systems from manual controls to automatic systems, identify the complexity of the system and the need for external expert
 - Turn off light in unoccupied spaces, when sufficient daylight...with occupancy sensors, timers, daylight harvesting, clever switches and dimmers
- Identify costs, with staff or external costs

Installing lighting controls

- Check with the plan
- In existing building minimize the on-site impacts on building
- Check On-site the whole control system,
- Proceed to installation procedures, schedule the maintenance time
- Require all drawing sets and all technical documentation of all equipment and their maintenance

Monitoring, check and act for enforcement

- Optimize the installation: scheduling...
- Do training for staff or use training video (providing by contractors, vendors..)
- Planning the maintenance time

Stakeholders to involve

- Hotel managers and staff
- External experts to perform a lighting audit, check emergency lighting, install schedule, contractors
- Electrical engineer
- Design team, architects, lighting designer

Costs aspects

Cost:

- Lighting controls systems involve additional costs, including the equipment and the installation, but also the labor to maintain, the replacement of materials, the recycling, the training for the staff. Identify the necessary devices and their costs and the complexity of the system and the need for external expert.

Cost savings:

- It will fairly improve the proportion of energy saving. Cost simulation is important, operating and costs and labor maintenance have to be included in the cost simulation.

Monitoring the implementation

- Set a strategic approach to consider the whole system, until the costs on-site, of maintenance time, making global costs estimations, and prioritize and plan the actions; this will allow to include opportunities in interactions between daylighting, lighting design, and lighting monitoring and maintenance

- For existing installation or building, make an assessment not only quantitative but qualitative at early stage, including the schedule of existing controls
- Appoint a referent for the lighting project, and identify his tasks (assessment of occupants and staffs, managers, consultation, following of goals and expectations...)
- Set multi criteria assessment including carbon footprint, zero waste and collection schemes, toxicity, summer comfort...
- Identify the needs for external skills and contractors and set the framework of lighting monitoring

Resources

<https://ec.europa.eu/environment/emas/takeagreenstep/09-article.html>

<https://www.nogreyarea.me/blog/4-reasons-why-many-hotels-are-switching-to-led-lighting/>

<https://challenge.abettercity.org/toolkits/emissions-reduction-toolkits/energy-efficiency/office-design/?toolkit=224>

Manage external lighting

Topic: Energy conservation

Objective: Think lighting strategy, matching well being and energy saving

LEVEL 1

Description

At night lighting emits too much light, Indoor and outdoor lights are concerned. Artificial brightness, waste of energy are significant. They contribute to light pollution and energy consumption. Outdoor lights are often brighting too long in the morning, too early in the evening, are over bright and often inefficient. The skyglow hide the stars, and the lighting has health and environmental impacts, as on human circadian rythms. As for indoor lighting it's possible to save energy but also to limit the use of non renewable energy.

Steps to follow to implement the practice

Reduce light pollution, reduce needs, and plan outdoor lighting

- Limit the outdoor lighting in time using timers and to specific areas
- Remove the excessive lights and luminaires
- Turn off lights for illumination at night
- Limit lighting in indoor empty areas using switchers, and when light necessary minimize light spill by shutters
- Reduce the needs and plan the right quantity and quality, just where and when necessary (at given time or linked to) or for emergency purpose
- Install dark sky friendly lighting, all the exterior fixtures have to be dark sky compliant
 - Don't light into the sky, the lighting has to be shielded, with full cutoff (no light above 90 degrees) to direct the light downward
- Respect national and local restrictions
- Think of solar energy for pathway

Reduce energy consumption, control lighting systems

- Reduce the lighting level (overlighting)
- Replace or use bulbs with newer technology, add sensors
 - Compact fluorescent lamps (CFL)
More energy efficient than traditional bulbs, CFL have a long lamp life, however they contain mercury.
 - High pressure sodium and metal halide lamps, HID, high intensity discharge, commonly in outdoor lighting (contain mercury, PCBs) and often in large areas
 - Led emitting diodes, LED highly energy efficient

LED bulbs will last at least 50,000 hours after being installed that denotes a noticeable decrease in output frequency (about 6 years). The increased of service life helps significantly to cut down the maintenance costs. The electricity savings of LED is about 85% compared to incandescent lighting. LEDs are used indoor and outdoor.

- Choose warmer-toned light and lowest color temperature to reduce impact on wildlife; in specific areas see with the local authorities or with one ecologist
- Use automated and smart technology, set up schedules, use timers, dimmers and motion sensors
- Control by computer managed system

Label have to be considered for the best quality of lighting equipment, the most common are energy star and the category A to G.

Stakeholders to involve

- Hotel managers and staff
- External experts to perform a lighting audit, contractors
- Project team, architects, engineers, lighting designers, ecologist
- Clients
- Local authorities

Costs aspects

The less night outdoor lighting, the better energy saving and costs will be, as it will suit for wildlife and human.

Cost savings:

- 30- 60 % depending of the initial state and of the project
- CFLs and LEDs would save energy and money

Monitoring the implementation

- Set a strategic and whole approach to consider the different impacts of outdoor lighting such as impacts on wildlife and human (spilling, intrusive light, ...), on sky darkness as for energy saving, and environmental products impacts.
- Respect the decree / light pollution; reduce the influence of glare, limit the emissions of light into the night sky, respect dime or switch off, limit for illumination levels, no light trespass, respect the limitation of the amount of blue light...
- Work with life cycle costs approach to take in account energy, replacement, maintenance, end of life...)
- For existing installation or building, make an assessment not only quantitative but qualitative at early stage

- Make a light plan for security, and guidance for persons with reduced mobility
- Appoint a referent for the lighting project, and identify his tasks (assessment of occupants and staffs, managers, consultation, following of goals and expectations...)
- Set multi criteria assessment including carbon footprint, zero waste
- Identify the needs for external skills and contractors and set the framework monitoring

Resources

<https://ec.europa.eu/environment/emas/takeagreenstep/09-article.html>

<https://www.nogreyarea.me/blog/4-reasons-why-many-hotels-are-switching-to-led-lighting/>

Law, decree for “prevention, reduction and limitation of light pollution”, France, 27th December 2018

Objective 3 - Upgrading household equipment and optimizing their uses

The installation of energy-efficient equipment is a key step in reducing energy consumption. By optimising the use and maintenance of electrical equipment, significant energy savings can be made as described in the following practices:

- **Optimizing the use of existing household equipment (level 1)**
- **Purchase and use of energy efficient equipment (level 2)**
- **Energy efficient operation of swimming pools (level 1)**
- **Managing hot water production (level 2)**

Optimizing the use of existing household equipment

Topic: Energy conservation

Objective: Upgrading household equipment and optimizing their uses

LEVEL 1

Description

While the installation of energy efficient equipment is a key step in reducing energy consumption, an optimization of the use and maintenance of household equipment can also endue significant energy savings and expand the life cycle of the equipment itself. In hotels and similar establishments offering accommodation, optimizing the use of household equipment primarily concerns kitchen and laundry operations, which are usually very energy intensive.

In kitchens, equipment includes cooking appliances, refrigeration and ventilation, which can represent up to 25% of total hotel energy consumption. However, it is estimated that only about 40% of the consumed energy contributes to kitchen processes, with around 60% of energy being lost as waste heat (Carbon Trust, 2007). Efficient use and regular maintenance and inspection, especially of cooking appliances and refrigeration, can result in energy savings and help reduce the energy wasted.

Laundry operations are also very energy consuming and moreover have an even stronger impact on water consumption. Optimizing the use of laundry equipment can thus generate important cost savings, related to both energy and water costs. One main low-cost action all hotels should take in order to reduce energy consumption of laundry operations, is to encourage the reuse of towels and bed sheets, in order to only wash them once or twice a week, instead of every single day. Most hotels already have a campaign for the reuse of towels in place, however, it is crucial to monitor the effects of the actions taken, in order to ensure that both the clients and the staff are adhering to the guidelines. Most clients adhere to pro-environmental actions taken by the hotel and literature suggests that when encouraged, 70% of clients adhere positively to the reuse of textiles in their rooms.

Steps to follow to implement the practice

- The first step to using household equipment more efficiently, is to train all staff concerned by these measures, specifically kitchen and housekeeping staff, in order to follow guidelines and participate in efficient management practices. Record keeping by the staff is especially important, whether it concerns changing dates for bedding or the inspection of the kitchen equipment. Appointing a member of staff, who is responsible for the monitoring of energy consumption and the implementation of energy efficiency procedures, can help keep track of how well these measures are being followed.
- The clients should be involved in the energy efficiency strategy, in order to raise awareness on how their choices impact energy and water consumption of the hotel. Promoting the reuse of towels and bed sheets is a very simple but effective step to optimizing laundry operations. Clients can be encouraged to participate in such schemes when they are provided with brief and clear information and

instructions. These should be displayed prominently in the room and emphasize the need to conserve water and energy, as well as give information on the reduction in water and energy use achievable through reuse of towels and sheets. Another important factor for success is the installation of adequately sized and easy to use towel rails positioned within easy reach of guests, as hanging towels is how clients can indicate that they do not want their towel to be changed.

- Training and involving the staff allows to undergo a number of operations-based improvements for the efficient operation of kitchen and laundry equipment. This can include:
 - Efficient cooking techniques, such as the use of correct sizes of pots and pans matched to cooking hobs.
 - Use of automatic cut-out function of induction hobs or installation of gas hobs with pot sensors save energy when hobs are left on continuously.
 - For refrigeration, ensure and monitor efficient stocking and use (e.g. not leaving doors open, etc.).
 - Improvement of laundry operations by pre-sorting heavily stained items to minimize reprocessing, counting or weighing items to ensure that washers are loaded to capacity, tracking load sizes in a log to monitor the average loading of the laundry's washers, and consolidating loads and processing them in the largest possible washer.
 - Maximizing mechanical dewatering, which can induce a reduction in total energy consumption of around 5 %.

- Another easy step to take in order to save energy on the use of kitchen and energy equipment is to carefully regulate the temperature of refrigeration and washing. When controlling refrigeration temperature, you should be aware that everyone degree rise results in a 2% energy saving. As a consequence, refrigeration and condensing temperatures should be adjusted during cooler periods. For laundry equipment, reducing wash temperature from 80 °C to 60 °C can result in reducing the energy consumption of your washing operations by up to 25 %.

- Dysfunctional equipment can be the source of a lot of wasted energy, thus regular and thorough maintenance and inspection of all equipment is crucial to ensure that the household equipment is not consuming more energy than it must. In kitchens, you should watch out for leakages in the refrigeration systems, regular inspection to detect and repair refrigerant leaks can reduce energy consumption by around 11%. When inspecting laundry equipment, ensure adequate dryer insulation, check for leaks, moisture sensor operation, duct blockages, and clean lint from filters every hour (if you have not installed an automated lint cleaner).

- For large-scale laundry operations, outsourcing these operations to professional laundry operators can be a cost and energy efficient option for hotels. Through economies of scale, these professional operators can reduce water consumption to only 5-6 litres of water per kg of linen, compared with in excess of 20 litres per kg for non-optimized small-scale laundry operations. It is important to know that the improved efficiency of laundry operations in terms of water and energy consumption achievable by

outsourcing to a professional largely outweigh the energy consumption and air emissions associated with laundry transport, as possible energy savings range from 0.5 to 1.0 kWh per kg laundry.

- Communicate about your achievements to both your staff and to your clients. This will help motivate staff members to further participate in the energy efficiency measures taken. Show them that they are part of the solution and that there is a real impact to their actions. The same is true for clients, who will feel more inclined to cooperate, for example by participating in a towel reuse scheme, when they are shown how much water and energy the hotel is actually saving through the environmental policy.
- You can also consider investing some of the cost savings generated through the efficient use of equipment to fund environmental projects. This is a strong signal to the clients about how serious the hotel is about its environmental strategy. Clients will be more likely to participate in reuse schemes when they believe it is motivated by environmental protection and not cost saving by the hotel.

Stakeholders to involve

- Hotel managers and staff (specifically kitchen and housekeeping staff)
- Experts that can provide information on the maintenance and inspection of equipment
- Technicians that can provide regular maintenance
- Professional laundry providers
- Clients
- Environmental NGOs / charities

Costs aspects

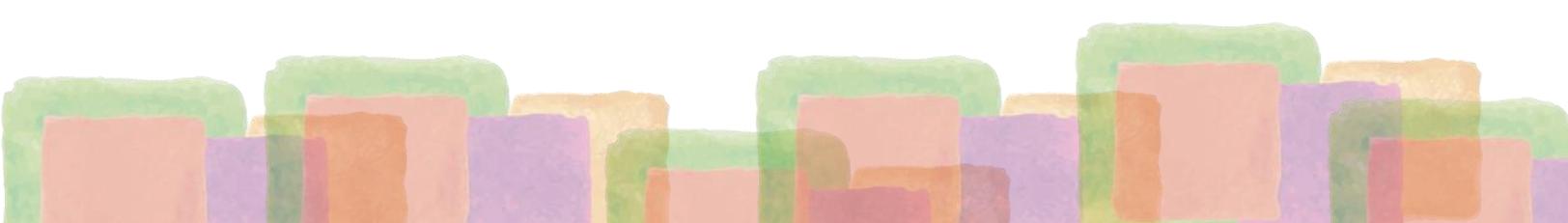
Costs:

- Salary costs related to training of staff and to reinforced maintenance and inspection of equipment.
- For most of the actions described, necessary investments are estimated to be minimal.

Cost savings:

- Towel and linen reuse schemes: If clients are convinced to use their towels and bed linen for two days rather than one day, resource use can be reduced by 50%, which brings economical benefits. For a 100-room hotel, a textile reuse rate of just 5 % is estimated to save almost EUR 2 400 per year (at an estimated laundry service cost of EUR 0.50 per kg).
- Training kitchen staff in efficient management practices is estimated to reduce cooking-related energy consumption by up to 25 %, which has a major impact on the hotel's energy bills.

Monitoring the implementation



- Towel and linen reuse schemes: Monitor the number of towels / bed sheets washed and the accommodation unit's occupancy over a period of time. A good indicator is 0,7 bath towels per guest night (if the indicator is higher, the scheme is not working correctly).
- The environmental indicator for laundry energy efficiency is kWh per kg dried, finished laundry. A good indicator for large hotels is: total process energy consumption for dried and finished laundry products ≤ 0.90 kWh per kg textile for accommodation laundry and ≤ 1.45 kWh per kg textile for restaurant laundry.

Resources

<http://www.greentourism.eu/en/BestPractice/Details/1>

<https://ec.europa.eu/environment/emas/takeagreenstep/pdf/BEMP-7-FINAL.pdf>

<https://www.carbontrust.com/resources/hospitality-sector-energy-saving-guide>

<https://ec.europa.eu/environment/emas/takeagreenstep/pdf/BEMP-5.5-FINAL.pdf>

<https://ec.europa.eu/environment/emas/takeagreenstep/pdf/BEMP-8-FINAL.pdf>

Purchase and use of energy efficient equipment

Topic: Energy conservation

Objective: Upgrading household equipment and optimizing their uses

LEVEL 2

Description

When replacing or upgrading your hotel's old appliances and electronic equipment the EU energy label can guide you to make sure you choose a product with a high energy efficiency class. The rating of the EU energy label was revised in March 2021 and these revised labels will initially apply to four product categories: fridges and freezers, dishwashers, washing machines, and television sets.

Energy efficiency is expressed in terms of energy performance categories, ranked from A to G. The A category corresponds to the highest level of efficiency, while the G category corresponds to the least efficient products. However, with more and more products achieving ratings as A+, A++ or A+++ according to the scale in place until March 2021, the A-G scale has been simplified. This scale is stricter and designed so that very few products are initially able to achieve the “A” rating, leaving space for more efficient products to be included in the future. The most energy efficient products currently on the market will typically now be labelled as “B”, “C” or “D”. A number of new elements will be included on the labels, including a QR link to an EU-wide database, which will allow buyers to find more details about the product.

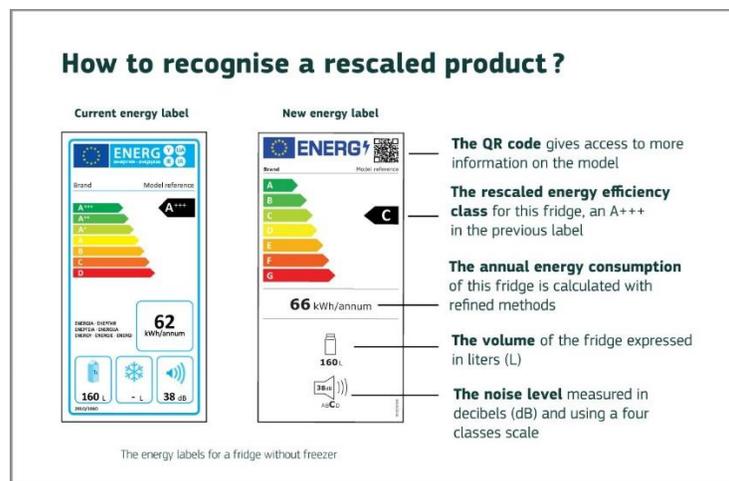


Figure 18 New EU energy label (source: European Commission, 2021)

The purchase of highly efficient food and laundry equipment is particularly important as these services account for a considerable proportion of hotel energy consumption. For example, washing machines and dryers with high efficiency ratings use less electricity and water than conventional equipment without sacrificing performance. Because less water is used, about half as much detergent is required. On average, highest rated washers reduce energy and water bills by using 50% less water and electricity, while efficient dryers use 20% less energy.

For office equipment (computers, printers, scanners, etc.), the EU-US Energy Star label can be used as a reference.

Steps to follow to implement the practice

- A first step is to identify all the appliances in the hotel. It is recommended that a list be drawn up that documents all available information on the existing appliances and equipment. This information can include the energy efficiency class, brand, year of purchase, energy consumption and hours of operation.
- The second step is for the hotel to determine which equipment needs to be replaced and to ensure that the new equipment is of a high energy efficiency class.
- Compare different products before choosing the new equipment you purchase. Remember to look at characteristics of the appliances that go beyond just energy efficiency. Especially when purchasing laundry equipment, compare energy consumption and water consumption: for commercial or professional washing machines, an average efficient water consumption is a maximum of 7 litres per kg of laundry washed.
- When choosing new efficient equipment, you can find helpful information on websites that compare appliances in terms of prices and energy efficiency. This can be especially helpful for the choice of large-scale professional equipment, which, differently to household appliances, does not always feature an energy efficiency rating. In France, the online guide Topten offers specific services for professionals in order to help them with the procurement of efficient equipment.
- When replacing appliances, consider that if you replace one piece of equipment with a more efficient one and at the same time upgrade the associated service (e.g. upgrade to a fridge with a larger capacity), the energy savings may be slightly altered.
- Furthermore, keep in mind that the purchase of efficient equipment alone is not sufficient to optimize the energy consumption of the hotel's appliances. Efficient use and regular maintenance are crucial to reduce waste of energy or water and to improve the life span of the appliances.

Stakeholders to involve

- Hotel managers and staff, especially staff in charge of procurement and the designated hotel energy manager
- External experts, who can provide information when choosing professional equipment

Costs aspects

Costs:

- Staff costs for the time spent on the inspection of existing equipment and the procurement of new efficient equipment

Cost savings:

- Electrical appliances in a high efficiency category are generally a low-risk investment and offer a high return on investment in terms of energy savings.
- Potential energy savings associated with the use of efficient electrical appliances can range from 50% up to 80%.
- However, energy savings can be partially offset if the chosen equipment offers new energy intensive functions or bigger capacities compared to the old equipment.

Monitoring the implementation

- Existence of an up-to-date record of all hotel appliances, their energy consumption and dates of purchase
- Impact on energy consumption of specific systems (kitchens, laundry facilities, etc.) before and after the purchase of efficient equipment

Resources

https://ec.europa.eu/commission/presscorner/detail/en/IP_21_818

<https://www.guidetopten.fr/pro>

https://susproc.jrc.ec.europa.eu/product-bureau/sites/default/files/inline-files/TourismBEMP_0.pdf

Energy efficient operation of swimming pools

Topic: Energy conservation

Objective: Upgrading household equipment and optimizing their uses

LEVEL 1

Description

Swimming pools are a common facility in many hotels and similar establishments, however both indoor and outdoor pools are energy intensive equipment, which can waste a lot of the energy they consume when they are not operated efficiently. A big part of these energy losses are due to evaporation, which affects indoor pools just as much as outdoor pools, representing around 70% of total energy loss. For indoor pools, more than 25% of energy losses are attributed to ventilation, which is required to control the indoor humidity.

Partially, the efficiency of the pool is determined by the way it is constructed. Even the shape of the pool can have an impact on energy consumption, as simple oval or rectangular-shaped pools facilitate water circulation and thus reduce energy consumption of the filtration system. Furthermore, selecting a spot with ideal sun-exposure will also help heat water temperature, especially in the summer. The heating equipment is also crucial to the efficiency of the pool. Heat pumps can be a good option, while they represent a bigger investment initially but offer exceptional efficiency, as for every 1kW consumed by its compressor, it gives off 4 to 5 kW to the pool. Solar panels are also an option to cover a part of the energy consumed for the heating of the pool.

Nevertheless, even for existing pools, there are several simple measures hotel owners can implement in order to operate their swimming pools efficiently and therefore reduce overall energy consumption of their establishment.

Steps to follow to implement the practice

- One simple measure you can take to reduce the energy consumption of your pool is to carefully regulate the water temperature according to the season and the needs of the clients. Each additional degree in water temperature costs between 5 and 10% more consumption. Between 20 and 22°C, the pool is considered to be refreshing, which is ideal for swimming and between 25 and 27°C, the pool temperature is considered comfortable and thus more suited for elderly people and small children. Remember to turn the temperature down or turn off the heater whenever the pool won't be used for several days. This will save energy and money. It is a myth that it takes more energy to heat a pool back up to a desired temperature than you save by lowering the temperature or turning off the heater.
- One of the most efficient measures you can take is to use pool covers when the pool is not being used. Pool covers should be used for both outdoor and indoor pools, as in both cases evaporation is responsible for most energy loss. Covers should be taken off just before swimming and replaced as soon as nobody is using the pool anymore. Many different pool covers are on the market, made of special materials, such as UV-stabilized polyethylene, polypropylene, or vinyl. They can be transparent

or opaque. As for outdoor pools, heat of the sun contributes to the heating needs of the pool, transparent covers may be preferable, as opaque pool covers strongly reduce pool solar energy absorption. Three main pool cover options exist, the choice has an impact on the price and life span of the pool cover:

- Bubble covers are a low-cost option, which are similar to bubble packing material except they use a thicker grade of plastic and have UV inhibitors.
 - Vinyl covers consist of a heavier material and have a longer life expectancy than bubble covers.
 - Automatic covers have permanently mounted reels that automatically cover and uncover the pool at the push of a button. This is the most expensive option, which also consumes additional electricity to unroll the cover.
- For outdoor pools wind is also an important factor which reduces both perceived and actual water temperature. Thus, pools located in windy areas, should have some form of windbreak, either in the form of natural barriers, such as trees and shrubs, or of a fence. The windbreak must be high enough and close enough to the pool that it doesn't create turbulence over the pool, as this will increase evaporation. The windbreak should also be constructed to not shade the pool from the sun, which helps heat it.
 - Regular maintenance and cleaning also ensure that the pool is being operated efficiently, as debris in pool drains will make it harder for the pump and filter will have to move water through the system, thus, consuming more energy. Modern filtration systems require less frequent backwashing, which means the pool does not have to be refilled as often and positively impacts the filtration system's lifespan.

Stakeholders to involve

Hotel managers and staff

Swimming pool service providers

Costs aspects

Costs:

- The costs for the implementation of most of these measures are estimated to be minimal.
- Pool covers vary strongly in price, depending on whether you opt for an automated or manual system. Simple bubble or vinyl covers cost around 10-12 EUR per m² and prices for manual roll-up systems are around 100-200 EUR. Fully automated hard covers are the most expensive option with prices over 2 000 EUR.

Cost savings:



- Use of pool covers is the single most effective means of reducing pool heating costs, which can amount to energy savings of 50-70%.
- Pools can represent around 10% to 15 % of the hotel's water consumption. Reducing evaporation losses can thus induce water savings of up to 30-50%.
- Pool covers also reduce cleaning time by keeping dirt and other debris out of the pool, which also puts less pressure on the filtration system.

Monitoring the implementation

Specifically monitor energy consumption, water consumption and chemical consumption of the pool over time.

Resources

<https://www.energy.gov/energysaver/swimming-pool-covers>

<https://www.piscine-clic.com/news/2012/02/comment-faire-des-economies-denergie-avec-sa-piscine/>

Managing hot water production

Topic: Energy conservation

Objective: Upgrading household equipment and optimizing their uses

LEVEL 2

Description

Efficient hot water management is crucial in reducing both energy and water consumption, thus resulting in significant cost savings for the hotel, as 80% of water costs are attributable to heating (Styles et al., 2013). Overall, domestic hot water accounts for around 17% of overall energy consumption in hotels (HES, 2011), representing the second largest source of energy consumption behind space heating.

Domestic hot water is either produced on demand or stored in a tank to be used when needed. Individual water heaters also exist, which can provide smaller quantities of hot water for a specific point of use. Production and distribution systems for hot water should be monitored in order to reduce heat losses. Moreover, measures for water reduction also contribute to reducing energy consumption related to water heating. Monitoring should aim at efficiently controlling that hot water production matches demand while optimizing the quantity and the temperature of the water supplied.

Apart from the kitchen and the laundry operations, guest's rooms can consume a lot of domestic hot water, as clients may be more inclined to take longer showers or baths when relaxing on vacation and when they do not have to worry about the water bills. Clients should be involved in the hotel's strategy to reduce water consumption, e.g., through instructions and information provided clearly visible in every room and emphasizing the environmental benefits of saving water. Furthermore, efficiently fitting taps and shower heads to control water flow contributes to saving hot water, without reducing the client's comfort.

Steps to follow to implement the practice

- Keeping track of energy consumption related to domestic hot water production is an essential step in order to determine an action plan of optimization and reduction measures. Thus, energy consumed for water heating should be monitored separately from electricity consumed for other systems and appliances of the hotel. An efficient solution is to install sub-meters in guest areas, to isolate energy consumption for domestic hot water used by guests from other demands for hot water, including kitchen, laundry and space heating.
- Another easy step, which can result in important energy savings, is to ensure that water temperature is regulated according to its use. In hotels, domestic hot water may be heated to over 80°C, even though such high temperatures are not necessary for most needs. Water heating temperature should be set around 45°C, which is sufficient for most circumstances that would arise on hotel premises. Periodically, water may be needed to be heated to 60°C in order to clean out the water system and thus reduce the risk of bacteria.

- When replacing appliances like boilers or water tanks, it is recommended to select the most efficient appliances for domestic hot water production in order to reduce heat losses. Appliances should be selected with reference to the mandatory EU energy label, which ranks products on an A to G scale according to their energy efficiency.
- For existing hot water appliances, specifically boilers, water tanks and pipes, energy and water consumption can be reduced through simple insulation of the water distribution system. You can verify the thermal insulation properties of hot water equipment by feeling if pipes and boilers are warm to the touch. They can be insulated with pre-formed insulating foams, which have the advantage of also preventing the risk of freezing in winter. For hot water tanks and boilers, you can buy ready-to-use pre-cut insulation jacket, which are available in different standard sizes. It is recommended to choose high-quality insulation products, preferably those that meet a quality standard or label, as insulation capacity highly depends on the type of material. By reducing heat loss, insulation allows the water temperature to be set lower, saving your hotel energy and money. In addition, insulating water distribution systems allow your guests to get hot water faster when they turn on a tap, thus saving water.
- As mentioned above, guests may be more inclined to take long showers or baths, when staying in a hotel. In order to better control domestic hot water consumption in guests' bathrooms, it is recommended to install thermostatic shower controls. A thermostatic shower valve controls how the hot and cold water supplies mix, adjusting according to the heat of the water itself, thus helping to maintain a steady temperature. Guests will reduce water consumption to adjust temperatures and reduce wasted hot water. Other than potential energy savings, thermostatic showers offer other benefits, such as safety against scalding and better user comfort with the hot-water temperature remaining constant during the shower.
- Similarly, hot water demand can be optimized through the installation of efficient water tap fittings with control mechanisms, such as push-button timers or low-flow water fittings. Push-button timers are especially recommended for common areas, such as showers in changing rooms for pools or for bathroom sinks.
- If you want to go a step further in making domestic hot water production more sustainable, you can use renewable energy sources to cover part of your hot water demand. One common and simple option are solar thermal collectors, which absorb energy from solar radiation and transfer it to heat water via heat exchangers. They are useful, as in many hotels the summer months are also the period of peak occupancy and therefore of peak hot water demand on their premises. Feedback from hotels suggests that solar collectors can cover around 40% of hotel hot water demand (Accor, 2007).

Stakeholders to involve

- Hotel managers and staff, specifically staff responsible for procurement
- The hotel's designated energy manager
- Clients, who should be informed of the actions taken by the hotel and encouraged to save water wherever possible
- External energy experts and craftsmen that can advise on and install thermostatic valves, efficient fittings or solar collectors

Costs aspects

Costs:

- Simple measures, such as monitoring and control of water temperature involve minimal costs, mainly staff costs related to the time spent.
- Insulation for a hot water boiler costs around 20€.
- Costs for thermostatic shower valves range between 50 and 300€ depending on brand and features.
- Installation costs of thermostatic shower valves can range between 30 and 150€ per shower. Installation cost depends on whether additional plumbing work is necessary to create new hot and cold water connections.

Cost savings:

- Reducing domestic hot water consumption (45°C) by 1 m³ results in energy savings of around 52 kWh (Styles et al., 2013).
- 20 mm of insulation reduces heat loss by around 400 kWh per year for every metre of large diameter (5 cm) piping (Styles et al., 2013).
- An insulated hot water tank reduces heat loss by 35-45%, thus resulting in hot water cost savings of 4 to 9%.

Monitoring the implementation

- Separately monitor hot water consumption for guest areas, kitchen, laundry and space heating
- Monitor kWh energy consumed to heat hot water per guest-night
- Benchmark for hot water consumption in guest areas is 3.0 kWh/guest-night

Resources

<https://www.ecolabeltoolbox.com/fr/solutions-techniques/isolation-thermique-des-chaudieres-des-reseaux-et-des-ballons-d-eau-chaude-68>

<https://susproc.jrc.ec.europa.eu/activities/emas/documents/TourismBEMP.pdf>

Objective 4 - Designing building, designing systems

To reduce energy demand in building, implementing architectural passive design is a winning strategy. Building shape, location, orientation, daylighting and natural ventilation has to be taken in account early in the process.

Building and systems have to be designed to upgrade the performance and thus, produce renewable energy for the lower energy demand could allow reaching net zero energy.

This objective will be reached through the following practices:

- **Reduce needs, design building (level 1)**
- **Reduce consumption, efficient systems (level 1)**
- **Manage building, control systems (level 2)**

Reduce needs, design building

Topic: Energy conservation

Objective: Designing building, designing systems

LEVEL 1

Description

To reduce energy demand in building, implementing architectural passive design is a winning strategy. Building shape, location, orientation, daylighting and natural ventilation has to be taken into account early in the process.

Building envelope and systems have to be designed to upgrade the performance and thus, produce renewable energy for the lower energy demand could allow reaching net zero energy.

But these buildings have to be monitored and this with the help of users.

For existing buildings the whole approach process is better, a diagnosis is necessary, an architectural and technical study will determine the key points and the values to respect.

Steps to follow to implement the practice

Building envelope, bioclimatic strategy

- For all new parts or building, set the goals to the pre- project stage, have a whole approach and a passive and bioclimatic strategy
- For existing buildings, make architectural and technical diagnosis with whole approach integrating bioclimatic strategy, set the goals
 - Assess the current performances for existing buildings, air tightness, thermal camera
 - Examine the actual energy concept, all the passive systems (configuration (daylight, exposition and solar gain, fresh air, shadow system, colors,..) and all the positive aspects
 - Examine the characteristics of architectural components and visual analysis, the level of air tightness
- Assess the solar gain (for new project, extension, and refurbishment) and the need for solar protection

Reducing needs is the first step for saving energy. To reduce needs and save energy, the envelope of the building has a great importance. In winter, the heat losses are great if the envelope isn't insulated and if the air is leaking through it. The insulation and the glazing performance mean to increase the thermal resistance of the parois (walls, attic, crawl space, foundation, hot water pipes). Air renewal has to preserve health and well-being but represent also a great thermal loss, with air flow through the fabric of the building. Thermal mass helps to maintain internal conditions and to reduce the demand. For existing buildings a professional energy auditor will examine the envelope, locate thermal bridging, air leaks with an audit point to air sealing, solar gain...

Low carbon passive strategy

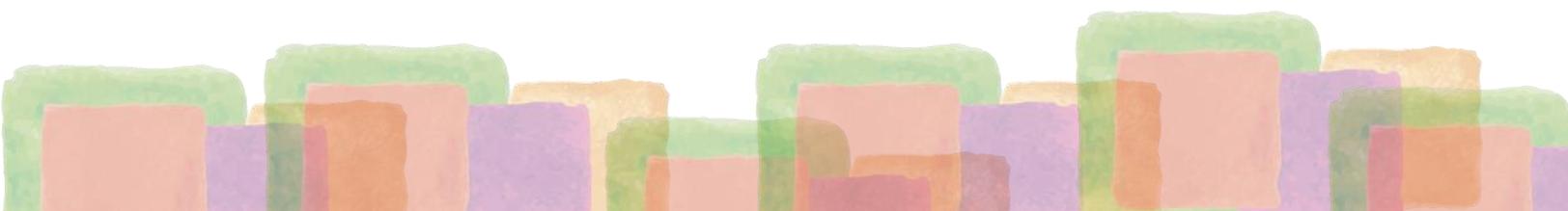
- Optimize indoor thermal hygrothermal, air quality and energy performance
- Sustainable and low carbon design for the building and systems and for interior design
 - First use passive design maximising natural sources of heating (including ECS), cooling and ventilation
 - Configuration and orientation of areas / needs, thermal zoning
 - Daylight and solar harvesting (large windows...)
 - Natural ventilation without any system, cross ventilation – air flow within building
 - Passive cooling
 - free cooling
 - cooling night-time,
 - evaporative cooling
- Insulation of water systems
- Lowering the carbon and energy footprint with a whole life cycle approach for materials, systems and equipments
 - Choose the materials and systems, use biosourced materials like wood, fibers...(structure, insulation, panels, exterior, adjuvants, fibers, plastic composed materials...)
 - Think of the flexibility of new project and the flexibility of new partitions and re usable materials or recycling, raw materials (earth panels...)
 - Re-usable wall panels made from fertilizer waste
 - Take in account the end of life of materials and products
- In existing building, improve envelope, taking in account humidity transfer, study the opportunities for improving envelope and windows, replacing them or setting secondary glazing windows...
- Green structures
 - Vertical gardens
 - Green roof or white roof

Stakeholders to involve

- Hotel technical managers and staff
- External experts to perform an energy audit, contractors
- Project team, architects, engineers
- Clients
- Local authorities

Costs aspects

Cost savings:



- It depends of the project, but the bioclimatic and passive strategy limit system cost and the intervention for maintenance, but with the climate change the buildings have to take into account extreme events like high temperature and to think about pre-integrated capacity for flexibility and switches on off active systems
- Projects needed to minimize first energy needs and consumption to reduce the costs of energy systems, for example PV array and minimize the needs of other energy source.

Monitoring the implementation

For all project, set the goals, and the values (multicriteria) to meet:

- Set the goals to the pre- project stage, have a whole approach and a passive and bioclimatic strategy
 - the outcome goals, concerns and budget (energy efficiency, effective and qualitative management, green standards products and purchases, wellness, costs ...),
 - the constraints and the opportunities (municipality, surroundings ...)
 - the values to be emphasize (cultural and historic, architectural, local materials...),
 - the building's characteristics (Urban or rural context, building type, facades, roofs, structural components, windows and doors); include design elements and decoration;
- Implement further specific methodology if **historic building** (to be listed)
- Identify needs of the building owner and the manager (or future) and the clients hearings
- Set the planning including hearings and diagnosis, set the cooperation and the training
- Respect of health and safety legislation
- Set the control goals
- Set the needs for performance measurements (Hold the crew accountable, communication to the team)
- Appoint a user project referent for the operative project, and identify his tasks (assessment of users and staffs, managers, consultation, following of goals and expectations...)
- Set multicriteria assessment including carbon footprint, zero waste
- Identify the needs for external skills and contractors and set the framework monitoring
- Well prepare the site building specially if occupied site
- Use automated and smart technology, set up schedules, use timers, dimmers and motion sensors
- Control by computer managed system

Resources

<https://ec.europa.eu/environment/emas/takeagreenstep/09-article.html>

<https://www.nogreyarea.me/blog/4-reasons-why-many-hotels-are-switching-to-led-lighting/>

Label effinergy, BEPOS, BEPOS +, RENO, France

Label BBKA, France

Reduce consumption, efficient systems

Topic: Energy conservation

Objective: Designing building, designing systems

LEVEL 1

Description

To reduce energy demand in building, implementing architectural passive design is a winning strategy. Buildings and systems have to be designed to upgrade the performance and thus, produce renewable energy for the lower energy demand could allow reaching net zero energy.

For existing buildings the whole approach process is better, a diagnosis is necessary, an architectural and technical study will determine the key points; it will be completed with users' interviews to understand well the operative situation, occupancy and the management and maintenance.

Steps to follow to implement the practice

Optimize indoor thermal hygrothermal, air quality and energy performance

The building performance is about energy and carbon issues, and also about indoor thermal hygrothermal, air comfort and quality for the building and for the users. Ventilation is of great importance for health and energy saving.

- Pay attention to performance of ventilation systems for hygienic reasons and for building structure (ventilation rates), make the point on health regulations and about interactions between air quality, ventilation, energy performance, summer comfort, make the point about different uses which can impact the consumption
- Pay attention on site for ventilation system, and favour ventilators with various speed for several areas (motion sensors or CO2 - varios speed)
- In existing buildings make the point about leakages on ventilation system, it could double the consumption
- Favour low energy and carbon cooling and heating, hot water systems
 - Heat recovery ventilation,
 - Solar thermal system,
 - Ground tube heat exchanger, ground water heat exchange (reduction in CO2 emissions, and energy saving)
 - Heat pump
- Examine heat storage system allowing to stock thermal energy (heat or cool) as water tank, latent heat storage, aquifer storage..., in complement to hereinabove systems
- Assist passive design when necessary
 - Hybrid ventilation system
 - Ceiling fans

Efficient systems

Active and passive systems are combined to ensure quality and performance, so the monitoring of all is important, but also to take in account all the components in life cycle analysis.

- Favour whole cost global approach and life cycle analysis of all systems and all components of the systems, as for back-up systems for renewable energies (e.g. storage of the electricity generated...)
- Support bioclimatic and passive design through operations and maintenance, and to obtain energy goals
- Efficient systems for hot water, heating, cooling, ventilation and energy regulation
 - Choose efficient systems and components, efficient lighting and air conditioning systems are very important, and set controlled
 - Pay attention about regulation about equipments and systems
 - HVAC systems, running all day and night, can account for up to 40% of a building's energy use. Newer HVAC systems are capable of using HVAC zoning, which controls the temperature for specific areas with specific parameters for temperature...
 - For HVAC system, selection of efficient models or individual components may optimize the overall efficiency:
 - Gas and oil-fired boilers and individual room air-conditioning units: an 'A' rated European Energy Label, should be sought for all new appliances. Moreover, the information should be sought on full and part load efficiency
 - Variable speed drive motors, electric motors whose speed is controlled via the power supply in accordance with demand, reducing energy consumption up to 40% compared with standard motors operating at one (full) speed
 - Direct drive pumps and fans require less energy than belt-driven versions
 - Pressure-independent control valves ensure the correct rate of flow through the cooling and heating systems, irrespective of system pressure variations. Installing these valves at critical points in the HVAC system can reduce energy consumption by facilitating a more accurate control of HVAC systems
 - Compressors are the main draw of energy for standard cooling systems. It is important to specify the most efficient compressors available. For example, variable speed compressors are more efficient than single-speed compressors for variable load applications. In addition, some newer compressor designs incorporate magnetic bearings instead of lubricating oil, with claimed energy-efficiency benefits of 35 - 50%.
 - The heat released by compressors used for cooling, could be recovered for DHW heating.
- Heat recovery:
 - Combined heating and power (CHP), captures the extra heat as hotel power systems are generating electricity. CHP units will use that thermal energy to heat-up the facility, reducing heating costs significantly; it can also be used to generate more electricity with CHP units. CHP units work well with tall buildings, like hotels, because they reduce the energy that the boiler system has to generate. The installation time for a CHP system is around 30 days, and its expected return on investment is between 4 to 5 years.
 - Use automated and smart technology, set up schedules, use timers, dimmers and motion sensors
 - Control by computer managed system

Stakeholders to involve

- Technical managers and staff
- External experts to perform an energy audit, contractors
- Project team, architects, designers, engineers, installers

Costs aspects

Cost savings: the global approach, its planning, the different objectives of the project and the associated costs will lead to arbitrate the options and the budgetary choices.

Monitoring the implementation

- Identify the needs for external skills and contractors
- Make a plan (identify design and uses optimizations, objectives, study energy demand and supply for best outcomes on whole energies and global cost saving including environmental and health issues, identify means for monitoring, maintenance, and building life cycle, identify users behaviors, in existing building make an architectural, uses, technical and environmental examination...)
- Set multi criteria assessment including carbon footprint, zero waste, use whole approach lifecycle analysis
- Take in account health parameters such as equipment noise
- Appoint a user project referent for the operative project, and identify his tasks (assessment of users and staff, managers, consultation, following of goals and expectations...)
- Use Thermal and hygrothermal modelling (STD)
- Use HVAC building simulations
- Inform, train manager, staff and users about objectives, about the conditions for the best functioning of the passive and active systems and the gains for all

Resources

<https://ec.europa.eu/environment/emas/takeagreenstep/09-article.html>

<https://www.nogreyarea.me/blog/4-reasons-why-many-hotels-are-switching-to-led-lighting/>

Manage building, control systems

Topic: Energy conservation

Objective: Designing building, designing systems

LEVEL 2

Description

Reducing energy demand in building and implementing architectural passive design is a winning strategy. Building and systems have to be designed to upgrade the performance and thus, produce renewable energy for the lower energy demand could allow reaching net zero energy. For existing buildings or camps the whole approach process is better, a diagnosis study which systems or what equipment work inefficiently or/and cost too much and what are the uses and the desired areas' comfort. All buildings, hotels or each construction, amenities or lighting systems, do have to optimize and manage regulation. Building automation systems allows monitoring energy usage, air quality and comfort for guests, as fire emergency and security systems. But in buildings, energy systems and regulation systems for the temperature, humidity and quality of air could take up a huge percentage of the operative budget. Moreover, the latter doesn't prevent from discomfort due to uneven temperatures or poor indoor air quality. With the climate change, flexibility and regulation in real time are a great challenge.

Steps to follow to implement the practice

Make a control plan

Reduce needs is the first step for saving energy, the envelope have a great importance. In winter, the heat losses are great if the envelope isn't insulated and if the air is leaking through it. To well regulate building and with energy and cost saving, passive systems are used with active systems, as the envelope has to be carefully examined and equipments selected with best performances like for HVAC system.

More and more, energy for construction and maintenance and end of life is being taken into account. So the whole life cycle is considered for the whole building and systems, and each equipments (cf. "Reduce needs, design building" & "Reduce consumption, efficient systems").

Choose control systems

- Using automated and smart technology, set up schedules, using timers, dimmers and motion sensors
- HVAC controlled system

A centralized energy management system uses a central controller that can operate all HVAC and heater fans, ducts, and appliances. The system relies on strategically placed door and window sensors, system arming stations, and system-controlled thermostats to make energy management decisions. It can implement intelligent energy practices such as shutting down air conditioners in rooms with open windows or shutting down heating units based on room occupancy and the status of windows/doors. It can reduce utility costs and greenhouse gas emissions.

- Smart lighting control systems

They become popular in the hospitality industry as they do not only provide comfort to guests but also reduce significant costs. A smart lighting control system, correctly specified, installed, and maintained, provides programmable control of all exterior and interior lighting, and creates an atmosphere that attracts repeat guests for dining, entertainment, and accommodation.

- Capacity to regulate in rooms

Guests are more likely to return for another stay when they can customize their room temperature. However, this may increase energy costs. Therefore, it is a challenging issue for hotels and similar accommodation.

Although the concept of energy management is not new – housekeepers have been turning down thermostat dials for decades, but improvements in technology have created sophisticated systems that can reduce unnecessary guestroom consumption by between 40-60% which can translate to as much as 20% reduction on a hotel's total energy bill. For most hoteliers, this translates into tens of thousands of dollars per year. Smart thermostats work by using motion and/or heat sensors to detect occupancy in a room. When guests leave the room during the day, the thermostats allow the HVAC unit to “setback”, or drift away from the temperature the guest left it at while the room was occupied. When guests return to their rooms, the units quickly recover to the desired temperature.

- Building management systems (BMS)

BMS is computer controlled, many systems could be automated as HVAC, fans, heat systems, emergency and security systems, elevator, water system, lighting system. It may connect the functioning to the weather, include dysfunctioning alerts and include planning for maintenance.

It's important to define the desired uses, the need for data, the financial and organisational means.

Stakeholders to involve

- Technical managers and staff
- External experts to perform an energy audit, contractors
- Project team, architects, engineers
- Specialist operatives
- Clients

Costs aspects

Building management systems are expensive (equipment and installation) at the beginning, and labor costs are additional for maintenance and follow up; They need energy to function, mostly electric power; But it has many advantages, gain of time, programming but also exploitation advantages (assessment, prevention, alert, devices failures ...)

The services depend on the collected data and many equipments are necessary, like different sensors for temperature, humidity, pressure, airflow sensors, liquid level sensors, and controllers.

Cost savings:

- It depends of the whole system and the set up and maintenance, the quality on-site and of installation and starting adjustments, the quality of organisation of maintenance

Monitoring the implementation

- Define the managing modalities, the pilot and control systems, the management for operation and maintenance
- Make a control plan to define objectives and guidelines, and organize the process to follow up, to act when checking discrepancies in objectives
- At planning stage, different solutions would be examined with global cost analysis, on whole life cycle, and for the performance requirements
- Adapt solutions to the right budget and to the human and organisational context
- Appoint a dedicated staff or external contractor
- Training employees

Resources

<https://ec.europa.eu/environment/emas/takeagreenstep/09-article.html>

<https://www.nogreyarea.me/blog/4-reasons-why-many-hotels-are-switching-to-led-lighting/>

<https://glsco.com/2017/03/06/energy-management-thermostats-for-hotels/>

<https://challenge.abettercity.org/toolkits/emissions-reduction-toolkits/energy-efficiency/energy-systems>

<https://www.buildtrack.in/news/lucknows-ramada-hotel-adopts-centralized-lighting-control-buildtrack-banquet-halls/>

Objective 5 - Diversifying your energy sources

Energy diversification means using different energy sources, suppliers and transportation routes to reduce dependence on a single resource or provider. A company that diversifies its energy mix contribute to sustainable development and strengthens its energy security.

To reach this objective the following practices are proposed:

- **Switching to a green energy supplier (level 1)**
- **Evaluate the potential for local renewable energy production (level 2)**
- **Installation of heat recovery systems (level 2)**
- **Local solar energy production (level 2)**

Switching to a green energy supplier

Topic: Energy conservation

Objective: Diversifying your energy sources

LEVEL 1

Description

When speaking of “green” energy, we refer to electricity, gas or heat that is produced exclusively from renewable energy sources, such as solar, wind, hydraulic, geothermal or biomass energy. For an electricity offer to be “green”, the supplier must guarantee that a quantity of electricity from renewable sources equivalent to the consumption of the subscribed customers has been fed into the grid.

In order to certify the origin of the electricity supplied by any renewable energy production unit, the European Union has set up a mechanism for the certification of the Guarantee of Origin (GO) in all its Member States. In most Member States, a National Registry for Guarantees of Origin has been designated to oversee the mechanism. In France, the registry is managed by Powernext, in Italy by GSE and in Spain by the National Commission for Markets and Competition (CNMC). Guarantees of Origin trace green energy from the producer to the final consumer, thereby ensuring transparency for end consumers.

Some energy suppliers have a more local and direct approach by purchasing the electricity and Guarantees of Origin that they then sell on, from the same local renewable electricity producer (Carbone 4, 2018) or by obtaining electricity from their own production sites. These are often the most committed suppliers, some of which function as cooperatives, as is the case of the French supplier Enercoop. By purchasing electricity at a price above the market price, they help guarantee a stable income for the renewable electricity producer. This guarantees that the energy supplied is being produced locally and not being fed into the grid somewhere else in Europe.

However, thanks to the Guarantee of Origin mechanism, you do not necessarily have to switch from your current supplier to a “green” supplier as most energy suppliers now have “green” energy offers. When subscribing to a new contract, it is essential to take the time to review the energy needs of your hotel and to adapt the contract accordingly.

By subscribing to a renewable energy offer you are supporting the development of renewable energies in Europe.

Steps to follow to implement the practice

- If you wish to stay with your current energy supplier but switch to a renewable energy offer, you can find out whether an offer is entirely or partially “green” by consulting the general terms and conditions of the contract where the share of energy from renewable sources is indicated.
- Subscribing to a green energy offer can be more expensive than a conventional contract. Before deciding which offer to subscribe to, it is therefore relevant to take a look at your current energy contract

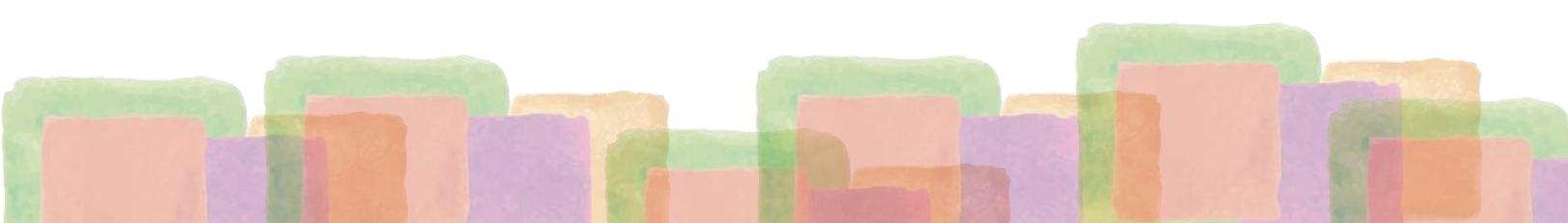
and to ask yourself about the real energy needs of the hotel. One important decision concerns the contract power, which determines the maximum amount of electricity that can be used simultaneously by electrical equipment and is expressed in kilovolt-ampere (kVA). To calculate the maximum and minimum power needed, you can measure the power of all your electrical appliances, then consider which appliances will work simultaneously and add up the power of these appliances. Reducing the maximum contract power according to your needs will save money on your electricity contract. Changing your energy supplier is also a good opportunity to identify sources of wasted energy and to eliminate them to reduce your electricity bills.

- When choosing a “green” energy supplier, it is recommended to use an online service to compare the different electricity and gas offers and suppliers on the market. They offer information on subscription cost, cost of consumption and characteristics of the different energy suppliers, including “green” energy offers. While there are many websites that offer these services online, most Member States have set up an “official” site to compare energy offers, which work in partnership with the energy or another national agency.
 - In France: <https://comparateur.energie-info.fr/compte/profil>
 - In Spain: <https://comparador.cnmc.gob.es/>
 - In Italy: <https://www.ilportaleofferte.it/portaleOfferte/>
- Once you have chosen the offer that best fits the needs of your hotel, changing your energy supplier is free of charge. The new supplier usually helps you cancel your old contract.
- Your energy bills include all relevant information that helps you keep track of the part of renewable energies fed into the grid. Your bill provides an overview of the sources of electricity production related to the offers that your supplier has marketed during the previous year and the share of electricity from renewable sources is also indicated on the bill.
- Finally, you should communicate about your choice of subscribing to a 100% renewable energy offer to your guests. This will be a selling point for clients but also contributes to providing visibility to “green” energy suppliers, thus encouraging others to think about the sources of their energy supply.

Stakeholders to involve

- Hotel managers
- Designated energy manager of the hotel
- Staff responsible for procurement
- Clients

Costs aspects



Costs:

- Depend on the terms and conditions of the offer. Electricity from 100% renewable energy suppliers can often be slightly more expensive than conventional offers.

Cost savings:

- Taking the time to analyse your hotel's needs and optimizing your contract options can reduce costs when subscribing to a new energy contract.

Monitoring the implementation

- Electricity consumption of appliances in kWh. Calculate minimum and maximum power necessary for the functioning of your hotel.
- Your electricity bill allows you to keep track of the sources of energy production and the share of renewable energy marketed by your supplier.

Resources

http://www.carbone4.com/wp-content/uploads/2018/11/Publication-Electricite-verte_EN.pdf

https://www.energie-info.fr/fiche_pratique/quest-ce-quune-offre-deelectricite-verte/

<https://comparateur.energie-info.fr/compte/profil>

<https://comparador.cnmc.gob.es/>

<https://www.ilportaleofferte.it/portaleOfferte/>

Evaluate the potential for local renewable energy production

Topic: Energy conservation

Objective: Diversifying your energy sources

LEVEL 2

Description

On-site exploitation of renewable energy sources is a feasible option for many hotels, but the recommended local renewable energy production can depend on the geographic situation of the establishment and on how its activities are spread out throughout the year (stable over the seasons or important variations between peak and off-seasons).

On-site exploitation of renewable energies also gives visibility to your strategy for sustainability, as it can be easily identified by clients and can be a marketing advantage for your establishment.

The most common types of local renewable energy production adapted to hotels are the following:

- **Hot water production with solar thermal:** Solar collectors are installed on a sun-exposed surface and connected to a hydraulic circuit with hot water storage tanks. Solar thermal systems are a recommended option for hotels, as they are easy to install, do not require extensive maintenance and have a lifespan of around 30 years. They also have the big advantage of being more than 90% recyclable. The part of energy for domestic hot water production, which can be covered by solar thermal depends on the surfaces available for the solar collectors. For hotels situated in temperate climate zones, to cover 50% of the annual domestic hot water needs of a 40-room hotel, you require about 40 m² of solar collectors.
- **Electricity generation with solar photovoltaics:** The installation of photovoltaic panels converts sunlight into electricity via a solar inverter and which can be fed into the electricity grid or into a local, off-grid electrical network. Panels can be placed on sun-exposed roofs, facades, sunshades or shades. In terms of lifespan, manufacturers generally guarantee a maximum efficiency reduction of 20% after 15 years of use for the panels, while the inverters have an estimated lifespan of 10 years.
- **Hot water production and heating with biomass:** The installation of a wood or pellet boiler, which uses wood as a fuel for space and domestic hot water heating. Biomass boilers represent a rather higher initial investment cost compared to solar energy and is mostly recommended for hotels suited to non-urban areas, as sufficient space is required to store the boiler and the wood. Establishments located in more rural areas can have direct access to a local wood supply and furthermore combustion emissions pose a lower health risk in less dense areas.

On-site exploitation of other renewable energy sources, such as wind, hydraulic or geothermal energy, may be possible in specific locations but are not explored in detail as they do not present a feasible option for all establishments. When carrying out a feasibility study for the installation of renewable energy production systems, get assistance from an energy expert or your local energy agency, which will help you choose the technical solutions most suited for your hotel.

Steps to follow to implement the practice

- Begin by identifying the energy needs of your hotel which could partially or totally be covered by renewable energy sources. It is recommended that you ask yourself whether you need a renewable

energy source to produce electricity, domestic hot water or space heating. It is also important to have information on how the energy consumption of the establishment related to these needs fluctuates throughout the year. Solar panels can be an option to cover partial electricity demand if summer is the hotel's peak season, while other systems, such as solar thermal, are more adapted to a stable energy demand.

- Based on this initial needs assessment, it is crucial to always carry out a feasibility study before deciding what installation to choose. This study should be carried out with an energy expert, such services may be supplied by your energy supplier or by your local or regional energy agency. The feasibility study can help you identify the renewable energy sources most adapted to the needs of your establishment and it helps you size the installation according to your needs. Oversized systems will not work properly throughout the year. For example, if your solar thermal system is oversized in relation to the actual domestic hot water needs or underused during the summer period, panels will overheat. It is recommended to aim for a reasonable coverage rate of domestic hot water needs by the solar energy produced, which should be less than 80% in July and August.
- Draft a financing plan for your installation. The feasibility study will provide you with information on financing solutions and potential administrative formalities. Subsidies may be available at the national or at a regional or local level. Your local or regional energy agency or the competent local authority can provide information on the subsidies or other financing solutions you may be able to benefit from.
- Select the companies to carry out the installation. Again, the feasibility study will help you to include relevant specifications when consulting companies. In some countries, companies will have certifications to prove the quality of their works and their experience in the field of energy retrofit and renewable energies. In France, many companies are labelled "*Reconnu garant de l'environnement*", working with a certified company may be a requirement when benefitting from public subsidies. You are also responsible for monitoring the site and verifying and validating the delivered installation. An energy expert can help you to make sure that the system has been installed according to the specifications of the feasibility study.
- Finally, a member of staff should receive training in order to be in charge of the operation and maintenance of the renewable energy production system. Regular maintenance is crucial to ensure that the system is functioning correctly and to maximize the lifespan of the equipment.
- Communicate about your on-site renewable energy exploitation to clients. Make sure that clients are made aware of the type of renewable energy installation used in your hotel and communicate about how much of your energy needs are covered by the on-site renewable energy system.

Stakeholders to involve

- Hotel staff (maintenance staff and staff responsible for procurement) and managers
- Designated hotel energy manager
- External energy experts
- Local authorities or local/regional energy and climate agencies
- Clients

Costs aspects

Costs:

- Costs vary heavily depending on the type and size of installations.
- Solar thermal panels are generally a very cost-efficient option, especially in sunny climates, as initial investment costs are low. To cover 50% of the annual domestic hot water needs of a 40-room hotel with around 40 m² of usable surface area solar collectors, the cost is estimated around 1,200 € before tax/m² of useful panel area, including piping, inverter and storage (ARENE, 2018).

Cost savings:

- When replacing an oil fuelled boiler by a biomass boiler, the cost savings will be significant.
- In sunny climates, solar thermal collectors can cover between 50% and 80% of heating needs for domestic hot water.

Monitoring the implementation

- When comparing the energy performance of renewable energy systems and conventional energy sources, the unit of measurement is expressed as primary energy ratios (PERs).
- Lifecycle greenhouse gas emissions, expressed per kWh heat or electricity produced, is another environmental indicator of renewable energy performance that is useful for sustainability reporting.
- Regular (at least monthly) meter reading is crucial to monitor the functioning of the system.
- Monitoring should include: kWh of electricity produced by PV panels, litres of domestic hot water produced by solar thermal and consumption of wood or pellets for biomass boilers.
- Monitor the share of overall energy consumption provided by on-site renewable energy exploitation

Resources

<http://www.hotelpower.ch/fr/mesures/detail/les-%C3%A9nergies-renouvelables-dans-l039h%C3%B4tellerie>

<https://www.ecolabeltoolbox.com/fr/solutions-techniques/solaire-photovoltaique-72-72>

https://susproc.jrc.ec.europa.eu/product-bureau/sites/default/files/inline-files/TourismBEMP_0.pdf

ARENE (2018), “La rénovation énergétique des hôtels: Des solutions opérationnelles pour modifier en profondeur le fonctionnement énergétique des établissements”.

ADEME (2021), “Hébergeurs touristiques: Quelles actions mettre en place pour un tourisme durable?”.

Installation of heat recovery systems

Topic: Energy conservation

Objective: Diversifying your energy sources

LEVEL 2

Description

Heat recovery systems harness waste heat rejected from refrigeration, air conditioning systems or wastewater in order to heat domestic hot water through a heat exchanger: the hot wastewater - or hot refrigerant gas - cools and the cold freshwater heats up. Therefore, heat recovery is a viable option to reduce energy consumption in almost any hotel, as long as there is equipment that gives off heat and a need for domestic hot water.

It is recommended to install heat recovery systems in the establishment that concern at least one or two of the following categories with a potential for heat recovery: refrigeration systems, ventilators and air conditioning, washing machines and dryers, dishwashers, swimming pools or sanitary wastewater (for example from showers). Generally speaking, all economically viable opportunities for heat recovery should be exploited. While the installation of such systems is an investment, on most equipment heat recovery can reduce the heating energy required by at least 30%.

For the transfer of wastewater heat to freshwater, a basic heat exchanger with a corrugated pipe system is recommended, as corrugated pipes are more efficient and have longer running times and higher tolerance to soiled water compared to smooth surface pipes. Corrugated pipes prevent any residue from the wastewater to stick to the pipe walls and thus impact the heat exchange. This technology is relevant for large-scale dishwashers and washing machines especially. On top of wastewater from washing machines, tumble dryer exhaust can also be recovered to heat freshwater.

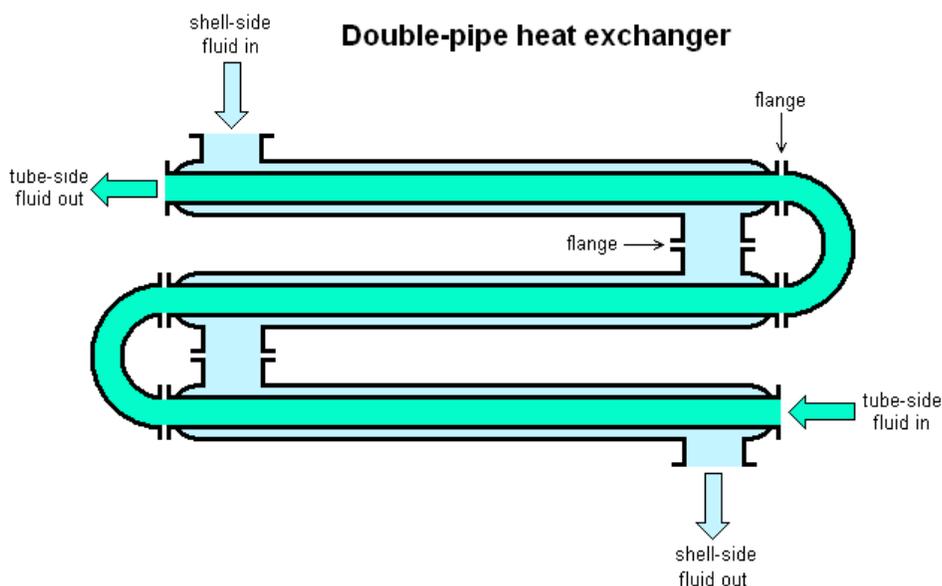


Figure 19 Double-pipe heat exchanger (source: Wikimedia Commons)

In refrigeration and air conditioning systems, heat can be harnessed in form of gas instead of water. The waste heat rejected from this equipment is intercepted and the hot gas is passed through a heat exchanger to heat

freshwater. For air-conditioning, double-flow ventilation systems are recommended wherever economically viable. While double-flow ventilation is quite costly compared to most single flow ventilation systems, it offers the possibility of heat recovery, which will reduce overall energy costs for the hotel.

Finally, heat recovery systems can be installed in the guests' showers in order to preheat clean water for the shower valve or for the domestic hot water generator. However, this requires that your hotel is equipped with separate wastewater disposal systems for blackwater (heavily soiled and contaminated wastewater coming from the toilet for example) and greywater (less soiled wastewater from showers, bathtubs or washing machines). Only greywater can be used for heat recovery. Heat recovery units can be installed either directly under the shower drain or at the foot of the shower column. One heat exchanger can connect several showers but there should always only be a short distance separating each shower from the heat exchanger, as otherwise there is a risk of harmful bacteria development in the system.

Steps to follow to implement the practice

- If you are considering carrying out renovation work or replacing your laundry and/or kitchen equipment (washing machines, dryers, refrigeration systems, dishwashers, etc.), these are ideal opportunities to think about the installation of heat recovery systems. When procuring new equipment, heat recovery is a feature you should include in the efficiency criteria for the appliances you are looking for. Smaller heat exchange units in guest rooms, mostly don't even need larger renovation works, as many solutions are easy to install.
- It is recommended to always begin with a feasibility study to determine the opportunities for heat recovery in the hotel and evaluate their technical and economic feasibility. Such a feasibility study can take place in the context of a larger energy audit of the hotel, conducted by an external energy expert. Many energy suppliers also offer services, which include energy audits to help reduce energy consumption or to plan renovation works.
- The feasibility study will show you where the installment of heat recovery systems is feasible, which will also determine what equipment and systems will be concerned by the heat recovery systems. For laundry spaces and kitchens, heat recovery should be considered as part of the general heating and ventilation system of these spaces. Heat exchangers can contribute to better distribute heat in the room and thus reduce heating or ventilation needs. These systems should thus also be adapted accordingly. For washing machines and dishwashers incorporating a heat pump combined with heat recovery is the most efficient solution and can reduce energy consumption for water heating by 75%.
- Have a professional install the heat recovery systems that you have chosen. Be sure to check in advance that the wastewater disposal system of the building separates greywater and blackwater, this is very important as only greywater can be used for heat recovery. During the installation, make sure that the distance between the equipment generating hot wastewater and the heat exchanger is minimized. This reduces the risk of harmful bacteria development, such as legionella bacteria.
- Once the heat recovery system is installed, pay special attention to maintenance and temperature control. For example, wastewater used to heat freshwater for laundry should not exceed 40°C to avoid the fixing of stains in fabrics. As much time as possible should be provided for the heat exchange.

Stakeholders to involve

- Hotel management
- Staff responsible for procurement and designated hotel energy manager
- External energy experts
- Energy management contact person of your energy supplier
- Professional plumber, other technicians for installation

Costs aspects

Costs:

- Costs vary strongly depending on the heat recovery system installed.
 - The partial modification of a ventilation system to install a heat recovery unit is estimated around 6.500€.
 - The purchase and installation of a heat recovery unit for guest bathrooms is estimated at 800€ / shower.
 - The purchase of a heat recovery for a large tunnel dishwasher is estimated at 3.500€.

Cost savings:

- Energy saved by heat recovery depends on the size of the equipment concerned and the efficiency of heat recovery. However, energy savings for different equipment are estimated as following:
 - Heat recovery from refrigeration systems with a capacity to heat freshwater by 15°C can reduce heating energy needs by 30%.
 - Heat recovery in showers can reduce domestic hot water consumption by up to 30%.
 - Heat recovery in dishwashers can reduce energy consumption for water heating by around 40%.
- Overall, heat recovery often can also reduce ventilation needs in laundries or kitchens by reducing the heat rejected into the spaces where the equipment is installed.

Monitoring the implementation

- Install submeters to separately monitor energy consumption related to the systems concerned by heat recovery units: laundry, kitchen, guest bathrooms.
- Monitor domestic hot water production to check on the hot water saved through heat recovery.

Resources

<https://www.ecolabeltoolbox.com/en/solutions-techniques/efficient-ventilation-systems-70>

<https://www.ademe.fr/sites/default/files/assets/documents/eas-recuperation-chaleur-hotel-polynesie-2018-010591.pdf>

http://dkheatrecovery.co.uk/resources/files/d58b1c13109e41ffb495d7e29eed124d/dk_beginners_guide_to_heat_recovery_from_refrigeration.pdf

https://susproc.jrc.ec.europa.eu/product-bureau/sites/default/files/inline-files/TourismBEMP_0.pdf

Local solar energy production

Topic: Energy conservation

Objective: Diversifying your energy sources

LEVEL 2

Description

On-site exploitation of solar energy is a feasible option for many hotels, which is especially cost-effective for establishments in southern Europe where sunlight is an abundant resource. Solar energy can be harnessed either to produce electricity through photovoltaic panels or to heat hot domestic water through solar thermal collectors.

Photovoltaic panels are connected to an inverter, which transforms sunlight into electricity, while solar collectors are connected to a hydraulic circuit with the hotel's hot water storage tanks. Solar collectors have a lifespan of around 30 years, while photovoltaic panels generally tend to become less efficient after about 15 years.

Photovoltaic production capacity depends on solar irradiation, thus on the location and sun exposure of your hotel. The following map gives an overview of solar electricity production capacity in the different European countries.

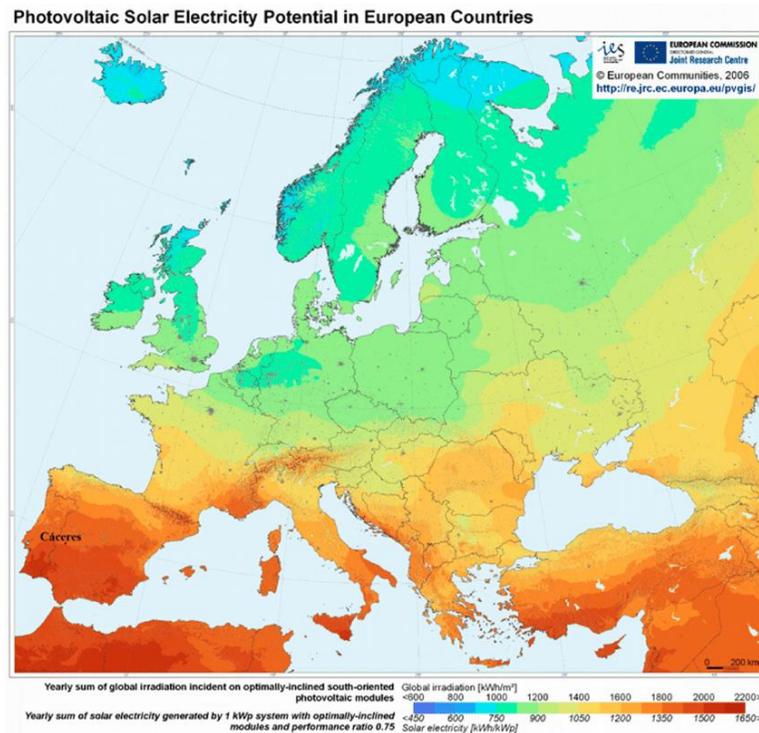


Figure 20 Solar electricity potential in European Countries (source: European Communities, 2006)

However, production capacity also depends on where modules will be installed on the building and how they are inclined in respect to the solar irradiation. In France for example, modules should ideally face directly south and be inclined at an average of 30 degrees to the horizontal to maximize energy production over the year. The following table provides an overview of how inclination of the modules impacts the expected energy output by indicating the correction factor to be applied to the expected output of the system depending on its position and inclination.

Correction coefficients for a given inclination and position				
Position	Inclination			
	0°	30°	60°	90°
East	0.93	0.90	0.78	0.55
South-east	0.93	0.96	0.88	0.66
South	0.93	1.00	0.91	0.68
South-west	0.93	0.96	0.88	0.68
West	0.93	0.90	0.78	0.55

Figure 21 Correction coefficients for solar panels (source: photovoltaïque.info)

As a consequence, solar energy potential will depend on the architecture and structure of your building and its roof, which is the optimal space to install solar panels. If your hotel is located in a very urban environment or a historical city centre, there may be limitations to the installations possible on buildings protected for their historical or architectural value.

Some local authorities have developed interactive maps, which help businesses estimate the solar energy potential of their buildings, according to location and architectural characteristics. The regional council of the French Ile-de-France has such a tool, which can be accessed freely in its open source database: <https://monpotentielsolaire.smartidf.services/fr>

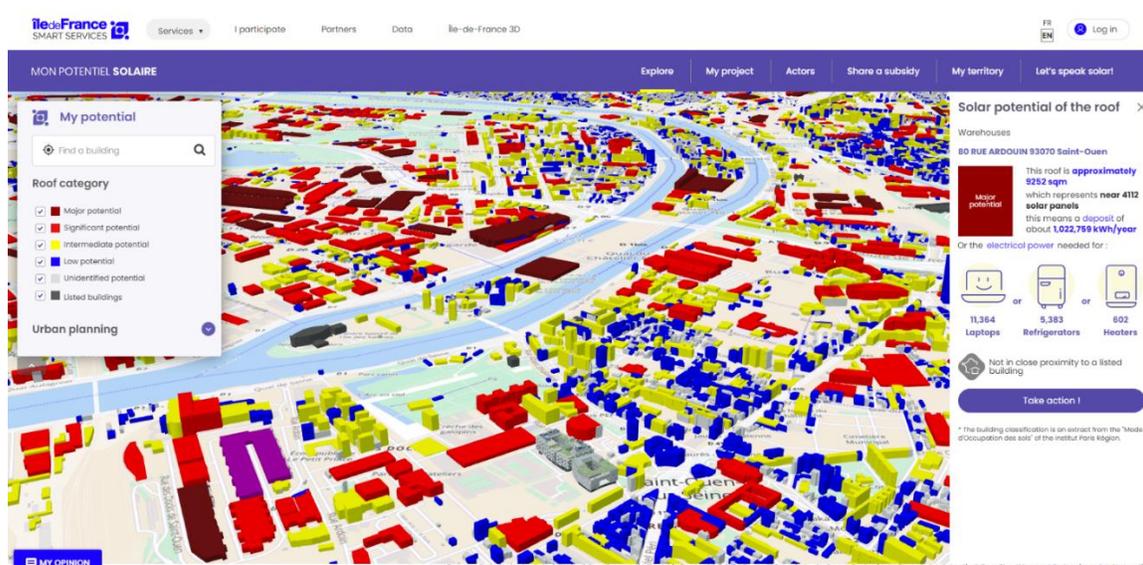


Figure 22 Solar energy potential Île-de-France Region (source: Île-de-France Smart Services, 2021)

Steps to follow to implement the practice

- Begin by identifying the energy needs of your hotel which could partially or totally be covered by solar energy. Photovoltaic panels will produce electricity, while solar collectors will reduce energy needs for domestic hot water production. Depending on the location of the establishment and the space available for installation, photovoltaic panels will probably not be able to cover the total electricity demand of the hotel. It is recommended to use solar power to cover electricity consumption of the hotel's common areas (hallways, lobby, elevators, dining halls, etc.), rather than guest rooms, where electricity consumption is more difficult to predict and is prone to fluctuations.
- Based on this initial needs assessment, it is crucial to always carry out a feasibility study before deciding what installation to choose. This study should be carried out with an energy expert, such services may be supplied by your energy supplier or by your local or regional energy agency. The feasibility study helps you size the installation according to your needs. Oversized systems will not work properly throughout the year. For example, if your solar thermal system is oversized in relation to the actual domestic hot water needs or underused during the summer period, panels will overheat. It is recommended to aim for a reasonable coverage rate of domestic hot water needs by the solar energy produced, which should be less than 80% in July and August.

An easy calculation to roughly estimate the surface of photovoltaic panels needed to cover part of the hotel's electricity demand is the following:

$$\frac{[\text{Surface of the hotel in m}^2] \times [\text{Average electricity consumption in kWh/m}^2/\text{year}]}{[\text{number of sunshine hours/year}] = \text{nominal power to be installed in kW}_p$$

Assuming that the average electricity consumption of a hotel is situated at 240 kWh/m²/year, for a hotel with a surface of 1000 m² located in Ile-de-France, where there is an average of 1000 sunshine hours/year, the nominal power needed to cover 25% of electricity demand is: 1000 m² x (240 kWh/m²/year x 0.25) / 1000 = **60 kW_p**

1 m² of photovoltaic module has an average power of 0.16 kW_p the surface of panels needed would be: 60 kW_p / 0.16 kW_p = **375 m²**

Thus, a hotel with a surface of 1000 m² would need to install 375 m² of photovoltaic panels to cover 25% of its electricity consumption.

- Draft a financing plan for your installation. The feasibility study will provide you with information on financing solutions and potential administrative formalities. Subsidies may be available at the national or at a regional or local level. Your local or regional energy agency or the competent local authority can provide information on the subsidies or other financing solutions you may be able to benefit from.

- Select the companies to carry out the installation. Again, the feasibility study will help you to include relevant specifications when consulting companies. In some countries, companies will have certifications to prove the quality of their works and their experience in the field of energy retrofit and renewable energies. In France, many companies are labelled “*Reconnu garant de l’environnement*”, working with a certified company may be a requirement when benefitting from public subsidies. You are also responsible for monitoring the site and verifying and validating the delivered installation. An energy expert can help you to make sure that the system has been installed according to the specifications of the feasibility study.
- Finally, a member of staff should receive training in order to be in charge of the operation and maintenance of the solar energy production system. Regular maintenance is crucial to ensure that the system is functioning correctly and to maximize the lifespan of the equipment. Solar thermal collectors are relatively low-maintenance equipment, however for solar panels you should calculate between 10 to 25 EUR/m² for the maintenance of installations.

Stakeholders to involve

- Hotel staff (maintenance staff and staff responsible for procurement) and managers
- Designated hotel energy manager
- External energy experts
- Local authorities or local/regional energy and climate agencies
- Clients

Costs aspects

Costs:

- Cost of equipment averages around 500 EUR/kW for photovoltaic panels and 80 EUR/kW for inverters.
- Cost of installation is estimated at 400 EUR/kW.
- Feasibility studies, which should always be carried out before purchase and installation, cost around 120 EUR/kW. Additional costs can arise, especially for bigger installations, for assistance and support during the installation period and if more detailed studies of the building are necessary, which should be estimated between 1000 to 3000 EUR.
- Solar thermal panels are generally a very cost-efficient option, especially in sunny climates, as initial investment costs are low. To cover 50% of the annual domestic hot water needs of a 40-room hotel with around 40 m² of usable surface area solar collectors, the cost is estimated around 1,200 EUR before tax/m² of useful panel area, including piping, inverter and storage (ARENE, 2018).

Cost savings:

- Depends strongly on the location of the hotel and the size of the installation feasible in regards to the size of the building.
- In sunny climates, solar thermal collectors can cover between 50% and 80% of heating needs for domestic hot water.

Monitoring the implementation

The following figures give an estimate of the sizing ratios that can be used to quickly calculate the power of an installation in relation to the available surface area:

- Installations on roofs: Between 60 and 180 W_p per m^2 of unobstructed roof area, excluding any obstruction or shade.
- Installations on parking shades: Between 90 and 120 W_p per m^2 of parking space including roads, i.e., the equivalent of 200 to 250 kW_p for 100 light vehicle parking spaces.
- Installations on the ground: between 0.4 and 0.9 MW_p per ha of fenced area.

Resources

<https://www.ecolabeltoolbox.com/fr/solutions-techniques/solaire-photovoltaique-72-72>

<https://monpotentielsolaire.smartidf.services/fr>

https://www.photovoltaique.info/fr/realiser-une-installation/analyse-de-la-faisabilite-technique/potentiel-solaire-dun-toit-ou-dun-terrain/#estimer_la_production_photovoltaique

3.2.4 Green procurement

Green procurement consists of choosing to purchase and consume products and energies that have the most positive environmental, social and economic impact possible while striving to reduce the impact on the environment as much as possible. This approach consists in reviewing its global purchasing policy.

Start by asking the question of the need for the acquisition of a new product: Is this acquisition really necessary? If the need to acquire a product is justified, can we consider buying it second-hand? This will allow financial savings at the time of acquisition and increase the life span of the existing product.

If the product needed is new, it is important to be aware of several parameters:

- its manufacture, what are the materials used for its design? where do they come from?
- Where was this product manufactured? Can we acquire the same one nearby?
- If not, how will it be shipped to its destination?
- how is it packaged?
- will it be repairable by ourselves? Do we need to call on specific technicians?
- How will it be disposed of? what kind of waste will it be, can it be reused afterwards, is it biodegradable? will it be recyclable? ...

Thus, each acquisition can be made in conscience, which is essential to a responsible procurement policy.



Figure 23 : Green procurement and circular economy (source: <https://www.europarl.europa.eu/>)

This section presents the practices that can be undertaken to improve the purchasing and consumption policy. It is structured in 4 objectives:

1. **Changing cleaning products, using ecological labels**
2. **Developing short circuits and responsible consumption**
3. **Promoting reuse and products materials**
4. **Purchasing efficient household equipment**

Objective 1 - Changing cleaning products, using ecological labels

Cleanliness is essential for the image of a hotel. The products used must be extremely effective. The customers are even more sensitive to this since the sanitary crisis of Covid. The products said to be effective are unfortunately too often harmful to the environment. There are now labels that can guide us in our purchases of products, behaviors to adopt or recipes for ecological and economic cleaning products.

This objective will be reached through the following practices:

- **Reducing the use of cleaning agents & using steam cleaning (level 1)**
- **Switching to bulk-size and organic bathroom amenities (level 1)**

Reducing the use of cleaning agents & using steam cleaning

Topic: Green procurement

Objective: Changing cleaning products, using ecological labels

LEVEL 1

Description

Cleanliness is essential in the hotel sector, it is a guarantee of safety, subject to strict regulations and finally it is a matter of image and quality of the hotel. The attractiveness and comfort of a place are linked to its cleanliness, it is therefore an essential position in the management of a hotel.

For cleaning, the products most commonly used are often chemical and polluting. Indeed, they can have harmful effects on human health (the customers and especially the employees who use these products) and on the environment. Used in gardens, they pollute the water table. When they are rejected in the waste water system, their treatment not being easy, they are still sources of pollution of the grounds and the seas. Once released into the environment, they can take a considerable amount of time to break down and become inactive.

Fortunately, there are many solutions to reduce or even completely eliminate the use of chemicals. Awareness of the use of these products, their consequences on the environment and their impact on health, are a starting point to a change in behavior of their use.

Indeed, the use of chemicals can be reduced to a minimum thanks to:

- proper dilution of products often supplied in concentrated form,
- an efficient cleaning technique,
- the use of microfiber cloths.
- Regular training of staff in the handling of chemicals is very important from a health, safety and environmental perspective.
- The selection and purchase of environmentally friendly cleaning products, such as those with an ISO Type I (European Ecolabel), can significantly reduce the impact of cleaning.
- Use of a steam cleaner

Steps to follow to implement the practice

- First, the best environmental management practice is for facility management to implement an environmentally friendly supply of microfiber cloths and mops, as well as eco-labeled or less harmful cleaning chemicals. Using microfiber mops instead of wet mops can reduce water and chemical consumption by 95% (Espinozal et al., 2010). It is also now possible to replace some traditional cleaning products with natural products (white vinegar, lemon, baking soda, etc.).

The best reusable cleaning tools

Hypoallergenic, eliminates the need for glass and all-purpose cleaners, penetrates invisible crevices in surfaces to cut out dirt & grime.



Figure 24 : The best reusable cleaning tools (source : thehowtohome.com)

ALL PURPOSE CLEANER

INGREDIENTS

- 1 PART WHITE VINEGAR
- 1 PART WATER
- A FEW DROPS ESSENTIAL OIL

METHOD

- COMBINE EVERYTHING IN A SPRAY BOTTLE AND SHAKE



Figure 25 : All purpose cleaner (Source : <https://inhabitat.com/infographic-a-guide-to-natural-diy-cleaning-products/>)

- Chemical use can be significantly reduced by training staff in chemical management and by investing in chemical-free cleaning equipment (e.g., steam cleaners). For concentrated cleaning products, facilitate dilution operations by clearly marking the fill level of the bottles.
- Training in effective cleaning techniques can significantly reduce chemical (and water) consumption
- Training in the use of natural cleaning products may be necessary to implement their use.
- The use of synthetic perfumes should be avoided whenever possible

Stakeholders to involve

- Hotel managers and staff
- Health, safety and environment responsible within the hotel, restaurant, etc.
- cleaning team

Costs aspects

Costs

- Making your own cleaning products takes time and should not be neglected. It also requires that the employee is well trained in their manufacture and use. A recipe book of cleaning products should be considered.
- Training in effective cleaning techniques

Costs saving

- The cost of natural products is much lower than conventional chemical cleaning products.
- Using microfiber mops instead of wet mops reduces water and chemical consumption

Monitoring the implementation

- Audit consumption and access to consumables, chemicals and hazardous materials in housekeeping operations
- Tracking of cleaning product expenses

Resources

<http://www.greentourism.eu/en/BestPractice/Details/13>

<https://inhabitat.com/infographic-a-guide-to-natural-diy-cleaning-products/>

Switching to bulk-size and organic bathroom amenities

Topic: Green procurement

Objective: Changing cleaning products, using ecological labels

LEVEL 1

Description

8 million tons of plastic end up in the oceans per year! Each year in Europe 58 Mt of plastics (16% of the world production) are produced, that is to say 1.8 t every second. However, only 33% of the plastic waste collected in Europe is recycled, the majority is burned, fortunately with energy recovery (46%), the rest is buried.

The part that is not collected is abandoned in the environment and ends up in sewage systems and waterways to end up in the sea in fragmented form (microplastics). The prevention of plastic waste has therefore become a major issue.

Plastics are, along with cardboard, the most widely used materials for packaging, particularly in the tourism sector.

An efficient way to prevent plastic waste consists in the replacement of disposable products in hotel bathrooms. In this respect, by means of greener procurement policies, hotels can commit to minimize the purchase of disposable items.

One of the main problems of “welcome kits” in hotel rooms is the excessive plastic packaging of hygiene products for single use (e.g. shampoo, gel, etc.). In addition, these products are paid twice, as they include purchasing costs and waste treatment and management costs, which is something hotels can avoid by changing the purchasing policy.

In this sense, hotels can stop purchasing single-use products with individual packaging and start replacing single-use bottles with soap and shampoo dispensers. Moreover, there is nowadays a large array of products that fit well into the decoration of the room while implying a waste prevention measure.

A simple measure like the replacement of individual soap bottles in the bathroom by dispensers is estimated to reduce the total waste generated in hotels by 5 %. Block soap could be also an alternative and has some ecological benefits. It does not transport unnecessary water around and uses paper packaging instead of plastic bottles. Moreover, the solid blocks can easily be piled and allow a greater space efficiency.

Together with the replacement of individual soap bottles, articles such as brushes, combs, etc. can be replaced with ecological alternatives made of 100% organic and compostable materials and packaging made from recycled cardboard.

The Marriott has replaced most of its hotels' single-use shampoo, conditioner, and bath gel bottles with larger ones in 2020, preventing about 500 million of the tiny plastic bottles from reaching landfills yearly—equivalent to about 770 tonnes of plastic annually and 30% of its current plastic use for amenities.

The 52 Meliã hotels have installed dispensers to reduce plastic use by at least an estimated 45,000kg per year in bathroom amenities, 75% less than required for single-dose containers, thus avoiding the emission of more than 29,000kg of CO₂ into the atmosphere.



Figure 26 dispensers in a Meliã Hotel's bathroom

Steps to follow to implement the practice

Plan the implementation well in advance of the peak tourist season as it needs time to be well organised. There is a number of actions to take in respect to the purchasing policy:

- Once the real needs for purchasing have been identified (e.g. purchasing of plastic-free packaging soap for hotel rooms) and the objectives have been set, the purchasing policy should be revised and modified to meet the established goals.
- From that moment on, the requirements and objectives should be introduced in all provision and service contracts (suppliers including environmental quality guarantees or ecolabels will have higher chance to meet the hotel requirements).
- As the measure is connected to the behaviour and commitment of hotel clients, it is very important to communicate with them about the environmental achievements so that they feel part of the initiative and become key participants in the reduction of generated waste. For example, brushes and combs made of organic materials are provided on request from guests should they wish to consume more responsibly at Meliã hotels.
- Suppliers must be also informed and updated on purchasing policies and initiatives taken in the hotel, as this will reinforce collaboration with them and facilitate cooperation with other hotels interested in implementing similar measures.
- Furthermore, hotel chains and associations sharing suppliers have more power and a better position to negotiate regarding environmental aspects and encourage the availability of environmental friendly products and services from suppliers.

Stakeholders to involve

- Hotel managers
- Maintenance and housekeeping department at the hotel (responsible person, cleaning staff, etc.)
- Product suppliers

Costs aspects

Costs

- Costs related to the acquisition of dispensers to substitute single-use products. Although these costs would be more elevated at first, in the long term it will lead to cost savings.

Cost savings

- Replacing single-use bottles for dispensers can lead to a reduction of acquisition costs and a 30 to 70 percent cost savings. The “Hotel Pastor Park Plaza” (United States) saved up to 0.20\$ (0.17€) per overnight stay.

Monitoring the implementation

Waste production and performance of the measure:

- Quantity of plastic waste produced [kg] or [number of bins or garbage bags] in rooms and in common areas: the number of bins or garbage bags can be chosen as a unit of measurement if it is not possible to weight waste produced, the average weight of a fulfilled bin or bag will have to be estimated beforehand for further calculation
- Quantity of mixed waste produced [kg] or [number of bins or garbage bags] in rooms and in common areas
- Number of guest-night [number]
- Waste generation per guest-night (kg/ guest-night)

Time frame

Start the monitoring before dispensers are installed to assess the effect of the measure on waste production.

Quantity of waste produced, and number of customers can be registered continuously (every day every week) or randomly (one day per week or every day one week per month).

Resources

<https://www.hospitalitynet.org/news/4095581.html>

<https://www.concapark.com/en/eco-friendly-hotel>

<http://www.urban-waste.eu/eco-innovative-measure-forms/>

Objective 2 - Developing short circuits and responsible consumption

Among the actions to be implemented for green procurement, it is necessary to consider the purchasing practices performed by tourist accommodation.

If, to provide itself by privileging the products of proximity, that is not always easy. What distance are we talking about when we talk about proximity? Which products are concerned? If the products are not available nearby, how can we proceed to limit the environmental impact?

This objective will be reached through the following practices:

- **Developing short circuits and responsible consumption (level 1)**

Developing short circuits and responsible consumption

Topic: Green procurement

Objective: Developing short circuits and responsible consumption

LEVEL 1

Description

Purchasing decisions can have significant environmental and social impacts, particularly for the tourism and hospitality sectors, which are often forced to import large numbers of goods, including food, from distant countries to meet customer demands. The products consumed have an impact on the environment related to:

- to their manufacture
- their distribution
- their use
- their disposal

Therefore, the activities of service providers also have environmental impacts.

The host's position as a consumer of goods and services makes it possible to choose to adopt environmentally friendly purchasing practices that can extend beyond the facility and influence the behavior of suppliers.

Green procurement considers the following questions:

- Is this purchase really necessary?
- What is the product I need to buy made of?
- In what condition was it made?
- What is the path it has taken?
- How is it packaged?
- What is the purpose of this purchase in the home?
- How will it be disposed of?

Considering a purchase in its entire cycle makes it possible to become aware of its impact on the environment and thus to reorient this purchasing practice if necessary.

Steps to follow to implement the practice

Some practices can be favored in an almost systematic way:

- **Buy local:** It is possible to reduce the impact of transporting goods (air pollution, consumption of non-renewable resources, production of greenhouse gases) by buying products made in your region. It is usually considered that a local purchase is made within a maximum radius of 150 km.
- **Give preference to fresh products,** as this avoids the use of preservatives. Prepared products (assembly cooking) require more energy consumption throughout their life cycle and generate a lot of packaging.

- Buying products from organic agriculture means encouraging an agriculture whose techniques are more respectful of the environment.
- Favour seasonal products with a clear origin.
- Prefer buying in bulk.
- Avoid packaging and individual portions and replace them with products without packaging, such as in bulk.
- Buy bio-agricultural products to encourage more environmentally friendly farming techniques.
- Focus on quality and reparability: an eco-product is above all a quality product that will have an extended life span and this is even more so if the product is repairable
- Favour recyclable products and packaging
- Reduce packaging: Buy products with a minimum of packaging, while favoring recyclable packaging and whose composition is of a single material, its recycling will be facilitated. Make suppliers aware of the need to reduce packaging to the strict minimum and ask them to take back their packaging for reuse. Inform them of your preference
- Inform suppliers of your wish to orient your purchasing policy towards more environmentally friendly products, encourage them to propose new products.
- Monitor the appearance of new eco-products, test them.
- Favour the rental of equipment for occasional use
- For administrative tasks, favour the use of reusable printer cartridges and toner. Use recycled paper that has not been bleached with chlorine.

Give preference to cleaning and hygiene products with a label (European ecolabel...). Official ecolabels Initiated by the public authorities and subject to specific regulations, ecolabels guarantee both the quality of use of the product and its ecological characteristics: the product is efficient and generates less impact on its environment throughout its life cycle.

Stakeholders to involve

- Hotel managers and staff
- Health, safety and environment responsible within the hotel, restaurant, etc.

Costs aspects

Costs

- The time needed to identify the most environmentally friendly suppliers and products. The monitoring work necessary to follow new products.

Costs saving

- Reduce transportation costs by buying locally.
- Reducing waste by purchasing products in bulk packaging rather than individually.

Monitoring the implementation

- Tracking of waste reduction
- Monitoring of expenses related to the purchase of quality, local and seasonal products.

Ressources

- <http://www.greentourism.eu/en/BestPractice/IndexByCategory/15>
- Mon hotel et l'environnement n°2 – agir

Objective 3 – Promoting reuse and products materials

In the life cycle of a product, the problem of its end of life often arises. The ideal is to avoid as much as possible that it becomes a waste for the planet. Also proposals for recycling waste are proposed as the construction of furniture from plastic bottles for example. The hotel industry is a large user of bed linen, towels, table linen ... it is now proposed to use recycled products to equip its establishment.

This objective will be reached through the following practice:

- **Using duvets, pillows, bed linen and carpets made from recycled materials**

Using duvets, pillows, bed linen and carpets made from recycled materials

Topic: Green procurement

Objective: Promoting reuse and products materials

LEVEL 1

Description

In Europe, only 33% of the plastic waste collected is recycled, the majority is burned, with energy recovery (46%), the rest is buried. In order to increase the recycled portion, it is necessary that recycled products find outlets, particularly in everyday consumer products.

Once recycled, transparent plastic bottles and flasks such as water bottles can be found in the composition of common objects: sweater (15 bottles), t-shirt (7 bottles), pen (half a bottle), watch (2 bottles). This recycled material can become textile fiber used to make bedding. On average, A single blanket is made from 48 bottles. A soft pillow is made from around 33 bottles whilst a firm pillow is made from 43 bottles. A single duvet is made from 80 bottles, whilst a double duvet is made from 131 bottles.

Hotels and other accommodation services therefore have a special opportunity to effect positive change.



Figure 27 Fiber from recycled plastic bottles. Source: The Fine Bedding Co.

InterContinental Hotels Group (voco Hotels) has been using duvets and pillows that are filled with 100% recycled materials (plastic bottles). The supplier (Vision) takes single-use plastic bottles that have been discarded and repurposes them in its eco-factory to become plush, cozy filling inside the duvets and pillows for voco guest rooms all over the world. Vision has developed and supplied duvets and pillows made from

recycled plastic bottles to voco hotels across the world, from the UK to Dubai and as far as Australia, equating to over 530,000 bottles that have been reused and recycled.

InterContinental Hotels Group has been using carpets produced from recycled plastic bottles and fishing nets. IHG purchased these carpets from carpet supplier Ege considering green procurement criteria. 1 m² of the carpet backing is made using 18 half-liter plastic bottles, keeping these materials in circulation rather than disposing of them as waste.

In the UK, the Ritz Hotel, the Grosvenor House Hotel, the Landmark Hotel, and the Wellesley Hotel have been also using bed linen, supplied by Mitre Linen, made from recycled plastic bottles. Mitre Linen claims that its products are made from recycled plastic bottles which are extruded into soft, non-allergenic fibers. Most importantly, the process produces around 70% less carbon dioxide emissions, uses 70% less water and 40% less energy compared to standard fiber production.

Steps to follow to implement the practice

- Inform your suppliers of your desire to orient your purchasing policy towards more environmentally friendly products and recycled materials. Motivate them to offer you new products.
- Search for these products. Watch for new products on the market. Ask for samples or trial products to test yourself and compare to your own.
- Gather information about products you have tried, innovative products and interesting suppliers in a specific file.
- Buy the products that best fit your needs and that are produced in a way that reduces water consumption and CO₂ emissions.
- Improving your purchasing policy is an ongoing effort. Do not try to change all your purchases at once. Keep track of new eco-products.

Stakeholders to involve

- Hotel managers
- Maintenance and housekeeping department at the hotel (responsible person, cleaning staff, etc.)
- Product suppliers

Costs aspects

Costs

- Purchasing prices are variable according to the quality researched and the usage. However, in general plastic fibers is less expensive than natural fibers

Cost savings

- Synthetic items are easier to maintain

Monitoring the implementation

- Percentage of article made of recycled materials (%)
- Average number of years of usage of items

Resources

<https://www.lestra.com/hotellerie/produit/eco-responsable.php>

<https://www.camif.fr/lesbelleshistoires/ebac-fabricant-de-sommiers-lattes-et-de-matelas-eco-concus.html>

<https://www.greenbiz.com/article/turning-plastic-bottles-plush-hotel-bedding>

<https://corp.visionlinens.com/news/vision-recycles-3-million-plastic-bottles-voco-bedding/>

<https://www.hotelbusiness.com/w-hotels-worldwide-rolls-out-linens-made-from-recycled-plastic/>

<https://www.insidermedia.com/news/wales/137401->

https://www.mitrelinen.co.uk/bedroom/bed-linen/eco-bedding/_/a33-3

<https://www.egecarpets.com/sustainability/the-green-thread/carpets-made-from-waste>

Objective 4 - Purchasing efficient household equipment

Purchasing energy-efficient equipment is a key step in reducing energy consumption. Significant energy savings can be made as described in the following practices:

- **Purchase of energy efficient equipment (level 2)**
- **Selection of efficient components for HVAC system (level 2)**

Purchase of energy efficient equipment

Topic: Green procurement

Objective: Purchasing efficient household equipment

LEVEL 2

Description

When replacing or upgrading your hotel's old appliances and electronic equipment the EU energy label can guide you to make sure you choose a product with a high energy efficiency class. The rating of the EU energy label was revised in March 2021 and these revised labels will initially apply to four product categories: fridges and freezers, dishwashers, washing machines, and television sets.

Energy efficiency is expressed in terms of energy performance categories, ranked from A to G. The A category corresponds to the highest level of efficiency, while the G category corresponds to the least efficient products. However, with more and more products achieving ratings as A+, A++ or A+++ according to the scale in place until March 2021, the A-G scale has been simplified. This scale is stricter and designed so that very few products are initially able to achieve the “A” rating, leaving space for more efficient products to be included in the future. The most energy efficient products currently on the market will typically now be labelled as “B”, “C” or “D”. A number of new elements will be included on the labels, including a QR link to an EU-wide database, which will allow buyers to find more details about the product.

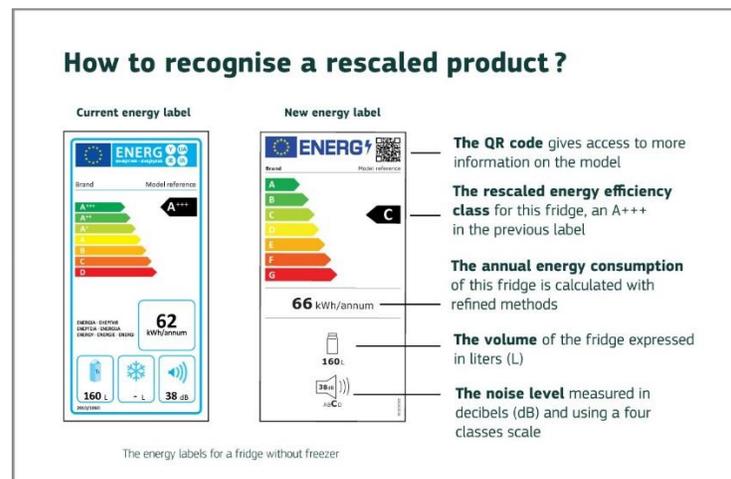


Figure 28 New EU energy label (source: European Commission, 2021)

The purchase of highly efficient food and laundry equipment is particularly important as these services account for a considerable proportion of hotel energy consumption. For example, washing machines and dryers with high efficiency ratings use less electricity and water than conventional equipment without sacrificing performance. Because less water is used, about half as much detergent is required. On average, the highest rated washers reduce energy and water bills by using 50% less water and electricity, while efficient dryers use 20% less energy.

For office equipment (computers, printers, scanners, etc.), the EU-US Energy Star label can be used as a reference.

Steps to follow to implement the practice

- A first step is to identify all the appliances in the hotel. It is recommended that a list be drawn up that documents all available information on the existing appliances and equipment. This information can include the energy efficiency class, brand, year of purchase, energy consumption and hours of operation.
- The second step is for the hotel to determine which equipment needs to be replaced and to ensure that the new equipment is of a high energy efficiency class.
- Compare different products before choosing the new equipment you purchase. Remember to look at characteristics of the appliances that go beyond just energy efficiency. Especially when purchasing laundry equipment, compare energy consumption and water consumption: for commercial or professional washing machines, an average efficient water consumption is a maximum of 7 litres per kg of laundry washed.
- When choosing new efficient equipment, you can find helpful information on websites that compare appliances in terms of prices and energy efficiency. This can be especially helpful for the choice of large-scale professional equipment, which, unlike household appliances, does not always feature an energy efficiency rating. In France, the online guide Topten offers specific services for professionals in order to help them with the procurement of efficient equipment.
- When replacing appliances, consider that if you replace one piece of equipment with a more efficient one and at the same time upgrade the associated service (e.g. upgrade to a fridge with a larger capacity), the energy savings may be slightly altered.
- Furthermore, keep in mind that the purchase of efficient equipment alone is not sufficient to optimize the energy consumption of the hotel's appliances. Efficient use and regular maintenance are crucial to reduce waste of energy or water and to improve the life span of the appliances.

Stakeholders to involve

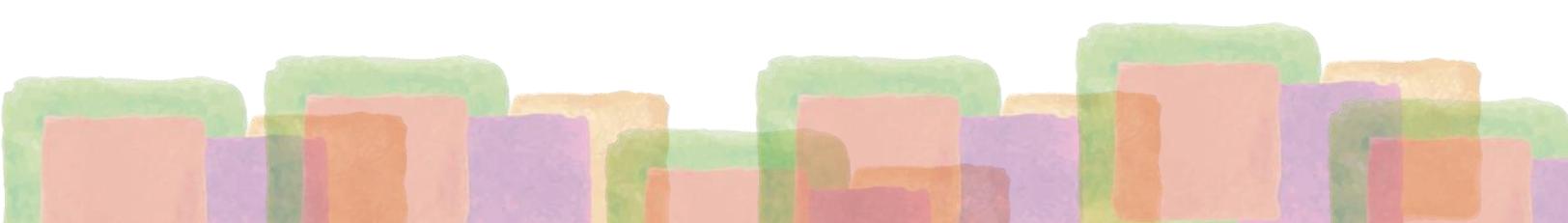
- Hotel managers and staff, especially staff in charge of procurement and the designated hotel energy manager
- External experts, who can provide information when choosing professional equipment

Costs aspects

Costs:

- Staff costs for the time spent on the inspection of existing equipment and the procurement of new efficient equipment

Cost savings:



- Electrical appliances in a high efficiency category are generally a low-risk investment and offer a high return on investment in terms of energy savings.
- Potential energy savings associated with the use of efficient electrical appliances can range from 50% up to 80%.
- However, energy savings can be partially offset if the chosen equipment offers new energy intensive functions or bigger capacities compared to the old equipment.

Monitoring the implementation

- Existence of an up-to-date record of all hotel appliances, their energy consumption and dates of purchase
- Impact on energy consumption of specific systems (kitchens, laundry facilities, etc.) before and after the purchase of efficient equipment

Resources

https://ec.europa.eu/commission/presscorner/detail/en/IP_21_818

<https://www.guidetopten.fr/pro>

https://susproc.jrc.ec.europa.eu/product-bureau/sites/default/files/inline-files/TourismBEMP_0.pdf

Selection of efficient components for HVAC systems

Topic: Green Procurement

Objective: Purchasing efficient household equipment

LEVEL 2

Description

Heating and cooling systems are very energy intensive and represent one of the highest sources of energy consumption in most hotels. When renovating or replacing the hotel's HVAC systems, you should make sure to choose the most energy efficient solutions in order to reduce your energy bills, while even optimizing comfort for your guests. In addition to this, you can also install controlling mechanisms that help regulate the capacity of the system's motors in accordance to the actual ventilation needs.

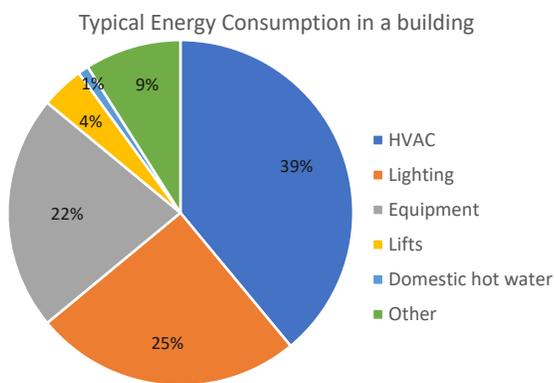


Figure 29 : Typical Energy Consumption in a building (Source: energy.gov.au)

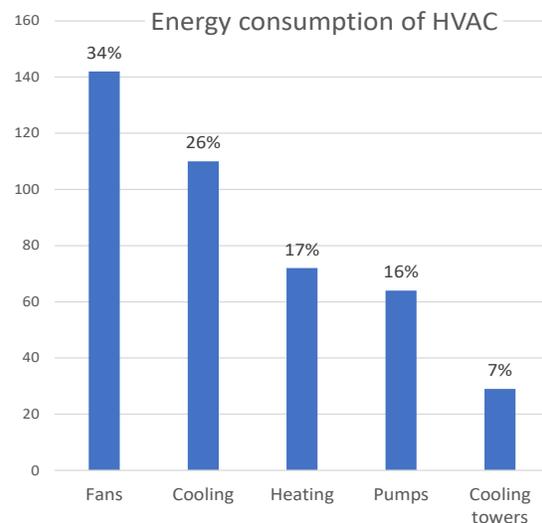


Figure 30 : Energy consumption of HVAC (Source: energy.gov.au)

A general best practice is to always go for the equipment, which has the highest energy efficiency rating whenever such a rating is available. Most boilers for example are subjected to the EU energy label, which scores efficiency on a scale from A to G. The higher purchasing price of equipment labeled A compared to equipment labeled B is mostly compensated by the energy savings it endues.

Apart from the energy efficiency label, there are a range of heating and cooling systems that reduce energy consumption and greenhouse gas emission.

For energy efficient heating solutions:

- Condensing boilers** are identical to non-condensing boilers, except that they achieve higher efficiency (typically greater than 90% on the higher heating value) by condensing water vapor in the exhaust gases and so recovering its latent heat of vaporization, which would otherwise have been wasted. They can also extract more heat because they have a larger heat exchanger. Condensing boilers generally have an A energy efficiency label.

- **Low-temperature boilers** are designed to operate with water temperatures below 40 °C (while standard boilers operate with water temperatures between 70 and 80 °C). Low-temperature heating systems generate less wasted heat in the distribution system. However, low-temperature boilers usually require changes in the water distribution system and the radiators, which have to be sized accordingly. The solution is thus most feasible during a major renovation of the hotel.
- **Heat pumps** can exploit the free heat present in the environment: in the outside air, a river or other body of water and the ground. Although they still need electricity to run, heat pumps supply more heating and cooling capacity than the amount of electricity that is needed to run them. Heat pumps are a higher initial investment, but they have the advantage of being low maintenance and have a lifespan of around 15 years. There are three types of heat pumps, which are adapted to different environments:
 - Ground source heat pumps are used with a deep vertical borehole. They are more cost-effective for businesses that have a big area of outside space, especially in rural locations
 - Water source heat pumps need a nearby water source, such as a lake or a river. Air source heat pumps can be used in a wide variety of establishments and locations.

For energy efficient ventilation solutions:

- **Controlled mechanical ventilation:** Simple or double flow systems. Controlled ventilation is best practice in most hotels, as it contributes to air exchange and thus air quality in the guests' rooms and furthermore reduces heat losses by avoiding overventilation in winter. While simple flow ventilation systems are cheaper, double flow systems have the advantage of heat recovery through a heat exchanger, which results in important energy savings.
- **Variable-frequency drive** allow you to match the speed of the motors to the actual needs of your hotel, helping to reduce the power consumption of your HVAC appliances. **Adjusting the speed of the motors can save up to 70%** of electricity compared to systems that run continuously at full capacity, as electricity consumption is proportional to the speed of the motors.

Other considerations:

- A variable air volume unit regulates the volume of air supplied to the spaces according to the amount of heating or cooling required. It better controls airflow rates, which reduces overall fan energy consumption. It may also reduce energy wastage associated with re-heating, where the heating system counteracts the cooling system.
- Direct drive pumps and fans require less energy than belt-driven versions
- Pressure-independent control valves ensure the correct rate of flow through the cooling and heating systems, irrespective of system pressure variations. Installing these valves at critical points in the HVAC system can reduce energy consumption by facilitating a more accurate control of HVAC systems.
- Chillers generally work most efficiently at a particular load, so they should be sized to operate at this load.
- Gas and oil-fired boilers and individual room air-conditioning units do not represent best practice with respect to heating and cooling sources. However, where they are installed, the highest seasonal energy efficiency ratio, for example, reflected in an 'A' rated European Energy Label, should be sought for all new appliances. Moreover, the information should be sought on full and part load efficiency.

Steps to follow to implement the practice

- Assess the needs of your hotel in terms of HVAC systems. Verify how much energy these systems are currently consuming and how they are fuelled. If you are planning a renovation or an extension of your establishment, this is a perfect opportunity to install efficient HVAC equipment.
- Due to the technical complexity of this solution, it is recommended to seek advice from a qualified installer to select the most appropriate equipment for your hotel's specific needs. An energy audit is also a chance to determine where potentials for energy savings are and what systems would help you reduce your energy consumption most, as energy savings will depend on the type and location of installations.
- Verify whether the efficient HVAC solution you have chosen allows you to benefit from any national or local subsidy schemes or other financing solutions. Energy agencies can usually provide information on existing subsidies for energy efficiency.
- When choosing an installer, you should verify whether they have been certified by a national certification scheme which attests to their qualifications. Energy agencies or trade associations can provide information on existing certification schemes.
- When choosing your equipment, it is recommended to check the quality labels it carries. Most boilers and other heating equipment are labelled under the EU energy efficiency label. For heat pumps, there is the NF Heat pump mark, which verifies that the equipment complies with the various national, European and international standards and meets minimum performance requirements.
- Temperature control is essential to the efficiency of the HVAC system. Heating and hot water should be managed and controlled separately, and it should also be possible to control that the equipment is only operating when necessary to reduce waste heat.
- Maintenance is essential to ensure the good and efficient functioning of the HVAC systems. Equipment should be serviced at least once a year.

Stakeholders to involve

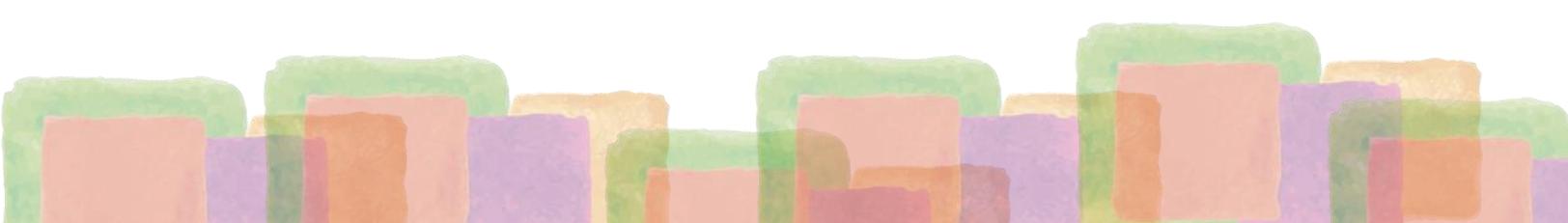
- Hotel managers and staff (especially staff responsible for procurement)
- Designated hotel energy manager
- External energy expert, as may be provided by an energy agency or your energy supplier
- A professional installer or HVAC manufacturer
- Energy agency
- Trade associations
- Your chimney sweep or other professionals responsible for verifying the maintenance of your heating equipment

Costs aspects

Cost:

- Costs depend strongly on the type of equipment you are using and its size.
- Some equipment (e.g. heat pumps, double flow ventilation, etc.) are a bigger initial investment but also generate the biggest energy savings, thus representing a good return on investment.
- When it comes to heat pumps, ground source heat pumps are more expensive than air source heat pumps.
- Variable-frequency drives to adjust the speed of the motors of HVAC appliances can save up to 70% of electricity compared to systems that run continuously at full capacity.

Cost savings:



- Approximate payback time: 1 to 4 years. It should be noted that costs and payback times are highly dependent on the local setting and the initial situation of the hotel.
- Adjusting motor speed can save up to 70% on electricity use, compared to equipment that is not regulated.
- The energy savings achieved will considerably prolong the life of a pump or fan. The purchase price represents about 5% of overall life cycle cost, maintenance about 5%, and energy consumption about 90%.

Reduced CO2 emissions:

- For a hotel of 1,000 m² that uses 15 kWh/m² of electricity for HVAC equipment motors annually, and applying emission factors for France, a 50% savings in energy consumption represents: 0.63 t CO₂ eq of avoided emissions each year (Emission factors for electricity in France: 84.3 g CO₂ / kWh; Emission factors for natural gas in France: 331 g CO₂ / kWh - Source: ADEME).

Monitoring the implementation

- Energy consumption related to HVAC systems should always be monitored separately from other sources of energy consumption.
- Impact on energy consumption before and after the update of the HVAC system in kWh/m².
- For heat pumps, the reduction of electricity consumption is evaluated according to the Coefficient of Performance: a heat pump with a Coefficient of Performance of 3 gives 3 kW of heating for 1 kW of electricity consumed.

Resources

<https://energy.zerowastescotland.org.uk/content/heat-pumps-%E2%80%93-quick-guide>

<https://www.ecolabeltoolbox.com/fr/solutions-techniques/chaudiere-a-haut-rendement-67>

<https://www.ecolabeltoolbox.com/fr/solutions-techniques/chauffage-ventilation-et-climatisation-cvc-economies-en-energie-65>

<https://www.ecolabeltoolbox.com/fr/solutions-techniques/pompes-a-chaleur-pac-92>

<https://www.ecolabeltoolbox.com/fr/solutions-techniques/systemes-de-ventilation-efficaces-70>

<https://www.environment.gov.au/system/files/energy/files/hvac-factsheet-basics.pdf>

https://www.airah.org.au/Content_Files/UsefulDocuments/DCCEE_HVAC_HESS_GuideToBestPractice2012.PDF

<https://www.melbourne.vic.gov.au/SiteCollectionDocuments/hvac-management-improvement-ops.pdf>

3.2.5 Sustainable mobility

The concept of sustainable mobility derives from the broader concept of “sustainable development”. The term “sustainable mobility” was first introduced in 1992, five years after the Brundtland report (EC, 1992). The objective of sustainable mobility is “to ensure that our transport systems meet society’s economic, social and environmental needs whilst minimizing their undesirable impacts on the economy, society and the environment” (EC, 1992). It is worth mentioning that all the definitions of sustainable mobility stress that it is not enough to refer to environmental aspects, although they are of primary importance, but also social and economic impacts must be taken into account (Gallo & Marinelli, 2020). Put differently, strategies to pursue the objective of sustainable mobility cannot be limited to producing/using less polluting transport systems, although this is of fundamental importance.

Sustainable mobility can play an important role in the development of sustainable tourism as tourism-related transport, especially road and air traffic, is on the rise, and contributes considerably to greenhouse gas emissions, pollution, and climate change. Developing and encouraging the use of different modes of transport with low impact on the environment, e.g. cycling, walking, car-sharing, fuel-efficient transport systems, and the use of electric vehicles is a key to reducing the tourists’ ecological footprint (DestiNet, 2020). To achieve this, consistent and innovative sustainable mobility strategies and measures need to be formulated and introduced at the destination as well as the business level (DestiNet, 2020).

To this purpose, the following objective has been set for sustainable mobility:

- 1. Promote eco-mobility**

Objective 1 – Promote eco-mobility

The use of the private car causes many inconveniences: pollution, cost of use, traffic jams, parking difficulties, etc.

Informing customers or staff of the alternatives may attract them and encourage them to use other means of transport as described in the following practices:

- **Renting bicycles to guests (level 1)**
- **Encouraging guests to explore attractions by public transport/foot (level 1)**
- **Providing sustainable mobility to employees (level 1)**
- **Installation of an electric vehicle charging station (level 2)**

Renting bicycles to guests

Topic: Sustainable mobility

Objective: Promote eco-mobility

LEVEL 1

Description

It is important to promote sustainable mobility not only among residents but also among tourists visiting the city. Renting bicycles to guests has become an increasingly developed practice. In case of warm days, narrow streets and tiny city centers there is obviously no better way to explore a new place than by bike. So bike rental becomes a service well appreciated by guests, chiefly if it is easy and free.

Many hotels have developed such a service, for example:

- The Stadsvilla Mout in Schiedam (the Netherlands) offers its guests the opportunity to rent bikes so that they can explore the city in a more sustainable way.
- NH Hotel Group has been promoting sustainable mobility for many years. It offers mobility services such as car-sharing or bicycle hire. At present, there are more than 75 NH Hotels in the world that offer bicycle hire to guests.
- To foster sustainable mobility, Hotel Molí del Mig in Girona (Spain) provides a bicycle-rental service as well as secure storage for them. Moreover, it provides information on circular routes from the hotel for cyclists and hikers



Figure 31 Bicycle park in hotel Aerohus (source: www.visitaeroe.com)



Figure 32 Bicycle park in hotel Milo (source: www.hotelmilosantabarbara.com)

There are many ways to implement such a service: from the provision of a few common bicycles, ready to be dropped off, to the proposal of a real unified fleet, managed by a specialist company.

Offering bikes with a specific livery, designed for the hotel, necessarily reflects a good image of quality of service to all customers but also of traveling advertising in the city.

Bicycle parking spaces should be in good visibility, as far as possible, in front of the hotel entrance.

Offering electric bikes may be necessary in case of significant relief. However, this type of equipment has higher investment and maintenance costs. In most cases, it is better to offer simply bikes with a basket, easy to use, comfortable and unisex, with low maintenance.

Steps to follow to implement the practice

- Size the offer according to the number, the type of customers, the parking place available, the possibility to cycle around :
 - service reserved for hotel's customers or open to all tourists
 - simple service or image and advertising support for the hotel
 - free for customers or not
- Buy the bikes (helmets and padlocks) or contract with a specialized company
- Organize the rental process, rental form, insurance for customers and bikes, prices, security of bikes against theft. Edit a user agreement that specifies the rules that guests are required to follow when renting the hotel's bicycles (in particular on the use of helmets, lighting and bells, advices on circulation rules and against thefts)



Figure 33 Bicycle rental (source www.setupmyhotel.com)

- Make the service attractive: Even if the clients have to pay for the rent, offer the first ride. The rent should not be expensive (for instance for a family) and tariffs easy to understand (by day).
- Provide pleasant routes and rest stops (paper maps at least) or organize a visit by bike with a guide

Stakeholders to involve

- Hotel managers and staff (specifically maintenance staff)
- Specialist bikes rental companies
- Tourist offices and local bike promoters

Costs aspects

Costs:

- A simply, comfortable bike costs around 300€



Figure 34 Bicycle (source : www.hotel-sablesdor.com)

- An all-inclusive service by a specialist company can allow a monthly charge according to the size of the fleet

Monitoring the implementation

Fleet:

- Number of bikes proposed
- Number of bikes available per month

Use:

- Number of reservations per month
- Total time of use per month
- Is the use free? If not, what are the tariffs?

Resources

<https://setupmyhotel.com/formats/fo/759-bicycle-rental-agreement-sample.html>

http://www.republicbike.com/bikes_for_hotels.asp

Encouraging guests to explore attractions by public transport/foot

Topic: Sustainable mobility

Objective: Promote eco-mobility

LEVEL 1

Description

Sustainable mobility has become very important not only for residents but also for tourists to promote sustainable tourism. Hotels and travel agencies may contribute to the sustainable tourism agenda in several ways. For instance, hotels and travel agencies may encourage and guide guests on how to explore the city through public transport or bicycle or on foot.

The Stadsvilla Mout in Schiedam (the Netherlands) requests their guests to leave the car on their premises and explore the city by bike or on foot. Moreover, the hotel is located nearby multiple tram stations and, thus, very easy to reach by public transport.

AX The Victoria Hotel in Sliema (Malta) is committed to sustainable tourism and thus encourages its guests to adopt more sustainable and green mobility options.

The Hotel Ciutat de Girona (Spain) offers a 4% discount to guests who take any means of public transportation to get to their hotel.

Steps to follow to implement the practice

- Information : provide documents and maps to the guests (City maps / touristic map / PT plans / Routes planner / fare); guide to rates and reductions on public transport (and museums)



Figure 35 City map (source: www.santorinidave.com/banff-hotels)



Figure 36 Visit London card (source: www.visitlondon.com)

- Promotion: free ticket or voucher, discount on the price of rooms for all those who arrive on foot or public transport (or bike also)
- Agreement with public transport operators and tourist transport operators



Figure 37 Touristic bus (source: www.visitberlin.de)

Stakeholders to involve

- Hotel managers and concierge staff
- Tourist offices
- Public transport authority
- Transport operators: bus, train, river services, on-demand buses, taxis...
- Mobility services: to rent or free-floating system of e-scooters, bikes or e-bikes, etc.

Costs aspects

- Time to meet the stakeholders
- Compensations for the discount offers
- On-demand shuttle bus for the hotel (or for a group of hotels) to the next train or bus station: a private service will be very expensive (driver-s). Less expensive if the costs are shared with other hotels of the same area, or negotiated with public transport authority / public transport operator.

Monitoring the implementation

Information:

- Number of flyers distributed per month

Services:

- Number of passengers or transport tickets and cards sold per month

Promotion:

- Total cost of voucher and discount per month

Resources

<https://www.finehotelsandsuites.com/media/fine-hotels-and-suites-sustainability-policy-stadsvilla-mout.pdf>

<https://victoriahotel.com/green-mobility/>

<https://www.hotelciutatdegirona.com/en/specialoffers/sustainable-mobility>

Providing sustainable mobility to employees

Topic: Sustainable mobility

Objective: Promote eco-mobility

LEVEL 1

Description

Sustainable mobility is being promoted by many organizations in the world including enterprises in the hospitality industry by implementing a so-called "**company sustainable mobility plan**".

AX The Victoria Hotel in Sliema (Malta) is committed to sustainable tourism. It does not only encourage its guests to adopt more sustainable mobility options but also encourages its employees to use sustainable mobility options. AX The Victoria Hotel is fully aware of the impact that its employees can make. Therefore, it has invested in some measures to encourage alternative methods of transportation between the workplace and its employees' homes. Employees are offered to use onsite bicycle parking facilities or shared shuttle transport.

A company sustainable mobility plan is a long-term dynamic strategy to accompany changes in commuting habits. The plan consists of a set of measures implemented by a company to facilitate employee travel and to address the problems caused by vehicular traffic and the shortage of car parks.

It concerns also goods and deliveries. By drawing up sustainable mobility plans, companies can help their employees to opt for sustainable modes and more rationalised usage of private cars for their work-related trips.

The benefits of mobility planning for companies are mainly a lower parking requirement means cost savings and extra space to be used for other purposes. It also improves the health of employees who opt for active mobility and has a positive effect on reducing absenteeism and accidents, reducing the costs associated and increasing productivity.

The development of such a plan, on the initiative of the company, is very much appreciated by the employees as they observe how the company is taking action that shows concern.

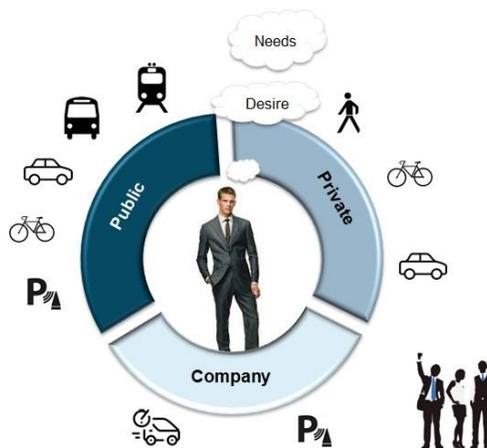


Figure 38 Mobility plan (source: luxmobility.eu)



Figure 39 Cargo bicycle (source: www.weelz.fr)



Figure 40 Bicycle (source : www.commeunvelo.com)

Steps to follow to implement the practice

A mobility plan is a dynamic and long-term process and may vary depending on the position and needs of each company.

Before analysis of the current situation is carried out, the objectives and means of implementation need to be defined, a steering committee set up and a communication plan developed.

The main steps are:

- Analysis of the current situation: to evaluate the company's accessibility and conduct spatial analyses (to identify potential alternative means of transport depending on the employees' places of residence).

- Surveys: to determine the mobility patterns of all members of staff and their attitude to alternatives to the private car through completion of a questionnaire
- Development and validation of an action plan: to map out, on the basis of the analytical results and surveys, an implementation strategy employing those measures deemed likely to succeed
- Implementation: to put into practice the measures identified as relevant for addressing the mobility issues encountered
- Evaluation and monitoring: to periodically evaluate the implemented measures in order to reflect changes in infrastructure, staff and attitudes

Stakeholders to involve

- Hotel managers and the whole staff
- Public transport authority to discuss about bus stops and bus routes
- Car sharing or fleet rental operator

Costs aspects

It depends on many variables: insourcing or outsourcing studies, the number of measures actually implemented, and internal resources.

Main actions can be conducted to develop car sharing between employees (by a website), a sharing fleet of bikes or cars for work related trips, to create a specific bus stop or new bus route or better scheduled stops.

Lots of gain can occur for the company: easier recruitment, less absenteeism, less car accidents... Less stress for the commuters means more productive and motivated to work employees.

Monitoring the implementation

- Number of measures
- Cost of measures per year
- Modal share evolution per year
- Number of employees commuting by train / bus / private car / bike...

Resources

https://www.eltis.org/sites/default/files/mm_examples_6.pdf

Installation of an electric vehicle charging station

Topic: Sustainable mobility

Objective: Promote eco-mobility

LEVEL 2

Description

A charging station, also called electric vehicle charging station, electronic charging station (ECS), is a part of the network of the charging infrastructure, also called electric vehicle supply equipment (EVSE). Such a station has several electric recharging points (or charging point, charge point) to allow to charge 1 to 4 plug-in electric vehicles at the same time.

Some electric vehicles (EV) have on-board converters that plug into a standard electrical outlet or a higher voltage outlet, but most others use custom charging stations.

Charging stations provide connectors that conform to a variety of standards. For common direct current rapid charging, chargers are equipped with multiple adaptors such as Combined Charging System (CCS), CHAdeMO, and AC fast charging.

Hotel charging stations are typically found in parking areas.

For major hotel chains, power points that enable guests to recharge their cars on the premises are a new perk. As the EV-driving population increases, a growing number of hotels are exploring how they might accommodate guests requiring recharging facilities.

More than 3,137 EV charging stations are available and ready for use at Marriott hotels globally. Hilton, Starwood Hotels & Resorts, and Scandic have been installing EV charging stations in many of their properties. Many leading hotel companies have public sustainability goals, which have become increasingly important in guest attraction and loyalty and thus is now a matter of their corporate reputation. On the other hand, they perceive that more affluent guests (having expensive cars) are also likely to spend more money on spa services, food and drink, room services, and other hotel extras. Tesla implements a network of fast chargers (500 Superchargers in Europe), and some are located in parking areas of some luxury hotels and restaurants (for free).

Steps to follow to implement the practice

- Implementing an electric vehicle charging station is a question of technical requirements and sizing: number of parking lots equipped, type of charging (low speed, medium, fast), electrical connection capacity:
 - Charging time basically depends on the battery's capacity, power density, and charging power. The larger the capacity, the more charge the battery can hold (analogous to the size of the fuel tank). Higher power density allows the battery to accept more charge/unit time (the size of the tank opening). Higher charging power supplies more energy per unit time (analogous to a pump's flow rate). Charging at fast speeds requires a lot of energy and needs powerful industrial electrical connection.

- An overnight charging that may suit most hotel users, requires an ordinary electrical connection of 3kW per unit (Charging time for 100 km of range on a Tesla Model S is 7 hours with a 230 V, 12 A, 3 kW plug, the same than for an electric oven).
- the hotel may or may not charge customers for the electricity consumed, knowing that the cost of fully recharging a vehicle remains low (from 2 to 3 € for 100km of range)
- the hotel must be able to provide these customers with the different electrical adapters needed to connect the different connection standards

Stakeholders to involve

- Hotel managers and staff (specifically maintenance staff for parking lots and electrical installations)
- Experts that can provide information on the maintenance and inspection of equipment
- Technicians that can provide regular maintenance
- Electricity distribution companies
- Be sure your charging station is visible to EV drivers through app and websites but also through navigation services in vehicles by platform such as GIREVE which aggregates descriptive data of your charging points in a standardized European database.

Costs aspects

Costs:

- The installation of a low-power charging socket (12 A) is inexpensive, more or less the same than a common domestic plug



Figure 41 Electric plug (source: www.legrand.fr)

- The higher the power of the terminal, the faster the recharging and the more expensive the terminal as well as the electric subscription
- The installation of medium-power charging socket (usually called “Wallbox” 16-32 A)) cost around 1500€ per unit.



Figure 42 Wallbox (source: www.automobile-propre.com)

- Electric adapters and cables (also inexpensive)
- the hotel's electrical installation must be correctly sized to support all the new sockets

Cost savings:

- gain of attractivity for clients who are motorized with an EV, including ebikes
- gain of customer satisfaction
- sustainable and rewarding image
- less noise (and air pollution) due to local traffic and park

Monitoring the implementation

Installation:

- Number of sockets proposed (by type / power)
- For private use only? Or open public access?

Use:

- Energy consumed per month
- Number of plugs per month
- Number of users per month

Price of energy:

- Is the charging free? yes / no, if no: Tariffs? What are the means of payment? Which subscriber cards are valid?

Resources

<https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/charging-ahead-electric-vehicle-infrastructure-demand#>

<https://easyelectriclelife.groupe.renault.com/en/day-to-day/charging/electric-car-charging-points-the-possibilities/>

3.2.6 Waste management

The UN has been expressing concern about environmental issues for the last few decades. Initially, the focus was on the manufacturing sector as the main culprit, but recent studies revealed a growing concern on the tourism sector whose activities also harm the environment (Bohdanowicz, 2005; Matai, 2015). Indeed, tourists may generate up to twice as much solid waste per capita as local residents (IFC, 2007). Although tourism is responsible for a small share of waste generation within Europe, contributing towards 6.7% of total waste generation in the EU (EEA, 2010). Nonetheless, the quantities of solid waste generated by tourism organizations are large in absolute terms – 35 million tonnes of solid waste per year globally.

Within the tourism sector, hotels and similar accommodations are the largest consumers of durable and non-durable goods resulting in large amounts of waste generated. They are also major contributors to packaging waste (Eurostat, 2010), including plastics and metals with high embodied energy that are responsible for significant resource depletion upon disposal. Waste from this sector has similar characteristics to mixed household waste, is composed of a diverse mix of materials, including organic and hazardous materials, that can give rise to significant environmental impacts upon disposal (especially through GHG emissions and leaching of toxic materials). Furthermore, waste in the tourism sector often varies seasonally and is generated in areas sensitive to littering, potentially putting pressure on waste management facilities during peak season and damaging high nature value resources. Plastic waste in the oceans poses a threat to marine life too (Styles et al., 2013).

Waste management simply refers to the activities or actions required to manage waste from its inception to its final disposal. This includes amongst other things, collection, transport, treatment, and disposal of waste together with monitoring and regulation. The EU aims at promoting waste treatment options in line with the waste hierarchy, notably favoring preparation for re-use and recycling over disposal operations such as landfilling. The hospitality industry in particular often pays little attention to their environmental responsibilities. That is, many hotels and accommodations have very little interest in reducing and/or recycling waste, believing that such activities are too expensive and time-consuming (Zorpas, Voukkali, & Loizia, 2015). It is therefore essential for the hospitality industry to develop an effective waste management system. To do so, hotels and accommodations may take the following steps. 1. characterization and quantification of waste, 2. understanding waste hierarchy so they can manage waste accordingly, 3. data analysis, 4. developing a framework and engaging stakeholders (Lawson, 2018).

To this end several practices are proposed according to the following objectives:

- 1. Knowing its waste volume**
- 2. Preventing waste production**
- 3. Improving waste sorting**
- 4. Fighting against food waste**
- 5. Promote recycling and reuse**

Objective 1 - Knowing its waste volume

To progress towards more sustainable development, more understanding is necessary. To reach this understanding, concise measurement is necessary. In this case, if an SME has a clear view of the type of waste it produces, then it will be able to take appropriate measures to effectively reduce the sources of waste.

To reach this objective, two types of measures are proposed, one general to get a concise overview of waste sources, and a second one focussed on food waste

- **Tracking and measuring waste (level 1)**
- **Tracking and measuring food waste (level 1)**

Tracking and measuring waste

Topic: Waste management

Objective: Knowing its waste volume

LEVEL 1

Description

Every hotel or similar accommodation generates any kind of waste. It has a financial cost to manage and an environmental impact. Whatever the type and volume of waste a business generates, it is costing money. In fact, a waste is paid twice, when a product is purchased and when the product is thrown away. By consuming and throwing away less, the need to handle, treat and dispose of waste will be reduced.

Any hotel can find ways of eliminating wasteful practices and reducing their resource use. However to control waste production, then good measuring and monitoring is important. It should be one of the first steps hotels take to improve their environmental performance.

Regularly measuring and monitoring will help to identify patterns of wasteful behaviour and opportunities to reduce resource use. It is important to understand current performance – the types of waste and the amount of waste that is produced as well as the places where waste is generated.

Accurate measuring and monitoring enables you to see what's not working as it should be. Human error, equipment faults and problems can arise in the organisation, enabling to take swift remedial action.

Measuring and monitoring provides you with clear evidence to show the staff how its behaviour directly impacts on your organisation's resource use and its environmental impact and is a great way to encourage them to adopt and maintain resource efficient behaviours.

Steps to follow to implement the practice

Before beginning any action to prevent and reduce waste, it is important to understand current performance, especially the types and the amount of waste that is produced, and the places in the organisation where waste is generated. This will help to track and share success stories with employees and the management team to improve resource efficiency.

Examine waste management costs

Depending on the situation of your organisation, the costs of the collection of waste are covered by municipal taxes (based on the rental value of your premises) or a fee calculated according to the service provided by a contractor. Waste costs can vary greatly in the level of detail provided. Understanding waste costs is a key part of understanding the current performance. It is recommended to review waste and recycling invoices for the last 12 to 24 months to determine the levels of waste being generated throughout the year. A check of the costs may also highlight some immediate cost-saving opportunities. For instance, alerting you to whether you are being charged for more bins than you actually have.

Develop a simple system to measure and record waste

It is important to gather accurate data. This will enable you to monitor progress effectively. It is also important that all key waste streams are included in the measurement, such as general waste, confidential waste, food waste (see next pages “**Tracking and measuring food waste**”), dry mixed recycling, cardboard, metal and wood.

Model of form to be filled up to monitor waste production

Origin		Category*	Receptacle**	Quantities*** (type and volume) (in kg or litres)
Catering	Kitchen	Receipt of goods		
		Cold preparation		
		Hot preparation		
		Dishes		
	Bar			
Accommodation	Room			
	Reception			
	Floors			
	Laundry			
Administration	Technical services			
	Other			

Figure 43 Form to monitor waste production

Category*: Identify discarded items. Indicate if it is packaging, the nature of the materials and to which product they correspond.

Receptacle**: Indicate in which type of receptacle the waste is disposed of at the place of production: plastic bins, bags, etc. Estimate the volume of these bins (and their average weight when full, if possible).

Quantities***: Indicate for each container the quantity of waste generated. Over a period of time, such as a week, count the number of times these bins are emptied and multiply this by the average volume or weight of these bins when full. This will give you a volume (litres or cubic metres) or weight per unit of time (litres/day, week, month, year).

Where good waste data is not available, a waste compositional analysis is a valuable tool because it is a simple way to understand and quantify waste streams. Start by determining the total number of bins by waste stream and container type emptied by your waste contractor.

Commonly encountered bin capacities are 90, 120, 140, 240, 360, 660, 1,000, 1,100 and 1,280 litres.

Finally, estimate how full the bins are when they are emptied – 100% full or 50% full. Remember to look at how the waste is stacked and how tightly compressed it is.

Using the results of the compositional analysis, combined with information on the size of bins and the frequency of uplift, the average weight of each waste stream can be calculated. Some waste contractors have also the ability to provide weights for each collection.

Identify where waste is being produced



It is often difficult to grasp the nature, scale and impact of the waste an organisation produces. One technique for helping clearly understand current performance is to undertake a site walk-around assessment. This involves carrying out a visual inspection around of the premises and noting:

- the types of material used in the organisation
- where these materials are used and where waste occurs in the day-to-day activities
- why these materials are being used and why waste occurs
- the volume of materials used, waste produced and costs involved

When carrying out a site walk-around assessment and gathering this information about the site and processes, don't hesitate to take photographs for 'before and after' comparisons; and to talk to staff to identify the causes of waste and their ideas on how to reduce waste in their area.

When carrying out this assessment, immediate cost-saving opportunities and priority areas for action may also be identified.

Give feedback to your team

People from the organisation team will be motivated by feedback that tells them how well they are doing. Sharing and celebrating success is a sure-fire way of reinforcing people's belief in the organisation's commitment.

Stakeholders to involve

For the effective introduction, implementation and continuous operation of the proposed measure a number of key stakeholders should be involved. These include (whenever applicable):

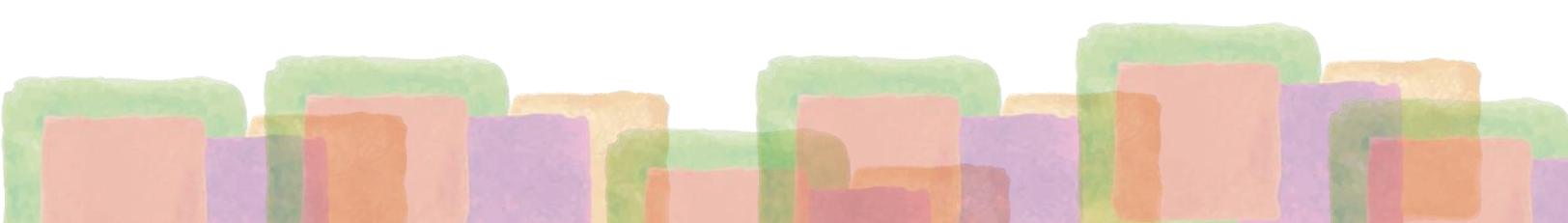
- Hotel staff (that quantify waste production)
- Hotel managers (that uses key figures for benchmarking and systematic improvements)
- Waste management department of local authorities
- Waste management company/local authority in charge of municipal waste collection
- Hoteliers associations

Costs aspects

Costs:

- Costs of a scale for precise measurement to be purchased
- Costs of bins to be possibly purchased
- Costs of human resources to organise the tracking and measurement of waste

Cost savings:



- Cost savings are indirect. By consuming and throwing away less, the need to handle, treat and dispose of waste will be reduced. However, waste costs do not stop at the bills that are paid each month to empty the bins. That is just the 'tip of the iceberg'. There are many hidden costs such as lost materials, lost labour, energy costs and other invisible environmental costs.

Monitoring the implementation

Identify a contact person and pass on the compilation process.

Monitoring indicators

It is important to ensure that the data is presented in a clear and concise manner which is relevant to business operations.

- **Quantity of organic waste produced** [kg] or [number of bins or garbage bags]: the number of bins or garbage bags can be chosen as a unit of measurement if it is not possible to weight waste produced, the average weight or volume of a fulfilled bin or bag will have to be estimated beforehand for further calculation (e.g. 1 full 660 litre bin gives $660 \times 0.75 = 495$ L of waste)
- **Number of customers** [number]

Performance indicators:

- **Quantity of waste produced per capita**: Quantity of waste produced / Number of customers [kg / customer]
- **Quantity of waste produced per €1 000 turnover** [kg / euros]
- **Part of waste produced per food categoried** [%]: vegetables, fruits, meat, fish, pasta, etc.
- **Part of food purchased that is waste** [%]

Time frame:

- Determine the frequency of these collections: monthly, weekly, daily, etc. The minimum is once a month, but it may be appropriate to collect some data more frequently
- Data can be registered continuously (every day every week) or randomly (one day per week or every day one week per month).

Resources

Mon Hôtel & l'environnement – Partie 1, 2, 3 – Ecolabel Toolbox - ADEME

Measuring to manage your resources; Advice and support for organisations - Zero Waste Scotland

Save money on waste; Advice and support for organisations - Zero Waste Scotland

Tracking and measuring food waste

Topic: Waste management

Objective: Knowing its waste volume

LEVEL 1

Description

More than 40% of the waste generated at tourist establishments such as bars, restaurants and hotels with buffet serving meals is considered as food waste. This issue requires special attention as it immensely contributes to the total municipal solid waste generation.

A first step in a systematic reduction of food waste is to quantify the problem in order to generate knowledge on how much is wasted, when is it wasted and what is wasted. Waste reducing measures can then be designed and prioritised based on where the problems are largest. Quantitative data can then be used to follow up on specific measures simply by comparing how much was wasted before and after the implementation.

People working on the front lines will see where the waste is being produced. If waste is being produced at some point in the premises, in the kitchen, or when the customers are leaving food, these are the places to take a closer look. Producing a waste map can help to identify all the sources of food waste in the business and what processes are involved – for example, food ordering, preparation, serving and disposal. With a waste map all potential locations can be seen to place monitoring stations.

Kitchen staff should use the feedback to increase their awareness not only of the amount of food they were wasting, but also with more detailed information of what they are wasting and when. This increased awareness is expected to lead to waste reducing actions based on the problems identified.

Steps to follow to implement the practice

- Decide what information is needed.
- Put in place a manual or automated monitoring system that will collect the data at the strategic location in the premises (in general the kitchen)
- Train the personnel at least one month prior to the implementation of the monitoring system and limit the number of categories to characterize food waste (vegetables/fruits, meat/fish and pasta/rice/bread) on how to collect the food waste data
- Provide any support necessary and written instructions
- Depending on the team, make one person responsible for collecting the data to ensure measurements are taken frequently and consistently
- Launch starting phase and training early before the hot season
- Analyse and evaluate collected data to get the information that is needed for decision-making: the kitchen staff/managers use data on food waste and incorporate follow up meetings or similar in their day to day routines in order to use the generated statistics to facilitate a continuous improvement with focus on food waste reduction.

- Continued monitoring of waste will gauge the effectiveness of any actions you put in place and help keep staff motivated.

Stakeholders to involve

For the effective introduction, implementation and continuous operation of the proposed measure a number of key stakeholders should be involved. These include (whenever applicable):

- Kitchen staff (that quantify food waste production)
- Kitchen managers (that uses the statistics to improve production planning)
- Hotel managers (that uses key figures for benchmarking and systematic improvements)

Other possible stakeholders to involve:

- Waste management department of local authorities
- Waste management company/local authority in charge of municipal waste collection
- Hoteliers associations

Costs aspects

Costs:

- Costs of installing a food track device or scales and a number of containers or bins
- Cost of maintaining the software of the device

Cost savings:

- It is estimated that the value of a kg of food waste costs the restaurant's owner about 2€. Therefore, if you are disposing of a ton of food waste a year, you are throwing away 2,000€ of potential profits. If you decrease your food waste by 25% you not only decrease your waste costs, but you could also potentially save up to 500€ on food and energy related costs

Monitoring the implementation

There are manual and automated methods for monitoring and measuring food waste streams. The one that's best will depend on the size and output of the premises, and the level of capital investment available. You should also consider the space needed to accommodate equipment and actions, as well as staff time and capability.

Manual data collection

Usually it's a case of providing multiple waste bins at key points or setting up weighing scales in different locations. All that is needed are scales and a number of containers or bins. What is measured will depend on categories of food waste you might want to measure resulting from food preparation, spoilage and plate waste.

Give staff a simple monitoring sheet to complete when food waste is weighed at the end of each production run or service. The data can be entered periodically into an electronic spreadsheet for analysis. The data should be collected over a suitable time period to provide an accurate reflection on food waste production – for example, over a period of four weeks.

Automated data collection

The Food Tracking Device consists of a heavy-duty scale provided with a data port connected to a Bluetooth antenna. The weight of the waste placed on the scale could be sent to a tablet computer with a quantification application installed. Through the quantification application the staff could categorise each piece of waste by selecting one of the pre-selected waste categories. This enabled quantifications to be both comparable and tailor-made to each individual problem of the catering unit. The kitchen staff choose the number of categories of food waste to quantify.



Figure 44 Food waste tracker machine (source: <https://www.leanpath.com>)

Monitoring indicators

It is important to ensure that the data is presented in a clear and concise manner which is relevant to business operations.

- **Quantity of organic waste produced** [kg] or [number of bins or garbage bags]: the number of bins or garbage bags can be chosen as a unit of measurement if it is not possible to weight waste produced, the average weight of a fulfilled bin or bag will have to be estimated beforehand for further calculation
- **Number of customers** [number]

Performance indicators:

- **Quantity of waste produced per capita:** Quantity of waste produced / Number of customers [kg / customer]
- **Quantity of waste produced per €1 000 turnover** [kg / euros]
- **Part of waste produced per food category** [%]: vegetables, fruits, meat, fish, pasta, etc.
- **Part of food purchased that is waste** [%]

Time frame:

- Data can be registered continuously (every day every week) or randomly (one day per week or every day one week per month).

Resources

<http://www.urban-waste.eu/eco-innovative-measure-forms/>

The ultimate guide, Monitoring and measuring food waste, Zero waste Scotland

Reducing food waste in hotel kitchens based on self-reported data, Dominik Leverenz et al., Industrial Marketing Management, Volume 93, February 2021, Pages 617-627

Objective 2 - Preventing waste production

The best waste is the one we do not produce!

Preventing waste production not only avoids the environmental impacts of waste treatment. In many cases, it also makes it possible to avoid the environmental impacts of the upstream stages of a product's life cycle, which are just as important, if not more so, than those linked to waste management: extraction of natural resources, production of goods and services, distribution and use. Prevention is an essential lever for reducing the pressure on resources caused by our production and consumption patterns.

To increase waste prevention in hotels and tourism accommodations, three key practices are proposed:

- **Substitution of disposable products & reducing single-use plastics in hotels (level 1)**
- **Promotion of tap water consumption (level 1)**
- **Installation of in-house filtered water bottling system (level 2)**

Substitution of disposable products & reduction of single-use plastics in hotels

Topic: Waste management

Objective: Preventing waste production

LEVEL 1

Description

8 million tons of plastic end up in the oceans per year! Each year in Europe 58 Mt of plastics (16% of the world production) are produced, that is to say 1.8 t every second. However, only 33% of the plastic waste collected in Europe is recycled, the majority is burned, fortunately with energy recovery (46%), the rest is buried.

The part that is not collected is abandoned in the environment and ends up in sewage systems and waterways to end up in the sea in fragmented form (microplastics). The prevention of plastic waste has therefore become a major issue.

Plastics are, along with cardboard, the most widely used materials for packaging, particularly in the tourism sector.

An efficient way to prevent plastic waste consists in the replacement of disposable products in hotels, including hotel rooms, common areas (e.g. dining rooms) and some services provided to customers (e.g. laundry service). In this respect, by means of greener procurement policies, hotels can commit to buy recycled and reusable products and, on the other hand, minimize the purchase of disposable items.

Hotel rooms

One of the main problems of “welcome kits” in hotel rooms is the excessive plastic packaging of hygiene products for single use (e.g. shampoo, gel, etc.). In addition, these products are paid twice, as they include purchasing costs and waste treatment and management costs, which is something hotels can avoid by changing the purchasing policy.

In this sense, hotels can stop purchasing single-use products with individual packaging and start replacing single-use bottles with soap and shampoo dispensers. Moreover, there is nowadays a large array of products that fit well into the decoration of the room while implying a waste prevention measure.

A simple measure like the replacement of individual soap bottles in the bathroom by dispensers is estimated to reduce the total waste generated in hotels by 5 %. Block soap could be also an alternative and has some ecological benefits. It does not transport unnecessary water around and uses paper packaging instead of plastic bottles. Moreover, the solid blocks can easily be piled and allow a greater space efficiency.

Together with the replacement of soap bottles, fabric cloths could be made available instead of disposable paper towels. Traditional straw baskets can be lend to guests that they can use for shopping. It encourages them not to use disposable plastic bags.

Steps to follow to implement the practice

Plan the implementation well in advance of the peak tourist season as it needs time to be well organised. There is a number of actions to take in respect to the purchasing policy:

- Once the real needs for purchasing have been identified (e.g. purchasing of plastic-free packaging soap for hotel rooms) and the objectives have been set, the purchasing policy should be revised and modified to meet the established goals.
- From that moment on, the requirements and objectives should be introduced in all provision and service contracts (suppliers including environmental quality guarantees or ecolabels will have higher chances to meet the hotel requirements).
- As the measure is connected to the behaviour and commitment of hotel clients, it is very important to communicate with them about the environmental achievements so that they feel part of the initiative and become key participants in the reduction of generated waste.
- Suppliers must be also informed and updated on purchasing policies and initiatives taken in the hotel, as this will reinforce collaboration with them and facilitate cooperation with other hotels interested in implementing similar measures.
- Furthermore, hotel chains and associations sharing suppliers have more power and a better position to negotiate regarding environmental aspects and encourage the availability of environmentally friendly products and services from suppliers.

Stakeholders to involve

- Hotel managers
- Maintenance and housekeeping department at the hotel (responsible person, cleaning staff, etc.)
- Product suppliers

Costs aspects

Costs

- Costs related to the acquisition of reusable products (i.e. table cloths, naps, etc.) or dispensers to substitute single-use products. Although these costs would be more elevated at first, in the long term it will lead to cost savings.

Cost savings

- Replacing single-use bottles for dispensers can lead to a reduction of acquisition costs. The “Hotel Pastor Park Plaza” (United States) saved up to 0.20\$ (0.17€) per overnight stay.
- The Ascos Beach Hotel in Paphos (Cyprus) invested 867 euros to purchase 3,000 reusable plastic cups to replace disposable plastic cups and stopped using plastic bin liners in guest rooms. The Ascos Beach Hotel during the first year avoided the disposal of 100,000 plastic cups and saved

almost 2,000 euros. Furthermore, 50% fewer bin liners were disposed of and thus further save 300 euros.

Monitoring the implementation

Waste production and performance of the measure:

- Quantity of plastic waste produced [kg] or [number of bins or garbage bags] in rooms and in common areas: the number of bins or garbage bags can be chosen as a unit of measurement if it is not possible to weight waste produced, the average weight of a fulfilled bin or bag will have to be estimated beforehand for further calculation
- Quantity of mixed waste produced [kg] or [number of bins or garbage bags] in rooms and in common areas
- Number of customers [number]
- Quantity of mixed waste produced per capita (Quantity of mixed waste produced / Number of customers)

Time frame

Start the monitoring before dispensers are installed to assess the effect of the measure on waste production.

Quantity of waste produced and number of customers can be registered continuously (every day every week) or randomly (one day per week or every day one week per month).

Resources

<https://www.helloyok.com/zero-waste-lets-embrace-the-challenge/>

<https://www.concapark.com/en/eco-friendly-hotel>

<http://www.urban-waste.eu/eco-innovative-measure-forms/>

<https://ec.europa.eu/environment/emas/takeagreenstep/pdf/BEMP-6.1-FINAL.pdf>

Promotion of tap water consumption

Topic: Waste management

Objective: Preventing waste production

LEVEL 1

Description

Tap water is 100 to 200 times cheaper than bottled water, its transportation is less greenhouse gas producing and it allows to reduce considerably the waste production due to disposable plastic bottles, in particular PET bottles.

Key figures on the environmental impact of plastic bottle production:

Energy consumption	¼ of the bottle in oil
Water consumption	3 L of water
GHG emissions	0.09 kg of CO ₂
Recycling	1 bottle out of 5
Decomposition	1 000 years

Tourists are particularly big consumers of bottled water when on holiday, both directly through their purchases than through their tourist lifestyle (hotels, restaurants, etc.).

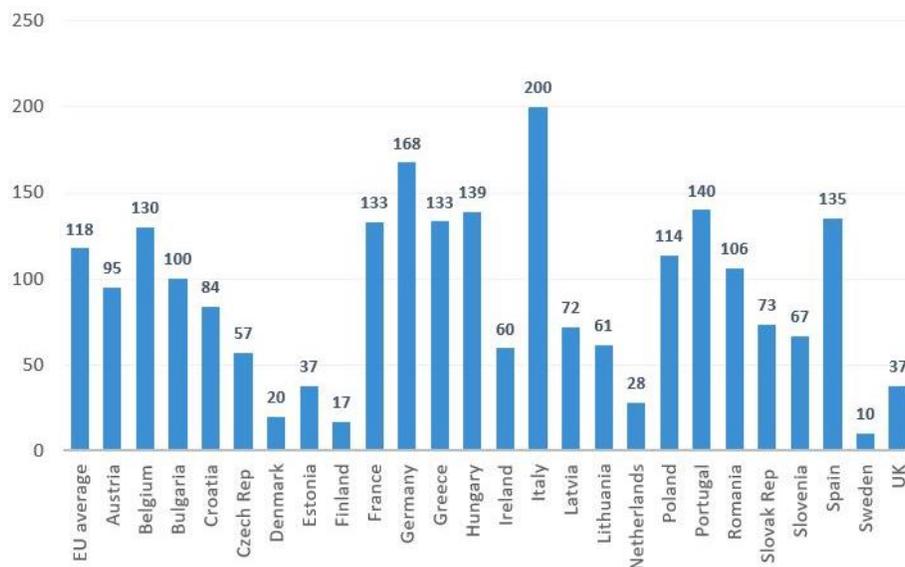


Figure 46 Consumption of bottled water per capita in the European Union in 2019 (source: Natural Mineral Waters Europe)

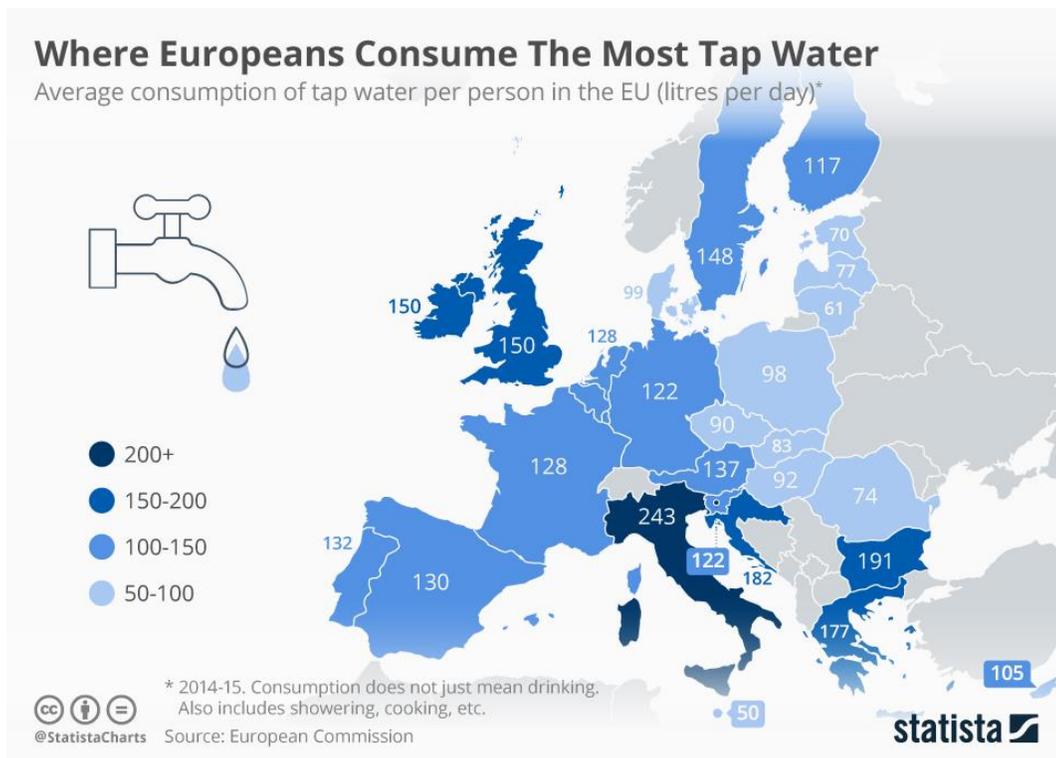


Figure 47 Tap water consumption for drinking, showering, cooking, etc. in the EU in 2014-2015

Although tap water in Europe is a very well controlled and safe product that can be offered for any event, some people are reluctant to drink tap water anywhere. This could be due to fears that the water is unsafe for drinking. Or this could be due to thoughts that tap water is dirty especially in hotels.

Whatever their reason, a sealed bottle of water is seen as a guarantee of a clean, healthy, and untainted product, and people will most definitely pay for peace of mind.

Providing more information on water quality is the only way to give consumers the confidence needed for them to drink water from the tap. Information is key to promote tap water use.

Steps to follow to implement the practice

Promoting tap water can be done by combining the following approaches:

Inform guests

- Raising awareness through the display of information on the environmental impacts of plastic bottles (energy consumption, gas emissions, marine litter, etc.)
- Display small card on tables in hotel rooms or in the breakfast room to inform guests about your approach



Figure 48 Glass bottle with the message “Save the Ocean” (Surfrider Foundation Euro)



Figure 49 Card displayed in hotels in Halifax to promote tap water

- Inform tourists about the safety of tap water: display information on water analysis. This is provided regularly by the municipality or the local public water operator
- If available, distribute edited printed sightseeing maps localizing water drinking fountains in the city. This will reinforce the idea that water is easily available, safe, free, and that most of the time it is not necessary to buy bottled water

Improve access to tap water

- Serving systematically water in carafes in place of single-use water bottles at lunch or dinner or during business meetings and corporate events
- Eliminate mini bars or replace minibar drinks in plastic containers with returnable glass bottles
- Offer refillable water bottles, instead of single-use plastic bottles, to guests at check-in
- Offer tap water at strategic points in your hotel: reception, waiting room with a clear indication of the quality and safety of the water

Go further: propose fresh tap water or sparkling water

- Offer fresh tap water
- Filter and possibly carbonate the water to make it sparkling and sell it at a lower price than bottled water or give it for free (see *Installation of in-house filtered water bottling system* next pages)

Stakeholders to involve



- Hotel managers
- Maintenance and housekeeping department at the hotel (responsible person, cleaning staff, etc.)
- Water supplier: municipality of local public water operator

Costs aspects

Costs

- Costs associated to the purchase of reusable bottles to be distributed among guests free of charge.

Costs savings

- The use of reusable bottles allows for savings in terms of waste reduction.

Monitoring the implementation

- Reusable flasks and bottle distributed [number]
- Evaluation of people potentially reached by the communication campaign on the use of tap water [number]

Waste production and performance of the measure:

- Quantity of plastic waste produced [kg] or [number of bins or garbage bags] in rooms and in common areas: the number of bins or garbage bags can be chosen as a unit of measurement, the average weight of a fulfilled bin or bag will have to be estimated beforehand for further calculation
- Quantity of mixed waste produced [kg] or [number of bins or garbage bags] in rooms and in common areas
- Quantity of mixed waste produced per capita (Quantity of mixed waste produced / Number of customers)

Resources

<http://www.urban-waste.eu/eco-innovative-measure-forms/>

<https://eudebates.tv/debates/eu-policies/agriculture-food/can-you-drink-the-tap-water-in-europe-is-it-safe/>

Promoting tap water in Europe: <https://www.aquapublica.eu/>

<https://naturalmineralwaterseurope.org/>

<https://fne.asso.fr/actualites/absurdite-des-bouteilles-deau-en-plastique-resumee-en-une-infographie>

<https://onlinelibrary.wiley.com/doi/full/10.1002/wat2.1435>

https://surfrider.eu/wp-content/uploads/2019/08/guidebonnespratiques_en_web.pdf

Installation of in-house filtered water bottling system

Topic: Waste management

Objective: Preventing waste production

LEVEL 2

Description

The hospitality industry is a significant contributor to the 300 million tons of plastic produced globally every year. Studies show that single-use plastic bottled systems consume up to 31 times more energy than tap water systems. These bottles are often transported long distances, sit on a shelf, are consumed, and then tossed in the recycling bin. However, around 80% of such plastic bottles might end up in the landfill anyway.

Installing in-house filtered water bottling systems can considerably increase tap water consumption and avoid purchase of bottled water.

Filtered water is served to guests “still or sparkling” in reusable glass bottles. Filtering and bottling on-site eliminates the need for single-use bottles and reduces carbon emissions generated by transporting bottled mineral water. When making trips out of the hotel, guests can use impact-resistant bottles or stainless-steel alternatives and can be encouraged to fill their bottles at the guest lobby’s complimentary “central oasis” water dispenser.

Different characteristics are to be considered for installing an in-house filtered water bottling system.

Types of fountains

There are two basic types of water fountains: fountains connected to the running water network and fountains with plastic bottles.

The latter are to be avoided because they do not use running water but use water from sites requiring transportation costs that are sources of greenhouse gas emissions. The water bottles must be changed every two weeks, for hygiene reasons, and require a lot of manpower. Above all, bottled water is 100 to 300 times more expensive than tap water.

Nature of the water delivered

- Fresh water fountain

The water passes through coils cooled by a heat exchanger. The cold water is produced on demand. It is not stored for sanitary reasons and reaches the user at a temperature between 6 and 10 °C.

- Hot water fountain

To produce hot water, the water cooler is equipped with a small boiler. The system activates and heats the water in a few seconds to an average temperature of 80°C. Some fountains are equipped with a thermostat that allows you to adjust the temperature of the drink (coffee, tea, soup, etc.).



Figure 50 Brita system connected directly to the water tap

- Sparkling or carbonated water fountain

To deliver sparkling water, a water cooler is equipped with a gas cartridge system in its upper part. It allows to carbonate the still water coming from the network. A cartridge of 600gr of CO₂ produces 150 liters of sparkling water for a very variable cost from 40€ to 100€ according to the suppliers.

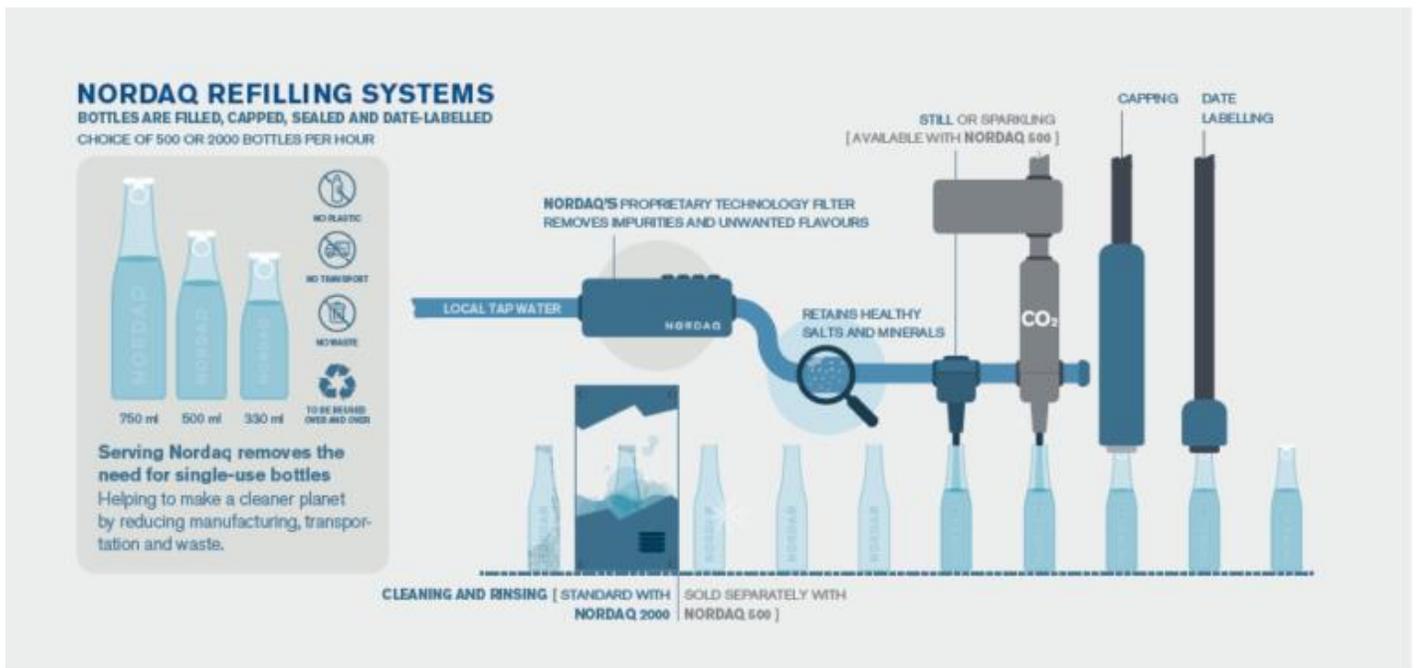


Figure 51 Nordaq refilling system

- Filtration system

Fountains composed of a filtration system that is effective on almost all substances that are harmful to health. The filtration is generally based on an activated carbon filter, while some are using UV purification system. Filters are changed every 5,000 liters, about once or twice a year.

- Touchless water cooler

Some brands are developing touchless water fountains that limit the use of hands. The fountain is activated by an infrared or pedal system, which is essential during the Covid-19 period.

A water fountain with a jet of water can also be an effective solution.



Figure 52 Waterlogic pedal system

Steps to follow to implement the practice

Inform guests

- Raising awareness through the display of information on the environmental impacts of plastic bottles (energy consumption, gas emissions, marine litter, etc.)
- Display small card on tables in hotel rooms or in the breakfast room to inform guests about your approach
- Inform tourists about the safety of filtered tap water

Definition of the choices

- Choose the type of water to be distributed: fresh, sparkling or hot water according to where it will be consumed: in the breakfast room or restaurant, on the floors or in a spa.
- Define the number of water coolers: at least one per floor.
- Purchase or rent: an analysis is necessary from an accounting point of view.

Installation

- A networked water cooler should be installed in a ventilated room to optimize its operation and minimize energy costs. Like a washing machine, it requires a simple water supply and an electrical outlet. The waste water drain is not necessary, a collecting tray is inserted in the fountain.

Operation

- Placing the water cooler in strategic locations also means that fewer of them can be purchased/rented, and therefore less money can be spent.
- Provide non-disposable glasses or bottles for drinking water. Provide a place to collect used glasses.
- Define who will operate the water cooler, who will change the filter if the fountain is not rented, who will collect used glasses.

Stakeholders to involve

- Hotel managers
- Maintenance and housekeeping department at the hotel (responsible person, cleaning staff, etc.)
- Guests
- Private water fountain supplier

Costs aspects

The costs are different if the fountain is rented or purchased.

- **Renting a network filtered water cooler**

A rental contract for a water cooler allows you to have access to regular services: maintenance, filter changes and upkeep.

The additional advantage of renting a fountain is that it guarantees the correct operation of the fountain and avoids programmed obsolescence!

Renting a water cooler can be more expensive in the long run. You must therefore be sure to use it regularly.

A water cooler can be rented from a few dozen euros per month (between 20€ and 50€) for a minimum service with a single temperature. A monthly rental of a high quality water cooler costs between 100€ and 300€, offering different water conditions and temperatures.

- **Buying a network filtered water cooler**

Buying a water cooler does not increase your monthly expenses. In the long run, it can be more cost-effective, but it is better to sign a service contract. Pay attention to the quality of the water cooler and filters: the lower the price, the less functional they will be over time.

Prices vary from several hundred euros, for the cheapest, to several thousand euros, for the most expensive of them.

Monitoring the implementation

- Volume of water supplied to guests in liters [L]: A water meter can be easily attached between the water supply pipe and the fountain. First prices of water meter are about 10€.



Figure 53 Water tap meter

- Number of customers [number]
- Volume of water supplied per capita (Volume of water supplied / Number of customers)

Time frame

Start the monitoring before fountains are installed to assess the effect of the measure on waste production.

Volume of water supplied and number of customers can be registered once a month.

The number of liters supplied by the fountains in a month can give an estimation of plastic bottles avoided.

Resources

<https://www.aquachiara.com/en/hotels/>

<https://nordaq.com/product/tapping-solutions/>

<https://www.culligan.com/product-category/water-filtration-category/drinking-water-filter-systems>

<https://www.waterlogic.com/product-services/catalog/>

<https://www.my-eco-design.com/en/patented/drinks/filter-fountain/>

Objective 3 – Improving waste sorting

As the load of the waste increases and put more in the ground, then landfills produce and release methane gas which is a contributor for causing greenhouse effect and play an important role for global warming. Therefore, any product that cannot be reused and becomes waste should be sorted into its component fractions so that, as much as possible, it can be recovered for recycling. To reach this objective the following practices are proposed:

- **Waste sorting bins in hotel rooms (level 1)**
- **Separating organic waste to produce biogas (level 1)**
- **Installation of self-composting machine (level 1)**

Waste sorting bins in hotel rooms

Topic: Waste management

Objective: Knowing its waste volume

LEVEL 1

Description

On average, hotels generate around 1 kg of waste per guest per night. Any product that cannot be reused and becomes waste should be sorted into its component fractions so that, as much as possible, it can be recovered for recycling. It is estimated that at least 70% of waste generated at hotels can be recycled, provided that there is a functional and effective separation and collection system in-situ. In order to achieve these results, it is essential to consider waste separation already in the hotel rooms and establish an appropriate sorting system.

Keeping in mind that comfort in rooms is a main objective in hotels, there are different environmental practices that can be implemented without reducing well-being of guests while generating environmental benefits. In most cases, hotel rooms only include a couple of waste bins, located in the bathroom and bedroom, where waste fractions are mixed. While bins located in the bathroom are intended for toilet waste, the one in the bedroom is used to collect all types of litter generated by guests (i.e. plastics, magazines, bio-waste, etc.). This is the bin that holds the largest potential to be adapted to a more sophisticated waste sorting and collection system.

For this purpose, individual small-sized bins adapted for separation of different fractions (i.e. paper, plastic, glass and food waste) are presented as a solution. An alternative could be the placement of several bins for different fractions in the room, although it would require more space and therefore it is less recommended.

The hotel will be responsible for waste sorting and management and will make sure that all waste fractions are properly separated in their respective container. Afterwards, an authorised waste manager can take care of the waste generated at the hotel and collect it periodically from the respective facilities.

Steps to follow to implement the practice

Waste review (see Objective 1: Knowing its waste volume):

- The very first step should be the identification and quantification of waste generated and recycled at the hotel. Every waste fraction should be considered separately. By knowing how much waste is being generated before implementing the measure as well as which fractions end up as waste, it will be possible to link other measures such as the replacement of specific disposable products in hotel rooms. This step will not be necessary in case the information is already available.

Introduction and implementation phase:

- Awareness raising and training for the hotel cleaning staff as they must be involved so as to adopt the new working practices.

- Recycling advisors can inform establishments on the type of waste they can/cannot recycle and how/where to do so. Recycling advisors would inform businesses about alternative materials that could be recycled and strongly advise establishments to contact their suppliers and request the substitution of such materials by reusable or recyclable packaging.
- Distribution in every room of individual small-sized bins adapted to separate different fractions.
- “Welcome kit” in hotel rooms should provide leaflets with guidance and instructions to guests regarding waste sorting in the room and the environmental commitments adopted by the hotel policy.
- Instructions to guests shall be displayed in English in addition to the national language with explicit and clear illustrations of the types of waste and the good place where to through them
- An empty letter could be included in the “welcome kit” where guests could suggest other environmental practices to improve the overall performance of the hotel (e.g. food waste at buffets, substitution of disposable products, partnership between hotels/charities, etc).
- Use of different plastic bags with different colours, according to the waste collection system of the respective city (e.g. green-glass, blue-paper, brown-bio waste, etc.). An alternative could be the use of transparent plastic bags for every fraction so that the content of the bags can be checked avoiding mixing of fractions, most of all for the cleaning staff once they are collecting waste from the rooms to their bigger waste trolleys.



Figure 54 Sorting basket with 3 bins proposed by My eco Design

Operation phase:

- Collection and separate storing of the different fractions by cleaning staff until it is taken to higher capacity containers, becoming part of the waste management system of the hotel (with different containers per fraction including waste from other areas of the hotel such as kitchen, reception, etc.).
- Housekeeping/cleaning trolleys used by cleaning staff should be similarly divided to facilitate the work for cleaners and to speed up the process. It is particularly important to keep the same colours.

- Incessant encouragement for feedback from employees with suggestions and observations as a means of continuing to improve the new implemented measure.
- Constant training of the cleaning staff, with reminders. It could be relevant to define a referent on that measure within the cleaning staff so that they could refer to him/her for any doubt they have regarding this measure.

Stakeholders to involve

For the effective introduction, implementation and continuous operation of the proposed measure a number of key stakeholders should be involved. These include:

- Hotel manager
- Maintenance and housekeeping department at the hotel (i.e. responsible person, cleaning staff, etc.)
- Customers
- Waste management company/public authority in charge of waste collection
- Recycling advisors possibly proposed by the public waste management service or an environmental association
- Supplier of bins adapted for waste separation

Costs aspects

Costs

- Separate waste collection is normally financed via municipal waste fees (tariffs are determined in the municipal waste removal ordinances). Otherwise, the costs of collection will be determined by private authorized waste collectors.
- Hotels implementing this measure will incur in expenses related to the installation of sorting bins and bags, which will depend on the type and amount.

Costs savings

- As an illustrative example, the Hilton Tokyo Bay saved more than €365,900 between 1998 and 2006 after implementing their solid waste management recycling programme, despite an 8% rise in disposal costs over that period.
- Improving the recycling rates at a room level will contribute to the reduction of mixed waste generated and thus, the costs of incineration or landfilling it. Average costs of incineration and landfilling of residual waste in the EU: Incineration: 64€/ton, Landfilling: 56€/ton

Monitoring the implementation

- Percentage of rooms that correctly use bins for the separated collection [%]
- Total number of recycling bins placed in hotels [number]

- Positive feedbacks about the initiative collected from clients [%]
- Quantity of plastic/paper/organic waste produced [kg] or [number of bins or garbage bags] in rooms and in common areas: the number of bins or garbage bags can be chosen as a unit of measurement, the average weight of a fulfilled bin or bag will have to be estimated beforehand for further calculation
- Quantity of mixed waste produced [kg] or [number of bins or garbage bags] in rooms and in common areas
- Number of customers [number]
- Occupancy rate (n. of rooms occupied / total of rooms) [%]

Time frame

Start the monitoring at least one week before Waste sorting in hotel rooms is implemented to assess the effect of the measure on waste production.

Quantity of waste produced and number of customers can be registered continuously (every day every week) or randomly (one day per week or every day one week per month).

The Hilton Slussen in Stockholm (Sweden) has implemented sorting bins in every room so that guests can sort their waste under three different categories and contribute to the recycling process. Through this practice more than 125 tons per month being sent to the landfill were reduced by 76%, reducing the total waste generated per guest per night up to 0.3 kg. In this way, the Hilton Slussen in Stockholm (Sweden) avoided landfill costs.

Resources

<https://ec.europa.eu/environment/emas/takeagreenstep/pdf/BEMP-6.2-FINAL.pdf>

<http://www.urban-waste.eu/eco-innovative-measure-forms/>

<https://www.my-eco-design.com/en/>

Separating organic waste to produce biogas

Topic: Waste management

Objective: Improving waste sorting

LEVEL 1

Description

Kitchens generate large quantities of organic waste, including peelings and trimmings, bones, uneaten returns from customer servings, out-of-date products, oil used for frying, etc. Organic waste can represent 37 % of residual waste generated by accommodation, and almost 50 % of residual waste generated by restaurants.

A study of UK restaurants by the Sustainable Restaurant Association (SRA, 2010) found that the average quantity of organic waste generated by restaurants was 0.48 kg per diner, dominated by kitchen preparation (65 %), followed by returns on customer plates (30 %). Spoilage of stored food made only a minor contribution (5 %).

Life-cycle assessment of food waste treatment, carried out in a Danish study in 2004, shows that the best options are ranked as follow:

1. avoid landfill
2. send for anaerobic digestion or incineration with energy recovery, or (if this option is not available)
3. perform on-site composting or send for central composting

Composting was rated the least preferred option because it does not generate energy and releases additional GHG emissions through methane production but is more favourable in terms of nutrient cycling.



Figure 55 Separation at the source during the food preparation

Organic waste needs therefore to be separated at the source. During the food preparation, bins could be placed next to chefs to collect offcuts and peelings, etc. Similarly, food scrapings from returned plates could

be separated from other waste. Separated organic waste can then be placed in large separate waste bins for collection to centralized or decentralized anaerobic digestion plants.

Nowadays, there is an increasing number of cities that include separate waste collection systems as a strategy to increase the recycling rate of the different waste fractions as well as to improve the quality of separation. The selective collection can be carried out by the municipality or through private waste collectors and the service is offered to commercial businesses such as restaurants.

The selective collection of biowaste in cities has a great number of benefits (e.g. saving of landfill space, avoidance of greenhouse gas emissions, etc.) and it facilitates the separated treatment for production of high-quality compost or biogas.

In door-to-door collection systems, the restaurant should separate biowaste at source and place it in a specific bin outside the front/back door in order to facilitate the collection by the authorised collection service provider, according to the frequency (daily, weekly) and schedule (time of collection) arranged. Instead of door-to-door systems, biowaste could also be transported to containers located in specific collection points or areas from which it will be picked-up by the authorised waste manager.

Steps to follow to implement the practice

In case the service of selective collection of biowaste is not provided, the following steps could be followed:

At municipal level

- A selective collection service should be in place with the support of the local government. This service could be provided either by the municipality or by private authorised waste collectors.
- Provide the restaurants/hotels with a map that registers all the areas served by a door-to-door selective biowaste collection service (with specific schedules) and the biowaste bring banks in order to help them accessing the system.
- Possible financial support, through the reduction of waste collection fees, for establishments that have implemented waste separation at source
- Municipalities can provide free biowaste collection bins to hotels (as it often happens with households) and possibly recycling advisors.

At hotel and restaurant level

- Definition of responsibilities
 - Appointing of a responsible person (coordinator) to coordinate the implementation and assessment of the measure (at management level).
 - Training and appointing of a responsible person supervising the correct separation of biowaste at source and the disposal in the right bin (at kitchen level). Additionally, a “green team” including other staff members could support this task.
 - Every member of the kitchen staff must participate and be involved in the separation and disposal of biowaste.

- Keeping periodic meetings between coordinator and all staff/person in charge of separating/disposing bio-waste.
- The restaurant must be responsible and ensure that all organic waste is properly separated in the respective container.
- Place the bins for separated biowaste close to where food waste is generated (e.g. kitchen, bar area, etc.) and make sure they are clearly labelled.
- The restaurant should include a dedicated area where larger bins/containers with biowaste can be stored and accessible for collection by an authorised waste manager.
- Awareness activities and training of kitchen staff. Stimulate and motivate workers and staff in the preparation and implementation of the measure (e.g. correct separation of food waste). Train and inform them of what can be included in the bin.
- Communication of results: It can be interesting to finally publish or release the results obtained after implementing the measure to motivate workers and encourage other restaurants to join selective collection of biowaste.

Stakeholders to involve

For the effective introduction and successful implementation of the proposed measure the following stakeholders should be involved:

- Waste management company/local authority in charge of municipal waste collection
- Hotels managers and kitchen staff
- Supplier of containers and bins for separate disposal and collection of biowaste

Costs aspects

Costs

- Costs related to the purchase of specific containers/bins for biowaste.
- Bio-waste collection is normally financed via municipal waste fees (tariffs are determined in the municipal waste removal ordinances).
- Although biowaste collection costs differ greatly from country to country, the following indicators developed by the IPCC for the EU can be taken as reference :
 - Biowaste collection: 10-400€/ton
 - Composting separated biowaste: 35€/ton for open-windrow operations and 50€/ton for in-vessel processes

Possible costs savings

- The selective collection and treatment of biowaste from hotels and restaurants reduces costs in the sense that this fraction will not be treated together with the mixed fraction, avoiding incineration or landfilling costs. In average, the general costs of incineration and landfilling of residual waste in EU are:

- Incineration of residual waste: 64€/ton
- Landfilling residual waste: 56€/ton

Monitoring the implementation

- Quantity of biowaste collected [kg] or [number of bins]: the number of bins or bags can be chosen as a unit of measurement if it is not possible to weight biowaste collected, the average weight of a fulfilled bin will have to be estimated beforehand for further calculation
- Quantity of biowaste collected per capita: Quantity of biowaste collected / Number of customers [kg / customer]

Time frame

Start the monitoring at least one week before the starting phase to assess the effect of the practice on waste production.

- Quantity of waste produced and number of customers can be registered continuously (every day every week) or randomly (one day per week or every day one week per month) to compute a daily average each month: Quantity of organic waste collected / Number of customers / Day [kg / customer/day]

Resources

<https://ec.europa.eu/environment/emas/takeagreenstep/pdf/BEMP-8.2-FINAL.pdf>

<http://www.urban-waste.eu/eco-innovative-measure-forms/>

Installation of self-composting machine

Topic: Waste management

Objective: Preventing waste production

LEVEL 1

Description

The implementation of on-site composting concerns organic waste (vegetable and fruit peelings, egg shells, coffee bags, etc.) produced in hotels and their catering services. It is estimated that about 12% of the total food waste in Europe is generated by tourist establishments.

Whenever organic waste is not collected separately in your city or region, on-site composting is presented as a sustainable alternative to recycle food waste generated in restaurants, buffets, etc. and turn it into a valuable fertilizer.

The Hotel Tigaiga in Tenerife has installed an automatic composting machine that processes about 40 kilos per day, or about 1,200 kilos per month. So much material to not be transported by the waste management service, thus limiting the emission of greenhouse gases.

For tourist establishments with sufficient space outside there exist compost bins that facilitate the degradation of organic waste into a high-quality compost. Another option to treat organic waste is to implement worm composting bins (also called vermicomposters), which make use of earthworms to digest food waste and produce vermicompost. It is estimated that 1 kg of earthworms can consume up to 1 kg of organic waste per day. Therefore, a small area in the backyard, rooftop, garden, etc. should be provided and dedicated to composting activities.



Figure 56 Compost bin receiving organic waste from the kitchen

In case outdoor composting cannot be carried out due to limited space available, there are other options to undertake on-site composting, such as the use of electric composters. These are compact electronic

appliances which have a reduced size and do not produce odors or leakages. Although these systems require an electricity supply, they can be easily installed in the kitchen or maintenance room, do not require labour intensive activities and produce a high-value natural fertilizer.



Figure 57 Electromechanical composter (Eco-digesteur®) treats organic waste up to 100 covers/day (10 kg of food waste)

Besides food waste from the kitchen, green waste from gardens, green roofs, etc. such as plant cuttings, leaves and dead plants can be mixed and composted, which is actually necessary to obtain a good compost.

For food safety and hygiene issues, it is essential that putrescible waste that cannot be composted is periodically collected. In this sense, raw fish or meat and leftovers of cooked food should be avoided and not included in the compost bin.

Compost should be ready for use after 6-12 months (depending on the system, climate conditions, etc.), once it has turned dark brown and smells earthy. A great variety of outdoor bins as well as indoor electric composters are available nowadays so it is worth researching the market for each specific region.

The produced compost can be used as a fertilizer in green roofs, decorative plants, urban gardens, etc. providing an additional benefit to the establishment together with the decrease in organic waste disposed. This is of great importance for establishments growing their own plants and food, as it implies cost savings in fertilizers and it contributes to closing the nutrients' cycle (returning nutrients from vegetables and fruits back to the soil). In addition, compost could be sold in the market or donated to community gardens (using public/private areas), farmers associations, restaurant employees, non-profit organisations, etc.

Steps to follow to implement the practice

- Definition of responsibilities

Appointing of a responsible person (coordinator) to coordinate and promote the preparation, implementation and assessment of the measure. Training and appointing of a responsible person in charge of maintenance of composting bin and supervision of composting phases. Additionally, a “green team” including other staff members could support this task. Keeping periodic meetings between coordinator and person in charge of composting.

- Baseline analysis and quantification assessment
- It is important to involve all workers in this step so that they believe in the measure as it was their responsibility too and they commit to its implementation.
- Place the bins for collection of organic waste close to where food waste is generated e.g. kitchen, bar area, etc. Make sure the bins are clearly labelled and train and inform staff of what can be composted.
- Depending on the type of on-site composting system carried out, follow specific instructions so as to periodicity to feed the composter, parameters to be controlled (e.g. humidity, temperature, balance between green and food waste), potential problems (e.g. odours, insects), etc.
- Awareness activities and training of kitchen staff. Stimulate and motivate workers and staff in the preparation and implementation of the measure (e.g. separation of food waste). Staff could be encouraged in the participation if they can receive part of the compost obtained and take it to their own house.
- Communication of results

It can be interesting to finally publish or release the results obtained after implementing the measure to motivate workers and encourage other tourist establishments, as well as to increase the number of customers.

Stakeholders to involve

For the effective introduction and successful implementation of the proposed measure, the following key stakeholders should be involved:

- Hotel manager
- Kitchen, buffet, canteen, etc. staff (i.e. chef, kitchen assistants, etc.)
- Local farmers, non-profit organisations, urban farming associations, etc.
- Suppliers of composting bins (e.g. worm composting bin, electric composting bin, etc.)

Costs aspects

- Costs

The cost of composting bins varies depending on the type of bin/composter. It starts at about 100€. But many municipalities provide for free simple composting bins to households and restaurants. For electric composters, the price varies greatly according to the technology used and the volume of organic waste the machine is able to treat per day.

- Possible costs savings

Costs of fertilizers: If restaurants or hotels grow their own food, the compost produced could be used for these crops instead of buying fertilizers (organic or non-organic), translating into cost savings. The average price in EU for ammonia fertilizers is 352.5 €/ton.

- Revenues

If restaurants or hotels do not grow their own food, the compost produced could be labeled and sold to interested actors, like farmers, after a quality control process has taken place. In average, the selling market price in Europe for agricultural purposes is 6.1 €/ton.

- Financing options

Municipalities could provide interested hotels and restaurants with composting bins free of charge in return for the compost produced, which could be used for fertilizing public parks. In the same way, hotels could finance the initiative with the benefit obtained from the compost sold to farmers.

Monitoring the implementation

- Organic waste sent to the composter [kg] or [number of bins or garbage bags]: the number of bins or garbage bags can be chosen as a unit of measurement if it is not possible to weight waste produced, the average weight of a fulfilled bin or bag will have to be estimated beforehand for further calculation
- Number of customers [number]
- Quantity of organic waste sent to composter per capita: $\text{Quantity of organic waste sent to composter} / \text{Number of customers [kg / customer]}$

Time frame

- Start the monitoring one week before on-site composting is implemented to assess the effect of the practice
- Quantity of waste produced and number of customers can be registered continuously (every day every week) or randomly (one day per week or every day one week per month) to compute a daily average each month: $\text{Quantity of organic waste sent to composter} / \text{Number of customers} / \text{Day [kg / customer/day]}$

Resources

<http://www.urban-waste.eu/eco-innovative-measure-forms/>

<https://www.ecolabeltoolbox.com/fr/solutions-techniques/compostage-94>

<https://www.eco-digesteur.com/>

Objective 4 - Fighting against food waste

The main causes of food waste in commercial catering are the following: difficulty in assessing the number of meals to be served, quantities served that are not adapted to the customer's appetite, poor stock management or minimum orders imposed by certain suppliers. Food waste is costly: energy and water expenses for food preservation and preparation, transportation before purchase, waste management and of course the associated loss of staff time.

To fight against food waste, the following practices are proposed:

- **Calculated procurement of food stuff (level 1)**
- **Food waste prevention at buffets and restaurants (level 1)**
- **Encouraging guests to take away their leftover food (level 1)**
- **Food donation (level 1)**
- **Selling cooked leftovers through mobile apps (level 1)**

Calculated procurement of food stuff

Topic: Waste management

Objective: Fighting against food waste

LEVEL 1

Description

The UN estimates that 33% of the world's food is wasted. According to the FAO, 45% of fruits and vegetables are lost on average each year. This is the highest loss rate for food products. Finally, 125 g of perfectly consumable foodstuffs are wasted on average in commercial catering for each meal, which represents about 10% of the purchase price of raw materials.

Uneaten food has dire consequences: decomposing waste releases methane, a potent greenhouse gas.

One of the challenge to avoid as much food waste as possible is to estimate and procure almost an exact amount of foodstuff (fruits, vegetables, cooking ingredients, drinks, and other items) needed for guests and to make a fine management of stocks.

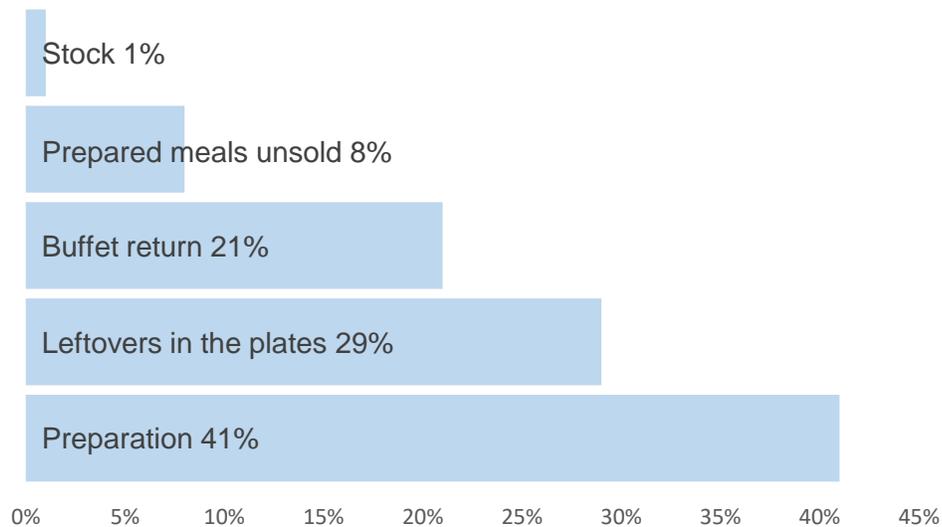


Figure 58 Main sources of food waste production (Swiss Hotel Association)

Steps to follow to implement the practice

Inventory management

- Systematically check the stock before procurement to avoid buying the same products again
- Place regular but smaller orders by prioritizing just-in-time work
- Optimize the management of raw materials by establishing a precise list of products to be prepared during the week
- Apply the golden rule of "first in, first out" for food storage
- Do a stock check at least once a week, noting what is thrown away

- Follow the storage instructions on the packaging
- Remove damaged fruits and vegetables that contaminate healthy ones
- Optimize sales forecasts to ensure that quantities are properly proportioned according to the number of customers (this prevents leftovers from accumulating)
- Encourage the reuse of by-products and sales withdrawals in other production or distribution channels when they are no longer saleable but still consumable
- Distribute and donate foodstuffs to charitable associations (see further “Food donation”)



Figure 59 Food storage in the fridge and control of temperature (source: blog-testo.fr)

Elaboration of the menu

- Give preference to daily menus
- Have a limited menu with less choice
- Use the same food for several recipes
- Include in the menu of the day products that are nearing the end of their shelf life

Management of quantities

- Favour reservations to have a better vision of the quantities to be produced and thus a better management of stocks, buy fruits and vegetables according to the demand
- Carry out minute cooking in order to avoid the preparation of large quantities of dishes
- Establish a precise weight for each dish in the technical sheets
- Adapt quantities to the cost of raw materials

Staff awareness step

- Raise staff awareness of the cost of purchasing raw materials, the impact of waste, good inventory management, increased surveillance of fragile products

- Draw up manufacturing protocol sheets mentioning the quantities of the different ingredients of the different dishes

Distributing food amongst the staff

- Use end-of-life products, unsold products for the staff meals
- Reheat bread from previous service
- Offer doggy bags to the staff of unsold products to take home

Examples of unsold food management

- Raw material waste: appetizers
- Bread: breadcrumbs, toast, pudding, French toast
- Chicken: rilette
- Vegetables: cream soup, mousse, purée, flan
- Fish : rilette, soup, smoked fish
- Meat : Parmentier, stuffed, bolognese, terrine
- Fruits : syrup, sorbet

Focus on breakfasts

- Raising customer awareness with posters in the breakfast room
- Set up a pre-order the day before: the client indicates what he or she would like to have for breakfast. This allows the client to know precisely the quantities of pastries, bread... to be provided for the next day
- Offer a table service that limits the waste linked to the all-you-can-eat buffet
- Offer a classic breakfast at a lower cost served in the room
- Bake baked goods as needed
- When possible, arrange bread so that guests can cut the quantity they need themselves
- During low traffic periods, prepare eggs and hot dishes on demand
- Reuse dry bread for other preparations: French toast, breadcrumbs, croutons

Stakeholders to involve

- Hotel managers and staff
- Catering service providers
- Health, safety and environment responsible within the hotel, etc.
- Kitchen staff (i.e. chef, kitchen assistants, etc.)
- Tourists/customers:
- Food banks, NGOs and charities working on food waste prevention and donations

Costs aspects

Costs:

- Human resources costs to train the staff and to optimize the management of procurement and stocks

- 0.34 €/client is the average cost of food waste (source: optigede.ademe.fr)

Cost savings:

- Potentially 0.34 €/client
- By preventing food waste at restaurants or buffets the number of bin lifts per week can be reduced and with this, the amount of food waste to be landfilled or incinerated. As a reference, average costs of incineration and landfilling of residual waste in EU are:
 - Incineration of residual waste: 64€/ton
 - Landfilling residual waste: 56€/ton

Monitoring the implementation

- Quantity of organic waste produced per capita: $\text{Quantity of waste produced} / \text{Number of customers}$ [kg / customer]

The amount of organic waste generated can be estimated by the number of garbage cans or bags used as a unit of measurement; if it is not possible to weigh the waste generated, the average weight of a filled garbage can or bag should be estimated beforehand for later calculation.

If possible, distinguish between 'avoidable' and 'unavoidable' food waste. Avoidable food waste: food waste that could have been consumed on site, such as plate returns, spoilage, etc.

Another possibility consists in measuring the quantity by type of food: fish, meat, bread, vegetables, fruits to identify

Time frame

Start the monitoring at least one week before the practice is put in place to assess the effect of the measure on waste production.

Resources

<https://hotelkitchen.org/>

https://umih.fr/export/sites/default/.content/media/pdf/UMIH-guide_gaspillage_0915.pdf

<https://umih.fr/export/sites/default/.content/media/pdf/UMIH-GUIDE-HOTELS-FINAL-1.pdf>

https://www.united-against-waste.ch/wp-content/uploads/2016/05/Hotelleitfaden_A4_FR.pdf

<https://librairie.ademe.fr/dechets-economie-circulaire/645-guide-pratique-reduire-le-gaspillage-alimentaire-dans-l-artisanat-des-metiers-de-bouche-9791029714047.html>

<https://opentextbc.ca/basickitchenandfoodservicemanagement/>

Food waste prevention at buffets

Topic: Waste management

Objective: Fighting against food waste

LEVEL 1

Description

It is estimated that around 12% of the total food waste in Europe is generated at tourist establishments such as buffets, restaurants, catering and canteens. This issue requires special attention as it immensely contributes to the total municipal solid waste generation in many cities in Europe.

To cope with this problem there exists a large number of actions and measures including:

- Prevention sign based (on consumer incentives or penalties)
 - consumers would be encouraged to take on its meal tray only the amount of food strictly necessary to meet its appetite. If at the end of the meal, the tray is shown empty and without leftovers, the consumer would receive an incentive or symbolic reward
- Adjustment of dishes size
 - evaluate and adjust the size of your meal portions if you find they are consistently being returned unfinished – and price offered menu items accordingly (remember that most people prefer food quality over quantity)
 - as a side practice to prevent other waste fractions, use serving containers in sizes that meet the portion needs of your menu items without having excess packaging material



Figure 60 Small dishes for the buffets of the hotel El Tope in Tenerife

- Re-use of edible leftovers
 - E.g. vegetable and meat trimmings could be re-used for soup stock
- Preparation of foods to order
 - E.g. just in time ordering to minimize waste due to over-preparation
- Adjust inventory levels on perishables to minimize waste due to spoilage or dehydration and incorporate a good stock rotation policy

- if a lot of dairy products are expired or vegetables or fruits get too dried, it might be a sign that a lot of products are being stocked and it is not being rotated properly

Whenever food waste cannot be prevented, consider donation of any extra food to a food bank.

Steps to follow to implement the practice

- The very first step should include the monitoring and identification of food waste so as to define an action plan and to address the challenges identified. Consider which type of food waste is being generated and where changes to reduce food waste could be made (see objective 1 1 Knowing its waste volume).
- Afterwards, a presentation and introduction of the practice should be provided to hotels personnel, at all levels. Communication campaign materials and continuous support/training should be distributed to all stakeholders involved to ensure participation and a proper understanding and uptake of the measures.
- Staff should be asked and interviewed for their input and assistance on what and how things can be done to minimize waste and could be rewarded for good ideas (besides increasing their participation and involvement). Including them in the decision-making process can translate into a higher productivity, better morale, lower costs and most importantly, less food waste generated.
- Along the implementation and operation phases of the measure, it is very important to promote the new activities to customers. Clients will not only appreciate the efforts and concern from the hotel, but they may potentially increase their support too (which would be translated into economic benefits).



Figure 61 Napkin with messages displayed in Guldsmeden Hotels in Copenhagen

- The last step should consist and conclude with measuring the efficiency of the actions adopted when comparing the results obtained after a trial period. The communication of results could follow, by sharing on the media or posting them, for instance.
- On top of it, new trusted employees should be periodically designated to be the “eyes and ears” for supervision and management of the practice as well as to identify areas where participation/cooperation is somehow not taking place (either by specific areas of the kitchen or certain

staff members). Keep a conversation with those not participating so as to determine if they understand the importance of the practice and the reasons behind their low interest.

Stakeholders to involve

- Hotel managers and staff
- Catering service providers
- Health, safety and environment responsible within the hotel, etc.
- Kitchen staff (i.e. chef, kitchen assistants, etc.)
- Tourists/customers
- Food banks, NGOs and charities working on food waste prevention and donations

Costs aspects

Costs:

- Some of the examples of practices mentioned above will involve no extra cost for the buffet of hotels implementing them. Nevertheless, the adjustment of dishes size will require the acquisition of new plates or the purchase of a sign to raise awareness among customers, which is expected to be a minimal cost.

Cost savings:

- By preventing food waste at restaurants or buffets the number of bin lifts per week can be reduced and with this, the amount of food waste to be landfilled or incinerated. As a reference, average costs of incineration and landfilling of residual waste in EU are:
 - Incineration of residual waste: 64€/ton
 - Landfilling residual waste: 56€/ton
- In restaurants and bars serving meals, food waste can be a significant cost. Consider the following: the initial purchase cost of raw ingredients, the cost of storing the food, the cost of preparing and cooking the food and the cost of disposing food waste.
- It is estimated that the value of a kg of food waste costs about 2€. Therefore, if you are disposing of a ton of food waste a year, you are throwing away 2,000€ of potential profits. If you decrease your food waste by 25% you not only decrease your waste costs, but you could also potentially save up to 500€ on food and energy related costs

Monitoring the implementation

- Quantity of organic waste produced per capita: $\text{Quantity of waste produced} / \text{Number of customers}$ [kg / customer]

The amount of organic waste generated can be estimated by the number of garbage cans or bags used as a unit of measurement; if it is not possible to weigh the waste generated, the average weight of a filled garbage can or bag should be estimated beforehand for later calculation.

If possible, distinguish between 'avoidable' and 'unavoidable' food waste. Avoidable food waste: food waste that could have been consumed on site, such as plate returns, spoilage, etc.

Time frame

Start the monitoring at least one week before the practice is put in place to assess the effect of the measure on waste production.

Resources

<http://www.urban-waste.eu/eco-innovative-measure-forms/>

Encouraging guests to take away their leftover food

Topic: Waste management

Objective: Fighting against food waste

LEVEL 1

Description

There are always times when guests are not able to finish all the food that they have ordered, and yet, more often than not, they perceive that it might be awkward asking the staff to pack up uneaten food, and indeed many luxury hotels do not even do so.

The distribution and promotion of small food containers to take home leftovers in restaurants, also called “doggy bags”, is an efficient way to reduce the production of food waste, considering that it is an important part of the waste produced by restaurants. Indeed, an average of 125 grams of edible food products are wasted per meal served in commercial restaurants. Hotel catering services can propose doggy bags or other food and drink containers to their customers when they have leftovers to avoid producing food waste.

A related measure would consist on the delivery of reusable bags to take away food from restaurants and other establishments offering food to take away. Interested restaurants and food providers could adopt this measure to reduce the amount of packaging and encourage customers to consider the benefits of waste prevention. In order to encourage customers to reuse these bags, every time they would take it to the restaurant and reuse it they would get a stamp on it. After reaching a certain number of stamps, the restaurant would reward them by, for instance, offering free desserts. This measure will result in a win-win situation that contributes to waste prevention, as customers obtain a reward from their good practices and restaurants will save money from the reduced number of bags to be purchased.



Figure 62 Doggy bag in preparation (source: Ici.fr)

Steps to follow to implement the practice

Depending on the type of stakeholders behind the initiative of doggy bags, several actions can be established to develop and promote the use of doggy bags in restaurants:

- selection of the type of containers/boxes/doggy bags
- equipment and training of the staff on the use of doggy bags
- awareness raising of the customers on the use of doggy bags (and system for reuse, stamps and rewards)

The information of the customers on this practice and its benefits, and the information of the restaurant owners, especially on the regulatory framework, are key factors during the implementation of this measure.

The EC has taken measures to clarify EU legislation related to facilitate donations without compromising food safety. In this sense, the Commission has published in June 2020 a series of EU-wide food donation guidelines for donors and receivers of food surplus.

Sanitary precautions:

- Advise the customer against giving the doggy bag food to any high risk group or persons with food allergies
- Food which is not eaten within 24 hours should be thrown away
- Some foods may not be suitable for a doggy bag e.g. If it has been outside temperature control for a given period (for service or display), or if it has already been reheated
- Refrigerate the food as soon as possible. Food left out of the fridge for longer than two hours may become unsafe due to bacterial growth and should be discarded

Stakeholders to involve

- Hotel managers and staff
- Kitchen staff (i.e. chef, kitchen assistants, etc.)
- Tourists/customers
- Waste management department of local authorities or suppliers of containers, boxes or bags

Costs aspects

Costs

- Costs of a container, box or bag: less than 1€

Costs savings

- Some municipalities provide the restaurants and hotels with doggy bags in order to avoid municipal treatment costs.

- Implementing doggy bags would reduce the amount of food waste generated and, hence, the costs of treating this fraction would be reduced/avoided. In average, the general costs of incineration and landfilling of residual waste in EU are:
 - Incineration of residual waste: 64€/ton
 - Landfilling residual waste: 56€/ton

Monitoring the implementation

- Quantity of organic waste produced per capita: $\text{Quantity of waste produced} / \text{Number of customers}$ [kg / customer]

The amount of organic waste generated can be estimated by the number of garbage cans or bags used as a unit of measurement; if it is not possible to weigh the waste generated, the average weight of a filled garbage can or bag should be estimated beforehand for later calculation.

- Doggy bags distributed to customers [number]

Time frame

Start the monitoring at least one week before doggy bags are distributed to assess the effect of the measure on waste production.

Resources

<http://www.urban-waste.eu/eco-innovative-measure-forms/>

https://ec.europa.eu/food/safety/food-waste/eu-actions-against-food-waste/food-donation_en

<https://www.finehotelsandsuites.com/media/fine-hotels-and-suites-sustainability-policy-stadsvilla-mout.pdf>

<https://www.lci.fr/societe/video-les-doggy-bags-deviennent-obligatoires-dans-les-restaurants-2190308.html>

Food donation

Topic: Waste management

Objective: Fighting against food waste

LEVEL 1

Description

The UN estimates that 33% of the world's food is wasted. According to the FAO, 45% of fruits and vegetables are lost on average each year. This is the highest loss rate for food products. Finally, 125 g of perfectly consumable foodstuffs are wasted on average in commercial catering for each meal, which represents about 10% of the purchase price of raw materials.

Leftover food can be donated to food banks and charities for further consumption. In this respect, food donation from restaurants and buffets to food banks and non-profit organisations can do a lot to reduce and minimize the amount of food waste generated, otherwise mixed with residual waste and thrown away (as in most cases selective organic waste collection is not provided).

There is a great number of non-profit and social organisations in Europe that collect excess and leftover food to provide for the needy. Depending on the country, however, there may be various legal and health/safety requirements to consider. Many hotels and restaurants have already adopted this practice.

The Hilton in Virginia (USA) announced an innovative food donation initiative to its 300 managed hotels across the USA and Canada, representing one of the largest hotel food donation programs to date. It expects to donate nearly 100 tons of food over the next year — enough to feed more than 160,000 people — while also diverting millions of pounds of food waste from landfills. Hilton hotels are encouraged to partner with local food rescue organizations to feed the hungry in their immediate communities.

The EC has taken measures to clarify EU legislation related to waste and food and facilitate donations without compromising food safety. In this sense, the Commission has published in June 2020 a series of EU-wide food donation guidelines for donors and receivers of food surplus.

Restaurants, bars, buffets, etc. are better protected from civil and criminal liability if a recipient would get ill or hurt as a result of consumed donated food. Donors are only culpable in cases of gross negligence or intentional misconduct (such as donating food from which others have already become sick).

Consequently, food donation from restaurants and buffets to food banks and non-profit organisations can do a lot to reduce and minimize the amount of food waste generated, otherwise mixed with residual waste and thrown away (as in most cases selective organic waste collection is not provided).

Steps to follow to implement the practice

- Appointment of the owner/manager or specific employee to be in charge of food donations (this will avoid mismanagement of food surplus, pick-ups and schedule for collection, etc.)

- Monitoring and identification of potential food to be donated so as to define the scope of the action plan (consider where, how much and which type of food waste is being generated in the kitchen, canteen, etc.).
- Before the initial donation is made, the establishment should contact the local health department and find out how donation is regulated.
- A presentation and introduction of the measure should be provided to hotels and restaurant personnel, at all levels. Including them in the decision-making process can translate into a higher commitment and better morale of involved staff.
- Communication campaign materials and continuous support/training should be distributed to all involved stakeholders to ensure participation and a proper understanding and uptake of the measure.
- Examples of actions to adopt when donating fresh products include:
 - Keep refrigerated items cold all the time; examine the items for any signs of decay, spoilage, mould or odours; store food products separately to prevent cross contamination; discard any cut items that have not been kept refrigerated, etc.
- Examples of actions to adopt when donating prepared food include:
 - Avoid dishes containing potentially hazardous foods that have been heated, chilled and reheated; store dishes in shallow, one-use recyclable aluminium pans or clear-plastic food-grade bags; package donations in smaller containers, such as shallow pans, rather than larger ones so that recipients can maintain the food's temperature and prepare only the amounts that will be consumed at once, etc.
- The responsible person in the restaurant or hotel should also be aware of where the food is destined and how it will be stored and handled until it is consumed (even if the food was perfectly safe when it left the restaurant, it could be mistakenly allowed to cool or thaw somewhere in transit, which could be harmful).
- Along with the implementation of the measure, it is very important to promote the new activity to customers. Clients will not only appreciate the efforts and concerns from the restaurant or hotel, but they may potentially increase their support too (which would be translated into economic benefits). The participating establishment could place a specific sticker/label on its front door to promote the measure.
- The last step should consist and conclude with measuring the efficiency of the actions adopted when comparing the results obtained after a trial period.

Stakeholders to involve

- Hotel or restaurant managers
- Health, safety and environment responsible within the hotel, restaurant, etc.
- Catering service providers
- Kitchen staff (i.e. chef, kitchen assistants, waiters/waitresses, etc.)
- Receiving organisations: food banks, charities and other non-profit social organizations working on food waste prevention and donations recovering food from donors and redistributing it to charity organisations, or directly receiving food from donors

- Homeless shelters, orphanages, homes for the elderly, drug rehabilitation centres, etc.

Costs aspects

Costs

- Transportation and distribution from the restaurant/hotel to food banks or charities. However, this expense could be covered by the receiving part, depending on their capabilities.

Cost savings

- Some EU countries have implemented a tax credit system or deductions for donated food in order to encourage restaurants and hotels to donate more food instead of throwing it away. In France and Spain, 60% and 35% respectively, of the value of food donated can be claimed as tax credit.
- Moreover, the amount of food waste that would be incinerated or landfilled would decrease, avoiding the costs of these alternatives. In EU, the average costs are :
 - Incineration of residual waste: 64€/ton
 - Landfilling residual waste: 56€/ton

Monitoring the implementation

- quantity of food donated [kg] or [number of boxes/trays]: the number of boxes or trays can be chosen as a unit of measurement, the average weight of a fulfilled boxes or trays will have to be estimated beforehand for further calculation
- quantity of food donated can be estimated by type: vegetables, bread/pasta, beef/lamb, chicken/pork, fish, etc.
- quantity of food donated / number of customers [kg / clients]

Time frame

Start the monitoring at least one week before food donation from hotels to charities to assess the effect of the practice. Quantity of food donated and number of customers can be registered continuously (every day every week) or randomly (one day per week or every day one week per month).

Resources

<http://www.urban-waste.eu/eco-innovative-measure-forms/>

https://ec.europa.eu/food/safety/food-waste/eu-actions-against-food-waste/food-donation_en

<https://www.ecowatch.com/food-waste-people-in-need-2649698860.html>

Selling cooked leftovers through mobile apps

Topic: Waste management

Objective: Fighting against food waste

LEVEL 1

Description

40% of the food produced in the world is thrown away. Rather than throwing off their cooked food, now hotels and restaurants can sell their cooked leftovers at a low price on Apps such as **Phenix** or **Too Good To Go**.

The principle is the same for both applications. It is based on the sale by commercial restaurants of surprise baskets at reduced prices made up of their unsold meal. They connect consumers with businesses whose products would otherwise have gone unsold and been disposed of. Anyone can simply download, log on, and get saving perfectly good, surplus food from nearby locations. Users choose the basket from the proposals according to their food preferences, buy it and pick it up on site. They can either view what's close by or search for specific meals with different options, such as collection time, location or type of food, for instance vegan or vegetarian.

Too Good To Go was founded in 2015 in Copenhagen and it saved its first meal in March 2016. After four years, its success can be measured in having moved from one city to 14 countries, 29 million meals being saved through the mobile application, and its more than 18 million users. The app involves for more than 38,000 restaurants, supermarkets, hotels, bakeries and canteens using it every month. At the end of 2019, the company was employing close to 500 people across Europe

Regarding other types of waste, such as the packaging used to contain the food, the company encourages its partners to allow consumers to bring their own containers as much as possible.

PHENIX was created in 2014 in Paris, their quick growth enabled them to open 24 local offices in France, 2 in Portugal, 3 in Spain, and 1 in Switzerland and to hire more than 100 people. In 5 years, **PHENIX** has saved 30.000 tonnes of products from the bin and distributed 60 million meals. The company offers several alternatives to food waste, in addition to selling at reduced prices on its app: donation to charities, donation for animal feed, as well as composting and methanization. Consumers do not know beforehand the products that they purchase.



Figure 63 Too Good To Go advertisement



Figure 64 Too Good To Go App

Steps to follow to implement the practice

- The choice of the most suitable app for your business will depend, on the one hand, on the availability of the App in your country and, on the other hand, on the density of the App's network of users and partners from which you can benefit
- Organize the packaging of unsold goods that will be offered via the App
- In case of below-expectation by the user reviews, ask the company's team for the support

Stakeholders to involve

- Hotel or restaurant managers
- Catering service providers
- Kitchen staff (i.e. chef, kitchen assistants, waiters/waitresses, etc.)
- *TOO GOOD TO GO* or *PHENIX* Sales Department

Costs aspects

Costs:

- *PHENIX* commission: 20% of the price of each basket of products purchased via the Platform when the price of the basket exceeds 5 euros including all taxes; 1 euro per basket of Products purchased via the Platform when the price of the basket is less than or equal to 5 euros all taxes included
- *TOO GOOD TO GO* commission: 1.09 euros per basket and 39 euros in annual administrative costs. Beyond 4 euros, 25% commission is charged.
- Cost of container if the client does not bring it

Cost savings:

Hotels

- Cost for storage and disposal (between 100 and 200 euros per tonne).
- Price of the basket sold

Consumers

- Consumers have access to a 3 to 5 euros “magic bag” with an original value of 10 to 15 euros. In general one third of the price.
- For 20 euros per month, consumers can subscribe to a weekly 3kg basket. They can also buy a basket once in a while for 6 euros by checking on the app what is available around them.

Monitoring the implementation

- quantity of food sold via the App [kg] or [number of boxes/trays]: the number of boxes or trays can be chosen as a unit of measurement, the average weight of a fulfilled boxes or trays will have to be estimated beforehand for further calculation
- quantity of food sold can be estimated by type: vegetables, bread/pasta, beef/lamb, chicken/pork, fish, etc.
- quantity of sold donated / number of customers [kg / clients]

Time frame

Start the monitoring at least one week before the first sale via the App to assess the effect of the practice. Quantity of food sold and number of customers can be registered continuously (every day every week) or randomly (one day per week or every day one week per month).

Resources

<https://toogoodtogo.com/en-us>

<https://wearephenix.com/>

https://zerowasteurope.eu/wp-content/uploads/2020/01/zero_waste_europe_CS7_CP_TooGoodToGo_en.pdf

https://zerowasteurope.eu/wp-content/uploads/2019/06/zero_waste_europe_cs5_CP_phenix_en.pdf

Objective 5 – Promote recycling and reuse

Re-use, recycling and repair consist in giving a second life to a product in order to avoid its destruction and to limit the consumption of raw materials associated with the manufacture of a new product. This applies to all types of goods: furniture, textiles, bedding, etc. as described in the following practice:

- **Donating or recycling unusable furniture, textile, mattresses and box springs**

Donating or recycling unusable furniture, textile, mattresses and box springs

Topic: Waste management

Objective: Promote recycling and reuse

LEVEL 1

Description

Furniture, mattresses and box springs are often replaced at hotels and in many cases disposed of as waste even when these are still functional. In this respect, hotels can liaise with charities, non-profit and social inclusion organisations to donate such items while promoting reuse initiatives.

Donated things from hotels could be first recovered, for instance, by social inclusion institutions or employment centres which are also authorised waste managers. After collection and before reuse, donated items could be properly managed and repaired, if necessary, by workers with special needs or at risk of social exclusion.

Examples of no longer required things from hotels which could be reused in collaboration with charities are:

- Furniture: used pieces of furniture can be donated as reusable items for refurbishment of low-income households, second-hand shops or donated to local charities, schools and small businesses



Figure 65 Stock of unused furniture (source: hotelfurniture.com)

- Mattresses and box springs: many organisations accept donations of such goods for refurbishment and second-hand selling (If it is still in good condition). They can also be recycled very well. Once they are dismantled the different materials such as metal, foam and textiles (cotton, felts, polyester, wool...) can be recovered to at least 80% into various products, such as the following, rather than being diverted to a landfill:
 - Steel springs: tools, automobiles, construction materials
 - Wood: tempered flooring, particle board shelving and a variety of pressed wood products

- Cotton fibres: oil filters, mats, and stuffing
- Quilt scrap: carpet padding



Figure 66 Mattress recycling workshop (source: secondly.fr)

- Textile waste (e.g. staff uniforms, bathroom linen, bed linen, blankets, curtains, etc.) can be donated to a company in the circular economy that will be happy to recover old textiles to give them a new life. For instance, Le Rouquin Qui Roule in France collects the waste and upcycle them into different products such as bicycle bags made from upcycled materials

Steps to follow to implement the practice

Involve the staff

- The first step before launching any reuse initiative should be the monitoring and assessment of the type of waste generated in the hotel, including the identification of items and waste fractions which could be potentially reused
- It is also important to ask hotel staff for their input and assistance on what things can be reused to minimize waste and reward them for good ideas. Including them in the decision-making process can pay dividends in higher productivity, better morale and most importantly, less waste
- In that sense, employees should be able to benefit from the discarded goods from the hotel. Once the inventory of goods to be reused has been done, the hotel could organize a specific event for employees to pick things up or have a specific room to store those things where employees could serve themselves. Afterwards, items not collected by employees would be donated to charities
- If a little workshop is provided, the furniture can be repaired and used bed or bathroom linen can be transformed into reusable rags or bulk bags by some of the staff

Communicate with the guests

- As some of the measures are connected to the behaviour and commitment of hotel clients (e.g. use of towels, bed linen, minibar fridge, etc.), it is important to communicate with them about the

environmental achievements so that they feel part of the initiative and become key participants in the reduction of generated waste

- Hotels could use a reuse sticker/label that states they are participating in such a project

Establish a partnership with charities

- In case of change of furniture, contact the local associations which can recover them to give them a second life
- The establishment of collaboration agreements as well as effective communication channels with charities and other organisations will be essential to ensure the continuity of such initiative and a long-term effect

Modify the purchasing policy

- Consider whether leasing equipment or hiring services would be more cost-effective than outright purchase. Often, contracts for leasing or hiring equipment are combined with regular maintenance contracts, supply of accessories and spare parts, and periodic replacement with new models
- This can eliminate the need to buy, maintain and, ultimately, dispose of equipment, while minimising environmental impacts
- If you do not want to lease equipment, consider purchasing used and refurbished equipment.
- The policy should also encourage the consideration of the length of warranty and availability of repair services when purchasing new furniture and equipment
- You can also consider leasing or hiring staff uniforms instead of buying them outright
- Generally, the leasing company will be responsible for all alterations, repairs and replacements

Stakeholders to involve

- Hotel managers
- Maintenance and housekeeping department at the hotel (responsible person, cleaning staff, etc.)
- Local charities, second-hand shops, reuse centres and social inclusion organisations
- In France, *Valdelia* and *ÉcoMobilier* are the eco-organizations that structure the management of furniture waste including mattresses and box springs according to the principle of extended producer responsibility (EPR). They are in charge of collecting used furniture and include in their network actors from the social economy sector in charge of refurbishing and reusing it.

Costs aspects

Costs

- Transportation costs from the hotels to the charities. Take into account the vehicle, personnel and fuel related costs. Unless an agreement is reached with the charity which can cover transportation expenses while receiving the goods free of charge.

Cost savings



- The reuse of these goods will reduce the residual waste that would need to be treated by incineration or landfilled and, therefore, will reduce the costs incurred. In average, the general costs of incineration and landfilling of residual waste in EU are :
 - Incineration of residual waste: 64€/ton
 - Landfilling residual waste: 56€/ton
- Bulky waste collection costs: it varies greatly among Member States, but for example, the cost in Paris region can range from 45€ to 75€/m³, depending on the type of waste, the size of container, collection frequency, collection area and service provider
- Possibility in France to invoice customers for an eco-contribution to be paid to the eco organizations *Valdelia* or *ÉcoMobilier* that structure the management of furniture waste according to the principle of extended producer responsibility (EPR).

Monitoring the implementation

- Number of items donated by types: big furniture items, small furniture items...
- To assess the quantity of items donated in kg, the average weight of each item donated can be estimated in kg beforehand
- Average number of years of usage of items
- Keep a record of this information for follow-up over time

Resources

<http://www.urban-waste.eu/eco-innovative-measure-forms/>

<https://www.zerowastescotland.org.uk/reduce-waste/how-to>

<https://www.lhotellerie-restauration.fr/journal/equipement-materiel/2019-10/mobilier-et-equipements-usages-cinq-idees-pour-leur-offrir-une-nouvelle-vie.htm>

<https://www.valdelia.org/>

<https://www.eco-mobilier.fr/page/working-together-to-give-new-life-to-old-furniture/>

<https://lerouquinquiroule.com/>

3.2.7 Water conservation

Among the levers of a more responsible and sustainable tourism, it appears that the control and reduction of water consumption in a hotel establishment is essential. There are several reasons for this: global warming implies a change in behaviour with regard to water consumption, whether you are a professional or an individual. For both, the potential for reducing consumption is significant. Indeed, a tourist's water consumption is higher than a resident's water consumption. A European tourist consumes around 300 litres per day compared with a European resident consumption of 100 - 200 litres per day, averaging approximately 150 litres (EEA, 2009; EC, 2009, Eurostat, 2011; Gössling et al., 2011). This tourist water consumption includes daily room cleaning, daily laundry, maintenance of swimming pools, intensive kitchen activities, and a 'pleasure approach' to showers and baths.

Example of average water consumption for a 3* hotel:

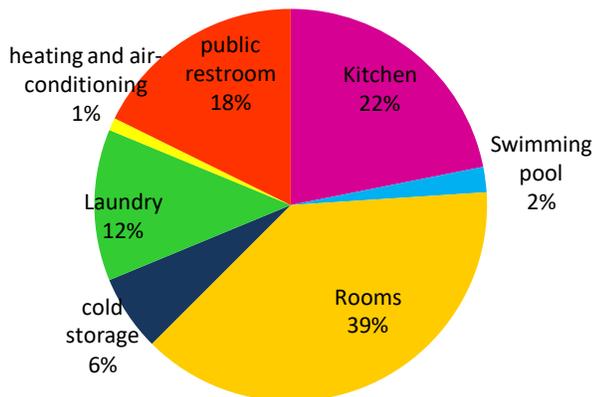


Figure 67 Average water consumption (source: CCI Pas de Calais)

	Good use	Poor consumption
Hotel 1, 2 and 3 ☆ :	< 150 liter / night	> 200 liter / night
Hotel 4, and 5 ☆ :	< 170 liter / night	> 220 liter /night
Restaurant	< 20 liter / meal	> 30 liter / meal
Camping	< 120 liter / night	> 160 liter / night
Bed and Breakfast	< 125 liter / night	> 175 liter / night

Several advantages appear in the implementation of a water consumption reduction policy:

- Preserve natural resources
- Save money, as water consumption is one of the major costs of running a tourist accommodation
- Communicating on its water saving policy is also an asset for customers, who are more and more concerned about the environmental commitments of tourism professionals
- Encourage suppliers and partners by informing them of the commitment to save water and encourage them to act⁴.

Water conservation also includes the issue of improving the quality of wastewater by striving to use only environmentally friendly household products.

⁴ CCI Pas de calais : Fiche environnement : « Les gestes pour économiser l'eau »

The reduction of water consumption beyond the identification of possible leaks implies an adaptation of the behaviors of both the team in place and the customers for an increased vigilance as for the use of water. Particular attention should be paid to all the places that require water: bathrooms, toilets, kitchen, laundry, garden, swimming pool... and to the tasks that are carried out there (cleaning, cooking, maintenance, hygiene...).

Specific, economical equipment can help to reduce water consumption, but it must be complementary to a strong awareness and an adaptation of the behavior.

- Raising customer awareness :
 - Communicate about the company's environmental commitments to customers via the website, for example, on the actions implemented and the eco-actions to adopt in terms of water saving
 - Promote the environmental labels or certifications obtained
 - Raise awareness among customers to reduce the volume of laundry (towels, bed linen) to be washed
- Raising staff awareness :
 - Efficient housekeeping: One of the first steps is to consult staff in order to adapt the objectives and tasks to be implemented, particularly for staff in charge of cleaning rooms, the laundry and the kitchen. This will ensure that they are adapted to their mission and therefore achievable.
 - For the cleaning of rooms, propose techniques that allow the rooms to be cleaned and minimise water consumption :
 - Turn off the water when cleaning the sink, shower or bathtub
 - Flush the toilet only once to rinse the cleaning products used
 - Use sponges or microfiber towels adapted to cleaning operations (saving water and cleaning products)
 - For concentrated cleaning products, facilitate dilution operations by clearly marking the filling level of the bottles. Rinsing with clear water will be facilitated and therefore save water
 - Raising staff awareness of leak detection, water recovery and water efficiency
- Raising suppliers :
 - communicate its water reduction policy and encourage them to do the same in their company
 - For example replacing liquid soap with soap flake dispensers will indirectly reduce the supplier's water consumption. Indeed, liquid soap contains a lot of water unlike bar soap

This part presents environmental management practices required to measure, monitor, manage and reduce water consumption in order to have a more cost-effective and environmentally sound water management system. It is structured in 5 objectives:

- 1. Knowing and controlling its water consumption**
- 2. Reducing its consumption**
- 3. Diversifying its water supply**
- 4. Optimizing pool maintenance**

Objective 1 - Knowing and controlling its water consumption

Having a very global, very basic understanding of the domestic water cycle up to its arrival and then its departure from the establishment is also a way of understanding the issues at stake in terms of economy and pollution. This very educational information is a starting point for raising awareness.

The small water cycle



Figure 68 : the small water cycle (source: Office international de l'eau)

This objective will be reached through the following practices:

- **Installation of sub-meters in water-using areas (level 2)**
- **Measure of water flow: flow meter and smart plughole (level 2)**

Installation of sub-meters in water-using areas

Topic: Water conservation

Objective: Knowing and controlling its water consumption

LEVEL 2

Description

Knowing your water consumption is the starting point for a proactive water reduction policy. It allows you to monitor your consumption and then to initiate a reduction policy based on your consumption. It also allows you to measure the progress to be made and to set targets over time.

There are several ways to monitor consumption:

- Tracking consumption with water bills from the last 3 to 5 years
- Reading the water meter outside the building, at the point where the water enters the building
- Installing water meters inside the building at the entrance to one or all of the water consuming areas
 - Kitchen
 - Room sanitary facilities
 - Laundry
 - Swimming pool
 - Garden

Monitoring by item makes it easy to identify high consumption sites that need to be addressed as a priority. The sub-meters provide an extremely detailed identification of the building's consumption. While this allows precise action to be taken on each of the stations, it means that a person must be assigned to carry out this monitoring. It is up to the hotelier to consider whether the involvement of both material (installation of several meters) and human resources (time spent reading and monitoring the meters) is necessary to implement a policy of saving water consumption.

This assessment, based on a better knowledge of consumption, is the starting point for implementing a reduction policy. To establish this policy over time, monitoring will be very useful to

- Checking the effectiveness of the savings policy
- Communicating with employees about the improvements and savings they have achieved
- Communicate with their customers, who are aware of environmental policies.

Assessing your consumption is the starting point for better water management.

Steps to follow to implement the practice

- Identify where the water that is used comes from. Most often, it comes from the public network, but it can also come from rainwater, a spring or a nearby well...

- Drawing up an inventory of water consumption, having an estimate at a precise moment of the quantities of water consumed, of its use... this information will be the reference point for the evaluation of the progress made.
- Identify the water consumption points as well as those that only require drinking water (catering, showers, cold rooms, etc.) or for which it is not necessary (laundry, cleaning of floors and sanitary facilities, garden, etc.)
- draw up an annual, monthly or weekly monitoring table, possibly in litres of water (more meaningful than cubic metres). Meter monitoring can be done for the last 3 years, ideally for the last 5 years for the meter(s).

Resource	Building / site concerned	Use	Origin of water	Possible alternatives
Drinking water	Building 1	- Sanitary - restauration	Drinking water from the city network	None
		- watering		Rain water
Water from a well	none	No used	Ground water	

- Analyse the data collected (identify exceptional years or months), try to explain them (seasonality, increase in hotel occupancy, etc.). Qualify, if possible, its consumption in relation to the average for similar sites, particularly high in relation to others... For example: 150 to 300 litres/night for a hotel up to 2 stars, 400 to 600 litres/night for a hotel above 2 stars.
- Have sub-meters installed or read existing sub-meters to get a more accurate analysis of water consumption and to identify areas of particularly high consumption. Sub-meter key areas such as the kitchen, laundry, garden, bedrooms, etc.

Water meter

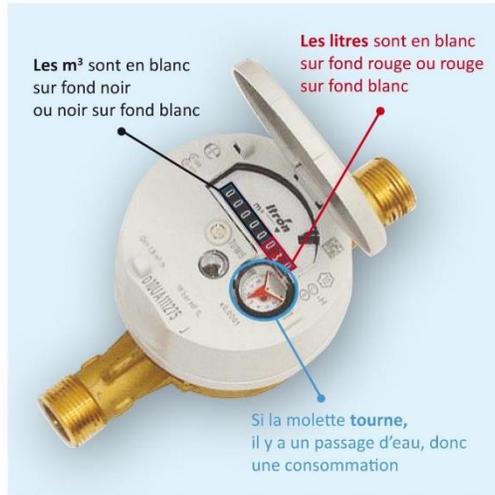


Figure 69 : Water Meter
(Source : <https://semv.fr/particuliers/ma-facture/lire-mon-compteur-deau/>)

Sub-meter or divisional water meter :



Figure 70 : Sub-meter or divisional water meter
(Source : <https://www.mon-actualite.com/differents-types-compteurs-eau-divisionnaires-2089.html>)

- Sub-metering provides a detailed analysis of water consumption for each use. It is important to first consider whether it is necessary to implement it, perhaps depending on the size of the facility. It is also important to consider the amount of time required to regularly monitor the meters and analyse the data.
- The analysis of sub-meters allows the identification of unusual areas of over-consumption (leaking taps, buried pipes, taps for drawing water, etc.). Indeed, malfunctions can have a significant impact on overall consumption:

Oozing faucet	0.1 litre per hour	1 m3/year
Small drip	0,5 litre per hour	5 m3/ year
Dripping tap	1,5 litres per hour	15 m3/ year
Slight flush leak	3 litres per hour	30 m3/ year
Water tap	10 litres per hour	90 m3/ year
Leaky toilet flush	30 litres per hour	250 m3/ year

- Based on consumption, set short-, medium- and long-term water reduction targets for all workstations. Implement them through an action plan involving all staff and customers.
- Monitor the meter(s) to measure the effectiveness of the actions undertaken by the results obtained and finally to ensure the relevance of the measures taken. Redirect them if necessary. Share the

results with the team in order to become aware of the impact of their behaviour and with the clientele from a more promotional perspective.

Stakeholders to involve

- Hotel or restaurant managers and staff
- Health, safety and environment responsible within the hotel, restaurant, etc.

Costs aspects

Costs

- A conventional water meter (pipe diameter less than 15 mm) has a cost of about 50 € HT. Including installation, it is necessary to double the cost, or even a maximum of 200 € in places that are not easily accessible.
- The price of a meter is much higher as soon as the diameter of the pipe increases. If it is necessary to build a manhole to install the meter, the cost is higher: prefer an installation on an internal pipe.

Costs saving

- The installation of a meter makes it possible to ensure monitoring, savings will be made thanks to the detection of leaks and the implementation of a global water saving policy in a second phase

Monitoring the implementation

- Monitor the results obtained month by month;
- Analyse developments to ensure the relevance of the actions taken and, in the event of deterioration, identify areas for progress and modify the action plan consequently.

Ressources

Hébergeurs touristiques : quelles actions mettre en place pour un tourisme durable ?, Ademe Bretagne, avril 2021

<https://www.mada-hotels-consultant.com/dix-astuces-limiter-consommation-deau-hotel>

<http://responsalliance.eu/rplearn>

https://www.jeconomiseleau.org/images/stories/content/guide_tertiaire_445.pdf

Measure of water flow: flow meter and smart plughole

Topic: Water conservation

Objective: Knowing and controlling its water consumption

LEVEL 2

Description

The water flow rate is the amount of water that can flow out of the tap in a given time. It can be measured with a flow meter, direct reading, sub-meter as discussed in the previous practice "Installation of sub-meters in water-using areas" or with a smart plughole.

A flow meter (such as a measuring cup) can be used to measure the flow rate of water from taps and showers. It provides information in liters per minute and liters per hour. It can be used to identify high inlet water pressures that would result in over consumption of water. There are reference flow rates at the outlet of taps (French standard) that supply washbasins. It is fixed at 12l/ minute (under 3 bars). For showers, the flow rate is around 15 litres/minute.

It is also possible to use a smart plughole that measures the number of litres used each time the tap is turned on. This practice is intended to make customers aware of their water consumption. This product has been developed by Roca, a company specialised in taps and sanitary ware.



Figure 71 : Smart plughole

(Source : <https://www.helloyok.com/es/english-how-to-reduce-water-with-a-smart-plughole/>)

Steps to follow to implement the practice

Very simple to use, this practice does not require any arrangement to be implemented

Stakeholders to involve

- Hotel or restaurant managers and staff
- Health, safety and environment responsible within the hotel, restaurant, etc.
- Kitchen staff (i.e. chef, kitchen assistants, etc.)
- Tourists/customers

Costs aspects

Costs

- The price of the smart plughole is not specified

Costs saving

- Savings may be linked to awareness of water consumption

Monitoring the implementation

Compare the results obtained month by month.

Resources

<http://www.roca.fr/>

Objective 2 - Reducing its consumption

Bathrooms account for about 40% consumption of water in hotels. Therefore, water conservation and efficiency measures such as the installation of water-efficient fixtures in the bathrooms of hotels and similar accommodations could be an effective approach.

A flow meter (such as a measuring cup) can be used to measure the flow rate of water from taps and showers. It provides information in liters per minute and liters per hour. For example, a standard flow rate for faucets is 12 liters per minute, but with a flow limiter (a foamer) it can be reduced to 5 liters per minute. For a shower, the standard flow rate is 14 liters per minute.

The reduction of water consumption beyond the identification of possible leaks implies an adaptation of the behaviors of both the team in place and the customers for an increased vigilance as for the use of water. Particular attention should be paid to all the places that require water: bathrooms, toilets, kitchen, laundry, garden, swimming pool... and to the tasks that are carried out there (cleaning, cooking, maintenance, hygiene...).

This objective will be reached through the following practices:

- **Reuse of towels and bed linen (level 1)**
- **Installation of low-flush / dual-flush toilets (level 1)**
- **Installation of water-free urinals (level 2)**
- **Installation of water-efficient bathroom fixtures (level 1)**
- **Installation of sensor-controlled water faucets and thermostatic shower controls (level 2)**
- **Nudge communication: sand timer for hotel showers (level 2)**
- **Selecting native plants for gardens and optimizing garden operations (level 2)**
- **Optimizing laundry and kitchen operations (level 2)**

Reuse of towels and bed linen

Topic: Water conservation

Objective: Reducing its consumption

LEVEL 1

Description

This practice involves raising the awareness of customers. Until recently, bed linen, towels and bath mats were changed every day. This practice leads to a high consumption of water. Indeed, it can be estimated that a classic room requires the use of about 4 kg of linen. The cleaning of the room requires an estimated 60 litres of water. It is therefore possible for customers who stay several days in a row not to change the linen every day but to propose to change it once or twice a week. This usage allows for considerable water savings.

This practice is only a proposal made to the client, who is free to decide whether or not to implement it. However, there are ways to encourage them to do so. It is becoming more and more common to see this practice.

This practice needs to be made available to customers with accurate information about the possibility of reusing towels and bed linen, to facilitate the hanging of towels, to allow for efficient air drying and to inform staff about this use.

In addition, the choice of quality, material and weight of the linen has an influence on the amount of water used during washing and drying.

Steps to follow to implement the practice

Inform the customer about the possibility of keeping their elite linen and towels for several days in case of a medium or long stay. This is usually done by means of posters encouraging this reuse. They are placed in a visible place in the room or in the bathroom.



Figure 72 Panel encouraging reuse

They can contain the following information:

- The importance of water and the need to conserve it
- The amount of water saved through the practice of reusing their laundry

A request from the institution to help them conserve water

A clear description of the procedure to be followed with the implementation of a change of towel on request of the client. For example: *towels hanging on towel rails will not be changed.*

It is very important that an accessible and easy/quick to use towel rack is provided for the customers. It should allow for efficient storage and drying of towels between uses. They should be placed within easy reach of customers (ideally at an average height between waist and shoulders if space permits)...



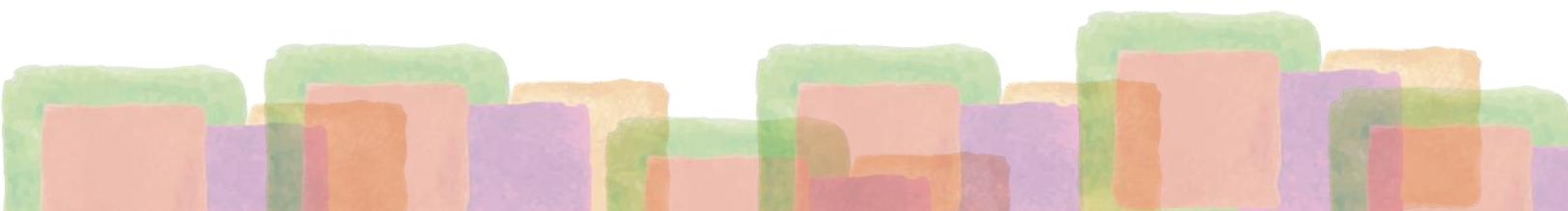
Figure 73 Poster encouraging reuse

This practice will be all the more effective if the staff in charge of cleaning the rooms are informed of the established procedures: a towel should not be changed if it is hung up. For medium and long term stays, it is necessary to specify in the control register the date of the change of sheets.

It is also important to communicate the impact of this practice in the environmental programme of the store. It also helps to raise customer awareness of their involvement in the environmental policy

Stakeholders to involve

- Hotel managers and staff
- Health, safety and environment responsible within the hotel, restaurant, etc.
- Tourists/customers



Costs aspects

Costs

- There is no additional cost to implement this procedure

Costs saving

- Water and energy savings are achieved, as well as a reduction in washing products. Example : For a room with 75 % occupancy and 4 kg of laundry per room night open year around, and at a laundry service cost of EUR 0.50 per kg, annual laundry costs would equate to 479 €. Thus laundry costs for a 100-room hotel could be EUR 47 900 per year, and a textile reuse rate of just 5 % could save almost 2 400 € per year

Monitoring the implementation

The monitoring of meter readings and water bills are the indicators to be followed to measure the impact of this practice.

Resources

Hébergeurs touristiques : quelles actions mettre en place pour un tourisme durable ?, Ademe Bretagne, avril 2021

<https://www.mada-hotels-consultant.com/dix-astuces-limiter-consommation-deau-hotel>

<https://www.voyageons-autrement.com/communication-tourisme-durable-actions>

Guide ADEME « 40 trucs et astuces pour économiser l'eau et l'énergie » 2019 :

www.ademe.fr/sites/default/files/assets/documents/guide-pratique-economiser-eau-energie.pdf

Guide du bâtiment durable: <https://www.guidebatimentdurable.brussels/fr/accueil.html?IDC=1506>

<http://www.greentourism.eu/en/BestPractice/Details/1>

Installation of low-flush / dual-flush toilets

Topic: Water conservation

Objective: Reducing its consumption

LEVEL 1

Description

The most commonly used toilets are the push button gravity tank toilets. The most economical to purchase, they are typically used in accommodation facilities. They do not require a high water pressure supply, are gravity fed and have lower installation costs. However, they are relatively fragile and are vulnerable to water leakage: particles can alter the sealing of the joints and the use of rubber also. These toilets therefore require regular inspection.

Dual flush is a practice that relies on the improvement of an equipment: the toilet flush. It is increasingly common to find dual flush toilets in private homes as well as in hotels. This use allows a significant reduction in water consumption in sanitary facilities. The objective in this practice is to improve the functioning of existing equipment without having to replace the tank, by replacing the old flushing mechanism with a new one. This investment is all the more interesting as it can concern equipment that is used frequently (more than 15 times a day) for communal toilets such as those near restaurants.

This mechanism has two buttons, usually one smaller than the other. The size of the buttons corresponds to the amount of water that each can release. Thus, it is possible to choose to activate one or the other depending on the quantity of elements to be evacuated from the bowl.

Steps to follow to implement the practice

The first simple practice to implement is that of reducing the volume of water used by flushing. By installing a volume (such as a water bottle filled with 1 liter or more) the flush will fill faster using less water. Also float arm may be adjusted to lower the fill level.

The two-touch flush is available in 2-4 litre and 3-6 litre sizes. Only the cistern is smaller:

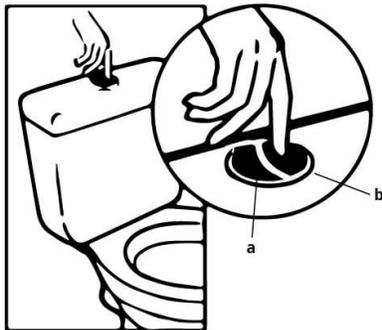


Figure 74 Dual flush button (source: Ungfu Mall)

For the 3-6 litre flush: If 5 flushes of 9 litres from a conventional flush are replaced by 2 flushes of 6 litres and 3 flushes of 3 litres, 24 litres of water are saved, i.e. 53%. Toilets equipped with dual flushes of 2-4 litres per flush save 55-78% water compared to a 9 litres flush.

Some models allow the volume of water released to be precisely adjusted by the smaller of the two knobs. This is a more elaborate mechanism that is really cost-effective in terms of water consumption.

Even if the operation of a dual flush toilet is relatively intuitive, its use implies an awareness of its use. Indeed, it must be adapted to the expected discharge. The sanitary cleaning team must also be made aware of the use of this flush: flush only once while choosing the right flow rate.



a - Small button = small flush

b - Large button = large flush

Figure 75 ; Dual flush toilet
(Source :<https://www.laissepascouler.fr/>)

To take it a step further: there is now a single push button: This system releases the water from the flush in a controlled manner. It stops the water flow as soon as the faeces have been removed from the toilet without having to wait for the tank to empty. This results in significant water savings: 20€ to 80€.

Stakeholders to involve

Health, safety and environment responsible within the hotel, restaurant, etc.

Tourists/customers

Costs aspects

Costs

- Two types of flushes are available:
- 3-6 litre double shot cost: 25 € on average
- 2-4 litre double-flush Cost: 30 € on average

Costs saving

- On water consumption: A dual flush mechanism saves up to 50% water compared to a conventional flush

Monitoring the implementation

Monitor the results obtained month by month.

Resources

<https://www.laissepascouler.fr/nos-reductions/chasse-deau-a-double-commande/>

https://www.alec-montpellier.org/UserFiles/File/Collectivites/guide_methodo_eau.pdf?amp

http://www.ecolabeltoolbox.com/files/marketing/Mon_hotel_et_lenvironnement_-_Partie_1_Connaitre.pdf

http://www.ecolabeltoolbox.com/files/marketing/Mon_hotel_et_lenvironnement_-_Partie_2_Agir.pdf

Installation of water-free urinals

Topic: Water conservation

Objective: Reducing its consumption

LEVEL 2

Description

In an effort to reduce water consumption, different types of toilets are proposed. Those with a tank that works with gravity, those with pressure, there are now toilets without water. Several types exist. Some campsites already have dry toilets where sawdust replaces the use of water. But this is often used for outdoor toilets. The sawdust is then reused as compost. Toilets with a urine collection system are also being considered. This separate collection of urine allows it to be recycled as natural fertiliser and no chemical fertiliser is used for food production. A system to recover nitrogen and phosphorus from urine. If this latter collection can be envisaged in a hotel environment, but rather during the construction of the establishment, dry toilets are more common for outdoor accommodation.

Water-free urinals are best installed in communal toilets, not in bedrooms. The advantage of this system is that waterless urinals need to be connected to a drain, there is no need to install the plumbing that carries water to the drain, which can be a sizable saving.

Steps to follow to implement the practice

Consider installing water free urinals in communal toilets (near the restaurant or hotel reception).

There are two types of dry toilets that rely on source separation of liquids (urine) and solids (faeces and toilet paper)⁵ :



Figure 76 : Water free urinals (source : <https://www.lovelytoilettes.com/procedes-techniques-2/>)

⁵ <https://www.lovelytoilettes.com/procedes-techniques-2/>

Standard Separate Dry Toilet: The split bowl allows liquid and solid waste to be separated. This does not require any intervention from the user, but requires a sitting position only. The urine is discharged into the existing grey water system or collected in a separate tank for further use. This type of dry toilet is recommended for episodic use or for use by less than 15 people at the same time (tourist lodging, refuge with few beds, etc.). Different models and brands available (Separett, Wostman).

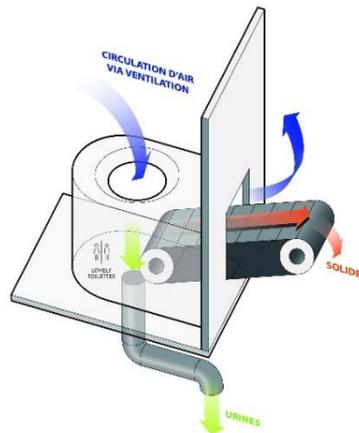


Figure 77 : segregated dry toilets
(source : Ecodomeo)

Large capacity segregated dry toilets: The most common large capacity system includes a discharge belt: instead of flushing the toilet, a foot pedal or manual control is used. This then activates the belt, which discharges the solids into a composting box, which can be set back or offsets. By gravity, the urine is directed under the seat and treated separately (in a tank or via a phytodepuration device for example). Solids can be treated by dehydration or vermicomposting. No sitting required. The solution for medium and high traffic. Can absorb heavy traffic (preferable for tourist sites). Potential manufacturer: Ecodomeo.

Stakeholders to involve

- Health, safety and environment responsible within the hotel, restaurant, etc.
- Tourists/customers

Costs aspects

Costs

- Standard Separate Dry Toilet; approximately € 950 per unit, Large capacity segregated dry toilets from € 2400 to 2800 € per unit.
- Installation on quotation

Costs saving

- The water saving achieved. The Willard Intercontinental in Washington D.C. (USA) implemented water-free urinals resulting in savings of 95,000 gallons of water in 2005

Monitoring the implementation

Monitoring of water consumption by pre-periodic meter reading

Resources

<https://www.lovelytoilettes.com/procedes-techniques-2/>

<https://www.maison-ecolo.com/toilette-seche.html>

<https://separett.com/en>

<https://www.ecodomeo.com/en/accueil-en/>

Guide Méthodologique (smegreg) Analyse et réduction des consommations d'eau dans les établissements tertiaires : https://www.alec-montpellier.org/UserFiles/File/Collectivites/guide_methodo_eau.pdf?amp

[http://www.ecolabeltoolbox.com/files/marketing/Mon_hotel_et_lenvironnement - Partie 1 Connaitre.pdf](http://www.ecolabeltoolbox.com/files/marketing/Mon_hotel_et_lenvironnement_-_Partie_1_Connaître.pdf)

[http://www.ecolabeltoolbox.com/files/marketing/Mon_hotel_et_lenvironnement - Partie 2 Agir.pdf](http://www.ecolabeltoolbox.com/files/marketing/Mon_hotel_et_lenvironnement_-_Partie_2_Agir.pdf)

Installation of water-efficient bathroom fixtures

Topic: Water conservation

Objective: Reducing its consumption

LEVEL 1

Description

For sinks and showers, there are systems that reduce the pressure of the water coming out of the taps. Without affecting the comfort of use, systems now exist that are very effective and inexpensive. Moreover, their installation does not require the services of a professional. These are improvements that it is strongly advised to implement.

Sanitary equipment is designed to operate at a water pressure of about 3 bar. This pressure is often unnecessarily high for many uses. It is therefore proposed to adapt the existing equipment, to improve it without replacing it and to achieve a reduction in water consumption of 25-50% for moderate use fittings.

For taps installed in communal areas and used very frequently (i.e. more than 15 times a day), it will be more interesting (and cost-effective) to consider replacing the existing equipment (rather than simply adapting it) for greater efficiency in reducing consumption.

It is important to consider regular maintenance of all sanitary equipment in order to sustain the water savings achieved over time (scale removal, equipment malfunction, leaks....).

Steps to follow to implement the practice

Most of these new fittings have a built-in flow restrictor. For taps where this is not the case, it is possible to add a flow regulator.

For washbasins where the tapware is already installed, consider installing energy-saving aerators on taps :



Figure 78 : Flow regulator (Source : <https://www.activeau.fr/>)

The flow regulators (also called sparkling) allow to maintain a constant flow while changing from 6 to 8 litres per minute instead of 12. There are two types of restrictors:

- Faucets with a "male" inlet with the screw thread on the outside
- Faucets with a "female" inlet with the screw thread on the inside

Regulators (or foamers) can vary by offering variable water outlets and regulations depending on the model chosen.



Figure 79 : example of regulators (Source : <http://www.dynavive.eu/regulateurs-eau-robinets.html>)

Powerful foamy and pulsating jet with unparalleled comfort. Ideal for the home or for hotels with demanding customers. Constant flow rate of 4.5 to 10 litres/minute.

Powerful and airy column jet. Suitable for home, community or hotel use. Constant flow rate at 4.5 or 6 litres/minute.

"Spray" type jet designed for all public water points (hand washing, sanitary, camping). Great economy. Constant flow rate of 1.7 or 2.5 litres/minute.

Flow restrictors for shower heads or kitchen taps can be installed between the shower head and the shower hose. However, kitchen (sink) and shower taps require more specific equipment. In the kitchen, it is preferable to work with several flows (rinsing fruit and vegetables or filling a large container does not require the same flow). In the shower, water limiters can lead to a decrease in comfort during use, which is not the objective. In both these cases, changes to the taps may be useful (cf practice *Installation of sensor-controlled water faucets and thermostatic shower controls*).

Stakeholders to involve

- Hotel or restaurant managers and staff
- Health, safety and environment responsible within the hotel, restaurant, etc.
- Tourists/customers

Costs aspects

Costs

- Flow limiter: minimal investment: 5€ to 40€.

Costs saving

- Flow limiter: The additional cost of the valves and fittings is negligible compared to the water savings achieved, in the order of 35 to 50% of the item concerned. The simple return on investment is less than 6 months.

Monitoring the implementation

- Compare the results obtained month by month;
- Analyse trends to ensure the relevance of the actions taken and, in the event of deterioration, identify areas for progress that can be added to the action programme.

Resources

Hébergeurs touristiques : quelles actions mettre en place pour un tourisme durable ?, Ademe Bretagne, avril 2021

<https://www.mada-hotels-consultant.com/dix-astuces-limiter-consommation-deau-hotel>

<https://www.voyageons-autrement.com/communication-tourisme-durable-actions>

Guide ADEME « 40 trucs et astuces pour économiser l'eau et l'énergie » 2019 :

www.ademe.fr/sites/default/files/assets/documents/guide-pratique-economiser-eau-energie.pdf

Guide du bâtiment durable : <https://www.guidebatimentdurable.brussels/fr/accueil.html?IDC=1506>

<http://www.greentourism.eu/en/BestPractice/IndexByCategory/2>

<https://www.lftechnologies.fr/banc-essai-hydraulique/blog/quels-sont-les-differents-types-de-robinets-sanitaires#mitigeur%20m%C3%A9canique>

<http://www.dynavive.eu/regulateurs-eau-robinets.html>

smegreg, Guide Methodologique. Analyse et réduction des consommations d'eau dans les établissements tertiaires : https://www.alec-montpellier.org/UserFiles/File/Collectivites/guide_methodo_eau.pdf?amp

http://www.ecolabeltoolbox.com/files/marketing/Mon_hotel_et_lenvironnement_-_Partie_1_Connaitre.pdf

http://www.ecolabeltoolbox.com/files/marketing/Mon_hotel_et_lenvironnement_-_Partie_2_Agir.pdf

Installation of sensor-controlled water faucets and thermostatic shower controls

Topic: Water conservation

Objective: Reducing its consumption

LEVEL 2

Description

Sometimes it can be more interesting, especially for older installations, to replace the equipment for a better adaptation to the current use. Different types of taps exist and can be adapted to the intended use.

For taps installed in communal areas and used very frequently (i.e. more than 15 times a day), it will be more interesting (and cost-effective). It may be more interesting to install taps that turn off automatically after a few seconds. To preserve comfort (and still save water) in bathrooms and showers, thermostatic valves may be preferred.

In any case, even if they are the most economical taps to buy, mixer taps should be banned. Regulated mixer taps (regulated at an average of 6 litres per minute) should be preferred. For professional kitchens, the taps can be adapted according to the workstations: taps equipped with a hand shower for pre-washing, for hand washing, timed taps with knee control which also allows for greater hygiene.

It is important to consider regular maintenance of all sanitary equipment in order to sustain the water savings achieved over time (scale removal, equipment malfunction, leaks...).

Steps to follow to implement the practice

In the case of a new installation or a complete renovation, it may be worthwhile to buy taps with integrated water controls. In fact, when purchased, equipment designed as water-saving has costs very close to those of conventional (non-water-saving) equipment

- Mixer taps or mechanical mixing valves are opened and closed by a user who also has to adjust the desired temperature. Mixer taps cost between 10 and 120 € and mechanical mixing valves between 20 and 200 €. The latter has an integrated water saving system. The advantage of the mechanical mixing valve is that it limits water wastage by finding the right temperature (unlike the mixer)
- The timed tap: this prevents the tap from being left on by forgetfulness. Very common in public spaces, it is activated by a push button and the water stops automatically after a flow of 5 to 20 seconds. These settings should be checked regularly. It is not possible to adjust the temperature. It allows high water savings and above all avoids that a user leaves the water running as it is possible for simple mechanical taps.
- The electronic tap: with an infrared detector for its use. It does not require the user to open or close the tap. Only movement will trigger it (hands are detected). It is water efficient. It must receive a power supply to operate (either 2 x 3 volt lithium batteries or a direct supply from the mains).
- The thermostatic valve: allows hot and cold water to be mixed with automatic temperature control. Its flow rate is regulated manually. Often equipped with a water saver when purchased, it is used mainly for showers.



Figure 80 : Mixer taps



Figure 81:
Mechanical mixing



Figure 82 : Timed tap



Figure 83 : The
electronic tap



Figure 84 :
Thermostatic valve

Stakeholders to involve

- Hotel or restaurant managers and staff
- Health, safety and environment responsible within the hotel, restaurant, etc.
- Tourists/customers

Costs aspects

Costs

- Mixer taps from 10 to 120€.
- Mechanical mixing valve from 20 to 200€.
- Timed tap from 25 to 100€.
- Thermostatic mixer: from 50 to 250€.
- Electronic tap: from 50 to 350€.
- taps equipped with a hand shower for pre-washing : from 200 to 500 €
- timed taps with knee control : from 150 to 400 €
- Installation of taps by a professional (on estimate)
- Regular checks on the correct functioning of the taps

Cost saving

Water saving will depend on the tap and the frequency of use, but on average it can be considered:

- Mixer taps from 35 to 50 %.
- Mechanical mixing valve 35 to 50 %
- Timed tap from 50 to 70 %
- Electronic tap: from 50 to 70 %.
- taps equipped with a hand shower for pre-washing : from 20 to 40 %
- timed taps with knee control : from 20 to 30 %

Monitoring the implementation

- Compare the results obtained month by month;
- Analyse trends to ensure the relevance of the actions taken and, in the event of deterioration, identify areas for progress that can be added to the action programme.

Resources

Hébergeurs touristiques : quelles actions mettre en place pour un tourisme durable ?, Ademe Bretagne, avril 2021

<https://www.mada-hotels-consultant.com/dix-astuces-limiter-consommation-deau-hotel>

Guide ADEME « 40 trucs et astuces pour économiser l'eau et l'énergie » 2019 :

www.ademe.fr/sites/default/files/assets/documents/guide-pratique-economiser-eau-energie.pdf

<http://www.greentourism.eu/en/BestPractice/IndexByCategory/2>

<https://www.lftechnologies.fr/banc-essai-hydraulique/blog/quels-sont-les-differents-types-de-robinets-sanitaires#mitigeur%20m%C3%A9canique>

<http://www.dynavive.eu/regulateurs-eau-robinets.html>

Guide Méthodologique (smegreg). Analyse et réduction des consommations d'eau dans les établissements tertiaires : https://www.alec-montpellier.org/UserFiles/File/Collectivites/guide_methodo_eau.pdf?amp

http://www.ecolabeltoolbox.com/files/marketing/Mon_hotel_et_lenvironnement_-_Partie_1_Connaître.pdf

http://www.ecolabeltoolbox.com/files/marketing/Mon_hotel_et_lenvironnement_-_Partie_2_Agir.pdf

Nudge communication: Sand timer for hotel showers

Topic: Water conservation

Objective: Reducing its consumption

LEVEL 2

Description

Awareness-raising messages can be passed on in a playful way, via "nudge marketing"⁶, by inciting a person to act in a certain way without forcing them, in a playful way, such as the sand timer for hotel showers.

Nudge marketing comes from the teachings of behavioural economics. It proposes a new way of acting on behaviour. Messages are often designed to be fun and directly address the person reading them. This communication is proposed to replace boring messages whose effectiveness is less and less perceptible. For example, for a message such as "Thank you for throwing your cigarette butts in the bin", nudge marketing will propose a double ashtray with a survey, throwing your cigarette butt in one or the other ashtray will answer the question asked.

Thus, behavioural economics, which conceptualised nudge, focuses on incentive-based approaches rather than on the constraint of the rule.

Steps to follow to implement the practice



Figure 85 : Nudge communication (<https://www.nudgeme.fr/>)

⁶ <https://www.voyageons-autrement.com/communication-tourisme-durable-actions>

The first step in proposing nudge-based communication and acting on behaviour is to clearly identify what needs to be improved.

1. What is the problem to be solved? What behaviour do we want to move towards? It is important to choose a specific problem, for example, reducing water consumption in the bathroom.
 2. Observe the behaviour at work in order to analyse the biases. This observation allows us to understand the user's thought process which leads him/her to a particular behaviour. What triggers an attitude or a decision or not. This analysis will make it possible to identify the levers for adjusting the behaviour.
 3. Imagine simple nudges whose effectiveness can be verified
 4. Start by testing these nudges in a small area, such as a bedroom. This will make it easy to measure the effectiveness of the message. This is a test phase, a sample that will allow you to decide whether to implement it in the whole building or to adjust it and test it again before implementing it globally.
 5. Implement these messages throughout the structure in order to have a massive influence on the behaviour of the clientele, the staff, etc. Monitoring water consumption will make it possible to measure the effect of this nudge on a large scale and to adjust it continuously.
- Examples of nudge communication in hotels to influence water consumption





Figure 86 : Nudge communication for the reuse of towels in hotel rooms

Nudge communication for the reuse of towels in hotel rooms

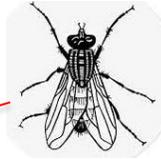
After analysis, it appears that a sign adapted to many hotels stating "75% of the guests in this room have reused their towels" was much more effective than the initial message which was "protect the environment by reusing linen".

- Introduction of a 5-minute sand timer in the showers to raise awareness of the impact of water consumption in relation to the time spent in the shower.



Figure 87 : Sand Timer (source: <https://www.nudgeme.fr/portfolio/tourisme-et-eco-gestes/>)

- Examples of nudge communication in Amsterdam airport to encourage cleanliness of toilets:



Flies were drawn on the bottom of the urinals.

The visitors, thinking it was a real fly, mostly aimed at the insect. The result was a more controlled discharge and less urine outside the urinals. The technique was a winner, since cleaning costs were reduced by 80% after this inexpensive approach was implemented. The "target" urinals keep the toilets clean much longer

Figure 88 : nudge communication in Amsterdam airport

Stakeholders to involve

- Hotel managers and staff
- Health, safety and environment responsible within the hotel, restaurant, etc.
- Tourists/customers
- Communication agency specialising in nudge

Costs aspects

Costs

- Time paid for the reflection, analysis, proposal, test and development phases at the school level
- Printing of pankards or other necessary nudge elements
- Possible support from a communication agency

Costs saving

- The savings achieved through the behavioural changes implemented by nudge.

Monitoring the implementation

Monitoring of meters and or water bills.

Resources

<https://www.hbrfrance.fr/chroniques-experts/2017/07/16300-nudge-influencer-comportements-5-etapes/>

<https://www.nudgeme.fr/portfolio/tourisme-et-eco-gestes/>

Selecting native plants and optimizing garden operations

Topic: Water conservation

Objective: Reducing its consumption

LEVEL 2

Description

The quality of green spaces can play an essential role in the attractiveness of a hotel. Nature in the city, the search for green space and well-being, the quality and aesthetics of gardens can be significant in the image of a hotel. They also make it possible to combat heat islands in the city and encourage biodiversity. Maintenance (use of chemical products, if any) and water consumption must be done in a reasoned manner to limit any environmental impact

Thus, selecting local plants adapted to the climate brings many advantages:

- Facilitates the maintenance of gardens
- Is decorative and brings calm and well-being
- Hides spaces that could be unsightly (a parking lot, a wall...) while enhancing the site
- Provides shade in the summer and protection from the wind in the winter, thus reducing energy consumption for air conditioning and heating
- Reduces noise
- Offers particular scents that mark the site
- Preserves local biodiversity

Steps to follow to implement the practice

Selecting natives plants :

- Learn about native plants and their requirements in terms of sunlight and watering.
- Identify the areas to be planted
- Do not put grass on the whole site, leave areas where nature will take over, this will improve the quality of the landscape and the water needs
- Be accompanied by local landscapers with a good knowledge of the environment in which the tourist accommodation is located. A landscape diagnosis is essential for personalized recommendations.
- The choice of plant species is of great importance, particularly with regard to water consumption. A perennial plant, for example, consumes on average 2 times less water than an annual plant. After 3 years, a shrub does not need watering anymore. It is therefore not advisable to suppress the flowering but to replace the annual flowers or carpet of flowers by perennial plants or flowering shrubs. They will also require less labor for their maintenance and will allow drip irrigation.

Optimizing garden operations :

- Stop using drinking water for plants : Recover rainwater
- Collect rainwater on roofs (even on mobile homes), for example with a small water collector. This can be used to water plants and/or clean the terraces or the ground.
- Water green spaces with the lightly soiled water recovered in the kitchen (cleaning vegetables).
- Schedule the watering of green spaces at times when it is less hot in order to limit evaporation, water in the evening rather than during the day
- Hoe around plants to improve watering efficiency. Hoeing in the garden serves to break up the soil crust and save water by watering less. By breaking the soil crust, water can penetrate the soil better towards the roots. Hoeing the soil allows the soil to be aerated.

- Place straw or mulch at the foot of plants and flowerbeds. This mulch hides the sun from the soil, limiting evaporation and therefore watering, as well as the growth of weeds. Covering the soil with mulching techniques keeps the moisture in for longer and therefore limits watering. Mulching also has other advantages. In particular, it limits the development of weeds, limits soil leaching in the event of heavy rain and nourishes the soil
- Adjust watering frequencies to the plantations, the soil and the season
- Mowing higher up allows the soil to dry out less and to resist better to a lack of water

Stakeholders to involve

- Hotel manager and gardener
- Health, safety and environment responsible within the hotel, restaurant, etc.

Costs aspects

Costs

- Natives plants
- Landscape architect or designer

Costs saving

- water saving through the planting of local plants
- Water savings through task optimization

Monitoring the implementation

- Monitoring of water meters and sub-meters

Resources

https://www.iucn.org/sites/dev/files/import/downloads/iucn_hotel_fr_final_single_1.pdf

smegreg, Guide Methodologique. Analyse et réduction des consommations d'eau dans les établissements tertiaires : https://www.alec-montpellier.org/UserFiles/File/Collectivites/guide_methodo_eau.pdf?amp

http://www.ecolabeltoolbox.com/files/marketing/Mon_hotel_et_lenvironnement_-_Partie_1_Connaître.pdf

http://www.ecolabeltoolbox.com/files/marketing/Mon_hotel_et_lenvironnement_-_Partie_2_Agir.pdf

https://susproc.jrc.ec.europa.eu/product-bureau/sites/default/files/inline-files/TourismBEMP_0.pdf

Optimizing laundry and kitchen operations

Topic: Water conservation

Objective: Reducing its consumption

LEVEL 2

Description

In the laundry room, water is used for pre-washing, washing and rinsing clothes. It represents a very important potential for reducing water consumption, which is mainly related to the type of washing machines or dryers used. Therefore, one of the most important measures, when replacing equipment, is to favour the purchase of equipment with low water and energy consumption (A+++ in EU labelling and whose water consumption is less than 7l/kg of laundry).

In the kitchen, water is used for food preparation, drinking and washing up. It is possible to consider the reduction of water consumption for dishwashing, but it seems less obvious for the preparation of meals and even less for drinking water. For dishwashing, the use of a dishwasher consumes less water than washing dishes by hand. For example, a small capacity professional machine will consume 3 liters of water per cycle to wash 36 glasses, while a manual dishwasher will consume between 20 and 40 liters. Professional machines work with an internal water recycling system. It is important to adapt the capacity of dishwashers to the needs. Indeed, a large capacity machine consumes less than several smaller capacity machines.

Steps to follow to implement the practice

Optimizing laundry operations:

- Raise awareness among customers to reduce the volume of laundry (towels, bed linen) to be washed.
- Fill a washing machine according to its capacity, the linen will be better washed and rinsed. Avoid underfilling the machine as much as possible.
- Adapt the temperature, washing time and detergent to the clothes to be washed.
- Where possible, recover the rinse water for pre-washing or washing the following cycle. Recover the rinse water for use in the next wash (or pre-wash) cycle. This can save up to 40% of water per cycle. Some manufacturers offer kits for this purpose.
- Avoid using combined equipment (washing and drying) that uses water continuously and is therefore highly consumptive
- Where possible, recover the drying water
- Adjust the cleaning programme. Avoid pre-washing if the laundry is not very dirty
- When purchasing linen and towels, select the most efficient textile. It seems that cotton-polyester blend linen requires less water than pure cotton linen: take a census of the bed linen (sheets, pillowcases, comforter covers) and bathroom linen (towels, sheets and bath mats) used in the establishment (rooms, rentals, swimming pool, spa, sports hall, etc.). Whether they are rented or purchased, this census will allow us to study the opportunity to reduce the weight of washed, dried or transported linen by acting on:
 - the weight
 - the dimensions

- the material of the fabric
- choose an unbleached colour for the sheets, which allows to extend their lifespan
- choose textiles with an ISO type I ecological label (e.g. European Ecolabel), of organic origin, fair trade or guaranteeing an absence of toxic products for the body and the environment

Optimised Kitchen operation

- Defrost food at air temperature, not under water
- Plan your set-up in advance, so that you can organise defrosting the day before.
- Clean vegetables or utensils with a basin, rather than under running tap water.
- Recover this water for watering plants or green areas.
- Limit the use of the glass rinser on the beer dispenser. Avoid washing (glasses or plates) by hand.
- Only run the glass washer or dishwasher when the baskets are full.
- Use squeegees rather than running water to empty plates.
- For small kitchens, the installation of a pre-wash shower coupled with a double stop mixer tap considerably reduces water consumption

Stakeholders to involve

- Hotel or restaurant managers and staff
- Health, safety and environment responsible within the hotel, restaurant, etc.
- Kitchen staff (i.e. chef, kitchen assistants, etc.)
- Tourists/customers

Costs aspects

Costs

- Possibly the purchase of an equipment (washing machine or dishwasher) adapted to the use and saving in energy and water consumption

Costs saving

- Water savings through task optimization

Monitoring the implementation

Monitoring of water meters and sub-meters.

Resources

smegreg, Guide Methodologique. Analyse et réduction des consommations d'eau dans les établissements tertiaires : https://www.alec-montpellier.org/UserFiles/File/Collectivites/guide_methodo_eau.pdf?amp

http://www.ecolabeltoolbox.com/files/marketing/Mon_hotel_et_lenvironnement_-_Partie_1_Connaitre.pdf

http://www.ecolabeltoolbox.com/files/marketing/Mon_hotel_et_lenvironnement_-_Partie_2_Agir.pdf

Objective 3 - Diversifying its water supply

Many alternatives to the use of drinking water can be envisaged. From rainwater harvesting to grey water harvesting, the existing solutions are more or less easy to implement. Rainwater harvesting can be done by a simple tank installed in the garden or by the installation of a borehole. It also possible to recycling and using greywater. Solutions are more or less demanding in terms of investment and may be subject to regulation. Their use can be interesting for garden maintenance, external use (cleaning in particular) or for flushing toilets.

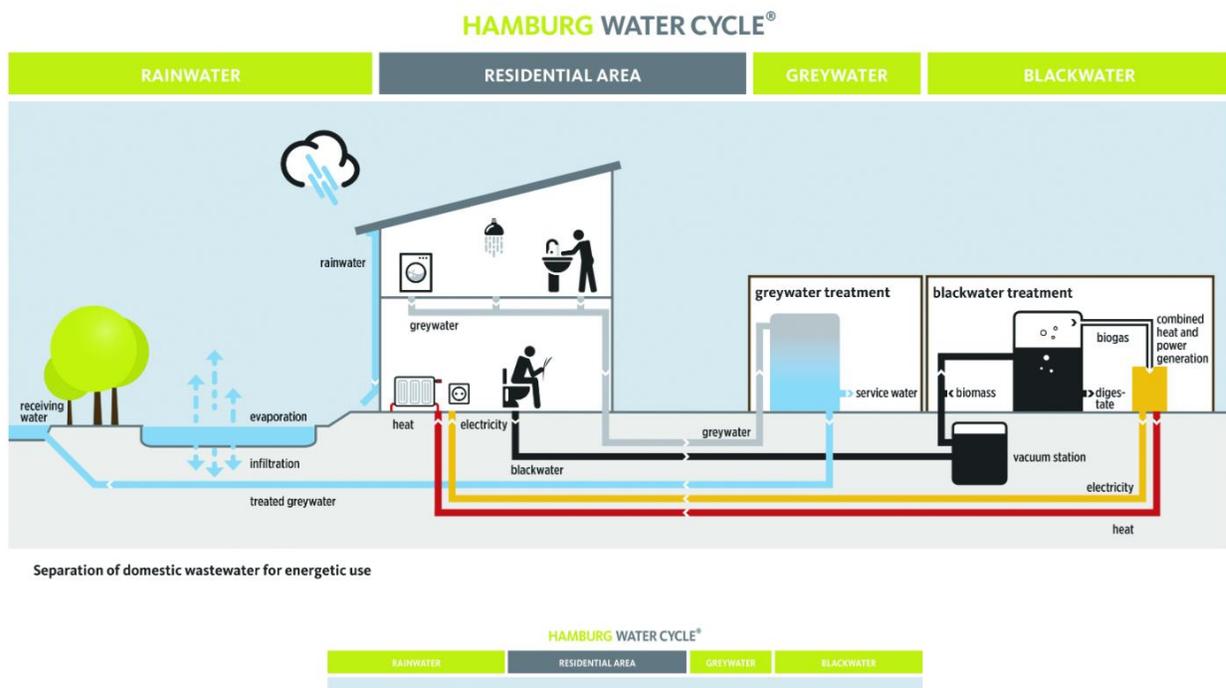


Figure 89 : Hamburg Water cycle (source: <https://watershedsentinel.ca/articles/hamburg-water-cycle/>)

This objective will be reached through the following practices:

- **Collection and use of rainwater (level 2)**
- **Recycling and using greywater (level 2)**

Collection and use of rainwater

Topic: Water conservation

Objective: Diversifying its water supply

LEVEL 2

Description

In France, there are regulations that govern the withdrawal and consumption of water for domestic use. It is necessary to check in each European country the local constraints and obligations. According to the French public health code (art. L1321-1), "anyone who offers water to the public for human consumption, whether in return for payment or free of charge, is required to ensure that this water is fit for consumption". Moreover, considering the collection of rainwater, it is authorized in France (art. 641 of the civil code) "every owner has the right to use and dispose of rainwater that falls on his land"⁷.

It is currently considered that only drinking water can be used for the following domestic purposes:

- Food uses: drinking, food preparation, dishwashing
- Uses related to personal hygiene: washbasin, shower, bath, washing clothes
- Other uses inside individual or collective housing: floor washing...

For non-domestic uses such as washing of outdoor floors, vehicles, watering of green spaces, supply of water to fountains or ponds, firefighting, it is then recommended not to use potable water but substitute water (rainwater, drilling...).

Concerning the use of rainwater, it is interesting because it does not require any particular regulatory approach, however, in France, its use in the interior (flushing, washing floors...) is subject to prefectural exemption.

Steps to follow to implement the practice

- You must start by clearly identifying your needs. Do you want to use rainwater to replace drinking water throughout the year (vehicle cleaning, toilet flushing, floor cleaning...)? Do we want to use rainwater only for watering green spaces, which spreads the need over the warmer months and then requires storing water in a quantity proportional to the needs?
- Rainwater collected from roofs should be filtered to avoid the collection of leaves, bird droppings and gravel. It is necessary to avoid collecting rainwater from soil runoff because it comes from waterproofed surfaces (roads, sidewalks, parking lots...) with a risk of presence of hydrocarbons or herbicides.
- The quantity of water filtered will depend on the rainfall of the site, the surface of water recovery (size of the roof) and its texture. Indeed, the amount of water drained will be different for a slate, tile or vegetated roof. Experts generally consider that there is a coefficient of 0.8 between the potential volume of rainwater and the volume of water actually collected. Thus, the calculation of the potential amount of water captured will be :

⁷ https://www.legifrance.gouv.fr/codes/article_lc/LEGIARTI000039367267/

Volume captured = $0.8 \times \text{Roof surface in m}^2 \times \text{Annual rainfall in mm of water / year} / \text{m}^2$.

- The size of the tank will depend on the intended use of the recovered water (watering only or watering and washing of vehicles, exteriors...). For watering only, it is important to plan a storage time proportional to the number of driest days (without rain). For example, for an average of 3 weeks without rain in a region, it is necessary to foresee a tank which allows to store 3 weeks of rain. If the recovered water is only intended for outdoor washing (floors, vehicles, toilets...) it is likely that 15 days of storage will be sufficient.
- Some additional equipment to the purchase of the tank are to be foreseen like a filtration system at the entrance (mechanical filter) or at the exit of the tank. A more advanced water treatment can also be considered. An overflow system must also be considered for the evacuation of water at full load.
- Many tanks exist between small capacity tanks (300 to 500 l) outside in the open air of relatively easy installation or large capacity tanks (up to 120 m³) buried (High Density Polyethylene tank), concrete or steel tanks that require more complex installations.



Figure 90 : tank of 200 l (environ 30 €) –
(source: <https://www.oogarden.com/>)



Figure 91 : tank of 1 000 l (environ 200 €) –
(source: <https://www.oogarden.com/>)

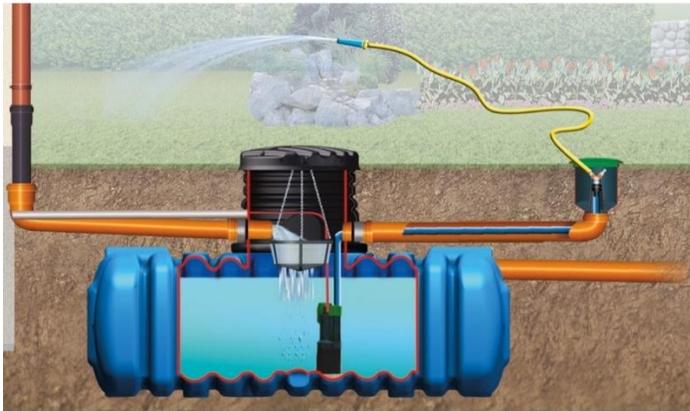


Figure 92 : Tank to be buried 3 000 l (environ 2000 € ttc)
(source : <https://agrifournitures.fr/>)



Figure 93 : Flexible tank : 30 m³
(source : <https://www.citerne-rain-o.fr/>)

Stakeholders to involve

- Hotel or restaurant managers and gardener
- Health, safety and environment responsible
- For important needs, it is necessary to be accompanied by a professional

Costs aspects

Costs

- For a rainwater storage superior to 1 000 m³ / year; the cost of the project will be superior or equal to 65 000 € before tax. The return on investment will be 15 years minimum.
- The price of the tank varies according to its capacity and its installation.

Costs saving

- Water savings achieved for watering the garden and, or outdoor washing and toilet use

Monitoring the implementation

- Percentage of annual potable water consumption substituted with recycled rain
- Monitoring of water meters and sub-meters

Resources

smegreg, Guide Methodologique. Analyse et réduction des consommations d'eau dans les établissements tertiaires : https://www.alec-montpellier.org/UserFiles/File/Collectivites/guide_methodo_eau.pdf?amp

Recycling and using greywater

Topic: Water conservation

Objective: Diversifying its water supply

LEVEL 2

Description

Grey water is the term used to refer to the discharge of wastewater from showers, baths, dishwashers and washing machines. It differs from "black water" which is water from toilets.

Many uses in the operation of a hotel do not require the use of potable water such as garden irrigation or outdoor cleaning. Also the use of recycled water from rainwater or greywater collection can considerably reduce the consumption of drinking water.

For rainwater, collection systems can be easily set up such as rainwater harvesting tanks. Similarly, runoff collection systems can be installed on roofs or other permeable surfaces.

Grey water can be collected and reused, but it requires the installation of a more restrictive recovery system, starting with the installation of a drainage system that separates black water (from toilets) from grey water. It is therefore a rather expensive system to implement when renovating a facility, however, these water recycling systems can be installed at a relatively low cost during the construction of the building.

The use of grey water will also be facilitated on the hygienic and household products that are injected into it are themselves environmentally friendly products.

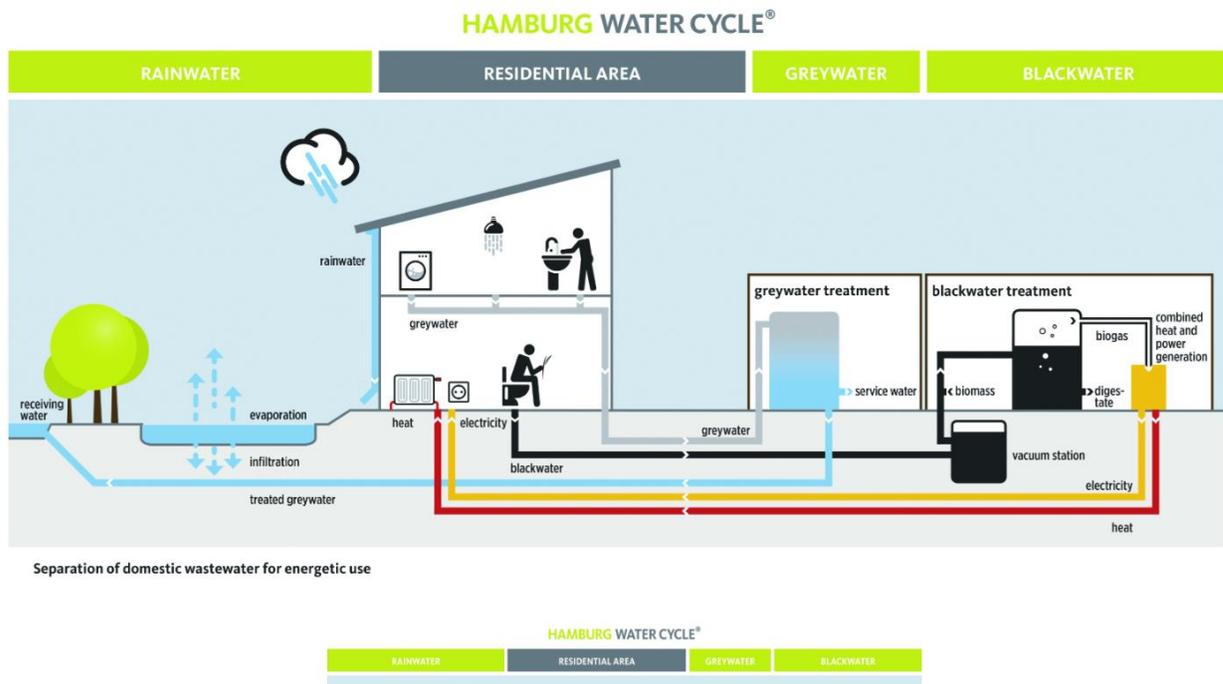


Figure 94 :Hamburg Water Cycle (Source : <https://watershedsentinel.ca/articles/hamburg-water-cycle/>)

Steps to follow to implement the practice

- The very first step is to improve the quality of wastewater by using environmentally friendly products:
- By replacing all conventional cleaning products with products that have the European Ecolabel or natural products (white vinegar, lemon, baking soda, etc.)
- Limit the number of products, it is often not necessary to have one product for each use
- Give preference to hygiene products (soap, shampoo) with the European Ecolabel in the bathroom
- Inform on the prohibited discharges in the collective sewerage system
- Inform about solid products and substances that alter the functioning of the pipes:
- Sludge, peelings, cigarette butts, wipes, sanitary towels, tampons, cotton and toilet paper rolls, even if they are announced as biodegradable;
- Chemical and toxic products (pesticides, medicines, etc.)
- Cooking oils. It reduces the treatment capacity of wastewater treatment plants by asphyxiating the bacteria responsible for purifying the water (for private individuals, it is recommended that you take your cooking oil to a waste disposal centre).
- In terms of installation, there are simple systems that can be installed to collect water from sinks to toilets

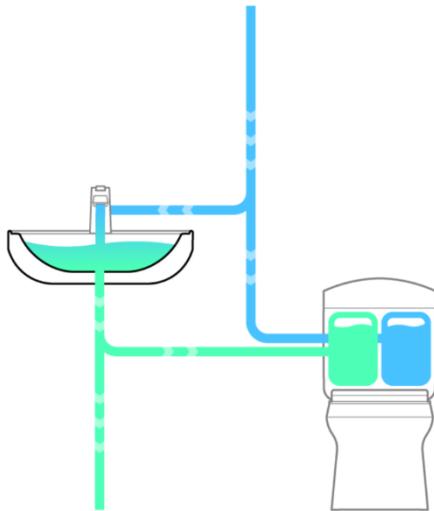


Figure 95 : Grey water being used to partially refill the toilet canister



Figure 96 : Eco toilets industrial design, Jang WooSeok

- In its most basic form, grey water recycling requires:
 - installation of a separate wastewater collection system for grey water and black water
 - basic screening to remove debris
 - installation of large grey water storage tanks
 - Connection to an irrigation system.

Stakeholders to involve

- Hotel or restaurant managers and staff
- Health, safety and environment responsible within the hotel, restaurant, etc.
- Kitchen staff (i.e. chef, kitchen assistants, etc.)

- Tourists/customers

Costs aspects

Costs

- Costs vary depending on the proposed installation, whether it is a simple rainwater harvesting system (the purchase of a tank can vary from a hundred euros to several hundred depending on its capacity and aesthetics) or a complete grey water treatment system (several thousand euros).

Costs saving

- The EC (2009) estimates that water recycling can reduce water consumption by an additional 10%, after a 40% reduction in water consumption achievable through the implementation of water efficiency measures.

Monitoring the implementation

The most relevant indicators of water recycling implementation are:

- installation of a grey water recycling system that supplies internal or external water demand
- quantity of rainwater and grey used, m³/yr
- Monitoring of water meters and sub-meters

Resources

https://susproc.jrc.ec.europa.eu/product-bureau/sites/default/files/inline-files/TourismBEMP_0.pdf

<https://www.lemoniteur.fr/article/les-techniques-pour-utiliser-les-eaux-usees-epurees.815599>

<http://www.greentourism.eu/en/BestPractice/Details/28>

Objective 4 - Optimizing pool maintenance

A conventional pool requires a lot of water, energy and chemicals to operate. Many solutions now exist to improve the use of a pool. To begin with, it is important that all pool maintenance procedures are posted in the pool area and that staff are properly trained.

Optimising pool maintenance involves several actions:

- Reducing the use of chemicals, especially chlorine, ozone or ultra-violet (UV) generating systems can be considered.
- Reducing energy for water temperature. Water heating can be improved if it comes from a heat pump system or solar energy.

Reducing water consumption. Several items should be considered: The operation of the pool itself but also the showers that are taken before and after swimming as well as the use of toilets.

This objective will be reached through the following practices:

- **Optimizing pool operations (level 2)**
- **Disinfecting swimming pools through own salt electrolysis (level 2)**

Optimizing pool operations

Topic: Water conservation

Objective: Optimizing pool maintenance

LEVEL 2

Description

A conventional pool requires a lot of water, energy and chemicals to operate. Many solutions now exist to improve the use of a pool. To begin with, it is important that all pool maintenance procedures are posted in the pool area and that staff are properly trained.

Optimising pool maintenance involves several actions:

- Reducing the use of chemicals, especially chlorine, ozone or ultra-violet (UV) generating systems can be considered.
- Reducing energy for water temperature. Water heating can be improved if it comes from a heat pump or solar energy.
- Reducing water consumption. Several items should be considered: The operation of the pool itself but also covering the pool to avoid evaporation, the showers that are taken before and after swimming as well as the use of toilets.

Steps to follow to implement the practice

- It is essential to consider whether a swimming pool is necessary for the hotel. Many places offer swimming pools even though the hotel is located by the sea or near a body of water (e.g. lake).
- If it is decided to build a swimming pool on site, the installation of a natural outdoor (and unheated) pool is the best practice to consider.
- Installing a natural swimming pool or transforming an existing body of water into a natural swimming pool, which uses the natural self-purification capacities of the aquatic ecosystem (sun, plants, minerals) to maintain good quality swimming water.
- In the case of an indoor pool, integrated into the building, water recycling solutions should be considered from the design stage with drainage systems used to collect overflow and splash water.
- A water sub-meter can be installed to monitor water consumption for pool use.
- For showers and toilets, install low-flow taps (showers and taps), shower timers (percussion valves or sensors) and dual-flush toilets
- To prevent evaporation, cover the pool and check it regularly for leaks
- Keep the water level in the pool below the maximum level to limit overflow
- Backwashing sand filters is a water-intensive process, requiring in the region of 225 to 450 litres per minute for a standard pool. Many hotel pool filters are backwashed as a matter of routine once or twice a day, compared with typical requirements of once every two or three days. Backwashing should be based on filter pressure rather than a fixed schedule – for example, when the filter pressure required is over 0.5 bar more than the pressure required for a clean filter. The backwash process should not

take more than three to five minutes, and the subsequent pipe rinsing process just 15 to 30 seconds (Travel Foundation, 2011).

- The use of chlorine is a difficulty in the treatment of swimming pool water. Indeed it is a dangerous product for the staff and harmful for the environment. If the hotel has a chlorine treatment system, the objective is to reduce its use to the minimum necessary.
- For any new pool construction, it is strongly recommended to favor treatment processes that do not involve the use of industrial chlorine. There are electrolysis, ozone or UV lamp systems that can be proposed.

Stakeholders to involve

- Hotel or restaurant managers
- Swimming pool manager
- Health, safety and environment responsible within the hotel
- Tourists/customers

Costs aspects

Costs:

- A pool cover can cost between 500 and more than 10,000 € depending on the type of cover chosen (cover, shell ...) and the size of the pool.

Costs saving:

- Optimisation of backwashing frequency based on filter pressure rather than fixed intervals can reduce water consumption for backwashing by over 50 %. For example, backwashing a sand filter once every three days for five minutes, instead of once every day for five minutes, could reduce water consumption by 1 500 litres per day, or 550 m³ per year.

Monitoring the implementation

Monitoring of the pool water sub-meter.

Resources

https://susproc.jrc.ec.europa.eu/product-bureau/sites/default/files/inline-files/TourismBEMP_0.pdf

<https://umih.fr/export/sites/default/.content/media/pdf/UMIH-GUIDE-HOTELS-FINAL-1.pdf>

http://www.ecolabeltoolbox.com/files/marketing/Mon_hotel_et_lenvironnement_-_Partie_1_Connaitre.pdf

http://www.ecolabeltoolbox.com/files/marketing/Mon_hotel_et_lenvironnement_-_Partie_2_Agir.pdf

Disinfecting swimming pools through own salt electrolysis

Topic: Water conservation

Objective: Optimizing pool maintenance

LEVEL 2

Description

The salt pool works on the principle of electrolysis. It consists of a titanium electrode polarized by a low voltage current which is placed at the outlet of your pool filter and which breaks down the salt present in the water into natural chlorine and caustic soda. A small amount of chlorine is thus permanently released, which ensures the disinfection of the water, while avoiding the unpleasant odors and the time of neutralization of the pool, consecutive to an ordinary chlorination. This means that the water in the pool must be salted and a certain concentration of salt must be maintained. With a salt water chlorinator, the salt is transformed into natural chlorine. Natural chlorine is as effective as the chemical chlorine sold in stores. It has oxidizing, disinfecting, antibacterial and antifungal properties. Once the chlorine has done its job of disinfecting and under the effect of the sun's rays, it recombines with the caustic soda to become salt again. The chlorine produced by an electrolyser is very pure, which makes it very effective for the daily treatment of your pool water. Electrolysis is based on a perpetual cycle because the salt that has turned into chlorine will then turn back into salt and so on.

A salt pool does not mean a seawater pool, the salt content of the pool is 10 times lower than that of seawater.

An electrolyser is composed of different elements to be able to function and produce enough chlorine to keep the water clean:

- The cell body: To be placed on the filtration circuit, it can be easily removed to control the electrodes.
- The electrodes: In the form of plates or grids depending on the type of electrolyser. They are made of titanium and covered with a precious metal (ruthenium and iridium)



Figure 97 : Salt pool © Fotolia

- The electrical box which allows to regulate and diffuse the active chlorine in the pool. Thanks to an alarm system, it signals any anomaly or failure of the chlorinator.

The advantages of a salt pool:

- Simplified use: Maintenance is easier for the owner because salt replenishment is much less frequent than with disinfecting pebbles, and anti-algae are no longer necessary ;
- Better health protection: Salt is natural, it no longer has the disadvantages of chemicals, such as chlorine for example, on the health of bathers. It does not present any risk of irritation or allergies for the eyes and the skin; it is also odorless;
- Reinforced safety: it does not require any storage of chemical products (conservation out of reach of children and animals, in a dry place...);
- Environmentally friendly: It does not pollute and does not imply, in the event of emptying the pool, having to purify the water of any chemical product beforehand.

Steps to follow to implement the practice

- The salt treatment for swimming pools needs to dose the salt: At the time of the first use, the quantity of salt to be poured depends on the electrolyser and the quantity of water of the basin. It is then necessary to refer to the instructions to know the dosage. Depending on the model, you should add between 3 and 7 grams of salt per liter of water. You also need to know the volume of water in your pool in cubic meters and then multiply this figure by the recommended salt level. For example, if you have a pool of 30 m³ and an electrolyser that recommends 5 g of salt per liter of water, you will need to pour 150 kg of special pool salt into your pool.
- It is then sufficient to check twice a year if the salt level has not changed. If you notice any problems (such as water turning green or algae growth on the walls), check the salt level and take the necessary measures. The maintenance of the salt pool also involves regular water analysis and regular pH control because caustic soda tends to increase the pH level. For this, it is possible to use several types of pH testers such as a pH meter or colorimetric testers. The pool water should have a neutral pH of around 7.4. A salt water electrolyser can be installed in a new pool or in the hydraulic circuit of an already built pool. However, for the connection of a salt water chlorinator, it is strongly recommended to call on a professional or an approved technician.
- It is recommended to clean the electrodes of the chlorinator regularly in order to improve the conductivity, slow down the erosion and increase the production of natural chlorine. Ideally, it should be cleaned every 6 months or so. This involves dismantling the electrodes and removing the lime deposits. It is important to know that even with regular maintenance of the chlorinator, it will be necessary to change the electrodes about every 4 years.
- The water temperature is also an important factor for a good filtration of the salt pool. Water that is too cold (below 16°C) will damage the electrodes. In winter, it is strongly advised to stop the chlorinator. For a year-round use, it will be necessary to install a pool heater to maintain the water at the right temperature.
- For the maintenance of the pool, there is no chemical product to handle, a net for the surface impurities, possibly a pool broom to clean the bottom, as well as a winter cover to protect the pool in the low season will be useful.

Stakeholders to involve

- Hotel or restaurant managers
- Swimming pool manager
- Health, safety and environment responsible within the hotel,

- Tourists/customers

Costs aspects

Costs

- The cost of salt treatment is generally higher than that of chlorine or bromine treatment. If the price of the raw material is much lower, it is the purchase and installation of the chlorinator, on average 1,500 euros, which are expensive. Considering the quality/price ratio, a salt pool is however more interesting
- There are different types of electrolyzers at prices ranging from 600€ to more than 2 000€ depending on the options.
- However, the electrodes must be changed every 3 or 4 years because they tend to erode and oxidize. It is necessary to count between 200 and 1000 euros for an electrolysis cell.

Costs saving

- Salt, on the other hand, is inexpensive, which makes it possible to save on the cost of pool maintenance.

Monitoring the implementation

Monitoring of the pool water sub-meter

Resources

<https://www.guide-piscine.fr/>

https://www.guide-piscine.fr/traitement-sel/avantages-et-inconvenients-d-une-piscine-au-sel-3643_A

https://www.guide-piscine.fr/traitement-sel/entretien-eau-piscine-regle-mode-emploi-231_A

3.3 Travel agencies, tour operator reservation service and related activities

Topics covered:

- Awareness and behavioural change
- Developing sustainable tour

1.1.1 Awareness and behavioural change

There are several technical measures that travel agencies or tour operators, may undertake for promoting sustainable tourism. Several studies show that despite their declared positive attitudes towards sustainable tourism, only a few tourists act accordingly by buying responsible tourism products, choosing environmentally friendly transportation, or behaving responsibly towards destination communities (Budeanu, 2007). Hence, it is important for tourism organizations to also pay attention to how to raise sustainability awareness among tourists and/or how to positively influence the behavior of their guests.

To this end the following objective is set:

1 - Raising awareness to customers

Objective 1 - Raising awareness to customers

While tourism activities often have beneficial effects on the development of the countries and populations visited, they can also have undesirable impacts on the social, cultural and environmental balance of these countries. It is therefore essential to put in place the following practice:

- **Raising awareness of the customers (level 1)**

Raising awareness of the customers

Topic: Awareness and behavioural change

Objective: Raising awareness to visitors

LEVEL 1

Description

While tourism activities often have beneficial effects on the development of the countries and populations visited, they can also have undesirable impacts on the social, cultural and environmental balance of these countries. Responsible tourism aims to:

- Encourage the development of quality tourism for an authentic discovery of the host regions
- Ensure that the economic benefits are distributed as fairly as possible among the travel actors, and participate in the sustainable development of destinations
- Respect the customs and cultural differences of the host regions
- Respect the environment and the cultural and natural heritage

For a successful environmental performance policy, it is essential to raise awareness of the customers and to let them know you care about the environment and encourage them to travel in a responsible way.

Steps to follow to implement the practice

Inform the customer about the good practices of responsible tourism and the economic model of the tour operator:

- Presentation of the principles and objectives of Responsible Tourism on a brochure or the website
- Presentation of the company's commitment to sustainable tourism
- Dissemination of a Traveller's Ethical Charter: information on the inhabitants and their way of life, heritage, religion, respect for nature and local culture, etc.
- Presentation of partners chosen according to their involvement in sustainable tourism: accommodation, restaurants, guides, local activities.

Inform the client about the issues related to the different destinations proposed:

- Local habits and customs
- Information required by the client for the proper application of the traveller's ethical charter
- Good practices to adopt in environmentally and culturally sensitive destinations

Develop and promote sustainable tourism packages by taking care of the destination and the transport mode, the accommodation and catering offered and the range of activities.

Destination :

- Promote destinations accessible by coach or train
- Promote well-managed (e.g. EDEN, Nature Regional Park) destinations
- Exclude destinations without adequate infrastructure or protection

- Size tour groups and offers according to carrying capacity
- Support destination management

Transport:

- Promote destinations accessible by coach or train
- Provide price incentives for bus or train transport
- Avoid domestic and connecting flights
- Offer flights only for minimum holiday durations
- Provide bus or train transfers to airports
- Provide information on environmental impacts of different options

Accommodation & catering:

- Include ecolabel accommodation in package offers
- Establish minimum criteria for water, waste and green sourcing performance of accommodation

Activities:

- Exclude high-impact activities from offers (e.g. off-road tours)
- Promote low-impact and activities (e.g. cycling, on-trail hiking)
- Promote educational activities
- Restrict tour group sizes
- Use local and trained ecologist guides



Figure 98 Circular tourism (source: <http://www.circular-tourism.com>)

Stakeholders to involve

Managers and staff

Tourists/customers

Partners

Costs aspects

Costs:

- Staffing costs to implement your policy

Cost savings:

- Make this criterion into a competitive advantage for your establishment, setting it apart from others.

Monitoring the implementation

- Total number of travel packages sold over a year
- Part of travels using flight
- Part of travels using train/bus travel
- Part of travels using other motorised means (car, motorbike...)
- Part of travels using other non-motorised means (bicycle, foot...)
- Part of destinations well-managed (e.g. EDEN, Nature Regional Park) destinations

Resources

Best Environmental Management Practice in the Tourism Sector, JRC, 2013

<http://www.greentourism.eu/>

<https://www.tourisme-responsable.org/>

<http://www.circular-tourism.com/>

<https://www.ecolabeltoolbox.com/en/solutions-techniques/information-des-clients-74>

1.1.2 Developing sustainable tour

Sustainable mobility can play an important role in the development of sustainable tourism as tourism-related transport, especially road and air traffic, is on the rise, and contributes considerably to greenhouse gas emissions, pollution, and climate change. Developing and encouraging the use of different modes of transport with low impact on the environment, e.g. cycling, walking, car-sharing, fuel-efficient transport systems, and the use of electric vehicles is a key to reducing the tourists' ecological footprint (DestiNet, 2020). To achieve this, consistent and innovative sustainable mobility strategies and measures need to be formulated and introduced at the destination as well as the business level (DestiNet, 2020).

To this end the following objectives are set:

- 1. Promote eco-mobility**
- 2. Promoting eco-friendly activities and low carbon emission travels**

Objective 1 – Promote eco-mobility

The use of the private car causes many inconveniences: pollution, cost of use, traffic jams, parking difficulties, etc.

Informing customers or staff of the alternatives may attract them and encourage them to use other means of transport as described in the following practices:

- **Renting bicycles to guests (level 1)**
- **Encouraging guests to explore attractions by public transport/foot (level 1)**
- **Providing sustainable mobility to employees (level 1)**
- **Installation of an electric vehicle charging station (level 2)**

Renting bicycles to guests

Topic: Developing sustainable tour **Objective:** Promote eco-mobility

LEVEL 1

Description

It is important to promote sustainable mobility not only among residents but also among tourists visiting the city. Renting bicycles to guest becomes an increasingly developed practice. In case of warm days, narrow streets and tiny city centers there is obviously no better way to explore a new place than by bike. So bike rental become a service well appreciated by guests, chiefly if it is easy and free.

Many hotels have developed such a service, for example:

- The Stadsvilla Mout in Schiedam (the Netherlands) offers its guests the opportunity to rent bikes so that they can explore the city in a more sustainable way.
- NH Hotel Group has been promoting sustainable mobility for many years. It offers mobility services such as car-sharing or bicycle hire. At present, there are more than 75 NH Hotels in the world that offer bicycle hire to guests.
- To foster sustainable mobility, Hotel Molí del Mig in Girona (Spain) provides a bicycle-rental service as well as secure storage for them. Moreover, it provides information on circular routes from the hotel for cyclists and hikers



Figure 99 Bicycle park in hotel Aeros (source: www.visitaeroe.com)



Figure 100 Bicycle park in hotel Milo (source: www.hotelmilosantabarbara.com)

There are many ways to implement such a service: from the provision of a few common bicycles, ready to be dropped off, to the proposal of a real unified fleet, managed by a specialist company.

Offering bikes with a specific livery, designed for the hotel, necessarily reflects a good image of quality of service to all customers but also of traveling advertising in the city.

Bicycle parking spaces should be in good visibility, as far as possible, in front of the hotel entrance.

Offering electric bikes may be necessary in case of significant relief. However, this type of equipment has higher investment and maintenance costs. In most cases, it is better to offer simply bikes with a basket, easy to use, comfortable and unisex, with low maintenance.

Steps to follow to implement the practice

- Size the offer according to the number, the type of customers, the parking place available, the possibility to cycle around:
 - service reserved for hotel's customers or open to all tourists
 - simple service or image and advertising support for the hotel
 - free for customers or not
- Buy the bikes (helmets and padlocks) or contract with a specialized company
- Organize the rental process, rental form, insurance for customers and bikes, prices, security of bikes against theft. Edit a user agreement that specifies the rules that guests are required to follow when renting the hotel's bicycles (in particular on the use of helmets, lighting and bells, advices on circulation rules and against thefts)



Figure 101 Bicycle rental (source www.setupmyhotel.com)

- Make the service attractive: Even if the clients have to pay for the rent, offer the first ride. The rent should not be expansive (for instance for a family) and tariffs easy to understand (by day).
- Provide pleasant routes and rest stops (paper maps at least) or organize a visit by bike with a guide

Stakeholders to involve

- Hotel managers and staff (specifically maintenance staff)
- Specialist bikes rental companies
- Tourist offices and local bike promoters

Costs aspects

Costs:

- A simply, comfortable bike costs around 300€



Figure 102 Bicycle (source : www.hotel-sablesdor.com)

- An all-inclusive service by a specialist company can allow a monthly charge according to the size of the fleet

Monitoring the implementation

Fleet:

- Number of bikes proposed
- Number of bikes available per month

Use:

- Number of reservations per month
- Total time of use per month
- Is the use free? If no, what are the tariffs?

Resources

<https://setupmyhotel.com/formats/fo/759-bicycle-rental-agreement-sample.html>

http://www.republicbike.com/bikes_for_hotels.asp

Encouraging guests to explore attractions by public transport/foot

Topic: Developing sustainable tour **Objective:** Promote eco-mobility

LEVEL 1

Description

Sustainable mobility has become very important not only for residents but also for tourists to promote sustainable tourism. Hotels and travel agencies may contribute to the sustainable tourism agenda in several ways. For instance, hotels and travel agencies may encourage and guide guests on how to explore the city through public transport or bicycle or on foot.

The Stadsvilla Mout in Schiedam (the Netherlands) requests their guests to leave the car on their premises and explore the city by bike or on foot. Moreover, the hotel is located nearby multiple tram stations and, thus, very easy to reach by public transport.

AX The Victoria Hotel in Sliema (Malta) is committed to sustainable tourism and thus encourages its guests to adopt more sustainable and green mobility options.

The Hotel Ciutat de Girona (Spain) offers a 4% discount to guests who take any means of public transportation to get to their hotel.

Steps to follow to implement the practice

- Information : provide documents and maps to the guests (City maps / touristic map / PT plans / Routes planner / fare); guide to rates and reductions on public transport (and museums)



Figure 103 City map (source: www.santorinidave.com/banff-hotels)



Figure 104 Visit London card (source: www.visitlondon.com)

- Promotion: free ticket or voucher, discount on the price of rooms for all those who arrive on foot or public transport (or bike also)
- Agreement with public transport operators and tourist transport operators



Figure 105 Touristic bus (source: www.visitberlin.de)

Stakeholders to involve

- Hotel managers and concierge staff
- Tourist offices
- Public transport authority
- Transport operators: bus, train, river services, on-demand buses, taxis...
- Mobility services: to rent or free-floating system of e-scooters, bikes or e-bikes, etc.

Costs aspects

- Time to meet the stakeholders
- Compensations for the discount offers
- On-demand shuttle bus for the hotel (or for a group of hotels) to the next train or bus station: a private service will be very expensive (driver-s). Less expensive if the costs are sharing with other hotels of the same area, or negotiated with public transport authority / public transport operator.

Monitoring the implementation

Information:

- Number of flyers distributed per month

Services:

- Number of passengers or transport tickets and cards sold per month

Promotion:

- Total cost of voucher and discount per month

Resources

<https://www.finehotelsandsuites.com/media/fine-hotels-and-suites-sustainability-policy-stadsvilla-mout.pdf>

<https://victoriahotel.com/green-mobility/>

<https://www.hotelciutatdegirona.com/en/specialoffers/sustainable-mobility>

Providing sustainable mobility to employees

Topic: Developing sustainable tour **Objective:** Promote eco-mobility

LEVEL 1

Description

Sustainability mobility is being promoted by many organizations in the world including enterprises in the hospitality industry by implementing a so-called "**company sustainable mobility plan**".

AX The Victoria Hotel in Sliema (Malta) is committed to sustainable tourism. It does not only encourage its guests to adopt more sustainable mobility options but also encourages its employees to use sustainable mobility options. AX The Victoria Hotel is fully aware of the impact that its employees can make. Therefore, it has invested in some measures to encourage alternative methods of transportation between the workplace and its employees' homes. Employees are offered to use onsite bicycle parking facilities or shared shuttle transport.

A company sustainable mobility plan is a long-term dynamic strategy to accompany changes in commuting habits. The plan consists of a set of measures implemented by a company to facilitate employee travel and to address the problems caused by vehicular traffic and the shortage of car parks.

It concerns also goods and deliveries. By drawing up sustainable mobility plans, companies can help their employees to opt for sustainable modes and more rationalised usage of private cars for their work-related trips.

The benefits of mobility planning for companies are mainly a lower parking requirement means cost savings and extra space to be used for other purposes. It also improves the health of employees who opt for active mobility has a positive effect on reducing absenteeism and accidents, reducing the costs associated and increasing productivity.

The development of such a plan, on the initiative of the company, is very much appreciated by the employees as observing how the company is taking action that shows concern.

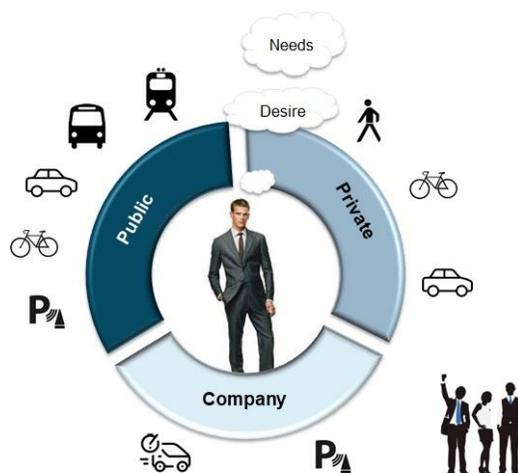


Figure 106 Mobility plan (source: luxmobility.eu)



Figure 107 Cargo bicycle (source: www.weelz.fr)



Figure 108 Bicycle (source : www.commeunvelo.com)

Steps to follow to implement the practice

A mobility plan is a dynamic and long-term process and may vary depending on the position and needs of each company.

Before analysis of the current situation is carried out, the objectives and means of implementation need to be defined, a steering committee set up and a communication plan developed.

The main steps are:

- Analysis of the current situation: to evaluate the company's accessibility and conduct spatial analyses (to identify potential alternative means of transport depending on the employees' places of residence).

- **Surveys:** to determine the mobility patterns of all members of staff and their attitude to alternatives to the private car through completion of a questionnaire
- **Development and validation of an action plan:** to map out, on the basis of the analytical results and surveys, an implementation strategy employing those measures deemed likely to succeed
- **Implementation:** to put into practice the measures identified as relevant for addressing the mobility issues encountered
- **Evaluation and monitoring:** to periodically evaluate the implemented measures in order to reflect changes in infrastructure, staff and attitudes

Stakeholders to involve

- Hotel managers and the whole staff
- Public transport authority to discuss about bus stops and bus routes
- Car sharing or fleet rental operator

Costs aspects

It depends on many variables: insourcing or outsourcing studies, the number of measures actually implemented, and internal resources.

Main actions can conduct to develop car sharing between employees (by a website), a sharing fleet of bikes or cars for work related trips, to create a specific bus stop or new bus route or better scheduled stops.

Lots of gain can occur for the company: easier recruitment, less absenteeism, less car accident... Less stress for the commuters means more productive and motivated to work employees.

Monitoring the implementation

- Number of measures
- Cost of measures per year
- Modal share evolution per year
- Number of employees commuting by train / bus / private car / bike...

Resources

https://www.eltis.org/sites/default/files/mm_examples_6.pdf

Installation of an electric vehicle charging station

Topic: Developing sustainable tour **Objective:** Promote eco-mobility

LEVEL 2

Description

A charging station, also called electric vehicle charging station, electronic charging station (ECS), is a part of the network of the charging infrastructure, also called electric vehicle supply equipment (EVSE). Such a station has several electric recharging points (or charging point, charge point) to allow to charge 1 to 4 plug-in electric vehicles at the same time.

Some electric vehicles (EV) have on-board converters that plug into a standard electrical outlet or a higher voltage outlet, but most others use custom charging stations.

Charging stations provide connectors that conform to a variety of standards. For common direct current rapid charging, chargers are equipped with multiple adaptors such as Combined Charging System (CCS), CHAdeMO, and AC fast charging.

Hotel charging stations are typically found on parking areas.

For major hotel chains, power points that enable guests to recharge their cars on the premises are a new perk. As the EV-driving population increases, a growing number of hotels are exploring how they might accommodate guests requiring recharging facilities.

More than 3,137 EV charging stations are available and ready for use at Marriott hotels globally. Hilton, Starwood Hotels & Resorts, and Scandic have been installing EV charging stations in many of their properties. Many leading hotel companies have public sustainability goals, which have become increasingly important in guest attraction and loyalty and thus is now a matter of their corporate reputation. On the other hand, they perceive that more affluent guests (having expensive cars) are also likely to spend more money on spa services, food and drink, room services, and other hotel extras. Tesla implements a network of fast chargers (500 Superchargers in Europe), and some are located on parking areas of some luxury hotels and restaurants (for free).

Steps to follow to implement the practice

- Implementing an electric vehicle charging station is a question of technical requirements and sizing: number of parking lots equipped, type of charging (low speed, medium, fast), electrical connection capacity:
 - Charging time basically depends on the battery's capacity, power density, and charging power. The larger the capacity, the more charge the battery can hold (analogous to the size of the fuel tank). Higher power density allows the battery to accept more charge/unit time (the size of the tank opening). Higher charging power supplies more energy per unit time (analogous to a pump's flow rate). Charging at fast speeds required a lot of energy and needs powerful industrial electrical connection.

- An overnight charging that may suit to most hotel users, requires an ordinary electrical connection of 3kW per unit (Charging time for 100 km of range on a Tesla Model S is 7 hours with a 230 V, 12 A, 3 kW plug same than for an electric oven).
- the hotel may or may not charge customers for the electricity consumed, knowing that the cost of fully recharging a vehicle remains low (from 2 to 3 € for 100km of range)
- the hotel must be able to provide these customers with the different electrical adapters needed to connect the different connection standards

Stakeholders to involve

- Hotel managers and staff (specifically maintenance staff for parking lots and electrical installations)
- Experts that can provide information on the maintenance and inspection of equipment
- Technicians that can provide regular maintenance
- Electricity distribution companies
- Be sure your charging station is visible to EV drivers through app and websites but also through navigation services in vehicles by platform such as GIREVE which aggregates descriptive data of your charging points in a standardized European database.

Costs aspects

Costs:

- The installation of a low-power charging socket (12 A) is inexpensive, more or less the same than a common domestic plug



Figure 109 Electric plug (source: www.legrand.fr)

- The higher the power of the terminal, the faster the recharging and the more expensive the terminal as well as the electric subscription
- The installation of medium-power charging socket (usually called “Wallbox” 16-32 A)) cost around 1500€ per unit.



Figure 110 Wallbox (source: www.automobile-propre.com)

- Electric adapters and cables (also inexpensive)
- the hotel's electrical installation must be correctly sized to support all the new sockets

Cost savings:

- gain of attractivity for clients who are motorized with an EV, including ebikes
- gain of customer satisfaction
- sustainable and rewarding image
- less noise (and air pollution) due to local traffic and park

Monitoring the implementation

Installation:

- Number of sockets proposed (by type / power)
- For private use only? Or open public access?

Use:

- Energy consumed per month
- Number of plugs per month
- Number of users per month

Price of energy:

- Is the charging free? yes / no, if no: Tariffs? What are the means of payment? Which subscriber cards are valid?

Resources

<https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/charging-ahead-electric-vehicle-infrastructure-demand#>

<https://easyelectriclife.groupe.renault.com/en/day-to-day/charging/electric-car-charging-points-the-possibilities/>

Objective 2 - Promoting low carbon emission travels and eco-friendly activities

Travel agencies have small carbon footprint but some of the core services they facilitate are emission-intensive. Acting responsibly can have a great environmental impact and is a valuable new way to engage with clients.

To this end, the following practices are proposed:

- **Planning eco-friendly tour activities (level 1)**
- **Travel agencies offsetting carbon emissions (level 2)**

Planning eco-friendly tour activities

Topic: Developing sustainable tour

Objective: Promoting low carbon emission travels and eco-friendly activities

LEVEL 1

Description

For a travel agency, engaging in the promotion of a trip consists in reducing the impact of the activities, carrying the fragile environments that are a source of tourist attraction without endangering biodiversity. Three levers can be identified for the travel agency:

- social: respecting the local population through fair tourism: purchasing and employment policies
- mobility: propose a mobility that emits the least amount of GHGs both for entry into the territory and mobility within the territory.
- Lodging: in the choice of energy, resource management and waste production (give preference to labelled lodging)

Indeed, travel agencies and tour operators can play an important role in promoting sustainable tourism development. They can influence change on both the demand and supply sides. In other words, on the one hand, they can encourage their clients to be more responsible towards the environment and the people they meet, and on the other hand, they can indirectly push the accommodation to adopt ecological measures:

Tour operators can influence tourist behavior. Tour operators, aware of their responsibility, should plan their tourism activities in an environmentally friendly way. Encourage them not to travel to places where tourism is causing environmental damage. By publicizing the sustainability criteria, they will encourage destinations to respect them and attract new customers.

Steps to follow to implement the practice

Travel agencies can influence the mode of transportation preferred by the tourist to get to a chosen destination as well as getting around on site.

To get to the destination:

- Systematically propose an alternative to the plane: the train, the carpooling, the bicycle...
- When air travel is unavoidable, propose to estimate the carbon footprint of the trip in order to compensate it via
 - <https://www.goodplanet.org/en/>
 - <https://www.greentripper.org/en>
- Offset all or part of the emissions linked to the trip that cannot be reduced by proposing offsetting platforms such as <http://www.info-compensation-carbone.com/en/> (see *Travel agencies offsetting carbon emissions*)
- Mobility within the destination:

- Favour soft mobility and public transport. Consider the local "transport pass" and / or bike rental, electric vehicle rental, walking
- inform about the destination, its wealth of course but also its fragilities, notably the environmentally fragile places to visit, the behaviors and consumption items that stress the destination (water use, waste sorting, places with high tourist density, the use of non-ecological sunscreen on marine environments...)

The offer itself:

Communicate on the commitment of the travel agency to offer a responsible travel in the choice of accommodation, restaurants and leisure activities:

- Select professionals committed to a social and environmental approach by meeting them and interviewing them about their strategy
- Rely on the existence of credible labels and certifications such as Travel Life, European Ecolabel, Green Key, Global Destination Sustainability Index (GDS Index), Earth Check, Green Globe, Destination Internationale Responsible, Global Sustainable Tourism Council (GSTC)
- Encourage service providers to commit to good social and environmental practices
- Sensitize partners, especially tourist accommodations, to offer local activities, meetings with artisans and inhabitants. Information on existing offers to professionals should be considered through discovery days of the territory and local tourism actors
- Discuss with the service providers about the awareness of their own suppliers in terms of good social and environmental practices
- Propose offers taking into account the dimension of territorial proximity
- Propose offers towards eco-touristic destinations such as regional nature parks, EDEN-labelled territories or territories strongly engaged with their stakeholders in the development of sustainable tourism (contact local tourism development agencies)
- Propose a charter for responsible travelers, as is done by the ART association

Stakeholders to involve

- All the staff of the travel agency
- The tourist actors of the territory: the hoteliers and tourist accommodation providers, the tourist sites, the soft mobility providers

Costs aspects

Costs

- The time spent on identifying service providers involved in responsible tourism and the time spent on raising their awareness if necessary

Costs saving

- Enhanced image of the travel agency due to its commitment to sustainable tourism

Monitoring the implementation

- Regular exchanges with service providers to follow the evolution of their commitment.
- Follow-up of customer demands for sustainable tourism

Resources

<https://ec.europa.eu/growth/sectors/tourism/eden/>

<https://destination-responsible.com/>

<http://www.info-compensation-carbone.com/en/>

<https://www.tourisme-responsable.org/voyager-responsable/charte-ethique-voyageur/>

<https://www.goodplanet.org/en/>

<https://www.greentripper.org/en>

Travel agencies offsetting carbon emissions

Topic: Developing sustainable tour

Objective: Promoting low carbon emission travels and eco-friendly activities

LEVEL 2

Description

The Covid-19 pandemic, by putting a brake on the world economy, has led to a sharp drop in CO₂ emissions of about 7% in 2020. According to a UN report, in order to limit global warming to +1.5°C, it would be necessary to reduce CO₂ emissions by 7.6% per year, every year from 2020 until 2030 i.e., the decrease recorded during the containment. The pandemic allows us to measure the efforts we still have to make in the near future especially in the field of travel.

Travel agencies have small carbon footprint but some of the core services they facilitate are emission-intensive. Acting responsibly can have a great environmental impact and is a valuable new way to engage with clients. Travel from airplanes, cars, and other methods is a leading cause of carbon emissions. The aviation industry is responsible for roughly 3% of global carbon emissions, while a flight from Tenerife to Rome, for example, emits the same amount of carbon into the atmosphere that it would take 20 trees ten years to absorb.

Carbon offsetting allows you to compensate for the carbon dioxide and other emissions you produce by reducing emissions somewhere else. *Voluntary* carbon offsetting is the financial participation of a company (or community or individual) in a project to reduce or sequester greenhouse gas (GHG) emissions. Each tonne of GHG avoided by an offset project, expressed in tonnes of CO₂ equivalent, is certified by the issuance of a carbon credit.

However, before considering offsetting CO₂ emissions, **effort must be put in priority in the reduction of GHG emissions relating the travel offer and the modes of transport. Carbon offsetting should only concern residual CO₂ emissions.**

Steps to follow to implement the practice

Measuring emissions

The carbon footprint of travel offers must be measured in order to control it. To do this, it is necessary to measure the current carbon consumption of the travel offer and of each of the stages of the journey: travel to the destination (plane, train, other), travel on site, type of accommodation, etc. This will make it possible to establish a baseline and calculate the carbon footprint of each new journey that will be offered to a customer.

This will provide a snapshot, over a period of time, of the carbon consumption of trips sold. Reporting and tracking carbon emissions is essential to promote eco-friendly travel.

Some tools available to measure emissions:

https://co2.myclimate.org/en/flight_calculators/new

<https://sustainabletravel.org/our-work/carbon-offsets/calculate-footprint>

<https://www.goodplanet.org/en/carbon-calculator/company/>

https://docs.google.com/spreadsheets/d/10lmm3bEsGMgk3SjpBUosoybdQSwhoYaDWPxU_NV5kQM/

<https://www.bilans-ges.ademe.fr/en/accueil>

Reduce emissions (see *Planning eco-friendly tour activities*)

- Avoid short-haul flights
- Favour trains over planes
- Choose travel options based on emissions, not just price
- Reduce the class of flights where possible (e.g. from premium to economy class)

Offset carbon

The reduction actions you put in place will not solve everything. In this case, you can further reduce your impact by completing your programme by offsetting what you cannot reduce.

Offset projects can be related to resource recovery (e.g. methane capture), renewable energy production, increased energy efficiency, fuel switching, etc. However, according to a study carried out by the Öko-Institut, 85% of offset projects have a low probability of achieving their objectives. For example, if trees are planted to offset emissions, they will usually take 20 to 30 years (or more) to absorb the CO₂ emitted in a few hours' flight. But there is no guarantee that these trees will still be there in 20 years' time.

The carbon offset must meet the following criteria:

- **Measurability:** avoided GHG emissions must be accounted for using a methodology validated by an independent third party.
- **Verifiability:** an independent auditor verifies annually the GHG savings achieved by the project.
- **Permanence:** GHG emissions must be avoided for at least 7 years.
- **Additionality:** the project must avoid GHG emissions compared to a baseline situation. The operator (the project leader) must also prove that without the income from the sale of carbon credits, its project could not have been implemented.

To ensure the robustness of an offset project, several labels exist. Projects registered under these labels are often more reliable in terms of the GHG emissions avoided/sequestered and the uniqueness of the carbon credits issued, which assures the buyer of carbon neutrality.

The labels most represented on the European market are the **Gold Standard** and the **Voluntary Carbon Standard**. These are two carbon offset labels that impose a standard of accounting, monitoring and verification of the project and the keeping of a register. In France, the Ministry of Ecological Transition and Solidarity with local actors created the **Bas Carbone** label in 2020, which guarantees the quality of offsetting projects and the effectiveness of financing.

Some carbon offset initiatives:

- <https://eco-act.com> (France)
- <https://stock-co2.com> (France)
- <https://www.carbonsink.it/en> (Italy)
- <https://www.atmosfair.de/en> (Germany)
- <http://www.firstclimate.com> (Germany)
- <https://www.southpole.com> (Switzerland)
- <https://climatecare.org> (UK)

Communicate

- Gives customers the chance to make a green choice should they wish to: a commonly-used option is to inform users about the possibility of buying emissions offsets as they are finalizing payment.
- Communicating the impact to make it palpable: inform customers that an economy-class roundtrip between Madrid and Berlin is equal to the emissions associated with the energy use of a house over a nine-day period rather than it results in 313 kilograms of CO2 emission.
- Ensuring transparency: clients still question whether their money is contributing to meaningful change. Choosing operators with projects Certified Emission Reductions, reviewed by objective third parties, will help win clients' trust.
- Follow-up with clients who do choose to offset their emissions. This can be done via a simple email confirming the offset purchase and providing more information about the project benefitting from the transaction. Such clients may also be interested in information about additional green offers by the travel agency.

Stakeholders to involve

- All the staff of the travel agency
- Carbon offset operator
- Customers

Costs aspects

Costs

- It is very variable; Sweden, for example, has set the price per tonne at around €120, the European average is around €45, while the offsets offered by airlines are less than €10 per tonne of carbon. However, the real impact of a tonne of carbon would be more than €200 per tonne according to some scientists (Frances Moore, 2015).

Costs saving

- The price of the offset can be integrated into the price of the trip and the carbon offset can be integrated directly into the application at the time of booking.

- Enhanced image of the travel agency due to its commitment to sustainable tourism

Monitoring the implementation

- Carbon footprint of travel offers
- Number of trips including carbon offsetting
- Number of customers purchasing carbon offset trips
- Total amount of carbon offset per year
- Total amount of carbon offset per traveler and change

Resources

<https://www.reservations.com/blog/tips-tricks-budgets/carbon-footprint-travel/>

<https://www.lechotouristique.com/article/voyages-faut-il-arreter-la-compensation-carbone>

<https://www.unep.org/news-and-stories/press-release/cut-global-emissions-76-percent-every-year-next-decade-meet-15degc>

<https://www.ademe.fr/sites/default/files/assets/documents/compensation-volontaire-demarches-et-limites-7402.pdf>

<https://www.ecologie.gouv.fr/label-bas-carbone>

<https://co2cards.com/travel-agencies-can-help-climate-at-no-extra-cost>

4 Access to environmental certifications

4.1 A Label or Certification for your sustainable development

But what is the difference?

The **label** guarantees a higher level of quality according to a given specification.

The **Certification** is a specific approach, framed by law that targets products, services or companies.

Definition of the Label

A label is a distinctive mark created by a trade union or a parastatal body and affixed to a marketed product to guarantee its quality, or even conformity with manufacturing standards (Bern.-Colli Extr.1976).

Definition of Certification

Certification is a voluntary process by the actor to obtain an official certificate indicating the conformity of his procedures with the legal standards set and verified by an accredited certifying body.

For what benefit?

These 2 steps are designed to:

- 1) Indicate your company's ability to follow best practices and sustainable tourism laws.
- 2) Communicate with your different partners on your involvement in sustainable tourism.
- 3) Communicate with your customers who are more and more interested in sustainable development.

4.2 Label & Certifications

Four of the main labels and certifications in sustainable tourism present in Europe are:

EU Eco-Label is a generalist label promoting products and services that have been declared for tourism and accommodation.

Green Key is an international label carried by an organization recognized by the UNWTO which has been developed specifically for accommodation and catering.

EMAS European Management and Audit System is a certification whose implementation requires a certain structure and investment.

EDEN European Destination of Excellence is a European competition rewarding a destination, a territory by the award of a label.

4.3 EU ECOLABEL



Created in 1992, the European Ecolabel is the only official European eco-label that can be used in all member countries of the European Union. It was established by Council Regulation (EEC) No 880/92 of 23 March 1992, published in the Official Journal on 11 April 1992. The EU Ecolabel covers a wide range of product groups, from major areas of manufacturing to tourist accommodation services.

EU Ecolabel

What?	Rules ISO 14024										
Who?	All tourism accommodations except transport and approval journey										
How many have a label in the EU?	<table border="1"> <tr> <td>EU</td> <td>409</td> </tr> <tr> <td>Cyprus</td> <td>0</td> </tr> <tr> <td>France</td> <td>182</td> </tr> <tr> <td>Italy</td> <td>57</td> </tr> <tr> <td>Spain</td> <td>51</td> </tr> </table>	EU	409	Cyprus	0	France	182	Italy	57	Spain	51
EU	409										
Cyprus	0										
France	182										
Italy	57										
Spain	51										
What are the main domains concerned?	53 products and services including tourism accommodations										
How much does the procedure cost?	Different prices depending on the country consult the website https://ec.europa.eu/environment/ecolabel/documents/eu-ecolabel_fees.pdf										
How long does the procedure last?	About 5 months										
Period of validity	2 years with a new global audit										
How does it work?	<ol style="list-style-type: none"> 1- Contact your competent body 2- Product and service registration on the online EU Ecolabel Catalogue, ECAT 3- Product and service testing to build application dossier 4- Application submission and fees 5- Assessment 6- Application approval and licence award 7- Communicate about your EU Ecolabel products and services 										
Intervenor during the proceeding	Competent body in your country										
Main aspects covered	<ul style="list-style-type: none"> - 67 criteria of which 22 are mandatory - General management - Energy - Water - Waste - Information/ Communication 										
To know	https://ec.europa.eu/environment/ecolabel/how-to-apply-for-eu-ecolabel.html										

4.4 GREEN KEY LABEL



Green Key

The Green Key eco-label for tourism facilities exists for more than 20 years and has been developed from a national initiative in Denmark to become the world's leading eco-label for accommodations. Present on 5 continents in 66 countries. Implementation of an environmental policy and a socially responsible approach, intelligent waste management, control of energy and water consumption, responsible purchasing, active awareness of customers: these are all criteria to be taken into account by establishments. The labelling process provides for regular audits and the collection of evidence to attest to the seriousness of the institutions' approach. Green Key programme has been recognised by the World Tourism Organization (UNWTO) and UN Environment (UNEP), and the Green Key criteria are recognised by the Global Sustainable Tourism Council.

GREEN KEY

What?	The world's leading eco-label for accommodations launched by professional of tourism and accommodations.										
Who?	All accommodations and restaurants										
How many have a label in the EU?	<table border="0"> <tr> <td>EU</td> <td>3 200</td> </tr> <tr> <td>Cyprus</td> <td>30</td> </tr> <tr> <td>France</td> <td>714</td> </tr> <tr> <td>Italy</td> <td>16</td> </tr> <tr> <td>Spain</td> <td>6</td> </tr> </table>	EU	3 200	Cyprus	30	France	714	Italy	16	Spain	6
EU	3 200										
Cyprus	30										
France	714										
Italy	16										
Spain	6										
What are the main domains concerned?	All accommodations and restaurants										
How much does the procedure cost?	Different prices depending on the country consult the website https://www.greenkey.global/costs-and-policies										
How long does the procedure last?	About 6 months https://www.greenkey.global/costs-and-policies										
Period of validity	Each year with audit in year 1 /2 /5										
How does it work?	<ol style="list-style-type: none"> 1. Sending the application documents 2. Receiving on-site audits 3. Decision by independent entity (third-party verification) 										
Intervenors during the proceeding	Your Green Key national office for France/ Italy / Spain Green Key International for Cyprus										
Main aspects covered	<ul style="list-style-type: none"> - 13 criteria areas / Most are imperative while other criteria are guidelines - General management - Energy - Water - Waste - Learning - Your sustainable development plan 										
To know	https://www.greenkey.global/green-key-toolbox-1										

4.5 E.M.A.S



Performance,
Credibility,
Transparency

EMAS was created in 1993. It is a premium management instrument developed by the European Commission for companies and other organisations to evaluate, report, and improve their environmental performance. EMAS is open to every type of organisation eager to improve its environmental performance. It spans all economic and service sectors and is applicable worldwide since 2010.

E M A S European Management and Audit Scheme

What?	Rules ISO 14001 and additional requirements										
Who?	All type of organisations										
How many are certified in the EU?	<table border="0"> <tr> <td>EU</td> <td>3 838 companies</td> </tr> <tr> <td>Cyprus</td> <td>72 companies</td> </tr> <tr> <td>France</td> <td>30 companies</td> </tr> <tr> <td>Italy</td> <td>1 023 companies</td> </tr> <tr> <td>Spain</td> <td>956 companies</td> </tr> </table>	EU	3 838 companies	Cyprus	72 companies	France	30 companies	Italy	1 023 companies	Spain	956 companies
EU	3 838 companies										
Cyprus	72 companies										
France	30 companies										
Italy	1 023 companies										
Spain	956 companies										
What are the main domains concerned?	Public Administration / Waste Industry/ Mecanic Industry/ Building Industry / Education / Agricultural products										
How much does the procedure cost?	For a company already certified ISO 14001, the cost will be between €3,500 and €6,000. For a company not certified ISO 14001, the cost will be between €6,000 and €9,000.										
How long does the procedure last?	About one year										
Period of validity	The EMAS certification is valid for 3 years. Annual control audits must be done.										
How does it work?	<ol style="list-style-type: none"> 1 Contact EMAS organisation in your country 2 Conduct an initial environmental audit 3 Plan your environmental policy and program 4 Implement your Environmental Management System 5 Check by an internal environmental audit 6 Act the continuous environmental performance improvement 7 Environmental report 8 Verification and validation by your environmental verifier 9 Registration by your competent body 10 Promote your environment credentials 										
Interveners during the proceeding	2 accredited external auditors EMAS committee from your country European Committee of EMAS for validation										
Main aspects covered	<ul style="list-style-type: none"> - Energetic efficiency - Waste production - Respect of the Biodiversity - Water consumption - Atmospheric emissions - Rational use of materials 										
To know	https://ec.europa.eu/environment/emas/join_emas/how_does_it_work_step0_en.htm										

4.6 E.D.E.N



Since 2007, the European Commission has supported the European countries in rewarding non-traditional, emerging sustainable tourism destinations in Europe through the EDEN award. The initiative aimed to foster sustainable tourism destination management models across Europe by selecting and promoting EDEN destinations. Each year, the EDEN competition names one 'European Destination of Excellence', an accolade that signals a destination's forward-thinking approach and identify them as a sustainable tourism pioneer.

E.D.EN. European Destinations of Excellence

What?	Annual competition around a theme										
Who?	European Tourism Destinations and from 10 other countries between 25 000 and 100 000 inhabitants										
How many have a label in the EU?	<table border="0"> <tr> <td>EU</td> <td>350</td> </tr> <tr> <td>Cyprus</td> <td>9</td> </tr> <tr> <td>France</td> <td>7</td> </tr> <tr> <td>Italy</td> <td>8</td> </tr> <tr> <td>Spain</td> <td>8</td> </tr> </table>	EU	350	Cyprus	9	France	7	Italy	8	Spain	8
EU	350										
Cyprus	9										
France	7										
Italy	8										
Spain	8										
What are the main domains concerned?	City, town, or other urban area understood as an administrative unit governed by a city /town council or another form of elected body.										
How much does the procedure cost?	Free										
How long does the procedure last?	7 months between April and November										
Period of validity	You shall be winner of the year in each country										
How does it work?	<ol style="list-style-type: none"> 1 Create an account on the website 2 Submit your application form and supports documents 3 Explain how did you about the award 4 First selection by jury of experts 5 For the finalists: presentation of the dossier to an European jury 										
Interveners during the proceeding	<p>First selection by jury of experts</p> <p>For the finalists: presentation of the dossier to a European jury</p>										
Main aspects covered	<ul style="list-style-type: none"> - Sustainability - Culture - Digitalisation - Accessibility - Your sustainable development project for future years - The realization will have to be communicable and duplicable in other territories 										
To know	https://ec.europa.eu/growth/sites/default/files/eden_guideforapplicants_2022_final.pdf										

4.7 AND NOW

4.7.1 What to do?

This presentation gives the first keys to choose the label or certification of commitment to sustainable development according to the profile of your organisation.

Obtaining and maintaining one of these steps will be a boost for any tourism business. In this post Covid period, customers are even more sensitive to this engaging and impactful approach for our future.

Self-diagnostic tools are provided on the website of EMAS, EU Ecolabel and Green Key. Whether your establishment is certified or not, a self-audit can be carried out to see how your establishment measures up under the label or certification. It can also help to elaborate an environmental action plan, track the advancement of your certification project and renew it.

SELF-DIAGNOSTIC TOOLS

EU Eco Label

Self-assessment tool: <https://www.ecolabeltoolbox.com/en/espace-de-travail>

GREEN KEY

Self-assessment form for hotels: <https://www.greenkey.global/self-assessment>

Self-assessment form in France: <https://www.laclefverte.org/espace-pro/>

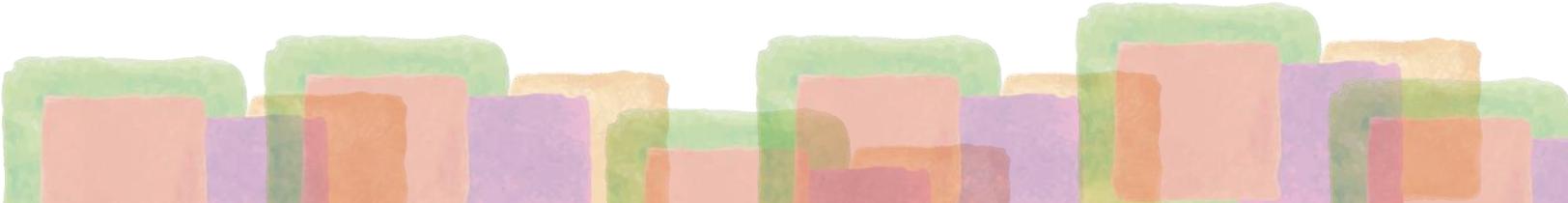
Water footprint self-assessment: <https://www.greenkey.global/water-calculation-tool/>

Carbon footprint self-assessment: <https://www.greenkey.global/online-hcmi>

EMAS

Self-assessment tool: https://ec.europa.eu/environment/emas/emas_publications/guidance/tools_en.htm

Competent bodies in each country to contact (see next page).

A decorative footer at the bottom of the page consists of several overlapping, semi-transparent squares in shades of green, orange, and purple, mirroring the style of the 'TOURISME' logo.

4.7.2 Competent bodies in each country

	EU Ecolabel	GREEN KEY
EUROPE	https://ec.europa.eu/environment/ecolabel/	https://www.greenkey.global/
CYPRUS	https://ec.europa.eu/environment/ecolabel/competent-bodies.html#cy	https://www.greenkey.global/
FRANCE	https://ec.europa.eu/environment/ecolabel/competent-bodies.html#fr	https://www.laclefverte.org/
ITALY	https://ec.europa.eu/environment/ecolabel/competent-bodies.html#it	https://www.green-key.it/
SPAIN	https://ec.europa.eu/environment/ecolabel/competent-bodies.html#es	http://www.llaveverde.org/
	EMAS	EDEN
EUROPE	https://ec.europa.eu/environment/emas/	https://ec.europa.eu/growth/sectors/tourism/eden/
CYPRUS	https://ec.europa.eu/environment/emas/emas_contacts/competent_bodies_en.htm#c-cyprus	https://ec.europa.eu/growth/sectors/tourism/eden/
FRANCE	https://ec.europa.eu/environment/emas/emas_contacts/competent_bodies_en.htm#c-france	https://ec.europa.eu/growth/sectors/tourism/eden/
ITALY	https://ec.europa.eu/environment/emas/emas_contacts/competent_bodies_en.htm#c-italy	https://ec.europa.eu/growth/sectors/tourism/eden/
SPAIN	https://ec.europa.eu/environment/emas/emas_contacts/competent_bodies_en.htm#c-spain	https://ec.europa.eu/growth/sectors/tourism/eden/

5 Guidelines to organize matchmaking events

Two one-day matchmaking events (B2B) will be organised in each country in the framework of TOURISME, including Cyprus, France, Italy and Spain, in face-to-face or remote mode from November 2021.

This activity aims at creating synergies business-to-business (B2B) to facilitate the exchange of good practices among SMEs and technology and sustainable solutions providers, fostering networking and technical cooperation from the same sector and across sectors.

The different categories of actors concerned by the project are: the hotel sector, travel agencies, the economy and the territories - will be brought together.

This note proposes recommendations and scenarios for the organisation of matchmaking events. What are the different types of possible sessions (conferences, workshops, stand areas), the different types of workshops, the methods of participation and interaction, the partners involved according to the topics, the existing resources?

Recommendations are also provided to organize sustainable matchmaking events that reduce pressure on the environment and natural resources via concrete actions from the venue to the catering and the reduction of waste. It is also an opportunity to show visible evidence of environmental commitment to participants who are expected to improve their own company's sustainability performance in the areas of energy conservation, waste and water management, sustainable mobility, green procurement and awareness raising of people.

5.1 Recommendations and scenarios for matchmaking events (one-day format)

1. Different types of sessions

It is recommended to mix formats that bring together:

- all participants: plenary conferences at the opening and closing of the day,
- only a part of the participants with different workshops offered simultaneously,
- and time reserved for exchanges with economic and territorial players (companies, incubators, service providers...), via a trade fair area with stands.

2. Different types of workshops

Four types of workshops are recommended:

- **Professional speed dating:** a method of rapid successive meetings between 2 or a group of people, in order to find the right person for the event's theme.

- **World café:** a creative process that aims at facilitating constructive dialogue and the sharing of knowledge and ideas in a group, with a view to fostering collective intelligence. The principle can be summarised as participating in several discussion groups to debate several issues with a view to achieving a common objective for the whole group.
- **BarCamp:** a meeting or "non-conference", the principle of which can be summarised as "no spectators, all participants". This event takes the form of participatory workshops, a "giant brain storming" which aims to bring out the collective intelligence.
- **Practice sharing workshops:** classic workshop with speakers/trainers who explain their approach to participants, answer questions and engage in dialogue with participants.

A trade fair area with stands, a meeting area and an exhibition wall

It is recommended to organise a trade fair area where companies and actors from the territory will have stands to present their products, good practices and skills. This requires a dedicated space and exhibition material (tables, panels). The stand area is open all day.

A meeting area, with a coffee reception, tables, chairs or sofas, will be offered to all participants who wish to exchange in comfort.

We propose to set aside an "exhibition" area in this exhibition space where transnational hoteliers and travel agencies will be invited to exhibit photos or drawings of projects they find particularly inspiring.

3. Methods of participation and interaction

The following programme is recommended:

- **8.30/9.00:** Welcome of participants, coffee
- **9.00/10.00:** Welcome plenary (all participants)
- **10.00/11.00:** 3 to 6 simultaneous cross-sectoral workshops, such as speed dating, word café and bar camp
- **11.00/11.30:** coffee break, visit of the exhibition area
- **11.30/12.30:** between 3 and 6 simultaneous cross-sector workshops, such as speed dating, word café and bar camp.
- **12.30/14.00:** lunch together
- **14.00/15.00:** between 3 and 6 simultaneous cross-sector workshops, such as speed dating, word café and bar camp.
- **15.00/11.30:** coffee break, visit to the exhibition area
- **15.30/16.30:** visit of the stands, meeting area and exhibition wall
- **16.30/17.00:** closing plenary (all participants)

In this programme, each participant chooses the workshops he/she wishes to attend, while having the possibility to attend all three workshops proposed. The number of workshops offered depends on the number of participants.

Possible Variation of the 1st programme:

- **8:30/9:00:** Welcome of participants, coffee
- **9:00/10:00:** Welcome plenary (all participants)
- **10:00/11:00:** between 3 and 6 simultaneous cross-sector workshops: practice exchange workshop, speed dating and certification workshop
- **11:00/11:30:** coffee break, visit of the exhibition area
- **11:30/12:30:** visit of the stands, meeting area and exhibition wall
- **12:30/14:00:** lunch together
- **14:00/15:00:** between 3 and 6 cross-sectoral workshops simultaneously: practice exchange workshop, speed dating and certification workshop
- **15:00/15:30:** coffee break, visit of the exhibition area
- **15:30/16:30:** visit of the stands, meeting area and exhibition wall or certification workshop
- **16:30/17:00:** closing plenary (all participants)

4. Partners involved according to the topics

Speed dating: hoteliers and travel agencies participate in speed dating and exchange with each other.

World café: hoteliers and travel agencies participate in the world café to build a shared vision of problems and solutions.

BarCamp: all stakeholders are invited to participate in the BarCamp to share and showcase their ideas, methods and best practices, however small. The idea is to create emulation and to encourage exchanges and meetings.

Workshop for the exchange of practices: these workshops are intended for hoteliers and travel agencies. The trainers can be: hoteliers and travel agencies already experienced in sustainable practices, as well as economic and territorial actors.

Exhibition area (open all day): the stands are held by the economic and territorial actors. They can visually show their achievements (brochures, videos, photos, objects).

The **exhibition wall** is reserved to hoteliers and travel agencies. Its organisation is simple: a wall with panels where photos and post-it notes can be hung. The idea is to ask hoteliers and agencies, when registering, to

bring a photo of a project or achievement that they consider particularly "inspiring". The aim is to encourage contacts and exchanges via these photos.

5. Existing resources

The tools presented can be used face-to-face or remotely. The equipment required is minimal:

- in face-to-face: tables, chairs, pencils, pads of paper, paper board.
- in remote mode: 2.0 tools, social networks or Wiki application for example.

Professional speed dating

What is speed dating?

Speed dating is a method of meeting people in quick succession in order to find the right person for the event's theme.

How does it work?

Meetings usually last between 1 and 10 minutes at most. This is enough time to start an objective discussion where everyone introduces themselves to each other. Certain rules are essential for a successful business speed dating event. The participants must clearly define the objectives to be achieved. One of the unique features of this type of meeting is that it can be conducted both one-on-one and in groups. The formation of the meeting groups is done in different ways. It all depends on the objective of the speed dating.

Resources: <https://epale.ec.europa.eu/fr>

World Café

What is the World Café?

The World Café is a creative process that aims to facilitate constructive dialogue and the sharing of knowledge and ideas. The aim is to engage a group in a dialogue process to generate ideas, share knowledge, stimulate reflection, open up avenues for action...

How does it work?

The World Café focuses on a topic of common interest. Participants are grouped in tables of 4 to 6 people. The participants (idea ambassadors) change tables in each round, except for one (the table host) who stays to share the results of previous conversations with new participants. Each table has a specific working theme (or question), which should be clarified in advance. The World Café usually consists of three rounds of conversation, each lasting about twenty minutes. After several rounds of dialogue, there is time for an exchange of ideas with the whole group. These conversations help to identify patterns, increase collective knowledge and create opportunities for action.

Resources: <https://www.enseigner.ulaval.ca/ressources-pedagogiques/methodes-world-cafe>

BarCamp

What is it?

Created in August 2005 in Palo Alto, California, BarCamp is a meeting, a "non-conference", whose principle can be summarised as "no spectators, all participants". This event takes the form of participatory workshops, a "giant brain storming" that aims to bring out the collective intelligence.

How does it work?

The procedural framework of a BarCamp can vary while respecting the double principle of "unconference" and "all participants". In the initial model, the BarCamp begins with a presentation of the participants in the form of a round-table discussion in which each person gives his or her name, affiliation (company, association) and three key words that identify his or her areas of interest. Then the participants are invited to write down the theme that interests them on a sheet of paper that will be displayed. This takes the form of a matrix with the available rooms or tables on one side and the time slots on the other. All participants are encouraged to present a project or help with an intervention. There is no note-taking and the initial methodology does not include instructions on how to use what is produced. However, it is possible to use videos, summaries and reports to convey the content of the work produced.

Resources: <https://espaces-numeriques.org/wp-content/uploads/2019/01/l90p14.pdf>

Workshops for exchanging practices

What are workshops?

A classic workshop with speakers/trainers who explain their approach to participants, answer their questions and engage in dialogue with them.

How does it work?

In this workshop, speakers present and discuss their projects and trajectories in the field of transition and come up with a set of lessons learned and good practices, a first common reference framework intended to support the transfer of their experience to other actors. The other participants question them.

6. Operational organisation

Steps to follow for the matchmaking events

- STEP 1: Create the event & set up the attendee profiles.
- STEP 2: Build the B2B Session.
- STEP 3: Set up the networking profiles.
- STEP 4: Launch the event.
- STEP 5: Register the guests and open the networking space.
- STEP 6: Assign tables and generate meetings.
- STEP 7: Run the event.
- STEP 8: Send post event surveys.

In practice

How would it work?

- Register online.
- Describe company, technology/know-how, projects and partner search.
- Browse the catalogue of participants and profile.
- Select and validate meetings.

Few days before SMEs will receive their personal agenda.

Online registration.

SMEs will have the opportunity to register online and submit their own profile. Their profile should highlight the kind of technology/product/expertise/system they are offering, what kind of cooperation they are looking for and what ideas they would like to discuss with potential partners. All cooperation profiles will be published online and will be available for everyone to see. They can edit your profile at any time.

Promotion of published profiles.

All published profiles will be extensively promoted by the organizers of the event and profiles can be viewed by all participants.

Selection of bilateral meetings:

- Email notification.

They will be informed by email when you can start booking bilateral meetings. Intelligent search options allow you to quickly identify suitable participants and profiles.

- Booking of bilateral meetings.

Once you they have found the most promising business partners, they can select them for bilateral meetings. They can add further meetings at any time but please be aware that the bookings will be managed on the basis first come - first served.

- Personal meetings schedule.

A few days before the event they will receive by email their personal meeting schedule, but their meeting schedule can be checked online. The meeting schedule will include information about the time, the table number and who they are going to meet.

- At the event.

At the registration desk, they will receive an updated version of your meeting schedule including any last minute bookings. Their personal meeting schedule will include all their meetings, in chronological order—the names of the potential partners and the table number for each meeting.

5.2 Organizing sustainable match making events

An event is a concentration of people, equipment and energy in one place for a limited period of time. Events often require a team of organisers, equipment, particularly for decoration or sound, and transport, accommodation, speakers, service providers and suppliers.

If creating an event is necessary to enable people to exchange and share experience and knowledge, an event can put a lot of pressure on the environment and natural resources.

According to ADEME (France), on average, an event that brings together 1,000 people consumes:

- 100 kg of paper, or 2 trees, 30,000 liters of water. It is not a question of eliminating paper, but of using it more intelligently.
- 200 KWh of energy, or 3 years of lighting with an energy saving bulb (15 w)
- 500 kg of waste, that is to say the production of a French person in one year

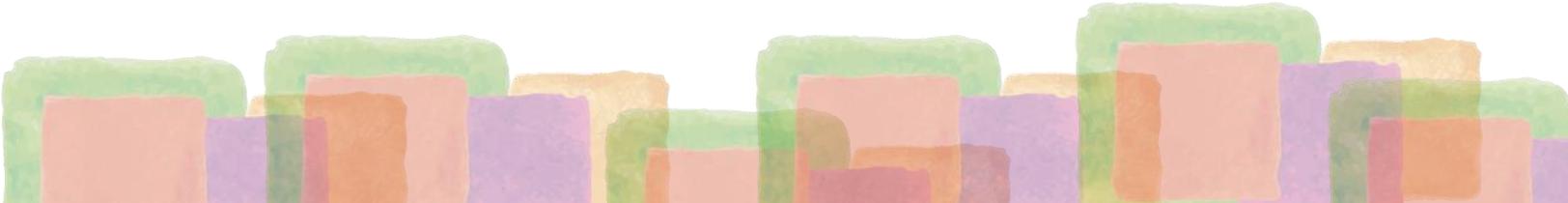
Setting up an eco-responsible design approach for an event means taking the opportunity to act at every stage. Which action(s) to focus on first? What are the main impacts? How to choose the venue? How to optimize travel? How to consume less resources? What promotion to adopt? What choices should be made in terms of catering? How to optimize dismantling and waste management? How to promote the approach by raising the awareness of all stakeholders especially those involved in TOURISME?

In the following paragraphs, recommendations and practical advice are offered on these aspects. They can also form the basis of a specification if you use service providers.

1. Venue

The movement of people and goods is the most important source of environmental impact of an event. On average, 80% of an event's carbon footprint is linked to the transportation of goods (product deliveries, material transport, etc.) and participants (organizers, audience, etc.). Simple and smart choices can reduce this impact and raise awareness among the participants. The location and the nature of the event conference centre is a key factor to lower the environmental impact.

Key points to consider:

- Are there good public transport links?
 - Is it close to the majority of the audience to reduce travel?
 - Shuttle system (electric) to train stations and airports
 - Offer bicycle rental
 - Offer public transport tickets to participants
 - Are teleconferencing or video available?
 - Does it have the right size for the number of people expected? - Are rooms the right size and shape for plenary / breakout sessions?
 - Is accessibility easy and available to all?
- 

- Does the conference centre have a clear re-use and recycling policy?
- Are staff aware of policies and trained to implement them?

2. Choose eco-designed materials and equipment

There is no need to oversize and systematically renew equipment. Rent, reuse and don't necessarily look for the latest equipment that will force you to change it often. Ephemeral décor is often a feature of events, but it is possible to eco-design both décor and furniture to minimize the environmental impacts of their manufacture, use and disposal. Booths are usually made for a single occasion, are not necessarily removable, and include wood and many other materials, some of which are highly polluting.

Key points to consider:

- Lighting and sound: The use of halogen spotlights, which consume a lot of energy, is still often perceived, wrongly, as a must to be able to light the stands well.
- The first good gestures: opt for low-consumption electrical equipment, light-emitting diodes (LED).
- Give preference to daylight as much as possible.
- Plants make the space more welcoming. But their origin, if they are exotic, and their cultivation, especially for cut flowers, can generate strong environmental impacts (pesticides, fertilizers, CO2 emissions from the heating of the greenhouse, transport, cold room...).
- Opt for locally grown or rented plants and flowers. Make sure that they will be well cared for after the event.

3. Promotion and goodies

The dissemination of information and promotion of the event must be consistent with an eco-communication approach. Before and during the event, opt for useful and efficient solutions.

Inform before the event

Avoid the logic of "all paper" by using the Internet to disseminate general information: dates, program, registration form, access map... Pre-register on the Internet to save time, paper, postage and money.

This channel is ideal for avoiding mailings, saving time (online registrations), expanding and getting to know your target (forms...), putting as much information as possible online: maps, registrations... and recommending not to print.

When paper distribution is essential, if possible, design a single document, simple and synthetic, which serves as a map, program, etc. Avoid the massive distribution of leaflets and prefer to post them in strategic places.

Inform during the event



Choose signage materials made from recycled and sustainable materials (reusable from one year to the next) or eco-innovative materials. Avoid the "disposable": for a regular event, signage without dates can be recovered from one session to another.

On kakemonos and banners printed on tarpaulins, the dates can be written on an adhesive and changed at will. Instead of throwing them away, end-of-life tarps can now be donated to a collection for recycling.

Avoid distributing documents in "batches" (a folder containing the paper version of presentations, additional documents, even paper, a pen, etc.). Not all participants may want a folder or all the documents.

Customizable badges (transparent pockets) are more easily reused, just slip the new label in. Provide a wastebasket at the exit to recover them and allow their reuse.

Provide useful and eco-designed goodies only if necessary

The real usefulness of the distribution of "marketing" objects often remains to be demonstrated. We will try to avoid them except to propose useful and more ecological objects.

The origin of promotional objects must be clearly identified. Some products can be made locally or be the result of recycling a first product. These objects are then interesting because of the messages they convey (European Ecolabel or fair trade certified textiles, organically grown foodstuffs, etc.).

Everyday objects that can be reused are to be favored:

- Recycled cardboard briefcase, recycled paper notebooks, woven recycled plastic bag pencil case, staple-less stapler, ruler...
- Recycled plastic key rings and pencils, recycled cardboard or branch pencils, corn-starch pens, labelled wood ballpoint pens, refillable pens...
- Reusable shopping bag and its cover, solar calculator, organic cotton or 100% recycled tee-shirt, environmental awareness games, recycled tarpaulin bags or key rings...

4. Catering

It is essential to manage the quantities to avoid any risk of waste, but above all to favor seasonal, local and sustainable products and to optimize your choice of materials.

Choose local and seasonal products: for snacks, whether it is through a caterer or not, use seasonal food (to avoid transport or cultivation in heated greenhouses, activities that consume a lot of energy), from organic farming, fair trade...

Offer several menus with a vegetarian alternative. For meat and fish, give priority to quality over quantity and vary the types of meat offered.

Select service providers offering a choice of organic food and beverages or from local production, caterers committed to a responsible approach, integration structures...

Eliminate disposable dishes

To avoid buying disposable items (even compostable or recyclable ones), you can offer the equivalent reusable version: replace paper plates or plastic cutlery with tableware, paper napkins and tablecloths with cloth table linen.

These visible actions are the first awareness-raising tool for the participants and it gives credibility to a responsible policy.

The necessary equipment can be found on hire (for table linen, crockery) or via a loan system (for reusable cups for example). This search can be an opportunity to develop links with other associations and potential partners in order to pool the purchase or rental.

Zero food waste

To limit food waste, the best solution is to anticipate and, as a last resort, provide for the possibility of managing leftovers (via donation or the organisation of a soup disco for example).

Planning the quantities as accurately as possible can result in net savings. Throwing away food is a never a pleasant act.

To ensure that the number of meals planned is as close as possible to the actual number, it is useful to follow up on the registrants specifically by asking them about the meal. Be careful not to break the cold chain, because once a fresh product (meat products, fish, cream, eggs...) is taken out, it must be eaten, otherwise it will be thrown away to avoid any health risk.

Also offer a choice of different portion sizes to adapt to the appetite of each person, limit the choice, take out the dishes as they are eaten, offer doggy bags. Working with organic fruits and vegetables that don't need to be peeled allows you to cook dishes that use the whole vegetable (for example, radish soup or vegetable peel chips).

4. Prevention and waste management

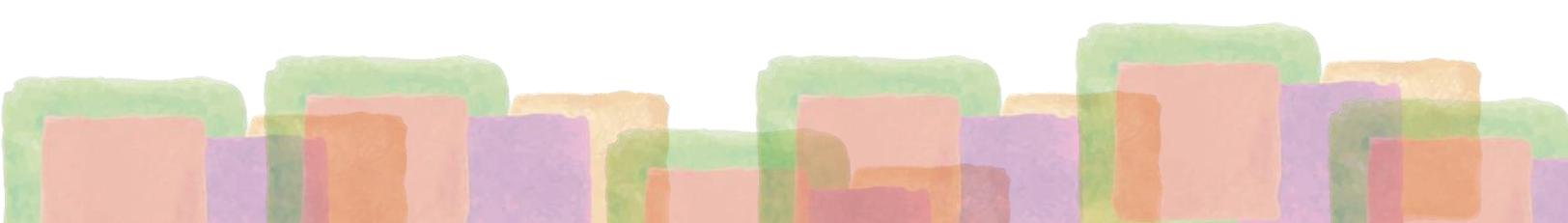
Reducing packaging consumptions

The pod system has become widespread, and for the coffee break at an event, people almost systematically opt for single-dose coffee, sugar and even individually wrapped biscuits...

However, there are less wasteful solutions. For coffee, sugar, salt, tea, condiments and sauces, opt for bulk or large containers. For drinks: fountains or kegs.

Bulk and large packs are often cheaper than single-serve packs. For example, a standard coffee (with a pod and a small sugar sachet) costs €0.62 per coffee, i.e. €62 for 100 coffees, whereas a zero waste coffee (machine coffee and a spoonful of coffee) costs €0.11, i.e. almost 6 times less.

Propose tap water



Tap water is 100 to 200 times cheaper than bottled water, its transport is less greenhouse gas producing and considerably reduces waste production due to disposable plastic bottles. It is a very well controlled and safe product that can be offered for any event.

Depending on the type of event, water can be served in water bars, through self-service fountains or simply offered to participants by waiters or via carafes.

Bio-waste

If no specific solution is put in place, bio-waste is mixed with household waste and ends up in the incinerator or landfill. However, allowing bio-waste to be returned to the soil is a logical and completely ecological process. It is therefore important to provide a recovery channel for bio-waste.

Separating bio-waste for recovery gives a better picture of what is thrown away and helps to control food waste.

If the municipality or the waste management company offers a service to sort bio-waste, simply add a bin at the various sorting points of the event. Alternatively, for smaller events, a worm composting machine can be used. For large events, a service provider or an association can come and collect the bio-waste on site in order to recover it for composting or methanization.

Raise awareness of sorting

For sorting to be effective for the recovery of products, it is necessary to provide visible sorting points, to raise awareness among participants, to ensure that sorting is respected and that the area around the bins is clean to encourage everyone to continue to respect the site.

As for the use of reusable dishes, an efficient deployment of sorting points gives a good visibility to the environmental commitment of the event.

Collection points must be placed at strategic locations (near the buffet), the display of sorting instructions should be clear displayed in the national language and translated at least in English.

Resources

<https://energy.zerowastescotland.org.uk/content/how-plan-and-deliver-environmentally-sustainable-events>

<https://www.zerowasteFrance.org/wp-content/uploads/2018/03/mon-evenement-zero-waste.pdf>

Le Calculateur Cleo de performance événementielle : <https://www.lecalculateur.fr/>

Le guide de la communication responsable ; ADEME 2020

<https://communication-responsable.ademe.fr/eco-evenement>

Environmental self-diagnosis tool: <https://evenementresponsable.ademe.fr/>

https://www.ademe.fr/sites/default/files/assets/documents/ademe_restaurant_evenementielle_planche_bd_010339_002.pdf

6 Table of figures

Figure 1 Nights spent in tourist accommodation (source: Eurostat 2017)	10
Figure 2 Highest number of tourists (source: Eurostat 2017)	11
Figure 4 Specific CO2 emissions at average occupancy for various transport modes, 2014 (source EEA report No 34/2016)	12
Figure 5 Sustainable tourism principles (source: www.devalt.org)	13
Figure 6 Sustainable Development Goals (source: UNWTO)	14
Figure 7 Hourglass (source: www.turbosquid.com)	20
Figure 8 Connected shower head (source: www.absmarthealth.com)	20
Figure 9 Ad for hourglass “5 minutes of precious water” (source: www.espritparcnational.com)	20
Figure 10 Panel encouraging reuse	29
Figure 11 Poster encouraging reuse	30
Figure 12 Doggy bag in preparation (source: Ici.fr)	32
Figure 13 City map (source: www.santorinidave.com/banff-hotels)	35
Figure 14 Visit London card (source: www.visitlondon.com)	36
Figure 15 Touristic bus (source: www.visitberlin.de)	36
Figure 16 Gaz shares in the EU-27 in 2019 (source EEA)	47
Figure 17 Emissions over time in France, Italy, Spain and Cyprus in 2019 (source EEA)	47
Figure 18 SCOPES broken down into 23 subcategories (ISO-TR 14069, March 2011). Source: www.bilans-ges.ademe.fr	49
Figure 19 New EU energy label (source: European Commission, 2021)	85
Figure 20 Double-pipe heat exchanger (source: Wikimedia Commons)	111
Figure 21 Solar electricity potential in Europeans Countries (source: European Communities, 2006)	114
Figure 22 Correction coefficients for solar panels (source: photovoltaique.info)	115
Figure 23 Solar energy potential Île-de-France Region (source: Île-de-France Smart Services, 2021)	115
Figure 24 : Green procurement and circular economy (source: https://www.europarl.europa.eu/)	119
Figure 25 : The best reusable cleaning tools (source : thehowtohome.com)	123
Figure 26 : All purpose cleaner (Source : https://inhabitat.com/infographic-a-guide-to-natural-diy-cleaning-products/)	123
Figure 27 dispensers in a Meliã Hotel’s bathroom	126
Figure 28 Fiber from recycled plastic bottles. Source: The Fine Bedding Co.	133
Figure 29 New EU energy label (source: European Commission, 2021)	137
Figure 30 : Typical Energy Consumption in a building	140
Figure 31 : Energy consumption of HVAC (Source: energy.gov.au)	140
Figure 32 Bicycle park in hotel Aerohus (source: www.visitaeroe.com)	146
Figure 33 Bicycle park in hotel Milo (source www.hotelmilosantabarbara.com)	146
Figure 34 Bicycle rental (source www.setupmyhotel.com)	147
Figure 35 Bicycle (source : www.hotel-sablesdor.com)	148
Figure 36 City map (source: www.santorinidave.com/banff-hotels)	149
Figure 37 Visit London card (source: www.visitlondon.com)	150

Figure 38 Touristic bus (source: www.visitberlin.de).....	150
Figure 39 Mobility plan (source: luxmobility.eu)	152
Figure 40 Cargo bicycle (source: www.weelz.fr)	153
Figure 41 Bicycle (source : www.commeunvelo.com).....	153
Figure 42 Electric plug (source: www.legrand.fr)	156
Figure 43 Wallbox (source: www.automobile-propre.com).....	157
Figure 44 Form to monitor waste production	161
Figure 45 Food waste tracker machin (source: https://www.leanpath.com)	166
Figure 46 Zero single use plastic (Accor group 2020).....	170
Figure 47 Consumption of bottled water per capita in the European Union in 2019 (source: Natural Mineral Waters Europe).....	173
Figure 48 Tap water consumption for drinking, showering, cooking, etc. in the EU in 2014-2015.....	174
Figure 49 Glass bottle with the message “Save the Ocean” (Surfrider Foundation Euro)	175
Figure 50 Card displayed in hotels in Halifax to promote tap water	175
Figure 51 Brita system connected directly to the water tap.....	178
Figure 52 Nordaq refilling system	178
Figure 53 Waterlogic pedal system	179
Figure 54 Water tap meter.....	181
Figure 55 Sorting basket with 3 bins proposed by My eco Design	184
Figure 56 Separation at the source during the food preparation	187
Figure 57 Compost bin receiving organic waste from the kitchen	191
Figure 58 Electromechanical composter (Eco-digesteur®) treats organic waste up to 100 covers/day (10 kg of food waste).....	192
Figure 59 Main sources of food waste production (Swiss Hotel Association).....	196
Figure 60 Food storage in the fridge and control of temperature (source: blog-testo.fr).....	197
Figure 61 Small dishes for the buffets of the hotel El Tope in Tenerife	200
Figure 62 Napkin with messages displayed in Guldsmeden Hotels in Copenhagen	201
Figure 63 Doggy bag in preparation (source: lci.fr)	204
Figure 64 Too Good To Go advertisement	210
Figure 65 Too Good To Go App	210
Figure 66 Stock of unused furniture (source: hotelfurniture.com).....	214
Figure 67 Mattress recycling workshop (source: secondly.fr)	215
Figure 68 Average water consumption (source: CCI Pas de Calais)	218
Figure 69 : the small water cycle (source: Office international de l'eau).....	220
Figure 70 : Water Meter	223
Figure 71 : Sub-meter or divisional water meter	223
Figure 72 : Smart plughole	225
Figure 73 Panel encouraging reuse.....	228
Figure 74 Poster encouraging reuse	229
Figure 75 Dual flush button (source: Ungfu Mall).....	231
Figure 76 ; Dual flush toilet.....	232
Figure 77 : Water free urinals (source : https://www.lovelytoilettes.com/procedes-techniques-2/)	234

Figure 78 : segregated dry toilets (source : Ecodomeo)	235
Figure 79 : Flow regulator (Source : https://www.activeau.fr/).....	237
Figure 80 : example of regulators (Source : http://www.dynavive.eu/regulateurs-eau-robinets.html)	238
Figure 81 : Mixer taps.....	241
Figure 82: Mechanical mixing.....	241
Figure 83 : Timed tap	241
Figure 84 : The electronic tap	241
Figure 85 : Thermostatic valve	241
Figure 86 : Nudge communication (https://www.nudgeme.fr/)	243
Figure 87 : Nudge communication for the reuse of towels in hotel rooms	245
Figure 88 : Sand Timer (source: https://www.nudgeme.fr/portfolio/tourisme-et-eco-gestes/)	245
<i>Figure 89 : nudge communication in Amsterdam airport.....</i>	246
Figure 90 : Hamburg Water cycle (source: https://watershedsentinel.ca/articles/hamburg-water-cycle/)	251
Figure 91 : tank of 200 l (environ 30 €) –	253
Figure 92 : tank of 1 000 l (environ 200 €) –	253
Figure 93 : Tank to be buried 3 000 l (environ 2000 € ttc).....	254
Figure 94 : Flexible tank : 30 m ³	254
Figure 95 :Hamburg Water Cycle (Source : https://watershedsentinel.ca/articles/hamburg-water-cycle/) ..	255
Figure 96 : Grey water being used to partially refill the toilet canister	256
Figure 97 : Eco toilets industrial design, Jang WooSeok	256
Figure 98 : Salt pool © Fotolia	261
Figure 99 Circular tourism (source: http://www.circular-tourism.com)	268
Figure 100 Bicycle park in hotel Aerohus (source: www.visitaeroe.com)	272
Figure 101 Bicycle park in hotel Milo (source www.hotelmilosantabarbara.com)	272
Figure 102 Bicycle rental (source www.setupmyhotel.com).....	273
Figure 103 Bicycle (source : www.hotel-sablesdor.com)	274
Figure 104 City map (source: www.santorinidave.com/banff-hotels)	275
Figure 105 Visit London card (source: www.visitlondon.com)	276
Figure 106 Touristic bus (source: www.visitberlin.de).....	276
Figure 107 Mobility plan (source: luxmobility.eu)	278
Figure 108 Cargo bicycle (source: www.weelz.fr).....	279
Figure 109 Bicycle (source : www.commeunvelo.com).....	279
Figure 110 Electric plug (source: www.legrand.fr)	282
Figure 111 Wallbox (source: www.automobile-propre.com).....	283



The content of this publication represents the views of the author only and is his/her sole responsibility; it cannot be considered to reflect the views of the European Commission and/or the Executive Agency for Small and Medium-sized Enterprises (EASME) or any other body of the European Union. The European Commission and the Agency do not accept any responsibility for use that may be made of the information it contains.

TOURISME

Improving Sustainability of Tourism SMEs Through Knowledge Transfer, International Cooperation and Multi-Stakeholder Engagement



Co-funded by the COSME programme of the European Union

