



ASSET-H&C

Association of Southeast Asian
Social Enterprises for Training in
Hospitality & Catering



eco GUIDE

for **HOSPITALITY**
Businesses & Schools

"Recipes to minimise your impact on
the environment while saving costs."

A project initiated by

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ASSET-H&C

ASSET-H&C is the Association of Southeast Asian Social Enterprises for Training in Hospitality & Catering. This network was created in 2016 and brings together vocational training centres willing to work hand in hand to better fulfil their common mission: providing quality, hands-on and comprehensive training to youth and adults to enable them to successfully integrate into the tourism job market and society.

Every year, the schools which are members of ASSET-H&C build the competencies and the future of more than 2,200 women and men across Southeast Asia. A majority of students come from academically, socially, and/or economically disadvantaged backgrounds, but they are given a chance to become highly-skilled professionals. To this date, more than 17,300 students have graduated from the 14 schools with very high employment rates in the months following their training.

As a network, ASSET-H&C aims at becoming a key regional player in the Technical and Vocational Education and Training (TVET) sector as well as in sustainable hospitality and tourism. The goal is to have a positive impact on the society, environment and economy of the countries ASSET-H&C members are working in.



ASSET-H&C

THE “ECOSPITALITY INITIATIVE”

As part of this global vision, ASSET-H&C members decided to put a particular focus on eco-responsible hospitality and tourism.

In 2017, the network launched the Ecospitality Initiative, which aims at shaping the next generations of responsible tourism professionals by creating conducive environments - eco-schools - for the capacity building of young generations - eco-students.

The overall objective of the initiative is to raise awareness among current and future professionals on the environmental footprint of the tourism industry, and thus have a positive and long-term impact on sustainable development.

The first phase of the project was to help member schools improve their operations in a durable manner to reduce their environmental impact. ASSET-H&C collaborated with Artelia to assess the environmental footprint of training centres, identify good practices, and provide guidance to take further action.

This guide gathers the good practices drawn from the observations and recommendations of Artelia. It aims at helping all interested tourism stakeholders increase their environmental sustainability.

This Eco-Guide was published in 2018 by the Association of Southeast Asian Social Enterprises for Training in Hospitality & Catering (ASSET-H&C).

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And the precious collaboration of  ARTELIA and  EXO TRAVEL

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Finally, parts of this document have been drawn from observations and experience of the six ASSET-H&C member schools that participated in the pilot Eco-Schools Project:

- Ecole d'Hôtellerie et de Tourisme Paul Dubrule (Siem Reap, Cambodia)
- Hospitality and Catering Training Centre (Mae Sot, Thailand)
- KOTO (Hanoi, Vietnam)
- PSE-Institute School of Hospitality and Tourism (Phnom Penh, Cambodia)
- Sala Bai (Siem Reap, Cambodia)
- Yangon Bakehouse (Yangon, Myanmar)

YOU CAN CONTRIBUTE

Any idea, question, or suggestion? We would be glad to receive an email from you at asset@iecd.org.

The ideas and opinions expressed in this publication are those of the authors; they do not necessarily reflect the views of Agence Française de Développement (AFD) or any of the above mentioned organisations.

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WHO IS THIS GUIDE FOR?

This Eco-Guide is dedicated to organisations willing to change their structure and processes with the aim of limiting their negative impact on the environment. It is a practical guide, accessible to anybody looking for a course of action and does not require any technical background.

Readers will find tips and levers to improve their eco-responsibility, while often making financial savings.

It is particularly geared towards directors, managers and engineers of the Hospitality, Catering and Tourism industry, including:



Hotel businesses



Restaurant and catering businesses




Travel agencies and tour-operators



Training institutions specialised in hospitality and catering

The goal is to spread the word as widely as possible: please share this Eco-Guide around you to increase our positive impact.

LEGEND

word  Find this word or notion in the Glossary and Acronyms (page 48)



This is a practical recommendation, or “recipe” you can apply right now!



Hospitality Insight: read a case study from a hospitality actor in the region



Find more resources and information on this topic at the following link(s)



CHOOSE YOUR FAVOURITE WAY TO BROWSE THIS ECO-GUIDE

- Read it in full to get a global understanding of issues and solutions; or
- Access directly the topic you’re interested in by using the interactive table of contents. Each title is clickable. When you want to switch sections, go back to the beginning easily by clicking on “TABLE OF CONTENTS” on the top right corner of each page.

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FOREWORD

“ Human activities, including tourism, are responsible for several and significant impacts on the environment: decreased water quality, increased pollution and greenhouse gas emissions, depletion of natural resources or contribution to climate change, to name a few. All the latter threaten life on earth and can already be observed and felt, particularly in at-risk regions like Southeast Asia.

Within the Energy & Environment Department of Artelia in Ho Chi Minh City, we individually and collectively have a passion for sustainability. This has always been the foundation of the work we conduct with private and public organizations, including hospitality actors, to assess and reduce their environmental footprint and to develop more sustainable solutions for the future.

We were therefore thrilled to partner with IECD and ASSET-H&C and participate in the elaboration of this Eco-Guide. This was the opportunity for us to put our core expertise at the service of a project for the common good, one that aims at disseminating tools to enable actors of the sector, schools and businesses, to get started. We are glad we could do our part by sharing our knowledge with those willing to take a first step towards eco-responsibility, and hope this will contribute to trigger change on a wider scale.

Nicolas JALLADE

Head of Energy & Environment Department,
ARTELIA Vietnam

“ At EXO Foundation, we believe that responsible travel is a key to the sustainable development of Asia. Together with EXO Travel, we promote it throughout the whole tourism industry in all destinations we operate in, by minimizing negative impacts and maximizing positive ones for both the environments, and the people living in them.

Being fortunate enough to live and operate within Asia's marvelous natural and cultural heritage, we see it as our responsibility to be conscientious about where we tread and what impact this has on the world around us.

By supporting local charities, enterprises and organizations that contribute to social, cultural and environmental causes, we are able to maximize the benefits that tourism has on locals and their economy.

We are proud to be partnering with IECD and ASSET-H&C, who provide opportunities for the less fortunate and set a great example in guiding the tourism industry towards a more sustainable path. We truly believe responsible tourism is the future of travel, bringing people closer together and developing a style of travel that is conducive to making the world a better place.

Alexandra MICHAT

Director,
EXO Foundation

Nia KLATTE

Sustainability Coordinator
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INTRODUCTION

By 2030, an expected 1.8 billion international tourists will be traveling the world⁽¹⁾, enhancing both local and global economic development, creating large direct and indirect employment opportunities, as well as promoting cross-cultural exchanges and understanding. If future looks bright for the industry, it is however much duller when environmental factors are taken into account.

With 1.3 billion people traveling the world each year, the tourism sector is already responsible for 14% of global climate change⁽²⁾. According to the United Nations Environment Programme, “in a ‘business-as-usual’ scenario, tourism would generate through 2050 an increase of 154% in energy consumption, 131% in greenhouse gas emissions, 152% in water consumption and 251% in solid waste disposal”⁽³⁾.

Redefining tourism development now is primarily a moral and ethical issue, so that tourism can remain a great lever for development and peace.

Environmental destruction should also be an economical concern for the sector. Tourism heavily depends on the availability and quality of natural resources and environments it is embedded in to exist and pursue its development. One could say the sector’s biggest threat could become tourism itself if it keeps actively contributing to the depletion of resources instead of preserving them. There is a risk that “in the future the sector may be more exposed to criticism as a “dirty” sector” according to the Global Sustainable Tourism Council, if nothing is done at least “on the ground to reduce emissions and other harmful environmental and social effects”⁽⁴⁾.

It is therefore key to rethink how we will be able to sustainably manage this growing industry in order to make it a positive experience and asset for all its stakeholders.

The good news is that there is a commercial opportunity for industry actors who will lead the way. In fact, travellers are increasingly aware of global environmental and social issues, and attentive to their own impact while travelling. The effective responsibility and sustainability of the industry actors they are entrusting their holidays with is clearly becoming a factor in their final consumption choice. In 2017, a poll conducted by AIG⁽⁵⁾ revealed that 78% of travellers considered sustainable travel as “very important” or “somewhat important” - while “only” 52% gave that same answer the year before. The sector will increasingly be held accountable by consumers and only industry players who have a proven interest in doing their part (and concrete actions) will stand out.

¹ UNWTO, “Why Tourism”, <http://www.tourism4development2017.org/why-tourism>, accessed on 20/04/2018.

² Transforming Tourism - Tourism in the 2030 Agenda, March 2017.

³ UNEP, <https://www.unenvironment.org/explore-topics/resource-efficiency/what-we-do/responsible-industry/tourism>, accessed on 20/04/2018.

⁴ Randy Durband, Global Sustainable Tourism Council (GSTC), WTTC, 2017, Understanding the Critical Issues for The Future of Travel and Tourism.

⁵ In March 2017, AIG Travel conducted a 15-question poll (AIG Pulse Poll) with 1300 participants in the U.S. - International Travel and Health Insurance Journal, 26 April 2017, “Travellers want education on going green”, <https://www.itij.com/story/13205>, accessed on 20/04/2018.

We trust it is not too late to turn the tide if we all - professionals, travellers - start acting to make tourism more sustainable, and if we all do the best we can⁶⁾.

As vocational training centres, within ASSET-H&C, we believe we bear a very special responsibility, being major sources of influence through the youth and adults we train, to drive large-scale and long-term changes. With this Eco-Guide, we hope to start doing our part and bring others on this journey.

Consider this a recipe book: page after page, it will provide you with easily-implementable good practices to limit the impact of your hospitality and catering activities on the environment, in 4 main areas: energy consumption, water consumption, waste and pollution, and other climate change mitigation and adaptation measures. Through basic explanations, a concrete course of action and insights from the hospitality industry, we hope to give you the keys to start or carry on change at your level.




⁶⁾ Find the inspiring Hummingbird's Tale on the last page of this Eco-Guide.

ENERGY CONSUMPTION

- **Monitoring and Awareness**
- **Building**
- **Lighting**
- **Air-Conditioning**
- **Renewable energies**



What is the issue?

The energy we use daily for human activities is still largely dependent on the combustion of fossil fuels (coal, oil, natural gas...), which present two issues: first, fossil fuels are being consumed at a faster pace than that of their natural production, and second this combustion releases **greenhouse gases**  such as carbon dioxide (CO²), that are partly responsible for the greenhouse effect, leading to climate change.

Climate change takes the form of global warming, more severe weather events (storms, floods, droughts), and is therefore a threat to biodiversity, natural landscapes, and human activity. According to the Asian Development Bank, Southeast Asia is one of the world's most vulnerable regions to climate change, yet still a growing source of greenhouse gas emissions.

Why should you care?

Hospitality and catering activities are responsible for significant energy use through food production (energy-intensive equipment for kitchen and bakery), cold storage, lighting, air-conditioning (AC)...). The sector as a whole (including transportation) is estimated to be responsible for up to 14% of global carbon emissions⁷.

To comply with the commitment of an average global temperature rise of no more than 2°C taken at the Paris Climate Agreement in 2015, the hospitality industry would need to reduce its greenhouse gas emissions per room per year by 90% by 2050⁸.

Additionally, the sector will be one of the first to suffer from the impact of climate change if current trends continue - in Vietnam or Thailand, it could reduce tourism arrivals by 11.5% in 2050⁹. It is therefore a priority for the industry to actively work on reducing its carbon emissions by limiting its global energy consumption.

This section provides data and tips to better monitor, control and diminish the energy consumed. Implementing the simple steps recommended in this Eco-Guide will reduce your electricity consumption by up to 20%.

⁷ Transforming Tourism - Tourism in the 2030 Agenda, March 2017.

⁸ According to a study conducted by Greenview for the International Tourism Partnership in: ITP, November 2017, Hotel Global Decarbonization Report.

⁹ According to one of the scenarios of the Asian Development Bank, in: Asian Development Bank, 2015, Southeast Asia and the Economics of Global Climate Stabilization.

Monitoring and Awareness •

1. Monitor energy consumption

- Knowing the amount of energy consumed is the first step in assessing the performance of a site and a necessity to be able to reduce energy consumption.
- Different energy sources are available but natural gas and electricity are the two most common sources of energy found in the hospitality and catering sectors.
- To monitor electricity consumption, meters should be installed in the energy-consuming areas. Meter reading should be conducted at least weekly and data gathered in an electronic file to follow the consumption over time. Other sources of energy such as gas should also be monitored (number of bottles, quantity of gas, etc.).
- The price of an electricity meter (including installation) averages 250 USD/unit.



Once meters are installed, create a simple sheet to report the weekly consumptions of the main different areas and departments of your site (for instance, for a hospitality school: offices and classrooms/kitchen/restaurant/housekeeping and laundry area/dormitories...) and appoint a person or a team to do the monitoring.



Hospitality Insight: Monitoring rules

In Vietnam, the **TMG Hospitality Group** (<http://www.tmggroup.vn>), which owns brands such as Victoria Hotels & Resorts or ÊMM Hotels & Resorts, has created a rigorous monitoring system to support the group's proactive and ambitious environmental policy. Each hotel, restaurants, or cruise boat of the group has to send monthly consumption reports to the specifically appointed Regional Technical Controller and to the Chief Operating Officer (COO). The reports include precise data regarding energy and water and gas consumption.

This practice was set up approximately 5 years ago and according to Hanno Stamm, COO, it has allowed the group to observe a 50% cut in global resource consumption on that timespan. This result was obtained through the many changes progressively made on the hotels that were built up to 20 years ago, at a time when the state of the planet was not such a hot topic.

At first, implementing this monitoring practice was also linked to the fact that the group had been financed by a loan from the Asian Development Bank, involving many environmental stipulations and required audits. Thanks to a strong philosophical buy-in from the group's leadership, as well as the obvious potential gains in terms of money and image, it soon became corporate culture. All the General Managers are now behind this and environmental issues (how to save more energy, water, or utilities) are raised in every meeting.

The data collected and shared is compared with that of previous reports, other businesses of the group as well as international benchmarks.

The benefit of such a system is two-fold:

- it enables hotels to quickly identify potential problems in case of an unexpected increase in consumption (leakage...) - and any change in consumption should be justified by the manager;
- it is a good way to prove the effective impact of new practices implemented to reduce consumption and consequently congratulate associated teams and encourage them to keep on this track.

Monitoring waste has proven to be more difficult, so the COO includes a visit of storage rooms and looks at purchasing and delivery policies during his bi-annual tour in all hotels.



Sustainable Hotel - Siting, Design and Construction, International Tourism Partnership, 2014.

Part 9: Monitoring performance / Electricity and energy use.

www.greenhotelier.org/wp-content/uploads/2016/02/SDG-9-Monitoring-Performance-for-web.pdf

2. Create awareness about energy use

- The behaviour of the occupants of the building will impact significantly the total energy use. The awareness of all occupants (staff, customers, students in the case of a hospitality school) should therefore be raised through training sessions and signs across the infrastructures to explain the importance of saving energy for both environmental and financial purposes.
- For AC, selecting an adapted temperature (around 26°C) and preferring fans whenever possible will help reduce electricity consumption. For more information, refer to the section focusing on AC (page 17).
- Often, several cold storage equipment (fridges, freezers) and washing equipment (dishwashers, washing machines, dryers) are only partially full; increasing their filling rate optimises the quantity of power needed to run them.
- Devices that are not used over a long period of time should be unplugged/power-off rather than put into sleep mode.
- In most countries, national electricity rates can widely vary depending on the time of the day. To further reduce electricity bills, it is advised to use energy-intensive equipment (washing machines, ovens...) during off-peak hours. For instance, in Vietnam, there are three time-slots in the day (peak hour, standard hour, off-peak hour); peak hour rates (VND/kWh) can be up to four times higher than off-peak hour rates. Rates and schedules can usually be found on the website of electricity providers.



Create fun and attractive signs or organise challenges for guests, staff, and students to motivate them to adopt energy-saving habits.



Hospitality Insight: Green intrapreneurs

In 2015, the **TMG Hospitality Group** (<http://www.tmggroup.vn>) organised a big internal challenge for all its hotels around Vietnam: participating teams had to come up with original ideas and solutions to reduce the environmental impact of their department, and in each hotel the winning team would get a percentage of the savings obtained through their solution. The group found great new ways to reduce its footprint and saved more than 4,000 USD thanks to these solutions.

In the **Victoria Can Tho Resort** (<https://www.victoriahotels.asia/en/hotels-resorts/cantho.html>), the winning team was the Engineering Team, who invented a totally new process to reduce the energy consumed in housekeeping operations. They imagined a system where the heat produced by dryers would be used to warm-up the water of the washing machines, using an insulated box taking the heat from the dryers and having the water pipe pass by the box before going to the washing machines. Doing so, the water would already be heated up to 40/50°C, reducing the time and energy used by the washing machine later to bring the water to an adequate temperature.

This smart idea also won the 1st prize of the Best Business Idea at group level and inspired many other hotels of the group to replicate it.

The group's cruising boats **Victoria Cruises** (<https://www.victoriahotels.asia/en/victoria-cruises.html>) in the Mekong Delta got inspired by this system to create a similar eco-friendly heating system for their guests' rooms: hot water available in the bathrooms for showers is now warmed up using the heat generated by the boats' engines instead of using a generator or an electric boiler, optimising the consumption of energy and therefore saving costs.

Building •

1. Optimise building design to reduce energy consumption

■ Reduce cooling needs

As ventilation and cooling systems require significant energy to run, energy consumption can be reduced by designing buildings in a way that will favour natural ventilation and limit artificial cooling needs. Such measures include:

- Limiting the number of windows and avoiding oversized windows. Less opaque than walls, windows are responsible for more important **solar heat gains** 🔍 in the building. The ratio between the area of windows and walls should be around 30%.
- Using overhangs, louvers, and vegetation to avoid direct daylight and reduce heat (see illustrations under).
- Using external natural ventilation (double roof ventilation as seen on the drawing below) and internal natural ventilation (patio, etc...).
- Using light colours for pavement, roof, and exterior walls to reflect sunlight and expel heat.
- Installing garden, green walls and ponds to cool air.

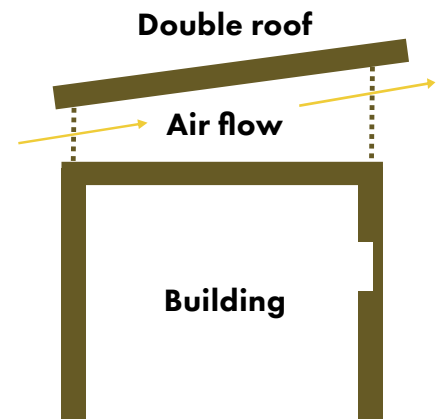
■ Prefer natural lighting

In the same fashion as for ventilation, energy needs can be reduced by limiting artificial lighting needs:

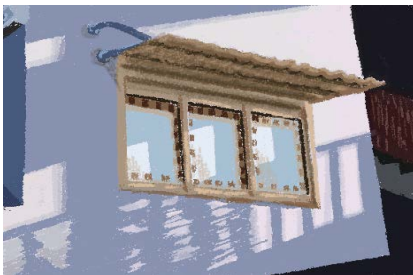
- Make sure there are enough windows (but not too many) to prefer natural light when available and to limit artificial light during day-time.



If you are about to build a new facility, check if you have correctly studied natural lighting and ventilation aspects using the above list. If your building is already finished, consider smaller improvements such as changing painting colours and installing light blinds and shutters.



2. Illustration of good practices for building envelope



Hospitality Insight: Keeping it cool


In Phnom Penh (Cambodia), where the sun shines 365 days per year, good **thermal insulation** 🔍 is key to reducing cooling needs created by solar heat gains.


This led the **Amanjaya Pancam Suites Hotel** (<http://www.amanjaya-suites-phnom-penh.com>) to install UV filters on all windows, particularly in guests' rooms, which benefit from a great exposition to sunlight. This is a simple but effective way to lower the temperature in rooms and therefore limit energy consumption.

In 2018, the hotel will invest in new filters using modern technologies to further enhance the positive impact of this smart building design.

Lighting

1. Lighting design

The goal of smart lighting design is to control and adapt the power of the lighting equipment to each space. An important parameter to consider is the **Lighting Power Density (LPD)** , which is expressed in Watts per square metres (W/m²). This is the sum of the power of all lightings in the space divided by the area of the space. A LPD of 7W/m² should be targeted for the different spaces. For instance, a classroom of 25m² with 12 lamps of 15W each (total 180W) will have a LPD of 7.2W/m² (180/25=7.2). This target should not be reached by reducing the number of fixtures (which will affect the visual comfort) but by using more energy-efficient fixtures and ensuring appropriate brightness in the room.


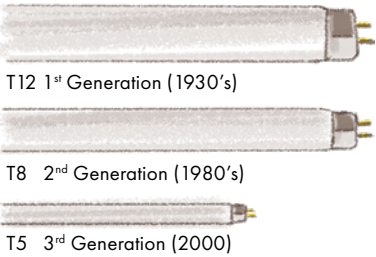
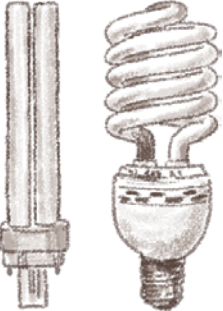
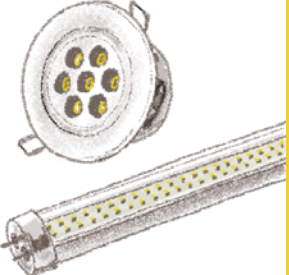
■ **Energy-efficient**  **indoor and outdoor lighting design focuses on ways to improve both the quality and efficiency of lighting. Lighting design principles are:**

- Maximise the use of day lighting while minimising the solar heat gains (indirect sunlight and glazing): free lighting.
- More lamps are not necessarily better: light quality is more important than quantity. Amount and quality of light should match with the performed function of the space (for instance, storage rooms would need less lighting than a kitchen or a classroom).
- Install task lights (lamps for a specific use, such as a desk lamp) where needed and reduce mood and ambient lighting elsewhere.
- Use energy-efficient lighting components (lamp and reflector), controls and systems (dimmer, presence detector and brightness sensor). See below for more precise information.

2. Efficient fixtures

Energy consumption for light can be significantly reduced by using efficient lighting systems. Efficient lighting systems not only reduce energy consumption but improve the working environment and enhance occupants' well-being by reducing eye strain.

2.1. Types of lamps

	 <p>T12 1st Generation (1930's)</p> <p>T8 2nd Generation (1980's)</p> <p>T5 3rd Generation (2000)</p>		
<p>Incandescent Lamp</p>	<p>Fluorescent Tube</p>	<p>Compact Fluorescent Lamps (CFLs)</p>	<p>LED</p>

2.2. Light reflectors

Light reflectors are small reflecting panels surrounding the bulb (above and/or around). By reflecting the light that is naturally going towards the ceiling and upper-part of the room and redirecting it towards the floor and other more used parts of a room, they optimise the produced lighting.

This is often useful for neon tubes (fluorescent tubes).



Light reflector

2.3. Fixtures for indoor lighting

Different lighting technologies available consume more or less electricity. For instance, fluorescent lamps use 75% less energy than incandescent lamps to provide the same amount of light. They also last about 10 times longer (from 10,000 hours up to 24,000 hours with optimal use).

Fluorescent lamps are recommended for indoor use, in particular for rooms needing long hours of use, as they provide the best user comfort. For task lamps however, LEDs should be preferred.

■ The two general types of fluorescent light sources are:

- Fluorescent tubes - typically used for lighting large areas in offices, commercial and public buildings: T5, T8, T12, etc.
- Compact fluorescent lamps (CFLs) - a type of bulb which is commonly used in household fixtures.

2.4. Fixtures for outdoor lighting

For outdoor lighting, LED lights are the best option for training centres, hotels or restaurants, given their robustness and lifespan.

2.5. Economic benefits of efficient fixtures

While the initial price of energy-efficient fixtures (CFL and LED) is typically higher than traditional incandescent ones, newer lamps cost less to operate, saving money over the life of the lamp as seen in the table below (calculations include the initial cost of the fixture):

	LED	CFL ⁽¹⁰⁾	Inc.
Watts per bulb to produce the same lighting as an incandescent lamp (standard reference of 60W)	10	14	60
kWh of electricity used for 30,000 hours [A]	300	420	1,800
Hypothesis of electricity rate in USD per kWh [B] ⁽¹¹⁾	\$0.1	\$0.1	\$0.1
Cost of electricity consumed for 30,000 hours of operation (Hyp: 0.1 USD/kWh) [C=AxB]	\$30	\$42	\$180
Bulbs expense in USD for a 30,000-hour use [D]	\$24	\$45	\$31
Total cost for 30,000 hours [E=C+D]	\$54	\$87	\$211



Once you have optimised the use of natural light in your building(s), check the types of lamps you have in your indoor and outdoor areas; consider progressively replacing all incandescent lamps with fluorescent lamps and LEDs.

The European Union banned the sale of incandescent lamps because of their poor energy efficiency.

¹⁰ CFLs and Fluorescent Tubes use the same technology; the analysis has therefore been restricted to the 3 main technologies.

¹¹ This is a general hypothesis based on a global order of magnitude. Actual electricity rates vary in each country.



Hospitality Insight: Switching (on) to efficient lighting

From 2015, as part of the implementation of the Agenda 21 policy of AccorHotels group, the **Sofitel Angkor Phokeethra Golf and Spa Resort** (<https://www.sofitel-angkor-phokeethra.com>) decided to replace their 200 outdoor garden halogen bulbs (a type of incandescent lamp) to reduce their energy consumption. They calculated that in a given month, they were spending close to 900 USD in energy consumption for these lights only, while more efficient LEDs would cost them about 335 USD per month to run. Even though the initial investment to buy LEDs was higher (2,100 USD extra for 200 units), the difference in daily consumption is so important that the hotel's team estimated it would take less than 4 months to recover the investment and start making savings. Over time, the savings are even bigger when taking into account the respective lifespans of the two types of lamps, which is 4 times longer in the case of LEDs.

3. Lighting control



You can further adjust your lighting to the effective needs of your users by using the smart lighting controls described hereunder. Using lighting controls to automatically turn lights on and off (as well as other equipment) as needed can save up to 60% in energy costs. Those controls have to be designed according to each room and function.

■ Dimmers

Dimmers are fixtures to adjust the level of lighting density of a lamp. They are inexpensive and provide some energy savings when lights are used at a reduced level.

They can be used with daylight or occupancy sensors, or just by means of a control unit.

■ Motion, occupancy and photo sensors

- Motion sensors automatically turn lights on when they detect motion and turn them off a short time later. They are very useful for outdoor security and utility lighting.

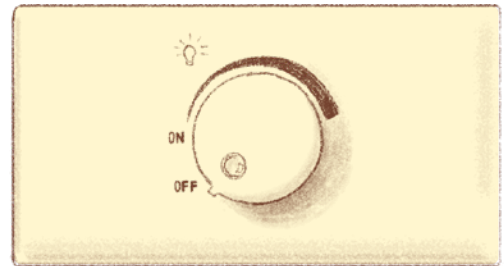
- Occupancy sensors detect indoor activity and are more sensitive. There are two types of occupancy sensors (ultrasonic: sound and infrared: heat and motion).

- Photo sensors sense ambient light conditions, making them useful for all types of outdoor and indoor lighting.

■ Timers or time switches

There are two types of timers: manual timers and in-wall programmable digital timers (looking like digital thermostats), which automate indoor or outdoor lighting for given times and periods of the day.

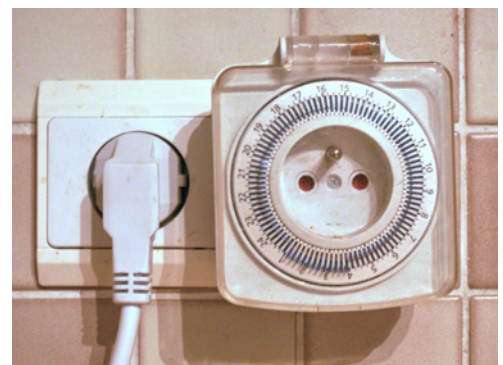
Timers can be used for any electrical equipment.



Dimmer



Motion sensor



Manual time switch

■ **Card-type switches**

Card-type switches allow to quickly turn on/off a set of lights and other electric equipment in a given space. When combined with a card lock system, this fixture guarantees all electricity is shut down when the user leaves the room.

Such systems are common in hotels. However, when setting it up, hotels should be careful to correctly dimension the equipment linked to the card switch: it may not be necessary to have all lights, AC, TV and other equipment turned on each time clients enter the room. This may have the opposite effect and automatically increase their personal consumption during their stay.



Keycard switch and lock



Hospitality Insight: Adjusting lighting needs to effective use

In Siem Reap (Cambodia), the **Sofitel Angkor Phokeethra Golf and Spa Resort** (<https://www.sofitel-angkor-phokeethra.com>) also worked on optimising energy consumption for lighting by installing various lighting control devices:

- Timers for outdoor lighting (only when dark), hallways and kitchen exhaust;
- Dimmers for function rooms;
- Sensors for the Fitness Center and the ballroom;
- Switch-cards for all guestrooms.

The hotel’s team analysed that the most significant energy saving was obtained through the switch-cards installed in guestrooms, which allowed a minimum 8-hour electricity saving per room per booking. Financially, this represents a 32 USD conservative saving per day on energy expenses for the hotel. Dimmers also had a significative impact: rooms equipped consumed on average 50% less than non-dimmed rooms.

Air-Conditioning (AC) •


1. A major energy consumer

A large portion of a building’s energy consumption is used for cooling (40% to 70% in tropical countries). The energy consumption of an AC system is affected by many factors such as system efficiency, thermal insulation of the building, quality of the windows and doors and of course how the AC system is used. A properly installed and well-designed cooling system along with reductions in AC loads (= sizing) can result in significant energy and financial savings over the life of a building.

2. Go for cooling fans

As a general recommendation, and when possible (particularly in weather transition periods), fans should be preferred to AC as their consumption is significantly lower and they prevent liberating harmful gases into the atmosphere. A regular AC unit needs about 1,500W to run, while a ceiling fan only needs 250W.


3. Select an efficient AC system

The efficiency of air conditioning systems can be measured by the **Coefficient of Performance (COP)** . The higher the COP, the more efficient the AC system. Efficient systems have a COP higher than 3.5. In the table hereafter, we compare two AC units with different COPs:

Cooling capacity (kW)	5	
Coefficient of Performance (COP)	2.9	3.6
Initial investment (USD)	\$850	\$1,400
Lifetime (years)	20	20
Estimated yearly consumption (kWh)	3,525	2,650
Hypothesis of electricity rate (USD per kWh)	\$0.1	\$0.1
Estimated yearly consumption expense (USD)	\$352.5	\$265

As shown above, the AC with the highest COP consumes 30% less energy than the other one. Choosing the more efficient AC therefore allows to reduce the energy consumption, which also has a positive financial impact.

Considering that 1kWh costs around 0.1 USD, ~90 USD of savings could be made per AC on the yearly electricity bill by preferring the more efficient AC (352.5 USD - 265 USD).

The **payback period**  of an efficient AC varies significantly depending on the brand, capacity, etc. but generally varies from 4 to 8 years. Assuming the parameters above, the payback period was estimated to be under 7 years:

COP	2.9	3.6
Initial investment (USD) [A]	\$850	\$1,400
Estimated yearly consumption expense (USD) [B]	\$352.5	\$265
Total cost for 1 year of use [C=A+B]	\$1,202.5	\$1,665
Total cost for 6 years of use [D=A+Bx6]	\$2,965	\$2,990
Total cost for 7 years of use [E=A+Bx7]	\$3,317.5	\$3,255
Total cost for 20 years of use [F=A+Bx20]	\$7,900	\$6,700


► Over the economic lifespan of the system, savings amount to 1,200 USD. Considering that a building usually has several AC units, total savings can be significant.

4. Maintenance

The lifespan of equipment highly depends on maintenance. Without appropriate maintenance, the economic lifespan of an AC unit can be reduced from 20 to 10 years.

If maintenance cannot be conducted internally by qualified staff, a maintenance contract with a specialised company should be signed to extend the economic lifetime of the AC system and avoid energy losses (energy consumption can be reduced by up to 25% compared to the same equipment without maintenance).

Maintenance activities should be conducted every 6 months and include:

- Controlling the quantity of **refrigerant**  when necessary
- Filter cleaning
- Cleaning indoor coils (part of the AC unit that absorbs the heat from the air)
- Maintaining pipe insulation



Check the COP of the splits installed in your facilities. Replace progressively those that are getting old/damaged with more efficient ones (COP>3.5) and take specific measures to ensure a proper maintenance of your general AC system.

Remember to use cooling fans instead of AC whenever possible.



Hospitality Insight: Smart ACs

The **Amanjaya Pancam Suites Hotel** (<http://www.amanjaya-suites-phnom-penh.com>) opened in Phnom Penh (Cambodia) in 2002. The original AC system installed then is still running, but it uses a classical technology (versus the newer inverter technology, which consumes less energy), and is aging. Consequently, the hotel's electricity bills have been quite high, in a country where AC is used all year-round. However, as many other hotels, the Amanjaya Pancam Suites Hotel does not own the facilities where it operates its activities, which limits its capacity to renew its equipment.

This didn't stop the hotel's team from acting. Mid-2015, they installed "Airco-Savers" in all the rooms and common areas (total of 25 AC units), which cost them 4,000 USD. An Airco-Saver is an electronic control unit fixed on an AC unit to upgrade it. It optimises the use of produced cooling energy, which is normally dimensioned to cope with extreme cooling needs that are actually oversized for a regular use. To do so, the Airco-Saver switches the unit to a "saver mode" during which only the remaining cooling energy that has been produced and stored is used.

According to Anne Guerineau, General Manager of the Amanjaya Pancam Suites Hotel, the hotel has been reducing its energy consumption by 10%, which amounts to approximately 700 USD of savings on electricity bills every month!

Airco-Savers should be installed by qualified technicians, and the hotel recommends to train staff properly on their maintenance and use as these fixtures are quite fragile. The lifespan of an Airco-Saver is about 2 years, but given their short payback period, their regular renewal is still profitable.

In 2018, the hotel has confirmed the replacement of the global AC system and has planned a switch to inverter technology.

5. Usage and condition

5.1. Setpoint temperature

Choose an adapted setpoint temperature: comfort conditions depend on both temperature and humidity. A setpoint temperature between 25°C and 27°C is considered enough for a humidity level of 50% to 70%.

Reducing by 1°C the average temperature of a building (for example, changing the setting from 25°C to 24°C) is equivalent to increasing the energy consumption needed for cooling by 7% to 20% (depending on orientation, internal heat gains, etc.).



Increase the setpoint temperatures of your AC units to 25°C and raise awareness among the occupants of your buildings (students, guests, staff...). Increasing the setpoint temperature from 23°C to 25°C on one AC unit can save around 70 USD per year on the electricity bill.

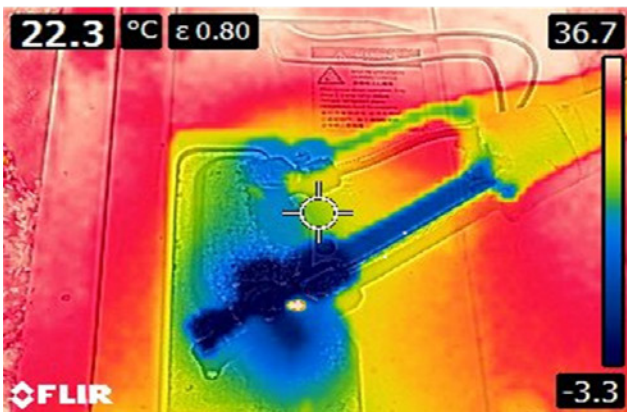
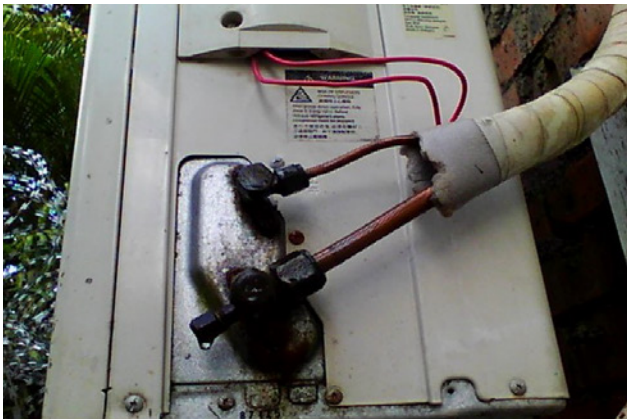
5.2. Location of outdoor unit

The location of the outdoor unit will impact the external appearance of the building but also the energy efficiency of the AC system. Four main rules have to be followed:

- To boost heat removal, the unit should not be exposed to the sun or face the dominating wind. If the unit is exposed to the sun, it will heat up and consume more energy to remove the heat from the building. Protect the unit from the sun with overhangs or trees (see image on the right-hand side).
- The outdoor unit should not be located on the ground to avoid dust build up (responsible for clogging of the system).
- Outdoor units should be installed as close as possible to indoor units. This way, heat losses in the pipes will be reduced.
- Ensure accessibility of the units to ease regular maintenance operations.



AC outdoor unit on the façade correctly protected by an overhang



AC outdoor unit (standard and infrared camera) showing that extremities of the hose are not properly insulated

5.3. Insulation of pipes

To increase the system's energy efficiency, the pipe from the indoor to the outdoor units should be properly insulated to further reduce heat losses and thus reduce the electricity consumption of the whole system.

Insulation should be checked regularly. On the image on the left, we can see that the pipe is not properly insulated (blue colour), which means there is some cold loss. Increased energy is therefore needed to produce the required level of cold.

5.4. Optimisation of AC use

Cooled spaces should be carefully insulated and protected from solar heat gain. This is particularly critical for spaces always cooled when occupied such as the kitchen or dining room.

Similarly, internal equipment generating heat such as ovens should be located outside of the cooled spaces whenever possible.

Finally, the sizing of the AC must be adapted to the room. Oversizing will lead to an increased consumption.



Check that your outdoor units have been properly located and that they are well insulated.

Inside your buildings, check that cooled areas do not lose cooling power through doors and windows: they should close completely leaving no air gap, be protected with curtains or louvers, and be kept shut whenever the AC is on.

Be careful not to position equipment that generate heat (oven, cooker...) in cooled areas or close to cooling equipment (fridge, freezer...).

Ask a professional to conduct an insulation diagnosis of your facilities with specific infrared equipment.



Hospitality Insight: Bringing in fresh air

At **Victoria Can Tho Resort** (<https://www.victoriahotels.asia/en/hotels-resorts/cantho.html>) in Vietnam, housekeepers are trained to automatically switch off AC and open windows while cleaning and making up guest rooms. Not only does this allow the hotel to reduce energy consumption, it also facilitates the renewal of fresh air in the rooms, which improves user comfort.

Renewable energies •

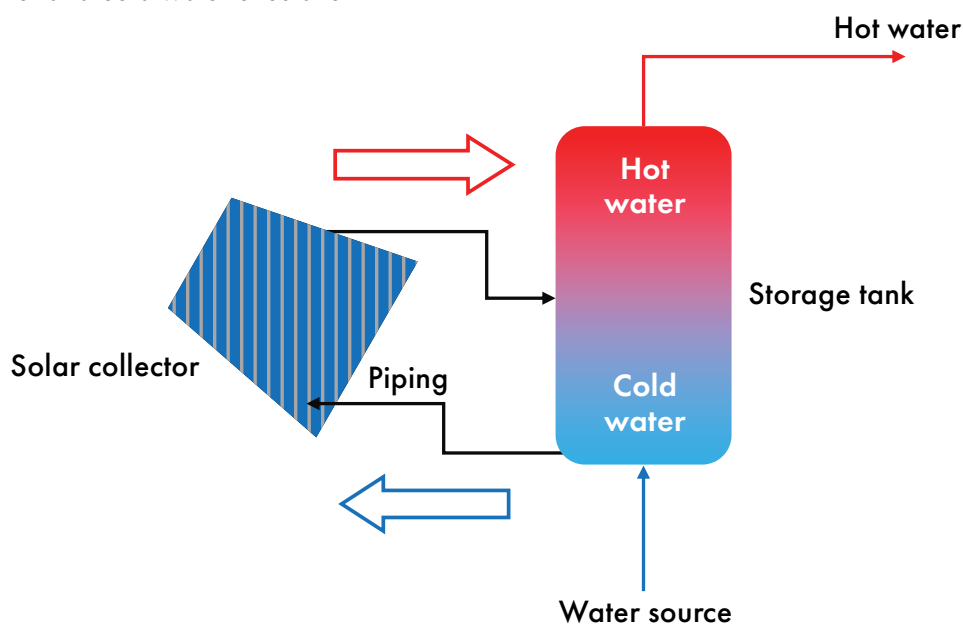
1. Production and use of thermal solar energy

Different types of renewable energies can be produced and used in the premises of a training centre, a restaurant or a hotel. Because of size, cost, installation efforts and context variations, only thermal solar systems will be described here. Setting-up such systems requires the support of a professional.

1.1. Installation of a thermal solar system

Solar thermal systems use the energy from the sun to heat water. A solar thermal system is made up of the following parts:

- Solar collector where water is heated by the sun
- Storage tank with both hot and cold water inside
- Piping for hot and cold water circulation



The solar absorber is supplied with water by a circulating pump.

Several parameters have to be taken into account during installation of a thermal solar system, including domestic hot water needs, the size of the panels and the tank, and the orientation and the slope of the panels. Companies offering full services for installation of solar thermal systems are widely available across South East Asia.

Please note that the system is sized to be used even on cloudy days but for comfort reasons, it should be backed-up by another energy source such as electricity with an electric water heater. Indeed, a thermal solar system will be dimensioned for regular use conditions only and might not be enough for "extreme" conditions, such as simultaneous use by a high number of guests or constant bad weather.



Examples of solar thermal systems

1.2. Investment and benefits

The investment will depend on the size of the thermal solar system and the first step is to contract with suppliers to calculate the optimised size. The average price per square metre of panels is 250 USD.

The table below presents an example of thermal solar system optimised for 3 hotel rooms:

Size of panels (m ²)	Initial investment (USD)	Assumption of electricity price (USD)	Yearly avoided electricity consumption	Payback period	Savings over equipment lifespan (15 years) (USD)
4	\$1,000	\$0.14/kWh	1,800 kWh or \$250	4 years	\$2,750

2. Purchase and use of other renewables energies

2.1. Solar photovoltaic and wind energy

It is not yet possible to buy renewable energy from external suppliers in Southeast Asia but as solar photovoltaic and wind energy markets expand, the proportion of renewable energy in the energy provided by national suppliers should increase. When given the choice, preferring renewable energy providers will favour a faster increase of the amount of renewable energy in the global energy mix at the national level.

2.2. Biofuels

Biogas and biodiesel are produced from organic waste (vegetable or animal fats and oils) and can be used for different uses such as cooking, lighting or transportation.

Read more information in the section related to green transportation (page 43).



Switch On: Renewable Energy Opportunities in the Tourism Industry, United Nations Environment Programme, 2003.
<http://www.unep.fr/shared/publications/pdf/3258-SwitchedOn.pdf>

WATER CONSUMPTION

- **Monitoring and Awareness**
- **Equipment**
- **Water for F&B**
- **Water for housekeeping**
- **Outdoors and landscape**



What is the issue?

A report issued by the United Nations warned that, by 2030, only 60% of the global water demand would be met by existing resources⁽¹²⁾. This scarcity is particularly a risk for Asia, which is home to more than half of the world's population but is the continent with the least amount of accessible freshwater.

At the global level, stress on water resources is expected to have "a cascading set of consequences, including impaired food production, the loss of livelihood security, large-scale migration within and across borders, and increased economic and geopolitical tensions and instabilities"⁽¹³⁾.

Why should you care?

Although at a global level the tourism industry consumes less water than agriculture, hospitality and catering activities are still responsible for significant water consumption through kitchens, laundry, toilets, showers, swimming pools, etc. Hotels and restaurants are usually located in vegetated environments that may also require irrigation.

What's more, touristic activities can often be found in water-stressed areas - which Asia is a part of. And yet, a study conducted by EarthCheck in 2013 shows that the average water use in hotels in Southeast Asia is among the highest in the world (above 800 Litres per guest night)⁽¹⁴⁾. When compared with the daily consumption of an average citizen, amounting to less than 20 Litres per day, this also highlights an issue of inequity.

Reducing the use of water in tourism activities is therefore a pressing matter, both for environmental and social reasons.

This section provides data and information about how to monitor, control and reduce your water consumption.

Hotels around the world that have participated in comprehensive water use reduction programmes have positively contributed to the preservation of their environment and have been able to save up to 10,000 USD per year.

¹² WWAP (United Nations World Water Assessment Programme), 2015, The United Nations World Water Development Report 2015: Water for a Sustainable World, Paris, UNESCO.

¹³ Leadership Group on Water Security in Asia, 2009, Asia's Next Challenge: Securing the Region's Water Future.

¹⁴ Stewart Moore, EarthCheck, for PATA, 2015, Visitor Economy Bulletin (November 2015 Edition).

Monitoring and Awareness

1. Water monitoring

As with electricity, knowing the quantity of water consumed is the first step towards assessing the performance of a site. Water meters should therefore be installed in the main water-consuming areas.

Meter reading should be conducted at least weekly and data gathered in an electronic file to follow variations in consumption over time for the respective areas.

Combined with a regular physical inspection of the distribution network (every two months), this will help in identifying potential leakages when unusually high consumption is noticed.

The price of a water meter (including installation) averages 60 USD/unit.



Once meters are installed, create a simple sheet to report the weekly consumptions of the main different areas and departments of your site (for instance, for a hospitality school: kitchen/bathrooms/housekeeping and laundry area/dormitories...) and appoint a person or a team to do the monitoring.

A two-fold benefit

Water savings go along with energy savings. Reducing water consumption will for instance reduce hot water needs or the quantity of water pumped in the aquifer. In that case, water heaters and pumps will mechanically consume less energy.



Sustainable Hotel - Siting, Design and Construction, International Tourism Partnership, 2014.
 Part 9: Monitoring performance / Water use.
<http://www.greenhotelier.org/wp-content/uploads/2016/02/SDG-9-Monitoring-Performance-for-web.pdf>

2. Create awareness about water use

The second step to reducing water consumption relates to the use made by the buildings' occupants. This is why it is important to firstly educate all users (staff, customers, students...) to make sure they are aware of water conservation issues by providing trainings and displaying water saving notices at appropriate locations.



Create fun and attractive signs or organise challenges for guests, staff and students to motivate them to adopt water-saving habits.



Hospitality Insight: Encouraging guests to take an active role in environmental protection

In Thailand, the **Rembrandt Hotel Bangkok** (<https://rembrandtbkk.com>) started its Green Earth Program in October 2014 to reduce the consumption of energy, water and detergent linked to laundry operations. The programme raises guest awareness of resource preservation and empowers them to choose whether they want their linen (bed and bathroom linen) changed or not.

Although this practice has become quite common in the hospitality industry, the hotel added an original twist to give more incentives to guests to get involved: in fact, those who do so receive a voucher entitling them to a 5% discount in all the hotel's restaurants. A little Green Earth card is available in all rooms; if guests hang it on their door, it means that housekeeping teams shouldn't change their linen. In return, they will then place the discount voucher on the desk of the guest.

Parallel to the ecological benefit, the hotel estimates combined savings in water, energy and detergent to roughly 250 USD per month.

The programme, which required an initial staff training, has been generating great feedback ever since it was introduced: the hotel's team sees the potential cost and work savings and value the good action for the planet; and guests are also happy to do something for the environment during their stay.



Equipment •

1. Water collection and reuse

Collecting rainwater is a good way to reduce water costs while reusing and saving existing natural resources. The main steps to set-up a rainwater collection system are the following:

- Collecting the water: the easiest method is to collect it from rainwater runoff on buildings' roofs with gutters.
- Stocking the water, above ground or underground (storage tanks).
- Bringing the water towards exit points, which necessarily requires a pump.

Rainwater is not proper for drinking, food preparation or hygienic uses; it should be used only for toilets, washing the floors and irrigation. Other types of uses require prior water treatment.

On-site water recycling systems are another way to efficiently reduce and optimise water consumption.





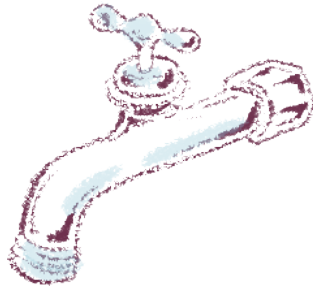
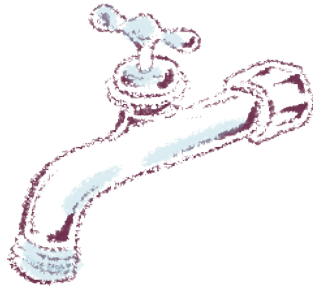

If the configuration of your site allows it, consider installing a rainwater collection system, on your roof or on/under the ground. Prices start from a few hundred dollars (depending on the size and system). Setting-up an internal water recycling system with the help of professionals will also generate very big savings.

2. Efficient fixtures

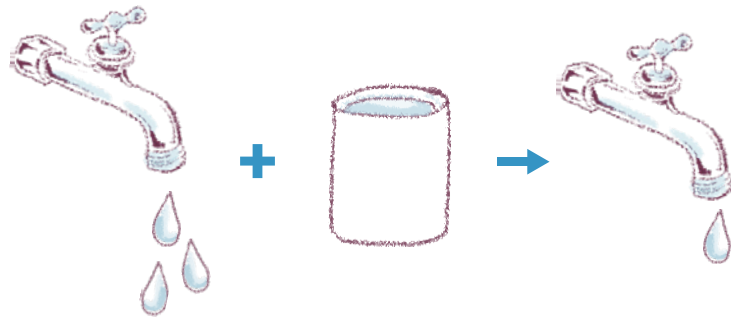
Efficient water fixtures installed in the buildings will help reducing the overall water consumption.

The following table provides ideal efficiency which should be targeted for the different types of equipment. In order to assess the current performance of faucets/showerheads, a simple one-litre bottle could be used by measuring the time to fill it. For other equipment, specifications on equipment or brand's website should provide appropriate information.

A water-efficient toilet will typically use up to 4 times less water per flush; a water-efficient showerhead will reduce water flow by half.

				
Toilet	Showerhead	Kitchen Faucet	Standard Faucet	Clothes Washer
3.5 L/flush	0.1 L/s	0.08 L/s		6 L/kg of load

Existing faucets and showerheads can be improved by changing or adding an efficient flow restrictor. The price of flow restrictors varies from 2 USD to 15 USD depending on the size and the type of faucet, showerhead or flow restrictor used.



Water for F&B •

Below is a list of practical tips to save water in the kitchen’s daily operations.

Remember that water-saving techniques should not put at risk the health and safety of consumers, which should remain the top priority in the kitchen.



■ Do you have the right equipment?

- As explained above, remember to first check if your faucets are water-efficient both in the kitchen and restaurant.

A flow restrictor can be easily installed on a faucet to make it more efficient.

- Fixtures such as motion-sensor taps, or foot and knee valves limit unnecessary water-running when kitchen and restaurant staff wash their hands.
- Recent dishwashers are generally much more efficient in terms of water-consumption (15% difference in consumption). Ask suppliers for consumption details.
- In guests’ and staff’s bathrooms, check if toilet flushes are efficient.
- Regularly check for leaks in all spaces using water (kitchen, guests’ bathrooms, staff’s bathrooms).



■ Food preparations

- Defrost food in the refrigerator or in the open-air instead of with water.
- Wash raw products (vegetables, fruits...) using a large container filled with water, instead of letting the faucet run. The grey water can then be used to water plants if it is unsalted.
- If you have food waste from preparations, prefer composting (learn more about it in pages 37-38) and use your garbage disposal unit only when necessary as it needs a lot of water (and electricity) to run.
- With appropriate equipment, use the steam generated from boiling ingredients to steam-cook other products such as vegetables or fish. Classic steamers are very water-intensive.
- Have an accessible water bowl to use when you need to wait for water to reach a certain temperature. The collected water can then be used for defrosting or cleaning food, cleaning dishes, watering plants, etc.
- Keep cooking water to water plants (if unsalted) or pre-rinse dishes.



■ Dishwashing techniques

- If dishes need to be pre-rinsed, soak them in a water bowl (of grey water) instead of putting them under running water.
- Run dishwashers with a full load.
- For manual dishwashing: use several and separate washing basins along cleaning process (eg: soaking, washing and rinsing...) to reduce the water use.



■ Drinking water for customers

- If you provide your guests with free water, serve them on demand rather than automatically.
- Collect remaining water for cleaning or for watering plants.



Hospitality Insight: Taking good habits in the kitchen

In the kitchens of **Caravelle Saigon** (<http://www.caravellehotel.com>), in Ho Chi Minh City (Vietnam), staff members are encouraged to take an active part in reducing water consumption, thanks to small notices placed in common areas highlighting 3 easy water-saving practices implementable in their daily jobs:

1. Adjust the water flow according to the type of cleaning to be done
2. Do not let water flow while cleaning or rinsing
3. Fill dishwashers to their maximum capacity in order to minimise the number of cycles

According to Khoa Dinh, the hotel's Environmental Manager, it takes time to make these good practices become a routine; therefore, supervisors and leaders ensure a close follow-up and remind staff members every day during operations about the importance of complying with those rules, especially newcomers.

Water for housekeeping

Below is a list of good practices to save water in housekeeping operations:



■ Do you have the right equipment?

- In guests' bathrooms, check if faucets, showerheads and toilet flushes are efficient.
- Invest in water-efficient washing machines.
- Regularly monitor the presence of leaks in bathrooms and laundry areas.
- Install a global grey water recycling system in your hotel: treated wastewater from bathing and laundry can be reused for toilet flushing, making significant water and financial savings on global consumption.



■ Guest rooms and indoor hotel areas

- Prefer the use of a mop to hoses, to use just the right amount of water when cleaning smooth surfaces.
- Limit the number of toilet flushing during cleaning.
- Turn off the tap if water is not being used for cleaning purposes. Prefer filling-in a water container than letting the tap run.
- If you provide your guests with water bottles (preferably reusable ones), save the water from opened ones for cleaning or for watering plants.



■ Laundry room

- Don't automatically change linen and towels in hotel rooms every day but inform guests that it will be done upon request.
- Sort the laundry in several piles depending on dirtiness and adapt the washing cycle to each pile.
- Select the right amount of detergent for your washing load to avoid the need of extra rinsing.
- Avoid pre-rinsing laundry and save 25% of total water of one washing cycle.
- Run washing machines with a full load.
- If you outsource your laundry services, ask your provider about their water-saving practices.



Hospitality Insight: Innovations to recycle and save water, drop by drop

In 2009, **Caravelle Saigon** (<http://www.caravellehotel.com>) installed a wastewater treatment plant (using no chemicals), combined with an internal water recycling system. Every day, around 220 cubic metres of wastewater coming from all the hotel's activities (kitchen, guest and staff bathrooms...) are treated, and around 120 cubic metres of treated water are then recycled within the hotel, with 70% going to the hotel's cooling tower and 30% used for toilet flush. The remaining treated wastewater is discharged into the city's drainage system.

The hotel estimates the cost savings to be an average 18,000 USD per year only using this system.

Additional savings have been made through the installation of water-saving sanitary facilities: heat-sensors for urinals and faucets; flow restrictors in shower heads, taps and flushes. For instance, the hotel's toilets consume 3-4 litres per flush instead of 9 litres for regular toilets.

Overall, between 2008 and 2016, the hotel has cut its water consumption by 30%, and saved more than 210,000 USD.

Outdoors and landscape •



Below is a list of good practices to save water in landscaping and outdoor uses:

- Prefer brooms and mopes to hoses to clean smooth outdoor surfaces.
- Select drought resistant plants, native plants and groundcover which will have limited water needs (lawn should be avoided).
- Mulch garden beds to reduce evaporation.
- Use efficient irrigation systems such as a drip irrigation system (sprinklers are not efficient). See pictures on the next page.
- Irrigate during coolest parts of the day to reduce evaporation (morning and evening).



Above: Example of drip irrigation. Below: Example of sprinkler.



Hospitality Insight: Saving water in landscaping and outdoor management

In the heart of the Mekong Delta (Southernmost Vietnam), the **Victoria Can Tho Resort** (<https://www.victoriahotels.asia/en/hotels-resorts/cantho.html>) waters its 8,000 square metres of garden using only grey water coming from the hotel's guest rooms and kitchen. The 80 cubic metres used every day pass through an on-site water treatment system, which has been dimensioned to treat up to 150 cubic metres in case the hotel expands its activities.

A fixed schedule has also been set for gardeners, who should water the garden only in the early-morning or late afternoon to avoid evaporation.

WASTE AND POLLUTION

- **Monitoring and Awareness**
- **Refuse and reduce waste**
- **Reuse or recycle waste**
- **Compost**
- **Avoid soil and water pollution**



What is the issue?

By 2025, the world's cities will produce over 2 billion tonnes of waste per year⁽¹⁵⁾. Only a small amount of trash is actually reused or recycled, creating large dumpsites and massive pollution problems all over the planet, particularly in low and middle-income countries where few sustainable waste treatment systems exist. Unmanaged trash is already having disastrous impacts on the environment: it is estimated that only 5% of world plastic wastes are effectively recycled, while 40% end up in landfill and a third goes to fragile natural ecosystems like world oceans⁽¹⁶⁾. This is happening at such a pace that by 2050, there will be more plastic than fish in the sea.

Solid waste also directly impacts human health: when burnt, it liberates toxic substances into the atmosphere; when dumped, it creates sanitation issues and decomposes into microparticles that infiltrate soils, water or are absorbed by the animals we eat. This is even more an issue when it comes to hazardous wastes, which are inherently toxic or potentially reactive.

Another type of waste, certainly the most unethical one, relates to food: while more than 800 million people worldwide do not have enough to eat, roughly one third of the food produced in the world gets lost or wasted every year.

Why should you care?

Hospitality and catering activities can produce a significant amount of waste (food waste, packaging, single-use items, customers' wastes...) and pollution if no specific measure is implemented. The priority to tackle waste issues is to apply the famous following rule:

- ▶ Refuse and reduce: limit at the source the production of waste by avoiding or limiting packaging, single-use items, unnecessary goods...
- ▶ Reuse: when production of waste is unavoidable, the second step is to reuse, i.e. finding a new way to use the item or product as it is.
- ▶ Recycle: the last step should be to recycle, which implies sorting the waste correctly to allow its appropriate treatment and the reintroduction of part or all of its components in the production cycle of a new product.

This section provides concrete keys to reduce, reuse and recycle, as well as advice for composting and avoiding pollution in hospitality activities.

¹⁵ UNEP, <https://www.unenvironment.org/explore-topics/chemicals-waste/why-do-chemicals-and-waste-matter>, accessed on 03/04/2018.

¹⁶ The Guardian, January 19, 2016, "More plastic than fish in the sea by 2050, says Ellen MacArthur".

Monitoring and Awareness •

1. Waste monitoring

As for other topics, having a clear idea of how much waste is produced, and what types of waste are the most significant, should be the first step towards creating a waste reduction plan.

To monitor waste, it is easier to have it sorted in different categories: organic, plastic, glass, paper, electronic, others. Each category of waste should be weighted to identify the ones with most reduction potential and need.



Create a sheet to follow-up on the quantities of waste for each category. According to the overall quantity of waste produced, monitoring can be done daily or weekly. The follow-up can also be done at the level of each operational department or sub-entity (restaurant, floor, office...) and then aggregated to divide efforts between your teams.



Sustainable Hotel - Siting, Design and Construction, International Tourism Partnership, 2014.
Part 9: Monitoring performance / Waste production.
<http://www.greenhotelier.org/wp-content/uploads/2016/02/SDG-9-Monitoring-Performance-for-web.pdf>

2. Create awareness about waste production

Making all users and guests aware of issues related to waste and empowering them through educational activities or information and action signs in appropriate location is key.

Monitoring actions involving frequent building occupants (staff and students), as recommended upper, will be useful to create awareness: it is more difficult to ignore that there is a waste issue once it is all exposed before one's eyes.



Create fun and attractive signs or organise challenges for guests, staff and students to motivate them to adopt waste-reduction habits.

Informing your guests about your voluntary actions to protect the planet, such as banning plastic straws for drinks, will help manage their expectations and give them the keys to understand, appreciate and maybe even back up your efforts.

Refuse and reduce waste •

Before sorting and recycling, the first step is to prevent and limit waste production. Several measures will help reduce the total quantity of waste produced:

1. Single-use items



- Provide reusable water bottles in hotel rooms with refill stations and appropriate signs to guests.
- Use reusable containers for liquid soaps and shampoo in hotel rooms.
- Avoid using disposable tableware (straws, plastic cups and mugs). Alternative solutions such as bamboo, grass, metal or glass straws, as well edible cutlery, are increasingly popular and available.
- Provide customers with single-use bathroom items only upon demand (toothbrush, comb, etc.) to avoid unnecessary consumption.



Hospitality Insight: Refill Not Landfill in Southeast Asia

Refill Not Landfill (<https://refillcambodia.com>) is a campaign initiated by two hospitality actors in Siem Reap to fight against the growing land and river pollution due to disposable plastic bottles sold or given in hotels and restaurants. Refill Not Landfill's goal is to provide a simple alternative to both individuals and organisations by promoting reusable aluminium bottles.

The initiative works thanks to refill stations located at partner organisations (hotels, restaurants, cafes, NGOs, etc.), where the Refill Not Landfill bottles can be refilled free of charge. Many of those partner organisations also sell the bottles, which can be customised with their own logo.

An online map (<https://refillcambodia.com/map>) compiles all locations to make it easy to find the nearest refill station. The non-for-profit initiative started in Cambodia and is now expanding in neighbour countries (Myanmar, Laos, Vietnam...).

In 2018, ASSET-H&C and Refill Not Landfill signed a partnership agreement to promote their respective actions in favour of environmentally-responsible and sustainable tourism in the region.

2. Packaging



- When compliant with hygiene and safety standards, avoid unnecessary packaging.
- If packaging is needed, avoid Styrofoam or plastic products. Many alternative solutions can be found: paper and cardboard-based or biodegradable containers, bee-wrap paper, cassava or linen bags...



Hospitality Insight: A plastic-free hotel

In Siem Reap (Cambodia), **Jayahouse Riverpark** hotel (<http://www.jayahouseriverparksiemreap.com>) was created with the ambition of being plastic-free (or almost - 95% at the moment) from day 1. The biggest plastic waste that Christian de Boer, the founder, had identified in his previous hotel, was packaging for raw products in the kitchen. With his team, he therefore got all his suppliers/deliverers together to raise their awareness of plastic waste impact and explain the hotel's goal. The team had ordered several hundreds of linen bags that were given to the suppliers and deliverers to help them provide a plastic-free service. From then on, every time the food is delivered in the linen bag, an empty bag is given back for the following delivery.

Other smaller yet significant wastes were avoided by removing single-use items such as:

- little plastic containers for shampoo and shower gel, replaced by refillable canisters in ceramics made by a local craft shop;
- coffee pods and sachets, replaced by a filter coffee machine in every room;
- plastic bottles, replaced by glass bottles in the room and aluminium bottles for outside (see the Hospitality Insight above about Refill Not Landfill).

The remaining 5% of plastic still used by the hotel is packaging for fresh food (meat and fish).

Christian de Boer believes in "under-promising and over-delivering", which is why the hotel decided not to advertise the fact it is 95% plastic free on its website. However, he is convinced that travellers are starting to make decisions on where to stay based on proven sustainable actions, and thanks to word of mouth his hotel now gets many bookings specifically for that reason.

3. Paper

With the democratisation of new technologies, it is becoming increasingly easy to avoid using paper in hotels and restaurants:

- Replace passport photocopies by a scan or picture with a tablet or smartphone device.
- Avoid printing bookings, bills and invoices. Suggest to your guests to send them their invoice by email.
- Replace communication brochures by social media communication.

4. Food waste

In 2018, the Pacific Asia Travel Association (PATA), which ASSET-H&C is a member of, launched the BUFFET (Building an Understanding For Food Excess in Tourism) Initiative, providing a complete toolkit to fight against food-waste in the hospitality industry and drive positive change.

Food waste is “food discarded as part of operations in the hospitality sector... Food waste can further be divided into avoidable (food that is eaten by some but not by others, or a single type of food that may or may not be waste depending on how it was prepared) and unavoidable waste. The avoidable and possibly unavoidable waste may, therefore, be considered to be edible”⁽¹⁷⁾.

■ Food and drink waste in hospitality and food service can be:

- Ingredients;
- Produce;
- Leftover food on or in customers’ plates or glasses;
- Unused partially-prepared food;
- Unused fully-prepared food;
- Peelings and preparation wastes;
- Waste in bins and waste to the sewer (liquids).

Building on the success of the United Nation’s International Year of Sustainable Tourism for Development (IY2017) initiative and in the context of the Sustainable Development Goals (SDGs), PATA, along with their project partner Scholars of Sustenance Thailand (Thai-SOS) and knowledge partner Futouris, launched the BUFFET Campaign to raise awareness of food waste in the industry to drive positive change.

PATA recognised that there are many challenges and barriers to implementing food waste reduction practices in hospitality and food and beverage operations. Perhaps implementing such changes are too expensive, or there is a lack of space; perhaps the infrastructure in your property or municipality is not conducive to reducing food waste to landfill, or perhaps you simply don’t know where to start. PATA developed the BUFFET Toolkit, a free resource that presents some possible solutions to challenges you may face when working to reduce food waste.



1. Organisational buy-in



2. Don’t know where to start



3. Too much food waste



4. Preparation waste



5. Overproduction



6. Plate scrapings



7. What to do with waste

The seven main challenges identified are

(Click on each icon to access related content)

¹⁷ Pirani, Sanaa & Arafat, Hassan, 2014, Solid waste management in the hospitality industry: A review by Journal of Environmental Management.



Visit www.pata.org/food-waste to learn more and to download the toolkit as well as other resources:

- BUFFET Toolkit
- Food waste management checklist
- List with worldwide legislations
- List with food waste companies (by location)
- Resource library

If you have further questions or need assistance getting started, please don't hesitate to contact PATA at ssr@pata.org. They are here to help!



Reuse or recycle waste •

1. What to reuse?

- Laundry items such as bed linens and towels that are used but still in correct condition can easily be donated to local organisations and charities.
- Hotels or restaurants that want to renew their furniture can also donate or sell them rather than dump them. Hospitality schools for instance are glad to receive professional equipment and furniture to train their students on.
- Food waste or leftovers can be given to local farmers to feed their animals, or composted (see pages 37-38).

2. Treat appropriately hazardous wastes

Hazardous wastes such as used lighting fixtures, paints, electronics or pesticides should be given a particular treatment because of their potential reactivity or toxicity.

Identify local opportunities to reuse or recycle your hazardous wastes by discussing with local environmental NGOs and local authorities.



Hospitality Insight: Investing for the common good

Although there is no hazardous waste collection or treatment in Can Tho (Vietnam), the **Victoria Can Tho Resort** (<https://www.victoriahotels.asia/en/hotels-resorts/cantheo.html>) committed to treating appropriately its toxic waste including used batteries and printing cartridges, in order to make sure they were not disposed in the nature. To do so, the hotel has signed a contract with a specialised company from Ho Chi Minh City, which comes twice a year to collect and handle that waste specifically. This service is not free (approximately 530 USD per year), but this is an investment the team is willing to make to avoid polluting its ecosystem.

3. What to do with other types of wastes?

Recycling centres are rare in Southeast Asian countries and the chain of recycling waste remains mostly informal with several individuals usually collecting most of wastes that can be recycled.

Such wastes may include metal cans, glass or plastic packaging such as plastic bottles.

■ **Waste can be sorted in at least 4 different categories:** • Paper • Food waste • Plastic and Metal • Glass



■ **Identify local opportunities and stakeholders from the formal and informal waste recycling chains in your city and provide each type of waste to the concerned stakeholder.**

It is noted that several types of waste may be valuable as it is for other economic sectors. A deposit-return system with the supplier is usually financially interesting and is worth considering for some products such as plastic or glass packaging.



Hospitality Insight: From trash to treasure

A typical 400-room hotel generates 3.5 tons of solid soap waste per year. The **Soap For Hope** initiative (<https://www.diversey.com/sustainability/soap-for-hope>) was launched in 2013 by the cleaning and hygiene solutions company Diversey, based on the simple idea that used soap collected from the hotels can be recycled into fresh soap bars and distributed to underprivileged local communities.

The initiative has already spread in Vietnam, China, Indonesia, Philippines, Myanmar, Cambodia and 34 more countries, thanks to the collaboration of several stakeholders in the field: after guest checkout, participating hotels collect the used soap slivers and transfer them to a local partner NGO. The NGO sorts, clears and sanitises the slivers before moulding them into brand new soap bars, with technical support from Diversey. Diversey provides the soap machine, which does not need energy or running water for the process. New soap bars are then distributed to those most in need, alongside awareness workshops on health and hygiene.

This is a simple yet effective and impactful solution for hotels to reduce their waste - depending on the number of rooms and occupancy rate, they might discard up to a few hundred bars every day - by putting used bars to meaningful use. 540 hotels have already joined the initiative worldwide, allowing 2,623 metric tons of soap waste to be diverted from landfills and recycled! To date, Soap For Hope has made 22 million bar soaps for distribution.

More recently, Diversey has launched a similar initiative called Linens For Life to recycle used hotel linens such as bedsheets, table linens, bathrobes and towels. Used linens are given away for immediate disaster relief or recycled by local communities into useful items for sale as an income-generating activity.

Compost •

Composting is a process aimed at reusing and recycling organic waste by transforming it into a natural soil fertiliser. This process is based on the decomposition of organic matter typically regarded as waste. This produces nutrients-rich compost that can be used for plants and landscaping.



■ **Here is an easy guide to setting-up a composting system:**

1. Build or buy a compost bin (simple woodbox).
2. Choose a site that is flat, well drained and that is easily accessible all year round.
3. Add the right materials in the compost bin.

What to add

“Green” materials

- Vegetable & fruits peelings and pulp after juicing
- Old bread, donuts, cookies, crackers, pizza crust, noodles
- Coffee grounds
- Green plant cuttings
- Grains (cooked or uncooked): rice...

“Brown” materials

- Leaves, straw & hay
- Shredded paper & cardboard (avoid glossy and highly colored papers)
- Eggshells
- Tea bags
- Woody pruning

What NOT to add

- Meat & bones
- Poultry & fish
- Fatty food waste
- Whole eggs
- Dairy products
- Human & pet feces
- Pernicious weeds
- Treated wood

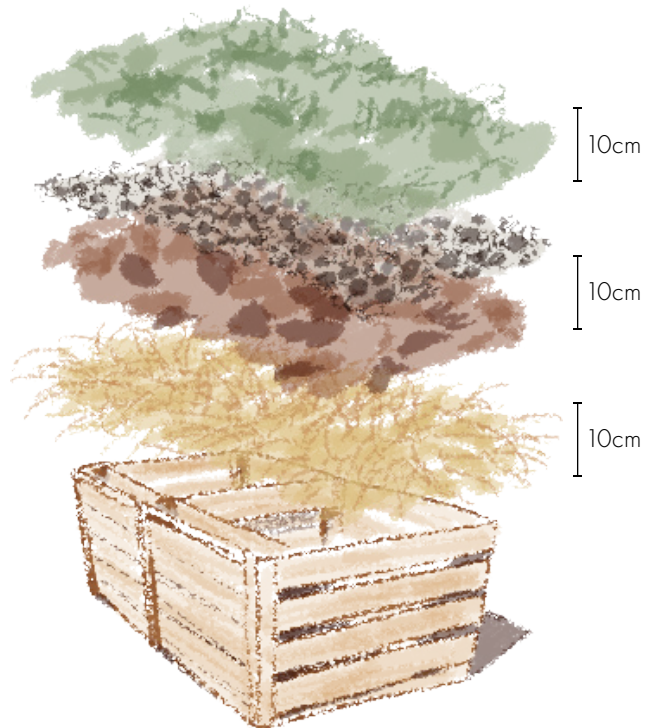
Start with a 10cm layer of brush, twigs, hay or straw at the bottom of the compost bin. If not available, dry leaves will do. This first layer should be as coarse as possible to allow air to be drawn up into the pile from the bottom of the bin.

Then add a 10cm layer of “brown” material, then a thin covering of finished compost or good garden soil. That's one layer.

Then add a 10cm layer of “green” material topped. Continue adding materials in alternating layers of greens and browns until the compost bin is full.

It can take anywhere from 14 days to 12 months (depending on the materials) to produce your finished compost.

Compost can be used for house plants and soil amendment and fertiliser.



WARNING

Vegetable fats and dairy products should not be added as they will slow down the composting process by excluding the oxygen that helpful organisms need to do their job.

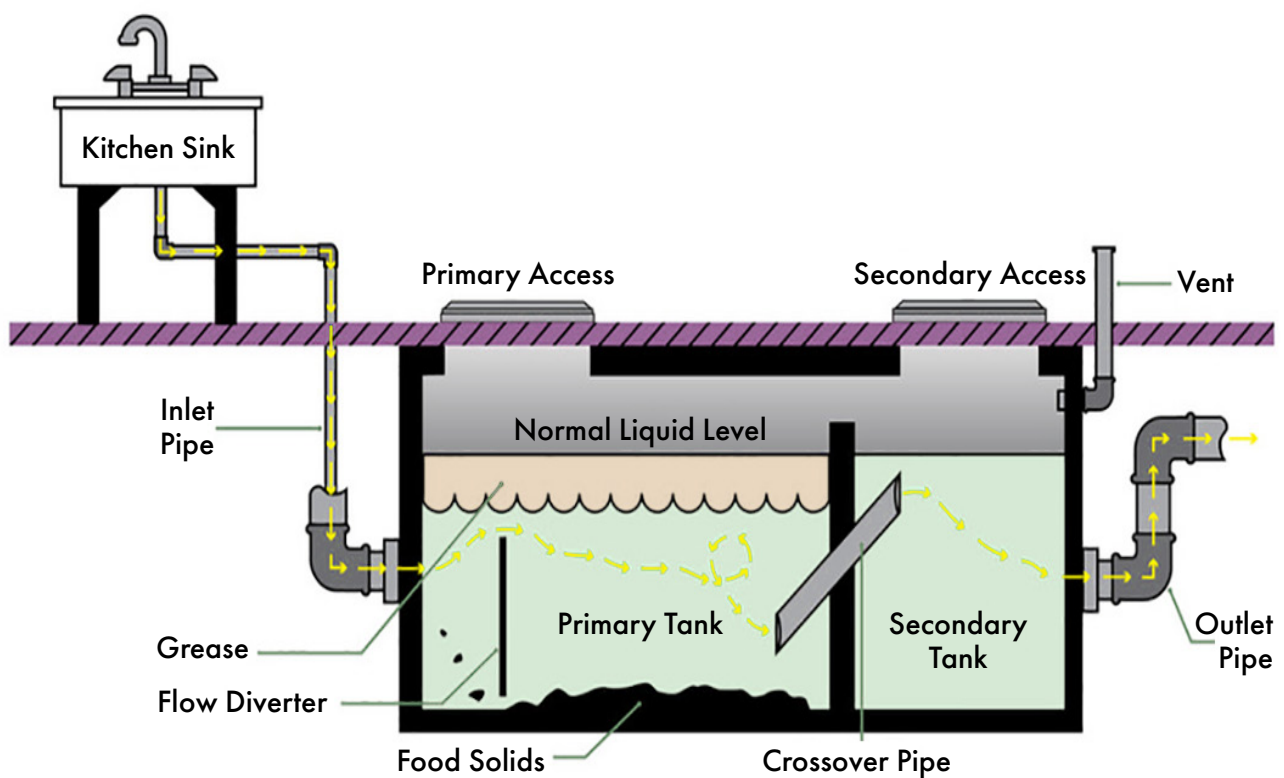
Adding other materials to the pile is dangerous because of the chance of poisoning or disease. Human and pet faeces, chemically or pressure treated wood or sawdust, and meat and animal fats fall into this category and should never be added to the compost pile.

Avoid soil and water pollution •

1. Grease from the kitchen

The number of blockages and pollution incidents relating to fat, oil and grease is increasing and fat separators are mandatory in restaurants in some countries. A grease trap is a simple box which will separate the fat from wastewater. This allows reducing the amount of fat and particles discharged in the main drainage and prevents blockage and pollution. The fat should be regularly collected by a specialised company.


Cooking oils that have not been mixed with water should also be properly sorted.



Example of grease trap

2. Cleaning, sanitary and body hygiene products

Many hygiene-related products contain harmful chemicals, pollutants, artificial preservatives, which impact both the planet and users' health.

 Prefer organic and eco-friendly detergents, cleaning products and body hygiene products for guests. Many natural do-it-yourself solutions are also easily accessible, such as vinegar as a disinfectant for surfaces.

Those green products are better for your staff, your guests and the environment.

This is also applicable for swimming pools, which can be treated with salt instead of chlorine.



Hospitality Insight: Cleaning products for a cleaner planet

In order to minimise the impact on the environment as well as to ensure better comfort and health protection for guests and staff, the **Novotel Saigon Centre** (<http://www.novotel-saigon-centre.com>) uses only eco-friendly products for hygiene (soaps, shower gels, shampoos) and cleaning. Bathroom amenities are fair trade-branded and made from natural products, while all cleaning products used by the hotel are eco-certified.

These two actions are part of the compulsory actions of AccorHotels' Planet 21 programme for environmental and social responsibility.

3. Fertilisers and pesticides

As for cleaning products, fertilisers and pesticides are mostly made of chemicals that are harmful to the environment.



Use compost instead (made by you or external organisations) as a natural fertiliser, and eco-friendly repellents such as lemongrass essential oil for mosquitoes and/or mosquito nets.

If chemical products are still needed, reduce their frequency of use.

4. Wastewater treatment systems

It is your responsibility to know what happens with the wastewater produced by your activities: Where does it go? Is it treated before going back into nature? Are you able to reuse some of the water in your own facilities after treatment (for instance for toilet flushing)?



If there is no available treatment system in your close environment, get information about sewage treatment solutions specifically for your hotel, restaurant or training centre.

Some natural treatment solutions also exist provided you have enough space. Ask for the help of professionals.



Hospitality Insight: Preserving the water of Inle Lake

In the region of Inle Lake (Myanmar), tourist and agricultural growth have brought more and more inhabitants and visitors alike in recent years. However, sanitation practices, which were not a problem when the lake population was small, have not always kept pace with this expansion. Untreated wastewater now usually goes directly back into the lake.

The **Inle Heritage Foundation** (<http://inleheritage.org/en/home>), which hosts among other activities a hotel, a restaurant and a hospitality school part of ASSET-H&C right at the heart of Inle Lake, has developed a wetland wastewater solution that is embedded in its facilities. Wastewater transfers successively from section to section by gravity, and it is cleaned using plants - some sourced from the lake itself - and the microorganisms that live on these plants.

This solution presents a sustainable model for the lake's businesses and residents to properly deal with wastewater. The system is cheap to construct, low maintenance, uses no chemicals, and requires no electricity.

MITIGATION AND ADAPTATION

- Green transportation
- AC refrigerant
- Responsible procurement
- Maximisation of site perviousness
- Limiting Heat Island Effect



What is the issue?

Climate change is one of the biggest challenges for humanity. Because of human activity, the concentration of carbon dioxide in the atmosphere is increasing, thus increasing the greenhouse effect and leading to global warming.

The impact of climate change can already be seen in the form of stronger and more frequent storms, frequent flooding and drought, sea level rise, and other extreme weather phenomena. It is urgent to adopt measures to further mitigate the causes of climate change and adapt to its consequences.

Why should you care?

Tourism is an industry sector that is both an important contributor to climate change and one of the most vulnerable to its consequences. In fact, as the UNWTO puts it, “climate is an essential resource for tourism, and especially for the beach, nature and winter sport tourism segments. Changing climate and weather patterns at tourist destinations and tourist generating countries can significantly affect the tourists’ comfort and their travel decisions. Changing demand patterns and tourist flows will have impacts on tourism businesses and on host communities, as well as knock off effects on related sectors, such as agriculture, handicrafts or construction”⁽¹⁸⁾.

Climate change should therefore become a priority concern for tourism actors.

Aside from direct energy consumption, the hospitality and catering industry can work on other measures to further reduce its GHG emissions (mitigation measures), while the sector should also prepare itself and increase its resistance towards natural disasters to limit human and financial costs (adaptation measures).

The present section provides additional advice to reduce the degradation of the environment caused by hospitality and catering activities as well as to limit the risks they are exposed to due to global warming.

¹⁸ <http://sdt.unwto.org/en/content/climate-change-tourism>, accessed on 12/04/2018.

Green transportation •

Transportation accounts for a large part of greenhouse gas emissions, coming primarily from burning fossil fuel for cars, ships, trains and planes.



At the level of a hotel, restaurant or hospitality school, the emission of greenhouse gases due to transportation could be reduced by:

- Providing covered and secured bicycle parking spaces to promote the use of bicycle.
- Installing electric vehicle charging stations to promote the use of low-emitting vehicles.
- Setting-up information and incentives for public transportation use by guests, staff and students.
- Setting-up up a collective transportation program such as shuttle bus between the different areas of the site if they are remote.
- Preferring green transportation in the supply chain and during operations (suppliers using green transportation modes, delivery of produced food by bicycle or electric vehicles, etc.).
- Encouraging guests to favour “slow travel”, which is more ecological as it promotes the use of collective transportation modes such as train, bus, shared cars, etc. rather than flights.



Hospitality Insight: From food to clean fuel



In Cambodia, the social enterprise **Naga Earth** (<https://www.nagaeearth.org>) recycles cooking oils from hotels and restaurants to produce biodiesel and soap. Biodiesel is less harmful for the environment as it does not emit as much greenhouse gases when burnt (90% less hydrocarbon emissions, 50% less carbon dioxide emissions and no sulphate emissions, in comparison with classic fuel). This clean fuel is then sold at local market prices for transportation means or to power generators. This system also ensures that used oils from the catering industry are not disposed into the nature or re-used by other food vendors with high hygiene risks. To recycle as much as possible, Naga Earth is also producing eco-friendly soap thanks to the glycerin extracted from the biofuel reaction. They offer this soap to their supporters and will soon be able to distribute it widely to children through hygiene programs of partner NGOs.


AC refrigerant •

Refrigerant is a compound typically found in either a fluid or gaseous state. It readily absorbs heat from the environment and can provide refrigeration or air conditioning when combined with other components such as compressors and evaporators.

The type of refrigerant used in the AC system should be given particular attention.

Indeed, the refrigerant used in ACs may be harmful to the atmosphere by increasing global warming or damaging the ozone layer.

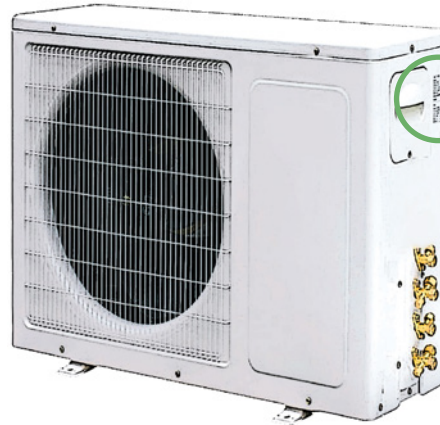
Throughout the second half of the 20th century, nearly all air conditioners used chlorofluorocarbons (CFCs) as their refrigerant. Most of air conditioning systems now employ halogenated chlorofluorocarbons (HCFCs such as R-22) as a refrigerant, but both chemicals are **Ozone Depleting Substances**  and have significant **Global Warming Potential (GWP)** .

Other refrigerants such as HFCs or HFOs have zero **Ozone Depletion Potential (ODP)**  but they still have high GWP. So, in selecting an ideal refrigerant, a trade-off should be adopted between ODP and GWP.



Each AC is associated to one specific type of refrigerant, which means you need to make an informed choice when buying the AC unit. The following refrigerants (from the best to the less environmentally friendly) should be preferred to R-22:

- CO²
- R-290 or R-600A
- R-32
- R-134A



The name of the refrigerant used can usually be found on the specifications on the outdoor unit of the AC.



Greenhouse gas emissions from refrigerants - information for hotels, Susanne Becken and Katja Becken, Griffith University, 2015. Accessed on 16/04/2018.
<http://www.greenhotelier.org/wp-content/uploads/2016/03/Greenhouse-gas-emissions-from-refrigerantsfinal.pdf>

Responsible procurement •

1. About responsible procurement

When selecting products and services from external suppliers, hospitality and catering actors can further improve or worsen their environmental (and societal) impact. Indeed, depending on the distance it travelled to reach its final user, on the working conditions of the person who made it, and on where it will end up once used, a product could be considered more or less responsible towards the planet and humans.

Responsible procurement therefore means having a global approach to any product or service, by taking their **life-cycle costing** into account. This implies studying the following:

- What is the product or service made of (raw components)?
- What were the conditions under which it was made (working conditions, use of natural resources...)?
- Where does it come from and how has it travelled?
- Is it packaged? How? Is that packaging necessary?
- How is the product or service going to be used? What is its lifespan going to be?
- How is it going to be disposed of? Can it and will it be reused? Can it and will it be recycled?

And first and foremost, responsible procurement should be about evaluating whether the product or service is really necessary or if it could and be avoided - in compliance with the "refuse/reduce, reuse, recycle" rule.



Responsible Procurement, Green Hotelier, 2012.
 Accessed on 16/04/2018.
<http://www.greenhotelier.org/our-themes/responsible-procurement>

2. In food production

Food and beverage service being at the heart of the hospitality and catering industry, a particular focus should be given to the source of raw products used in preparations, considering both environmental and health aspects. In fact, even food products have an environmental footprint as they travel to their final destination and are produced using methods that are more or less eco-friendly.



Measures to limit the environmental footprint through the sourcing of raw products may therefore include:

- Adapting the menu at canteens and restaurant depending on the availability of seasonal products.
- Selecting local products with a closer geographical origin.
- Preferring products from sustainable agricultural production or fishing methods.
- Growing an organic vegetable and/or herbs garden for the kitchen.
- Paying particular attention to locally and globally endangered species, which should be completely banned from restaurant menus.

Such measures also positively contribute to local economic development as well as customers' and users' well-being and satisfaction.



Hospitality Insight: Eat local, think global

On the Southern island of Phu Quoc (Vietnam), **La Veranda Resort Phu Quoc** (<http://www.laverandaresorts.com>) runs a 1,000 m² organic farm to sustain its restaurant's needs in fresh vegetables and herbs.

The hotel makes its own pesticides and fertilisers and allows no synthetic materials to be used in all processes within the farm. A mixture of different plants with insecticidal properties are used to produce organic pesticides, totally safe for humans and the environment. To fertilise the soil, the hotel uses blood meal (dry powder made from animal blood), molasses (products of the sugar cane) and vermicompost. Vermicompost is the product of a composting process using Red Wiggle worms: shredded kitchen waste, green/garden wastes and cow manure are recycled as bedding materials and transformed by worms into compost. This technique and the practice of crop rotation ensure a healthy soil and quality products.

The farm is watered using an overhead watering system that distributes just the necessary amount of water onto the vegetables to avoid excess, and each type of plant is supplied with the right amount of water, depending on its root depth. Adding compost to the soil further reduces the plants' need for water.

This system creates many benefits for the resort, including:

- A reduction of input costs
- The production of fresh vegetables and herbs for the restaurant
- A reduction of costs of handling garden waste and food waste

The impact of such an organic farm on the environment is also very positive, as it generates a healthier soil, reduces greenhouse gases, and reduces garden waste and food waste.

La Veranda Resort Phu Quoc complements this sustainable food sourcing system by implementing a ban on the use of 6 threatened fish species, in compliance with AccorHotels' global guidelines (specific species of shark, ray, bluefin tuna, grouper, sturgeon and eels). An additional list of 16 species that should be avoided in Asia is communicated to the staff.

The **Ratilanna Riverside Spa Resort Chiang Mai** (<http://www.ratilannachiangmai.com>), in Northern Thailand, has also committed to minimising its environmental impact related to food

production and service through a responsible sourcing policy: from the day it opened, the hotel decided to purchase only locally-grown products when it comes to pork, chicken, vegetables and fruits. To do so, the team has surveyed suppliers and made sure that their products were made locally. According to the hotel, buying local products cuts food costs by about 30%! For products that cannot be found locally (including for instance beef or fish), the hotel has also developed strict guidelines that are in line with its comprehensive environmental ambitions. All contracted suppliers for these products must have an environmental policy, i.e. they should not use chemicals nor growth promoters for cattle or fish, and their production process should not destroy the environment through air or water pollution.

3. In hospitality activities



In hotels too, the origin and production process of supplies matter; here are a few tips to welcome guests in an eco-friendly environment:

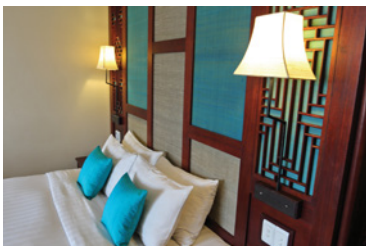
- Prefer furniture made by local artisans, using local materials, ideally sustainably grown.
- For bed linen and other fabrics (uniforms, curtains, carpets), prefer natural textiles (such as cotton or linen).
- When possible, promote products from repurposed and recycled materials (for instance for small bathroom and room furniture).



Hospitality Insight: A local touch for a unique style

The **Amanjaya Pancam Suites Hotel** (<http://www.amanjaya-suites-phnom-penh.com>), in Phnom Penh (Cambodia), works mostly with local artisans and materials to furnish and decorate its 21 rooms and common areas. This choice was motivated both by the willingness to create a unique style for the hotel and the managing team's desire to promote local crafts and know-how. For instance, all the furniture and parquet were made 15 years ago from local rosewood (before massive deforestation issues). Cambodian silk can be found in many decoration items such as the head-boards, cushion covers, curtains or lamp shades. All models are made by independent tailors and workers and match the colour of each room. Silk off-cuts are used to create little pouches for hairdryers. The hotel also features many art pieces (wooden sculptures, traditional paintings, pottery...) made by local producers and promoting traditional Cambodian decoration elements and style.

Although local products usually require a particular maintenance and care compared to industrial products, they also present a range of benefits: ease of renewal and repair, lower acquisition price, ease of customisation (colours and shapes), possibility to create small series or even single pieces... All these advantages facilitate the customisation of each room as well as the hotel more globally.



Custom-made head-board in rosewood and raw silk, matching cushions.




"Lotus" lamp and matching cushions in raw silk, custom-made models.



Global room view, with: local artist painting under glass, water hyacinth box, ikat fabrics from the Takeo province.

Maximisation of site perviousness •

With climate change, storms and floods have become stronger and more frequent, especially in Southeast Asia. Maximising the infiltration capacity of a site is critical to reducing local flooding and minimising the impact on ground water.


One way to maximise the **site perviousness**  is to minimise hard surfaces, and where hard surfaces are required, use pervious surface materials that allow water to pass through them.

Examples of pervious surfaces include (see illustrations under, clockwise from top):

- Densely vegetated groundcover
- Unbound gravel
- Open-grid pavement



Limiting Heat Island Effect •

Materials used in urban areas usually absorb and reradiate solar energy creating a small microclimate which is hotter. This phenomenon is called the urban **Heat Island Effect (HIE)** , and it adds to the rise in temperatures that is already caused by climate change.

Open-grid pavement systems (see above), vegetated areas and trees will help reducing the HIE and thus improve the comfort of customers and users ■

GLOSSARY AND ACRONYMS

- **Coefficient of Performance (COP):** The efficiency of air conditioning systems can be measured by the Coefficient of Performance (COP). The COP is equal to the cold power provided divided by the electrical power used. The higher the COP, the more efficient the AC system.
- **Efficiency:** To be efficient, a process needs to use the lowest amount of inputs to create the greatest amount of outputs. For AC, the input is electricity and the output is cold.
- **Global Warming Potential (GWP):** The Global Warming Potential relates to the amount of solar heat trapped by a greenhouse gas into the atmosphere as well as its stagnation time in the atmosphere.
- **Greenhouse Gas (GHG):** A Greenhouse Gas is a gas in the atmosphere that absorbs and emits radiant energy within the thermal infrared range. This process is the fundamental cause of the greenhouse effect.
- **Heat Island Effect (HIE):** Materials used in urban areas usually absorb and reradiate solar energy creating a small microclimate which is hotter. This phenomenon is called the urban Heat Island Effect.
- **Life-cycle Costing:** Life-cycle costing is a technique to analyse whether a service or product purchase is responsible, by measuring the total costs of that service or product, "from cradle to grave".
- **Lighting Power Density (LPD):** The Lighting Power Density is the sum of the power of all lightings in the space divided by the area of the space. It is expressed in W/m².
- **Ozone Depleting Substances:** Substances that have a proven important ozone depleting potential. Such substances are used particularly for refrigerators and air-conditioners, in dry-cleaning, in cleaning solvents, etc.
- **Ozone Depletion Potential (ODP):** Level of theoretical degradation a substance causes to the ozone layer, which is protecting the Earth from the sun's ultraviolet radiation and thus making it liveable for human beings. The depletion occurs as the substance destroys the ozone gas in the atmosphere.
- **Payback Period:** It is the length of time required to recover the cost of an investment. The payback period of a given investment or project is an important determinant of whether to undertake the position or project, as longer payback periods are typically not desirable for investment positions.
- **Refrigerant:** The refrigerant is a compound typically found in either a fluid or gaseous state. It readily absorbs heat from the environment and can provide refrigeration or air conditioning when combined with other components such as compressors and evaporators.
- **Site Perviousness:** It is the capacity of the site to let water infiltrating the soil. Maximising the infiltration capacity of the site is critical to minimise the impact on ground water and to reduce local flooding.
- **Solar Heat Gain:** It refers to the increase in thermal energy of a space, object, or structure as it absorbs the energy of the sun.
- **Thermal Insulation:** It is a general term used to describe products that reduce heat loss or heat gain by providing a barrier between areas that are significantly different in temperature (inside and outside for instance).

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“ THE HUMMINGBIRD

An inspiring tale¹⁹⁾ to close this Eco-Guide and get started!

The story of the hummingbird is about this huge forest being consumed by a fire.

All the animals in the forest come out and they are transfixed as they watch the forest burning, and they feel very overwhelmed, very powerless. Except this little hummingbird.

It says, “I’m going to do something about the fire.”

So, it flies to the nearest stream and takes a drop of water. It puts it on the fire, and goes up and down, up and down, up and down... as fast as it can.

In the meantime, all the other animals - much bigger animals like the elephant, with a big trunk that could bring much more water - are standing there, helpless, and they are saying to the hummingbird: “What do you think you can do? You’re too little! This fire is too big! Your wings are too little, and your beak is so small, you can only bring that small drop of water at a time.”

But as they continue to discourage it, it turns to them without wasting any time, and tells them:

“I’m doing the best I can.”

As told by Professor Wangari Maathai,
founder of the Green Belt Movement
and 2004 Nobel Peace Prize Laureate.

¹⁹⁾ <http://www.greenbeltmovement.org/get-involved/be-a-hummingbird>, accessed on 02/04/2018.