CLIMATE MANAGEMENT IN HOTELS AND RESORTS

A GUIDE TO REDUCING CO_2e EMISSIONS IN HOTEL OPERATIONS

Based on the findings and recommendations of the Futouris project:

Climate Management in Hotels

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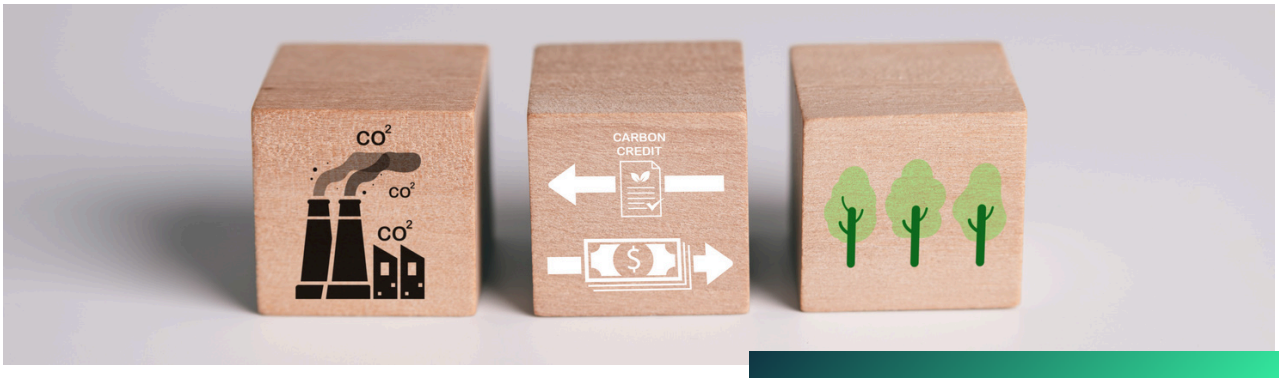

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Project

Initial situation

In order to achieve the global climate targets set out in the Paris Agreement, the hotel industry faces the challenge of reducing its greenhouse gas emissions by 66% by 2030 compared to 2010 levels and achieving net-zero emissions by 2050 (WSHA, 2017) To realise these ambitious goals, it is essential that hotels accurately measure, analyse and effectively reduce their carbon footprint.

Project

The Futouris project ‘Climate Management in Hotels’ now aims to tackle this challenge. In collaboration with a group of pilot hotels selected by Futouris member companies DERTOUR Group and schauinsland reisen, as well as experts from Tourythm and myclimate, the project is dedicated to analysing and reducing CO_2e emissions caused by hotel operations.

Based on a detailed analysis of the data collected, specific targets and measures are being developed together with the hotel teams and experts to successfully pave the way to climate neutrality. The project pays particular attention to Scope 3 supply chain emissions, which play a significant role in a hotel's overall emissions profile.

Pilot hotels

Playitas Resort Fuerteventura
- Beds: 1558
- Energy reference area: 25196 m2
- F&B: all inclusive

01

Aldiana Club Fuerteventura
- Beds: 800
- Energy reference area: 12490 m2
- F&B: all inclusive

02

aja Bad Saarow, Germany
- Beds: 300 +
- Energy reference area: 9162 m2
- F&B: all inclusive & a la carte

03

R2 Hotel Rio Calma
- Beds: 722
- Energy reference area: 24226 m2
- F&B: all inclusive

04

R2 Higos Beach Aparthotel
- Beds: 170
- Energy reference area: 4190 m2
- F&B: a la carte Bistro

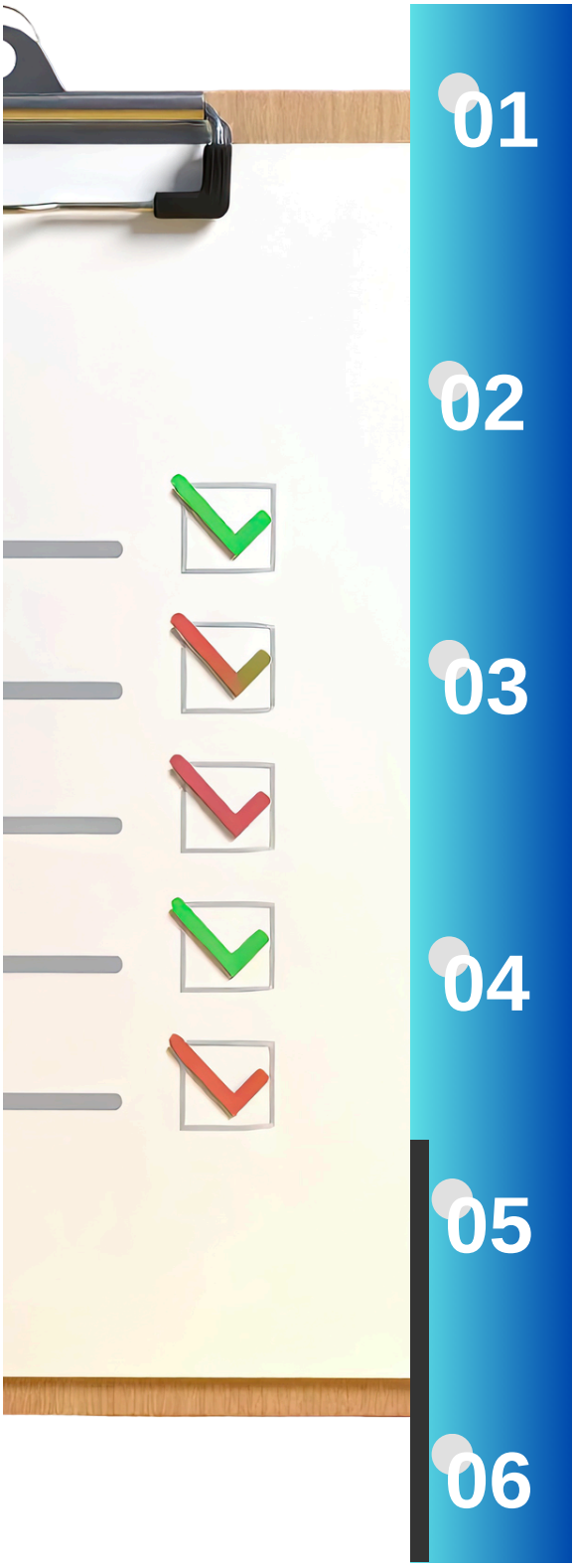
05

Creta Maris Resort
- Beds: 1952
- Energy reference area: 62.383 m2
- F&B: all inclusive

06

Project overview

Project phases at a glance



Kick-Off

Joint start of the project with all participants
Explanation of first steps and introduction to myclimate tool for recording CO_2e emissions

CO_2e footprint

Supported collection of all data for recording the climate footprint of the pilot hotels in the myclimate tool. Subsequent evaluation and calculation of the carbon footprint (incl. Scope 3) as status quo for the reference year 2023

Climate audit

Audit in the hotel facilities. Recording of technical and operational processes. Priority identification based on the existing carbon footprint. Identify possible savings potential.

NET ZERO Roadmap

Development of targeted measures to reduce the CO_2e emissions of the pilot hotels.

Implementation phase

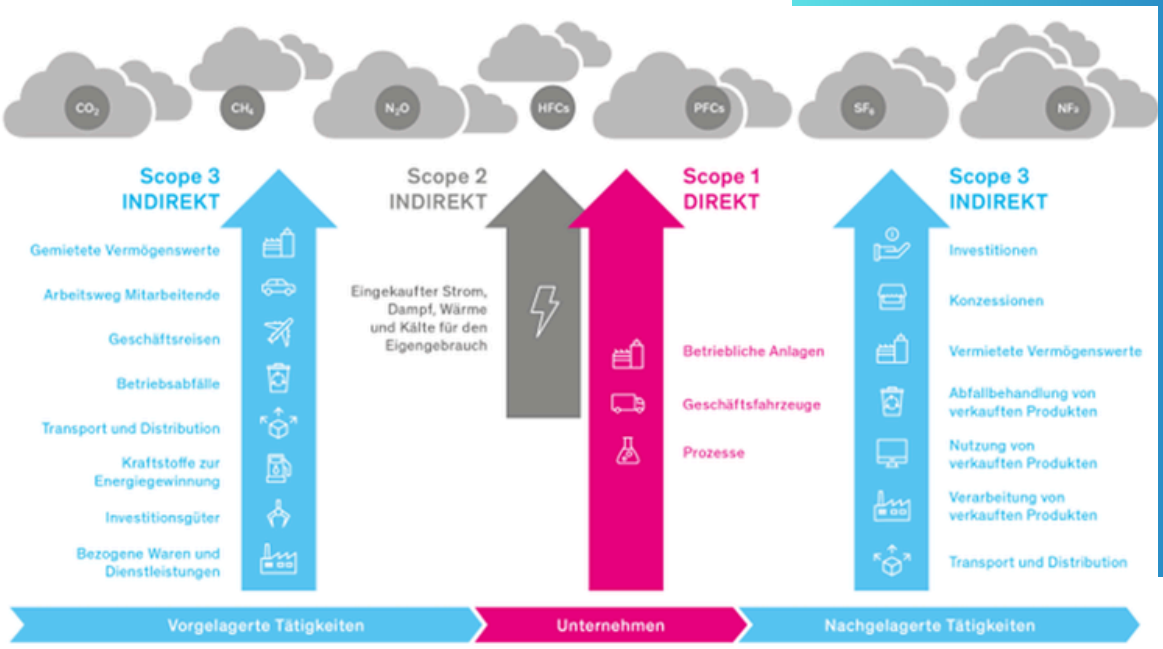
Pilot companies discuss, plan and implement initial measures. Support and guidance in the form of online Q&A sessions.

Industry event

Publication and dissemination of results and findings in an online event. Exchange of experience and sharing of the most important levers identified to reduce the CO_2e emissions of the project companies.

Carbon footprint

Scopes at a glance



Methodology

The carbon footprints calaculated as part of the project are based on the internationally recognised standard ‘The GHG Protocol: A Corporate Accounting and Reporting Standard’ and include climate-relevant greenhouse gases that fall under the ‘operational control’ of the company. The data used for the calculations comes from myclimate Release 0.2 Standard (based on ecoinvent 3.6, 3.8, 3.9) and the IPCC 2013 assessment method (GWP 100a).

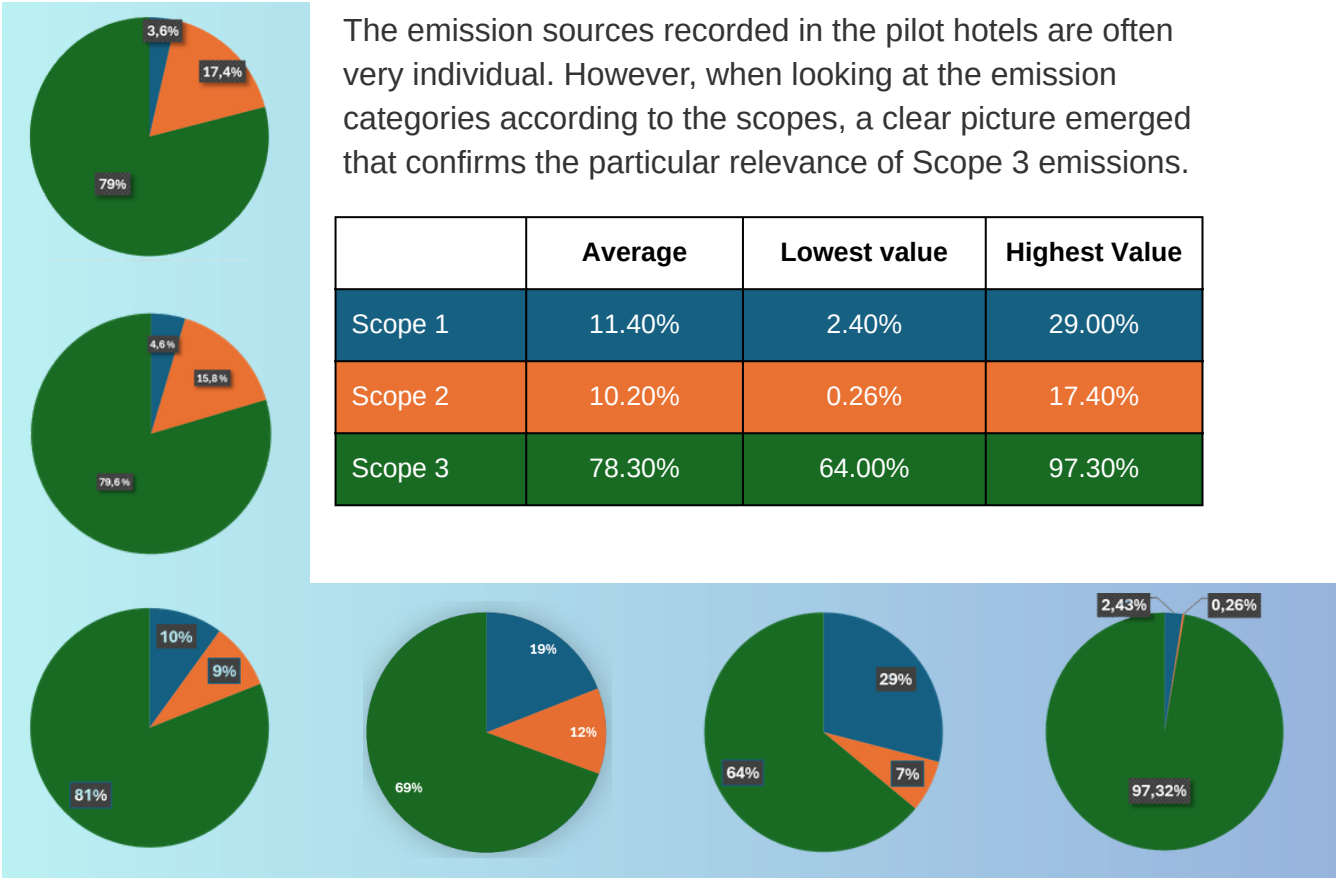
The data was collected using the Smart 3 tool from myclimate. The recording logic was explicitly adapted to the emission categories in the hospitality industry. The data collection was supervised by experts from Tourythm and myclimate, checked for possible input errors and validated.

Scopes: Scopes 1-3 were recorded as completely as possible in all buildings included in the balance sheet.

Carbon footprint

Results

Distribution of recorded emissions according to Scopes 1-3:



The emission sources recorded in the pilot hotels are often very individual. However, when looking at the emission categories according to the scopes, a clear picture emerged that confirms the particular relevance of Scope 3 emissions.

	Average	Lowest value	Highest Value
Scope 1	11.40%	2.40%	29.00%
Scope 2	10.20%	0.26%	17.40%
Scope 3	78.30%	64.00%	97.30%

Data collection categories

Main categories (left) with sample composition

Total
Energy
Total Electricity
Total Heating and Cooling
Mobility
Total Commuting
Total Business Travel and Overnight Stays
Transport
Total Fuel Consumption Company Owned Vehicles
Food and Beverages
Total Beverages
Total Groceries
Material
Total Office Material
Total Tapwater
Total Printed Matter
Total IT Materials
Total External Laundry Service
Total Detergents
Total Toiletries
Waste and Recycling
Total Waste to Incineration
Total Recycling Waste
Additional Results

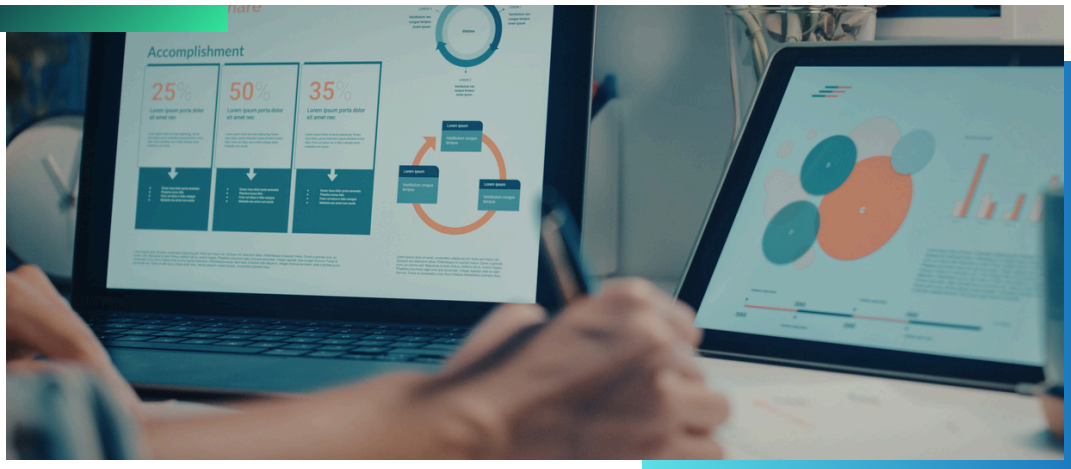
- Heat
- Refrigerant Loss

- Public transport
- Fossil fuel
- Alternative fuel

- Cleaning agents and solvents
- Dish detergent
- Fabric softener
- Washing detergents

Category
Mineral Water & Soft Drinks
Juice
Coffee, Beans
Coffee, Capsules
Tea
Cocoa Powder
Milk
Beer
Wine
Spirits / Liquor
Poultry
Pork
Beef
Other Meat
Fish and Seafood
Cream
Yoghurt
Butter
Cheese
Fruit
Vegetables
Potatoes
Pasta and Bread
Rice
Cooking Oil
Other Food Products

Excursus Data and Monitoring



Laying the foundations for emissions management

Efficient monitoring and high data availability are crucial to keeping the effort involved in carbon accounting manageable. Whilst standard data (energy, procurement) is usually available, complex meter structures and time-based accruals in the flow of goods make accurate recording considerably more difficult.

01 **Derive a recording logic**
- Categories in CO_2e-reporting are always the same
- Simple excel tool for start (with faq), i.e. HCMI tool as a basis
- Identify the source and destination of the data

02 **Digital monitoring**
- Digital meters and automated provision of consumption data
- Regular data collection, including for error and progress analysis
- Automatic forwarding of data

03 **Data collection in Controlling**
- Centralised collection of data based on the data categories
- Some of the data is already available here

Obtaining the data has presented hotels with a variety of challenges. Some were better equipped to deal with this than others.
In order to standardise data collection processes and minimise the workload for staff who are already very busy, there are a few key points that can help hotels provide data. The larger the hotel, the more important effective monitoring and automated data collection become.
Those who stay on top of things here needn't worry about data collection.

Carbon footprint

Results

The largest sources of emissions at the project resorts by category:

	Average	HOTEL 1		HOTEL 2		HOTEL 3		HOTEL 4		HOTEL 5		HOTEL 6	
		Rank	Share	Rank	Share	Rank	Share	Rank	Share	Rank	Share	Rank	Share
Food	**33 %**	1.	45 %	1.	31 %	2.	23 %	1.	37 %	3.	21 %	1.	44 %
Electricity	**19 %**	2.	19 %	3.	18 %	3.	17 %	2.	28 %	1.	27 %	6.	3,3 %
Heating and Cooling	**13 %**	3.	11 %	2.	20 %	1.	35 %	5.	5 %	5.	5 %	7.	3 %
Commuting	**11 %**	4.	8 %	4.	15 %	5.	6,6 %	3.	13%	2.	26 %	3.	11 %
Beverages	**8 %**	5.	11 %	5.	7,7 %	6.	4,5 %	4.	10 %	6.	5 %	4.	9 %
External Laundry	**6 %**	6.	2,3 %	6.	2,3 %	4.	12%	6.	4 %	4.	7 %	5.	3,8 %
Waste and Recycling												2.	24 %

Primary areas of action:

F&B

The use of animal-based foods in particular causes high emissions. Furthermore, the F&B sector requires a great deal of energy for appliances and food refrigeration.

∅ 41 %

Energy and technology

The basis of a well-positioned business from a climate and environmental perspective is and remains energy requirements, technical equipment, and how this equipment is handled and maintained.

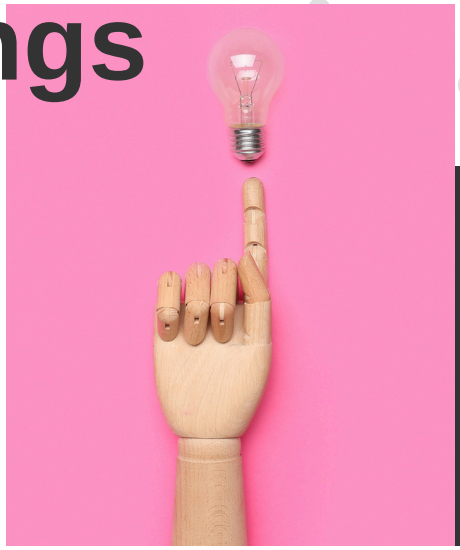
∅ 32 %

Employee travel and business trips

The more employees who do not live locally, the higher the commuting emissions. Business trips, especially air travel, also have a significant impact.

∅ 11 %

General Learnings



Starting out together

Success begins with teamwork

Setting up a task force:

- General Management
- Sustainability
- Technology
- Food & Beverage

→ *Interdisciplinary collaboration speeds up implementation and maximises impact*

Think individually

Every hotel is unique

Location is key:

- Climate affects heating and cooling
- The cost-effectiveness of PV and technical measures varies

Benchmarks = guidance, but not a one-size-fits-all solution

→ *Always assess measures on a case-by-case basis*

Keeping an eye on Scope 3

The greatest leverage lies in the outside.

Over 66% of emissions originate in the upstream and downstream value chain, especially in the F&B offer.

Without Scope 3:

- no realistic picture
- no effective strategy

→ *A holistic approach creates real impact*

Thinking towards zero

Rethinking energy

Priority:

- Own renewable energy sources (PV/solar thermal)

Supplementary:

- 100% certified green electricity

→ *Emissions in the energy sector can be reduced to almost zero*

Achieve results quickly

Get started with energy & technology

Staff in this area is already trained:

- Improve energy efficiency
- Reduce consumption
- Optimise technology

→ *Easy to implement & immediately measurable*

Rethinking F&B

The biggest hidden lever

Purchasing and menu choices are key

Opportunities:

- Choosing more climate-friendly products
- Adapting recipes
- Optimising the menu structure

→ *Attractive to guests – effective for the climate*

Setting priorities

Investing where it matters

Often secondary categories from an emissions perspective:

- Waste
- Cleaning products
- Hygiene products

Yet still important in the bigger picture

→ *Impact first – thinking sustainability holistically*

Catalogue of measures

Basic measures (quick wins)

These measures are characterised by low investment costs and rapid implementation. Although they are often already known, the audits have shown that there is often still room for optimisation here. In the overall context, these measures often offer only modest savings potential, but they are easy to implement and achieve immediate savings. These measures were at least partially relevant for all pilot hotels involved in the project.
Some of the savings potentials highlighted relate to the initial situation in the hotels involved in the project and must be considered on a case-by-case basis for each hotel. However, the potential savings can give an idea of the annual financial savings that are possible here (depending on energy prices)

Optimisation of flow rates (shower heads/fittings): Reduction in water consumption and the associated energy required for hot water production and desalination.

Initial situation: flow rate of the shower heads has been reduced from 12–15 litres to approximately 7 litres, 10 min average showertime
Potential savings per 100,000 shower cycles**: Water:** ca 8.000 m3, **Heating:** ca. 250.000 kWh, (Possibly) **Desalination**: ca. 10.000 kWh

Adjusting minibar settings: Setting minimum temperatures in minibars and switching them off during periods of vacancy. Developing SOPs for housekeeping.

Initial situation: Minbars need on average 50 - 100 W of power, 681 Minibars in 681 Rooms
Potential savings: Up to 40 % of energy consumption, ca. 38.000 kWh/a

HACCP temperature optimisation: Adjusting food storage temperatures to exact HACCP specifications to avoid overcooling. Every degree of unnecessary cooling increases energy consumption by approx. 5-6%.

Initial situation: The cooling temperature is set on average 3 degrees too low.
Potential savings: Around 15% of cooling energy. In this case: 25.000 kWh/a

Digital monitoring & daily meter reading: 'You can't manage what you don't measure.' Switch from manual to digital recording (electricity, water, heating energy). Only those who have real-time data can immediately detect leaks, malfunctions or defective climate controls and prevent expensive waste of resources over weeks.

Initial situation: The meters are read manually every day to ensure continuous monitoring
Potential savings: 250 - 500 staff hours per year

Switch to LED lighting: Replacement of remaining outdated light sources, especially in outdoor areas, work areas and public zones.

Initial situation: In many hotels, a small percentage of the lighting has still not been converted to LED (kitchens, offices, outdoor areas...)
Potential savings: Generally 50–70% savings. In this case: ca. 7.000 kWh/a

Good Practice case

Calculated emission savings potential from reducing flow rates in showers in a pilot hotel

Current situation	
Rain showers with a flow rate of 12-15 litres per minute in the hotel rooms	
Recommendation	
Reduction of the flow rate to 7 litres/minute with good shower heads (flow reducers only if necessary). At the same time, less DHW is consumed, which means that the system size (solar thermal with storage tank per block) can be smaller.	
Calculation	
Assumption: Active guests tend to shower twice a day, which corresponds to about 10 minutes of shower time on average.	
Savings: approx. 27.500 m3 water and 55,000 kWh electricity plus approx. 800.000 kWh gas for water heating (27.500 m3 x 1.16 x 25) (Even with just 5 min of shower time the savings are more than relevant)	
Reduction of CO2 emissions:	**ca. 210 tons**

Recommendations for relevance checks:

- **Flow rate:** Analogue measurement of the flow rate per minute in the hotel rooms. (Stopwatch and container with litre markings)
- **Water volume:** Extrapolation of annual showering x average shower duration in minutes x water flow rate of shower heads per minute = required water volume.
- **Energy requirement for hot water production:** This depends on the type of hot water production and the energy sources used. An energy consultant or technically knowledgeable employee should be consulted here.
- **Savings potential:** Especially in buildings where no water-saving shower heads are used, this simple measure can enable enormous energy savings.

Catalogue of measures

Technical measures

Technical measures often require investment, but they form the backbone of long-term decarbonisation through increased efficiency and self-generated electricity. The focus here is on reducing energy consumption and generating your own energy, which should ideally complement each other. As a rule, optimising technical infrastructure offers sufficient potential to make it economically attractive. Every approach should be reviewed in terms of cost-effectiveness and benefits. Short payback periods are often possible.

Expansion of photovoltaics (PV): Installation of large-scale PV systems on roofs or open spaces to maximise self-sufficiency. Although sometimes not easy to implement, this approach often offers the highest potential.

Initial situation: Available space: Roof approx. 1,000 m², Location: Fuerteventura
Estimated invest: 240.000 €
Potential savings: (100 % self consumption) > ca. 350.000 kWh/a > ca. 52.000 €/a

Optimisation of hot water production/heat generation: Replacement of fossil fuels (e.g. heating oil) with renewable energies (heat pumps, solar thermal energy).

Initial situation: Hot water production using diesel generators and propane
Estimated invest: High
Potential savings: This depends on the system used. Monetary potential ist very high.

Air conditioning control (energy management): Intelligent control of AC systems depending on occupancy and outside temperature. Contact switches on windows, central control of room air conditioning, etc.

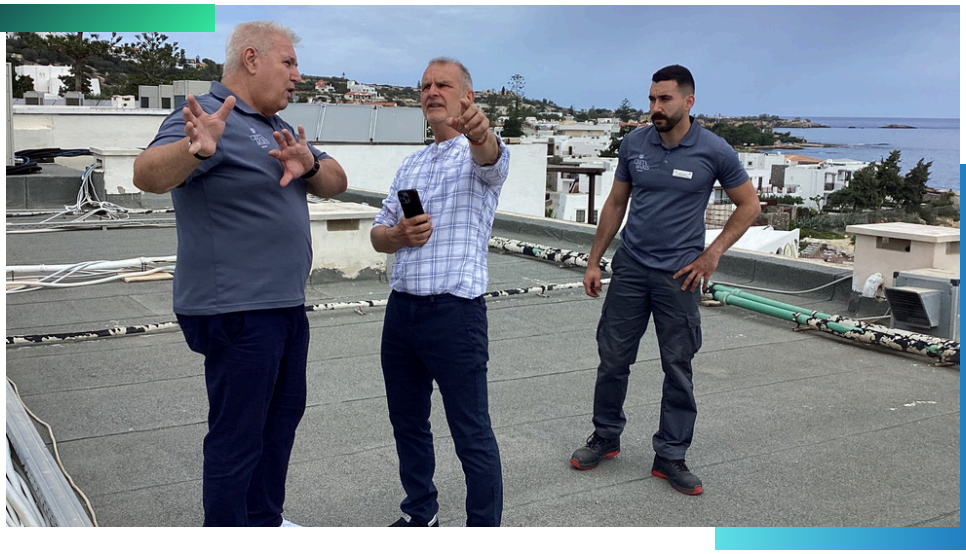
Initial situation: Retrofit window switches in rooms to switch off A/C when door is opened
Estimated invest: ca. 25.000 - 35.000 €
Potential savings: Generally ca. 5 % of A/C energy > ca. 70.000 kWh/a > ca. 10.500 €/a

Heat recovery from the cooling units in the kitchen area: The heat energy recovered can be used to heat water either for the kitchen area or to feed into the hot water circuit.

Initial situation: Various refrigeration units in the kitchen wing generate waste heat in a central location
Estimated invest: ca. 45.000 €
Potential savings: ca. 120.000 kWh/a > 6.000 €/a (direct savings)

Frequency converters and volume flows in the pool area: Review of legally compliant use and retrofitting of frequency converters in the pool pump area to reduce the volume flow of the pool systems. Switching the filter medium from sand to glass can bring additional savings. Particularly relevant in facilities with many pools.

Good Practice case



PV systems as the main lever for reducing CO_2e emissions

The project has demonstrated that PV systems are not only beneficial for CO_2e reduction but also economically attractive for all participating hotels. The following recommendations for action are taken from the final reports of four participating hotels and provide individual recommendations for different initial situations:

HOTEL 1

Photovoltaic system currently only 99 kWp

Expand system to 2 MWp as an off-grid system

ROI (Years)	CO_2e reduction t/a	est. Invest	Savings (€/a)
5,3	83,2	1.520.000 €	286.679

HOTEL 2

Planning and installing a solar panel system

Approximately 1000 m² of roof space could be used for a PV system.

Generation potential approx. 350.000 kWh/a

ROI (Years)	CO_2e reduction t/a	est. Invest	Savings (€/a)
4,56	97	240.000 €	52.683

HOTEL 3

Renewable energy is currently not being used. An old solar thermal system is no longer operational.

Build the largest possible PV system; assumption for calculation example: 1000 kWp central + 0.5 kWp per bungalow. If necessary, PVT elements also for the cottages to generate electricity + DHW, including storage

ROI (Years)	CO_2e reduction t/a	est. Invest	Savings (€/a)
4,67	385	770.000 €	165.000

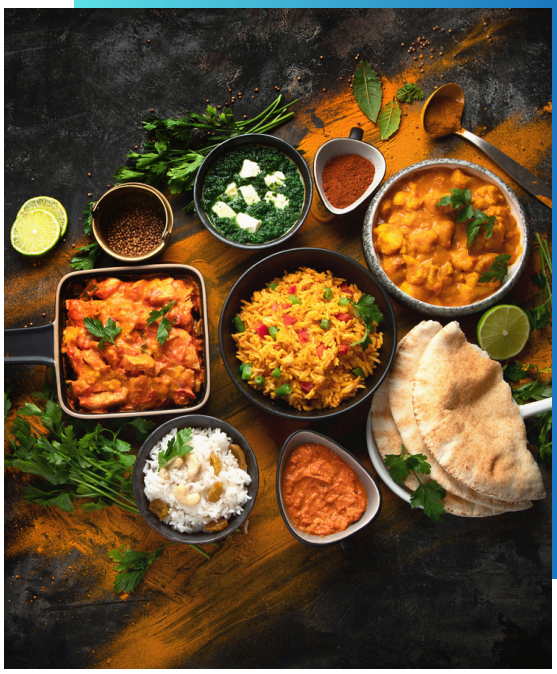
Recommendations for relevance checks:

- **Availability of Space:** What open spaces or roof areas are available?
- **Permits and legal requirements:** The project has shown that the legal framework is not always straightforward. Depending on national and regional law, a lengthy approval process is often required.
- **Economic efficiency and return on investment:** What savings does a system generate? Often, the larger the system and the more of the electricity produced is used by the hotel itself, the more economical the new system is. The project results show that for almost all pilot hotels, the expansion of PV offers great opportunities and, in most cases, a faster ROI than expected.
- **Practical feasibility:** Construction and material costs often vary enormously depending on the region and country. The right specialist company and timely quotations ensure successful planning.

Catalogue of measures

F&B area

The need for action in this area is obvious. The F&B sector is now one of the main sources of emissions in larger hotels. On average, 41% of total emissions in the project are attributable to the F&B sectors. At the same time, reducing CO_2e emissions is often particularly difficult in this area. The core of the emissions is the selection of products. Animal products play the main role here and almost always account for the lion's share of emissions. As catering is a sensitive issue on holiday, it is important to proceed with caution here. Nevertheless, this area remains essential for reducing CO_2e emissions and offers enormous savings potential. All-inclusive concepts face slightly different challenges here than purely à la carte restaurants. Guest expectations, as well as the composition and variety of the menu, require a different approach. But in the end, the choice of products and the composition of the dishes make all the difference



Reduction of high-emission product groups: Targeted reduction of animal products (especially beef) in favour of plant-based alternatives.

Avoid air freight: Products transported by aeroplane cause enormous CO_2e emissions. Air freight should therefore be banned from modern kitchens.

Use of CO_2e calculators for menu design: Integration of climate data into meal planning to enable and promote more climate-friendly dishes and buffet concepts. Such tools provide kitchen staff with a practical resource.

Reduction of high-fat dairy products: the higher the fat content, the higher the total requirement of the raw material milk. Where possible, use plant-based alternatives.

Meat-free or -reduced/climate-friendly buffet as a themed evening: Create a more climate-friendly buffet/ menu once a week. Good communication is essential. A meat option can be available on request.

Food waste management: Relatively high amounts of organic waste have been identified in several of the project businesses. Discarded food represents CO_2e emissions that have been produced for nothing. Waste reduction not only saves CO_2e, but also directly reduces food cost. Waste measurement can identify the origins of food waste and highlight potential for reduction.

Good Practice case

Reduction of high-emission product groups

It doesn't have to be vegetarian, but the composition of food and drink consumption alone offers potential that is often underestimated.

Topic	Measure	Potential	Estimated CO_2e Savings (t/a)
Targeted reduction for certain high-emission groups	Develop reduction targets for particularly relevant food groups: veal, beef, cheese, other animal products,	The potential savings are difficult to determine. However, proportionality clearly indicates clear priorities. **Assumption:** beef consumption is reduced by 15% and replaced by the same amount of (high-quality) poultry. Beef savings: 2.350 kg corresponds to 52,6 t CO_2e **Replacement emissions for poultry:** 2.350kg corresponds to: 8,563 t CO_2e **Difference: 44,04 t CO_2e savings**	**60-80**

Recommendations for relevance checks:

- **Consumption volumes:** Data on annual production volumes must be available in order to determine the key categories and reduction potential.
- **Food emission factors:** These figures may vary depending on the location and origin of the products. However, the proportions remain essentially the same. Animal products in particular often perform poorly. But even within this group, there are significant differences that offer potential. (see table on page 14)
- **Proportion of air freight:** Transporting fresh produce by air usually turns a low-emission plant-based product into one of the most emission-intensive products. Modern kitchens should generally avoid air freight.
- **Conceptual implementation in the F&B concept:** Once the product groups to be reduced are known and initial reduction targets have been set, this approach must be translated into menu and buffet design in consultation with the operational staff on site.

Excursus F&B

Excerpt: Overview of the quantities of goods used (typical composition) and the associated emissions from one of the pilot hotel point categories in comparison. The last column shows the CO_2e emissions per kg of the respective product.

Category	Quantity	Unit		CO2 Emissions	Unit	Factor kg CO2 /Unit
Mineral Water & Soft Drinks	147.798,4400	l	Soft Drinks RE EI	77,1858	t CO_2e	0,522
Juice	63.785,0000	l	Juice RE EI	35,9792	t CO_2e	0,564
Coffee, Beans	19,7800	t	Coffee, Beans RE EI	158,7002	t CO_2e	8,023
Coffee, Capsules	11.000,0000	#	Coffee, Capsules RE EI	1,397	t CO_2e	0,127
Tea	0,1712	t	Tea RE EI	0,3403	t CO_2e	1,988
Cocoa Powder	0,0062	t	Cocoa Powder RE EI	0,1577	t CO_2e	25,435
Milk	58.536,0000	l	Milk RE EI	99,5697	t CO_2e	1,701
Beer	18.746,0000	l	Beer RE EI	9,373	t CO_2e	0,500
Wine	48.989,0000	l	Wine RE EI	60,3544	t CO_2e	1,232
Spirits / Liquor	22.318,0000	l	Spirits RE EI	47,5597	t CO_2e	2,131
Poultry	28,5800	t	Poultry RE EI	104,1421	t CO_2e	3,644
Pork	20,4500	t	Pork RE EI	220,1431	t CO_2e	10,765
Beef	15,6700	t	Beef RE EI	350,7044	t CO_2e	22,381
Other Meat	3,8100	t	Other Meat RE EI	43,6379	t CO_2e	11,454
Fish and Seafood	54,6904	t	Fish and Seafood RE EI	233,4604	t CO_2e	4,269
Cream	3.800,0000	l	Cream RE EI	10,0254	t CO_2e	2,638
Yoghurt	7,7800	t	Yoghurt RE EI	14,7353	t CO_2e	1,894
Butter	4,2630	t	Butter RE EI	31,5334	t CO_2e	7,397
Cheese	33,4534	t	Cheese RE EI	434,5602	t CO_2e	12,990
Fruit	184,9557	t	Fruit RE EI	92,0317	t CO_2e	0,498
Vegetables	198,8405	t	Vegetables RE EI	178,1966	t CO_2e	0,896
Potatoes	41,9050	t	Potatoes RE EI	13,5186	t CO_2e	0,323
Pasta and Bread	16,0740	t	Pasta and Bread RE EI	19,7138	t CO_2e	1,226
Rice	1,3640	t	Rice RE EI	3,3046	t CO_2e	2,423
Cooking Oil	11.910,0000	l	Cooking Oil RE EI	38,9407	t CO_2e	3,270
Other Food Products	0,1190	t	Other Food Products RE EI	0,3256	t CO_2e	2,736

The emission values presented here are based on calculations from the 'Hotels go NET ZERO' project and may vary depending on origin and production method. However, the proportionality remains the same.

Know-how: Staff and guests

Staff: Catering staff are often not sufficiently trained to be able to tackle savings targets in an effective manner. This requires the creation of the appropriate knowledge base. It does not always have to be vegan or vegetarian. The targeted reduction of individual product groups and a shift in focus to other product groups offers enormous opportunities. In addition, the environmental impact of different product groups and the associated consumption volumes should be known.

- **Training on basic knowledge and opportunities for reduction**
- **Clear reduction targets and guidelines for kitchen teams**
- **Understanding your own emission categories and key areas**

Staff
Recommendations

Guests: Experience shows, guests respond positively to transparent communication about climate awareness. Effective communication is key to promoting more climate-friendly offerings and encouraging guests to do their part. Various approaches show promise here:

- **CO2e labels at the buffet**
- **Brief storytelling elements on menus ("Locally sourced, half the CO_2")**
- **Illustrating relative proportions using emission factors (**see table above**), e.g. beef > five times higher than chicken.**

Guest
Recommendations

Catalogue of measures

Other measures

In addition to the two main areas of action, F&B and energy / technology, there are various other approaches in the other categories. The main focus here is on employee commuting and business travel, as well as waste generation. These measures often require a more in-depth approach and are often secondary due to the relatively high costs involved, particularly in the area of mobility. Nevertheless, these measures are becoming increasingly important as reduction efforts in other categories progress and should therefore not be neglected.

Mobility solutions for employees (commuting): Employees' commutes are often underestimated. Shared shuttles or e-bikes reduce individual traffic and position the hotel as an attractive, sustainable employer.

Purchasing certified green electricity/green electricity certificates: As long as your own generation is insufficient, this is the fastest way to reduce your balance sheet emissions from electricity purchases to zero and support the market for renewables.

Annual carbon footprint (monitoring): Without regular performance reviews, measures remain fragmented. Regular audits of gathered data enables management to demonstrate success to stakeholders (banks, tour operators).

Review of waste volumes: What volumes are involved? Where do they originate and how does waste disposal work in the region? Landfill waste, for example, is more harmful to the climate than technically efficient incinerated waste.

Refrigerants: When purchasing new refrigerators, care should be taken to ensure that they use refrigerants that are as climate-friendly as possible. Although the impact is relatively small for intact appliances, implementation is quite simple.

Certifications as a supplementary tool: Holistic sustainability certifications can support hotel teams to measure and monitor all their environmental impacts in a structured way, including CO_2e. Often they also provide good ideas for improvement measures as part of their criteria, which can help to get from measurement to action.

Reduction roadmap

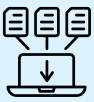
As a guide for hotel businesses.

01 **Status quo**
If no carbon footprint has been measured yet, an initial survey (Scope 1-3) should be conducted to determine the current situation. The analysis often reveals a massive discrepancy between perception and actual climate impact. The Hotel Carbon Measurement Initiative (HCMI) by World Sustainable Hospitality Alliance provides a cost-free tool for this purpose.

02 **Service providers and professional support**
It is often difficult to do your own carbon accounting. A suitable service provider can take care of the accounting and assist with interpreting the data. This prevents errors in the evaluation and provides a validated footprint.

03 **Specialised recording logic suitable for the hospitality industry**
Care should be taken to ensure that the relevant categories for the hospitality industry are included in the survey and recorded accordingly (i.e. by using HCMI). Care should also be taken to ensure that the recording is carried out in accordance with current standards (GHG Protocol, IPCC 2013, etc.).

04 **Data collection**
As the project has shown, data collection is particularly challenging during an initial survey. Collection logic should be integrated directly into operational processes. Data quality should be ensured. Here, too, a service provider can be helpful in ensuring the plausibility of the data.



05 **Assessment of the carbon footprint:**
Once the carbon footprint has been determined, the areas for action are often obvious. However, it is important to note that the necessary bridge between the theoretical data model and physical reality must be created. A valid roadmap requires that technical and operational options be tested directly on the property. Knowledge of your own building – from the plans and inventory to the existing infrastructure – is a prerequisite for any prioritisation.

06 **Check causes and develop approaches for measures in core areas**
It should be clarified in which areas emissions are generated. This usually allows initial areas for action to be identified. The following points, among others, can provide useful insights.

- Infrastructure & technology: Evaluation of the building envelope, heating and cooling systems, and the efficiency of hot water production.
- Tracking energy flows: Where is how much energy needed? A specific energy audit can be very useful here.
- Operational processes: Analysis of daily routines to identify waste in the housekeeping, technology and F&B sectors.
- Consultation with the responsible parties in the relevant departments regarding initial assessments and feasibility issues.

07 **Define expert and training requirements**
Determination of required support, e.g. for calculating the economic efficiency of technical systems, training requirements for staff and assessments by specialist companies regarding the feasibility of planned measures.

08 **Cost-benefit analysis**
What potential savings are connected with which costs, and which measures enable monetary savings? For technical /infrastructure measures: When will they reach amortization?

09 **Time and financial planning**
Draw up a schedule for implementing measures (quick wins first). Define short-, medium- and long-term measures. Determine financial requirements. Adjust financial planning. Formulate savings targets.

10 **Define and communicate responsibilities**
Define and communicate clear responsibilities for operational implementation. Plan change processes and inform staff. Schedule regular review processes to assess the current status.

Repeated and regular CO_2e footprint measurement in subsequent periods to measure success

Outlook:

The path to “Net Zero”

This guide provides a structured overview of practical methods for measuring and reducing CO_2e emissions in hotels. Reduction efforts should always be implemented in stages. The path to becoming a climate-neutral hotel is not always straightforward and should be carefully planned so that it also represents an economically viable process that is firmly embedded in the company’s culture.

The overarching goal of ‘NET ZERO’ should remain in mind. However, in the early stages of CO_2e reduction, it is far more important to prioritise individual areas of action and to steadily progress towards zero. The further a hotel’s reduction efforts have progressed, the more challenging further measures often become. A thorough reassessment of the status quo and the associated updating of the catalogue of measures with regard to reduction potential, effort and economic benefits are an essential part of this journey.

To make this process easier for your hotel, you can join industry sustainability initiatives like Futouris or the World Sustainable Hospitality Association to get inspiration as well as support from peers.