

Global accommodation sector

The road to net zero emissions

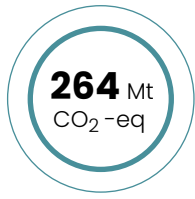


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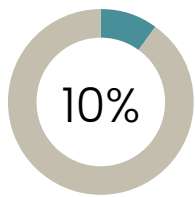
The road to net zero emissions

Executive summary

Climate change is one of the most pressing challenges of our time. As an important contributor to greenhouse gas (GHG) emissions, the accommodation sector has a vital role to play in the effort to decarbonise. Accommodations account for 264Mt CO₂-eq direct and controllable emissions (so-called scope 1&2), reflecting roughly 10% of emissions throughout the tourism sector. The accommodation sector needs to curb emissions by 17Mt CO₂-eq per year – an annual reduction rate of 6 to 7% of current levels – to achieve net zero emissions by 2050. This is the equivalent of eliminating all residential emissions in roughly 2.3 million households per year. An exponential increase in effort is therefore needed to master this transformation in a market that is continuously growing.



Global greenhouse gas emissions from accommodations



Accommodations' share of tourism sectors' emissions

Four-element approach to net zero emissions



Infrastructure efficiency improvement



Behavioural changes



Greenification of energy production



Carbon offsetting

A challenge with a double dividend

The good news is that there is a wide range of measures that significantly reduce GHG emissions and can in principle be implemented profitably. They provide accommodations with a double dividend: they cut both GHG emissions and operating costs. That is not to say these emission reductions are easy to achieve. Significant upfront investments are still needed at a time when accommodations around the world are only slowly starting to recover from the catastrophic impact of the global COVID-19 pandemic. But it does provide an opportunity to heed the call for urgent action. It also provides an opportunity for closer cooperation between all stakeholders in the accommodation sector – public and private – to come together to master this challenge.

This report presents a transition pathway with specific opportunities for accommodations to directly reduce their carbon emissions. It is based on novel and unparalleled primary research, mapping the GHG emissions of the global accommodation sector accounting for different types of accommodations operating in different geographies and climate zones. It provides a detailed, bottom-up underpinning of what the sector has achieved to date and – more importantly – what can still be achieved with different measures. This report focuses on abating direct and controllable GHG emissions. It identifies concrete measures to abate carbon emission by implementing the best available technologies, estimates the associated investment and implementation costs, and surveys existing barriers to taking action. Finally, the report shows how a wider set of stakeholders can support accommodations in their decarbonisation efforts and accelerate the green transition.

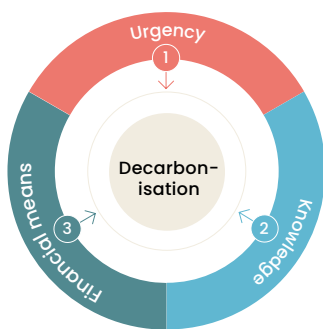
Four element approach to arrive at net zero emissions

The transition pathway to net zero emissions consists of four elements: [1] improve the efficiency of natural resource usage by accommodations, [2] promote more sustainable behaviour by guests and accommodation staff, [3] stimulate the transition to renewable energy usage, and [4] offset any remaining GHG emissions.

- A wide range of carbon-saving measures is available for accommodations to reduce usage of natural resources and waste disposal. An accommodation can reduce its (original) GHG emissions by up to 32% with these measures. Most of the measures have a positive business case.
- Accommodations are already, to varying degrees, engaged in sustainability initiatives. Current adoption levels of carbon-saving measures diverge from anywhere between 30% -70%, with even a few outliers still outside this broad band. About 39Mt CO₂-eq have been abated annually as a result.
- Accommodations can still achieve a further 15% - 20% reduction of total current emissions, which reflects approximately 48Mt CO₂-eq per year. The lion's share of residual abatement potential is associated with the implementation of just three initiatives: energy-efficient heating, ventilation, and air conditioning (HVAC) systems; energy-efficient appliances across the accommodation; and installation of double glazing. Despite the skew in potential, accommodations should aim for greater adoption of all initiatives in the quest for net zero emissions. Small steps are better than inaction.
- Even after implementing all currently available abatement technologies, significant GHG emissions remain. They will have to be addressed through behavioural changes, the greenification of energy production, and, if electrification is not an option, carbon offsets.

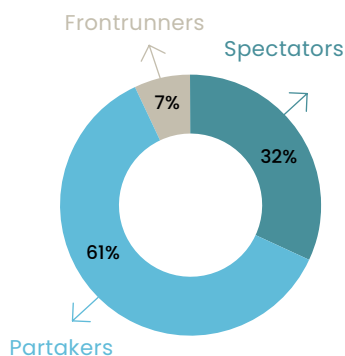
48Mt CO₂-eq
 remaining abatement
 potential reflecting an
**18% emission
 reduction**

Key barriers to overcome



€243 billion
 investment is required
 to implement
 all decarbonisation
 initiatives – equivalent
 of c. **€ 4,750**
per room

Sustainability mindsets



Barriers to implementation

Many accommodations care deeply about sustainability. However, there are some barriers to implementation of decarbonisation measures. The most important are: an insufficient sense of urgency, knowledge gaps or deficient data, and a lack of financial resources or access to capital. This report identifies three accommodation mindsets with respect to implementation and importance of sustainability. The Spectators, reflecting approximately 32% of the market, do not actively pursue sustainability goals and have to date only implemented standard industry initiatives or taken action solely for cost-saving purposes. Creating urgency for this segment, for example by highlighting the cost of inaction, would be an important driver going forward. The Partakers – the bulk of the market with approximately 61% of room coverage – want to take action as long as it does not negatively impact the attraction of their accommodation. They will go along with the transition as long as it does not hurt their long-term interests. They can be specifically supported with increased knowledge and financial support to increase the viability of the business case. And, last but not least, the Frontrunners, to which approximately 7% of the market supply can be attributed. They have sustainability at the core of their proposition and pro-actively try to achieve all kinds of improvements. Though little left to still abate, they could be supported with relevant and compelling knowledge and financial resources with respect to the remaining, most challenging initiatives.

Concerted action needed

The road to adopt carbon-saving measures cannot be travelled by accommodations on their own. Even with a large share of abatement measures being profitable in principle, the cost of realising the full abatement potential of current technologies is estimated to be €243b or €4,750 per room. Greening the energy production for the remaining emissions comes at an estimated cost of €525b for the global accommodation sector. Given the catastrophic impact of COVID-19 and the prevalence of many small and medium-sized accommodations, it is clear that it will take financial and non-financial support to master this transition. These support actions range from creating general awareness to helping channel demand to sustainable properties to providing easy access to capital and financial support schemes.

Governments are essential in creating the right regulatory framework and incentives for the accommodation sector. However, other stakeholders also have a role to play. Travel is a growing market and unlocking additional demand by responding to travellers' preferences for more sustainable choices can be an important driver for the transition as it will make green investments amortise better and faster. For example, online travel platforms can help in creating a cycle of supply and demand of sustainable travel choices mutually reinforcing each other. It will take the cooperation of all stakeholders to master this transition.

Although 2050 may seem a long way off, urgent action to decarbonise the accommodation sector is required. This report provides a roadmap to take the first steps along the way ahead.



_ Index

page **8**

_ The road to net zero emissions in the global accommodation sector

page **12**

_ Methodology of the study

page **15**

_ The potential of implementing the most efficient technologies

page **24**

_ The abatement potential of accommodations in practice

page **36**

_ Full transition pathway to achieve net zero ambition

page **40**

_ Support from stakeholders to accelerate decarbonisation

page **47**

The way ahead

The road to net zero emissions in the global accommodation sector

Climate change is one of the most pressing challenges of our time. Limiting surging global temperatures to 1.5 to 2°C requires a significant acceleration in the mitigation of greenhouse gas (GHG) emissions. The accommodation sector is no exception. Global accommodations emit the equivalent of 264 megatons of carbon dioxide (CO₂-eq) per year – and the sector is expected to grow (again) in the future. Decarbonisation by 2050 requires the accommodation sector to increase its efforts at a time when many are still recovering from the impact of the COVID-19 pandemic. All stakeholders – private and public sector – need to closely cooperate to make this transition a success.

Decarbonisation is a political and societal priority – one that is increasingly urgent. With the 2015 Paris Agreement, governments around the world agreed to undertake “ambitious efforts” to reduce their countries’ emissions and to increase their ambition and endeavour over time [Source 1]. Despite this exertion, progress has been limited so far. The most recent report by the Intergovernmental Panel on Climate Change (IPCC), published in August 2021, therefore stresses the urgency to take action: “Stabilizing the climate will require strong, rapid, and sustained reductions in greenhouse gas emissions, and reaching net zero CO₂-eq emissions” [Source 2].

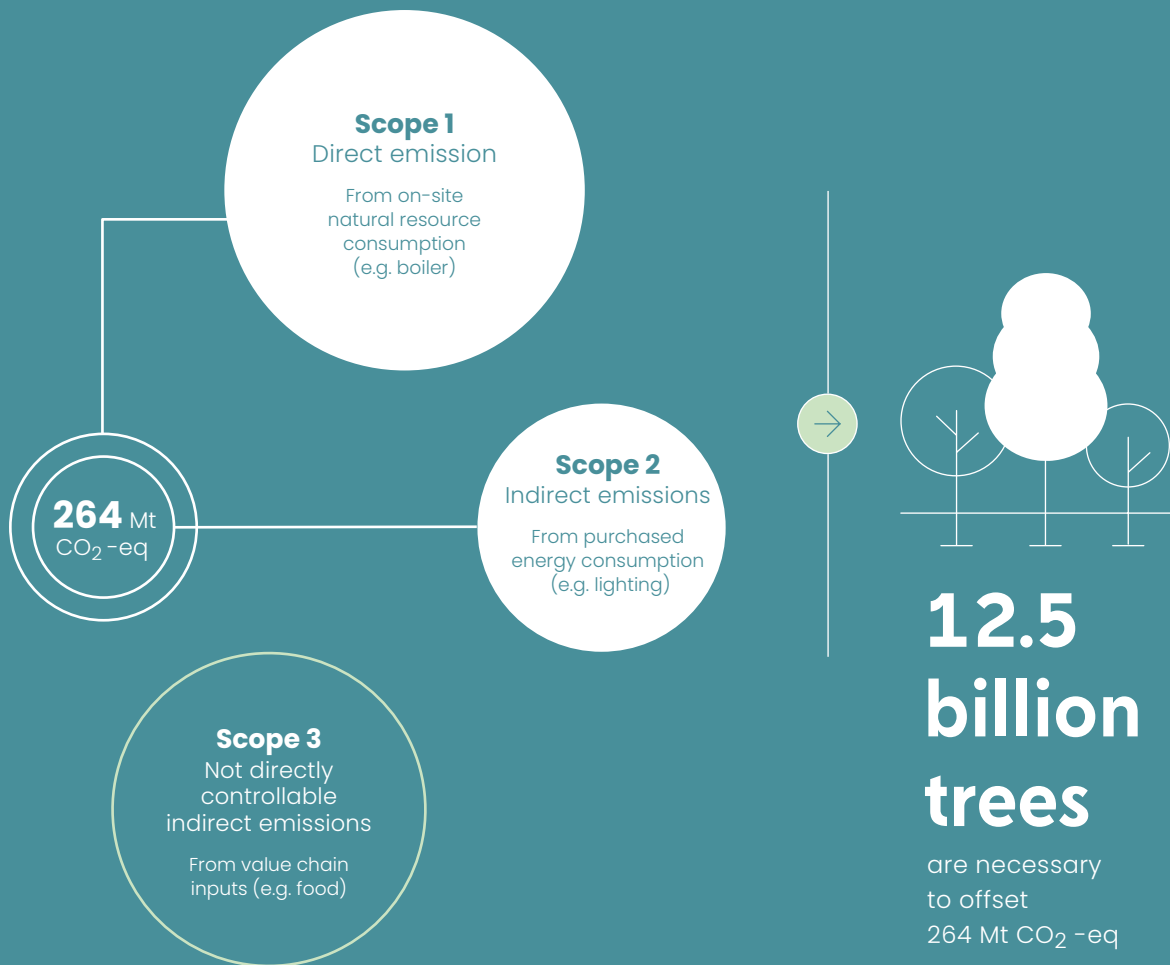
The accommodation sector is no exception to the need to take urgent action. Accommodations are a substantial contributor to global GHG emissions. Direct and controllable emissions (so-called scope 1&2) account for 264Mt CO₂-eq p.a., representing roughly 10% of the tourism sector’s total emissions [Source 3]. The travel and tourism sector, including accommodations, is a continuously and strongly growing market [Source 4]. Domestic and international travel are anticipated to bounce back post-COVID-19 and continue their historical growth trajectory. Between 2011 and 2019, accommodations have been growing at an annual rate of c. 4% [Source 5]. This underlines the need to take effective action: achieving net zero emissions by 2050 requires the accommodation sector to reduce emissions by 3% per year compared to current emission level and by 6-7% when taking into account the

expected sectoral growth of 3-4% (c. 17Mt CO₂-eq annually). This is the equivalent of eliminating all residential emissions from roughly 2.3 million households per year [Source 6].

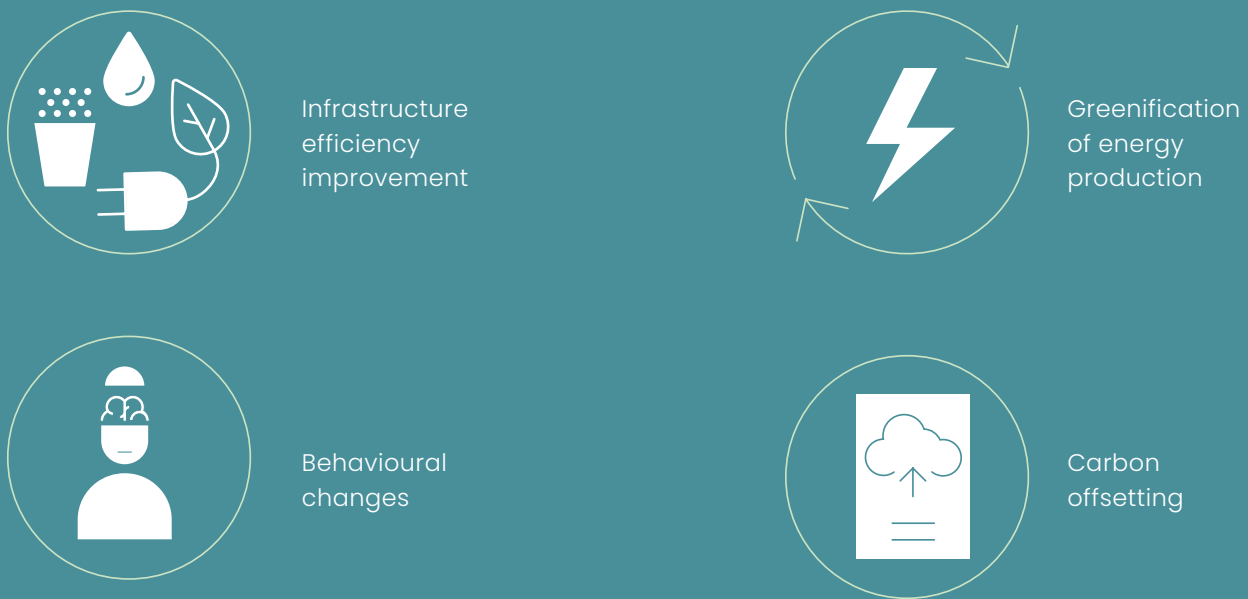
The transition to zero emissions can be seen as a four-element approach, as depicted in figure 2. Stage one consists of accommodations improving the efficiency of their natural resource usage (i.e. energy and water) and waste disposal. As this report will show, there are a large number of initiatives to improve energy conservation, water stewardship and single-waste prevention. In stage two, accommodations can actively try to nudge guests and personnel towards more sustainable behaviour. A large share of energy consumption is unavoidable for the operation of an accommodation, yet smarter and more efficient usage can already result in significant improvements. Stage three sees accommodations achieve carbon neutrality by substituting fossil fuels for renewable energy. This can be achieved through local renewable energy production (e.g. wind turbine or solar panels), or by sourcing green energy from the national grid. Finally, and as a last resort, any remaining GHG emissions can and need to be offset. However, as offsetting capacity is limited, this can only be a measure for physical or chemical processes that are



_ Global greenhouse gas emissions from accommodations [Figure 1]



Four-element approach to net zero emissions [Figure 2]

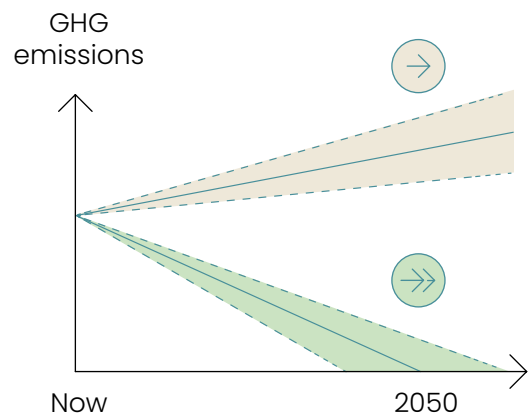




without an alternative and essential to the operation of an accommodation.

While the need for decarbonisation is becoming increasingly acute, not many accommodations currently consider sustainability a priority. The concern is that sustainable practices might negatively impact guest experience or business profitability. That is not to say that accommodations do not perceive sustainable development as an important goal. They are, however more focused on sustainability in a broader sense and do not solely focus on decarbonisation, as seen in figure 4. Accommodations interviewed for this study often referred to the UN Sustainable Development Goals and placed emphasis on the social/local community goals of that framework. These two factors – a broad sense of promoting sustainability and the focus on guest experience and business profitability – might explain why, up to now, accommodations have mostly adopted sustainability initiatives that are relatively easy to implement and financially attractive.

For the future, this will not be enough. This report presents a transition pathway for accommodations to get to net zero emissions. It does so by meticulously mapping the GHG abatement potential of existing properties through adoption of the most efficient current technologies. It also provides a calculation of the associated costs of implementing these measures. However, not all emissions can be abated. Eventually all energy consumption will therefore have to come from renewable energy generation. This report also

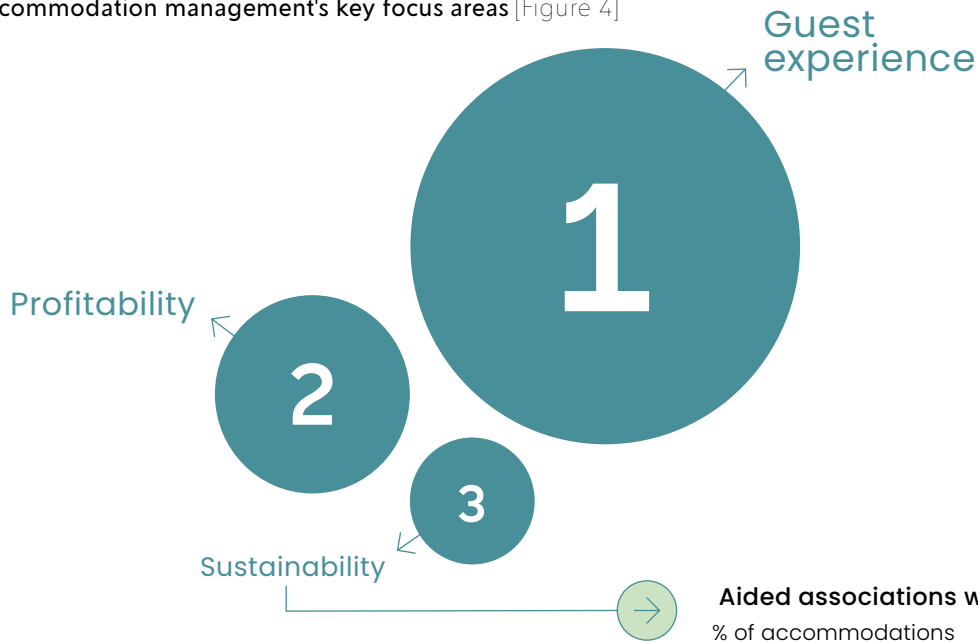
Expected emission development Expected sector emission development [Figure 3]



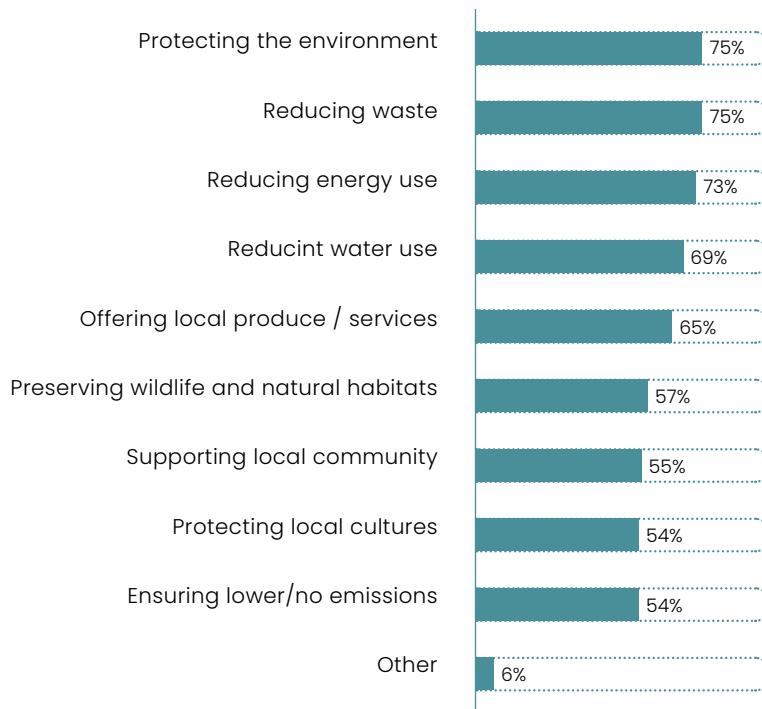
-  **Status Quo:**
Tourism growth driving emissions, without any action
-  **Ambition:**
Full focus on decarbonisation to drive net emissions to zero

Key focus areas

Accommodation management's key focus areas [Figure 4]



Aided associations with sustainability
% of accommodations



offers estimates for the costs associated with the switch to renewable energy. Finally, the report provides an overview of current progress in the transition of the accommodation sector, its main adoption barriers and the provision of support by external stakeholders to accelerate the effort to decarbonise.

It is evident that the transition pathway to zero emissions is not an easy one and, more importantly, it is one that has to be taken collectively. The COVID-19 pandemic has disproportionately impacted the tourism sector. According to the World Travel and Tourism Council, international tourist arrivals worldwide dropped by 74% compared

to pre-pandemic levels and the sector's contribution to GDP declined by nearly 50%, compared to an overall decline of global GDP of 3.7% [Source 7]. It is estimated that around 62 million jobs were lost in the tourism sector globally due to the pandemic, particularly impacting small and medium-sized enterprises [Source 8]. Accommodations were particularly hard hit. Investing in decarbonisation therefore poses an enormous challenge. While ultimately only accommodations can bring about the necessary changes, other stakeholders have a role to play as well in supporting this transition. Although 2050 may seem like a long way off, immediate action to decarbonise the accommodation sector is crucial.

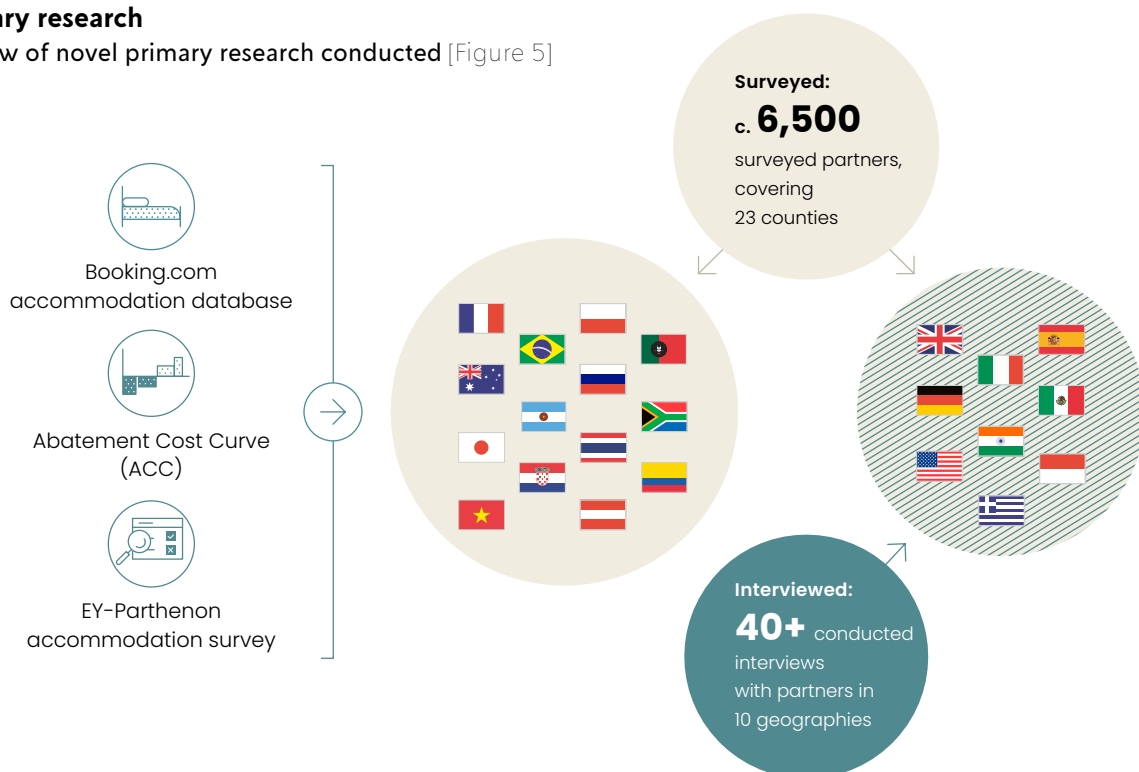
Methodology of the study

The findings in this report are based on a wide variety of new collected primary data, compiled in the second half of 2021, and current research. In contrast to most existing literature, this study is based on a bottom-up approach with extensive fieldwork underscored by a consideration of the global accommodation sector – both in terms of countries and accommodation archetypes. This research was initiated by selecting the most relevant actions for accommodations to reduce emissions, based on existing studies and discussions with various industry players. An elaborate interview programme with over 40 accommodation providers from all over the world has been used to detect both the current positioning of these initiatives and the key drivers and barriers with respect to their adoption. Abatement Cost Curves have been modelled for several relevant segmentations (i.e. continent, climate and accommodation archetype) as an in-depth underpinning of the sector’s total potential. Inputs for these curves also rely on existing research [Source 9; 10; 11]. Current and planned levels of implementation were determined based on a thorough accommodation survey among Booking.com’s partners in 23 countries. This partner survey has a total response rate of c. 6,500 properties, covering all types of accommodations, different continents and climate regions across the world. Finally, based on Booking.com’s database of global accommodations, the findings and results were extrapolated to come to a global overview of the accommodation sector’s remaining abatement potential.

Despite the expansive bottom-up approach of this study, some limitations remain. Firstly, a selection bias may have

Primary research

Overview of novel primary research conducted [Figure 5]



Contribution and added value of this study

- Complete roadmap to archive net zero emissions in accommodation sector
- Extensive coverage of the global accommodation supply across all types and regions
- Global new primary data collection among a representative set of accommodations
- Detailed Abatement Cost Curves addressing all property types and various climates
- Extensive bottom-up approach with respect to current emissions and abatement potential
- Market supply coverage based on most extensive global accommodation database

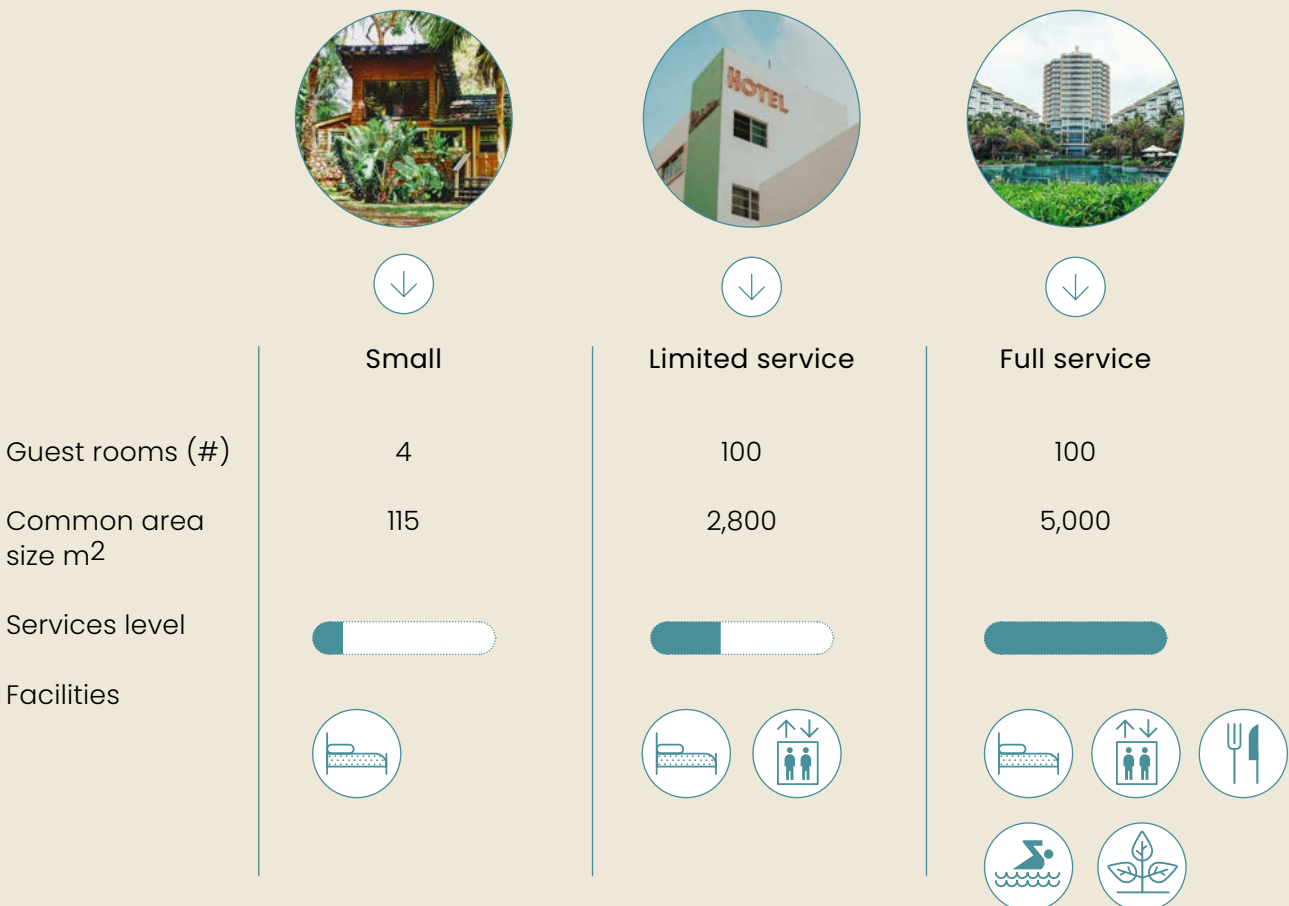
occurred within the partner survey, as partners committed to sustainability are likely to have been more inclined to participate. Consequently, remaining abatement potential is likely even slightly underestimated. Secondly, a limited response rate in certain geographies covered by the survey constrains accuracy of underlining data points. Furthermore, in order to model global measures, findings of certain geographies were extrapolated. Lastly, as this is a modelled exercise, simplifications were applied in measures such as climate segmentation and extent of implementation of sustainable practices.

Relevant segmentation throughout the report

Accommodations with the function of providing a short-stay lodging function to travellers exist in all kinds of sizes and typologies. Within this research, relevant segmentations are a simplification of reality, yet should provide clear differentiators. Accommodation segmentations in this report are based on [1] country/continent, [2] climate zone and [3] archetype. An accommodation's archetypes are determined by their size (small vs. large) and for large accommodations on their service level (limited vs. full).

The abatement cost curve (ACC) identifies the key initiatives accommodations can implement to reduce greenhouse gas emissions. As an accommodation's size and service level significantly impact the GHG abatement potential, three archetypes were sketched: small, limited and full-service accommodations. The model full-service accommodation has 4,500 m² flooring space, 100 guest rooms and includes facilities such as a pool, garden area and catering. On the other hand, small and limited-service accommodations are assumed not to offer facilities other than guest rooms. Small and limited-service accommodations are differentiated based on the number of guest rooms – 4 and 100 respectively – and the total flooring space of 115 m² and 2,800 m² respectively. In reality, identifying

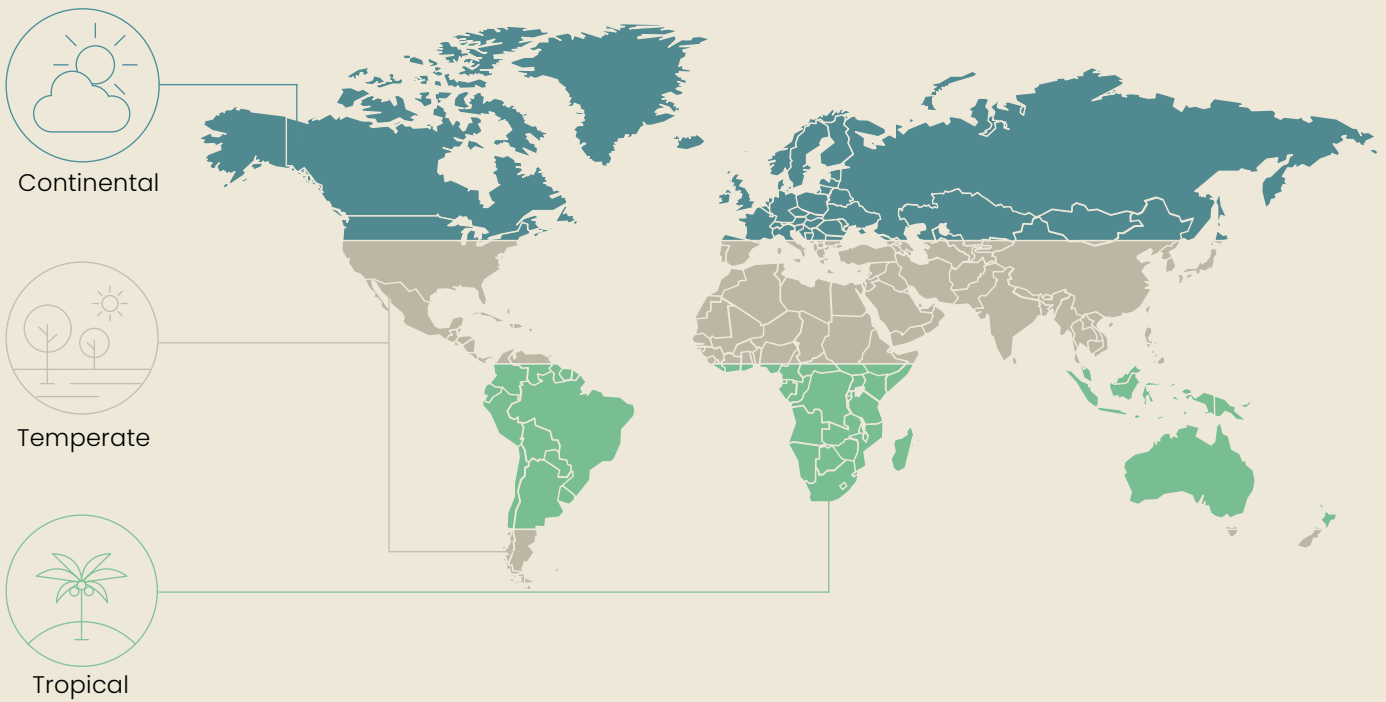
_ Accommodation archetypes [Figure 6]



archetypes is more complex. Although each archetype exhibits differences in the range of service and facilities offered, these are often not as binary as currently assumed in the ACC. Furthermore, in-house food and beverage options often differ substantially from full to small and limited-service accommodations; other facilities such as gyms or swimming pools can also be found at both establishment types.

The climate zone in which an accommodation is located also impacts its overall carbon footprint and the effectiveness of carbon-saving initiatives. Consequently, three climate zones were identified for the modelling: continental, temperate and tropical. These climates have been illustrated in figure 7. The ACC was made climate-specific, by adjusting key assumptions such as average monthly rainfall and temperature for each initiative. This is a simplification of the broad range of existing country and even location-specific climates.

Climate zones [Figure 7]



— The potential of implementing the most efficient technologies

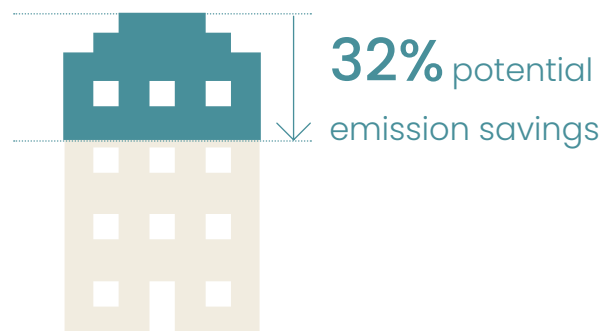
The accommodation sector has the ability to realise significant reductions in GHG emissions by implementing carbon-saving measures which reduce usage of natural resources and waste disposal. In doing so, an individual accommodation could lower the carbon emissions of its operations by up to 32%, with the majority of measures being net profitable over a 15-year investment horizon.

Accommodations are typically considered to be resource-intensive buildings. The range of services offered by accommodations, along with occupation density of guest rooms, leads accommodations to use relatively large amounts of energy and water per square meter and generate high levels of waste [Source 12]. As a result, energy and water efficiency, together with waste reduction, are key areas of environmental management for the accommodation sector. Implementing the most efficient available technologies and best practices would enable an individual accommodation to reduce its GHG emissions by up to 32%.

Although the reduction of all three elements (i.e. energy, water and waste) is relevant, the majority of greenhouse gas emissions stem from energy consumption. Energy conservation measures are commonly linked with improvements to a building's structure and on-site equipment, for example measures such as insulation and light sensors. In parallel, accommodations can practise water stewardship, by for instance installing low-flow systems and introducing towel and linen reuse programmes. This not only results in less water usage but also in reduced energy consumption from water heating. Finally, the accommodation sector can reduce the carbon footprint of its waste disposal. For example, by eliminating single-use packaging and facilitating recycling

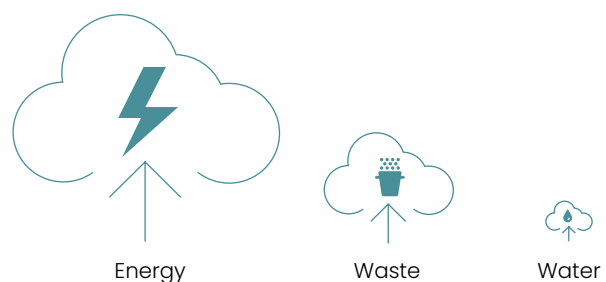
The various mitigation measures have different reduction potential and come with diverging costs. This report presents an analysis of the reduction potential and associated costs for 24 measures that have been identified as particularly relevant through the primary research. Moreover, the operating costs (e.g. reduction in energy consumption) were modelled over a 15-year investment horizon to estimate the net financial impact. Finally, to compare the cost-effectiveness of different measures, a breakdown was made of the cost per kilogram of CO₂-eq abatement. The result is an Abatement Cost Curve (see figure 10 for more

— Emission reduction potential [Figure 8]



details). This curve serves two purposes: i) it provides an easy overview of the economic implications of reducing carbon emission for different types of accommodations and climate zones, ii) it helps accommodations identify measures by impact and — The potential of implementing the most efficient technologies. This is particularly important in the current situation, where many accommodations are in a financially precarious situation with little resources for new investments, but still want to become more sustainable. The analysis lets them choose those measures that are best suited to their individual preferences. Ultimately, however, all of the applicable measures need to be implemented by accommodations.

— Contributors to GHG emissions [Figure 9]





GHG Abatement Cost Curve

The GHG Abatement Cost Curve (ACC) illustrates the potential abatement of emissions by individual initiative and the associated cost per kg CO₂-eq. Six different ACCs are presented in figure 11 and 12, covering three unique climates and both limited and full-service accommodations. Such curves provide a quantitative basis for accommodations to identify which actions could be the most effective in delivering emission reductions. However, as the ACC curves identify an average abatement potential and costs, they will still require validation on a case-by-case basis. Property-level decisions will also require consideration of other dimensions such as local taxes, government subsidies, operational impacts and technological developments.

Each bar on the ACC curves represents a carbon-saving initiative – see figure 13 for the full detailed list of initiatives – that an accommodation can implement with technologies available today. The width of each bar illustrates an initiative's potential to reduce GHG emissions within a given year, compared to business-as-usual. The GHG abatement potential assumes considerable improvements in the energy efficiency of equipment along with optimised operational processes. It does not take into account current levels of implementation or the applicability of each initiative to individual properties. The height of each bar represents the net cost of abating 1 kg of GHG emissions, assuming that investments are carried out now and potential GHG savings are modelled until 2035.

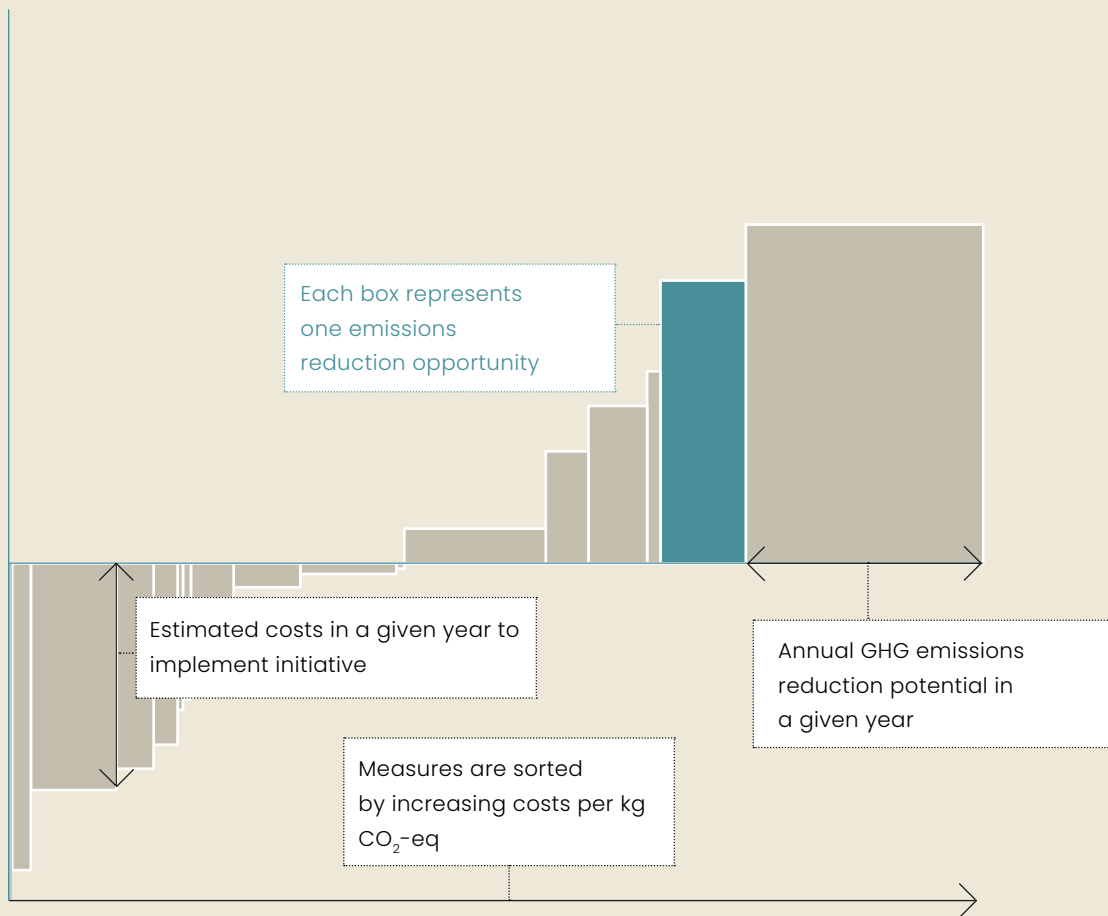
Background

The costs incurred to install each initiative do not include (local) taxes or subsidies. Moreover, opportunity costs of potentially missed revenues resulting from more severe operational interventions, are excluded from the equation. This methodology allows comparison of the economic appeal of each abatement opportunity on a more holistic level and between regions and countries.

Abatement Cost Curve reading guide [Figure 10]

Abatement cost

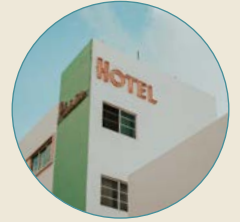
€ per kg CO₂-eq



The graph is read from left to right, illustrating the GHG abatement from the lowest to the highest cost opportunities. The initiatives which appear below the horizontal axis offer financial savings over a 15-year investment horizon, whereas initiatives that appear above the horizontal axis come at a net cost.

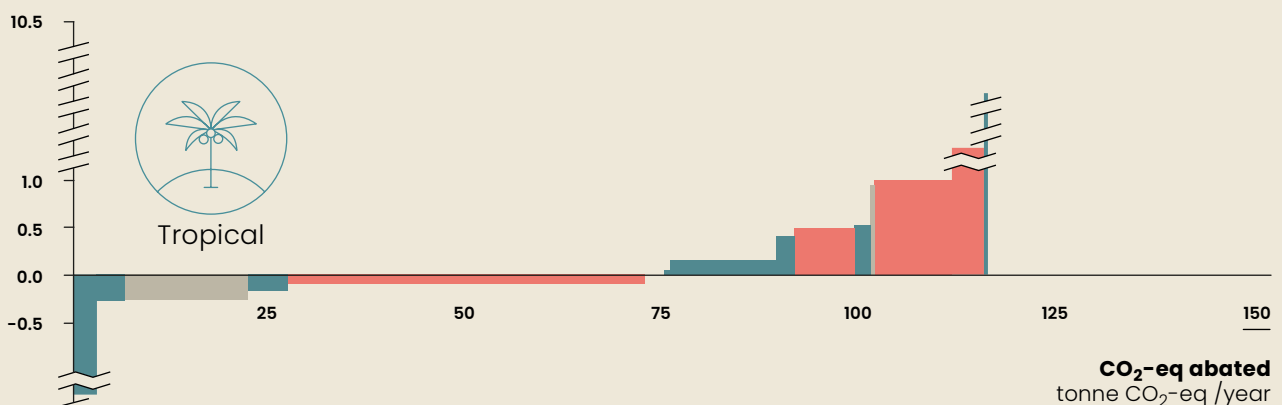
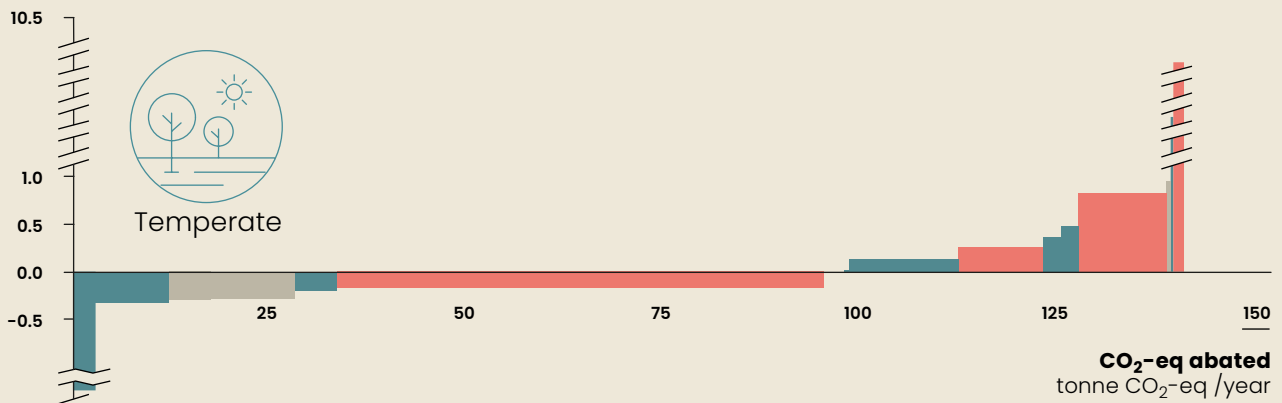
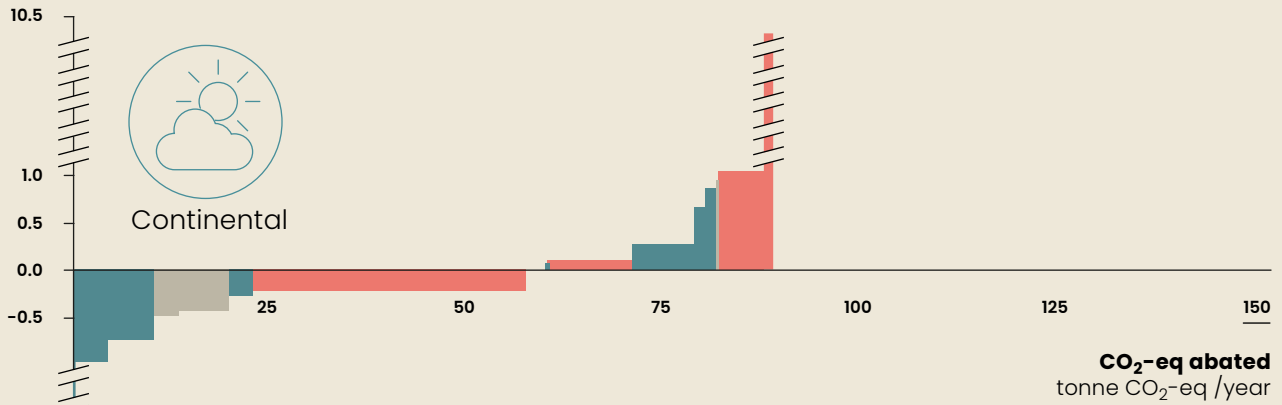
Abatement Cost Curve by climate, limited-service accommodations

Tonne CO₂-eq emissions [Figure 11]



Limited service

Abatement cost
€/kg CO₂-eq



Key underlying differences between climate regions

- Heating / cooling days (and outdoor temperature)
- Monthly rainfall
- Showering habits
- Sunlight hours & intensity
- ...

● Building structure & facades ● Fixtures & equipment ● Operations

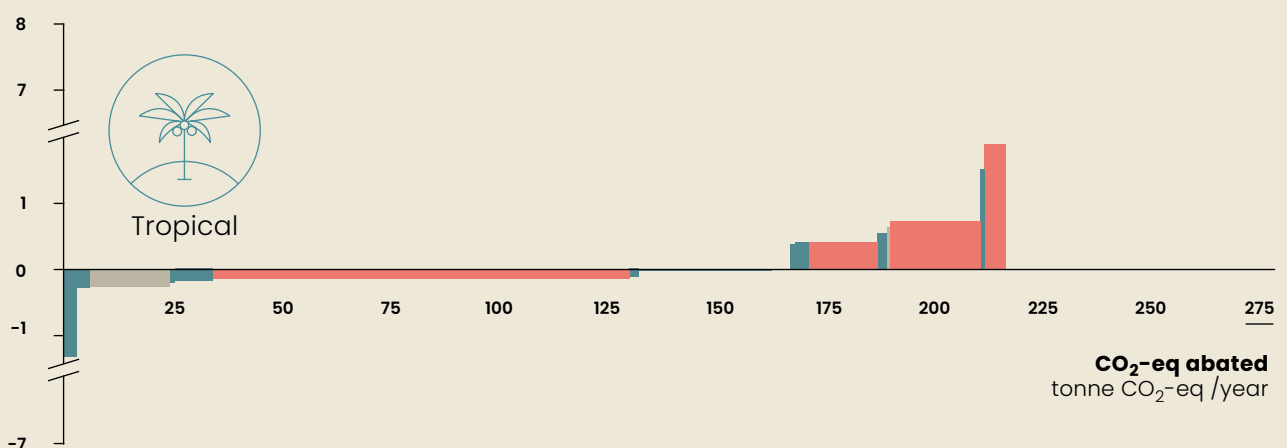
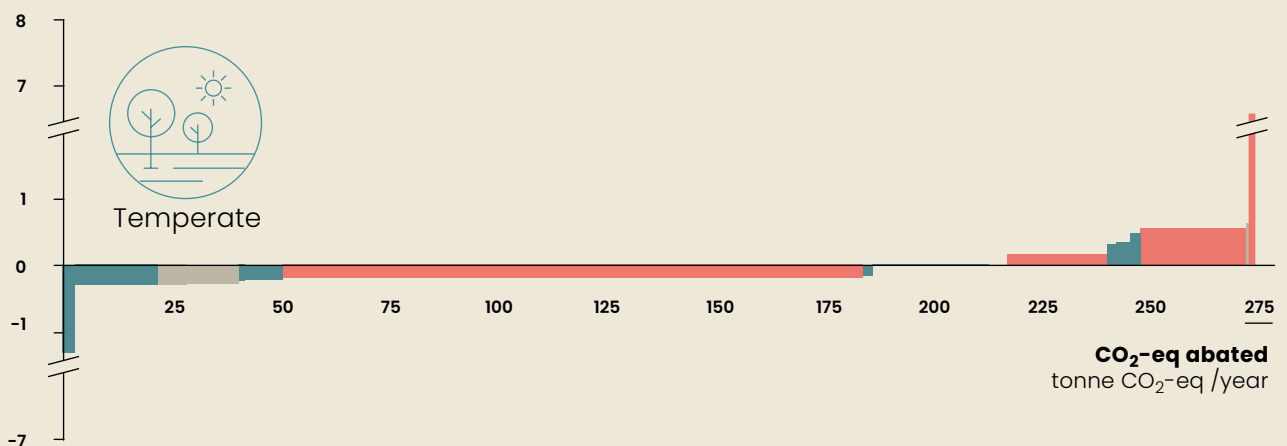
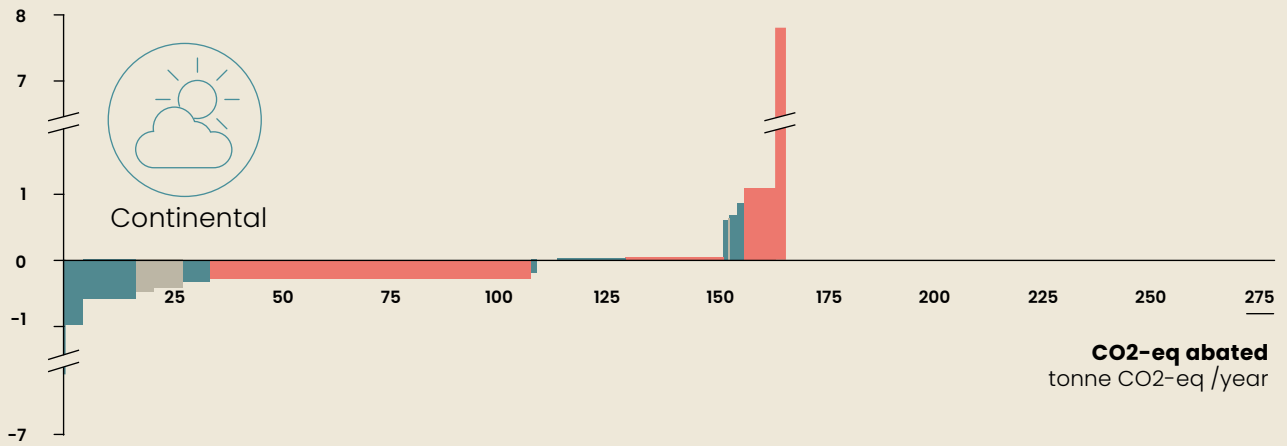


Full service

Abatement Cost Curve by climate, full-service accommodations¹

Tonne CO₂-eq emissions [Figure 12]

Abatement cost
€/kg CO₂-eq































Key underlying differences between archetypes

- Applicability of facilities (i.e. restaurant, garden, pool and lift)
- Hotel size (average common area per guest room)
- Usage intensity (e.g. laundry per room, waste per room)
- ...

¹ Excluding outdoor initiatives

Overview of decarbonisation initiatives (impact per accommodation) [Figure 13]

	Initiative	Rationale	Key lever	GHG impact (kg O ₂ -eq) ¹	Investment (€) ²	Yearly savings (€) ³	Scalable metric
Building structure & facades	Retrofit efficient HVAC system	Efficient technologies and control options can reduce overall energy consumption of Heating, Ventilation, and Air Conditioning (HVAC) systems		35k - 130k	110k - 170k	18k - 60k	
	Install double-pane windows	Double glazing reduces heat loss through windows, which lowers energy consumption for HVAC		7k - 25k	80k - 160k	3k - 15k	
	Install sunshading on windows	Sunshading reduce heat gain from solar radiation, which lowers energy consumption for HVAC		1k - 25k	180k - 300k	0.7k - 10k	
	Install (more) insulation	Insulation creates a barrier to heat gain and loss through walls and roofs, which lowers energy consumption for HVAC		1k - 7k	130k - 160k	0.5k - 5k	
Fixtures & equipment	Install energy-efficient appliances	Install energy-efficient (A-grade rating) appliances in guest, laundry rooms and kitchen, which lowers electricity consumption		8k - 30k	80k - 110k	5k - 7k	
	Install low-flow fixtures	Low-flow showerheads and faucets reduce water usage and energy consumption for hot water		4k - 19k	c. 16k	3k - 13k	
	Use energy-efficient lighting	LED lighting is more energy efficient than older solutions, reducing electricity consumption		3k - 9k	7k - 9k	2k - 4k	
	Electrify vehicle fleet	Replace owned or leased vehicles by electric models, reducing emissions from vehicles' fuel		3k - 4k	c. 2k	c. 6k	
	Install smart lift software	Elevator software which automatically switches off elevator lights and ventilation lowers energy consumption		1k - 3k	20k - 30k	0.9k - 1k	
	Install key card switch in guest rooms	Key card controlled switches ensure lights are only used when guests are present in their room, reducing electricity consumption		1k - 2k	c. 25k	0.9k - 1k	
	Install motion sensors in corridors for lighting	Motion sensors turn on lights only when movement is detected in corridors, resulting in reduced energy consumption for lighting		0.4k - 2k	3k - 4k	0.2k - 1k	
	Install efficient pool pumps	Variable-speed pool pumps can run at a lower speed setting, which is more energy-efficient		0.8k - 1k	c. 1k	0.5k - 0.6k	
	Place a pool cover	Pool covers decrease the heating need of pool water and reduce water evaporation		0.7k - 1k	c. 11k	0.5k - 0.6k	
	Install dual-flush toilets	A dual-flush toilet conserves water by offering choice between two flush volumes, reducing the water consumption		0.3k - 1k	40k - 50k	1k - 9k	

	Initiative	Rationale	Key lever	GHG impact (kg CO ₂ -eq) ¹	Investment (€) ²	Yearly savings (€) ³	Scalable metric
Operations	Turn off minibars by default	Switching off minibars by default and guests can turn them on if needed, lowering unnecessary electricity use		4k - 8k	-	c. 3k	
	Opt-out of daily towel & linen changes	By opting out, laundry volume is reduced, lowering water use and electricity consumption		3k - 7k	-	2k - 3k	
	Reduce laundry temperature	Reducing laundry water temperature from 90°C to 60°C, reduces energy consumption for hot water		2k - 4k	-	1k - 2k	
	Recycle waste	Recycling allows for reusing materials and reduces waste, consequently lowering emissions related to waste disposal		2k - 3k	-	-	
	Introduce paperless procedures	Limiting the paper use will reduce GHG emissions associated with paper manufacturing and waste treatment		c. 0.7k	-	-	
	Limit food waste	Reduce food waste (eg. donating food, removing buffets, etc.) limits amount of waste disposal		c. 0.7k	-	-	
	Eliminate disposables	Eliminating single-use materials reduces GHG emissions associated with product manufacturing and waste treatment		0.4k - 0.6k	c. 5k	-	
Outdoors (i.e. garden)	Collect rainwater	Collecting rainwater which can be used for irrigation will reduce an water use		21 - 33	c. 7k	100 - 400	
	Develop native gardens	Native gardens have local plants which require no additional irrigation, reducing water consumption		8 - 13	c. 5k	40 - 100	
	Install smart irrigation system	Drip irrigation eliminates inefficiencies associated with overwatering and evaporation, reducing water consumption		6 - 13	c. 10k	30 - 100	

	Surface area		Number of elevators		Garden area		Energy
	Number of rooms		Number of cars		Waste		Water
	Number of windows		Number of pools				

1. Yearly GHG emission savings, based on specific conversion factor
2. Total upfront investment required for the initiative
3. Yearly savings stemming from lower energy consumption / water use / waste disposal

Implications of the GHG Abatement Cost Curves

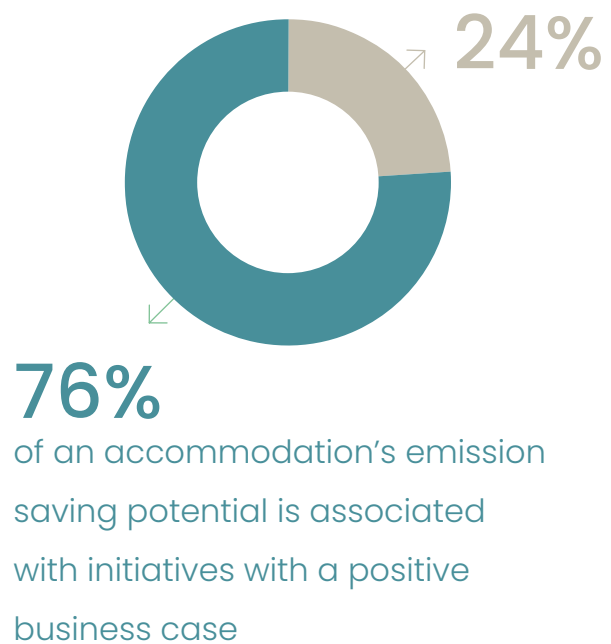
The total abatement potential can be estimated by adding up all the individual measures. For example, when looking in absolute terms, a full-service accommodation with 100 guest rooms and extensive facilities in a tropical climate – as shown in figure 15 – could realise c. 215,000 kg CO₂-eq savings on average per year. Absolute emissions scale with the number of guest rooms or common area, and are heavily impacted by the applicability of measures to each archetype, i.e. not all accommodations offer the same amenities (e.g. minibar, pool, and diversity of Food & Beverages). This is reflected by the width in curves of figure 11 compared to figure 12, in which limited-service accommodations realise lower absolute GHG abatement compared to a full-service accommodation. While absolute abatement potential differs between climates, the relative abatement is fairly comparable. On the other hand, limited-service accommodations have a higher relative potential compared to full-service accommodations, albeit at lower overall emissions, see figure 15.

Finally, country variances in power conversion rates strongly impact the absolute GHG abatement potential. The more a country's energy grid relies on renewable energy, the less GHG is emitted by consumed energy and as such less GHG can be abated. For example, a full-service accommodation in France, which is a frontrunner when it comes to renewable electricity generation (i.e. conversion factor of 0.0487 kg CO₂-eq/kWh), has an abatement potential of 32 tonne CO₂-eq, whereas a full-service accommodation with the same number of rooms in South Africa has an abatement potential of c. 450 tonne CO₂-eq (i.e. conversion factor of 0.9927 kg CO₂-eq/kWh).

When looking at individual abatement measures, the ACC highlights considerable fragmentation regardless of the considered archetype – there is not one silver bullet, but multiple measures need to be combined. For full-service accommodations, most of the GHG abatement potential (c. 65%) relies on improvements to the structure and façade of accommodations' building. On the flip side, garden stewardship typically offers limited carbon savings (c. 1%), though it should be recognised that the latter offers clear other sustainability improvements besides decarbonisation.

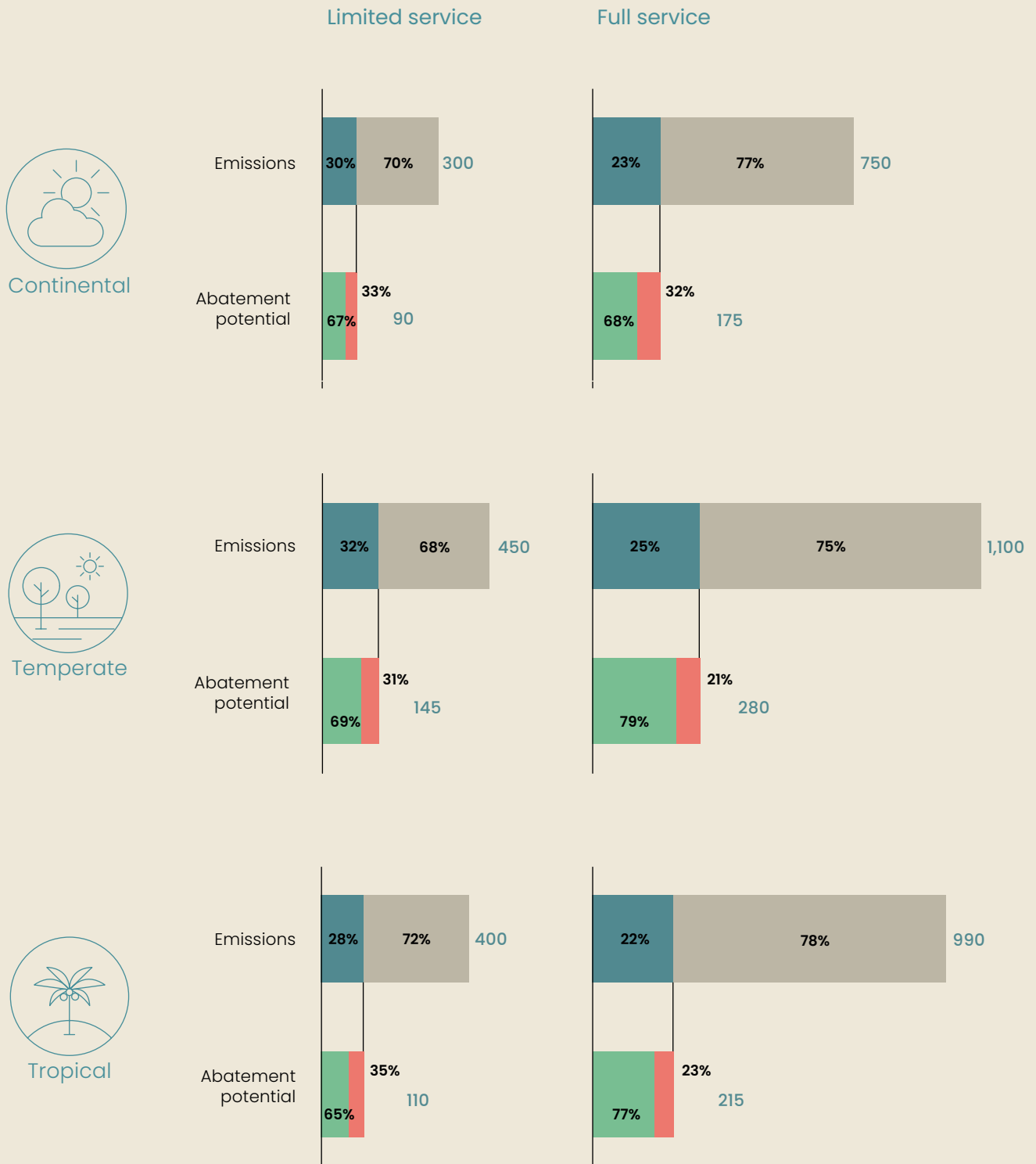
The majority of measures require upfront investments, which vary in size. A large share (c. 58%) of measures has a positive business case, which means that the upfront investments are recovered by lower energy spending in the next 15 years. These measures represent c. 76% of the abatement potential. Hence, the majority of abatement can be pursued with a positive net return.

Business case feasibility of decarbonisation measures [Figure 14]



Abatement potential breakdown

Tonne CO2-eq, % of total emissions / abatement potential [Figure 15]



- Abatement potential
- Unabated emissions
- Abatement attributed to initiatives associated with net savings¹
- Abatement attributed to initiatives associated with net costs²

¹ Net savings: cost savings compensate for upfront investments within a timespan of 15 years
² Net costs: cost savings do not compensate for upfront investments within a a timespan of 15 years



— The abatement potential of accommodations in practice

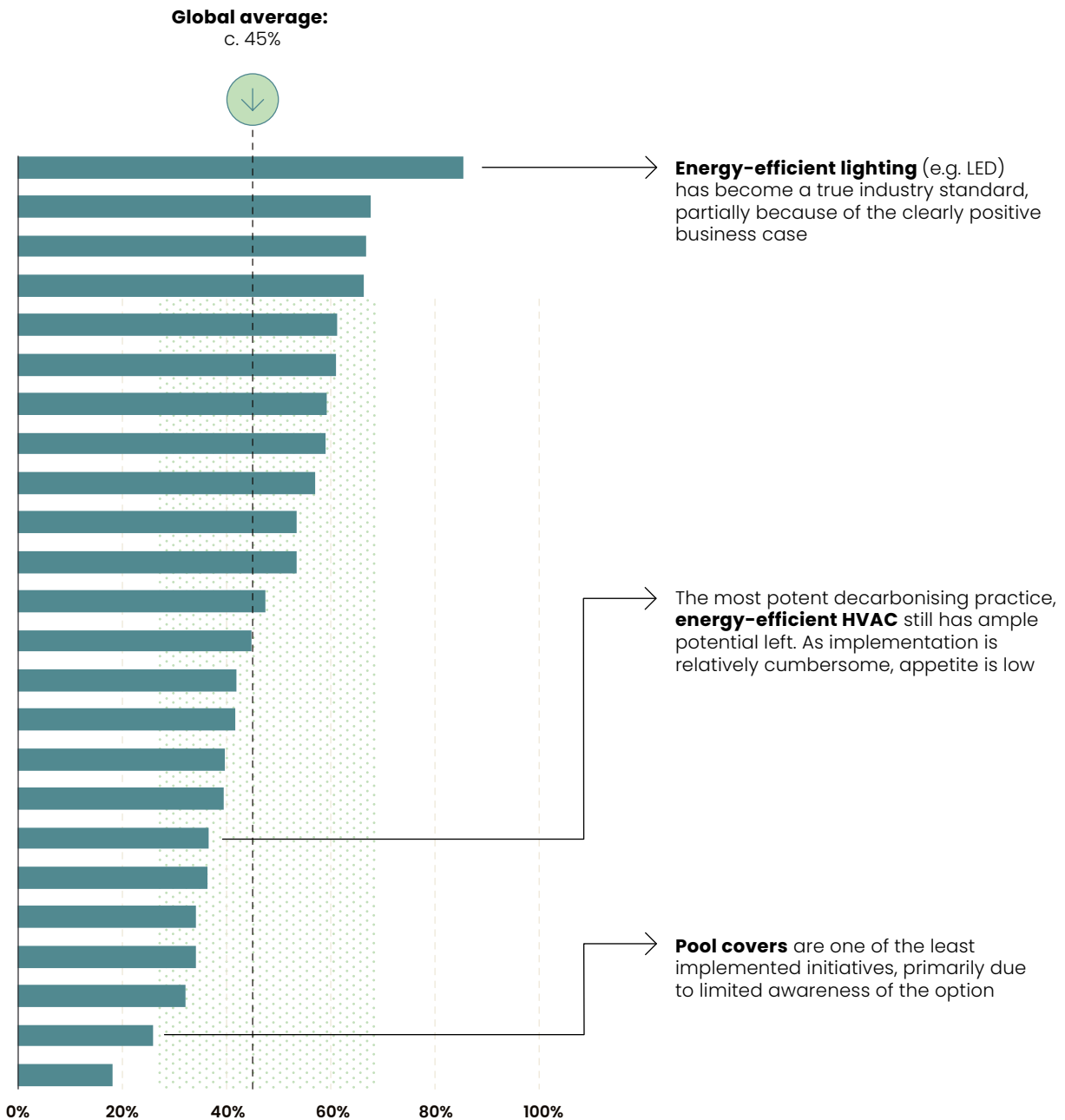
Accommodations have already made considerable progress in implementing sustainable practices. Nevertheless, there is still room for further improvement. Collectively, accommodations have the opportunity to abate c. 15-20% of their current total carbon emissions by adopting the most efficient technologies. This requires a greater sense of urgency, more targeted information about the potential of different measures, and better access to financial capital.

Accommodations care about sustainability and decarbonisation: virtually all businesses have implemented one or several practices to reduce their carbon footprint. However, the depth of these efforts varies greatly, leaving substantial reduction opportunities for adoption. Current global adoption rates of decarbonisation initiatives fluctuate mostly between 30% and 70%, see figure 16.

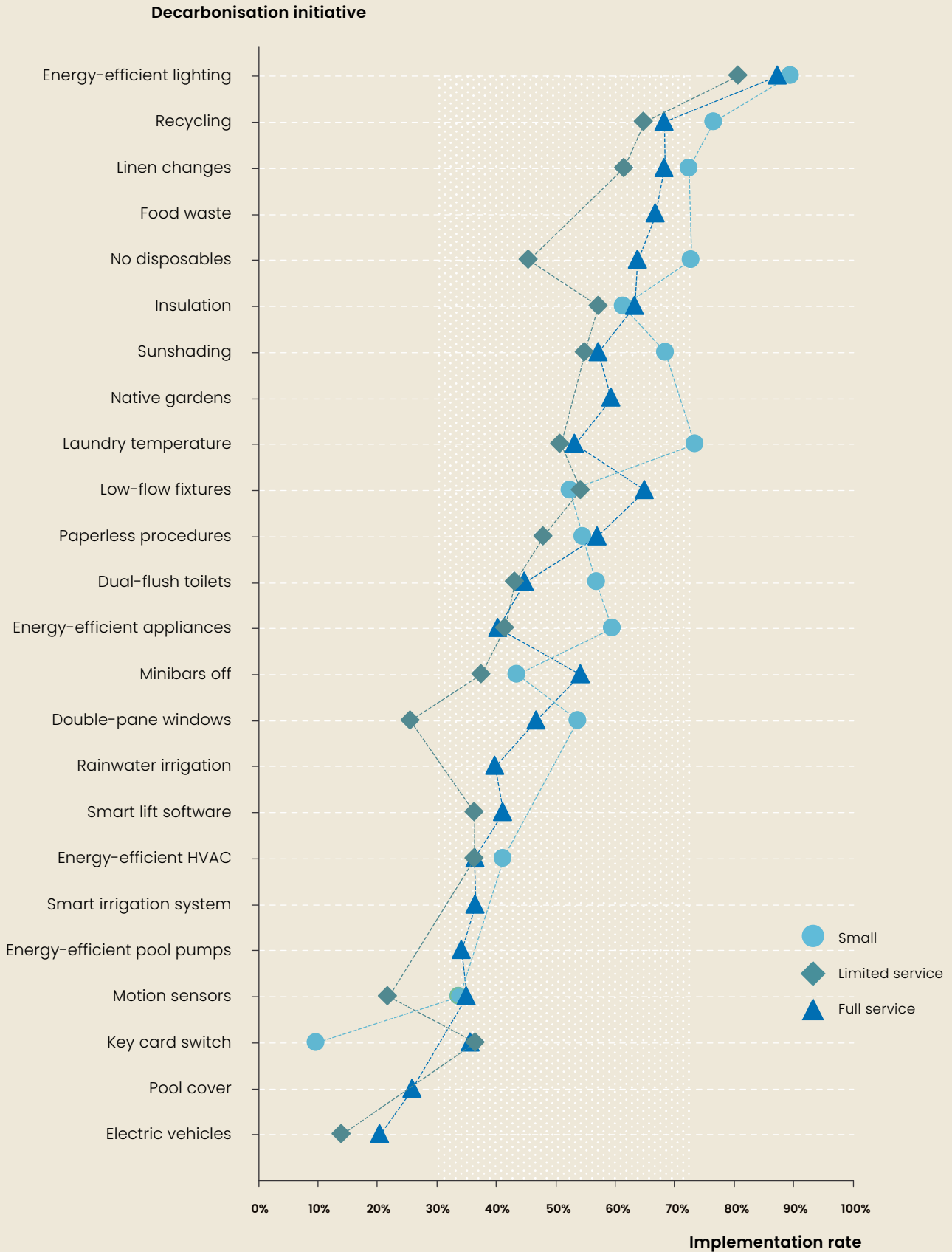
A select number of practices have become industry standards: only a few accommodations do not yet have energy-efficient lighting, offer opting out of daily laundry and adopted waste separation. On the other hand, some practices appear persistently lagging, such as insulating pool covers and energy-efficient lift software.

Implementation rate of decarbonation practices

% of decarbonisation practices [Figure 16]

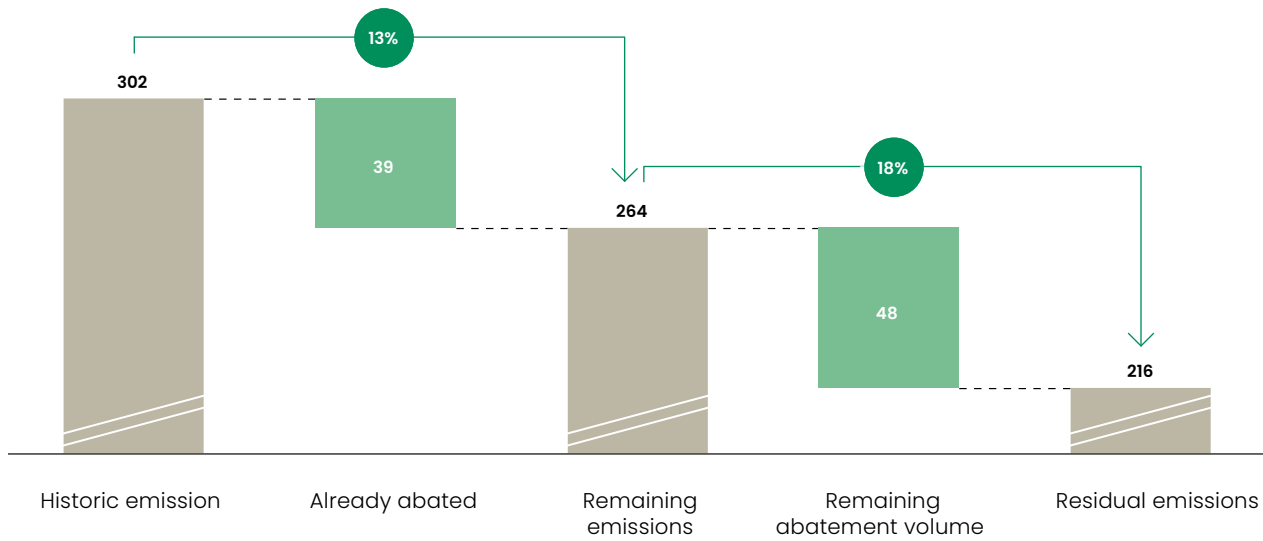


Implementation rate of decarbonisation practices by archetype
% of abatement potential [Figure 17]



GHG emission and abatement potential

Mt CO₂-eq [Figure 18]

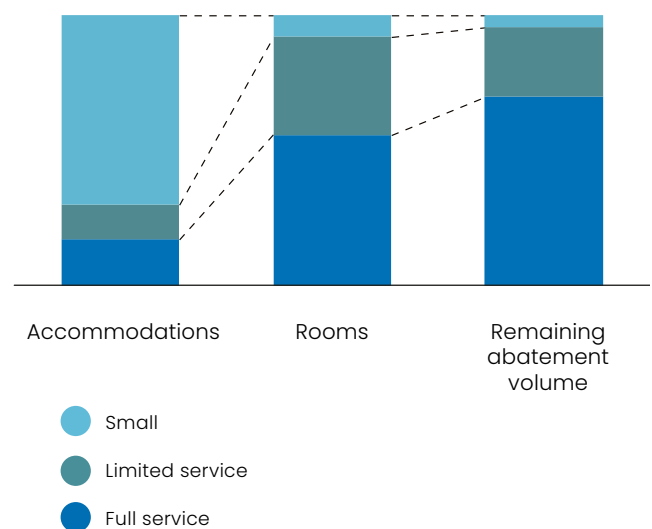


The potential amount of CO₂-eq that can be abated through sustainable practices amounts to 87Mt globally. The majority thereof, 48Mt CO₂-eq, remains untapped to date, corresponding to a saving of 15-20% of accommodations' current total emissions (264Mt CO₂-eq). This potential is strongly skewed towards full-service accommodations, as depicted in figure 19. This type of accommodation represents only a small share of properties, but their large room portfolio and extensive service proposition increase their share of usage of natural resources. Still, it is imperative that all accommodations reduce their GHG emissions to achieve the Paris climate goals.

The lion's share of remaining abatement potential (c. 75%) is associated with the implementation of just three initiatives, see figure 20 for more detail. The greatest potential lies in installing an energy-efficient heating and cooling systems (HVAC; c. 53% of remaining abatement potential globally), using energy-efficient appliances across the accommodation (c. 12%) and in installing double-glazed windows (c. 10%). However, despite the skew in potential, it should be clear to all value chain participants that the focus should not just be on these 'big fish'. Wider adoption of all initiatives – including ones with relatively smaller impact – is still indispensable to achieve net zero emissions in the end. These other initiatives account for c. 25% of the total abatement potential. Despite having relatively smaller impact, typically these practices are easier to implement. For example, turning the minibar off by default (c. 2%), opting out of daily linen and towel changes (c. 2%), lowering laundry temperature (c. 1%) are all practices which could easily be implemented tomorrow without the need for additional investment. Relative impact and current implementation rates are

comparable for individual initiatives across the world, with only slight variations between different archetypes of accommodations. As depicted in figure 17, it appears that especially limited-service accommodations are slightly lagging in terms of their adoption rate across the range of initiatives. Furthermore, nuances exist mostly with respect to applicability/effectiveness of initiatives across different regions of the world.

Accommodation market and abatement potential by archetype [Figure 19]





Remaining abatement potential by region

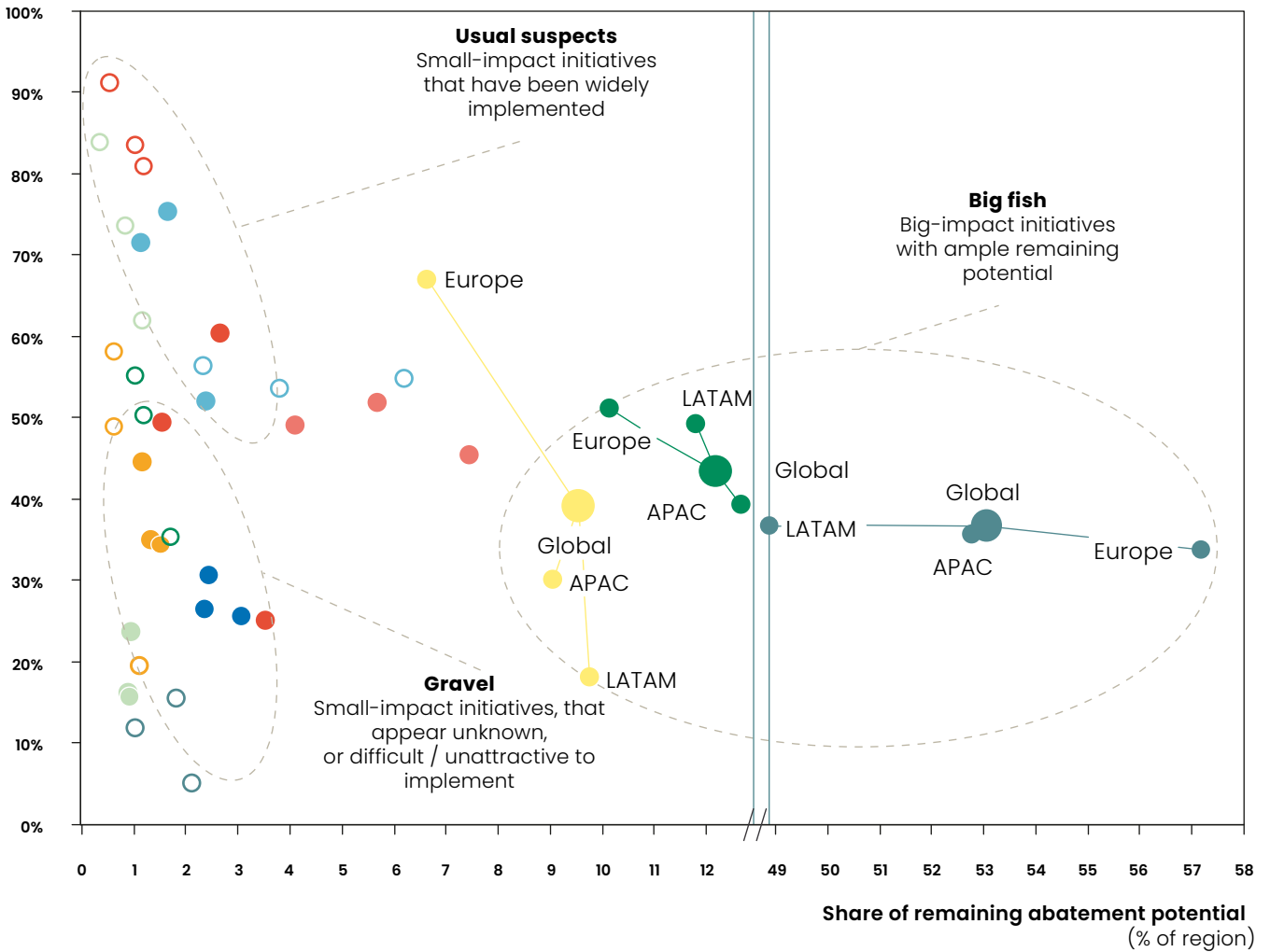
Initiatives can be bucketed based on the remaining potential and the current installed base. The combination of these metrics provides a high-level view on the ease of capturing the potential and the extent to which adoption barriers exist. Overall dynamics of individual initiatives are fairly comparable the world over. Meanwhile, specific segments (in terms of continents, climate and accommodation type) each have their nuances, in particular continents, as depicted in this graph.

The horizontal axis 'share of remaining abatement potential' explains how large the impact of an initiative is relative to other initiatives within the same segment (i.e. specific continent). Based on this measure, three initiatives ('big fish') drive the majority of abatement potential across the world. The current implementation rate on the vertical axis is associated with ease of implementation. Initiatives that have already been widely adopted appear attractive, indicating that future adoption could occur relatively smoothly ('usual suspects'). Lastly, a few initiatives have low adoption rates ('gravel'), indicating that external intervention might be necessary to make these cases attractive as well.

Remaining abatement potential of decarbonisation measures by region¹ [Figure 20]

Installed base

(% of rooms with measure)



- | | | |
|-----------------------------|---------------------|-------------------------------|
| ○ Energy-efficient lighting | ○ Motion sensors | ● Double-pane windows |
| ○ Electric vehicles | ● Minibars off | ● Energy-efficient appliances |
| ● Insulation | ● Linen changes | ● Energy-efficient HVAC |
| ● Key card switch | ○ Recycling | |
| ○ Laundry temperature | ○ Low-flow fixtures | |
| ● Smart lift software | ● Sunshading | |

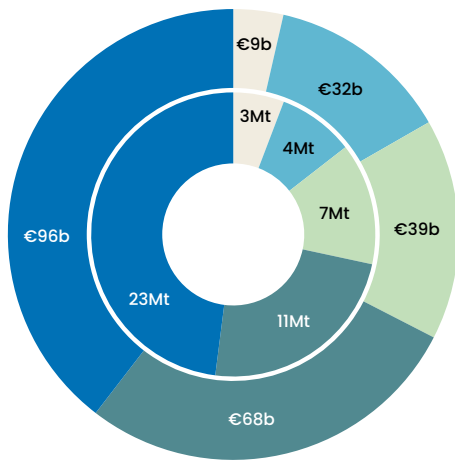
¹ North America and Africa not explicitly visualised but included in global number

_ Financial perspective of remaining potential

As illustrated by the Abatement Cost Curve in the previous chapter, most initiatives are effectively positive business cases. In other words, the investment is earned back over the lifetime (15 years) of the initiative. This is the case for initiatives representing c. 74% of the abatement potential. Meanwhile, only c. 28% of the cumulative required investments are associated with these positive business cases. This disparity is caused by the fact that initiatives carrying large abatement potential (the 'big fish') are associated with relatively positive business cases, whereas initiatives with smaller impact also require substantial investments. The cumulative investment required to achieve the remaining carbon emission abatement of 48Mt CO₂-eq is €243b, or an average of c. €4,750 per room. These investments do not take into account opportunity costs in the form of potentially missed revenues and it also ignores

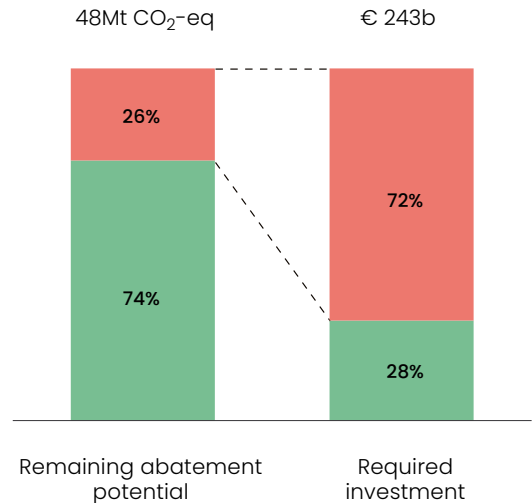
the availability of (local) grants/subsidies. It should be noted that continental differences exist in terms of average required investment per CO₂-eq abatement potential. Especially Europe is more expensive, which is a reflection of their progression to date – the remaining potential is skewed towards initiatives with larger investment – and the region's relatively low energy conversion rate, see figure 21.

_ Abatement potential and required investments [Figure 21]



- APAC
- Europe
- North America
- LATAM
- Africa

_ Feasibility of sustainable initiatives [Figure 22]



- Negative business case
- Positive business case



__ Barriers for further adoption

Most accommodations recognise the growing need to do their part in decarbonising the industry. However, despite their good intentions and efforts, businesses run into barriers that prevent them from going further. Based on accommodations' considerations, current implementation profiles, and perceived barriers, accommodations can be classified into three 'sustainability mindsets' – see figure 23: Spectators, Partakers and Frontrunners. In general, Spectators, reflecting c. 32% of global supply, are lagging in their efforts. They do not perceive the urgency to prioritise decarbonisation in their decisions and operations. Next, Partakers, reflecting c. 61% of global rooms, have taken initial steps towards decarbonisation. They are now at the point that they do not necessarily know how to continue. Furthermore, sustainability is still an objective which comes secondary to their core business. Lastly, a minority of c. 7% of global rooms can be classified as Frontrunners, proactively pushing sustainable efforts. It is mostly large full-service accommodations that can be

identified as Frontrunners and they have a larger prevalence in Europe and Africa, see figure 26 and 27. Even this group still has some steps to take to achieve net zero emissions.

Spectators and Partakers behave largely reactively with respect to sustainability or do so with a different primary objective (e.g. cost savings) in mind. With the ambition of accelerating the transition, accommodations eventually need to shift sustainability mindset. In other words, Spectators becoming Partakers and Partakers becoming Frontrunners, thereby increasing the overall focus on sustainability.

The road to adoption of new practices contains three main barriers: sense of need or urgency, availability of knowledge and availability of required resources. The three sustainability mindsets struggle at various stages of the implementation path. Support with overcoming

__ Sustainability mindsets [Figure 23]



Spectators

Spectating accommodations typically have few initiatives in place. Their focus is on running a profitable business, and sustainability is subordinate to this. They tend to implement the industry standards and, when applicable, some cost-saving practices that happen to be sustainable as well. This group has achieved some reductions, but it clearly has the largest abatement potential left.

"We have a few sustainability measures in place, however these were solely implemented with the aim to reduce operating costs. For example, we have LED bulbs and opt-out for daily laundry in place." 'Spectator' hotel, USA



Partakers

Partaking accommodations put considerable effort into adopting sustainable practices. However, as it is not their main focus, they tend to run out of ideas and therefore miss out on less obvious practices. As such, they typically have implemented a wider range of initiatives, but only those that are financially attractive and relatively well-known. There is still significant reduction to be achieved.

"We have included sustainability as a pillar in our strategy last year, driven by the increasing sustainability demand from guests. However, progressing from a high-level plan to concrete actions has been challenging." 'Partaker' hotel, Spain



Frontrunners

Frontrunning accommodations explicitly build their proposition on sustainability. It is deeply engrained in their operations and part of the guest offering. They have high adoption rates as a result of their focus to make even the more far-fetched initiatives viable. However extensive the efforts of this group are, in most cases they can still achieve further emission reduction.

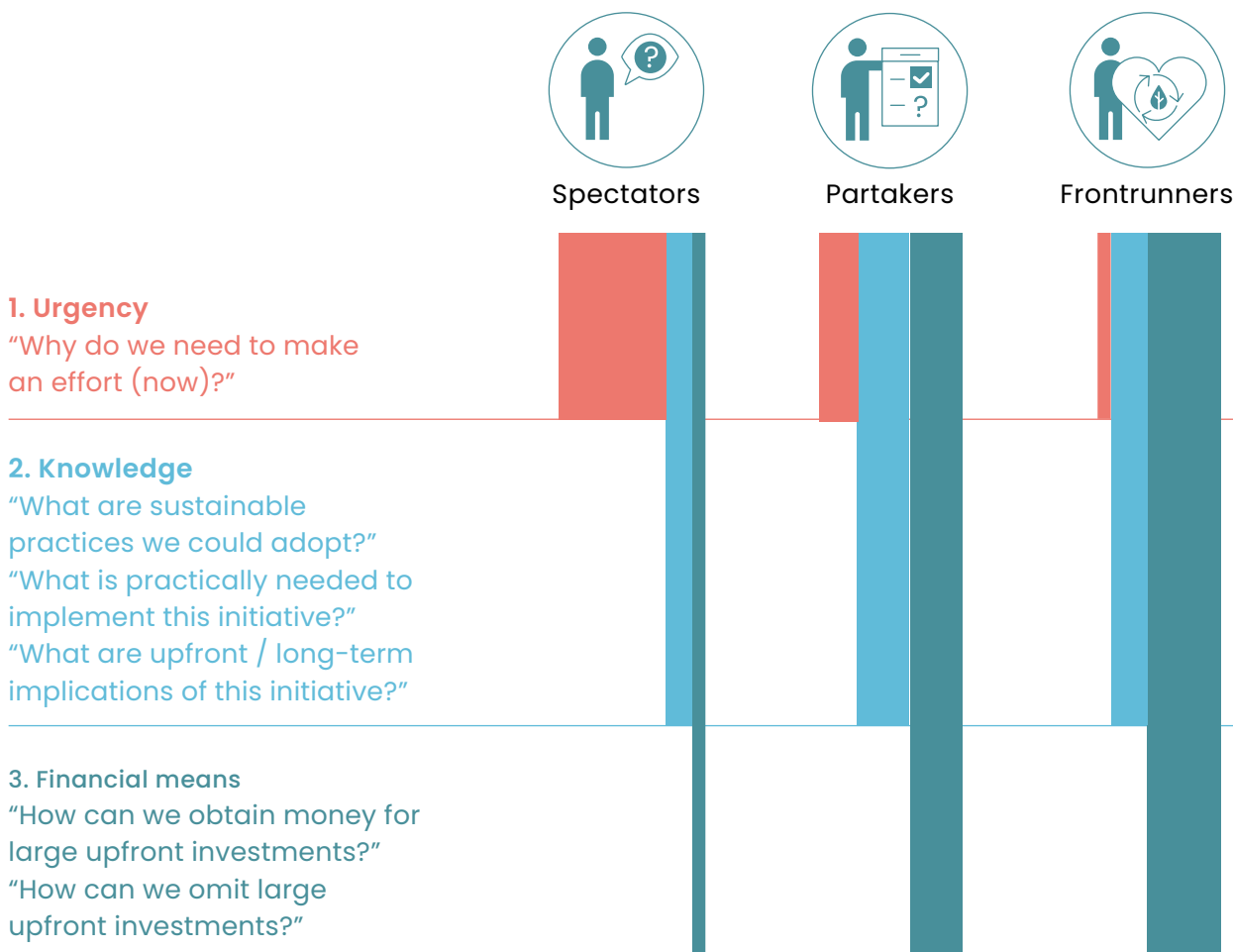
"Most hotels are happy when they reach a platinum level for some eco label. We go far beyond that point. It is fun to come up with new and more sustainable initiatives." 'Fronrunner' hotel, the Netherlands



existing barriers is crucial to accelerate overall decarbonisation efforts and to unlock the reduction of the remaining abatement potential.

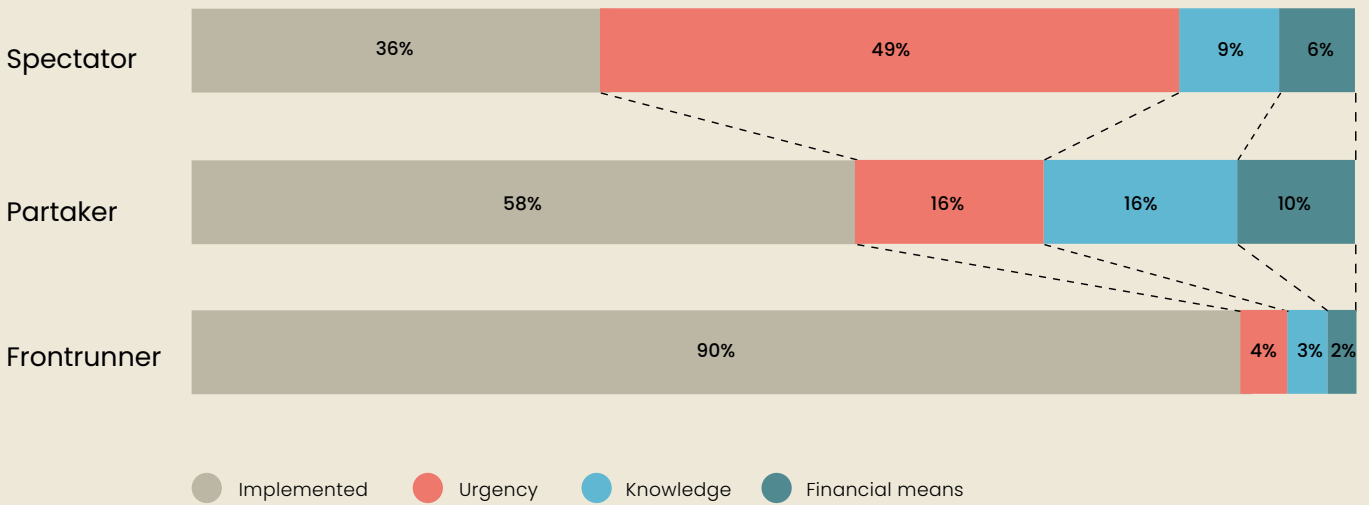
- Spectators do not yet feel the urge to make steps with respect to decarbonisation, see figure 25. A call to action and creating a sense of urgency (e.g. by showing the likely increase in energy prices in the future) will be the most direct lever to increase their levels of implementation.
- Partakers on the other hand, already want to make a larger effort. They especially run into the barriers of knowing what they can do and how to achieve this. Moreover, even if they are aware of the opportunities, the lack of resources might still hamper their actions.
- Lastly, even Frontrunners could benefit from external help. These accommodations are still incidentally limited by knowledge and/or resources.

Barriers to implementation by sustainability mindset [Figure 24]

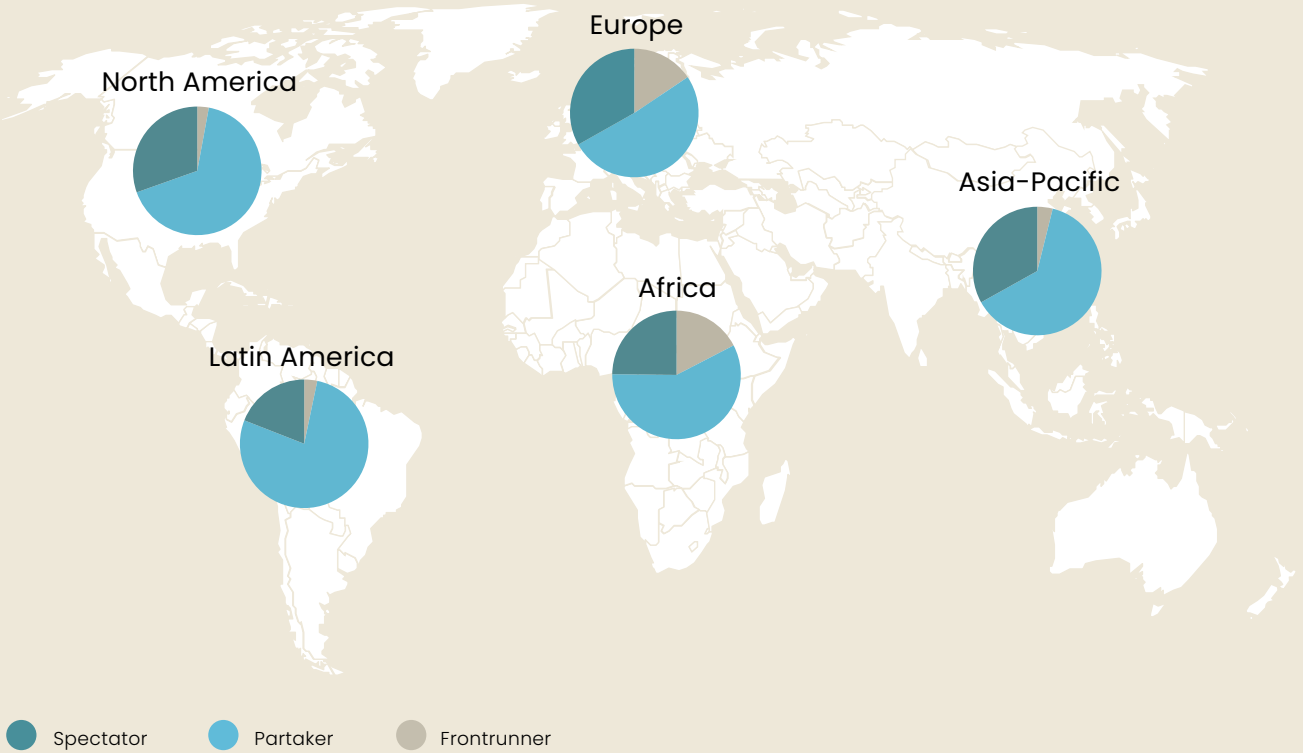




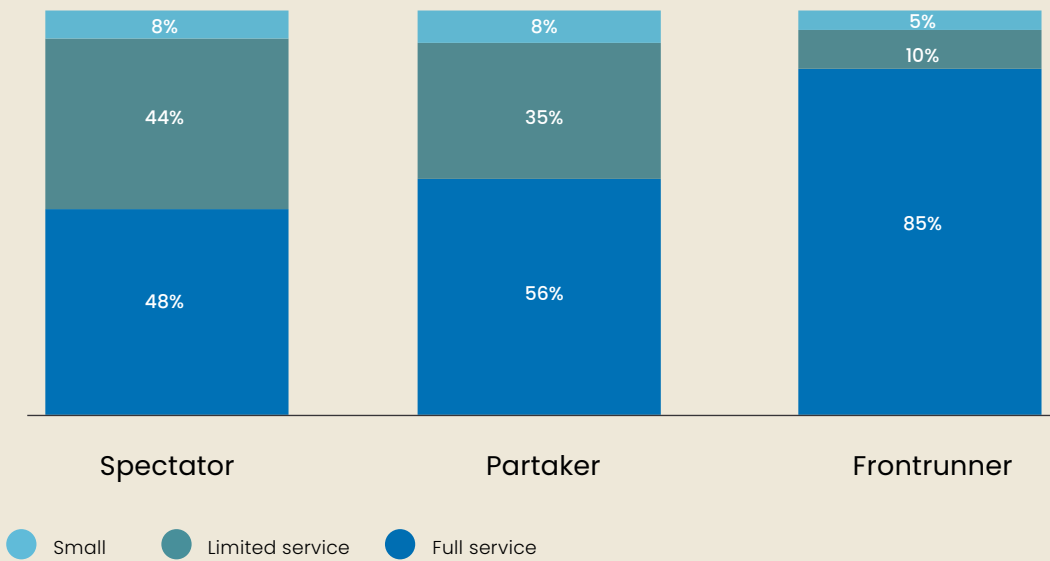
Adoption barriers by sustainability mindset
% of initiatives [Figure 25]



Regional spread of sustainability mindset
Share of rooms [Figure 26]



Adoption barriers by sustainability mindset
% of rooms [Figure 27]



Full transition pathway to achieve net zero ambition

As identified, accommodations can abate c. 15-20% of total GHG emissions by improving the efficiency of their infrastructure. In order to achieve net zero emissions, three remaining steps need to be taken: behavioural changes, so-called greenification of energy production and carbon offsets.



Behavioural changes

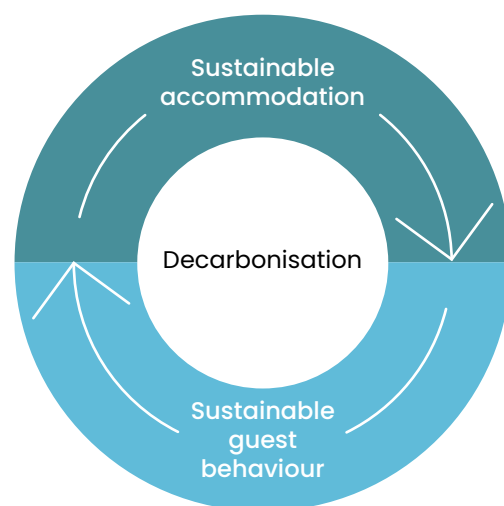
Accommodations can further reduce consumption of natural resources by stimulating behavioural changes among their guests and their own personnel. Human behaviour is not under accommodations' direct control, yet nudging can unlock significant GHG reductions.

Guest behaviour

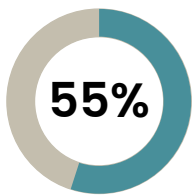
While consumers become increasingly aware of the need to avert climate change, their sustainable behaviour tends to cease during their travels. 33% of travellers indicate that they view vacations as a special time where they want to escape and relax, without thinking about sustainability [Source 13]. As such, habits like switching off lights when leaving a room and recycling are often left at home, which results in preventable emissions. Even though accommodations cannot directly control guest behaviour, they can try to positively influence it.

Changing guest behaviour is a particularly powerful tool as its effect is twofold. Firstly, and most obviously, emissions will be reduced directly when guests limit their energy consumption. Secondly, involving guests in sustainable practices initiates a mutually amplifying interplay between sustainable demand and supply. After all, when accommodations succeed in making sustainability an integrated part of travel, commercial relevance of sustainability in the accommodation sector will grow. This self-reinforcing mechanism will eventually drive overall sustainability adoption throughout the travel value chain.

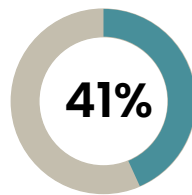
Flywheel of decarbonisation [Figure 28]



Guests can for example already be made aware ahead of bookings, by emphasising accommodations' sustainability initiatives on their listings. Furthermore, accommodations can actively educate travellers on sustainable practices



Room share of the accommodation sector in which staff is trained to adopt sustainable manners



Room share of the accommodation sector in which travellers are educated on sustainable behaviour

through environmental appeals. This outreach can be undertaken in many ways, for example by indicating the relevance of lowering/turning off the HVAC system and showing the impact of shorter showers. Such messages appeal to guests' voluntary cooperation. More persuasive influencing may be achieved through the addition of attractive incentives (e.g. free perks, discount on future stays). Nudging and attractive interventions regarding behaviour can have substantial impact, since the majority of travellers is indifferent or even resistant. For example, in the USA only 15% of travellers already have a pro-active sustainable behaviour pattern. 40% are indifferent, and are likely to adopt more sustainable manners upon being educated. More notably, a group of 45% resists sustainable behaviour when travelling, and is most likely only moved by incentives [Source 14].

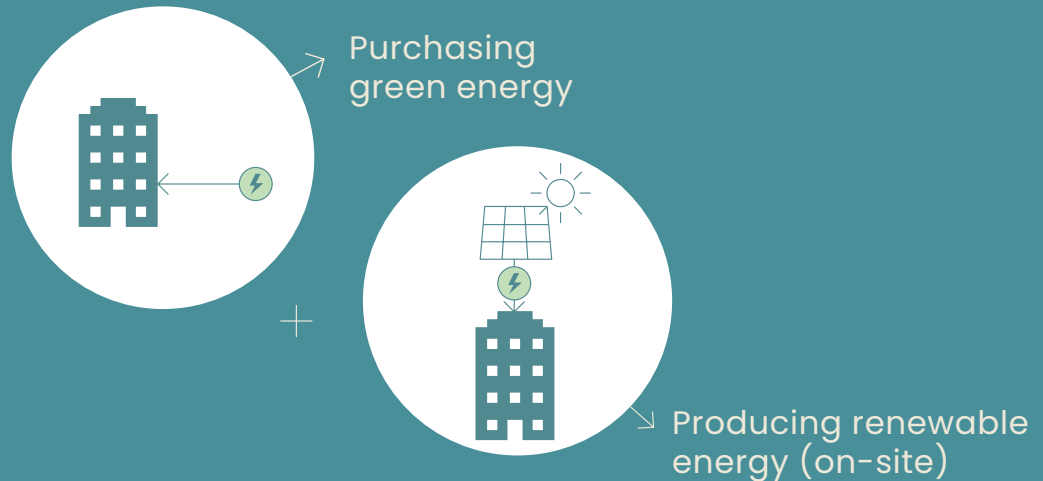
Staff behaviour

Not just the attitude of guests, but also staff behaviour affects the efficient consumption of natural resources. Accommodations can (more) actively educate staff

on how to reduce greenhouse gas emissions. Involving personnel – through brainstorm and/or sustainability committees – in efforts to decarbonise creates a shared responsibility. Furthermore, personnel could limit consumption of natural resources by, among other things, turning off lights and HVAC in vacant rooms, using kitchen appliances only when needed, and – perhaps most importantly – helping and supporting guests to behave sustainably. Furthermore, training staff to abide by sustainable practices is vital for the transition. In the end, many sustainable practices are as effective as the personnel applying them.

Although changing behaviour of guests and staff seems obvious, only half of the accommodations currently train their staff regarding energy saving practices. Full-service accommodations already do this a little more. Moreover, fewer than half the accommodations currently pro-actively inform their guests on ways to behave more sustainably. Accommodations typically lack the knowledge on how to effectively communicate this, without compromising guest comfort.

_ Green energy production options [Figure 29]



_ Greenification of energy production



Alongside optimising energy consumption, accommodations can further reduce GHG emissions by minimising their reliance on fossil fuels. This requires accommodations to transition to renewable energy sources, such as wind, solar and hydro energy. Adoption of green energy can be done directly, by local energy production; or indirectly, through procurement.

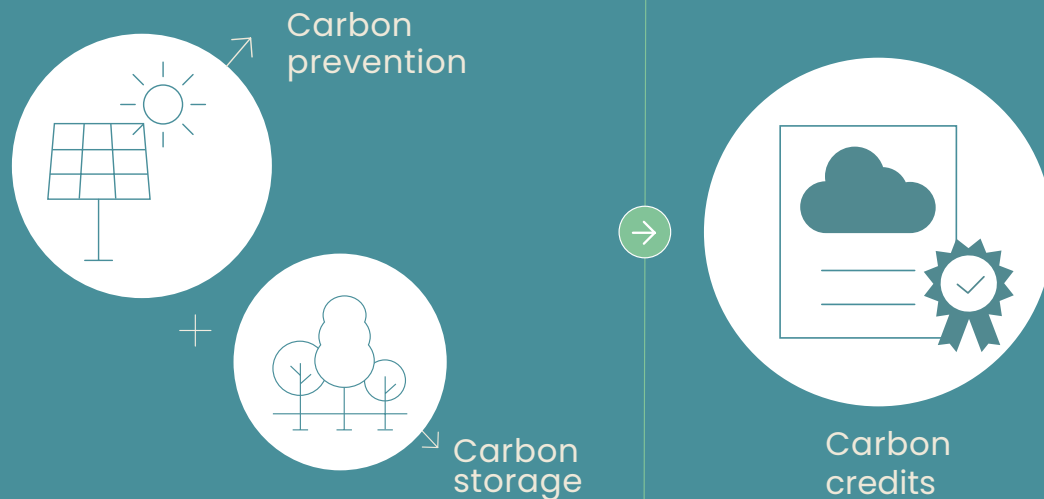
Local green energy production

Accommodations have the opportunity to generate their own renewable energy locally. Various options exist: on-site solar panels, wind turbines and heat pumps can be installed, but a stake in local solar/wind farms or even connecting to a grid at pre-existing farms can also be bought. So far, accommodations appear hesitant to adopt on-site installations. Payback periods of these installations depend on the local energy price, the technology employed, product characteristics, subsidy schemes and local climate conditions. In the illustrative case of solar panels, the typical payback period is roughly 10 years. If all accommodations were to place solar panels on their roof surface, they would – theoretically – produce a collective c.71TWh, abating an additional c. 33 Mt CO₂-eq, at an estimated investment of c. €141b [Source 12; 15]. Despite the generally positive business case, accommodations perceive the high upfront investment as the main barrier. It is not just financial attractiveness, but also a lack of (financial) knowledge that holds back accommodations from broader adoption. Yet, incentives – like leasing and loans – go a long way towards establishing local green energy production.

Procurement

Accommodations can also purchase renewable energy from the grid. The notion that the sector's emissions can be abated by procuring green energy from utility providers should however be handled with caution. After all, earmarking green energy production to a certain sector may seemingly decarbonise the sector in question, but does not provide a direct solution to global emissions. Eventually, increased demand for green energy does stimulate the market to greenify global energy production. To realise an actual difference in global emissions, production of green energy should be expanded and applied at a global level across all sectors. Moving the world to 100% renewable energy by 2050 would require a collective €63 trillion in upfront investments as recently published by Stanford University [Source 16]. In theory, this translates to c. €525b for the accommodation sector, to reduce the remaining c. 215Mt CO₂-eq (i.e. after adoption of all initiatives introduced in the previous chapter).

_ Carbon offset credits [Figure 30]



_ Carbon offsetting



Even after full implementation of available reduction measures, accommodations might still emit some greenhouse gases. Accommodations have the option to offset the remainder. However, supply is limited, and offsets should therefore be adopted moderately and as a last resort.

Carbon credits are regulated tradable certificates or permits representing the negation of one tonne of CO₂-eq. In essence, carbon credits aim to facilitate the reduction of GHG emissions by generating the opportunity to monetise. Credits can be created in two ways: either through prevention of or by storing emissions. Carbon prevention schemes typically fund projects/initiatives that reduce GHG emissions, such as updating power plants, improving energy efficiency of buildings and transport, etc, whereas carbon storage prevents emissions from entering the atmosphere. Storage can be done through biological, physical and chemical processes. For example, afforestation – establishing a forest in an area without previous tree cover – creates carbon credits, since trees function as carbon sinks and remove CO₂ from the atmosphere. Accommodations could partake in acquiring carbon credits and using these 'negative emissions' to neutralise their own.

Carbon offsets appear attractive as they are a relatively accessible way to limit GHG emissions. Knowledge and investment requirements are typically lower than for the implementation of carbon-saving measures and greenifying energy production. As an illustration, compensation for a year's energy consumption of a typical guest room would cost €330¹ [Source 9; 17]. However, the financial

attractiveness of this measure will rapidly decrease. Supply of carbon credits is becoming increasingly restricted and with a rising demand, prices are likely to surge. Despite their current appeal, carbon offset credits are currently hardly used in the accommodation sector; only 3% of accommodations indicate they procure such credits. These options at the moment still appear relatively unknown to most accommodations.



More importantly, despite their appeal, offsets should strictly be seen as (a small) part of the solution rather than the whole solution. They could be used during the transition phase, and in the long run only as a last resort. As the world searches for ways to reduce emissions, the limited supply of offsets can serve only to alleviate a certain share of that demand.

¹Based on 2021 price point of a European carbon credit.

Support from stakeholders to accelerate decarbonisation

The roadmap for accommodations towards net zero emissions is ambitious. External support is needed to accelerate the adoption of decarbonisation practices. All stakeholders of the accommodation sector, both public and private, can assist in overcoming barriers which have constrained decarbonisation until today.

The accommodation sector has a broad range of stakeholders who can influence an accommodation's decisions/operations and in particular assist in overcoming the barriers towards decarbonisation. Within an accommodation's value chain, these stakeholders include travellers, online distributors (OTAs), employees and local communities. Outside this ecosystem, it is possible to recognise other stakeholders, such as: governments, intergovernmental organisations (e.g. UN), NGOs, travel and tourism associations, creditors and sustainability advisors (e.g. consultancy firms, certification agencies, research institutes). Each of these stakeholders has their own specific set of resources, capabilities and core competencies, which can facilitate the decarbonisation of the accommodation sector.

As mentioned previously, accommodations can perceive multiple barriers to achieving net zero emissions, namely: a lack of urgency, a lack of knowledge and access to financing. It is important to realise that barriers might differ by specific initiative.

To support accommodations in overcoming these barriers, stakeholders can:

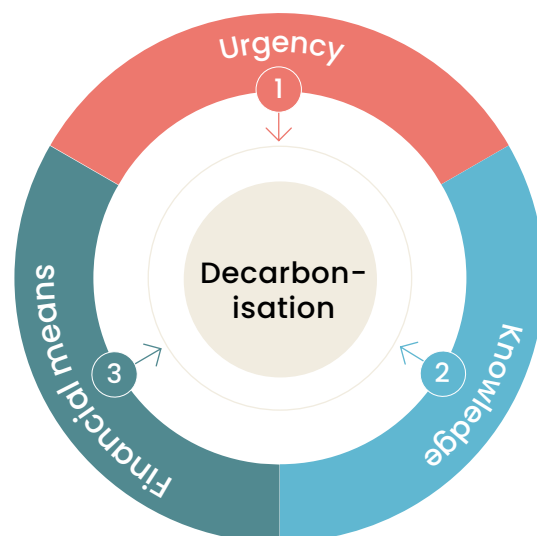
- **Create a sense of urgency** by raising awareness on the need for decarbonisation or incentivising the adoption of carbon-saving measures

- **Close the knowledge gap of accommodations** by improving the quality and availability of data, and promoting information sharing

- **Facilitate the investments needed for accommodations to decarbonise** by enhancing the availability and mobilisation of financing

For a summary of potential actions by stakeholder, see figure 33.

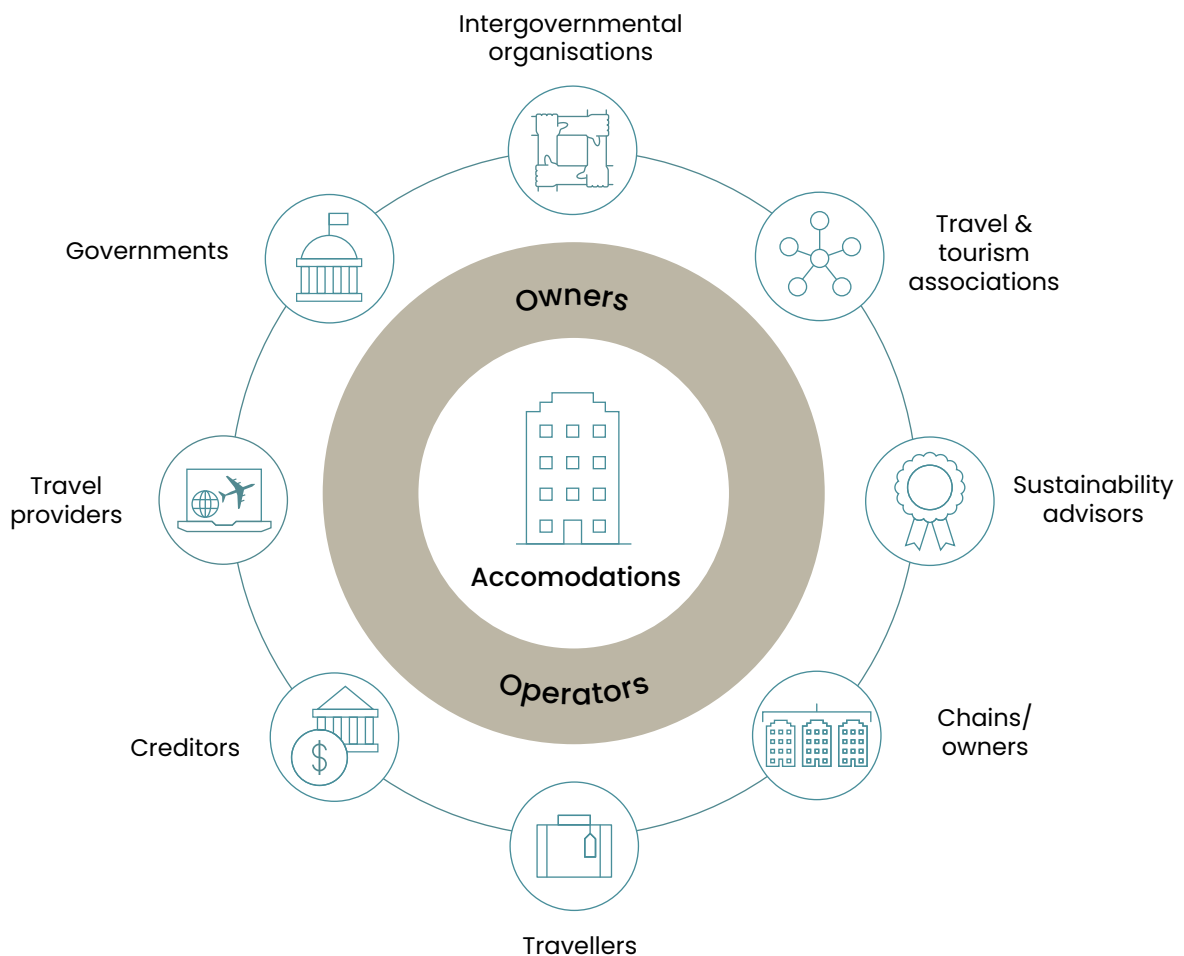
— **Main barriers to overcome** [Figure 31]



Bridging the gap between property owners and operators

Decisions impacting property real estate might fall under a different responsibility than day-to-day operations. If owners and operators are different parties, alignment of goals can vary, driven by different sources of income and risk. Implementation of sustainable and decarbonisation practices becomes more challenging, with potentially conflicting underlying goals and agendas. To successfully decarbonise the accommodation sector, external stakeholders need to align accommodation owners and operators under a common objective. Greater goal alignment will likely produce a more consistent and effective set of decisions with regards to decarbonisation.

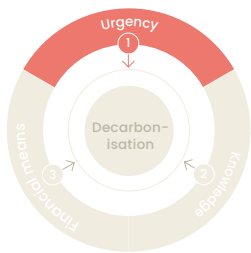
Stakeholders' overview of accommodation sector [Figure 32]



__ Create sense of urgency for accommodations to decarbonise

Lack of urgency is still a limitation for most accommodations on their way to achieving net zero emissions. In particular for Spectators – see figure 23 for an overview of the different sustainability mindsets –, it is the key barrier as they tend to focus on other priorities. Somewhat surprisingly, even Partakers and Frontrunners can still benefit from support with respect to raising urgency for the initiatives they have not yet implemented. They have overcome this barrier, evidenced by their past efforts, but need additional support with the next initiatives.

Lack of urgency is a dominant barrier that accommodations can hardly be expected to overcome without help. When indicating that urgency is a limiting factor to adopt a practice, a staggering 78% of accommodations state that ‘nothing’ could persuade them to adopt, even when the practice in question is relevant to reducing their business’ emissions. To defy this strong mindset, stakeholders may employ increased awareness, incentivisation and constraints.



To create a sense of urgency, stakeholders can:

- Raise awareness on the need for decarbonisation by increasing media coverage of climate change and by setting explicit decarbonisation goals for accommodations

To start with, raising awareness about the need for decarbonisation can be achieved by increasing coverage of climate change and its impacts, often pursued via the media and outreach campaigns. Ultimately, every single person or institution can assist in generating awareness for a specific cause and in particular place efforts towards the promotion of sustainable travel. Governments can for example play a role in developing public awareness campaigns. In parallel, climate-focused NGOs, tourism associations, sustainability advisors, public personalities and the media industry can act as partners for outreach efforts, by creating content and sharing this content through targeted channels to reach accommodations. Examples include global climate strike movements or documentaries on global warming. The need for decarbonisation can be strengthened by setting explicit goals for the accommodation sector. Also in the direct ecosystem, accommodation owners/chain management can create urgency by promoting sustainable travel and setting goals as well as travellers, who communicate efforts through their own behaviour. On a (supra)national level, governments should put in place a clear and time-defined roadmap to achieve net zero emissions. This endeavour can be reinforced by tourism associations, that can show support for government goals by providing short-term milestones to accommodations.

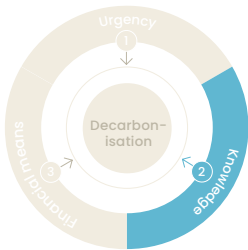
- Incentivise the adoption of carbon-saving measures by stimulating the willingness of guests to travel sustainably, improving the transparency of an accommodation’s sustainable efforts and offering preferential treatment to sustainable accommodations

The urgency to decarbonise can further be passed on to accommodations through commercial incentives. First, the need can be bolstered by guests, who become increasingly aware of climate change, thereby increasing their willingness to travel sustainably [Source 18]. This makes it commercially crucial for accommodations to decarbonise in

order to remain competitive. Business travellers sometimes already introduce this metric as a selection criterion, therewith disqualifying specific Spectating and Partaking accommodations. Furthermore, decarbonisation can be incentivised by improving transparency regarding sustainable accommodations, thereby driving additional guest bookings. Until now, 41% of travellers indicate they do not know how to find sustainable travel options [Source 13]. Online travel agencies (OTAs) and tourism sites can remedy this by introducing sustainability search filters. Moreover, OTAs and tourism sites can make an accommodation's sustainability efforts more transparent by adopting sustainability labels and listing descriptions.

_ Close the knowledge gap of accommodations

Partakers – and, to a lesser extent, Frontrunners – often mention their lack of knowledge as a barrier to decarbonisation. They see the need and urgency of decarbonisation, but lack the knowledge to some degree. Partakers in particular would benefit from knowing more about the available decarbonisation options, understanding the (financial) implications, and how to potentially prioritise these initiatives in order to take the next step in the transition.



To bridge the knowledge gap of accommodations, stakeholders can:

- **Improve data availability and quality with regards to decarbonisation**

A necessary step towards addressing accommodations' knowledge barrier will be to increase information and data quality. Specific areas are still underdeveloped and might be deemed relevant for accommodations in their decision-making process, especially when it comes to the technical characteristics and commercial viability of the various carbon-saving options. Research by intergovernmental organisations, climate-focused NGOs, governments, sustainability advisors, travel and tourism associations, and travel providers can help produce detailed results and recommendations for specific countries.

- **Increase information accessibility and distribution, by making it freely available (online) and through campaigns, conferences/training sessions and best-practice sharing across the sector**

To further close the accommodation sector's knowledge gap, it is necessary to make information and data freely accessible and available to those accommodations seeking it. First, travel and tourism associations, travel providers and specific accommodation groups/chains could remedy this by creating a centralised platform which serves to identify the main programmes and funding options available for accommodations to decarbonise. The French Chamber of Commerce has developed such a tool, through which it offers personalised advice based on an accommodation's location, proposed project and support needs [Source 19].

Furthermore, information targeted to decarbonisation in the accommodation sector should remain in the public domain. Libraries, archives and government offices should make relevant documents accessible without restriction.

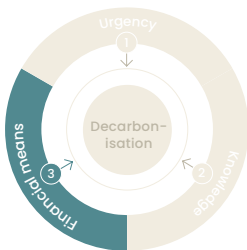
Even if knowledge is present and available, not everyone is aware of it, or can easily access it. Continuous activation of relevant materials can be of support to accommodations.

Typically, tourism associations can launch campaigns and schedule training sessions/conferences on the mitigation strategies available to accommodations. As an example, the German Hotel and Restaurant Association uses such campaigns to offer guidance, on-site consulting services and workshops to the accommodation sector [Source 19].

Finally, accommodations themselves also have a hand in driving knowledge distribution. Strengthening feedback loops and best practice sharing across peers or within their ownership structure and taking a pro-active stance in facilitating such knowledge sharing could prove useful for other accommodations to gain practical insights.

Facilitating the investments needed to decarbonise

The last barrier is access to and support with financial means. This barrier is mainly relevant for Partakers and Frontrunners. They typically have the motivation and knowledge to implement initiatives, but are sometimes limited due to the large upfront investments. These investments are particularly hefty when accommodations improve their building structure and equipment. On top of the relatively large investment, temporary accommodation closure can lead to missing revenues. When means are the limiting factor for accommodations to implement initiatives, accommodations indicate that especially subsidies (78%) could trigger them vs. loans (22%).



To ease the investments needed for accommodations to decarbonise, stakeholders can:










- Improve the financial attractiveness of decarbonisation through grants or subsidies

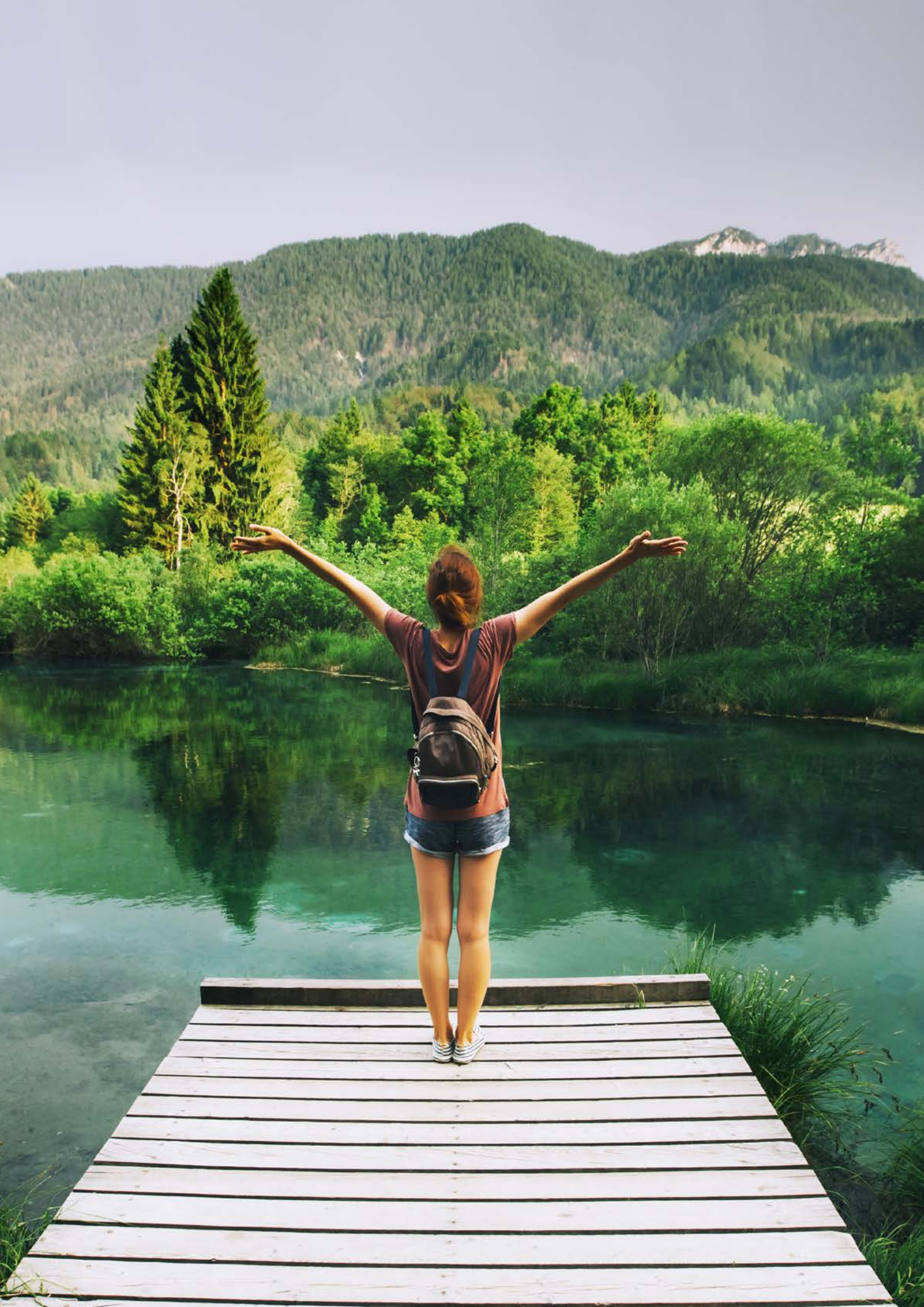
Implementing decarbonisation practices typically requires upfront investments. Governments can play a vital role in unlocking profitable investments, which banks currently are unwilling to finance given the long-term investment for especially (smaller) properties. Governments can alleviate all or part of this financial burden by offering grants or subsidies to accommodations. Such incentives can also be offered in the form of taxation, both as a bonus or a malus initiative.

- Promote investments in decarbonisation by developing credit (e.g. loans) activities

Governments and financing institutions (e.g. banks) can also spread the upfront financial burden associated with decarbonisation, enabling longer and more-than-market-attractive repayment terms. This is achieved through long-term loans targeted to sustainable development, on-site renewables and green tourism accreditations. Such loans could offer advantageous interest rates for sustainable development. As an example, Triodos Bank offers loans targeted to sustainable development, with interest rate discounts linked to the level of environmental certification achieved [Source 19]. Finally, when an accommodation has an overarching ownership structure, financial requirements for investments are often more stringent. A relaxation of these investment requests when it comes to sustainable development can also provide further support.

_ Opportunities to support by stakeholder [Figure 33]

	1. Urgency	2. Knowledge	3. Financial means
 Intergovernmental organisations	<ul style="list-style-type: none"> • Launch public awareness campaigns • Define transition ambitions and goals • Provide (global) platform 	<ul style="list-style-type: none"> • Contribute to research into sustainability • Improve information availability 	
 Governments	<ul style="list-style-type: none"> • Launch national awareness campaigns • Define national roadmap for decarbonisation 	<ul style="list-style-type: none"> • Contribute to research into sustainability • Improve information availability 	<ul style="list-style-type: none"> • Introduce sustainability related taxation • Offer grants and subsidies • Offer attractive financial structures
 Travel & tourism associations	<ul style="list-style-type: none"> • Promote sustainable travel & tourism • Define (sub)sector-specific decarbonisation roadmap 	<ul style="list-style-type: none"> • Contribute to research into sustainability • Create a central knowledge platform • Enable information sharing across sector(s) 	
 Travel providers (e.g. OTAs)	<ul style="list-style-type: none"> • Promote sustainable travel • Improve transparency of sustainability efforts 	<ul style="list-style-type: none"> • Create a central knowledge platform • Enable information sharing across accommodations 	
 Sustainability advisors	<ul style="list-style-type: none"> • Support public awareness campaigns 	<ul style="list-style-type: none"> • Contribute to research into sustainability • Partner with accommodations and other stakeholders 	
 Creditors		<ul style="list-style-type: none"> • Improve financial information availability • 	<ul style="list-style-type: none"> • Offer attractive financial structures
 Chains / owners	<ul style="list-style-type: none"> • Promote sustainable travel • Set sustainability targets for affiliated accommodations 	<ul style="list-style-type: none"> • Become the industry standard • Create a knowledge platform • Enable information sharing across accommodations 	<ul style="list-style-type: none"> • Relax financial requirements
 Accommodations	<ul style="list-style-type: none"> • Promote sustainable travel 	<ul style="list-style-type: none"> • Share knowledge and best practices among peers 	
 Travellers	<ul style="list-style-type: none"> • Propagate sustainable travel 		



The way ahead

Climate change is – and will remain – one of the most pressing challenges of our time. Urgency will only further increase if no immediate and substantial action is taken by all market players. As a relevant contributor to climate change, the accommodation sector has a vital role to play in the effort to decarbonise. The tourism sector is expected to bounce back after the COVID-19 crisis to historic (growth) levels. As such, it is crucial to take all possible measures now to prevent the growth of this thriving market to be translated into more GHG emissions. The aim towards net zero emissions is in line with global ambitions and this study showcases how accommodations themselves can intensify their current efforts, and how stakeholders can support and accelerate this relevant transition.

Despite the focus on decarbonisation in this report – as well as of global policymakers –, the broader importance of sustainability should not be forgotten. There are many more aspects, such as local employment, overtourism and environmental preservation, which will become increasingly pressing over the coming decades. Accommodations already indicate that sustainability for them goes much further than ‘just’ decarbonisation and support this by a wide variety of actions. However, in line with decar-

bonisation, more can and needs to be done. And a relatively large share of accommodations is still in reactive mode as far as its behaviour is concerned. It is important that sufficient time and effort is also invested in these topics to reinforce the accommodation sector and its stakeholders on the different playing fields of sustainability.

On the other hand, this transition will also be pushed by changing consumer behaviour. Consumers play an important role with respect to pushing sustainability and decarbonisation in the accommodation sector. Awareness and demand for sustainable travel is anticipated to grow further. Younger generations in particular will influence the future mix of travellers, inherently placing more emphasis on ESG topics. This enhanced demand will ultimately translate into commercial impact. Accommodations will more often be (de-)selected on the basis of their commitment to these issues. This will not only apply to accommodations, but it will resonate throughout the travel value chain. Consumers may well shift transport mode and even prefer specific destinations to others. It will further increase the urgency for accommodations and other travel providers to prioritise sustainability as a matter of policy and principle.

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— Glossary

ACC:	Abatement Cost Curve
Accommodation:	A room, group of rooms, or building in which guests can stay overnight
APAC:	Asia-Pacific
Archetype:	Segmentation of accommodations (Small, Limited service and Full service)
CO ₂ :	Carbon Dioxide
CO ₂ -eq:	Carbon Dioxide equivalents
ESG:	Environmental, Social, and Governance
GDP:	Gross Domestic Product
GHG:	Greenhouse Gas
HVAC:	Heating, Ventilation, and Air Conditioning
kWh:	Kilowatt Hour
LATAM:	Latin America
Mt:	Megaton (1,000,000 tonnes)
NGO:	Non-Governmental Organisation
OTA:	Online Travel Agency
Tonne:	1,000 kg
TWh:	Terawatt-hour (1,000,000,000 kWh)



_ Want to know more?

We are happy to provide more information about our experience in each of these areas and look forward to supporting management teams and investors in addressing the strategic challenges and opportunities within the travel and tourism sector.



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