NET ZERO METHODOLOGY FOR HOTELS
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GREENVIEW

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INTRODUCTION

Net zero is becoming a real business need and trend, championed by the investor community and embraced by companies and governments around the world. However, net zero is somewhat still conceptual, and constantly evolving. Dozens of different initiatives exist already with their own respective methodologies, and ultimately the technical aspects of net-zero claims and approaches will be determined more specifically by industry and type of business model.

This joint initiative between Tourism Declares, Greenview, the World Travel & Tourism Council, the Pacific Asia Travel Association and the Sustainable Hospitality Alliance aims to define this for the broader benefit of the hotel industry as well as travel and tourism.

Specifically, this methodology has been developed to support hotels and the wider hotel industry as they seek to make net-zero commitments and take action to achieve them. It sets out a recommended approach which is relevant for hotel companies of any size, but can be adapted as necessary to align with specific requirements of individual companies.

OBJECTIVES OF THE METHODOLOGY

1. **Serve as the referential methodology** that can be used by all stakeholders in the tourism value chain when addressing net zero in developing, owning, operating, franchising, booking, and staying in hotels, recognizing that multiple entities will ultimately be responsible for decarbonizing the same sources of emissions.
2. **Define both the default boundaries and parameters** for how hotel companies and hotel properties can quantifiably achieve net zero as well as interim progress milestones, including the defined Scope 3 (value chain) emissions boundary for a hotel owner or operator of any size, from individual properties to larger chains.
3. **Define a common approach, including roles and responsibilities**, for addressing and accounting for the overlap of purchased renewable energy and carbon offsets for a hotel property as it affects the hotel owner, hotel operator, hotel franchisor, travel buyer, travel intermediary, and destination across aspects of Scope 1, 2, (operational and financial control) and 3 (purchased goods & services, business travel, franchised properties).
4. **Serve as a resource** for supporting applications, planning, and disclosures necessary for entities using general frameworks such as SBTi, SME Climate Hub, and the Glasgow Declaration by providing specific context, approach and rationale for decarbonization of hotels and hotel companies and itemized alignment with them.

> **THIS METHODOLOGY PROVIDES SPECIFIC GUIDANCE IN THE FOLLOWING AREAS TO HELP SET A NET-ZERO COMMITMENT:**
> - Setting a baseline from which to pursue a net-zero target
> - Establishing the boundary of emissions that hotels should address over time as part of the baseline and target
> - Establishing default categories for planning a net-zero pathway, with milestones to achieve at 5-year interval yardstick years
> - Understanding how the hotel's emissions will relate to the wider value chain of tourism and real estate
> - Commencing the net-zero planning for a commitment.

Several appendices are provided as resources for practitioners, stakeholders, and the net-zero community.

The methodology was developed in a joint initiative between Tourism Declares, Greenview, the Pacific Asia Travel Association (PATA), Sustainable Hospitality Alliance and the World Travel & Tourism Council (WTTC) and supported by an Advisory Group of experts[1] from hotel companies around the world, with broad stakeholder consultation[2]. This First Edition of the Net Zero Methodology for Hotels incorporates input and feedback from these groups. As with all nascent environmental, social and governance (ESG)-related frameworks, further iterations and evolution is expected as net zero also evolves, with an update expected to come prior to 2025.

> **A carbon neutral trip or hotel stay vs net zero**
>
> This methodology seeks to address a hotel or organization approach to pursuing a net-zero pathway, a long-term pathway that will require significant efforts for a hotel to achieve. It does not seek to define what is a 'carbon neutral hotel stay' or 'carbon neutral trip'. Although such products are offered, no common definition or criteria exist which has been specifically developed and adopted by the industry at large for a hotel stay, and as such claims are difficult to regulate or certify across the industry. Further work needs to be undertaken to identify the parameters of these claims, and differentiation should be noted between the possibility of the instance of a particular hotel stay being carbon neutral, vs a hotel or hotel company being entirely net zero. Further guidance on how to measure the carbon footprint of a hotel stay for offsetting or Scope 3 accounting purposes can be found in Section 5, and tools for support are listed in Appendix J.

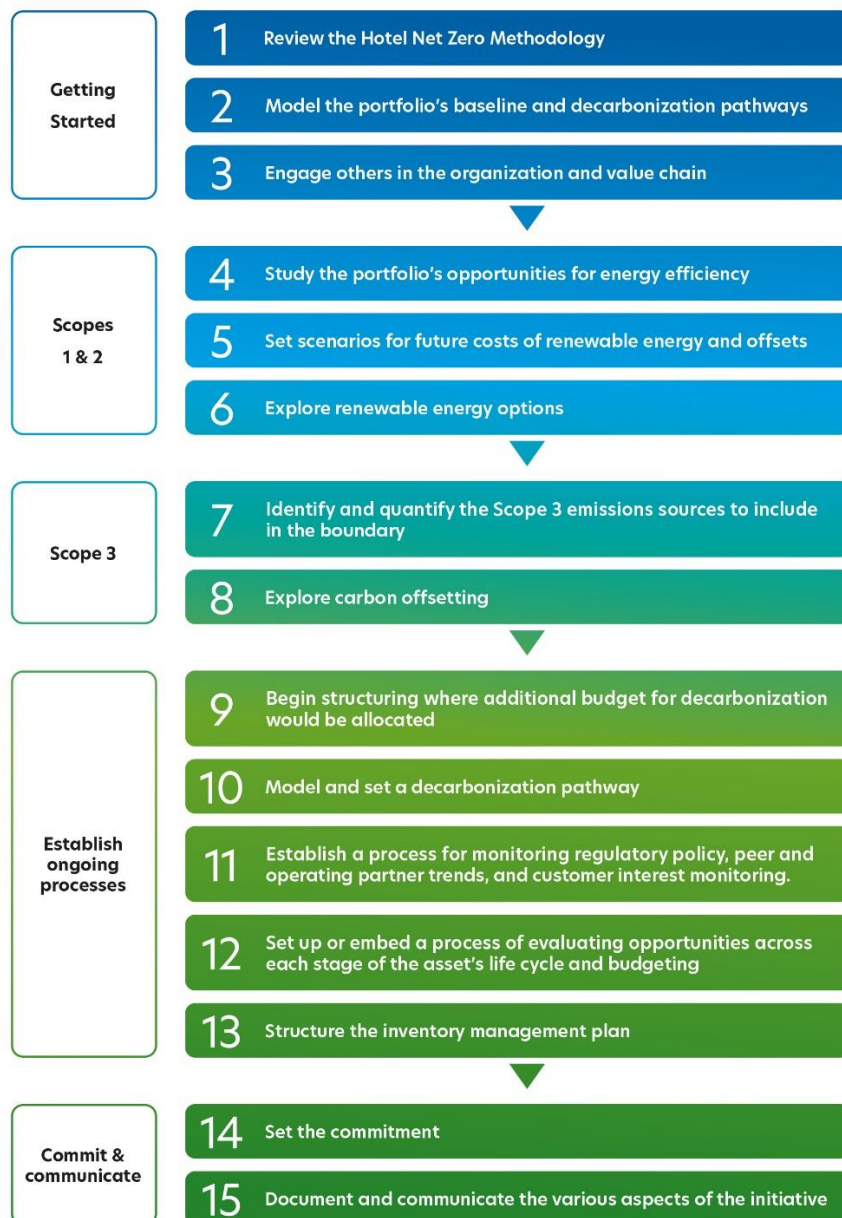[1] See Appendix M for list of Advisory Group Members.
[2] See Appendix M for list of groups who responded to the industry consultation.

IMPLEMENTING THE METHODOLOGY

This Net Zero Methodology for Hotels is intended to provide comprehensive guidance on how a hotel company should approach setting their net zero pathway with full discussion and rationale for suggestions made and decisions to be taken. The appendices provide further detailed information and guidance on key topics which are referred to in the methodology and which will need to be addressed as the net-zero process is undertaken.

In order to operationalize the methodology, an accompanying 'Practical Guide to Getting Started' has been produced. This guide sets out the steps to be taken once the methodology has been reviewed and digested, to model the pathway, obtain buy-in from stakeholders, address Scope 1, 2 and 3 emissions, establish ongoing processes, and then make and publicise the commitment. Figure 1 provides an overview of these steps.

Figure 1: Overview of steps in 'Practical Guide to Getting Started'

Getting Started
1. Review the Hotel Net Zero Methodology
2. Model the portfolio's baseline and decarbonization pathways
3. Engage others in the organization and value chain

Scopes 1 & 2
4. Study the portfolio's opportunities for energy efficiency
5. Set scenarios for future costs of renewable energy and offsets
6. Explore renewable energy options

Scope 3
7. Identify and quantify the Scope 3 emissions sources to include in the boundary
8. Explore carbon offsetting

Establish ongoing processes
9. Begin structuring where additional budget for decarbonization would be allocated
10. Model and set a decarbonization pathway
11. Establish a process for monitoring regulatory policy, peer and operating partner trends, and customer interest monitoring.
12. Set up or embed a process of evaluating opportunities across each stage of the asset's life cycle and budgeting
13. Structure the inventory management plan

Commit & communicate
14. Set the commitment
15. Document and communicate the various aspects of the initiative

SECTION 1: HOTEL BASELINE AND TARGET

1.1   UNDERSTANDING THE BASELINE

Net zero is a type of *emissions reduction target* (or *carbon target)* to achieve. The concept of carbon targets is not new, with many hotel companies having first set targets over a decade ago. Setting carbon targets starts with the concept of a **baseline value[3]** against which progress can be measured over time. While the concept of a "baseline" was originally intended to develop scenarios, including a "business-as-usual" scenario with no mitigation measures vs. other scenarios with action to achieve reductions, in common practice and use in frameworks the *baseline* typically consists of a year and its corresponding carbon emissions, from which progress will be measured going forward. In these earlier times of setting carbon targets, the focus was on merely having one to demonstrate a credible approach to climate change, addressing it similarly to how other financial targets were set as part of good business. Carbon targets were set managerially, where the company would evaluate and arrive at a percentage of carbon reduction it could achieve over a specific period via good management and implementation of best practice. Baseline and target years were also not standardized, as companies could choose any year for the baseline and any year for the target, or a series of years to demarcate interim targets toward a final target year.

With the advent of science-based targets and global climate agreements, expectations increased to view setting a safe, managerially attainable carbon target as insufficient, unless the target was aligned with the level of decarbonization required to meet the science of climate change mitigation. Figures were derived from the IPCC reports and agreements set forth in the Paris Agreement on the 2-degree scenario[4], which were translated into industry terms by frameworks such as the Sectoral Decarbonization Approach (SDA) that standardized carbon budgets and reduction from a 2010 baseline, and the International Energy Agency (IEA)'s Energy Technology Perspectives that modeled from a 2014 baseline.

The Science Based Targets initiative (SBTi) set a framework for corporate target-setting, whereby the baseline needed to be modeled or adapted from 2010 figures, target years needed to be between 5 and 15 years from the baseline, and percentage reduction aligned with the corresponding sector's decarbonization pathway towards 2050. This required more complex modeling and definition of the boundary of emissions to define the baseline and target. More importantly, it implied increased internal analysis and buy-in for committing to significant systemic shifts in operations and investments that would be needed to achieve such an ambitious target that was not easily attainable by business-as-usual practices.

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[3] Baseline value refers to the value against which change is measured. 'Baseline scenarios' are based on the assumption that no additional policies/measures will be implemented beyond those that are already in force and/or planned. They are counterfactual constructions that help highlight the level of emissions that would occur without further mitigation effort. Other terms that are often used interchangeably include 'reference scenario', 'no policy scenario', and 'business as usual (BAU) scenario'. However, the term 'BAU' is no longer preferred due to the difficulties in projecting century-long socioeconomic circumstances. While baseline measurements are a fundamental part of science, emission baselines were mainstreamed by global agreements such as the 1997 Kyoto Protocol which uses emission data from 1990 as the baseline value.
[4] The 2-degree scenario is widely accepted as the limitation to global average temperature growth to prevent significant changes to the planet. One of the goals of the 2015 Paris Agreement is to limit global average temperature to well below 2°C above pre-industrial levels, and to pursue efforts to limit temperature increase to 1.5°C.

Setting a pathway for hotels to align with the Paris Agreement

While the movement towards 'net zero' has evolved over the past year, the hotel sector first tackled decarbonization at the industry level through The *Global Hotel Decarbonization Report*[5] which was published by the Sustainable Hospitality Alliance (formerly International Tourism Partnership) in 2017. The report states that in order to keep pace with the requirements of a 2-degree scenario, and taking into account the industry's growth trajectory, the global hotel industry will need to reduce its Greenhouse Gas (GHG) emissions per room per year by 66% from 2010 levels by 2030 and by 90% by 2050. Since the publication of this document, a number of hotel companies have set science based targets and others have announced net-zero commitments. In addition, Tourism Declares a Climate Emergency was launched in 2020 as a campaign to galvanize support from the tourism sector, including hotels, for setting reduction targets in line with the Paris Agreement. As a further development the Glasgow Declaration on Climate Action in Tourism was launched in November 2021.

With the advent of net zero, the objective is more straightforward: **zero carbon emissions**, achieved by keeping emissions to an absolute minimum, and addressing the remainder via removals and offsets. The target year is also clear: 2050 planet-wide at the absolute latest, and as early as possible with 2040 being an accepted organizational-level goal[6]. While the ultimate goal is essentially 100% reduction from a baseline, setting a baseline year is necessary to track progress toward the target over time as well as to benchmark performance.

This section sets out the issues which should be addressed when determining a baseline.

1.1.1 Setting a Baseline Year

Companies tend to choose a baseline year that allows them to show most progress. This may include:

- A particularly good year for business, where emissions are higher due to high occupancy and consumption.
- A year prior to a period when a company may have made several strides in improving energy efficiency via investment and operating procedures to a portfolio, so that this progress can be represented.
- Consideration of the external change in electric power grid factors of GHG emissions which may be much more favorable if they are captured over a period of time.

As net zero is commonly discussed as a "percentage reduction towards net zero" with a rule-of-thumb interim target of "halving emissions by 2030"[7], it is more advantageous for a typical hotel or portfolio to set as early a baseline year as possible. Conversely, when frameworks are structured in terms of annual absolute reductions from a baseline year, it is more advantageous to set the latest

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[5] Global Hotel Decarbonization Report is available from www.sustainablehospitalityalliance.org
[6] Per the UN Race to Zero criteria
[7] According to the 2018 IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels, global carbon emissions would need to fall by about 45% from 2010 levels by 2030 to limit warming to 1.5°C. This has since been accepted as a pathway to net zero by 2050.

baseline year possible. Finally, changes in frameworks and expectations can cause the need to modify the baseline year or set multiple years for different frameworks.

To provide guidance and simplify for comparison, for this methodology an organization can use its existing baseline or choose any baseline year "best fit", which is classified into one of the following periods:

- **OG[8] Baseline** – a year prior to 2012, when many of the early adopters and large corporations had set baselines and started working toward targets, but which did not typically envision long-term decarbonization[9] aligned with the science of climate change.
- **Prior Baseline** – a year between 2012 and 2019, when more companies started quantifying carbon emissions and pursuing targets once better data became available, generally prior to or around COP26.
- **Recent Baseline** – any year after 2020, when the Glasgow Declaration, this methodology with interim yardsticks, and stakeholder expectations for net zero are already in place and the entity will need to demonstrate progress immediately. This category is for newer hotels, new organizations, and those with difficulty obtaining quality data prior to 2020. Note that 2020 and 2021 are challenging as baseline years due to the effects of COVID-19, which may negatively skew performance thresholds when compared with future years.

Depending on which year is set, the methodology sets out more specific expectations for percentage progress toward net zero in section 2. However, as a benefit of the net-zero concept, many of the yardsticks and ultimate goals are the same regardless of baseline year.

1.1.2. Absolute vs. Intensity Targets

For the purposes of net zero for hotels, the baseline should be communicated at a minimum in an intensity figure as well as an absolute figure for both individual hotels and for portfolios of hotels. Progress should be measured and communicated alongside the intensity reductions and corresponding percentage progress toward net zero so that the actual footprint can be analyzed and compared. In presenting both sets of figures, progress will be transparently reported, comparison can be made, and industry practitioners and relevant stakeholders can best relate and understand performance. Utilizing both will also mitigate against fluctuations in expectations from existing and yet-to-be-established initiatives, in terms of which is acceptable.

1.1.3 Intensity Metrics

The intensity metric of floor area, expressed in $kgCO_2e/SqM$, should be used for Scope 1 & 2 emissions as well as those directly relating to the building and the aggregate of all sources. Scope 3 emissions that are driven more directly by occupancy or by other factors may use additional metrics.

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[8] Old Guard Baseline

[9] Long-term decarbonization refers to a strategy with a long time horizon towards 2050. Such strategies are needed to achieve the Paris Agreement goal of limiting global average temperature to well below 2°C and preferably 1.5°C relative to pre-industrial levels. To do so, there is scientific consensus that carbon emissions have to be reduced by half by 2030 and reach net zero by 2050.

Hotels may choose to use to utilize additional metrics of intensity to track and portray progress that is seen as more relevant for comparison among peers and over time. Examples of these are intensity metrics per square foot, per occupied room, per available room, per room, per guest night, per dollar of total revenue, and per daily rate. The floor area intensity metric is preferable for being consistent with common practice in real estate, alignment with the intensity metrics designated for service buildings in the Sectoral Decarbonization Approach, and demonstrative of the largest driver of carbon emissions over time (growth in the floor area of a portfolio).

1.1.4. Changes in the Baseline

For a single hotel, the baseline may need to be changed if the hotel undergoes a structural change that will skew its perception of progress, for example a renovation adding an additional wing of guestrooms, meeting space, or restaurant. Some changes will also greatly affect the carbon footprint of the building such as outsourcing laundry or switching to onsite combined heat and power cogeneration. However, with net zero the goal is still the same, so the hotel can adjust its baseline accordingly, but the target year or yardstick progress towards net zero should still remain the same.

For portfolios of hotels, the baseline becomes more problematic. Many hotel owners and operators are constantly changing their portfolios, acquiring and selling hotels, adding to their brand and having them de-flagged, and at times merging with portfolios. According to the Greenhouse Gas Protocol (GHG Protocol), a company can adjust its baseline if a material change over 5% to its business occurs. In hotel companies this is a constant, as growth of a portfolio will exceed 5% of total room-count every few years, and owners may acquire or sell a hotel that itself is more than 5% of the total floor area.

For this net-zero methodology, a static baseline is recommended, where the absolute intensity figure remains unchanged, as does the intensity of kgCO2e/SqM in the baseline year which remains the figure against which any current year's intensity performance is measured. Static baselines remove the need for heavy year-to-year recalculations of all prior and forecasted emissions, reduce the need for internal re-approval and socializing of targets and budgets, and make progress more easily understood by stakeholders. However, there are some scenarios where the baseline may need to be re-evaluated, as shown in Figure 2

Figure 2: Scenarios where a baseline may need to be reviewed.

SCENARIOS WHERE A BASELINE MAY NEED TO BE REVIEWED

Several scenarios exist where a hotel owner, operator, and/or franchisor of hotels may need to re-evaluate and update its original baseline and corresponding target values. These include:

- **A merger or acquisition of a large portfolio of hotels** that significantly changes the composition of the portfolio's geographic location or asset class mix; or conversely a large disposition, exit, or spin-off of part of the portfolio that has similar effects (as is outlined in the GHG Protocol).
- **Cumulative, organic growth changes the constitution of the portfolio significantly over time**, such as change in proportion of regional representation, or segment/type, such as increasing representation of full-service resorts in comparison to limited service urban hotels.
- **Correction due to significant errors in prior years**, or due to increased data quality that alters previous extrapolation values.
- **Change due to updating of methodology or sources** of calculation of emission factors that result in large changes of intensity, such as switching to residual mix sources.

Alternatively, though more cumbersome for calculation, planning and monitoring, scenarios exist where it would be more appropriate to add an additional baseline and calculations for part of the portfolio, such as private equity owners with distinct funds, large subsidiary restructuring, or acquisitions of significant portfolios that have distinct traits and decarbonization pathways.

1.1.5. Baseline for Scope 3 Emissions

As will be outlined in the next section, **Scope 3 emissions from the hotel building, operation, and activities will also need to be addressed in a net-zero plan.** These sources of emissions are diverse, not as easily quantified, and not necessarily correlated to the ongoing operation or floor area of the building.

- For franchisors of hotels, the baseline should follow the same logic as above.
- For Scope 3 emissions tied specifically to building operation, a baseline should be set, once available, in the absolute or intensity metric most appropriate. This baseline may be the same as the Scope 1 & 2 baseline, or a different year in the case of sufficient data and common quantification approaches only becoming available years later.

SECTION 2: THE GHG EMISSIONS BOUNDARIES OF A HOTEL

The next step towards net zero is to determine the boundaries of the GHG emissions that will be included in the baseline and target. These are guided by the GHG Protocol and its delineation of Scope 1, 2, and 3. For further details on the concept of scope, and the full list of potential sources of GHG emissions in a hotel, please refer to Appendix B.

The GHG emissions quantification of a hotel is primarily centered on heating, cooling, and lighting of the building and its equipment. While the emissions of a building are fairly straightforward, the various activities involved in a hotel stay also generate a carbon footprint, such as bathroom amenities, food and beverage from restaurants, transportation of a guest to and from the hotel, and the various activities undertaken by the guest and the hotel staff outside the hotel. As net zero places an increased focus on the value chain activity, the boundary will need to be examined in terms of these activities as well as the entities related to a hotel stay.

2.1   UNDERSTANDING THE HOTEL BUSINESS MODEL AND THE IMPLICATIONS FOR DECARBONIZATION

To determine the approach for decarbonizing a hotel, it is important to note that the **brand of the hotel does not necessarily indicate the hotel's owner or operator**.

The well-known global hotel companies do not own many of their hotels. Several of these chains, such as Marriott International, Hilton, IHG, and Wyndham Hotels & Resorts, own very few. These companies enter into agreements with other entities that own the building (or will own it once it is developed). Then for the day-to-day operation of the hotel, the owner may sign an agreement with the hotel chain to operate the hotel, or the owner may choose to designate a different entity to operate it, in which case the hotel chain enters into a franchise agreement with the other entity operating it. Some of these roles may change over time as a hotel is sold to another owner, ends its management agreement and switches to a different operator, or exits its affiliation or franchisee status.

The differentiated roles by multiple entities for a single hotel create particular challenges in assigning responsibility and allocating emissions. Given the owner/operator distinction, **double counting** commonly occurs for a hotel when both owner and operator report their emissions for the same property. The common practice in hotels is for the operator to use the ***operational control*** approach of the GHG Protocol, while the owner uses the ***financial control*** approach. For further details see Appendix A.

This is one of many examples where approaches for hotels diverge from general commercial real estate, primarily because of the Hotel Management Agreement (HMA) or lease model where the hotel owner does not operate any of the building or considers some areas under its operation when contracted to a facility management company and "non-tenanted". Publicly traded Lodging Real Estate Investment Trusts (REITs) in some countries, including the US, are also regulated differently and are prohibited from operating a significant threshold of their portfolio in order to maintain tax status as a REIT.

In addition to the double counting issues, this complexity generates various scenarios. For an independent hotel, the same entity may own and operate the hotel. In rare cases, a major hotel chain may own, operate, and brand the hotel. In more cases, the hotel chain will operate the hotel but not own it. In even more cases, the operator will franchise the hotel to a different operator, and the building is owned by an entirely different entity. In the majority of cases for the global hotel chains, they franchise the hotel to a different operator, and that operator is a Small or Medium Enterprise (SME) which also owns the hotel. Figure 3 sets out some scenarios to provide further clarification on hotel ownership structures.

Figure 3: Hotel ownership structures and examples

Hotel ownership structures

Hotel Owner: the entity which owns the property, responsible for the building and all elements related to it. In some instances the owner will also operate the hotel, but in most examples the day to day operations are contracted out to an operator.

Hotel Operator: the entity which operates the property, responsible for day to day operations. Sometimes this is one of the well-known brands, but in many cases it is a third-party operator who manages the hotel under a franchise agreement with one of the brands.

Franchisor / Franchisee : this is when a hotel is managed under the 'flag' of a particular brand but is managed by a third-party operator. The Franchisor is the brand, the franchisee is the operator who buys the right to use the brand name.

There are many different configurations of the relationship between owners, operators and franchisees. Below are some examples:

Cathedral House Hotel, Glasgow: independent family owned and operated hotel

Radisson RED, Finnieston Quay, Glasgow: owned by Forrest Hotels, managed by Radisson

Holiday Inn Express, Greenock, Glasgow: owned and operated by Starboard Hotels, under franchise agreement with IHG (Holiday Inn Express brand)

Mercure Glasgow City: owned by Alternative Income REIT plc, managed by Jupiter Hotels under a franchise agreement with Accor (Mercure brand)

Hotel Indigo, Glasgow: jointly owned by Heeton Holdings (60%), KSH (20%) and Lian Beng (20%), managed by Interstate Hotels & Resorts under a franchise agreement with IHG (Indigo brand).

The implication of this complexity is that not only will there be double counting and different roles and responsibilities when it comes to decarbonization, it will often be the case that two or more entities will have to share the responsibility for addressing Scope 1 and 2 emissions, and increasingly Scope 3 as the momentum towards net zero increases and expectations grow for companies to address Scope 3 In addition to the basic owner/operator/franchisee role, other scenarios exist that create further complexity. These are set out in Figure 4.

Figure 4: Additional scenarios of hotel ownership

ADDITIONAL SCENARIOS OF HOTEL OWNERSHIP

- A hotel whose **operator owns a share of the hotel asset**, which may be a controlling or non-controlling interest
- A hotel that is part of an **affiliation program** that acts differently from a franchise model
- A hotel which is **managed together with a branded residence model**, where the hotel operator is managing the building as a facility but the portion of branded residence is occupied by tenants and the units are not part of its operational control or management of utility efficiency and conservation measures. If under a Triple Net Lease (NNN) structure, the tenant pays all expenses normally attributed to the owner or operator such as building insurance, real estate tax, and maintenance.
- A resort structured in a **vacation ownership model** where an individual owns a unit or a fraction of a unit
- A hotel structured in a **condo-hotel model** where individual units are sold and then may or may not be part of the hotel's operational "pool" available to guests
- A hotel that is **part of a larger building where the hotel occupies several floors** of the building, but is not the building's overall operator or facility manager
- A hotel's **restaurant or other amenities are operated by an entirely different entity**, and may be sub-contracted by the operator or leased by the owner of the building, and have some shared services and utility distribution but different levels of operational control
- A hotel has an **agreement with nearby apartment rental units of a sharing economy model**, where the hotel operates some of the aspects such as linens and cleaning and provides the sales and distribution support.

2.1.1. Linking Hotel Emissions with an Entity

While the scenarios can be numerous, the key implications for net zero pertain to where the ultimate decisions are made to undertake or invest in actions to reduce GHG emissions. The main points to consider are:

- **There will be inherent "double counting" of emissions** as an owner will be responsible for the emissions using an approach of *financial control*, while the operator will be responsible for the emissions using the approach of *operational control*.[10]
- **If the hotel is owned or operated by an entity with a portfolio of hotels**, then while the nuances of specific properties may include unique situations and scenarios, overall they will be relatively insignificant to the total emissions of the entity that are most relevant for stakeholders. The larger the portfolio, the less significant.
- **Capital expenditure (CAPEX) investments** in energy efficient equipment, onsite renewable energy, and other building design that will reduce carbon are generally funded by, and are the decision of, the owner of the building, not the operator. This may be in an escrow account

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[10] For more information, see the Greenhouse Gas Protocol

- with specific stipulations of a reserve for replacement from which investments should be made in upkeep and improvement of the asset, but are still within the owner's control.

- **Operational expenditure (OPEX) of the hotel** is the responsibility of the hotel operator, usually within annual budgeting processes needing owner approval.

- **Procurement of energy is typically handled by the operator**, but may require owner approval for decisions in energy procurement contracting or as part of annual budgeting of OPEX. This includes the purchase of renewable energy.

- **When a hotel is franchised, it becomes part of the hotel chain's Scope 3**, but the hotel chain is not a decision-maker in either the CAPEX investment decisions of the building and equipment, nor the OPEX components of the hotel's expenses.

- **As a general premise, real estate appreciates in value over time**. Ownership of hotels is cyclical in several ways, which often disincentivizes investment in energy efficiency and decarbonization if not addressed in early stages of development or acquisition, or the terms of equity investors or debt lenders.

- **The ownership of hotels is diverse and fragmented globally and even within any given country**. Many of the owners of branded hotels are SMEs. Some may just be parking money in real estate. This creates difficulty in gaining economies of scale, engaging on the concept of net zero, and achieving reduction decarbonization targets.

- **Pursuing net zero for the hotel industry requires systemic and transformational change** in the strategy, planning, decisions, accounting, and operation of hotels. This change will take time and should be recognized as such, but it should not be an excuse for any entity within the value chain to back down from decarbonization.

2.2 THE GHG EMISSIONS BOUNDARIES OF A HOTEL

The GHG emission boundaries suggested in this methodology are aligned with the boundaries set out in the GHG Protocol, with the emission scopes and sources outlined specific for the hotel industry. The GHG boundaries and approach laid out are also in line with the criteria of the UN Race to Zero campaign and SBTi. For further detail on alignment of this methodology with the UN Race to Zero and the SBTi, see Appendix C.

2.2.1 Scope 3 Emissions Approach

This methodology seeks to **provide clarity and a common approach for the hundreds of potential sources of emissions** occurring within a hotel and the value chain of its operation and ownership as identified in Appendix B.

A quick glance of the potential sources, combined with the complexity and nature of hotel ownership and operation, encompassing thousands of SMEs as well as the value chain relation encompassing a number of other entities, should help contextualize why a standardized**, simplified boundary approach should be drawn when decarbonization targets should be set** for them (as opposed to just quantifying them).

Net zero's primary enhancement to the discipline of carbon reduction is the implication of encompassing wide Scope 3 – or value chain – emissions. While using a default percentage-based threshold (i.e., the need to include at least 65%-95% of a company's Scope 3 emissions) is a good starting point in general, it presents several challenges and redundancies in how it will play out over time for a hotel or hotel company.

In the hotel industry, scalability and acceleration of practices are needed, which can be obfuscated by constant flux in Scope 3 thresholds. A few examples:

- **Exactly where to draw the line on Scope 3** is extremely challenging considering all the potential sources listed in Appendix B.
- **Even when deciding a boundary and conducting an analysis, calculation methods vary widely** for quantifying Scope 3 emissions. Depending on the approach and emission factor, a source such as waste emissions and employee commuting may be a large part of Scope 3, or a minor one when using the same source data set.
- **As methodologies change, calculations may change and the ability to address them may as well.** Transmission & distribution loses from electric power may be a significant source of Scope 3 for a non-franchisor, but guidance is lacking on how to address T&D losses in market-based accounting using residual mix emission factors, and how to address them with purchased certificates. Likewise, as residual mix emission factors currently available are highly volatile, the relative % of T&D Losses may fluctuate significantly.
- **Interpretation of the GHG Scope 3 protocol for embodied carbon and useful life accounting emissions of commercial buildings can cause significant variation in Scope 3 composition.** If a hotel owner completes a new development and is expected to address all embodied carbon emissions the year it is completed, those emissions may dwarf other Scope 3 that year. Similar year-on-year skewing may occur if the owner sells a hotel and is expected to account for the useful life emissions of the hotel thereafter. It is then in the company's best interest to choose a baseline year or range where it sells a lot of hotels in a disposition/exit cycle to inflate its Scope 3 baseline, and thereby more easily demonstrate decarbonization progress.
- **For franchisors of hotels, Scope 3 emissions may represent a wide range of the total % of common Scope 3 categories**, and in some cases above 90% of total Scope 3. Should a hotel company that increases its franchised portfolio at a more accelerated rate over time compared to its managed portfolio suddenly be able to reduce targets to other Scope 3 emissions previously addressed in targets as the franchise portion increases? Conversely, if franchised portfolio emissions decrease, does the franchisor need to re-assess and integrate additional Scope 3 categories?
- **Some of the most common sources of emissions in a hotel may either be Scope 3 or within Scope 1 & 2, depending on the configuration.** The two most common are laundry wash and hotel-organized guest transportation. By strict GHG protocol alignment, a hotel can reduce its Scope 1 & 2 just by outsourcing laundry wash and its airport shuttles. While net zero would imply these are encompassed regardless, the need for threshold quantification in relation to other sources could be seen as redundant.

- **A pure % threshold creates a significant divergence in the expectations of a hotel franchisor in comparison to a non-franchisor.** A hotel operator with no franchised properties, managing primarily resorts that house staff and generate power onsite, may see its food and beverage emissions represent almost all Scope 3. An operator of limited-service domestic US hotels in secondary and tertiary markets may find its employee commuting represent almost all of Scope 3.

To address this, **the methodology provides a classification system to arrive at default categories that at an industry level will represent over 90% of typical Scope 3 emissions within a reasonable boundary**. In doing so, the intention is to enable the hotel and wider travel industry to focus efforts on collectively pursuing decarbonization actions for the most relevant and significant sources of emissions rather than inventorying, evaluating, and adjusting sources and related targets over time.

2.2.2 Classification of Hotel Emissions

Hundreds of potential emissions sources may occur for a hotel. These sources may transcend scopes and the ability of the hotel's owner or operator to exert influence on them, and vary in the ability to be accurately quantified at present. To arrive at the default boundary, GHG emissions of a hotel and hotel stay were analyzed and classified according to the following steps:

1. **Prioritize the sources of emissions** in terms of their relative significance to a hotel's footprint, how common they are across the hotel industry, and the degree to which stakeholders will expect the emissions to be addressed, in order to arrive at the common set of emissions sources for a hotel to include in net-zero planning.
2. **Identify cases where the sources of emissions may vary** within a particular hotel type or region in relative significance, as well as whether the same source of emissions may change in scope as Scope 1 & 2 vs. Scope 3.
3. **Evaluate the common sources of Scope 3 in relation to the role of owner or operator** (and subsequently franchisor) to identify significant differences in the share of control or influence that one role may have in comparison to the other.
4. **Evaluate the degree to which the sources of emissions can be credibly and consistently quantified** at present based on availability of default data and coefficients, methodology, and emission factors.

Resources used to inform the classification process are outlined in Appendix B.

Default Hierarchy for Emissions Sources of a Hotel

Based on the analysis above, which is outlined in more detail in Appendix B, a default hierarchy for the sources of emissions of a hotel is shown in Table 1.

Table 1: Default Hierarchy for Emissions Sources of a Hotel

Classification	Approach	Examples
Very High	• Sources of emissions should be quantified, striving for granular level of activity data and actively pursuing efforts to improve calculation resources and methodologies when needed • Quantifiable targets should be set, and decarbonization should be prioritized first within interim milestones • Processes and engagement should be prioritized as soon as possible	• Stationary combustion of primary fuels • Purchased electricity • Upstream emissions from purchased F&B and OS&E
High	• Sources of emissions should be quantified based on actual data, particularly if part of the hotel's Scope 1 & 2 emissions boundary • Efforts should be pursued to improve calculation resources and methodologies when needed in order to arrive at quantifiable targets • Quantifiable targets should be set once sound calculation methods and resources are available, and decarbonization approaches made more apparent through engagement targets • Processes and engagement should be prioritized, when planning/engagement is available, within interim milestones as early possible	• Purchased heating and cooling • Laundry wash (when outsourced) • Emissions from waste disposal and treatment • Embodied carbon emissions of the building and FF&E • Transportation of guests arranged by the hotel within the destination (when present) • Employee commuting
Medium	• Sources should be quantified but may be estimated using default data • General processes and engagement should be developed within reason • Targets should follow a decarbonization pathway by 2050	• Transmission & Distribution losses from electric power distribution to the hotel • Business travel
Low	• Sources may be excluded from calculated boundary • When significant for a particular hotel or company and included, quantification can be done using estimated or proxy data • General processes and engagement should be developed within reason • If present by 2040, targets should include that emissions be offset as residual	• Fugitive emissions from refrigerant leakages • Other combustion of fuels when used for secondary purposes and insignificant in comparison to the rest of the hotel's Scope 1 & 2 emissions

Classification	Approach	Examples
	emissions when related to the building, or by 2050 for others	• Transportation of guests arranged by the hotel to/from the destination
Out of Bounds	• Others within the universe of potential sources that do not meet thresholds in the analysis of prevalence, significance, control/influence, and availability of credible and consistent emission factors	• See Appendix B for full list of items

2.2.3 Default Net-Zero Hotel Emissions Boundary

In order to achieve net zero a hotel should include the above sources of GHG emissions in its net-zero plan as set out in Table 2. For each category, the hotel should have both a **quantifiable reduction target and planning and engagement target**, and build in timing considerations for phasing in of Scope 3 significant sources based on the owner/operator distinction.

While the planning and engagement pathway can begin in year 1, quantitative measurement and targets are more challenging, and are categorized based on the availability of reliable, consistent approaches to quantification and respective emission factors:

1. **Included at Baseline** – emissions should be included from the same baseline year as Scope 1 & 2 emissions, and quantified each year toward the target of net zero.

2. **Included from 2025** – emissions are significant, but default or actual data are unavailable at this time and will require more years to accurately quantify. From 2025, these should be included in the calculation boundary, with the baseline emissions quantified for 2025 at the latest.

3. **Included from 2030** – emissions are either significant but extremely difficult to quantify, relatively insignificant, or anticipated to be addressed within the value chain directly through other sectors. From 2030, these emissions should be included in the calculation boundary, and baseline emissions should be determined based on the latest methodology and best practices available for net zero overall and in their respective sectors of activity.

In the case of a distinction, the entity with the distinction should be responsible for the quantification and setting of respective targets, while the other entity should include the source in the planning and engagement activities:

- **The owner** should include the physical aspect of the building including embodied carbon, land use change, and the purchased FF&E from development, construction, and renovations in the quantifiable inventory and targets.
- **The operator** should address the activities of guests which are reflected in the operation of the building, and the upstream and downstream emissions from F&B and OS&E in the quantifiable inventory and targets.
- **Both entities** share responsibility for planning and engagement to use influence to support decarbonization of each category.

Table 2: Boundary of GHG Emissions for Net Zero for a Hotel Owner and Operator

SCOPE	SOURCE	CLASS	PHASING	QUANTIFICATION APPROACH	QUANTIFICATION DISTINCTION
1	Combustion of fuels onsite	VERY HIGH	Baseline	Actual data gathered for fuels used to heat the building via HVAC Systems, to use in cooking equipment, or as primary source of onsite electricity generation	
2	Purchased electricity	VERY HIGH	Baseline	Actual data gathered	
3	Upstream emissions from ongoing consumable F&B[11] and OS&E[12]	VERY HIGH	2025 or 2030	Estimated based on best-available coefficients, for the most impactful and commonly sourced items such as beef, once sufficient default data are available by 2025, with others deferred to 2030 based on available data and further separation of this category into sub-categories or specific items	Operator
2	Purchased heating and cooling	HIGH	Baseline	Actual data gathered, when present at the hotel	
3	Emissions from outsourced laundry wash	HIGH	2025	Estimated using best available data or coefficients, when laundry wash is outsourced	Operator
3	Transportation of guests arranged by the hotel within the destination	HIGH	2025	Estimated based on best-available coefficients using some level of activity or usage data, unless significant and actual data should be used	Operator
3	Emissions from downstream waste disposal	HIGH	2025	Estimated based on coefficients from actual waste generation and disposal data, once sufficient GHG emissions from waste disposal are available globally following the WWF Hotel Waste Methodology When treated onsite, categorized as Scope 1 and related to actual activity data	Operator, unless waste is treated onsite and categorized as Scope 1
3	Embodied carbon emissions of the building, land use change, and upstream FF&E[13]	HIGH	2030	Estimated based on best-available coefficients and determination of a boundary of most impactful materials and processes to be included, such as concrete and steel, once sufficient data is available to itemize the specific	Owner

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[11] Food & Beverage
[12] Operating Supplies & Equipment
[13] Furniture, fixtures & equipment

SCOPE	SOURCE	CLASS	PHASING	QUANTIFICATION APPROACH	QUANTIFICATION DISTINCTION
				components and the overall LCA figures. Potentially includes land use change if significant	
3	Employee commuting	HIGH	2030	Estimated based on property or market-specific default data done in sampling studies as well as more detailed methodology and granular city-level coefficients available	Corresponds to the employees of each respective entity only
3	T&D[14] losses from purchased electricity	MEDIUM	Baseline	Actual data gathered for electricity, using best available emissions coefficients	
3	Business Travel	MEDIUM	2025	As best available based on travel providers, transportation or property-specific coefficients, or estimated based on coefficients derived from default data. *Note that business travel to hotels within the same portfolio boundary of the company should not be included as they are already part of that hotel's emissions boundary.*	Corresponds to the employees of each respective entity only
1	Fugitive emissions from refrigerant leakages	LOW	N/A	Excluded by default from quantitative targets, otherwise estimated, or actual data gathered for emissions from refrigerant leakage when significant in comparison to the rest of hotel's Scope 1 & 2 Include in planning and engagement targets for addressing low-carbon refrigerants and effective management	
1	Other combustion of fuels	LOW	N/A	Excluded by default from quantitative targets, otherwise estimated or actual data gathered for other combustion of fuels when used for secondary purposes and significant in comparison to the rest of a hotel's Scope 1 & 2 Include in planning and engagement targets for addressing these sources	
1	Transportation of guests arranged by the hotel to/from the destination	LOW	N/A	Excluded by default, unless in the exception of being significant as part of the hotel's business model Include in planning and engagement targets for efforts to build awareness and support carbon reduction and mitigation efforts from travel	

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[14] Transition & Distribution Losses

2.2.4. Additional company-level considerations for companies that own, operate, franchise portfolios of hotels

Two distinctions should be noted for hotel companies. First, while some of the Low and Medium classified sources of emissions may be significant or exceptionally present at a specific hotel within a portfolio, they may be insignificant at the company-level inventory and excluded or estimated, and indicated as such in the company's disclosure.

Second, hotel companies may also have additional sources of Scope 1 & 2 emissions. In addition, hotel chains and conglomerates owning hotel chains may have additional businesses or joint ventures such as retail product lines, venture capital wings, consulting services provision, financing mechanisms, and other hospitality and entertainment facilities. Some common examples include:

- Corporate offices for company-level employees
- Sales offices
- Corporate jets owned by the company for executive use
- Company-owned vehicles for staff use
- Leased space as reception facilities in airports and cruise terminals
- Employee housing directly owned or operated by the company
- Other non-property facilities owned or operated by the company

This methodology is intended to address only the aspects of the company as pertaining to the ownership, operation, or franchising of hotels and management of the company. Additional sources of Scope 1 & 2 emissions should be documented, included and classified in the list of sources using the same approach of relative significance to the overall inventory and ability to gather data.

2.2.5 Addressing Scope 3 for a franchisor of a property

In the case of a franchised hotel, the hotel's franchisor should include the hotel's Scope 1 & 2 emissions as outlined in column 1 of Table 2 within its net-zero boundary (categorized as the company's Scope 3), and set a pathway for decarbonizing those emissions. The Scope 3 emissions of the hotel's ownership and operation, as outlined in Table 2 above are essentially "Scope 3 of a Scope 3" which this methodology seeks to avoid as part of the value chain approach to hotel stays further outlined in Section 5.

The additional corporate-level activities and Scope 1 & 2 emissions sources outlined above should be accounted for, much of which will also cover activities relating to its franchised portfolio.

Figure 5: Example of addressing Scope 3 for a franchised hotel

Example of Addressing Scope 3 for a Franchised Hotel

Mercure Glasgow City: owned by Alternative Income REIT plc, managed by Jupiter Hotels under a franchise agreement with Accor (Mercure brand).

SCOPE	SOURCE	CLASS	Owner (Alternative Income REIT)	Operator (Jupiter Hotels)	Franchisor (Accor)
1	Combustion of primary fuels onsite	VERY HIGH	✓	✓	Scope 3
2	Purchased electricity	VERY HIGH	✓	✓	Scope 3
3	Upstream emissions from ongoing consumable F&B[15] and OS&E[16]	VERY HIGH	✗	✓	✗
2	Purchased heating and cooling	HIGH	✓	✓	Scope 3
3	Emissions from outsourced laundry wash	HIGH	✗	✓	✗
3	Transportation of guests arranged by the hotel within the destination	HIGH	✗	✓	✗
3	Emissions from downstream waste disposal	HIGH	✗	✓	✗
3	Embodied carbon emissions of the building, land use change, and upstream FF&E[17]	HIGH	✓	✗	✗
3	Employee commuting	HIGH	✓ (only their employees)	✓ (only their employees)	✗
3	T&D[18] losses from purchased electricity	MEDIUM	✓	✓	✗
3	Business travel	MEDIUM	✓ (company business travel only)	✓ (company business travel only)	✗

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[15] Food & Beverage
[16] Operating Supplies & Equipment
[17] Furniture, fixtures & equipment
[18] Transition & Distribution Losses

SCOPE	SOURCE	CLASS	Owner (Alternative Income REIT)	Operator (Jupiter Hotels)	Franchisor (Accor)
1	Fugitive emissions from refrigerant leakages	LOW	✕ (unless deemed significant)	✕ (unless deemed significant)	Potential Scope 3
1	Other combustion of fuels	LOW	✕ (unless deemed significant)	✕ (unless deemed significant)	Potential Scope 3
1	Transportation of guests arranged by the hotel to/from the destination	LOW	✕ (unless deemed significant)	✕ (unless deemed significant)	Potential Scope 3

In the case of a branded residence, where the hotel chain serves in a similar role to a franchisor but many of the operational and investment decisions are under the control of the tenant as described in section 2.1, the branded residence footprint should be evaluated to assess the level of significance, control and influence, and complexity of the data to be obtained, and be addressed in the boundary accordingly for quantified and/or planning and engagement targets. Future iterations of this methodology may further address branded residences more specifically once further analysis, best practice, and guidance are available to incorporate.

In the case of a franchised or licensed use of the hotel's name for other products and services, similarly the company *should evaluate the product or service, the relationship, and relevant emissions, to decide whether they should be included in the boundary for quantified and/or planning and engagement targets*.

SCOPE 3 EMBODIED CARBON EMISSIONS

Of the emissions sources in Table 2, the least commonly disclosed (and the least commonly understood) by hotels are the embodied carbon and the upstream emissions from building and furnishing the hotel. **Increasingly, these emissions are being addressed in climate action as more awareness is built around how specific materials are large sources of global emissions, such as concrete, steel, and beef.** The hotel industry will not be able to avoid discussion of the emissions of building a hotel and visible products such as plastic bottles.

However, resources are currently limited to enable sound quantification of these. While the initiatives, data and calculation approach for embodied carbon of buildings are becoming more common, specific figures and methods for a hotel asset class are rare. Hotels differ significantly from other types of commercial buildings because the "fit-out" of the hotel is done almost all at once and integrated into the hotel's initial development, rather than this being offloaded to individual tenants from entirely different sectors unrelated to the building's business model. Thousands (yes, *thousands*) of different products may be sourced in the building materials, durable goods, and ongoing consumables of a single hotel.

Two main challenges inhibit sound calculation and quantitative planning for decarbonization in these areas. First, it is unreasonable to expect that a single hotel would do a Scope 3 evaluation for each individual item procured in comparison to its overall emissions, and then compounded at a portfolio level. Also, hotels may not necessarily have access to all the specifications of materials and processes used in building the hotel. However, estimating emissions based on a generic amount of spend per macro category uniformly for every hotel in the world is also an unreasonable exercise. Better default data, analysis, and classification of level of significance are needed to aid in this category.

Second, accounting for embodied carbon of the building and durable goods is not a symmetrical exercise to annual emissions reporting of the "use phase" of the building. Just as a hotel's capital equipment and other durable goods are amortized over their useful life and hotel real estate may be renovated, bought, or sold, appropriate methodology should be developed for addressing the embodied carbon of an asset with a decades-long useful life, renovation, and ownership transfer.

This methodology seeks to address these upstream emissions from building the hotel (including land use change and construction operations) and its procurement, but allows for time for the hotel industry to evolve its methodology and identification of the most important products and processes to include in the boundary and how to account for them, and the respective industries building hotels and manufacturing the products to evolve their own data and decarbonization approaches. At the latest, the significant sources of emissions should be quantified by 2030, with some initiating by 2025 where readily available, in order to determine credible milestones through 2050. For further information on embodied carbon, see Appendix I.

2.2.6 Further Rationale on Noteworthy Low Classifications

While Appendix B provides the full list of potential Scope 1, 2, and 3 emissions sources of a hotel, the following merit further clarification:

- **Fugitive Emissions** – excluded for being insignificant per industry study[19] and for observation in the Greenhouse Gas Protocol's GHG Emissions Calculator which states "*It is customary to exclude CFCs, HCFCs, and halons from GHG inventories because they are regulated and are being phased out under the Montreal Protocol.*"[20]

- **Stationary combustion of fuels to heat other areas** – some hotels may use minor space heaters or have separate propane tanks to power grills or fireplaces, among other minor heating sources. Except in special cases, these are insignificant in comparison to the overall energy footprint of the building and are therefore commonly excluded.

- **Mobile combustion of fuel for powering vehicles and other mobile equipment** – commonly excluded for being insignificant at a portfolio level[21].

- **Stationary combustion of fuels to power a backup generator** – hotels may have a backup generator for onsite generation of electricity, which is used in emergency situations when needed, and for routine testing requirements under load. While this may be a significant source for a hotel in a year of need for prolonged onsite generation, such as a hurricane knocking out local power grids, the use for testing or minor emergencies is insignificant compared to the energy footprint of the building in a year.

- **Guest transportation from city of origin to the destination** – though the transportation of travelers to a destination constitutes the largest footprint of the travel industry value chain, a hotel's net-zero pathway should allow for excluding this portion of guest transportation for the following reasons:

  - **The hotel's business model is not driven by choice of geographical distance of its guests.** Hotels may focus efforts on source markets to generate better RevPAR, but the origin city of the guest booking a stay is not controllable by the hotel. Furthermore, the prevalence of hotels arranging transportation for their guests is very low in the industry overall, though it may be common in some locations, segments, or companies that have integrated business models.

  - **Multi-city itineraries make this overly cumbersome and intrusive to quantify**. A traveler to Glasgow for COP26 may originate from Dubai, stop over 3 nights in London, then after proceeding to Glasgow for one week to stay at the Holiday Inn Glasgow City Centre Theatreland, go on holiday to Paris for 3 days before returning to Dubai, and books the travel via distinct channels. Identifying and apportioning the

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[19] For further details see "Determining Materiality in Carbon Footprinting: What Counts and What Does Not." Cornell Hospitality Report 12.12, September 2012
[20] For further details see the GHG Protocol's GHG Emissions Calculation Tool
[21] For further details see "Determining Materiality in Carbon Footprinting: What Counts and What Does Not." Cornell Hospitality Report 12.12, September 2012

appropriate transportation emissions attributed to the Holiday Inn Glasgow City Centre Theatreland is overly cumbersome, and when repeated for every guest over each year, hinders the ability to effectively address it.

o **The transportation emissions are more relevantly addressed by others in the travel industry value chain**. It would seem counterintuitive that a hotel should be accountable for a hotel guest's transportation emissions from city of origin but the airline, tour operator, OTA, corporate travel buyer, event organizer, or business travelers' company of employment should not. Conversely, it is unlikely that airlines would be addressing the emissions of the hotel stays of their passengers.

o **Other service businesses do not commonly account for transportation in their Scope 3 accounting.** Restaurants do not quantify the Scope 3 emissions of customer travel from origin or home to the restaurant. Nor do movie theaters, theme parks, or sightseeing tours.

SECTION 3: HOTEL NET-ZERO PATHWAY 2025 - 2050

3.1 PATHWAY APPROACH

Although net zero's conceptual target year for decarbonization is 2050, meaningful progress needs to be made much sooner in order to achieve tangible results as well as to meet stakeholder expectations. **To support hotels in measuring and communicating progress, a recommended hotel net-zero pathway has been developed** using the following approach:

1. **Default Milestone Categories** of significant Scope 1, 2, and 3 emissions that should be quantified and decarbonized, as applicable to the hotel or company.
2. **Equity Considerations** for the business model of the hotel company, level of ambition attainable based on policy, regulation, development, and market mechanisms for progressing to net zero for a hotel and its value chain.
3. **Both *performance targets* and *engagement targets*** as part of the plan along the pathway, so that all categories can be addressed immediately in some form, and performance targets can be differentiated based on distinctions of control and influence.
4. **Five Yardstick Years** at five-year intervals through 2040 and finally 2050.
5. **Specific Milestones** to achieve or commence by each yardstick year for quantitative performance, which vary based on the entity's role relating to the emission source.

3.1.1 Default Milestone Categories

Hotels should be able to quantify, plan, and progress toward net zero in the following categories, setting appropriate milestones in each. Each category will carry varying levels of ambition and expectation for progress from 2025 through 2050. The categories have been developed based on how a hotel would undertake a net-zero plan in practice, and set a framework for enabling consistent reporting of progress to stakeholders. Categories are also specific to whether the entity is a hotel owner or operator, as well as franchisor or non-franchisor.

1. **Facility Emissions Intensity** – covers the emissions from the energy usage of the building itself, and separate from other sources of hotel operation that may be included, such as vehicles or fugitive emissions, to enable performance thresholds and comparability. The primary KPI of Scope 1 & 2 emissions is intensity per square meter, progress against which will be determined by actions in the other Scope 1 & 2 categories. The effects of changes in electric power emission factors – from which emissions from electricity are derived – will be most profound in this category[22]. This category also covers carbon offsetting for the building Scope 1 emissions based on yearly limits.

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[22] For further details on the effect of electric power emission factors contributing to a hotel's GHG emissions and decarbonization pathway, see the step-by-step guide and Appendix D.

2. **Energy Efficiency** – covers all activities to reduce the Scope 1 & 2 energy consumption of the facility, including investment in efficient design, equipment, technology, and operating procedures.

3. **Energy Sources** – covers the various forms of installing or purchasing energy either as a source of power for the hotel in Scope 1 & 2 emissions, or as a contribution to the electric power grid via market certificate or mechanism for the hotel's Scope 2 emissions. Includes activities to switch to cleaner fuels used by the hotel, and switching to electric power as an energy source for heating and cooling from fuels.

4. **Other Scope 1 & 2** – includes any other Scope 1 & 2 emissions sources of the hotel or the company that are not included in the default boundary of performance targets, but should be part of engagement targets, and may be material to the hotel or the company and increase in priority level, including:

   a. Fugitive Scope 1 emissions from refrigerants

   b. Vehicles

   c. Additional company facilities, business units or other activities.

5. **Franchised Properties** – covers reductions of Scope 1 & 2 emissions of franchised properties that form the Scope 3 boundary of the franchisor, if applicable.

6. **Waste** – covers activities to reduce emissions of waste disposal, in terms of source reduction, reuse, and diversion from landfill or incineration (recycling, composting, upcycling, donation, etc.) which are categorized as Scope 3.

7. **Outsourced Laundry** – covers Scope 3 emissions of laundry wash at a separate offsite facility outside the hotel's ownership or operational control.

8. **Embodied Carbon of Building, Land Use Change, and FF&E** – covers the most significant sources of Scope 3 emissions which are often classified as "Capital Goods" in Scope 3 evaluation, consisting of the construction of a hotel and the upstream lifecycle emissions of the building materials and FF&E, according to a life-of-use allocation of the embodied carbon balance over the lifecycle of the hotel. This category is a catch-all for several sources, which can be further segmented and clarified in future years.

9. **Purchased Ongoing Consumable Goods (F&B, OS&E)** – covers the most significant sources of Scope 3 emissions from the upstream lifecycle emissions of products sourced for ongoing consumption at the hotel.

10. **Employee Commuting –** encompasses Scope 3 emissions of property staff commuting to and from work via transportation not owned or operated directly by the hotel.

11. **Business Travel** – covers the transportation and lodging for purposes of business travel of property-level and company-level staff employed by the organization.

12. **Transmissions & Distribution Losses** – includes emissions from location-based losses from delivery of purchased electricity from source (utility) to the hotel

13. **Other Significant Scope 3** – includes any other Scope 3 emissions sources of the hotel or the company that are not included in the default boundary, but are material to the specific hotel or the company and require a different approach and milestone pathway to net zero, including:

    a. Guest transportation and other activities within the destination

    b. Transportation of fuel for onsite generation of electricity in remote, private island resorts.

3.1.2 Equity Considerations in Net-Zero Pathways

The concept of equity principles allows for different pathways to be set based on elements inherent to the company, but over which there is no control.

Business Model Equity Principle

Hotels are located in every country and city across the globe, and the value chain of both real estate ownership and travel translates to cross-border activity for almost the entire industry. Likewise, the business models of hotel companies vary, in particular that of an owner of hotel real estate that buys and eventually sells hotels but does not grow a footprint consistently over time, versus a chain whose business model is based on increasing the number of hotels, rooms, and floor area of operated and/or franchised hotels consistently over time.

The milestones for each category are structured for a **business model equity principle**. **Hotel companies with business models *not* based on consistent floor area growth should be expected to decarbonize the emissions from use of the building more quickly by 2030 and incorporate embodied carbon of the building into their value chain emissions accounting.** They have more control in the short- and long-term investment decisions of the assets, benefit much more from external grid decarbonization, hold more economic value per square meter of the same real estate utilized, derive benefit from general appreciation of the asset value of the property over time, and can decouple economic growth from carbon emissions more easily. This group generally includes hotel owners of private equity or publicly traded Real Estate Investment Trusts (REITs), casino hotel chains, companies with hotels as part of a larger parks and attractions business model, and independent hotel owner-operators.

Regional Equity Principle

Equity principles tend to call for consideration of regional differences in a country's level of development, which align with the original principles of the Kyoto Protocol and the concept of sustainable development in general. The challenge for hotels arises when some companies in developing countries are actually further ahead in net zero due to market and business factors such as renewable energy use in India, or due to energy sources such as decarbonization in Costa Rica. Also, as can be seen in the business model equity principle above, owners of hotel portfolios in developing countries should not necessarily have expectations lowered. Likewise, hotel companies commonly have portfolios encompassing developed and developing nations regardless of

headquarters. **To address regional differences, the proxy for this expectation is set on the most impactful variable of availability of purchased renewable electricity, which generally overlaps with developing markets, but not entirely.**

As of 2021 a large disparity exists regarding the regulatory environment, market mechanisms for renewable energy purchases, awareness and integration of the value chain and customer base, and purchasing power based on a destination. The EU has cemented net-zero policy, whereas widely available market mechanisms for localized renewable energy purchase, published residual emissions data, and engaged travel buyer value chain seeking net zero, Renewable Energy Certificates (RECs) / Energy Attribute Certificates (EACs) purchases tied to specific grids are unavailable in most of the world. Further limitations exist in methodology in other frameworks such as the RE100, which call explicitly for purchases to be tied to grid markets, but where it is unlikely that a commercial building tenant would be able to negotiate directly with a utility provider some type of renewable energy agreement. Many limitations exist in countries' regulatory frameworks, infrastructure, and awareness among ownership of building stock in countries heavily reliant on tourism, including Southeast Asia and Latin America.

The methodology embeds a **regional equity principle** to approach the milestones based on a designation of **immediate markets** and **next markets.** These markets are not easily defined as there are likely to be transition pathways and stages for countries that evolve in the coming years, but for the purposes of this methodology the **designation is essentially once a viable renewable energy purchase of REC/EAC or direct sourcing of Power Purchase Agreements (PPAs) for all its electricity is readily available for a single hotel to purchase directly at reasonable cost, the location would be considered an immediate market**, as the hotel is enabled to immediately purchase and reduce market-based emissions. Future iterations of this methodology will seek to further stipulate, clarify, and denote which countries, provinces, or cities fall within each market category.

In general, hotels located in immediate markets should be expected to transition to renewable energy and decarbonize across the value chain more quickly, and the related cost increases should be absorbed more quickly. Conversely, next markets should be prioritized first in energy efficiency, fuel switching, and then carbon offsetting and other value chain activities in a **sustainable tourism equity principle**, which is further outlined in Section 3.3.

3.1.3. Performance Targets and Engagement Targets

Performance targets should be set for each of the default categories outlined in Section 3.1.1, to set milestones in each of the yardstick years as outlined in Table 3 (pp. 31-35). Setting of performance targets and corresponding baselines for some of these categories are deferred until 2025 or 2030 yardstick years due to challenges in setting more granular boundaries, and accurately and consistently quantifying the emissions of these sources.

As net zero enhances decarbonization targets to encompass a wider boundary of Scope 3, hotels and companies in turn have less direct control and influence over the decarbonization actions of a

hotel's value chain. At the same time they face increased variability in the methods for how carbon emissions will be quantified for these sources. **To address the varying levels of control and influence as well as the complexity of Scope 3 chain emissions, the methodology calls for process-based engagement targets to support credible claims and demonstrate progress over time.** Engagement targets seek to support decarbonization through actions that can be undertaken immediately, especially where influence and control are low and quantifying emissions is challenging. *In essence, just because a hotel can't fully control or quantify a source, doesn't mean the hotel can't take steps to reduce those emissions*. While these will vary based on category, source of emissions, and degree of control and influence, specific Engagement Targets should be set for each category. Examples of engagement targets include:

- Conduct or support quantitative studies to determine calculation coefficients and data sources
- Support suppliers in technical capacity and opportunities for decarbonization, encompassing a wide range including training, financing, scalability, innovation, etc.
- Embed criteria and processes into supplier requests for proposals, and eventually contracts that will lead to emissions reductions within the hotel or value chain
- Conduct routine engagement with suppliers and partners (i.e., owners and operators) to review carbon performance and identify opportunities
- Plan for supporting the partner roles among respective entities in net-zero planning and performance (owners/operators/franchisors)
- Embed criteria into operating standards that seek to increase efficiency of operations or equipment, as well as increase use of renewable energy.
- Embed criteria and processes into capital budgeting and annual budgeting to require, suggest, or analyze specific areas of energy efficiency, use renewables, and energy sources
- Set managerial performance targets tied to compensation that link to decarbonization activities (but not necessarily specific ESG scores)
- Collaborate with industry bodies to advance specific solutions for collective impact
- Engage with net-zero initiatives in supply chain industries (e.g. textiles) to align pathways
- Incentivizing and supporting staff in alternative and low-carbon transportation options

Note that some performance targets will relate directly to decarbonization, though the target may be in other metrics. These can be included as performance targets or engagement targets, as the intent is to build credible claims and demonstrate progress over time. Examples include:

- Waste reduction (including sub-categories of soap, food, etc.)
- Increasing waste diversion
- Increasing percentage of non-animal protein purchases and reducing animal protein purchases
- Committing specific investment amounts in decarbonization
- Achieving certifications that have efficiency and low-carbon or carbon reduction criteria
- Increasing local sourcing

Additional performance and engagement targets can be made to support planetary decarbonization, net zero, and climate action. Such elements are outside of the boundary of this methodology which addresses net-zero emissions, but are important and can be found in initiatives such as the Glasgow Declaration.

3.1.4 Yardstick Years

A suggested, credible pathway is presented for hotels to progress toward net zero. Each of the five yardstick years is based on an overall scenario as described below, and detailed in Table 5 (p. 38). These yardstick years and milestones may differ, as hotels may seek to advance more rapidly in decarbonization, need to modify and expedite to meet certain criteria of other frameworks, or be regulated by government policy to do so differently.

For the most important milestone categories of increased energy efficiency and renewable energy procurement, **the following rule-of-thumb pathways are suggested from the baseline year through 2030**:

- **Scope 1 &2 emissions intensity** should be reduced by 3% per year for OG Baselines (<2012), 4% per year for Prior Baselines (2012-2019), and >5% per year for New Baselines, unless emissions intensity is below the threshold decarbonization pathway for buildings
- **Energy intensity should seek to achieve** a general linear trend averaging reductions of 2% per year through 2030, and 1% per year after 2030 regardless of baseline, unless energy intensity is already among highest performance in industry best practice or nearly all energy is from renewables

The ultimate pathway and associated milestones for interim progress on energy and GHG emissions intensity reductions will be determined by the hotel or company based on its own analysis, and in alignment with goals set by local authorities. Some hotels may already be very efficiently designed or obtaining energy from renewable or low-carbon sources. Hotels built after 2020 will need a different plan, as will companies formed recently. In addition, pathways may need to be adapted to follow specific national or local authority decarbonization and reporting needs. The yardstick pathways generally converge at 2030 with the most important milestones regardless of baseline year. However, the baseline year should always be considered, per the approach of the SDA in determining a carbon budget based on a 2010 baseline and 2050 decarbonization, and so as to not incentivize setting the baseline as close to the present as possible.

2025

The next few years will see most increases in net-zero commitments and planning. 2025 should be the year by which hotels have made their commitment and disclosed a plan for quantifying emissions of each of the categories in the default boundary, as well as for implementing actions to decarbonize each of the milestone categories.

Scopes 1 & 2: Significant progress should be made in the fundamentals of increasing energy efficiency measures and the related opportunities for reducing costs as a result of doing so. After energy efficiency, progress should be made on commencing or advancing on procurement of

renewables, and engaging with the value chain and stakeholders toward action (in particular engagement between owners, operators, and franchisors). Credible claims for offsets can be made within allowable thresholds.

Scope 3: For the more challenging sources to quantify and influence decarbonization, such as embodied carbon and LCA emissions of purchased goods, 2025 should serve as the year for which most significant sources have been identified in further granularity for quantification and action. For more information on hotel accounting and allocation of embodied carbon, see Appendix I.

2030

This is the most important yardstick year for climate action, in particular regarding renewable electricity. Carbon offsetting approaches should be commenced for addressing residual emissions and the related offsets that have been purchased by various entities in the value chain that correspond to the hotel and hotel stay.

Scopes 1 & 2 Performance: All electricity should be sourced from renewables in immediate markets. In doing so, most of the hotel industry will easily halve their emissions from a 2019 baseline and align with sectoral convergence for emissions of service buildings. Furthermore, as the lynchpin of sectoral decarbonization, efforts to purchase renewables will support cross-sectoral need to decarbonize the electric power grid. Progress should be made on all the aspects of the plan. Thresholds for the amount of offsets that can be used in credible net-zero claims are further reduced as the expectation is that energy efficiency will have significantly increased, electrification will have advanced, and renewable energy purchases will provide the majority of the decarbonization progress.

Scope 3 Performance: Embodied carbon and other purchased goods and services LCA emissions should have been quantified and actions commenced to decarbonize. Supplier engagement through the value chain should be enacted with demonstrable, quantifiable progress enabled. In the case of franchised properties, hotel franchisors should be able to gather accurate data for almost all the portfolio and have engagement mechanisms in place for franchisees to purchase renewable energy and make notable progress in efficiency.

2035

2035 completes the pathway on renewable electricity and value chain engagement, and creates the inflection point to focus on residual emissions and value chain decarbonization.

Scopes 1 & 2 Performance: Renewable electricity advances across all geographies, carbon offsets threshold claims further reduce, and other residual emissions are started to be addressed.

Scope 3 Performance: Franchised properties and properties located in next markets for renewable energy purchase mechanisms catch up to 100% renewable electricity, as it is now expected by the tourism distribution and customer that a hotel stay will be powered by renewable energy by default. All direct suppliers in the value chain boundary are powering electricity by 100% where possible. All contractual agreements with Scope 3 value chain vendors embed net-zero stipulations, including high efficiency and electrification fully embedded in new development. Significant progress is made

on reducing the footprint of significant sources of emissions in embodied carbon and purchased goods and services.

2040

By 2040, hotels should be able to make credible claims to achieving net zero for the emissions of the building.

Scopes 1 & 2 Performance: The carbon emissions from all of the default categories can be shown to have been reduced to an absolute minimum and aligned with the targets in the Sectoral Decarbonization Approach. Residual emissions from remaining non-renewable energy sources are quantified and offset as a standard practice contractually bound across the value chain of a hotel stay. The focus of carbon offsets shifts in principle toward removal projects going forward.

Scope 3 Performance: Franchised hotels also achieve net zero for their own respective Scopes 1 & 2. New hotels should be net-zero with the residual emissions offset in embodied carbon upon completion. All other value chain emissions in the default categories are quantified with clear plans for reducing to net zero by 2050.

2050

Net zero is achieved, with all value chain emissions heavily decarbonized, residual emissions are minimized, quantified, and offset when there is no viable alternative. The focus transitions to supporting corresponding hotel carbon budgets for removing atmospheric CO2e and addressing the mitigation issues resulting from physical impacts of climate change.
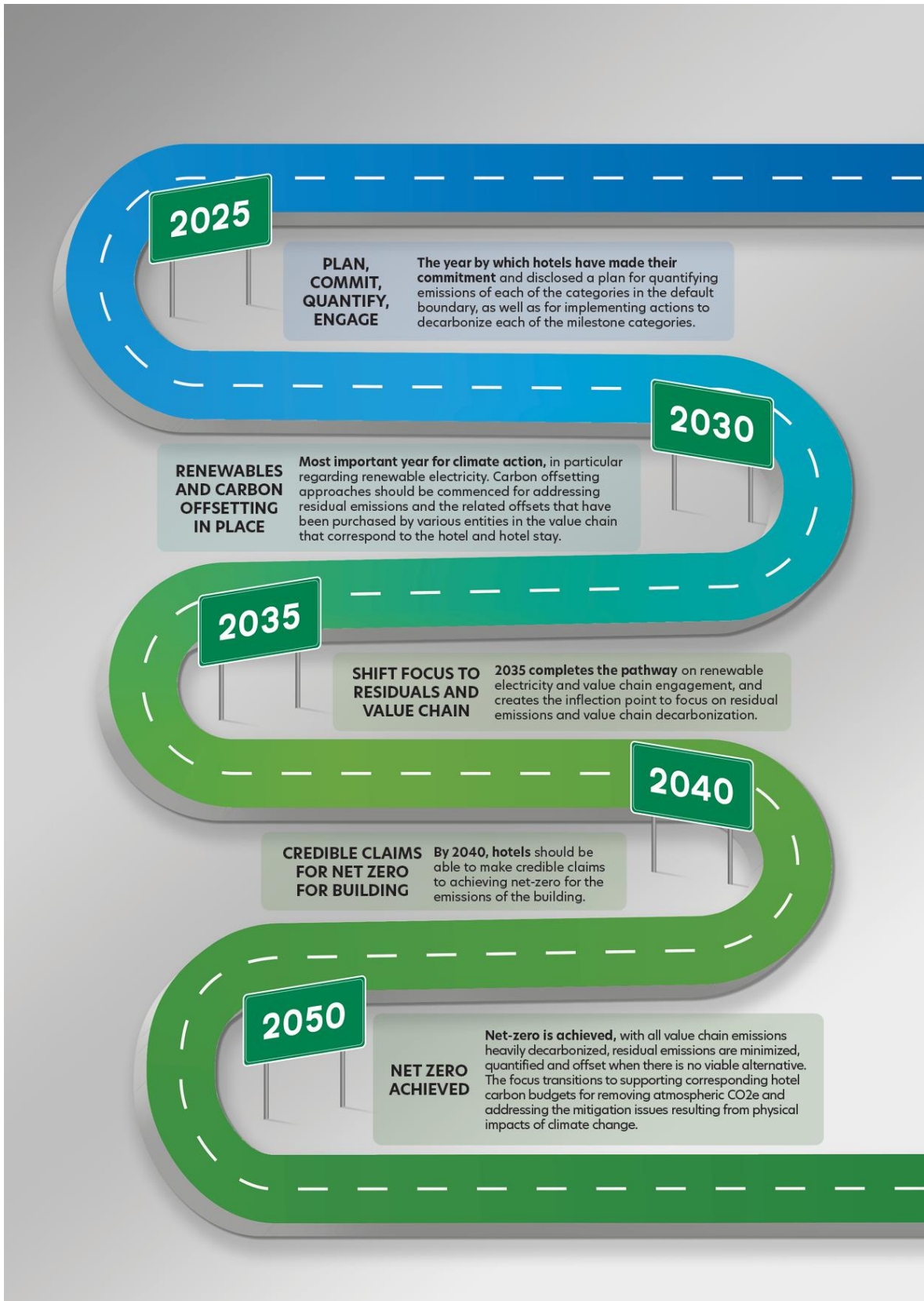
Net Zero Roadmap for Hotels

Table 3: Hotel Net-Zero 2025-2050 Performance Milestones

	CATEGORY	2025	2030	2035	2040	2050
SCOPE 1&2						
1	**Facility Emissions Intensity**	***At least one*** of the following thresholds: 1. 25% absolute reduction from baseline or annual linear equivalent[23] 2. 36% intensity reduction from 2019 baseline or annual linear equivalent 3. Emissions intensity of 19 kgCO2e/SqM or established industry asset class adapted thresholds • Scope 1 & 2 offsets can be claimed in net-zero progress calculations up to 13.65 kgCO2e/SqM or established industry asset class adapted thresholds	At least one of the following thresholds: 1. 45% absolute reduction from 2019 baseline or annual linear equivalent 2. 66% intensity reduction from baseline or annual linear equivalent 3. Emissions intensity of 14 kgCO2e/SqM or established industry asset class adapted thresholds • Scope 1 & 2 offsets can be claimed in net-zero progress calculations up to 7.3 kgCO2e/SqM or established industry asset class adapted thresholds	At least one of the following thresholds: 1. 60% absolute reduction from baseline or annual linear equivalent 2. 79% intensity reduction from baseline or annual linear equivalent 3. Emissions intensity of 10.4 kgCO2e/SqM or established industry asset class adapted thresholds • Scope 1 & 2 offsets can be claimed in net-zero progress calculations up to 5.52 kgCO2e/SqM or established industry asset class thresholds	At least one of the following thresholds: 1. 73% absolute reduction from baseline or annual linear equivalent 2. 88% intensity reduction from baseline or annual linear equivalent 3. Emissions intensity of 7 kgCO2e/SqM or established industry asset class adapted thresholds • All remaining fuel sources quantified and offset, with Scope 1 & 2 offsets being claimed in net-zero progress calculations up to 4 kgCO2e/SqM or established industry asset class thresholds	• 99% reduction from baseline • 100% renewable electricity for all markets • Total energy from renewables exceeds 90% • Electrified sources of heating and cooling either in place, confirmed for replacement at end-of-life or renovation, and embedded in any new projects unless unfeasible • All remaining emissions sources quantified and offset
2	**Energy Efficiency**	• Cumulative reduction of at least 10% from baseline, or among highest performance	• Cumulative reduction of at least 20% from baseline, or among highest performance	• Cumulative reduction of at least 25% from baseline, or among highest performance	• Cumulative reduction of at least 30% from baseline, or among highest performance	

[23] Intensity reductions adjusted on chosen baseline year and annual linear reduction to achieve 66% intensity or 45% absolute reduction from 2019

	CATEGORY	2025	2030	2035	2040	2050
3	**Energy Sources**	• Demonstrate increase in % of total energy from renewables from baseline	• 100% renewable electricity for immediate markets • 50% renewable electricity for next markets, including grid mix	• 100% renewable electricity for immediate markets • 75% renewable electricity for next markets, including grid mix • Achieve increase in % of total energy from renewables from 2030	• 100% renewable electricity for all markets • Achieve an increase in % of total energy from renewables from 2035	
4	**Other Scope 1 & 2 (when separated from above)**	• Demonstrate reduction from baseline	• 100% renewable electricity for immediate markets • 50% renewable electricity for next markets, including grid mix • Achieve reductions in emissions from 2025 for each source	• 100% renewable electricity for immediate markets • 75% renewable electricity for next markets, including grid mix • Achieve increase in % of total energy from renewables from 2030 • Achieve reductions in emissions from 2030 for each source	• 100% renewable electricity for all markets • Achieve an increase in % of total energy from renewables from 2035 • Achieve reductions in emissions from 2035 for each source • All remaining sources quantified and offset	
SCOPE 3						
5	**Franchised Properties (Franchisors)**	• >70% of portfolio reporting actual data *At least one* of the following thresholds for the portfolio with actual data: • 15% absolute reduction from baseline or annual linear equivalent[24]	• >95% of portfolio reporting actual data • >40% renewable electricity for immediate markets • >25% renewable electricity for next markets, including grid mix	• >95% of portfolio reporting actual data • >70% renewable electricity for all markets *At least one* of the following thresholds for the portfolio with actual data:	• >95% of portfolio reporting actual data • 100% renewable electricity for all markets • Achieve an increase in % of total energy from renewables from 2035	• >95% of portfolio reporting actual data • 100% renewable electricity for all markets • Achieve an increase in % of total energy from renewables from 2035

[24] Intensity reductions adjusted on chosen baseline year and annual linear reduction to achieve 66% intensity or 45% absolute reduction from 2019

	CATEGORY	2025	2030	2035	2040	2050
		• 36% intensity reduction from 2019 baseline or annual linear equivalent • Emissions intensity of 50 kgCO2e/SqM or established industry asset class adapted thresholds	*At least one* of the following thresholds for the portfolio with actual data: • 27.5% absolute reduction from baseline or annual linear equivalent • 54% intensity reduction from 2019 baseline or annual linear equivalent • Emissions intensity of 32.5 kgCO2e/SqM or established industry asset class adapted thresholds	• 49% absolute reduction from baseline or annual linear equivalent • 66% intensity reduction from 2019 baseline or annual linear equivalent • Emissions intensity of 24 kgCO2e/SqM or established industry asset class adapted thresholds	*At least one* of the following thresholds for the portfolio with actual data: • 70% absolute reduction from baseline or annual linear equivalent • 77% intensity reduction from 2019 baseline or annual linear equivalent • Emissions intensity of 16 kgCO2e/SqM or established industry asset class adapted thresholds • All remaining fuel sources quantified and offset	• All remaining fuel sources quantified and offset
6	**Waste (Operator)**	• Accurately measured with actual data, with baseline set	• Waste reduction in line with established industry benchmarks/goals • Cumulative waste emissions intensity reduction from baseline exceeds waste intensity reduction, as most intense sources are further reduced and diversion increases	• Waste reduction in line with established industry benchmarks/goals • Significant sources of GHG emitting waste are further reduced • Cumulative waste emissions intensity reduction from 2030 exceeds waste intensity reduction, as most intense sources are further reduced and diversion increases	• Waste reduction in line with established industry benchmarks/goals • Cumulative waste emissions intensity reduction from 2035 exceeds waste intensity reduction, as most intense sources are further reduced and diversion increases • All significant waste sources quantified and offset	• Waste reduction in line with established industry benchmarks/goals • Cumulative waste emissions intensity reduction from 2040 exceeds waste intensity reduction, as most intense sources are further reduced and diversion increases • All significant waste sources quantified and offset
7	**Outsourced laundry (Operator)**	• Emissions are accurately quantified with coefficients and portfolio estimates, with baseline set	• Suppliers' facilities powered by 100% renewable electricity in immediate markets	• Suppliers' facilities powered by 100% renewable electricity in immediate markets • >50% of supplier facilities powered by 100% electricity for next markets, including grid mix	• >95% supplier facilities powered by 100% electricity across all markets • Remaining emissions offset	• All supplier facilities powered by 100% electricity • Remaining emissions offset
8	**Building and FF&E Embodied**	• Emissions are estimated for the hotel or portfolio at high level • Most significant sources within the category are identified and default boundary set	• Emissions are accurately quantified by estimation with default data available for use and accounting methodology in place, with baseline set	• Achieve reduction emissions from 2030 • All new build embodied carbon committed for offsetting over established industry best practice	• Achieve reduction in embodied carbon emissions from 2035 • All significant sources of embodied carbon in buildings and FF&E will be contracted with 100% renewable energy	• Achieve reduction in embodied carbon emission from 2040 • Remaining embodied carbon from all new builds from 2040 offset

	CATEGORY	2025	2030	2035	2040	2050
	Carbon (Owner)			• Achieve quantifiable progress in increase in renewable energy use in default boundary • Threshold of offsetting of embodied carbon to be achieved, determined by established industry best practice	• Threshold of offsetting of embodied carbon to be achieved, determined by established industry best practice • Remaining embodied carbon from all new builds from 2030-2040 offset	• All new builds will be committed for offsetting over established best practice in accounting and life cycle
9	**Purchased Ongoing Consumable Goods**	• Most significant sources of emissions from typical spend identified and default coefficients determined for the default boundary, with further segmentation of the category • Data collection and estimation methods in place for quantifying annual emissions of most significant sources, with baseline values determined	• F&B emissions reduction in line with established industry benchmarks/goals • Data collection and estimation methods in place for quantifying annual emissions of all significant sources within the default boundary, with all remaining baseline values determined • 15% absolute reduction in emissions for sources with 2025 baseline or equivalent, or established industry thresholds by category	• F&B emissions reduction in line with established industry benchmarks/goals • 28% absolute reduction in emissions for sources with 2025 baseline or equivalent, or established industry thresholds by category • 15% absolute reduction in emissions for sources with 2030 baseline or equivalent, or established industry thresholds by category	• F&B emissions reduction in line with established industry benchmarks/goals • 40% absolute reduction in emissions for sources with 2025 baseline or equivalent, or established industry thresholds by category • 28% absolute reduction in emissions for sources with 2030 baseline or equivalent, or established industry thresholds by category	• All significant sources of emissions related to materials will use 100% renewable electricity • Applicable suppliers will offset remaining emissions • Hotel/company will offset additional emissions for suppliers not capable of offsetting
10	**Employee Commuting (Operator)**	• Accurately estimated with default data available for use	• Accurately calculated and baseline determined with best practice for accepted calculation methods and coefficients	• Demonstrate reductions in related emissions from baseline	• Demonstrate reductions in related emissions from 2035	• Demonstrate reductions in related emissions from 2040 • 100% of remaining emissions offset
11	**Company Business Travel**	• Accurately measured with actual data and baseline intensities	• Company bookings for hotel stays and meeting space usage will be in facilities powered by 100% renewable electricity and have a plan in place for net zero	• Company bookings for hotel stays and meeting space usage will be in facilities powered by 100% renewable electricity and meet thresholds for • >50% of remaining emissions from hotel stays and venue usage will be offset • >50% of transport emissions will be offset by best available	• Company bookings for hotel stays and meeting space usage will be in facilities powered by 100% renewable electricity in line with expected performance thresholds for remaining emissions • 100% of remaining emissions offset • 100% of transport emissions will be offset by best available	• Company bookings for hotel stays and meeting space usage will be in facilities powered by 100% renewable electricity in line with expected performance thresholds for remaining emissions • 100% of remaining emissions offset • 100% of transport emissions will be offset by best available

	CATEGORY	2025	2030	2035	2040	2050
				contribution to host destination/region	contribution to host destination/region	contribution to host destination/region
12	**Transmission & Distribution Losses**	• Accurately measured with actual data and baseline intensities	• Performance reductions in line with milestones for energy sources, energy efficiency, and renewables	• Performance reductions in line with milestones for energy sources, energy efficiency, and renewables	• Performance reductions in line with milestones for energy sources, energy efficiency, and renewables • Remaining emissions offset	• Performance reductions in line with milestones for energy sources, energy efficiency, and renewables • Remaining emissions offset
13	**Other Significant Scope 3**	• Identified, quantified as best available • Decarbonization pathway identified with quantifiable milestones for each yardstick year in line with other categories above, and best practice	• All other significant sources should be quantified with a minimum 2030 baseline • Achievement in reduction per the quantifiable milestones set	• Achievement in reduction per the quantifiable milestones set	• Achievement in reduction per the quantifiable milestones set • All remaining fuel sources quantified and offset	• Achievement in reduction per the quantifiable milestones set • All remaining fuel sources quantified and offset

ENERGY EFFICIENCY AND DECOUPLING ENERGY USAGE FROM CARBON EMISSIONS

Historically in the hotel industry, the primary focus on environmental performance was reducing energy usage. This was primarily because it carried the most potential for cost reduction and return on investment, as well as typically being the largest expense in a hotel operation after labor. In addition, energy usage is tied directly to the carbon emissions associated with it, and was essentially a proxy for carbon reduction.

Increasing energy efficiency is still the most important approach that hotels will focus on in the next few years in terms of building the business case for decarbonization. Investments in efficiency will pay off, and when looked at holistically will help counter other increased expenses. **However, another implication of decarbonization is the shifting focus from energy usage to the source of energy used**. If the hotel is powered by 100% renewable energy, then the energy intensity performance has value for costs and other aspects, but not necessarily for increases in carbon emissions.

The pathway yardsticks are set to increase the focus on carbon emissions and percentage of renewables over time, with less ambitious milestones for long-term energy efficiency after 2030.

Similar to carbon efficiency, some hotels may already be highly energy efficient, performing well below established benchmarks in the baseline year. The pathway recognizes this possibility so that hotels already meeting best performance thresholds should then be able to focus on other categories to decarbonize.

3.2 STAYING ON THE NET-ZERO PATHWAY

Perhaps the biggest limitation in the current environment of net-zero and science-based target setting is an ambiguous answer to "what if the company veers off track in its pathway?". In deviating from a pathway, theoretically a carbon balance is generated that should be addressed and incorporated in some way as residual emissions. Guidance and methodology are sparse in this area.

This methodology purposefully limits guidance on how to "get back on track" in quantifiable terms, since the current net-zero focus in 2021 is on credible planning for commitments and action. Moreover, the carbon target discussion in 2021 is entirely different and evolved from the one in 2016, and the playing field and urgency may completely change by 2025.

However, at high level, organizations should:

- **disclose their progress and failures** to stay on track in each of the default categories in the corresponding yardstick year and baseline year
- **include a plan to get back on track** by the next yardstick year for which they will be held accountable
- **ensure the value chain will also be held accountable**.

3.3 CARBON OFFSETTING APPROACH

Carbon offsetting will play a significant role in the hotel and wider travel industry's pathway to net zero. While carbon offsetting has its limits and its detracting stakeholders, for some activities where there are no alternatives to fossil fuels, carbon offsetting is the most significant way a carbon footprint can be mitigated until 2030. When done well, carbon offsetting can deliver benefits to people in the form of alternative livelihoods, as well as for biodiversity and across the UN Sustainable Development Goals (SDGs). Furthermore, carbon offsetting is going to proliferate in voluntary markets, as reflected in the burgeoning number of carbon offsetting approaches to consumer products and services, and in particular for travel.

Carbon offsetting has the potential to play a fundamentally different role in the travel industry than in other sectors if aligned with the pillars of sustainable tourism – environmentally friendly practices, protection of natural and cultural heritage, and bringing social and economic benefits to local people.

In particular, carbon offsetting projects that protect the natural and cultural heritage in locations visited by travelers, can play a dual role in preserving the assets that generate benefit for travel while offsetting the emissions of an activity, allowing the travel industry to evolve past the 'pay to pollute' view of carbon offsetting.

This methodology therefore a proposes a strategic approach to carbon offsetting for hotels, which reflects the realities of both the decarbonization pathways available and the proliferation of offsetting within the wider travel and tourism industry, and which ensures that the offsets applied benefit not only the atmosphere but also the people and places on which the sector depends, applying the so-called Sustainable Tourism Equity Principle. For full rationale and explanation of the strategy please see Appendix G.

3.3.1 A Strategic Approach to Carbon Offsetting for Hotels

Given the considerations above, this methodology builds off the Oxford Offsetting Principles for Net-Zero Aligned Carbon Offsetting for a strategic approach for the hotel industry.

Principle 1: Cut emissions, use high quality offsets, and regularly revise offsetting strategy as best practice evolves

The methodology seeks to achieve this principle in practice and prioritize hotels reducing their own emissions and scaling up removals, minimizing offsets to achieve net zero by:

1. Differentiating between claiming retired credits and accounting for linked offsets, where all entities in a hotel's value chain can account for the carbon offset of a hotel stay. While only one entity may make a claim of purchasing and retiring the credit for the offset, other entities in the

value chain may include record of that offset in their accounting. For full rationale, examples of this in practice, and a discussion of some of the challenges involved, please see Appendix G.

2. Enabling hotels to account for offsets toward net-zero pathway each year, with claims capped within the sectoral budget for each year (Table 4). Hotels should be able to account for carbon offsets for net-zero planning and claims, **up to the amount equivalent to their sectoral decarbonization pathway for each year**.

Table 4: Sectoral Budget for every 5 Years

Year	kgCO2e/M2 allowable for offset accounting for net-zero claims
2020	20.0
2025	13.7
2030	7.3
2035	5.5
2040	3.7
2045	2.0
2050	0.18

Any accrued offsets for the year purchased by the hotel's owner, operator, or franchisor can then either be counted toward the Scope 3 value chain emissions, or accrued for a further year based on established best practice for carbon accounting. Any accrued offsets for the year purchased through the value chain cannot be carried forward. For further details and rationale please see Appendix G.

3. Ensuring that the offset must meet a minimum threshold of quality and contribution to sustainable tourism, in order for it to be included in a hotel's carbon offsetting claims.

The attributes of a good carbon offset are described in Table 5.

Table 5: Attributes of a good carbon offset

Verified	Verifying offsets ensures that the emission reduction or carbon removal actually takes place. Ensure that carbon offsets have undergone a rigorous validation and verification by a third-party organization and received certification from a credible carbon standard in a voluntary or compliance market. See Section G.3 in Appendix G for a list of key credible carbon standards.
Minimized Forward-selling	Any time gap between the purchase of the offset and the successful execution of the emissions reducing or carbon removing activity must be minimized, and mechanisms to ensure that the environmental benefits from an offset are actually delivered must be strong.
Accurately accounted	Care must be taken to ensure offset providers are properly converting the climate impacts of non-CO2 climate pollutants into CO2 terms according to their actual warming impact, particularly for short-lived greenhouse gases like methane.
Additional	Offsets should be additional, meaning they represent an emission reduction or carbon removal relative to a baseline that would not have taken place but for the offsetting activity. Additionality can be difficult to determine and verify, and ultimately involves some degree of subjectivity. There are key questions buyers can ask to determine whether the offset project is additional or not. For more details you can refer to the additionality guidance published by Carbon Offset Guide[25].
Permanent	Permanence refers to how long a greenhouse gas stays out of the atmosphere, whether stored in a physical reservoir or whose emission was deferred through avoidance. In the case of physically storing carbon in a reservoir (e.g. a forest or a geological sink), the risk of reversal of that carbon back into the atmosphere must be acknowledged and accounted for in the offsetting plan. For example, afforestation or reforestation generates carbon removal carbon offsets, but if forests are subsequently cut down or destroyed by pests, fire, or other natural disturbances the stored carbon is reversed and the carbon offset must be invalidated.
Co-beneficial	It is essential that in addition to contributing to significant emissions reduction the carbon offsets should also realize environmental and social equity and integrity. Also, a project should demonstrate it complies with all legal requirements in the jurisdiction where it is located. Depending on the type of project and the jurisdiction where it is located, however, additional reviews and safeguards may be necessary to guard against negative outcomes unrelated to GHG emissions.

Principle 2: Shift to carbon removal offsetting

An immediate transition to 100% carbon removals is not necessary, nor is it currently feasible, but organizations must commit to gradually increase the percentage of carbon removal offsets they procure with a view to exclusively sourcing carbon removals by mid-century. Examples of emissions reduction and carbon removal projects are included in Appendix G.

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[25] http://www.offsetguide.org/high-quality-offsets/additionality/high-quality-offsets-additionality-questions-for-buyers-to-ask-about-additionality/

Principle 3: Shift to long-lived storage type carbon offsets

Offsets increasingly need to come from activities that store carbon permanently, with very low risk of re-release into the atmosphere. Such 'long-lived' storage includes storing CO_2 in geological reservoirs or mineralizing carbon into stable forms, rather than 'short-lived' storage which includes biological methods such as afforestation, reforestation and soil carbon enhancement which may result in carbon being re-emitted in the near to medium term. A net zero aligned portfolio of offsets must increase over time the portion of carbon removals over emission reductions, and the portion of long-lived storage over short-lived storage. Table G.2.3, in Appendix G gives examples of different types of long- and short- lived storage projects and Figure G.2.4 in Appendix G provides an example of a typical pathway to 2050 for the uptake of different types of projects.

Principle 4: Support the development of net-zero aligned offsetting – The Sustainable Tourism Equity Principle

Carbon offsets relating to hotel emissions should create a nexus of benefits between carbon offsetting and tourism, so that the offset projects also benefit local economies and heritage through application of the Sustainable Tourism Equity Principle as outlined in Figure 6.

Figure 6: The Sustainable Tourism Equity Principle

The Sustainable Tourism Equity Principle

In order to support the development of net-zero aligned offsetting the offset should comply with a minimum threshold contribution to sustainable tourism, and the selection of a project should be viewed in terms of its geographic location and its contribution to the UN SDGs. A list of examples of how carbon offsetting can contribute to the UN SDGs is found in Appendix G.

- The offset should provide a tangible economic and social benefit to SMEs and local communities and economies, ideally supporting the decarbonization of emissions related to tourism activities.
- The offset should contribute to preserving natural and/or cultural heritage.
- The offset should identify the contribution to related SDGs as it pertains to supporting a location used for tourism, and in particular it should benefit tourism-related businesses and activities.
- The offset should be related as best as possible to the region of the hotel: municipality, state/province, country or physically proximate region. Where the hotel is located in an area without proximity to potential offset projects, it should be at least tied to the same macro-region of the globe.
- Finally, a carbon offset project can also seek to align with the hotel company's corporate strategy or their sustainability program. For example, if the company has a vision to empower women, or to empower certain communities, minorities, refugees, or to improve education, then they should look for projects which are focused on such themes.

SECTION 4: GHG EMISSIONS QUANTIFICATION & REPORTING

4.1 REPORTING APPROACH

GHG emissions and corresponding plan and progress should be publicly reported annually for each of the default categories.

The methodology provides guidance for reporting, recognizing that this may differ from current or eventual regulatory reporting requirements or stakeholder formats. As a general rule, hotels should follow the GHG Protocol Corporate Accounting and Reporting Standard and ISO 14064-1:2018 Organizational Level Quantification and Reporting of GHG Emissions and Removals, with the following clarifications based on common industry practice:

- As common practice, hotels report on associated CO2, CH_4 (Methane), and N2O (Nitrous Oxide) emissions collectively as CO_2e as those are the ones found in the sources of energy consumed and purchased. As CH_4 and N_2O are consistently an insignificant source in comparison to CO_2, hotels only report on individual gases when required by disclosure frameworks such as CDP. Where relevant, hotels can report on HFCs. Other Greenhouse Gases are excluded as they are not significant and generally not present in commercial buildings.

- Hotels generally report based on financial control or operational control, with operators reporting using the operational control approach, and owners using the financial control approach. Where a company owns a portion but not all of its portfolio, it tends to use operational control. Reporting on equity share has proven cumbersome and impractical for the hotel industry and is uncommon.

- Hotels should use a calendar year or a 12-month period aligned with financial reporting or the realities of data availability i.e., October-September that spans two calendar years. For fair comparison, a calendar year boundary should be used.

- The data hierarchy to be followed is: activity data is the most preferable when available, followed by proxy data based on prior or relevant actual data to the company next best, and default data is the least preferable.

- For converting actual activity data (fuel consumption, purchased electricity usage, etc.), the following are recommended:
  - The latest emission factors available for the same calendar year should be used.
  - The global warming potential (GWP) of CH4 and N2O commonly use 100-year values based on IPCC AR5[26] until IPC AR6 is released, at which time it should be updated as retroactively as possible. Some argue a 20-year horizon for methane, though this is not the most common approach for the hotel industry.

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[26] Intergovernmental Panel on Climate Change 5th Assessment Report

- Emission factors should be chosen at country and sub-national levels as best and consistently available. A complete list of sources of emission factors used for the hotel industry is available in the guidance document of each year's Cornell Hotel Sustainability Benchmarking (CHSB) Index.[27]

- Although emission factors for purchased steam and chilled water should be reported based on the emission factor provided by the supplier, in most cases this has proven extremely challenging for the hotel industry. A default emission factor or a default methodology will most likely be the best alternative until something better is developed. This includes the emission factors for steam published by the Energy Star in the US or the UK Government, and the US Energy Information Agency 2010 publication 1605(b). See Appendix F for discussion on quantifying purchased chilled water globally.

- For the Scope 2 emissions boundary as per the SBTi, hotels may choose to report purchased heating and cooling (i.e., steam and chilled water from central plants or other sources) as Scope 1.

  - Though this contradicts the GHG Protocol, the SBTi has offered this approach as those sources are generally tied to the same uses of Scope 1 for heating and cooling a building.

  - Alternatively, hotels can report in a structure of electric vs. non-electric emissions as the distinction is considered to be more clear, as onsite electricity generated at the property under its ownership is technically Scope 1 and creates the same challenge, as does electrification of heating and cooling in general.

- Hotels may report both location-based and market-based emissions[28].

  - All hotels at the least should report market-based emissions. As net zero advances and renewable energy purchases become the primary approach toward decarbonization for a commercial building, location-based accounting will be less relevant.

  - For market-based emissions, although the GHG Protocol Scope 2 guidance indicates that the *residual mix* should be used to determine emission factors, in practice this is unavailable in almost all of the world except Europe, and the methodology is still evolving, with historical figures only available for the past few years and varying widely. The common practice is to report using the same set of emission factors used for location-based reporting, and subtract the purchased renewables. Guidance for an approach to the residual mix is found in the Section 4.4 'Distinctions' below, and further explanation on approaches to Scope 2 emissions calculation can be found in Appendix D.

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[27] CHSB is available at www.greenview.sg/chsb-index
[28] See Appendix D for more information

4.2 MEASURES AND METRICS

The following should be reported at a minimum and be publicly available in some format, which can be a routine ESG disclosure or report.

1. Total Scope 1 Emissions
   - In $kgCO_2e$ for a hotel
   - In $MTCO_2e$ for a portfolio
2. Total Scope 2 Emissions
   - In $kgCO_2e$ for a hotel
   - In $MTCO_2e$ for a portfolio
3. Total Scope 3 Emissions by category
   - In $kgCO_2e$ for a hotel
   - In $MTCO_2e$ for a portfolio
4. Scope 1 & 2 Emissions per square meter in $kgCO_2e$
5. Total Scope 1, 2 & 3 emissions in $MTCO_2e$
6. For a hotel property, the Hotel Carbon Measurement Initiative (HCMI) measures for emissions per room night and emissions per square meter per hour of meeting space usage, both in $kgCO_2e$
7. % of Scope 1 and 2 Energy from renewables
8. % of Electric power obtained from renewables
9. Energy intensity in kWh per square meter

In addition, hotels may find it useful to report:

- Scope 1 & 2 Emissions per occupied room in kgCO2e
- Scope 1 & 2 Emissions per square foot / square meter in kgCO2e
- Scope 3 Emissions intensity by category and relevant intensity metrics as available
- Scope 1, 2, & 3 Emissions per square meter / square foot in kgCO2e
- Further breakdowns of % of energy:
  - % of electricity from renewables, inclusive of grid power generated from renewables
  - % of electricity from renewables, exclusive of grid power generated from renewables
  - % of energy from low-carbon sources such as hydrogen or nuclear power.
  - % of energy obtained from electric power sources (% electrification)
- Energy intensity per occupied room
- Energy intensity per square foot / square meter
- Energy intensity in a different unit of measure (MJ, kBtu, etc.)
- Breakdowns of carbon offsets accounted for
  - Total Scope 1 & 2 Emissions Offset and Net Scope 1 & 2 Emissions in MTCO2e
  - Total Scope 3 Emissions Offset and Net Scope 3 Emissions in MTCO2e, percentage of which retired by the hotel/company and % accounted for but retired by another entity

- o Net emissions intensity after allowable offsets in kgCO2e/SqM
- o % of allowable Scope 1 & 2 Emissions Offset
- o % of Scope 3 Emissions Offset, percentage of which retired by the hotel/company and % accounted for but retired by another entity
- o % of emissions allocated by source (owner, operator, franchisor, value chain)

4.3 DISCLOSURES

In addition to annual disclosure of the metrics above, companies (or individual hotels if required) should disclose the following content at a minimum in the year of their commitment and within any climate action plans[29] and then thereafter it is suggested to disclose in 2025, 2027, and 2030[30]. Baseline and current progress in each of the default categories for the corresponding year for categories with defined KPIs.

1. Description of the plan, or link to where the plan or description of it is located, which should be updated for all categories
2. Any significant changes since the prior disclosure (i.e., adjusted baseline)
3. Sources of emission factors and coefficients used to perform the calculations, with year of publication.
4. Clarifications on key assumptions, estimations, extrapolations, exclusions, or other aspect to enable stakeholders to assess progress fairly.
5. Indication of the figures that have been externally verified.

This is not intended to evolve into a formal protocol or an addition to the already cumbersome annual ESG reporting process, but a simplified table that can be added to an appendix of an ESG report or stand-alone PDF download, and ultimately the source submitted to disclose a net-zero claim to a stakeholder. Note that the primary purpose of this document is methodology rather than reporting and disclosure, which will fit into existing channels as necessary.

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[29] Climate Action Plans as outlined by the Glasgow Declaration for signatories to deliver within 12 months of signing the commitment
[30] These years have been selected to support the preparation of future methodology versions to address 2030 guidance and yardsticks ahead of them, and so that a company is expected to disclose at least once in between the five year increments.

4.4 DISTINCTIONS

In order to perform GHG emissions calculation and progress towards net zero, it is important to clarify the distinctions in the process for:

- A single hotel vs. a portfolio of hotels
- Reporting for fair comparison vs. reporting for a company's own progress

4.4.1 Distinctions between a Single Hotel vs Portfolio of Hotels

- A single hotel should evaluate whether additional sources of emissions should be included in the boundary, and to report and set forth a plan for decarbonizing as applicable to the hotel, such as refrigerant leakages, mobile vehicle fuel, and onsite wastewater treatment.

- In general, the larger the size of the portfolio, the less significant the Relatively Insignificant and other sources of Scope 1 & 2 emissions will be, and should enable more estimations or exclusions to focus on the key sources of emissions. This generality may not apply in cases where the portfolio consists of a specific type, such as resorts that use more vehicles and treats wastewater onsite, or integrated resorts.

- A portfolio of hotels may not find it useful to embed other company Scope 1 & 2 emissions into its intensity figures for decarbonization per square meter. In such case it can separate them out in the disclosure and planning per the default categories.

- A portfolio of hotels or a company may have different sub-portfolios of varying asset classes as well as different degrees of financial and/or operational control. For example, a conglomerate hotel chain that acquires a smaller hotel chain of differentiated hotel types and significant regional differences, and maintains its operations separately from the rest of the portfolio in some of the areas concerning decarbonization, could be reported separately as the entity (or subsidiary).

- Currently, the residual mix electric power grid emission factors are not available or consistent globally for calculating market-based emissions. Furthermore, the residual mix is not currently understood by the wider community of small hotel owners and operators, or commonly used. While use of residual mix emission factors tends to incentivize the purchase of renewable energy in the long-term, it remains an enigma for use on a global scale. Portfolios of hotels should assess whether the variance between location-based emission factors and residual mix emission factors available in immediate markets (i.e., in the European Union) represents a significant portion of the portfolio's emissions, and whether the volatility in year-over-year emission factors will present challenges to ongoing disclosure to stakeholders. For a regional chain operating in Europe, residual mix emission factors are likely to be most of the portfolio. For a large or small global chain based in North America or

Asia, it may be negligible. For a full explanation of the residual mix, market-based emission factors, and renewable energy purchases, see Appendix D.

- While changing a single hotel's baseline figures and assumptions in progress against them would only be needed in the event of a structural change to the facility or its main supply of energy, a portfolio of hotels has a more complex set of changes and data challenges. Similarly, the larger the portfolio and the more diverse in owned/managed/franchised, the larger the set of changes and challenges. For portfolio reporting, hotel companies should follow the methodology as set forth in the WWF Hotel Waste Measurement Methodology Section 3, which outlines a comprehensive guidance for waste measurement that can be adapted for GHG emissions on the following:

  - Including and excluding properties as they enter or exit the portfolio
  - Gap-filling of missing data for portions of a hotel and portfolio
  - Portfolio extrapolation and use of default coefficients

  For further information on this methodology, please refer to Appendix H.

4.4.2 Distinctions between Reporting Progress vs. Comparisons and Benchmarking

When a hotel or company is disclosing its net-zero plan and progress, the indicators reported may vary widely in boundary and quantification method such as choice of emission factors. Essentially the hotel or company is reporting against itself, and harmonization should not be needed in addition to the common set of metrics and disclosures provided in this section.

For reporting to enable comparing performance across hotels or portfolios, the following opportunities for disclosure exist:

- Comparing level of ambition toward the milestones in relation to yardstick years. Some may plan to reach net zero prior to 2050, some may transition to renewable electricity before 2030, etc.
- Percentage of electricity from renewables, which does not involve intensity metrics
- Energy and carbon emissions intensity that is calculated uniformly with the same set of metrics, conversions and emission factors for all hotels, such as the Cornell Hotel Sustainability Benchmarking Index

SECTION 5: HOTELS AS A PART OF OTHER ENTITIES' VALUE CHAIN EMISSIONS

5.1 DEFINING THE ENTITIES INCLUDING HOTELS OR HOTEL STAYS IN THEIR VALUE CHAIN EMISSIONS

For net zero, the carbon footprint of a hotel stay should be understood within its relation to the wider value chain of hospitality and travel. In addition to the three separate potential entities of owner, operator, and brand franchisor that one hotel would fall under, the hotel may also form part of the boundary of a contracted real estate asset manager as well as the entities financing or investing in the hotel or company.

Along with transportation, accommodation is part of Business Travel, one of the 15 defined categories for any company within the **GHG Protocol Supplement: Corporate Value Chain (Scope 3) Accounting and Reporting Standard**. A hotel stay is also part of the value chain for tour operators and other entities that sell packages or perform roles in bookings and transactions. Finally, a hotel is part of a wider destination or set of destination-level entities. **For all of these entities and more, the hotel or a hotel stay is part of their Scope 3 emissions that will need to be addressed in their own respective net-zero action.** Table 6 outlines these entities and the role they play.

Table 6: Entities in the value chain of a hotel stay

ENTITY	RELATION AND ROLE
HOTEL OWNER	Owns the physical asset of the hotel. May not own the land upon which the hotel sits. A hotel may have more than one owner. The owner is responsible for approving operator budgets and making investments in the building's upkeep and its equipment, in particular large capital equipment such as chillers and boilers, and other FF&E such as lighting and faucets. This may be a publicly traded entity, SME, private equity fund, sovereign wealth fund, or a number of other structures.
HOTEL OPERATOR	Manages the operations of the hotel and staffs the hotel. May be in a management agreement or lease, whereby some of the physical building responsibility lies with the owner.
HOTEL FRANCHISOR	Provides the brand/flag of the hotel and other support such as distribution, standard operating procedures, design and style guides, training guides, software, and various other aspects to a separate operator. In many cases this includes sustainability software. The franchisor does not staff the hotel or take part in its operation.
HOTEL ASSET MANAGER	Manages the ongoing strategy and budget of the physical hotel property on behalf of the owner, in the case of the owner of the hotel engaging or outsourcing a separate entity to fulfil asset management duties, but that entity is not the operator of the building and does not hold ownership in the asset, but receives a fee for asset management services from the owner.

ENTITY	RELATION AND ROLE
HOTEL COMPANY INVESTOR	Invests capital into the entity that owns, operates, and/or franchises a hotel or a portfolio of hotels.
HOTEL LENDER	Provides a loan to the entity structured to own the hotel property.
HOTEL DEVELOPER	In the case of the hotel owner not undertaking the initial construction and development of the hotel but acquiring it upon turnkey opening, generally an entity that leads the design, financing, permitting, land acquisition, and construction of the hotel or master-planned destination, then sells the real estate to a different owner.
PHYSICAL DESTINATION ENTITY	If applicable, when a hotel is located within a specific, master-planned mixed use destination where the entity may be a development corporation but plays an ongoing role in the destination's management and ownership. The hotels within the destination will have separate operators and may have separate ownership, e.g. Sentosa (Singapore), Nusa Dua (Bali), Playacar (Mexico), Cap Cana (Dominican Republic), NEOM (Saudi Arabia)
GEOGRAPHIC/POLITICAL DESTINATION ENTITY	The municipal, state/province, designated tourism zone/region, nation, or supranational union or initiative covering several states, nations or economies. This entity may be responsible for policy and codes for hotel building, zoning, accreditation, and operational aspects. The buildings will also be a part of the destination's overall footprint, e.g. Glasgow City Council, Scottish Government, UK Government, Government of Italy, European Union.
GUEST	The person or persons staying at the hotel or, where applicable, attending a meeting or using other amenities or facilities.
CUSTOMER	The entity on behalf of which the guest is staying, if the guest part of an organization, or an entity such as a tour operator.
TRAVEL BUYER	An entity buying the travel on behalf of a customer or guest, such as a corporate travel management company. This entity is responsible for sourcing the room nights, e.g. CWT, Amex GBT, Key Travel, Amadeus
TRAVEL INTERMEDIARY	An entity involved in the marketing, sales, distribution, transaction of the hotel room night or meeting space rental, such as an OTA, software booking engine, destination management company, or backend application, e.g. Expedia, Booking.com,Trip.com, TripAdvisor.
EVENT ORGANIZER	The entity organizing an event which generates the demand for the travel and hotel stays, but which may not represent the customer or be involved in the purchase of the hotel stay. Note this may be further segmented into the organizer of the event and the owner of the event, as well as the entity responsible for the ground handling activities within the destination (a Destination Management Company or DMC)

ENTITY	RELATION AND ROLE
HOTEL AND TRAVEL MEDIA	An entity that provides B2C or B2B media and communications relating to the hotel industry or wider travel sector, but whose business model is not tied directly to a transaction of travel purchases.
TRAVEL CARBON OFFSETTER	An entity that provides or profits from carbon offsetting for consumer or business activities that include hotel stays or wider travel, which may engage consumers for carbon offsetting separately from relation to any other entity in the travel value chain.
SERVICE SUPPLIER	An entity providing a service to a hotel, such as IT support, offsite server, maintenance, consulting, etc.
GOODS SUPPLIER	An entity supplying goods procured by the hotel such as food, soap, etc.
OTHER	Any other entity involved in the value chain that is not specifically categorized within the above.

5.2 DEFINING THE GHG EMISSIONS BOUNDARIES OF A HOTEL AS SCOPE 3

Other than the owner and operator, a hotel or hotel stay may fall within the Scope 3 emissions of the entities in the Table 6 above. While relation of the entity to the hotel varies in proximity and control, the most important consideration is to avoid **Scope 3 of a Scope 3** in the boundary, meaning that at a default, unless commonly expected, a hotel's Scope 1 & 2 Emissions listed in Table 2 (pp. 19-20) should be included, but NOT the hotel's Scope 3, and should be adjusted to add or remove Scope 1 & 2 sources for level of significance.

Based on that premise, entities should then proceed to account for their organizational Scope 3 emissions from hotels or hotel stays per the relation in the Table 7 below. Note also that Scope 3 inherently involves double-counting, so the table below is for purposes of supporting value chain accounting, but not to imply that allocation or apportionment of emissions should be quantifiably distributed among entities.

Table 7: Value Chain Boundaries for Hotels and Hotel Stays

ENTITY	SCOPE 3 BOUNDARY
HOTEL FRANCHISOR	• Scope 1 and 2 Emissions of the hotel facility and operations
HOTEL ASSET MANAGER	• Scope 1 and 2 Emissions of the hotel facility and operations
HOTEL COMPANY INVESTOR	• Scope 1 and 2 Emissions of the hotel facility and operations • Note that the proportionate embodied carbon of the building in the case of investing in an owner should be accounted for
HOTEL LENDER	• Scope 1 and 2 Emissions of the hotel facility and operations • Note that the proportionate embodied carbon of the building in the case of investing in an owner should be accounted for
HOTEL DEVELOPER	• Until exiting the venture, Scope 1 and 2 Emissions of the hotel facility and operations • Embodied carbon emissions of the building are the entity's Scope 1, 2, and 3 depending on the source
PHYSICAL DESTINATION ENTITY	• Scope 1 and 2 Emissions of the hotel facility and operations • Other value chain emissions of the hotel to be captured separately via other boundaries of the entity (i.e., entity may own/operate the ground transport or outsourced laundry facilities directly) • Note that the proportionate embodied carbon of the building in the case of investing in an owner should be accounted for, which may fall under Scope 1 & 2 or Scope 3, depending on the structure
GEOGRAPHIC/POLITICAL DESTINATION ENTITY	• Scope 1 and 2 Emissions of the hotel facility and operations • Other value chain emissions of the hotel to be captured separately as related to businesses and activities within the destination
GUEST	• Scope 1, 2, and 3 emissions from the hotel stay per the HCMI[31] methodology apportioning emissions based on facility type and including outsourced laundry
CUSTOMER	• Scope 1, 2, and 3 emissions from the hotel stay and meeting space usage per the HCMI methodology apportioning emissions based on facility type and including outsourced laundry
TRAVEL BUYER	• Scope 1, 2, and 3 emissions from the total amount of hotel stay and meeting space bookings per the HCMI methodology apportioning emissions based on facility type and including outsourced laundry • Other offsetting of entity's emissions should contribute to sustainable tourism per Appendix G
TRAVEL INTERMEDIARY	• Scope 1, 2, and 3 emissions from the total amount of hotel stay and meeting space bookings per the HCMI methodology apportioning emissions based on facility type and including outsourced laundry • Other offsetting of entity's emissions should contribute to sustainable tourism per Appendix G.
EVENT ORGANIZER	• Scope 1, 2, and 3 emissions from the total amount of hotel stay and meeting space bookings per the HCMI methodology apportioning emissions based on facility type and including outsourced laundry • Other offsetting of entity's emissions should contribute to sustainable tourism per Appendix G.

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[31] Hotel Carbon Measurement Initiative – See Appendix J for more information

HOTEL AND TRAVEL MEDIA	- Scope 1, 2, and 3 emissions per HCMI methodology resulting from the entity's actual business travel - Other offsetting of entity's emissions should contribute to sustainable tourism per Appendix G.
TRAVEL CARBON OFFSETTER	- Any carbon offsets transacted and relating to hotel stays or meeting space usage should be quantified using HCMI - Offsets transacted in relation to the hotel stay should contribute to sustainable tourism per Appendix G.
SERVICE SUPPLIER	To be determined by the supplier based on the relationship of the services provided to the hotel
GOODS SUPPLIER	To be determined by the supplier based on the relationship of the services provided to the hotel
OTHER	To be determined by the entity based on the relationship to the hotel the services provided to the hotel

EXAMPLES

The examples below show various scenarios of how the myriad relationships can play out. In each case, the entities highlighted in **bold** will have an interest in the carbon emissions of the hotel stay.

Scenario 1

Five delegates are staying at the **Radisson** RED in **Glasgow** to attend the COP26 climate change conference at the **Scottish Event Campus**. The conference is hosted by the **UK** in partnership with **Italy** and organized by **UNFCCC**. The hotel is owned by local commercial hotel development company **Forrest Hotels**, and managed and operated by Radisson.

Delegate 1 is an **independent contractor** working for one of the **event production companies** contracted by the UK government to support the delivery of COP. She booked her hotel stay through the COP 26 Corporate Booking Partner **MCI** and will invoice the event production company.

Delegate 2 is a high-level representative from a **UN agency**. His hotel stay was booked via the agency's **corporate travel management company**.

Delegate 3 works for a small **NGO** and booked her hotel stay via a mainstream **online travel agency** which she will claim on expenses.

Delegate 4 is a **freelance journalist** covering the event and booked his hotel stay direct with the hotel. He is offsetting his journey and stay using an **online offset provider**.

Delegate 5 is a senior executive from **Radisson**.

Scenario 2

A group of ten students from Germany are traveling to Glasgow for **COP26**. Their group trip was booked on an **online travel website** and included flights from Frankfurt

to Edinburgh on Lufthansa and accommodation at a **small privately owned hotel** in central **Edinburgh**. The hotel owner picked them up from the airport in his minibus. During their seven-day stay in Scotland, they travelled three times to Glasgow to **the SEC**, using intercity and local trains, and visited **two major attractions** in Edinburgh, booked through the same website.

Scenario 3

A **global travel industry association** is hosting a side event during COP26. The event is a half day meeting of three of its senior executives and ten CEOs **of member companies**. The event is taking place at the Mercure Glasgow – which is owned by **Alternative Income REIT Plc** (a publicly traded company on the London Stock Exchange) and operated by **Jupiter Hotels** under a franchise agreement with **Accor**. The three staff members are staying at the Mercure, as are two of the CEOs. Three of the CEOs work **for global hotel chains** and are staying in their respective company hotels. The other five CEOs are traveling to / from Glasgow on the day.

5.3 RESOURCES FOR ESTIMATING AND QUANTIFYING SCOPE 3 EMISSIONS

After exploring the various entities for which hotels and hotel stays involve Scope 3 emissions, the next challenge is understanding how to perform the calculations for these emissions. According to the hierarchy of calculation approaches of the IPCC, as outlined in the GHG Protocol, **activity data is the primary source that should be used for calculating emissions, and facility-specific emission factors are preferable**. As such, value chain entities should use the corresponding activity data of the hotel during the relevant period. For example, a travel buyer would compile the inventory of Scope 3 from hotel stays and meeting space usage according to the HCMI methodology, by obtaining the actual HCMI metrics from each hotel as generated for a 12-month period ending not more than 9 months prior to collection.

While this may be a reasonable exercise to collect for a hotel or instance of hotel stays in an area, **it may prove cumbersome for a travel buyer of hundreds of thousands of room nights across hundreds of hotels and dozens of countries to obtain the actual recent HCMI metrics for each hotel**. Likewise, it will be a significant undertaking for a hotel or hotel chain to provide exact emissions for all room nights for the year to all interested travel buyers. In such cases, per the GHG protocol, sector-specific guidelines and calculation tools, as well as those offered by the GHG Protocol, should be sought.

The established industry methodology for calculating the carbon emissions of a hotel stay is the HCMI methodology, and the established industry set of default activity data for the carbon emissions of hotels is the Cornell Hotel Sustainability Benchmarking (CHSB) Index which provides HCMI coefficients and other intensity metrics of carbon emissions for hotels by segment in specific cities, countries, regions, and climate zone global regions.

In addition, Greenview utilizes CHSB index data as a base to output the Greenview Hotel Footprinting Tool, which adds estimations for all countries and segments globally and can be used by the travel industry to quantify estimated carbon footprint of hotel stays and meeting space usage.

The GHG Protocol Quantis Scope 3 Evaluator Tool incorporates the CHSB index as its referential data source for estimating emissions from accommodation in the business travel category, in addition to other government and commercial entities.

Entities including hotels or hotel stays in their Scope 3 emissions should seek facility-level activity where possible, and supplement with the CHSB index or Greenview Hotel Footprinting Tool to quantify the carbon footprint of hotel stays and meeting space usage as part of their Scope 3 emissions per the boundary suggested above. For further information on HCMI, CHSB, and the Greenview Hotel Footprinting Tool, see Appendix J. For complete listing of emission factors and default data sources, see Appendix E.

5.4 MULTIPLE COUNTING FOR PURCHASED RENEWABLE ENERGY AND OFFSETS

Given that net zero requires almost all Scope 3 emissions to be addressed, and that a hotel's and hotel stay's emissions are part of a myriad of entities' boundaries, it is understood that the same hotel or room night may have a carbon offset or Renewable Energy Certificates / Energy Attribute Certificates (RECs/EACs) purchased for it by multiple entities.

This methodology takes the approach of not ruling out multiple acts of purchased carbon offsets and RECs, while also encouraging proper accounting and allocation in order to maximize the benefit and quality of them, as follows:

- **If one entity within the value chain purchases a valid, retired offset** for the GHG emissions of a hotel or a hotel stay, all entities in the value chain can account for that amount of carbon as part of their emissions offset.
- **The claim must be related to the amount of carbon offset for the hotel or stay**. Where the facility-level data is not available directly, default industry coefficients from the CHSB index should be used.
- **Hotel owners and operators can only account for carbon offsets** purchased by another entity as relating to the limit of their Scope 1 & 2 emissions thresholds per year, and not to the hotel's own Scope 3.
- **Offsets allocated to the hotel for the year in excess of the annual Scope 1 & 2 limits** cannot be carried over to subsequent or prior years until after 2030 or more established guidance, standards, and registries exist.
- **The entities should not subtract or net-out the emissions reduced from offsetting**. They should disclose them separately in terms of the total emissions and the total offsets related to those emissions.
- **In the case of RECs, the same applies but the threshold is up to 100% of the hotel's electricity** (or other energy if a non-electric REC is sourced) per year and not carried over, unless purchased by the hotel owner or operator through a contractual instrument with a utility or PPA that adjusts for each year's estimates.
- **Hotels should seek to maximize communication across the value chain** for their purchase of RECs and impact to lower their HCMI figures, as well as include this information

in submission of annual data to the CHSB Index so that the default coefficients accurately reflect the activity data of the hotels in each geography.

As the implications of large Scope 3 emissions accounting and decarbonization efforts unfold, challenges with multiple counting will likely emerge not only for the hotel industry but the wider travel industry, as well as many other products and services outside it. Lack of collective action among the industry (as well as the reverse outcome that no entity can account for the purchased RECs or offsets of another entity for the same source of emissions) will result in confusion, inefficient use of resources, and multiple instances of purchases for the same emissions. As outlined in Appendix K, an opportunity for further work is to share best practices and develop innovative solutions for addressing the multiple counting issue.

GUIDE TO APPENDICES

The following appendices provide further detailed information, discussion and rationale for various issues addressed in the methodology. Table 8 below provides a summary of each appendix and key information contained within.

Table 8: List of Appendices

Appendix A: Understanding the Concept of GHG Emissions Scopes	• Overview of Scope 1, 2 and 3 definitions as they relate to hotels • List of GHG Protocol Scope 3 value chain categories as related to a hotel
Appendix B: Setting Hotel Net-Zero Boundaries Within The Universe of Scope 1, 2, and 3 Emissions	• Classification approach for prioritizing Scope 1, 2 and 3 emissions of a hotel • Categorized list of over 500 GHG emissions sources for a hotel
Appendix C: Methodology Alignment with the UN Race To Zero, SBTi, SME Hub, and Glasgow Declaration	• Detailed analysis of alignment of this methodology with other frameworks • Guidance on how to apply this methodology when working with / towards other frameworks, particularly science based targets
Appendix D: Purchased Renewable Energy and Addressing Market Based Emissions	• Different ways hotels can embrace renewable energy through on-site generation, PPAs and EACs • Availability of purchased renewable energy in different geographies • Scope 2 quantification and accounting approaches
Appendix E: Emission Factors, Coefficients, and Default Data for Quantification	• List of sources
Appendix F: The Purchased Chilled Water Conundrum	• Discussion on the challenge of quantifying emissions from purchased chilled water
Appendix G: A Net-Zero Carbon Offsetting Strategy for the Hotel Industry	• Background context for offsetting • Detailed description and rationale of strategy • List of SDG aligned carbon offsetting projects • Overview of key carbon standards • How to address multiple counting • Brief discussion of carbon insetting
Appendix H: Portfolio Extrapolation Methodology	• Outline approach for extrapolating portfolio level data
Appendix I: Upstream Emissions – Embodied Carbon in Hotel Buildings, FF&E, and Food & Beverage	• Detailed information on embodied carbon in buildings including key sources of embodied carbon, how it relates to the building lifecycle, discussion of current approaches to calculating embodied carbon, and key actions to reduce embodied carbon in hotels • Detailed discussion of upstream emissions from purchased furnishings, including key sources of emissions, calculation approaches and reduction actions

	• Detailed discussion of upstream emissions from F&B, including key sources of emissions, calculation approaches and reduction actions
Appendix J: Industry Tools to Calculate Carbon Footprint of Hotels	• Overview of Hotel Carbon Measurement Initiative (HCMI), Cornell Hotel Sustainability Benchmarking Index (CHSB), Greenview Hotel Footprinting Tool • Scenarios for using these tools based on different user requirements (hotels, business travel, destinations etc.)
Appendix K: Opportunities for further work	• Potential research projects, collaborative efforts and other opportunities for further work identified by the methodology developed process
Appendix L: Frequently Asked Questions	• Additional information on key issues which arose during the consultation
Appendix M: Stakeholder Engagement	• Overview of stakeholder engagement process including entities involved
Appendix N: References and Resources	• List of references and resources used in this methodology
Appendix O: Glossary	• Definition of terms used

APPENDIX A: UNDERSTANDING THE CONCEPT OF GHG EMISSIONS SCOPES

The Greenhouse Gas Protocol (GHG Protocol) was established by the World Resources Institute (WRI) and World Business Council for Sustainable Development (WBCSD) to develop a standard for accounting and reporting GHG emissions. The [GHG Protocol Corporate Accounting and Reporting Standard](#) (Corporate Standard) was developed and is now widely used by organizations to understand, inventory and manage their GHG emissions. The Corporate Standard categorizes emissions into three 'scopes':

- Scope 1 – Direct GHG emissions that occur from sources owned or controlled by the organization.
- Scope 2 – Indirect GHG emissions from generation of purchased electricity consumed by the organization.
- Scope 3 – Other indirect GHG emissions that occur as a consequence of the activities of the organization, but occur from sources not owned or controlled by the organization

The GHG Protocol also released the [GHG Protocol Scope 2 Guidance](#) which standardizes how organizations corporations measure their Scope 2 emissions from purchased electricity, steam, heat and cooling.

For GHG emissions calculation, seven gases are included:

- Carbon dioxide (CO_2)
- Methane (CH_4)
- Nitrous oxide (N_2O)
- Hydrofluorocarbons (HFCs)
- Perfluorocarbons (PFCs)
- Sulfur hexafluoride (SF_6)
- Nitrogen trifluoride (NF_3)

Though water vapor and ozone (O_3) are also greenhouse gases, they are not counted.

For hotels, CO_2, CH_4, and N_2O are prevalent, as they are released in the burning of fossil fuels as well as attributed to the burning of fuels to generate electricity purchased by the hotel.

HFCs are refrigerants and common in hotels, found in chillers and refrigerators. Some of the most common are R-12, R-22, and R-134a.

For the purposes of GHG emissions calculation, the gases are normalized by the Global Warming Potential (GWP) of each gas, which refers to the effect it has in the atmosphere in contributing to the greenhouse effect over a specified period of time (i.e., 100 years) in comparison to Carbon Dioxide. This GWP is quantified in a unit of Carbon Dioxide Equivalent (CO_2e). Methane is currently calculated at 28 times more potent than Carbon Dioxide, and Nitrous Oxide is 265 times more potent, though both of these are only found in trace amounts in the energy sources used by hotels.

Though HFCs are common and can have extremely high GWP values depending on the gas, they are found in closed loop piping, and only released into the atmosphere when leakage occurs. HFCs are also planned for global phaseout per the Kigali Amendment to the Montreal Protocol. Thus they are not routinely included in hotel inventory calculations, or are estimated at a small percentage. However, phasing out to low-GWP refrigerants should be part of a net-zero plan.

Beyond tackling Scope 1 and 2 emissions, there is a need for organizations to address the significant Scope 3 emissions that result from upstream and downstream value chain activities. The GHG Protocol address this gap by developing the supplementary Corporate Value Chain (Scope 3) Accounting and Reporting Standard which takes a value chain approach to GHG accounting, helping organizations account for emissions at the corporate level and engage suppliers along the value chain. The Corporate Value Chain (Scope 3) Standard also classifies the Scope 3 emissions into 15 distinct categories. Figure A.1 illustrates the scopes and categories of emissions across the value chain of a reporting organization.

Figure A.1 Defining Scope 1, 2, 3 Emissions Source: GHG Protocol
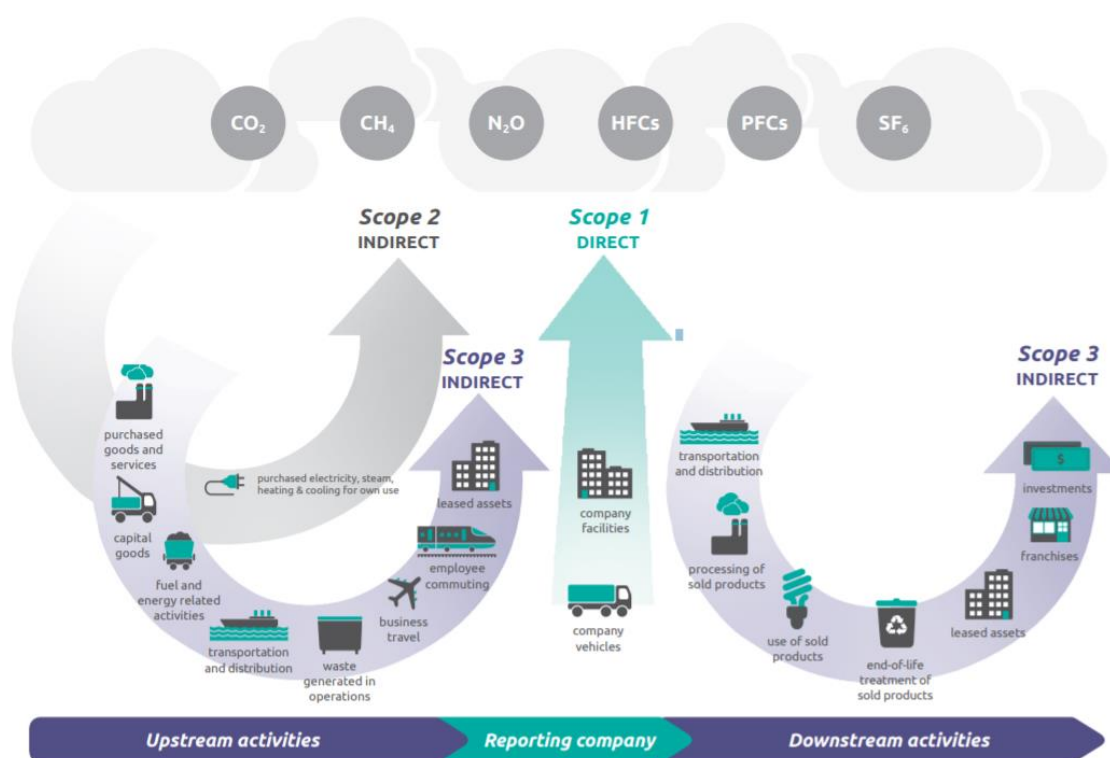
The GHG Protocol also developed the Scope 3 Evaluator Tool together with Quantis to simplify the process of estimating Scope 3 emissions throughout the corporate value chain. The output of the tool is based on the same 15 categories of Scope 3 emissions, including waste, purchased F&B and OS&E products, and employee commuting.

These categories provide organizations with a framework to understand the diversity of Scope 3 activities along the corporate value chain. The following Table A.1 provides the descriptions for each

of the 15 categories, and also enable hotel companies to better understand on how this methodology for the hotel industry aligns with the GHG Protocol's categorization.

Table A.1: Scope 3 Value Chain Categories as Relating to a Hotel

No.	Category and Description[32]	Default Boundary, Classification and Examples

1	**Purchased goods and services**
	
	This category includes all upstream (i.e., cradle-to-gate) emissions from the production of products purchased or acquired by the reporting company in the reporting year. Products include both goods (tangible products) and services (intangible products).
	
	Cradle-to-gate emissions include all emissions that occur in the life cycle of purchased products, up to the point of receipt by the reporting company (excluding emissions from sources that are owned or controlled by the reporting company). Cradle-to-gate emissions may include:
	• Extraction of raw materials
	• Agricultural activities
	• Manufacturing, production, and processing
	• Generation of electricity consumed by upstream activities
	• Disposal/treatment of waste generated by upstream activities
	• Land use and land-use change
	• Transportation of materials and products between suppliers
	• Any other activities prior to acquisition by the reporting company
	
	Emissions from the use of products purchased by the reporting company are accounted for in either Scope 1 (e.g., for fuel use) or Scope 2 (e.g., for electricity use), rather than Scope 3.
	
	Companies may find it useful to differentiate between purchases of production-related and non-production related products. Doing so may be aligned with existing procurement practices and therefore may be a useful way to more efficiently organize and collect data.
	
	Companies may also find it useful to differentiate between purchases of intermediate products, final products, and capital goods.
		Applicable to hotels as **upstream emissions from purchased F&B and OS&E (VERY HIGH),** and **emissions from outsourced laundry wash (HIGH).**
		
		Emissions from production of Ongoing Supplies and Equipment (OS&E) to the hotel:
		  a. Writing materials (paper, stationery, etc.)
		  b. Bottled amenities: shampoo, conditioner, bath gel, hand soap, lotion
		  c. Paper
		  d. Facial Tissue
		  e. Food and beverage items
		  f. Cleaning agents
		  g. Linens and towels
		  h. Staff uniforms
		
		Emissions from production of purchased services:
		  a. Laundry washed offsite by an outsourced or central facility not owned or operated by the hotel
		  b. Outsourced data servers
		  c. Vendor software used within hotels

2	**Capital goods**	Applicable to hotels as **embodied carbon emissions**

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[32] Derived from the GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard, September 2011

No.	Category and Description[32]	Default Boundary, Classification and Examples
	This category includes all upstream (i.e., cradle-to-gate) emissions from the production of capital goods purchased or acquired by the reporting company in the reporting year. Emissions from the use of capital goods by the reporting company are accounted for in either Scope 1 (e.g., for fuel use) or Scope 2 (e.g., for electricity use), rather than in Scope 3. Capital goods are final products that have an extended life and are used by the company to manufacture a product; provide a service; or sell, store, and deliver merchandise. In financial accounting, capital goods are treated as fixed assets or as plant, property, and equipment (PP&E). Examples of capital goods include equipment, machinery, buildings, facilities, and vehicles. In certain cases, there may be ambiguity over whether a particular purchased product is a capital good (to be reported in category 2) or a purchased good (to be reported in category 1). Companies should follow their own financial accounting procedures to determine whether to account for a purchased product as a capital good in this category or as a purchased good or service in category 1. Companies should not double count emissions between category 1 and category 2.	**of buildings and FF&E (HIGH)** Emissions from production of capital goods purchased/acquired/used by the hotel. • Durable goods • Furnishings, Fixtures, and Equipment (FF&E) • Embodied carbon/life-cycle assessment of hotel building
3	**Fuel- and energy-related activities (not included in Scope 1 or Scope 2)** This category includes emissions related to the production of fuels and energy purchased and consumed by the reporting company in the reporting year that are not included in Scope 1 or Scope 2. This category includes emissions from four distinct activities:	
	A. Upstream emissions of purchased fuels Extraction, production, and transportation of fuels consumed by the reporting company. Examples include mining of coal, refining of gasoline, transmission and distribution of natural gas, production of biofuels, etc.	For hotel end users of fuels generally **OUT OF BOUNDS**. May include emissions from transmission of natural gas or other fuels to remote off-grid locations; especially relevant for remote hotels such as those on islands
	B. Upstream emissions of purchased electricity Extraction, production, and transportation of fuels consumed in the generation of electricity, steam, heating, and cooling that is consumed by the reporting company.	Generally **OUT OF BOUNDS**

No.	Category and Description[32]	Default Boundary, Classification and Examples
	Examples include mining of coal, refining of fuels, extraction of natural gas, etc.	
	C. Transmission and distribution (T&D) losses Generation (upstream activities and combustion) of electricity, steam, heating, and cooling that is consumed (i.e., lost) in a T&D system – reported by end user.	Applicable to hotel end users and categorized as **T&D losses from purchased electricity (MEDIUM).**
	D. Generation of purchased electricity that is sold to end users Generation (upstream activities and combustion) of electricity, steam, heating, and cooling that is purchased by the reporting company and sold to end users – reported by utility company or energy retailer Note: This activity is particularly relevant for utility companies that purchase wholesale electricity supplied by independent power producers for resale to their customers	Generally not applicable to hotels; applicable to utility companies and energy retailers, but also include any company selling excess power to the grid (e.g. net positive energy hotels).
4	**Upstream transportation and distribution** This category includes emissions from the transportation and distribution of products (excluding fuel and energy products) purchased or acquired by the reporting company in the reporting year in vehicles and facilities not owned or operated by the reporting company, as well as other transportation and distribution services purchased by the reporting company in the reporting year (including both inbound and outbound logistics). Specifically, this category includes: - Transportation and distribution of products purchased in the reporting year, between a company's tier 1 suppliers and its own operations in vehicles not owned or operated by the reporting company (including multi-modal shipping where multiple carriers are involved in the delivery of a product, but excluding fuel and energy products) - Third-party transportation and distribution services purchased by the reporting company in the reporting year (either directly or through an intermediary), including inbound logistics, outbound logistics (e.g., of sold products), and third-party transportation and distribution between a company's own facilities. Emissions may arise from the following transportation and distribution activities throughout the value chain: - Air transport - Rail transport	Applicable to hotels as t**ransportation of guests arranged by the hotel within the destination (HIGH)** and **transportation of guests arranged by the hotel to/from the destination (LOW)**. Other emissions from the ongoing purchases and the durable goods of hotels generally found in Purchased Goods & Services

No.	Category and Description[32]	Default Boundary, Classification and Examples
	• Road transport • Marine transport • Storage of purchased products in warehouses, distribution centers, and retail facilities. Outbound logistics services purchased by the reporting company are categorized as upstream because they are a purchased service. Emissions from transportation and distribution of purchased products upstream of the reporting company's tier 1 suppliers (e.g., transportation between a company's tier 2 and tier 1 suppliers) are accounted for in scope 3, category 1 (Purchased goods and services).	
5	**Waste generated in operations** This category includes emissions from third-party disposal and treatment of waste that is generated in the reporting company's owned or controlled operations in the reporting year. This category includes emissions from disposal of both solid waste and wastewater. Only waste treatment in facilities owned or operated by third parties is included in Scope 3. Waste treatment at facilities owned or controlled by the reporting company is accounted for in Scope 1 and Scope 2. Treatment of waste generated in operations is categorized as an upstream Scope 3 category because waste management services are purchased by the reporting company. This category includes all future emissions that result from waste generated in the reporting year. Waste treatment activities may include: • Disposal in a landfill • Disposal in a landfill with landfill-gas-to-energy (LFGTE)– i.e., combustion of landfill gas to generate electricity • Recovery for recycling • Incineration • Composting • Waste-to-energy (WTE) or energy-from-waste (EfW) – i.e., combustion of municipal solid waste (MSW) to generate electricity • Wastewater treatment Companies may optionally include emissions from transportation of waste. A reporting company's Scope 3 emissions from waste generated in operations include the Scope 1 and Scope 2 emissions of solid waste and wastewater management companies.	Applicable to hotels as **emissions from downstream waste disposal (HIGH).** Emissions from disposal and treatment of waste generated at the hotel, resulting in emissions associated with transport and degradation/decomposition of waste depending on the waste type and treatment method.

No.	Category and Description[32]	Default Boundary, Classification and Examples
6	**Business travel** This category includes emissions from the transportation of employees for business-related activities in vehicles owned or operated by third parties, such as aircraft, trains, buses, and passenger cars. Emissions from transportation in vehicles owned or controlled by the reporting company are accounted for in either Scope 1 (for fuel use) or Scope 2 (for electricity use). Emissions from leased vehicles operated by the reporting company not included in Scope 1 or Scope 2 are accounted for in Scope 3, category 8 (Upstream leased assets). Emissions from transportation of employees to and from work are accounted for in Scope 3, category 7 (Employee commuting). Emissions from business travel may arise from: • Air travel • Rail travel • Bus travel • Automobile travel (e.g., business travel in rental cars or employee-owned vehicles other than employee commuting to and from work) • Other modes of travel Companies may optionally include emissions from business travelers staying in hotels. A reporting company's Scope 3 emissions from business travel include the Scope 1 and Scope 2 emissions of transportation companies (e.g., airlines).	Applicable to hotels as **emissions from business travel (MEDIUM)** Emissions due to transportation by hotel employees for work or business-related activities, such as company-level meetings. This differs from traveling for leisure purposes and regular commuting between their homes and hotel workplace (see Category 6 Employee commuting).
7	**Employee commuting** This category includes emissions from the transportation of employees between their homes and their worksites. Emissions from employee commuting may arise from: • Automobile travel • Bus travel • Rail travel • Air travel • Other modes of transportation Companies may include emissions from teleworking (i.e., employees working remotely) in this category. A reporting company's Scope 3 emissions from employee commuting include the Scope 1 and Scope 2 emissions of employees and third-party transportation providers. Even though employee commuting is not always purchased or reimbursed by the reporting company, it is	Applicable to hotels as **emissions from employee commuting (HIGH).**

No.	Category and Description[32]	Default Boundary, Classification and Examples
	categorized as an upstream Scope 3 category because it is a service that enables company operations, similar to purchased or acquired goods and services.	
8	**Upstream leased assets** This category includes emissions from the operation of assets that are leased by the reporting company in the reporting year and not already included in the reporting company's Scope 1 or Scope 2 inventories. This category is only applicable to companies that operate leased assets (i.e., lessees). For companies that own and lease assets to others (i.e., lessors), see category 13 (Downstream leased assets). Leased assets may be included in a company's Scope 1 or Scope 2 inventory depending on the type of lease and the consolidation approach the company uses to define its organizational boundaries. If the reporting company leases an asset for only part of the reporting year, it should account for emissions for the portion of the year that the asset was leased. A reporting company's Scope 3 emissions from upstream leased assets include the Scope 1 and Scope 2 emissions of lessors (depending on the lessor's consolidation approach).	Applicable to hotels that operate leased/rented assets (e.g. lease equipment and durable goods instead of owning); classified as **OUT OF BOUNDS.**
9	**Downstream transportation and distribution** This category includes emissions from transportation and distribution of products sold by the reporting company in the reporting year between the reporting company's operations and the end consumer (if not paid for by the reporting company), in vehicles and facilities not owned or controlled by the reporting company. This category includes emissions from retail and storage. Outbound transportation and distribution services that are purchased by the reporting company are excluded from category 9 and included in category 4 (Upstream transportation and distribution) because the reporting company purchases the service. Category 9 only includes transportation- and distribution-related emissions that occur after the reporting company pays to produce and distribute its products. Emissions from downstream transportation and distribution can arise from: • Storage of sold products in warehouses and distribution centers • Storage of sold products in retail facilities • Air transport • Rail transport • Road transport	Generally not applicable to hotels ; classified as **OUT OF BOUNDS**.

No.	Category and Description[32]	Default Boundary, Classification and Examples
	• Marine transport Companies may include emissions from customers traveling to retail stores in this category, which can be significant for companies that own or operate retail facilities. See the Corporate Value Chain (Scope 3) Accounting and Reporting Standard for guidance on the applicability of category 9 to final products and intermediate products sold by the reporting company. A reporting company's Scope 3 emissions from downstream transportation and distribution include the Scope 1 and Scope 2 emissions of transportation companies, distribution companies, retailers, and (optionally) customers.	
10	**Processing of sold products** This category includes emissions from processing of sold intermediate products by third parties (e.g., manufacturers) subsequent to sale by the reporting company. Intermediate products are products that require further processing, transformation, or inclusion in another product before use, and therefore result in emissions from processing subsequent to sale by the reporting company and before use by the end consumer. Emissions from processing should be allocated to the intermediate product. In certain cases, the eventual end use of sold intermediate products may be unknown. For example, a company may produce an intermediate product with many potential downstream applications, each of which has a different GHG emissions profile, and be unable to reasonably estimate the downstream emissions associated with the various end uses of the intermediate product.	Generally not applicable to hotels; classified as **OUT OF BOUNDS**.
11	**Use of sold products** This category includes emissions from the use of goods and services sold by the reporting company in the reporting year. A reporting company's Scope 3 emissions from use of sold products include the Scope 1 and Scope 2 emissions of end users. End users include both consumers and business customers that use final products. This standard divides emissions from the use of sold products into two types: • Direct use-phase emissions • Indirect use-phase emissions The minimum boundary of category 11 includes direct use-phase emissions of sold products. Companies may	Applicable to hotels by viewing hotels as a service provider to guests; classified as **OUT OF BOUNDS**.

No.	Category and Description[32]	Default Boundary, Classification and Examples
	also account for indirect use-phase emissions of sold products, and should do so when indirect use-phase emissions are expected to be significant.	
	This category includes the total expected lifetime emissions from all relevant products sold in the reporting year across the company's product portfolio. By doing so, the Scope 3 inventory accounts for a company's total GHG emissions associated with its activities in the reporting year.	
	Companies may optionally include emissions associated with maintenance of sold products during use.	
	Calculating emissions from category 11 typically requires product design specifications and assumptions about how consumers use products (e.g., use profiles, assumed product lifetimes, etc.). Companies are required to report a description of the methodologies and assumptions used to calculate emissions.	
	Where relevant, companies should report additional information on product performance when reporting Scope 3 emissions in order to provide additional transparency on steps companies are taking to reduce GHG emissions from sold products. Such information may include GHG intensity metrics, energy intensity metrics, and annual emissions from the use of sold products.	
	Any claims of avoided emissions related to a company's sold products must be reported separately from the company's Scope 1, Scope 2, and Scope 3 inventories.	
12	**End-of-life treatment of sold products** This category includes emissions from the waste disposal and treatment of products sold by the reporting company (in the reporting year) at the end of their life. This category includes the total expected end-of-life emissions from all products sold in the reporting year. End-of-life treatment methods (e.g. landfilling, incineration) are described in category 5 (Waste generated in operations). A reporting company's Scope 3 emissions from end-of-life treatment of sold products include the Scope 1 and Scope 2 emissions of waste management companies. Calculating emissions from category 12 requires assumptions about the end-of-life treatment methods used by consumers. Companies are required to report a description of the methodologies and assumptions used to calculate emissions.	Generally not applicable to hotels; classified as **OUT OF BOUNDS**.

No.	Category and Description[32]	Default Boundary, Classification and Examples
13	**Downstream leased assets** This category includes emissions from the operation of assets that are owned by the reporting company (acting as lessor) and leased to other entities in the reporting year that are not already included in Scope 1 or Scope 2. This category is applicable to lessors (i.e., companies that receive payments from lessees). Companies that operate leased assets (i.e., lessees) should refer to category 8 (Upstream leased assets). Leased assets may be included in a company's Scope 1 or Scope 2 inventory depending on the type of lease and the consolidation approach the company uses to define its organizational boundaries. If the reporting company leases an asset for only part of the reporting year, the reporting company should account for emissions from the portion of the year that the asset was leased. In some cases, companies may not find value in distinguishing between products sold to customers (accounted for in category 11) and products leased to customers (accounted for in category 13). Companies may account for products leased to customers the same way the company accounts for products sold to customers (i.e., by accounting for the total expected lifetime emissions from all relevant products leased to other entities in the reporting year). In this case, companies should report emissions from leased products in category 11 (Use of sold products), rather than category 13 (Downstream leased assets) and avoid double counting between categories. A reporting company's Scope 3 emissions from downstream leased assets include the Scope 1 and Scope 2 emissions of lessees (depending on the lessee's consolidation approach).	Applicable to hotels which own assets that are leased to others; classified as **OUT OF BOUNDS** as this is generally covered by other categories collectively in the hotel business model. Hotel amenities leased or outsourced to others such as restaurants, gift shops, fitness centers, spas etc. tend to be either included in utility usage as Scope 1 & 2 as they are not submetered separately, or under some type of financial control for an integrated resort, or a minor % of the total area and excluded. Emissions from operations of any leased offices, commercial spaces, call centers, sales centers, corporate offices owned by hotels tend to be included as other Scope 1 & 2 as they are operated by the Company similar to the operation of the hotel.
14	**Franchises** This category includes emissions from the operation of franchises not included in Scope 1 or Scope 2. A franchise is a business operating under a license to sell or distribute another company's goods or services within a certain location. This category is applicable to franchisors (i.e., companies that grant licenses to other entities to sell or distribute its goods or services in return for payments, such as royalties for the use of trademarks and other services). Franchisors should account for emissions that occur from the operation of franchises	Applicable to franchised hotels; hotel brands which provide hotel owners with licenses or franchises to use their brand should be included in the scope 3 of the parent hotel brand.

No.	Category and Description[32]	Default Boundary, Classification and Examples
	(i.e., the Scope 1 and 2 emissions of franchisees) in this category. Franchisees (i.e., companies that operate franchises and pay fees to a franchisor) should include emissions from operations under their control in this category if they have not included those emissions in Scope 1 and Scope 2 due to their choice of consolidation approach. Franchisees may optionally report upstream Scope 3 emissions associated with the franchisor's operations (i.e., the Scope 1 and Scope 2 emissions of the franchisor) in category 1 (Purchased goods and services).	
15	**Investments** This category includes Scope 3 emissions associated with the reporting company's investments in the reporting year, not already included in Scope 1 or Scope 2. This category is applicable to investors (i.e., companies that make an investment with the objective of making a profit) and companies that provide financial services. Investments are categorized as a downstream Scope 3 category because the provision of capital or financing is a service provided by the reporting company. Category 15 is designed primarily for private financial institutions (e.g., commercial banks), but is also relevant to public financial institutions (e.g., multilateral development banks, export credit agencies, etc.) and other entities with investments not included in Scope 1 and Scope 2. Investments may be included in a company's Scope 1 or Scope 2 inventory depending on how the company defines its organizational boundaries. For example, companies that use the equity share approach include emissions from equity investments in Scope 1 and Scope 2. Companies that use a control approach account only for those equity investments that are under the company's control in Scope 1 and Scope 2. Investments not included in the company's Scope 1 or Scope 2 emissions are included in Scope 3, in this category. A reporting company's Scope 3 emissions from investments are the Scope 1 and Scope 2 emissions of investees. For purposes of GHG accounting, this standard divides financial investments into four types: • Equity investments • Debt investments • Project finance • Managed investments and client services	Generally not applicable to hotels; classified as **OUT OF BOUNDS**.

No.	Category and Description[32]	Default Boundary, Classification and Examples
	Emissions from investments should be allocated to the reporting company based on the reporting company's proportional share of investment in the investee. Because investment portfolios are dynamic and can change frequently throughout the reporting year, companies should identify investments by choosing a fixed point in time, such as December 31 of the reporting year, or using a representative average over the course of the reporting year.	

APPENDIX B: SETTING HOTEL NET-ZERO BOUNDARIES WITHIN THE UNIVERSE OF SCOPE 1, 2, AND 3 EMISSIONS

A hotel and its operation will have hundreds of potential emissions sources, These sources may transcend scopes and the ability of the hotel's owner or operator to exert influence on them, and vary in the ability to be accurately quantified at present. **This methodology provides a classification system used to arrive at default categories that at an industry level will represent over 90% of typical Scope 3 emissions within a reasonable boundary.** In doing so, the intention is to enable the hotel and wider travel industry to focus efforts on collectively pursuing decarbonization actions for the most relevant and significant sources of emissions rather than inventorying, evaluating, and adjusting sources and related targets over time.

To arrive at the default boundary, GHG emissions of a hotel and hotel stay were analyzed and classified according to the following steps:

1. **Prioritize the sources of emissions** in terms of their relative significance to a hotel's footprint, how common they are across the hotel industry, and the degree to which stakeholders will expect the emissions to be addressed, in order to arrive at the common set of emissions sources for a hotel to include in net-zero planning.
2. **Identify cases where the sources of emissions may vary** within a particular hotel type or region in relative significance, as well as whether the same source of emissions may change in scope as Scope 1 & 2 vs. Scope 3.
3. **Evaluate the common sources of Scope 3 in relation to the role of owner or operator** (and subsequently franchisor) to identify significant differences in the share of control or influence that one role may have in comparison to the other.

> **Resources to inform classification process**
>
> This analysis was conducted based on the following resources, then vetted by the industry advisory group for feedback and input:
>
> - Race To Zero Process Criteria Starting Line and Interpretation Guide
> - Existing research on materiality of specific sources
> - GHG Protocol GHG Emissions Calculation Tool
> - Hotel Carbon Measurement Initiative (HCMI) methodology
> - The Global Sustainable Tourism Council (GSTC) Industry criteria
> - Scope 3 analysis and categorization of the SBTi and CDP
> - Previous internal analysis performed by Greenview for hotel client work and the industrywide calculation of hotel carbon emissions for the CHSB data set
> - Interpretation based on hotel guest perception, interaction, and/or experience
> - Interpretation based on controllability of owner or operator and relation to overall business model
> - Public disclosure of third-party ISO 14064-assured GHG inventories for hotel chains
> - Relation of the source among hotel entity and the general responsibility of the entity within the value chain that generates the emissions.

Evaluate the degree to which the sources of emissions can be credibly and consistently quantified at present based on availability of default data and coefficients, methodology, and emission factors.

1. Prioritizing emissions sources

To prioritize the sources of emissions, the following three variables (Table B.1) were used from the perspective of a hotel, regardless of their typical classification of scope, their ability to vary, or differences in relation to the owner/operator/franchisor portfolios.

Table B.1: Variables for Emission Sources Classification

VARIABLE	ANALYSIS	ORDINAL SCALE
Prevalence	Classification based on how common the sources are across the global hotel supply.	Low (1) Medium (2) High (3)
Significance	Classification based on the relative significance of these emissions when they are present in a hotel's inventory.	
Stakeholder Expectations	Classification based on the expectations of guests, travel buyers, investors, and other stakeholders for a hotel to address these emissions	

The results are as follows in Table B.2:

Table B.2: Emissions Sources Classification Results

Source	Significance	Prevalence	Stakeholder Expectations	Total	Classification
Combustion of primary fuels onsite	3	3	3	9	Very High
Purchased electricity	3	3	3	9	Very High
Upstream emissions from ongoing consumable goods	3	3	3	9	Very High
Emissions from waste disposal and treatment	2	3	3	8	High
Employee commuting	2	3	3	8	High
Embodied carbon emissions of the building and FF&E	3	3	2	8	High
Purchased heating and cooling energy (not generated onsite)	3	1	3	7	High
Emissions from outsourced laundry wash	2	2	3	7	High
Transportation of guests arranged by the hotel within the destination	1	2	3	6	Med
Transmission & Distribution losses	2	3	1	6	Med
Business Travel	1	2	3	6	Med
Fugitive Emissions	1	3	1	5	Low

Transportation of guests arranged by the hotel to/from the destination	3	1	1	5	Low

2. Identifying potential variances

The following potential variances (Table B.3) in significance and scope categorization for each emissions source were then noted:

Table B.3: Potential Variances of Emission Sources

SOURCE OF EMISSIONS	POTENTIAL VARIATION
Combustion of fuels onsite	• A hotel may have several different sources of stationary fuels combustion encompassing secondary uses, such as space heaters or gas-fired fire pits, which are not commonly significant, but may be so in a particular hotel. • Hotels also commonly have a backup emergency generator of electricity which will need to be tested routinely, and have instances where it constitutes a significant source. • Other sources of combustion for minor equipment, such as lawnmowers or leaf blowers, are not technically "stationary" combustion, but have never been found to constitute a significant source of emissions. • In the case of a hotel with combined heat and power (CHP) or cogeneration, some configurations exist where the hotel procures the natural gas but does not combust it, in which case it is categorized Scope 1. If the onsite system is owned and operated by a separate entity which then sells the electricity to the hotel, it would be categorized as Scope 2. • In the case of a hotel with a fuel cell powered by natural gas, the natural gas consumed is consumed but not combusted. If the fuel cell is owned and operated by a third party then the source is categorized as Scope 2 for the purchased electricity (and in some cases purchased waste heating).
Upstream emissions from ongoing consumable goods	• Purchase of ongoing consumables for a typical hotel can number in the hundreds, and even thousands of items. While a common practice in Scope 3 evaluation is to bucket all into basic categories and estimate emissions based on spend, the upstream carbon emissions and overall impact on climate change associated with each item will vary widely. For example, $1 of beef procured will have much higher carbon emissions and need to decarbonize in comparison to $1 of apples.
Emissions from waste disposal and treatment	• Some hotels, such as island resorts, may treat waste onsite, categorized as Scope 1.
Purchased heating and cooling energy (not generated onsite)	• This source of emissions is one of the most uncommon sources when taken as a percentage of hotels globally. However, for hotels within a specific market with similar energy sources it will be highly prevalent. For hotels that use purchased heating and cooling as a source, it is a significant source of emissions.
Emissions from outsourced laundry wash	• It is common for hotels to outsource laundry wash to offsite facilities not owned or operated by the same entity, categorized as Scope 3.
Transportation of guests arranged	• Hotels may own/operate the vehicles themselves (Scope 1), outsource to a third party (Scope 3), or a combination of both.

SOURCE OF EMISSIONS	POTENTIAL VARIATION
by the hotel within the destination	• Significance varies widely by hotel. For some hotels such as those with airport shuttles, the source may be significant. For limited-service urban hotels, very little if any transportation is arranged by the hotel directly. • In many cases of meetings and events, hotel guests staying on a room block for a convention or other event will have ground transportation coordinated by a separate entity such as an event organizer or a destination management company (DMC).
Transportation of guests arranged by the hotel to/from the destination	• In some cases, hotels may organize charter planes, private jets, boats, helicopters, or other means required to transport the guest to the location directly which may be owned/operated by the hotel and categorized as Scope 1. Integrated tour operators will have transport as part of the package offering and also be Scope 1. By and large, however, hotels do not arrange transportation for guests to and from the place of origin to the hotel.
Transmission & Distribution losses	• While T&D losses are commonly calculated with available emissions sources for purchased electricity, the T&D losses associated with purchased heating and cooling are not uniformly accounted for in terms of whether they are included in emissions factors, and rarely accounted for separately in hotel company inventories.
Business Travel	• Company employees on business travel may stay at hotels within the same company while on business travel to other destinations, in which case the Scope 3 emissions are already claimed as part of the company's Scope 1 & 2, or franchised emissions Scope 3.
Fugitive Emissions	• Fugitive emissions may be significant in some hotel types or instances of major leakage.

3. Identifying the share of influence

Then applying the share of influence for Scope 3 sources among owner and operator, the following distinctions (Table B.4) were noted:

Table B.4: Control or Influence Distinctions of Emission Sources

SOURCE OF EMISSIONS	CONTROL OR INFLUENCE DISTINCTIONS
Upstream emissions from ongoing consumable goods	• Operator distinction of purchased ongoing consumables such as food and beverage and other Operating Supplies & Equipment (OS&E) for quantities, types, and sources.
Emissions from waste disposal and treatment	• Operator distinction for quantity of waste disposed, disposal method, and waste composition due to upstream purchases.
Employee commuting	• Operator distinction for employee commuting of hotel property staff, though each entity has its own company employees.
Emissions from outsourced laundry wash	• Operator distinction for quantity and vendor facility used in outsourced laundry wash
Embodied carbon emissions of the building and FF&E	• Owner distinction for the influence and budgeting for embodied carbon and the financial ownership of the building asset, in particular when the operator of the hotel has not been chosen until further along in the process of building the hotel.

SOURCE OF EMISSIONS	CONTROL OR INFLUENCE DISTINCTIONS
Transportation of guests arranged by the hotel within the destination	• Operator distinction for choice of vendor, vehicles, and services offered in ongoing operation.
Transportation of guests arranged by the hotel to/from the destination	• With the exception of the cases noted in the variations above, neither the owner nor the operator has significant control or influence of the emissions sources or location of the guest origin.
Business Travel	• Both owner and operator will have their own respective sources of business travel for their company employees.

4. Evaluating degree of difficulty in quantifying emissions

When evaluating the degree of difficulty in quantifying the emissions of the categories due to lack of consistent or credible emissions factors, or a large variation in the results based on available approaches used, the sources were classified as follows in Table B.5:

Table B.5: Degree of Difficulty of Emission Sources

SOURCE OF EMISSIONS	DEGREE OF DIFFICULTY
Combustion of fuels onsite	LOW
Upstream emissions from ongoing consumable goods	HIGH
Emissions from waste disposal and treatment	HIGH
Employee commuting	MEDIUM
Purchased heating and cooling energy (not generated onsite)	LOW
Emissions from outsourced laundry wash	MEDIUM
Embodied carbon emissions of the building and FF&E	HIGH
Transportation of guests arranged by the hotel within the destination	HIGH
Transportation of guests arranged by the hotel to/from the destination	MEDIUM
Transmission & Distribution losses	LOW
Business Travel	LOW
Fugitive Emissions	MEDIUM

5. Default Hierarchy for Emissions Sources of a Hotel

Based on the analysis above, a default hierarchy for the sources of emissions of a hotel resulted as follows (Table B.6):

Table B.6: Default Hierarchy for Emissions Sources of a Hotel

Classification	Approach	Examples
Very High	• Sources of emissions should be quantified, striving for granular level of activity data and actively pursuing efforts to improve calculation resources and methodologies when needed • Quantifiable targets should be set, and decarbonization should be prioritized first within interim milestones • Processes and engagement should be prioritized as soon as possible	• Stationary combustion of primary fuels • Purchased electricity • Upstream emissions from purchased F&B and OS&E
High	• Sources of emissions should be quantified based on actual data, particularly if part of the hotel's Scope 1 & 2 emissions boundary • Efforts should be pursued to improve calculation resources and methodologies when needed in order to arrive at quantifiable targets • Quantifiable targets should be set once sound calculation methods and resources are available, and decarbonization approaches made more apparent through engagement targets • Processes and engagement should be prioritized when planning/engagement is available, within interim milestones as early possible	• Purchased heating and cooling • Laundry wash (when outsourced) • Emissions from waste disposal and treatment • Embodied carbon emissions of the building and FF&E • Transportation of guests arranged by the hotel within the destination (when present) • Employee commuting
Medium	• Sources should be quantified but may be estimated using default data • General processes and engagement should be developed within reason • Targets should follow a decarbonization pathway by 2050	• Transmission & Distribution losses from electric power distribution to the hotel • Business travel
Low	• Sources may be excluded from calculated boundary • When significant for a particular hotel or company and included, quantification can be done using estimated or proxy data • General processes and engagement should be developed within reason	• Fugitive emissions from refrigerant leakages • Other combustion of fuels when used for secondary purposes and insignificant in comparison to the rest of the hotel's Scope 1 & 2 emissions

Classification	Approach	Examples
	• If present by 2040, targets should include that emissions be offset as residual emissions when related to the building, or by 2050 for others	• Transportation of guests arranged by the hotel to/from the destination
Out of Bounds	• Others within the universe of potential sources that do not meet thresholds in the analysis of prevalence, significance, control/influence, and availability of credible and consistent emission factors	• See Universe of Hotel GHG Emissions Sources below

6. Universe of Hotel GHG Emissions Sources

Table B.7: Examples and Default Classification for Emission Sources by Scope

SOURCE	EXAMPLES	DEFAULT CLASSIFICATION
SCOPE 1		
Fuels burned for primary heating and cooling the building in stationary combustion	Boiler	Very High
Emissions from onsite waste treatment facilities	Facilities within hotel's operational or financial control	High
Fuels burned for gas-fired equipment in cooking	Kitchen ovens and stoves	Low
Stationary combustion of fuels burned for other smaller equipment	Barbecue pits, Sterno chafing fuel, tandoors, firewood	Low
Stationary combustion of fuels burned for generation of electricity or cogeneration as a primary fuel source	Combined heat and power equipment Natural gas fuel cell	Low
Stationary combustion of fuels in other areas for heating	Space heaters, fireplaces	Low
Stationary combustion of fuels to power a backup generator for testing and emergency use	Backup generator	Low
Mobile combustion of fuel for powering vehicles owned/operated by the hotel	Shuttle van, hotel-owned private car, boat, ship, gas-powered cart, helicopter, airplanes owned by the hotel	Low
Mobile combustion of fuels for other equipment	Lawnmowers, leaf blowers, mulchers, forklifts	Low
Use and emptying of fire extinguishers	Fire extinguisher	Low
Use of CO2 in food and beverage	CO2 cartridge in carbonating beverages	Low
Fugitive emissions from refrigerant leakage in HVAC	Refrigerants in chillers, kitchen refrigerators, mini bars	Low
SCOPE 2		

SOURCE	EXAMPLES	DEFAULT CLASSIFICATION
Purchased electricity	Electricity purchased from a utility	Very High
Purchased cooling	Purchased chilled water from a utility or another facility (for cooling, not consumption)	High
Purchased heating	Purchased exhaust heat from a fuel cell or other external waste heat recovery source, purchased municipal steam, purchased municipal heat, purchased municipal hot water for heating purposes only	High
SCOPE 3		
Upstream lifecycle emissions relating to embodied carbon of the building and its capital equipment	Building materials such concrete, steel, sand, masonry, and wood. Large capital equipment such as HVAC equipment (e.g. boilers and chillers), elevators, escalators, plumbing, fire protection system (e.g. smoke detectors, sprinkler system), electrical system and security system.	High
Upstream lifecycle emissions (materials extraction, manufacturing/processing, transportation to hotel) of fit-out FF&E procured by the hotel owner or operator	Outlet safety plugs, surge protectors, water fountain/ features and other decorative items with water, pool and other outdoor furniture, outdoor lighting, elevator lobby furniture, elevator cab finishes, fireplace, box spring/ box spring cover/ headboard and other bed related furniture, curtains/ curtain holdbacks/ curtain rods/ curtain stack backs/ drapery batons/ drapery liners/ drapes/ drapery valence/ mini blinds/ roller shades/ roman shades and other curtains and drapery, framed dressing mirror/ lighted mirror/ makeup/ backlit mirrors and various styles of mirrors, towel racks, toilet/ urinals, faucets and connections, closet shelf unit, hooks, coat, iron, ironing board holder and cover, desk, door viewer, sofa, dresser/ credenza/ nightstand and other chest like furniture, floor/ end table lamps/ night light/ bracket lamp/ ceiling mounted lighting/ vanity lighting and other lighting.	Presumed "Very High" as an overall category, to be further categorized and prioritized further granularity for final determination by 2025 or 2030
Upstream lifecycle emissions (materials extraction, manufacturing/processing, transportation to hotel) of other durable goods procured by the hotel owner or operator (either FF&E or OS&E) with very low replacement rates	Bar blender, beaters, food processor, desk chair/ dining chair / lounge chair/ banquet chair/ bar stools/ executive chair/ ottoman and other indoor furniture for sitting, side/ coffee/ dining/ nesting/ communal/ chef's/ meeting/ conference tables and other indoor tables , air deodorizing system, carpet cleaning machines, portable steam cleaners, vacuum cleaner, CPR kits/ defibrillator/ fire extinguisher and chemicals/ emergency exit instruction card/ life preserver/ pool safety equipment and	

SOURCE	EXAMPLES	DEFAULT CLASSIFICATION
	other emergency equipment and supplies, CCTV, laptop and desktop computers, Walkie Talkies, camera (video, film) and accessories, projectors, timeclocks, ice machine, refrigerator/ freezer, laundry equipment (washer, dryer, folder), adding machine, check writer machines, ball washers, banquet/conference/catering recoverable supplies, fitness class supplies, gym equipment, playpens, mattresses of all sizes, inflatable beds, rollaway beds, bathroom scale, iron, ironing board, portable bar, clock radios for guestrooms, clocks for guestrooms, coffee machines, desk lamp, DVD players, Blu-ray, Apple TV for guestrooms, hair dryers, humidifier, microwave oven, portable fans and ac, radios, refrigerators, speakers, stereo, television remote, TV and mount.	
Upstream lifecycle emissions (materials extraction, manufacturing/processing, transportation to hotel) of other OS&E durable goods procured by the operator with less typical replacement rates greater than one year	Tumblers, baking/broiling/ frying and other pans, bar shaker/ bottle openers/ bottle stoppers/ bottle warmers/ corkscrews and other beverage tools, glass racks, pocket thermometer, table pad, fireplace screen, fireplace tools, carts (housekeeper and laundry), wet floor signs, vacuum cleaner accessories, pool maintenance equipment, garbage cans, recycle bins, urinal baskets, electric bulbs – all, sheers, screwdriver/wrench/hammer and other maintenance tools, artifacts, artwork/ frames and other framed decorations, bell stand, braille signs, candlesticks, flags, smoking urn sand stamp, outdoor lighting, elevator cab finishes, fireplace, vases, key chain coils and reels, key lock box, key machine, keys for safe deposit box/ lock, adapter plug, electrical, av cables, computer keyboards, computer monitors, computer mouse, CPU stands, ethernet cables, extension cords, keyboard drawers, mouse pad, telephone accessories (e.g. cords and face plate), telephone headsets, telephone directory covers and holders, data processing supplies, fax machine supplies and accessories, machine stands, cash register ribbons, calculators, clipboards, hole punch, label maker, mail bags, pencil sharpener, printer/ copier, rubber stamps, rulers, scissors, staplers, tape holders, cart name plates, easels, books, in-room guest reading, cribs, quilt	

SOURCE	EXAMPLES	DEFAULT CLASSIFICATION
	rack, quilt rack, showerhead, closet rack, closet rod, hangers (all types), laundry hamper, carpet, base and pad, doorstop, hooks, door, lampshades, vases (tabletop), flashlights, Innkeeper Liability Card and frame, rack cards.	
Upstream lifecycle emissions (materials extraction, manufacturing/processing, transportation to hotel) of other OS&E ongoing consumable goods procured by the operator with less typical replacement rates less than one year but not single-use	Cups and saucers (all sizes and materials), non-alcoholic beverages glasses in all sizes and materials, alcoholic beverages glasses in all sizes and materials, ice tongs/ cooking tongs/ serving tongs and other tongs, aluminum trays/ buffet trays/ serving trays and other trays, bowls (all sizes and materials), butter dishes/ chafing dishes/ casseroles/ glass dishes/ souffles dishes/ ramekins and other dishes, china, coffee pots and lids (all sizes and materials), coffee urn, pitchers and carafes, plates, all sizes and materials (except paper/plastic), platters, serving, potholder and mitt, pour spouts, salt and pepper shakers, sauce boats (all sizes and materials), sugar holders, teapots and lids, tray jacks, crocks/ mixing bowls/ pots and other cookware, reusable stirrers, spatula, reusable cutlery, ice buckets and liners, sneeze guard, reusable straws, bar shaker/ bottle openers/ bottle stoppers/ corkscrews and other beverage tools, bar blender/ bar shaker/ bottle openers/ bottle stoppers/ bottle warmers/ corkscrews and other beverage tools, can openers, cookier cutter, cutting board, F&B strainers (all sizes and materials), molds, pastry tubes, scissors, kitchen, bar mats, menu cover, tablecloths, runners, skirts, under cloth and accessories (all materials and sizes), fire-starter packets for use by guests in rooms, brooms, brushes, dusters, dusting mitts, dustpan brushes, dustpans, feather duster, flatware cleaner, mop handles, mop wringers, rug cleaners, scrapers/ sponge/ scrubs/ steel wool and other supplies, spray bottles, squeegees, toilet plungers, fly swatters, paint and ancillary chemicals, paint brushes/rollers/sprayers and other supplies, rubber cement, live indoor and outdoor plant/ tree/ shrub/ flowers/ seeds and other greenery supplies, golf course sand/ cinders/ top dressing/ topsoil and other supplies, indoor and outdoor plant/ tree/ shrub/ flowers/ seeds and other	

SOURCE	EXAMPLES	DEFAULT CLASSIFICATION
	greenery supplies, aquarium and supplies, ashtray/ ashcans in various materials, artificial floral arrangements/ flowers and other greenery, holiday and event decorations (indoors and outdoors), banners, electronic/ static signs, safety glasses, key rings, key tags, aprons/ chef hats/ smocks and other kitchen uniforms, blouses/ t-shirts/shirts and other uniform tops, boots/ shoes/ socks and other footwear uniforms, caps/ hats and other uniform headgear, coats/ jackets/ jumpers/ suits and other outerwear uniforms, dresses, pants/ skirts/ shorts/ trousers/ overalls and other uniform bottoms, ties, pants/ skirts/ shorts/ trousers and other uniform bottoms, cell phone chargers, electrical adapters, vehicle parts and supplies—not capitalized, business cards, calendars/ diaries/ planners (various sizes), desk organization supplies, folders, glue, label maker supplies, log/ reservation/ record/ report books, placards, poster board, rubber bands, stencils, safety/ stick/ straight pins, check presenters, educational books/pamphlets/ manuals for employees, publications, house (for employees), videotapes, training/safety, nail file, umbrellas, luggage racks, golf cart batteries, pull carts, props, toys, cable guide cover, cell phone equipment, Gideon Bibles, anti-fatigue mats, bath/ floor mats and rugs, bath sheets, bathrobes, bed and crib pads, bed canopy, bed ruffles, bed sheets (various), bed skirts, bedspreads, comforters/ blankets/ duvets and similar bedding, bed/ crib bumpers, bunting, linen tablecloth, mattress cover/ protector, mattress pad, pillows (various materials and functions), rubber sheets, towels (various sizes), washcloths, cords, bathtub safety mats, bathtub safety strips, dispensers (soap, lotion), shower curtain, shower curtain liner, rod and rings, clothes brushes, reusable laundry and dry cleaning bags, shoe brush, amenity containers (reusable), do not disturb cards/ guest guide/ water conservation cards/ towel reuse cards/ health, sports and spa equipment instructions and other advisories, doormats, posters.	

SOURCE	EXAMPLES	DEFAULT CLASSIFICATION
Upstream lifecycle emissions (materials extraction, manufacturing/processing, transportation to hotel) of other OS&E ongoing consumable goods of high frequency of replacement for continuous use, procured by the hotel operator	Glass bags, food and drink cover (all sizes and materials), steak markers, menus (F&B), reusable placemats, table protectors, fireplace lighter, acids, air freshener (all forms), alcohol (cleaning), all-purpose cleaner/ artificial plant cleaner/bathroom cleaner/ concrete cleaner/ stainless steel/ tile/ upholstery and other cleaners, ammonia, bleach (general), bleach packets (laundry), carpet shampoo/ chemical, degreaser, dishwashing soaps and rinsing agents, disinfectants, polish for furniture/ floor/ silver and other, floor soap, floor wax, furniture wax, gum remover, lemon oil, lye, non-dishwashing cleansers (powder/ liquid), oxalic acid, pool chemicals (health club/spa operated), soap scum remover, soaps, cleaning, stain remover (laundry), stain removers (non-laundry, all forms), dishcloths, dust cloths, lint brush, remover, mops, rubber gloves, scouring pads, scrapers/ sponge/ scrubs/ steel wool and other supplies, toilet brushes, vacuum filter, bug traps, insecticides, mouse traps, adhesive, stair tread, air filters, cooling tower chemicals, shelf paper, carpet tape, fertilizer, candles, fish/ live items for aquarium, artificial floral arrangements/ flowers and other greenery, fresh floral arrangements/ flowers and other greenery, ice sculptures, medical supplies and drugs, key blank, key cards (non-guestroom), name badges, batteries, photos, binder clips/ paper clips, cardboard boxes, data cartridges and tapes, note pads (various sizes), parchment, postcards, printer/ copier ink/ toner, printer/ copier paper, shipping supplies, stamp pads, staples, tape (various), wrapping paper, writing supplies, adding machine tape, cash and coin handling equipment, cashier forms, currency bill straps, envelopes, guest checks, employee gifts, promotional gifts, VIP guest gifts, aromatherapy oils (health club/spa), cosmetics, mouthwash, tweezers, luggage tags, golf balls (practice range), flip charts, magazines (both staff/ trade and guest use), newspaper bags for use by guests in rooms, playing cards for use by guests in rooms, accessories/ apparels/ books/ golfing personal equipment/ logo merchandise and other	

SOURCE	EXAMPLES	DEFAULT CLASSIFICATION
	merchandise, spa products, tobacco and cigar, shower slippers, tissue and paper towels, dispenser, holder and cover, toilet seat and covers, candy dishes, computer forms –commercial, printed, housekeeping/ room attendants' reports, room rack forms, trade show promotional items.	
Upstream lifecycle emissions (materials extraction, manufacturing/processing, transportation to hotel) of other OS&E ongoing consumable goods of single-use or which generate solid waste from each use and discard, procured by the hotel operator	Firewood/ logs, matches, customer use, butane fuel/ charcoal/ Sterno/ propane and other minor kitchen fuel, garbage bags, gasoline and lubricants, aftershave lotion, bath gel, bath salts, combs, conditioner, hair, cotton swabs and cotton balls, creams, body/face (rooms), dental kit (toothbrush, toothpaste, toothpicks, floss), deodorant, diffusers (health club/spa), elixirs (health club/spa), emery boards, hair nets, hair pins, hair spray, hairbrushes, hand sanitizer, hand soap (bar, gel), lotions (body, hand), makeup remover, massage oils (health club/spa), nail polish (health club/spa), nail polish remover, razors, room slippers, sanitary pads/tampons, shampoo, shaving cream/gel, shower caps, tonics (health club/spa), tissue and paper towels, toilet paper, bathing suits, disposable, closet sachets, single-use laundry and dry-cleaning bags, sewing kits for use by guests in rooms, shoe mitt, shoe polish, amenity baskets (non-reusable), brochures/ maps and other attraction guides, charge vouchers, check-out notices, comment cards/ request forms/ safe deposit cards, parking permit, violation cards/ tickets, housekeeping/ room attendants' reports, golf scorecards.	
Upstream lifecycle emissions of food and beverage consumables provided by the hotel to guests	Takeout bags and containers, single use cups and glasses, aluminum single use trays, coasters, plates, all sizes, disposable, aluminum foil, cellophane/ plastic wrap, doilies/ coffee filters/ paper liners/ waxed paper and other liners, tray liners, single-use stirrers, disposable cutlery, picks (toothpicks, cocktail), single-use straws (all sizes and materials), wine cellar supplies, linen napkins, napkins and towelettes, single-use placemats, table tent cards, baked goods, bar supplies— consumable, beer- bottles and cans, beer-draught, CO2 (for soft drinks and beer), canned food, dairy products, dry goods (flour, pasta, etc.), dry ice, eggs, fish and	

SOURCE	EXAMPLES	DEFAULT CLASSIFICATION
	other seafood, ice, juice, liquor- bottles, beef/pork/chicken/lamb and other meat, soft drink syrup or premix, soft drinks, vegetables, wine- bottles, bottled water, candy & mints, cheese baskets, coffee/ tea/ hot drinks/ creamer and other instant beverage supplies, cookie wrappings, guestroom, cookies, fruit baskets, soda.	
Emissions from disposal and treatment of solid waste generated at the hotel	Landfilled municipal solid waste, bottles and cans, food waste, garden waste	High
Emissions from outsourced laundry	Laundry wash outsourced to an external operator, or a centralized destination facility outside the hotel's financial or operational control	High
Emissions from employee commuting	Employees driving cars to/from work, employees taking public transport	High
Transmission & Distribution Losses	Grid loss of purchased electricity	Medium
Business travel	Travel of sales and marketing staff to a customer's destination, travel of general manager to a regional company conference	Medium
Emissions from on-site composting for gardening use	On-site composting and generation of fertilizer	Low
Emissions from guest ground transport to and from the hotel arranged by the hotel	Airport pick-up, offsite event shuttle bus	Low
Emissions from disposal and treatment of wastewater effluent from the hotel	Sewer water effluent via piping for municipal treatment not owned or operated by the hotel company	Out of Bounds
Emissions from other guest activities unrelated to the hotel during the guest stay	Guest visit to an amusement park, convention center for a conference, restaurant down the street for a meal	Out of Bounds
Emissions from guest transport from city of origin to the destination of the hotel not organized by the hotel	Flight to/from home city to destination with interim layovers, interim travel on rail between two different destinations on a multi-city itinerary	Out of Bounds
Freight emissions of materials transported to a hotel for a meeting held in the hotel as a venue	Exhibitor booth, banner, SWAG	Out of Bounds
Emissions from transportation of fuel procured directly by the hotel	Shipping and ground transport of propane tanks for heating or diesel oil for generating electricity in a remote island	Out of Bounds
Emissions from generation of fuel sources	Process emissions from using methane to produce hydrogen that is delivered to the hotel to power a fuel cell for property energy use
Process emissions for extracting, refining, and delivering fuel sources used by electric	Out of Bounds

SOURCE	EXAMPLES	DEFAULT CLASSIFICATION
	power utility to generate and distribute electric power to the hotel	
Employee housing	Employees housed in accommodation paid for but not owned or operated by the hotel	Out of Bounds
Emissions from outsourced data servers	Physical server used in a cloud server procured by the hotel	Out of Bounds
Emissions related to municipal water processing and transmission to the hotel	Upstream emission of water delivery Downstream emissions of wastewater treatment	Out of Bounds

APPENDIX C: METHODOLOGY ALIGNMENT WITH THE UN RACE TO ZERO, GLASGOW DECLARATION, SME CLIMATE HUB, AND SBTI

The UN Race to Zero campaign and the Science Based Targets initiative (SBTi) are the two entities leading the global discussions on decarbonization. The SME Climate Hub is the UN Race to Zero's partner for businesses with less than 500 employees, in which independent or small hotel owners or operators may fit. For travel and tourism, the Glasgow Declaration is the central commitment to decarbonization. Below we set out how this methodology aligns with these.

C.1. UN RACE TO ZERO CAMPAIGN

Table C.1: UN Race to Zero Campaign Alignment

Attribute	Question	Net Zero Methodology for Hotels
Procedural Criteria		
Pledge Pledge at the head-of-organization level to reach (net) zero GHGs as soon as possible, and by midcentury at the latest, in line with global efforts to limit warming to 1.5C. Set an interim target to achieve in the next decade, which reflects maximum effort toward or beyond a fair share of the 50% global reduction in CO2 by 2030 identified in the IPCC Special Report on Global Warming of 1.5C	Does the network / initiative clearly require actors to have a NZ target by 2050? Note any exceptions or deviations. Are targets required to be firmly embedded in organizations' strategies? Can you provide evidence that organizations actually have such targets? Are interim targets required?	Hotel companies aligning with the methodology are to aim for net zero in 2040 for building emissions, and 2050 for all others per the boundary as outlined in Section 2. The commitment is to be approved at the highest levels of the company and the net-zero pathway is to be integrated into the company's structure and processes. See Section 6 for the detailed step-by-step guide for hotels to set their net-zero pathway.
Plan Within 12 months of joining, explain what actions will be taken toward achieving both interim and longer-term pledges, especially in the short- to medium-term.	Are plans required? What level of ambition is required of short- or medium-term targets / plans, if any? Are they required within a certain timeframe? How does the network/initiative require/support actors to make plans? Can you find evidence of these plans existing?	The methodology's pathway approach set out in default milestone categories, performance and engagement targets in Section 3 can be utilized by hotels to formulate plans for actions to be taken in the interim and long term.
Proceed Take immediate action toward achieving (net) zero, consistent with delivering interim targets specified.	Does the network / initiative clearly urge or require immediate action? What near-term measures does it require of actors, and in what	

Attribute	Question	Net Zero Methodology for Hotels
	timeframe does it require those measures? Do actors in the network/initiative show evidence of actually taking steps?	
Publish Commit to report publicly both progress against interim and long-term targets, as well as the actions being taken, at least annually. To the extent possible, report via platforms that feed into the UNFCCC Global Climate Action Portal.	Does the network/initiative require at least annual reporting? What form does it require reports to take? Can you provide evidence that progress has been reported?	Hotel companies are to communicate their progress toward net zero routinely by embedding in their annual ESG reporting processes and in alignment with existing reporting frameworks. See Section 6 for the detailed step-by-step guide for hotels to communicate on the initiative.
Leadership Practices		
Scope Targets must cover all greenhouse gas emissions: 1. Including Scope 3 for businesses and investors where they are material to total emissions and where data availability allows them to be measured sufficiently. 2. Including all territorial emissions for cities and regions Leading targets may also include: 1. Cumulative emissions (for all actors) 2. Consumption emissions (for cities, states, and regions)	To the extent some emissions are NOT included, what justifications, if any, are given (e.g. trivial amount, data are impossible to find, actors lack power to control, etc.)?	All Scope 1, 2, and 3 emissions across the hotel's defined boundary as suggested in this methodology in Section 2 are covered. This includes greenhouse gases of CO_2, CH_4, and N_2O, and potentially HFCs if significant to a hotel. The methodology covers the hotel industry as a component of commercial real estate and the value chain of travel and tourism. For specifics on sectors covered, see Table 6 and Table 7. Targets should cover Scope 1 and 2 emissions for hotel owners and operators, as well as Scope 3 emissions in each default category. All are covered per the respective entity as a default, and unless determined based on circumstance of a hotel or company, those deemed insignificant, uncommon, or out of bounds as itemized in Appendix B are not covered. Territorial and imported emissions are mostly covered as well. Imported emissions potentially include imported product emissions from F&B and OS&E, embodied carbon emissions from building materials. Otherwise, the provision of a hotel stay is inherently a territorial activity.

Attribute	Question	Net Zero Methodology for Hotels
Sinks and credits 1. In the transition to (net) zero, prioritize reducing emissions, limiting any residual emissions to those that are not feasible to eliminate. 2. Clearly specify what sinks or credits are used to make what, if any, neutralization claims, clarifying how sinks and credits are used both on the path to (net) zero, and after (net) zero is obtained. Any neutralization of residual emissions must transition to permanent removals by the time (net) zero status is achieved. 3. Encourage immediate contributions to the preservation and restoration of natural sinks, not necessarily linked to neutralization claims. 4. Ensure that any credits achieve robust outcomes for additionality, permanence, and accounting, and do not undermine social justice or harm biodiversity.	Are there any restrictions on offsetting (e.g. must be high environmental integrity, avoid social harm, avoid biodiversity harm, not include avoided emissions (e.g. via renewable energy projects), not include emissions reductions (e.g. via forest conservation), not include biological sequestration (e.g. via afforestation)? Are these similar to peer networks / initiatives?	Entities are allowed to purchase external offsets, with guidance on principles for types of offsets to purchase and specific limitations and thresholds for what can be accounted for in net-zero progress claims by each yardstick milestone. Offsets should meet a minimum threshold of quality and contribution to sustainable tourism, and approach is aligned with the Oxford Principles for Net Zero Aligned Carbon Offsetting as a base framework. The Methodology does not participate in any emissions trading schemes. Residual emissions are still to be further defined per best practice guidance in general, but currently determined as emissions accumulated each year in deviation from a pathway trajectory of emissions. See Section 3.4 and Appendix G for further specifics.
Empowerment and equity Seek to enable all actors to contribute to the global transition toward net zero through engagement, information sharing, access to finance, and capacity building. Develop pledges, plans, and actions in consideration of equity, drawing on, inter alia, the Sustainable Development Goals and Articles 2 and 4 of the Paris Agreement.	N/A	The Methodology embeds three related principles: 1. **Regional Equity Principle** – immediate markets that have established mechanisms for purchasing renewable energy should be held to more stringent Scope 2 decarbonization 2. **Business Model Equity Principle** – Hotel owners who obtain value on the appreciation of real estate over time and do not have a business model based on growth of floor area and subsequent job creation and local economic spend should be

Attribute	Question	Net Zero Methodology for Hotels
		held to more stringent decarbonization targets 3. **Sustainable Tourism Equity Principle** – Carbon offsets should meet a threshold of sustainable tourism that benefits local communities for tangible economic benefit and protection of natural and cultural heritage as well as align with company strategy and also seek to support industrywide decarbonization including aviation The guidance should be used when making choices about carbon offsets and when engaging among the value chain of entities have either a hotel asset or hotel stay in their Scope 3 boundary.
Questionnaire on Criteria for Net Zero Targets		
End state and transition	How do you define the end state you are seeking to achieve? For example, are you seeking net zero, absolute zero, or 'climate positive,' or some other goal? How is the pathway to that end state defined? Please refer to the Race to Zero Lexicon.	Net zero is defined to be zero carbon emissions across the hotel's defined boundary as suggested in this methodology in Section 2. Net zero is targeted for 2040 for building emissions, and 2050 for all other per the boundary as outlined in Section 2. Interim targets are set for 2025, 2030, 2035, 2040 with respective targets for each default category to decarbonize. Refer to Section 3 for specific interim targets per default category of a net-zero plan. The Net-Zero Pathway outlines milestone activities per yardstick year and disclosures of the Net-Zero Plan outlining action in each of the default categories for performance targets, and introduces the approach of engagement targets for each respective category that can be started immediately, in particular for areas of less control/influence or that have gaps in calculation

Attribute	Question	Net Zero Methodology for Hotels
		methodology that need to be solved first.
Future uncertainties	Which solutions (including key technologies or behaviors) do you anticipate will be necessary to achieve the net-zero targets, but which do not yet exist, or which are not yet feasible to implement? How much uncertainty surrounds the future development of these solutions, and how do your plans address uncertainty in these factors and in other trends?	In the current methodology, the most immediate necessary solutions relate to accounting and quantification of Scope 3 emissions. Please refer to Appendix K for further details. The pathway and further clarifications in Section 3 outline how energy efficiency will be the current prioritization, then the key behaviour/solution/technology to achieve net zero for the industry will be the driver of purchasing renewable electricity by 2030. Low level of uncertainty as these are not unique to the hotel industry but generally faced by a much wider value chain of transport, real estate, construction, restaurants, manufacturing, agriculture, finance, and accounting, and will all be incentivized to solve by market, regulatory, and physical risks.
Dependence on other actors	To what extent do your plans depend on other actors doing something? E.g. for a company, are you assuming suppliers will decarbonize? Or for a city, are you assuming a national power provider will go 100% renewable?	The largest assumption is that additional investment or operational spend will be required to purchase renewable energy which is related to but supersedes grid decarbonization forecasts. For value chain emissions, the methodology largely assumes that embodied carbon of buildings will be acted upon by entities within the value chain of construction and materials. Finally, the methodology anticipates widespread voluntary action across the travel industry and its value chain for carbon neutral travel and business travel buyers seeking to decarbonize their value chain which commonly includes lodging along with transport.
Governance arrangements	How are targets embedded in long-term decision-making (e.g. for governments, are they in law, or simply political declarations?). Who is responsible for delivery? How does your network or initiative ensure that	The intent of the methodology is that its approach and guidance will be taken into consideration in the hotel business model for owners, operators, franchisors, and the value chain to budget and contract accordingly, and have a unified approach that can help synergize action. By disclosing the standard

Attribute	Question	Net Zero Methodology for Hotels
	participants meet their commitments? What processes and procedures does your network use to make decisions?	boundary, stakeholders should be able to embed these issues into long-term planning of hotel development and the relation to travel. The entities owning, operating, or franchising hotels as well as the wider value chain, will be responsible for delivery. Recommendations are provided for embedding in public annual disclosures of key metrics, with interim disclosures of progress of the plan according to each default category in the Net-Zero Pathway, in addition to requirements for signatories of the Glasgow Declaration Routine public disclosures would enable transparency on progress toward the commitment.

C.2. GLASGOW DECLARATION

For hotel signatories of the Glasgow Declaration, the methodology can be adapted and used to support commitments made. A high-level alignment is provided below for its use.

Table C.2: Glasgow Declaration Alignment

Attribute	Glasgow Declaration	Net Zero Methodology for Hotels
General timeframe and target	Net Zero by 2050	Net Zero by 2040 for building emissions, 2050 for other value chain emissions.
Interim timeframe and target	50% reduction in emissions by 2030	Pathway is based interim milestones per yardstick year of 2025, 2030, 2035, and 2040.
Audience	All tourism stakeholders such as destinations, businesses which include the hotel industry, and supporting organizations.	Hotel industry only.
Reporting mechanism	Publish climate action plan(s), or update existing plans, within 12 months of signing. Public annual reporting on emissions, progress against interim and long-term targets, as well as on actions being taken.	Pathway plan and reporting suggestions can be used to support structure and consistency in the plan and annual reporting.
Pathway	Climate action plans to consider all 5 of the following pathways; first 2 pathways are compulsory: 1. **Measure** – measure and disclose emissions in alignment with established guidelines 2. **Decarbonize** – set and deliver science-based targets to decarbonize tourism-related activities (transport, infrastructure, accommodation, activities, food & drink, and waste management) 3. **Regenerate** – restore and protect ecosystems, and support local communities in climate mitigation and adaptation 4. **Collaborate** – effectively coordinate with all stakeholders, including authorities, civil society, large companies and SMEs, vulnerable groups, local communities and visitors 5. **Finance** – Ensure organizational resources are budgeted to support commitment	Pathway of yardstick years and interim milestones can be used to support the first two pathways.

Attribute	Glasgow Declaration	Net Zero Methodology for Hotels
Baseline Year	Any year from 2015 onwards for which emissions data is available, or future years (e.g. 2022) if emissions data have not been collected previously, except for 2020 and 2021 due to COVID-19.	Categorizes the baseline year, based on which differing levels of decarbonization pathways should be achieved.
Coverage of emissions	Scope 1 and 2, and including Scope 3 if emissions constitute greater than 40% of the entire inventory.	Scope 1, 2, and 3 emissions as set forth in the Default Boundary in Section 2.
Limitation on carbon offsets	Absolute emissions reductions and carbon credits to be prioritized over carbon offsets.	Allows for offsets to count toward reductions in net-zero pathway claims, up to the threshold of emissions intensity in the Sectoral Decarbonization Approach for each year, with a Sustainable Tourism Equity Principle for approach and choice of offsets and a prioritization given to purchasing renewable energy first.
Mechanism to ensure commitments are met	Follow-up and support mechanisms in place. 90-day grace period for submission of climate action plans and annual reports.	Guidance provided at high level for disclosure of veering off track from the commitment and a plan for getting back on track.

C.3. SME CLIMATE HUB COMMITMENT

For an SME, the SME Climate Hub is the preferred initiative of the UN Race to Zero for commitment to net zero. For those SMEs seeking to pursue the commitment via the SME Climate Hub, this methodology can be used in full alignment per the table below.

Table C.3: SME Climate Hub Commitment Alignment

Attribute	SME Climate Hub Commitment	Net Zero Methodology for Hotels
Definition of SME	Business with up to 500 employees	Applicable for hotels and companies of any size. Also recognizes that headcount may not be a representative determinant of business size, as publicly traded REITs may have only a few dozen employees but company valuation of millions. Conversely, hotel operations may be very labor intensive and a small hotel may have hundreds of employees but the entity still be an SME.
Definition of net zero	A state in which the activities within the value-chain of your company result in no net impact on the climate from greenhouse gas emissions	As outlined in section 2.
General timeframe and target	Net zero by 2050	2040 for building emissions, 2050 for other value chain emissions.

Attribute	SME Climate Hub Commitment	Net Zero Methodology for Hotels
Interim timeframe and target	Target 50% reduction in emissions by 2030	Interim milestones at 2025, 2030, 2035, and 2040, generally aligned with a 50% reduction by 2030 with the KPI of 100% renewable electricity. Allows for a threshold of offsets and setting an earlier baseline for entities already pursuing decarbonization, which would in most cases exceed 50% for Scope 1 & 2. Provides additional milestones for other categories.
Baseline and target amount	Cut *absolute* emissions from a base year not more than 2 years back in time	Allows for intensity targets along pathway based on SDA as well as considerations for meeting performance thresholds. Outlines targets and set of milestones to reach net zero earlier than 2050 for the main emissions of the building.
Immediacy of action	Within 3-6 months of commitment (measure, set targets, develop plan, act)	Methodology can be used to support the actions needed to fit within the timeline.
Coverage of emissions	Both Scope 1 and 2, and Scope 3 emissions that are material to business and available data Based on GHG Protocol	Scope 1, 2, and 3 emissions as set forth in the Default Boundary in Section 2.
Limitation on carbon offsets	Residual emissions should not exceed 10% of the base year emissions; can only off-set for up to a maximum of 10% of the total emissions in baseline year	Allows for offsets to count toward reductions in net-zero pathway claims, up to the threshold of Scope 1 intensity in the Sectoral Decarbonization Approach for each year, with a Sustainable Tourism Equity Principle for approach and choice of offsets.
Position on RECs	Encourage to achieve 100% renewable energy	100% renewable electricity by 2030 for immediate markets. Allows for both owner, operator, and franchisor to account for RECs purchased for the same facility for the same year by one of the entities to avoid over-purchases of RECs and streamline engagement.
Equity	Not addressed	Addressed in three equity principles, which may affect the SME directly.
Reporting mechanism	Annual reporting	Annual disclosure of metrics, and periodic disclosure of plan and progress toward it in each of the default categories.
Mechanism to ensure commitments are met	Not addressed	Guidance provided at high level for disclosure of veering off track from the commitment and a plan for getting back on track. Refer to Section 3.3. for further details.

Attribute	SME Climate Hub Commitment	Net Zero Methodology for Hotels
Alignment with existing standards	- Greenhouse Gas Protocol - UNF Race to Zero - SBTi - CDP - Mission Innovation's Net-Zero Compatible Innovations Initiative - Chambers Climate Coalition	Derived from: - GHG Protocol - UN Race to Zero - SBTi - HCMI - Glasgow Declaration

C.4. SCIENCE BASED TARGETS INITIATIVE

Entities committing to net zero with the Science Based Targets initiative will seek to utilize the SBTi Corporate Net-Zero Standard. While the initial standard was released in November 2021, much of the details of how the standard is to be implemented, adapted to specific sectors, and interpreted in practice will still need to be further defined. As such, for those entities the methodology strives to:

1. provide supplementary guidance that can support industry-specific context, modeling, planning, and an approach for hotel companies seeking to commit and receive SBTi approval;

2. help contextualize and reduce the amount of individual Scope 3 screening by each company; and

3. serve as a resource to support the validation process and reduce possibility of differing interpretations that may result when one of the corresponding SBTi entities is assigned to the company's application.

Two tables are provided below for companies using the SBTi Corporate Net-Zero Standard[33]. Table C.4.1 outlines the specific differences or relation of the Net Zero Methodology for Hotels with the SBTi Corporate Net-Zero Standard. Table C.4.2 provides tips on using the methodology and supporting approaches when seeking target validation.

Table C.4.1: SBTi Corporate Net-Zero Standard Alignment

Attribute	SBTi Corporate Net-Zero Standard	Net Zero Methodology for Hotels
Use	Intended as a model of commitment, application, and approval with the SBTi (cannot make target claims unless this is done) with payment required to participate, and the need to revise targets upon updating of the criteria.	Intended to support net-zero claims, planning, and alignment with various initiatives and frameworks.
Sector Specificity	General criteria with some sector-specific requirements, of which the hotel industry falls under Service Buildings category which	Methodology is intended specifically for hotels and the hotel industry, with supporting guidance for how hotel stays within the business travel value chain

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[33] Tables are based on the Version 1.0 October 2021 of the standard. Note that the SBTi criteria have been known to change over time in terms of level of ambition, guidance, and sector pathways (i.e., uses of physical intensity convergence vs. absolute reductions), and when using this methodology, the latest version of the SBTi Corporate Net-Zero Standard should be used, which may diverge from the alignment above.

Attribute	SBTi Corporate Net-Zero Standard	Net Zero Methodology for Hotels
	encompasses the range of commercial buildings. At present, specific pathways and guidance for Service Buildings is planned, but no timeline is available[34]	category of any company applying to SBTi.
Boundary	Scope 1 & 2 boundary is 95% of emissions (enabling a 5% exclusion). Scope 3 boundary is based on an approach of applying a percentage of Scope 3 in relation to total emissions and setting thresholds. Requires a Scope 3 evaluation based on a standard set of categories and provide data to determine whether overall aggregate of Scope 3 is significant or not. Currently, if Scope 3 is over 40% of the company's total emissions, then at least 67% of the Scope 3 needs to be covered by short-term targets. For long-term targets, 90% of Scope 3 must be included, but it is not currently stipulated for which components of the Scope 3 could be excluded as part of the remaining 10%.	Provides a default boundary for industry-specific categories of Scope 1, 2 & 3 based on research and industry best practice, which will constitute >95% of Scope 1 & 2, and >90% of Scope 3 emissions for the hotel industry, from which a company can then adjust as needed based on business model. By using a default boundary, the methodology seeks to avoid the complications and challenges with a percentage-based boundary to Scope 3.
Baseline	Baseline cannot be prior to 2015. In addition, most recent year is required to be submitted as part of the application (note due to COVID, 2019 can still be used at time of publication). Requires all Scope 1, 2 & 3 emissions to use the same baseline year.	Allows for any baseline year, adjusting accordingly for the convergence pathway to be achieved. Allows for different baselines for different categories, and deferred baselines for some Scope 3 categories which are presently challenging to sub-categorize, prioritize, and quantify accurately and set quantitative decarbonization pathways for.
Target Ambition and Method	Service Buildings should use the Service Buildings Pathway of either a 98% absolute reduction or an intensity reduction below 0.179kgCO2e/M^2 by 2050 or earlier. Short-term (interim) 2030 target Service buildings default pathway is either a 56% absolute reduction, or	Target is zero emissions by 2040 for emissions relating to the building, and 2050 for others in the value chain. Pathway is based on baseline year and interim milestones per yardstick year of 2025, 2030, 2035, and 2040. Pathway for Scope 1 & 2 calls for at least 1 of 3 targets to be met at each yardstick year. Ambition is based on

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[34] SBTi Corporate Net-Zero Standard Table 2

Attribute	SBTi Corporate Net-Zero Standard	Net Zero Methodology for Hotels
	63% intensity reduction from 2020[35]. Short-term target years different from 2030 but within the 5-10 year timeframe from baseline year. Scope 2 targets can be set specifically for renewable energy, with 100% renewable electricity by 2030 and 80% by 2025. Scope 3 targets can use absolute contraction, or physical intensity contraction and companies can define their own metrics, in alignment with the 1.5 degree scenario for an annual 7% intensity reduction for short-term period, and overall 97% reduction for the long-term period to 2050.	the same absolute contraction and physical intensity convergence options used in the SBTi Corporate Net-Zero Standard's Service Buildings pathway. Additionally, the methodology allows for a specific intensity threshold to be used as a target, in the case of entities that are already below the intensity pathway for Service Buildings, instead of requiring % reductions. Additionally, calls for a percentage of renewable electricity in place in each interim yardstick year depending on the availability in the corresponding location (*immediate* or *next* market). Scope 3 for franchise property pathway follows the same approach as above, using the B2DS scenario for franchises through 2030, then aligning to the long-term absolute contraction or physical intensity convergence for buildings by 2050. Other categories outlined for decarbonization pathways individually, with some deferred baselines and targets but all following toward zero emissions by 2050.
Engagement Targets	Allows for setting engagement targets for suppliers to set science-based targets through 2030, ***instead*** of a performance targets for Scope 3 decarbonization. No other engagement targets are needed, or allowed for suppliers for long-term targets.	A plan should be submitted for engagement targets for each category of emissions regardless of scope, and outlining how the entity will pursue decarbonization. Outlines a wider range of forms of engagement for the plan than supplier commitment. Engagement targets cannot be used as a substitute for performance targets, except up until the corresponding yardstick years for Scope 3 categories with deferred baselines due to lack of availability of credible, consistent data and calculation methods.
Carbon Offsets	Offsets (carbon credits, neutralization of unabated emissions) are allowed only for long-	Allows for offsets to count toward reductions in net-zero pathway *claims* after meeting at least one of the three

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[35] Information is not provided in the final Standard Version 1.0, but was provided in the draft Corporate manual Version 1.0 September 2021 Table 2

Attribute	SBTi Corporate Net-Zero Standard	Net Zero Methodology for Hotels
	term abatement of residual emissions and do not count as reductions.	target options for facility emissions for each year up to the allowable threshold of intensity in the SBTi's Service Buildings physical intensity convergence metrics for each corresponding year, with a Sustainable Tourism Equity Principle for approach and choice of offsets. The approach is based on the acknowledgment that these emissions are allowed along a pathway, and emissions offsetting within the value chain of travel will occur.

Table C.4.2 provides guidance for how to use the methodology and other suggestions and rationale for the business model of a hotel to support companies when undergoing their target validation process. A set of suggestions for approaches and rationale are provided for each issue that may arise.

Table C.4.2: Suggestions for Seeking Target Validation

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When seeking a baseline earlier than 2015, demonstrate the pathway and how the year meets the same trajectory, with the following arguments:	1. As the Net-Zero standard for service buildings is based on physical intensity convergence arriving a the sector's 2050 intensity at 97%-99% reduction, then a prior year to 2015 should not be a problem as it can be modeled for convergence. 2. Not allowing baselines prior to 2015 diverges from the original SDA baseline year of 2010, and also runs the same risk of not enabling companies that took big strides to decarbonize prior to 2015 to include those results. 3. Enquire as to why 2015 was chosen for the earliest baseline year and if that is applicable to all sectors and types of companies.
When setting absolute reduction targets	It will be more advantageous in the SBTi application to use the latest representative year possible as a baseline year, as an absolute reduction of 4.2% per year will be needed, and the later the baseline year, the less years the Company will be accountable for in its target pathway. Note however that this would have to be adjusted in following the Net Zero Methodology for Hotels to increase the corresponding ambitions toward 2030 for intensity/absolute reductions.
When selecting a Scope 3 baseline years by category of Scope 3 that are different from the Scope 1 & 2 baseline year	1. The Net-Zero standard indicates Scope 1, 2, and 3 emissions should be accurate and verifiable. However many of the Scope 3 categories lack consistent and accurate ways to quantify them. 2. Setting a target without accurate baseline data runs a risk of creating more work later to re-baseline. 3. Current tools promoted by the GHG protocol and SBTi are also not accurate, for example the Quantis Scope 3 Evaluator has not been updated since 2016, and the source data for purchased goods and services calculation methodology is from 2011. 4. Requiring all scopes to use the same baseline year may then cause the Company to need to choose a later baseline, which

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	risks criticism from external stakeholders of not doing enough to decarbonize prior, and augments the reduction pathway for a shorter time period. 5. Argue that the long-term target year is 2050 with a near total decarbonization and the Standard is intended for long-term targets after 2030, therefore the handful of years in this earlier stage for Scope 3 baselines is not as relevant as in the short-term targets. 6. If some value of a baseline is needed for the same year as the Scope 1 & 2 targets in order to qualify and set a decarbonization pathway, use the highest possible emission factors and assumptions in the baseline in order to mitigate potential challenges in the future where recalculation could increase baseline emissions and boundaries, and internally communicate that these are placeholder values not to be taken too seriously, and then plan on recalculating the baseline in the 5-year revalidation process.
When seeking to exclude some Scope 1 & 2 Emissions Sources up to 5%	Refer to citations within the methodology for rationale of default exclusions from smaller sources of onsite combustion, vehicle use, and fugitive emissions.
Setting a boundary of Scope 3 emissions to meet the 67% and 90% thresholds (Franchisors)	1. Refer to the methodology regarding the *Scope 3 of a Scope 3* issue, to reduce the boundary of franchises to their Scope 1 & 2 emissions. 2. For the extrapolated portfolio in which actual data does not exist, use the most conservative assumptions to arrive at the highest possible emissions intensity of the franchised portfolio and push it above 67% of total emissions, and ideally 90%. Then the Company should be able to exclude all other Scope 3 sources and still receive target validation. Note that this can always be restated 5 years later in re-validation, when more sound calculations for other Scope 3 will be needed, and baselines can be adjusted. 3. Should franchises not reach the 90% threshold, see suggestions below for non-franchisors.
Setting a boundary of Scope 3 emissions to meet the 67% and 90% thresholds (non-Franchisors)	1. Find the references and calculation methods with the highest emissions coefficients for the default categories of employee commuting, waste, outsourced laundry wash, transport in business travel in the baseline year. This will help inflate the percentages of the known and controllable categories now and reduce the weighting of the less known/controllable categories within purchased goods & services. Note that you can always restate the baseline and recalculate later in the 5-year interim validation thereafter, when much better emission factors and calculations will be available. 2. Include a smaller boundary for purchased goods and services to include some food and beverage items if applicable. 3. Refer to the methodology and Appendix B and Appendix I to outline the complexity of purchased goods and services for a hotel building and operation. Request clarification on how each of these should be treated. Indicate that the Quantis Scope 3 evaluator has not been updated since 2016 and uses data from

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	2011 that does not account for inflation, currency fluctuations, or granularity for hotels.
When addressing portfolio growth issues of adjusting market share parameters for reduction targets	Should SBTi suggest that the % reduction in targets be increased due to portfolio growth outpacing the growth of service buildings overall, use the following arguments for justifying maintaining the same percentages despite increased portfolio growth outpacing service buildings: 1. DISPORPORTIONATE INTENSITY TARGETS ACROSS ALL ASSET CLASSES. The SDA calls for reductions based on a projected pathway in Scope 1 emissions, coupled then with the decarbonization pathway of the electric power grid for Scope 2. These are based on a specified intensity, from which reduction percentages are derived. However, the intensity metric is uniform across all buildings. In the case of hotels, it has been empirically shown that hotels have higher energy use intensity than other asset classes. The drivers are straightforward – hotels are 24/7 operations where people eat, sleep, and bathe, and the buildings need to partition conditioned space at much smaller ratios. The annual Greenprint Performance Report provides statistics to demonstrate this. Per this logic, if a hotel decarbonized at the same rate in percentage terms as other asset classes, it would achieve a higher proportion of actual carbon intensity reduction. (i.e., a 20% reduction from 250 = 50kgCO2e, whereas a 20% reduction from 100 = 20 kgCO2e). Therefore, the blanked approach of requiring percentage-based reductions to align with SDA skews the impact more on hotels. 2. GROWTH FROM NEW DEVELOPMENT VS. CONVERSION OF EXISTING BUILDINGS. A portion of a large hotel chain's growth in portfolio floor area may be from conversions of pre-existing buildings that were either part of a different hotel chain, an independent unaffiliated hotel, or a different type of building that was converted into a hotel. From the perspective of the SDA methodology and subsequent SBT target-setting tool of quantifying the total activity (floor area for service buildings) of a sector, a hotel chain that converts a pre-existing building into its own portfolio (either managed or franchised), is not adding additional building stock to the global total. Therefore, the portfolio growth from conversions should not carry additional weighting to a hotel chain's index against fixed market share of the SDA overall growth of service buildings. Furthermore, conversions may incorporate a large portion of local Small and Medium-sized Enterprises (SMEs) which have almost no direct awareness or participation in an SBT or affected by sustainability reporting, ESG ratings, responsible investment principles or shareholder activism. Effectively, they would not have the same motivations, access to capital, or sophistication to address the pressing need to decarbonize. By incorporating hotels into the portfolio as conversions to brands, hotel chains absorbing their footprint which otherwise would not have been addressed. As such it will take time to put these properties on the same decarbonization path, and definitely should not necessitate deeper levels of ambition.

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	3. ADJUSTING FOR A DISPROPORTIONATE ALLOCATION TO HOTELS AS SERVICE BUILDINGS. The SDA model for both 2 degrees and well-below 2 degrees is based on IEA research and publications estimating the future growth of service (commercial) buildings. This model uses the assumption that as a country develops, its economy changes and less commercial building space is needed compared to economic growth. While this was true traditionally, the model did not factor the advent and impact of developing country international travel on other countries' floor area. China is the best example of this with the Chinese traveler impact on places in North America and Europe. The overall building stock forecast of 66% growth through 2050 is a weighted average of all buildings including hotels. But the growth of tourism will result in hotels outpacing this growth by a factor of at least two. Thus other industries with service buildings are positively affected in their SBT modeling as they are likely to have less proportionate floor growth but an average sector-wide benchmark of 66%. As a result, the service buildings calculations have weighted growth among several countries and regions. Energy usage is forecasted to increase by 26% in OECD countries, and 77% in non-OECD countries. Floor area is forecasted to increase 46% in OECD countries, and 91% in non-OECD countries. For a global hotel chain, the new growth will be tilted toward non-OECD countries such as China and India which have relatively higher growth but are weighted in average worldwide. While it is a lengthy exercise to demonstrate the hotel company's growth proportionate to the growth in weighted average with each country's contribution as forecasted in SDA service buildings, the straightforward approach would be to allow for less ambitious targets to compensate for the higher concentration of growth in non-OECD countries which have higher electricity emission factors to start with.
When addressing inquiries that may arise for buildings in terms of capital goods and use of sold products (non-owner or significant owner)	1. Refer to the methodology for this being part of the boundary of the owner of the hotel. 2. Refer to the methodology in Appendix I for the complexities of calculating embodied carbon in buildings and FF&E. 3. Should requirements to account for this be required by the person assigned to the validation, see the suggested approach and arguments for a hotel owner below.
When addressing inquiries that may arise for buildings in terms of capital goods (Owner)	1. Refer to the methodology in Appendix I for the complexities of calculating embodied carbon in buildings and FF&E and setting them at present, requesting a deferral on these to calculate the baseline, but agreeing to decarbonize them in line with the 1.5 pathway by 2050. 2. Indicate the challenges and discrepancies in the GHG Protocol Value Chain (Scope 3) Standard for accounting for buildings in their entirety in the year of completion and not amortized, questioning why Capital Goods should be accounted for in their entirety at the beginning when they are commonly amortized. Also question the challenge of concrete absorbing CO_2 over time which may further complicate the calculation and how to resolve that over time. 3. If forced to include estimated embodied carbon at the time of baseline year in order to receive target validation, choose the

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	coefficients that will arrive at the highest possible emissions of the building and choose a baseline year with a significant portion of additions to the portfolio so as to inflate the baseline year, and make reductions from it much easier in subsequent years with no embodied carbon additions.
When addressing inquiries that may arise for buildings in terms of use of sold products (Operator)	If requested to account for the useful life of a sold building per the GHG Protocol Value Chain (Scope 3) Standard for accounting for a building's useful life in the future, argue that the building is not the product, but rather a physical structure to provide a service. Make enquiry on the following issues and scenarios for the SBTi to further clarify: 1. The example of a Company that spun off their owned hotels into separate real estate ownership companies and do not have a JV or subsidiary relationship with them thereafter – would they then need to account for the lifetime emissions of the buildings that were spun off to a separate company? In such cases, if that spun off company then buys more hotels would that also be part of the sold products? 2. If the hotel is sold, and then as commonly happens, that owner invests in the hotel to renovate, then sells it in 5 years, would the seller be responsible for the hotel's lifetime emissions in perpetuity or just until the owner who you sold the hotel to sells it to another owner? If the former, then would that owner also have to account for the lifetime emissions of the hotel that was bought and then sold, so that 2 entities are now accounting for the lifetime use since technically both of them sold the same hotel? 3. As sometimes happens, if a hotel is sold and then the new owner converts it into commercial office buildings or residential building, then is the seller responsible for the lifetime use of that building if it is no longer fitting the purpose of what it was used for when it was sold? 4. What is the lifetime of a hotel in terms of its useful life as it is not a product but a building that continuously gets remodeled? And how would that be accounted for in target-setting for a 2030 target and interim progress? Would it be accounted for annually in an amortized or adjusted format based on re-adjustments needed? What about the emissions beyond the target year of 2030 year if the building has a useful life of 20 years? Would the lifetime use emissions beyond 2030 needed to be reduced from a target baseline or included? 5. If you estimated the lifetime use of a hotel and then for example suddenly a pandemic arrived and that hotel was only at minimal use for 2 years, then would you be able to re-adjust the estimated useful life emission of that hotel retroactively? And how would that fit in give the previous question about amortizing and accounting for annual use emissions over a period of time? 6. As the hotel is a physical place to provide a service, would the additional Scope 3 emissions associated with provision of the service such as waste generation and purchased goods and services need to be accounted for in the useful life calculation? 7. When estimating lifetime use of a building, most of the emissions currently come from purchased electricity. So would

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	the seller need to model the electric power grid forecast for across the useful life and then accounting accordingly as the emission factors will change over time?
	8. Similarly to the above, when estimating the emissions of the sold hotel over a lifetime, should location-based or market-based accounting be used for estimating their Scope 2? Market based would seem to make sense as the owner would then be using the hotel and in that use, purchasing renewable energy, is that the case?
	If forced to include useful life emission of sold hotels at the time of baseline year in order to obtain target validation, choose the coefficients that will arrive at the highest possible emissions of the building and choose a baseline year with a significant portion of dispositions to the portfolio so as to inflate the baseline year, and make reductions from it much easier in subsequent years with no sold hotel useful life additions.

APPENDIX D: PURCHASED RENEWABLE ENERGY AND ADDRESSING MARKET BASED EMISSIONS

D.1 USE OF RENEWABLE ENERGY AT HOTELS

After reducing carbon emissions by increasing energy efficiency measures at hotels, progress should be made on commencing or advancing the procurement of renewable energy.

For hotels to embrace renewable energy, a hierarchy of actions (Figure D.1) can be pursued by maximizing on-site renewable energy opportunities before using off-site renewable energy options. This hierarchy is closely aligned with industry resources such as the Green Building Principles[36] by the World Economic Forum (WEF) and JLL, and the Green Building Council Australia's (GBCA) push for climate positive buildings[37].

Figure D.1: Hierarchy of Renewable Energy Options
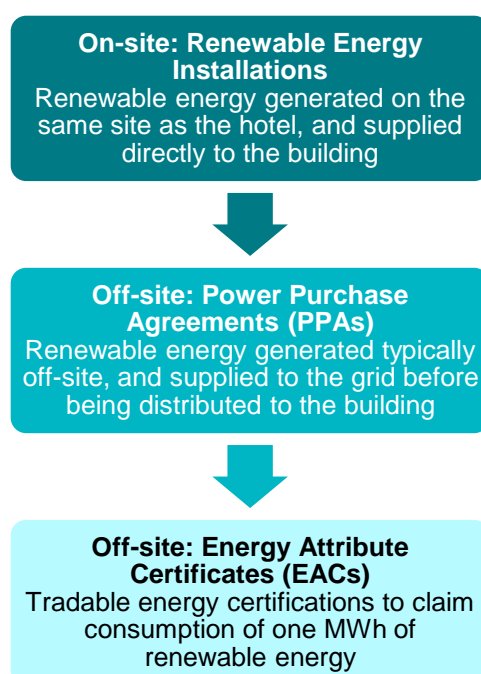
The hierarchy is based on the quality and extent of renewable energy to which the source can guarantee *exclusivity* and *additionality*. Exclusivity refers to the extent to which the hotel purchasing the renewable energy can credibly claim that they exclusively own the energy generated and that it was generated from renewable sources. Renewable energy is considered to be additional if it would not have been generated if a hotel had not specifically purchased it. Based on these variables, the following ways to implement renewable energy are available for hotels.

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[36] Green Building Principles by the WEF and JLL:
https://www3.weforum.org/docs/WEF_Green_Building_Principles_2021.pdf
[37] Climate Positive Buildings & our Net Zero Ambitions by GBCA: https://gbca-web.s3.amazonaws.com/media/documents/climate-positive-buildings-net-zero-ambitions_Z3pcK5R.pdf. Guidance on the use of on-site and/or off-site renewable energy is provided in the form of 12 scenarios.

1. **On-site Renewable Energy Option: Renewable Energy Installations**

On-site installation of renewable energy (RE) technologies such as solar panels, wind turbines are one of the direct ways available to a hotel to meet its energy needs. There are several emerging examples where hotels around the world are continuously installing RE technologies on-site and using it for their internal consumption. Some of the key examples are given below:

*   **Hotel Geysir, Iceland**: Hotel Geysir, as its name implies, is located near a geyser at the historical site of Haukadalur. The hotel, which is outfitted with twenty-four cabin rooms, is located next to a river and is all about helping guests unwind and regenerate. Hotel Geysir heats its water using a local geothermal system which taps into the natural heat underground.
*   **Star Island, Bahamas**: The hotel harnesses the Caribbean region's abundant sunshine and has installed solar panels that power the hotel even through the night.
*   **Garonga Safari Camp, South Africa**: The Garonga Safari Camp covers 30 percent of their electricity needs with solar energy. They've also worked in a heater pump system, water treatment, vegetable garden, and bio-gas system to minimize their carbon footprint.

While possible, the examples are anecdotal, and installing RE on-site to meet a significant portion of the building's total energy demand can be very challenging for hotels due to constraints such as available sources of geothermal energy, available space to install enough solar panels to generate the electricity required, and sufficient battery storage options which may not fit into an existing hotel.

2. **Off-site Renewable Energy Option: Power Purchase Agreements (PPAs)**

A power purchase agreement (PPA), or electricity power agreement, is a contract between two parties, one generating electricity (usually the renewable energy project developer) and one purchasing electricity. PPAs define all of the commercial terms of the power supply contract, including duration, schedule for delivery of electricity, penalties for under delivery, payment terms, and termination. There are three main types of PPAs, as follows:

a. **Physical PPA.** Under a Physical PPA, the RE project developer will build, maintain, and operate the renewable energy system, either on the hotel property site or off-site, while assuming the risks associated with owning and operating the system. In return, the hotel will purchase the power at a set price over a specified period of time and receive the physical delivery of (or title to the) electricity through the grid.
b. **Virtual/Financial PPA.** The main difference is the hotel does not receive the physical delivery of electricity through the grid with a Virtual/Financial PPA (VPPA). Under a VPPA, the RE project developer sells the power to the grid at wholesale market price and sells the power to the hotel at a fixed price. The developer owes the hotel the difference when the wholesale price is above the fixed price, and the hotel owes the developer the difference when the wholesale price is below the fixed price. The hotel would typically receive or pay the developer the net price difference between the fixed price and the wholesale price at the end of each month. The hotel will also receive the environmental attributes of the green energy in form of Energy Attribute Certificates (EACs).

c. **Sleeve PPA:** In a sleeved PPA, an intermediary utility company handles the transfer of money and energy to and from an RE project on behalf of the hotel buyer. The hotel buyer does not need to be intimately familiar with wholesale power market dynamics, and the buyer is not subjected to wholesale power market price fluctuations because the utility bears the market risk.

Example of a hotel using PPA model:

MGM Resorts entered into a 20-year PPA agreement with Invenergy to purchase solar power from a 100 MW solar array in Las Vegas. The solar power will enable the delivery of up to 90% of daytime power in 13 of its Las Vegas resorts, encompassing 65 million square feet of buildings with more than 36,000 rooms on the Las Vegas Strip, including Bellagio, ARIA, Mandalay Bay, MGM Grand and The Mirage

For some hotels based in remote or exotic locations, the challenge with a PPA might be that the regulatory market and the regulatory ecosystem may not be completely developed and do not easily facilitate entering into such energy contractual agreements, and therefore may not fully support the purchase and selling of renewable electricity. Hence, on-site RE may be more convenient in such cases.

3. Off-site Renewable Energy Option: Energy Attribute Certificates (EACs)

EACs are tradable energy certificates that represent proof that 1 megawatt-hour (MWh) of electricity was generated from an eligible renewable energy resource (renewable electricity) and was fed into the grid. As power on the grid comes from various sources such as coal, nuclear, natural gas, renewables etc. which are all blended together, it is difficult for the user to tell whether the electricity which is being consumed is from a renewable source or not. EACs are a way for businesses to certify that they have a valid claim to renewable energy use. To make a credible renewable energy claim and to prevent double counting, EACs must be "retired" after use for businesses to retain ownership of it forever and prevent another entity from making a claim on it. Note that EACs are different from carbon offsets, although both help to reduce atmospheric carbon. While EAC specifically targets lowering a companies' Scope 2 emissions from purchased electricity and purchases can be used to claim carbon footprint reduction, carbon offsets can be used to compensate for Scope 1, 2, or 3 emissions but without any claim of carbon footprint reduction. There are also differing qualities of EACs available. While high-quality EACs ensure exclusivity of energy provision and additionality, low-quality ones are available on the wholesale market without guarantees on exclusivity or additionality. EACs are referred to by different names in different regions:

- **Guarantees of Origin (GOs):** The EU Renewable Energy Directive from 2009 states that Guarantees of Origin prove to consumers that a given quantity of energy was produced from renewable energy sources. GOs are a purely voluntary system used by businesses, public institutions and households in Europe.
- **Renewable Energy Certificates (RECs):** In North America, RECs must be bought to document and report that the energy consumed comes from renewable energy sources. In

the US, RECs are used both for compliance reporting as well as voluntary consumption purposes.

- **International REC Standard (I-RECs):** I-REC is a newer global standard introduced in a growing number of countries where no market mechanism was previously in place. I-REC builds on best practice from the North American REC market and Europe's GO system and has strong stakeholder support. Currently I-RECs are issued in 22 countries for use in a number of regions, based on the Renewables Good Practice (ReGP) criteria.

Purchasing EACs is essentially paying for the renewable energy that is added to the grid and claiming credit for the energy. There are again two types of EACs:

- **Bundled EACs:** Bundled EACs are sold together with its associated energy from the regional grid. They typically help to finance new renewable energy projects, enabling the hotel company to make "additionality" claims since the investment directly added renewable energy to the grid while displacing energy generated from fossil fuels. If hotel companies are motivated to actively decarbonize the grid and directly drive renewable energy development, choosing this option can help achieve that objective.
- **Unbundled EACs.** In contrast, unbundled EACs are sold separately from the underlying electricity production. They are less expensive as they typically come from an oversupplied renewable energy market (e.g. regions with abundant solar and wind energy). However, hotel companies that purchase unbundled EACs cannot claim "additionality" as they do not help increase renewable energy capacity.

Hotel companies have their portfolio spread all across the world with separate ownership of the assets, which makes it difficult to obtain any meaningful scale on renewable energy installation or PPAs. As the transversal decarbonization pathway involves decarbonizing the power grid, hotels should include the ability to support the grid's decarbonization through unbundled EACs because that is where the largest scalability exists, and impact can be made which will benefit other sectors by accelerating the power grid's addition of renewables. Allowing for large, unbundled EAC purchases will not match the specific site to specific power grids or countries, but the overall contribution to renewable energy will be the same.

D.2 AVAILABILITY OF PURCHASED RENEWABLE ENERGY

Unfortunately, not all markets are ready for the transition towards renewable energy for companies to exercise their off-site options of purchasing renewable energy either through PPAs or EACs. According to the Carbon Disclosure Project (CDP)[38], the readiness of the renewable electricity market is determined by four factors:

1. **Renewable Energy Resources**: Supply of renewable energy options in the market.

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[38] Based on CDP's methodology for the Asia Renewable Electricity Competitiveness Index (AREC-Index): https://cdn.cdp.net/cdp-production/cms/reports/documents/000/005/931/original/REenergize_Asia_report_20211027.pdf?1635322051

2. **Market Infrastructure**: Market fundamentals within which renewable energy sector operates.
3. **Policy**: Government policies supporting renewable energy generation and uptake.
4. **Corporate Demand**: Demand for renewable energy form companies operating in the market.

The broad spectrum in how different markets are transitioning towards renewable energy is acknowledged and incorporated in the methodology through the **regional equity principle** introduced in Section 3. This principle underpins the approach towards the milestones based on a designation of **immediate markets** and **next markets.** These markets are not easily defined as there are likely to be transition pathways and stages for countries that evolve in the coming years based on the four factors identified above. For the purposes of this methodology, the **designation is essentially once a viable renewable energy purchase of EAC or direct sourcing of Power Purchase Agreements (PPAs) for all its electricity is readily available for a single hotel to purchase directly at reasonable cost, the location would be considered an immediate market**. In engagement targets for the net-zero plan, companies should monitor the readiness to help forecast the potential of the portfolio's composition to transition from next markets to immediate markets.

Hotels in immediate markets are enabled to readily purchase renewable energy, hence they are expected to transition to renewable energy and decarbonize across the value chain more quickly, and the related cost increases should be absorbed more quickly. Conversely, next markets should be prioritized first in energy efficiency.

Example of hotel using REC model:

A Renewable Energy Certificate (REC) program by CLP Power Hong Kong Limited (CLP Power) has recorded its biggest deal after Rosewood Hong Kong committed to buy 13 gigawatt hours (GWh) of renewable energy through the purchase of RECs for six years from 2020. The transaction is equivalent to a reduction of around 4,800 tonnes in carbon emissions associated with electricity, equivalent to around 208,000 trees planted.

How to Purchase EACs/RECs

- **Utilities:** RECs can be purchased directly through electric utilities. In US, there are almost 850 utilities which offer green power programs to their customers by charging a nominal premium. Most green pricing premiums cost around 1 to 2 cents per kWh.
- **Auctions and Exchanges:** Entities covered by mandatory national/regional programs and renewable purchase obligations can purchase RECs through national/registries and auctions by bidding. India has set up an REC registry for tracking, purchasing and selling of RECs as part of national program.
- **Brokers/Traders/Consultants:** There are various brokers, traders and consultants involved that can secure delivery of RECs and IRECs and can also add quality labels that enable customers to make certifiable claims on the additional impacts of purchases.
- **Third-party organizations:** There are several third-party organizations which provide unbundled RECs.

- **Green Tariffs:** These are energy contracts sold to energy users by utility companies that only source their energy from 100% renewable sources. Such contracts enable buyers to purchase bundled renewable energy from a specific project through a special utility tariff rate.

D.3 SCOPE 2 QUANTIFICATION AND ACCOUNTING APPROACHES

Different electricity suppliers and contracts emit different amounts of emissions depending on the energy source or technology. As companies become increasingly able to purchase renewable energy with lower carbon emissions from their chosen suppliers, the approach towards quantifying and accounting Scope 2 electricity emissions has changed accordingly to support this transition. The GHG Protocol defines two approaches to allocate Scope 2 emissions to the end-users which companies are to report.
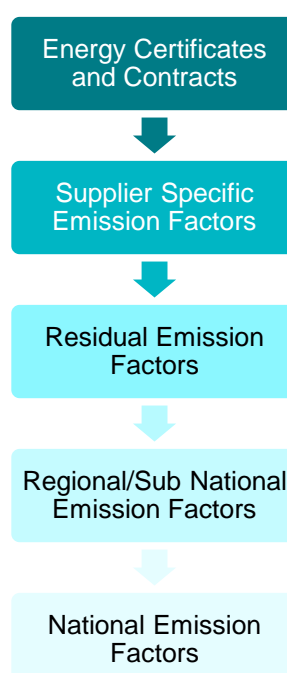
Location-based emissions

The location-based method reflects the average emissions intensity of grids on which energy consumption occurs. This method applies to all locations where grids are used for the distribution of energy, where electricity demand causes the need for energy generation and distribution. The location-based method follows the basic allocation approach (Section 1.2) and uses mostly grid-average emission factors that are based on statistical emissions information and electricity output aggregated and averaged within a defined geographic boundary and a defined time frame. This includes regional/sub-national grid averages and national production grid averages.

Market-based emissions

The market-based emissions are emissions from electricity that companies have chosen in the electricity market. Under this accounting method, a company should use one of the following emission factors according to this hierarchy (Figure D.3):

Figure D.3: Hierarchy of choosing market-based emission factors (CDP guidance)

Energy Certificates and Contracts

↓

Supplier Specific Emission Factors

↓

Residual Emission Factors

↓

Regional/Sub National Emission Factors

↓

National Emission Factors

Energy Certificates and Contracts: In this, the emission factor is usually mentioned in the energy certificates or contracts for the qualifying contractual instruments. These can include Energy Attribute Certificates (RECs, GOs, I-REC, etc.) and PPAs with energy generators (for both low-carbon, renewable, or fossil fuel-based energy) etc.

Supplier-Specific Emission Factor: If the emission factors are not already mentioned in the energy certificates and contracts, then the hotel should seek the factors from the supplier it is in contract with. Any green electricity products purchased from energy suppliers should give an indication of the emission factor. The supplier specific and energy certificate and contracts method can only be used in certain cases and is required for locations where the type of contracts, instruments and information listed above are available to corporate purchasers and if they meet the GHG Protocol's quality criteria. Please see the section below on how to determine supplier-specific emission factors.

Residual Emission Factor: If a company either does not have any such contracts or its instruments do not meet the quality criteria, then it should use the residual mix – regional emission factors representing the untracked or unclaimed energy and emissions. Please see the section below on how to determine residual emission factors.

Location-Based Emission Factor: If the residual mix is not available, then the location-based method shall be used and companies should calculate their Scope 2 emissions with either regional/sub-national grid averages or national grid averages. In this case, the reported market-based Scope 2 total will be the same as the location-based total.

How to determine supplier specific emission factors

One of the greatest challenges with using supplier-specific emission factors is finding them, as there is no set methodology or resource that publishes this. The potential sources of supplier-specific emission factors are:

- asking utilities complex questions about each of their sources of electricity to confirm that the emissions factors they provide (assuming they have them) accurately represent all delivered power, including both self-generated and imported power, with appropriate emissions factors applied to each power source
- researching the utility and their sustainability or CSR reports
- identifying and cultivating a contact at the utility who has a deep understanding of the emissions profile of their entire power supply
- ensuring that any REC/GOs/EACs purchased has the emission factor mentioned or confirming from the supplier regarding the emission profile

How to determine residual emission factors

The "residual-mix" emission factor is much like the grid-average emission factor, but differs in that all of the green electricity attributes have been removed. Where to find residual emission factors?

Currently, there is no central database, or a dedicated repository for determining the residual emission factors for each country. Some of the ones that are available are shown below:

- For US, Green-e: https://www.green-e.org/2020-residual-mix
- For Europe, AIB: https://www.aib-net.org/facts/european-residual-mix

Example

Suppose Hotel ABC is based in Glasgow. Its electricity consumption in 2020 was around 1,000,000 kwh. The location-based emission factor is taken from UK Government GHG Conversion Factors for Company Reporting 2020. However, for market-based emission factors there are three approaches available by which the hotel can disclose its market-based emissions:

Scope 2 Location Based

Consumption = 1,000,000 kwh

Grid Emission Factor from UK Government = 0.23314 kgCO2e/kwh

Scope 2 emissions – Location based = 1,000,000 * 0.23314 = **233,140 kgCO2e**

Scope 2 Market Based – EACs/RECs

The hotel has also purchased 1000 RECs (1 REC = 1 MWh) from a nearby wind farm. Since wind electricity generates no emissions, for their market-based figure they have used 0 kgCO2e/kwh as the emission factor

= 1,000,000 * 0
= **0 kgCO2e**

Scope 2 Market Based – Supplier Specific

The hotel finds out that its electricity is coming from a leading utility company in Scotland known as ScottishPower. ScottishPower have listed their own emission factor for their fuel mix generation in their website as 0.264 kgCO2e/kwh. Therefore Scope 2 emissions would be

Scope 2 emissions – Market based = 1,000,000 * 0.264 = **264,000 kgCO2e**

Scope 2 Market Based – Residual Mix

For market based the hotel has used UK's residual mix factor from latest 2020 AIB report

= 1,000,000 * 0.316
= **316,000 kgCO2e**

Current Challenges with using Residual Mix Factors

There are various challenges pertaining to residual mix factors. One of the major ones is the availability of the data. A central database of resources does not exist to publish residual mix factors. In the US, Green-e published a residual mix, however, it takes into account only the Green-e certified energy sales is not entirely representative, and has not been recently updated at time of publication.

Even with residual mix emission factors available, utilising them is not without challenges. Illustrated below (Table D.3) using the residual mix factors from the 2016 to 2018 AIB reports for 30 European countries, there is significant year-on-year variation and is highly volatile. The trend also differs greatly across the different countries. These challenges cause further significant fluctuations in the hotels' GHG inventories which are hard to explain and also causes challenges when communicating progress, analysing results, and forecasting future trends for action planning and budgeting.

Table D.3: Residual Mix Factors for 30 European Countries (2016-2018)

Country	Emission Factor (kgCO2e/kwh)			Variation (%)		
	2016	**2017**	**2018**	**2016 -2017**	**2017 – 2018**	**3 Year Trend**
Belgium	0.199	0.123	0.189	-38.2%	54.0%	-4.9%
Bulgaria	0.482	0.514	0.495	6.6%	-3.5%	2.9%
Croatia	0.481	0.413	0.562	-14.0%	35.9%	16.9%
Cyprus	0.712	0.637	0.770	-10.5%	20.8%	8.1%
Czech Republic	0.620	0.614	0.612	-0.9%	-0.3%	-1.2%
Denmark	0.573	0.505	0.509	-11.8%	0.9%	-11.1%
Estonia	1.026	1.042	1.043	1.5%	0.1%	1.6%
Finland	0.316	0.349	0.302	10.4%	-13.5%	-4.5%
France	0.046	0.057	0.053	23.8%	-7.2%	14.8%
Germany	0.727	0.732	0.729	0.6%	-0.4%	0.3%
Great Britain	0.391	0.367	0.381	-6.1%	3.9%	-2.5%
Greece	0.584	0.625	0.696	7.0%	11.3%	19.1%
Hungary	0.369	0.341	0.379	-7.4%	11.0%	2.8%
Iceland	0.467	0.493	0.482	5.6%	-2.1%	3.4%
Ireland (All-Island)	0.761	0.641	0.640	-15.8%	0.0%	-15.9%
Italy	0.465	0.477	0.487	2.5%	2.2%	4.8%
Latvia	0.403	0.244	0.323	-39.4%	32.4%	-19.8%
Lithuania	0.437	0.705	0.381	61.4%	-46.0%	-12.8%
Luxembourg	0.544	0.457	0.361	-16.1%	-20.9%	-33.6%
Malta	0.668	0.662	0.669	-1.0%	1.1%	0.1%
Netherlands	0.540	0.531	0.533	-1.7%	0.5%	-1.2%
Norway	0.442	0.499	0.280	13.1%	-43.8%	-36.5%
Poland	0.851	0.835	0.905	-1.9%	8.4%	6.3%
Portugal	0.289	0.383	0.316	32.4%	-17.6%	9.1%
Romania	0.390	0.425	0.403	8.9%	-5.2%	3.3%
Slovakia	0.187	0.180	0.194	-3.6%	7.6%	3.8%
Slovenia	0.532	0.447	0.502	-15.9%	12.3%	-5.6%
Spain	0.400	0.446	0.451	11.7%	1.0%	12.9%

Sweden	0.046	0.026	0.037	-43.5%	43.7%	-18.8%
Switzerland	0.286	0.200	0.035	-30.1%	-82.6%	-87.8%

APPENDIX E: EMISSION FACTORS, COEFFICIENTS, AND DEFAULT DATA FOR QUANTIFICATION

E.1. AGGREGATE SOURCES OF EMISSION FACTORS

Global

- [WRI GHG Protocol Tool for Stationary Combustion Version 4.1 (2015)](#) (most fuel types)
- [GHG Protocol GHG Emissions Calculation Tool](#) (most emissions types)
- [WMO Global Ozone Research and Monitoring Project – Report No. 55, Scientific Assessment of Ozone Depletion: 2014](#) (refrigerants)
- [UNEP Technical Options Committee Refrigeration, Air Conditioning and Heat Pumps Assessment Report 2014](#) (refrigerants)
- [International Energy Agency (IEA)](#) Emission Factors 2021 (electricity and heat generation) and Greenhouse Gas Emissions from Energy (formerly CO2 Emissions from Fuel Combustion)[39]

Country-Specific

- [National Greenhouse Accounts Factors October 2020](#) (Australia only)
- [2020 Climate Registry – Default Emissions Factors April 2020](#) (Canada only)
- [Hong Kong Carbon Accounting Guidelines 2010](#) (Hong Kong only)
- [UK Government GHG Conversion Factors for Company Reporting 2020](#) (UK only)
- [EPA Emission Factors for GHG Inventories 2020](#) (US Only)
- [México Registro Nacional de Emisiones](#) (México only)

E.2. PROXY EMISSION FACTORS FOR A HOTEL PROPERTY NOT COMMONLY AVAILABLE

Compressed Natural Gas (CNG) – Natural Gas as proxy if unavailable

- [UK Government GHG Conversion Factors for Company Reporting 2020](#) (Global)
- [National Greenhouse Accounts Factors October 2020](#) (Australia only)

Diesel (Mobile) – Petroleum Product CH4 and N2O Efs, added to mobile diesel CO2/gallon as proxy

- [EPA Emission Factors for GHG Inventories 2020](#)

Ethanol

- [US EPA Direct Emissions from Stationary Combustion Sources 2020](#) (Global)
- [National Greenhouse Accounts Factors October 2020](#) (Australia only)

Purchased Chilled Water

- [US EIA Form 1605 – Appendix N (2010)](#) (Global)
- [US Energy Star Portfolio Manager Technical Reference: Greenhouse Gas Emissions, October 2020](#) (US and Canada only)
- [Decree on CO2 Content of Heating and Cooling Networks 2020](#) (France only)

Residual Mix
- [Green-e Residual Mix Emissions Rates](#) (US only)
- [AIB European Residua Mix](#) (Europe only)

Steam and Hot Water
- [UK Government GHG Conversion Factors for Company Reporting 2020](#) (Global)

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[39] Both IEA publications are updated annually and are paid services.

- US Energy Star Portfolio Manager Technical Reference: Greenhouse Gas Emissions, October 2020 (US and Canada only)

E.3. EMISSION FACTORS FOR SCOPE 3 ITEMS

Electricity Transmission & Distribution (T&D) Losses
- Global
  - International Energy Agency CO2 Emissions from Fuel Combustion 2020
- Country-Specific
  - EPA eGRID Power Profiler ZIP Code Tool with eGRID 2019 Data (US only)
  - UK Government GHG Conversion Factors for Company Reporting 2020

Waste generation and disposal

- EPA Waste Reduction Model (WARM)
- Greenhouse Gas Protocol Quantis Scope 3 Evaluator Tool

Outsourced laundry
- Hotel Carbon Measurement Initiative (HCMI)

Purchased F&B and OS&E products
- Greenhouse Gas Protocol Quantis Scope 3 Evaluator Tool
- ecoinvent Database Version 3.8 (updated yearly): https://ecoinvent.org/the-ecoinvent-database/ This database contains 18,000 life cycle inventory datasets for a wide range of economic activities, including datasets for building construction, building operation, plastic waste, textile waste and general solid waste by hotel categories from hostels to luxury hotels.

Embodied Carbon Pilot by University of British Colombia (UBC):

Embodied Carbon
- Refer to Appendix I: Upstream Emissions – Embodied Carbon in Hotel Buildings, FF&E, and Food & Beverage
- Greenhouse Gas Protocol Quantis Scope 3 Evaluator Tool

Employee commuting and business travel
- Greenhouse Gas Protocol Quantis Scope 3 Evaluator Tool

Upstream and downstream leased assets (e.g. facilities, meeting space), and franchises
- Greenhouse Gas Protocol Quantis Scope 3 Evaluator Tool

E.4. EMISSION FACTORS FOR A HOTEL STAY AND MEETING SPACE USAGE
- Cornell Hotel Sustainability Benchmarking (CHSB) Index
- Greenview Hotel Footprinting Tool (HFT)
- Hotel Carbon Measurement Initiative (HCMI)

APPENDIX F: THE PURCHASED CHILLED WATER CONUNDRUM

F.1 BACKGROUND

Most HVAC hotel systems use onsite boilers and chillers for the heating and cooling of the building, either through boilers and centralized chillers that pump chilled water throughout the building, or decentralized air conditioner units in each room (or a combination of both). Some hotels do not produce heating or cooling on their own, but instead purchase steam and chilled water from a utility provider.

For inventory calculation and decarbonization targets, purchased heating and cooling can be problematic and presents two challenges. The first challenge is that because they are categorized as Scope 2 emissions per definition of the GHG Protocol, these sources are grouped together with electricity, even though functionally purchased steam serves the same purpose as a hotel's Scope 1 emissions, as does purchased chilled water in the case of the building using a gas-driven chiller. In terms of approaches to decarbonization, market-based renewable energy certificate mechanisms for their purchase are rare. The Sectoral Decarbonization Approach outlines specific decarbonization pathways for commercial buildings for Scope 1 and Scope 2. When purchased heating and cooling form part of a hotel's Scope 2, it will be more challenging to decarbonize as rapidly as electricity is. To address this, the SBTi criteria actually indicates that companies can treat purchased heating and cooling as Scope 1 in their calculation and reduction pathways. Though it is in contradiction to the GHG Protocol, it points to a better approach managerially for buildings of bifurcating energy as "electric" and "non-electric".

The second challenge of purchased chilled water is that the cooling energy content of the water received by the hotel is not the same as the amount of energy used to produce the chilled water. The cooling energy content of the water received is much greater than the amount of energy it takes to produce it. This is because of the closed loop system that enables the cooling effect to continue being distributed and circulated.

Purchased chilled water utility data is often provided in a flow rate unit of ton-hours, with 1 ton-hour being equivalent to 0.012 MMBtu or 3.51685 kWh. The utility data provides the precise amount of cooling energy content of the purchased water and needs to be converted to kWh to calculate carbon emissions.

This is known as the Coefficient of Performance (COP) in engineering systems. Chilled water can be generated using electricity or natural gas, each carrying a different COP range and set of conversions. Assuming that electricity was used and the chiller has a COP of 4.0, the energy content of the chilled water is four times of the energy needed to produce the chilled water. Simply put, 1 kWh of electricity will produce the equivalent of 4 kWh of cooling energy for a building.

It is important to note that while energy is related to carbon, the <u>carbon emission of purchased chilled water,</u> and the <u>energy of purchased chilled water</u> are two different quantities. Likewise, calculating the footprint of a building vs. benchmarking against other buildings are different approaches.

F.2 CALCULATION CHALLENGE

Quantifying the carbon emissions associated with purchased chilled water can be challenging due to two issues: availability of emission factors, and correctly applying the COP. The emission factors (Efs) for purchased chilled water are not widely or publicly available. Only a few countries provide Efs that are updated regularly such as the US, Canada and France. Difficulty has been observed in attempts to obtain supplier-specific emission factors, where providers have indicated they do not have this information, or are unwilling to share it. For proxy calculations, the US Energy Information Agency Form 1605(b) Appendix N remains the most commonly cited reference for how to generate emission factors despite being released in 2010.

The next issue arises from the lack of clarity on when and how COP can be applied, if needed at all, when quantifying carbon emissions. The different purchased chilled water EF references have different methodologies, and a deep understanding of each reference is needed to understand all the assumptions. For example, the purchased chilled water Efs provided in the US Energy Information Agency Form 1605(b) Appendix N have already applied a fixed but unspecified COP that generally calculates out to 4.2. While this makes calculating carbon emissions convenient, it may either lead to an under or overestimation given that there is a wide range of chiller efficiencies and thus a wide range of COPs in reality. Likewise, a COP should not be applied to the energy figures in ton-hours prior to using the methodology in the US EIA or other sources.

F.3 REPORTING VS BENCHMARKING

The different methodologies available to quantify carbon emissions has implications on how hotels report and benchmark their emissions among peers. When hotels are reporting their carbon emissions, they can decide how to apply COP. However, for benchmarking purposes, a uniform COP has to be agreed upon to normalize the carbon emissions associated with purchased chilled water. Otherwise, there would not be a fair comparison between hotels that generate chilled water onsite (Hotel A) and hotels that purchase chilled water (Hotel B) as illustrated in Table F.1.

Table F.1: Comparison between Hotels that Generate and Purchase Chilled Water

	Hotel A – Generate own chilled water	Hotel B – Purchase chilled water
Utility Data	*Purchased Electricity utility data in kWh used to generate chilled water* 100,000 kwh	*Purchased Chilled Water utility data in ton-hours* 113,738 ton-hours
Cooling Energy of Chilled Water	*With COP of 4.0* 100,000 x 4 = **400,000 kWh**	*Given that 1 ton-hour = 3.516852842 kWh* 113,738 x 3.516852842 = **400,000 kWh**
Addition to Energy Footprint	**100,000 kwh**	**400,000 kWh**
Addition to Carbon Emissions *Assuming 1kgCO2e of a kWh of electricity = 0.837kgCO2e of a ton-hour of purchased chilled water*	Equivalent of 100,000 kwh = **100,000 kgCO2e**	• Without COP applied: Equivalent of 400,000 kWh = **400,000 kgCO2e** • With COP of 4.0 applied: Equivalent of 113,738 ton-hours = 0.837 x 113,738 = **95,200 kgCO2e**

APPENDIX G: A NET-ZERO CARBON OFFSETTING STRATEGY FOR THE HOTEL INDUSTRY

G.1 BACKGROUND CONTEXT

Carbon offsetting will play a significant role in the hotel and wider travel industry's pathway to net zero. While carbon offsetting has its limits and its detracting stakeholders, four elements should be considered when approaching carbon offsetting:

1. **For some activities, carbon offsetting is the most significant way a carbon footprint can be mitigated until 2030.** Activities that involve burning of fossil fuel with no electrified or renewable replacement available at scale, have no readily available, viable alternative activities other than their reduction or elimination, are transversal with no exclusive business-to-business pressure in an integrated value chain, and are essential to basic provision of services to sustain life.

2. **Carbon offsetting delivers benefits to people, not just the atmosphere**. Though the primary intended purpose is contributing positively to the balance of atmospheric greenhouse gases, carbon offsetting mechanisms involve compensating humans for their work. This includes people involved in originating, validating, and brokering the financial transaction. More importantly, it involves the people undertaking the activities that remove carbon from the atmosphere or preserve it from being released. Opportunities exist for carbon offsetting projects to generate local economic benefit and provide alternative livelihoods to local communities in locations where it is most needed.

3. **Carbon offsetting can generate benefits for biodiversity and other UN SDGs.** Few question the value of funding the protection of forests, coral reefs, and waterways, which in turn enable myriad other benefits and activities, including carbon reduction.

4. **Carbon offsetting is going to proliferate in voluntary markets.** The burgeoning number of carbon offsetting approaches to consumer products and services in place or in planning at the time of this publication is telling. In many cases, these mechanisms will be related to activities but not directly tied to their transactions. Many of these mechanisms will ensue and will involve offsetting activities despite stakeholder criticism or even the position of the companies whose activities are being offset.

The travel sector is perhaps the most emblematic manifestation of these four elements. Electric or biomass-based aviation is years off. Humans need heat in buildings. As the COVID-19 pandemic showed, some travel and accommodation are essential even in lockdown situations (quarantine hotels, housing for hospital workers, essential business and humanitarian travel) and the wider impact on economies is significant.

Carbon offsetting has the potential to play a fundamentally different role in the travel industry than in other sectors if aligned with the pillars of sustainable tourism:

1. Environmentally friendly practices
2. Protection of natural and cultural heritage

3. Social and economic benefits to local people. [40]

In particular, carbon offsetting projects that protect the natural and cultural heritage in locations visited by travelers, can play a dual role in preserving the assets that generate benefit for travel while offsetting the emissions of an activity. Almost all natural ecosystems of significant carbon sequestration are visited by travelers, and hotels are found in or near them inherently, as is evidenced by the Sustainability Accounting Standards Board (SASB) including a KPI of number of lodging facilities in or near protected areas or endangered species habitats for the Hotels & Lodging Standard.[41] Therefore, the travel industry can evolve past the 'pay to pollute' view of carbon offsetting.

Finally, voluntary over-the-counter carbon offsetting for travel activities is increasing rapidly, both to engage travelers directly, and as part of the number of large multinationals purchasing carbon offsets in bulk, and who will be allocating offsets to their Scope 3 value chain that includes business travel.

G.2 A STRATEGIC APPROACH TO NET-ZERO ALIGNED CARBON OFFSETTING FOR HOTELS

Given the considerations above, this methodology builds off the Oxford Offsetting Principles for Net-Zero Aligned Carbon Offsetting for a strategic approach for the hotel industry.

Principle 1: Cut emissions, use high quality offsets, and regularly revise offsetting strategy as best practice evolves

The methodology seeks to achieve this principle in practice and prioritize hotels reducing their own emissions and scaling up removals, minimizing offsets to achieve net zero via three important tenets.

1. Differentiation between claiming retired credits and accounting for linked offsets, where all entities in a hotel's value chain can account for the carbon offset of a hotel stay. For example, when a corporate travel management company offers carbon neutral travel for its clients by default as a service premium, then it can claim the offset purchases and credits retired accordingly in its Scope 3 accounting. The bookings for a hotel through that company's program with offsets can be accounted for by that specific hotel and its owner and operator, based on the amount used to offset by the travel management company. Conversely, when a hotel operator offsets the emissions of a hotel, its owner and franchisor can also include those in its accounting, as well as the travelers or corporate travel management companies that book with that hotel. While only one entity may make a claim of purchasing and retiring the credit for the offset, other entities in the value chain may include record of that offset in their accounting. Rationale for this approach:

- As net-zero targets involve addressing the majority of value chain emissions, where inherent overlap and double-counting occurs and business travel is a part of almost any business's value chain, an evolved approach is needed from that of the original parameters of carbon offsetting that was set up in the Kyoto Protocol in 1997.

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[40] Source: Costas Christ
[41] See Sustainability Accounting Standards Board Hotels & Lodging Industry Standard Version 2018-10 SV-HL-160a.1.

- The inverse of this approach, should double-counting not be allowed, is that a plethora of offsets will need to be purchased by multiple entities, creating confusion to a traveler who may have touchpoints with several of these, each making a different claim for a different project and a different set of figures that were offset.

- The inverse also risks exacerbating the current trend of voluntary offset initiatives for the industry where the rationale is to offset first and think later, without regard to the calculation or the supply chain engagement of the hotel to decarbonize in its most effective way, which should be the focus as the original intention of decarbonizing the value chain. By stimulating more accurate accounting and engagement, the need then focuses on decarbonizing for hotels via the better approach in a decarbonization hierarchy and also the more cost-effective method of purchasing renewable electricity first and reducing emissions, then offsetting a much smaller amount.

- It does not seem reasonable that 10 or more entities would each need to purchase carbon offsets to make claims toward the same source of emissions, but a carbon offsetting provider would be allowed to sell offsets for the same source of emission for 10 different entities. Targeted, tracked offsetting can help ensure environmental integrity and maintain transparency.

2. Hotels can account for offsets toward net-zero pathway each year, with claims capped within the sectoral budget for Scope 1 & 2. Hotels should be able to account for carbon offsets for net-zero planning and claims, up to the amount equivalent to the service buildings sectoral decarbonization pathway for each year. Any accrued offsets for the year purchased by the hotel's owner, operator, or franchisor can then either be counted toward the Scope 3 value chain emissions, or accrued for a further year based on established best practice for carbon accounting. Any accrued offsets for the year purchased through the value chain cannot be carried forward.

The limit amount is defined as the carbon emissions intensity per square meter allocated to each year from 2014 through 2050 based on the *convergence* methodology of service buildings decarbonization at a well-below 2-degrees scenario as set forth in the IEA Energy Technology Perspectives 2017 publication, subsequently adapted to the Sectoral Decarbonization Approach and the SBTi's Science-based Target Setting Tool and then recalculation and combination of Scope 1 & 2 in the SBTi's Corporate Net-Zero Standard, as shown in Table G.2.1 (kgCo2e/M2):

Table G.2.1: Comparison between Original and Update Sectoral Budgets

Year	Original Service Buildings Sectoral Scope 1 Budget[42]	Updated Service Buildings Sectoral Pathway Scope 1 & 2[43]
2014	22.9	N/A
2019	17.3	N/A
2020	16.3	20.0
2021	15.3	18.7
2022	14.4	17.5
2023	13.5	16.2
2024	12.6	14.9
2025	11.7	13.7
2026	10.8	12.4
2027	9.9	11.1
2028	9.0	9.8
2029	8.2	8.6
2030	7.4	7.3
2035	5.9	5.5
2040	4.4	3.7
2045	3.2	2.0
2050	2.1	0.18

Rationale for this approach:

- As an original source of most calculations for target setting aligned with climate science and IPCC 5th Assessment, the SDA pathways admit that a certain amount of emissions will occur from baseline through 2050, as the basis for intensity targets. This approach is then followed for intensity targets being used in the SBTi Net-Zero Standard pathways (though the metrics are provided in Scope 1 & 2). As organizations can meet these thresholds to align with the pathway, it is logical to assume that the amount of emissions for buildings allowable each year should then be able to be offset.

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[42] SBTi Science Based Target Setting Tool V1.2.1, Service Buildings B2DS scenario, Scope 1 emissions intensity
[43] The SBTi Net-Zero Manual & Criteria Version 1.0, September 2021 Table 2 (service buildings, with 2021-2049 interim annual intensity thresholds adapted for linear annual reduction between 2020, 2030, and 2050 values). Note the 2020 and 2030 values are not provided in the Corporate Net-Zero Standard Version 1.0 October 2021

- In providing a cap threshold for each year, the methodology allows for offsetting but prioritizes reducing emissions by limiting the ability of companies to make claims of being net zero without first transitioning to renewable energy, electrifying building equipment, using cleaner fuels, and reducing energy usage.
- Using this upper limit pathway of available emissions to offset and include in the net-zero plan, carbon offsetting becomes less and less of a viable and strategic approach to its direct and indirect emissions for a hotel as time goes on.

3. To be included in a hotel's carbon offsetting claims, the offset must meet a minimum threshold of quality and contribution to sustainable tourism. Carbon offsets should be credible in terms of their rigor of certification and proof of retirement (i.e., not just planting trees and associating an estimated value per tree). Furthermore**,** the potential for a nexus of benefits between carbon offsetting and tourism is lost if the offset is purchased toward an activity not directly impactful to tourism activities and resources (i.e., ODS substance destruction).

Use offsets that are verifiable and correctly accounted for, have a low risk of non-additionality, reversal, and creating negative unintended consequences. The attributes of a good carbon offset are described in Table G.2.2 below.

Table G.2.2: Attributes of a good carbon offset

Verified	Verifying offsets ensures that the emission reduction or carbon removal actually takes place. Ensure that carbon offsets have undergone a rigorous validation and verification by a third-party organization and received certification from a credible carbon standard in a voluntary or compliance market. See Section G.3 in Appendix G for a list of key credible carbon standards
Minimized Forward-selling	Any time gap between the purchase of the offset and the successful execution of the emissions reducing or carbon removing activity must be minimized, and mechanisms to ensure that the environmental benefits from an offset are actually delivered must be strong.
Accurately accounted	Care must be taken to ensure offset providers are properly converting the climate impacts of non-CO2 climate pollutants into CO2 terms according to their actual warming impact, particularly for short-lived greenhouse gases like methane.
Additional	Offsets should be additional, meaning they represent an emission reduction or carbon removal relative to a baseline that would not have taken place but for the offsetting activity. Additionality can be difficult to determine and verify, and ultimately involves some degree of subjectivity. There are key questions buyers can ask to determine whether the offset project is additional or not. For more details you can refer to the additionality guidance published by Carbon Offset Guide[44].
Permanent	Permanence refers to how long a greenhouse gas stays out of the atmosphere, whether stored in a physical reservoir or whose emission was deferred through avoidance. In the case of physically storing carbon in a reservoir (e.g., a forest or a geological sink), the risk of reversal of that carbon back into the atmosphere must be acknowledged and accounted for in the offsetting plan. For example, afforestation or reforestation generates carbon removal carbon offsets, but if forests are subsequently cut down or destroyed by pests, fire, or other natural disturbances the stored carbon is reversed and the carbon offset must be invalidated.

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[44] http://www.offsetguide.org/high-quality-offsets/additionality/high-quality-offsets-additionality-questions-for-buyers-to-ask-about-additionality/

Co-beneficial	It is essential that in addition to contributing to significant emissions reduction the carbon offsets should also realize environmental and social equity and integrity. Also, a project should demonstrate it complies with all legal requirements in the jurisdiction where it is located. Depending on the type of project and the jurisdiction where it is located, however, additional reviews and safeguards may be necessary to guard against negative outcomes unrelated to GHG emissions.

Principle 2: Shift to carbon removal offsetting

An immediate transition to 100% carbon removals is not necessary, nor is it currently feasible, but organizations must commit to gradually increase the percentage of carbon removal offsets they procure with a view to exclusively sourcing carbon removals by mid-century. Most offsets available today are emission reductions, which are necessary but not sufficient to maintain net zero in the long run. Carbon removals scrub carbon directly from the atmosphere which can counteract ongoing emissions after net zero is achieved, as well as create the possibility of net removal for those actors who choose to remove more carbon than they emit.

Examples of emission reduction and carbon removal projects:

- Emissions reductions include avoided emissions, for example the deployment of renewable energy to replace planned fossil fuel power plants, programs to update inefficient cook stoves, energy efficiency measures in a factory resulting in carbon savings etc.
- Carbon removals are offsets generated by projects that remove carbon dioxide directly from the atmosphere. Examples include biological carbon sequestration (planting trees, soil carbon enhancement, etc.), bioenergy with carbon capture and storage (BECCS), direct air capture with geological storage (DACCS), or converting atmospheric carbon back into rock through remineralization.

Principle 3: Shift to long-lived storage type carbon offsets

Offsets increasingly need to come from activities that store carbon permanently, with very low risk of re-release into the atmosphere. Short-lived storage refers to methods of storing carbon which have an uncertain or higher risk of being reversed within decades. These include many biological storage methods like afforestation, reforestation and soil carbon enhancement. Such methods are capable of storing carbon for millennia, provided that land use and environmental conditions do not change. However, challenging conditions such as changing political priorities, economic pressures, fire, disease and risks associated with climate change itself, all conspire to increase the risk that this trapped carbon will be re-emitted in the near-to-medium term.

Long-lived storage refers to methods of storing carbon which have low risk of reversal over centuries to millennia. This includes storing CO_2 in geological reservoirs or mineralizing carbon into stable forms. While robust monitoring and verification is still needed to ensure the CO_2 added to these stores does not leak out, they are generally much more inert and secure than biological storage methods. A net-zero aligned portfolio of offsets must increase over time the portion of carbon removals over emission reductions, and the portion of long-lived storage over short-lived storage.

Table G.2.3 summarizes the principles of Carbon Offsetting.

Table G.2.3: Hierarchy of carbon offset projects

Project Type	Reversal risk and permanence	Project Type
Carbon Removal with Long Lived Storage	More permanent and lower risk of reversal	DACCS
		BECCS
		Mineralisation
		Enhanced Weathering
Carbon Removal with Short Lived Storage	Less permanent and high risk of reversal	Afforestation and reforestation
		Soil carbon enhancement
		Ecosystem restoration
Emission Reduction with long lived storage	More permanent and lower risk of reversal	CCS on industrial facilities
		CCS on power plants
Emission Reduction with short lived storage	Less permanent and high risk of reversal	Avoided damage to ecosystems
		Changes to agriculture practices that retain already-stored carbon
Avoided emission or emission reduction without storage	N/A	Renewable energy
		Cleaner cookstoves
		N2O abatement
		Methane abatement

Figure G.2.4: Example of a Typical Net-Zero Pathway for Uptake of Type of Projects from 2020-2050
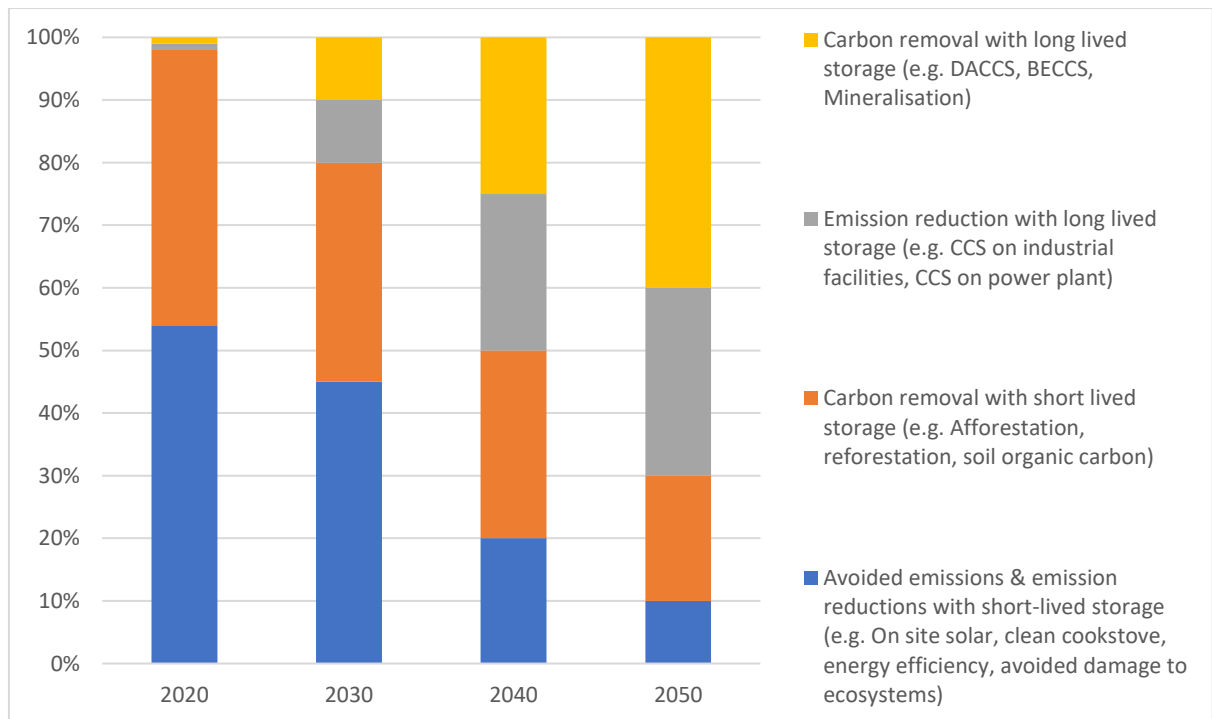
The Sustainable Tourism Equity Principle

Carbon offsets relating to hotel emissions should create a nexus of benefits between carbon offsetting and tourism, so that the offset projects also benefit local economies and heritage. For a minimum threshold contribution to sustainable tourism, the selection of a project should be viewed in terms of its geographic location and its contribution to the UN Sustainable Development Goals.

- The offset should provide a tangible economic and social benefit to SMEs and local communities and economies, ideally supporting the decarbonization of emissions related to tourism activities.
- The offset should contribute to preserving natural and/or cultural heritage.
- The offset should identify the contribution to related SDGs as it pertains to supporting a location used for tourism, and in particular it should benefit tourism-related businesses and activities.
- The offset should be related as best as possible to the region of the hotel: municipality, state/province, country or physically proximate region. Where the hotel is located in an area without proximity to potential offset projects, it should be at least tied to the same macro-region of the globe.
- Finally, a carbon offset project can also seek to align with the hotel company's corporate strategy or their sustainability program. For example, if the company has a vision to empower women, or to empower certain communities, minorities, refugees, or to improve education, then they should look for projects which are focused on such themes.

Examples of Offset Projects that Support SDGs

Household Biogas and Cookstove Projects

A great example of an efficient and pollution-free project that can be implemented in many communities in or near tourism destinations, where gas released from organic waste is transformed to clean, reliable source of energy using anaerobic digestion. In addition, the residues from the fermentation process can be used as organic fertilizer, increasing crop growth and yield. More than 3 billion people lack access to clean cooking solutions and still rely on traditional methods such as using firewood and coal. Therefore, with the help of various Improved cookstoves, households can receive cleaner air, cost savings, and health benefits.

Contribution to SDGs

Water Projects

These projects provide access to safe drinking water, improving health and living conditions and eliminating the burden on women and children of fetching water. For destinations with high water scarcity, supporting water-based projects is meaningful for the localized support it can provide.

Contribution to SDGs

Forestry Projects

Afforestation/Reforestation projects provide a nature-based solution that not only absorb CO2 from the atmosphere but create local jobs in forest management and conserve vital ecosystems – protecting local biodiversity at a time when several species are on the verge of extinction. Where biodiversity forms part of a tourism destination's natural heritage and part of the demand for travel to it, forestry projects support the principles of sustainable tourism directly. This is especially true in areas where the deforestation is being practiced and offsets can support tackling this problem.

EXAMPLE: Sumatra Merang Peatland Project, Indonesia This project aims to restore more than 22,934 hectares of peatland rainforest in the Merang biodiversity zone in Indonesia, one of the largest and deepest peat swamp areas in South Sumatra and an area more than 3.5 times the size of Manhattan. Climate finance will be used to rehabilitate and protect this critical ecosystem, preventing the release of significant volumes of emissions, in addition to creating a conservation area for hundreds of unique and endangered species such as the Sumatran Tiger which also generate revenue for eco-tourism.

Contribution to SDGs

Agriculture Projects

These are projects based on improving the various agriculture practices which empowers the farmers and also improves the environmental conditions. The practices can be improved tilling, soil preparation, reducing chemical fertilizers, and reducing erosion. Agriculture is important to hospitality and tourism as food and beverage establishments can support local and sustainably produced agriculture and add to guest experience.

EXAMPLE: Cordillera Azul National Park, Peru: This project is working in a huge landscape of 3.7 million hectares (nearly the size of the Netherlands) to protect 1.6 million hectares of threatened forest. The Cordillera Azul project focuses on establishing sustainable livelihoods through technical assistance and support for transitioning land use to agroforestry systems for sustainable cocoa and coffee production. In addition, a wide community-driven program is helping tens of thousands of local people gain access to basic services such as sanitation, health care and education

Contribution to SDGs

Blue Carbon Projects

Blue Carbon refers to projects that sequesters CO2 within marine and coastal ecosystems like wetlands marshes, mangroves and seagrass meadows. These vast natural carbon sinks have tremendous potential to store significant amounts of carbon while also restoring the habitat of some of the species that rely on them.

EXAMPLE: Gazi-Kwale County of Kenya: a mangrove restoration carbon offset project has served as a teaching mechanism to promote environmental awareness and recognition for the value of mangrove forest resources in primary and secondary schools. The children of Gazi have benefited, after they received textbooks from the earning of the second proceeds of the carbon trade worth USD 1,500. Across in Makongeni, the first installment was used to buy textbooks worth USD 1,500 for Makongeni primary school while the second earning connected at USD 5 to every home with a monthly fee of USD 2.5.

Contribution to SDGs

Various Renewable Energy Projects

EXAMPLE: The Paradigm Project: American University, which became carbon neutral in 2018, invests in offset programs in Kenya through The Paradigm Project. American University has a study abroad center in Nairobi; the Paradigm Project counteracts emissions associated with study abroad air travel while also deepening connections with Kenyan communities and providing students an example of sustainable development

Contribution to SDGs


Methane Recovery Projects

Methane recovery projects use technology to convert landfill gas into electricity which can be fed into a national grid. This not only reduces GHG emissions, but also the risks of explosion and unpleasant odors.

Contribution to SDGs

Composting Projects

Composting projects use organic waste and produces good quality compost using aerobic digestion which is then sold to farmers as soil structure improver
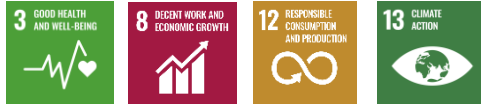
G.3. KEY CARBON STANDARDS

Following Table G.3 lists the key carbon standards that are being used to certify offset projects in accordance with the attributes and principles of carbon offsetting.

Table G.3: Key Carbon Standards

Name of Program	Type of Carbon Market	Regional Scope	Registry	Verification Required	Label Used
Clean Development Mechanism (CDM)	Compliance (Under Kyoto Protocol)	International (Projects should be developed in Developing Countries as defined by Kyoto Protocol)	Yes	Yes	Certified Emission Reductions (CERs)
California Compliance Offset Program	Compliance	United States	Yes	Yes	Air Resources Board Offset Credit (ARBOC)
Regional Greenhouse Gas Initiative	Compliance	Northeast United States	Yes	Yes	RGGI CO2 Offset Allowance
American Carbon Registry	Voluntary	International	Yes	Yes	Emission Reduction Tonne (ERT)
Climate Action Reserve	Voluntary	United States, Canada and Mexico	Yes	Yes	Climate Reserve Tonne (CRT)
Gold Standard	Voluntary	International	Yes	Yes	Verified Emission Reduction
Verra	Voluntary	International	Yes	Yes	Verified Carbon Unit (VCU)
Plan Vivo	Voluntary	International	Yes	Yes	Plan Vivo Certificate (PVC)
Social Carbon	Add-on certification standard	International	Yes	Yes	Used in Conjunction with other labels
Climate, Community, & Biodiversity Standards (CCBS)	Add-on certification standard	International	Yes	Yes	Used in Conjunction with other labels

G.4. ACCOUNTING AND BOUNDARY ISSUES IN CARBON OFFSETTING IN HOTEL INDUSTRY

Due to the nature of the travel and hotel business, multiple entities are involved in the value chain of the hotel industry, as outlined in Section 5 of this methodology. This leads to several challenges pertaining to carbon offset claiming and accounting, with the potential for multiple entities to offset the same emissions. As discussed above, *the recommendation of this methodology is that two or more parties can account for the same carbon offset, while only one entity can claim retiring of the offset.*

The challenge lies in identifying offsets which have been claimed and retired throughout the value chain so that entities do not, even unwittingly, double count. As such, the whole tourism and hotel sector should work towards the introduction of transparent and appropriate tracking systems which centralize and streamline efforts, and engage travelers uniformly. When a travel intermediary offsets the emissions of a hotel, the operator may not need to offset again, and using an improved registry and tracking system, could show the amount of carbon offset from its GHG inventory without the need for additional offsets, as the emission from the traveler's stay has already been neutralized. It can then focus efforts and resources in other emissions reduction activities.

Appropriate claims should be made with full transparency and details should be noted in inventories and disclosures on aspects related to who, how and how much has been offset. There are various resources available which gives guidance on making offset claims, one of which is the Carbon Offset Claims Guidance.

G.5. CARBON INSETTING AND ITS RELEVANCE IN HOTEL INDUSTRY

Carbon insetting differs from carbon offsetting in terms of where the emission reductions take place. In carbon insetting, investment in emissions reduction projects are made by a company within its supply chain i.e., in the Scope 3 value chain boundary. Whereas for carbon offsetting it is clearly stated that the investment can be made anywhere outside the company's supply chain, the definition of carbon insetting has not been standardized and documented.

In generally, carbon insetting may be more attractive than carbon offsetting as:

- The funds remain within the company's value creation
- Stakeholder relationships are strengthened
- It can demonstrate commitment and leadership
- Companies can actively support communities or SMEs in their supply chain

There are several examples of companies such as L'Oréal, Chanel and Nespresso that are already implementing forestry restoration and conservation projects in Latin America where the majority of their farmers and suppliers are based.

As the definition of insetting has not been standardized and formalized, SBTi recommends in its recently published Net-Zero Standard, that companies should only include emissions reductions from

"insetting" projects that use a corporate accounting approach and are wholly contained within their supply chains, or the portion of a "partially-included" project that is within their supply chain and linked directly to sourcing.

Given the extensive supply chain, with the potential for sourcing of locally produced goods and services (such as bathroom amenities, food, materials (wood, timber, steel etc.), carbon insetting may be a consideration for the hotel industry, however challenges may arise as hotels generally do not have the scale to undertake projects themselves or quantify the insetting with respect to their direct supply chain.
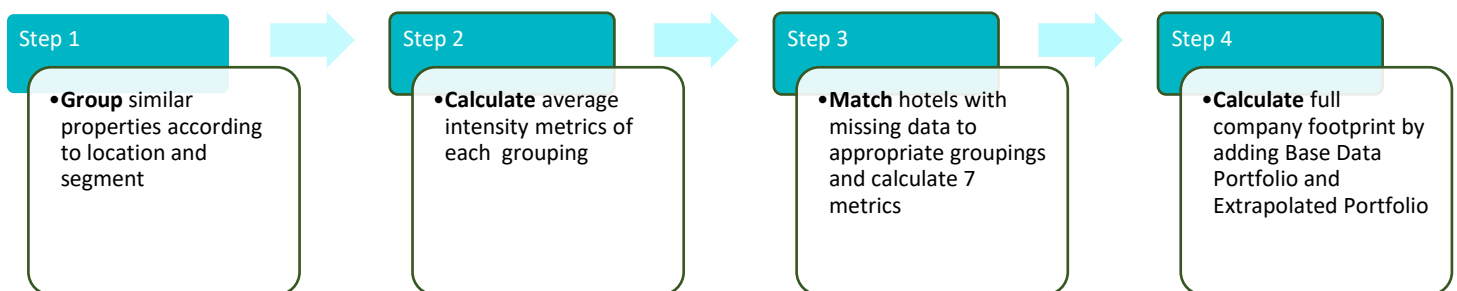
APPENDIX H: PORTFOLIO EXTRAPOLATION METHODOLOGY

All hotel companies should ideally have data for the metrics and measures set out in Section 4 for all of their properties in the portfolio. However, realistically, data is not available completely for all properties and for all of the metrics. To address this, it would require an extrapolation of data based on whatever is available for other properties. The process below is adapted from that set out in the Hotel Waste Measurement Methodology[45].

Ideally, a bespoke portfolio extrapolation should be created based on the composition of property segmentation, geographic segmentation, and internally derived coefficients from actual data. This is outlined in the process below. However, where a representative data set from which to extrapolate data are not available or properties are in a location with extremely limited waste data, then use the industry coefficients. The industry coefficients can be sourced from the latest CHSB tool.

The following process in Figure H details the steps to do an extrapolation for the Portfolio, which will result in the seven metrics given in Section 4.2.

Figure H: Extrapolation Steps for Hotel Portfolios

Step 1	Step 2	Step 3	Step 4
• **Group** similar properties according to location and segment	• **Calculate** average intensity metrics of each grouping	• **Match** hotels with missing data to appropriate groupings and calculate 7 metrics	• **Calculate** full company footprint by adding Base Data Portfolio and Extrapolated Portfolio

1. Place similar hotels within the Base Data Portfolio of the company into groups according to location and segment, as available.
2. Calculate the average emission and energy intensity metrics of those groups. Should the groups be insufficiently representative of the hotel's missing data, use the coefficients derived from industry benchmarking according to the latest CHSB tool to best fit the geographic segmentation and property type segmentation.
3. Extrapolate for hotel's missing data by matching each hotel to the corresponding best available group, then multiply the groups' metrics by the hotel's floor area to arrive at the absolute figures.
4. Calculate the full company's footprint by summing the Base Data Portfolio + Extrapolated Portfolio.

Please note that extrapolation should only take place when the objective is to fill data gaps for company level reporting. This methodology should not be used to estimate the emission and energy intensity for a particular property or properties for the purposes of, for example, completing an RFP.

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[45] http://hotelkitchen.org/wp-content/uploads/2021/09/HotelWasteMeasurementMethodology_SEP2021_v1.0.-1.pdf

For more details on how to extrapolate and when to use internal company coefficients or industry coefficients, please refer to the Hotel Waste Measurement Methodology.

APPENDIX I: UPSTREAM EMISSIONS – EMBODIED CARBON IN HOTEL BUILDINGS, FF&E, AND FOOD & BEVERAGE

I.1. OVERVIEW OF EMBODIED CARBON IN BUILDINGS AND RELATED NET-ZERO INITIATIVES

Introduction to Embodied Carbon

Decarbonizing buildings is a key part of achieving net zero to mitigate the adverse effects of climate change. Buildings are currently responsible for 38%[46] of global carbon emissions. Given that the global building stock is expected to increase with world population, the climate impact of buildings will only grow if its impact remains unaddressed. Carbon emissions are released from buildings not only when they are operational, but also before and after they are in use. Such emissions are commonly referred to as embodied emissions. As energy grids decarbonize and energy efficiency measures become commonplace, carbon emissions associated with operational energy use are expected to decrease and embodied carbon may become proportionately more significant. Embodied carbon must be tackled alongside efforts to reduce operational carbon.

Embodied carbon refers to carbon emissions associated with materials and construction processes throughout the whole lifecycle of a building or infrastructure. This includes emissions released before it begins operation, caused by extraction, manufacture/processing, transportation and assembly of every element and material used in the building. It also includes the emissions from maintenance and replacement activities during its use stage, and also emissions from deconstruction/demolition and disposal during its end-of-life stage. Embodied carbon contributes 30-70%[47] of the total building lifecycle emissions. Embodied carbon is classified as Scope 3 emissions under the GHG Protocol emissions accounting guidelines and though cited by the Scope 3 Protocol that upstream emissions of capital goods – including buildings – should be accounted for at the time of acquisition and not amortized over time, in practice this is rarely, if ever, done for commercial building disclosures, much less hotels.

Key sources of embodied carbon

Emissions from the materials used to construct buildings, and those used later on during renovation, represent a significantly greater source of embodied carbon than all other stages in the building lifecycle. Common materials such as cement and steel are two of the most significant sources of embodied carbon emissions. Manufacturing of cement and steel contribute 7% and 7-9%[48] of global carbon emissions respectively. Both cement and steel require very high temperatures during

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[46] UNEP 2020 Global Status Report for Buildings and Construction:
https://wedocs.unep.org/xmlui/bitstream/handle/20.500.11822/34572/GSR_ES.pdf?sequence=3
[47] IHG-Arup Net Zero Hotels: https://www.ihgplc.com/-/media/ihg/files/news/2021/2021_05_04/whitepaper---net-zero-carbon-hotels-vf.pdf
[48] WorldGBC Bringing Embodied Carbon Upfront (2019):
https://www.worldgbc.org/sites/default/files/WorldGBC_Bringing_Embodied_Carbon_Upfront.pdf

production, making them energy and carbon intensive processes. Both manufacturing processes entail chemical reactions that also release carbon dioxide. Other materials such as aluminum and glass are also common sources of embodied carbon as they require high temperatures during manufacturing. Table I.1.1 below shows the list of common sources of embodied carbon in buildings, commonly cited as a relatively significant or insignificant source.

Table I.1.1: Sources of Embodied Carbon

Significant source	Insignificant Source
• Steel/reinforcement steel • Cement • Aluminum • Glass • Insulation (especially petroleum-based products)	• Biomaterials (e.g. wood, timber, bamboo, etc.) • Concrete containing cement substitute (e.g. fly-ash) and low-cement concrete • Ceramic tiles • Wool insulation

Some materials present opportunities for carbon capture and recycling. Biomaterials such as timber and bamboo capture atmospheric carbon during growth and carbon is stored within even after they are harvested for construction. Harvesting mature timber then frees up space for more biomaterials to be grown and more atmospheric carbon to be captured in effect. Using biomaterials from reputable and certified sources that practice proper forest management is important to ensure that construction of the building does not perpetuate deforestation. Reuse and recycling of biomaterials when buildings are decommissioned is also important to ensure that the captured carbon remains stored for as long as possible and prevents unnecessary logging. Otherwise, disposing biomaterials in landfills would release all the captured carbon back into the atmosphere as they decompose.

Besides biomaterials, concrete can also capture carbon from the atmosphere when it is exposed to air. Concrete also has a high thermal mass, or high ability to absorb and store heat energy, thereby have the potential to reduce operational emissions associated with heating and cooling. Given that having a high thermal mass (increasing embodied carbon) has the potential to lower heating/cooling loads (decreasing operational carbon), the overall benefits associated with concrete has to be properly evaluated and balanced.

Metals such as steel and aluminum can be recycled infinitely without loss of quality or properties. Using recycled steel and aluminum, and re-using them after buildings are decommissioned, help to reduce overall embodied carbon of buildings. To properly account for all sources of embodied carbon and identify opportunities for reduction, a full building lifecycle approach can be applied.

Building Lifecycle

The building lifecycle is often described to have four stages as shown in Figure I.1 below; blue dashed line represents the boundary of embodied carbon in buildings.

Figure I.1: Building Lifecycle and its Different Carbon Boundaries[49]
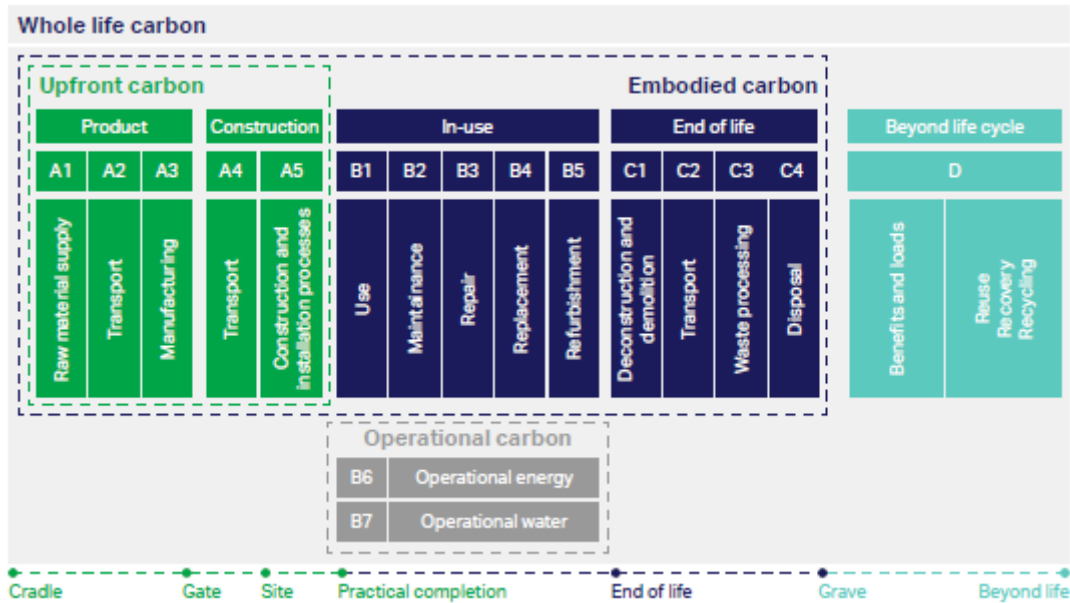
Product Stage

Emissions from the Product Stage are associated with activities such as raw material extraction (A1), transport to manufacturer (A2) and manufacturing (A3). Emissions from these activities represent a significantly greater source of embodied carbon than all other stages in the building lifecycle. Building elements such as foundations, structures and frames often represent a major source of embodied carbon. Not only are large volumes of materials needed, they contain materials such as cement and steel that have carbon-intensive manufacturing processes. Table I.1.2 below from the Carbon Leadership Forum (CLF) Embodied Carbon in Construction Calculator (EC3) Tool Methodology shows the relative contribution of embodied carbon of common structural materials from the three activities under Product Stage. Building facades and enclosures that use large amounts of carbon-intensive materials like aluminium and glass also represent another significant source. Building finishes such as carpets and tiles are also contributors to total embodied carbon.

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[49] WBCSD-ARUP Net-zero buildings: Where do we stand?: https://www.wbcsd.org/contentwbc/download/12446/185553/1

Table I.1.2: Relative Contribution of Embodied Carbon[50]

Material \ Sub-stages	Attribute	A1: Raw Material Extraction	A2: Transport to Manufacturer	A3: Manufacturing
Steel	**Portion of embodied carbon**	>90%	<5%	<10%
	Source	Ore mining	Transportation to fabricator	Shaping steel
Concrete	**Portion of embodied carbon**	>80%	<20%	<10%
	Source	Production of cement	Transportation to concrete plant	Concrete mixing
Cement	**Portion of embodied carbon**	<10%	<5%	>90%
	Source	Mining	Transportation to cement kiln	Production of cement
Clay masonry	**Portion of embodied carbon**	<5%	Small	>95%
	Source	Mining	Transportation and storage	Firing
Glue laminated beam	**Portion of embodied carbon**	<10%	<5%	>90%
	Source	Planting, harvesting, drying	Transportation to fabricator	Cutting, gluing, pressing

Construction Stage

This stage refers to the actual construction of the building, including activities such as transport of finished materials and products from manufacturer to project site (A4), and on-site construction and installation (A5). Some specific emissions can occur through the use of diesel-powered heavy construction equipment, on-site fabrication, energy use for power tools, construction waste from unused or damaged building materials, and construction site runoff containing sediments of building materials, concrete washout, paint, etc. into the stormwater management system. In addition, though not part of the building structure emissions, other impacts from land use and land cover change can be significant and should be incorporated, particularly in the case of hotels built in more remote or pristine areas. Land use change from natural environment to other man-made purposes such as buildings result in negative environmental impact such as vegetation loss and soil sealing, which represents the loss of carbon storages. A promising practice to reduce emissions in the construction stage is off-site modular construction, whereby building modules are prefabricated in factories before delivery for on-site assembly. Modular construction fares better in emissions performance as there is less transport emissions, less energy waste during installation and less on-site material waste.

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[50] CLF EC3 Tool Methodology: https://carbonleadershipforum.org/ec3-methodology/

In-use Stage

This stage refers to the use (B1), maintenance (B2), repair (B3), replacement (B4) and refurbishment (B5) of building systems. Note that operational emissions related to the energy and water use during building operations (B6 and B7) fall under this stage but are not within the boundary of "embodied carbon". Emissions from materials, its transport and equipment use during maintenance and renovation represent significant source of embodied carbon in the building lifecycle.

End-of-Life Stage

Emissions from this stage refers to those associated with energy use and waste produced during deconstruction/demolition (C1), transport of waste to end-of-life facilities (C2), waste processing for reuse, recycling or disposal (C3) and landfill disposal (C4). Modular construction offers higher potential for reuse and recycling of building components and materials, thus reducing emissions associated with the end-of-life stage of buildings.

Current approaches

While it is widely acknowledged that embodied carbon is highly complex to tackle, there are existing approaches to quantify embodied carbon in buildings and initiatives for net-zero buildings.

Calculating Embodied Carbon

One popular approach is to conduct a life cycle assessment (LCA) to understand the environmental impacts associated with all four stages of the building lifecycle. Most available calculation guides focus on quantifying the embodied carbon from the Product and Construction Stages. Emission factors for construction materials are also increasingly publicly available, with some manufacturers including the factors on product datasheets and Environmental Product Declarations (EPDs). The Inventory of Carbon and Energy (ICE) database is a well-known compilation of cradle-to-gate emission factors of key constructional materials. Some noteworthy resources include:

1. Embodied Carbon in Construction Calculator (EC3) Tool (2019) by the Carbon Leadership Forum (CLF): https://carbonleadershipforum.org/ec3-methodology/
2. Building Life Cycle Assessment in Practice Guide (2010) by the American Institute of Architects (AIA): https://www.aia.org/resources/7961-building-life-cycle-assessment-in-practice
3. Methodology to Calculate Embodied Carbon of Materials (2012) by Royal Institution of Chartered Surveyors (RICS): https://www.igbc.ie/wp-content/uploads/2015/02/RICS-Methodology_embodied_carbon_materials_final-1st-edition.pdf
4. Inventory of Carbon and Energy (ICE) Database Version 3.0 (2019) by Circular Economy and University of Bath: https://circularecology.com/embodied-carbon-footprint-database.html
5. Emission Reduction Tool (H\B:ERT) by Hawkins\Brown using the ICE Database: https://www.hawkinsbrown.com/services/hbert
6. Embodied Carbon Guidance (2019) by International Living Future Institute (ILFI): https://buildingtransparency-live-87c7ea3ad4714-809eeaa.divio-media.com/filer_public/5f/b8/5fb8936f-2e92-40a0-94b9-43185107612c/wc_am-embodiedcarbonguidancedocpdf.pdf
7. Getting to Zero Embodied Carbon resources: https://gettingtozeroforum.org/embodied-carbon/

8. IFC EDGE India Construction Materials Database: https://edgebuildings.com/india-construction-materials-database/ (embodied energy; need to be converted into embodied carbon)
9. Embodied Carbon Pilot by University of British Columbia (UBC): https://strategicplan.ubc.ca/embodied-carbon-pilot-helps-building-industry-address-climate-change/

Net Zero Building Initiatives

The International Finance Corporation (IFC) Excellence in Design for Greater Efficiencies (EDGE) [51]green building program aims to help buildings reduce operational energy and water use, and embodied energy of construction materials. Buildings covered under the program include hotels and resorts. The program provides a practical resource for calculating embodied carbon in buildings in the form of a global dataset of embodied energy from emerging economies[52].

The Royal Institute of British Architects (RIBA)[53] launched the voluntary 2030 Climate Challenge for Chartered Practices to meet the performance targets on all their new and major refurbishment projects. There are four targets covering operational energy, potable water use, health and wellbeing metrics, and embodied carbon. The aim is to reduce embodied carbon by at least 40% from current business as usual baseline figures before offsetting, or less than 750 kgCO2e/SqM for new build offices.

The London Energy Transformation Initiative (LETI)[54] supports the net-zero transition of the United Kingdom's built environment by 2050 in alignment with the national 2050 net-zero target. The initiative directly addresses embodied carbon, illustrating key milestones in the net-zero trajectory, providing guidance materials on embodied carbon reduction strategies, introducing an embodied carbon rating system for performance tracking and providing embodied carbon reporting templates to kickstart reporting consistency in the industry. To meet the national target, all new buildings need to achieve a 65% reduction in embodied carbon emissions by 2030. Some best practices identified include reducing embodied carbon to less than 350 kgCO2e per sqm, having 50% building materials from re-used sources and 80% building materials to be re-usable at end-of-life for non-domestic buildings.

The World Green Building Council (WorldGBC) Net Zero Carbon Buildings Commitment, which aims for organisations to achieve net zero by 2030, currently focuses on operational energy-related emissions and does not include embodied carbon within the scope. Some challenges identified include limited calculation methodologies for global portfolios and the over-reliance on carbon offsets given that embodied carbon is often considered difficult to abate. However, the WorldGBC intends to include embodied carbon in the future.

As countries and cities are in the process of adopting building electrification and decarbonization policies, the New Buildings Institute (NBI) Building Decarbonization Code provides guidance on updating building codes for newly constructed buildings to adopt electrification technologies and use

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[51] IFC EDGE: https://edgebuildings.com/
[52] IFC EDGE India Construction Materials Database: https://edgebuildings.com/india-construction-materials-database/
[53] RIBA: https://www.architecture.com/-/media/files/Climate-action/RIBA-2030-Climate-Challenge.pdf
[54] LETI: https://www.leti.london/

100% carbon-free energy sources. The Code provides a decarbonization overlay of the building code and identifies key future-proofing measures such as renewable energy production, battery storage, and electric vehicle changing stations. While the Code currently focuses on new construction and does not address embodied carbon, the NBI intends to release future iterations which include decarbonization code language for existing buildings for example.

Embodied Carbon in Hotels

Within the hotel industry, IHG released a white paper titled 'Transforming Existing Hotels to Net Zero Carbon' in collaboration with ARUP, Gleeds and Schneider Electric. Embodied carbon was found to make up 30%-70% of a typical building's total lifecycle emissions. Besides upfront embodied carbon from the Product and Construction Stages, another typical source of embodied carbon is regular major and minor refurbishments that hotels undergo every 6 to 7 years. The paper serves as a good reference for hotels to become net zero operationally, demonstrating ways to reduce (but not eliminate) embodied carbon by choosing refurbishment upgrades over building replacement for a case study hotel. Indeed, a research study has found that the mean embodied carbon for refurbished buildings is 33–39% lower than newly built projects, and the cost for refurbished buildings is 22–50% lower than newly built projects (per square meter of floor area)[55].

Hotels present some unique characteristics in comparison to other buildings which will need to be further explored. Several of the frameworks and calculation methods mentioned above can be built upon to identify and account for structural differences such as placing more bathrooms per square meter and related piping and plumbing than other building types, as well as whether to include the upstream emissions from purchased FF&E in the embodied carbon boundary from time of opening, or separately.

Key Actions

While strategies and calculations to reduce and ultimately eliminate embodied carbon are still evolving, some clear actions have emerged given the increasing attention to the issue.

- Use fewer materials, such as preserving and reusing existing substructures and building frames.
- Use low carbon materials
- Ensure building can be adapted for future changes in building uses and for climate resilience, such as opting for modular design.
- Avoid composite materials that are hard to deconstruct and produce high amount of demolition waste; opt for materials that are easy to disassemble, reuse and recycle.

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[55] Hybrid Input-Output Analysis of Embodied Carbon and Construction Cost Differences between New-Build and Refurbished Projects: https://www.mdpi.com/2071-1050/10/9/3229

I.2. UPSTREAM EMISSIONS FROM PURCHASED FURNISHINGS

Introduction

Similar to embodied carbon, upstream emissions from purchased furnishings refers to carbon emissions associated with extraction, manufacture/processing, transportation and assembly of every material used in the furnishing until the point that it is installed at the site building. In addition, downstream emissions from disposal may occur at end-of-life stage.

The upstream emissions associated with purchased furnishings are often neglected as it is widely thought to comprise a small percentage of buildings' total carbon emissions; it is commonly cited to be less than 10% of total building lifecycle emissions[56]. However, given that hotels are significant consumers of furnishings for guestrooms and public areas, attention to the carbon emissions associated with its materials and manufacturing processes is due. This is especially important since hotels periodically undergo interior renovations and purchase new furnishings which would add to the buildings' total embodied carbon. A study found that the cumulative embodied carbon of a commercial building's interior renovations exceeded the embodied carbon of its building structure and envelope[57].

Key Sources of Emissions

Some common examples of hotel furnishing include upholstery, bedding, carpets and lighting. Furniture is one of the most significant sources of upstream carbon emissions in hotels. Products such as mattresses, sofas and task chairs were found to have the largest carbon impacts among key furniture items[58]. The largest contributor to the carbon impact of mattresses and sofas is its raw material content, comprising materials such as foams and fillings, textiles, and metals. For task chairs, metal and plastic are major contributors as the two materials make up around 70% of such chairs.

Carpets are another significant source of upstream carbon emissions in hotels[59]. For carpets made from nylon fibers, oil and gas extraction and processing to produce such plastic materials is the largest contributor to the carbon impact of most carpets. Carpets made from natural fibers such as wool can also have large carbon impacts as the manufacturing and dyeing process of carpets is energy intensive. For example, large amounts of natural gas are often used to evaporate water and melt plastics into carpet backings.

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[56] Why Interior Designers Must Fight Climate Change: https://metropolismag.com/viewpoints/interior-designers-climate-carbon/
[57] Why Interior Designers Must Fight Climate Change.
[58] FIRA – A Study into the Feasibility of Benchmarking Carbon Footprints of Furniture Products (2011): http://www.healthyworkstations.com/resources/Environment/FIRA.CarbonFootprint.pdf
[59] Carbon Impact of Carpet: https://materialspalette.org/carpet/

Lighting is another significant source of upstream carbon emissions in hotels. While the use of LED lighting have led to significant savings in operational energy and carbon, the process to manufacture LEDs is more energy and carbon intensive than the process for conventional lamps[60].

Current Approaches

Calculations and Initiatives

There is currently a lack of sector-wide net-zero initiatives or approaches towards quantifying and eliminating upstream emissions associated with purchased furnishings. UK-based research found that all furniture manufacturer respondents feel that the sector is lacking a clear net-zero strategy[61]. One notable initiative by the Furniture Industry Research Association (FIRA) in 2011 quantified the carbon footprint of key furniture products[62].

Key Actions

Some strategies to reduce upstream emissions from purchased furnishings include:

- Use fewer materials, such as by opting for items like carpets with high recycled content.
- Choose furniture with timeless design to avoid furnishings becoming unfashionable and ensure they can last a long time.
- Select furniture that can be easily disassembled, repaired, maintained. Examples selecting furniture that uses screws and bolts or other joinery methods instead of glue, and upholstery fabrics that can be detached and machine-washed instead of dry-cleaned.
- Consider product leasing services for items such as furniture and floor finishes.

I.3. UPSTREAM EMISSIONS FROM FOOD AND BEVERAGE

Introduction

Emissions from food and beverage (F&B) products refer to the greenhouse gas emissions associated with growing, rearing, farming, manufacturing and processing, storing, transporting them until they are delivered to hotels, and lastly wastage after consumption. Food production is found to be account for around 26% of global GHG emissions[63]. Upstream food-related emissions can be further broken down into livestock and fisheries (31%), crop production (27%), land use for human food and livestock (24%), and supply chain activities (18%) such as processing and transport. On the other hand, estimates show that one-third of all food produced s lost or wasted, accounting for 8% of total GHG emissions[64].

[60] Life cycle assessment of light courses – Case studies and review of the analyses: http://lib.tkk.fi/Diss/2013/isbn9789526052502/isbn9789526052502.pdf
[61] British Furniture Manufacturing – Sentiment of the Sector & the Road to Net Zero Report (2021): https://www.furnitureproduction.net/news/articles/2021/06/2055426337-new-report-highlights-need-sector-wide-environmental-strategy
[62] FIRA – A Study into the Feasibility of Benchmarking Carbon Footprints of Furniture Products (2011)
[63] Reducing food's environmental impacts through producers and consumers (2018): https://globalsalmoninitiative.org/files/documents/Reducing-food%E2%80%99s-environmental-impacts-through-producers-and-consumers.pdf; Data visualization: https://ourworldindata.org/food-ghg-emissions
[64] FAO Food Wastage Footprint & Climate Change (2015): http://www.fao.org/3/bb144e/bb144e.pdf

Animal products such as meat, cheese and eggs have the highest upstream carbon emissions, while fruits, vegetables, beans and nuts have much lower emissions[65]. Notably, beef has the highest carbon emissions at 99.48 kgCO2e for every kilogram. A major source of emissions for animals such as cattle, sheep and goats is methane, which occurs during feed digestion and manure management[66]. On the other hand, feed provision is the largest source of emissions for animals such as pigs and poultry. This is due to soil emissions of nitrous oxide (N2O) and carbon emissions from the production of fertilizers. Energy consumption to maintain suitable animal housing conditions for animals such as chickens can also be significant, especially if the national grid is powered by fossil fuels.

Current Approach

Calculation

There is no straightforward way of calculating emissions from F&B products due to a variety of reasons, ranging from production in different locations and circumstances, different manufacturing processes, different transportation modes and different ingredient composition, to having direct and indirect carbon emissions. Not only are there upstream emissions associated with the F&B products until they arrive at the hotel, there are also downstream emissions from food wastage that may be included in the coefficients used for calculation, resulting in double counting for a hotel that already includes emissions from its waste.

Given the increasing focus on reducing emissions from F&B products, there has been research conducted to quantify the upstream emissions of key food items. Some noteworthy resources include:

- Environmental Impacts of Food Production data visualization:
  https://ourworldindata.org/environmental-impacts-of-food, based on a 2018 research titled "Reducing food's environmental impacts through producers and consumers": https://globalsalmoninitiative.org/files/documents/Reducing-food%E2%80%99s-environmental-impacts-through-producers-and-consumers.pdf
- Environmental Impact of Key Food Items in Singapore (2019): https://www.ecosperity.sg/content/dam/ecosperity-aem/en/reports/Environmental-Impact-of-Key-Food-Items-in-Singapore_Oct2019.pdf
- Climate Change on your Plate (page 27) (2012) by WWF Germany: https://www.wwf.de/fileadmin/fm-wwf/Publikationen-PDF/Climate_change_on_your_plate.pdf

To quantify the downstream emissions associated with food wastage, some noteworthy resources include:

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[65] Data visualization: https://ourworldindata.org/environmental-impacts-of-food
[66] FAO Food Wastage Footprint: Impacts on natural resources (2013): http://www.fao.org/3/i3347e/i3347e.pdf

- Food wastage footprint: Impacts on natural resources (2013) by the Food & Agriculture Organization of the United Nations (FAO): http://www.fao.org/3/i3347e/i3347e.pdf
- Food Loss and Waste Accounting and Reporting Standard (FLWS) (2016) by World Resources Institute (WRI): https://www.wbcsd.org/Programs/Food-and-Nature/Food-Land-Use/Scaling-Positive-Agriculture/Resources/Food-Loss-and-Waste-Accounting-and-Reporting-Standard

Initiatives

There are currently a lack of global sector-wide net-zero initiatives. One initiative to watch is the UK's Food and Drink Federation (FDF) ambition for the sector to reach net zero by 2040[67]; the FDF will be producing a Roadmap to Net Zero Project and accompanying Handbook for food businesses to be launched at COP26 in November 2021. Another notable initiative is the Courtauld Commitment 2030, a voluntary agreement for players along the entire UK food chain to deliver reductions in food waste, GHG emissions and water use[68]. The Commitment aims to reduce both per capita food waste and GHG emissions by 50% by 2030.

Key Actions

Some strategies to reduce emissions from F&B products include:

- Shift away from carbon-intensive foods
- Reduce food loss and food waste
- Source food produced locally or in neighboring countries, and choose food to be transported via land or sea instead of air transport
- Source food from countries that use renewable energy instead of fossil fuels for electricity generation

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[67] FDF: https://www.fdf.org.uk/fdf/what-we-do/environmental-sustainability/climate-change-net-zero/
[68] Courtauld Commitment 2030: https://wrap.org.uk/taking-action/food-drink/initiatives/courtauld-commitment

APPENDIX J: INDUSTRY TOOLS TO CALCULATE THE CARBON FOOTPRINT OF HOTELS

The hotel industry has a long history of collaborative initiatives in order to address the challenges around carbon measurement and reporting, and three free to access tools are available for those wishing to measure, report and estimate the carbon emissions of hotels. This section gives an overview of each, as well as guidance on when and how to use them in the context of net zero.

HOTEL CARBON MEASUREMENT INITIATIVE (HCMI)

The Hotel Carbon Measurement Initiative (HCMI) is a free methodology and tool for hotels to calculate the carbon footprint of hotel stays and meetings on their properties (applying a number of aspects from the GHG Protocol Standards). HCMI is the commonly accepted way to measure and compare Scope 1 and 2 GHG emissions of hotels. It includes emissions related to fuels burnt on site (e.g. in gas boilers and company vehicles) and electricity used on site. It also accounts for emissions related to any outsourced laundry and refrigerants (e.g. used in air conditioning). **Hotels can use HCMI free of charge to calculate their carbon footprint per occupied room and the carbon footprint of an area of meeting space per hour.** The methodology and tool are available for download from the Sustainable Hospitality Alliance.

CORNELL HOTEL SUSTAINABILITY BENCHMARKING INDEX (CHSB)

The Cornell Hotel Sustainability Benchmarking Index (CHSB) is an industry-led global data collection and benchmarking initiative, with data on energy, water and carbon emissions from over 20,000 hotels around the world, available free of charge. The public data set is available from the Cornell Center for Hospitality Research and contains average hotel performance for different types of hotels in different geographies, including HCMI benchmarks. CHSB provides a solution for companies and those buying business travel on their behalf, as well as those offering GHG calculations and offsetting, **to estimate in a robust way the carbon footprint of hotel stays and meeting space at scale.**

The datasets and emissions factors published in CHSB are used by a range of entities as a basis for industry guidance. This includes:

- The Greenhouse Gas Protocol Quantis Scope 3 Evaluator
- UK Government Greenhouse Gas Guidance
- New Zealand Government Guide to Measuring Emissions

GREENVIEW HOTEL FOOTPRINTING TOOL

For those wishing **to estimate the carbon footprint of a hotel stay or meeting in a particular location**, the Greenview Hotel Footprinting Tool is a simple to use tool which will make the calculation instantly, using HCMI data from CHSB. A data template is also available so that companies can export data easily into their systems.

SCENARIOS FOR USING HCMI, CHSB AND GREENVIEW HOTEL FOOTPRINTING TOOL

Table J provides guidance on how you can use the HCMI, CHSB and Greenview Hotel Footprinting Tool depending on who you are and what you would like to achieve.

Table J: Guidance on using HCMI, CHSB and Greenview Hotel Footprinting Tool

I am a(n)…	I would like to….	Steps to take
Hotel operator	Calculate the carbon footprint of my portfolio and benchmark performance of individual properties	• Participate in the annual CHSB Index where the carbon footprint of each hotel will be calculated using the Hotel Carbon Measurement Initiative methodology (HCMI) and individual benchmarking reports provided • HCMI data can be shared with corporate clients for RFP purposes or as part of their own Scope 3 business travel calculations
Hotel operator or owner	Share the carbon footprint of individual hotels with entities wishing to build it into their own Scope 3 emissions calculations	• Measure the carbon footprint of the property using the HCMI methodology and share as necessary. For bulk calculations participation in CHSB is advised
Hotel owner	Calculate the carbon footprint of my portfolio and benchmark performance of individual properties	• Participate in the annual CHSB Index where the carbon footprint of each hotel will be calculated using the Hotel Carbon Measurement Initiative methodology (HCMI) and individual benchmarking reports provide • Participation can be direct, i.e., through submitting data for each hotel, or indirect, whereby hotel owners can access data for owned hotels already in the dataset
Organization with business travel	Calculate the carbon footprint of my hotel stays and meeting space usage for my organization's business travel (Scope 3 emissions) or in order to purchase carbon offsets for my organization	• Use the Greenview Hotel Footprinting Tool to find default metrics and calculate the footprint • If you are seeking further granularity and adjustment needs based on the types and locations of hotels in your data set, refer to the CHSB index tool HCMI Measure 1 which has more detailed segmentation and benchmark ranges • If the size and geographic distribution of stays is large, contact Greenview for options to perform the multiple footprinting exercise or gain access to the bulk data output template • Request that your hotel partners participate in CHSB, to grow and improve the dataset
Organization with business travel	Calculate the carbon footprint of my hotel stays for specific hotels in which I am staying or have stayed	• Ensure you are clear on the rationale for needing a specific footprint for a hotel, if a default figure will suffice. If a default figure suffices, use the Greenview Hotel Footprinting Tool, or the CHSB Index tool HCMI Measure 1 for more granularity and request that your hotel partners participate in CHSB • If a specific figure is necessary, contact each hotel or hotel company directly to obtain the intensity figures specific to that company or hotel
Travel agency, tour operator, or meeting organizer that books hotels	Calculate the carbon footprint of clients' bookings based on the location and segment of each booking (Scope 3	• Use the Greenview Hotel Footprinting Tool to find default footprint metrics for each location • If you are seeking further granularity and adjustment needs based on the types and locations of hotels in your data set, refer to the CHSB index tool HCMI Measure 1 with more detailed segmentation and benchmark ranges

I am a(n)…	I would like to….	Steps to take
on behalf of others	emissions), or offer a carbon offsetting option to clients based on the location and segment of each booking	• If you are seeking further automation and calculation, contact Greenview to provide a bulk output data set of the Greenview Hotel Footprinting Tool that can be incorporated into your database/system • Request that your hotel partners participate in CHSB, to grow and improve the dataset
Travel agency, tour operator, or meeting organizer that books hotels on behalf of others	Offer a carbon offsetting option to my clients based on the average footprint of bookings	• Do not attempt to arrive at a generic number in perpetuity or to estimate the hotel's intensity(ies) based on algorithm or extrapolation • Use the Greenview Hotel Footprinting Tool or CHSB index HCMI Measure 1 to calculate the total footprint of your bookings in one year, then derive the average for that year and apply that value. Update the exercise each year. For access to the Bulk Data Output Template please contact Greenview. • Request that your hotel partners participate in CHSB, to grow and improve the dataset
Organization performing GHG emissions calculation for a client	Calculate the carbon footprint of my clients' bookings based on the location and segment of each booking (Scope 3 emissions)	• Use the Greenview Hotel Footprinting Tool to find default footprint metrics for each location • If you are seeking further granularity and adjustment needs based on the types and locations of hotels in your data set, refer to the CHSB index tool HCMI Measure 1 with more detailed segmentation and benchmark ranges
Carbon offset provider	Calculate the carbon footprint of my clients' bookings based on the location and segment of each booking (Scope 3 emissions)	• Use the Greenview Hotel Footprinting Tool to find default footprint metrics for each location • If you are seeking further granularity and adjustment needs based on the types and locations of hotels, refer to the CHSB index tool HCMI Measure 1 with more detailed segmentation and benchmark ranges • If you are seeking further automation and calculation, contact Greenview to provide an output data set of the Greenview Hotel Footprinting Tool that can be incorporated into your database/system
DMO, hotel association, or destination-based sustainable tourism organization	Calculate a baseline carbon intensity in order to offset the footprint of the destination	• Encourage or require hotels to participate in CHSB, to grow and improve the dataset • Contact Greenview about streamlining data submission processes and fees for independents • Utilize the Measure 2 Carbon per Room metric for the destination as the basis to quantify the footprint of the entire destination to offset based on destination room count

APPENDIX K: OPPORTUNITIES FOR FURTHER WORK

This Version 1.0 of the Net Zero Methodology for Hotels is released around COP26 in November, 2021 in Glasgow, Scotland. While the methodology seeks to provide guidance for setting and pursuing net-zero commitments, it recognizes that many of the elements necessary for improving the quantification and reduction of GHG emissions across a hotel value chain will need to be developed or improved. Thus, the methodology invites collaboration and parallel or supporting efforts to fill the following gaps, needs, and opportunities that were identified during the development and consultation of this methodology, also in the hopes of reducing the need to re-invent the wheel or address concurrent initiatives attempting to do the same thing.

1. Renewable energy and carbon offset purchases in hotel accounting. A historical limitation to purchasing renewable energy is the limitation in clarity on how it should be accounted for in the P&L (and in some cases, balance sheet) of a hotel. Furthermore, when viewed solely within the line item of energy expense and not something more representative of its intended use (i.e., cost of goods sold, marketing, general expense for helping save the planet, etc.), it may skew the perception of cost. For example, adding $0.02 per kWh of electricity to the energy line item may represent a 15% increase in energy spend, but if that value were accounted as a cost of goods sold as a 0.03% percent of revenue, the perception would be much different. Guidance and standardization through standards and industry bodies, such as the Uniform System of Accounts for the Lodging Industry (USALI), could support this. The 12th edition of USALI, currently in draft form at the time of publication, has made enhancements for the first time to include sustainability metrics and enhance the Energy, Water, and Waste (EWW) section to encompass renewable energy and carbon offsetting, and further enhancements and guidance can be added over time as the topic evolves, including issues of internal carbon pricing or carbon abatement.

2. Better emission factor coefficients for outsourced laundry. When HCMI was developed in 2011, the methodology agreed that outsourced laundry should be included in the footprint. At the time, the most recognized practice in the hotel industry was the linen/towel reuse program, and it was perceived unreasonable that the one guest engagement mechanism requesting guest participation would be essentially null and void if the hotel were to outsource its laundry wash. HCMI outlined the expectation that hotels should seek the energy usage associated with its outsourced laundry wash from the provider, and a rule-of-thumb ten percent of energy add-on was allowed as a proxy. Ten years later, in practice it is extremely difficult to obtain this data, and much less in a direct ratio figure for a hotel based on occupancy. Additional studies to further segment and provide default coefficients that the industry can use to estimate the energy usage of outsource laundry relative to the hotel's size would be welcomed.

3. Hotel-specific studies for the GHG emissions of purchased FF&E and OS&E. As outlined in Section 2, embodied carbon and upstream LCA emissions of the various goods purchased for a hotel will need to be addressed in some form. However, no definitive industry study or referential data set exists for quantifying and itemizing typical emissions or a range of emissions from the most common purchases of a hotel is found. Nor are default coefficients available for easy use respective to common

purchases for a hotel. Supporting these calculations would enable better decision-making and expedite the addition of this source of Scope 3 emissions prior to the 2025 and 2030 yardstick years.

4. Better emission factors and approaches for hotel waste generation and disposal. For a hotel to quantify the GHG emissions of waste, a handful of resources are available such as the GHG Protocol Scope 3 Evaluator and an interpretation of the EPA Waste Reduction Model (WARM) model. However, specific modeling based on composition of hotel waste would be very helpful, as the composition of a hotel's waste, including used amenities, food scraps, and other common items, may merit different coefficients for better estimation and quantification of reductions. Hotels routinely perform waste stream auditing (aka Dumpster Diving) and several hotel companies report on waste emissions. However, consistent calculation methodology and resources would facilitate more disclosure across the industry.

5. Supplier-specific emission factors for purchased municipal steam and chilled water. Globally these are very hard to come by and calculate consistently.

6. Emissions from employee commuting. While a hotel is able to undertake surveying of staff and calculation for its estimated annual emissions of their communities, this ends up being a redundant and highly repetitive exercise as each hotel in a destination performs its own survey and calculations. To determine baselines and fill gaps, larger scale surveying and default data per destination based on the emission factors specific to its electric power, public transport etc. would be helpful. Likewise, hotel-specific calculators would enable smaller hotels to easily and quickly conduct the assessment.

7. Carbon offsets to contribute to sustainable tourism. While this methodology outlines the aspirations for a carbon offsetting and sustainable tourism nexus incorporating the UN SDGs, work still needs to be done to help identify, qualify, and document these efforts. Further criteria, and a database of valid projects in terms of their contribution, would be immensely helpful to practitioners as well as enabling quantification of collective impact for carbon, SDGs, and destinations. Furthermore, to maximize the benefits, in addition to methodology and best practices, alliances can be formed between technological innovation centers with members of the hotel and the wider travel industry in order to identify and scale compensation techniques relating to types of hotel establishment and regions.

9. Technology, best practices, and other solutions to address offset overlap of multiple Scope 3 boundaries. As outlined in Section 5.4, challenges and inefficiencies arise when a renewable energy certificate of a hotel would need to be purchased by the hotel's owner, operator, and franchisor in order to count, and a carbon offset purchased for the same hotel stay could be purchased by the traveler, the company on which the traveler is on business travel, the company's corporate travel buyer, the hotel's owner, the hotel's operator, the hotel's franchisor, the hotel's physical destination entity, and the corporate travel buyer's distribution system. Conversely, transparency should exist if a REC provider or carbon offset provider were to sell eight different certificates or offsets for the same source of emissions. Hotel chains which have portfolio-level software for tracking of purchases are one area where best practices can be developed and shared. Blockchain technology can also bring solutions, as well as better and more contemporary guidance on accounting, retiring, and claiming offsets which were originally

developed decades ago for purposes of national government-level accounting and not for a net-zero world or the implications of multiple offsetting on products and services such as hotel stays.

10. Defining a carbon neutral hotel stay or meeting. While this methodology seeks to address a hotel or organization approach to pursuing a net-zero pathway, overlap will continue to increase as initiatives arise among hotel chains, intermediaries, and other providers for offering carbon neutral travel and a carbon neutral stay. Much like the instance where HCMI was needed to define the common calculation of a hotel stay and meeting space usage, a similar approach will be needed to identify the parameters of these claims. The primary difference between net zero and carbon neutral stays is that net zero is a long-term pathway that will require larger efforts to achieve for a hotel or an organization, while carbon neutral stays are being offered presently and claims will be difficult to regulate or certify across the industry without common definition and criteria, for example that a carbon neutral stay should encompass 100% renewable electricity, minimum efficiency practices, and offsetting per the sustainable tourism equity principle and be calculated using HCMI metrics.

11. Common thresholds for highest performance in carbon and energy intensity. As industry data sets mature, it should be possible to identify ranges of superior performance for energy usage intensity specific to hotel types, regions, and sizes, which are not dependent on comparison with others but rather on specific intensity values. Such values do exist in various frameworks, but are yet to be proven empirically on a wider scale and specific to hotel operations and metrics. In establishing such performance thresholds, managerial approaches to the pathway category on energy efficiency as well as the general need in ESG to set "reduction targets" can mature as well. For carbon emissions intensity, the Sectoral Decarbonization Approach (SDA) sets specific thresholds by proxy in a pathway for intensity-based decarbonization. However, this is limited to all types of commercial buildings, and hotels have been shown to have larger energy and carbon intensities than other asset classes. As such, hotels achieving the SDA pathway of % intensity reduction will in effect achieve larger reductions than other types of commercial buildings, as they start from a higher intensity base to begin with.

12. Common definition of floor area to determine energy and carbon intensity. While hotels and other buildings are typically measured, benchmarked, and modeled for decarbonization in an intensity metric of floor area (i.e., per square meter or per square foot), no universal definition of floor area is used across the industry. This is due to many jurisdictions defining it differently, and general standards not addressing the specifics of a hotel for things such as pool areas, guestroom balconies, varied parking structures, and other amenities. HCMI calls for *conditioned space* as a boundary to use, but even this is not defined in a standard. Furthermore, conditioned space may not be the most accurate in depicting performance when it forces a hotel to exclude open-air and naturally ventilated areas that have been developed specifically to reduce energy usage. Developing a common standard or guidance addressing all the specific issues to a hotel will help address this issue, especially as benchmarking of performance becomes more granular and requested by stakeholders.

APPENDIX L: FREQUENTLY ASKED QUESTIONS

The questions below emerged during the consultation process and will be reviewed and updated following further comments and queries.

1. Is this methodology intended for all hotels or just the big brands?

This methodology attempts to set out an approach to net zero which is applicable to all sizes of hotel company. While it is recognized that some of the larger operators will by necessity be driven by specific external methodologies, such as the Science Based Targets initiative, and that some types of hotel, such as island properties with very specific transport and energy generation situations, will need to adjust priorities to their own realities, it is intended that the basic processes, definitions and assumptions are helpful to all sizes of portfolio. In addition, there are some hotel companies which sit within larger conglomerates which will have their own approaches to net zero. In this case the methodology can help the hotel sections of the business communicate how general approaches should be adapted to the specific needs of hotels.

2. Does this methodology represent a standard approach to net zero which must be adhered to by all in the hospitality sector?

As outlined above, this methodology is intended to provide a comprehensive approach and pathway to net zero for hotels. However, it is not a *standard* to be adopted or require certification or reporting for itself, as it is designed to be adapted to the specific situations of different hotel operators and owners.

3. What is the relationship between this methodology and the Science Based Targets initiative?

See Appendix C for the relationship and alignment.

4. How does the reporting approach set out in this methodology relate to existing ESG disclosures?

The reporting approach set out in the methodology is not intended to be an additional set of reporting separate from existing ESG disclosures, nor is there any requirement to report against it (see note 2 above). However, the milestones identified in the methodology should be highlighted in company annual sustainability reports or ESG performance tables and used as a means to show progress towards net zero. By reporting against these common milestones, it is possible to benchmark and compare progress as well as communicate transparently to stakeholders who can refer to the methodology consistently.

5. Why is real estate called out separately when it is part of the value chain?

Although real estate is part of the value chain, those working in the real estate sector do not always focus on or understand their relationship to tourism. A significant challenge for the hotel sector is to build awareness among the commercial real estate community about the nuances, best practices, and industry norms of hotels as real estate assets that differ from other asset classes. This methodology seeks to enable understanding of how net zero relates to a hotel as real estate in addition to travel.

6. Why is the goal net zero by 2040 for operations and 2050 for value chain?

Ideally companies should be aiming for a goal of net zero by 2040 as this is the year cited by the UN Race to Zero 'starting line criteria'. Furthermore, the World Green Building Council's Net Zero Carbon Buildings Commitment calls for net-zero operating emissions of the building by 2030, which influences the commitment perception of commercial buildings in general. In addition, the recent IPCC report and large increase in commitments for COP26 are likely to accelerate pressures to the system in general and move the timeline up for generally accepted net-zero commitments. However, we recognize that 2040 is highly ambitious to achieve net zero across the value chain, especially when several aspects still need further guidance and calculation support. Also, physical buildings will be in place in 2040 for which decisions will need to be made today and is unlikely to happen at scale. As such, the methodology stipulates 2040 should be the net-zero target year for the hotel building from an operations perspective, and 2050 net-zero for others in the value chain and where the organization has less control.

7. **How do downstream leased assets such as stores or restaurants neither owned nor operated nor branded with the hotel, but which utilize space within the hotel, fall under hotel boundaries and responsibilities?**

These tend to be included in the utility usage and counted as Scope 1 & 2 even if not technically operated by the hotel, such as a restaurant, gift shop etc., as they are not commonly sub-metered and separated out from GHG emissions data reported by hotel portfolios. Alternatively, they are included in the case of an integrated resort with the assumption being that they would still be under some financial control. Also, in hotels where they are a minor % of floor area and they are relatively small, they tend to be excluded, and from the operator's perspective where the operator does not own the building, technically they are not leased assets under ownership and separate from the operator.

8. **Why is floor area used as the intensity metric rather than other options such as room night, guest night, or occupied room?**

Floor area is used as the intensity metric as this is consistent with the Sectoral Decarbonization Approach for service buildings. It is also the intensity metric related to the most important variable for a hotel company's pathway as it changes over time. However, other metrics are set out so companies can choose those which may be more relevant or comparable for their own needs and used in addition to floor area.

9. **How is 'floor area' defined for intensity metrics?**

There is no commonly used consistent definition or approach to 'floor area' worldwide. The recommended approach is to use the Mixed-Use Properties: Standard Methods of Measurement (ANSI/BOMA Z65.6—2012) standard, but which lacks specifics for hotels, and ultimately hotels will use what they are already using which could be gross floor area, conditioned/enclosed space or another definition guided by local or national regulation. It is not the aim of this methodology to define it, but once an agreed definition or set of parameters are available it can be incorporated.

10. Why is the definition of 'baseline' emissions not lined to a Business As Usual (BAU) scenario?

The original concept of a baseline was Business As Usual (BAU), however in practice now, especially with the advent of SBTi and others, a baseline amounts to a year chosen from which progress on a target can be calculated. There are two key challenges to the concept of BAU: 1) in the current landscape, where many hotels and companies have set targets and achieved reductions by implementing efficiency measures and moving to renewables up until now, a BAU in theory includes doing those things, and 2) most of the hotel's Scope 1 & 2 emissions will come from purchased electricity, where the grid decarbonization over time has been achieved and forecasting is needed but is constantly changing, which makes a business-as-usual baseline approach difficult as a primary lever to decarbonization as it is inherently variable.

11. How should portfolio changes over time be reflected in the baseline?

According to the GHG Protocol, increases in the boundary over 5% justify an adjustment to the baseline. In the business model of hotel operators and in some ownership entity types, hotels and floor area are continuously added over time, and will routinely trigger a 5% threshold. However, it is cumbersome to perform full calculations to reset a baseline by adding an existing building converted to the portfolio, tracing back its original emissions from baseline year or earlier through the present, then weighting it accordingly. The simplified hotel model takes this into account by adding any floor area to the portfolio in the year it was acquired, but not changing the baseline intensity or target pathway to intensity convergence unless a major change such as a merger or large acquisition occurs. Similarly, if a hotel is disposed of or exits the system, the same approach applies and no change in baseline or target pathway occurs. The intent of this approach is to reduce the burden on companies to constantly be challenged to adjust baselines and change forecast results, when all have the same ultimate target of net zero.

12. Should we be setting absolute or intensity targets for our company?

There are advantages and disadvantages of both absolute and intensity targets. While it is recognized that absolute targets are the only valid way to properly decarbonize and are most valuable to many external bodies, the methodology starts with an intensity target as the base as it can be extremely challenging to articulate an absolute target when starting out and rallying support across all stakeholders as it is not always easy to understand in terms of how individuals need to address it within their roles. Also, the Sectoral Decarbonization Approach uses intensity target metrics of floor area for buildings. Even if using intensity metrics as the absolute reduction, progress should be reported as well in order for stakeholders to be able to understand performance holistically.

13. How can yardstick years be realistic in countries where, for political or other reasons, the move towards renewables / regulation is slow?

It is recognized that there will be challenges in some countries. The provision for immediate and next markets highlights this and does allow for flexibility, as does the business model equity principle. The methodology outlines the proposed yardsticks, much of which is also calling for a plan and some

quantification deferred until 2025 or 2030 to address. At a portfolio level, the mix of countries with solutions and stakeholder pressures should support overall efforts as much as possible. Much uncertainty still exists at the time of publication as to the forecasting of market readiness for purchasing renewables per country, region, and globally, and could evolve in the coming years. As such, the methodology will seek to adapt as needed to provide the most sound guidance that strikes a balance between practicality and ambition that can be applied to any hotel and hotel company.

14. Why is it recommended that F&B emissions are not simply measured in number of meals?

Combining all F&B into meals served is problematic for several reasons, most important of which is the significant impact of beef vs. plant-based options. While estimating F&B emissions at high level is more common now for a general approach to quantifying and understanding the footprint or in order to offset, with net zero the implication is that hotels will be accountable for the footprint, will work to reduce their footprint first, and then offset the remainder. By only using number of meals served, the calculation loses the opportunity for influence and control of upstream emissions per $ or per kg of food, when actions such as reducing animal protein, local sourcing where possible, right-sizing serving sizes, and reducing pre-served kitchen prep food waste can be considered. Although it is possible to identify, measure and control top food items, the challenge currently is that they are included in Purchased Goods & Services overall, where there is a lens of % contribution to overall Scope 3 and combined 1+2+3. So by separating out the top items, it is then left for critique to ensure that those in relation to other sources within that category have been addressed and similarly weighted. There is also the risk of regional issues where some hotels do not use some of the key items, and others use much higher intensity products, as well as the need to address the issue of full service vs. limited-service hotels and resort/ non-resort, as depending on the level of F&B in the hotel the amount may vary.

15. Why is Food and Beverage not listed as a milestone category?

F&B is currently covered in category 9 (Purchased ongoing consumable goods). It will be one of the major contributors and elements to decarbonize in Scope 3. This overall bucket of a GHG Protocol/CDP/SBTi category for a hotel needs to be further segmented and the most important, significant and priority sources out of the myriad purchases that a hotel makes on an ongoing basis will need to be defined. When this happens, it is likely that food will be near the top. There are further challenges with F&B calculation, as it currently does not include additionality – i.e., the fact that humans will eat when they are not traveling. So while F&B decarbonization approaches such as plant-based and locally sourced food are key, it does not seem correct to allocate F&B 100% to a traveler, as they would have eaten anyway if not traveling. More work needs to be done in this area which is why the methodology calls for deferring the baseline.

16. Why is it recommended that T&D losses, over which hotel companies have little control, be included in Scope 3?

T&D losses are included in the Scope 3 Protocol and are a common category for CDP and SBTi, and as such are necessary to include. While it is recognized that this is out of the control of the hotel in terms of the amount of loss, if the hotel reduces electricity consumption purchased from the grid, then it also

reduces T&D losses. In the future, as we move toward market-based accounting and purchased renewable energy, it may be possible to make the case that by purchasing renewables, the T&D losses are also reduced.

17. How are fugitive emissions addressed in the methodology?

While it is recognized that fugitive emissions can be a significant in hotels, the methodology proposes that they are excluded from Scope 3 calculations. This is based on research at portfolio level[69] which shows that they do not exceed the commonly used cut-off point of 5% of total emissions; and on the GHG Protocol's own tool which indicates that they can be excluded given the Kigali Amendment to the Montreal Protocol. However, it is not the intention to excuse hotels from addressing refrigerants. While the research and cited works support reducing the need for fugitive emissions to be consistently quantified for decarbonization over time, as that is cumbersome (especially at portfolio level and for wider industry of limited service hotels with PTACs), they should have a decarbonization plan in place with engagement targets for effective management and changeout, as that will help bring awareness to it and address the gap.

18. Why is outsourced laundry not included in Scope 3 at baseline, but rather deferred to 2025?

Outsourced laundry has proven difficult to quantify accurately in scale. Although the HCMI methodology identifies a 10% 'rule of thumb', this was set 10 years ago and was a high-level estimate, and few if any tangible data points have been published to correlate percentage of energy to outsourced laundry that can be used to define industry norms. If this 10% is adopted now, and is then replaced by better and more granular, accurate calculations which are significantly higher or lower, then reductions will be skewed. It is our hope that as part of this effort of pointing out challenges and further opportunities and deferring certain components, better sources and coefficients for outsourced laundry could be developed and subsequently included. This would also provide the opportunity to update the HCMI methodology.

19. Why are guest transportation in destination and employee commuting included but guest travel to the destination not included?

Transportation of guests by vehicles operated by the hotel are categorized as Scope 1 and excluded unless significant. Transportation of guests organized/arranged by hotels but not in vehicles or entities owned or operated by the hotel is included as a Scope 3 emission. In both cases, guest transportation within the destination is part of the direct guest experience and often the hotel can choose or influence the provider and their practices. Guest transport to the destination, however, is largely out of the control of the hotel and is often not directly linked to the hotel stay. As such it is not included unless the hotel's model includes a significant level of direct organizing of transport of guests, such as in the case of private island resorts.

Employee commuting is a listed category in the GHG Scope 3 Value Chain Protocol and includes CDP and SBTi, and based on the current calculations at high level that companies use, which is fairly

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[69] https://ecommons.cornell.edu/handle/1813/71114

significant in many places in the United States (which is where the authorship and much of the rationale of the GHG Protocol is found) where most employees drive by themselves several km to work each day. It is also a common category in LEED and other certifications in order to encourage alternative transportation. Furthermore, employee commuting is also a transversal category that many businesses will need to address. As such, employee commuting is included, but the methodology hopes to defer this until later when better and more simplified and accurate calculation methods can be done based on specific cities, whereby some of the employee commuting will be an insignificant source of emissions as cities decarbonize transportation networks.

20. How can we avoid double counting Scope 3 emissions?

Double counting of Scope 3 is a reality for net zero across all industries and the methodology accepts that the hotel sector will be no different. This is further explored in Section 3 and Appendices C and D. Clarifications are made where possible to avoid double counting (for example waste would be double counting part of the LCA if not separated out) and highlight any overlap in estimations based on calculation methods that bundle or separate some of these as well.

21. Why does this methodology allow for claiming of carbon offsets, when they have been criticized and the SBTi does not allow them?

First, this methodology seeks to strike a balance between the corporate ESG focus at an organizational level (where offsetting is discouraged and viewed as pay-to-pollute) and the reality of the travel industry where voluntary carbon offsetting initiatives are prevalent and increasing rapidly in terms of the activity of travel despite all the negative corporate ESG lens on them. By not allowing for them or ignoring them, a compelling opportunity to address issues described in the Sustainable Tourism Principle is lost, and offsetting risks being undertaken ineffectively and haphazardly. Second, the sectoral pathways, as originally outlined in the Sectoral Decarbonization Approach and most recently in the SBTi net-zero standard, trace out pathways for commercial buildings in terms of an intensity reduction from 2020 of 20kgCO2e/m2 through 2050 of 0.179kgCO2e/m2. Following this logic, an intensity-based reduction pathway essentially acknowledges that a specifically quantified amount of CO2e emissions are acceptable. Therefore, if a company could reduce emissions to that level and qualify for the most credible recognition of following a science-based decarbonization pathway, then the methodology argues that they should be able to offset the corresponding amount up to that threshold and claim it credibly as well.

22. Why does the methodology discourage the use of offsets for Scope 2 emissions? What about the regions where renewable energy cannot be procured at the necessary quantities or it is not possible to purchase renewable energy?

Offsets are discouraged to be used for Scope 2 emissions in order to address common criticism of carbon offsets being a first choice and to support transversal decarbonization of the electric power grid. For regions where purchased renewables are not available, potential options include bulk purchasing in a

similar offset model for other locations and the use of mechanisms such as I-RECs or TIGRs, which would still help achieve the intended objective. This is a challenge also faced in aligning to frameworks such RE100 as it's not feasible for many types of businesses with relatively small facilities to negotiate PPAs in many of countries, and likely there will be more resources and guidance on this in future iterations of this methodology and complementary initiatives.

23. Why do you differentiate markets using the term 'immediate' and 'next' rather than 'developed' and 'developing'?

The methodology makes the distinction between Immediate Markets and Next Markets rather than using the terminology of developing/developed or established markets because there are cases where some companies in developing countries are actually further ahead in net zero, such as renewable energy use in India, decarbonization in Costa Rica, etc. The proxy for this expectation is set on the most impactful decarbonization variable of purchased renewable electricity. Where the expectation is indicated as less, markets are defined as 'next' and although it is often the case that this overlaps with developing markets, there are several examples where it is not. By encompassing both, the methodology attempts to collectively address the consideration in less developed countries, while also addressing the need to hold more accountable entities that hold the most wealth and ability to invest in decarbonization within those countries.

24. Why are equity principles proposed?

The introduction of equity principles is based on the UN Race to Zero criteria. As these are new and in some cases bold, the intent of this methodology is to gain agreement on the three set out – business model equity principle, regional equity principal, and sustainable tourism equity principle – as the fundamentals to use for the industry approach to net zero and carbon offsetting. This will then enable further development and guidance in the future once best practice on equity principles for net zero are put into place, carbon offsetting aspects become more evolved, and overall discussions for net zero for developing vs. developed countries evolve.

25. Why only focus on sustainable tourism offsets rather than those that contribute to the SDGs in general?

While the SDGs are always the foundation of sustainable development impact activities, the methodology suggests a focus on sustainable tourism as this will help focus the entire travel industry on other benefits that it can have to tourism more specifically. It will also encourage an improved perspective on and approach to offsetting in the industry more generally, through a better understanding of the downstream impacts and beneficiaries. These can often be confused or hidden when linked to general SDGs without local context. In addition, SDG benefits can be drawn out of any sustainable tourism project and of course, where offsets linked to sustainable tourism are not available, the SDGs provide a backup approach.

26. 100% renewable electricity by 2035 may be challenging for hotel properties based in off-grid locations. What does the methodology recommend for hotels based in such locations and how should they become 100% renewable?

Off-grid locations are not considered immediate markets if there is no form of purchasing renewable electricity from market mechanisms. The methodology does not call for 100% renewable electricity sourced directly (location-based). Mechanisms such as I-RECs or other cross-border purchases should be considered by then in order to achieve this milestone.

APPENDIX M: STAKEHOLDER ENGAGEMENT

The Net Zero Methodology for Hotels has been developed through a collaborative effort of Greenview, PATA, Sustainable Hospitality Alliance, Tourism Declares and WTTC. Work was overseen by a Steering Group of representatives from these organizations. An Advisory Group of hotel company representatives reviewed and provided input into the first draft of the methodology, which has been updated, and a second draft was presented for consultation from a wider stakeholder group. This First Edition incorporates feedback from the wider consultation process.

STEERING GROUP

The following individuals participated in the Steering Group:

- Eric Ricaurte and Olivia Ruggles-Brise, Greenview
- Graham Harper, PATA
- Claire Whitely, Sustainable Hospitality Alliance
- Jeremy Smith, Tourism Declares
- Chris Imbsen and Birka Valentin, WTTC

ADVISORY GROUP

The following companies participated in the Advisory Group. The Advisory Group was invited to provide a thorough review of the first draft of the methodology from 20 August to 11 September and individuals submitted feedback on each section via an online survey. Feedback was then incorporated and key issues which arose in that process are covered in Appendix L – Frequently Asked Questions.

- Accor
- Caesars
- Dusit Thani
- Four Seasons
- Hilton
- Hongkong and Shanghai Hotels
- Hyatt
- Iberostar
- IHG
- Indian Hotels Co
- Jetwing

- Mandarin Oriental
- Melia
- MGM Resorts
- Minor Hotels
- Oberoi
- Palace Resorts
- Radisson Hotel Group
- Soneva
- TUI
- Wyndham Hotels & Resorts

Advisory Group members were asked to answer a series of questions to indicate their level of agreement with specific elements of the methodology. The average 'yes' rate across all questions was 93%. Overall, 195 comments were received, of which only 15 indicated disagreement with the proposed approach. All major issues were modified in order to ensure the robust nature of the methodology. Comments were responded to individually, outlining what updates would be included and rationale for those which were not taken on board.

STAKEHOLDER CONSULTATION

The following organizations provided feedback on the 2nd draft of the methodology:

- Amex GBT
- Air Transport Action Group (ATAG)
- Booking.com
- GRESB
- Green Tourism
- Griffith University
- Iberostar
- Informa
- IU International University of Applied Sciences
- Pebblebrook Hotel Trust
- UN Environment (UNEP)
- University of Surrey

APPENDIX N: REFERENCES AND RESOURCES

- Carbon Disclosure Project: https://www.cdp.net/en
- Carbon Offset Claims Guidance : https://3degreesinc.com/wp-content/uploads/2019/07/3D_CarbonClaims-Whitepaper_07172019_Final.pdf
- Cornell Hotel Sustainability Benchmarking: https://greenview.sg/chsb-index/
- Determining Materiality in Carbon Footprinting: What Counts and What Does Not: https://ecommons.cornell.edu/bitstream/handle/1813/71114/Ricaurte_202012_20Determining_20materiality.pdf?sequence=1
- Greenhouse Gas Abatement Cost Model (GACMO): https://unepdtu.org/publications/the-greenhouse-gas-abatement-cost-model-gacmo/
- Greenhouse Gases (GHG) Protocol:
    - https://ghgprotocol.org/corporate-standard
    - https://ghgprotocol.org/standards/scope-3-standard
    - https://ghgprotocol.org/calculation-tools
- Intergovernmental Panel on Climate Change Assessment Report 5: https://www.ipcc.ch/report/ar5/syr/
- Net Zero Standards
    - Climate Action 100+: https://www.climateaction100.org/progress/net-zero-company-benchmark/
    - Climate Neutral Now: https://unfccc.int/climate-action/climate-neutral-now
    - Science Based Targets Initiative (SBTi) Net-Zero Targets: https://sciencebasedtargets.org/net-zero
    - SME Climate Hub: https://businessclimatehub.org/wp-content/uploads/2020/09/About-the-SME-Climate-Commitment-v1.0.pdf
    - UN Race to Zero:
        - https://unfccc.int/climate-action/race-to-zero-campaign
        - https://racetozero.unfccc.int/wp-content/uploads/2021/04/Race-to-Zero-Criteria-2.0.pdf
        - https://racetozero.unfccc.int/wp-content/uploads/2021/04/Race-to-Zero-EPRG-Criteria-Interpretation-Guide.pdf
    - World Green Building Council Net Zero Buildings Commitment: https://www.worldgbc.org/thecommitment
- Hotel Carbon Measurement Initiative: https://sustainablehospitalityalliance.org/resource/hotel-carbon-measurement-initiative/
- Hotel Global Decarbonization Report: https://sustainablehospitalityalliance.org/resource/global-hotel-decarbonisation-report/
- Hotel Waste Measurement Methodology: https://sustainablehospitalityalliance.org/resource/hwmm/
- International Energy Agency (IEA) Energy Technology Perspectives 2017 publication: https://www.iea.org/reports/energy-technology-perspectives-2017
- Sustainability Accounting Standards Board Hotels & Lodging Industry Standard Version 2018-10 SV-HL-160a.1: https://www.sasb.org/
- United Nations Environment Program (UNEP) Emissions Gap Report 2019: https://wedocs.unep.org/bitstream/handle/20.500.11822/30797/EGR2019.pdf
- United Nations Environment Program (UNEP) Food Waste Index Report 2021: https://www.unep.org/resources/report/unep-food-waste-index-report-2021

APPENDICES

- Embodied Carbon section
    - Building Life Cycle Assessment in Practice Guide (2010) by the American Institute of Architects (AIA): https://www.aia.org/resources/7961-building-life-cycle-assessment-in-practice
    - Carbon Smart Materials Palette: https://materialspalette.org/palette/
    - Embodied Carbon Guidance (2019) by International Living Future Institute (ILFI): https://buildingtransparency-live-87c7ea3ad4714-809eeaa.divio-media.com/filer_public/5f/b8/5fb8936f-2e92-40a0-94b9-43185107612c/wc_am-embodiedcarbonguidancedocpdf.pdf
    - Embodied Carbon in Construction Calculator (EC3) Tool (2019) by the Carbon Leadership Forum (CLF): https://carbonleadershipforum.org/ec3-methodology/
    - Hybrid Input-Output Analysis of Embodied Carbon and Construction Cost Differences between New-Build and Refurbished Projects: https://www.mdpi.com/2071-1050/10/9/3229
    - IHG-Arup Net Zero Hotels: https://www.ihgplc.com/-/media/ihg/files/news/2021/2021_05_04/whitepaper---net-zero-carbon-hotels-vf.pdf
    - Inventory of Carbon and Energy (ICE) Database Version 3.0 (2019) by Circular Economy and University of Bath: https://circularecology.com/embodied-carbon-footprint-database.html
    - Methodology to Calculate Embodied Carbon of Materials (2012) by Royal Institution of Chartered Surveyors (RICS): https://www.igbc.ie/wp-content/uploads/2015/02/RICS-Methodology_embodied_carbon_materials_final-1st-edition.pdf
    - New Buildings Institute (NBI) Building Decarbonization Code: https://newbuildings.org/resource/building-decarbonization-code/
    - UNEP 2020 Global Status Report for Buildings and Construction: https://wedocs.unep.org/xmlui/bitstream/handle/20.500.11822/34572/GSR_ES.pdf?sequence=3
    - World Business Council for Sustainable Development (WBCSD)-ARUP Net-zero buildings: Where do we stand?: https://www.wbcsd.org/contentwbc/download/12446/185553/1
    - World Green Building Council (WorldGBC) Bringing Embodied Carbon Upfront (2019): https://www.worldgbc.org/sites/default/files/WorldGBC_Bringing_Embodied_Carbon_Upfront.pdf
- Emission Factors
    - 2020 Climate Registry - Default Emissions Factors April 2020: https://www.theclimateregistry.org/wp-content/uploads/2020/04/The-Climate-Registry-2020-Default-Emission-Factor-Document.pdf
    - Hong Kong Carbon Accounting guidelines 2010: https://www.climateready.gov.hk/files/pdf/Guidelines_English_2010.pdf https://www.epa.gov/sites/default/files/2020-04/documents/ghg-emission-factors-hub.pdf
    - International Energy Agency CO2 Emissions from Fuel Combustion 2020: https://www.iea.org/data-and-statistics/data-product/emissions-factors-2020
    - National Greenhouse Accounts Factors October 2020: https://www.industry.gov.au/data-and-publications/national-greenhouse-accounts-factors-2020
    - National Inventory Report 1990-2018: Greenhouse Gas Sources and Sinks in Canada (2020): https://publications.gc.ca/site/eng/9.506002/publication.html

- o UK Government GHG Conversion Factors for Company Reporting 2020: https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2020
- o UN Environment Program (UNEP) Technical Options Committee Refrigeration, Air Conditioning and Heat Pumps Assessment Report (2014): https://ozone.unep.org/sites/default/files/2019-08/RTOC-Assessment-Report-2014.pdf
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APPENDIX O: GLOSSARY OF TERMS

- **2-Degree Scenario** – Widely accepted as the limitation to global average temperature growth to prevent significant changes to the planet. One of the goals of the 2015 Paris Agreement is to limit global average temperature to well below 2°C above pre-industrial levels, and pursue efforts to limit temperature increase to 1.5°C.
- **Advisory Group** – Group of experts from hotel companies providing support for the development of the methodology.
- **Baseline Value** – Refers to the value against which change is measured. 'Baseline scenarios' are based on the assumption that no additional policies/measures will be implemented beyond those that are already in force and/or planned. They are counterfactual constructions that help highlight the level of emissions that would occur without further mitigation effort. Other terms that are often used interchangeably include 'reference scenario', 'no policy scenario', and 'business as usual (BAU) scenario'. However, the term 'BAU' is no longer preferred due to the difficulties in projecting century-long socioeconomic circumstances. While baseline measurements are a fundamental part of science, emission baselines were mainstreamed by global agreements such as the 1997 Kyoto Protocol which uses emission data from 1990 as the baseline value.
- **Carbon Disclosure Project (CDP)** – A global disclosure system for investors, companies, cities, states and regions to manage their environmental impacts.
- **Cornell Hotel Sustainability Benchmarking (CHSB)** – The hotel industry's largest annual benchmarking of energy, water, and carbon. Open to hotels and hotel companies of all sizes and published in a freely available index every year.
- **Double/multiple counting** – Occurs when two or more different companies include the same GHG emissions in their respective inventories.
- **Embodied Carbon** - Carbon emissions associated with materials and construction processes throughout the whole lifecycle of a building or infrastructure.
- **Emission Factor** – A conversion figure used to convert energy consumption into a unit of carbon.
- **Equity Principles:**
  - Business Model Equity Principle – Net-zero approach for hotel organizations whose business models are not based on consistent floor area growth; expected to decarbonize quickly.
  - Regional Equity Principle – Net-zero approach for hotel organizations whose business models are based on consistent floor area growth.
    - Immediate markets – Hotel organizations in markets that have established renewable energy markets (e.g. EU, US, and Australia) are expected to decarbonize more quickly.
    - Next markets – Hotel organizations in markets that have less established renewable energy markets are expected to decarbonize less quickly.
  - Sustainable Tourism Equity Principle – Carbon offsets should meet a threshold of sustainable tourism that benefits local communities in terms of tangible economic benefit and protection of natural and cultural heritage.
- **Greenhouse Gas (GHG) Protocol Corporate Accounting and Reporting Standard** – A standard designed for organizations to inventory and report all of the GHG emissions they produce, categorizing emissions into three scopes and introducing two distinct approaches to consolidate GHG emissions:
  - Definition of Scopes:
    - Scope 1 – Direct GHG emissions that occur from sources owned or controlled by the organization.
    - Scope 2 – Indirect GHG emissions from generation of purchased electricity consumed by the organization.

- Scope 3 – Other indirect GHG emissions that occur as a consequence of the activities of the organization, but occur from sources not owned or controlled by the organization.
  - o Approaches in Setting Organizational Boundaries:
    - Equity Share Approach – Company accounts for GHG emissions from operations according to its share of equity in the operation.
    - Control Approach – Company accounts for 100 percent of the GHG emissions from operations over which it has control, whereby control can be defined in either financial or operational terms.
- **Global Sustainable Tourism Council (GSTC)** – Establishes and manages global standards for sustainable travel and tourism.
- **Greenview Hotel Footprinting Tool** – Tool to calculate the carbon footprint of a hotel stay or meeting anywhere in the world following the Hotel Carbon Measurement Initiative (HCMI) methodology.
- **Hotel Carbon Measurement Initiative (HCMI)** – A free methodology and tool for hotels to calculate the carbon footprint of hotel stays and meetings in their properties.
- **Hotel Waste Measurement Methodology (HWMM)** – A common approach for the hotel industry to collect waste data, and measure and report waste.
- **Intergovernmental Panel on Climate Change (IPCC)** – The United Nations body for assessing the science related to climate change, releasing regular scientific assessments on climate change, its implications and potential future risks, and adaptation and mitigation options.
- **ISO 14064** – An international standard against which greenhouse gas (GHG) emissions reports are voluntarily verified. Part 1 (ISO 14064-1:2018) specifies principles and requirements at the organization level for quantification and reporting of GHG emissions and removals. It includes requirements for the design, development, management, reporting and verification of an organization's GHG inventory.
- **Long-term Decarbonization** – Refers to a strategy with a long time horizon towards 2050. Such strategies are needed to achieve the Paris Agreement goal of limiting global average temperature to well below 2°C, and preferably 1.5°C, relative to pre-industrial levels. To do so, there is scientific consensus that carbon emissions have to be reduced by half by 2030 and reach net zero by 2050.
- **Net-Zero Carbon** – Refers to a state in which the greenhouse gases going into the atmosphere are balanced by removal out of the atmosphere to mitigate global warming. The IPCC concluded that net-zero carbon has to be achieved by 2050 to limit global warming at 1.5°C. Other similar but different terms refer to the different ways in which emissions sources and sinks are accounted for in context, and help to indicate what is included and excluded in the calculations:
  - o **Climate Neutral:** An actor's activities result in **no net effect on the climate system**. Any GHG emissions or other activities with warming effects are fully compensated by GHG reductions or removals, or other activities with cooling effects — irrespective of the time period or the relative magnitude of emissions and removals involved. A near synonym for GHG neutral, but climate neutral also includes non-GHG radiative forcing effects, such as land use changes with albedo effects. Not a valid end-state target, as it does not require "like for like" balancing, but a possible intermediate step.
  - o **GHG Neutral:** An actor's **net contribution to global GHG emissions is zero**. Any GHG emissions attributable to an actor's activities are fully compensated by GHG reductions or removals exclusively claimed by the actor — irrespective of the time period or the relative magnitude of emissions and removals involved. Not a valid end-state target, as it does not require "like for like" balancing, but a possible intermediate step.
  - o **Carbon Neutral:** An actor's **net contribution to global CO2 emissions is zero**. Any CO2 emissions attributable to an actor's activities are fully compensated by CO2 reductions or removals exclusively claimed by the actor — irrespective of the time period or the relative

magnitude of emissions and removals involved. Not a valid end-state target, as it only refers to carbon, but a possible intermediate step.

- o **Carbon Negative**: An actor's **carbon removals**, internal and external, **exceed its emissions** and any removals are "like for like". Must be specified over a declared time period, and whether removals and emissions are cumulative or represent only the time period specified. Not a valid end-state target, as it only refers to carbon, but a possible intermediate step.
  - o **Climate Positive / Net Negative:** An actor's **GHG removals**, internal and external, **exceed its emissions** and any removals are "like for like". Must be specified over a declared time period, and whether removals and emissions are cumulative or represent only the time period specified. A valid end-state target.
  - o **Absolute Zero / Zero Emissions**: **No GHG emissions** are attributable to an actor's activities across all scopes. Under this definition, no offsets or balancing of residual emissions with removals are used. A valid end-state target.

- **Net-Zero Target** – Refers to target set by countries and organizations to reach net-zero carbon emissions by a selected date.
- **Net-Zero Pathway** – Refers to the temporal evolution of natural and/or human systems towards a future net-zero state. The trajectory is modeled based on a set of features such as technological advancement and institutional policy changes, depending on the course of action and strategy set by countries and organizations to achieve net-zero carbon emissions by the selected date.
- **Paris Agreement** - Legally binding international treaty on climate change to limit global warming to well below 2°C, preferably to 1.5°C , compared to pre-industrial levels and achieve a net-zero world by 2050.
- **Pacific Asia Travel Association (PATA**) – An association working to promote the responsible development of travel and tourism in the Asia Pacific region.
- **RevPAR** – Refers to revenue per available room, a performance metric in the hotel industry that is calculated by dividing a hotel's total guestroom revenue by the total number of available rooms in a specific period.
- **Rule-of-thumb Pathway** – Suggested pathway from baseline year to 2030 whereby (1) Scope 1 & 2 emissions should be reduced by 3% per year for OG Baselines (<2012), 4% per year for Prior Baselines (2013-2018), and >5% per year for New Baselines, and (2) Energy intensity should be reduced by 2% per year regardless of baseline.
- **Sustainability Accounting Standards Board (SASB)** – A sustainability accounting standards designed to help public corporations disclose material, decision-useful information to investors.
- **Science Based Targets initiative (SBTi)** – Defines and promotes best practice in emissions reductions through science-based targets which are aligned with what the latest climate science deems necessary to meet the goals of the Paris Agreement – limiting global warming to well below 2°C above pre-industrial levels and pursuing efforts to limit warming to 1.5°C.
  - o **Sectoral Decarbonization Approach (SDA)** – An approach that allocates the 2°C carbon budget to different sectors, taking into consideration inherent differences among sectors, such as mitigation potential and how fast each sector can grow relative to economic and population growth.
  - o **Convergence** – Level where all companies within a given sector reduce their emissions intensity to a common value by some future year as dictated by a global emissions pathway.
- **Sustainable Hospitality Alliance (The Alliance)** – An alliance of leading hospitality companies taking collective responsibility to address key environmental and social challenges in the industry.
- **SWAG** – *Stuff We Always Give Away*, a common phrase in meetings and events to denote giveaways by event organizers and exhibitors

- **Tourism Declares Climate Emergency** – A coalition of tourism businesses, organizations and individuals that have declared a climate emergency and are taking purposeful action to reduce their carbon emissions.
- **UN Race to Zero Campaign** – A global campaign to rally leadership and support from businesses, cities, regions, investors for a healthy, resilient, zero-carbon recovery that prevents future threats, creates decent jobs, and unlocks inclusive, sustainable growth.
- **UN Sustainable Development Goals (SDGs)** – A collection of 17 interlinked global goals designed to be achieve a sustainable future for all across the globe.
- **World Travel & Tourism Council (WTTC)** – The representative body of the global Travel & Tourism private sector, with members consisting chief executives of leading travel & tourism companies, destinations, and industry organisations.

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Greenview is the world's leading provider of sustainability programs and data management for the hospitality and tourism sector. Greenview supports dozens of companies to design, implement, and monitor their corporate responsibility and sustainability platforms to drive profitability, streamline data, keep ahead of trends, and provide effective communication for stakeholders. Greenview has developed industry methodologies for carbon, waste and plastics measurement.

Tourism Declares is a global community of over 300 organisations, companies and professionals working together to plan a better future from tourism. All members have committed to align their plans with the need to cut global emissions in half by 2030.

Pacific Asia Tourism Association (PATA) is a not-for-profit membership-based association that acts as a catalyst for the responsible development of travel and tourism to, from and within the Asia Pacific region. By bringing together private and public sector members, PATA facilitates meaningful partnerships to enhance the value, quality and sustainable growth of travel and tourism to, from and within the Asia Pacific region.

Sustainable Hospitality Alliance (the Alliance) brings together engaged hospitality companies and uses the collective power of the industry to deliver impact locally and on a global scale. They work with leading hospitality companies and strategic partners to address key challenges affecting our planet and its people, and develop practical resources and programmes to enable the wider industry to operate responsibly and grow sustainably.

World Travel & Tourism Council (WTTC) is the global authority on the economic and social contribution of Travel & Tourism. WTTC promotes sustainable growth for the Travel & Tourism sector, working with governments and international institutions to create jobs, to drive exports and to generate prosperity. Council Members are the Chairs, Presidents and Chief Executives of the world's leading private sector Travel & Tourism businesses.