



TRANSFORMING
TOURISM



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OVERVIEW AND HOTSPOTS ANALYSIS OF THE TOURISM VALUE CHAIN IN THE PHILIPPINES



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Executive Summary

An assessment of the environmental hotspots associated with the tourism sector value chains in the Philippines was conducted by the United Nations Development Programme and the Waste and Resources Action Plan using the process and guidance contained in the 2017 Life Cycle Initiative overarching methodological framework for hotspots analysis.¹ An environmental hotspot is a process that accounts for a significant proportion of the negative environmental impact in the value chain. Value chain is the entire sequence of activities or parties that provide or receive value in the form of products or services (e.g. suppliers, outsourced workers and contractors).

The combination of a top-down approach (using information drawn from national input-output databases) and a bottom-up approach (e.g. using WRAP's Hotspots Tool to identify the environmental impact hotspots associated with the full lifecycle of products used in the tourism sector) was used to identify and quantify hotspots. This work was undertaken in the two areas of geographical focus for the project: Metro Manila and Iloilo.

Data gaps resulting from incomplete hotel survey data in the bottom-up approach required some additional sense checking of the top-down data to improve confidence levels around the hotspots identified. It is also worth noting that whilst national-level data was available for hotels in the Philippines, no national-level data has been identified for the meetings, incentives, conferences and events (MICE) sector.

Supporting analysis to investigate the implications of goods imported by the tourism sector on the ranking and size of product-related hotspots was also undertaken and showed that whilst imported goods did not affect the ranking of environmental impact hotspots they do affect the quantification (size) of hotspots relating to the consumption of goods and services in the tourism sector.

In order to better understand the location and context for environmental hotspots during this analysis the tourism value chain for the Philippines was mapped to illustrate how the tourism sector operates, how it is supported by other sectors of the economy (e.g. energy and water supply infrastructure, building and construction, facilities management, food and beverage, transportation), what activities are in scope in the Philippines (see **Figure 4**: Value chain map for hotels and MICE in the Philippines. Adapted by UN Environment from ITC WTO (2015); how expenditure in the tourism sector is distributed in the economy (see **Figure 5**); and which value chain actors are able to control or influence the environmental hotspots identified during the analysis (see **Figure 6**).

The analysis of expenditure suggests that imports, support services, energy, non-clothing textiles, wooden furniture and food and beverage products are key elements in the Philippines tourism value chain. This suggests that ongoing implementation efforts in the Philippines need to focus on suppliers of domestic goods and services and in some cases those imported from other countries (e.g. dairy products, cereal crops and non-clothing textiles); although this may not be as important for overseas suppliers of most food and beverage products, as the Philippines imports comparatively little food and beverage products (10-13% by weight between 2008 and 2013). That said, **Figure 3** shows that hotels account for less

¹Source: <http://www.lifecycleinitiative.org/new-hotspots-analysis-methodological-framework-and-guidance/>

than 2% of income to other sectors of the Philippines economy, with non-clothing garments representing the sector with the highest proportionate income from hotels. This suggests that the sector is a relatively insignificant customer in these sectors and may therefore have a weak degree of potential influence on practices which relate to hotspots through collective activity. See [Figure 9](#) for more information on the main countries that the Philippines import goods and services from. Further information on the approach taken to map and define the Philippines tourism value chain can be found below.

In summary, the environmental hotspots identified for the tourism sector in the Philippines are broadly split between:

- **Primary production of food**, particularly GHG emissions and water use in meat, (imported) dairy production and rice cultivation. In addition, processing of meat and fresh produce is also a hotspots for energy use. Tourist spend on food and beverages in the sector in 2014 amounted to PHP220.8 billion (nearly 40% of all the gross revenue from the sector) also makes this a significant hotspot for the sector. [FAOstat](#) suggests that the Philippines imported approximately 10-13% of food and beverages by weight each year between 2008 and 2013; although this figure increased over the time period.
- **Electricity and fuel use in hotel and MICE establishments** national-level data suggests that over 60% of the energy used by hotels and their value chains is in the form of direct electricity use by hotels and establishments; Hotel and restaurant energy use in lighting, heating, ventilation and air conditioning; and water heating and use in washing and sanitation, cleaning of rooms and public spaces; and for leisure activities, like swimming pools and spas. Energy generation and its climate change impacts relate to the environmental impacts associated with the extraction of raw materials (fossil fuels: coal, oil and gas), their conversion to electricity or heat and the transmission of energy from point of generation to point of use in the tourism sector. Hotels in the Philippines pay between US\$0.14 (in Metro Manila) to US\$0.21 per Kw (in Iloilo) for their electricity.
- **Liquid and solid waste generation by in hotel and MICE establishments, leading to pollution** of land, water and air, compounded by the deficiencies in national infrastructure, regulation and enforcement – for example:
 - Groundwater, river, lake and marine pollution from due to a lack of waste management and recycling infrastructure and regulatory permitting and enforcement of waste management sites, leading to the degradation of natural resources;
 - A lack of public water supply or wastewater treatment infrastructure leading to water/marine pollution from untreated or inadequately treated wastewater and risks to public health from contaminated drinking water sources; and

A summary of environmental impact hotspots by tourism activity and impact category can be found in [Table 1](#) below. More detail on the approaches taken to hotspots analysis and key findings can be found in **Section 4** of this report, with a further summary table of hotspots organised by impact category and lifecycle stage in **Annex F** of this report.

Table 1: Summary of hotspots by environmental impact indicator for the tourism sector in the Philippines

Summary of hotspots across environmental impact categories – The Philippines				
Rank	GHG	Energy	Water	Waste
1	<p>Primary production of meat and dairy products: GHG emissions from the rearing of livestock for meat and dairy products (e.g. methane emitted by ruminant digestion systems and production of manures) account for 33% of the GHG emissions for hotels and restaurants in the Philippines tourism sector. NOTE: the Philippines imported approximately 10-13% of food and beverages by weight each year between 2008 and 2013. This figure increased over the time period; but milk is only produced in small quantities in the Philippines, so the majority is imported.</p>	<p>Electricity and fuel use in hotel and MICE establishments: lighting, heating, ventilation and air conditioning (HVAC) of rooms, public spaces, back of house areas. The largest use of energy for hotels in the Philippines is through the use of electricity. Over 60% of the energy of tourism value chains (ex. International flights) is used directly by the hotel, either through direct combustion of fuels (e.g. gas) or use of grid supplied electricity².</p>	<p>Primary production of food crops and livestock; and beverage production: Over 99% of the 69 million m³ water associated with hotels in the Philippines is considered as Scope 3 (water used in the supply chain). This is mainly the use of water in the production of food crops and livestock, which accounts for 68% of the water associated with hotels and restaurants. Food crops include rice sugar, bananas, coconuts and pineapples. Beverages is the next most significant category at 12% of the water footprint associated with hotels and restaurants in the Philippines.</p>	<p>Food waste in hotels, restaurants and MICE establishments: WRAP estimates an average of 7-12% meat waste and 20% of edible vegetable parts are wasted in hotel kitchens and by customers, with one hotel survey return indicating overall food waste levels of 41%. This suggests there are significant opportunities for efficiency gains. A lack of private and public-sector infrastructure for collection and treatment of food/organic waste leads to wasted resource and high methane emissions from open, unlicensed landfill sites. NOTE: Philippines national-level data appears to significantly underestimate solid waste arising in the sector.</p>
2	<p>Electricity, fuel and refrigerant use in hotel and restaurants: 15% of emissions are from the consumption of purchased electricity or other energy sources; and 3% from direct emissions controlled by the organisation (e.g. generators, vehicles and the use of gas for cooking or heating. A heavy dependence on fossil fuels (coal, oil and gas) are linked to hotspot above on energy generation. (Also see Energy hotspot.)</p>	<p>Processing and packing of meat and dairy products: energy use in the provision of meat and dairy products is the second largest energy hotspot. This includes slaughterhouse processing and energy used in chilled storage and refrigeration, which also contribute to post-farm gate energy use and emissions.</p>	<p>Water use in hotels and MICE establishments: guest washing and sanitation, cleaning of rooms and public spaces, laundry services, food preparation and cooking, irrigation of grounds, swimming pools and the treatment of waste water and sewage by hotels are all likely to be significant uses of water in the Philippines tourism sector.</p>	<p>Primary production of fresh produce and grain crops: in-field, unharvested crops and immediate post-harvest crop waste due to supply chain quality requirements and poor demand forecasting (estimates are up to 20% losses/waste).</p>
3	<p>Primary production of rice and fresh produce: emissions from use of fertilizers; methane emissions from flooded rice paddies; and fuel</p>	<p>Transportation: the tourism sector spends over US\$4 million a year on transportation equipment, but this probably represents a</p>	<p>Water pollution from hotels: a lack of public infrastructure, regulation and enforcement leads to sub-optimal use of</p>	<p>Wastewater and solid waste pollution from hotels and establishments: resulting from a lack of modern, regulated waste and</p>

² **NOTE:** Iloilo is also known for its expensive electricity at \$0.21per kwh (as compared to \$0.14 per kwh in Metro Manila), providing more of an incentive for energy efficiency and renewable energy projects there.

	use for in-field operations. Rice alone accounts for 8% of the GHG emissions of restaurants in the Philippines.	fraction of the transportation costs provided by third party service providers. Transportation and distribution of food and beverage products, particularly for imported goods; or from tourists participating in tours, excursions or using taxis and hire cars is a major user of energy (predominantly gasoline) in the Philippines (using circa 140 TJ of energy a year according to national-level data). This situation is exacerbated by traffic congestion in many parts of the country as a result of poor urban planning (especially in the National Capital Region, including Metro Manila), underdeveloped road and public transport doesn't have the capacity to meet the population's or visitor's needs ³ . Traffic congestion in the Philippines costs the national economy PHP 7 billion a day in lost productivity.	water resources and pollution from untreated wastewater ⁴ and places a burden on hotels to provide water supplies via boreholes, desalination plants and other means, as well as for in-situ waste water treatment. A lack of available freshwater and waste water treatment can lead to the pollution of groundwater, local rivers, lakes, coral reefs and beaches, which has an impact on the natural environment that Philippine's tourism depends upon ⁵ . (also see waste hotspot)	wastewater management infrastructure in the Philippines. A lack of available waste water treatment can lead to the pollution of groundwater, local rivers, lakes, coral reefs and beaches, which has an impact on the natural environment that Philippine's tourism depends upon ⁶ . Leachate from unlicensed open landfills poses threats to groundwater, public health, local rivers, beaches, coral reefs and other ecosystems. Consumption of contaminated water is a real risk due to a lack of wastewater treatment for domestic, industrial, and chemical wastes. Periodic flooding as a result of accumulated solid waste in water / drainage systems also occurs.
4	Primary production of fish and seafood products: based on production data fish and seafood products used in hotels and restaurants are likely to represent a hotspot in	Processing and packing of fresh produce: energy use in the processing and packing of produce, energy use in product chill chain or for freezing of produce post-harvest.	Processing and manufacturing of food, livestock products and beverages the use of abstracted (blue) water in the Philippine's tourism sector water footprint	Waste and pollution from single use items: e.g. plastic packaging, water bottles, cups, drinking straws, etc. creating litter and marine pollution, damaging natural environments.

³ **Source:** Kritz, B. (2017, May 11). Public transportation is infrastructure, too. *The Manila Times*. Retrieved from <http://www.manilatimes.net/public-transportation-infrastructure/326609/>

⁴ For example: in the Philippines, 86% of piped water supply systems use groundwater as a source, but around 60% of groundwater extraction is without the water rights permits granted by the National Water resources Board (NWRB), resulting in indiscriminate withdrawal. And according to the Water Environment Partnership in Asia (WEPA), 58% of groundwater sampled is contaminated with coliform and needs treatment; and approximately 31% of illnesses monitored over a five-year period were caused by water-borne sources.

⁵ For example: according to Luzon and Licuanan (2017), only around 4% of coral reefs are still in a pristine condition, and are continuing to decline, with damage to this important ecosystem due to unsustainable land practices (including wastewater effluent run-off) and destructive fishing practices. The discharge of domestic and industrial wastewater and agricultural runoff has caused extensive pollution of the receiving water-bodies. This effluent is in the form of raw sewage, detergents, fertilizer, heavy metals, chemical products, oils, and even solid waste.

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	the tourism sector in the Philippines. NOTE: the Philippines has been a net exporter of wild caught fish since 2013 ⁷ .		is dominated by water use in processed foods in the supply chain (i.e. meat, dairy and other food products). Data from the hotels surveyed in the Philippines suggests that meat and dairy products have a significant contribution to the water associated with hotels.	NOTE: the rising consumer, NGO, media and government focus on the proliferation of plastic bottles, packaging and products in the environment, which has become a major pollutant and a cause of concern in both land-based and ocean environments.
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Those hotspots identified and quantified by WRAP were then validated at a workshop with tourism stakeholders in November 2017. At the same workshop, stakeholders were consulted to seek their views on the range of solutions and interventions that could be implemented to address key environmental hotspots, primarily in tourism business value chains. The hotspots identified will also be used to inform and prioritise the implementation of national-level solutions and interventions required to enable or support actions by private sector tourism companies and other key stakeholders. Those solutions and interventions suggested at the workshop were then supplemented through desktop research and further discussions with stakeholders to arrive at an agreed long list of potential solutions and interventions, which, in turn, were split out into solutions relevant to tourism business value chains and those requiring interventions at a national-level, either through the development of government policies and strategies or through improvements in national or regional infrastructure. This long list can be found in summary form at **Section** Error! Reference source not found. f this report and is presented in **Annex G** as a fuller list of actions and activities.

⁷ UN Environment 2017: <http://uneplive.unep.org/country/data/PH#charts>

To summarise, the long list covers the following range of solutions and interventions:

Business value chain solutions and interventions: have the potential to be implemented by individual tourism businesses and value chains or via collaborations between tourism businesses and/or the public sector. Some business value chain solutions would benefit from a supportive government policy and strategy framework, like the options for national-level solutions identified below.

- **Sustainable purchasing and value chain initiatives:** that enable multiple hotspots across all impact categories to be addressed, including sustainable procurement policies and practices; appointing a 'green procurement champion'; adopting voluntary sustainability standards for key raw materials (e.g. seafood, timber and paper, textiles); supplier accreditation, environmental KPIs and benchmarking and shared / consortia-based supplier platforms and databases to help identify reliable, high-performing suppliers; the use of product/package specifications (product life requirements for hotel furniture and electrical items) and healthy, sustainable menus (e.g. local, seasonal sourcing of food).
- **Improving operational practices:** including the provision of information to guests to help them make the right environmental choices when choosing or buying goods and services; adopting healthy, sustainable menus to reduce the environmental 'food print' of food served in destinations; measuring and monitoring food waste; reviewing food storage, preparation and cooking practices (e.g. portion control) and using data analytics to improve inventory management and demand forecasting to reduce food waste; donating uneaten food and establishing food recycling programmes to produce compost and renewable energy.
- **On-site energy management and efficiency:** making significant improvements in energy use by: developing an energy and GHG policy; conducting and acting on the findings of energy audits; specifying energy efficiency and GHG emission improvements in HVAC systems, hotel room energy management systems and electrical equipment (including laundries); and increasing the amount of in-situ renewable energy generation.
- **Sharing best practice and site visits:** the potential for hotels and restaurants to learn from each other's best practices and to learn from other's experiences of implementing solutions (e.g. food waste reduction, energy management, water efficiency).
- **Team training and cross-functional training:** training within and across teams to enable them to minimise their contribution to environmental hotspots and that equips them to help deliver a range of solutions and interventions – e.g. sustainable procurement approaches, monitoring and measuring resource use (food and beverages, water and energy) as well as eco-design tools and techniques for buildings and rooms.

National-level solutions and interventions:

National-level solutions that have been ranked and grouped based on their likely impact and require either actions led by government policy-makers and/or that call for public or public/private sector investment in national and local infrastructure to address identified hotspots. These national-level solutions should support private sector tourism actions to achieve a more sustainable value chain. They include:

- **Developing / adapting a National GHG / Energy Policy for the tourism sector:** policies on renewable energy and energy efficiency can provide essential context for business action.
- **Improving the production and conversion of energy:** build on existing renewable energy infrastructure projects to reduce dependency on imported fossil fuels for the generation of energy. The existing provision of government fiscal and non-fiscal incentives (e.g. a feed-in tariff to pay those generating renewable energy and duty-free importation of renewable energy equipment) should help to encourage tourism businesses to invest in renewable energy.
- **Mandatory and voluntary standards for efficient use of resources and energy in hotels and restaurants:** support the creation of mandatory standards for efficient use of resources and measurement of emissions in all hotels with more than 100 rooms. Voluntary for hotels with 50+ rooms. Also look at mandatory and voluntary standards for the use of solar hot water systems in hotels. The existence of the Philippines Green Building Code should facilitate this activity.
- **Policy support for healthy, sustainable food sourcing, purchasing and diets:** the development of dietary guidance that promotes and supports the use of healthy, low-carbon and resource efficient menus in hotels and restaurants to reduce the greenhouse gas emissions (GHG) resulting from sourcing, menu and consumption decisions. A healthy, low-carbon and resource efficient menu minimizes the emissions released from the production, packaging, processing, transport, preparation and waste of food. Major tenets of a healthy, low-carbon diet include eating less red meat and dairy products, eating less industrially produced food in general, eating food grown locally and seasonally, eating less processed and packaged foods and portioning of meals accordingly to the nutritional needs of visitors. Research and experience elsewhere e.g. the revised Live Well Plate ('Eating for 2 Degrees')⁸ shows that it is possible to achieve a 30% reduction in greenhouse gas emissions by 2030 based on sourcing and eating this way.
- **National food waste strategy:** develop a national food waste strategy in line with UN SDG target 12.3 to halve food loss and waste by 2030, with specific components and targets for the tourism sector, including food waste reduction targets, incentives to redistribute surplus food to charitable organisations and the provision of food waste recycling infrastructure to enable the production of renewable energy from biogas and compost for use in agriculture. Implementation of the strategy could include a voluntary agreement with the tourism sector; a consumer/tourist focused behaviour change campaign in collaboration with tourism operators, hotels and restaurants; and a national food waste quantification and best practice platform.
- **Enhance legislation and regulation on drinking water quality and wastewater treatment to improve infrastructure, water security and protect tourism biodiversity resources:** the role of legislation in ensuring drinking water quality, the development of a freshwater distribution system and the appropriate collection and treatment of wastewater to improve water security in the tourism sector and protect the natural environment on which the tourism sector depends.
- **Development or review of the National Tourism Development Plan (2016-2020):** originally established under the Tourism Act of 2009 (RA9593), envisions a tourism

⁸ For more information please see: https://www.wwf.org.uk/sites/default/files/2017-09/WWF_Livewell_Plates_Full_Report_Sept2017_Web.pdf

industry that is globally competitive, environmentally sustainable, socially responsible and culturally rich, thereby promoting inclusive growth in tourism businesses. The Plan seeks to ensure the integration of climate mitigation and adaptation and resource efficiency aspects into the tourism sector, focusing in particular on accommodation, power, food and beverage, transport, water and waste sectors. This includes adopting measures to enhance environmental preservation and climate change mitigation and adaptation by:

- Promoting green technologies and innovative conservation measures in the development of tourist sites and facilities by acknowledging such in accreditation processes;
- Actively participating in the ASEAN initiatives for the preparation of a manual of guidelines for incorporating environmental preservation and climate change mitigation, adaptation and resilience in the tourism sector;
- Developing two modules namely: (1) the framework, approaches, parameters and measures for Climate Change and Tourism in the ASEAN, which will provide directions to manage climate-related issues in the ASEAN; and (2) the ASEAN Sustainable and Inclusive Tourism Assessment Tool (ASITAT), which is an evaluation mechanism to measure destination sustainability has been spearheaded by the Philippines;
- Working with the Department of Tourism (DOT) to draft a Philippine Sustainable Tourism Guidebook, using ASITAT as the baseline for evaluating sustainable tourism destinations. The DOT has tested some 16 local tourism destinations in the first semester of 2018.

This type of review would define the vision of the tourism sector by 2030 (or beyond) and would identify objectives in line with the sustainable development objectives of the country, integrating mitigation, adaptation and resource efficiency concerns. This strategy would also identify and describe key measures that would be taken in order to achieve the objectives. A medium-term plan or strategy would help to provide a framework for the sustainable development of the sector and to address several the environmental hotspots identified in this report.

The summary long list of potential solutions with an accompanying narrative and a table on how these solutions help to address the hotspots identified for the tourism sector in the Philippines can be found in **Section** Error! Reference source not found. of this report. full list of business value chain and national-level solutions captured during the November 2017 country workshop can be found in **Annex G** of this report.

1. Introduction

1.1. Background

The project "transforming tourism value chains in developing countries and Small Island Developing States (SIDS) to accelerate more resilient, resource efficient, low carbon development" has been developed in the framework of the International Climate Initiative financed by the German Federal Ministry for the Environment, Nature conservation, Building and Nuclear Safety. The project proposes to transform tourism activities along three key tourism value chains (accommodation, food & beverage, meetings/incentives/conferences/events – MICE) in participating countries (the Philippines, the Dominican Republic, St. Lucia and Mauritius), so as to reduce carbon emissions and improve resource efficiency by implementing low carbon development actions integrated with sustainable consumption and production patterns. This four-year project has two phases: an assessment phase (2017/2018) and an Implementation phase (2019/2020). The goals of the assessment phase are to define tourism value chains with high resource use and to identify and assess key environmental indicators for greenhouse gas (GHG) emission and resource consumption impacts (presented as 'hotspots') within these chains.

1.2. Purpose

This document is a project report for the Philippines, with separate reports focusing on the Dominican Republic, Mauritius and Saint Lucia. Its purpose is to support decision making of key stakeholders within the Transforming Tourism Value Chain's project so as to prioritise feasible solutions to reduce GHG emissions and improve resource efficiency (RE) in the target value chains during the project's implementation phase and beyond the project timeline in the Philippines. The Document may also be useful for other tourism stakeholders, e.g. destination management and civil society organizations, policy makers and other public-sector bodies that design, develop, regulate or manage tourism destinations. This document will also provide the context to involve businesses and other private sector actors in the development of policy recommendations and definition of action plan priorities.

It has been produced by WRAP, with information collated by local partners PCEPSDI (Philippine Center for Environmental Protection and Sustainable Development), and with the support of both UN Environment and DTU. The report assesses the hotel and MICE value chains and their impacts at the national level (based on published data). The report also includes an assessment at hotel level to provide background information on GHG emissions levels and resource efficiency in the Philippines tourism sector. The findings of this report (hotspots) have been discussed during a workshop held in November 2017. Based on the recommendations of this meeting, a long list of potential mitigation solutions have been produced and will evolve to a short list of solutions and intervention through a consultation process with industry and experts to define priority areas for action and implementation. Supplementary information and data are contained in the following Annexes:

- A. Philippine Tourism Context Report (PCEPSDI)
- B. Hotel and MICE Survey Report (PCEPSDI)
- C. Proceedings Report - Workshop 2 (PCEPSDI)
- D. Survey of the tourism value chain (WRAP)

- E. Policy analysis on national situation with regards to climate change and low carbon development in the Philippines (UDP)
- F. Summary table of environmental impact hotspots for the Philippine's tourism sector organised by impact category and lifecycle stage
- G. Long list of business value chain and national-level solutions and interventions captured during November 2017 country workshops.

1.3. Scope of the Report

The scope of the report assesses the hotel value chain, including accommodation, food and beverage value chain aspects and finally MICE (meetings, incentives, conventions and exhibitions). The MICE segment is especially important with the array of annual festivals, trade fairs, exhibitions and concerts in cities, regions and provinces consuming large amounts of food & beverages, and potentially generating waste and carbon emissions. The value chain approach to tourism covers all stakeholders involved in delivering a tourism experience in the accommodation service (dinning, recreation, leisure, shopping, etc). The analysis covers all goods and services in the respective value chains and the life cycle impacts created by the international and in-country manufacture, storage, distribution, consumption and disposal of these goods and services. Therefore, tourist travel into the country is excluded, but impacts embedded in imported goods and services are included. This enables a strategic way of identifying and prioritizing critical issues along the value chain; and facilitates the development of targeted solutions and interventions in order to achieve maximum impact.

The first section of the report (National Context) is an introduction to the Philippines and the two geographical focus areas of the project, to understand the context and scale of the tourism industry.

The remainder of the report focuses on the activities related to the first assessment phase of the project. Firstly, the outcome of the value chain mapping is described, in addition to the agreed boundaries of the project and the selected sustainability indicators used. It then details the rationale, methodology and outcome of the national level data and local level hotel assessments conducted over five months during 2017. The local assessments serve to understand the structure of the tourism value chain at the company (e.g. hotel) level, such as different types of accommodation, their activities and impact. The report then highlights the quantitative energy and consumables data that was evaluated using models available to WRAP. This is to provide an initial assessment of the GHG impacts, and range in the impacts, at the company-level. Leading from the national assessment and the pilot activity, a successful workshop was held in November 2017 to validate the identified hotspots, to develop the long-list of solutions and to provide inputs for further prioritization (please see **Annex C** for more detail). The quantitative data collected in 2017, supplemented with the qualitative information gained during the workshop, has been detailed in this report. The result is the hotspots identified and the associated long list of potential mitigation options.

For the Philippines, the project is focused on both value chain actions and government policy and strategy recommendations to build capacity to develop a low carbon and resource efficient tourism sector. As such, the long list of solutions and interventions found later in this report includes solutions that can be implemented in tourism value chains, via collaborations between different tourism businesses and through national-level policy and strategy interventions. This information is drawn from desktop research by WRAP, policy analysis by

UDP (see **Annex E**) and information included in the country context report provided by the in-country partner, the Philippine Center for Environmental Protection and Sustainable Development Inc. (PCEPSDI) (see **Annex A**).

2. National Context

2.1. Overview of the Tourism Sector

The current and forecast levels of travel and tourism in the Philippines have considerable environmental and social impacts. The transforming value chains project seeks to prioritise the activities which contribute the most to the selected environmental impacts. These activities will be addressed in order to reduce GHG emissions and improve resource efficiency in key tourism sector value chains with high resource use.

This section of the report provides a brief overview of the Tourism Sector in the Philippines, to contextualise the scale and characteristics of the tourism industry. It is presented as a summary of a detailed report provide by the in-country partner, the Philippine Center for Environmental Protection and Sustainable Development Inc. (PCEPSDI). For the full report please refer to **Annex A**. The overview will cover geographical information and the economic and employment contribution of tourism to the national economy. This is followed by a summary of visitor arrivals, information on the typical visitor stay and expenditure, an overview of the accommodation sector, and any accreditation or certification schemes present in the Philippines.

2.2. Geography of the Philippines and the Tourism Sector Overview

Officially known as the Republic of the Philippines, the Philippines is an island country of approximately 7,641 islands in the western Pacific covering 116,518 square miles. The Philippines is a sovereign state in South East Asia. As of the 1st of August 2015, the population of the Philippines was approximately 101 million⁹ according to the 2015 Census. The Philippines are geographically divided into three (3) main island groups: Luzon, Visayas, Mindanao in the Northern, Central, and Southern Philippines respectively. The national capital, City of Manila is in Luzon and is part of the greater Metropolitan Manila (Metro Manila), officially known as the National Capital Region (NCR). Metro Manila, is composed of sixteen (16) cities and one (1) municipality, each with their own local government units. Other well-known cities, Cebu City and Iloilo City are two of the major cities in Visayas, and Davao in Mindanao. The two areas selected as the focus of this project are Metro Manila and Iloilo. The former was selected because it is the central hub of businesses activity in the country, as its National Capital Region. Iloilo City, however is one of the emerging destinations for businesses and events. Further detail on both these locations can be found within the detailed report in **Annex B**, however, both locations have been summarised below for the purposes of this report.

Metro Manila is the most densely populated region with an accumulation of 16 cities and one (1) municipality. Metro Manila is the flagship tourism cluster and gateway with its concentration of large hotels and MICE (meeting, incentives, conferences and events)

⁹ <http://psa.gov.ph/population-and-housing>

facilities. It is the centre of culture, politics and economy of the Philippines. In Southeast Asia, it is considered as one of the more modern metropolises.¹⁰

The Philippines has been under the region's economic spotlight recently as it has been gaining significant growth in commercial activities which spur the demand for business class accommodation and MICE facilities in Metro Manila, which contributes more than 33% of the country's GDP (Bondoc, 2016)¹¹. In the past 2 years, Metro Manila has been the host of successful major international events such as the Asia-Pacific Economic Cooperation (APEC) Summit, Association of Southeast Asian Nations (ASEAN) Tourism Forum, 6th World Tourism Organization (UNWTO) International Conference on Statistics, Routes Asia, and Miss Universe. It is inevitable that the overall MICE sector should benefit from the overflow of success and media attention it received. This should affirm the Philippines' viability as a key MICE destination in the region. Metro Manila's occupancy increased from 69% in the first half of 2016 to 71% by end of 2016. This can be seen in the rise in international visitor arrivals and related earnings, with Php 227.6 billion earned in 2015 and Php 230 Billion earned in 2016¹².

By 2018, the total count of hotel rooms in Metro Manila is expected to reach 31,285, of which the hotels participating in the project account for 21.39% of those rooms. This significant contribution is mainly because of Okada Manila's 6,253 rooms. According to the director of research and advisory of Colliers Philippines, the growth of room inventory is because of developments in casino-related projects¹³.

Iloilo City is a fast-rising tourism cluster with newly developed hotels and MICE facilities. It is known for the famed Dinagyang Festival, (which is attended by more than 1 million tourists), Iloilo cuisine, warm hospitality, and heritage structures. It is becoming a preferred destination for leisure and business; and is unfolding into a developing metropolis. This is evident from the three-fold increase in tourist numbers in the city and province. A growing part of the tourism industry is the MICE sector. A prime reason of this, is the development of Megaworld in the Iloilo Business Park, where the Iloilo Convention Center is situated. Surrounding it are lifestyle shops, dining outlets, star-rated hotels, and mixed-use buildings to cater to a growing urban hub.

MICE is a growing industry in Iloilo City. With the completion of the Iloilo Convention Center in 2015, Iloilo has been hosting various national and international MICE events. Notably two of these are the APEC Ministerial and Senior Officials Meeting in 2015 and recently the ASEAN Ministerial Meetings. Aside from Iloilo Convention Center, other MICE venues for large capacity events (500-1500 people) are the newly opened Grand Xing Imperial Hotel, The Grand Hotel, The Mansion and Punta Villa Resort. The hosting of the APEC Meetings also positioned Iloilo as a major MICE destination, showcasing Iloilo's capacity and readiness to host an international activity. MICE is also a big contributor to the local tourism industry. The increase in the tourist arrivals of Iloilo City in the past two years is largely attributed to the

¹⁰ <http://www.visitmyphilippines.com/>

¹¹ "Philippine GDP and property on upward trajectory." Colliers International, 17 Nov. 2016, www.colliers.com//media/files/marketresearch/apac/philippines/2016/philippine%20gdp%20and%20property%20on%20upward%20trajectory.pdf?la=en-gb

¹² "Philippine tourist arrivals to grow 10% to 6.6 million." | Philippines | Colliers International, 10 Apr. 2017, www.colliers.com/en-gb/philippines/about/media/collierspr-phtourism-apr102017.

¹³ Dumlao-Abadilla, Doris. "Hotel room inventory seen to surge." Inquirer Business Hotel room inventory seen to surge Comments, 15 Feb. 2016, www.business.inquirer.net/207108/hotel-room-inventory-seen-surge

MICE activities. The peak months during the last four months of the year in 2015 and 2016 are also the peak of MICE activities. Many national and regional conventions are held during these months.

Iloilo City has 40 hotels with 2,722 rooms, 12 Pension Houses with 275 rooms, 9 Tourist Inns with 170 rooms and 3 Resorts with 212 rooms. The total accommodation capacity is 3,379 rooms. The occupancy rates for accommodation establishments is at 50-60%. For hotels, the week day average occupancy rate is at 60-80% which is higher than the weekend occupancy rate of 35-50%. The hotel industry will continue to grow alongside the growing tourism sector and wider economy of Iloilo City. Several hotels are set to open for 2018, including the Courtyard by Marriott with 200 rooms and Gold Berry Lite Hotel with 100 rooms. Hotels under construction are Park Inn by Radisson, Zuri Hotel Suites and Soto Grande Iloilo. Planned hotels are DusitThani and Big Hotel.

The overall economy in the Philippines has been growing between 2011 and 2016. As measured by the share of tourism direct gross value added (TDGVA) to total gross domestic product (GDP), the contribution of tourism to the economy was estimated at 8.6 percent in 2016. The TDGVA amounted to PhP 1,243.5 billion in 2016, 13.7 percent higher compared to the previous year's PhP 1,093.4 billion.¹⁴ The World Travel and Tourism Council (WTTC) estimates that the entire Philippines tourism industry comprised 19.7% of the country's GDP. The direct contribution to GDP of hotels, travel agents, airlines, and other passenger transportation services and restaurant and leisure industries supported by tourists was equivalent to 8.2 percent of the country's GDP in 2016.¹⁵ In 2015 the Philippine Statistics Authority reported that there was a total of 27,028 establishments engaged in accommodation and food service activities of which 2,276 were hotels and motels.¹⁶ Tourism's contribution to the economy is expected to increase by 7.8 percent in 2017, and could advance by 5.3 percent annually (equivalent to 20.7 percent of GDP in 2027). The expenditure of international tourists (i.e. visitor exports), is considered by the WTTC as the key component of the direct contribution of tourism.¹⁷

According to PSA (2017), during 2016 employment in tourism accounted for 12.8 percent (5.2 million) of total employment within the country, which is 5.1 percent higher than in 2015. Data from the WTTC showed that the Philippine tourism sector directly supported 2.22 million jobs or 5.5 percent of total employment in 2016.¹⁸ Employment in the sector is expected to increase by 5.3 percent in 2017 and further grow by 2.4 percent annually to 2.96 million jobs by 2027. The tourism sector in the Philippines is growing, with a wide range of tourism operators. Tourism plays a significant role in the employment within the Philippines. This highlights the importance of solutions to mitigate any negative environmental impact caused by tourism.

¹⁴ <http://www.psa.gov.ph/content/contribution-tourism-economy-86-percent-2016>

¹⁵ Nicolas, B.D. (2017, March 22). Travel, tourism sector adds P2.85T to PH GDP. *Inquirer.net*. Retrieved from <http://business.inquirer.net/226547/travel-tourism-sector-adds-p2-85t-ph-gdp>

¹⁶ <http://psa.gov.ph/content/2015-annual-survey-philippine-business-and-industry-asphi-accommodation-and-food-service>

¹⁷ WTTC Economic Impact 2017

¹⁸ This figure captures employment in hotels, travels, travel agencies, airlines, and other passenger transport services and restaurant and leisure activities dealing with tourists.

Recent data from Department of Tourism (DOT) shows that for the period January to December 2017, visitor arrivals reached a total of 6.6 million with peak periods being in January and February (631,639 and 579,178 visitor arrivals respectively), March (574,065 visitor arrivals) and December (613,372 visitor arrivals). The arrivals were 11 percent higher compared to those for 2016, when a visitor count of 5.96 million was recorded. The National Tourism Development Plan (2016-2022) has projected a total of 12 million international visitor arrivals by 2022. **Tables 2-7** summarise this data below.

Table 2: Data highlighting the geographical spread of visitors travelling to the Philippines from the period 2016-2017:¹⁹

	January - December 2017	January - December 2016	% Growth Rate
East Asia	3,517,471	3,040,860	15.67
ASEAN	488,346	461,698	5.77
South Asia	129,507	111,167	16.50
North America	1,164,197	1,048,018	11.09
South America	12,283	9,172	33.92
Middle East	89,932	91,501	-1.71
Western Europe	244,172	231,804	5.34
Northern Europe	275,755	261,891	5.29
Southern Europe	74,745	63,524	17.66
Eastern Europe	54,873	47,445	15.66
Eastern Mediterranean Europe	25,854	24,609	5.06
Australasia/Pacific	333,179	321,061	3.77
Africa	8,029	6,606	21.54

Table 3: Mode of Travel of Visitors to the Philippines²⁰

Mode of Travel	2017	2016
Air	6,506,471	5,894,634
Sea	114,437	72,371

Table 4: Average Length of Stay (days)²¹

2017	2016
9.35	9.29

¹⁹ January – December 2017 Department of Tourism Visitor Arrivals to the Philippines by Country of Residence

²⁰ Department of Tourism. Profile of Visitors to the Philippines from Selected Markets. 2016-2017.

²¹ Ibid.

Table 5: Type of Accommodation of Visitors to the Philippines²²

Type of accommodation	2017	2016
Hotel	50.90%	57.60%
Resort	23.10%	16.70%
Pension/Inn/Lodge	4.30%	4.20%
Hostel/Dormitory	7.50%	5.80%
Apartelle/Rented Home/Apartment	2.60%	2.40%
Home of Relatives/Friends	18.20%	22.30%
Others	3.90%	3.70%

Table 6: Purpose of Visit ²³

	2017	2016
Holiday	59.19%	57.89%
Business	5.85%	6.84%
Official	0.34%	0.34%
Convention	0.99%	1.07%
Visit Friends/Relatives	7.96%	8.71%
Incentive	0.02%	0.01%
Health/Medical Reason	0.22%	0.24%
Educational Studies	0.98%	1.11%
Others	4.05%	3.88%
Not Stated	20.40%	19.91%

Table 7: Visitor average daily expenditure in the Philippines for 2016 and 2017 are as follows:²⁴

	2016	2017
Average Daily Expenditure (in USD)	100.23	125.65
• Accommodation	31.36	33.75
• Food/Beverage	28.33	38.21
• Guided Tour	0.93	0.48
• Entertainment and Recreation	15.38	20.97
• Local Transport	8.00	9.10
• Shopping	14.91	20.90
• Visits to Cultural/Historical Sites, Museums, National Parks and Other Sites	0.05	0.04
• Miscellaneous	1.28	2.21

²² Ibid.²³ Ibid.²⁴ Ibid.

2.3. Resource Efficiency

In terms of energy consumption, the Philippine Statistical Authority's (PSAs) Household Energy Consumption Survey (HECS)²⁵, shows electricity is the most common source of energy, used by 87% of households in the country. Geothermal energy, a product of volcanic activity in the country, has been harnessed successfully, with 18% of the country's electricity needs being met by geothermal power. Other sources used by a significant proportion of households include crude petroleum and coal.

In the hospitality industry, hotels largest use of energy is electricity. Hotels use over 60 % of the energy, either via direct combustion of fuels or electricity ([Figure 7](#)). Given the rising demands on energy consumption as a result of increases in population and increased economic activity the country's renewable energy resources are central to the country's future sustainable energy agenda.

A growing domestic population and increasing tourism numbers are also putting pressure on water resources, waste water treatment and solid waste infrastructure. The country's main sources of water are rivers, lakes, river basins, and groundwater reservoirs.

In addition to the growing demands on energy and water resources, there is also the issue of improper waste disposal, which is a one of the largest environmental problems faced by the Philippines. Mismanagement of waste and a lack of properly regulated waste disposal sites is having a serious effect on ground and surface water, causing land contamination, flooding, air pollution, and water pollution, among others. Consumption of contaminated water is a real risk due to a lack of wastewater treatment for domestic, industrial, and chemical wastes. The Clean Water Act of 2004 served as a response to protect the country's bodies of water from land-based sources of pollution. The Act provides a comprehensive and integrated strategy to prevent and minimize pollution through a multi-stakeholder approach.

2.4. Voluntary Standards and Certification

Accommodation enterprises in the Philippines such as hotels, resorts, apartment hotels, Mabuhay Accommodation (Tourist Inns, Pension Houses, Motels, Hostels, Vacation Homes, Bed and Breakfast), homestays and other types of accommodation undergo an accreditation process conducted by the Department of Tourism (DOT).

Accreditation is based on a certification issued by the Department to a tourism enterprise that officially recognizes it as having complied with the minimum standards for the operation of tourism facilities and services. It assures quality tourism facilities and services, which gives tourists a safe, convenient and enjoyable stay and travel in the country.

Starting on 1 June 2018, the Department's accreditation of primary tourism enterprises, which includes hotels and other accommodation types is based on the Progressive Accreditation System, a three-level recognition scheme of the Department for Primary Tourism Enterprises prescribing not only the minimum standards for Basic Registration and Regular Accreditation, but also reflecting customers' expectations for the Premium or Star-Rating Accreditation. Under this new scheme, hotels, resorts or apartment hotels may opt to

²⁵ <https://psa.gov.ph/hecs>

be accredited as Regular Accredited Hotel or a Star-Rated Hotel. Star-rated Hotels are assessed based on the seven dimensions of the National Accommodation Standards:

- (1) Arrival and Departure;
- (2) Public Areas;
- (3) Bedrooms;
- (4) Bathrooms;
- (5) Food and Beverage;
- (6) Amenities and Services; and
- (7) Business Practices.

The National Accommodation Standards also classify hotels, resorts and apartment hotels from 1 star up to 5 stars. The accumulation of points is based on the availability, condition and quality of facilities and services as reflected in the seven dimensions and compliance with the mandatory and minimum requirements of every star classification.

In addition to the above accreditation scheme, there is also the ASEAN Green Hotel Standards²⁶. The ASEAN Green Hotel Award is an accolade ceremony held by the ASEAN Member States, including the Philippines, in recognition of hotel industry players whose operations are based on the achievement of sustainable tourism through environmentally-friendly principles, resource consumption reduction and local community involvement. To qualify for the award, aspiring accommodation enterprises need to meet the following major criteria and requirements of the ASEAN Green Hotel Standards:

- i. Environmental Policy and action for hotel operation;
- ii. Use of green products;
- iii. Collaboration with the community and local organization;
- iv. Human resource development;
- v. Solid waste management;
- vi. Energy efficiency;
- vii. Water efficiency;
- viii. Air quality management (indoor & outdoor);
- ix. Noise pollution control;
- x. Wastewater treatment and management; and
- xi. Toxic and chemical substance disposal management.

There is a further environmental certification scheme issued for tourism businesses, or businesses in general, named the Environmental Compliance Certificate (ECC). This is a requirement for businesses that may pose a direct impact to the environment. The award of the ECC, which issued by the DENR-EMB (Environmental Management Bureau), is based on the environmental impact assessment of the business²⁷.

On 31 January 2018, the ANAHAW-Philippine Sustainable Tourism Certification, developed by the Zero Carbon Resorts (ZCR) Project, launched a new national certification scheme that supports hotels and resorts who adopt practices and techniques that save energy, water, fuel

²⁶ <http://www.asean.org/wp-content/uploads/2012/05/ASEAN-Green-Hotel-Standard.pdf>

²⁷ Environmental Management Bureau. "Revised Procedural Manual for DENR Administrative Order No. 30 Series of 2003." Republic of the Philippines Department of Environment and Natural Resources - Environmental Management Bureau, 21 Aug. 2007, www.eia.emb.gov.ph/wp-content/uploads/2016/06/Revised-Procedural-Manual-DAO-03-30.pdf

and other resources; and that reduce waste and carbon emissions as a means to improving operational efficiency and profitability^{28,29}. The first tranche of applications for this new scheme closed at the end of March 2018 and the first round of certifications are currently underway.

Other local certifications exist which may be applicable to the tourism sector. These include:

- i. The National Ecolabelling Programme: Green Choice Philippines. A Type 1 environmental declaration for products and services based on ISO 14024.
- ii. The BERDE Rating System by the Philippine Green Building Council. A voluntary green building rating system established by the Philippine Green Building Council.
- iii. Businesses also opt to consider being certified under ISO Certifications such as for ISO9001 and ISO 14001.

The certification schemes described, highlight the commitment at a national level to advance environmentally sustainable practices within the tourism industry. However, it is observed that there are fewer international environmental standards being promoted in the Philippines, which creates a substantial opportunity through this project to deliver more support at a hotel level through training and capacity building strategies.

2.5. Climate change- policy summary

Through the years, tourism stakeholders ranging from government agencies, private sectors, and non-governmental organizations have undertaken several initiatives to sustain the growth and development of the industry. The passing of RA 9593, also known as the Tourism Act of 2009, officially recognizes the vital role of tourism as an "indispensable element of the national economy and an industry of national interest and importance, which must be harnessed as an engine of socio-economic growth and cultural affirmation to generate investment, foreign exchange and employment, and to continue to mould an enhanced sense of national pride for all Filipinos."³⁰ More information on the Act is provided in the country context report (**Annex A**). RA9593 designated the role of the Department of Tourism as the "primary planning, programming, coordinating, implementing and regulatory government agency in the development and promotion of the tourism industry both domestic and international, in coordination with attached agencies and other government instrumentalities." Along with this growth, it is vital that there is a more co-ordinated, integrated approach within the sector to limit climate risks and promote resource efficiency, in line with the objectives of this project.

It has been detailed in DTU's policy analysis that the Philippines includes climate change adaptation in the core of its national strategies and plans. The Medium-Term Philippine Development Plan (MTPDP), which is the central document describing the country's vision and plan for sustainable growth, is built around the need for adaptation measures to reduce vulnerability to climate change. In most of these national strategies and plans, tourism is seen as a key sector of the economy, vulnerable to climate change risk and dependent on the need for robust climate change adaptation measures. To put this into context, according to the

²⁸ For more information please see: <http://zerocarbonresorts.eu/zcr-dot-launch-anahaw-certification-innovation-environment-value/> and <http://zerocarbonresorts.eu/anahaw-philippine-sustainable-tourism-certification/>

²⁹ To date the Zero Carbon Resorts Project has saved its tourism members PHP432 million each year.

³⁰ <http://www.tourism.gov.ph/Downloadable%20Files/RA%209593.pdf>

Global Environmental Risk Index, developed by GermanWatch (2016), the Philippines ranks number 5 in a list of countries most affected by climate change (extreme weather events) between 1996 and 2015.

Climate change mitigation is also addressed in some national documents like the National Climate Change Action Plan (NCCAP), which references the importance of energy efficiency and renewable energy. In addition, most recently, sectoral regulatory documents such as the Green Building Code have been developed that integrate climate change mitigation measures in the built environment. For further detail on the national climate change policy context for the Philippines, please refer to **Annex E**.

A key observation made in DTU's report is that the link between tourism and the need for climate mitigation is rarely explicitly mentioned; although national strategies and plans state that it is necessary to support the private sector as a whole in addressing climate change mitigation objectives through policy and incentives mechanisms. Only the Green Building Code, which covers hotels and resorts, makes a clear link between mitigation and tourism from a regulatory point of view.

Overall, there is a strong emphasis in national policy and strategy documents of the need to create a strong policy environment to support private sector climate actions. UDP's report highlights that this provides a good opportunity for tourism and MICE businesses to implement solutions.

3. General methodology on mapping the tourism value chain, hotspot analysis, data collection and processing

3.1. Concepts and definitions

This project and report have followed the 2017 Life Cycle Initiative overarching methodological framework for hotspots analysis³¹. This allows for the rapid assimilation and analysis of a range of information sources, including life cycle based and market information, scientific research, expert opinion and stakeholder concerns. The outputs from this analysis can then be used to identify potential solutions and prioritize actions around the most significant governance, economic, environmental and/or social sustainability impacts or benefits associated with a specific country, city, industry sector, lifestyle, product portfolio, product category or individual product or service.

The Life Cycle Initiative (2017) identifies that hotspots may be defined in two ways. Firstly, a hotspot may be a life cycle stage (such as material sourcing, processing, manufacturing, transport, retail, use and disposal) whose contribution to the impact category (such as global warming potential) is greater than even distribution of that impact across the life cycle stages. For example, if five life cycle stages are defined, a hotspot should be at least 20% of the impact category. Secondly, hotspots may be all life cycle stages collectively contributing more than 50% to any impact category, ensuring that most of the impact is considered. In this project, the second approach is taken to ensure that the impact of data uncertainty on addressing hotspots is minimised.

³¹ <http://www.lifecycleinitiative.org/new-hotspots-analysis-methodological-framework-and-guidance/>

Hotspots analysis comprises 8 stages, as illustrated in **Figure 1** below.

Figure 1: 8 Stages of Hotspots Analysis



The goal and scope, including the indicators to be assessed, are established in the introductory section of this report. The remainder of this report goes through to step 7 of the hotspots analysis framework. Step 8 of the framework was undertaken during a workshop in the Dominican Republic in May 2018.

The project has adopted the definition of a value chain contained in the second committee draft of ISO14001: “the entire sequence of activities or parties that provide or receive value in the form of products or services (e.g. suppliers, outsources workers, contractors, investors, R&D, customers, consumers, members)”³². **Figure 2** below further illustrates this definition noting how there are stakeholders that are not necessarily part of the supply chain, but that perceive social, economic and environmental value and impacts from the series of activities required to deliver a product or service.

Mapping and managing the tourism value chain is all about extending line of sight and influence beyond the traditional areas of focus and looking to limit risk, add value and address identified environmental impact hotspots at each value chain stage. It looks both upstream to the suppliers and materials, and downstream to the customers and reuse/disposal, to identify key risks and opportunities for business.

³² ISO14001 CD2, 2013, in UNEP and DTU (2017) Eco-Innovation Manual <http://unep.ecoinnovation.org/>



Figure 2: The difference between supply chain and value chain

Clear boundaries are essential to ensure that appropriate information is obtained and used within the hotspot's analysis. Whereas a supply chain includes the activities of all parties involved in fulfilling a customer request, such as a product or service, a value chain also includes the customer themselves and the impact of subsequent waste and emissions.

3.2. Value Chain Mapping

A value chain approach is based on a comprehensive look at the entire commodity chain, from all involved producers to end market consumers to end of life management. Inherent to the value chain approach is acknowledging that there are other stakeholders in the chain and that they are interrelated.

A value chain approach will provide the 'big picture' that should guide the activities to be taken within the value chain based on the identification of hotspots, threats, and opportunities. It will help decide where partnerships need to be established, what type of collaboration is required from stakeholders, identify clients to target with services, or what changes are required to meet clients' expectations.

A site or organisational-based approach to tourism environmental impacts considers the impacts that occur at a specific location or as part of a specific activity, such as operating a hotel or providing an excursion. A value chain approach also considers the control and influence a tourism organisation has through the goods and services they procure, and the waste and emissions that arise as a result of their activities and those of their suppliers. The objective of this project, is to influence best practice and decision-making in businesses across the tourism value chain. This includes the direct and indirect relationships that a tourism business has with its suppliers and with consumers (tourists); and to some degree how it interacts with other key stakeholders, like government ministries and agencies or investors. The scope of tourism value chains are the goods and services provided to tourists, the resources consumed in providing those services through the supply chain and key solution

providers (this includes the national and local institutions which support tourism development).

Within this project, the value chain mapping has been developed in consultation with key local partners and stakeholders. This development comprised an analysis of the structure and description of the key components of the tourism value chain, based mainly on national statistics for the country, and primary data collection. A desk-based analysis of the sector and policy environment were also undertaken to identify key actors to attend the workshop to support amending and improving the value chain maps. In the first workshop held in 2017, WRAP held interactive sessions to gain key insights from stakeholders in the tourism value chain in Dominican Republic. WRAP supported stakeholders in identifying key areas creating environmental hotspots in the tourism sector and in understanding the causes of the hotspots identified. The second workshop in Dominican Republic held in November 2017, built on the interactive sessions in the first workshop to further map out key value chains. The value chains under consideration in the workshop were those with the highest contributions to greenhouse gas impacts, water and energy consumption (including on-site waste). This built on workshop 1 which focused on greenhouse gas emissions. Ten specific value chain maps were provided to stakeholders (for example, electricity and gas, meat products). Then, delegates were encouraged to review the value chains and hotspots identified within these chains. Further information gathered in these workshops is detailed throughout the remainder of the value chain and hotspots analysis.

The value chain map for tourism and MICE in the Philippines is shown in [Figure 4: Value chain map for hotels and MICE in the Philippines](#). Adapted by UN Environment from ITC WTO (2015) below. This identifies the activities and actors involved in the provision of tourism goods and services, all of which are within the scope of the project. The maps also acknowledge the upstream activities in the value chain, such as raw material extraction or production, resource use, product (or service) design, manufacturing and distribution, the use of goods and materials; and the downstream environmental impacts of the tourism sector, including the need for waste management and water treatment.

[Figure 5](#) below, then highlights the expenditure by hotels and restaurants in the Philippines tourism sector, quantified where information is available. A more detailed discussion on value chain expenditure in relation to identified hotspots is included in the sections summarising the results of the top-down analysis of hotspots and on data limitations of the approach below.

Whilst, [Figure 6](#) below highlights the value chain actors most able to control or influence the hotspots that have been identified for the Philippines tourism sector.

It is worth noting that in 2014, food and beverage service activities earned 39.4% of the gross total revenue generated by tourist establishments. The majority of food sources/suppliers in Iloilo City are local. Iloilo is part of Region 6, which is composed of six (6) provinces and has a total land area of 20,223.2 sq kms (6.74% of total land area of the Philippines). Its total Agricultural area is 666,917 hectares which is mainly why food is purchased and consumed locally and shared amongst nearby provinces. However, Manila is part of the National Capital

Region (also known as Metro Manila) and hardly has any agricultural land. The main sources of food for Manila are brought in from far provinces in Luzon and sold by national wholesalers.

Figure 3 below shows the proportion of income to a sector from hotels. Hotels account for less than 2% of income to other sectors of the Philippines economy, with non-clothing garments representing the sector with the highest proportionate income from hotels. This suggests that the sector is a relatively insignificant customer in these sectors and may therefore have a weak degree of potential influence on practices which relate to hotspots through collective activity.

Figure 3: proportion of income to a sector from hotels (Source: Lenzen et al 2013)

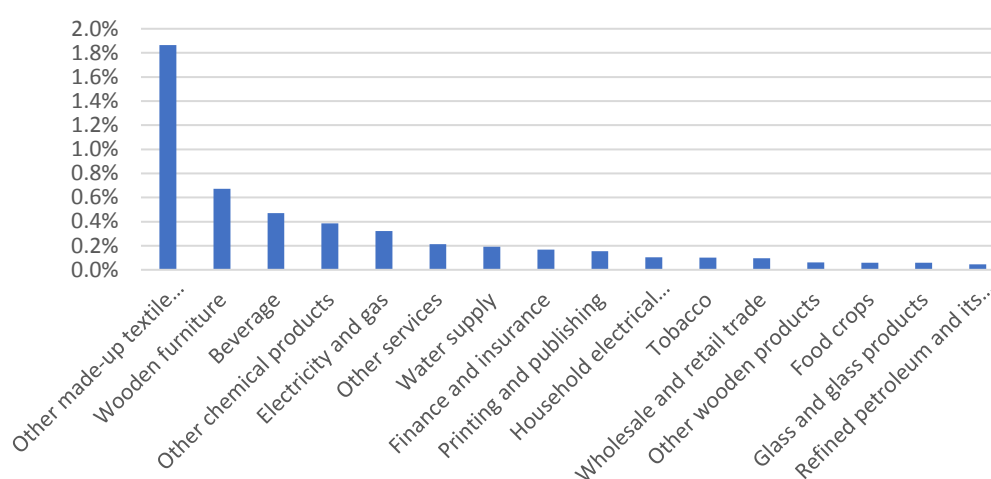


Figure 4: Value chain map for hotels and MICE in the Philippines. Adapted by UN Environment from ITC WTO (2015)

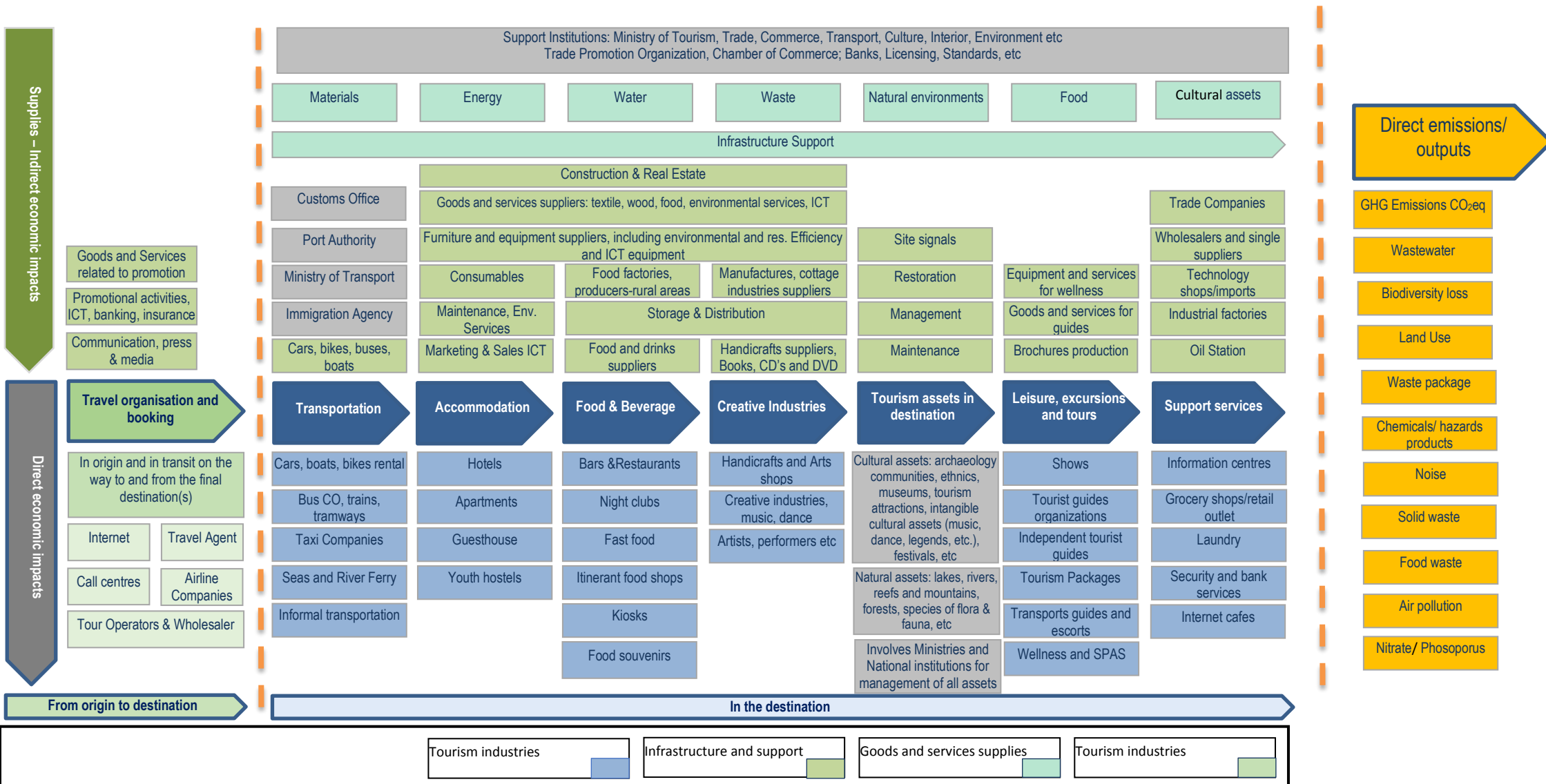


Figure 5: Expenditure by hotels across the Philippine's tourism value chain, 2013 (Source: Lenzen et al 2012, 2013)

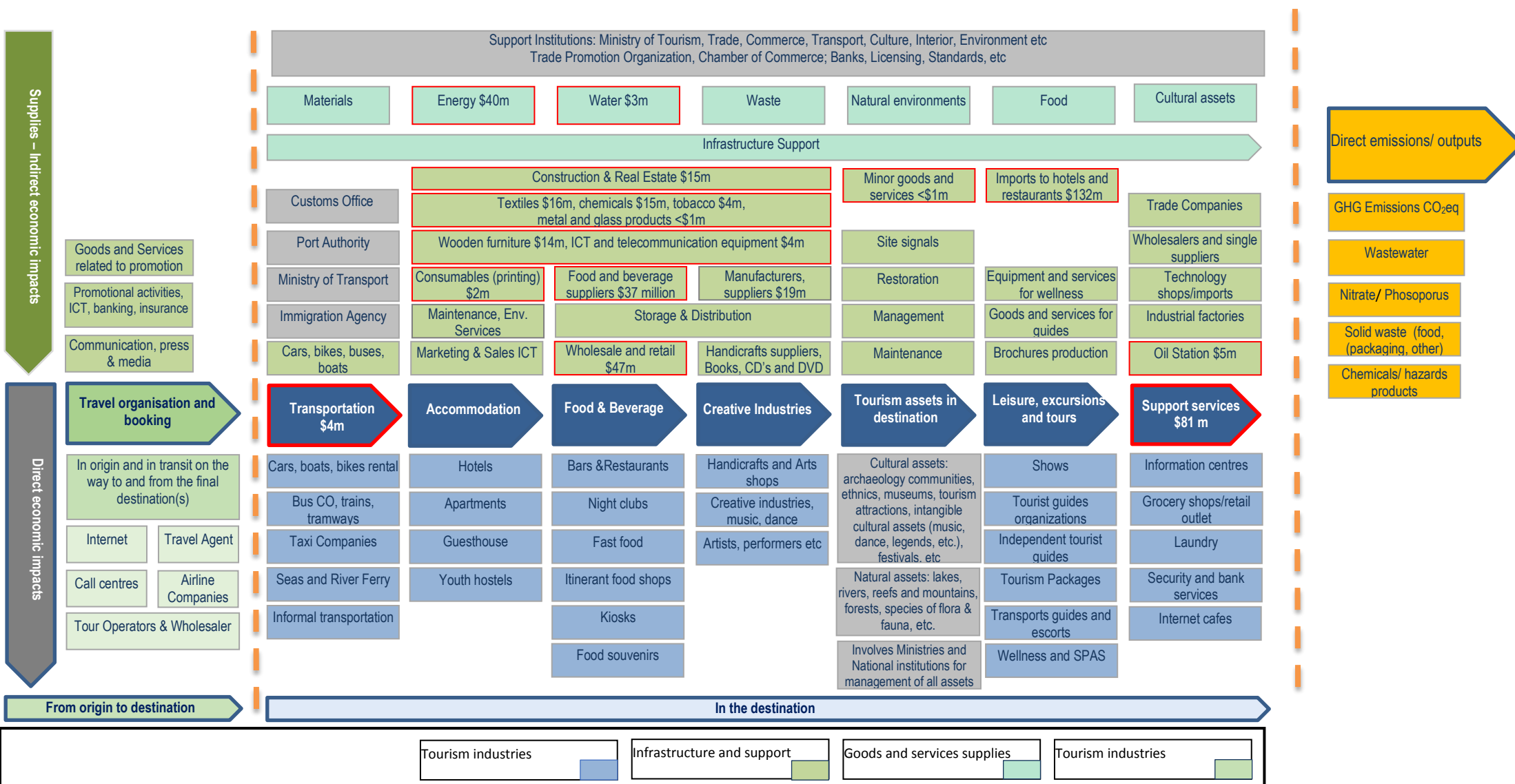
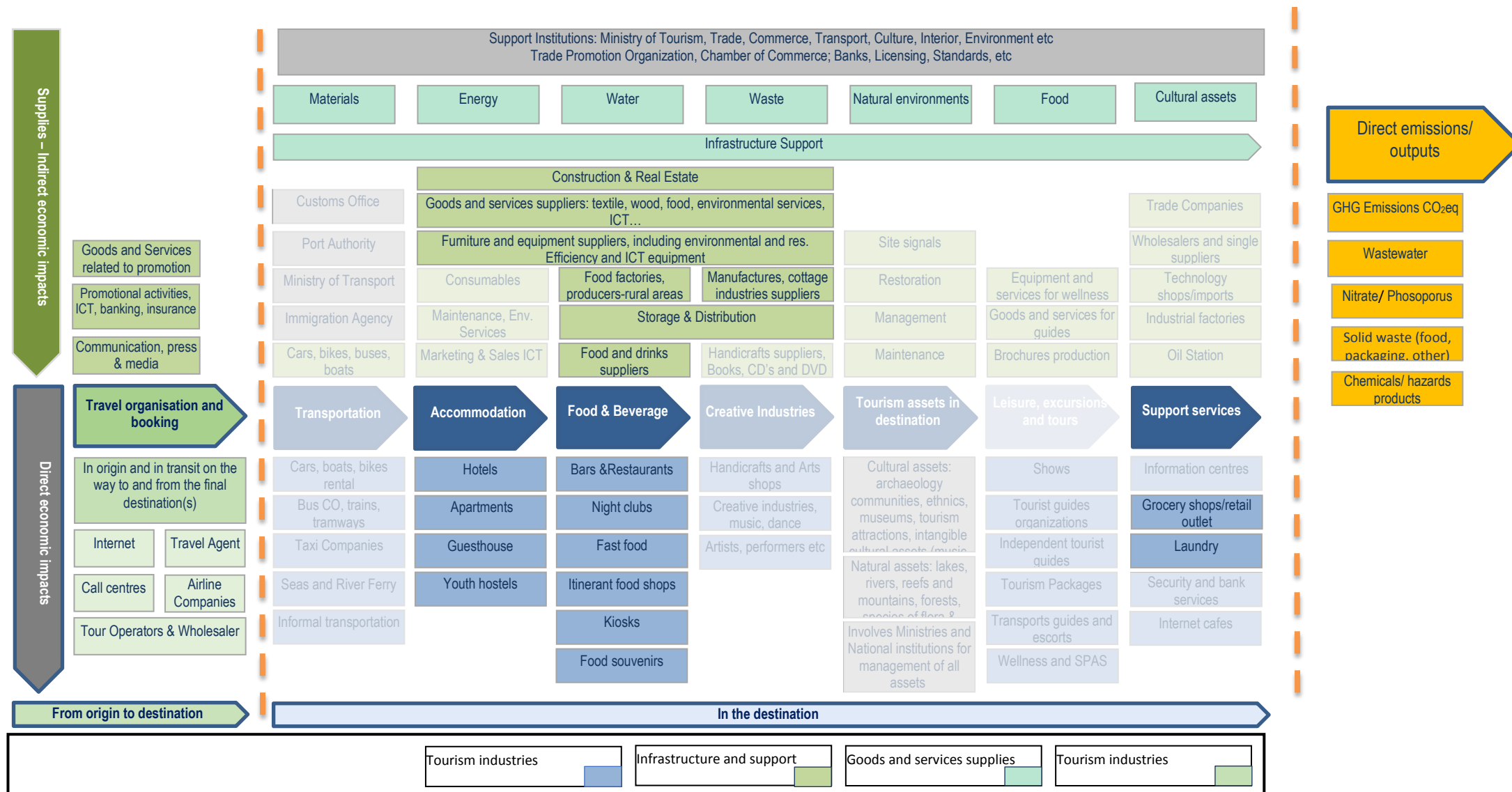


Figure 6: Value Chain actors able to control / influence environmental hotspots



4. Identification of Hotspots

4.1. Introduction

This section provides information on the methodologies and processes used to collect data to inform the hotspots analysis for the tourism value chains in the Philippines. It starts by providing a summary of the two approaches taken, the methodologies used and the key findings from each. This is followed by a short discussion of the inherent data limitations in both approaches; and how supplemental research was used to sense check the approaches taken. Finally, an analysis of imported goods was conducted to check their significance and any implications for the hotspot's analysis.

Two approaches have been taken to gathering data and identifying hotspots. The first approach has been to gather data at a national level (a top-down approach) relevant to the goal and scope of the study, and the second to collect data from individual organisations in the two destinations in the Philippines tourism sector that form the geographical focus of the project there (a bottom-up approach).

WRAP have previously combined these two approaches to validate data on the environmental impacts of food waste ([WRAP 2016](#)). This has been validated through comparison with a bottom-up approach, which comprised data gathered through a survey of hotels. This provides confidence in the robustness of conclusions drawn from the hotspot's analysis.

The top-down approach offers a rapid way of approximating the greenhouse gas emissions, energy use and water footprint associated with the tourism value chain using national statistics collated in a consistent manner. The bottom-up approach gathers data through a survey of individual hotels to identify data at a greater degree of resolution where it is available and compares this to the national data. Where common themes are able to be identified, this gives greater confidence in the results of the hotspot analysis.

The two approaches, how they have been used and the findings from each are included in the following sections of the report.

4.2. Top-down approach and results

The top down approach builds on the work of Lenzen et al.³³ to construct the EORA database. The Eora multi-region input-output table (MRIO) database provides a time series of Input Output tables with matching environmental and social satellite accounts for over 180 countries. Input Output tables provide data regarding the economic spending of sectors within an economy in other sectors, and the economic output that results. In short, these tables can tell us how much is spent in all sectors of the economy (inputs) to produce one US\$ of value in a given sector (output). Using this data, we can calculate the cascade effect of spending within an economy. For example, \$1 spent in the electricity sector requires the electricity sector to spend a given fraction of a dollar on fuels, and so on.

³³ Lenzen, M., Kanemoto, K., Moran, D., Geschke, A. Mapping the Structure of the World Economy (2012). *Env. Sci. Tech.* 46(15) pp 8374-8381. [DOI:10.1021/es300171x](#).
Lenzen, M., Moran, D., Kanemoto, K., Geschke, A. (2013) Building Eora: A Global Multi-regional Input-Output Database at High Country and Sector Resolution, *Economic Systems Research*, 25:1, 20-49, [DOI:10.1080/09535314.2013.769938](#)

Where the total environmental impact of a sector and its total economic output for a given year are known, the environmental impact per dollar of economic output for each sector can be calculated. At a high level, this allows the direct and indirect environmental impact of spending in a given sector to be calculated. The raw data is drawn from the UN's System of National Accounts and COMTRADE databases, Eurostat, IDE/JETRO, and numerous national agencies. By mapping the economic interactions of hotels and restaurants with other sectors of the economy, the impact incurred through expenditure by hotels and restaurants can be identified and quantified.

A top down approach has a number of strengths and weaknesses. By capturing all of the data from a sector (e.g. food and drink manufacturing), a top-down approach allows a comprehensive view of the impacts of a system. However, it is constrained by the availability of data in a suitable format. For example, data may be available for the sector “accommodation”, or for “accommodation and restaurants”, which will lead to results that cannot be used to separately benchmark the impacts of these two sectors of a tourism value chain with those in other countries where the data is available for both sectors separately. Inferences and assumptions are also required to sub-divide activities (e.g. imports) to identify the relevant emissions. The top down approach does not include product specific information; therefore, it needs to be complemented by the bottom-up approach, for a detailed accounting of the environmental impacts at the product and activity level.

This top-down data is available for hotels in the Philippines and allows for the modelling of their environmental impacts through their value chains. However, it is worth noting that no national level data has been identified for the MICE sector. From the survey results, there is no clear pattern to the impact of MICE organisations. This is because of the size of the sample and diversity of approaches. For example, some MICE organisations provide food and beverages whilst some do not. Further work will be required to assess the impacts of MICE.

The expenditure by hotels is quantified in **Figure 5** above. Significant areas of expenditure are outlined in red. Imports procured directly by hotels are also shown separately, and this is discussed further in the section on data limitations below. The analysis of expenditure suggests that imports, support services, energy and food and beverage products are key elements in the Philippines tourism value chain. **Figure 7: Expenditure** and environmental impact of hotels in the Philippines. Data source: Environmentally Extended Input Output tables: Eora Version 199.82,

2013 data (<http://www.worldmrio.com/>).

below translates this expenditure into environmental impact, showing greenhouse gas emissions and water footprint. It also shows that the results can vary depending on the environmental issue under analysis.

Figure 7: Expenditure and environmental impact of hotels in the Philippines. Data source: Environmentally Extended Input Output tables: Eora Version 199.82,

2013 data (<http://www.worldmrio.com/>).

shows that the greatest contributors to greenhouse gas emissions related to hotels are meat products, electricity and gas, grain products and other food services. When considering the water footprint, food crops are the dominant causes of demand. This is due to the amount of water required in agriculture to produce crops. Translating economic expenditure into

environmental impact demonstrates that expenditure is not a proxy for impact and should not be used as a basis for actions to reduce the environmental impacts of Tourism Value Chains.

4.3. Bottom-up approach and results

The bottom-up approach is based on a survey of individual hotels in the tourism value chain. The strength of the bottom-up approach is usually the higher level of detail and the traceability due to higher transparency. The approach can also allow for the inclusion of additional products which may not be identifiable through national data (e.g. non-apparel and apparel textiles), which can provide more guidance on potential interventions where these relate to a hotspot.

In addition, the bottom up data will include imported products, and the significance of these can then be considered when interpreting the national, top-down data to assess its suitability in the identification of hotspots. A weakness of this approach is the time required to gather data, whether the data is available; and the need to convert it into consistent units and the heterogeneity of the sector, which means that the hotspots identified may vary from one hotel to another. This may mean that a large sample is required to obtain an indication of hotspots which can be considered representative of the sector as a whole and suitable for comparison. The degree of alignment between bottom-up data sets is assessed and commented upon before drawing any conclusions.

The survey used in the bottom up approach can be found in **Annex D**. It covers a range of topics, however for the purpose of assessing participating hotels, the purchasing data was crucial to enable WRAP to complete the hotspots analysis. The survey was administered by the in-country partners in the Philippines, who surveyed 15 hotels. The survey was anonymised to ensure we had co-operation from hotels surveyed and is reported in this format for the purposes of this report.

The survey questions include data required for the UN Environment (2017) [Recommended key environmental indicators for the tourism private sector](#). The indicators which most closely align to hotspots are reviewed in **Section 8** below.

Completed surveys were entered into WRAPs hotspots tool. This is a Life Cycle Assessment based tool which contains regionalised life cycle data for over 70 products utilised by hotels and MICE organisations in the Philippines. The tool has previously been used in a range of peer-reviewed projects including WRAP (2013)³⁴ and is currently used with signatories to voluntary agreements facilitated by WRAP in the UK. For the current project, these products are aggregated to the level at which participating organisations can provide data (e.g. bananas, coconuts and pineapples are assessed as ‘fruit’). The range of products and services has been expanded to cover electricity, textiles, furniture, chemicals and glassware, based on feedback on what hotels are able to provide, and the data for electricity has been tailored to the country. Once data on the quantity purchased has been entered, the GHG emissions, water, waste and energy associated with that product can usually be identified in total and

³⁴ WRAP (2013) An initial assessment of the environmental impact of grocery products
http://www.wrap.org.uk/sites/files/wrap/An%20initial%20assessment%20of%20the%20environmental%20impact%20of%20grocery%20products%20final_0.pdf

by life cycle stage. This allows specific products to be prioritised and key life cycle stages identified in line with **Section 3**.

Analysis at a hotel level was challenging due to the level of data required to input into the WRAP hotspots tool. The in-country partners had trouble gathering all the data required. As a result, WRAP was only able to include the hotel level hotspots analysis of two hotels and three MICE organisations. However, despite the potential for heterogeneous results, there is a strong degree of alignment between the results collected from these hotels and the top-down data. Whilst not definitive due to the small sample size, this is indicative that the national level data is appropriate in the identification of hotspots in the tourism value chain in the Philippines.

Data for two example hotels from those who have provided sufficient data are presented in **Figure 8** below. These show the contribution of the hotel to greenhouse gas emissions, water, waste and energy consumption. The findings are consistent with the national-level analysis, confirming the importance of animal products and electricity consumption across the environmental impacts considered. It can be assumed that excluding imports has a negligible effect on the hotspots identified for tourism value chains in the Dominican Republic. For one hotel, textile consumption is also significant. This highlights that although general hotspots can be identified using national data, there may be hotel-specific variations.

4.4. Data limitations

A top down approach has a number of strengths and weaknesses. By capturing all the data from a sector (e.g. food and drink manufacturing), a top-down approach allows a comprehensive view of the impacts of a system. However, it is constrained by the availability of data in a suitable format. For example, data may be available for the sector “accommodation”, or for “accommodation and restaurants”, which will lead to results which cannot be used to benchmark the results of a tourism value chain with that in other countries. Inferences and assumptions are also required to sub-divide activities (e.g. imports) to identify the relevant emissions.

Databases such as Eora contain information on the value of imports in a country, including in their country of origin. The environmental impacts in the country of origin can be attributed to these imports. However, Eora do not provide details on the nature of the imports, nor to which sector specific items are being imported. This means that whilst we may know what is imported to a country and from where, we cannot use the model to attribute specific imports and therefore combine imports into the analysis of sectors contributing to hotspots. Supplementary data from literature and surveys of hotels is therefore required to allow understanding of the significance of imported products.

In a business context, financial/economic data is usually easier to come by, and better understood by stakeholders, than the material flow data that is usually required for Life Cycle Assessment. The survey therefore allows both sets of information to be provided by a hotel for the bottom-up approach.

As noted above in the section on the results of the bottom-up analysis, analysis at a hotel level was challenging and WRAP was only able to include the hotel level hotspots analysis from two hotels and three MICE organisations. However, despite the small sample size, there

is a strong degree of alignment between the results collected from these hotels and the top-down data, indicating that the national-level data is appropriate in the identification of hotspots in the tourism value chain in the Philippines.

It is important to note that this approach excludes the impact of imports and is therefore not consistent with the system boundary. In the Philippines, 31% of hotel expenditure is not accounted for. There is therefore potential for a significant proportion of the environmental impact to be excluded through this approach.

Figure 7: Expenditure and environmental impact of hotels in the Philippines. Data source: Environmentally Extended Input Output tables: Eora Version 199.82, 2013 data (<http://www.worldmrio.com/>).

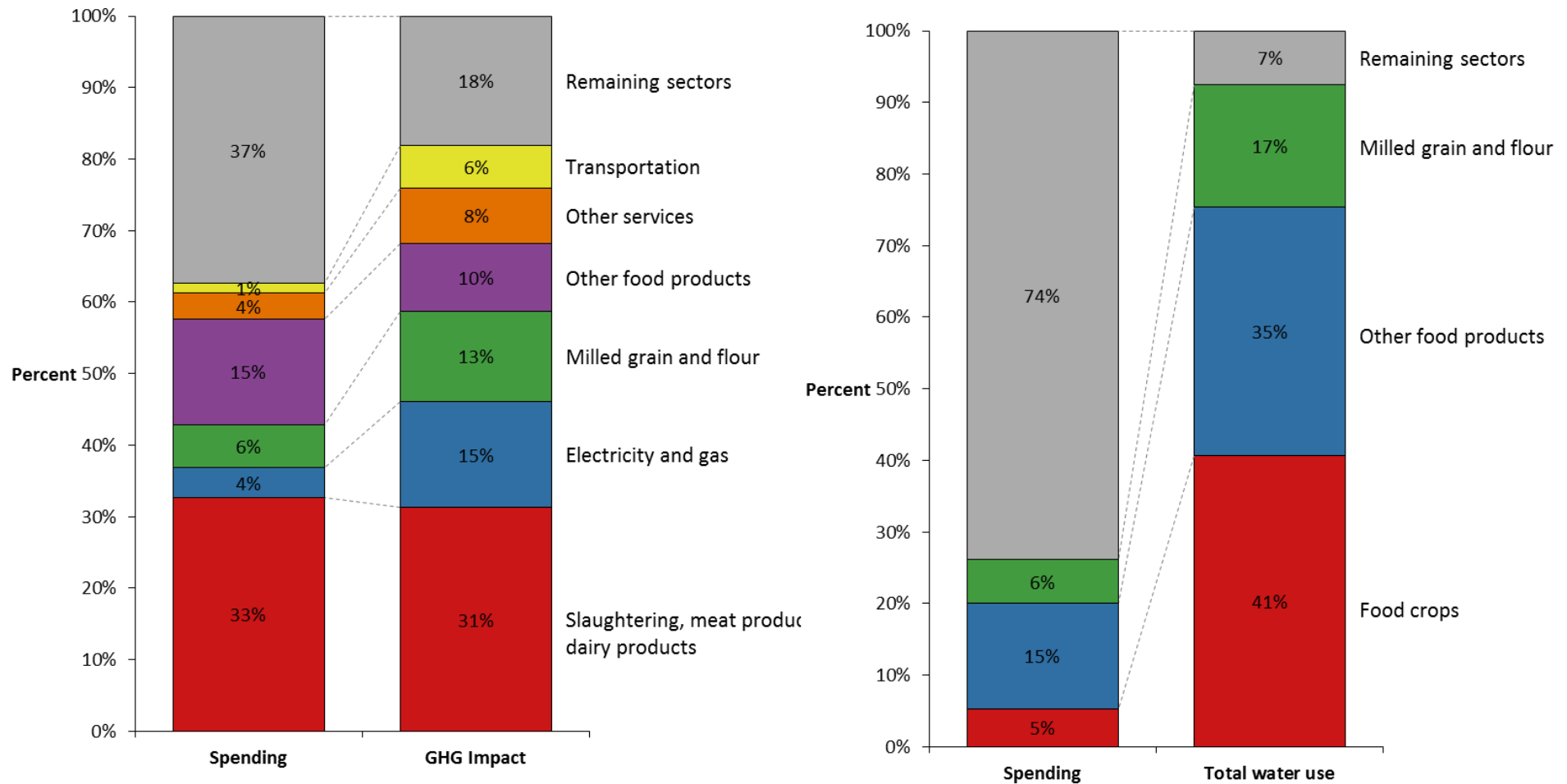


Figure 8: Example data from 2 hotels showing contribution to greenhouse gas emissions, water, waste and energy consumption.



Value Chain Map - Philippines Hotels

Input sales in yellow

Use arrows to sort largest to smallest impacts. Grey cells denote where no impact data is

Level 1	Level 2	Product Mass (tonnes unless otherwise stated)	GHG Emissions (tCO ₂ e)	Energy (GJ)	Total Water Footprint (million litres)	Total Waste and By-Product Footprint (tonnes)
Elektrisidad (kWh)	Electricity (kWh)	109,130	64	0.33	#N/A	#N/A
Karne	Meat	1	19	0.03	5	0
Manok	Poultry	4	18	0.16	9	2
Mga Tela	Textiles	0	2	0.02	1	0
Inumin	Non-Alcoholic Beverage	2	2	0.01	0	0
Isda at pagkaing-dagat	Fish & seafood	0	2	0.05	0	0
Mga gulay	Vegetables	0	1	0.01	0	0
Babasagin	Glassware	1	1	0.01	1	
Mga Alkohol na Inumin	Alcoholic Beverages	0	1	0.01	0	0
Prutas	Fruit	0	0	0.00	0	0
Tubig (m3)	Water (m3)	1,058		#N/A	1	#N/A



Value Chain Map - Philippines Hotels

Input sales in yellow

Use arrows to sort largest to smallest impacts. Grey cells denote where no impact data is

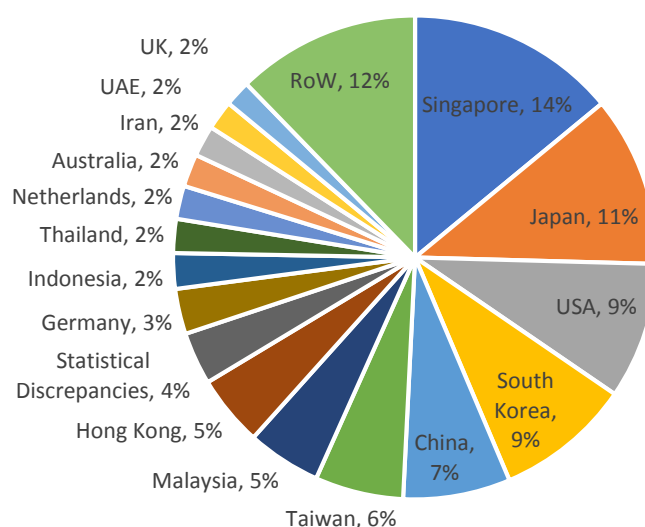
Level 1	Level 2	Product Mass (tonnes unless otherwise stated)	GHG Emissions (tCO ₂ e)	Energy (GJ)	Total Water Footprint (million litres)	Total Waste and By-Product Footprint (tonnes)
Karne	Meat	9	288	0.41	69	2
Mga pamilihan	Groceries	30	89	0.44	21	6
Butil at cereal	Grain and Cereals	20	77	0.53	48	2
Baboy	Pork	9	63	0.40	40	3
Elektrisidad (kWh)	Electricity (kWh)	70,000	41	0.25	#N/A	#N/A
Isda at pagkaing-dagat	Fish & seafood	10	39	1.21	6	2
Manok	Poultry	7	36	0.32	18	3
Mga gulay	Vegetables	15	30	0.22	5	3
Inumin	Non-Alcoholic Beverage	15	14	0.10	1	1
Prutas	Fruit	13	14	0.11	6	3
Pagawaan ng gatas	Dairy	5	11	0.06	14	1

4.5. Implications of imported products on the hotspots analysis

The effect of excluding imports on the identification of hotspots is assessed by comparing the results against the bottom-up data, and sense checking the importance of imports through other data sets.

Figure 9 below shows that of the imports to hotels in the Philippines, most come from or via Singapore, followed by Japan, USA and South Korea. However, hotels account for no more than 1.4% of imports from any country.

Figure 9: Proportion of Philippines hotel imports by country by value, 2013 (Lenzen et al 2013).



[FAOstat](#) suggests that the Philippines imported approximately 10-13% of food and beverages by weight each year between 2008 and 2013. This figure increased over the time period.

Agricultural imports can be grouped in 3 major categories:

- Bulk agricultural commodities: such as wheat, beans, corn, etc.
- Intermediate products: soybean meal, vegetable oils, animal fats, fish & seafood, meats, fresh fruits, sugar and other sweeteners, and tobacco.
- Processed, consumer-ready products: breakfast cereals, salted fish, bottled beverages, dairy, snack foods, canned goods, etc³⁵.

The most significant imported produce for 2013 are shown in **Table 8** below. 2013 data has been selected as this is the year for which top-down data is available for comparison with the bottom up data. It should be noted that wheat is not produced in the Philippines and milk is only produced in small quantities. Although maize imports are high in absolute terms, they are equivalent to just 5% of total consumption. The most significant domestic production is

³⁵ Government of Canada, Agri-Food Sector Profile - Dominican Republic, May 2016, Mr. Regis Batista-Lemaire, Trade Commissioner, Santo Domingo, Dominican Republic [<http://www.agr.gc.ca/eng/industry-markets-and-trade/international-agri-food-market-intelligence/reports/agri-food-sector-profile-dominican-republic/?id=1485956370308>]

of sugar cane (31,874,000 tonnes) coconuts (15,353,000 tonnes), rice (12,299,000 tonnes milled equivalent), bananas (8,646,000 tonnes) and maize and products (7,377,000 tonnes). This suggests that the hotspots identified through national data could underestimate the importance of goods and services procured by hotels, such as wheat products and milk. This will be discussed further in review of specific indicators and survey responses.

Table 8: Most imported products, 2013 (Source: FAOStat)

Most imported products by weight		Most imported products by proportion of total consumption	
Product	Quantity (000 tonnes)	Product	Percentage
Wheat and products	2803	Wheat and products, barley, oats, sweeteners, honey, peas, apples and products, grapes	100%
Milk excluding butter	1641	Milk excluding butter, oil crops oil (other), soya beans, sorghum and products	90-99%
Rice (milled equivalent)	426	Cocoa beans and products, coffee and products, oranges, soya bean oil	70-89%
Maize and products	369	Palm kernel oil, lemons, limes and products, potatoes and products, groundnuts, oil crops (other), beans, pepper.	50-69%
Sweeteners, other	316		

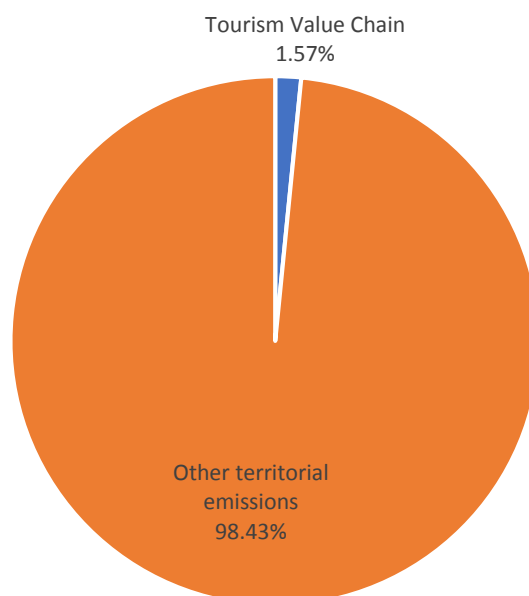
[UN Environment 2017](#) suggests that the Philippines has been a net exporter of wild catch fish, harvest and crops (including cotton) since 2013; and a net importer of wood and a net exporter of metal ores. Whilst this does not mean that there are no impacts associated with import of food, textiles and metal ores, it is nonetheless a useful rapid indicator of where hotspots are likely to occur.

5. National Baseline for the Environmental Impacts of the Tourism Value Chain

The top-down analysis provides information on the environmental impacts that occur within a country. For different indicators, these are commonly referred to as production-based, territorial, national or domestic impacts. The results presented in this section are consistent with national accounting frameworks such as the United Nations Framework Convention on Climate Change (UNFCCC) for greenhouse gas emissions but do not include the impacts of the Tourism Value Chain which occur overseas, in particular imported goods and air travel.

Greenhouse Gas Emissions - GHG emissions associated with hotels are estimated to be 2.7 million tonnes CO₂eq in 2013. According to the World Resources Institute Climate Analysis Indicators Tool ([WRI CAIT](#)), GHG emissions in Philippines in 2013 were 171.6 million tonnes CO₂eq, suggesting that hotels and restaurants are associated with 1.6% of national greenhouse gas emissions. This is illustrated in **Figure 10** below. This is a likely to be an **underestimate** related to the limitation of the top-down IORA dataset.

Figure 10: Proportion of national greenhouse gas emissions associated with the Tourism Value Chain in the Philippines, 2013



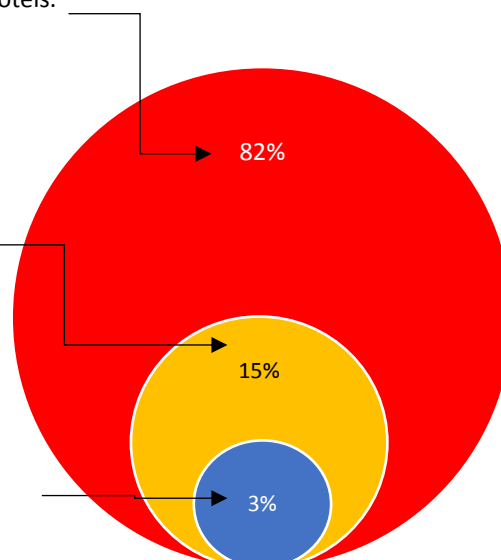
GHG emissions associated with electricity production are a hotspot for hotels directly, and within their supply chains. The emissions in the supply chains are far greater than the emissions from use of energy in the hotel as illustrated in [Figure 11](#) below. These are shown as scope 1, 2 and 3, estimated in line with the [GHG protocol](#).

Figure 11: Greenhouse gas emissions across the hotel value chain. (NB scope 3 excludes employee commuting and tourist travel to the Philippines)

Scope 3 covers indirect emissions that are a consequence of the organisations activities. This includes, for example, emissions from factories making goods procured by hotels, emissions from agriculture to grow food bought by hotels and emissions from management of waste generated by hotels.

Scope 2: emissions from the consumption of purchased electricity or other energy sources such as steam heat or cooling purchased directly.

Scope 1: direct emissions from sources that are owned or controlled by the organization. This includes, for example, generators, vehicles and use of gas for cooking or heating.



In identifying hotspots, the definition used is activities which contribute over 50% of an impact, as set out earlier in the report. The provision of food, especially meat and dairy contribute jointly 57% and direct consumption of electricity and gas contribute 15% to the overall GHG emissions and are therefore considered hotspots.

For the hotels who participated in the survey, the same hotspots were identified, though the exact contribution varies between hotels. Based on the analysis of imports and survey responses, greenhouse gas emissions appear to be largely from within the Philippines, with some emissions overseas (e.g. textiles from China).

Energy –

Figure 12 highlights that the largest use of energy for hotels is through the use of electricity. Over 60% of the energy is used directly by the hotel, either through direct combustion of fuels or use of electricity. The energy embedded in products is of less significance. The difference to greenhouse gas emissions highlights the importance of non-energy emissions of greenhouse gases, such as emissions from agriculture, forestry and metal processing. **Table 9** below illustrates the energy footprint (in terajoules) of products and services used by hotels in 2013.

Figure 12: Energy use across the hotel value chain. (NB scope 3 excludes employee commuting and tourist travel to the Philippines)

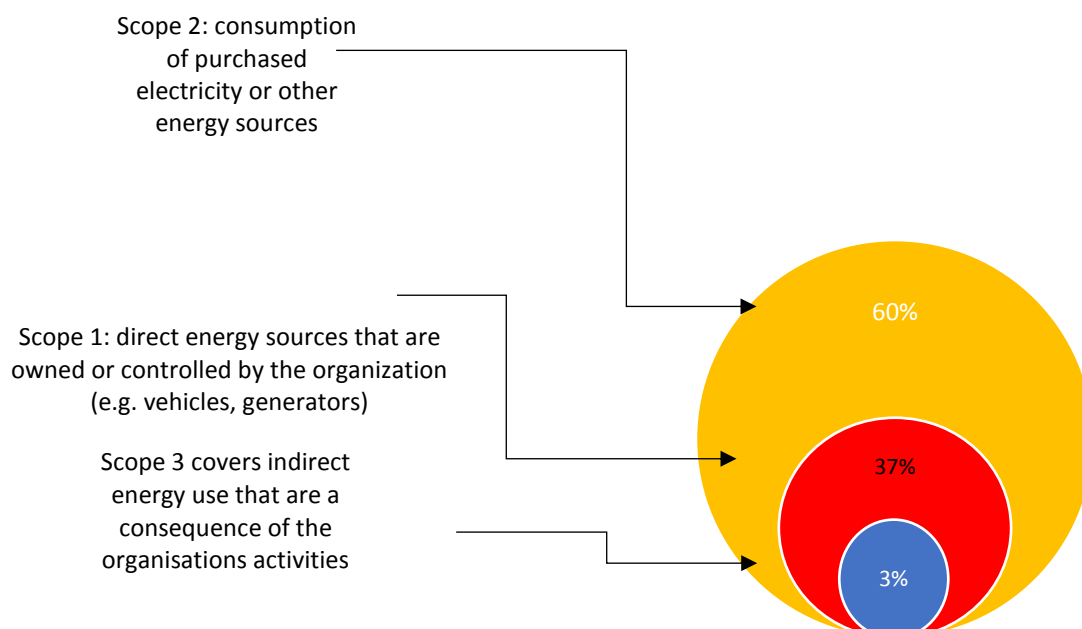


Table 9: Energy footprint (terajoules) of products and services used by hotels, 2013

	Beverage	Electricity and gas	Water supply	Transportation	Other services
Natural Gas	18	376	24	2	31
Coal	72	768	51	5	67
Petroleum	47	73	5	120	53
Nuclear Electricity	0	0	0	0	0
Hydroelectric Electricity	5	103	7	0	8
Geothermal Electricity	49	1,056	69	5	85
Wind Electricity	0	1	0	0	0
Solar, Tide and Wave Electricity	0	0	0	0	0
Biomass and Waste Electricity	50	20	3	7	24
Total	241	2398	158	140	269

The following section of the report provides further information on the distribution of energy, the energy mix and observed trends from the literature review. This provides the basis from which subsequent solutions to the hotspots identified above, will be considered.

The distribution utilities of Metro Manila are governed by MERALCO, a private firm which also services nearby provinces. As the sole energy distributor in Metro Manila, hotels and MICE facilities are connected to its grids. Transmission from generation companies and independent power producers is tasked under NPC (National Power Corporation).

Commercial power rate averages at \$0.14 per kwh, however, because both the generation and distribution are privatized, sporadic price change occurs where peak price is observed during dry season³⁶. Alternative power sources are made available by establishments. Typically, diesel power generators are available but used by the sector only during power interruptions.

In the hospitality industry, hotels' largest use of energy is electricity. Hotels use over 60% of the energy, either via direct combustion of fuels or use of electricity. Since 2000 there has been a decreasing trend in crude petroleum consumption and an increasing trend in coal consumption. This can be attributed to the increasing prices of crude petroleum relative to coal; thereby, substituting crude petroleum for coal.

Panay Electric Co., Inc (PECO) is the main distributor of energy in Iloilo. It is partly owned by the Lopez Group's First Philippine Holdings, Corp. PECO sources most of its supply from Global Business Power Corp., one of the largest independent power producers in the Visayas with a total installed capacity of 627 megawatts (MW). Current Typical Residential Rate is Php 11.05 per kWh.

Iloilo is also known for its expensive electricity at \$0.21per kwh (as compared to \$0.14 per kwh in Metro Manila). Electricity cost is one of the primary driver of energy efficiency and alternative energy projects. Several tourism-related establishments in Iloilo City augment their electricity needs with Solar Power. Robinson's Place Iloilo converted its rooftop into a solar plant with 613-kilowatt peak solar power system that is generating 815 megawatt (MW) hours annually. Gaisano City Iloilo is equipped with a 1.03-MW solar rooftop system that can supply up to 50% of the mall's daytime load. On the other hand, SM City Iloilo has a total of 2,904 solar panels at 285 watts each, producing 827 kilowatts which can sustain 10% of the mall's energy consumption. Iloilo Province has a separate power source. Palm Concepcion Power Corporation in Concepcion, Iloilo provides 135 MW power. It is currently expanding its operation to add an additional 135MW. Additional energy is being produced by two Diesel Powered Power Plants in Dingle, Iloilo with power capacity of 15 MW and 74 MW. A biogas power plant is also operating in Passi City with 15 MW Capacity. Several renewable power projects are being proposed. In Iloilo City, the city government is considering harnessing waste energy in its sanitary landfill. The Jalaur River Dam in Calinog, Iloilo, when completed, will generate 6.6 MW of hydro power. There is also a proposed 5.1 MW hydro power plant in Igbaras, Iloilo and a 5.67 solar powered plant in Miagao, Iloilo.³⁷

Water - Over 99% of the 69 million m³ water associated with hotels is considered as scope 3. This is mainly the use of water in the production of food crops which accounts for 68% of the water associated with hotels. This includes sugar, bananas, coconuts and pineapples. Beverages is the next most significant category at 12%. Data from hotels surveyed also suggests that meat and dairy have a significant contribution to the water associated with hotels. "Other made-up textile products" listed in **Table 10** below, refers to products other than wearing apparel (i.e. other than clothing).

³⁶ Finlayson, Bob, et al. "Philippines: Electricity Market and Transmission Development Project." Asian Development Bank, Mar. 2016, www.adb.org/sites/default/files/evaluation-document/167391/files/pper-phi-electricity-market.pdf

³⁷ Philippine Energy Plan 2017-2040 https://www.doe.gov.ph/sites/default/files/pdf/announcements/acd_15_phil_energy_plan_2017-2040.pdf

Table 10: Water footprint in Top 5 sectors associated with hotels in the Philippines

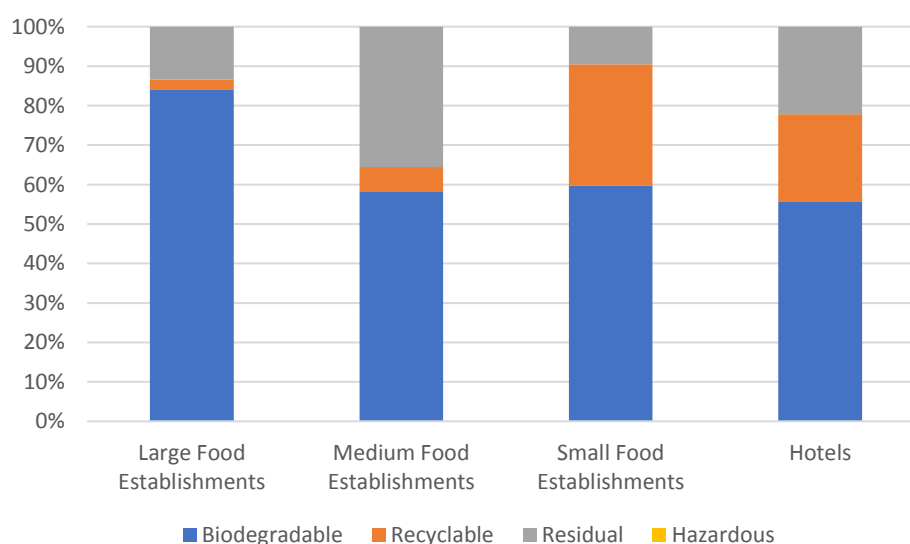
	Other chemical products	Other made-up textile products	Wooden furniture	Food crops	Beverages	Water Supply
Green water (m ³)	2889999	1826170	1990935	47236511	12305991	284
Blue Water (m ³)	6,189	538	606	90	14,916	21
Grey Water (m ³)	3,319	5,370	4,355	650	6,046	64
Total Water (m ³)	2899507	1832079	1995895	47237256.63	12326953	3,921

Waste – Data on waste has also been modelled from national data. Under the Ecological Solid Waste Management Act of 2000 municipal waste is defined as wastes produced from activities within local government units which include a combination of domestic, commercial, institutional and industrial wastes and street litters. The national data sources suggest that total solid waste from all sources is approximately 14 million tonnes p.a., of which approximately 4 million tonnes is from commercial sources. This would suggest 17,000 tonnes of municipal waste p.a. are associated with hotels. However, in combination with the data provided by hotels responding to surveys this figure appears to be an underestimate and further work is required to verify figures before hotspots can be identified.

[Matunog and Awa](#) (2013) surveyed waste arisings from 3-6 businesses in a range of categories in Ozamiz City, Philippines. Their findings are summarised in

[Figure 13](#) below. This suggests that biodegradable waste is the most significant component of the waste stream across both hotels and restaurants. The importance of biodegradable waste is in line with the assessment of the composition of waste from a range of sources in the [National Waste Management Strategy 2012-16](#).

Figure 13: Composition of waste from food establishments in the Philippines, 2013.



[WU \(2014\)](#): Global Material Flows Database suggests that unused food accounts for 95% of wasted biomass in the Philippines, with almost twice as much unused food as animal feed production.

6. Summary of Environmental Hotspots

Table 11 below summarises the hotspots in the tourism value chain. Organisations who can influence or control hotspots are identified in **Figure 6** above.

Greenhouse gas emissions associated with rearing animals (enteric fermentation, manure) account for 33% of the carbon footprint of restaurants, and rice cultivation 8%. This excludes the impact of storing and preparing food within the restaurant, which is accounted for in the electricity and gas figures. Direct use of electricity and gas is the other main hotspot with 15% contribution. The water footprint is dominated by water use in agriculture for crops including rice. The blue (abstracted) water footprint is dominated by processed products (i.e. meat and dairy and other food products).

Beverages, wooden furniture, non-clothing textile products, and direct consumption of electricity and gas are the greatest contributors to both the carbon and water footprint of hotels. Three of these are also prioritised based on their energy footprint.

Table 11: Summary of hotspots across environmental impact categories / indicators for the Philippines tourism sector

Summary of hotspots across environmental impact categories – The Philippines				
Rank	GHG	Energy	Water	Waste
1	<p>Primary production of meat and dairy products: GHG emissions from the rearing of livestock for meat and dairy products (e.g. methane emitted by ruminant digestion systems and production of manures) account for 33% of the GHG emissions for hotels and restaurants in the Philippines tourism sector. NOTE: the Philippines imported approximately 10-13% of food and beverages by weight each year between 2008 and 2013. This figure increased over the time period; but milk is only produced in small quantities in the Philippines, so the majority is imported.</p>	<p>Electricity and fuel use in hotel and MICE establishments: lighting, heating, ventilation and air conditioning (HVAC) of rooms, public spaces, back of house areas. The largest use of energy for hotels in the Philippines is through the use of electricity. Over 60% of the energy of tourism value chains (ex. International flights) is used directly by the hotel, either through direct combustion of fuels (e.g. gas) or use of grid supplied electricity³⁸.</p>	<p>Primary production of food crops and livestock; and beverage production: Over 99% of the 69 million m³ water associated with hotels in the Philippines is considered as Scope 3 (water used in the supply chain). This is mainly the use of water in the production of food crops and livestock, which accounts for 68% of the water associated with hotels and restaurants. Food crops include rice, sugar, bananas, coconuts and pineapples. Beverages is the next most significant category at 12% of the water footprint associated with hotels and restaurants in the Philippines.</p>	<p>Food waste in hotels, restaurants and MICE establishments: WRAP estimates an average of 7-12% meat waste and 20% of edible vegetable parts are wasted in hotel kitchens and by customers, with one hotel survey return indicating overall food waste levels of 41%. This suggests there are significant opportunities for efficiency gains. A lack of private and public-sector infrastructure for collection and treatment of food/organic waste leads to wasted resource and high methane emissions from open, unlicensed landfill sites. NOTE: Philippines national-level data appears to significantly underestimate solid waste arisings in the sector.</p>
2	<p>Electricity, fuel and refrigerant use in hotel and restaurants: 15% of emissions are from the consumption of purchased electricity or other energy sources; and 3% from direct emissions controlled by the organisation (e.g. generators, vehicles and the use of gas for cooking or heating. A heavy dependence on fossil fuels (coal, oil and gas) are linked to hotspot above on energy generation. (Also see Energy hotspot.)</p>	<p>Processing and packing of meat and dairy products: energy use in the provision of meat and dairy products is the second largest energy hotspot. This includes slaughterhouse processing and energy used in chilled storage and refrigeration, which also contribute to post-farm gate energy use and emissions.</p>	<p>Water use in hotels and MICE establishments: guest washing and sanitation, cleaning of rooms and public spaces, laundry services, food preparation and cooking, irrigation of grounds, swimming pools and the treatment of waste water and sewage by hotels are all likely to be significant uses of water in the Philippines tourism sector.</p>	<p>Primary production of fresh produce and grain crops: in-field, unharvested crops and immediate post-harvest crop waste due to supply chain quality requirements and poor demand forecasting (estimates are up to 20% losses/waste).</p>
3	<p>Primary production of rice and fresh produce: emissions from use of fertilizers; methane emissions from flooded rice paddies; and fuel use for in-field operations. Rice alone accounts</p>	<p>Transportation: the tourism sector spends over US\$4 million a year on transportation equipment, but this probably represents a fraction of the transportation costs provided</p>	<p>Water pollution from hotels: a lack of public infrastructure, regulation and enforcement leads to sub-optimal use of water resources and pollution from</p>	<p>Wastewater and solid waste pollution from hotels and establishments: resulting from a lack of modern, regulated waste and wastewater management infrastructure in the</p>

³⁸ **NOTE:** Iloilo is also known for its expensive electricity at \$0.21per kwh (as compared to \$0.14 per kwh in Metro Manila), providing more of an incentive for energy efficiency and renewable energy projects there.

	for 8% of the GHG emissions of restaurants in the Philippines.	by third party service providers. Transportation and distribution of food and beverage products, particularly for imported goods; or from tourists participating in tours, excursions or using taxis and hire cars is a major user of energy (predominantly gasoline) in the Philippines (using circa 140 TJ of energy a year according to national-level data). This situation is exacerbated by traffic congestion in many parts of the country as a result of poor urban planning (especially in the National Capital Region, including Metro Manila), underdeveloped road and public transport doesn't have the capacity to meet the population's or visitor's needs ³⁹ . Traffic congestion in the Philippines costs the national economy PHP 7 billion a day in lost productivity.	untreated wastewater ⁴⁰ and places a burden on hotels to provide water supplies via boreholes, desalination plants and other means, as well as for in-situ waste water treatment. A lack of available freshwater and waste water treatment can lead to the pollution of groundwater, local rivers, lakes, coral reefs and beaches, which has an impact on the natural environment that Philippine's tourism depends upon ⁴¹ . (also see waste hotspot)	Philippines. A lack of available waste water treatment can lead to the pollution of groundwater, local rivers, lakes, coral reefs and beaches, which has an impact on the natural environment that Philippine's tourism depends upon ⁴² . Leachate from unlicensed open landfills poses threats to groundwater, public health, local rivers, beaches, coral reefs and other ecosystems. Consumption of contaminated water is a real risk due to a lack of wastewater treatment for domestic, industrial, and chemical wastes. Periodic flooding as a result of accumulated solid waste in water / drainage systems also occurs.
4	Primary production of fish and seafood products: based on production data fish and seafood products used in hotels and restaurants are likely to represent a hotspot in the tourism sector in the Philippines. NOTE:	Processing and packing of fresh produce: energy use in the processing and packing of produce, energy use in product chill chain or for freezing of produce post-harvest.	Processing and manufacturing of food, livestock products and beverages the use of abstracted (blue) water in the Philippine's tourism sector water footprint is dominated by water use in processed	Waste and pollution from single use items: e.g. plastic packaging, water bottles, cups, drinking straws, etc. creating litter and marine pollution, damaging natural environments. NOTE: the rising consumer, NGO, media and

³⁹ **Source:** Kritz, B. (2017, May 11). Public transportation is infrastructure, too. *The Manila Times*. Retrieved from <http://www.manilatimes.net/public-transportation-infrastructure/326609/>

⁴⁰ For example: in the Philippines, 86% of piped water supply systems use groundwater as a source, but around 60% of groundwater extraction is without the water rights permits granted by the National Water resources Board (NWRB), resulting in indiscriminate withdrawal. And according to the Water Environment Partnership in Asia (WEPA), 58% of groundwater sampled is contaminated with coliform and needs treatment; and approximately 31% of illnesses monitored over a five-year period were caused by water-borne sources.

⁴¹ For example: according to Luzon and Licuanan (2017), only around 4% of coral reefs are still in a pristine condition, and are continuing to decline, with damage to this important ecosystem due to unsustainable land practices (including wastewater effluent run-off) and destructive fishing practices. The discharge of domestic and industrial wastewater and agricultural runoff has caused extensive pollution of the receiving water-bodies. This effluent is in the form of raw sewage, detergents, fertilizer, heavy metals, chemical products, oils, and even solid waste.

⁴² For example: according to Luzon and Licuanan (2017), only around 4% of coral reefs are still in a pristine condition, and are continuing to decline, with damage to this important ecosystem due to unsustainable land practices (including wastewater effluent run-off) and destructive fishing practices. The discharge of domestic and industrial wastewater and agricultural runoff has caused extensive pollution of the receiving water-bodies. This effluent is in the form of raw sewage, detergents, fertilizer, heavy metals, chemical products, oils, and even solid waste.

	the Philippines has been a net exporter of wild caught fish since 2013 ⁴³ .		foods in the supply chain (i.e. meat, dairy and other food products). Data from the hotels surveyed in the Philippines suggests that meat and dairy products have a significant contribution to the water associated with hotels.	government focus on the proliferation of plastic bottles, packaging and products in the environment, which has become a major pollutant and a cause of concern in both land-based and ocean environments.
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⁴³ UN Environment 2017: <http://uneplive.unep.org/country/data/PH#charts>

To elaborate on the information contained in [Table 11](#) above, the environmental impact hotspots identified for the tourism sector Philippines are broadly split between:

- **Primary production of food**, particularly GHG emissions and water use in meat, (imported) dairy production and rice cultivation. In addition, processing of meat and fresh produce is also a hotspots for energy use. Tourist spend on food and beverages in the sector in 2014 amounted to PHP220.8 billion (nearly 40% of all the gross revenue from the sector) also makes this a significant hotspot for the sector. [FAOstat](#) suggests that the Philippines imported approximately 10-13% of food and beverages by weight each year between 2008 and 2013; although this figure increased over the time period.
- **Electricity and fuel use in hotel and MICE establishments** national-level data suggests that over 60% of the energy used by hotels and their value chains is in the form of direct electricity use by hotels and establishments; Hotel and restaurant energy use in lighting, heating, ventilation and air conditioning; and water heating and use in washing and sanitation, cleaning of rooms and public spaces; and for leisure activities, like swimming pools and spas. Energy generation and its climate change impacts relate to the environmental impacts associated with the extraction of raw materials (fossil fuels: coal, oil and gas), their conversion to electricity or heat and the transmission of energy from point of generation to point of use in the tourism sector. Hotels in the Philippines pay between US\$0.14 (in Metro Manila) to US\$0.21 per Kw (in Iloilo) for their electricity.
- **Liquid and solid waste generation by in hotel and MICE establishments, leading to pollution** of land, water and air, compounded by the deficiencies in national infrastructure, regulation and enforcement – for example:
 - Groundwater, river, lake and marine pollution from due to a lack of waste management and recycling infrastructure and regulatory permitting and enforcement of waste management sites, leading to the degradation of natural resources;
 - A lack of public water supply or wastewater treatment infrastructure leading to water/marine pollution from untreated or inadequately treated wastewater and risks to public health from contaminated drinking water sources; and

Further detail on the nature of the hotspots and their drivers is provided in **Annex F**, these are organised by impact category and lifecycle stage. Red cells in the table in **Annex F** indicate a hotspot and amber cells indicate a life cycle stage with a lower, but still significant, contribution to the overall life cycle impacts. Please note that the selected products are illustrative, and for individual hotels additional product hotspots may exist.

7. Solutions to Address Environmental Hotspots

During 2017 workshops were held in each of the four target countries to build a better understanding of the environmental hotspots associated with tourism and identify potential actions to address these. In the Philippines, these workshops included participation from Government Ministries, Academia, Non-Governmental Organisations, Hotels and Sector Organisations. These groups provided a range of insights and aided in prioritising the long-list of solutions for further exploration.

A literature review has also been carried out to identify potential actions. Together, these form the long list of potential actions identified below. These actions will subsequently be reviewed for their feasibility and impact to enable shortlisting in 2018. Some actions may be recommended even where their impact may not be quantifiable (e.g. adoption of a policy) as they may be an enabling action which allows other activities to occur which may be quantifiable.

In the Philippines, the objective is to identify solutions which can be delivered through both business action and government policy, so all actions listed below should be read in this context.

So for completeness and to help identify situations where national policy interventions can support business action (and vice versa), the long list of solutions has been split into business-level solutions, which are presented first and segmented by topic, followed by national-level solutions that have been ranked and grouped based on their likely impact, that require actions led by government policy-makers and/or that call for public or public/private sector investment in national and local infrastructure to address identified hotspots.

Where appropriate some solutions are presented as both business and national-level solutions as action can be taken by individual businesses but may benefit from a supporting national policy or legal framework – e.g. a circular economy policy package could support the development and procurement of sustainable products and services by businesses; or a national food waste strategy would support actions by business to quantify and reduce their food waste.

The next stage of the project will involve shortlisting solutions and at this stage some items on the long list may be brought together under a collaborative business approach and/or an overarching policy ambition.

To summarise, the long list covers the following range of solutions and interventions:

Business value chain solutions and interventions: have the potential to be implemented by individual tourism businesses and value chains or via collaborations between tourism businesses and/or the public sector. Some business value chain solutions would benefit from a supportive government policy and strategy framework, like the options for national-level solutions identified below.

- **Sharing best practice and site visits:** the potential for hotels and restaurants to learn from each other's best practices and to learn from other's experiences of implementing solutions (e.g. food waste reduction, energy management, water efficiency).

- **Team training and cross-functional training:** training within and across teams to enable members to minimise their contribution to environmental hotspots by equipping them to help deliver a range of solutions and interventions – e.g. sustainable procurement approaches, monitoring and measuring resource use (food and beverages, water and energy) as well as eco-design tools and techniques for buildings and rooms.
- **Sustainable purchasing and value chain initiatives:** that enable multiple hotspots across all impact categories to be addressed, including sustainable procurement policies and practices; appointing a ‘green procurement champion’; adopting voluntary sustainability standards for key raw materials (e.g. seafood, timber and paper, textiles); supplier accreditation, environmental KPIs and benchmarking and shared / consortia-based supplier platforms and databases to help identify reliable, high-performing suppliers; the use of product/packaging specifications and healthy, sustainable menus (e.g. product life requirements for hotel furniture and electrical items, local, seasonal sourcing of food). The issue of single use items and specifically, plastics can also be addressed to reduce the amount of waste through procurement policies, replacing them with multiple use items (e.g. refillable product dispensers, reusable cups and glasses).
- **Improving operational practices:** including the provision of information to guests to help them make environmentally friendly choices when choosing or buying goods and services; adopting healthy, sustainable menus to reduce the environmental ‘food print’ of food served in destinations; measuring and monitoring food waste; reviewing food storage, preparation and cooking practices (e.g. portion control) and using data analytics to improve inventory management and demand forecasting to reduce food waste; donating uneaten food and establishing food recycling programmes to produce compost and renewable energy.
- **On-site energy management and efficiency:** making significant improvements in energy use by: developing an energy and GHG policy; conducting and acting on the findings of energy audits; specifying energy efficiency and GHG emission improvements in HVAC systems, hotel room energy management systems and electrical equipment (including laundries); and increasing the amount of in-situ renewable energy generation.

National-level solutions and interventions:

National-level solutions that have been ranked and grouped based on their likely impact and require either actions led by government policy-makers and/or that call for public or public/private sector investment in national and local infrastructure to address identified hotspots. These national-level solutions should support private sector tourism actions to achieve a more sustainable value chain. They include:

- **Developing / adapting a National GHG / Energy Policy for the tourism sector:** policies on renewable energy and energy efficiency can provide essential context for business action. Climate policy is well developed, but the role of Tourism as a driver and carrier for mitigation needs to be more clearly established.
- **Improving the production and conversion of energy:** build on existing renewable energy infrastructure projects to reduce dependency on imported fossil fuels for the generation of energy. The existing provision of government fiscal and non-fiscal incentives (e.g. a feed-in tariff to pay those generating renewable energy and duty-

free importation of renewable energy equipment) should help to encourage tourism businesses to invest in renewable energy.

- **Mandatory and voluntary standards for efficient use of resources and energy in hotels and restaurants:** support the creation of mandatory standards for efficient use of resources and measurement of emissions in all hotels with more than 100 rooms. Voluntary for hotels with 50+ rooms. Also look at mandatory and voluntary standards for the use of solar hot water systems in hotels. The existence of the Philippines Green Building Code should facilitate this activity.
- **Policy support for healthy, sustainable food sourcing, purchasing and diets:** the development of dietary guidance that promotes and supports the use of healthy, low-carbon and resource efficient menus in hotels and restaurants to reduce the greenhouse gas emissions (GHG) resulting from sourcing, menu and consumption decisions. A healthy, low-carbon and resource efficient menu minimizes the emissions released from the production, packaging, processing, transport, preparation and waste of food. Major tenets of a healthy, low-carbon diet include eating less red meat and dairy products, eating less industrially produced food in general, eating food grown locally and seasonally, eating less processed and packaged foods and portioning of meals accordingly to the nutritional needs of visitors. Research and experience elsewhere e.g. the revised Live Well Plate ('Eating for 2 Degrees')⁴⁴ shows that it is possible to achieve a 30% reduction in greenhouse gas emissions by 2030 based on sourcing and eating this way.
- **National food waste strategy:** develop a national food waste strategy in line with UN SDG target 12.3 to halve food loss and waste by 2030, with specific components and targets for the tourism sector, including food waste reduction targets, incentives to redistribute surplus food to charitable organisations and the provision of food waste recycling infrastructure to enable the production of renewable energy from biogas and compost for use in agriculture. Implementation of the strategy could include a voluntary agreement with the tourism sector; a consumer/tourist focused behaviour change campaign in collaboration with tourism operators, hotels and restaurants; and a national food waste quantification and best practice platform.
- **National circular economy policy package:** development of a circular economy policy package that encourages and promotes the development of more sustainable, innovative products and services, including consideration of circular / sustainable product, service and business model design and procurement, the promotion of sustainability standards and certification in tourism, the promotion of sustainable consumption in tourism, energy efficiency and product life extension for electrical and electronic products. This should include the creation of incentives to drive the procurement of more sustainable products and services and promoting demand for certified sustainable products.
- **Enhance legislation and regulation of waste management to reduce land-based, river and marine pollution:** the role of legislation and better regulation in ensuring appropriate collection and management of waste streams was identified in workshops in the Philippines. This could include new targets for food waste prevention.
- **Enhance legislation and regulation on drinking water quality and wastewater treatment to improve infrastructure, water security and protect tourism biodiversity**

⁴⁴ For more information please see: https://www.wwf.org.uk/sites/default/files/2017-09/WWF_Livewell_Plates_Full_Report_Sept2017_Web.pdf

resources: the role of legislation in ensuring drinking water quality, the development of a freshwater distribution system and the appropriate collection and treatment of wastewater to improve water security in the tourism sector and protect the natural environment on which the tourism sector depends.

- **Development or review of the National Tourism Development Plan (2016-2020):** originally established under the Tourism Act of 2009 (RA9593), envisions a tourism industry that is globally competitive, environmentally sustainable, socially responsible and culturally rich, thereby promoting inclusive growth in tourism businesses. The Plan seeks to ensure the integration of climate mitigation and adaptation and resource efficiency aspects into the tourism sector, focusing in particular on accommodation, power, food and beverage, transport, water and waste sectors. This includes adopting measures to enhance environmental preservation and climate change mitigation and adaptation by:
 - Promoting green technologies and innovative conservation measures in the development of tourist sites and facilities by acknowledging such in accreditation processes;
 - Actively participating in the ASEAN initiatives for the preparation of a manual of guidelines for incorporating environmental preservation and climate change mitigation, adaptation and resilience in the tourism sector;
 - Developing two modules namely: (1) the framework, approaches, parameters and measures for Climate Change and Tourism in the ASEAN, which will provide directions to manage climate-related issues in the ASEAN; and (2) the ASEAN Sustainable and Inclusive Tourism Assessment Tool (ASITAT), which is an evaluation mechanism to measure destination sustainability has been spearheaded by the Philippines;
 - Working with the Department of Tourism (DOT) to draft a Philippine Sustainable Tourism Guidebook, using ASITAT as the baseline for evaluating sustainable tourism destinations. The DOT has tested some 16 local tourism destinations in the first semester of 2018.

This type of review would define the vision of the tourism sector by 2030 (or beyond) and would identify objectives in line with the sustainable development objectives of the country, integrating mitigation, adaptation and resource efficiency concerns. This strategy would also identify and describe key measures that would be taken in order to achieve the objectives. A medium-term plan or strategy would help to provide a framework for the sustainable development of the sector and to address a number of the environmental hotspots identified in this report.

- **Making the transportation network more sustainable:** the EU Sustainable Transport for Areas with Tourism through Energy Reduction (STARTER) project identifies that “the seasonality of tourism demand leads to rising demand for transport and mobility services during the high season, which impacts heavily the traffic in specific touristic regions dealing with the challenges posed by seasonal traffic is not simply the task of the authorities: main players of the transport sector, environmental organisations and the tourism sector should join forces to resolve related issues. The concept of ‘Local Travel Plan Networks (LTPN)’ can be used to shift tourist travel to more sustainable mobility options, including consideration of electric or more fuel-efficient vehicles for the transportation of tourists and the goods and services the tourism sector depends upon. The Philippine government is planning to introduce a Clean Fleet programme,

including energy efficiency labelling for new vehicles and vehicle emissions controls to provide an incentive to businesses looking at the possibility of buying low emissions vehicles.

A full list of business value chain and national-level solutions captured during the November 2017 country workshop can be found in **Annex G** of this report.

In order to contextualise how these solutions discussed in the workshops in 2018 addresses the hotspots identified in the report, the following summary table has been provided.

below summarises the longlist of solutions, their sources and the relevant hotspot they are connected to. In the next stage of this project (shortlisting) we will assess their potential contribution to addressing the hotspots.

Table 12: Long list of business value chain and national-level solutions and interventions.

i = indirect solution for hotspot

d = direct solution for hotspot

Long list of solutions	Hotspots in Tourism Value Chain - Philippines																			
	GHG					Energy					Water					Waste				
	Meat and dairy products	Electricity and heating/cooling	Primary production of fresh produce	Fish and seafood products	Transportation	Electricity and heating/cooling	Processing of meat and dairy products	Transportation	Energy infrastructure	Preparation and cooking of food	Production of livestock, crop and beverage	Water use in processed foods	Wooden furniture and non-clothing textiles	Water use in hotels and restaurants	Water resource management	Food waste in hotels and restaur.	Production of livestock, crop and beverage	Waste management infrastructure	Food/organic waste recycling	Single use items/Plastics
National sustainable tourism development plan	i	i		i	i	i		i		i				i	i	i		i	i	i
Share best practice / visits		i				i				i				i		i			i	i
Provision of training for functions / across teams		i				i				i				i		i			i	i
Adopt a sustainable procurement / purchasing policy	i	i	i	i	i	i	i	i			i	i	i				i			i
National circular economy policy package	i	i		i	i	i		i	i	i				i	i	i		i	i	i
Create incentives for purchasing more sustainable items	i	i	i	i	i	i	i	i			i	i	i				i			i
Promote the demand and consumption of certified products	i	i	i	i	i	i	i	i			i	i	i				i			i

Long list of solutions	Hotspots in Tourism Value Chain - Philippines																			
	GHG					Energy					Water					Waste				
	Meat and dairy products	Electricity and heating/cooling	Primary production of fresh produce	Fish and seafood products	Transportation	Electricity and heating/cooling	Processing of meat and dairy products	Transportation	Energy infrastructure	Preparation and cooking of food	Production of livestock, crop and beverage	Water use in processed foods	Wooden furniture and non-clothing textiles	Water use in hotels and restaurants	Water resource management	Food waste in hotels and restaur.	Production of livestock, crop and beverage	Waste management infrastructure	Food/organic waste recycling	Single use items/Plastics
Define sustainable product specifications for hotspots	i	i	i	i	i	i	i	i			i	i	i				i			i
List of suppliers / supplier accreditation / supplier platform	i	i	i	i	i	i	i	i			i	i	i				i			i
Champion for green procurement	i	i	i	i	i	i	i	i			i	i	i				i			i
Agree a replacement schedule for equipment / furniture		d				d							d							
Consider removing / replacing high impact food / ingredients for low impact food / ingredients	d		d	d			d			d	d	d				d	d		d	
Ban single use items																				d
Create cleaner production awards	i	d	i	i	i	d	i	i			i	i	i	d		d	i		d	i

Long list of solutions	Hotspots in Tourism Value Chain - Philippines																			
	GHG					Energy					Water					Waste				
	Meat and dairy products	Electricity and heating/cooling	Primary production of fresh produce	Fish and seafood products	Transportation	Electricity and heating/cooling	Processing of meat and dairy products	Transportation	Energy infrastructure	Preparation and cooking of food	Production of livestock, crop and beverage	Water use in processed foods	Wooden furniture and non-clothing textiles	Water use in hotels and restaurants	Water resource management	Food waste in hotels and restaur.	Production of livestock, crop and beverage	Waste management infrastructure	Food/organic waste recycling	Single use items/Plastics
Create environmental protocols for suppliers	i	i	i	i	i	i	i	i			i	i	i				i			i
Programme to encourage purchase of local crafts					d			d												i
Setting specification for room design		d				d														
Build a consortium with other businesses to enable changes in procurement practices	i	i	i	i	i	i	i	i			i	i	i				i			i
National food waste strategy	i		i	i			i			i	i	i				i	i		i	
Provision of information to guests		d				d								d		d			d	d
Diversify menus / Offer a local /seasonal meal to tourists	d		d	d			d			d	d	d				d	d		d	
Make some products available on request only	d		d	d			d			d	d	d				d	d		d	

Long list of solutions	Hotspots in Tourism Value Chain - Philippines																			
	GHG					Energy					Water					Waste				
	Meat and dairy products	Electricity and heating/cooling	Primary production of fresh produce	Fish and seafood products	Transportation	Electricity and heating/cooling	Processing of meat and dairy products	Transportation	Energy infrastructure	Preparation and cooking of food	Production of livestock, crop and beverage	Water use in processed foods	Wooden furniture and non-clothing textiles	Water use in hotels and restaurants	Water resource management	Food waste in hotels and restaur.	Production of livestock, crop and beverage	Waste management infrastructure	Food/organic waste recycling	Single use items/Plastics
Monitor and measure food waste	i		i	i			i			i	i	i				i	i		i	
Review cooking and storage practices		d				d				d						d			d	
Communicate with customers and review portion and plate sizes	d		d	d			d			d	d	d				d	d		d	
Use of data / analytics to better predict demand for food and drink	i		i	i			i			i	i	i				i	i		i	
Staff training on the importance of food	i		i	i			i			i	i	i				i	i		i	
Donate uneaten food																			d	
Food recycling programmes	i		i	i			i			i	i	i				i	i		d	
Enhance legislation on waste management to optimise waste management	i		i	i			i			i	i	i				i	i		i	
Energy Audit		d				d			i											

Long list of solutions	Hotspots in Tourism Value Chain - Philippines																			
	GHG					Energy					Water					Waste				
	Meat and dairy products	Electricity and heating/cooling	Primary production of fresh produce	Fish and seafood products	Transportation	Electricity and heating/cooling	Processing of meat and dairy products	Transportation	Energy infrastructure	Preparation and cooking of food	Production of livestock, crop and beverage	Water use in processed foods	Wooden furniture and non-clothing textiles	Water use in hotels and restaurants	Water resource management	Food waste in hotels and restaur.	Production of livestock, crop and beverage	Waste management infrastructure	Food/organic waste recycling	Single use items/Plastics
Frequency Convertors									d											
Train architects in energy efficient design		d				d														
Mandatory standards for efficiency in large hotel		d				d														
Improve access to finance									i											
National GHG / Energy Policy		i			i	i		i	i											
Establishment in the tourism sector of a specialized information unit for data collection related to climate change adaptation and mitigation	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i
Company GHG / Energy Policy		d				d				d										
Improve production / conversion of energy		d				d			i											
Own PV, biomass, wind turbines									d											

Long list of solutions	Hotspots in Tourism Value Chain - Philippines																			
	GHG					Energy					Water					Waste				
	Meat and dairy products	Electricity and heating/cooling	Primary production of fresh produce	Fish and seafood products	Transportation	Electricity and heating/cooling	Processing of meat and dairy products	Transportation	Energy infrastructure	Preparation and cooking of food	Production of livestock, crop and beverage	Water use in processed foods	Wooden furniture and non-clothing textiles	Water use in hotels and restaurants	Water resource management	Food waste in hotels and restaur.	Production of livestock, crop and beverage	Waste management infrastructure	Food/organic waste recycling	Single use items/Plastics
Improve efficiency and climate-friendliness of HVAC		d				d														
Increase efficiency of other electrical equipment		d				d				d										
Room energy management systems		d				d														
Introduction of building energy efficiency standards or building codes for the construction of new hotels		d				d														
Transportation Network					d			d												
Laundry		d				d								d						

8. Key Environmental Indicators

UN Environment (2017) [Recommended key environmental indicators for the tourism private sector](#) identifies major environmental indicators that would help the tourism private sector to contribute to the [Sustainable Development Goals](#) (SDGs) and Paris Agreement using Life Cycle perspective. Based on the assessment of hotspots in the Philippines and Dominican Republic, St Lucia and Mauritius, the following indicators are recommended in **Table 13** below:

Table 13: Recommended key environmental indicators

Key Environmental Indicator	Level	Units	Evidence / Source which could be used for monitoring
Total energy use	Total and by functional unit	Megajoules, MJ	Grid electricity, renewable electricity, combustion of fuels.
Total volume of solid waste generated	By waste type, total and functional unit	Kilogrammes, kg	Surveys, national waste statistics
Total quantity of animal meat by meat type	Total and by functional unit	Kilogrammes	Purchase ledger
Corporate carbon footprint	Total and by functional unit	Kg CO ₂ eq	Corporate Social Responsibility Reports
Total Volume of Water Use	Total and by functional unit	Volume	Metering
Water Footprint (ISO14046)	Total and by functional unit	Volume	Databases (e.g. within LCA software)

Based on the surveys undertaken, data on energy use on site by hotels and restaurants is frequently collected and recorded. Data on waste and purchases are infrequently collected. Water foot printing is not undertaken on a regular basis by any organisation surveyed and corporate carbon footprint is infrequently reported. In order to use the recommended indicators there is a need for additional commitment from hotels and restaurants, along with the capacity building being provided through this project. Improvement of organisation structures for reporting and co-ordination with public utilities and suppliers will be required to generate the required information.

9. Conclusions

The hotspots analysis process has identified a number of challenges to effectively providing a baseline for greenhouse gas emissions and resource efficiency of hotels and MICE.

Through databases such as Eora, territorial impacts can be identified for a range of environmental issues. However, whilst imports from overseas are quantified in terms of total expenditure, they are not identified as specific products. So, whilst it may be known how much has been spent by a sector on imports from a certain country, it is not possible to use the same database to identify what these are. Additional measures must therefore be taken to understand the importance of imported produce.

One way to address this is to obtain data directly from organisations within the tourism value chain. To this end, a survey has been undertaken to gather data. However, a systematic issue is that accounts departments either do not have data available in a suitable format or are unable to provide data on purchases. Across the four countries participating in the Transforming Tourism Value Chains project less than 10 hotels have been able to provide the necessary data to date.

Despite the limited sample of hotels and MICE, there is a high degree of alignment between the hotspots indicated by databases (excluding imports) and survey data (including imports), and the contribution of tourism value chains to territorial energy demand, greenhouse gas emissions and water footprint has been quantified. This suggests that the omission of imports does not adversely impact on the identification of hotspots in tourism value chains, though it will inevitably affect the quantification of the hotspot. Sufficient data has been gathered to allow the project to progress to the next stage of shortlisting and prioritising interventions.

Value chain mapping was the basis of finding hotspots in the tourism value chains in Philippines. Travel to and from Philippines was deemed outside system boundaries, but all other activities supporting tourism, from agriculture that grows food consumed in the restaurants, to the mining of metals and manufacturing of furniture that is used in the buildings. The most significant expenditures of Philippine's Hotels, restaurants and MICE sector are Food and Beverage, Energy, Furniture and construction.

The main identified hotspots are as follows: electricity and meat production (including livestock husbandry and feed) for GHG emissions; primary production of food for water (mostly used in irrigation); HVAC, lighting and kitchens for energy; and food waste arisings and lack of waste regulation and infrastructure for waste.

This report offers a long list of 48 solutions related to cross-cutting actions, sustainable purchasing, operational practices, specific on-site energy solutions and national level solutions. One example of an operational solution for the hotspot of meat is diversification of menus into more local and seasonal meals, and an example of a national-level solution is development of a national food waste strategy. One example of operational solution for the hotspot of electricity use is increased efficiency and reducing the (over) use of air conditioning systems, and an example of a national level solution would be an enactment of mandatory and voluntary standards for energy use in hotels.