

QUEENSLAND TOURISM CLIMATE ACTION

A PATHWAY TO NET ZERO



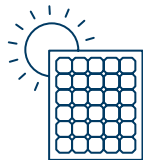


INTRODUCTION

The **Queensland Regional Tourism Network (QRTN)**, the collective of thirteen destination management organisations in Queensland commissioned EarthCheck and Griffith University to examine the carbon footprint of the tourism sector in Queensland with the intent of developing a pathway to net-zero - the **QRTN Climate Action Project**.

The initiative is aligned to the “**Towards 2032 Action Plan for Tourism Recovery**” which recommends the development of a clear pathway for the visitor economy to net zero and establishment of success measures. Research facilitated by the Queensland Government, led by Ernst & Young indicates that tourism as an industry is at the greatest risk from climate change¹.

In response to the identified challenges and threats, the **QRTN Climate Action Project** is consistent with the Queensland Government’s commitment to:



1. Reach 50% renewable energy use by 2030



2. Achieve 30% GHG emissions reduction below 2005 levels by 2030



3. Net Zero emissions by 2050

1. Capitalising on Queensland’s Opportunities in a zero net emissions future: Policy needs in response to the risks and opportunities of climate change. 2019. Ernst & Young.

AIM OF PHASE 1

While the **QRTN Climate Action Project** aims to deliver a pathway to net zero emissions for the Queensland tourism industry by 2050, Phase 1 focuses on:

- establishing a baseline carbon footprint methodology,
- understanding the tourism carbon footprint now and forecast to 2050,
- identifying potential scope 1 and 2 emissions reductions,
- identifying pathways and timeframes for achieving the State Government's targets for the tourism industry.

This project directly supports the recommendations addressed in the **Building a Resilient Tourism Industry: Climate Adaptation Plan**, which seeks to improve industry resilience, accelerate carbon neutrality and unify industry with government and community expectations.

The **QRTN Climate Action Project** is made up of three phases. This report delivers the outcomes of Phase 1 of the project.

The implementation of Phase 1 consisted of five project steps:

1. **DESKTOP REVIEW OF METHODOLOGIES**

2. **ESTABLISH A METHODOLOGY**

3. **MEASURE AND BENCHMARK CARBON FOOTPRINT**

4. **ANALYSIS AND DECARBONISATION OPTIONS**

5. **RECOMMENDATIONS REPORT**



QUEENSLAND REGIONAL TOURISM CARBON FOOTPRINT METHODOLOGY

There are a wide range of methods that can be used to determine the carbon footprint of tourism. These can be described as top down, bottom-up, transit, or a combination of the above approaches.

Top down relies on macroeconomic data using national accounts and Tourism Satellite Accounts (TSA) and applies an estimate of GHG emissions based on impact. Essentially, it applies carbon to dollars spent in the tourism economy.

Bottom up is more granular and uses tourism operator data, following the visitor directly. For example, a visitor might stay in a 3-star hotel and drive 300km, these emissions can then be directly calculated.

Transit studies estimate the emissions associated with travel to and from the main destination.

A combined approach takes a top-down and bottom-up approach, incorporating TSA data and verifying it with tourism operator data that follows the visitor.

This project takes a combined approach using top-down macro-economic analysis produced by Pham et al. for the Queensland Government (2018).

Bringing together Australia's national greenhouse gas accounts and regional TSA, the emissions of key tourism industries were estimated. Drawing on global aviation data allowed to add an estimate of international air travel emissions. This present project provides the opportunity to complement the earlier work with a regionally and sector specific bottom-up method. This provides greater insight into sub-sectors and visitor behaviour in Queensland's tourism regions.

TOP DOWN

Macro Tourism GHG account

- Expenditure derived
- Regional carbon account (input/output tables, TSA data)
- National GHG emission account

OUTPUTS

- CO₂-e for tourism in state/region
- Share of tourism emissions of total economy

BOTTOM UP

Micro Tourism GHG footprint

- Activity derived
- Regional carbon account (input/output tables, TSA data)
- National GHG emission account

OUTPUTS

- CO₂-e for international aviation and cruise ships
- CO₂-e for domestic transport to destination

TRANSIT TO DESTINATION

- Transit to destination
- Arrivals by origin
- Nights in region as %
- Modal breakdown
- Emission factors for transport

OUTPUTS

- CO₂-e for international aviation and cruise ships
- CO₂-e for domestic transport to destination

DATA SOURCES

Queensland-wide calculations

Queensland data were obtained for tourism activity data, carbon intensity and where possible more specific data were collected to reflect the context of each region. There is a low level of carbon reporting undertaken by operators across the state and improved reporting is required in the future.

Tourist activity and carbon intensity data

International Visitor Survey (IVS) and the National Visitor Survey (NVS) are the primary data sources for tourist activity data.

Tourism Research Australia (TRA) collects data on the consumption patterns of both international and domestic visitors, making these consumption-based datasets highly suitable for the combined modelling approach.

In this project, two types of data were required:

- 1. Activity data:** provide information on what visitors do and to what level/intensity.
- 2. Carbon intensity data:** provide information on the average carbon emissions for a given activity, ideally measured in carbon-dioxide equivalent to consider non-CO₂ greenhouse gases.

Activity data are multiplied with carbon intensity data to arrive at a total estimate for CO₂-e emissions. Effectively, everything a visitor does in Queensland translates into carbon emissions.

Activity Data

IVS

NVS

BITRE

GBRMPA

Other



Carbon Intensity Data

(CO₂-e per guest night, CO₂-e per pkm, CO₂-e per activity, etc.)

EarthCheck

Literature

Corporate Reports

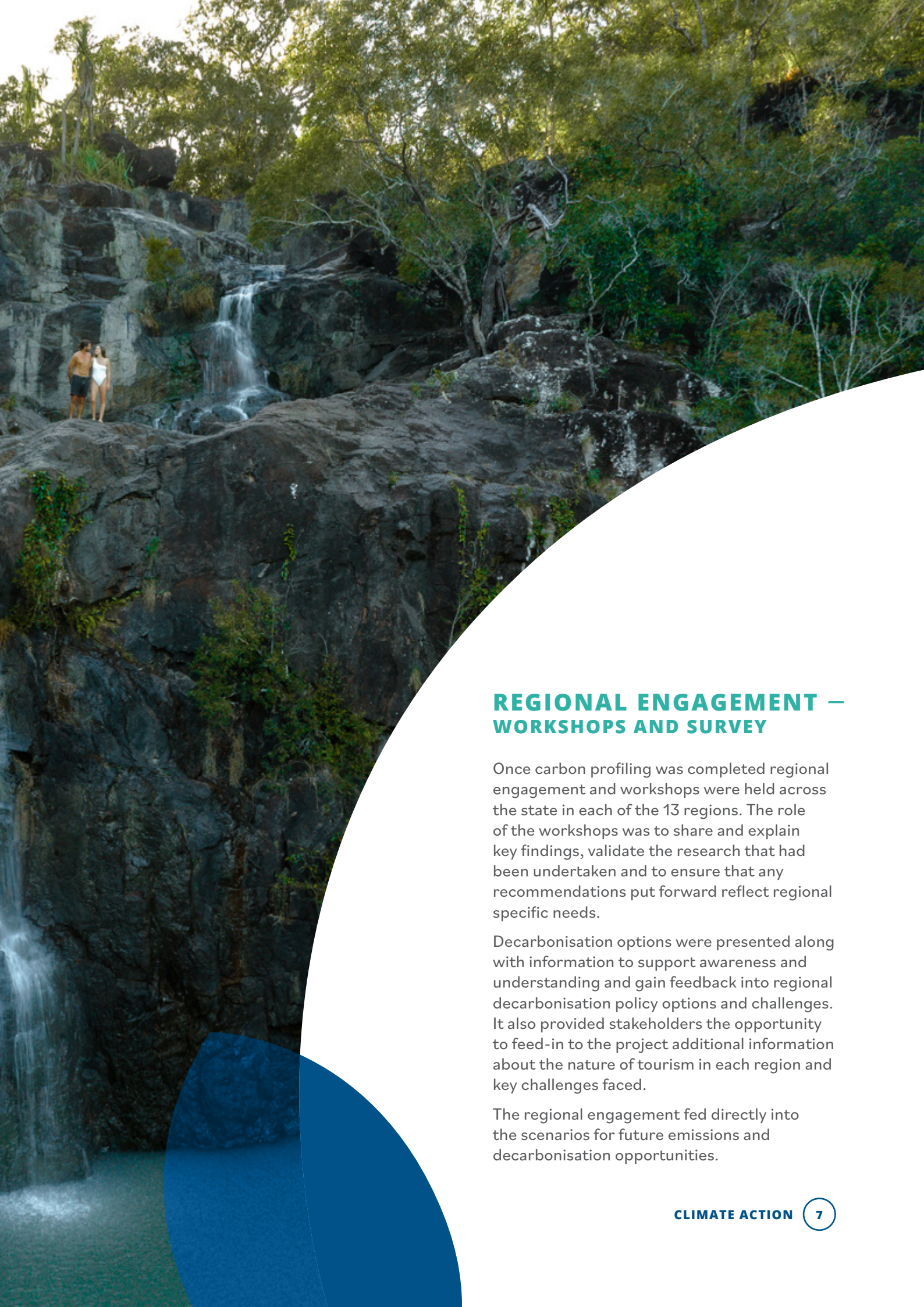
Carbon Projects



Cluster Data for Validation



Total CO₂-e for Subsectors and Regions



REGIONAL ENGAGEMENT — WORKSHOPS AND SURVEY

Once carbon profiling was completed regional engagement and workshops were held across the state in each of the 13 regions. The role of the workshops was to share and explain key findings, validate the research that had been undertaken and to ensure that any recommendations put forward reflect regional specific needs.

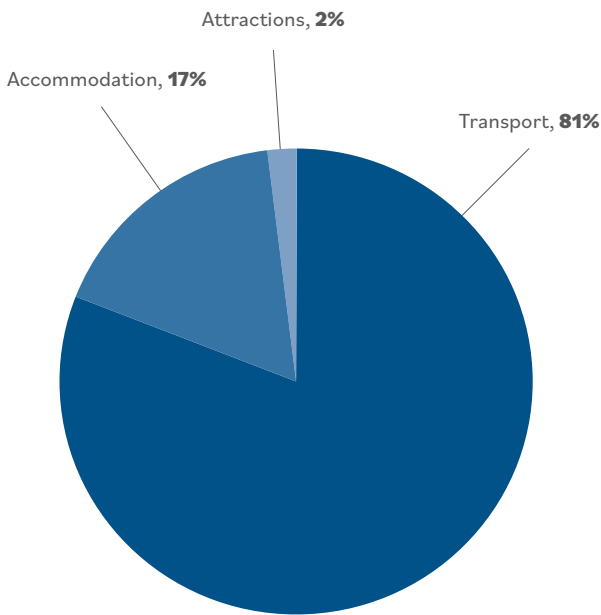
Decarbonisation options were presented along with information to support awareness and understanding and gain feedback into regional decarbonisation policy options and challenges. It also provided stakeholders the opportunity to feed-in to the project additional information about the nature of tourism in each region and key challenges faced.

The regional engagement fed directly into the scenarios for future emissions and decarbonisation opportunities.

TOURISM CARBON FOOTPRINT IN QUEENSLAND

Total emissions attributed to tourism for transport, accommodation and attractions in Queensland in this study is 10.03Mt CO₂-e*.

QUEENSLAND CO₂-e EMISSIONS (2017-2019 3YR AVG)



*22 Titanics weigh approximately 1Mt

The Queensland emissions profile is dominated by **transportation** emissions. The total estimated emissions for the transport sector amounts to 8.2 Mt CO₂-e (2017-19).

Transport is comprised of domestic air (33%), self-drive fuel (30%) and international travel (26%).

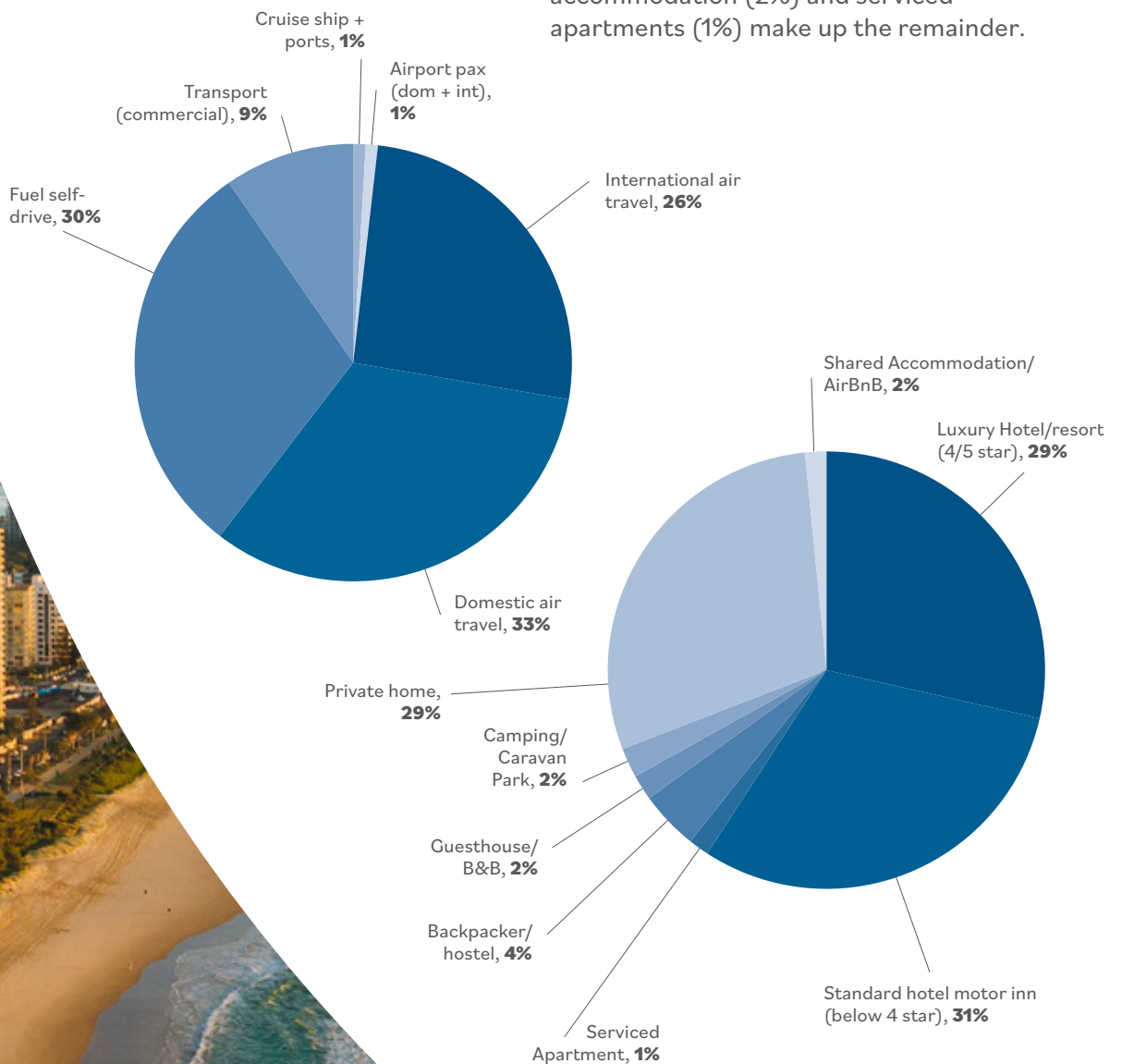
The remainder of transportation emissions come from commercial transportation, and cruise ship ports and journeys.

Accommodation accounts for 17% of the tourism industry's total emissions.

The total estimated emissions for total accommodation amounts to 1.7Mt CO₂-e (2017-19).

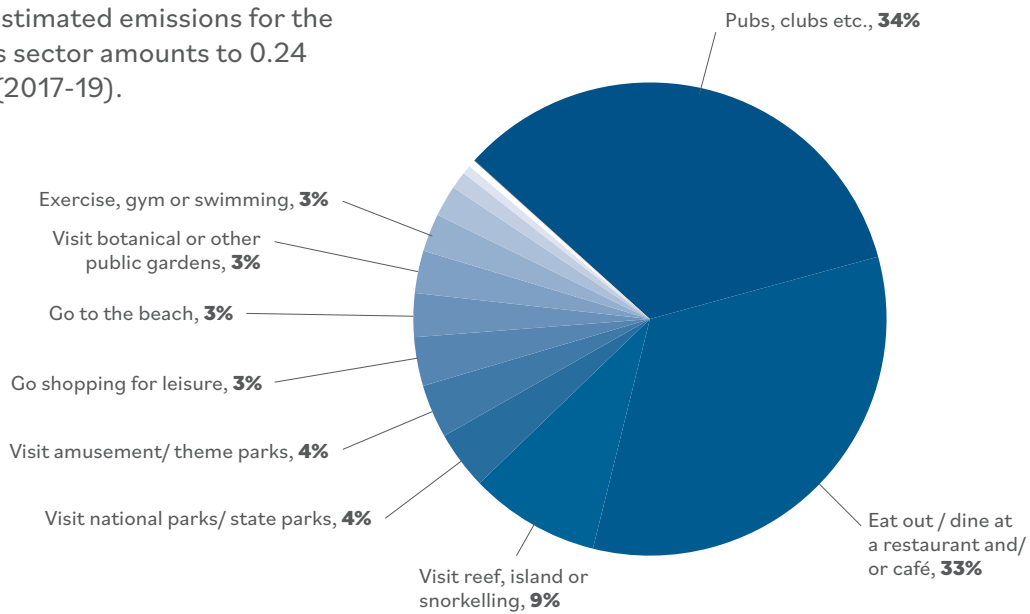
Among this standard hotels and motor inns (31%), luxury hotels 4 star and above (29%) and private home (29%) represent the largest emissions profiles.

Backpackers (4%), guest house (2%), camping and caravan park (2%) shared accommodation (2%) and serviced apartments (1%) make up the remainder.



Attractions account for 2% of Queensland's carbon footprint.

The total estimated emissions for the attractions sector amounts to 0.24 Mt CO₂-e (2017-19).



Whilst this is a small proportion due to the significance of transportation, attraction operators play an important role in delivering the *Travel for Good* brand across the state and therefore their commitment to decarbonisation is equally as important as the larger emitting transportation and accommodation sectors.

Attractions such as eating out (33%), pubs clubs and hotel visits (34%) and visiting reef and islands (9%) account for the largest footprint in this sector.

Attractions' CO₂-e emissions increased by 39% (0.07 Mt CO₂-e) from a base of 0.18 Mt CO₂-e in 2005-2007 to 0.24 Mt CO₂-e

(2017-2019). This reflects the second largest percentage increase of all three areas.

A comprehensive review is included in the main report of each sector.

In comparison to the State GHG Accounts, this Climate Action Project has estimated 10.03 Mt (inclusive of international aviation) CO₂-e for transport, accommodation, convention centres and activities across all tourism destinations in the state. This makes tourism's emissions equivalent to 6.4% which is 0.8% lower than previous studies by Tien et al. and similar to Becken and Patterson (2006) for New Zealand at 6%.



REGIONAL CARBON FOOTPRINTS

Regional benchmarking per visitor impact day has been used as an activity measure to provide comparative analysis.

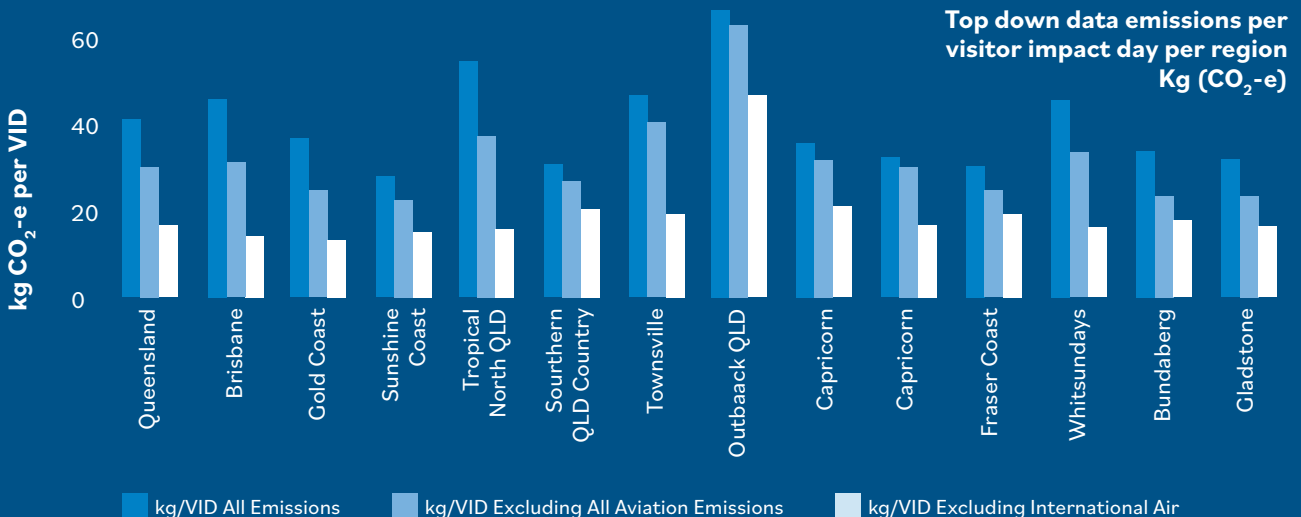
A visitor impact day is a hypothetical per person-day (referred to as ‘impact days’) inclusive of visitor night data for international tourists, domestic tourists and ‘days’ for day trippers.

Three emission profiles are provided to allow some understanding of the role that aviation plays in the emission profile of each destination.

Three scenarios are provided:

1. Kg CO₂-e from all sources
2. Kg CO₂-e excluding international travel
3. Kg CO₂-e excluding all aviation

Detailed regional emission profiles for all regions are included in the main report. While the graph provides a starting point to understand the emission profiles across the state, care needs to be taken given the wide difference in visitor numbers, visitor activities undertaken and the size and maturity of the tourism infrastructure in place.



There is a variability of emissions per visitor impact day due to differing contribution of carbon across sectors in each region and numbers of international, domestic and day guests.

The top three emitting regions per visitor impact day inclusive of all emissions are Outback Queensland, Tropical North Queensland and Brisbane.

Most of Outback Queensland's visitor impact day emissions are attributable to fuel consumption from self-drive visitors (66%). Comparatively, Tropical North Queensland is aviation dominant (70%). This region has the second highest reliance on aviation of any Queensland region.

A comprehensive overview of each region is included in the main report inclusive of the current amount of green power and renewable energy being used within regions.

Both Brisbane and Tropical North Queensland operators have green power agreements in place with 33% of Brisbane vacation hotels and 25% of Tropical North Queensland activities sitting under green power agreements. This is an important step towards Queensland's renewable energy goals.

Further regional engagement is required to gather deeper insight into regional emissions and to build tourism engagement in the process. Whilst there was clear support for the project among leading tourism operators, there is a need to bring all operators into this discussion.





SCENARIOS FOR FUTURE QUEENSLAND TOURISM EMISSIONS

On completion of the Queensland and regional emissions profiles future emissions forecasts were developed.

Scenarios are used to envisage potential tourism futures (Postma & Yeoman, 2021). Scenarios do not predict the future, and projecting tourism's carbon footprint up to 2050 is inherently difficult given the long timespan and numerous uncertainties involved, including the speed of the COVID-19 recovery, political commitment to GHG reduction, and changes in travel and traveller behaviour. The aim of the scenarios is therefore to contrast several possible futures to highlight how changes in visitor growth in combination with carbon efficiency gains may impact the total CO₂-e footprint of tourism in Queensland.

Three scenarios were developed based on changes in visitor growth and efficiency gains across different sub-sectors. The scenarios were informed by potential post-COVID-19 Asia Pacific tourism futures informed by research.

The three scenarios include:

Scenario 1 (S1) Visitor Growth

Pre-COVID-19 level growth, accelerated growth 2024 to 2050, accommodation growth at 3% per annum and day visitor 2% per annum growth. In this Visitor Growth scenario, a moderate annual increase in carbon efficiency ranging from 1.5% for international aviation to 2.5% improvement for accommodation, attractions and remaining transport is achieved

Scenario 2 (S2) Domestic Growth

This scenario (S2) follows a “Compete and Retreat” trajectory (ADB, 2021), influenced by growing nationalism and a decline in global approaches. In this scenario, resources are becoming increasingly perceived as scarce and countries focus on their own approaches and markets. In this future, national interest dominates, and borders are controlled more strictly, resulting in domestic tourism becoming the dominant form of tourism. In this nationalised world, international visitor nights will not grow and remain consistent at (relatively high) pre pandemic (2019) levels. Domestic visitor nights and day trips will grow at a rate of 2.5%, based on Australia’s projected population growth rate of 1.2% up until 2050 (Australian Government, 2019), and additional demand diverted from reduced outbound tourism.

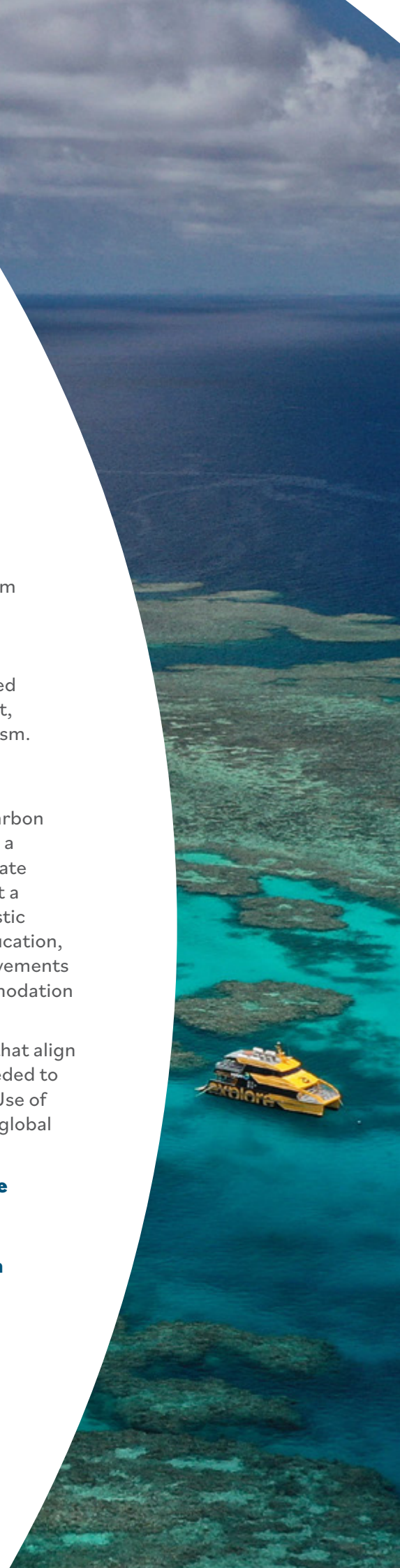
Scenario 3 (S3) Climate Focused

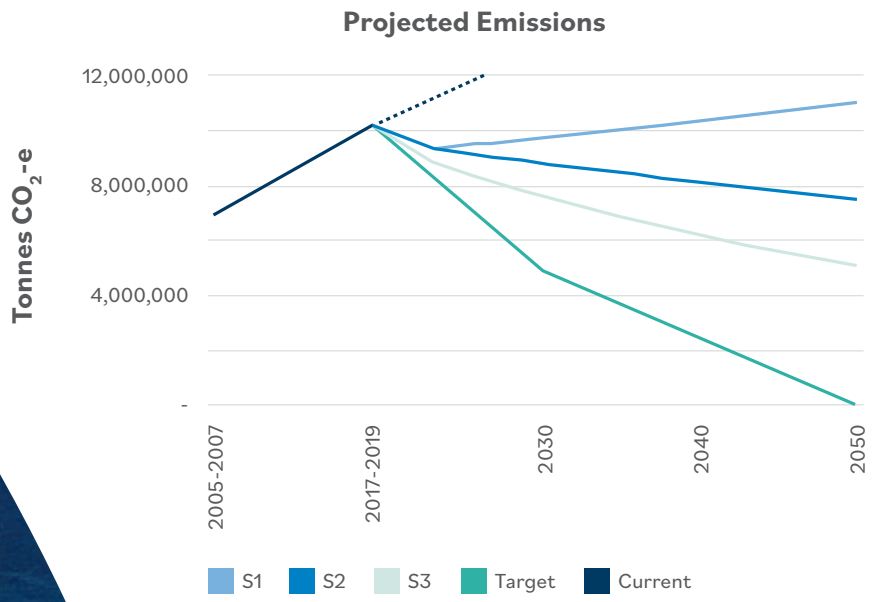
This scenario (S3) represents a future of increased resource prices (partly because policies internal the external costs of, for example, carbon emissions), and a shift towards a sustainability mindset. It represents a future where action on climate is a key focus, both for public and private sectors. In this transformed world, tourism activity grows slowly, at a rate of 1% annually for international visitor nights and 1.5% for domestic visitor nights and day guests. Investment in green infrastructure, education, research and development, and technology leads to efficiency improvements reflected in an annual reduction of carbon intensity of 6% for accommodation and 5% for attractions.

To reach these outcomes, targets are required for regional tourism, that align with the state’s climate commitments. Significant step-change is needed to achieve 2030 results and transformational change to achieve 2050. Use of Science Based Targets² in Phase 2 will support regional alignment to global net zero best practice frameworks.

None of the current scenarios will allow tourism to continue with business as usual to meet its set emissions targets. Decarbonising tourism is a multi-stakeholder collaboration where all actors are required to move together, aligned to a shared agreed goal.

2. Targets are considered ‘science-based’ if they are in line with what the latest climate science deems necessary to meet the goals of the Paris Agreement – limiting global warming to well-below 2°C above pre-industrial levels and pursuing efforts to limit warming to 1.5°C.





In addition to setting regionally specific targets, action is required across tourism destinations, this involves Local Government, tourism operators, destination management organisations and visitor engagement. This approach takes a whole of destination approach to destination management and engaging all aspects of the visitor economy.

This means visitor infrastructure (roads, airports, public toilets etc.), attractions (National Parks, beaches, theme parks etc.), accommodation (hotels, caravan parks, shared economy) and transportation, all need strategic planning and targeted actions.

TAKING ACTION ON DECARBONISATION

The QRTN Climate Action Project seeks to determine how and when the tourism sector can reach net zero. That is, the point when levels of greenhouse gases in the atmosphere stop climbing and start to steadily decline based on the action taken to stop or reduce anthropogenic carbon sources.

The decarbonisation process followed a four-phase method to arrive at decarbonisation models for 2050, for the tourism industry.

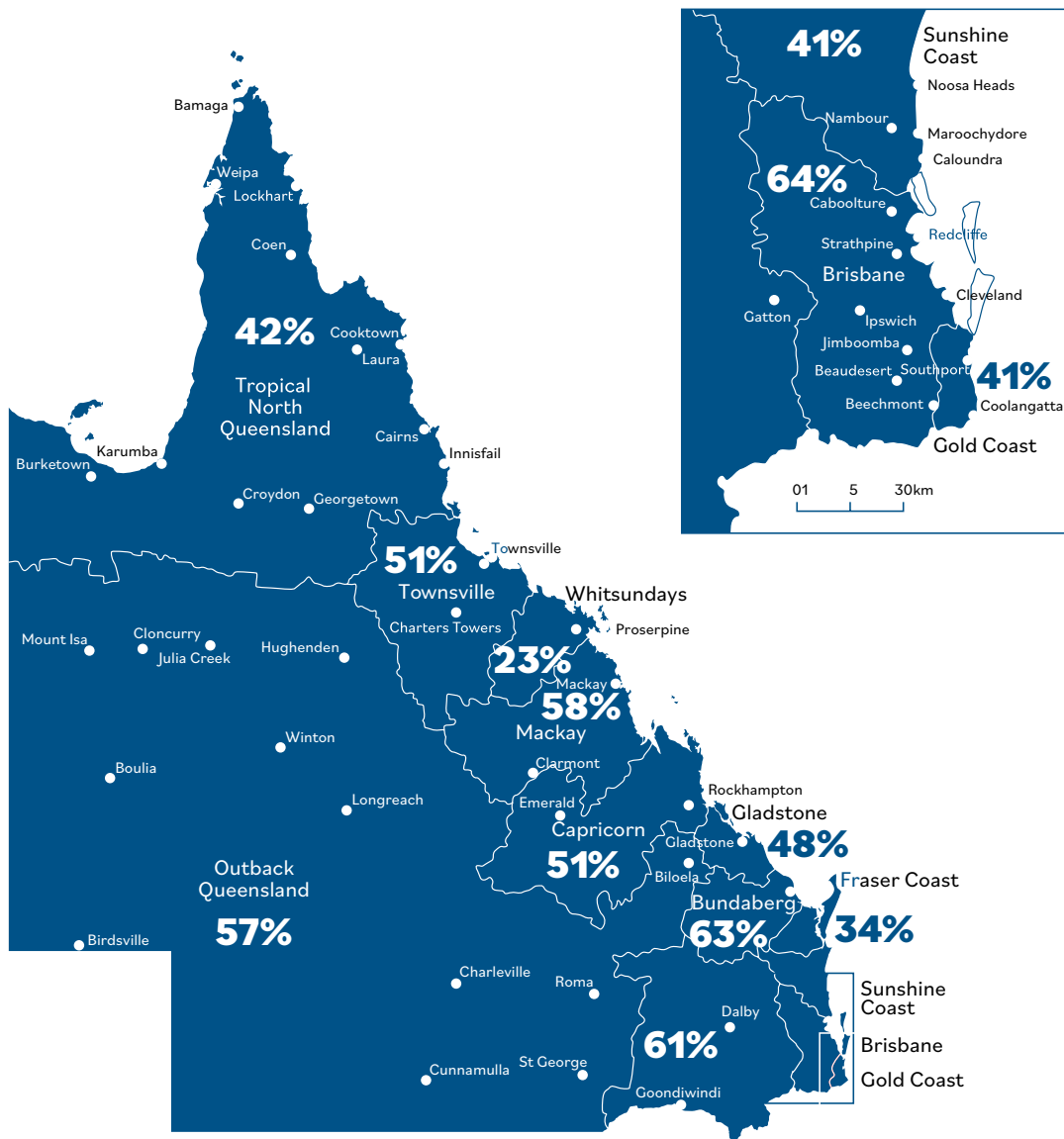
1. **Scoping and researching available options**
2. **Further investigation and validation, liaison with external experts**
3. **Verification of carbon reduction capability**
4. **Modelling impact of options on forecast**

These four phases were an initial sustainability and desktop assessment, options review and development and mapping options to the tourism sector and forecasting models to net zero 2050.

To achieve net zero 2050 targets, bold, progressive action is needed. Even to meet the interim 30% reduction of emissions by 2030, regions need to take a pro-active approach to measuring, monitoring, and managing their impact.

The process to regional decarbonisation follows the define, reduce, switch and offset strategy. Each region's reduction is highlighted in the map.

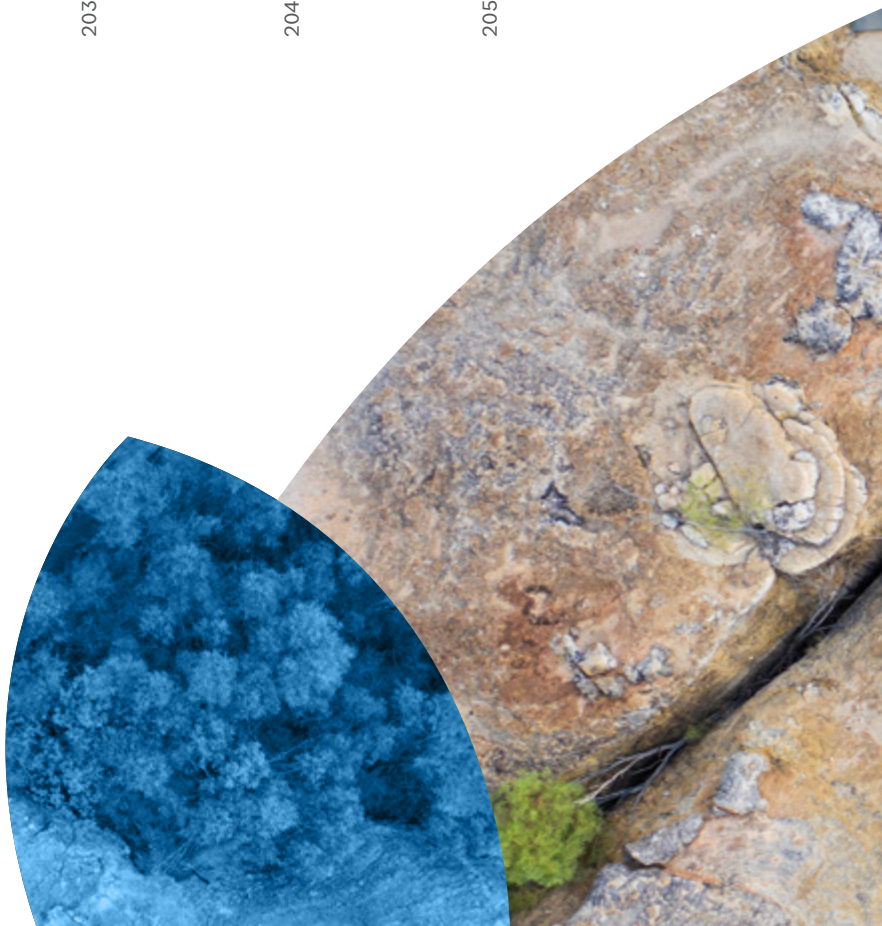
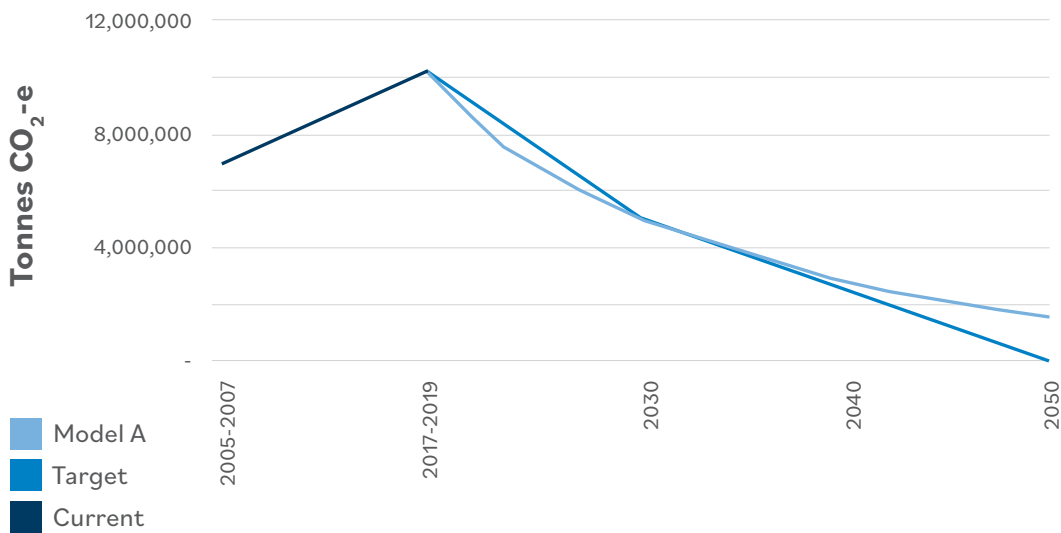









In an effective decarbonisation strategy, a target is only one requirement to achieve results. The target, which sits in the planning phase, is to be established, communicated, and then mapped to regional generating sources (established through this project). This project highlights each region’s generating sources through sector specific profiles. Effective leadership is also required in the planning phase to deliver outcomes that meet the needs of community. The QRTN has taken a leadership approach through this project to drive change across the tourism industry.

The decarbonisation options implementation is modelled below. This model is designed to meet the 2030 targets. With carbon reduction rates manually adjusted for each five categories - accommodation, attractions, international aviation, domestic aviation, and remaining transport directly to produce outcomes that align with the state’s target. Noting without the manual adjustment, the base scenarios fail to reach our climate goals.

**Model A: Climate Focused Pathway
Adjusted to Meet 2030 Target**



Outlined below are the emissions reductions required for the five categories that lead to emissions levels reaching the 2030 target level for Queensland. This trajectory will not meet the State 2050 target. These application rates leading to emissions reductions have manually been set in order to show what rate of reduction is needed to be applied.

	Accommodation	8.0%
	Attractions	8.0%
	International aviation	8.0%
	Domestic aviation	5.0%
	Remaining transport	8.0%

To achieve the outlined reductions, a continued commitment to measuring the carbon footprint of Queensland tourism is important to ensure integrity and data driven decisions making. Measurement, benchmarking, developing regional decarbonisation trajectories and monitoring performance over time is essential.

Identification of suitable actions for reaching reduction targets has four-phases:

- 1. Scoping and researching available options** and developing assessment for a long list of decarbonisation options.
- 2. Further investigation and validation, liaison with external experts** in the technical advisory group, mapping to tourism industry for applicability and magnitude.
- 3. Verification of carbon reduction capability** and application to accommodation, transport and attractions.
- 4. Modelling impact of options on forecast** to 2030 and 2050 scenarios. Review of scenarios by technical advisory group.



The following opportunities were highlighted for the industry:

Transport

1. **Sustainable Aviation Fuel**
2. **Electric Vehicles** - Personal vehicles/buses that are fully electric with charging infrastructure
3. **Accelerate Adoption of Renewable Energy in Transport** - Green hydrogen production (small/large scale) for hydrogen vehicles/marine/house charging/storage to displace traditional fuel - fuel cell bus service

Energy Generation

1. **Switch to Renewable Energy**
2. **Community or Precinct Owned or Operated Microgrid** - PV options with battery storage or PPA with a renewable source
3. **Energy Storage Planning and Development** (thermal, Li-ion, Sodium batteries, etc.)

Energy Efficiency

1. **Net Zero Building Design** - Daylighting, maximum insulation, electrochromic glass/films, passive solar design, and advanced heating and cooling
2. **Electrification** - Movement of transport, appliances, heaters, cookers and devices to electric
3. **Existing Building and Equipment Improvements** - Air flow, insulation, solar powered air cavity fans, cooler insulation, thermoscan, air curtains, high volume low flow fans, etc.

Water

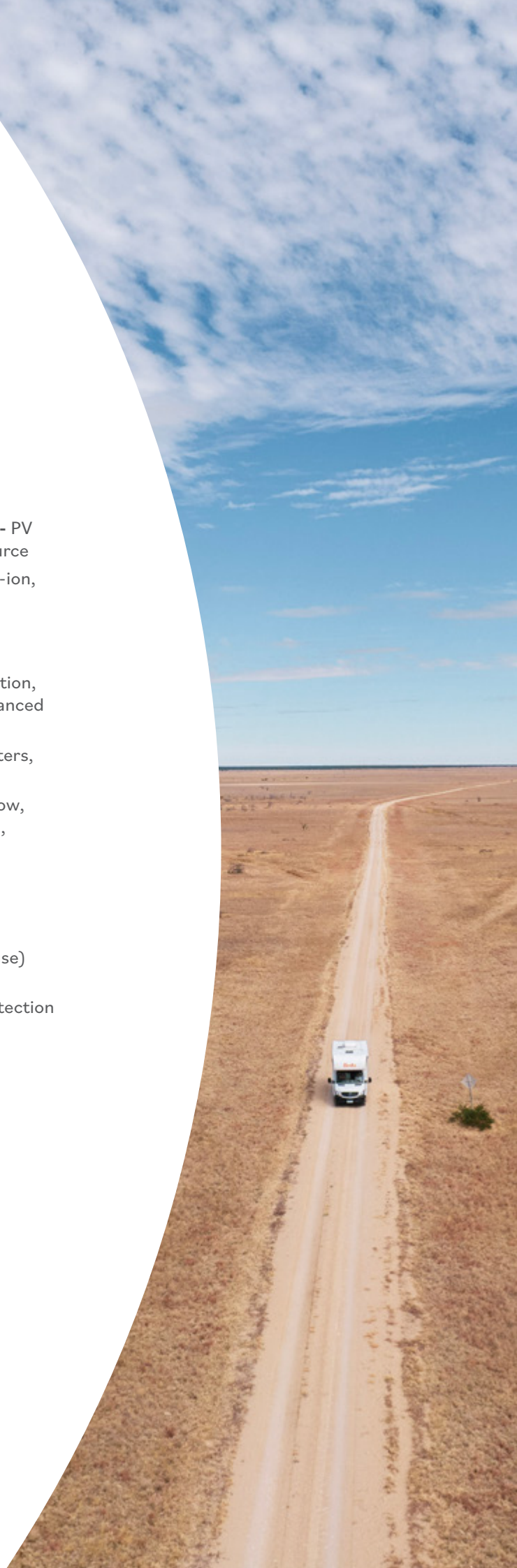
1. **Water Efficiency Education**
2. **Greywater System** (waste water capture, filtration and use) and **Black Water Systems** (compostable toilets)
3. **Real Time Water Monitoring** - Usage, patterns, leak detection

Waste

1. **Circular Economy Projects** - Design, implement, and monitor to eliminate waste (return to source, fast bio breakdown, separation of bio and technical e.g. wood key card with RFID. Use of ASPIRE Waste network
2. **Zero Waste** - Design, phase out single use items such as plastic
3. **Packaging Reduction Management Plan** (full supply chain)

Resilience

1. **Revegetation** - Dune grass, terrestrial, mangrove, seagrass, corals
2. **Localised food production** - hydroponic and aquatic farms, community gardens, livestock
3. **Localised Responsible Carbon Offsets That Have Multi-Factor Benefits to Ecology and Community**





ALIGNING TO MARKET EXPECTATIONS

- **Visitors are seeking sustainable destinations when they travel** – Booking.com and Expedia research indicates between 80-90% of travellers are actively seeking more sustainable travel options. **They are also willing to boycott destinations and businesses that are greenwashing and that are not authentically committed to doing right for people and planet.** Understanding the impact of the tourism sector and actively addressing that impact creates a positive story to tell visitors across each region of Queensland. This leads to a point of comparative advantage.
- **Being transparent** about carbon emissions and shifting perceptions of outcomes will be important especially over the period of rapid change to 2030.
- **Tourism has the power to change travellers' (and residents') behaviour.** As a high-touch point industry tourism has the ability to influence, empower and change attitudes and behaviours with regard to sustainability and responsible consumption. Shifting the narrative internally and externally will help build a market of travellers who positively contribute to Queensland's sustainability ambitions.
- **Visitors can be involved with the decarbonisation process.** Whether through citizen science projects, rubbish clean-ups or encouraging participation with local food chains, there are a plethora of ways to get visitors engaged in the journey to net zero. This supports behavioural shifts, but also shapes a narrative around Queensland's authentic commitments.

FINDINGS

INDUSTRY ENGAGEMENT

There was strong interest in the project across leading industry members. To further engage tourism stakeholder awareness building and education is required industry wide.

To ensure decarbonisation goals are met, whole of industry engagement and measurement is required.

A toolkit of support is also needed to facilitate operator transition – basic target setting and a framework for identification of, and budgeting for, decarbonisation opportunities. Supporting action to happen.

POLICY

Policy leadership will shape the transition towards net zero.

Tourism destination management plans need to embed carbon accounting, measurement, benchmarking and tracking against decarbonisation trajectories to deliver on outcomes.

Data collection processes need to better reflect the data needs of the future – updating TSA and adapting IVS and NVS to capture impacts in a way that will feed directly into modelling is a significant opportunity for Australia.

Subsidies and support mechanisms need to be explored as levers for success for regional and sector transition, especially across transportation.

PHASE 2

1. Continue to **build** and **validate** tourism activity sets and emissions data collected at the regional and state level.
2. Once regional and state emission profiles have been completed they need to be **mapped** and validated against **existing emission** footprints and reports undertaken by LGAs and **other industry sectors** such as agriculture and transport.
3. **Alignment** to State and Commonwealth reports and forecasts.
4. Mapping and alignment to **Olympic and Paralympic Games** commitments and methodology for a carbon positive games.
5. **Online** and **in-market** training programs and carbon measurement **toolkits** for RTOs and operators.





EARTHCHECK



QUEENSLAND REGIONAL
TOURISM NETWORK

