WATER SERVICES
ASSOCIATION OF AUSTRALIA

GUIDE TO SCOPE 3 EMISSIONS MANAGEMENT FOR THE WATER SECTOR

May 2024

WATER SERVICES
ASSOCIATION OF AUSTRALIA

Overview of WSAA

The Water Services Association of Australia (WSAA) is the peak body that supports the Australian urban water industry. Our members provide water and sewerage services to over 24 million customers in Australia and New Zealand and many of Australia's largest industrial and commercial enterprises. WSAA facilitates collaboration, knowledge sharing, networking and cooperation within the urban water industry. The collegiate approach of its members has led to industry-wide advances to national water issues. WSAA can demonstrate success in standardising industry performance monitoring and benchmarking, as well as many research outcomes of national significance. The Executive of the Association retains strong links with policy makers and legislative bodies and their influencers, to monitor emerging issues of importance. WSAA is regularly consulted and its advice sought by decision makers when developing strategic directions for the water industry.

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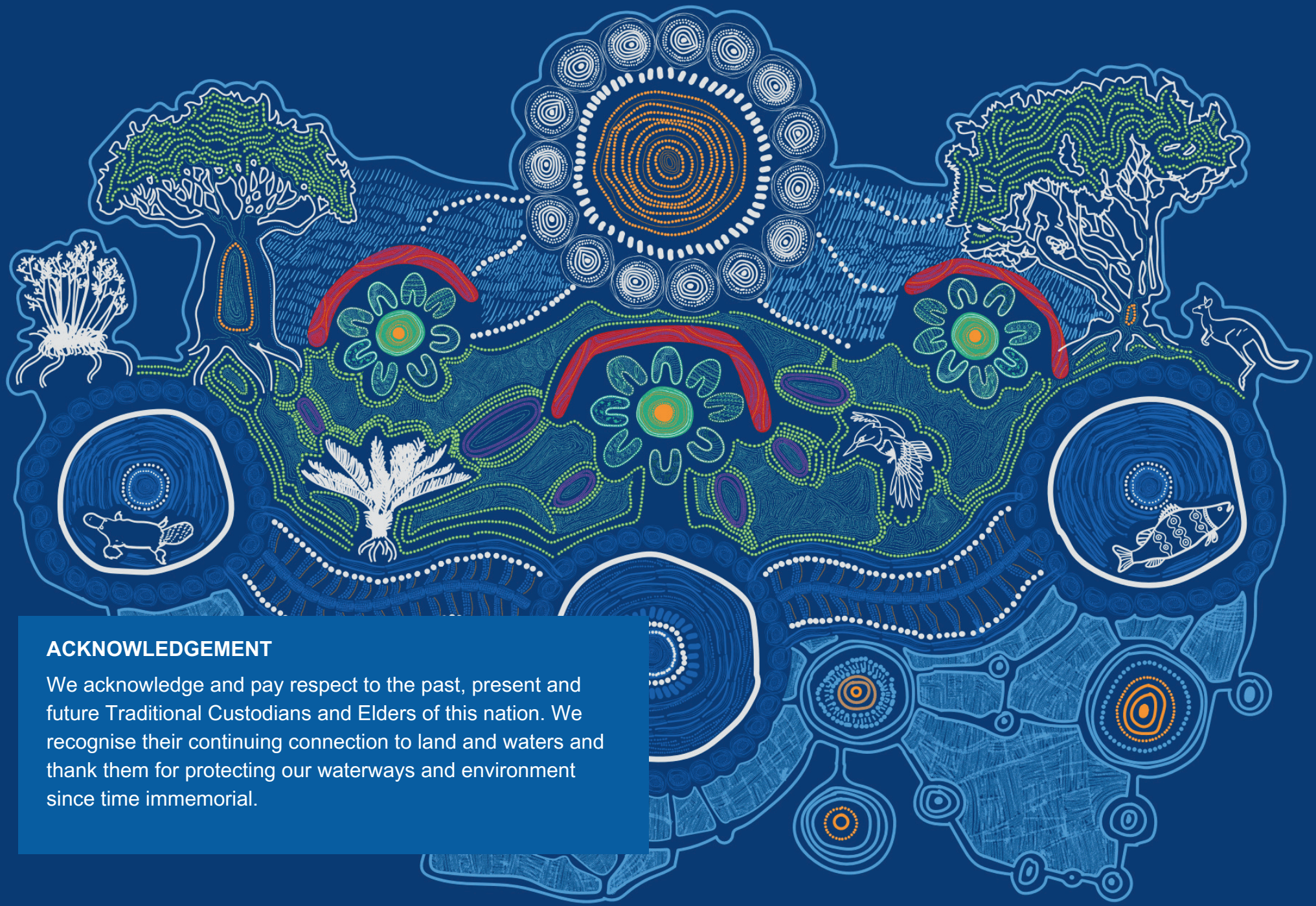

ACKNOWLEDGEMENT

We acknowledge and pay respect to the past, present and future Traditional Custodians and Elders of this nation. We recognise their continuing connection to land and waters and thank them for protecting our waterways and environment since time immemorial.

Foreword

The stakes could not be higher to reduce emissions across the water sector. In Australia, recent weather events have seen records broken through bushfires and floods, with intense extreme weather events becoming more common and having increasingly dangerous impacts on communities and infrastructure. Working with the rest of the world to meet and exceed global emissions targets is vital.

Water utilities stand to be impacted more than most sectors, being one of the largest government contributors to carbon emissions due to the nature of our products. Utilities also have a unique opportunity to enhance customer value by pursuing options that mitigate climate change whilst meeting customer, community, and business expectations.

For the majority of Australian businesses, GHG emissions cost and reduction opportunities site outside their own organisations. This is not necessarily the case for water utilities which are at the forefront in achieving Net Zero (Scope 1 and 2 emissions). Innovations in renewable energy investments including pumped hydro, investments in efficiency measures, waste-to-energy and resource production products like biochar, offer circular, innovative ways to reduce direct emissions while enhancing the resilience of water and wastewater systems.

With that said, measuring and managing Scope 3 emissions (the indirect Value chain emissions that arise from a water utilities activity, but are not under the ownership or direct control of a water utility) holds significant opportunities to realise the shared benefits for water utilities and the communities they serve.

Next to meeting emerging legislative requirements, understanding these indirect emission sources can:

- Foster key cross-sector partnerships to collaboratively transition to a low-carbon economy.
- Help manage transition risks in Value chains.
- Assess where emission hotspots are in Value chains to prioritise reduction strategies.
- Prepare the sector to publicly report its Scope 3 emissions consistently and transparently, meeting stakeholder expectations.
- Inform decision-making across procurement, regarding which interventions can deliver the most significant emissions reductions.
- Encourage product innovation and cross-sector engagement, to create more sustainable and energy-efficient products.
- Compliment other procurement initiatives such as addressing modern slavery risks and enhancing the circularity of purchased products.
- Provide a holistic overview of the emissions intensity in the provision of water and wastewater services.
- Contribute to national efforts towards achieving Net Zero.

Direct GHG emission sources (Scope 1) are well understood across the water sector, alongside emissions associated with electricity use (Scope 2), where the majority of water utilities have existing targets and strategies to reduce emission sources.

Measurement and management of Scope 3 emissions is an emerging area within the water sector, where very few utilities publicly report on Scope 3 emissions. Challenges are associated with the many and varied frameworks and standards available, setting the boundary for measurement, and consistency in the approach, and all with disclosure requirements for Scope 3 emissions well on the horizon.

This guide provides a starting point to align the sector in its approach to measuring, and ultimately reducing Scope 3 emissions, in parallel with other emission reduction initiatives. It is vitally important that the sector moves forward with earnestly to reduce emissions and embrace cross-sector partnership opportunities and the circular economy in a time of a declared climate crisis of the 'decade that matters'.

ADAM LOVELL

EXECUTIVE DIRECTOR

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Purpose

The purpose of this guide is to present the current state of knowledge in an easy-to-follow, step-by-step guide to support the management of Scope 3 emissions.

The guide aims to begin the process in building a broad understanding and acceptance of the importance of Scope 3 emissions and facilitate increased consistency and credibility to Scope 3 emissions management across the water sector. This initial guide will support water utilities to better understand how to evaluate their Scope 3 emissions profile, provide agreed principles to help define their Scope 3 emission boundary, and understand complexities and assumptions associated with different reporting methods and tools with the key aim to ultimately reduce material emission sources from Value chains.

The guide presents the current state of knowledge on Scope 3 emissions from the Australian and New Zealand water sector context and draws from water sector case studies with a particular focus on the Australian legislative context.

How to use this guide

The guide is targeted to assist Senior Managers, Executive, Governing Bodies, and Boards with an understanding of the principles and how to identify pathways for managing Scope 3 emissions. A process is outlined, with additional detail and further consideration given in a proposed step-by-step pathway for practitioners when managing scope 3 emissions. The pathway presented is relevant for water utilities with varying maturity on Scope 3, from starting to investigate to those looking to set targets and actively report on Scope 3 emissions.

Case studies are used throughout the guide to provide real-world, sector-specific examples including a summary of Scope 3 emissions in the urban water cycle.

It is noted that in different contexts internationally and within Australia, Scope 3 emissions can also be referred to as embodied and operational carbon. Within this guide, we refer to both embodied and operational carbon as a Scope 3 emission source, in alignment with GHG Protocol Scope 3 Standard.

What are Scope 3 emissions?

Scope 3 emissions are indirect greenhouse gas (GHG) emissions that are generated in the upstream and downstream Value chain of an organisation, excluding Scope 2 emissions (from grid electricity). These emissions arise as a result of the activities of the organisation, but from sources not owned or controlled by that organisation. To date, the water sector has focused on measuring and reducing their direct GHG (Scope 1) emissions and indirect GHG emissions from electricity consumption (Scope 2). To holistically reduce emissions, organisations must also understand and address their Value chain impacts to manage risks and seize opportunities in the transition to a low-carbon economy.

Understanding Scope 3 emissions enables water utilities to comprehensively manage their GHG-related risk and opportunities, which in turn gives owners, investors, customers, regulators, and other stakeholders a broader understanding of the material risks, opportunities, and threats a water utility may face. Figure 1 highlights examples of Scope 1, 2, and 3 GHG emission sources.

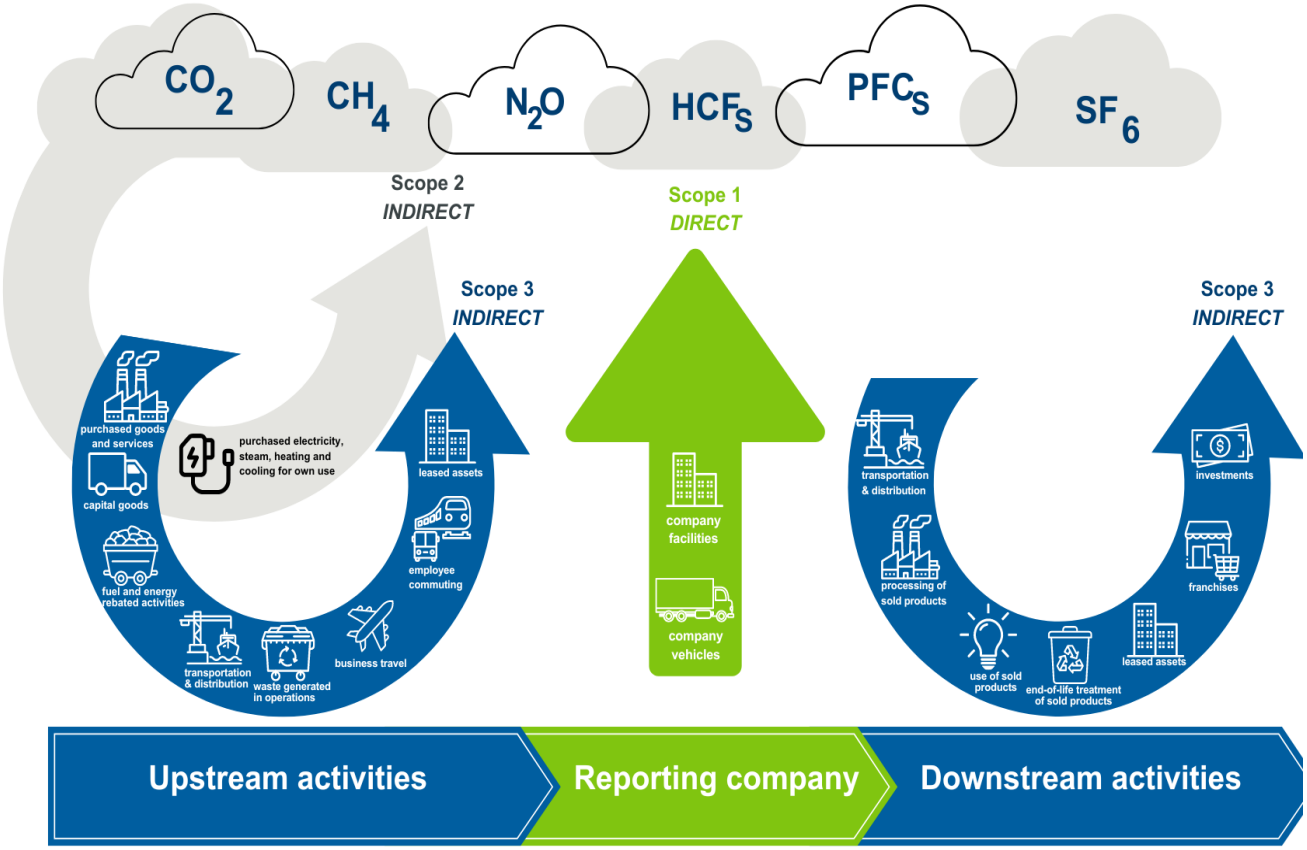


Figure 1: Example of Scope 1, 2 and 3 emissions sources, adapted from GHG Protocol, Scope 3 Standard

Why is understanding Scope 3 emissions important for the sector?

While not under the direct control of an organisation, Scope 3 emissions are typically responsible for 70 – 90 % of an organisation's carbon footprint (Carbon Trust Scope 3 Introductory Guide, 2023). For the public sector including the water sector, a large part of the Scope 3 emission footprint tends to be embodied in purchased goods and services (construction materials, chemicals, etc.). Measuring and managing Scope 3 emissions in the water sector holds significant opportunities to realise the shared benefits for water utilities and the communities they service. Scope 3 emissions management further provides opportunities for effective partnerships with Value chains required to holistically reduce emissions in order to reach global emission reduction targets in the Paris Agreement.

In addition, the federal government is in the process of implementing mandatory climate disclosures based on the International Sustainability Standards Board (ISSB)'s climate standard, IFRS S2 to improve consistency for global baseline reporting on climate-related disclosures. The IFRS S2 is based on the Taskforce for Climate-Related Financial Disclosures (TCFD) pillars of governance, strategy, risk management, and metrics and targets, and includes the quantitative requirements for reporting on Scope 1, 2, and 3 emissions among other metrics. The mandatory disclosures apply to utilities captured under Chapter 2M of the *Corporations Act 2001*, and are subject to reporting under Australia's National Greenhouse and Energy Reporting (NGER) Scheme.

At the time of writing, the outcomes from the consultation on the Treasury exposure draft legislation (closed in February 2024) and the Australian Accounting Standards Board (AASB)'s Australian Sustainability Reporting Standards (ASRS) exposure draft have not been finalised. While the ASRS are planned for release in July 2024, uncertainty remains as to how these requirements will directly or indirectly (through state-based requirements) impact different water utilities (refer to Step 1 of the guide). Some states have already begun to introduce reporting requirements for Scope 3 emissions for some categories, such as those required in Victoria's annual reporting in 2022/23.

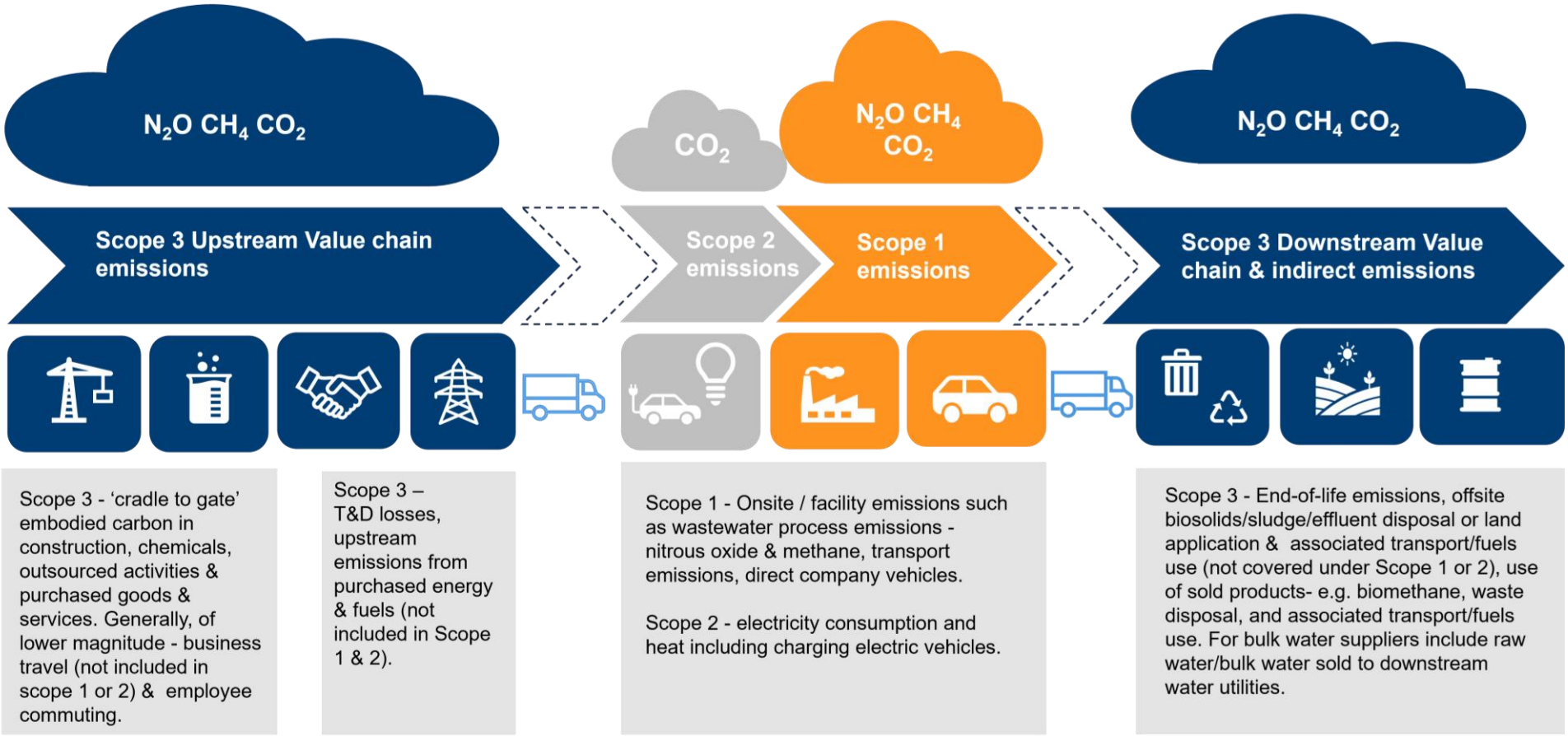
Determining material Scope 3 emissions in the water sector

It is difficult to determine what individual water utilities major Scope 3 emission sources are without completing a comprehensive inventory and materiality assessment (see Step 2 of this guide). Historically, corporate guidance and standards within Australia have focused on a limited range of Scope 3 sources, such as corporate air travel, office paper use and some limited waste disposal activities. For water utilities, these are likely to be very minor or immaterial Scope 3 emission sources.

The **material emission sources** will also vary between water utilities depending on the products and services provided, the environment in which the utility is operating, and the activities it is conducting. It is difficult to compare or benchmark a water utilities Scope 3 profile due to the differing functions, management responsibilities of different parts of the water cycle, and the magnitude of Scope 3 emissions in comparison to other Scope 1 and 2 emission sources for a utility. To address this, emission sources across different parts of the urban water cycle are further explored in Section 8 following the 7-step guide. A high-level summary across the emission scopes and main sources from the water sector is provided in Figure 2. This is not exhaustive and intended to capture the major emission sources relevant to a ‘typical' water and wastewater service utility.

Estimates of Scope 3 emissions sources are sometimes made using expenditure or financial data, especially for first-time reporting. While there are limitations with this approach (refer to Steps 3 and 4), expenditure can provide a helpful first pass assessment, as an initial indicator of the major Scope 3 emission sources. As a general rule of thumb, if an organisation spends a significant amount of money buying the product or service, then it (product/service) is likely to be a large Scope 3 emission source. Some considerations such as the size of the utility and its capital works program, will help inform the scale of emission sources from concrete and steel as an example.

Figure 2: Main GHG Emission Sources in the Water Sector – non-exhaustive list of emission sources



Water sector emission sources defined

Scope 1 emissions are the direct emissions produced from water and wastewater treatment and other activities under the control of the water utility, including fugitive or process emissions that are created from the aerobic digestion of wastewater during wastewater transportation and treatment. They generally comprise a large proportion of a water utility emissions profile, as they are often directly owned and controlled by a water utility.

The GHG Protocol Land Sector and Removals Guidance due for final release in 2024, includes reporting obligations that apply to Scope 1, 2, and 3. These new reporting categories may be significant for water utilities (if adopted by NGER in the future or reported voluntarily) that own land particularly those that own dams. For example, the guidance requires reporting of dam methane emissions within Scope 1 and Scope 3 (for those water utilities that don't own dams but have them in their Value chain).

Scope 1 emissions required to be reported under Australia's National Greenhouse Energy Reporting Act (NGER) Scheme include:

Carbon dioxide CO_2

Methane CH_4 Approximately 28 times more potent GHG than CO_2

Nitrous oxide N_2O Approximately 250-300 times more potent GHG than CO_2

In addition to carbon dioxide, methane, and nitrous oxide emissions, there are also other sources of Scope 1 emissions covered by the Kyoto Protocol and reported under the NGER framework such as emissions from refrigerants - hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6) These sources are typically not material across the water sector.

Scope 2 emissions are the indirect emissions, primarily from the use of energy in the production, transport, and treatment of water and wastewater.

Scope 3 emissions are other indirect emissions generated from the supply chain and other business activities.

The main emission sources from the water sector are shown in Figure 2.

Setting foundations for effective scope 3 emissions management

This guide presents a principle-based approach to overcome differences in organisational contexts and jurisdictional requirements. The four foundational pillars include, Governance, Strategies, Risk Management and Metrics and Targets, which have been adapted for the water sector and are aligned to the four main TCFD pillars from which the legislated sustainability disclosure framework in Australia is based upon (The final Australian Sustainability Standards are due for release in July 2024). It is noted that within New Zealand, TCFD reporting is already mandated for at least 200 large-listed entities and financial market participants.

Governance

To effectively reduce Scope 3 emissions, a business should allocate resources to determine its emissions boundary (upstream and downstream), materiality and ability to influence reduction in emissions - encouraging engagement & progress across the value chain, even if all data is not available yet.

Strategies

Businesses should develop comprehensive GHG reduction strategies that consider all emissions and apply GHG Protocol principles, ideally set science-based targets, and evaluate impacts through a full life cycle perspective. They should also assess initiatives in terms of overall costs, benefits, and risks with reference to SDGs, while considering other environmental and social consequences.

Risk Management

To effectively reduce Scope 3 emissions, water utilities should prioritise actions according to the emissions reduction hierarchy, follow a consistent boundary setting approach (to avoid double-counting), consider embodied carbon in business cases, and partner with suppliers to help them understand and reduce their emissions.

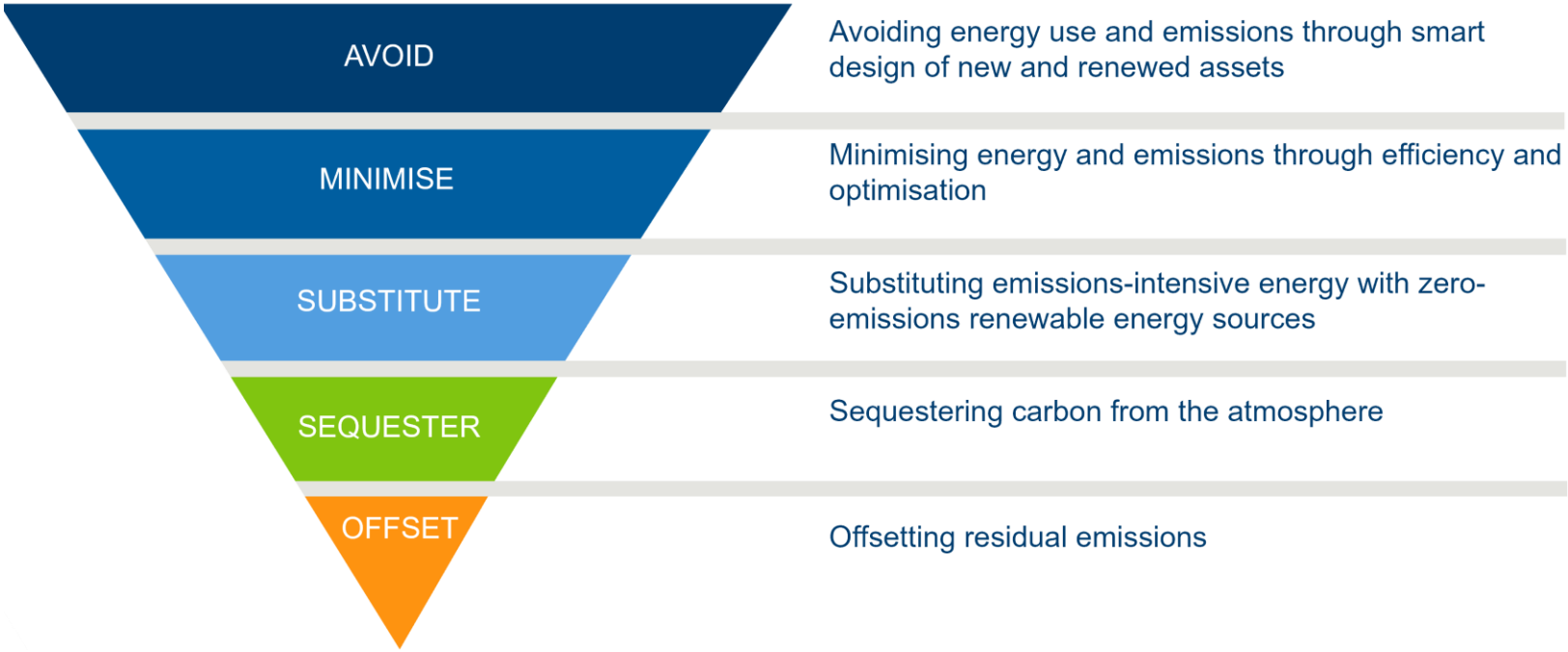
Metrics & Targets

Utilities should work towards setting practical targets to reducing their Scope 3 emissions, alongside commitments to reduce Scope 1 and 2 emissions. These targets may change, but at the very least should reflect the carbon reduction ambitions of each State or Territory the utility sits within. Wherever possible, utilities should preference primary data and verifiable emission factors.

Emission reduction hierarchy

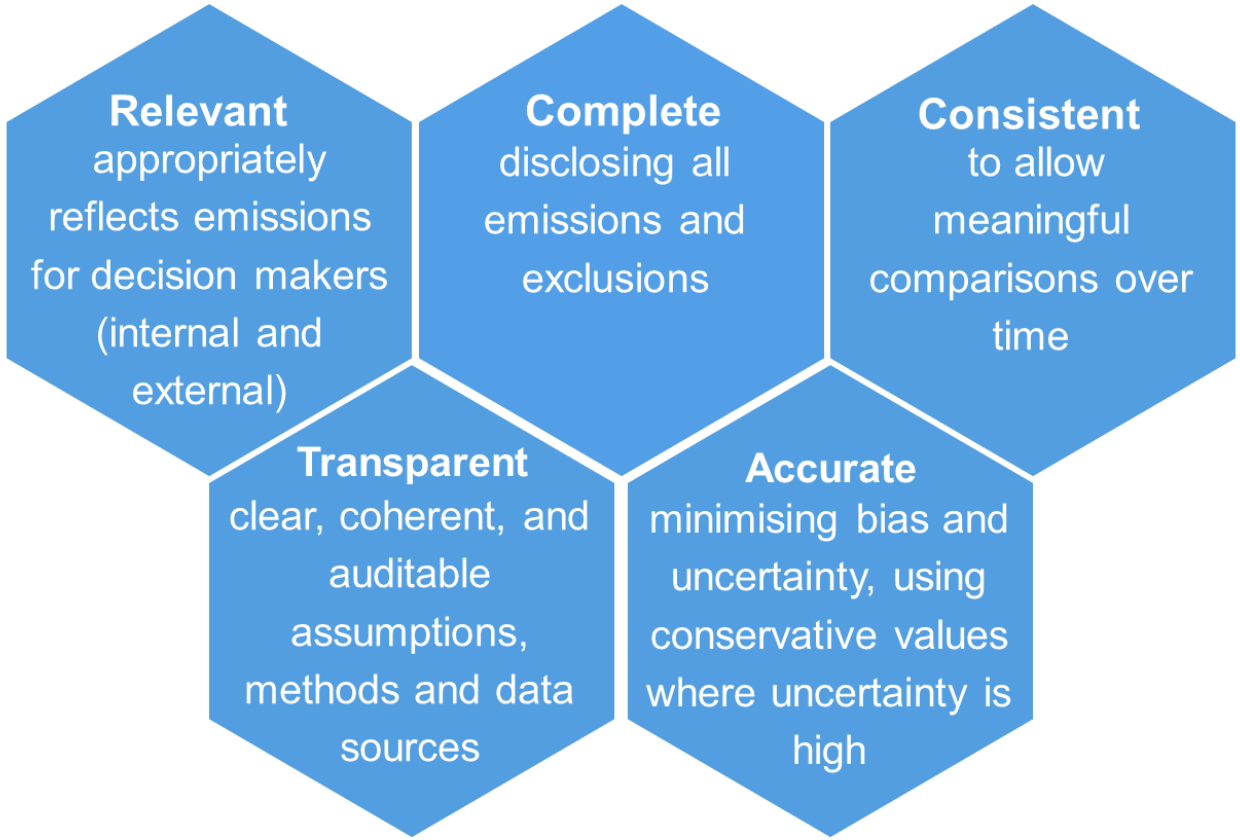
This guide recommends following the carbon emission hierarchy as detailed in Figure 3, when considering all emission sources within a water utilities profile, which suggests a priority order for the implementation of actions to achieve net zero emissions. Ideally minimising the selection of options further down the emissions hierarchy.

Figure 3: Emission Reduction Hierarchy, adapted from WSAA Climate Change Accelerating to Net Zero, page 8



Principles for Scope 3 emission calculation and reporting

The following 5 key principles outlined in the GHG Protocol Scope 3 Standard and reproduced in supplementary guides (WSAA Guide – Accelerating to Net Zero, Climate Active Carbon Neutral Standard (CACNS), ICMM Scope 3 Accounting and Reporting Guidance) provide an effective framework for undertaking Scope 3 emissions accounting and reporting: These are described in further detail below:



Relevance - ensures the GHG inventory appropriately reflects the GHG emissions of the utility and serves the decision-making needs of users – both internal and external to the utility or broader organisation (see more on relevance in Step 2 of the guide).

Completeness - refers to the accounting and reporting of all GHG emission sources and activities within the inventory boundary, both upstream and downstream, and disclosing and justifying any specific exclusions.

Transparency - of data is core to reporting, so that all relevant issues are addressed in a factual and coherent manner, based on a clear audit trail, while disclosing any relevant assumptions and making appropriate references to the accounting and calculation methodologies, and data sources used.

Accuracy - of GHG emissions calculated –with uncertainties reduced as far as practicable – is critical to enable utilities and relevant stakeholders to make decisions with reasonable confidence on the integrity of the reported information. However, it is important to understand that it may not be possible to cover all applicable emissions categories or activities completely accurately. Utilities should therefore, focus their efforts on addressing the most material categories that provide the biggest opportunities to reduce emissions, and where data is of reasonable quality.

Consistency - in methodologies used to account and report on Scope 3 emissions, to allow for meaningful performance tracking of emissions over time. It is important that there is transparent documentation of any changes to the data, inventory boundary, methods, or any other relevant factors in the time series so that current and future data can be more easily understandable by a wide range of stakeholders.

While all five principles are important, utilities may focus on different principles based on the level of maturity in their Scope 3 emissions management journey. For example, a utility starting out may focus on the principle of **completeness** in its early stages to broadly understand its Scope 3 emission profile, before directing its focus on **accuracy** of the activities or categories with higher **relevance** in consideration of its existing strategies and goals.

Managing Scope 3 emissions for a utility – a process overview

The Scope 3 management cycle is provided as a seven-step process (see Figure 4) and forms the structure for the remainder of this guide. While the steps are numbered, the arrows indicate this as an iterative process and some steps may not be reached until a sufficient level of maturity and confidence in the quality of the information has been developed. It is recognised the water sector (along with other sectors) are just beginning to understand and report on Scope 3 emissions. It is anticipated that as mandatory disclosure requirements are implemented, that more companies will be disclosing emissions information thus improving the quality and accuracy of data for reporting. A summary of the key considerations and topic inclusions for each step of the guide is also provided in Figure 5 – the Scope 3 Guide on a Page.

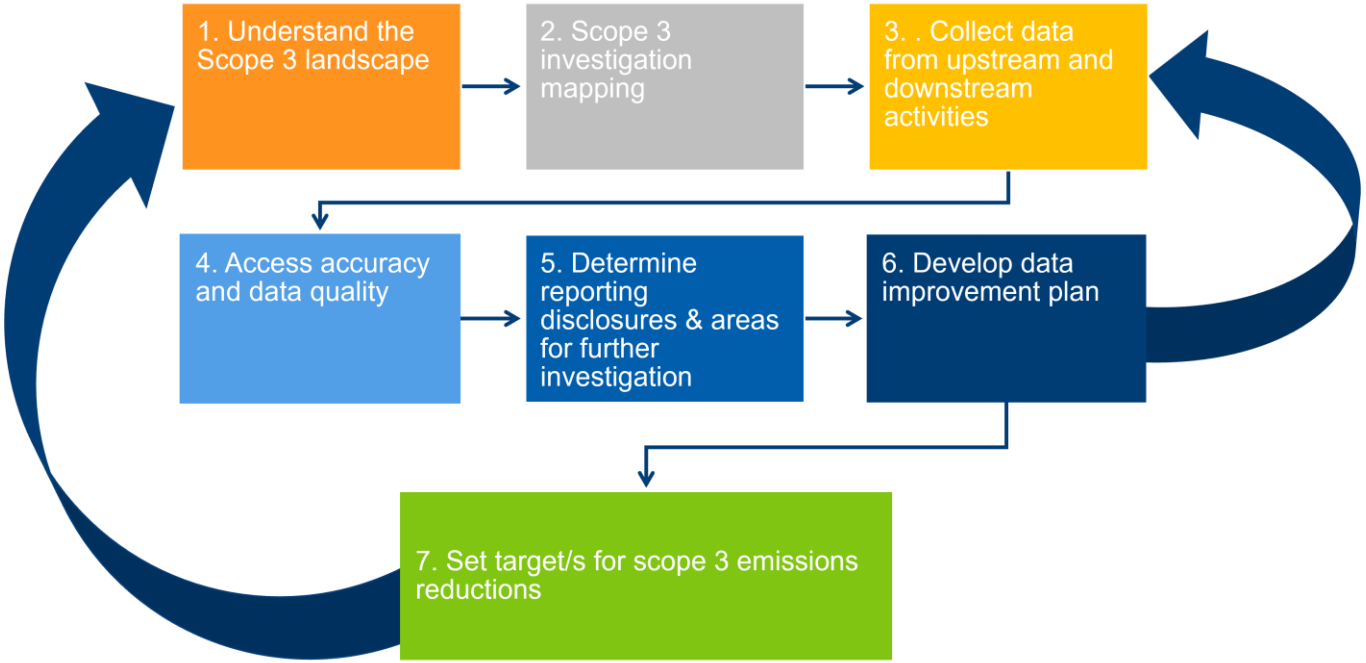
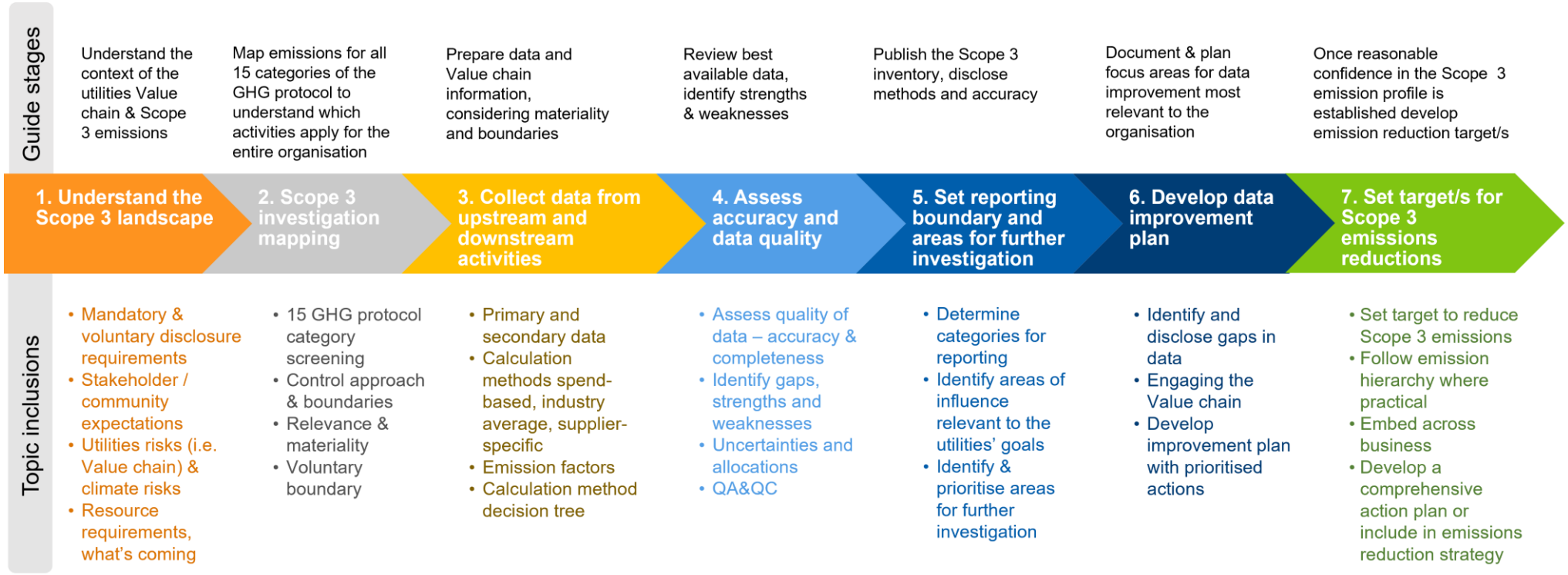


Figure 4: A process overview to managing Scope 3 emissions

Review of this guide

We are committed to continuous improvement and will update this guide as needed in response to WSAA member feedback or changes in the regulatory environment (for example the expected release of the *Australian Sustainability Reporting Standards – Disclosure of Climate-related Financial Information* by the Australian Accounting Standards Board).

Figure 5: WSAA Scope 3 Guide on a Page



1. Understanding the Scope 3 emissions landscape

Understanding the Scope 3 emission landscape will help uncover the objectives at play that may influence the level of ambition, urgency, and resources that are needed for Scope 3 emission management. Considerations may be outward-facing, such as existing and emerging legislative requirements, carbon price impacts and understanding stakeholder and community expectations. Some inward-facing considerations may include consideration of climate and business/supply risks and associated opportunities, as well as internal resource requirements. Some common considerations to help understand the Scope 3 emissions landscape for the water sector include:

- International Standards and Frameworks
- Australian Legislative Requirements
- Enhancing Organisational Risk Management

These areas are expanded upon in more detail below to help understand the operating context within a typical utilities Scope 3 emissions landscape. These are not exhaustive, but rather provide background to some common water sector considerations. By taking the time to understand the relevant objectives at play upfront, it will help ensure utility staff and external stakeholder expectations are met.

1.1 International standards and frameworks

A list of current and applicable international standards and frameworks is provided in Table 1. Refer to Section 9 for further description of each standard and reference. Note, this list is non-exhaustive but considered the main key international standards and frameworks for consideration.

Table 1: List of Key International Standards and Frameworks for Scope 3 Emissions Management

Type	Standard Reference
Existing Standards – GHG Protocol	• GHG Protocol Corporate Value chain (Scope 3) Accounting and Reporting Standard (2011), (referred to as GHG Protocol Scope 3 Standard) • Technical Guidance for Calculating Scope 3 Emissions – Supplement to the Corporate Value chain (Scope 3) Accounting & Reporting Standard (2013), (referred to as GHG Protocol Scope 3 Calculation Guidance) • GHG Protocol Corporate Accounting and Reporting Standard – Revised edition (referred to as GHG Protocol Corporate Standard)
Other International Standards	• ISO 14064 International standard for quantifying and reporting greenhouse gas emissions • PAS2080 – Carbon Management Infrastructure Standard
Voluntary Standards, Benchmarks, and Frameworks	• Task Force on Climate-Related Financial Disclosures / TCFD (framework) • Science-Based Targets Initiative / SBTi (methodology provider and validation body) • Climate Active Carbon Neutral Standard (Australian voluntary standard to achieve carbon neutrality)

1.2 Australian legislative requirements

A summary of Australia's current legislative requirements and expected future requirements is outlined in Table 2, with a particular focus on how these apply to Scope 3 emissions management. The Australian climate-related disclosure and reporting standards directly capture water utilities operating under *Chapter 2M* of the *Corporations Act* that meet the NGER reporting thresholds, which are annual emissions of 25,000 metric tonnes CO2-e. The timing for the rollout of the disclosures outlined in the Treasury exposure draft is based on groupings by the organisation size and financials which are detailed further in Figure 6.

At the time of writing, the key reference standards in relation to Scope 3 emissions provided in the exposure drafts are the GHG Protocol Scope 3 Standard and the GHG Protocol Scope 3 Calculation Guidance. These guidance documents are directly referenced for Scope 3 emissions accounting in the IFRS S2 (The IFRS S2 was issued in June 2023 by the International Sustainability Standards Board (ISSB) providing more granular standards building from the TCFD – further information is provided in Section 9). The Australian Sustainability Reporting Standards (ASRS) S2 exposure draft aligns with the IFRS S2, but takes into account consultation feedback from the Treasury exposure draft, noting that entities *could* consider the GHG Protocol standards, rather than requiring the entity to categorise Scope 3 emissions in accordance with the GHG Protocol standards.

Table 2: Current and expected Australian Legislative Requirements

Australian Legislation Reference	Description in relation to Scope 3 emissions
Australian National Greenhouse and Energy Reporting Act / NGER Act (in place)	Administered by Australia's Clean Energy Regulator, the NGER scheme provides a threshold and guidance for business to report Scope 1 and 2 emissions. Currently Scope 3 emissions are not reported under NGER but can be used under Australia's National Greenhouse Accounts.
Australian Treasury Climate-Related Financial Disclosure (expected 2024)	Standardised, internationally aligned legislative requirements for disclosure of climate-related financial risks and opportunities from 2024-25 onwards through Treasury Laws Amendment Bill 2024. The exposure draft includes disclosure requirements under the Corporations Act for Scope 3 emissions with limited assurance from FY 2025/26. The exposure draft reference the GHG Protocol Scope 3 Standard, and the GHG Protocol Scope 3 Calculation Guidance for Scope 3 emissions reporting in accordance with IFRS S2.
Australian Sustainability Reporting Standards – ASRS 2, consultation draft ED SR1 – Disclosure of Climate-related Financial Information (expected July 2024)	ASRS 2 Australian Climate-related Financial Disclosures has been developed using IFRS S2 Climate-related Disclosure as the baseline. The consultation draft considers consultation feedback from the Treasury exposure draft and provides reference to IFRS S2 as to what entities ***could consider*** to include in Scope 3 emissions, rather than requiring the entity to categorise Scope 3 emissions in ***accordance with*** the GHG Protocol standards.

The summary in Figure 6 presents the timing by financial year when different groups (based on size and financial information) are required to disclose climate-related financial information, presented under the key pillars of governance, risk management, strategy and metrics, and target disclosures. Figure 6 also presents the rollout for the level of assurance specified in the exposure draft, which recognises the low level of maturity of organisations in the disclosure of Scope 3 emissions. As the climate-related financial disclosures will be subject to similar assurance requirements currently in the Corporations Act, which requires entities to obtain an assurance report from their financial auditors who will use technical climate and sustainability experts where required. Figure 6 indicates that Group 1 will need to report on their Scope 3 emissions from FY 2025/26 with limited assurance, and reasonable assurance by FY 2027/28. Group 2 will need to report on their Scope 3 emissions from FY 2027/28 with limited assurance, and reasonable assurance by FY 29/30, and Group 3 will need to report on their Scope 3 emissions with limited assurance by FY 29/30 and reasonable assurance by FY30/31. Further detail on the levels of assurance according to the GHG Protocol Scope 3 Standard is provided in Step 5.

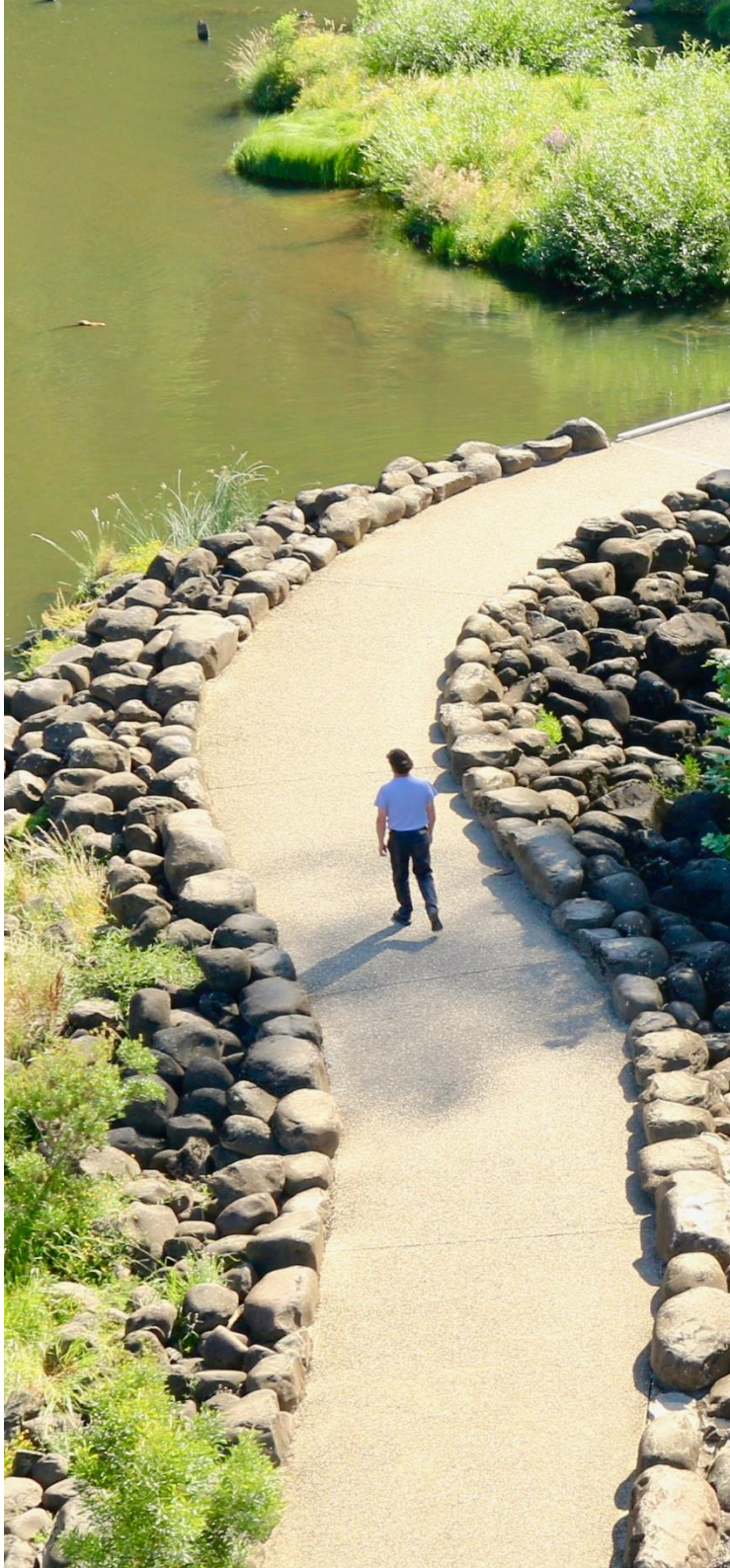
Figure 6: Summary of Australian Mandatory Reporting Requirements, adapted from Pangolin Associates 2024.

Group 1 (fulfill 2 of 3 thresholds)	Group 2 (fulfill 2 of 3 thresholds)	Group 3 (fulfill 2 of 3 thresholds)
• Has over 500 employees; • Gross assets and any entities it controls is $1 billion or more; • revenue of the company and any entities it controls is $500 million or more.	• Has over 250 employees; Gross assets and any entities it controls is $500 million or more; • revenue of the company and any entities it controls is $200 million or more.	• Has over 100 employees; • Gross assets and any entities it controls is $25 million or more; • revenue of the company and any entities it controls is $50 million or more.

1.3 Enhancing organisational risk management

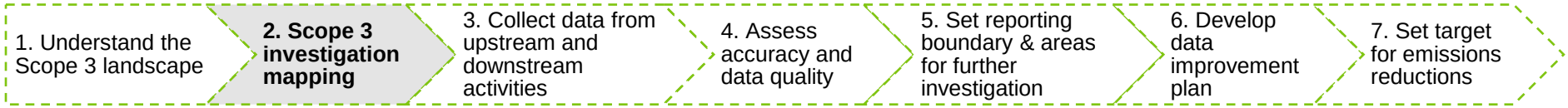
The GHG Protocol Scope 3 Standard has some examples of how a utilities risks and opportunities can be better understood from building a Scope 3 emission inventory and improving the understanding of indirect, Value chain emissions. Considering existing Value chain and organisational risks alongside high emission related activities in the Value chain, can lead to identification of opportunities to proactively work with suppliers or change suppliers to reduce these risks to acceptable levels.

For example, if a utility heavily relies on large volumes of certain chemicals for the water or wastewater treatment process, understanding the emission footprint of these can help better understand the emerging risks to the utility which may require significant time and investment to reduce to an acceptable level. This information can be built into existing Value chain risk assessments and enhance organisational risk management practices. In addition, understanding upfront if suppliers intend to pursue efforts to reduce emissions of their products and how (i.e. if offsetting is the only strategy) will ultimately help a utility to understand and manage its risks. There are also opportunities to work collaboratively across the water sector to identify key water sector suppliers and products to collectively engage with to manage identified risks. Another consideration is the reliance of a supplier or business on offsetting to reduce their emissions, either through use of renewable energy certificates, such as Large-Scale Generation Certificates (LGCs – primarily used for Scope 2 emissions reduction) or Australian Carbon Credit Units (ACCUs – primarily used for Scope 1 emissions reduction). If this is the known strategy to emissions management, it may be helpful to consider the forecast carbon price for RECs and ACCUs to understand potential price impacts from suppliers. The Emission Reduction Fund prepares quarterly carbon market reports on the supply and demand for LGCs and ACCUs.



1.4 Other Considerations

In addition to the direct capture of water utilities under the Corporations Act detailed in Section 1.2, there may be state-based legislative requirements that align to these. Furthermore, it is important to understand if there is an established state-based emission reduction target, if this includes Scope 3 emissions (or if it may include Scope 3 in future), or if there are any state-based Scope 3 categories or activities that are a reporting requirement of the state government that a utility is captured by (further described in Step 5).

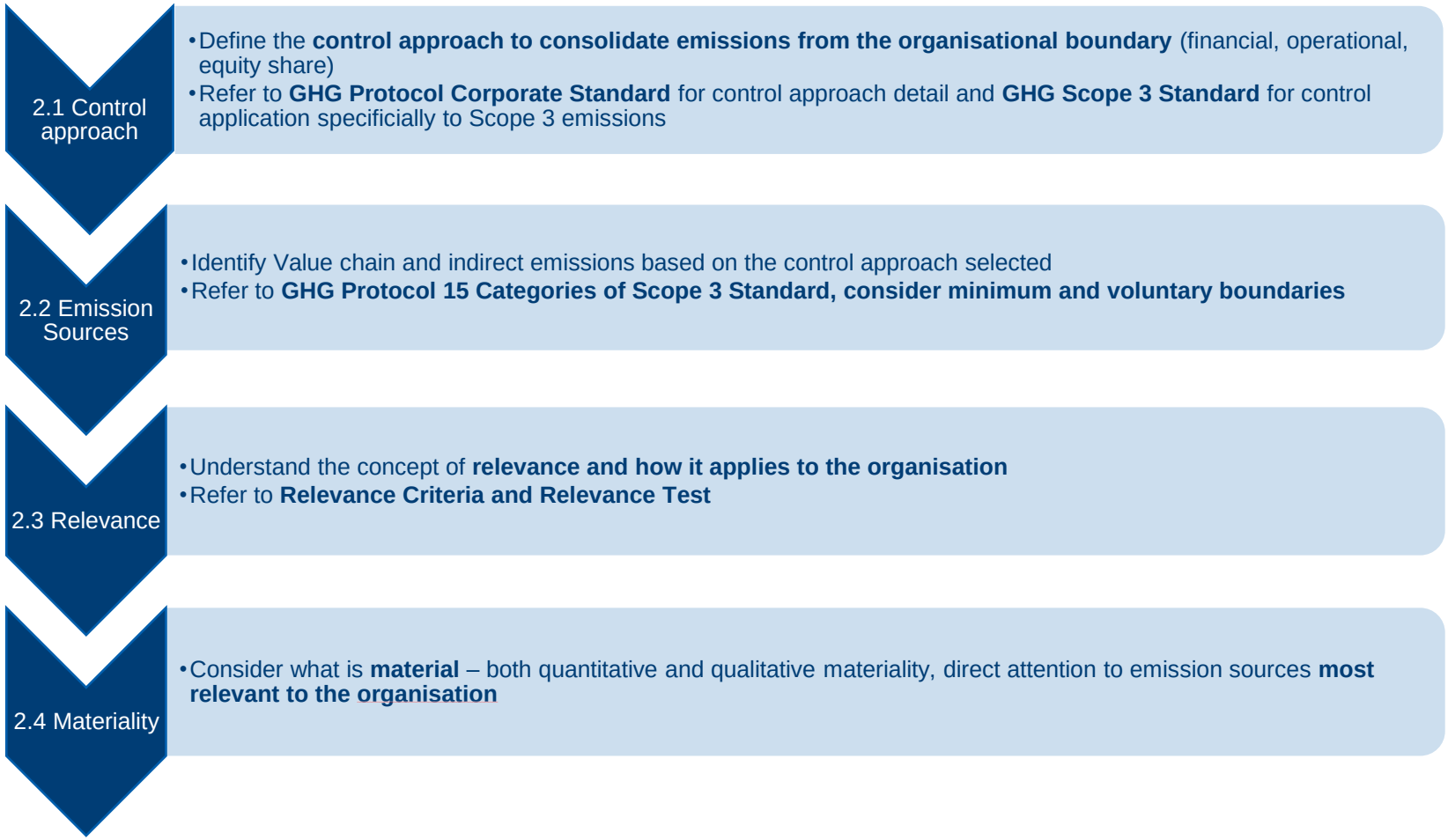


2. Scope 3 emission investigation mapping

The investigation mapping process is best approached at the outset with a thorough understanding of key steps and concepts to pinpoint the specific emissions related to an organisation's indirect activities. The process requires an initial investigation and strategic evaluation of several critical areas, to ensure a comprehensive understanding and effective management of Scope 3 emissions.

The first key step is to select the most appropriate **control approach** for the **organisational boundary** of a utility, as this determines the consolidation approach that Scope 3 emissions will be considered by for the entire Scope 3 mapping process. Following this, a detailed review of the **Greenhouse Gas (GHG) Protocol's 15 categories** considering the minimum and voluntary boundaries of Scope 3 emission sources is necessary to identify all potential indirect emission sources. In undertaking this exercise, it is also necessary to understand the concepts of **relevance** and **materiality** in relation to an organisation. This involves considering both qualitative and quantitative assessments, to help determine which sources of Scope 3 emissions are most significant to the organisation. These key steps are summarised in Figure 7 and further detailed below.

Figure 7: Key considerations for mapping Scope 3 emissions of an organisation



2.1 Defining the control approach and organisational emissions boundary

Defining the organisational boundary is a key step in the emissions accounting process, as it determines which operations are included in the utilities organisational boundary and how emissions from each operation are consolidated by the reporting organisation. According to the GHG Protocol, in order to set the organisational boundary an organisation needs to choose a **control approach** for consolidating GHG emissions and then consistently apply that approach to define the entities and assets included in the emissions accounting process. This approach should be consistent across Scope 1, Scope 2, and Scope 3 inventories, and affects which activities in the Value chain are categorised as direct (Scope 1) and indirect (Scope 2 and Scope 3) emissions. Activities excluded from Scope 1 and 2 inventories, may be relevant to Scope 3 emissions (further detail provided in GHG Protocol Scope 3 Standard, page 28 – 29).

An organisation has three options (provided below) to define the control approach to consolidate emissions and consistently apply these, based on the GHG Protocol Corporate Standard. It is recommended these approaches are considered carefully at the outset, refer to Chapter 3, pages 16 – 24 of the GHG Protocol Corporate Standard for further definitions and examples.

1. Financial Control Approach – reporting 100% of operations over which it is has the ability to direct the financial and operating policies with a view to gaining economic benefits from its activities.

2. Operational Control Approach – reporting 100% of the operations over which it has the full authority to introduce, and implement is operating policies. This approach will not account for GHG emissions from operations in which it owns an interest but does not have financial control.

3. Equity Share Approach – requires an organisation to account for GHG emissions according to its share of equity in the operations.

The **Operational Control Approach** tends to be the most common approach used by water utilities, as it typically aligns best for site-based GHG emissions compliance reporting and is required under the NGERs Legislation for Scope 1 and Scope 2 emissions reporting. However, it is important to review the different control approaches carefully at the outset, as based on the unique way a water utility is set up, an alternate approach may be more appropriate in some circumstances. For example, an organisation may select the equity share or financial control approach to align its GHG reporting with the assets included in its financial reporting. After the control approach is selected, the consolidation approach is uniformly applied to identify all direct and indirect emissions at each operational level for the entire organisation.

2.2 Screening of emission sources – GHG protocol categories

The GHG Protocol is the world's most widely used GHG accounting standard and is commonly the basis for Net Zero and Carbon Neutral claims (CDP, SBTi, Climate Active, etc). GHG Protocol Scope 3 Standard, builds upon the Corporate Standard and is at the time of writing the only internationally accepted method for companies to account for Value chain emissions and is referenced in key legislative disclosure requirements (refer to Section 1 for more detail).

According to the GHG Protocol Scope 3 Standard emissions are divided into 15 distinct categories across upstream and downstream Value chain activities. Each category may be made up of multiple activities that result in emissions. The first pass assessment should consider all activities across these categories. The minimum boundary across the 15 categories of the GHG Protocol is provided in Table 5.4 of the GHG Protocol Scope 3 Standard, on pages 34 - 37. A summary of the upstream and downstream emission categories is provided in Table 3 along with some water sector examples.

Note: The water sector examples provided in Table 3 are for illustrative purposes only and may not be relevant if outside the determined boundary of the organisation or irrelevant due to the services provided by the particular water utility.

Table 3: GHG Protocol Emission Categories and Descriptions

Category	Description	Water sector examples
1. Purchased Goods and Services	Extraction, production, and transportation of good and services purchased for acquired by the reporting company in the reporting year, not otherwise included in Categories 2 - 8	Purchased chemicals for treatment, other goods and services
2. Capital Goods	Extraction, production, and transportation of capital goods or acquired by the reporting company in the reporting year.	Embodied carbon in capital projects – concrete, steel, pipes,
3. Fuel and energy-related activities (not including Scope 1 or 2)	Extraction, production and transportation of fuels and energy purchased or acquired by the reporting company in the reporting year, not already accounted for in Scope 1 or 2, including: Upstream emissions of purchased fuels and electricity, Transmission and distribution losses Generation of purchased electricity that is sold to end users – reported by the utility company or energy retailer only	Losses in transmission and distribution, fuel and energy use by contractors in capital upgrades or maintenance contracts

Category	Description	Water sector examples
4. Upstream transportation and distribution	Transportation and distribution of products purchased by the reporting company in the reporting year between a companies Tier 1 suppliers and its own operations (in vehicles & facilities not owned or controlled by the reporting company).	Delivery/courier services not already covered in Category 1
5. Waste generated in operations	Disposal and treatment of waste generated in the reporting company's operations in the reporting year (in facilities not owned or controlled by the reporting company).	Includes inert waste: sludge screenings, biosolids, sludge, septic waste, hazardous chemical waste, trade waste, disposed chemicals, construction waste, E-waste, office waste
6. Business travel	Transportation of employees for business-related activities during the reporting year (in vehicles not owned or operated by the reporting company).	Employee travel
7. Employee commuting	Transportation of employees between their homes and their worksites during the reporting year (in vehicles not owned or operated by the reporting company).	Employee commuting to and from workplace
8. Upstream leased assets	Operation of assets leased by the reporting company (lessee) in the reporting year and not included in Scope 1 and Scope 2 – reported by lessee.	Leased offices or land

Category	Description	Water sector examples
9. **Downstream, transportation and distribution**	Transportation and distribution of products sold by the reporting company in the reporting year between the reporting company's operations and the end consumer (if not paid for by the reporting company), including retail and storage (in vehicles and facilities not owned or controlled by the reporting company).	Transport of biosolids/sludge by third parties, water cartage by contractors/third parties
10. **Processing of sold products**	Processing of intermediate products sold in the reporting year by downstream companies (eg manufacturers).	Sludge reuse, bulk water supplied for further treatment by third party, treated water to water retailers/distributers, onsite further recycled water treatment by third parties
11. **Use of sold products**	End use of goods and services sold by the reporting company in the reporting year.	Raw water/bulk water from dams, on sell of purified recycled water. May include residential and commercial hot water use if determined within the voluntary boundary.*
12. **End-of-life treatment of sold products**	Waste disposal and treatment of products sold by the reporting company (in the reporting year) at the end of their life.	Sold sludge for beneficial reuse, wastewater treatment, recycled water use if within the emissions boundary.

Category	Description	Water sector examples
13. **Downstream, leased assets**	Operation of assets owned by the reporting company (lessor) and leased to other entities in the reporting year, not included in Scope 1 and Scope 2 – reported by lessor.	Downstream grazing leases, leased recreation sites, properties
14. **Franchises**	Operation of franchises in the reporting year, not included in Scope 1 and Scope 2 – reported by franchisor.	Generally, not applicable
15. **Investments**	Operation of investments (including equity and debt investments and project finance) in the reporting year, not included in Scope 1 or Scope 2.	May be applicable to some utilities

*further detail on residential and customer hot water use is provided below and in a case study in Section 8. It is not considered to be within the minimum boundary based on GHG Protocol Scope 3 Calculation Guidance, however based on a utilities relevance and materiality test – it may be deemed relevant for inclusion in the voluntary boundary. Typically, companies will focus on Value chain activities based on the:

- expected magnitude of GHG emissions;
- availability of data, calculation methodologies, emission factors, and other resources; and/or
- minimum legislative requirements of international or local standards.

Voluntary inclusion of customer hot water use

Customer hot water use is an optional or voluntary Scope 3 emission source under category 11 of the GHG Protocol Scope 3 Calculation Guidance. This is based on its classification as a sold product that indirectly consumes energy during its use, as opposed to direct use-phase emission sources. The GHG Protocol Scope 3 Calculation Guidance (page 114) provides the following definitions of direct and indirect use-phase emission sources:

- **Direct use-phase emissions** include products that directly consume energy during use (e.g. Automobiles, electronics, lighting, data centres, power plants), products that contain or form greenhouse gases that are emitted during use (CO2, CH4, N2O, HCF etc., fire extinguishers, fertilisers), or fuels and feedstocks (petroleum products, natural gas, biofuels etc.). A sold-product from the water industry that could fall into this category would be Biomethane (e.g. Sydney Water).
- **Indirect use-phase emissions** are products that indirectly consume energy (fuels or electricity) during use, such as apparel/clothing (requires washing and drying), food (requires cooking and refrigeration), pots and pans (require heating), and soaps and detergents (require heated water). Customer hot water use is considered to fall into this category.

Some water utilities may choose to include emissions from customer hot water use if determined to be relevant or material in their operations, particularly if this is an identified area of influence or has a strategic corporate focus, such as through interventions that promote the installation of water efficiency shower heads. The Yarra Vally Water Case Study provided in Step 7 includes customer hot water use in reporting and emission reduction strategies.

2.3 Relevance

The most widely accepted framework for determining the relevance of Value chain emission sources is the GHG Protocol Scope 3 Standard, which recommends consideration of the key criteria provided in Table 4 below. These criteria are commonly referenced in other Scope 3 Sector Guidance [1] and form the basis for the relevance test developed under the Climate Active Carbon Neutral Standard (CACNS) shown in Table 5. A utility should consider these criteria in determining the relevance of different activities. Table 4 provides a summary of the relevance criteria from the GHG Protocol Scope 3 Standard, and Table 5 provides a relevance test within the Australian legislative context.

Table 4: Criteria for identifying relevant Scope 3 activities, adapted from GHG Protocol Scope 3 Standard, Table 6.1, page 61

Criteria	Description
Size	Contribute significantly to the company's total anticipated Scope 3 emissions.
Influence	There are potential emissions reductions that could be undertaken or influenced by the company.
Risk	They contribute to a companies risk exposure (climate change risk- financial, regulatory, Value chain, produce and customer, litigation, reputational).
Stakeholders	Deemed critical by key stakeholders.
Outsourcing	They are outsourced activities previously performed in-house by other companies in the reporting companies sector.
Sector Guidance	They have been identified as significant by sector-specific guidance.
Other	They meet any additional criteria determining relevance developed by the company or industry sector.

[1] US EPA Scope 3 Inventory Guidance, ICMM Scope 3 Emissions Accounting and Reporting Guidance,

Table 5: Relevance Test , adapted from Climate Active Carbon Neutral Standard for Organisations, page 15

Relevance Test – Climate Active Carbon Neutral Standard (CACNS)
• the emissions from a particular source are likely to be large relative to the organisation's electricity, stationary energy and fuel emissions. • the emissions from a particular source contribute to the organisation's greenhouse gas risk exposure (i.e. will the impacts of climate change pose a serious risk to the viability of this emission source over a timeframe suitable to the organisation). • the emissions from a particular source are deemed relevant by key stakeholders. • the responsible entity has the potential to influence the reduction of emissions from a particular source. • the emissions are from outsourced activities that were previously undertaken within the organisation's boundary or from outsourced activities that are typically undertaken within the boundary for comparable organisations.

[2] Emission sources are considered relevant when any two of the five conditions (above) are met – refer CACNS for Organisations, page 15.

2.4 Materiality

The principle of materiality, a fundamental concept traditionally associated with financial reporting, aims to enhance the integrity of reported GHG inventories and their corresponding reduction programs. By applying the principle of materiality, organisations are encouraged to focus their efforts on the emission sources that are most significant to their operations. This strategic approach not only ensures compliance with reporting standards but also directs organisational resources towards addressing the most impactful areas of GHG emissions, facilitating more effective and relevant emission reduction initiatives.

'Quantitative materiality' refers to a specific category's emissions contribution to the total Scope 3 emission profile. Based on the SBTi, quantitative materiality is reached when an activity exceeds 5% of the total Scope 3 emission profile.

'**Qualitative materiality'** refers to the **relevance** of the category from other perspectives such as business risk, social relevance, or other strategic considerations. Utilities need to consider their own quantitative and qualitative (relevance) materiality, to reflect their context, applicable legislative requirements, and business risks posed by the activities within the category.

The significance of an activity's emissions contribution to the inventory is a key consideration when determining the appropriate level of data specificity to calculate the emissions. Collecting data, assessing data quality, and improving data quality is an iterative process detailed further in Step 3 to 6 of this guide. In the initial years of Scope 3 data collection, utilities may need to use data of relatively low quality due to limited availability. Over time, the data quality of the inventory should improve over time by replacing lower-quality data with higher-quality data as it becomes available (refer to steps 5 to 6 of the guide for further detail on data improvements over time).

When defining materiality, utilities also need to consider the impact of accounting errors on the inventory results, which can result in what is known as a **'material misstatement'.** A **material misstatement** occurs when individual or aggregate errors, omissions, and misrepresentations have a significant impact on the GHG inventory results and could influence a user's decisions. Uncertainty is a separate concept from materiality because it is not a known error, but rather an indicator of how well the data represents the processes in the inventory (refer to Step 3 for more detail on uncertainty).

3. Collect data from upstream and downstream activities

Collecting data for upstream and downstream activities and categories identified in Step 2 of this guide can be carried out through a variety of different data collection methods with varying levels of accuracy. It is important that utilities understand different data collection methods to recognise the accuracy of the data and where improvements are best targeted.

It is also important to understand utilities starting point and available resources, recognising the data collection process is iterative, time-consuming and is anticipated to improve in accuracy and completeness over time. Spend-based, secondary data is commonly used to identify 'hot spots' for first-time reporting, with data collection methods improving over time as relevant and material activities or categories are prioritised through the use of more supplier-specific methods where appropriate.

If a utility is planning to outsource the data collection process or procure a reporting tool to assist with Scope 3 emission management, this step of the guide aims to inform and provide a high-level summary of the different data collection methods to support enhanced understanding for confidence in the data provided and to enable transparent reporting.

Collecting emissions-related data from suppliers and consumers generally allows organisations to measure their Scope 3 emissions more accurately. A significant proportion of suppliers to the water industry are not yet set up to consistently collect accurate data to determine emissions. To effectively abate emissions, accuracy in data and calculations is needed across Value chains.

The GHG Protocol Scope 3 Standard provides flexibility in the use of different data sources (primary and secondary data), as both may be appropriate ways of determining the Scope 3 emissions of a business. The GHG Protocol Scope 3 Calculation Guidance explains the different methods that can be used for Scope 3 calculations for each of the 15 categories, based on data availability. Different calculation methods can be based on secondary data, such as spend-based methods and average-data methods, or primary data, such as the supplier-specific method. A hybrid calculation method can be supplier-specific, average data

or a combination of both. The data calculation methods are summarised in Figure 8 below. The data quality and accuracy required may depend on the category or supplier with the highest emissions, the opportunity to reduce or abate the emissions, and the alignment with the organisation's goals and targets. Then the level of data integrity or quality balanced with time and resourcing to obtain this data can be assessed.

To determine emissions, the data collected should include product, material type, size (eg. diameter), quantity (mass/volume), emission factors, transport distances, and cost.

This data can then be applied to the various methods of calculating the emissions, with the accuracy of the data factored in. The GHG Protocol's Scope 3 Calculation Guidance notes (refer page 22) that while supplier-specific data and hybrid methods are more specific to the individual supplier than the average-data and spend-based methods, this may not necessarily translate to the accuracy of the data. Accuracy is derived from the granularity of the emissions data, the reliability of the supplier's data sources, and if any allocation techniques were used. The need to allocate a supplier's emissions to specific products it sells can add a considerable degree of uncertainty to the data (refer to Step 4).

A summary of the different methods for data collection for Purchased Goods and Services – Category 1 is shown in Figure 8.

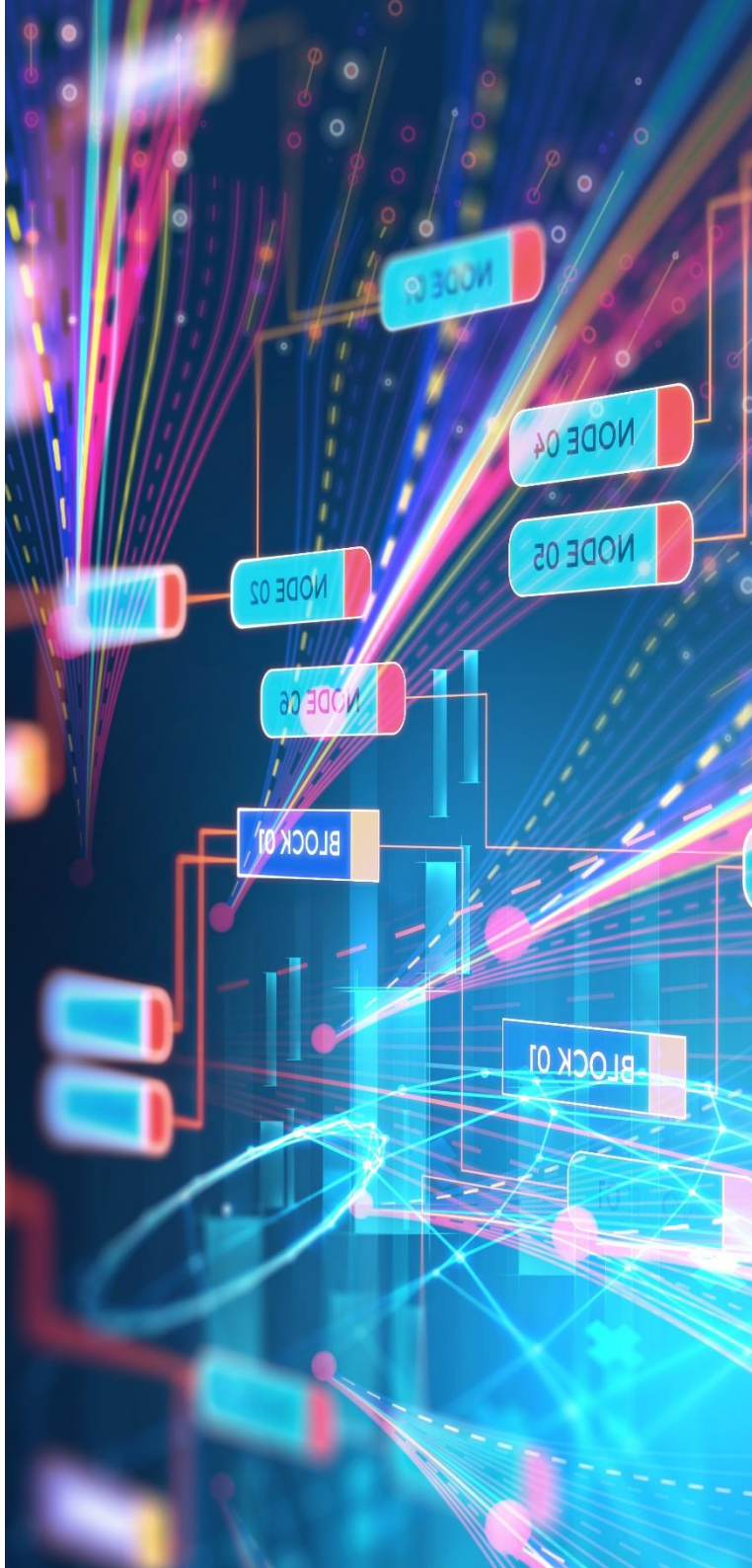
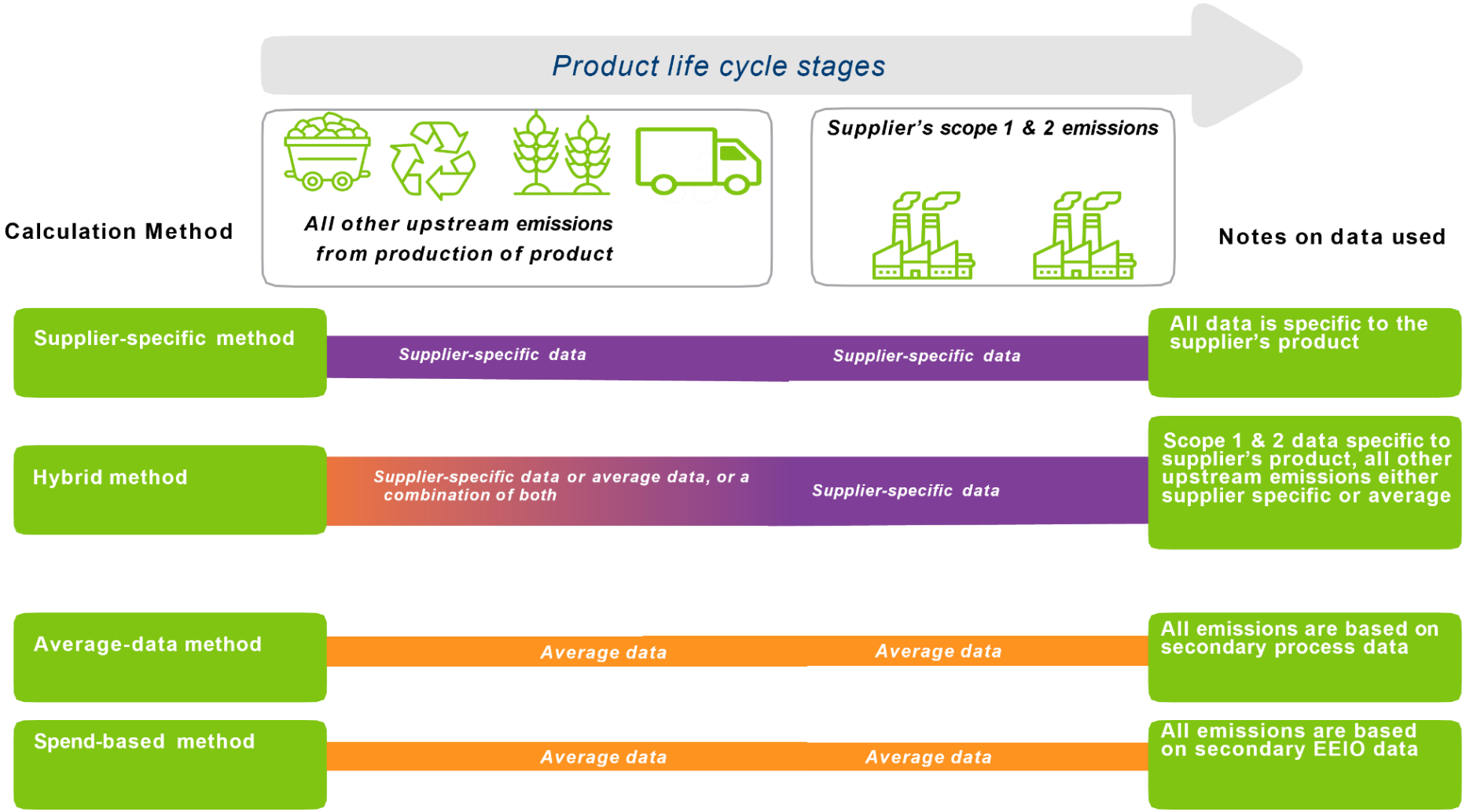


Figure 8: Different methods for data collection for Purchased Goods and Services, adapted from the GHG Protocol Scope 3 Calculation Guidance Figure 1.1, page 21



3.1 Secondary data – Spend-based method

The spend-based method uses activity data based on economic value associated with upstream purchases and downstream sales, adjusted for inflation where possible. The emission factors use average emissions per monetary value of purchased/sold products. This approach can be used to identify the hotspots within the Value chain and develop a current 'best estimate' of Scope 3 emissions, and although this method can have a 50 percent error margin compared to actual emissions, due to lack of granularity at a product level, it can provide a valuable starting point for most organisations.

3.2 Secondary process data – Average-data method

The average data method uses activity data based on mass or other relevant units such as weight or volume. For transportation activities, the industry average is distance-based. The emission factors are derived from average emissions per unit of product or service. Industry average data is still secondary data; however, it is more granular and generally considered to be more accurate than using the spend-based method.

3.3 Primary data - Supplier Specific

Using primary data is generally a more accurate method where known energy and environmental inputs for a process or activity are used to calculate the emissions of the output of the process or activity. There is a better understanding of the contribution of each activity in the Value chain. This methodology entails breaking down the product system into a sequence of processes that can be extended to calculate more complex data such as life cycle analysis. Emission factors are provided by the supplier or customer based on their own emission intensity of production or processing facilities. The data could also be constructed by the reporting company in-house based on relevant information from the supplier. However, the decision to include or exclude processes is subjective and can vary and is extremely time consuming.

3.4 Hybrid method

The hybrid method is a combination of the primary and secondary methods, for circumstances when primary data is not available, secondary methods such as the spend-based or average-data method may be used. Though simpler to calculate, the lack of clarity in descriptions regarding the methods employed in specific studies, makes replicating carbon footprints difficult, unless the approach is clearly documented, using reliable and transparent data sources, conducting sensitivity analyses, and adhering to established standards and guidelines. These practices enhance the transparency and reliability of the study, enabling other researchers to replicate the analysis and validate the results.

3.5 Data requirements for emission calculations - embodied carbon

To improve the accuracy of emission calculations, there are some key data parameters that are needed. For example, to calculate the embodied carbon in products such as steel and concrete, the utility would need to know:

Product or material (eg. concrete)

Boundaries (addressed elsewhere in this report)

Transportation distance travelled (km)

Emission factors for materials production and transportation

(Material Mass/Volume x EF) + (Distance Travelled x EF) = Carbon footprint (t CO2e)

Material quantities (mass/volume), also vary with pipe diameter or thickness

There is no 'one-size-fits-all' emissions factor for a particular type of product or material, as the supply-chain variables differ between sources.

Therefore, each utility must determine the most appropriate emissions factor for their given circumstances and suppliers. This can be challenging when utilities use tools developed in the UK and therefore based on UK emission factors, when the majority of Australian suppliers are from Asia where these emission factors are not reflective or representative of the activity in Asia.

There are many existing sources of emission factors and calculation methodologies used in carbon footprinting, and the results may vary for the same product. This is dependent on the integrity or quality of the data and is influenced by parameters such as age of data source, location/geography of source data, or use of average, measured or modelled data. The cross-industry group Materials and Embodied Carbon Leaders Alliance (MECLA) have identified 26 core groups of standards that may be used for calculating carbon emissions in Upfront Carbon in the Built Environment, 2022. MECLA's discussion paper further summaries methods to quantify embodied carbon and provides a summary of existing calculation tools, highlighting if these use Australian data and what claimed standards they align to (refer to pages 48, 49 and 50 in Upfront Carbon in the Built Environment, 2022).

Currently, some organisations are developing bespoke tools to calculate carbon emissions, with other tools commercially available for use. Refer to the Melbourne Water case study in Step 6.5 of the guide for further detail.

3.6 Consistently developed and applied emission factors

The various methods of emission factor development have created an additional level of complexity as various carbon emission factor databases have emerged, with little to no explanation to the user of their origins. These databases rely on suppliers to consistently provide the most accurate data for the goods and services they are providing.

Before use, these databases should be verified to ensure that they are developed consistently and have applied appropriate emission factors. Similarly, utilities wishing to develop their own bespoke tools should apply the same rigour. Publicly available GHG Protocol calculation tools and guidance can be found here.

The use of emission factors may not be consistently used across the industry or may not be able to be applied consistently. Table 6 below summarises the most recognised Emission Factor Databases (adapted from the ICMM Scope 3 Emissions Accounting and Reporting Guidance, 2023, page 38).

Table 6: Summary of Emission Factor Databases non exhaustive, adapted from ICMM Scope 3 Emissions Accounting and Reporting Guidance 2023, Table 11, page 38

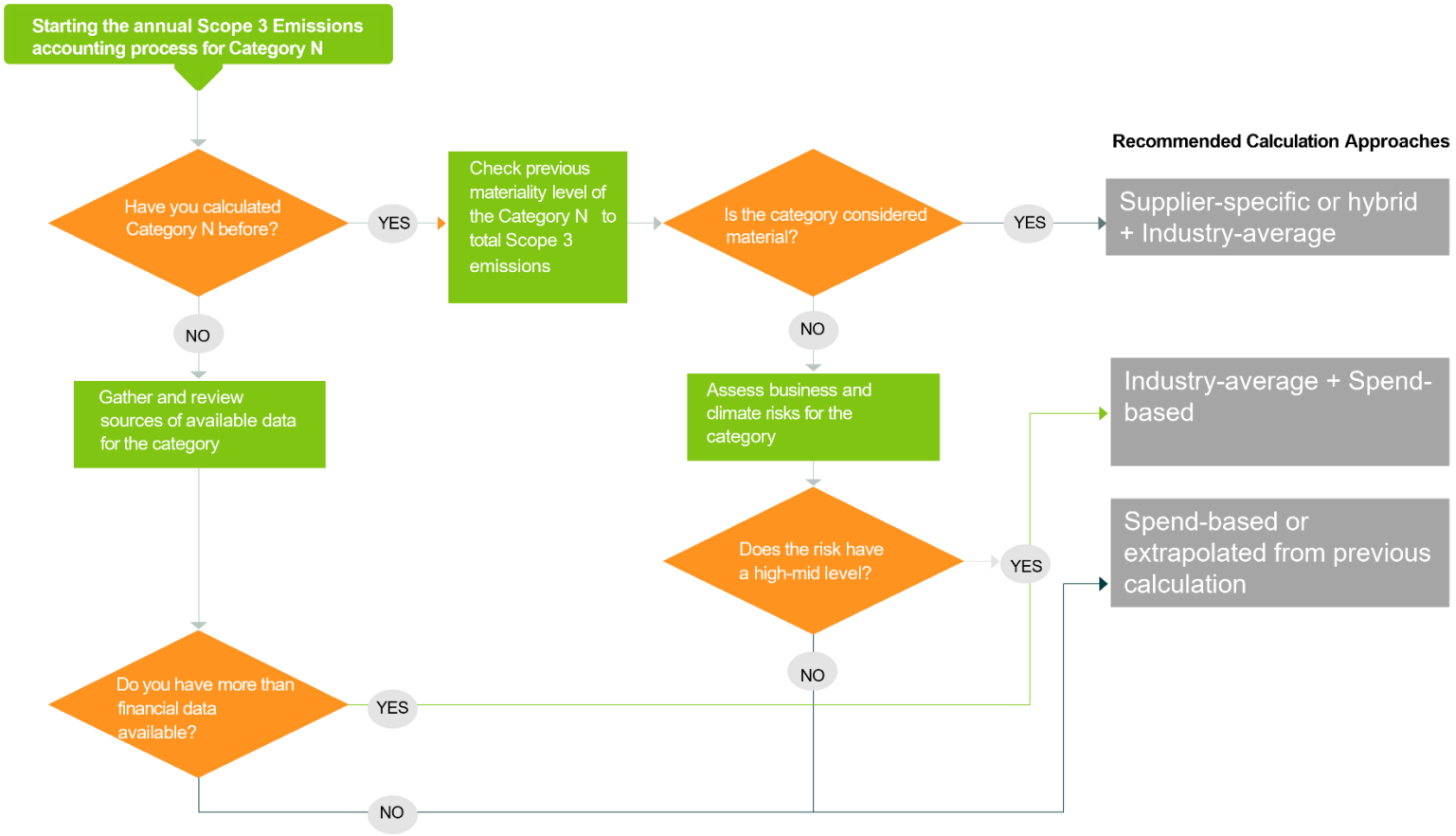
Note: Lifecycle Analysis for Copper Products was removed due to low relevance. Also recommend referring to MECLA 2023 Discussion Paper Inventory database which includes Australian Data listing, see MECLA Upfront Carbon in the Built Environment, 2023, Table 9, page 50

Name of Database	Owning/Maintaining Entity or Provider	Type of EFs	Applicability – Main categories	Updates to Database	Reliability and Accuracy
Conversion factors	Department of Environment, Food & Rural Affairs (DEFRA)	Spend-based and industry-average	C1, C3, C4, C9	Annual updates	Medium-high
Emission Factors Hub	Environmental Protection Agency (EPA) – USA Government		C3	Periodical updates	Medium-high
Life Cycle Inventory	EcoInvent	Industry-average	C1	Provider to inform users	High
IPCC Guidelines for National Greenhouse Gas Inventories & Emission Factor Database	Intergovernmental Panel on Climate Change (IPCC)	Industry-average	C1, C4, C9	Periodical updates	Medium-high
National Greenhouse Accounts (NGA) Factors	Australian government	Industry-average	C3, C11	Annual	High
Clean Cargo	Business for Social Responsibility (BSR)	Distance-based	C4, C9		

3.7 Calculation Method – Decision Tree

The decision tree in Figure 9 provides a reference in the prioritisation of different calculation methods, with the understanding that secondary, spend-based data may be required for the first time a particular category is calculated, when there is not industry-average information available.

Figure 9: Calculation Method Decision Tree, adapted from ICMM Scope 3 Emissions Accounting and Reporting Guidance, 2023, Figure 5, page 26



4. Assess accuracy and data quality

Once the inventory for Scope 3 emissions has been developed from Steps 2 and 3, it is important to characterise the quality of the data. This is an important step and will aid in subsequent steps of the guide.

Some key considerations to assist in the process are:

- Consider the data collection method used and identify the benefits and limitations from the method or approach.
- Identify data gaps, uncertainties, strengths, and weaknesses.
- Consider opportunities to embed data accuracy and quality with existing utility corporate quality assurance programs
- Consider the level of assurance required (refer to Step 1 for the timing of the rollout of assurance requirements for Scope 3 emissions associated with the Australian Climate-related financial disclosures)

If the work was outsourced or developed through a third-party tool, ask the consultant to disclose the method used, and the source of the emission factors, to apply a level of accuracy and identify uncertainties associated with each category reported. A key consideration is the calculation method used, the granularity of the emissions data, if primary data was used – the reliability of the supplier's data sources, and if any allocation techniques were used, which can add considerable degrees of uncertainty to the data. The following sections provide a little more detail to support the process, which include: identifying uncertainties, understand issues in allocating emissions when using primary data, links to QA/QC processes, and levels of assurance definitions.

4.1 Uncertainties

Appendix B of the GHG Protocol Scope 3 Standard (page 126 – 129) provides an overview of the concepts and procedures to evaluate the sources of uncertainty within a Scope 3 inventory. An uncertainty assessment can be used as a tool to guide data quality improvements and report the uncertainty of the results to stakeholders. Three types of uncertainties are identified by the GHG Protocol Scope 3 Standard:

- **Parameter Uncertainty –** Uncertainty regarding whether a value used in the inventory accurately represents the activity in the utilities Value chain, such as direct emissions data/activity data/emission factor data/global warming potential (GWP) values,
- **Scenario Uncertainty –** Methodological choices such as allocation methods, product use assumptions and end-of-life assumptions, and
- **Model Uncertainty –** Model limitations of the modelling approach to reflect the real world.

Uncertainty can be reported qualitatively through descriptions of uncertainty sources, and quantitatively through error bars, histograms, probability density functions, etc.

Further detail to support an uncertainty assessment can be found in Appendix B of the GHG Protocol Scope 3 Standard from page 126.

4.2 Data quality considerations with primary data - allocating emissions

When companies use **primary data** from suppliers or other Value chain partners to calculate Scope 3 emissions, they may need to allocate emissions.

Allocation is needed when:

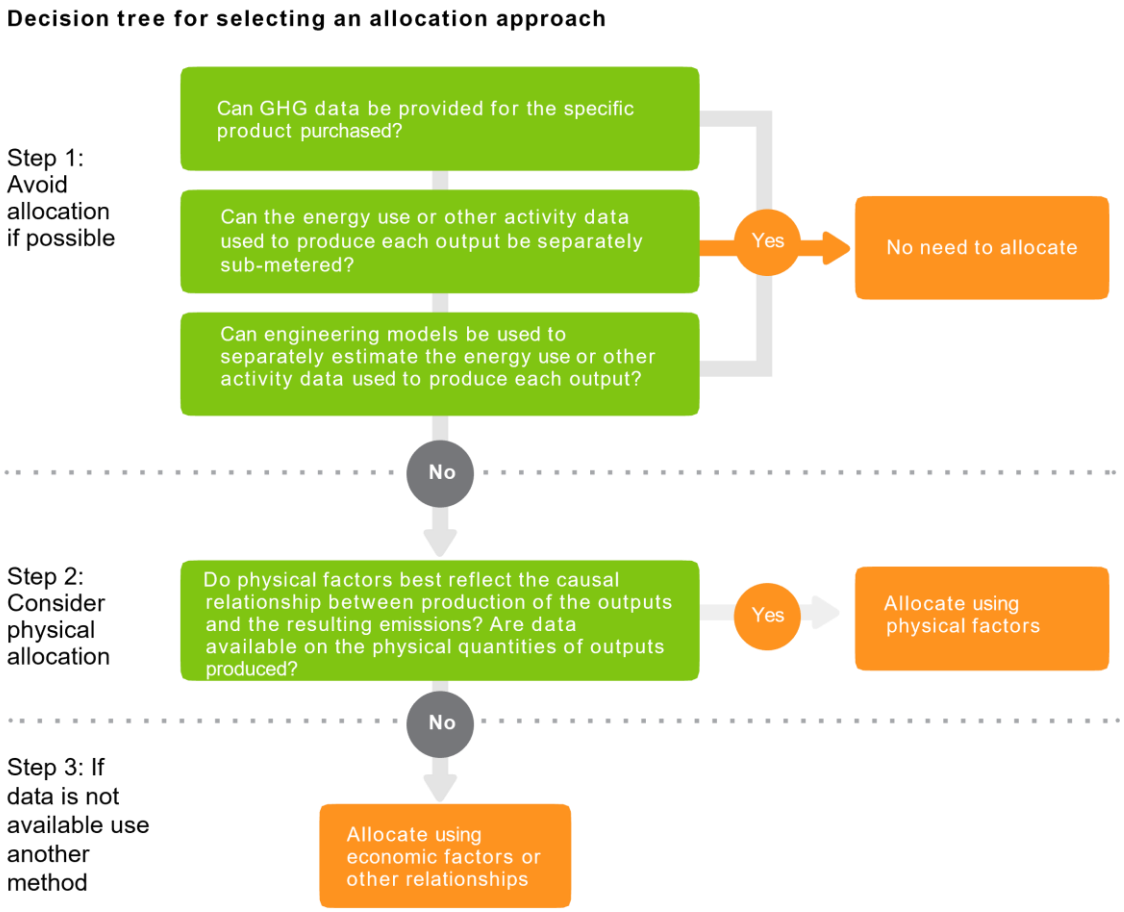
- A single facility or other system produces multiple outputs, or
- Emissions are only quantified for the entire facility or system as a whole.

Allocation is not necessary when using secondary data to capture Scope 3 emissions, since the activity data and emission factors are typically in reference to a single product.

The decision tree in Figure 10 is reproduced from the GHG Protocol Scope 3 Standard (see Chapter 8 p. 89) highlights the approach to allocation. These considerations may be relevant when water utilities are considering how to best calculate the emissions intensity of their products (bulk water supplies, recycled water, potable water, wastewater) for customers or other service providers within the urban water cycle.

Examples of physical and economic allocations is provided in the GHG Protocol Scope 3 Standard, Chapter 8, page 91. Further examples of allocation upstream and downstream emissions across the 15 categories are provided in Chapter 8 of the GHG Protocol Scope 3 Standard.

Figure 10: Decision tree for selecting an allocation approach, reproduced from GHG Protocol Scope 3 Standard, page 89



4.3 QA/QC data quality checks

Apply checks to all aspects of the Scope 3 inventory process, focusing on data quality, data handling, documentation, and calculation procedures. Carry out more in-depth checks to sources that are significant to the inventory and/or activities that have high levels of uncertainty. The GHG Protocol Scope 3 Standard includes Quality assurance (QA)/Quality Control (QC) procedures for managing a Scope 3 inventory in Appendix C – Data Management Plan page 129. A summary to assist in evaluating data quality indicators reproduced from the GHG Protocol Scope 3 Standard (page 77) is provided in Table 7. The assessment uses rating descriptions on direct emissions data, activity data, and emission factors as applicable. The process can be subjective, for example, some emission factors may not have been updated for many years impacting the score.

Table 7: Example of criteria to evaluate the data quality indicators, reproduced from GHG Protocol Scope 3 Standard, page 77

Score	Representativeness to the activity in terms of:				
	Technology	Time	Geography	Completeness	Reliability
Very good	Data generated using the same technology	Data with less than 3 years of difference	Data from the same area	Data from all relevant sites over an adequate time period to even out normal fluctuations	Verified data based on measurements
Good	Data generated using a similar but different technology	Data with less than 6 years of difference	Data from a similar area	Data from more than 50 percent of sites for an adequate time period to even out normal fluctuations	Verified data partly based on assumptions or non-verified data based on measurements
Fair	Data generated using a different technology	Data with less than 10 years of difference	Data from a different area	Data from less than 50 percent of sites for an adequate time period to even out normal fluctuations or more than 50 percent of sites but for a shorter time period	Non-verified data partly based on assumptions, or a qualified estimate (e.g. by a sector expert)
Poor	Data where technology is unknown	Data with more than 10 years of difference or the age of the data is unknown	Data from an area that is unknown	Data from less than 50 percent of sites for shorter time period or representativeness is unknown	Non-qualified estimate

4.4 Assess the level of assurance required

Consider the role of assurance for the Scope 3 inventory reporting. Providing assurance for the Scope 3 inventory can provide increased confidence in reported information (both internally and from external stakeholders), enhanced accounting and reporting practices and improved efficiency in subsequent inventory update processes. Assurance can be completed internally, as a '**First party assurance'** or by a third party as '**Third-party assurance'.**

Assurance is defined in the GHG Protocol Scope 3 Standard as *'the level of confidence that the inventory is complete, accurate, consistent, transparent, relevant, and without material misstatements.' (page 113).*

The GHG protocol Scope 3 Standard describes two levels of assurance, limited assurance and reasonable assurance.

The **level of assurance** requested by the reporting utility will determine the rigor of the assurance process and the amount of evidence required. The levels of assurance available are:

- **Reasonable assurance**: This can be defined as an assurance level when users can have a high degree of confidence that the GHG statements are free from material misstatements.
- **Limited assurance:** This is generally a less rigorous and thorough assurance process compared to reasonable assurance, with limited assurance evidence. There is a greater risk that material misstatements may exist in the GHG statement when an auditor provides limited assurance.

A definition of material misstatement and materiality is provided in Step 2 of the Guide. The highest amount of assurance is a reasonable level of assurance. Absolute assurance is never provided as it is not practical or possible to test 100% of the inputs to the GHG inventory. Examples of the wording from assurance are provided below in Table 8, refer to Chapter 10 of the GHG Protocol Scope 3 Standard page 115 for more details.

Table 8: Limited and reasonable assurance opinions, reproduced from the GHG Protocol Scope 3 Standard, page 115

Assurance opinion	Nature of opinion	Example wording of opinion
Limited assurance	Negative opinion	"Based on our review, we are not aware of any material modifications that should be made to the company's assertion that their Scope 3 inventory is in conformance with the requirements of the *GHG Protocol Scope 3 Standard.*"
Reasonable assurance	Positive opinion	"In our opinion the reporting company's assertion of their Scope 3 emissions by category, as reported in the inventory report, is fairly stated, in all material respects, and is in conformance with the *GHG Protocol Scope 3 Standard.*"

5.Set the reporting boundary and identify areas for further investigation

Setting the reporting boundary is the next critical step of this guide to transparently disclose the magnitude of Scope 3 emissions. Key considerations gathered from the previous steps of the guide will help inform the reporting boundary, such as consideration for any Scope 3 category disclosure requirements required set by State jurisdictions (Step 1), the assurance level required (Step 4), and whether there is enough information to be able to report on categories or activities (Step 2 – 4). In working through this process, it is important to consider the balance in transparently disclosing the Scope 3 inventory with the principle of consistency, considering impacts to reporting the magnitude of Scope 3 emissions year on year. It is recommended the reporting boundary match the Scope 3 inventory as closely as possible and transparently disclosing the level of accuracy associated with the data. Priority should be given to disclosing the most relevant and material Scope 3 emission sources and consideration be made for the potential for any 'material misstatements' (refer to Materiality in Step 2), when the impact of known accounting errors on the GHG inventory results could influence a stakeholders' decision. This process also involves determining priority areas for further investigation, such as material areas of the Scope 3 inventory that require improvement in accuracy or a reduction of uncertainties.

The US EPA Scope 3 Inventory Guidance presents the progress of Scope 3 emissions reporting over a five-year time horizon, leading to the reporting boundary covering all categories in year five, with improvements in supplier-specific data collection methods over time (refer to Figure 11). Key information to support the reporting process is provided below along with some considerations to support areas identified for further investigation.

Figure 11: Scope 3 calculation method improved and boundary expanded over time, reproduced from US EPA Scope 3 Inventory Guidance

GHG Protocol Categories	Year 1	Year 2	Year 3	Year 4	Year 5
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

Legend

	Specific method (supplier-specific method, fuel-based method)
	Average method (e.g. average-data method, spend-based method)
	Lack of data, cannot report
	Not relevant

5.1 Information for reporting

The key reporting requirement for Scope 3 emissions is defined by GHG Protocol Scope 3 Standard as:

> Scope 3 emissions in metric tons of CO2-e, excluding biogenic CO2-e emissions and independent of any trades, or transfers of offsets.

As noted in Step 1 of the guide, the GHG Protocol Scope 3 Standard, supported by the GHG Protocol Scope 3 Calculation Guidance are the most widely accepted standards for Scope 3 emissions, and are recommended references when reporting on Scope 3 emissions. The Australian Accounting Standards Board (AASB) exposure draft further, indicates a possible adjustment to first consider any relevant methodologies under NGER before referring to the GHG Protocol measurements or standards. It is recommended the ASRS be referred to after its release due in July 2024 to further clarify requirements for Scope 3 reporting purposes. A summary of reporting requirements of the GHG Protocol and the proposed ASRS are provided in Table 9.

Table 9: Overview of Reporting Requirements and Recommendations of the GHG Protocol Scope 3 Standard and metrics from the Exposure Draft of the ASRS
Note: The GHG Protocol Scope 3 Standard reporting requirements are summarised from Section 11.1 page 119 - 122, it is recommended Section 11.1 be reviewed for a comprehensive understanding of reporting requirements in accordance with the GHG Protocol Scope 3 Standard.

GHG Protocol Scope 3 Standard reporting requirements	Reporting measure – GHG Protocol Scope 3 Standard	Reporting measure – Australian Sustainability Reporting Standards (ASRS) – Exposure Draft (not finalised)
Required	Total Scope 3 GHG emissions in metric tons of CO2 equivalent using global warming potential values from the latest IPCC report - per category, material and immaterial, excluding life-cycle biogenic CO2 emissions	Total Scope 3 GHG emissions in metric tons of CO2 equivalent using the GWP from the same IPCC report as referred to in the NGER Act
	Disclose sources of Scope 3 emissions under 15 categories from the GHG Protocol standards	Scope 3 emission sources under the 15 categories are examples that an entity ***could*** consider when disclosing Scope 3 sources
	List of methodologies applied per category, with description of allocation methods and assumptions	Specifies an entity is required to prioritise applying **relevant methodologies in NGER Scheme legislation** as default methodologies, before referring to other GHG measurement methods for frameworks. It is recommended to refer to the final ASRS due for release in July 2024 for further clarifications.
	Historic emissions disclosure, as least 1 – 2 years wherever possible	
	Exclusions* and uncertainties** that could significantly impact the information disclosed	

GHG Protocol Scope 3 Standard reporting requirements	Reporting measure – GHG Protocol Scope 3 Standard	Reporting measure – Australian Sustainability Reporting Standards (ASRS) – Exposure Draft (not finalised)
Strongly recommended	Control*** approach applied to the organisational boundary and the level of assurance provided if applicable Indicate the contribution of each category to total Scope 3 emissions as a percentage	
Optional but recommended	Category level break down of emissions by key emission sources Identification of emission hot spots within inventories and explain changes year on year Plans to produce increasingly accurate activity data and EFs for material categories and emission sources	

**Disclose and justify any exclusions from reporting Scope 3 emission categories or activities (refer Step 2)*

***Describe the level of uncertainty of reported rata, qualitatively and quantitatively for transparency and to avoid misinterpretation. When data uncertainty is high, utilities should also include a description of the steps taken to address uncertainty (refer Steps 3-4)*

****Disclose the control approach applied (refer Step 2), and disclose the level of assurance provided to the Scope 3 inventory if this is applicable (refer Step 4)*

5.2 Scope 3 activities– a starting point

Based on Steps 1 – 4, utilities should have an idea of the material activities and categories most relevant to their organisation. For utilities just starting out that need to report, that have not managed to gather a robust understanding of their Scope 3 emissions profile, the following activities are identified as a starting point which are provided in Table 10. These activities could be investigated for initial reporting, along with categories identified in the 'hot spot' map (refer Section 8) that best reflects the service provision of the utility. Further consideration can also be made for common emission sources identified in urban water cycle that the utility services which are detailed further in Section 8.

Table 10: Possible Scope 3 emission reporting activities for a utility starting out

Scope 3 Reporting Activities (not captured in Scope 1 or 2)– A starting Point
Outsourced activities
Purchased electricity: extraction, production, transmission and distribution (location based)
Purchased heat: extraction, production, transmission and distribution
Purchased fuels: extraction production, transmission and distribution
Chemicals

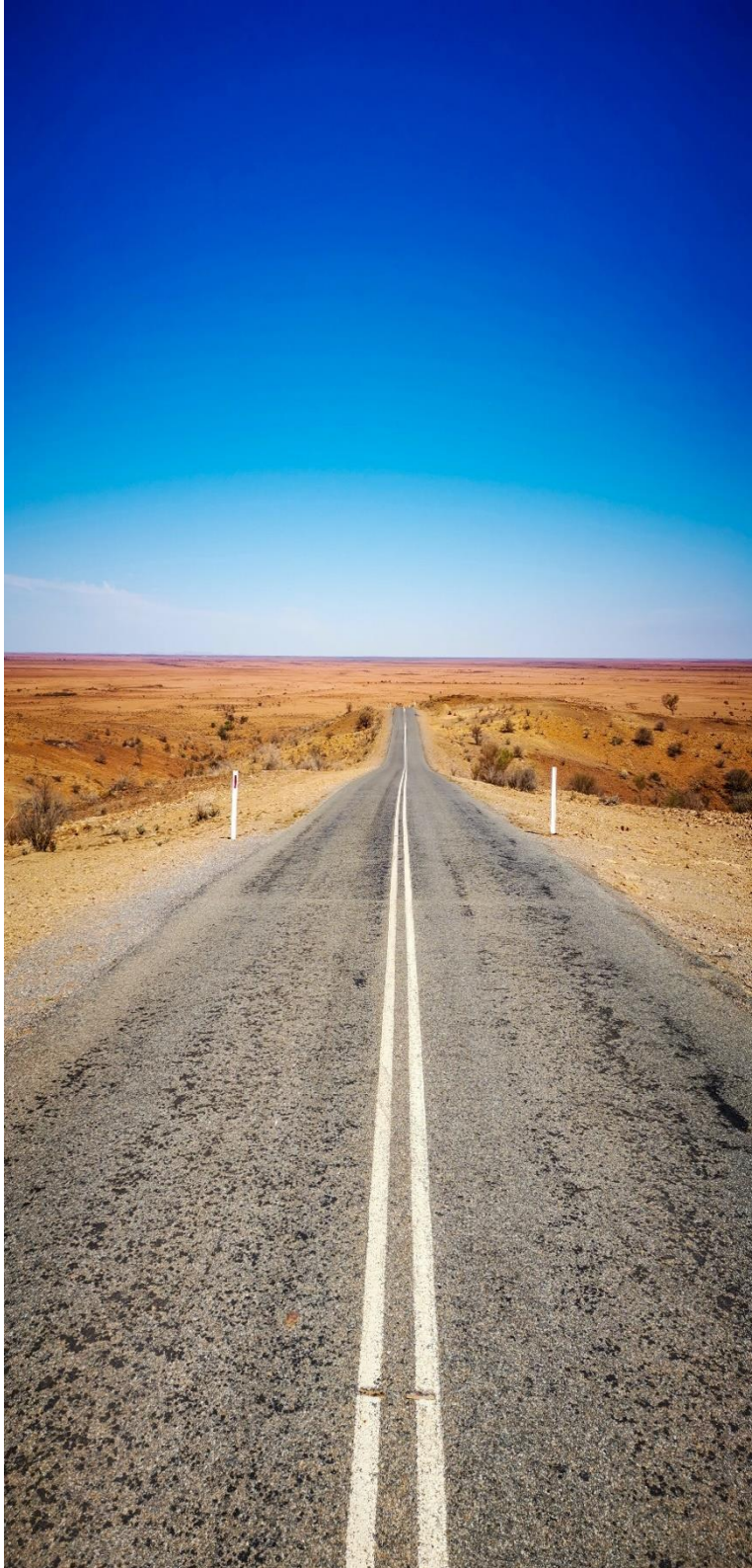
If a utility chooses to report on basic categories, without following the Steps 1 - 4 recommended in this guide and aligned to the GHG Protocol, this must be transparently disclosed in reporting, as these categories may not reflect the material Scope 3 emissions of the reporting utility. There may also be other categories or activities required by State jurisdictions to support their Scope 3 emission reporting requirements that need to be included in reporting disclosures.

5.3 Detail identified priority areas for further investigation

Following the previous steps of the guide and determination of the reporting boundary, it is important to outline key areas identified for further investigation, these may include:

- Engaging Value chains to gather more granularity of activities and improve understanding of accuracy of emission calculation methods, including any allocations or assumptions made,
- Further investigate emission hot spot sources or areas of high uncertainty,
- Ensure emission factors are up to date and reflect the Australian context as far as practical,
- Improve understanding of material emissions with most relevance to a utility that could result in emissions reduction.

Further information outlining considerations to improve the Scope 3 inventory over time are described in Step 6.



5.4 A case study from the UK - Water sector driving consistency in reporting through the Carbon Accounting Handbook

Water utilities in the UK have been reporting on **operational GHG emissions**, which include Scope 3 emissions under some categories (the operational boundary excludes embodied carbon in construction), for many years. UK Water Industry Research (UKWIR) has developed a standardised workbook for estimating operational GHG emissions, the Carbon Accounting Workbook (CAW), to bring consistency and accuracy to the reporting process across the water industry in the UK. The workbook has been in place for over ten years and is updated annually to reflect the needs of the industry, including changes in carbon accounting practices. The workbook sets out the minimum requirements for reporting on operational GHG emissions under different reporting frameworks and highlights these explicitly, including Scope 3 emissions. Water businesses may choose to investigate and disclose across a broader Scope 3 footprint on a voluntary basis, as you will find in the Yorkshire Case Study example here.

Recently, the economic regulator of water business in England and Wales, **Ofwat**, has introduced a Carbon Performance Commitment and have expanded mandatory reporting for Scope 3 emission categories, reported across water and wastewater. These commitments will hold a penalty for underperformance on emission targets and include emission reduction requirements that cover Scope 1, 2 and 3 emissions. The consultation from the engagement highlights challenges raised by different water utilities in reporting emissions in relation to the changes proposed and how the economic regulator responded.

The UK example highlights the opportunity for water sector-led guidance, such as the CAW, which has been influential with regulators and enabled a water sector baseline standardisation for emissions estimation, with the ability for annual updates to adjust to best practice.

6. Develop data improvement plan

Improving the Scope 3 inventory is an iterative and ongoing process. It should also be tailored to the needs and interests of an organisation, considering the operating landscape outlined in Step 1 and data accuracy and quality considerations provided in Step 4. Data improvements over time will support the principle of completeness and accuracy, along with consistency as reporting improves over time.

A data improvement plan can be aligned with utilities existing quality assurance and quality control procedures and provide a valuable tool to manage data and track progress of the Scope 3 inventory over time. This data improvement plan can also be useful for assurance, as it will contain the data that an assurance provider would need to preform assurance. While a data improvement plan may look different for different sized and resourced utilities, the following considerations are recommended:

- What are the key data quality concerns, and how easy are these to address? Consider the amount of effort for the overfall benefit – the balance between key principles of accuracy and completeness.
- Recognising that you can't do everything at once and you need to start somewhere. Focus on the most important activities and categories first (high materiality and relevance) that present emission reduction opportunities. Consider priority areas identified (Step 5) and utility risks and opportunities (Step 1).
- Set prioritised data improvement tasks with corresponding resource requirements over the short term and medium term.
- Align the data improvement plan with an organisation's existing QA/QC procedures.
- Consider what partnerships can be leveraged to support data improvement goals within the water sector and across other sectors.

THE FOLLOWING SECTIONS PROVIDE SOME RESOURCES AND EXAMPLES OF WATER SECTOR IMPROVEMENTS TO DATA THAT MAY BE APPLICABLE FOR CONSIDERATION.

6.1 Engaging with Value chain for Scope 3 emissions reduction

To achieve meaningful Scope 3 emissions measurement and reduction, water utilities must first gather more granular information by engaging with their Value chains (suppliers, customers, and other stakeholders). The most relevant suppliers (based on spend/expected emissions impact identified in Step 3), or those where the utility has a high degree of influence.

Consideration should be prioritised first to the maturity of suppliers with regards to GHG emissions and reporting, as suppliers may not have taken the steps necessary to collect or provide data required by water utilities (maintaining inventories, providing appropriate emissions factors for materials, etc). The GHG Protocol provides a useful methodology for engaging with suppliers:

- First targeting suppliers with prior experience developing GHG inventories
- Identifying subject matter experts at each company
- Explaining the business value of investing in GHG accounting and management and requesting data that has already been collected (such as energy use, fuel consumption, etc.)
- If able, provide instructions and support on further data requests, which may include material emissions factors, embodied carbon totals etc.

6.2 Asking for an environment product declaration (EPD)

To improve the accuracy of the emission factors applied, the Value chain can provide an Environment Product Declaration (EPD) as one of their deliverables with the product being purchased. An EPD is an independently verified and registered document that communicates transparent and comparable data and other relevant environmental information about the life-cycle environmental impact of a product. To have a product certified through this process is expensive, however, some suppliers (for example, Boral) are pursuing this for their products as they recognised there is business value in providing this. It may take some time for the Value chain, in general, to take up this process as it comes at a cost. However, water utilities could consider this as a contract requirement for carbon-intensive products or products ordered in large quantities and use this opportunity to influence the Value chain to make this into a ‘business as usual’ deliverable in the future.

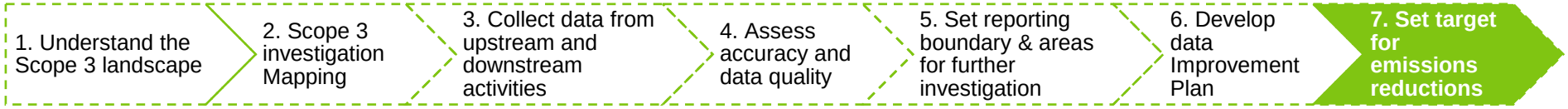
An EPD request template developed by Melbourne Water (see Appendix A) could be used by other water utilities to provide consistency in how water utilities ask for EPDs and take advantage of the lessons learnt by Melbourne water in this process. The templates also include an explanation of the intent of an EPD to help Value chains understand the purpose of the exercise.

6.3 A case study from Melbourne Water - Using verified sources for carbon emission factors in the water sector

Through the search for suitable emission factors, Melbourne Water have found technical gaps in the existing proprietary tools and databases on offer in the marketplace for the water sector. Melbourne Water further identified that there are no current emission databases designed specifically for the water sector, and the tools currently available are generally based on UK centric emission factors and databases, rendering them unsuitable in the Australasian context.

As such, Melbourne Water embarked on its own journey of collaborating with industry partners such as AusLCI and its own trusted service providers to develop a local emissions inventory, tailored to the Australasian water industry's needs: The Water Industry Carbon Emission Database (WICED).

Unlike other databases, WICED is intended ultimately to be manufacturer specific, to encourage and reward the Value chain for innovating and creating low carbon materials, thus enabling the user to optioneer between various products and materials to achieve a low carbon outcome. WICED is a combination of emission factors local to Australasian region from various verified sources ranging from EPDs to modelled SimaPro data (science based data), all of which have been produced using a process-based data method (refer to Step 3). Emission factors derived from other methods such as Spend-based method or Hybrid methods are excluded to ensure high level of data accuracy, transparency, repeatability and consistency. Its intent is to provide the most relevant up-to-date emission factors and models for the Australasian Water industry in a dynamic database (i.e. that is continuously being updated). This database can be used as the foundation by other water utilities with the intent that it is collaboratively updated in the future and used as a common resource to benchmark carbon emissions within the water sector. Within Melbourne Water, WICED has been integrated into a suite of in-house carbon tools, in order to calculate the carbon footprints of its capital construction and ultimately reduce Scope 3 emissions from capital work programs.



7. Set targets for emission reduction

It is recommended that a comprehensive understanding is generated across the Scope 3 emission inventory prior to setting targets for Scope 3 emissions reduction, supported by the previous steps in this guide. This should not prohibit action or be used as means to delay action for embedding Scope 3 emission reduction initiatives within a utilities existing plans and strategies. The intent is to ensure the relevance and materiality of Scope 3 emission sources are well understood in the first instance, to ensure target setting will assist in the delivery of genuine emissions reduction. Approaches should follow the emission reduction hierarchy and consider the overlap of any existing legislated emission reduction targets. Importantly, the target setting process should make sense to the utility and be designed to provide the greatest opportunity to reduce emissions and provide broader benefits and outcomes across Value chains. Targets should also be leveraged across existing strategies and plans, embedding opportunities for Scope 3 emissions reduction across a water utilities other business functions.

Considerations to assist in the target setting process and opportunities to embed Scope 3 emission reduction strategies across a water utility's business functions are provided below. These are supported by two water sector case studies along with other considerations such as issues with offsetting Scope 3 emissions.

7.1 Considerations for target setting

Chapter 9 of the GHG Protocol Scope 3 Standard, outlines considerations for setting an emission reduction target, setting the boundary for the target and different target types.

There are three main target boundaries applicable to Scope 3 emissions outlined in the GHG Protocol:

1. A single target for total Scope 1, Scope 2 and Scope 3 emissions.
2. A single target for total Scope 3 emissions.
3. Separate targets for individual Scope 3 categories.

Watercare NZ have set a target for Category 2 Scope 3 emissions in construction (embodied carbon), further detail in the Watercare case study provided below.

The GHG Protocol Scope 3 Standard further describes the advantages and disadvantages of different target boundaries. The process of target setting will need to consider any legislated target boundaries and requirements at the State level and/or under the Commonwealth Safeguard Mechanism if applicable. This may lead to establishment of a voluntary target that sits outside of the legislated target if it makes sense to take this path.

7.2 Strategies for reducing Scope 3 emissions across a utility

After completing Steps 1 – 6, key leverage points for influencing change across relevant and material Scope 3 emission sources should have been identified. To effectively reduce Scope 3 emissions, some ways to embed Scope 3 emissions management across a water utilities programs and strategies are outlined below:

- Embed the Scope 3 emissions reduction strategy (and target/s) into the organisations carbon reduction strategy and align with other organisational standards such as procurement, business travel and HR policies.
- Prioritise methods and resources for data collection that are granular enough to identify areas to reduce emissions in the Value chain.
- Include effective governance structures for Scope 3 emissions management in the Emission Reduction Strategy and allocate resources and budgets for ongoing Scope 3 measurement and management.
- Work with finance, human resources, procurement and Value chain managers as key delivery partners to reduce Scope 3 GHG emissions alongside senior managers and sustainability professionals. Essentially mainstreaming emissions reduction initiatives across the organisation. Consider the use of KPI targets for buy-in and other leverage points to gather broader interest in identified emission reduction opportunities and objectives.
- Embed procedures and processes for planners to consider the impact of planned construction projects on the Scope 3 emission profile, account for avoided emissions and adjust business plans to deliver on targets.
- Identify key partnerships to support the shared understanding of emissions reduction across the Value chain and across sectors.
- Consider co-benefits of reduced Scope 3 emissions in existing circular economy benefit assessments and strategies, such as uptake of recycled materials in construction and maintenance projects.
- Include complimentary emission reduction co-benefits in existing water efficiency programs and Zero Carbon Water Cycle research.
- Consider opportunities such as how accounting for carbon emissions for planned projects in the built environment could support transition and trialling of nature-based interventions, for flood mitigation (as opposed to traditional, high emission, grey infrastructure) and water quality improvements - as opposed to chemicals.

7.3 Reducing infrastructure-related emissions and emissions from purchased goods and services

The magnitude of Scope 3 emissions is greatest across most organisations including the water sector, in Purchased Goods and Services (Category 1) and Capital Goods (Category 2) – refer to the Water Sector heat map in Section 8. Which is why efforts for emissions reduction in these areas across the water sector are well underway (such as Melbourne Water's capital delivery WICED - Step 6 and the case studies from Watercare and Yarra Valley Water detailed further below)

Infrastructure related emissions can be reduced in two main ways, through:

- design and tender process,
- procurement, and
- innovation through project delivery

Reducing infrastructure-related emissions should be carried out in accordance with international practices such as the management framework for reducing emissions across the infrastructure delivery lifecycle (Figure 12). These principles outline the carbon reduction hierarchy which indicates the **greatest carbon reductions are found at or before the feasibility stages of infrastructure projects.** For example, at the earliest stages of the project, carbon emissions can be avoided by repurposing an existing asset or delivering the outcome through another means, such as through eliminating the need to build new assets.

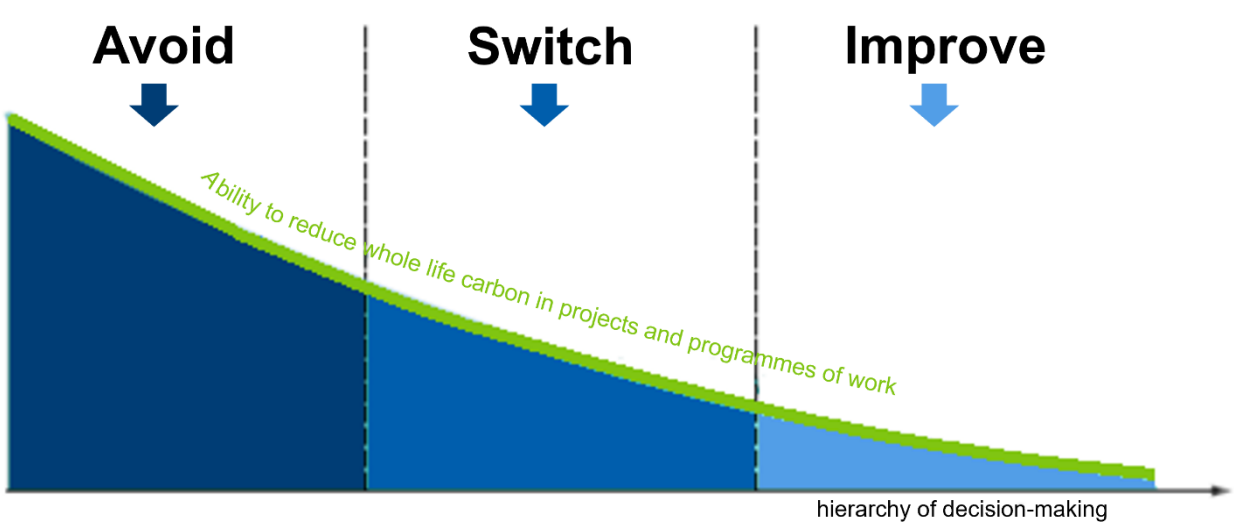
The GHG impact of the project should continue to be measured throughout the project delivery cycle to capture reduction opportunities. During the feasibility stage, optioneering is undertaken to evaluate factors such as cost, carbon, safety, time, etc. The desired option is then developed further into a concept design and submitted in a business case to progress to detailed design. This business case requires the carbon baseline and the carbon impact of the proposed solution. In detailed design there are further reduction opportunities identified which are submitted in the business case to move to the next phase – construction. The total carbon

savings of each project are considered when reporting against a baseline and/or target.

The procurement process is also an important opportunity for reducing Scope 3 emissions. This can be achieved through including carbon reduction clauses in supplier agreements and working with suppliers to help understand their emissions and incentivise them to do so.

Carbon reduction clauses can be introduced at a programme level or in project specific contracts. Contractual conditions could include climate related targets, material selection, and reporting, etc. The clauses in supply agreements can support contractual conditions by specifying low carbon design, materials, products and construction methodologies.

In addition to individual contracts and supply agreements, an incentivised programme delivery model approach can be adopted to further support emissions reduction.



Note: This figure represents a simplified and streamlined version of the carbon reduction hierärchy presented in PAS 2080:2016 and the Infrastructure carbon review [1]. It has been updated to clarity its applicability and relevance to a wider range of project and programmes within the built environment (i.e. to clarity that the carbon reduction: hierarchy is not solely about new builds).

Figure 12: Carbon management in buildings and infrastructure, adapted from PAS2080:2023

A case study from Watercare's strategic embodied carbon approach

Auckland's water and wastewater service provider Watercare has created a carbon-centric approach to investment decisions under its strategic Enterprise Model for infrastructure delivery. The company will spend NZ$18.5bn upgrading and building new infrastructure over the next 20 years, as Auckland's population of 1.7 million is forecast to grow by more than half a million people.

The Watercare 40:20:20 vision outlines three complementary targets for the company and its Value chain:

- 40% reduction in carbon emissions from construction by 2024
- 20% reduction in cost of construction by 2024
- 20% year-on-year improvement in wellbeing, health and safety

The Enterprise Model was created to transform the infrastructure delivery approach, which required a behavioural step change within Watercare and its Value chain to meet this vision. Driven by collective ownership of the full works programme by Watercare and its partners, the model financially incentivises its partners to work towards the vision.

A case study from Yarra Valley Water's Scope 3 Emission Strategy

Prior to setting a target, Yarra Valley Water has been undertaking activities to reduce Scope 3 emissions in its Value chain for some time. This includes:

- Its water conservation campaigns and showerhead exchange program, which have co-benefits of reducing energy and emissions associated with the supply and treatment of water, and emissions from customers heating their water.
- Installing electric car chargers in its car park (while also transitioning its fleet towards lower emissions vehicles).
- Participating in the Net Zero Carbon Water Cycle Program.

In 2022, Yarra Valley Water developed an initial estimated baseline of Scope 3 emissions in accordance with the GHG Protocol. The purpose of undertaking the baseline was strategic and to:

- Identify material categories of Scope 3 emissions along Yarra Valley Water's value chain.
- Enhance the organisations' understanding of Scope 3 emissions and support Scope 3 emissions reductions conversations.
- Inform approaches to reducing Scope 3 emissions.
- Enable the subsequent progress measurement of Scope 3 emissions reductions.

The baseline was established using a combination of sources that had varying data reliability or quality, reflecting the evolving maturity of Scope 3 reporting. This included primary sources, such as emissions self-reported by supplier, and secondary data sources including life-cycle analysis of embodied carbon emissions associated with the manufacture and installation of its pipe network and spend-based method sources where no other reliable data was available.

The initial baseline identified the following key insights for Yarra Valley Water:

- While a rough baseline, the assessment demonstrated that Scope 3 emissions are far

higher than its Scope 1 and 2 emissions elevating the importance of focusing on Scope 3 emissions reduction.

- Significant Scope 3 emissions sources included:
  - Melbourne Water's emissions in supplying water to Yarra Valley Water and treating wastewater.
  - Supply chain emissions related to the construction, maintenance, and embodied carbon in materials of its pipe network.
  - Customer's direct and in-direct use-phase emissions*.
- Employee-related emissions make up a very low portion of its Scope 3 footprint. However, Yarra Valley Water has included employee-related emissions in its reduction considerations due to its significant influence over these emissions.

**Yarra Valley Water in conjunction with the water sector is reviewing the boundaries for the assessment of customer emissions and will be revising its baseline. Yarra Valley Water is also exploring the opportunities to have a meaningful influence on customer's emissions reductions through water efficiency (via next-generation showerheads, rainwater tanks, and behaviour change campaigns) and potentially through encouraging the uptake of green energy and new efficient technologies (such as heat pump installations).*

Yarra Valley Water set a high-level Scope 3 emissions target with plans to set meaningful science-based targets for specific Scope 3 categories in the future. Based on existing projects underway, the trajectory of electrification across Victoria, and Melbourne Water's own Net Zero target, Yarra Valley Water set Scope 3 emissions reduction targets (from their 2022 baseline) of:

1. 66% by 2030
2. 100% by 2050

The initial measurement and targets for Scope 3 emissions have elevated the importance of taking action to reduce Scope 3 emissions. Since establishing the baseline and targets in 2022, across the key focus areas, Yarra Valley Water has:

Melbourne Water

- Progressed a 'growing carbon' project with Melbourne Water and the other metropolitan water corporations in Melbourne.
- Commenced engaging with Melbourne Water on how Yarra Valley Water can best support them to reduce their emissions.

Supply Chain

- Continued to work with staff, suppliers, and contractors to increase the use of recycled and low-impact materials.
- Developed a carbon-in-construction tool to calculate Scope 3 emissions in construction and maintenance activities and developed a baseline of construction emissions for its 2023-2028 price period. This identified primary sources of embodied carbon across its projects and opportunities to reduce emissions.
- Established a method to capture recycled material use in as-constructed documents.
- Set a strategic target for tonnes of recycled and low-impact materials used.
- Commenced exploration of carbon pricing as a mechanism to drive better Scope 3 emissions outcomes in construction.

Customers

- Commenced a new water audit and showerhead exchange pilot.
- Invested in ongoing behaviour change campaigns (e.g. Water Watchers).

Employees

- Set a target for the uptake of electric vehicles (EVs) in the Yarra Valley Water fleet and held EV test drive days. Yarra Valley Water will transition to an EV fleet by 2030 and only purchase EVs from 1 July 2026, where fit-for-purpose vehicles are available.
- Installed 7kw and fast EV chargers in the Yarra Valley Water carpark with further rollouts planned for delivery in 2024.

In addition, Yarra Valley Water has:

- Embedded its Scope 3 targets in its 2030 Strategy Scorecard (reported to its Board quarterly) and reported its initial Scope 3 baseline and annual emissions in the 2022-23 annual report.
- Collaborated with the water industry (to ensure consistency and alignment) on:
    - Scope 3 boundaries
    - Data collection standards
    - Calculation methodologies
    - Consistency of supplier engagement and data collection
    - Ways to move beyond estimated emissions to actual emissions where practical.
    - Strategies that will deliver reductions in Scope 3 emissions.

7.4 Identifying additional information to meet emission reduction goals

After setting an emission reduction target applicable to Scope 3 emissions, continual iterations are recommended across these key areas as a minimum:

- Continued setting of priorities, boundaries for further investigations and disclosures.
- Development of a comprehensive action plan or implementation plan.
- Keeping a watching brief on new and emerging regulatory requirements, industry standards, methods and emission factors.

7.5 Issues with offsetting Scope 3 emissions

Inevitably, where efforts to minimise Scope 3 emissions have been exhausted, offsetting may be considered a viable solution for reduction. This brings in additional layers of complexity when considering the current state of accurate, data-driven Scope 3 emissions, in addition to efforts to establish clear boundaries of ownership of respective emissions. Attempting to offset emissions which may be inaccurate, or double-counted by another entity is considered poor practice and does not reflect a meaningful intent to reduce global emissions. As such, the use of offsetting to reduce Scope 3 emissions is discouraged as a stand-alone strategy.

According to PAS2080 Guide, offsetting should only be considered as a strategy if:

- Efforts to minimise the source of emissions have already been made.
- Consideration has been given to insetting or emissions removals in the Value chain.
- The data used to estimate the volume of emissions requiring offsetting is measured and accurate.
- There is clear ownership of the respective emissions within established boundaries of control, with no risk of double counting by another entity.

8. Scope 3 emissions in the urban water cycle

Each water utility within Australia and Aotearoa New Zealand will have a different Scope 3 emissions profile, due to the differences in the services it provides within the urban water cycle. This can limit the usefulness of industry benchmarking and direct comparisons between organisations that service different parts of the urban water cycle. However, there are significant opportunities in the water sector to align in the approach and collective action for Scope 3 emissions management, such as:

- support data sharing and collaboration for improved activity data and fit-for-purpose emission factors, such as the use of Melbourne Water's Water Industry Carbon Emission Database (WICED) and Environment Product Disclosure (EPD) templates.
- consistency in the collection of and sharing of emissions data, particularly for water services provided across different utilities and contractors in the same geographic location (illustrated further in Figure 15).
- recognising the interconnectedness of emission reduction goals when applying the Scope 3 emissions lens which can lead to collective support for emissions reduction initiatives that benefit multiple water cycle service providers and contractors.

This section provides background on emissions sources including Scope 1, 2, and 3 across the urban water cycle. The coverage of direct and indirect emission sources will aid in the understanding for utilities that manage different aspects of the urban water cycle, as one utilities Scope 1 and 2 emissions will be a Scope 3 emission source for another utility, such as the Yarra Valley Water case study presented in Step 7 of the guide.

8.1 Direct and indirect emissions in the urban water cycle

The Urban Water Cycle Map (Figure 13) is based on the global urban water sector and adapted from the IWA Roadmap to a Low-Carbon Urban Utility report which depicts different parts of the urban water cycle where emissions are generated, separated by Scope 1, Scope 2 and Scope 3. Table 11 provides an overview of emission-generating areas of the urban water cycle, adapted from Table 2 in the IWA Roadmap to a Low-Carbon Urban Utility. Note the lighter shading indicates emission sources recognised to exist but not quantified in the ECAM tool that underpinned the 2018 report, which was developed to assess and monitor (with a global perspective) the GHG emissions of all water utilities. For further information refer to IWA Report - The Roadmap to a Low-Carbon Urban Utility 2018, pages 22 for the ECAM Tool, and pages 25 - 30 for the emissions source map and emission sources in the UWC table.

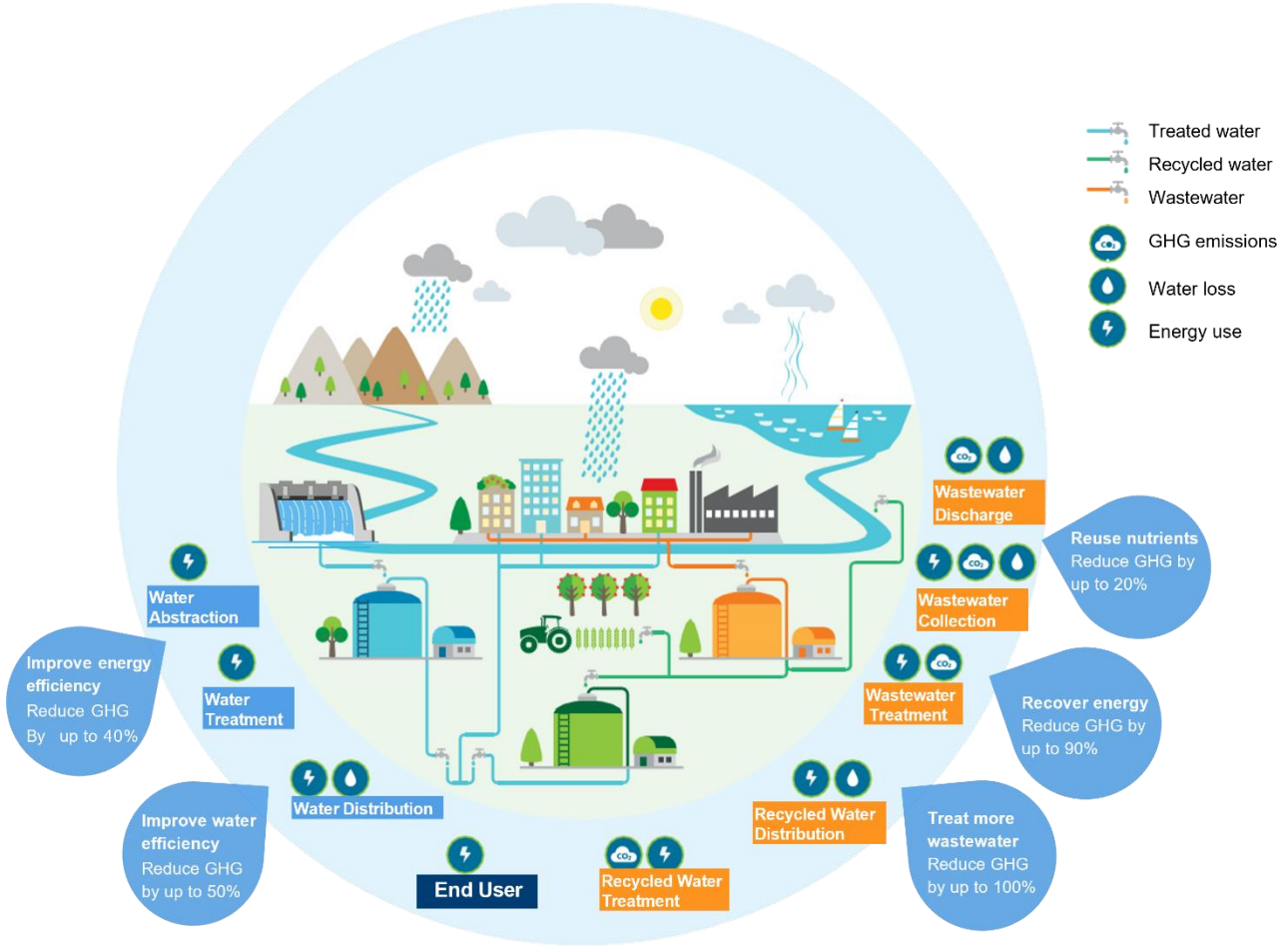


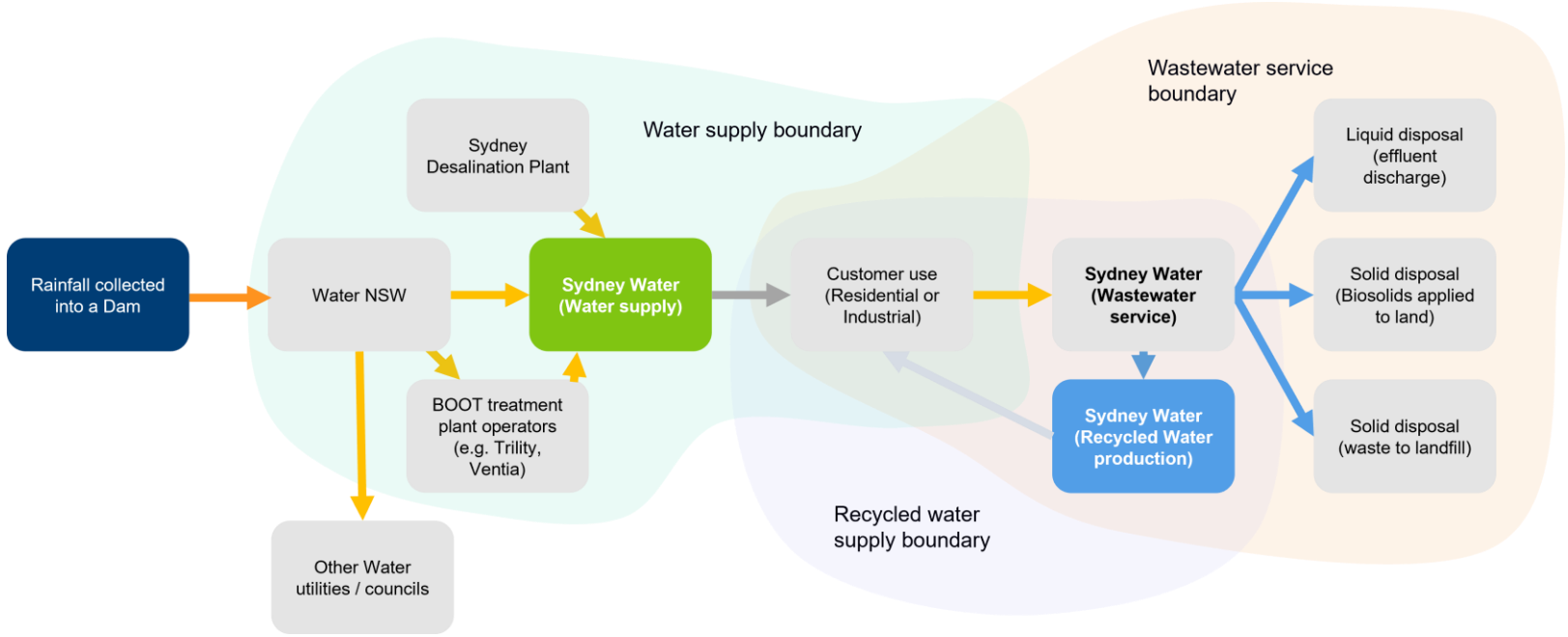
Figure 13: Emission Sources from different stages of the Urban Water Cycle, adapted from IWA Report - The Roadmap to a Low-Carbon Urban Utility 2018, figure 10 page 25, and opportunities to reduce energy use and GHG emissions are taken from figure 2, page 14. Note: In the reproduction of this urban water cycle map a dam was inserted in the image and colour coding was added to help match Table 11.

Table 11: Direct and Indirect emissions at each stage of the Urban Water Cycle (UWC), adapted from Table 2 of IWA Report – The Roadmap to a Low-Carbon Urban Utility 2018

8.2 Urban water supply boundaries

Figure 14 below highlights the intersections of Sydney Water's different supply boundaries for water, wastewater and recycled water and how these intersect with other utilities and contracted service providers. The map highlights arrangements for different parts of the urban water cycle that are managed by different parties to deliver the services of the urban water cycle. This includes Water NSW and contractors that manage Sydney Water's desalination plant and BOOT treatment plant operators, such as Trility and Ventia. In other cases, the urban water cycle services can be provided by different water utilities and/or contractors.

Figure 14: The different supply boundaries that Sydney Water manages.



8.3 Water sector heat map of Scope 3 emissions

The heat map in Table 12 depicts the relative magnitude of Scope 3 emissions from different water utilities based on the generalised service provision of a bulk supplier of water, to a water & wastewater provider to a water retailer/distributor. It is for illustrative purposes only, as the heat map has tried to best represent these three broad utility 'types' which can vary at the local context and particularly at the intersection with the amount of outsourced, contracted services.

Table 12: Heat Map of Scope 3 Emissions from different water utility types, adapted from ICMM Scope 3 Emissions Accounting and Reporting Guidance, Table 8 page 32. Note: Heat map adapted from the type of mining company to reflect different water utility types and was based on a limited number of available water utility Scope 3 emission profiles.

Scope 3 category GHG Protocol	Activity examples / considerations	Bulk supplier	Water & wastewater provider	Water retailer/distributor
1. Purchased Goods & Services	Chemicals, maintenance contracts, contractors, office supplies, lab couriers (if not in transport), other materials & equipment purchased	High	High	High
2. Capital Goods	Capital projects – concrete, steel	High	High	High
3. Fuel & Energy – related	Fuel and energy related activities not included in Scope 1 or 2 (i.e. losses and upstream fuel)	Mid	Mid	Mid
4. Upstream Transport	Upstream transport emissions not captured in No.1	Mid	Low	Low

Scope 3 category GHG Protocol	Activity examples / considerations	Bulk supplier	Water & wastewater provider	Water retailer/distributor
5. Waste Management	Waste to landfill – e.g. biosolids, sewerage screenings,	Low	Mid - High	Low
6. Business Travel	Milage and rental cars, travel & accommodation	Low	Low	Low
7. Employee Commuting		Low	Low	Mid
8. Upstream Leased Assets	For example- Build Own Operate	Low	Mid	Low
9. Downstream Transport and distribution	Downstream transport emissions not captured in No.1	Low - Mid	Low - Mid	Low
10. Processing of Sold Products	water or wastewater related products –bulk water, recycled water, biosolids	High	Low - Mid	High**
11. Use of Sold Products	water or wastewater related products –bulk water, recycled water, biosolids, voluntary boundary, customer hot water use	Mid	Mid - High	Low*
12. End of Life Treatment of Products		Low	Mid	Low

Scope 3 category GHG Protocol	Activity examples / considerations	Bulk supplier	Water & wastewater provider	Water retailer/distributor
13. Downstream Leased assets	For example- Build Own Operate	Mid	Low-mid	Low
14. Franchises	Wholly owned subsidiaries of water utilities	Generally not relevant	Generally not relevant	Generally not relevant
15. Investments	Shares, property, land	Low	Low	Low

Low* Category 11 may be high for a water retailer/distributor if it chooses to include customer hot water use as part of the voluntary boundary (Refer Yarra Valley Water case study in Step 7 where customer's direct and indirect use phase emissions (inc. customer hot water use) were found to be significant emission source within their Scope 3 emission profile.)

High** based on processing of sold products from a bulk supplier's water and wastewater. (Refer Yarra Valley Water case study in Step 7 where Melbourne Water emissions were found to be a significant emission source within their Scope 3 profile.)

Legend:

	high - expected to be >5% of total Scope 3 profile
	mid - expected <5% total Scope 3 profile or with qualitative relevance/ importance to the organisation
	low - expected <than 5% & of lower relevance

9. Standards and accreditation – Summary for Scope 3 emissions reporting

One of the challenges with understanding water utilities Scope 3 emissions is the multitude of different standards, tools and/or accreditation schemes that are available. These range from accounting standards such as the GHG Protocol, climate-related financial risk disclosure standards such as TCFD, target-setting standards such as SBTi, and carbon-neutral accreditations such as Climate Active. These examples are summarised in the table below with details on how these intersect with Scope 3 emission reporting particularly.

Type	Standard Reference	Description
Existing Standards – GHG Protocol	• GHG Protocol Corporate Value chain (Scope 3) Accounting and Reporting Standard (2011), (referred to as **GHG Protocol Scope 3 Standard**) • Technical Guidance for Calculating Scope 3 Emissions – Supplement to the Corporate Value chain (Scope 3) Accounting & Reporting Standard (2013), (referred to as **GHG Protocol Scope 3 Calculation Guidance**) • GHG Protocol Corporate Accounting and Reporting Standard – Revised edition (referred to as **GHG Protocol Corporate Standard**)	The Greenhouse Gas Protocol includes a widely recognised and comprehensive accounting standard developed by the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD) for measuring and reporting GHG emissions.
Other International Standards	ISO 14064-1:2018 International standard for quantifying and reporting greenhouse gas emissions	Documents the principles and requirements at the organisation level for the quantification and reporting of GHG emissions and removals.
	PAS2080 – Carbon Management Infrastructure Standard	A carbon management for infrastructure standard, developed by the British Standards Institution (2016), with the most recent update being PAS2080:2023

Type	Standard Reference	Description
GHG Reporting Regulation (or emerging) - most relevant to the Australian Context	Australian National Greenhouse and Energy Reporting Act / NGER Act (in place)	Administered by Australia's Clean Energy Regulator, the NGER scheme provides a threshold and guidance for business to report Scope 1 and 2 emissions. Currently Scope 3 emissions are not reported under NGER but can be used under Australia's National Greenhouse Accounts.
	Australian Treasury Climate-Related Financial Disclosure (under consultation)	Standardised, internationally aligned legislative requirements for disclosure of climate-related financial risks and opportunities from 2024-25 onwards, including disclosure of Scope 3 emissions with limited assurance from FY 2025/26. The exposure draft reference the GHG Protocol Corporate Value chain (Scope 3) standard, and the Scope 3 calculation guidance for Scope 3 emissions in accordance with IFRS S2.
	Australian Sustainability Reporting Standards – ASRS 2, consultation draft ED SR1 - Disclosure of Climate-related Financial Information (under consultation)	ASRS 2 Australian Climate-related Financial Disclosures has been developed using IFRS S2 Climate-related Disclosures as the baseline. The consultation draft provides reference to IFRS S2 as to what entities ***could consider*** including in Scope 3 emissions, rather than requiring the entity to categorise Scope 3 emissions in accordance with the GHG Protocol standards.
Voluntary Standards, Benchmarks and Frameworks	Task Force on Climate-Related Financial Disclosures / TCFD (framework)	A voluntary disclosure standard developed by the Financial Stability Board that provides guidance and recommended disclosures for organisations on reporting climate-related risks and opportunities. The International Sustainability Standards Board (ISSB) is implementing the TCFD, with climate-related disclosure requirements specified in the IFRS S2. TCFD Recommends disclosure of Scope 3 with related risk, includes a self-determined definition of materiality. Most countries are developing mandatory reporting requirements based on TCFD, therefore the TCFD remains voluntary for companies not subject to national legislations.

Type	Standard Reference	Description
	Science-Based Targets Initiative / SBTi (methodology provider and validation body)	A target-setting standard that helps companies set reduction targets for their Scope 1, 2 and 3 GHG emissions in line with climate science to contribute to limiting global temperature rise. Currently requires a science-based target to be set for Scope 3 emissions where it represents more than 40% of total company emissions (combined Scope 1, 2 & 3).
	Climate Active Carbon Neutral Standard (Australian voluntary standard to achieve carbon neutrality)	A carbon neutral accreditation scheme developed by the Australian government (formerly the Carbon Neutral Program) to recognise an organisations' efforts to achieve carbon neutrality and reduce their carbon footprint.

10. Next steps and acknowledgments

It is acknowledged that this is the first iteration of a guide to managing Scope 3 emissions in the water sector. As such, and as further information becomes available that is relevant to this guide, additional updates will be made. We welcome water utilities to test and trial the guide and we seek feedback on its usefulness or errors found. At the time of writing, there were very few publicly available reports on water utility Scope 3 emissions, so we acknowledge that water sector insights and opportunities were drawn from water utility conversations and feedback with the recognition that knowledge in this area is emerging at a significant rate, with many water utilities completing Scope 3 inventories based on financial data that is currently being refined.

We welcome opportunities to support the water sector to pursue efforts across common areas of influence to holistically reduce emissions across water sector Value chains.

We would like to acknowledge the WSAA Scope 3 working group members for their inputs into this guide::

- Sydney Water – Elliot Cichero (lead)
- Sydney Water –Jean Davis
- WSAA – Meg Humphrys
- WSAA – Jason Mingo
- Barwon Water –Hayley Vinden
- Barwon Water – Steve Reddington
- Melbourne Water –Mandhy Senewiratne
- SEQ Water – Rodney Ringe
- Watercare NZ – Glen Conley
- Watercare NZ – Atisha Daya
- SA Water – Sid Samarth
- Urban Utilities - Glen Taylor
- City of Gold Coast – Elliot Stuart
- South East Water – Katrina Hall
- South East Water – Sandy Xu

Other contributors include:

- Melbourne Water –Deborah Riley
- Yarra Valley Water - Rob Fittock
- Yarra Valley Water – Alice Greenhill
- Icon Water – Clare Idriss

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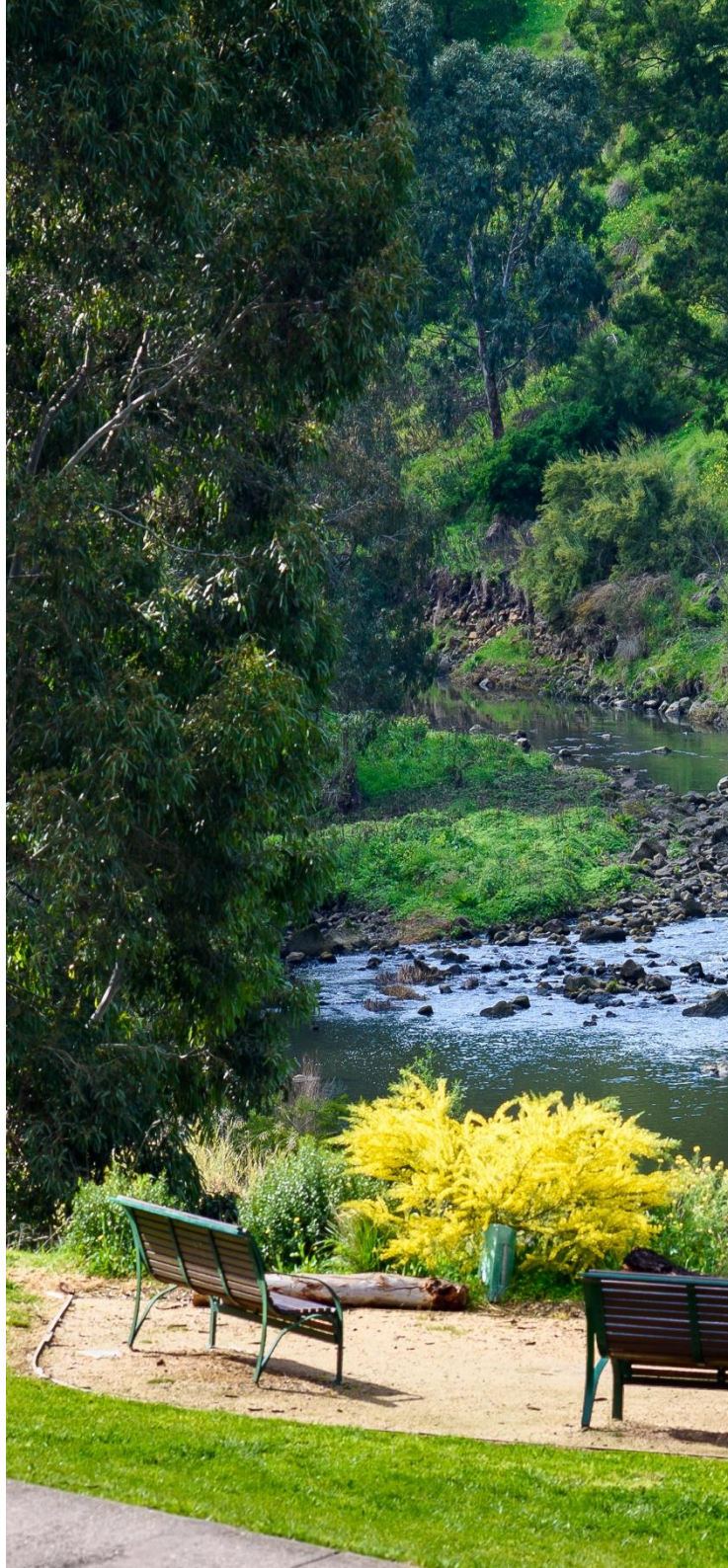
Appendix A – Melbourne Water EPD Templates

Environment Product Declaration (EPD) Template A – Contractually Binding – Suitable for new projects or engagements where contracts have not been signed/variations appropriate.

Environment Product Declaration (EPD) Template B – Seeking Collaboration – Suitable to politely request an EPD in the interest of collaboration. Appropriate for projects that have already commenced, or products that have already been procured (where new contractual terms cannot be introduced, and the water utility is reliant on goodwill for the information).



Environment Product Declaration (EPD) Template A – Contractually Binding – Suitable for new projects or engagements where contracts have not been signed/variations appropriat

Your ref: XXXX (delete paragraph if not required)

16 March 2017

Prefix Recipient's name
Recipient's title
Recipient's company
Recipient's address
SUBURB STATE POSTCODE

Dear (recipient's salutation)

Guidance for Sustainable Supply Chain Practices and Environmental Product Declarations

The following contractual obligations have been established to promote and enforce a sustainable supply chain, incentivize collaboration with Melbourne Water on sustainability initiatives, and prioritize products contributing to a circular economy.

As purchasers of significant quantities of construction materials and consequent emitters of Scope 3 carbon, Melbourne Water Corporation (MWC) is committed to facilitating responsible sourcing practices and enhancing carbon data transparency within the

Insert Inflo ID here or delete if not required

Environment Product Declaration (EPD) Template A – Contractually Binding – Suitable for new projects or engagements where contracts have not been signed/variations appropriate.

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Australian context. Acknowledging the challenges in determining local Emission Factors (EFs) for major construction materials, MWC mandates the submission of Environmental Product Declarations (EPDs) to assess the carbon footprint of products and other critical environmental metrics.

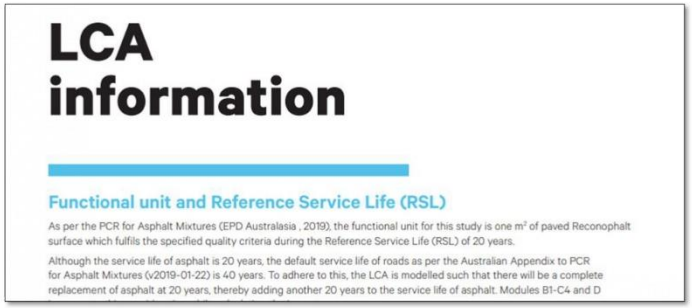
This addendum outlines contractual obligations regarding EPD development, packaging standards, and protocols.

EPD Development Guidelines:

The following EPD guidance has been formulated to ensure that EPDs produced adhere to consistent high standards, are easily accessible, fit-for-purpose, and are compatible with various certification schemes such as ISC and Greenstar. While Melbourne Water does not directly align with these schemes, it is imperative to note that other infrastructure providers and tender processes may necessitate such certifications. Therefore, EPDs should be designed to maximize marketability across multiple sectors.

Suppliers submitting EPDs for Melbourne Water projects must adhere to the following obligations:

1. Provision of an easily readable summary table: EPDs must include a concise summary table to facilitate comprehension. For instance, the Downer Reconophalt SA EPD fails to provide a conversion factor from square meters (m2) to weight, hindering product comparison and emission factor calculations related to transportation.


LCA information

Functional unit and Reference Service Life (RSL)

As per the PCR for Asphalt Mixtures (EPD Australasia , 2019), the functional unit for this study is one m² of paved Reconophalt surface which fulfils the specified quality criteria during the Reference Service Life (RSL) of 20 years.

Although the service life of asphalt is 20 years, the default service life of roads as per the Australian Appendix to PCR for Asphalt Mixtures (v2019-01-22) is 40 years. To adhere to this, the LCA is modelled such that there will be a complete replacement of asphalt at 20 years, thereby adding another 20 years to the service life of asphalt. Modules B1-C4 and D

[Figure 1: : Excerpt from Downer Reconophalt SA EPD p4]

2. Utilization of appropriate yardsticks: EPDs must utilize yardsticks suitable for carbon modelling and easily comprehensible by designers and contractors for product optioneering. Examples of mandatory and additional yardsticks for various assets are provided in Figure 2. Below as PaveX EPD (excerpt from p 7)

Product Weights

Product Line	Product/Part Code	Description	Length (mm)	Weight each (kg)	Weight per m (kg)
PaveX™ Crack-A-Joint™	PXCAJ25B	PaveX™ Crack-A-Joint™ 25mm x 3000mm, Black	3000	0.511	0.170
PaveX™ Crack-A-Joint™	PXCAJ25G	PaveX™ Crack-A-Joint™ 25mm x 3000mm, Grey	3000	0.511	0.170
PaveX™ Crack-A-Joint™	PXCAJ38B	PaveX™ Crack-A-Joint™ 38mm x 3000mm, Black	3000	0.731	0.244
PaveX™ Crack-A-Joint™	PXCAJ38G	PaveX™ Crack-A-Joint™ 38mm x 3000mm, Grey	3000	0.731	0.244
PaveX™ Crack-A-Joint™	PXCAJCJ	PaveX™ Crack-A-Joint™ Joiner, 200mm	200	0.02	0.100
PaveX™ Expanda™	PX100KIT	PaveX™ Expanda™ 100mm x 3000mm Assembly	3000	11.76	3.920
PaveX™ Expanda™	PX125KIT	PaveX™ Expanda™ 125mm x 3000mm Assembly	3000	11.955	3.985
PaveX™ Expanda™	3PX100	PaveX™ Expanda™ Panel, 100mm x 3000mm	3000	1.04	0.347
PaveX™ Expanda™	3PX125	PaveX™ Expanda™ Panel, 125mm x 3000mm	3000	1.236	0.412
PaveX™ Expanda™	3PXCAP	PaveX™ Expanda™ Capping	3000	0.79	0.263
PaveX™ Expanda™	3PXD14	PaveX™ Expanda™ 14mm x 240mm GFRP Round Dowel	240	0.5	0.167
PaveX™ Expanda™	CKP0001	PaveX™ Expanda™ Dowel Sleeve	N/A	0.14	N/A
PaveX™ Expanda™	PX100C	PaveX Expanda™ End Cap, 100mm	100	0.009	0.090
PaveX™ Expanda™	PX125C	PaveX Expanda™ End Cap, 125mm	125	0.011	0.088
PaveX™ Expanda™	3PXSTB	PaveX™ Expanda™ Stake Bracket	N/A	0.16	N/A
PaveX™ Expanda™	3PXJPT	PaveX™ Expanda™ Joiner Plate	N/A	0.12	N/A
PaveX™ Expanda™	3PXFTB	PaveX™ Expanda™ Foot	N/A	0.29	N/A
PaveX™ Expanda™	3PXSTK	PaveX™ Stake, 350mm, Galv	350	0.215	0.072

Figure 2: Excerpt from PaveX EPD

3. Compliance with relevant standards: EPDs must align with current General Programme Instructions, PCR 2019:14 Construction products, and ISO 14040, ISO 14044, and ISO 14025 standards. Suppliers must ensure adherence to the most recent standards and provide a summary as per examples provided in Tables 1 & 2below (Note: It is not an exhaustive list).

Table 1: Yardstick requirements for EPDs

Asset	Mandatory yardstick	Additional yardstick
Pipes & Cables	Defined diameter, per m length	Per kg
Pumps (and most mechanical and electrical equipment)	kW rating	
Blowers	kW rating and m3/h	Per kg
Concrete	Per Tonne, per m3	
Cables	Defined diameter, per m length	Per kg
Floor tiles	m2	Per kg
Tanks (circular)	Diameter, m3	Height

4. Inclusion of essential information: EPDs must include the product's density, reference service life, and relevant life cycle and environmental impacts as per EN 15804 + A2:2019 and EN 15804 + A1 standards.

5. The EPD must include the following information to ensure that data can be used to build other relevant models, and further costs are not incurred as a result of requesting further information from the EPD providers.

- Density of the product
- Reference service life

6. Provision of additional impact indicators: Suppliers may voluntarily include additional impact indicators according to EN 15804+A1:2013 for ISC and Green Star ratings, as outlined in Table 5..

Table 2: Summary of standards

Parameter	EN 15804 + A2	EN 15804 + A1
Environmental Impact	Potential environmental impact – mandatory indicators	Additional mandatory impact indicators
Resource	Resource use indicator	
Waste	Waste indicators	
Output flow	Output flow indicators	
Other Environmental Assessment Schemes		This enables EPD readers, ISC and Green Star ratings modellers, to utilise impact indicators aligned with the EN15804+A1 standard, which is still employed by ISC and Green Star rating systems in Australia. This standard provides environmental impact outcomes that align with Infrastructure Sustainability Council (ISC) and Green Star rating schemes. Whilst MWC does not partake in either of these schemes, the manufacturer/supplier of the product may desire to include these to further their cause. Additional voluntary impact indicators according to EN 15804+A1: 2013, for ISC and Green Star ratings (Table 5) Additional voluntary impact indicators in accordance with Green Star v1.3 (EN 15804+A1: 2013) (optional for Green Star ratings)

Table 3: Life Cycle Impact, Resource and Waste Assessment Categories, Measurements and Methods accordance with EN15804+A2: 2019 standard

Impact Category	Abbreviation	Measurement Unit
Potential environmental impact		
Global warming potential (fossil)	GWP - Fossil	kg CO_2 equivalents (GWP100)
Global warming potential (biogenic)	GWP - Biogenic	kg CO_2 equivalents (GWP100)
Land use/ land transformation	GWP - Luluc	kg CO_2 equivalents (GWP100)
Total global warming potential	GWP - Total	kg CO_2 equivalents (GWP100)
Acidification potential	AP	mol H^+ eq.
Eutrophication – aquatic freshwater	EP - freshwater	kg P equivalent
Eutrophication – aquatic marine	EP - marine	kg N equivalent
Eutrophication – terrestrial	EP – terrestrial	mol N equivalent
Photochemical ozone creation potential	POCP	kg NMVOC equivalents
Abiotic depletion potential (elements)*	ADPE	kg Sb equivalents
Abiotic depletion potential (fossil fuels)*	ADPF	MJ net calorific value
Ozone depletion potential	ODP	kg CFC 11 equivalents
Water Depletion Potential*	WDP	m^3 equivalent deprived
Global warming potential, excluding biogenic uptake, emissions and storage**	GWP-GHG	kg CO_2 equivalents (GWP100)
Resource use		
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	PERE	MJ, net calorific value
Use of renewable primary energy resources used as raw materials	PERM	MJ, net calorific value
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	PERT	MJ, net calorific value
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	PENRE	MJ, net calorific value
Use of non- renewable primary energy resources used as raw materials	PENRM	MJ, net calorific value
Total use of non- renewable primary energy resources (primary energy and primary energy resources used as raw materials)	PENRT	MJ, net calorific value
Use of secondary material	SM	kg
Use of renewable secondary fuels	RSF	MJ, net calorific value
Use of non-renewable secondary fuels	NRSF	MJ, net calorific value
Use of net fresh water	FW	m^3
Waste categories		
Hazardous waste disposed	HWD	kg
Non-hazardous waste disposed	NHWD	kg

Impact Category	Abbreviation	Measurement Unit
Radioactive waste disposed/stored	RWD	kg
Additional environmental impact indicators		
Particulate matter	Potential incidence of disease due to PM emissions (PM)	Disease incidence
Ionising radiation - human health	Potential Human exposure efficiency relative to U235 (IRP)	kBq U-235 eq
Eco-toxicity (freshwater)*	Potential Comparative Toxic Unit for ecosystems (ETP-fw)	CTUe
Human toxicity potential - cancer effects*	Potential Comparative Toxic Unit for humans (HTP-c)	CTUh
Human toxicity potential - non cancer effects*	Potential Comparative Toxic Unit for humans (HTP-nc)	CTUh
Soil quality*	Potential soil quality index (SQP)	dimensionless

** Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.*
*** This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO_2 is set to zero.*

[1] Method to calculate Cumulative Energy Demand (CED), based on the method published by Ecoinvent version 2.0 and expanded by PRé Consultants for raw materials available in the SimaPro database.
[2] Calculated based on the lower hearing value of renewable raw materials.
[3] Calculated based on the lower hearing value of non-renewables raw materials.
[4] Calculated as sum of Non-renewables, fossil, Non-renewable, nuclear and Non-renewable, biomass.
[5] Calculated as sum of Bulk waste and Slags/ash

Table 4: Environmental impact indicators in accordance with EN15804+A1:2013 standard (for ISC and Green Star ratings)

Impact Category	Abbreviation	Measurement Unit (eq. = equivalence)
Global warming potential (GWP100)	GWP	kg CO_2 eq.
Ozone depletion potential	ODP	kg CFC 11 eq.
Acidification potential	AP	kg SO_2 e eq.

Impact Category	Abbreviation	Measurement Unit (eq. = equivalence)
Eutrophication potential	EP	kg PO_4^{3-} eq.
Photochemical ozone creation potential	POCP	kg C_2H_4 eq.
Abiotic depletion potential for non-fossil resources	ADPE	kg Sb eq.
Abiotic depletion potential for fossil resources	ADPF	MJ net calorific value

Table 5: Environmental impact indicators in accordance with EN15804+A1:2013 standard (optional for Green Star ratings)

Impact Category	Abbreviation	Measurement Unit (eq. = equivalence)
Human toxicity cancer	HTPc	CTUh
Human toxicity noncancer	HTPnc	CTUh
Land use	LU	kg C deficit-eq.
Resource depletion - water	RDW	m^3
Ionising radiation	IR	kBq U-235-eq.
Particulate matter	PM	kg PM2.5-eq.

We expect suppliers to comply fully with these contractual obligations to ensure transparency, accuracy, and reliability in environmental product information.

Should you have any queries or require further clarification on any aspect of this guidance, please do not hesitate to contact [Name, Title, Contact Information].

Thank you for your continued partnership and commitment to sustainability.

Yours sincerely

Name
Position

Environment Product Declaration (EPD) Template B – Seeking Collaboration – Suitable to politely request an EPD in the interest of collaboration. Appropriate for projects that have already commenced, or products that have already been procured (where new contractual terms cannot be introduced, and the water utility is reliant on goodwill for the information).

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Your ref: XXXX (delete paragraph if not required)

16 March 2017

Prefix Recipient's name
Recipient's title
Recipient's company
Recipient's address
SUBURB STATE POSTCODE

Dear (recipient's salutation)

Guidance for Sustainable Supply Chain Practices and Environmental Product Declarations

We are pleased to present the following guidance aimed at fostering a more sustainable supply chain and incentivizing collaboration with Melbourne Water on sustainable initiatives, particularly those contributing to a circular economy.

As significant purchasers of construction materials and consequently contributors to Scope 3 carbon emissions, Melbourne Water Corporation (MWC) endeavors to promote responsible sourcing practices and enhance carbon data transparency within the Australian context. Recognizing the challenges associated with determining local Emission Factors (EFs) for major construction materials, MWC emphasizes the importance of Environmental Product Declarations (EPDs) to ascertain the carbon footprint of products and other pertinent environmental information.

The purpose of this addendum is to provide comprehensive guidance on EPD development, as well as to delineate packaging standards and protocols.

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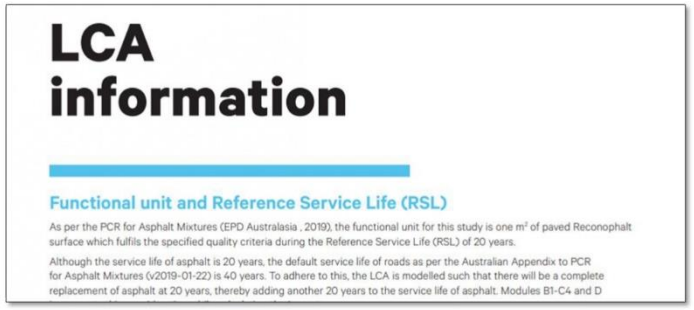
EPD Development Guidelines:

The following EPD guidance has been formulated to ensure that EPDs produced adhere to consistent high standards, are easily accessible, fit-for-purpose, and are compatible with various certification schemes such as ISC and Greenstar. While Melbourne Water does not directly align with these schemes, it is imperative to note that other infrastructure providers and tender processes may necessitate such certifications. Therefore, EPDs should be designed to maximize marketability across multiple sectors.

Requirements for EPDs:

EPDs submitted by suppliers for Melbourne Water projects must include the following information:

1. An easily readable summary table: EPDs should feature a concise summary table to facilitate comprehension. For example, the Downer Reconophalt SA EPD specifies its functional unit as per square meter (m2), however, it lacks a conversion factor from m^2 to weight. This omission poses challenges when comparing products or calculating emission factors related to transportation, which are contingent upon the weight being transported.



[Figure 1: : Excerpt from Downer Reconophalt SA EPD p4]

2. Provision of multiple yardsticks to ensure that various users of the EPD are provided with the required accurate, product specific information such as PaveX EPD (excerpt from p 7)

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Product Weights

Product Line	Product/Part Code	Description	Length (mm)	Weight each (kg)	Weight per m (kg)
PaveX™ Crack-A-Joint™	PXCAJ25B	PaveX™ Crack-A-Joint™ 25mm x 3000mm, Black	3000	0.511	0.170
PaveX™ Crack-A-Joint™	PXCAJ25G	PaveX™ Crack-A-Joint™ 25mm x 3000mm, Grey	3000	0.511	0.170
PaveX™ Crack-A-Joint™	PXCAJ38B	PaveX™ Crack-A-Joint™ 38mm x 3000mm, Black	3000	0.731	0.244
PaveX™ Crack-A-Joint™	PXCAJ38G	PaveX™ Crack-A-Joint™ 38mm x 3000mm, Grey	3000	0.731	0.244
PaveX™ Crack-A-Joint™	PXCAJCJ	PaveX™ Crack-A-Joint™ Joiner, 200mm	200	0.02	0.100
PaveX™ Expanda™	PX100KIT	PaveX™ Expanda™ 100mm x 3000mm Assembly	3000	11.76	3.920
PaveX™ Expanda™	PX125KIT	PaveX™ Expanda™ 125mm x 3000mm Assembly	3000	11.955	3.985
PaveX™ Expanda™	3PX100	PaveX™ Expanda™ Panel, 100mm x 3000mm	3000	1.04	0.347
PaveX™ Expanda™	3PX125	PaveX™ Expanda™ Panel, 125mm x 3000mm	3000	1.235	0.412
PaveX™ Expanda™	3PXCAP	PaveX™ Expanda™ Capping	3000	0.79	0.263
PaveX™ Expanda™	3PXD14	PaveX™ Expanda™ 14mm x 240mm GFRP Round Dowel	240	0.5	0.167
PaveX™ Expanda™	CKP0001	PaveX™ Expanda™ Dowel Sleeve	N/A	0.14	N/A
PaveX™ Expanda™	PX100C	PaveX Expanda™ End Cap, 100mm	100	0.009	0.090
PaveX™ Expanda™	PX125C	PaveX Expanda™ End Cap, 125mm	125	0.011	0.088
PaveX™ Expanda™	3PXSTB	PaveX™ Expanda™ Stake Bracket	N/A	0.16	N/A
PaveX™ Expanda™	3PXJPT	PaveX™ Expanda™ Joiner Plate	N/A	0.12	N/A
PaveX™ Expanda™	3PXFTB	PaveX™ Expanda™ Foot	N/A	0.29	N/A
PaveX™ Expanda™	3PXSTK	PaveX™ Stake, 350mm, Galv	350	0.215	0.072

Figure 2: Excerpt from PaveX EPD

3. EPD must be developed with utilisable yardsticks that are appropriate for use in carbon modelling and which designers and contractors are able to utilise for optioneering between similar products. Some examples provided below, but it is not an exhaustive list.

Table 1: Yardstick requirements for EPDs

Asset	Mandatory yardstick	Additional yardstick
Pipes & Cables	Defined diameter, per m length	Per kg
Pumps (and most mechanical and electrical equipment)	kW rating	
Blowers	kW rating and m3/h	Per kg
Concrete	Per Tonne, per m3	
Cables	Defined diameter, per m length	Per kg
Floor tiles	m2	Per kg
Tanks (circular)	Diameter, m3	Height

4. EPDs must align with the current General Programme Instructions , PCR 2019:14 Construction products and ISO 14040, ISO 14044 and ISO 14025. These standards

are reviewed periodically, therefore ensure that the EPD produced abide by the most recent relevant standards, and a summary is provided in Table 2.

5. The EPD must include the following information to ensure that data can be used to build other relevant models, and further costs are not incurred as a result of requesting further information from the EPD providers.

- Density of the product
- Reference service life

6. The EPD to include the relevant life cycle and environmental impacts as required by EN 15804 + A2:2019 and EN 15804 + A1 standards, as described in T 3, T4 and T5 respectively.

Table 2: Summary of standards

Parameter	EN 15804 + A2	EN 15804 + A1
Environmental Impact	Potential environmental impact – mandatory indicators	Additional mandatory impact indicators
Resource	Resource use indicator	
Waste	Waste indicators	
Output flow	Output flow indicators	
Other Environmental Assessment Schemes		This enables EPD readers, ISC and Green Star ratings modellers, to utilise impact indicators aligned with the EN15804+A1 standard, which is still employed by ISC and Green Star rating systems in Australia. This standard provides environmental impact outcomes that align with Infrastructure Sustainability Council (ISC) and Green Star rating schemes. Whilst MWC does not partake in either of these schemes, the manufacturer/supplier of the product may desire to include these to further their cause. Additional voluntary impact indicators according to EN 15804+A1: 2013, for ISC and Green Star ratings (Table 5) Additional voluntary impact indicators in accordance with Green Star v1.3 (EN 15804+A1: 2013) (optional for Green Star ratings)

Table 3: Life Cycle Impact, Resource and Waste Assessment Categories, Measurements and Methods accordance with EN15804+A2: 2019 standard

Impact Category	Abbreviation	Measurement Unit
Potential environmental impact		
Global warming potential (fossil)	GWP - Fossil	kg CO_2 equivalents (GWP100)
Global warming potential (biogenic)	GWP - Biogenic	kg CO_2 equivalents (GWP100)
Land use/ land transformation	GWP - Luluc	kg CO_2 equivalents (GWP100)
Total global warming potential	GWP - Total	kg CO_2 equivalents (GWP100)
Acidification potential	AP	mol H^+ eq.
Eutrophication – aquatic freshwater	EP - freshwater	kg P equivalent
Eutrophication – aquatic marine	EP - marine	kg N equivalent
Eutrophication – terrestrial	EP – terrestrial	mol N equivalent
Photochemical ozone creation potential	POCP	kg NMVOC equivalents
Abiotic depletion potential (elements)*	ADPE	kg Sb equivalents
Abiotic depletion potential (fossil fuels)*	ADPF	MJ net calorific value
Ozone depletion potential	ODP	kg CFC 11 equivalents
Water Depletion Potential*	WDP	m^3 equivalent deprived
Global warming potential, excluding biogenic uptake, emissions and storage**	GWP-GHG	kg CO_2 equivalents (GWP100)
Resource use		
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	PERE	MJ, net calorific value
Use of renewable primary energy resources used as raw materials	PERM	MJ, net calorific value
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	PERT	MJ, net calorific value
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	PENRE	MJ, net calorific value
Use of non- renewable primary energy resources used as raw materials	PENRM	MJ, net calorific value
Total use of non- renewable primary energy resources (primary energy and primary energy resources used as raw materials)	PENRT	MJ, net calorific value
Use of secondary material	SM	kg
Use of renewable secondary fuels	RSF	MJ, net calorific value
Use of non-renewable secondary fuels	NRSF	MJ, net calorific value
Use of net fresh water	FW	m^3
Waste categories		
Hazardous waste disposed	HWD	kg
Non-hazardous waste disposed	NHWD	kg

Impact Category	Abbreviation	Measurement Unit
Radioactive waste disposed/stored	RWD	kg
Additional environmental impact indicators		
Particulate matter	Potential incidence of disease due to PM emissions (PM)	Disease incidence
Ionising radiation - human health	Potential Human exposure efficiency relative to U235 (IRP)	kBq U-235 eq
Eco-toxicity (freshwater)*	Potential Comparative Toxic Unit for ecosystems (ETP-fw)	CTUe
Human toxicity potential - cancer effects*	Potential Comparative Toxic Unit for humans (HTP-c)	CTUh
Human toxicity potential - non cancer effects*	Potential Comparative Toxic Unit for humans (HTP-nc)	CTUh
Soil quality*	Potential soil quality index (SQP)	dimensionless

** Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.*
*** This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO_2 is set to zero.*

[1] Method to calculate Cumulative Energy Demand (CED), based on the method published by Ecoinvent version 2.0 and expanded by PRé Consultants for raw materials available in the SimaPro database.
[2] Calculated based on the lower hearing value of renewable raw materials.
[3] Calculated based on the lower hearing value of non-renewables raw materials.
[4] Calculated as sum of Non-renewables, fossil, Non-renewable, nuclear and Non-renewable, biomass.
[5] Calculated as sum of Bulk waste and Slags/ash

Table 4: Environmental impact indicators in accordance with EN15804+A1:2013 standard (for ISC and Green Star ratings)

Impact Category	Abbreviation	Measurement Unit (eq. = equivalence)
Global warming potential (GWP100)	GWP	kg CO_2 eq.
Ozone depletion potential	ODP	kg CFC 11 eq.
Acidification potential	AP	kg SO_2 e eq.
Eutrophication potential	EP	kg PO_4^{3-} eq.
Photochemical ozone creation potential	POCP	kg C_2H_4 eq.
Abiotic depletion potential for non-fossil resources	ADPE	kg Sb eq.
Abiotic depletion potential for fossil resources	ADPF	MJ net calorific value

Table 5: Environmental impact indicators in accordance with EN15804+A1:2013 standard (optional for Green Star ratings)

Impact Category	Abbreviation	Measurement Unit (eq. = equivalence)
Human toxicity cancer	HTPc	CTUh
Human toxicity noncancer	HTPnc	CTUh
Land use	LU	kg C deficit-eq.
Resource depletion - water	RDW	m^3
Ionising radiation	IR	kBq U-235-eq.
Particulate matter	PM	kg PM2.5-eq.

We trust that these guidelines will serve as a valuable resource for our esteemed suppliers as we collectively strive towards fostering sustainability and environmental stewardship within the supply chain.

Should you have any queries or require further clarification on any aspect of this guidance, please do not hesitate to contact [Name, Title, Contact Information].

Thank you for your continued partnership and commitment to sustainability.

Yours sincerely

Name
Position

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