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Asset Management Decision-Making Through a Sustainability Lens – A discussion paper

Asset Management Council Special Interest Group
Sustainability & Resilience in Asset Management

Prepared by: Mary Irwin, Ankur Maheshwari, Aneurin Hughes, Sean Reeves

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Contributors

This paper is a collaborative effort of the working group set up under the Sustainability and Resilience in Asset Management special interest group of the Asset Management Council. Contributors are noted below.

Sean Reeves (Project Manager), Aneurin Hughes, Arka Ghosh, Bob Wilson, Cliff Cheung, Darren Chuang, Edward Pieris, Ken Chapman, Lucie Mitchell, Mary-Lou Coorey, Matthew Bower, Misbah Khan, Nicola Gough, Rose Barns-Graham, Sally Busch, Stephen Ballesty, Susan Chamberlain, Susan Hanks, Svetlana Brengauz, Tete Awotedu.

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1. Part One – Context

1.1 Purpose

This paper explores how organisations can use asset management (AM) strategies to integrate sustainability into decision-making.

It's intended to help:

- Those responsible for delivering infrastructure and asset-related projects with sustainability requirements.
- Individuals struggling to balance environmental, social, economic and governance (ESG) factors alongside other competing organisational priorities.

This document builds on the *'Embedding Sustainability Principles in Asset Management – Key Considerations'* position paper. The position paper was released in 2023 by the Asset Management Council's Special Interest Group (SIG) for Sustainability and Resilience in Asset Management.

1.2 The need to consider sustainability

The SIG defines the term 'sustainability' as it applies to AM as "...to conduct all asset lifecycle activities in a manner which achieves an organisation's environmental, social and governance (ESG) objectives over the short, medium and long term, to achieve value for stakeholders, particularly the community".

The 2024 release of ISO 55000 and 55001 - informed by the ISO Guide 82:2019 Guidelines for addressing sustainability in standards - reflects this understanding. Here, sustainability is defined as "the state of the global system, including environmental, social and economic aspects, in which the needs of the present are met without compromising the ability of future generations to meet their own needs".

Gaining international recognition following the release of the UN's Brundtland Report in 1987, sustainability is comprised of three core interdependent pillars – environmental, social and economic.

The environment places natural limits on the social system, which in turn relate to the economy and the use and consumption of resources to meet stakeholder needs. All three pillars work together - organisations cannot continue to function in an environment of diminishing resources and in societies that fail. Governance is a further consideration - the internal and external arrangements that need to be in place to facilitate the best decision-making for stakeholders (not just shareholders) and support sustainable development.

Organisations must address all three pillars to ensure long-term success.

1. Environmental sustainability

- Focuses on minimising harm to the environment.
- Encourages responsible use of natural resources, acknowledging their limits.
- Supports environmental replenishment through pollution reduction, renewable energy adoption, waste minimisation and eco-friendly material choices.

2. Social sustainability

- Aims to enhance societal well-being and ensure fair outcomes.
- Protects and empowers communities by providing access to essential services, education, and opportunities for prosperity.
- Promotes peace by eliminating violence and discrimination.

3. Economic sustainability

- Ensures efficient and effective resource use for long-term viability.
- Balances financial returns with stability in an uncertain and complex world.

The role of governance

Governance determines how organisations make decisions and stay accountable. It involves:

- Acting responsibly to demonstrate corporate social responsibility.
- Reporting on sustainability performance through Environmental, Social, and Governance (ESG) frameworks.

Establishing structures, processes and rules that balance environmental, social and economic considerations to support sustainable development.



Source: Infrastructure Australia (2021)

Figure 1: Components of sustainability

1.3 The Sustainable Development Goals

The UN's 17 Sustainable Development Goals (SDGs) are a call for action for countries, societies, organisations and individuals to behave in a way that promotes sustainability for the benefit of people and the planet, and to promote peace, prosperity and partnership. The SDGs can act as a focus for organisations as they define their sustainability approach, as can the 169 targets that sit beneath them. However, only some of these SDGs are appropriate for most organisations.



Source: United Nations (2015)

Figure 2: United Nations Sustainability Development Goals

1.4 What does Sustainability ‘look like’ for organisations?

Organisations focus on sustainability for different reasons. Some do it to follow laws and regulations, while others see it as a way to manage risks, find new opportunities, cut costs, improve their reputation, maintain public trust and build social licence.

Organisations are making sustainability a key part of their strategy to:

- Handle unexpected challenges and changes in the business environment.
- Ensure they can operate successfully in the short, medium, and long term.
- Protect the environment and support the communities they rely on, securing their long-term ability to do business.
- Contribute to positive environmental, social, and economic outcomes.

Whatever the driver, organisations must make sustainability a core part of their vision and goals—not just an extra task. Sustainability should be built into their overall management system and company culture. This means that practices like adopting a circular economy, using sustainable suppliers, and investing in renewable energy should become a normal part of how they do business.

1.5 Incorporating Sustainability into Asset Management

Including sustainability in AM helps organisations achieve both short-term and long-term success. It allows them to create more value while reducing costs, cutting waste and lowering their environmental impact. It also helps build trust and support from customers and employees who share the organisation’s values.

Looking at asset management through a sustainability lens ensures that risks are well managed, assets perform efficiently, and costs are minimised. The aim is to make the best use of existing assets, explore

alternative solutions, reduce resource waste, maintain sustainable operations and build a long-term, resilient strategy. In this context, the Asset Management Framework (AMF) refers to the Asset Management System (AMS) as defined in ISO 55001:2024. It is a management system for business processes, not software or an application.

Financial sustainability and affordability are key parts of sustainable asset management. Organisations must align their asset management practices with their financial goals, policies and overall strategy. This means evaluating the value of the levels of service (LOS) from environmental, social and economic perspectives—both now and in the future.

Incorporating sustainability in asset management requires:

- Defining sustainability within the scope of the organisation’s asset management function.
- Creating strategies and plans that meet organisational goals and stakeholder needs.
- Ensuring there is enough funding and resources for the entire life cycle of an asset.
- Considering a wider range of stakeholders, including future generations and the environment.
- Balancing trade-offs and finding solutions that create long-term value while adapting to changing conditions.

By integrating sustainability into asset management, organisations can improve efficiency, reduce costs and contribute to a more sustainable and resilient future.

Asset management and sustainability elements are summarised in Table 1.

Table 1: Asset Management and Sustainability Elements

<p>Asset management – coordinated activity to achieve value from assets</p>	<ul style="list-style-type: none"> > Leadership and people > Balancing performance, risk, opportunities and cost > Organisational and asset management objectives > Meeting stakeholder requirements > Establishing levels of service needs > Whole of lifecycle considerations – planning, acquisition, operate, renew, re-purpose, dispose (cost, carbon) > Strategic, tactical and operational thought horizons > Service resilience > Service chain resilience > Data and information requirements > Evidence-based decision-making criteria > Decisions based on reliable information > Asset management competencies
<p>Environment – how an organisation treats the natural environment as its most critical asset</p>	<ul style="list-style-type: none"> > Environmental compliance, and going well beyond compliance > Climate change - adaptation, vulnerability and resilience > Carbon footprint/ energy use > Biodiversity and natural resource conservation > Pollution and waste management > Water security > Raw material sourcing > Circular economy
<p>Economic describes how an organisation considers its economic and financial decisions and actions.</p>	<ul style="list-style-type: none"> > Greater emphasis on the medium/long term > Financial sustainability of organisation to deliver level of service > Investment decisions based on full lifecycle cost analysis > Investment decisions based on lifecycle analysis including carbon pricing

	<ul style="list-style-type: none"> > Social and environmental considerations in financial decision making > Options analysis consider range of discount rates including social and zero discount rate
Social describes how an organisation and its activities impact on society	<ul style="list-style-type: none"> > Economic and social contribution > Customer affordability > Labour standards > Abolition of slavery in all its forms > Supply chain labour standards > Employee relationship > Developing the workforce and its skills for the future > Supplier relationship > Customer relationship > Health and safety of employees and the community > Gender inclusion and diversity > Using/ upskilling Indigenous people > Cultural awareness and sensitivity to achieve equitable outcomes > Privacy and data security verses data sharing to achieve outcomes
Governance describes an organisation's accountability and management framework, including its leadership structure, internal controls and shareholder rights	<ul style="list-style-type: none"> > Corporate governance > Financial and tax transparency > Financial reporting - climate change risk > Risk and opportunity oversight > Anti- corruption > Ethical behaviour > Executive pay, fairness and linkage to and achieving environmental, social and governance (ESG) objectives

Integrating sustainability into decision-making helps businesses succeed in the long run. It's not only about meeting short- or medium-term targets. It's about ensuring long-term success by creating value that goes beyond financial profits. This means reducing environmental and economic impacts, cutting waste and building strong relationships with customers and employees who share the company's values.

Embedding sustainability into asset management:

- **Increases efficiency** – Reduces energy use, water consumption, waste and emissions.
- **Enhances resilience** – Helps assets and services adapt to risks like climate change, disasters, social disruptions, or regulatory changes.
- **Improves customer and stakeholder satisfaction** – Addresses current and future needs while demonstrating a responsible approach to environmental and social issues.

Sustainability also creates new business opportunities, giving companies a competitive advantage through the innovation of products and services, entry into new markets and capitalisation on funding options, as well as solidifying public image and brand equity.

2. Part Two – Decision-Making

The Cambridge Dictionary defines a decision as a '[choice](#) that you make about something after [thinking](#) about several [possibilities](#).'

2.1 Current industry decision-making practices

When managing assets, three key factors guide decision-making: risk, cost, and performance. The goal is to find a balance between them, though sometimes one is given more importance than the others. This depends on the organisation's overall goals.

To ensure decisions support these goals, organisations create a Strategic Asset Management Plan (SAMP). This document outlines how organisations will manage assets to achieve organisational objectives, considering risk levels, performance expectations and long-term budget needs. It also helps plan future projects and ensures that services are delivered at the agreed level.

Decisions about assets are based on data wherever possible, and always consider long-term effects. These decisions happen at three levels:

1. **Strategic level** – These are big-picture, long-term decisions that align with the organisation's overall direction. They ensure customer needs are met and that assets are prepared to handle future demand.
2. **Tactical level** – These decisions focus on planning within the framework of the SAMP. They aim to meet LOS commitments while staying within budget and resource limits. If those commitments can't be met, decisions are made to manage risks and performance gaps. Tactical plans typically cover one to three years.

Operational level – These are the day-to-day decisions that put tactical plans into action. They follow service level agreements, technical standards and asset performance data. Information from daily operations helps shape future tactical and strategic decisions. Operational decisions also deal with unexpected issues like equipment breakdowns, sudden demand changes, weather impacts or supply shortages.

2.2 Strategic review – what is the organisation's approach to sustainability?

When making decisions with sustainability in mind, it's important to understand the organisation's overall approach.

This involves looking at:

- The organisation's strategic direction on sustainability, as outlined in key documents like its sustainability policy, corporate plan or sustainability strategy. These documents set out the organisation's goals, priorities, and values related to sustainability.
- Sustainability performance and targets, which are usually reported in sustainability reports or annual reports.
- Current sustainability initiatives and how they help achieve the organisation's sustainability goals.

- Roles and responsibilities within the organisation related to sustainability.
- What sustainability means for the organisation, and how broad the scope is.

Much of this information should already be available within the organisation. To fill in any gaps, discussions with relevant staff involved in sustainability efforts can provide further insights.

For organisations that haven't yet developed a strong approach to sustainability, internal teams should work together to gather information for senior management. This could include:

- A clear explanation of what sustainability means and how it could benefit the organisation and its stakeholders.
- A summary of relevant laws, regulations, and industry trends, such as guidance from the Australian Institute of Company Directors (AICD).
- Examples of what industry peers are doing in sustainability.
- The benefits and risks of adopting a sustainability-focused approach.
- The first steps needed to get started.

2.3 Strategy

When making decisions with sustainability in mind, the SAMP and asset management objectives play a key role in setting direction and intent. These objectives should align with the organisation's overall goals, while also integrating sustainability targets.

The SAMP should:

- Clearly combine asset management and sustainability objectives.
- Outline what needs to be achieved.
- Specify major strategic decisions (e.g. phasing out fossil fuels by 2030).
- Identify decisions that need to be made at tactical and operational levels.
- Provide a process for tactical planning and propose tools to support operational actions.

Maturity assessments can help assess whether the organisation is on track to meet its goals. These evaluations should involve people at all levels of the organisation, from executives to operational staff, and should engage multiple departments, including asset management, sustainability, finance, planning, operations and communications.

Examples of maturity assessments include:

- Climate Risk assessments (e.g. Climate Risk Ready NSW Guide, NSW Government 2020).
- Resilience assessments (e.g. Resilience Maturity Assessment Tool, UN Office for Disaster Risk Reduction).
- Alignment with the Taskforce on Climate-related Financial Disclosures (TCFD).
- Environmental, Social and Governance (ESG) assessments.
- General sustainability assessments.

A holistic understanding of the organisation's maturity can be achieved by combining an asset management maturity assessment with a sustainability assessment.

2.4 Asset management and sustainability policies

A policy defines an organisation's formal intentions and direction, as outlined by its senior leadership (ISO 55000:2024). This definition applies to both asset management and sustainability policies.

Reviewing these policies can help determine:

- How the organisation defines and prioritises sustainability.
- Common themes in both policies (e.g. long-term thinking, considering value beyond financial measures).
- Ways to improve the asset management policy by incorporating sustainability principles.
- Potential decision-making criteria that could be updated or adopted for asset management.

2.5 Organisational and asset management objectives

ISO 55000:2024 highlights three core principles for decision-making: value, alignment, and leadership. If sustainability is a strategic priority for the organisation, it must also be embedded into its asset management objectives.

Asset management ensures financial, technical, and operational decisions support the organisation's goals. This requires alignment in two key ways:

- Vertical alignment – Ensuring asset management objectives support broader organisational goals, including sustainability and financial targets. This involves identifying how asset management can help achieve these objectives.
- Horizontal alignment – Encouraging collaboration across departments such as sustainability, finance and risk management to ensure a coordinated approach.

A sustainability mindset expands the organisation's perspective beyond its own needs. It recognises that organisations are interconnected within a larger system and are influenced by the broader environmental, economic, and social context.

2.6 The decision framework

There are three key components within ISO 55001:2024 that are a requirement for decision-making:

- Establishing a decision-making framework (4.5.1)
- Defining decision-making criteria (4.5.2)

- Determining methods processes and tools (4.5.3)

The decision-making framework should be structured to fit the organisation's context and its approach to sustainability across the entire asset lifecycle, whether it provides a product or a service. It should consider regular decisions based on:

- Cost and revenue
- Investment needs and the point of time
- Stakeholder considerations noting that a wider group of stakeholders may be required to fully address sustainability
- Operational needs
- Risks and opportunities
- Performance against objectives

The framework should also define what data and information are needed for decision-making. This includes ensuring the information is reliable and continuously improving decision criteria based on the organisation's outcomes. Key questions to consider include:

- Are risks being mitigated?
- Are stakeholder needs being met and how are the conflicting stakeholder needs optimised?
- Are opportunities being exploited?
- Who is making the decisions and what is their knowledge, competencies and authority?
- Is the available information sufficient for the decisions being made?

Decision criteria can be characterised into two primary categories:

- Identifying and managing risks relating to sustainability (6.1.2)
- Identifying and managing opportunities relating to sustainability (6.1.3)

The criteria include the amount of input needed (complexity) into the decisions and how the decision makers must consider variables:

- Continual improvements (closing the loop)
- Stakeholder requirements
 - Customers
 - Internal teams
 - Regulators
 - Competitors

- Future generations
- The environment
- Organisational strategies
- Additional options (with time)

2.7 Integrating investment decision-making

Many asset-intensive organisations provide essential services for the social and economic well-being of the community (e.g. utilities, transport agencies, local government etc). To a certain extent, these organisations take social, economic and environmental impacts into account in their decision-making processes. However, further opportunities exist in taking a more sustainability-centred approach to the process, as summarised in Table 2.

Table 2: Investment decisions and sustainability considerations

Investment Decision Criteria	Sustainability Lens Consideration
Costs and revenues (net present value/ cost)	Greater application of scenario planning. Don't assume that the future will be the same as the past.
Investment needs and timing	<p>All non-asset solutions (e.g. demand management, maximising existing capacity) are thoroughly investigated to defer or negate asset investment (this has always formed part of good asset management!)</p> <p>Apply adaptive planning techniques to enable greater flexibility in response to unknown future circumstances. For example, an investment may be staged and reviewed at key points in response to changing circumstances.</p> <p>Options analyses and prioritisation techniques give a greater emphasis to non-financial criteria. Financial criteria may consider the price of carbon, or at least presented with and without a carbon price.</p> <p>The decision-making process may take a six-capital approach (Ardisa):</p> <ul style="list-style-type: none"> ● Financial capital ● Manufactured capital (i.e. the asset or product) ● Natural capital ● Intellectual capital ● Human capital ● Social and relationship capital <p>Investment prioritisation will give a greater weighting to social and environmental risks and benefits. Impacts (positive and negative) on future generations should be considered.</p>
Stakeholder considerations	<p>A wider range of stakeholders may be considered (e.g. future generations – are we transferring a liability to future generations through taking a short-term view?)</p> <p>Stakeholders in the supply chain will be under greater scrutiny in relation to health and safety and employee well-being.</p>
Operational needs	<p>Decisions will be focused on achieving efficiency through conservation of energy, water and other resource conservation.</p> <p>Opportunities for extending asset life through better maintenance and maximising the utilisation of assets through recycling/ re-purposing.</p>

	Decision-making will place greater attention on asset/service resilience, business continuity, contingency planning and collaboration with other organisations on internal and external events.
Risks and opportunities	A broader range of risks and impacts from, and to, those outside the organisation are considered. Low probability/ high consequence events ('black swan' events) will be seriously considered and prepared for. Opportunities available from the changing operating environment will be explored.
Performance against objectives	These will include performance against: <ul style="list-style-type: none"> • The objectives aligned to the organisation's sustainability objectives and reflected in the asset management objectives. • Performance against applicable SDGs where the organisation does not have any sustainability objectives.

2.8 A collaborative approach to stakeholders

Understanding stakeholder expectations is fundamental to good asset management practice.

Stakeholders are all those affected by the organisation's activities. Some stakeholders may have a vested interest in its success. Strategic asset management starts by identifying who the key stakeholders are, and then managing their interests and influence through on-going consultation and communication.

Collaboration with internal and external stakeholders ensures a robust approach to strategic planning and goal setting, and provides a sound basis for tactical and operational decision-making.

Key external stakeholders include:

- Customers utilising the services provided by assets (for example, road users).
- Regulators (for example, Essential Services Commission).
- Community and special interest groups.
- Stakeholders directly impacted by the organisations own service failures.
- Stakeholders whose service failures could impact on the organisation's performance (e.g suppliers, utilities, transport networks).
- Stakeholders who could be indirectly impacted by the organisation's own service failures.
- Stakeholders that may have a limited voice (e.g. future generations, the environment, Indigenous groups).

Key internal stakeholders include:

- Board of directors.
- Financial management teams.
- Sustainability teams

- Planning and development departments.
- Customer services personnel.

In most cases, sustainability objectives affect all stakeholders. Communication and consultation and reporting to stakeholders should include sustainability goals and expectations. Educating stakeholders about the importance of sustainability will help them understand its impact on strategic, tactical, and operational levels.

Ideally, internal stakeholders—such as sustainability teams and sustainability champions—will take the lead in driving sustainability initiatives. Proactively engaging with these stakeholders early on helps build strong partnerships, develop sustainability initiatives and shape decision-making processes. Consistent messaging to executive management is also important to ensure alignment.

To strengthen resilience across broader systems and networks, the organisation should collaborate with stakeholders at all levels, including:

- Governance and coordination
- Place
- Assets
- Community

To improve relationships and decision-making, asset management and sustainability teams should work together in an integrated way. This will facilitate:

- A greater understanding of expectations
- A deeper appreciation of how asset management and sustainability objectives are integrated in the short and long term.

For example, at the tactical planning level, the selection of assets/equipment for renewal should incorporate an assessment of sustainability benefits across the lifecycle.

2.9 Aligning service provider and asset owner perspective in decision-making

When selecting service providers, the asset owner must set clear social, environmental, and governance (ESG) criteria in procurement documents, alongside standard service requirements. These ESG criteria should be given the same level of importance as workplace health and safety (which is already a recognised social measure). This ensures that decisions are not based solely on financial factors.

One possible approach is a ‘two-envelope’ selection process, where service providers are first assessed based on ESG criteria before their financial proposals are reviewed. This prevents cost from being the only deciding factor.

To reinforce ESG commitments, contracts should include measurable ESG performance targets. Service payments could be linked to these targets, with incentives for exceeding requirements or delivering innovative ESG solutions. By allowing flexibility and rewarding high performance, service providers will be more motivated to meet or exceed sustainability expectations.

2.20 Levels of service

When setting sustainability policies and decision-making criteria at a strategic level, organisations must consider stakeholders, their needs, and their level of influence. Stakeholder management plans from different parts of the organisation should identify both risks and opportunities, as well as clear communication strategies to ensure transparency. These plans should also be reviewed regularly to ensure they cover all relevant stakeholders, both now and in the future.

Levels of service (LOS) refer to the specific activities and outcomes required to meet stakeholder needs, including customers and regulators. These levels define:

- What outcomes customers expect and are willing to pay for.
- What service levels are required to meet regulatory and legislative requirements.

When defining sustainability-focused organisational outcomes, the organisation must assess:

- How sustainability strategies will impact the cost of delivering services.
- How sustainability decisions affect customers' perception of value and willingness to pay.

The challenge with sustainability initiatives is that they often require high short-term (capital) costs but deliver long-term benefits. Because of this, future generations should be considered stakeholders in decision-making. To manage these costs effectively, sustainability initiatives may need to be phased in gradually, with their value clearly communicated.

All sustainability initiatives should be carefully planned, with lifecycle costs fully understood. Decision-making should also account for social impacts, particularly the effect on vulnerable stakeholders. Priority should be given to low-cost initiatives or those that provide short-term benefits, making them more immediately viable.

For communities already affected by climate change—such as those facing high insurance costs or difficulty obtaining coverage for vulnerable properties—investment in sustainability and resilience will be more easily understood and supported.

Monitoring and continual improvement is discussed in part four.

Governance and reporting are discussed in part four.

3. Part Three – Methodologies

3.1 Methodology

This section outlines practical ways for organisations to include sustainability in their asset management practices. It uses familiar language and criteria already applied to asset management, but adds a stronger focus on sustainability.

These methods are relevant to both government and private sector asset owners, as well as organisations that use their assets to deliver services or products.

3.2 Asset management thinking

Asset management often follows two ways of thinking:

1. **Linear thinking** – This breaks a problem into smaller parts and focuses on finding the most effective solution, usually to achieve a specific service outcome.
2. **Systems thinking** – This approach looks at the bigger picture, but its scope is often narrow.

Sustainability, however, is a "wicked problem"—a complex issue with no simple solution. It involves multiple interlinked challenges such as climate change, biodiversity loss, resource depletion and social equity. Because of this complexity, asset management takes a holistic, whole-of-life approach. This means looking at how different factors connect and considering multiple scenarios before making decisions.

This broader way of thinking leads to several benefits:

- A better understanding of complex issues.
- A lower risk of unintended consequences—solving one sustainability problem should not create another.
- Improved management of risks and opportunities.
- A greater focus on social and environmental factors.
- A more flexible approach to implementing projects, investments, and organisational changes.

Taking a logical and holistic approach helps organisations make better asset management decisions. It ensures assets are used efficiently over their entire lifecycle while also meeting sustainability and organisational goals. This is especially important in the planning and acquisition stages, where sustainability must be properly considered from the start.

3.3 Frameworks

Many organisations already have asset management frameworks to guide decision-making, based on cost, risk and performance. The following organisations have frameworks that already incorporate sustainability:

-Infrastructure Australia (IA).

- Uses sustainability principles to balance social, economic, environmental, and governance outcomes.
- Has a structured assessment process with four key stages: defining problems, analysing options, developing a business case, and reviewing completed projects.
- Supports decision-making through technical guidelines on areas like economic appraisal, risk analysis, and greenhouse gas assessment.

-The Infrastructure Sustainability Council (ISC) Rating Scheme

- Provides a consistent framework to measure sustainability performance in infrastructure projects.
- Covers planning, design, construction, and operation of assets.
- Assesses sustainability at different levels—individual assets, portfolios, networks, or entire regions.
- Uses a five-level rating system: Bronze, Silver, Gold, Diamond, and Platinum.

- Transport for New South Wales (TfNSW)

- Defines sustainability using ecologically sustainable development principles:
 - The precautionary principle (avoiding environmental harm).
 - Intergenerational equity (ensuring future generations benefit).
 - Biodiversity conservation (protecting ecosystems).
 - Valuation and incentives (factoring sustainability into costs and benefits).
- Follows sustainability assurance requirements, including the Infrastructure NSW (INSW) gateway review process for projects over \$10 million.
- Has baseline sustainability requirements that must be followed throughout the asset lifecycle.

In the future, leading organisations will have sustainability frameworks in place that are embedded in organisational decision-making, in a similar manner to how safety is addressed now.

3.4 Needs identification

Traditionally, organisations identify needs based on their strategic goals, growth, asset capacity and performance. The aim is to ensure solutions align with community and stakeholder priorities. However, this often leads to a default approach of demolishing old facilities and building new ones to meet future demand—sometimes with an emphasis on high-visibility projects rather than sustainability.

The problem with this approach is that it overlooks environmental and climate risks, which do not always have an immediate or loud voice in decision-making. A sustainability-focused approach to identifying needs and evaluating options considers ways to upgrade or expand existing assets rather than always building new ones. This includes:

- Improving energy efficiency
- Reducing waste
- Using climate-resilient technologies
- Adopting circular economy principles to reduce resource use and waste

Levels of Service (LOS) define the quality and reliability of services provided by assets. Traditionally, these are based on:

- Past asset performance
- Customer satisfaction levels
- Willingness and ability of current users to pay
- Feedback from complaints and surveys

However, a sustainability-focused approach to LOS should also consider:

- **Future generations** – What financial or quality-of-life impact will today’s decisions have on them? For example, delaying investment in wastewater infrastructure might lead to more pollution in rivers.
- **The environment** – What level of water quality should be maintained in rivers? Should beaches remain safe for swimming all year round?
- **Energy efficiency** – How can energy use be reduced?
- **Waste reduction** – Can waste from infrastructure projects and operations be minimised?
- **Service resilience** – How can we ensure services continue despite climate or environmental challenges?
- **Non-asset solutions** – Are there organisational or cultural changes that could achieve the same goals without building new infrastructure?

When involving customers in LOS decisions, they need **a clear and meaningful comparison of costs**. Sustainability costs are often presented as annual figures, whereas most people think about their expenses in daily (e.g. a cup of coffee) or monthly (e.g. phone or streaming services) terms. This mismatch makes it hard to compare sustainability costs to other expenses.

People also tend to focus on short-term costs rather than long-term impacts. Some may believe the future will “sort itself out” or fail to see the opportunities in sustainability. To address this, organisations need to:

- Clearly communicate the full picture – including long-term benefits and risks.
- Present sustainability costs in a way that is easy to compare with everyday expenses.
- Build on growing awareness of climate change and environmental issues, as recent severe weather events have increased public understanding.

By making sustainability more relatable and easier to understand, organisations can encourage more informed decision-making and stronger community support for long-term sustainability initiatives.

3.5 Planning

Asset management planning focuses on achieving the desired LOS while balancing demand, asset capacity, performance, risk and budget. Increasingly, organisations are considering climate change risks—such as supply chain disruptions, service resilience, and community impacts—when planning how to manage their assets. To make better decisions, organisations should quantify and estimate social and environmental impacts alongside financial costs.

However, planning is often done in isolation within organisations, with sustainability treated as a compliance issue rather than a key factor in decision-making. Many organisations also react to climate events rather than planning ahead, leading to short-term fixes that override more strategic, long-term approaches.

To improve lifecycle planning, better methods are needed to include detailed environmental and social factors in decision-making. The next section on option analysis explores current practices and areas for improvement.

Some organisations, such as water utilities, have adopted an adaptive planning approach. This involves:

- Preparing for and responding to climate change impacts
- Building climate resilience across the organisation
- Using scenario planning to assess risks and vulnerabilities
- Identifying, evaluating, and prioritising adaptation options
- Integrating these options into capital and operational investment decisions

An example of this approach is outlined by WSAA (2016). Organisations, such as Infrastructure NSW, use investment assurance gateways to ensure that investments provide the most value. These assessments should consider social and environmental benefits as well as financial returns. Decisions should be based on multiple future scenarios, with a full evaluation of their financial, social and environmental impacts.

3.5.1 Deferring new asset acquisition

Infrastructure is responsible for up to 70% of Australia’s annual carbon emissions (ISCA et al 2020). This means that delaying or reducing new infrastructure projects can significantly cut emissions. Organisations can achieve this by:

- Managing demand to reduce or defer the need for new infrastructure.
- Maximising and optimising existing assets instead of building new ones.
- Extending asset life where it provides long-term value.
- Re-using, re-purposing, and recycling existing assets.
- Exploring alternative service delivery models, such as remote working to reduce office space needs.

Some sectors have already adopted these strategies—for example, water utilities use demand management, and health and education sectors re-purpose buildings. However, these approaches are not widely applied due to challenges such as:

- Lack of understanding of asset capacity, performance, and demand, leading to risk-averse decision-making.
- A preference for visible, asset-based solutions (e.g. new buildings) to show progress, rather than considering lower-impact alternatives.

To address these issues, evaluating options for delaying or avoiding new assets should be a mandatory step in the decision-making process.

3.5.2 Options analysis

Sustainable investment is guided by government legislation and sustainability rating tools, such as those provided by the Department of Treasury and Finance, Victoria (2021). These principles apply to both public and private sectors.

In most cases, economic analysis plays the biggest role in deciding whether to invest in a project. One commonly used tool is Life Cycle Cost Analysis (LCCA), which evaluates asset costs over its entire lifespan, including:

- Design
- Construction
- Operation and maintenance
- Disposal

LCCA helps justify budget allocation and intervention strategies based on asset performance. In some cases, resilience is factored in when assets are vulnerable to risks, and an appropriate action plan is developed.

However, while social and environmental costs and benefits can be included in LCCA, they are often hard to express in dollar terms. As a result, they are typically assessed qualitatively using Multi-Criteria Decision Analysis (MCDA).

While LCCA and MCDA help in decision-making, they have some limitations:

- MCDA considers factors such as social, economic, technical performance, environmental impact, climate change risks, and governance. However, it is often subjective and lacks detailed analysis.
- Life cycle analysis (LCA) provides a more complete picture by including social and environmental factors (where measurable), such as reducing carbon emissions, energy use, and heat generation.
- LCA also integrates carbon reduction into decision-making, aligning with the PAS 2080 framework in the UK (ICE, UK, 2023; Infrastructure NSW, 2024).

Carbon measurement should be done across all stages of an asset's life, including:

- Materials, products, and fleet emissions
- Transport and construction impacts
- Maintenance and operational energy use

All the benefits should be estimated in an LCA. Infrastructure NSW provides guidelines for estimating carbon emissions at different stages of an asset's lifecycle. The NSW Government has also proposed including carbon reduction costs in a cost-benefits analysis, recommending a carbon price of \$123 per tonne for FY 2023, rising to \$150 per tonne by 2032 (NSW Treasury, 2023). Additional details can be found in the document '*Carbon Measurement Fundamentals for Engineers*' (Institution of Engineers Australia, 2024).

3.5.3 Combining LCCA and LCA for better decision-making

To optimise asset management decisions, both LCCA and LCA should be used together. A study on a freeway project in China found that combining these methods led to savings of 36.8 tonnes of CO₂ per lane per kilometre and \$10,530 (USD) per lane per kilometre (2007 values) over the pavement's lifecycle (Liu et al 2023).

By integrating LCCA and LCA, asset management decisions can become more rigorous and sustainable, considering a wider range of scenarios and options. These assessments can either be conducted separately and then combined, or an integrated LCCA-LCA model could be developed in the future to quantify economic, social and environmental benefits more accurately.

To achieve the best sustainability outcomes, asset management should aim to:

- Improve asset performance and resilience
- Optimise demand where necessary
- Minimise costs for agencies

- Reduce energy use, heat, and emissions (by using recycled materials, changing treatment methods, adjusting frequency of maintenance, and considering climate change and decarbonisation strategies)
- Maximise carbon reduction savings
- Maximise social benefits

For sustainable asset lifecycle planning, organisations should use one of the following approaches:

1. **LCCA and LCA combined** – for a more comprehensive assessment of economic, social, and environmental impacts
2. **LCCA and MCDA combined** – when qualitative analysis is required alongside financial evaluation

A well-balanced investment should provide strong asset performance over its lifecycle, lower greenhouse gas (GHG) emissions, and increased carbon savings at an optimal cost. The proposed LCCA-LCA approach may be seen in Figure 3.

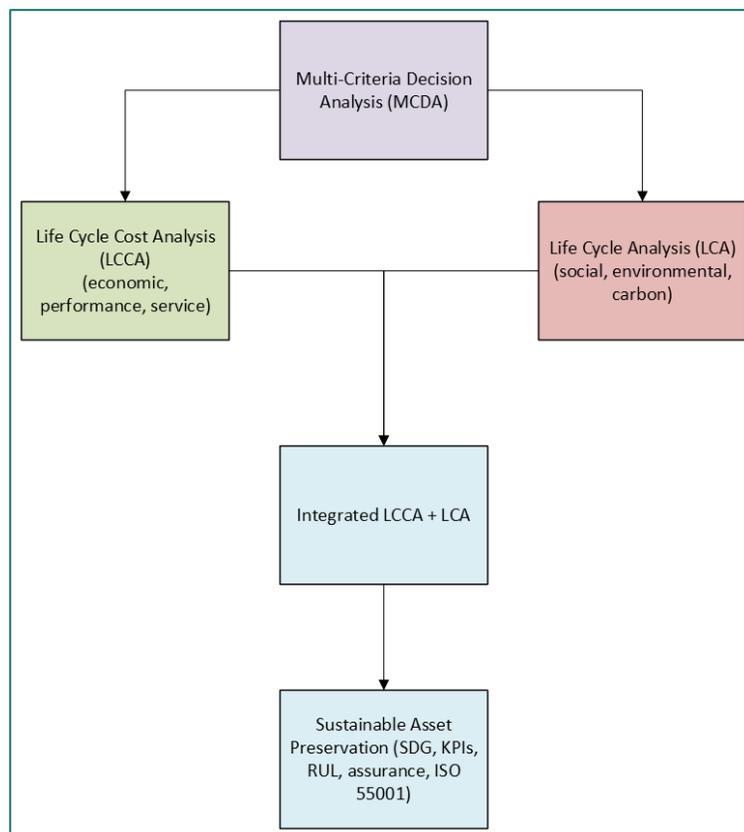


Figure 3: Sustainable asset management approach

A combined LCCA and MCDA approach (which is already in use) can be useful when social and environmental impacts cannot be easily measured in monetary terms. For example, issues like biodiversity loss and water quality degradation can be assessed using MCDA to ensure they are considered in decision-making.

To create a more comprehensive and balanced approach, it would be beneficial to combine LCCA, LCA and MCDA. LCCA is already widely used in asset management to develop prioritised work programs that align with service demands, asset performance, budgets and costs.

3.5.4 Discount rate

In financial and economic analyses, such as LCCA, future costs and benefits are discounted to reflect the time value of money—the idea that a dollar today is worth more than a dollar in the future because it can be invested.

However, this approach has a major drawback: it significantly reduces the importance of costs and benefits for future generations, giving far more weight to the present.

Professor Sir Dieter Helm from the University of Oxford, critiques traditional discounting methods in his book *Legacy: How to Build a Sustainable Economy* (2023). He highlights how, under standard economic models, long-term costs such as dealing with nuclear waste from power stations become almost negligible when discounted. This raises concerns about how economic models undervalue the future.

In response to this issue, social discount rates have been introduced in recent years to better reflect social and environmental concerns. Guidelines for their use can be found in documents such as HM Treasury (2024, Section 14.5) and supplementary guidance by Lowe J. (2008).

A more balanced way to assess investment decisions would be to report the present value of asset investment options from both a present and future generation perspective. This could be done by calculating present value using:

1. The organisation's standard discount rate, as recommended by finance teams or financial advisors.
2. A lower (social) discount rate, which gives more weight to long-term social and environmental impacts (Productivity Commission, 2010; HM Treasury, 2008).
3. A zero discount rate, which fully values future costs and benefits equally to those of today.

By presenting multiple discount rate scenarios, decision-makers can consider sustainability alongside financial criteria, leading to more responsible, long-term investment choices.

3.5.5 Risk and opportunity

Managing sustainability-related risks and opportunities throughout an asset's entire lifecycle can:

- Improve the financial and technical viability of projects
- Increase the likelihood of securing funding
- Support better long-term decision-making
- Enhance community acceptance

- Deliver stronger short- and long-term project outcomes

As climate change intensifies, assets and the services they provide will become more vulnerable to its impacts. Asset managers will need to balance performance, cost and risk while also considering how these risks affect their organisation and connected sectors, such as suppliers, utilities and transport providers.

To effectively manage future risks, organisational risk processes must evolve and become more comprehensive by:

- **Taking a systems-based approach** – Considering how networks of assets interact across different sectors, rather than focusing only on individual assets (Infrastructure Australia, 2021).
- **Assessing infrastructure vulnerabilities** – Examining the risks to existing networks, services, and processes in the short, medium, and long term, and how these risks may evolve over time.
- **Understanding interdependencies and cascading impacts** – Identifying how risks in one area can affect others, both inside and outside the organisation. This includes assessing how assets contribute to overall system resilience (Infrastructure Australia, 2021).
- **Engaging diverse perspectives** – Involving stakeholders both inside and outside the organisation, including different disciplines, to ensure a broad understanding of risk.
- **Considering risks across the full asset lifecycle** – From planning and construction to operation and disposal.
- **Addressing rare but high-impact ‘black swan’ events** – Preparing for low-probability, high-consequence events that could cause severe disruptions.
- **Evaluating transition risks** – Assessing financial risks linked to stranded assets (e.g., infrastructure becoming obsolete due to changes in technology, regulation, or market demand).

In response to priority risks, organisations will need to:

- Invest in service resilience – this includes physical improvements (eg strengthening assets, using natural solutions) and operational measures like better capacity building, technology adoption, and warning systems.
- Enhance contingency and business continuity plans – ensuring they are robust, regularly reviewed, and tested.
- Collaborate with interdependent organisations – strengthening partnerships with sectors that rely on or support their assets.

Integrating sustainability into asset management not only mitigates risks but also creates new opportunities. For example, electric vehicles, hydrogen fuel, recycling of materials and efficient use of public transport could drive innovation, create jobs and promote economic growth in the public and private sectors.

By taking a proactive and sustainability-focused approach, asset managers can help build a more resilient future, while delivering greater value to communities.

3.6 Investment prioritisation

Capital investment is often prioritised based on a ranking score derived from a range of criteria, which may or not be weighted. For example, this prioritisation may be separated into two categories:

- The risk of not undertaking the investment (e.g. customer/ community service/performance, financial, regulatory compliance, image/reputation, health and safety).
- The benefits of implementing the investment (e.g. return on investment, contribution to the achievement of organisational and/or asset management objectives, social and environmental benefits).

These criteria would be quantified in business cases to ensure consistency. A variety of prioritisation approaches are adopted by organisations. In updating these approaches to have a greater sustainability focus, the following may be considered:

- Level of alignment with achieving the sustainability objectives.
- Increasing the weighting to social and environmental benefits or risks.
- Carbon cost, embodied carbon.
- Certainty of future returns (will we have a stranded asset?).
- Risks or benefits to future generations.

3.7 Financial sustainability

Financial decision-making is often short-term and closely tied to the annual budgeting process. While organisations commonly prepare capital expenditure forecasts for new projects and asset renewals over a 5–10 year or longer horizon, these plans are not always fully funded. Operational budgets, on the other hand, are usually based on current-year spending plus an inflation adjustment, rather than a detailed forecast of future operational costs. Even though asset investment business cases clearly outline the lifecycle costs of new investments, these costs are rarely incorporated into long-term operational budgets. Similarly, end-of-life costs—such as decommissioning or disposal—are often overlooked in business cases.

For an organisation to be financially sustainable, it must be able to fund its services over the long term while achieving its objectives. This can be achieved by:

- **Developing long-term financial models** – Forecasting capital and operational costs (including end-of-life costs) and identifying funding needs to understand the total cost of asset investment over time.
- **Assessing affordability for customers and the community** – Considering both the willingness and ability to pay for services, as well as the social impacts of investment decisions.
- **Taking an adaptive approach to infrastructure planning** – Avoiding the risk of stranded or under-utilised assets by making investment decisions that allow for flexibility and future changes.

- **Using financial performance indicators** – Metrics such as the asset sustainability ratio, asset consumption ratio, and asset renewal funding ratio help track financial health. While local governments have focused on financial sustainability for decades (Queensland Government, 2024), these principles can also be applied to other organisations with long-lived assets.

By integrating long-term financial planning, affordability assessments, and adaptive investment strategies, organisations can improve their financial sustainability and ensure they can continue delivering essential services in the future.

4. Part Four – Implementation

Once an organisation decides to include sustainability in its asset management framework and decision-making, it needs a clear plan for implementation. This process happens in two key stages:

- **Transition phase** – the initial project to introduce sustainability practices.
- **Business-as-usual (BAU) phase** – ongoing integration into daily operations.

Most of the steps outlined here focus on the BAU phase, but they may also include actions during the transition to ensure sustainability becomes a lasting part of the organisation's functions.

4.1 Roles and responsibilities

Bringing sustainability into asset management will require a review of roles, responsibilities and skills across the organisation. To clarify who is responsible for what, a RACI matrix (Responsible, Accountable, Consulted, Informed) should be developed. This matrix should cover all levels of the organisation, from senior executives to operational staff.

- Senior executives will set the strategy in the Strategic Asset Management Plan (SAMP), ensuring sustainability is a key part of long-term planning.
- Operational staff will make practical choices, such as selecting sustainable materials, fuels and equipment.

Beyond defining roles, it is also essential to assess whether employees have the necessary skills to support sustainability-focused decision-making. A competency gap analysis can help identify areas where training or new expertise is needed. Examples of skills that may need development include:

- Systems thinking
- Resilience engineering
- Scenario planning
- Life cycle assessment (LCA)
- Demand management
- Recycling and repurposing assets
- Managing emissions and climate risks
- Biodiversity and social impact considerations

If the organisation lacks certain skills, it may need to train existing employees or hire new staff with the necessary expertise. A workforce development plan can help outline how to fill these gaps through training, mentoring, or recruitment.

Job descriptions for current employees should be updated to reflect the RACI and identified competencies around sustainability. Contracts for outsourced roles should also specify the required sustainability skills to ensure that external partners meet the same standards.

4.2 Governance / assurance

Strong governance is essential when integrating sustainability into BAU operations. It ensures that sustainability efforts are effective, efficient and aligned with the organisation's goals and stakeholder expectations. Governance also helps track whether asset management practices are delivering the intended sustainability outcomes.

Key governance actions include:

- **Documenting processes** – Ensure clear records of decisions, including what influenced sustainability choices at the time. Use configuration management to track changes.
- **Defining roles and responsibilities** – Clearly outline who is responsible for each aspect of sustainability governance.
- **Identifying risks** – Consider potential risks to achieving sustainability goals at all stages of an asset's lifecycle. Include these risks in key planning documents, such as the SAMP and Asset Management Plan (AMP).
- **Setting performance measures** – Establish clear sustainability targets and use reliable, unbiased data to track and report progress to top management and stakeholders.
- **Regular reviews** – Conduct structured periodic reviews throughout the asset lifecycle, with feedback mechanisms to improve processes.
- **Ensuring compliance** – Align sustainability efforts with existing auditing and compliance processes within the organisation.

It is important to strike a balance between setting realistic sustainability goals, meeting stakeholder expectations and managing financial and reputational risks.

4.3 Change management

When introducing new sustainability processes, it's important to manage any risks linked to changes in organisational procedures or technical decisions. A structured change management process helps ensure these changes are properly planned and implemented. Without this, sustainability strategies may not be fully delivered or effectively reported.

Key changes to consider and plan for include:

- **Asset management decisions** – Ensuring planning activities now include a clear focus on sustainability and meet performance targets.

- **Roles and responsibilities** – Updating approval processes to include sustainability measures.
- **Business processes** – Integrating sustainability into all stages of the asset lifecycle.
- **Communication and awareness** – Keeping employees and external stakeholders informed about sustainability changes.

The goal is to make sustainability a core requirement in asset management, rather than an optional extra. Just as workplace health and safety is now embedded in business operations, sustainability should become a fundamental part of an organisation's way of working.

4.4 Performance management

Performance management in sustainability means tracking, measuring, and improving an organisation's environmental, social and economic impact. It involves setting clear goals, implementing realistic strategies, and ensuring asset management plans (both strategic and tactical) include sustainability considerations.

The first step is to align sustainability efforts with the organisation's key objectives. These objectives may be strategic (long-term vision) or tactical (specific actions within policies and procedures). Once the objectives are clear, a set of performance indicators can be developed and managed.

There are two ways to approach sustainability performance management:

1. Building a new sustainability framework from scratch
2. Enhancing existing business processes with a sustainability focus

For organisations integrating sustainability into existing performance management systems, it can help to "reverse engineer" current performance measures. Many existing metrics, such as those reported to shareholders or regulators, can be adapted to align with sustainability goals.

Sustainability performance should be tracked throughout an asset's lifecycle using KPIs. Examples include:

- Asset Health Index – Measuring the overall condition and efficiency of assets.
- Carbon reduction percentage – Tracking progress in cutting emissions.
- Asset resilience – Assessing how well assets can withstand climate change impacts.

Regular performance audits are also essential to ensure sustainability efforts are maintained and improved over time.

4.5 Continuously monitor and improve

Regular performance evaluation is essential for maintaining and improving sustainability in asset management. This involves monitoring, measuring, analysing, evaluating, and auditing sustainability efforts. These processes are key parts of an asset management system and support continuous improvement, as outlined in ISO 55001 (Clauses 9 and 10).

Sustainability decision-making should be assessed as part of existing asset management (ISO 55001) and environmental management (ISO 14001) systems. This evaluation will focus on:

- **Contribution to sustainability goals** – Measuring how well decisions support the organisation’s sustainability objectives.
- **Decision-making process** – Reviewing decision criteria, scope, implementation, and overall effectiveness from a sustainability perspective.
- **Opportunities for improvement** – Identifying ways to enhance sustainability practices and outcomes.

By continuously reviewing and refining sustainability efforts, organisations can ensure ongoing progress and alignment with their long-term goals.

4.6 Governance and reporting

Sustainability involves many interconnected elements, requiring input from different functions within an organisation, such as technical, environmental, operational, people, procurement and compliance. To ensure alignment across these functions, both horizontally and vertically, roles and responsibilities should be clearly defined in the sustainability RACI matrix.

Table 2: Alignment with asset management and sustainability terminology

Asset Management Framework	Sustainability specific considerations
Levels of Service	<ul style="list-style-type: none"> • Emissions targets • Return on investment (return could be financial, social or environmental) • Costs to deliver specific sustainability initiatives • Understanding performance measures to track against targets • Carbon pricing per unit measure of organisational outcome
Stakeholders	<ul style="list-style-type: none"> • Community groups (setting expectations) • The public • Shareholders • Customers (willingness to pay) • Future generations • The environment
Strategic Framework	<ul style="list-style-type: none"> • Include sustainability objectives and targets in the SAMP. • Clearly articulate what decisions have been made at a strategic level (for example, ‘no fossil fuels by 2030’), and what decisions are left to be made at a tactical and operational level. Typically, strategic decisions would include top level targets and objectives that are relevant to a business objective. • Set out a process for developing ‘tactical’ plans and ‘operational’ tools.
Resourcing	<ul style="list-style-type: none"> • Articulate roles and responsibilities relating to sustainability decision-making in a RACI.

	<ul style="list-style-type: none"> • Identify needed competencies and skills, and compare to current organisation baseline. • Include any uplift or change in skills and competencies in the workforce development plan, considering new hires, training, engagement of external resources etc. • Include new expectations in to position descriptions for relevant employees and into contracts for suppliers and external resources.
Processes	<ul style="list-style-type: none"> • Document new processes clearly, using flow diagrams or other documents as appropriate. For sustainability related decisions, stakeholders from diverse parts of the business may be needed to provide input, so swim-lane diagrams may be suitable.
Change Management	<ul style="list-style-type: none"> • Ensure that all of these changes are integrated into the organisation and adopted throughout using appropriate change management processes.
Assurance	<ul style="list-style-type: none"> • Define what success looks like, with appropriate specific, measurable, achievable, relevant, time-bound (SMART) metrics at each of the relevant levels (strategic, tactical and operational). • Review existing available data sources within the organisation that can provide regular feedback on progress. Consider the timeliness and frequency of each data source, and whether new processes need to be set up to gather appropriate data. • Implement appropriate review processes at relevant frequencies for the level of the organisation. Consider more frequent and simpler reviews at more operational levels, and more targeted and less frequent reviews at strategic levels.

The Australian Accounting Standards Board (AASB) has published new sustainability reporting standards:

- AASB S1 (Voluntary) – Covers the disclosure of sustainability-related financial information.
- AASB S2 (Mandatory) – Focuses on climate-related disclosures and applies to certain entities from January 1 2025, as required by the Corporations Act 2001.

Organisations choosing to voluntarily follow AASB S1 would need to disclose information on all sustainability-related risks and opportunities that could impact:

- Cash flow
- Access to finance
- Cost of capital (short, medium, and long term)

AASB S2 requires entities to report on climate-related risks and opportunities, including:

- Physical risks (e.g. extreme weather events)
- Transition risks (e.g. policy changes, market shifts)
- Business model and value-chain impacts

- Strategy and decision-making adjustments
- Financial performance and cash flow implications
- Climate resilience and risk management
- Key climate-related metrics and targets

Since these requirements involve financial reporting, asset managers should work closely with their organisation's finance team to develop a coordinated approach to compliance and reporting.

5. Part Five – Conclusion

Sustainability will become an integral part of the DNA of every asset-intensive organisation in the same way that workplace health and safety is embedded into organizational processes. Asset managers have an important role in contributing to this transformation into business as usual through building on existing capabilities through:

- Increased awareness of the opportunities that asset management provides in achieving sustainability objectives
- Broadening strategic, tactical and asset management decision making through incorporating an increased sustainability perspective
- Collaborating with other teams / disciplines to contribute to the realisation of its sustainability goals and objectives
- Ensuring sustainability is a core inclusion within the scope of the asset management framework

This discussion paper provides guidance on approaches and tools that asset managers can consider in their decision making to realise social, economic and environmental value from assets and services. Furthermore, more detailed information is provided in Part Six – References.

6. Part Six – References

Once an organisation decides to include sustainability in its asset management framework and decision-making, it needs

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7. Further Information

Sustainability and Resilience in Asset Management Special Interest Group webpage.

<https://www.amcouncil.com.au/membership/special-interest-group/sustainability-resilience.html>

Email: info@amcouncil.com.au

More detailed supporting references may be found in the AMC Sustainability and Resilience in Asset Management Toolkit. https://www.amcouncil.com.au/app/Climate_Toolkit.html.



ASSET MANAGEMENT COUNCIL

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Comments are welcome and can be sent to info@amcouncil.com.au

