



Output from the first
Melbourne Carbon Crunch
hosted by Mott MacDonald
and ABCC on 5 June 2023.

Carbon Crunch



Accelerating Australia's pathway to net zero



Robin Reed
State manager, Victoria
Mott MacDonald



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Mott MacDonald has been hosting the annual Carbon Crunch event in the UK since 2013 to help catalyse change and hasten the decarbonisation of our built environment.

On World Environment Day, 5 June 2023, Mott MacDonald Australia, in partnership with the Australian-British Chamber of Commerce and Octopus Investments, hosted the inaugural Australian Carbon Crunch at the Sofitel on Collins, a venue that is genuinely committed to net-zero.

The first Carbon Crunch introduced the UK government's 'Infrastructure Carbon Review', which highlighted that cutting carbon delivers cost savings, as well as mitigating climate change.

In the 10 years since then, the most important aspect that has come up time and time again is collaboration – the value of bringing together infrastructure owners, government, regulators, academics, contractors and suppliers to share thinking, experiences and solutions.

Reaching our decarbonisation and net-zero targets, and adapting to the physical impacts of climate change, will require the industry to collaborate more frequently, more deeply and in new ways. This is because the outcomes we seek are systemic, and all the players and stakeholders within our systems need to work together to make them greener and more resilient.

At the 2023 Melbourne Carbon Crunch event, we heard from experts, stakeholders and infrastructure leaders about how they are tackling current and future challenges and what needs to be done if we are to decarbonise our economy by 2050.

I am pleased to be able to share with you some of the insights from those discussions and look forward to following up with industry partners to help progress Australia's journey to net zero.

We intend to host this event annually and will continue to accelerate decarbonisation.



Key takeaways from our speakers

Transitioning to a low-carbon economy is a key focus for the Victorian government

With an ambitious target of net-zero by 2045, the Victorian government has laid the foundations for effective, long-lasting change and is committed to ensuring these targets are achieved.

The State Electricity Commission has been reinstated and will increase government-owned renewable energy to drive down power bills and reduce emissions. Additionally, offshore wind, storage and renewable energy targets have been communicated, including reaching 65% renewable power by 2030.

Broader infrastructure decarbonisation is being driven by a focus on environmental performance and resilience of buildings through Plan Melbourne and energy efficiency programs. In particular, the government is providing financial support for neighbourhood battery programs and electric vehicle subsidies.

To increase the emissions offset in our landscape, the Victorian government has released a number of land and forestry initiatives including providing \$15M to rural landowners to plant more trees on their property.

In addition, the government has committed to cease native timber harvesting by the end of 2023.

Overall, these emissions cutting initiatives offer significant economic opportunities estimated at \$63bn, and support even more jobs.



Carolyn Jackson

Deputy secretary of Environment,
Climate Action and First People Group



It can no longer be left to climate scientists and activists, to carbon accountants or sustainability teams. Reaching net-zero is a challenge that we must all be ready to embrace as leaders.

There is an urgent need to address climate change and its impact on infrastructure

Climate change is an escalating global concern, with observable impacts across every region of the world and entire ecosystems.

As the effects intensify, it is becoming increasingly evident that infrastructure plays a critical role. In Australia, infrastructure costs are directly or indirectly responsible for 70% of the country's annual greenhouse gas emissions. Recognising the magnitude of this impact, it is imperative to prioritise infrastructure decarbonisation efforts.

Victoria, as a leading jurisdiction on climate action, has made commendable strides in addressing emissions reduction. However, it is essential to maintain a sense of urgency and guard against complacency.

By drawing on decarbonisation efforts in other jurisdictions, Infrastructure Victoria is developing recommendations for action that will be relevant and effective within the unique context of Victoria.

To successfully decarbonise, we must all embrace the challenge as leaders. The responsibility can no longer be left to climate scientists, activists, carbon accountants, or sustainability teams. By fostering a collaborative and inclusive approach, we can accelerate progress towards achieving net-zero emissions and building a sustainable future for generations to come.



Dr Allison Stewart
Deputy CEO, Infrastructure Victoria

Consider carbon early

Incorporating carbon considerations early in the planning and execution of construction projects is paramount for achieving maximum benefits and advancing sustainability goals. Developing environmental product declarations and the promotion of recycled materials across the industry will be an important supporter.

Just as safety measures are ingrained within project frameworks, carbon considerations should be an integral part of project planning and execution, and the construction industry must take ownership of this.

Adopting lean construction methods and reducing material usage are key strategies for minimising emissions and optimising maintenance. By embracing these approaches, projects can not only mitigate environmental impact but also realise long-term cost savings.

Digital technology also plays a vital role in facilitating real-time monitoring and data analysis to enable informed decision-making and continuous improvement. Engaging industry stakeholders and fostering knowledge sharing are vital for driving innovation and accelerating climate action.

By incorporating carbon considerations early in project planning and construction, the infrastructure sector can become a leading force in driving climate action and achieving a low-carbon built environment.



Rebecca Hendy
Sustainability manager,
McConnell Dowell



How can we be more ambitious, encourage step change, innovation and own our actions earlier?



Collaboration means keeping the end goal in mind, listening to the needs of key stakeholders, and sometimes feeling a little bit uncomfortable, as you work together to find solutions.

Collaboration is challenging but necessary

Governments must collaborate to enact meaningful energy policies and partner with the private sector to attract international investment and drive renewable energy projects. The emergence of hybrid solar and battery projects further highlights the need for collaboration to connect them to the transmission network successfully.

Engagement with local communities is crucial for gaining social acceptance and addressing concerns surrounding renewable energy projects. In addition, collaborating with indigenous leaders opens up opportunities for meaningful partnerships, employment, and co-investment, ensuring projects respect indigenous rights and traditions.



Sonia Teitel

Co-head of investment and development, Octopus Investments

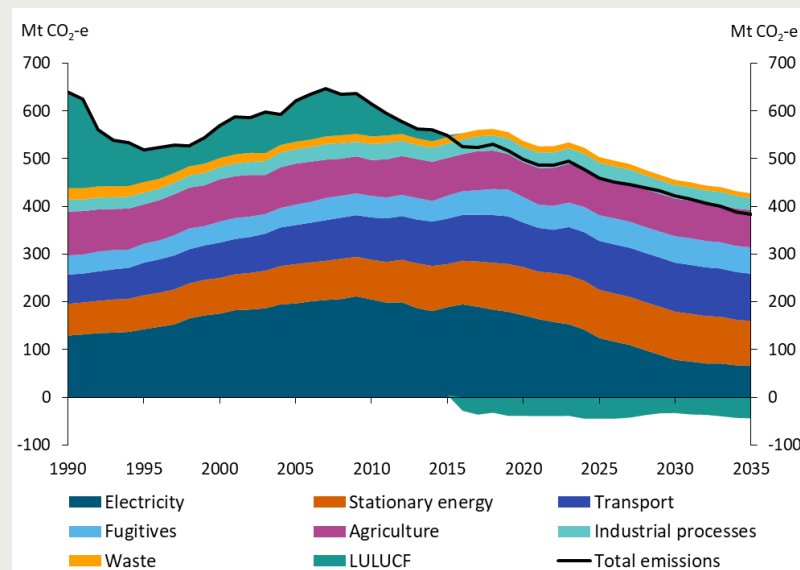
Ultimately, working towards a reliable and affordable renewable energy system will require collective efforts from everyone. By working together, sharing knowledge, and leveraging resources, stakeholders can overcome challenges, drive innovation, and propel the transition to renewable energy, ultimately realising reliable and affordable energy systems.

Decarbonisation in Australia



Summary of decarbonisation in Australia

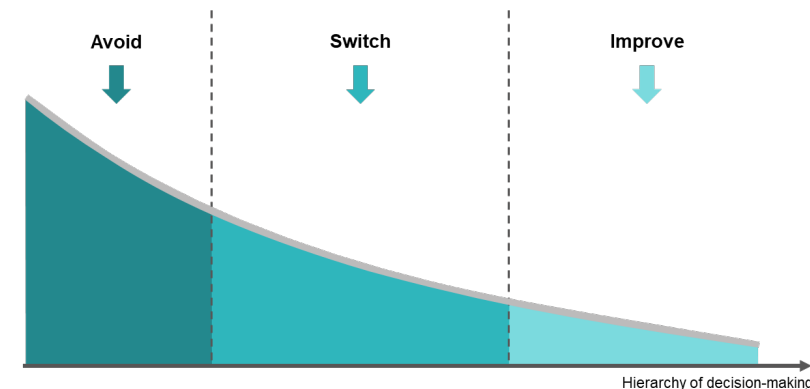
Today, there is alignment across Australia's federal and state governments on net zero ambition, both in setting a 2030 mid term and longer term 2050 goal. Establishing targets provides policy certainty and sends a signal to market but ultimately it is no substitute for mitigation action and initiatives to address climate change.



Whilst Australia has made significant progress over the last decade in reducing its carbon intensity, momentum needs to urgently accelerate across the economy to respond to the latest climate science and arrest dangerous temperature rises.

Despite additional policy commitments, growth in global GHG emissions will make it likely temperatures will rise above 1.5°C within this century and make it harder to contain to less than 2°C.

However, with deep, rapid and sustained reductions in greenhouse gas, global warming will substantially slow down within two decades.



Source: PAS2080:2023, Available at: <https://www.bsigroup.com/en-GB/standards/pas-2080/>

PAS2080 and its accompanying guidance documents provide a common language and framework for asset owners/managers, designers, constructors and suppliers to manage whole life carbon.

Helping organisations understand the impact of their assets on the wider network, the standard helps to reveal interdependencies and encourage early collaboration.

The 2023 revised version has an expanded scope, and increased emphasis on whole life carbon and stronger alignment with the transition to a net-zero carbon economy by 2050.

PAS2080 is a relatively new concept in the Australian market, but it is widely accepted to be the leading industry framework and recognised as a useful framework to hasten decarbonisation.

If intelligently applied PAS2080 is a powerful enabler to cut emissions, drive down cost and unleash innovation in design and technology.

2050
the Australian government's
deadline for reaching net-zero

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Decarbonising infrastructure workshop



To be accountable to future generations, we must take action. This action must be collective to have impact at scale. To achieve this, we need to start collaborating continually, across functions and industry to tackle our carbon emissions challenge.



Brian Dargan

Global digital advisory community lead,
Mott MacDonald

Collaboration and co-design are essential for achieving net-zero in infrastructure. When stakeholders from different fields work together, they can identify and resolve issues that might otherwise be deemed too complex or too cross-disciplinary and would therefore go unnoticed or overlooked.

Moreover, collaboration and co-design can bring diverse perspectives to the table, leading to innovative solutions that benefit everyone involved. It can also foster a sense of ownership and shared responsibility, leading to long-term commitment towards sustainability.

Therefore, it is imperative to encourage and facilitate collaboration and co-design among stakeholders to achieve net-zero in infrastructure.

Co-design workshop: Our net-zero journey

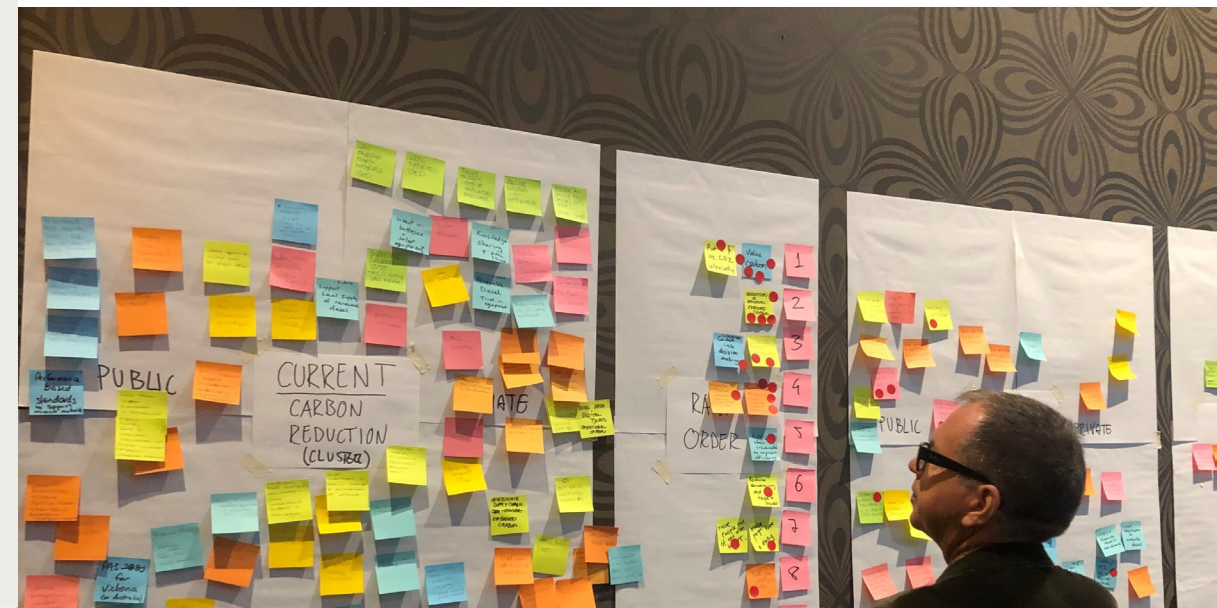
Four areas where we need to be focusing our efforts towards decarbonising infrastructure and achieving net-zero were selected.

1. **Design and Construction**
2. **Operations and Management**
3. **Energy**
4. **Waste**

Attendees were then asked to consider the following two prompts through the lens of their focus area.

Current: What are the current forms of private sector innovation & public sector initiatives that you are or should be implementing to increase/drive carbon reduction?

Future: What are the future forms of private sector innovation & public sector initiatives that you must or could implement to achieve net-zero?



Topic 1: Design and construction

Decarbonising embodied emissions presents a significant challenge, and with 40% of annual global emissions arising from the built environment, reaching net-zero is highly dependent on governments enforcing stronger policy, industries and communities collaboration and individuals applying innovative tools.

Several approaches have been proven to minimise carbon impact in the design and construction phases of a project including:

Conducting whole-of-life carbon assessments: by understanding the carbon footprint of each aspect, project teams can make informed decisions and prioritise low-carbon alternatives.

Applying lean construction practices: Implementing lean construction practices minimizes waste, optimizes resource use, and reduces carbon emissions.



Current

Whilst PAS2080 and other sustainability principles are currently being applied throughout the design and construction of some major infrastructure projects in Australia, at the forum workshop additional initiatives were considered including:

1. Placing a **meaningful value on carbon**
2. Promoting and investing in **innovative materials** to reduce embodied carbon
3. **Integrating carbon into decision making** e.g. reducing design carbon footprints
4. Collaborating and establishing **technical standards to include low carbon alternatives** and reduce unnecessary carbon involvement like gold plating
5. Coordinating and collaborating within supply chains and industry to **improve efficiency**

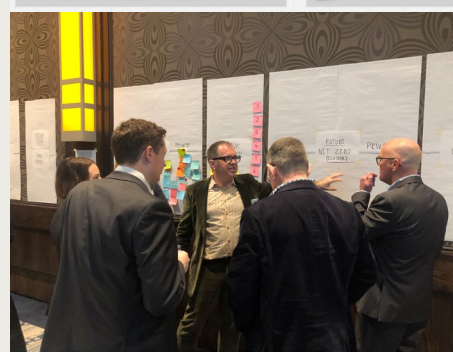
Future

To drive enhanced decarbonisation in private and public infrastructure projects, the following initiatives must be considered in design and construction sector:

1. Capturing the **value and cost of carbon** in projects and designs
2. **Promote government** investment into new and innovative low carbon material research and manufacturing
3. Collaborating with tertiary platforms to **educate, inspire, drive innovation** and prompt future leaders
4. Focus on **building capability and capacity**
5. Integrating **embodied carbon in strong policies** including as a key measure for existing and emerging infrastructure

Topic 2: Operations and management

Effective climate action and decarbonisation requires significant changes to private and public sector strategies to ensure equity and minimise disruption.



Current

With energy efficiency measures, renewable energy integration, increase in green building certifications and resource management, Australia has significantly reduced the carbon intensity in operating infrastructure. However, fully decarbonising operations and management will require uplift in initiatives including implementing the following:

1. **Utilising data from various sources** (eg satellites) to analyse, value or monitor for factors including energy use, carbon trading value and green credentials
2. Financing and investing in **decarbonisation solutions for operations and management**
3. **Establishing social license strategies** that could assist with procurement and partnering choices
4. Prioritising **knowledge sharing and education**
5. Procuring, investing and **incorporating new renewables**

Future

Initiatives brought to light in the workshop that will be important in decarbonising the operations and management sector include:

1. Integrating **decarbonisation into management policies**, eg. organisational buy-in
2. Reflecting and **shifting measures of prosperity** to include decarbonisation
3. Reviewing and financing appropriate markets or demographics to **assist required growth areas**
4. **Uphold responsibility in operation and management** through CSR, inclusive procurement, and circular economy actions and designs
5. **Establishing certification and validation** to enable transparent progress and accountability
6. **Involving artificial intelligence** in processes or systems

Topic 3: Energy



In recent years, Australia has started transitioning away from coal and gas, implementing renewable generation and storage and more recently establishing strategies for green hydrogen production.

21% of power generated in Victoria comes from renewables, but with an ambitious target of 50% by 2030, significant projects are on the horizon including the Victorian Hydrogen Hub and the soon to be established six new renewable energy zones.

However, Australia continues to face challenges in its decarbonization journey including grid integration of intermittent renewable sources, the need for substantial infrastructure upgrades, and the complex transition from coal-dependent regions.

Overcoming these obstacles requires continued investment in renewable technologies, policy support, and effective collaboration between the government, industry, and communities.

Current

Australia has already begun to decarbonise energy usage through the government's Solar Homes program and electric vehicle subsidies, among other examples. It is making strides to establish renewables targets, develop hydrogen production facilities and deploy community batteries. However, numerous other initiatives the public and private sectors should be implementing have been identified.

1. **Sustainable lending targets** for banks and private financing to assist company transition to net-zero
2. **Increased planning and clear mandates** to fast-track fed/state approvals for renewables projects
3. Further **investment in renewable power generation** and power purchase agreements
4. Natural capital projects to **develop biofuels industry**
5. Local **manufacturing of renewable energy equipment**

Future

Decarbonising the energy sector is achievable but challenging. To drive energy infrastructure decarbonisation, Australia requires:

1. Increasing Government budget to **deploy public funding / grants at the scale** required
2. Building local/**domestic supply chains**
3. Financing towards renewable energy, storage, green hydrogen and carbon capture and storage
4. Stronger **mandates** towards net-zero and greater awareness in society
5. Federal Government to issue a **renewable fuels standard**
6. Putting a **price on carbon**

Topic 4: Waste

In recent decades, waste generation has increased significantly across the world, with little to indicate it will slow down.

By 2050, worldwide municipal solid waste generation is expected to have increased by roughly 70 percent.

With such immense increases in the volume of waste and low recycling rates, Implementing circular economy principles in all supply chains has never been more important.

In Australia, the waste sector is undergoing a seismic shift to reach the government's targets of an 80% recovery rate of waste and 50% reduction in food waste, both by 2030.

However, sustained effort is required to fully decarbonise the waste sector.

In the year to March 2022, waste accounted for 2.7% of Australia's national inventory, with on-land solid waste disposal dominating emissions.

Current

Progress towards reduction and recovering waste are underway in Australia seen with the Nation Waste Policy and action plan as well as the pledge to recycle all plastics by 2040. However, there are substantial actions and solutions that should be implemented across sectors imminently. These were identified in the workshop and are summarised below:

1. **Assimilation of circular economy** practices
2. **Thoroughly understanding end of life considerations**, expanding to thoughtful purchases and recycling to reduce impacts from the fast fashion industry
3. **Invest in emerging technologies like carbon capture and storage** for hard to abate sectors to increase viability
4. **Removing waste through design** and/or designing with recycled materials
5. Incentivising or stipulating **waste management in contracts**

Future

Initiatives that are difficult to establish in the near term but are essential for reducing waste have been summarised and ranked below:

1. **Establishing EOL planning mandates** that also promotes extended design life
2. **Utilisation of digital tools to track materials and components**
3. **Establishing appropriate carbon regulation** through policy and/or funding, e.g. embodied carbon caps, carbon tax or credits
4. Establishing and rolling out appropriate education to sectors and industries on waste management
5. Legislating **zero waste requirements and targets**
6. Incorporating **direct air capture and carbon capture** and storage



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The importance of digital tools

What if we could understand and communicate the carbon impact of our design decisions?

Innovative digital technologies are being implemented across entire supply chains to help reduce the carbon associated with manufacturing through to design and construction.

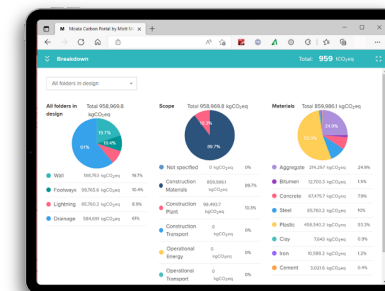
For regulators and investors, it has previously been difficult to identify and understand where carbon intensity is within infrastructure.

As Andrea Gaffney, APNA net-zero lead for Mott MacDonald, states: “As we move toward a net zero future, we need new ways, new tools, new innovations that are going to enable people in the infrastructure ecosystem to understand carbon and to help them on the net zero journey.”

Our digital solutions help identify carbon intensity associated with materials, assets or portfolios and empower decision makers to ask for changes in a design.

Moata Carbon Portal

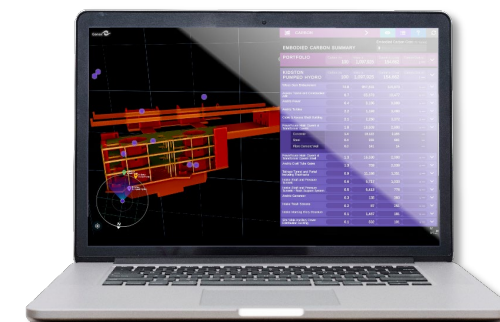
Moata Carbon Portal is an industry-leading carbon monitoring and optioneering tool which is globally compliant with the PAS 2080 certification. Moata Carbon Portal allows detailed embodied carbon accounting and can guide decision-making at all stages of a project.



Moata Carbon Portal

Moata People and Planet

Moata People and Planet enables our clients to understand the impact of infrastructure investments and projects on society and the environment. Using client and open-source data the solution rapidly calculates social and environmental impacts against a variety of frameworks.



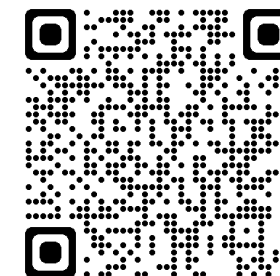
Carbon Twin of Kidston Pumped Hydro Storage

Dashboards

Moata capabilities can be effectively integrated into dashboards to visualise the quantification of carbon and empower decision-makers at multiple organisational levels to mitigate emissions through design choices.

Carbon Twin

Carbon Twin is our interactive tool enabling better understanding of carbon impacts and improving net-zero decision-making on assets and across portfolios. Combining embodied carbon data with carbon pricing and 3D models, Carbon Twin empowers leaders and investors to visualise the hidden carbon to drive positive interventions to reduce carbon.



To find out more, watch our video



Case studies

Examples of projects successfully
tackling embodied carbon.



Heathrow airport

Carbon reduction plan

Over the past 10+ years, Mott MacDonald has performed a wide range of lead consultant roles for Heathrow Airport Limited – from master planning, through to design and programme management.

Our engagement

As part of our ongoing engagement, we have begun work with Heathrow Airport in London, UK, to help deliver its carbon reduction targets. The work is a core part of the airport's capital development programme for the current five-year regulatory period (H7), which runs from 2022 to 2026.

As programme designers for the H7 Carbon and Sustainability Programme, we will work with Heathrow Airport to plan and design projects that will reduce its carbon footprint by 2.3M tonnes by the end of H7 in 2026 and lay the foundation for the airport to achieve net-zero by 2050.

Tackling a complex challenge

The decarbonisation of aviation is recognised as one of society's most complex challenges. It requires a truly multi-disciplinary solution, drawing on expertise from aviation, wider transportation and energy sectors. It also encompasses airport operations, surface access, future fuels, energy transition, operational and embodied carbon, nature-based solutions and behavioural change, as well as data, digital and smart systems.

Working together to make a difference

Heathrow have not only set an ambitious net zero strategy but, the programme will make Heathrow an industry leader for carbon reduction, with science-based reduction targets, playing its part in the national drive to attain net-zero by 2050.

As their advisor we look forward to working with Heathrow and their H7 ecosystem to share best practice as we design, manage and integrate their decarbonisation programme in the years ahead.

Read our press release: [Heathrow Airport carbon reduction programme](#)



Watercare carbon baseline

Capital carbon reduction

Opportunity

In 2019, Watercare in New Zealand commenced a pioneering journey to reduce capital carbon in their infrastructure delivery programme by 40% over five years, which ended up spanning nine years due to project lengths.

Solution

Projects, ranging from treatment works to pipelines, were scoped based on business-as-usual construction practices. Many of them were in early planning stages with minimal information.

Our project team worked closely with Watercare project managers to scope the projects. Each was broken down into individual assets which were then matched with our vast library of carbon models to produce a figure for total embodied carbon.

Carbon models were developed to reflect New Zealand and Watercare design standards, with local carbon emission factors built in. Our global specialists worked with Watercare staff to transfer carbon management strategies and knowledge, and held local workshops to inform other New Zealand clients.

Outcome

We assisted Watercare with the first programme-wide carbon baseline in Australasia. Together, we developed methods to mobilise Watercare's supply chain to deliver their goal of 40% reduction in capital carbon by 2024, in line with New Zealand's aim to become carbon zero by 2050.

What next

Mott MacDonald Australia intends to host this event annually, and we will be following up with industry partners to drive the outcomes of the workshop forward.

Tackling the causes and effects of
climate change. **Together.**