WWF

REPORT

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THE TIME IS NOW:
TACKLING EMBODIED CARBON IN THE BUILDING AND CONSTRUCTION SECTOR

This work is proudly funded by the NSW Government

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WWF-Australia acknowledges the Traditional Custodians of Country throughout Australia and their continuing connection to land, water and culture. We pay our respects to their Elders - past, present and emerging.

WWF is one of the world's largest and most experienced independent conservation organisations, with over five million supporters and a global network active in more than 100 countries.

WWF's mission is to stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature, by conserving the world's biological diversity, ensuring that the use of renewable natural resources is sustainable, and promoting the reduction of pollution and wasteful consumption.

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Foreword

Wherever they operate, businesses have an impact on the environment. As our natural resources continue to diminish and our carbon emissions climb, we are learning that many traditional production practices are not sustainable, and often contribute to global environmental challenges. For over 40 years, the World Wide Fund for Nature (WWF) in Australia has worked in partnership with businesses and industry organisations to reach solutions that work for business, the environment and the community. As with any relationship, we do not always agree with our partners. However, working with openness, using evidence to inform decisions, and by sharing a sense of mutual purpose, we are able to achieve great things for the future. Since 2018 , WWF-Australia has worked successfully to support business and organisations through the purchase of large-scale off-site renewable energy through our Business Renewables Centre-Australia (BRC Australia). And we are also instrumental in helping companies set science-based emission reduction targets for direct business emissions (Scope 1 and 2) and value chain (Scope 3) emissions.

2020 is a different year. The world is facing a once-in-a-lifetime challenge as we start to rebuild the economy from COVID-19. It could also be Australia's once-in-a-lifetime opportunity to bring manufacturing back to our shores, grow existing industries, unlock new industries and boost global exports as we also move towards a zero carbon future. We could emerge from this crisis as a renewable energy powerhouse in a post-COVID world including reimagining how we manufacture low and zero carbon products. Recognising the growing demand for lower-carbon materials worldwide, WWF-Australia is keen to explore the intervention points to drive the transformation of the building and construction materials industry in NSW, to move Australia towards a zero-carbon economy and position Australia in the top five zero-carbon materials suppliers.

The built environment sector is responsible for one quarter of Australia's emissions. The steel and cement industries each represent about 7% of global emissions. Reducing the emissions intensity of those sectors will be fundamental to achieving a zero carbon economy. Bringing different sectors together and gaining a better understanding of barriers to uptake will be vital to moving ahead. Supported by the NSW Government, WWF-Australia is bringing together various conversations across the building and construction sector to help accelerate this shift.

We have undertaken desktop research, including interviews with key players. This report will go towards shaping our first high-level industry event with participants across the supply chains, which will then develop into a plan of action that defines roles for government, industry and consumers to play.

Fundamentally, there is no single solution or intervention point. This requires a systemic view of the barriers, and therefore the opportunities for intervention. Transformational change is needed, with leadership at all levels, and decisions driven by the need to decarbonise at a rapid rate to keep warming at 1.5°C and ensure the achievement of the Sustainable Development Goals. In particular, SDG number 17, which seeks to strengthen global partnerships and bring together national governments, the international community, civil society, the private sector and other actors, will be fundamental to this being successful.

Executive Summary And Recommendations

The NSW Government has aligned itself to the Paris Agreement to deliver a net zero carbon society by 2050. They have released their Net Zero Plan Stage 1 2020-2030 program earlier in the year as an early step towards supporting the reduction of embodied carbon in the building and construction sector. This plan does come with both opportunities and challenges, and will require collaboration across all parts of industry and government. Taking a science and research-based approach, WWF interviewed over 30 professionals across different parts of the industry supply chain. These are our insights from the interviews.

There is a clear role that **governments at all levels can play to create critical demand for low- and zero-carbon construction materials.** As the largest procurer of building and construction projects in the state, the NSW Government has sufficient buying power to strongly influence the direction of the market to purchase more low-emissions building materials. In particular, the industry leaders we interviewed encouraged the government to send the right signals to the market by committing to specific targets for net zero materials as an explicit subset of the Net Zero Plan, starting with identifying the priority materials and a trajectory to net zero for each material, while still allowing for necessary competition between materials.

The **four roles for government action** are: a) procurement, b) policy and regulation, c) planning, and d) whole-of-government coordination.

We heard from our interviewees that there are multiple levers that need to be moved at once, that state governments are well-positioned to lead a broad transition, and that "both positive regulation and government procurement signals are needed".

An **"Impact Procurement"** approach - where anchor customers buy strategically and at scale as a precursor to switching to low-carbon materials in the near future - was welcomed by many of our interviewees as a way of transforming local supply chains. An Impact Procurement approach would also be a significant change to current procurement practices, which are reportedly based almost entirely on price (time-cost-quality is the current paradigm) with innovation not rewarded and actively discouraged. A concept that was supported by many interviewees was an alliance of buyers, an impartial body that can support, advise, and connect aligned parties on the path to decarbonisation. To this end, we propose the establishment of a ***Buyers Alliance for Reducing Embodied Carbon in Construction***. The scope of such an Alliance would be in three key areas: a) aggregation of demand and supply; b) knowledge sharing; and c) pre-competitive collaboration across industries.

Design optimisation was raised by the interviewees in the developer, contractor and customer parts of the sector ecosystem as having significant potential to reduce embodied emissions by designing-out unnecessary materials, operational emissions and unnecessary energy load. **Making every decision count towards a zero-carbon future** using thoughtful design processes could yield considerable benefits.

Interviewees emphasised the importance of **not locking ourselves into incumbent materials in the design process.** Rather, we should first consider the functions of materials required in construction projects, and then think afresh about the best materials to achieve those functions. Such an approach to buildings might look at, for example: structure, envelope, building operating systems (heating, cooling, lighting, lifts, fire systems), and finishes rather than starting with the materials (such as steel, concrete and aluminium).

Nonetheless, some interviewees were concerned that leaving it to customers alone to request these lower/zero carbon materials would not drive sufficient change. They indicated that we need both customer pressure and industry

transition plans for each material. Customer pressure can be effective where industry action does not keep pace with the urgency of the challenge, and a **Buyers Alliance** could assist in giving voice to this urgency.

Manufacturing solutions exist, to varying degrees, for steel, concrete, and aluminium. The report goes into greater detail on **concrete, steel, aluminium and substitute materials such as cross-laminated timber.**

However, **innovation** also has a major role to play, especially as we move from low-carbon to zero-carbon materials. There are many opportunities to reduce the embodied carbon incrementally, but for some materials, once early gains have been made, innovation is needed to either find alternative processes to cut emissions further, or to find zero-carbon alternatives to replace the conventional materials. From this perspective, there is a need to leapfrog pilot trials to "deep demonstrations".

While Australian innovation in low-carbon materials is strong, this innovation is not translating into large-scale use in construction projects due to the barriers identified. However, with the right kind of partnership and support, we could leverage this opportunity to build a low-carbon materials industry in Australia. Thoughtful procurement can drive the process and build resilient, local supply chains that add value to Australian primary resources and lessen our dependence on imported materials.

Green hydrogen has been spoken about as a solution to decarbonise manufacturing, such as in the case of steel. However, hydrogen electrolysis at the required scale is still some years away. Rather, an opportunity that exists now, that can be realised with government leadership, is to work towards an industrial cluster, say in the Hunter region, that could provide multiple options for transitioning local manufacturers towards a **zero-carbon industry precinct.** An ARENA-funded or similar feasibility study was suggested as a reasonable next step.

Private capital is one of the drivers for decarbonisation in the construction sector ecosystem. Parts of the finance sector are actively seeking investments that reduce their climate risk exposure in line with the Paris Agreement commitments. This includes physical, transition, and liability climate change risks. As developers start to understand the benefit of attracting carbon-conscious capital, they will in turn seek suppliers that can offer lower- or zero-carbon materials. To appeal to private sector investors, these projects need lower risk profiles through reduced interest rates and longer loan terms, perhaps underwritten by governments, for example through state treasuries or the Clean Energy Finance Corporation. **A Facility for Reducing Embodied Carbon** could finance projects across a number of industry sectors including industrial decarbonisation while at the same time stimulating local job creation.

Recommendations:

1. There is no one single intervention. The most significant shift will require addressing a number of the barriers and collaborating to achieve real and lasting change - a systems-led approach across the entire building and construction sector *ecosystem* will provide the best chance of success. Government and industry leadership will both play a fundamental role in setting expectations that every decision should count towards achieving a zero-carbon future, and this needs to be encouraged and rewarded.
2. The strongest theme in our research was that government procurement is a key lever for change, particularly in infrastructure projects. NSW Government leadership on procurement for contracts that goes beyond traditional time, cost, and quality is needed.

3. Private sector developers and constructors are willing to step up and deliver low-emissions building materials but need collaboration to drive the change all across the supply chain. Collaboration between and across industry sectors and government will be the key to success through an alliance or partnership approach. A **Buyers Alliance for Reducing Embodied Carbon in Construction** would have three key roles, namely: a) aggregation of demand and supply through 'anchor customers'; b) knowledge sharing across industry sectors; and c) collaboration between industry sectors.
4. Construction contracts that require and specify lower- and zero-carbon products with voluntary targets are considered global best practice and should be actively encouraged and duly rewarded by the Infrastructure Sustainability Council of Australia (ISCA), Green Building Council of Australia(GBCA)'s Green Star rating system and other mechanisms.
5. There is a need to actively embed low- and zero-emissions material building standards into the National Construction Code, as well as existing and new rating systems.
6. Innovation across materials and industries can drive change, including systems thinking from the design and conception stage, and building resilient and local supply chains to reduce our dependence on imported materials. A Hunter Valley industrial precinct cluster with "deep demonstration" projects could provide multiple opportunities for local manufacturing of zero carbon building materials. A feasibility study could be investigated with support from industry and government.
7. Investors are increasingly concerned about their climate risk exposure in line with the Paris Agreement's commitments to net zero by 2050. Consideration could be given to a Facility for Reducing Embodied Carbon underwritten by governments either through state treasury and/or the Clean Energy Finance Corporation to help finance decarbonisation projects across a number of industry sectors.