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Polar Enviro is focused on sustainability and safety. It is a private, Victorian-based, family-owned company that supports local jobs and manufacturing.

We are focused on decarbonising the built environment, growing the circular economy and helping more people get home safely from work, rest or play.

The Polar Enviro family of brands includes Smarterlite, Safety Path, OmniGrip Direct and Vivacity, established for more than 20 years. Our Executive Chairman, Gus Carfi, has significant industry experience in sustainability with 30-years at Visy, including 10 years as Chief Operating Officer, where he was closely involved in its adoption of recycled materials and improving its energy efficiency.

Polar Enviro's brands are pioneers in reducing demand for materials, extending lifecycles and using recycled materials to outperform products made from virgin materials.

Our response is structured in accordance with the Productivity Commission's information requests. We provide examples of where circular economy products will make a strong contribution to national productivity, but are being delayed through institutional inertia, resistance from existing non-circular economy businesses and organisations, and legacy regulations and processes that stifle innovation. We recommend changes that will enhance the value of the circular economy and delivery of Government policy objectives.

Summary of Recommendations:

Full recommendations are detailed in each Section.

- Switching to NCC-compliant photoluminescent exit signs will reduce e-waste and other waste, reduce costs, reduce energy use, reduce emissions and improve the labour efficiency of highly-skilled electricians, for which there is a national shortage. This will make a positive contribution to national, state and territory targets relating to the circular economy, reducing government and business costs, reducing emissions and addressing national skills shortages.
- Mandate Photoluminescent Exit Signs in all Government buildings to reduce energy use, reduce emissions, reduce costs and reduce eWaste.
- Review Federal and State energy-efficiency schemes to eliminate barriers to no and low-powered technologies distributed across many sites.
- Mandating the use of Australian coloured crushed recycled-glass in safety surfaces on roads and paths, to reduce recurring maintenance costs and replacement costs (lifecycle costs) and improve the safety of infrastructure. Microplastic paint and plastics pollution will be reduced. This will make a positive contribution to national, state and territory targets relating to the circular economy and the environment, reducing government and business costs, and improve road safety.
- Mandate low-carbon infrastructure in Government infrastructure procurement.

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- Establish a national Local Content and Sustainability Supply Register (LCSSR) to facilitate circular economy and sovereign manufacturing capability within Australia.
- Mandate recycled content in all elements of Government projects, and require a public register of non-recycled content across all aspects of a project as decisions are made.
- Mandate lifecycle costing in all Government procurement to deliver savings to Government and taxpayers.
- Mandate EPD's for Government procurement, initially in the Construction and Building Sectors.
- Introduce a Government register of EPD's, or facilitate new private EPD registers.
- Accelerate the supply of independent verifiers of EPD's to enable industry growth.
- Restructure Australian Standards so that separate technology specific content is in Standards and generic design information is in the National Construction Code.
- Reform the inclusion of industry associations in the development of Australian Standards, so that Australian Standards reflect the NCC and are appropriately technology-agnostic, and industry associations cannot block or inhibit innovations and technologies from other sectors.
- Reform regulatory processes and guidelines to ensure they are technology-agnostic, to enable innovations and circular economy products to more easily enter markets.
- Specify NCC compliance, which is comparatively technology-agnostic, rather than Australian Standards in Government procurement, so that Government is not locked into one specific technology such as the use of old-tech Electric-Battery Exit Signs when Photoluminescent Exit Signs are NCC compliant.
- Regulations should permit interchangeability of NCC compliant technologies, to increase competition, accelerate the adoption of new circular economy technologies and reduce unnecessary paperwork. State regulations should reflect this efficiency to accelerate the adoption of improvements in the NCC.
- Update the national training curriculum after every change to the NCC to ensure practitioners are trained in the updated requirements, which will accelerate the uptake of the improvements in the NCC. This will accelerate the uptake of circular economy and energy efficiency reforms within the building sector.

1. Circular economy success stories and measures of success

The PC is seeking views and information on the following.

Australian case studies of circular economy activities already occurring, which may involve narrowing loops (e.g. reducing the demand for materials) closing loops (e.g. using materials multiple times) slowing loops (e.g. extending useful product life) or regenerating (e.g. using non-toxic materials and regenerating ecosystems). Information would be particularly welcome on:

- how these activities affected business and economic outcomes (including costs), environmental outcomes (including waste and pollution) and social outcomes
- levels of uptake
- reasons why businesses, consumers and communities adopted circular economy activities
- the effectiveness and costs of these activities (such as from project evaluations, participant surveys).

Australia's overall potential to move to a more circular economy, as well as how best to monitor progress and measure success.

1.1 Reducing the demand for materials and extending product lifecycles

Smarterlite and OmniGrip Direct are both brands that focus on reducing waste by improving long-life cycle products.

Battery-free Exit Signs that use photoluminescent technology are a National Construction Code (NCC) compliant technology that uses little to no power, eliminates battery waste and reduces overall waste and Scope 3 emissions for organisations. Smarterlite's Photoluminescent Environmental Exit Signs are used by some of Australia's leading brands and large organisations, with interest increasing as organisations become more focused on sustainability and cost-control, particularly with the mandatory reporting of emissions. Moreover, the early adopting organisations are first movers with a focus on the lifecycle of products.

Photoluminescent Exit Sign technology is significantly more reliable, with a lifecycle of at least 16 years or 30+ years depending on the model. It is less wasteful than powered old-technology Electric-Battery Exit Sign technology that can have a life as short as two years.

Old-tech Battery-powered Exit Signs are the incumbent technology, with tens of millions installed across Australia. However, batteries and their charging circuits are the primary cause of failure of powered Electric-Battery Exit Signs, and batteries are often excluded from product warranties. With no standard design for batteries, and no requirement for their easy replacement, **whole Exit Signs are thrown away when a battery fails**. In contrast, in the case of unpowered Battery-free Exit Signs, Smarterlite's Photoluminescent Environmental Exit Signs only need their photoluminescent wafer to be replaced after 30 years, which the repairable design allows to be easily done on site.

The replacement of failed old-tech powered Electric-Battery Exit Signs requires licensed electricians. Replacing failed Exit Signs increases costs to businesses and can disrupt operations while it occurs – for example, in warehouses areas have to be closed off while an elevated work platform is used to swap the sign over. To manage risks, healthcare facilities, schools and childcare centres may not allow electricians to enter and conduct work during business hours. Moreover, there is also an even greater safety issue that arises should failed signs not be replaced.

Example case studies of organisations that have switched to Battery-free Exit Signs are available from our websites, documenting those organisation's reductions in battery eWaste and their reduced emissions from the installation of Smarterlite Environmental Exit Signs:

Bunnings - <https://polarenviro.com.au/case-studies/bunnings/>

Harvey Norman - <https://polarenviro.com.au/case-studies/harvey-norman/>

Despite the issues with powered Electric-Battery Exit Signs, there is strong institutional bias against Photoluminescent Exit Signs because there is an established ecosystem of organisations that profit from the supply, inspection and replacement of failed powered Electric-Battery Exit Signs. The actors within that ecosystem work to discredit Exit Signs that use photoluminescent technology, despite Photoluminescent Exit Signs being approved by the Australian Building Codes Board for inclusion in the NCC from 2014, and are part of a global movement.

There are significant benefits for Australia if it was to streamline the changeover of old-tech Electric-Battery Exit Signs to Exit Signs that use photoluminescent technology. In addition to reducing the use of power and reducing emissions, there would be;

- Reduced demand on qualified electricians inspecting exit signs to identify failures
- Less eWaste and less risk of battery fires
- Less plastic waste
- Reduced costs to businesses
- Opportunity for skilled electrical labour to be diverted to higher value activities.

In July 2024, Safe Work Australia reported¹ that there is a 'persistent shortage of electricians in our labour market'; hence shifting to more reliable technology that generates less waste can help address the national skills shortage.

By using **Smarterlite Environmental Exit Signs**;

Bunnings has eliminated an estimated 2,617 kg of eWaste each year, including eliminating 3,521 batteries from landfill.

Harvey Norman will save at least 361kg of eWaste from one of its centres, over the next 16+ years, in addition to 315,000 kg of carbon emissions.

Telstra is in the process of saving more than 47,500 kg of eWaste, and 5,218,000 kg of carbon emissions.

RECOMMENDATION:

- Switching to NCC-compliant photoluminescent exit signs will reduce e-waste and other waste, reduce costs, reduce energy use, reduce emissions and improve the labour efficiency of highly-skilled electricians, for which there is a national shortage. This will make a positive contribution to national, state and territory targets relating to the circular economy, reducing government and business costs, reducing emissions and addressing national skills shortages.

1.2 Using recycled materials in place of virgin materials

Another example is the use of crushed Australian recycled-glass to provide recycled skid-resistant texture within coloured surfaces on roads and paths, instead of short-lived paint industry products.

There are strict specifications around what is called a Coloured Surface Treatment on Australian roads; i.e. where road surfaces are coloured for use as bike lanes, bus lanes and pedestrian crossings. Being used on roads, coloured surfaces have to meet requirements for skid and slip-resistance, and resistance to wear, so that the colouring doesn't increase the risk of crashes by making the road more slippery. The surface has to be highly wear-resistant to retain its functionality and reduce worn materials from being washed into drains or blown away as dust. Specifications require that Coloured Surface Treatments can demonstrate they **stay compliant for at least five years** on arterial roads.

However, enforcement varies across road agencies and local governments. There are national and state-based specifications with minimum requirements, but they are not followed or enforced within every jurisdiction. Consequently, short-lived non-compliant (or untested) products get used, or approved products are used but applied incorrectly, to reduce the contractor's costs.

¹ Safe Work Australia (July 2024), WHS Trade Profile – Electricians, accessed 26 September 2024 at https://data.safeworkaustralia.gov.au/sites/default/files/2024-07/Electricians_trade_profile-Jul2024.pdf

OmniGrip Direct manufactures and applies a compliant coloured surface treatment, using coloured 1-3mm crushed Australian recycled-glass. Each square metre uses Australian recycled-glass, equivalent to the amount of glass within 35 beer bottles.

As required by specifications, five-year-old OmniGrip Direct surface applications have been tested by the Australian Road Research Board (now NTRO) and the CSIRO and found to be compliant with Victoria and Queensland's standard specifications, which are consistent with or more demanding than those in other States and Territories. Following independent certification, the Queensland Government awarded its largest ever contract for coloured surface treatments to OmniGrip Direct, to apply its crushed recycled glass OmniGrip CST to replace paint industry products on its roads. The delivery program is well underway at present.

Increasing the use of durable Australian recycled-glass with long-life binders in coloured surface treatments reduces the use of short-lived paint industry products, reduces microplastic pollution and ensures road users have safe and compliant products for longer. This delivers community safety and environment benefits. With less being spent on renewing faded and worn coloured surface treatments, more of the maintenance budget would be available for other maintenance purposes. With cash-strapped Councils not being able to use Federal and State grants for maintenance, using long-life products reduces lifecycle costs and the burden of maintenance and renewal.

RECOMMENDATION:

- Mandating the use of Australian coloured crushed recycled-glass in safety surfaces on roads and paths, to reduce recurring maintenance costs and replacement costs (lifecycle costs) and improve the safety of infrastructure. Microplastic paint and plastics pollution will be reduced. This will make a positive contribution to national, state and territory targets relating to the circular economy and the environment, reducing government and business costs, and improve road safety.

2. Opportunities to progress the circular economy

The PC is seeking views and information on the following.

Opportunities in Australia to improve environmental and economic outcomes through greater adoption of circular economy activities. These may relate to sectors, products or supply chain segments, and involve narrowing loops (e.g. reducing the demand for materials), closing loops (e.g. using materials multiple times), slowing loops (e.g. extending useful product life) or regenerating (e.g. using non-toxic materials and regenerating ecosystems). Information would be particularly welcome on:

- **how these opportunities could affect business and economic outcomes (including costs), environmental outcomes (including biodiversity, climate and water, land and air quality), and social outcomes**
- **feasible levels of future uptake or adoption in Australia**
- **how their effects could best be monitored or measured, and how opportunities could be prioritised**
- **how Aboriginal and Torres Strait Islander knowledges could be valued, in ways that protect Indigenous cultural and intellectual property, to identify and develop these opportunities.**

Analysis of which circular opportunities provide the greatest scope to improve environmental and economic outcomes in Australia and why, including information on:

- **metrics used to inform this analysis**
- **modelling or analysis relating to the potential benefits and costs of implementing specific circular economy opportunities at the sector, product or supply chain**

segment level (including, but not limited to, life cycle assessments or cost-benefit assessments)

- **the distribution of benefits and costs, and whether they will occur in the short, medium or long term.**

Information on specific opportunities and risks for Australia resulting from international developments, including circular economy policy. These may include developments that:

- **affect Australian exports, such as by opening or creating new markets, or by placing regulatory requirements on the design and production processes of Australian exports**
- **affect Australian imports, such as changes to production methods internationally, or developments in international markets**
- **innovative processes that could be adopted in Australia.**

2.1 Using Recycled Materials in Road Infrastructure

The roads sector is a significant user of recycled materials, particularly within road pavements and road surfacing. This has the benefit of reducing Australia's consumption of finite natural materials. However, there is much more that can be done in the roads sector that will not only lead to an increased use of recycled material but also improve safety for road users. We expand on this through our submission.

Sustainability Victoria provided grant funding to the National Transport Research Organisation and Australian company OmniGrip Direct to develop a new road safety High Friction Surface Treatment incorporating Crushed Recycled Glass. This is a useful demonstration of where appropriate government funding can lead to improved safety and recycling outcomes using recycled materials.

A benefit of the new recycled surface is that it uses glass diverted from kerbside recycling schemes, requiring less energy-intensive processing than turning waste glass into sand to use in road pavements and other construction activities.

OmniGrip Hybrid HF is a skid and slip-resistant High Friction Surface Treatment for roads, made from a blend comprising Australian 1-3mm crushed post-consumer recycled-glass.

It was developed with grant funding from Sustainability Victoria, with research and testing by the Australian Road Research Board (now National Transport Research Organisation), to exceed the minimum requirements for a High Friction Surface Treatment used by Victoria's Department of Transport & Planning.

Within the road safety sector, traditional road safety solutions often focus on short-term safety fixes that lead to higher maintenance and replacement costs over time. This is challenging for the Government to maintain, adding to a growing maintenance backlog as road and road safety infrastructure ages. These short-term approaches are not only economically inefficient but also suboptimal in terms of safety outcomes if governments can't afford to maintain their safety infrastructure. It is particularly important for local governments, who can obtain State and Federal Government grants for capital expenditure but none for infrastructure maintenance. By using lifecycle costing and selecting long-life, low maintenance, products, this becomes an avoidable cost to government and the community.

An illustration of the problems that arise when maintenance is not fully considered is Victoria's road safety barrier program. Victoria's Auditor General's scrutiny of Victoria's road safety barrier program found over-estimates of benefits used to justify the program, very high maintenance costs and long delays in repairs. During the period a road safety barrier is damaged, it cannot provide the community safety benefit it is intended to provide. In the period examined, the best average repair time was 30

days. Anecdotally, one local government has advised Polar Enviro that it is more like 90 days when on local roads.

A comprehensive research study by the US Federal Highway Administration found that High Friction Surfaces are highly effective² at reducing crashes on bends and ramps – places where barriers are typically installed. The study found statistically significant decreases in crashes, and high benefit-cost ratios. We believe High Friction Surface Treatment should be a regular part of any road safety program because of its proven effectiveness at reducing crashes, as well as reducing the severity of crashes. Barriers don't prevent crashes – they only reduce the severity of crashes that have occurred.

With the development of a High Friction Surface Treatment that is 60% Australian crushed recycled glass and demonstrates compliance with State specifications, statistically sound crash reduction factors by an independent and internationally respected organisation showing effectiveness at reducing crashes, and no additional maintenance costs, OmniGrip Direct's Hybrid High Friction Surface Treatment should be a priority for use on Victoria's roads. But recycled content and circularity are not factored into road safety evaluations despite billions of dollars of government spending each year.

From 2024, the Australian Government is spending \$150m per annum on fixing Blackspots and the Roads to Recovery Program will spend \$1 billion per annum from 2027/28.

The adoption of life-cycle costing is needed in road safety investments, to truly understand the costs of decisions and to compare options. With multiple technologies and methods available to save lives, in many cases with similar effectiveness at reducing crashes, injuries and deaths, lifecycle costing, carbon reduction and a circular economy should be part of the decision-making process.

A more holistic approach, considering material choices, lifecycle costs and Environmental Product Declarations, would mean that road safety investments could contribute to progress towards a circular economy without compromising safety. In many cases road safety may be improved due to the products being less susceptible to failure. We expand on this later in our submission.

RECOMMENDATION

- Adopt lifecycle costing in all Government procurement (National, State/Territory and Local Government) irrespective of the portfolio.

2.2 Reducing Waste and Scope 3 emissions from Low-Value Items in Built Infrastructure

Many Government and corporate purchases are of low-value items, when considered individually. Looking at the individual item, small costs, impacts and savings are ignored. But collectively, their consumption costs organisations tens of millions of dollars and generates significant waste. In many ways it could be considered that Governments are some of the biggest investors in failure, and this has implications not only for their operational expenditure budgets but also for the environment.

For example, with Exit Signs being mandatory in buildings and costing from \$100 to \$500 each, their impact is often missed. How can one Exit Sign make a measurable difference to corporate sustainability?

² Effectiveness, in this instance, is determined from using a statistically sound Crash Reduction Factor (CRF). The CRF for calcined bauxite high friction surfaces is 83% for wet-road crashes and 57% for total crashes on road curves. On ramps, it is 92% for wet-weather crashes. OmniGrip Direct's recycled high friction surface should be similarly effective based upon its development program by the Australian Road Research Board.

Every powered Electric-Battery Exit Sign in Australia consumes power 24/7. A charged Electric-Battery provides power in an emergency if the mains power is disconnected. Depending on quality, the life of an Electric Battery powered Exit Sign is 2-5 years. Data collected by Smarterlite from its customers has found that 20-25% of Exit Signs fail their six-monthly inspection and are replaced.

When a powered Electric-Battery Exit Sign fails its test, industry standard practice is for the whole sign to be discarded in regular waste - including its batteries. Only about 5% end up in the government subsidised industry recycling scheme, Exitcycle.³

The scale of the problem is that there are estimated to be tens of millions, if not hundreds of millions, of Exit Signs in Australia. Major corporates, with multiple sites, can have 10-20,000 Exit Signs. Collectively the energy consumed, waste generated and inefficiency of constant replacements is a significant cost to their businesses, the environment and the community. Exit Signs are a significant contributor to every large organisation's Scope 3 emissions because of the waste generated and transport emissions associated with replacing every failed Exit Sign. The transport emissions are those of the replacement product, as well as the electrician replacing the sign and the disposal of the failed sign.

We estimate that if Australia's 100 million old-technology Electric-Battery Exit Signs were replaced with Photoluminescent Exit Signs;

- 500 MW of power would be saved (equivalent to a power plant in the grid), or,
- In terms of reduced carbon emissions, it would be equivalent to removing 1.6 million cars off Australia's roads (ie 4 million tonnes of carbon saved per year)
- \$900 million per year of savings!

The more reliable, battery-free, Exit Signs that enabled by Australia's National Construction Code (NCC) are battery-free Exit Signs using photoluminescent technology. Smarterlite manufactures battery-free Exit Signs with a 16 to 30+ year life, reducing (or eliminating with some models) emissions from the operation of the signs, as well as their plastic and battery eWaste, and the transport emissions from replacing failed signs.

However, the traditional Electric-Battery Exit Sign industry has run a misinformation campaign discouraging their use because too many people make money from removing failed Exit Signs, and selling and installing new Exit Signs. Failure generates repeat business for the Electric-Battery Exit Sign industry. It is ironic that the industry that benefits from having more exit signs and emergency lights is the one that writes and maintains the standard for how many should be in a building, how often they must be inspected and how quickly they must be replaced.

It is only with increased awareness of the high operational costs and the environmental impacts of traditional Electric-Battery Exit Signs that this is turning around. An Australian Government department has installed thousands of Smarterlite's Environmental Exit Signs across its NSW sites, Telstra is retrofitting its buildings, Bunnings includes them in new stores, facility managers for inner-city apartment buildings are converting their signs in common areas to reduce costs, and retail asset owners like Harvey Norman and other owners of major and local shopping centres are converting their centres and showrooms.

The Smarterlite Exit Sign is included in the Victorian Energy Upgrade Program and NSW Energy Saving Scheme. However, the unwieldy structure of the programs makes it difficult for a building owner to only upgrade their Exit Signs, with the costs of compliance outweighing any financial incentive for the owner of the asset. A factor is that the schemes are on a 'per-building' basis, rather

³ Goodman, M (2024), 'Illuminating the path to sustainability', presented by Michael Goodman at 2024 IHEA National Conference and published in Health Facilities, Vol 50, No. 2 Winter 2024, pp29-35.

than a portfolio basis, requiring separate applications for each building (or land title) rather than one application for a complete portfolio of Exit Signs controlled by an organisation across a large number of sites.

If Photoluminescent Exit Signs were used to replace traditional battery-powered ones, significant environmental and cost savings would be achieved over the 16 to 30 year service lives of the different types of Photoluminescent Exit Signs. Battery waste would be eliminated, no or less eWaste produced, and electrical trades would be freed up for higher-value activities than replacing failed Electric-Battery Exit Signs. The world's scarce battery resources could be diverted to more productive and higher value applications.

There is no limit to using Photoluminescent Exit Signs to replace powered Electric-Battery Exit Signs, particularly if regulatory reform is achieved, regulations allow NCC compliant technology to be used interchangeably, and Australian Standards development and maintenance process made competitively neutral.

RECOMMENDATIONS

- Mandate Photoluminescent Exit Signs in all Government buildings to reduce energy use, reduce emissions, reduce costs and reduce eWaste
- Review Federal and State energy-efficiency schemes to eliminate barriers to no and low-powered technologies distributed across many sites
- Reform the inclusion of industry associations in the development of Australian Standards, so that Australian Standards reflect the NCC and are appropriately technology-agnostic, and industry associations cannot block or inhibit innovations and technologies from other sectors.

2.3 Enhancing Resource Efficiency through Life-Cycle Costing

Lifecycle costing (LCC) is an approach that considers the total cost of ownership of an asset over its lifetime, including initial costs, maintenance, and disposal.

LCC is particularly relevant in the context of sustainability, as it encourages decision-makers to consider long-term costs and benefits rather than focusing solely on upfront expenses.

By integrating LCC into procurement practices, governments can ensure that the full economic, environmental, and social costs of infrastructure projects are accounted for, leading to more sustainable and cost-effective outcomes.

Resource efficiency is an economic concept that focuses on optimising the use of natural resources to achieve the maximum possible output while minimising waste and environmental impact. This principle is closely related to LCC.

As explained earlier in this submission, powered Electric-Battery Exit Signs are resource-inefficient due to their reliance on short-lived batteries and charging circuits. Industry practice is to replace whole signs, generating significant eWaste and emissions. The production and disposal of these batteries involve resource-intensive processes, including the extraction of virgin raw materials, energy use in disposal as well as manufacturing replacements, and emissions.

These inefficiencies are not only environmentally damaging but also economically costly.

Smarterlite's Photoluminescent Environmental Exit Sign is more resource efficient. By eliminating the need for batteries and depending on the model, having a service life of 16 to 30 years, Smarterlite significantly reduces the resource inputs and waste outputs associated with the Electric-Battery Exit Sign industry.

Contributing to the environmental impact of powered Electric-Battery Exit Signs is the travel required to replace every failed sign. If one sign fails, an electrician travels to a wholesaler to purchase a new sign, then to a site to install the new sign. If it is to be correctly recycled, they then travel to one of the few disposal points in the Exitcycle recycling scheme – but more likely they throw it in their depot skip bin or their client's waste.

This leads to significant threats to the environment, as well as the viability of the waste and recycling sector due to the risk of battery fires. It directly contravenes bans on eWaste in landfills in place in the majority of Australian States and Territories.

The Smarterlite Photoluminescent Environmental Exit Signs don't have batteries to fail and be replaced, has simple maintenance requirements, and enables the reuse or recycling of components. They eliminate batteries and their associated charging circuits, reducing failure rates and reducing the extraction and consumption of virgin raw materials required to replace failed signs.

2.4 Life-Cycle Costing and Environmental Product Declarations

The logical extension of the introduction of Life Cycle Analysis to procurement decision making is mandating Environmental Product Declarations for all products over a set value. Procurement processes should favourably score products that have the lowest environmental impact based upon the EPD. Using EPD's also enables the cumulative impact of multiple purchasing decisions to be assessed; for example, by examining the carbon embedded in a building by compiling the data from the EPD's for each component.

EPD's are produced in Australia, for some common construction materials and architectural fittings. Australia can easily follow the European lead by mandating their use for the construction sector and related industries. For example, Sweden has used EPD's since 1992. Since 1st January 2022, France has the voluntary PEP Ecopassport scheme for electrical, electronic and HVAC equipment, and mandatory environmental impact statements for construction materials called Fiche de Déclaration Environnementale et Sanitaire (FDES).

EPDs began in Sweden - the first EPD was in 1992 - and Sweden was the first country to introduce a national EPD scheme. Norway has also been actively promoting CPDs since the 1990s, and its scheme has been adopted by other countries thanks to its high standards. France and Germany, a leader in promoting sustainability in the construction sector, have actively promoted EPDs since the early 2000s, and other European countries have emulated their approach. Beyond Europe, China's EPD programme has developed rapidly, making it one of the world's largest users of EPDs. The US, Canada, Australia and Japan are also getting behind using and developing EPDs.

www.kingspan.com, accessed 30 August 2024

There is an established register for EPD's, in accordance with one international program, in Australia but there needs to be either one government register or competition amongst private providers. The pool of independent verifiers has to be significantly broadened so that the process is cost competitive and cheaper for industry to implement. At a sustainability industry event in Melbourne in September 2024, it was claimed that it can take 12 months for an independent Expert Reviewer to be available – a critical part of the EPD process to ensure they're compliant with international standards and comparable to each other so that end-users can compare products.

RECOMMENDATIONS:

- Mandate lifecycle costing in all Government procurement to deliver savings to Government and taxpayers
- Mandate EPD's for Government procurement, initially in the Construction and Building Sectors
- Introduce a Government register of EPD's, or facilitate new private EPD registers
- Accelerate the supply of independent verifiers of EPD's to enable industry growth.

3a Hurdles and barriers to a circular economy

The PC is seeking views and information on the following.

- The main reasons businesses and consumers have not adopted circular economy practices to date, including (but not limited to):
 - costs
 - attitudes (including about risk)
 - regulatory constraints
 - lack of information or resources
 - lack of coordination.

3b Governments' role in the circular economy

The PC is seeking views and information on the following.

- The extent to which policy or regulatory changes (national, state and territory, or local; or for specific sectors, products or supply chains segment level) could better enable the pursuit of circular economy activities. This may include:
 - financial incentives
 - information provision
 - regulatory changes (e.g. approval processes, standards and codes, mandatory reporting, competition and consumer regulation, chemicals regulation) and co-regulatory approaches
 - education and training
 - facilitating collaboration
 - planning, and urban and regional development.

The extent to which current policies or regulations hinder the pursuit of circular economy activities. Specific examples of how current settings are acting as barriers would be welcome.

- The benefits, costs, risks and implementation issues associated with current or potential policy or regulatory changes that aim to address barriers to circular economy activities.
- What actions governments could take to facilitate Aboriginal and Torres Strait Islander roles in progressing the circular economy, including in drawing on Indigenous knowledges in policy design in ways that recognise and protect Indigenous cultural and intellectual property.

3.1 Addressing Market Failures through Policy Intervention

Within the Government procurement sector, Government policy can play an important role in creating markets for products containing recycled content. For example, Victoria's Big Build Program has a 'Recycled First' Policy.

One of the primary justifications for a policy like Recycled First is to correct market failures. Market failures occur when the free market does not allocate resources efficiently, often due to factors such as information asymmetry, externalities, and the public good nature of certain resources.

In the case of recycled materials, the market underutilises these resources because the environmental benefits of recycling (e.g., reduced generation of landfill, lower carbon emissions) are not fully reflected in the market prices of materials.

Additionally, there may be a lack of information or awareness about the availability and benefits of recycled materials among contractors and project developers. People are more comfortable with the higher perceived quality of products made from virgin raw materials.

By requiring tenderers to demonstrate how they will include the use of recycled materials, demand is created for products made from recycled materials. Manufacturers that don't use recycled materials are incentivised to change the composition of their products.

Mandating Australian recycled content also shifts the balance towards sovereign manufacturing, if Australian recycled materials are to be genuinely incorporated within a product. At present there's no easy means for contractors and clients to identify local suppliers of circular economy products. Later in this submission we address this specific issue.

From a manufacturer's perspective, the downside of the current incarnation of Recycled First is that there appear to be quotas for recycled content in projects, and that price still appears to be the governing factor. Recycled First doesn't apply to all elements of every project – so 'Recycled First' doesn't strictly apply across the whole project.

A true Recycled First policy would be that every component of a project must have Australian recycled content and that recycled is the first choice. Any exception would have to be justified.

By requiring tenderers to consider and report on their use of recycled materials, and publishing that data when a project is awarded, there is transparency, a motivation to use Australian recycled materials and a positive message to the community about why they are recycling household items.

3.2 Innovation Diffusion and Industrial Development

The Recycled First Policy also plays a critical role in promoting the diffusion of innovation within the construction and materials sectors. Innovation diffusion theory suggests that the adoption of new technologies and practices is influenced by factors such as perceived relative advantage, compatibility with existing systems, simplicity, and the ability to observe the benefits.

By encouraging the use of innovative recycled materials and methods, the policy accelerates the diffusion of sustainable practices across the construction industry. Tenderers are incentivised to trial new materials and technologies that meet policy requirements, which can lead to widespread adoption if these innovations prove successful.

On a major project in Melbourne, OmniGrip Direct submitted pricing to supply recycled-glass bike lane surfaces. The Contractor won the project but did not award the green bike lanes to OmniGrip Direct. Instead, they used a non-recycled product.

When asked why, they explained that they'd met their 'Recycled First' project quota for recycled content by using a different recycled product elsewhere in the project.

With a low target for recycled content and no responsibility for lifecycle costs, they used products with the cheapest upfront cost elsewhere in the project. In cases like this, any contractor only needs to select products that will outlast the project's Defects Liability Period, when their responsibility for the repair of defects ends.

The policy also supports policy objectives for Sovereign Manufacturing at a State and Federal Government level by fostering the development of a local recycling industry. By mandating Australian recycled-content it is highly probable that the item containing it will be manufactured within Australia. By creating demand for recycled materials, the policy encourages investment in recycling technologies and infrastructure, which in turn creates jobs and stimulates economic growth.

This targeted support for the recycling industry aligns with broader economic goals of promoting sustainable development and reducing reliance on imported materials.

3.4 Institutional Barriers

Industry organisations, whose members profit from the status quo, are in strong positions to frustrate the takeup of newer, lower embodied and low operational carbon from competing technologies such as those in the circular economy. Specifically, in the case of powered Electric-Battery Exit Signs, there is systemic bias in the industry preventing adoption of a more reliable, less wasteful, product that has been approved by the Australian Building Codes Board (ABCB), for a decade. Even worse there are active misinformation campaigns targeting more sustainable exit signs that generate less waste and emissions.

Entrenched and well-resourced organisations within the emergency lighting and fire safety supply chain are also actively stifling the competing, more sustainable technologies. This is because many of them benefit from the ‘failure model’ supporting the dominance of Electric-Battery Exit Signs. There are similar industries, where many companies and their industry organisations benefit financially from the use of products with a short life. When those products are mandated by Government and/or related to safety, serious money is made from the mandatory replacement of failed products with new products.

RECOMMENDATION

- Mandate recycled content in all elements of Government projects and require a public register of non-recycled content across all aspects of a project as decisions are made.

3.5 National Construction Code (NCC) vs Australian Standards

Information asymmetry and the persistence of outdated standards constrains progress towards a circular economy in Australia. This is due to resistance by suppliers that don't use recycled materials, their industry lobby groups, and Australian Standards being written around existing, established technologies; in particular to ensure the use of a particular technology is safe and its risks are managed. This inhibits the uptake of innovative Photoluminescent Exit Sign technology – even when a decade has passed since they were first included in the NCC – and imposes unnecessary restrictions and costs on newer technologies. An example is the testing of Exit Signs, written around the unreliability of battery technology, when new Exit Signs are battery-free.

For example, AS/NZS 2293 *Emergency lighting and exit signs* is about powered Electric-Battery Exit Signs and Emergency Lighting in buildings. Significant parts of the Standard are written around managing the shortcoming of Electric-Battery powered technology. The Standard requires 6 monthly inspections and tests of every Electric-Battery Exit Sign and Emergency Light in every building in Australia. A whole industry is then built around the unreliability of the technology –

- Training people in how to inspect and test Electric-Battery technology
- Completing the 6-monthly inspections
- Qualified electricians replacing failed products.

The embedding of Australian Standards like AS/NZS 2293 into the NCC⁴, State regulations and Government procurement stifles innovation and stifles the circular economy that will competitively disrupt the Electric-Battery powered Exit Sign industry.

The writing and maintenance of the Standard, AS/NZS2293 is led by the industry responsible for the problems created by the actual technology, including where Exit Signs must be placed in buildings. Yet, for ten years after Photoluminescent Exit Signs were incorporated within the NCC by the Australian Building Codes Board, the Committee responsible for AS/NZS2293 has consistently failed to update the Standard to incorporate the new technology.

Decoupling the NCC (and State and Territory regulations) from AS/NZS 2293 is fundamental to increasing competition in the Exit Sign industry. All general information about the location and appearance of Exit Signs should be within the NCC itself. AS/NZS 2293 should only be about the design and maintenance of Electric-Battery Exit Signs, where it can be maintained by the same Committee.

The NCC and all State and Territory regulations for Exit Signs should be technology-agnostic, enabling open interchangeability between NCC compliant solutions so that building owners can more easily transition to more environmentally sound technologies that are incorporated within the NCC.

Another example relating to Exit Signs is the national curriculum of training units (published at <https://training.gov.au/Training/Details/CPPEFES2026>) used by RTO's providing training for people conducting 6-monthly inspections of Exit Signs. Despite the NCC permitting Photoluminescent Exit Signs for more than a decade, the official government curriculum is wholly focused on AS2293 exit signs and emergency lights, with not a single reference to Photoluminescent Exit Signs. Success in completing the training is determined by whether the student can demonstrate their knowledge of Electric-Battery Exit Signs and Emergency Lighting, with no knowledge of Photoluminescent Exit Signs having to be demonstrated.

This means that people conducting inspections incorrectly try to conduct battery-related tests on them. They have no information about recognising and checking Photoluminescent Exit Signs. Without this knowledge, they are more likely to (incorrectly) fail the signs, resulting in further costs, disruptions and frustration for the building owner – and increased costs for inspectors told to return to site to do their job correctly.

Although examples are given relating to one specific industry, there are probably many other similar cases where embedded systems and thinking are limiting the adoption of better innovative and environmental technologies within the Australian economy, which could reduce both waste and emissions.

3.6 National Adoption of Decarbonising Infrastructure Policy

A national decarbonising policy is grounded in the concept of public goods. Decarbonising infrastructure increases the public good of a stable climate.

Low-carbon materials should be mandated across all components of public infrastructure projects. With infrastructure contractors often not responsible for the operation, maintenance and replacement cost of infrastructure, and Governments focused on building as much infrastructure as they can within

⁴ The NCC refers to AS2293 for the placement of Exit Signs in buildings as well as their appearance. The reinforces the perception of AS2293 as the standard that matters with respect to Exit Signs. Yet it has no mention of Photoluminescent Exit Signs 10 years after they were included in the NCC despite being updated in that period by Standards Australia.

a set budget, there's little interest in a holistic life cycle analysis of the cost and impact of infrastructure spending at the project level.

Market failures occur when the free market does not provide an optimal level of goods or services. Individuals make the correct decisions for themselves, not the right decision for society. In the context of infrastructure, the market fails to adequately price in the negative externalities of GHG emissions, such as climate change and public health impacts, or more broadly the consumption and exhaustion of finite resources. This leads to organisations preferring cheaper, carbon-intensive materials that have higher long-term environmental and social costs.

Government can ensure that the environmental costs of carbon emissions are accounted for, leading to a more efficient allocation of resources that prioritises long-term sustainability. Government can act to increase awareness of alternatives, such as products with local recycled content.

3.7 Establish a Local Content and Sustainability Supply Register (LCSSR).

Establishing a Local Content and Sustainability Suppliers Register aligns procurement with government climate goals, fosters a circular economy and boosts local manufacturing for products with local recycled content.

For procurement professionals it would enable them to easily identify relevant products and make comparisons to competitors. It could also provide information to educate and inform people about how their decisions help create a circular economy.

Existing State based registers, like Victoria's Construction Supply Register, are actually focused on professional services and do not include products. Sustainability Victoria's Buy Recycled Directory has limited functionality and company information and does not identify Victorian manufactured products. A national directory could enable purchasing from specific regions to meet local procurement objectives.

A LCSSR would also support the procurement of sustainable products and services with a focus on local content. Proposed by Polar Enviro to address shortcomings in existing information relating to construction in Victoria, the LCSSR is an example of how a government intervention could contribute to correcting market failures associated with the under-provision of more circular products. By providing a platform for these products, the government reduces information asymmetry and encourages the adoption of sustainable practices.

The LCSSR aims to bridge gaps in the market by providing a centralised platform where businesses can connect with suppliers of sustainable goods and services. The platform promotes the use of products that are not only environmentally friendly but also support local economies.

For example, a business might be unaware of the long-term benefits of using locally produced, sustainable materials over cheaper, imported alternatives that have a higher environmental impact. The register would help them find suppliers from within their local area.

By choosing locally sourced products with Australian recycled content, businesses can reduce the carbon footprint associated with transportation as well as the carbon footprint from manufacturing the product. It could link to the product's EPD, irrespective of which EPD scheme the product is registered with.

The LCSSR would also play a crucial role in the diffusion of innovation, particularly the adoption of sustainable products and practices across industries.

Innovation diffusion theory suggests that the adoption of new technologies and practices depends on factors such as perceived relative advantage, compatibility with existing systems, simplicity, and the ability to observe the benefits of adoption.

The LCSSR facilitates the diffusion of sustainable innovations by providing visibility to suppliers of innovative, sustainable products and services. This visibility helps to overcome barriers to adoption by making it easier for organisations to discover and evaluate these options.

We can provide more information about the establishment and benefits of a LCSSR, if it is required by the Productivity Commission.

RECOMMENDATIONS:

- Reform regulatory processes and guidelines to ensure they are technology agnostic, to enable innovations and circular economy products to more easily enter markets.
- Restructure Australian Standards so that separate technology specific content is in Standards and generic design information is in the National Construction Code.
An example is to place all information about the placement of Exit Signs and Emergency Lights into the NCC. Separate Standards or Specifications should be written and maintained around the design and maintenance requirements of each technology permitted by the NCC. This approach will ease the entry of innovations that reduce waste, carbon emissions and strongly support a more circular economy. It will remove the institutional burden on new technologies created by Australian Standards Committees controlled by parties linked to older technologies.
- Specify NCC compliance, which is comparatively technology-agnostic, rather than Australian Standards in Government procurement, so that Government is not locked into one specific technology such as the use of old-tech Electric-Battery Exit Signs when Photoluminescent Exit Signs are NCC compliant.
An example would be to specify an Exit Sign monitoring system – an Electric-Battery Exit Sign may need a monitoring system to monitor its battery condition. A Photoluminescent Exit Sign doesn't need one because it doesn't have batteries. This enables competing technologies to be offered by vendors.
- Regulations should permit interchangeability of NCC compliant technologies, to increase competition, accelerate the adoption of new circular economy technologies and reduce unnecessary paperwork. For example any Exit Sign technology that is the right visual appearance and placement within the building should be able to be installed with no more than a simple update to the asset records for the building so that it is maintained correctly. There should be no need for expensive experts to sign off on the changeover if both technologies are NCC compliant. It does not need to be more complex. State regulations should reflect this efficiency to accelerate the adoption of improvements in the NCC.
- Following each update to the NCC, training curriculum must automatically be developed or updated to ensure new practitioners are trained in the updated requirements, to accelerate the uptake of the improvements in the NCC. This will accelerate the uptake of circular economy and energy efficiency reforms within the building sector.
It is important that this is led by Government, because new technologies are not going to have industry bodies or sufficient funds available to lobby for updates to training programs to encompass new technologies. This assists with the adoption of new technologies that improve energy efficiency, safety and use recycled materials, via the NCC.
- Mandate low-carbon infrastructure in Government infrastructure procurement.
- Establish a national Local Content and Sustainability Supply Register (LCSSR) to facilitate circular economy and sovereign manufacturing capability within Australia.