

How Lighting can Support New Zealand's Economic Recovery and the Goal of a Net Zero Carbon Economy

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POSITION STATEMENT FROM LIGHTING COUNCIL NEW ZEALAND

LEADING NEW ZEALAND'S LIGHTING INDUSTRY





Contents

- P2** Position Statement from Lighting Council New Zealand
- P3** Energy Efficient Lighting in New Zealand
- P3** The Value of Smart Lighting Post COVID-19
- P4** Good Lighting for Health, Wellbeing and Productivity
- P5** New Business Model for Energy Savings – LaaS
- P5** Circular Economy for Lighting
- P6** Standards, Regulations and Climate Change Progress
- P6** New Zealand Lighting Strategy 2021-2025
- P7** Lighting Council New Zealand – Recommendations
- P9** Lighting Council New Zealand



How Lighting can Support New Zealand's Economic Recovery and the Goal of a Net Zero Carbon Economy

POSITION STATEMENT FROM LIGHTING COUNCIL NEW ZEALAND

Investing in safer, more efficient, and more comfortable buildings will benefit people, the environment and the economy. Astute application of LED lighting and controls has a major part to play in the delivery of digitally smart energy efficient buildings and infrastructure in New Zealand, and this can materially contribute to the post COVID-19 economic recovery and to New Zealand's net zero carbon goals.

The world is facing an unprecedented and ongoing crisis with the coronavirus pandemic and the immediate focus is on saving lives and slowing down the spread of the virus. But as the process of beating COVID-19 evolves, our attention naturally turns towards recovery from the damage the crisis has inflicted on the New Zealand economy.

Many activities have materially changed during the lockdowns and the reduction in traffic, cleaner air and reduced travel have highlighted the value of measures we can take to mitigate climate change. It is clear is that the strategy to recover from the crisis must build on a “*better than before*” agenda that includes tangible moves towards a net zero carbon economy.

Government is signalling the implementation of building and infrastructure recovery and support packages and this investment must be targeted wisely. It must benefit people and address the short-term employment impacts, but should also accelerate New Zealand's transition to a sustainable, low carbon and resilient economy.

In recent times when many of us have been confined to homes and home-working it seems fitting to consider the building sector as a target for recovery investment. Commercial buildings are responsible for 21% of New Zealand electricity use, costing NZD \$800 million every year¹. Furthermore, waste from construction and demolition accounts for 40-50% of solid waste to landfill². It is predicted that 65% of the NZ building stock that will be in use in 2050 already exists today³, however, much of that stock is currently old, energy inefficient and in many cases, unhealthy.

New Zealand has some of the most low-performing building stock in the developed world and it is a high priority to improve building energy efficiency. Renovation of our ageing building stock will reduce energy demand while supporting the construction industry and create grassroots jobs and economic well-being. Energy efficiency upgrades of the New Zealand building stock can contribute tangibly towards the government's statutory commitment to a net zero carbon economy by 2050.

1. EECA – Media release: EECA Renews NABERSNZ, 8 October 2020

2. BRANZ website: 16 October 2020

3. MBIE Building Systems Performance website: Building for Climate Change, 11 October 2020

Energy Efficient Lighting in New Zealand

Despite technology advances in recent years and the marked benefits of LED lighting, there remains a lingering market for less efficient legacy lighting technologies which fuels a “race to the bottom” in residential construction and in commercial building tenders. With improved education about the benefits of LED lighting and smart control systems, updates to the New Zealand Building Code, updates to technical standards, and improvements in building procurement processes, this trend can be reversed, and the unnecessary waste of energy and resources avoided.

Over the last two decades, improved lighting technologies have been responsible for major reductions in energy consumption in New Zealand. Through the continued adoption of new technologies such as LED lighting combined with digital control systems, these reductions will continue, but only if policy and regulatory interventions are well-targeted.

While LED retrofit lamps (in bulb or tube form) are more electrically efficient than earlier lamp technologies, the most efficient lighting is delivered by well-designed luminaires (light fittings) which have permanently integrated LED light sources. Such luminaires increase energy efficiency and product longevity through managing the critical temperatures at which LEDs operate effectively, and also through superior optical efficiency.

Simply switching to retrofit LED lamps alone cannot deliver full benefits. Retrofit lighting upgrades require a three-step implementation process:

- 1 Diagnosis – Review of the application to determine building specifics and user needs
- 2 Supply – Astute selection of appropriate luminaires or lamp/luminaire combinations
- 3 Install – Skilled installation by licenced electricians aware of safety compliance needs



The full potential energy and financial savings from lighting renovation cannot be achieved by retrofit LED lamps alone.

The Value of Smart Lighting Post COVID-19

Lighting has an important part to play in the value of building renovation programmes. The digital nature of LEDs has spawned the rapid development of intelligent digital controls which include sensors and communication capabilities, bringing user benefits that are much greater than the sum of their parts.

LED lighting is highly efficient, with 60-70% energy savings generally achievable. For commercial and public buildings, the addition of controls devices such as presence detectors, daylight controls, timeclocks, and personal device control (e.g. smartphones) can increase the impact by an additional 50+% over the energy savings already

provided by LED lighting. This is achieved by gathering the data generated by the sensing networks and combining it with additional data such as weather conditions, air quality, GPS locations and seasonal data. Sharing this data with other building services, smart lighting systems can unlock efficiency benefits in building operations, and importantly, to the well-being, comfort and productivity of the building occupants.

In commercial and public buildings, the use of automation, personal control, and data analytics can realise not only additional energy savings but also helps to reduce the spread of disease and its effect

on public health and the economy. Automation allows building occupants to avoid touching shared surfaces such as light switches or window blind controls. Occupancy data analytics can tell a building manager which areas of the building are used and the frequency of use, allowing more efficient planning of workplaces. That data in turn can be shared with the climate control system of the building to optimise heating and cooling efficiency.

The widespread use of smart portable devices combined with the maturity of new-build and retrofit wireless technologies (e.g. Bluetooth) make it possible to deploy these solutions in any space, from a single office to a whole building. Today, only the newest commercial buildings offer these capabilities, and therefore significant energy saving opportunities are being missed in existing buildings, along with the loss of additional owner, tenant and occupant benefits.

➤ **The technologies to harness all this potential and to deliver greater building efficiency and productivity are available today, with practical application and bankable business case economics.**

Good Lighting for Health, Wellbeing and Productivity

The 2020 New Zealand COVID-19 hard lockdown with home-based working brought a new realisation how much our built surroundings influence human behaviour and state-of-mind. Good lighting supports the health, wellbeing, and performance of humans by combining the visual, biological, and emotional cues of light.

Good lighting provides the “*right light, at the right place and the right time*” for the activities we carry out every day and reinforces stable and healthy human circadian sleep-wake cycles.

Good lighting benefits are wide-ranging:

Visual: good task visibility, visual comfort, mobility safety, and orientation

Biological: alertness, concentration, and stable sleep patterns

Emotional: improved mood, energy, and ability to relax.

Within the design process, lighting should deliver the core aspects of safety, task requirements and occupant needs in a coherent and integrated manner.

Healthy building expectations additionally means ensuring that the lighting system is:

Adaptive: can be dimmed or brightened according to personal and task needs

Tuneable: can vary in colour and spectrum according to time and task needs

Controllable: can be personally controlled according to specific user preferences.

➤ **The introduction of LED and digital controls has revolutionised lighting application and opened the door to many high-value new opportunities not previously possible.**

New Business Model for Energy Savings – LaaS

A relatively new commercial lighting business model for renovations and new-builds is *Light as a Service* (LaaS). This service model enables occupant companies to unlock capital for business development, as the lighting supplier installs the lighting and controls with no upfront capital cost and provides ongoing expert skills for continuous improvements. The hardware and software is owned and maintained by the lighting supplier

and the business case foundation is the energy and maintenance cost savings generated. This model enables the adoption of best practice energy efficiency technologies and embeds circular economy practices into a lighting system. The asset responsibility remains with the lighting supplier who can upgrade, re-use, re-manufacture or recycle the products at the end of their first useful life.

The main barrier to the implementation of LaaS business models in New Zealand are commercial building contracts and government and local government tender procurement practices that only accommodate historic business models.

Circular Economy for Lighting

The upcoming 2021 implementation of the European Commission Single Lighting Regulation (SLR) is acting as a global motivator for redefining supply-chains towards a circular economy for lighting products. This incentivises the progressive evolution from a linear “take, make, dispose” ethos towards a model that extends and revives the life of modular-design lighting products. This will result in buildings that are more durable, use fewer resources, less embodied energy, less operational energy, and use components that are upgradable, re-useable and easier to recycle at their ultimate end-of-life stage.

Continuing a longstanding commitment to International Electrotechnical Commission (IEC Geneva) standards participation, Lighting Council New Zealand is providing an expert leadership role by chairing the recently established IEC *Advisory Group on Environmental Aspects* for lighting. This role can directly transfer best practice circular

economy thinking to New Zealand stakeholders to benefit environmental and economic outcomes for both industry and consumers.

Implementation of this initiative in New Zealand is unlikely to flourish without government co-participation, and Lighting Council New Zealand recommends industry and government circular economy collaboration. This should include government funding to support IEC and SNZ standards development participation. As a tangible pathway, planning for circular economy implementation could be included in a *New Zealand Lighting Strategy 2021-2025* (see details on page 6).

However, to build momentum in New Zealand, government leadership is needed, and circular economy principles and practices need to be embedded in state sector building procurement processes.

Government must introduce and implement requirements for circular economy principles and practices in state sector building procurement processes as soon as practicable.

Standards, Regulations and Climate Change Progress

The current New Zealand Building Code energy efficiency regulation for commercial buildings (Clause H1 - Energy) defines minimum performance requirements for lighting energy efficiency on the basis of Lighting Power Density (LPD) as specified in NZS 4243.2:2007 A1. These quantitative design limits are well below the performance levels required in UK and EU states, and the NZ requirements are an ineffectual motivator for efficiency and too easily achievable today, given the availability of LED lighting and smart controls.

Additionally, the New Zealand commercial building lighting energy standard does not incorporate international best practice methodologies, contains

no carbon accounting guidance and ignores methods to quantify the impacts of control systems and the savings possible. The use of smart digital lighting systems takes energy savings to new heights and unlocks building productivity gains that result from integration of operational data across multiple building services functions.

If New Zealand adopted the recently released ISO standard *ISO/CIE 20086:2019 Energy Performance of Lighting in Buildings* this would deliver a practical and fit-for-purpose design and regulatory methodology to help New Zealand surge forward in terms of lighting energy progress.

Building energy regulation based on ISO standards, combined with acceleration initiatives to renovate existing commercial building stock, can stimulate post COVID-19 economic recovery and tangibly advance New Zealand's climate change ambitions.

New Zealand Lighting Strategy 2021-2025

Lighting Council New Zealand welcomes the goals and intentions of the proposed MBIE *Building for Climate Change* programme and seeks to work collaboratively with government agencies (EECA, MBIE, MfE, etc) to explore and advance practical ways of achieving the intended results. Reactionary or un-coordinated policy interventions or product subsidy initiatives will not deliver full benefits, or enduring progress.

To this end, Lighting Council New Zealand urges the development of a joint industry and government

strategic planning initiative, a *New Zealand Lighting Strategy 2021-2025*. This would be a 5-year strategic plan for collaboration on lighting quality, energy and material efficiency, and carbon emission goals. This can provide jointly researched and agreed pathways for progress, and ensure that subsequent actions are practical, effective and well-coordinated. This new-generation initiative would build upon a similar document that was successfully developed back in 2008 (with a Labour-led government) for the coherent application of the compact fluorescent technology of that era.

Lighting Council New Zealand urges the actioning of a joint industry and government *New Zealand Lighting Strategy 2021-2025* strategic planning initiative.

Lighting Council New Zealand – Recommendations

Lighting Council New Zealand provides a priority list of 10 action points, and recommends the accelerated implementation of the following government actions:

1 Renovation with LED Lighting

LED lighting upgrades should be a part of all government incentivised post COVID-19 renovation projects for commercial buildings.

2 Renovation with LED Luminaires

Purpose-designed LED luminaires should be part of all government incentivised post COVID-19 renovation projects for commercial buildings, to deliver full efficiency benefits and to provide user satisfaction for decades to come. Avoid simplistic retrofit lamp (bulb or tube) renovation programmes.

3 Renovation with Smart Controls

Smart digital controls should be part of all government incentivised post COVID-19 renovation projects for commercial buildings. These will deliver extended efficiency benefits and provide ongoing ownership economies and enhanced user comfort.

4 New Zealand Building Code Updates

Update New Zealand Building Code regulation as part of the proposed MBIE *Building for Climate Change* programme to mandate energy and carbon performance limits that require use of smart lighting controls for commercial buildings, for both new construction and renovations.

5 International Energy Standards

Adopt the *ISO/CIE 20086:2019 Energy Performance of Lighting in Buildings* standard as a NZ standard for commercial buildings, to quickly deliver a practical and fit-for-purpose design, application, and regulatory tool.

6 New Zealand Lighting Strategy 2021-2025

Develop a government and industry *New Zealand Lighting Strategy 2021-2025*. A 5-year strategic plan for multi-party collaboration for improved lighting quality, and for energy and carbon reduction goals.

7 LaaS Business Model for Energy and Monetary Savings

Implement government procurement process changes so the business model *Light as a Service* can be accommodated in state sector building procurement processes.

8 Circular Economy for Lighting

Implement requirements for demonstrating circular economy principles and practices in state sector building procurement processes as soon as practical. Engage in industry and government collaboration by funding international and local circular economy standards development.

9 Commercial Building NABERSNZ Energy Efficiency Ratings

Mandate EECA NABERSNZ Energy Ratings at the 5-Star level for all state-sector government tenanted buildings, and mandate NABERSNZ ratings for applicable private-sector commercial buildings, as in Australia. This accepted and well-respected energy rating system needs more impetus to extend its reach, influence and results.

10 New Zealand Government Leadership

Lead by example with government implementation of best-practice energy efficiency and low carbon technologies across the state-sector building portfolio. Implement the requirement to attain best-practice performance by renovating properties to include LED luminaires with smart digital controls by 2025.

Lighting Council New Zealand can provide information on specific measures for further energy efficiencies and carbon reductions, to make buildings more comfortable and to improve the health and wellbeing of their occupants.

LEADING NEW ZEALAND'S LIGHTING INDUSTRY

Lighting Council New Zealand is the industry association for lighting manufacturing, importing, and distribution companies in New Zealand, and associated lighting industry participants.

What is Lighting Council New Zealand?

Lighting Council New Zealand is the highly active industry association representing twenty-seven lighting equipment manufacturing, importing, and distribution companies in New Zealand, and associated lighting industry participants.

Lighting Council New Zealand was formed in 2003 in order to provide an informed and cohesive industry voice to advise and educate on lighting issues and to help navigate productively through the increasing

complexity of lighting technology, standards and regulation.

NZ lighting standards development work is predominantly sustained financially and by expertise from Lighting Council New Zealand member companies, with this investment also benefiting wider market participants at no cost to them, for the good of all in the industry and market in New Zealand.

What does Lighting Council New Zealand do?

PROMOTION OF EFFECTIVE LIGHTING

Lighting Council New Zealand provides a variety of messages and speaking engagements to assist with demystifying technical and regulatory conditions in New Zealand and assisting with the selection of effective lighting solutions.

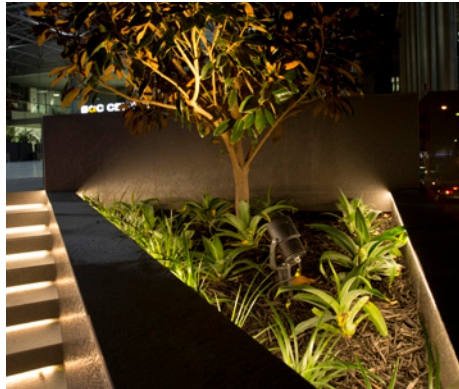
GOVERNMENT AND INDUSTRY RELATIONS

Lighting Council New Zealand is a cohesive voice to government on matters of lighting energy, safety, electro magnetic compatibility, environment and trade, and also assists kindred organisations on policy matters relating to lighting science, lighting design, electrical industry and energy management.

LIGHTING COUNCIL NEW ZEALAND MEMBERS



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