Energy Efficiency:
NCC 2022 and Beyond Scoping Study

Stakeholder Consultation

September 6, 2019

Executive summary

Lighting Council Australia welcomes the opportunity to comment on the *NCC 2022 and beyond scoping study [Scoping study].*

Firstly, we suggest that the current lighting market conditions and forecast directions are highly relevant to any future work in this area and should be carefully considered. We outline the state of the lighting market below based on the advice from our members who supply more than 80% of all lighting in Australia. The lighting market can be characterised by a voluntary market transformation that has resulted in a new build market that only uses highly efficiency products and a competitive market driving continuously towards more efficient products.

Secondly, we note that the scoping study primarily proposes to regulate lighting by including lighting along with other energy using building services in an energy budget arrangement. Lighting Council Australia would urge the Australian Building Codes Board to consider lighting as separate to other energy using appliances in any approaches going forward due to the very different market characteristics exhibited by lighting compared with the various other energy using appliance sectors. The proposed approach is likely to result in unnecessary regulatory costs.

Thirdly, we recommend a simple approach is needed for lighting that will reduce regulatory complexity and reduce housing costs. That is, the lighting market has and continues to demonstrate that it is voluntarily leading the way towards low and zero emissions buildings and the building sector should not be burdened with additional red tape leading to increased housing costs. Lighting should be removed from the proposed energy budget approach and no longer requires energy efficiency regulation at a residential building level.

Fourthly, Lighting Council Australia would like to be involved in any work on this project that may affect lighting going forward. If lighting modelling will be conducted then we would like to assist in modelling brief development and modelling assessment. We also offer to provide more detailed information on any of the points we raise below, should they be sought.

Lighting Council Australia response to the ABCB Energy efficiency scoping study

Lighting market characteristics

Significant carbon abatement has been achieved due to the paradigm shift in efficiency provided by LED lighting. The lighting industry is leading the building sector towards low and zero emissions buildings.

The *Trajectory for Low Energy Buildings* report includes the following definition of zero energy (and carbon) ready buildings:

> *Zero energy (and carbon) ready buildings have an energy efficient thermal shell and appliances, have sufficiently low energy use and have the relevant set-up so they are 'ready' to achieve net zero energy (and carbon) usage, if they are combined with renewable or decarbonised energy systems on-site or off-site.*

The above statement describes the new-build lighting market as it exists today. This market uses highly energy efficient lighting products that have, for some time already, been able to easily achieve net zero energy buildings when combined with renewable energy systems.

The Australian residential and commercial new build lighting markets have been highly efficient, stable and functioning well for a number of years now including no market failures. This follows a period of significant market transformation during which large investments by the lighting industry in Australia and overseas were made into the development of new technology LED products for all general lighting applications.

LED lamps and luminaires are now regarded as business as usual in the Australian lighting market and are essentially the only lighting technology being used for National Construction Code (NCC) scope markets.

The lighting market is now characterised by the widespread availability of quality LEDs for all general lighting applications, high levels of competition and a highly regulated market. Australian lighting suppliers are focused on continual product re-development and improvements including increased product efficiency, reduced costs, improved product quality and light quality.

Product re-development cycles have been reduced to six to ten months for the past seven or so years due to continuous improvements in LED component efficacy and light quality. LED components such as LED modules are the light engines within LED lamps and luminaires. Light quality improvement aspects include reduced glare, lower correlated colour temperatures (i.e. 'warmer' light) and increased colour rendering index (i.e. the ability to render the colours of an object truly).

Consumer LED prices have reduced by more than 80% over the past seven years and LED efficacy has improved more than 100% in the same period (noting also that improved light quality comes at the expense of product efficacy). It is also important to note that this product development period has come at a time of high energy prices in Australia.

The return on investment period for an average LED lamp is now in the order of around three months and continuing to shrink. Adding to the benefits, LED products have longer effective lifetimes than legacy technologies – This aspect is likely to be bedded down by lumen maintenance and lifetime performance requirements in future Australian LED MEPS regulations.

Legacy lamp technologies such as halogen and fluorescent have been essentially non-existent in the new build market since around 2015-2016.

The lighting market is highly regulated in terms of safety, efficiency and interference mitigation. State Governments regulate lighting product safety and several LED products have been categorised as high risk (mainly due to the fact that consumers change lamps and lamps can operate at mains voltage) requiring additional scrutiny including NATA (or equivalent) accredited testing, third party certification and product registration before sale.

The Commonwealth Greenhouse and Energy Minimum Standards (GEMS) Regulator determines minimum energy performance standards (MEPS) on several lighting products. Incandescent lamps have been phased out in Australia since 2009 and starting in September 2021, the Australian Government plans to extend MEPS legislation to phase out halogen lamps. LED lamps are slated for MEPS regulation (aligning with the European Single Lighting Regulation) on or soon after September 2021.

Furthermore, Australia's ratification of the Minamata convention (possibly commencing in 2020) would impose additional limits on fluorescent lamps (Compact and linear types) and remove the ability to manufacture and trade mercury vapour lamps. Also, the European Single Lighting Regulation will phase out T8 fluorescent lamps in 2023.

Regardless of any proposed energy efficiency regulations, legacy lighting technologies are quickly fading out of the market naturally and there is no foreseeable opportunity for technology backsliding.

The Australian Communications and Media Authority regulates the electro-magnetic compatibility of LED products through limitations placed on the amount of electro-magnetic noise able to be generated. LEDs must not interfere with radio, television, mobile phone, air-traffic control and other segments of the radio spectrum allocation in Australia. Suppliers are required to hold compliant product test reports and these are audited by the ACMA. The ACMA prioritised LED product compliance in 2015.

Over recent years lighting energy efficiency standards within the National Construction Code have become increasingly less relevant due to the recent step change and continuous improvements in lighting efficiency and the market dominance of highly efficient products. For some years already, LED lighting has achieved full market penetration in the new build and major renovation (i.e. NCC) markets and this has resulted in a self-regulating lighting market.

Lighting energy efficiency regulations have become irrelevant

Market indicators demonstrate there are no energy efficiency market failures occurring in the new build lighting markets. The market has voluntarily adopted LED lighting as the business-as-usual solution.

The market characteristics highlighted above lead Lighting Council Australia to highlight that building designers, developers, builders, installing contractors and consumers are demonstrating they can be trusted to correctly interpret signals from the market. The existing efficiency aspects of the LED market has been achieved through voluntary actions alone and is a clear indication that energy efficiency regulation is no longer relevant to the lighting industry.

In the cost-conscious Australian market, particularly considering our high cost of energy, owners and developers will not spend more money than they need, to achieve the lighting effects they seek. The NCC should acknowledge this change and allow the market to continue to self-regulate by excluding lighting from future efficiency requirements.

Lighting Council Australia's strong recommendation is for the proposed changes suggested in the scoping study to not be applied to residential lighting.

Downsides to continued regulation of lighting

Lighting Council Australia highlights there would be downsides to including lighting in NCC residential efficiency regulations moving forward

Additional compliance costs will be passed to consumers as increased housing costs.

Complex compliance requirements lead to reduced market understanding, less relevant requirements, higher rates of non-compliance (sometimes unintentional) and difficulties for building certifier understanding and enforcement.

Reduced housing amenity and value would result due to the difficulties associated with energy efficiency regulation being able to include the increasing variety of lighting design approaches being

taken. For example, simplified modelling that only accommodates downlights or omni-directional lamps (direct lighting) would restrict the ability of consumers to choose indirect, architectural, decorative and narrow beam lighting effects. Such indirect lighting design approaches add to the amenity (i.e. character, warmth, interest, comfort) and value of lighting installations and should be accommodated.

Multi-function approaches to lighting design are leading to increased numbers of lighting points being installed in some higher end residential installations. However, each is used for specific tasks, purposes and moods and are not likely to be all on at the same time. That is, even though more lighting points are sometimes installed only some are likely to be used at any one time – This to create a mood or enable specific task performance. Consumers want task performance and general lighting, or mood lighting but generally not both at any one time.

Installations that employ multi-function lighting are also more likely to be designed by a professional lighting designer. Both lighting design accreditation organisations in Australia (i.e. The Illumination Engineering Society, The International Association of Lighting Designers) in Australia have sustainability codes requiring their designers to achieve energy and environmental conservation.

Plug-in task lighting has always been exempted from NCC inclusion. Fixed (i.e. permanently hard wired) task lighting is becoming more popular and it does not make sense to exempt one without exempting the other.

Any rules to try to accommodate current market trends could be overly complex or lack relevance. That is, provisions would either need to be complex as to be difficult/costly to apply or be generous to the point of irrelevance for the majority of installations.

Lighting market regulation occurs now due to the very high cost of building in Australia, the limitation on installation budgets (lighting installation occurs towards the end of the build process and is often restricted due to budget constraints) and the high cost of energy. Developers, owners and occupiers only install the fixtures they can afford and then switch on the fixtures they need to achieve the task or effects sought.

Lighting should not be conflated with other product sectors

The lighting market is significantly different to all other energy using building services markets such as space conditioning, water heating and pool/spa pumps due to the step change/continuing rapid voluntary increase in lighting energy efficiency, continued decline lighting market pricing and widespread market adoption of highly efficient products. Accordingly, Lighting should be treated separately to all other energy using building product sectors otherwise regulatory duplication and unnecessary regulatory costs will add to the existing high cost of housing in Australia.

A simple approach is needed

Lighting Council Australia notes the scoping study proposes the development of four independent compliance pathways as well as the quantification of performance requirements. We suggest such an approach would be an overly complex and burdensome process given the current and forecast highly efficient new build lighting market.

Furthermore, such rules would only exacerbate Australia's compliance crisis. In Victoria a report from the office of the Auditor-General found up to 96 per cent of permits issued by surveyors to be non-compliant to NCC requirements. The increased complexity is in contrast to the recommendations issued by the Shergold Weir and Lambert Reports that identified legislative complexity as the greatest impediment to compliance.

As a matter of urgency, the NCC must prioritise restoring safety, quality and trust within the building sector. The existing problems with compliance must be fixed. Adding complexity to the NCC compliance pathways will not assist in this regard.

If the ABCB does decide to push ahead with continued regulation of lighting energy efficiency, Lighting Council Australia suggests the following simple compliance methodology that aligns with part of the NCC2019 Commercial building lighting energy efficiency requirements. Clause J6.5 (a)(ii)(A) of NCC 2019 Volume 1 allows exterior lighting attached to or directed at the façade of a building to comply if 90% or more of the total lighting load is LED luminaires.

This simple approach accommodates the fact that narrow beam luminaires are not as efficient as wide beam and allows for the wide variety of design approaches. A similar approach for all residential lighting would be the most that is required, if anything at all.

A simple policy extension such as this is aligned with the holistic and whole-of-house approach described in the *Scoping study.* Developing policy and standards that are simple to understand and apply will enable all stakeholders to reasonably be aware of the NCC requirements and easily account for an installation while ensuring compliance.

Beyond energy efficiency - Lighting quality, health, wellbeing and increased productivity

Lighting Council Australia highlights that any further modelling work undertaken by the Australian Building Codes Board should include the progressive market trends of the maturing LED lighting sector. As lighting moves to accounting for an increasingly relatively small proportion of a dwelling's energy consumption, a transition beyond energy efficiency improvements is underway due to consumer recognition of non-visual benefits provided by quality and human centric lighting.

As increasingly supported by scientific research, dynamic lighting schemes have been shown to demonstrate profound effects on productivity, health and mood. The static modelling methodologies that have been used by the ABCB to develop lighting regulation to date would restrict the ability of consumers to customise their homes with dynamic and multi-purpose lighting approaches. Such lighting approaches should be included in any modelling going forward.

Lighting Council Australia

Lighting Council Australia is the peak body for Australia's lighting industry. Its members include manufacturers and suppliers of luminaires, lighting control devices, lamps, solid state lighting and associated technologies. Lighting Council's goal is to encourage the use of environmentally appropriate, energy efficient, quality lighting systems.