

20 September 2018

National Energy Productivity Plan Secretariat

By email: [NEPP.Secretariat@environment.gov.au](mailto:NEPP.Secretariat@environment.gov.au)

**Responses to:**

**The Energy Action report titled *Cost-Effective Energy Performance Requirements for Non-Residential Buildings, 2022 – 2034, Final Report, 5 September 2018***

**The Commonwealth Government report titled *Trajectory for low energy Buildings (September 2018)***

**The Commonwealth Government's *Draft Report for Achieving Low Energy Homes (September 2018)***

**The ASBEC report titled *Built to Perform, An industry led pathway to a zero carbon ready building code, July 2018***

Dear NEPP Secretariat

This Lighting Council Australia submission outlines aspects that should be considered by the National Energy Productivity Plan (NEPP) Secretariat and COAG Ministers in their determination of appropriate and sufficient lighting energy efficiency requirements to be contained in future editions of the National Construction Code (NCC).

Significantly, Lighting Council Australia does not agree that any of the reports listed above provide any evidence that would justify a lighting energy efficiency stringency increase in NCC 2022.

## **NCC 2022 energy efficiency stringency increase proposal**

Lighting Council Australia is strongly opposed to any agreement being reached by COAG in 2018 to further increase lighting energy efficiency stringency (e.g. illumination power density (IPD)) in the 2022 edition of the NCC due to the likely significant negative impact on the lighting market and lighting installations of the NCC 2019. An assessment of the impact of NCC 2019 should be conducted before future targets and revisions are agreed. Such an assessment can only occur after NCC 2019 is published and implemented - noting that NCC 2019 will be implemented in May 2019.

Further to the above assessment being undertaken, COAG should consider directing the Australian Building Codes Board (ABCB) to apply the following principles and policies when it undertakes future Code revisions:

- Any future lighting energy efficiency and productivity modelling work be conducted only by reputable lighting experts who have direct and extensive experience in the lighting design market. This should avoid the overly simplistic approach taken by consultants Energy Action in its modelling to support proposed amendments to NCC 2019.

As well, international comparisons with comparable economies should be undertaken as part of the research and modelling work.

- Energy productivity should be a main goal of the National Energy Productivity Plan. The ABCB are focused on energy efficiency rather than energy productivity and in the lighting market such an approach can be to the detriment of productivity, visual comfort, safety, security, well-being, building value, interest and atmospheric effect.
- The ABCB should become accredited as an Australian Standards development organisation. Its processes should align with those of other standards development organisations in Australia and it should adopt a consensus-based approach rather than a consultation-based approach. Further detail is provided below.

### **Increased industry awareness and certainty**

Lighting Council Australia agrees that increased notification periods would be positive for industry. However, we highlight that this is only achieved when an extended notification period (e.g. 2 years) is given between a final published standard and the implementation date for that standard.

The current Australian Building Code Board process to revise the NCC every three years and publish new editions in January of the year of implementation only allows around five months forward notice for industry. A process that allows for publication one to two years in advance of implementation would allow industry greater certainty and sufficient time to design and bring new products to market.

Simply publishing general targets that are not specific to individual product areas does not provide industry with the investment certainty required to research and develop new

products and are not helpful. Such certainty is only achieved when a standard is published and publicly available.

### **Commercial building modelling**

The modelling undertaken as background to the report titled *Cost-Effective Energy Performance Requirements for Non-Residential Buildings, 2022 – 2034, Final Report, 5 September 2018* is simplistic (i.e. based on only 5 buildings), is not explained in detail and based only on 'extrapolation of trends in LED efficiency'<sup>1</sup>.

Such an approach does not acknowledge the poor and overly simplistic modelling that was conducted during the review of NCC 2019 and the significant movements in lighting design that aim to improve building amenity, building value, occupant productivity, interest, warmth, attractiveness and atmosphere through greater use of indirect lighting, architectural lighting, narrow beam lighting, decorative lighting and the use of human centric lighting.

Noting the lack of acknowledgement of major movements in lighting design and the overly simplistic modelling undertaken as part of the NCC 2019 review process, Lighting Council Australia does not agree that the Energy Action report provides compelling evidence to justify a reduction in lighting illumination power density allowances.

### **Residential building modelling**

The Commonwealth Government report titled *Report for Achieving Low Energy Homes, Final Draft* states,

*The modelling for this project assumed households install LED lighting as a base case assumption for new housing, while ASBEC's Built to Perform report considered there are opportunities to support this outcome by lowering maximum energy usage per m<sup>2</sup> in the NCC. This should be considered as part of the RIS process for NCC 2022.*

Lighting Council Australia highlights that this statement fails to acknowledge that the new building market and renovation market is already largely (95%+) LED and by 2022 will be overwhelmingly, if not exclusively, LED-based.

Also, Minimum Energy Performance Standards (MEPS) for LED lamps will likely be introduced in Australia in 2020. This combination of market forces and government intervention should mean that no further regulation or intervention is justified or required and any such regulatory intervention would simply increase compliance costs without achieving any significant energy reductions. The imposition of MEPS will be complemented by a phase-out of halogen lamps, significantly reducing the scope for lower-efficiency technology to be deployed in the residential sector.

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<sup>1</sup> Energy Action, *Cost-Effective Energy Performance Requirements for Non-Residential Buildings, 2022 – 2034, 5 September 2018*, Table 3, Lighting.

Based on the lack of lighting modelling undertaken as part of the ASBEC report<sup>2</sup> and the Commonwealth Government draft *Report for Achieving Low Energy Homes*, the lack of consultation with the lighting industry to date on this proposal, the lack of any report information indicating market failure, the lack of acknowledgement of future LED MEPS, the lack of information regarding the current state of the lighting market and lack of acknowledgement regarding major movements in lighting design, Lighting Council Australia is unable to agree that any justification for increasing the stringency of the new build residential lighting energy efficiency market has been provided.

The lighting industry is in fact leading the building industry in terms of building product energy efficiency improvements and no Government intervention is needed or justified at this time.

### **ABCB consultation processes**

Based on Lighting Council Australia's recent experience in dealing with the ABCB during the review of NCC 2019, the ABCB consultation process is flawed and should be overhauled to align with or be incorporated within the Standards Australia consensus-based process.

The ABCB consultation process seems to be weighted towards the views of consultants and ABCB project officers and when those views are simplistic, ill-informed and lack wide market knowledge, the outcomes are likely to be poor for both the affected industries and regulated buildings.

Standards can produce unintended consequences or an excessive cost burden unless developed with care. The current Standards Australia consensus-based process, requiring agreement across a wide range of stakeholders, is a strong protection against such risks.

Based on Lighting Council Australia's recent experience, the ABCB consultation-based process is likely to result in stakeholder concerns being missed or ignored. We do not have confidence that the ABCB consultation processes will deliver reasonable outcomes that include careful consideration of all relevant factors.

Standards Australia is the peak standards development organisation in Australia with over 90 years' experience in developing standards. Their extensive and detailed processes are published on the Standards Australia website including the key principles of balance, transparency and consensus. Government, industry and the Australian public trust Standards Australia as they are:

- Independently audited to comply with accredited standards development organisation requirements.
- Focused on providing demonstrable net benefit for Australia, rather than favouring specific approaches or outcomes; and

This trust and the approach that has earned it are demonstrated in a Memorandum of Understanding (MOU) signed by both the Commonwealth Government and Standards Australia.

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<sup>2</sup> ASBEC Built to Perform, An industry led pathway to a zero carbon ready building code, July 2018

COAG Ministers and the Commonwealth should, as a matter of priority, direct the Australian Building Codes Board to become an accredited Australian standards development organisation.

**Further lighting industry background information not considered in any of the reports to which this submission is responding**

The Australian lighting industry highlights that best practice lighting design considers and accommodates the visual, biological and emotional aspects of lighting schemes. The recent modelling work conducted by Energy Action and the Australian Building Codes Board only considered visual aspects using minimum recommended lighting levels and an overly simplistic lighting design approach (i.e. only using downlights) that did not include the variety of real-world products and design solutions (e.g. architectural, indirect and human centric lighting design).

The lighting industry understands that the National Energy Productivity Plan proposes to reduce the energy used in buildings by 40 per cent by 2030. The lighting industry considers that it is currently leading the way to assist in meeting these targets due to huge investments by Australian and global lighting businesses towards the development of improved efficiency new technology light-emitting diode (LED) products.

LED products now exceed the performance of the highest efficiency 'traditional' lighting products (i.e. high-intensity discharge lamps and linear fluorescent lamps) by between 10-30% and far exceed the performance of less efficient traditional lighting technologies (i.e. incandescent, halogen and compact fluorescent lamps) by 50 to 90%.

Relevant to any future National Construction Code reviews, comparisons with other jurisdictions lighting energy efficiency requirements should be conducted as well as consideration of major case study projects. For example, the U.S.A. lighting industry is currently finalising an extensive 12-month project to develop 100 case study models that will demonstrate the lighting power density requirements of different building types and building sizes.

**Lighting Quality**

Lighting Quality means achieving an optimum balance among human needs, architectural considerations, and energy efficiency. The benefits of lighting include human visual, biological and emotional aspects.

The quality of light affects the way people interact with businesses and buildings. Studies by retailers and business owners demonstrate the effects of lighting on retail sales, office productivity, and the ability to attract people to commercial downtown districts after dark. Lighting designers are keenly aware of these issues, as well as the techniques recommended for achieving positive results.

Lighting designers, building owners, business and innovation leaders (e.g. Google, Apple, Qantas etc.) acknowledge that the type of lighting used influences the perceived value of a building as well as the interest, comfort, warmth and attractiveness of a space. Further,

there is a link between the type of lighting used and human comfort, stress levels, productivity and the innovation potential of workers in those spaces.

Good lighting provides sufficient light levels without glare, which can be irritating or even impair vision. Just as older people need more light to see clearly, they are also more sensitive to glare, making vision and glare critical issues for Australia's ageing population. Energy policies should incorporate visual comfort as a requirement to promote lighting choices that do not trade-off efficiency for glare.

Poor lighting may negatively affect health and well-being by producing glare, eyestrain, flicker, tension and interference with the body's circadian rhythms. It can also produce unsafe conditions by failing to properly illuminate hazards such as curbs, stair edges, and even labels on cleaning products. Energy productivity policies should promote lighting that in turn promotes safety, security and well-being.

Within spaces, patterns of light and the appearance of lighting equipment itself convey vital information to people such as scale, function and wayfinding while emphasizing points of interest such as artworks. Light patterning articulates architecture and reinforces the mood and atmosphere of a space. Energy productivity policies should enable a wide choice of suitable lighting designs that enable businesses and building owners to interact with customers and building users by attracting and making those customers feel as comfortable, welcomed and relaxed as possible.

### **Lighting standards**

The Australian Standard for interior lighting (i.e. the AS/NZS 1680 series) makes minimum recommendations regarding the visual (functional) aspects of interior and workplace lighting. However, this standard specifically excludes consideration of lighting that is used for the purposes of decoration or display and it currently does not include any reference to the biological and emotional aspects of lighting.

We understand the previous modelling processes undertaken by the Australian Building Codes Board (ABCB):

- Only considered compliance with AS/NZS 1680 for visual task lighting requirements using wide beam downlights and 'troffers' (e.g. downlights only).
- Used only theoretical spaces that did not include the variations usually found in real buildings and spaces.
- Did not model any architectural lighting elements used for emotional and atmospheric effects.
- Did not consider the lighting comfort credit requirements within building rating systems such as Green Star and WELL. These certification systems include lighting credits related to occupant comfort and vertical illuminance and are in addition to the recommendations contained in AS/NZS 1680.

It is important to note that the use of wide beam downlights and 'troffers' is the most efficient way to provide a sufficient amount of illumination of a work surface. However, lighting designers and building owners would like to continue to use a wide variety of lighting designs and lighting products including architectural type lighting designs.

## **Architectural lighting**

Architectural lighting covers a broad range of lighting effects and can be defined as any or all of the following:

- Indirect lighting, which illuminates walls and ceilings and not just horizontal work surfaces
- Spot lighting to light architectural elements, provide guidance and increase contrast (i.e. to highlight safety situations such as changes in floor levels).
- Lighting that fulfils the requirements of both functional (visual) needs and emotional lighting needs.
- 'Decorative' fittings where these fulfil a dual role of providing adequate illumination for the task or space whilst also being visually pleasing in their own right.

It is important to note that the above architectural lighting design types are not as efficient as using simple recessed troffers or downlights due to the light loss when light is reflected within light fittings and off building surfaces. However, architectural lighting does provide significant benefits including improved building amenity, value, interest, warmth, attractiveness and atmosphere. The current \$400 Million-dollar Australian architectural lighting market is a testament to these benefits.

## **Energy productivity versus energy efficiency**

Energy efficiency should not be the only goal of the NCC. Given the growing understanding and interest in promoting healthy, productive and stimulating places for people to live and work, any changes to the NCC should recognise this global movement by focusing on energy productivity improvements and healthy, visually interesting installations rather than simply energy efficiency alone.

Markets always lead standards and we encourage the NCC to recognise and accommodate this global movement otherwise energy efficiency considerations alone will lead to gloomy, high glare, poorly lit, high contrast lighting installations.

Yours sincerely,

**David Crossley**



**Technical Manager**