Report on LED's and Effects on Insects – For Information Only.

Introduction:
The reported impact of LED lights on moth and insect populations.'

Information Gathering:

Sources of further information:

1. *Kilkenny County Council, Public Lighting Energy Efficiency Project for Eastern Region, Technical Specification.*
2. *The Best Practice Public Lighting guide by Dark Sky Ireland Prof. Brian Espey*

Dr. Ian Donohue, Head of Zoology in TCD provided 1 source of further information:

1. Research Paper titled *Retrofitting streetlights with LEDs has limited impact on urban wildlife by Ellery J. McNaughton and others* published in Biological Conservation Journal.

LED Lights can be trimmed and dimmed for energy saving and setting type.

The information gleamed through McNaughton research shows that the impacts of changing to LED was minor and increased insect activity on the ground.
'(…) over an 18-month period that coincided with a retrofit from high-pressure sodium (HPS) to white light-emitting diode (LED) streetlights…Avian species richness, relative abundances of three bird species and ground insect activity increased in the presence of LED streetlights. … Our study suggests that retrofitting streetlights with white LEDs may lead to both positive and negative conservation outcomes for urban wildlife, but direct impacts are relatively small and may be mitigated by changes in lighting characteristics, such as dimming. Streetlight retrofits could provide an opportunity to reduce the impacts of ALAN on urban wildlife if intentionally designed with conservation benefits in mind.' (Reference McNaughton 2021)
Note: ALAN - Artificial light at night.

Extracts from the Best Practice section of *The Best Practice Public Lighting guide by Dark Sky Ireland Prof. Brian Espey* strengthens the argument for the use of LED 3000K as proposed under PLEEP.

'The EU Commission's Green Public Procurement (GPP) document is intended to advise decision makers on implementation …. In terms of lighting levels it adheres to the principle of "as low as reasonably achievable" (ALARA) and also recommends that warmer colour LEDs be installed to restrict impacts on wildlife and sky quality as well as potential effects on human health. The document also recommends the installation of LEDs with CCT values of 3000K or less. The document also states that potential impacts on wildlife and skyglow, as well as human health, are sufficient justifications to set restrictions on blue light.

In 2017 the High Court recognised the constitutional right to protect the environment, and the precautionary principle is enshrined as one of the fundamental principles of the European Union. We have a global responsibility to reduce our carbon emission as well as save costs and our national strategy to reduce public lighting impacts relies on the changeover to LED lighting. What we must not forget, however, is that the actions to reduce both energy use and carbon output have been taken with the aim of protecting the environment, hence we should consider the potential environmental consequences of our choices in the long-term. We therefore recommend the adoption of lower CCT (warmer) lighting, which provides the best balance between efficiency, safety, and environmental impact.

Dark Sky Ireland strongly urges the use of warm white lighting with a maximum CCT of 3000K, and lower values in more sensitive areas such as National Parks and conservation regions.'

Practical guidance was also provided.

Practical Guidelines

The information outlined in this document can probably be best summarised using the guidelines produced by the EU COST Action Loss of Night Network (LoNNe) to combat light pollution and a precautionary standpoint suggests these are also good guidelines from the points of view of environmental and human health aspects as well as in terms of energy-efficiency: [1]

1. Every light needs to be justifiable
2. Limit the use of light to when it is needed
3. Direct the light to where it is needed
4. Reduce the light intensity to the minimum needed
5. Use light spectra adapted to the environment
6. When using white light, use sources with a "warm" colour temperature (less than 3000K)

Conclusion:
The use of warm white light benefits biodiversity, the well-being of humans, reduces light pollution, reduces emissions and lighting costs. This is highly relevant given the Climate and Biodiversity crises decreed in 2019.

Under the Government's Climate Action Plan 2021 we are tasked with reducing our emissions by 51% by 2030 and reaching net zero emissions by 2050.

The recommendations by Kilkenny County Council are in line with research, best practice and governmental set target.

Kildare County Council – Recommends advice is sought from a Lighting Engineer regarding the upgrading of LED Lighting on Sports Pitches and the measures to reduce the light spillage impact on local biodiversity.