



**DARK SKY**  
IRELAND

# Dark skies and light pollution

An Chomhairle Oidhreachta  
The Heritage Council



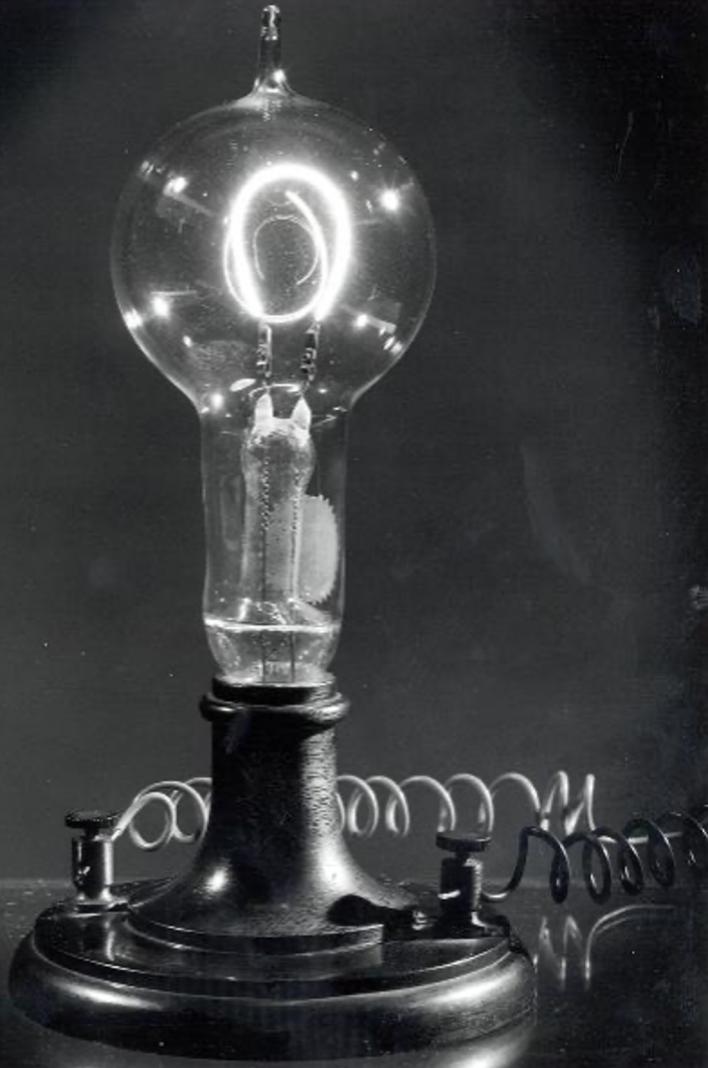


# History

Electric lighting is a relatively new discovery.

- 1752: Benjamin Franklin discovers electricity
- 1802: First electric lamp invented
- 1878: First commercially viable light bulb invented (by Thomas Edison)
- Post WWII: Use of artificial lighting begins to become widespread in Global North

Credit: [ethw.org/File:Light\\_Bulb\\_Edison\\_Series\\_2150\(1\).jpg](https://ethw.org/File:Light_Bulb_Edison_Series_2150(1).jpg)





# Artificial night-lighting today

- street lighting
- commercial lighting (e.g. factories, ports, sports facilities)
- flood lighting for heritage buildings
- shops, office buildings, ...
- domestic exterior lighting, ...

Credit: [https://commons.wikimedia.org/wiki/File:Hong\\_Kong\\_at\\_night.jpg](https://commons.wikimedia.org/wiki/File:Hong_Kong_at_night.jpg)



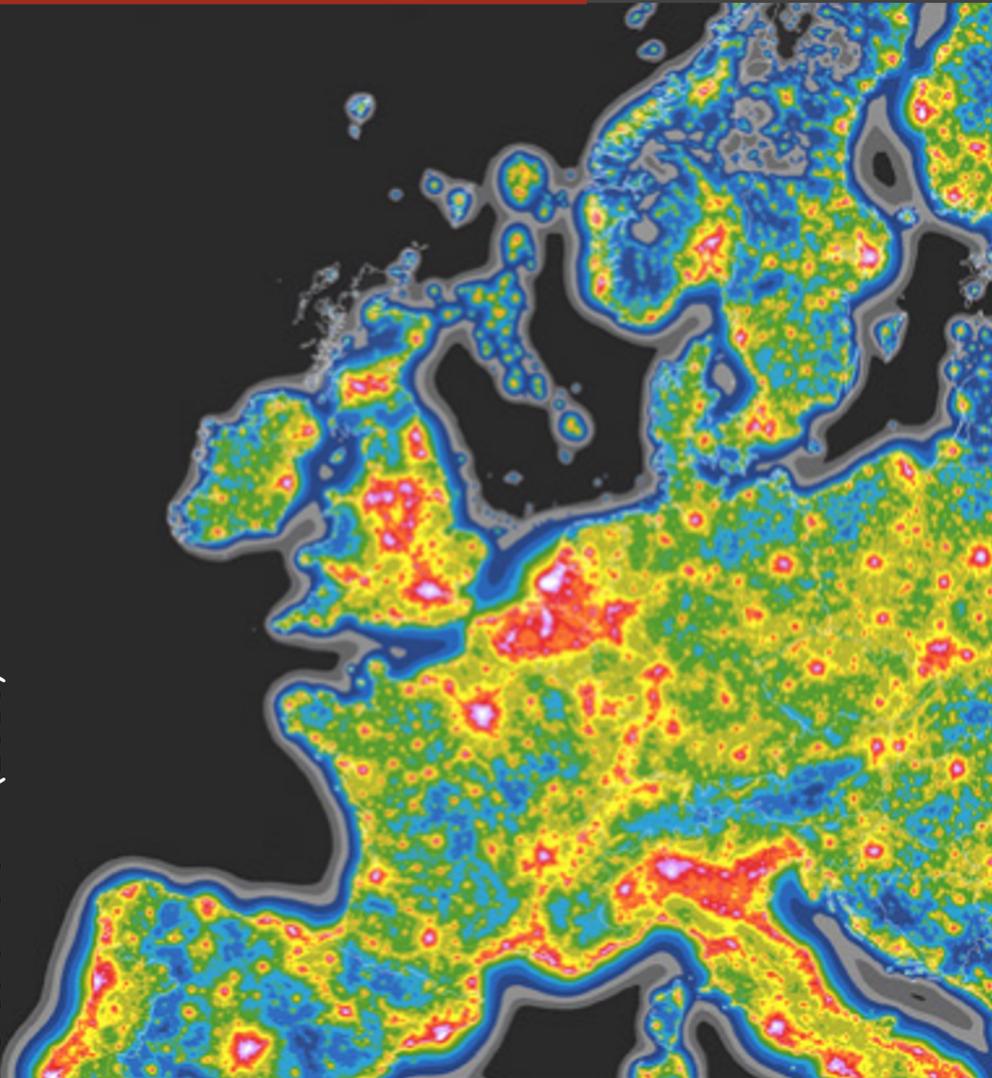


# Facts and figures

99% of Europeans live under light polluted skies (Falchi+ 2016).

Artificial light at night increases by 2% a year, a 49% increase over 25 years (Kyba+ 2017; Sánchez de Miguel+ 2021).

Electric lighting accounts for 16.5% of energy consumption and 5% of greenhouse gas emissions worldwide (Zissis+ 2021).



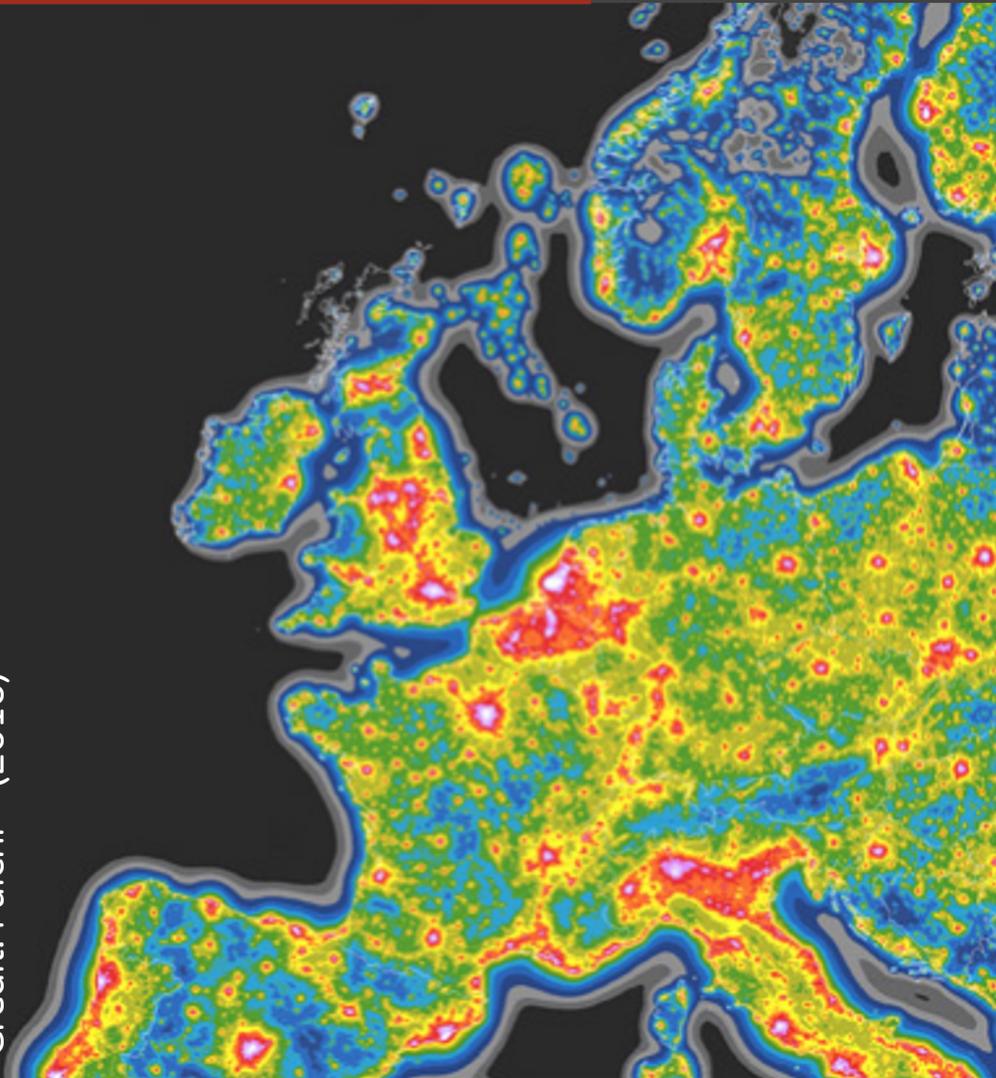


# Facts and figures (Ireland)

Nearly all public lighting is on from dusk till dawn, and consumes up to 35% of a Local Authority's total energy use.

Annual cost of public lighting is > **€56 m**, accounting for **110k tonnes** of CO<sub>2</sub>.

Domestic lighting costs **€233 m** annually, equivalent to **71k tonnes** of CO<sub>2</sub>.

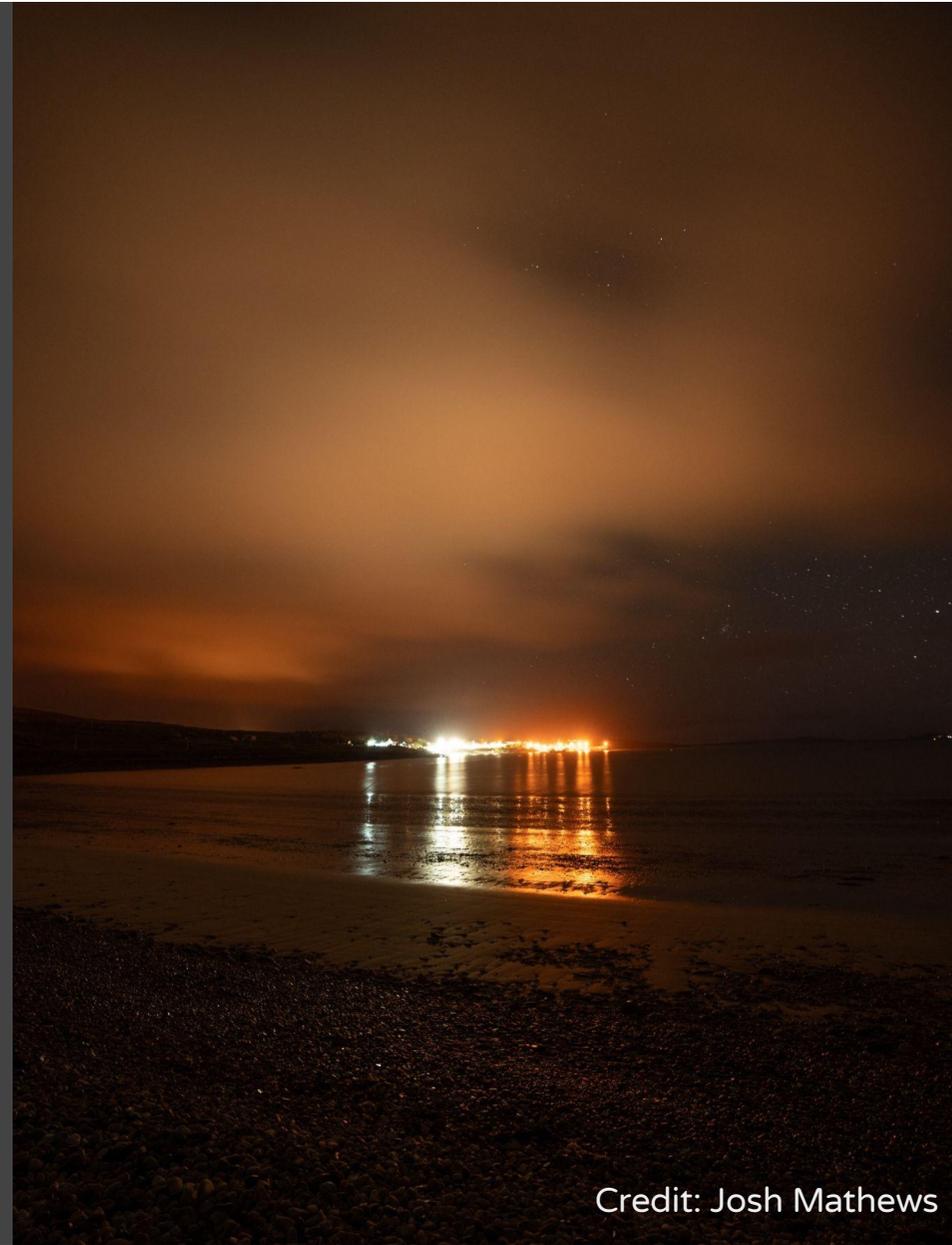




# Definitions

Light pollution is the **inappropriate or excessive use of artificial light.**

- **Glare** – excessive brightness that causes visual discomfort
- **Skyglow** – brightening of the night sky
- **Light intrusion** – light falling where it is not intended or needed



# LEDs

Light emitting diodes



Credit: <https://www.ledwatcher.com/history-of-leds/>

- Invented in 1962
- Commercially available for residential use in 2002 (~£90 per bulb)
- Main source of lighting since 2019

## Pros

- Energy efficient (uses up to 80% less energy than incandescents).

## Cons

- Emits a lot of blue light:
  - scatters high into the atmosphere
  - interferes with the circadian rhythm

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# Circadian rhythm



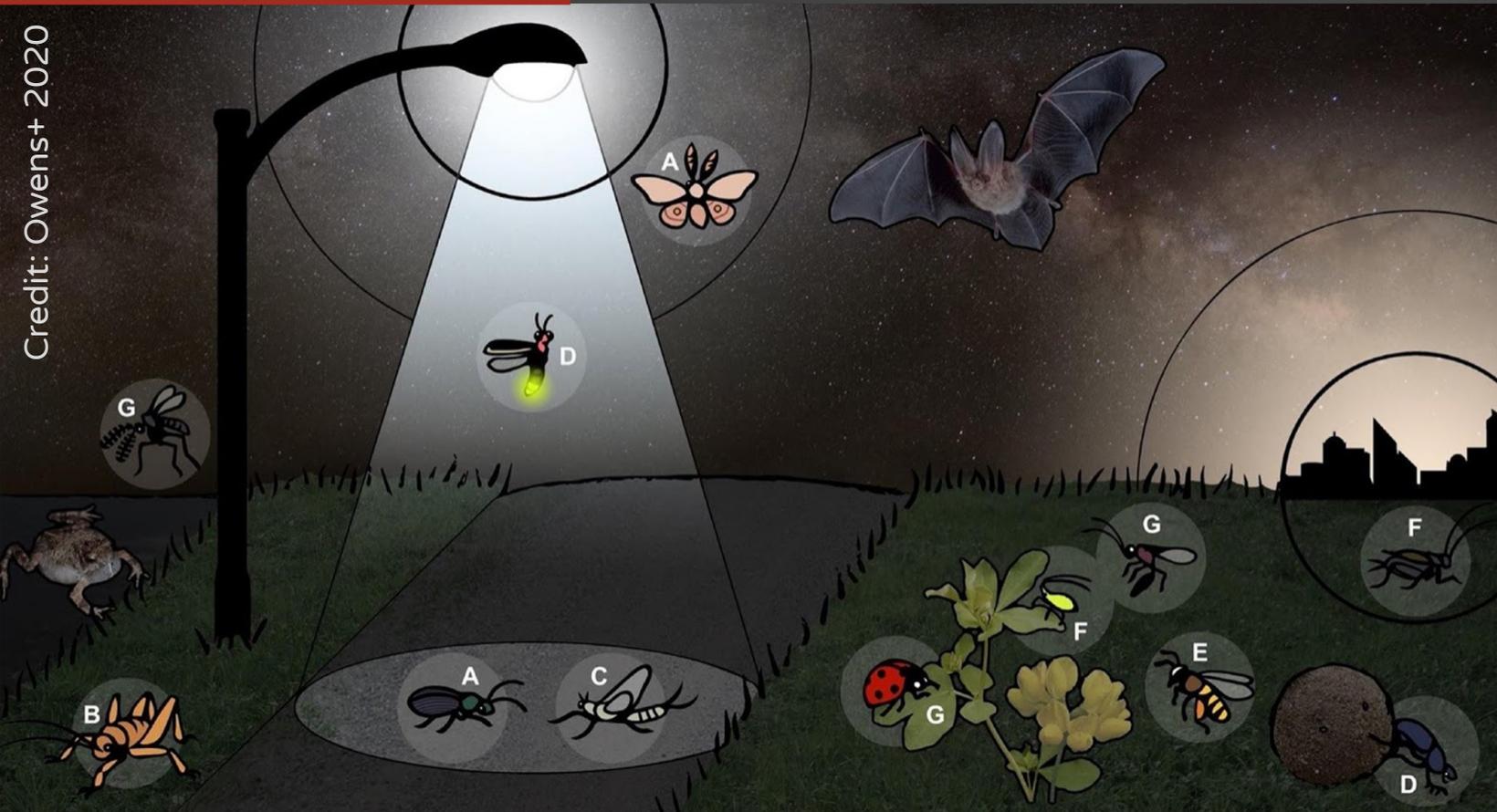
Credit: [365psd.com/istock/artist/Mochipet](https://www.365psd.com/istock/artist/Mochipet)

Life has evolved according to the cycles of day and night. Artificial light at night interferes with these natural rhythms, which negatively impacts the environment and human health.



# Environmental impacts

Credit: Owens+ 2020

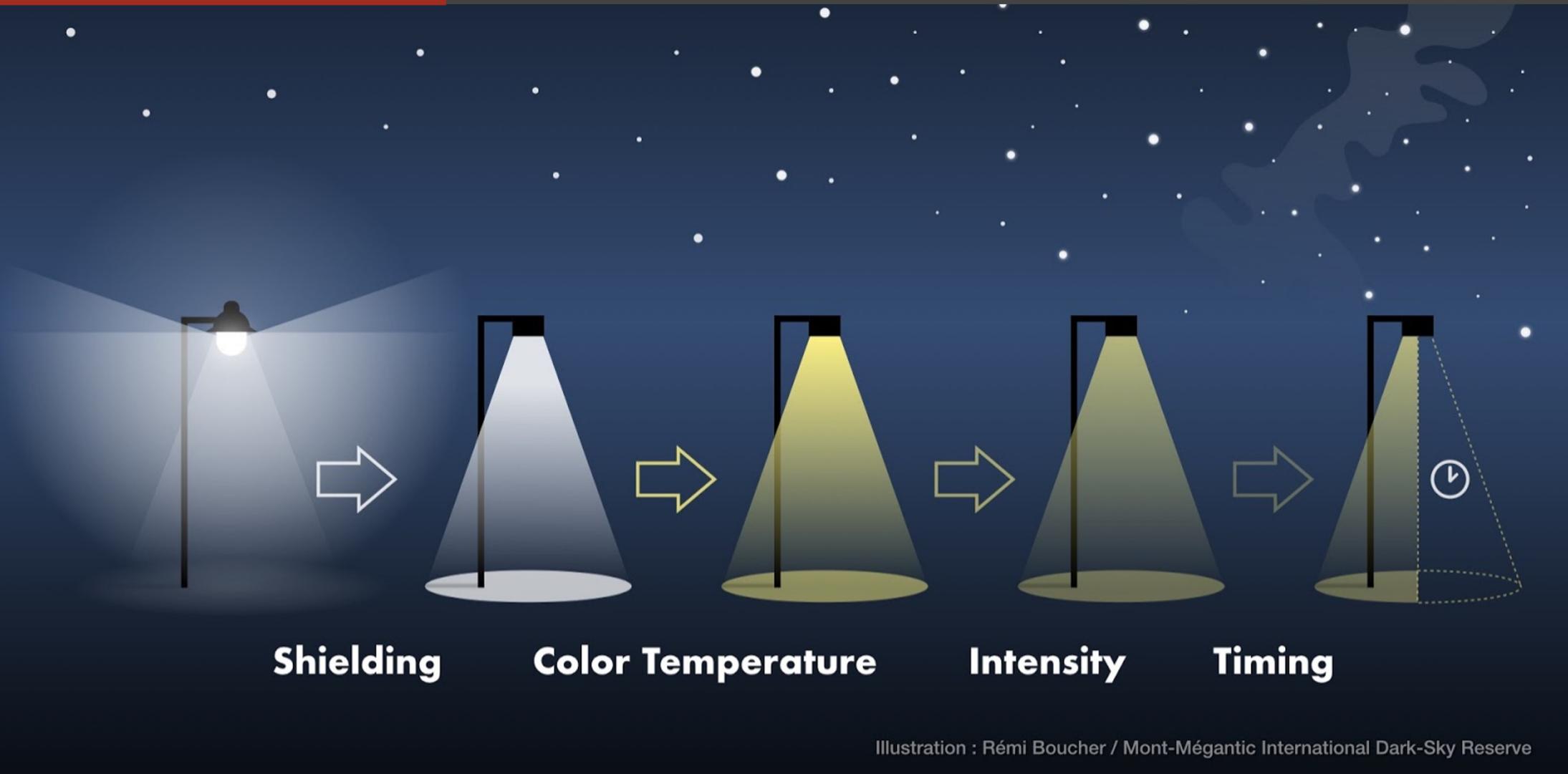


Light pollution impacts living things in numerous ways:

- Disrupts foraging and feeding patterns
- Inhibits movements
- Increases risk of predation
- Disorients and disturbs migration
- Reduces reproductive capacity

30% of vertebrates  
> 60% of invertebrates are nocturnal

These effects can significantly impact an entire ecosystem.





# Colour temperature



Colour temperature is measured in Kelvin (K). Cool white LEDs emit mostly blue light (more than 4000 K). Warm white LEDs have colour temperatures less than 3000 K, and is much safer for the environment and human health.



# Examples of good lighting

Newport



The project so far has saved x tonnes of carbon and x EUR.

(© Dark Source 2022)



# Cultural heritage

## Newgrange

Prehistoric monument. The entrance is aligned with the rising Sun during the winter solstice.

Credit: National Monuments Division, Office of Public Works



# Cultural heritage

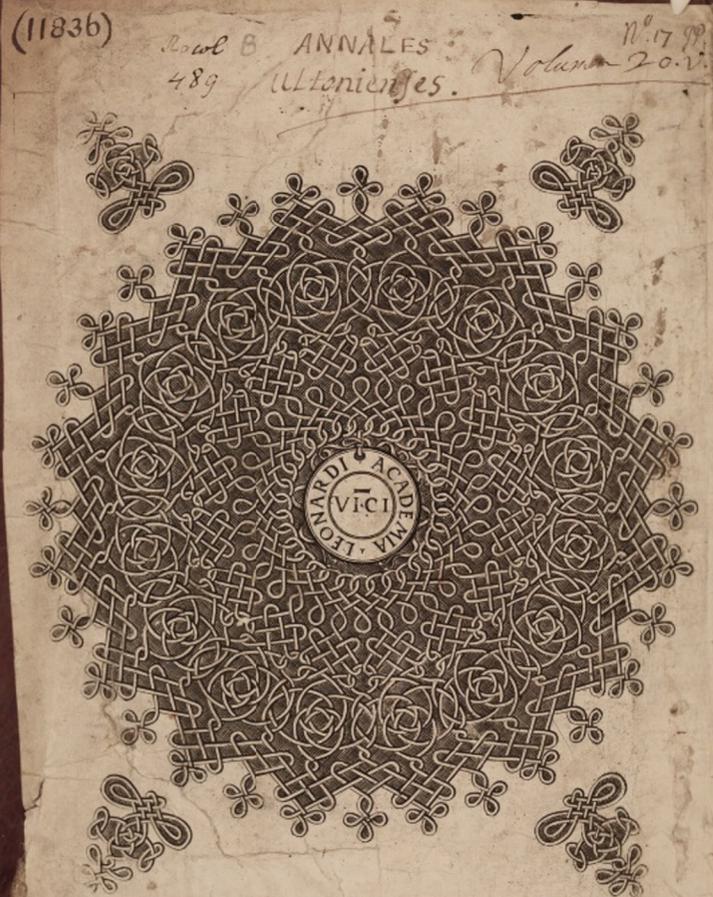
## Navan Fort

Signs of human  
activity since  
5500 BC  
(Neolithic times)

Credit: WG Magazine



# Cultural heritage



MS. Rawl. B. 489  
VOL. 11



- The Annals of Ulster (431–1540 AD)
- Armagh Franciscan Friary (1263–1542 AD)

Credit: Oxford, Bodleian Library MS. Rawl. B. 489



# Cultural heritage

Starry Night Over  
the Rhône  
Vincent van Gogh  
1888

How many artists might we  
be losing due to light  
pollution today?

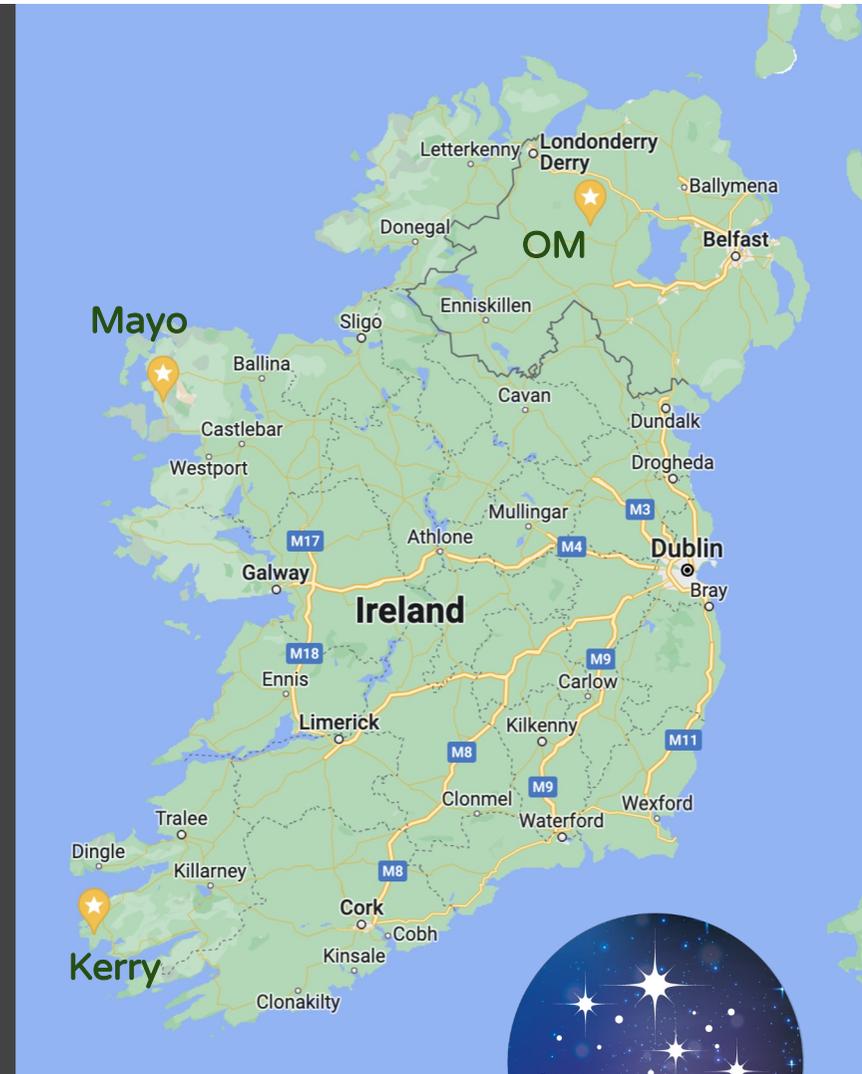




# International dark sky places (IDSPs)

The IDSP program encourages communities, parks and protected areas to preserve and protect dark sites through responsible lighting policies and public education.

The IDA has accredited more than 200 IDSPs since 2001.

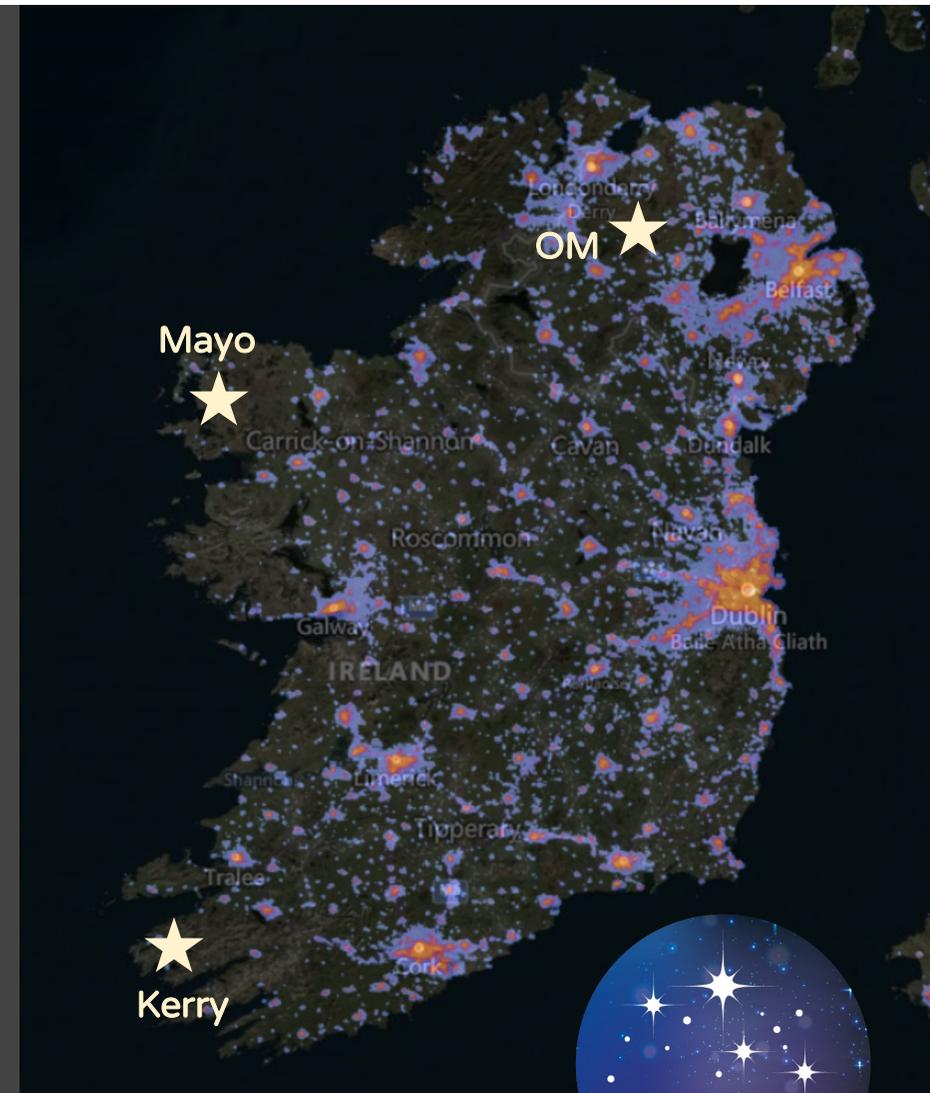




# International dark sky places (IDSPs)

Three IDSPs are located on the Irish Isles:

- Mayo Dark Sky Park
- Kerry Dark Sky Reserve
- OM Dark Sky Park & Observatory (Northern Ireland)



Credit: NASA





Save money and reduce  
carbon emissions

Improve safety

Protect the environment and  
biodiversity

Improve physical and mental  
health

Attract tourists and create jobs

Reclaim cultural night sky  
heritage



# Principles to reduce Light Pollution



## USEFUL



### ALL LIGHT SHOULD HAVE A CLEAR PURPOSE

Before installing or replacing a light, determine if light is needed. Consider how the use of light will impact the area, including wildlife and the environment. Consider using reflective paints or self-luminous markers for signs, curbs, and steps to reduce the need for permanently installed outdoor lighting.

## TARGETED



### LIGHT SHOULD BE DIRECTED ONLY TO WHERE NEEDED

Use shielding and careful aiming to target the direction of the light beam so that it points downward and does not spill beyond where it is needed.

## LOW LIGHT LEVELS



### LIGHT SHOULD BE NO BRIGHTER THAN NECESSARY

Use the lowest light level required. Be mindful of surface conditions as some surfaces may reflect more light into the night sky than intended.

## CONTROLLED



### LIGHT SHOULD BE USED ONLY WHEN IT IS USEFUL

Use controls such as timers or motion detectors to ensure that light is available when it is needed, dimmed when possible, and turned off when not needed.

## COLOR



### USE WARMER COLOR LIGHTS WHERE POSSIBLE

Limit the amount of shorter wavelength (blue-violet) light to the least amount needed.



## Additional Resources

- Protecting Cumbria's dark skies video  
<https://youtu.be/Vbgdytscg7A>
- Dark and Quiet Skies reports I & II:  
<https://cps.iau.org/further-reading/>
- Light Pollution A Global Discussion 2018:  
<https://www.lightpollutiondiscussion.net/>
- Ten Dark Sky Policies for the UK Government:  
<https://appgdarkskies.co.uk/policy-plan>
- Become a Dark-Sky Advocate:  
<https://www.darksky.org/our-work/grassroots-advocacy/>

Credit: Tyler Nordgren



Contact us for more information



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