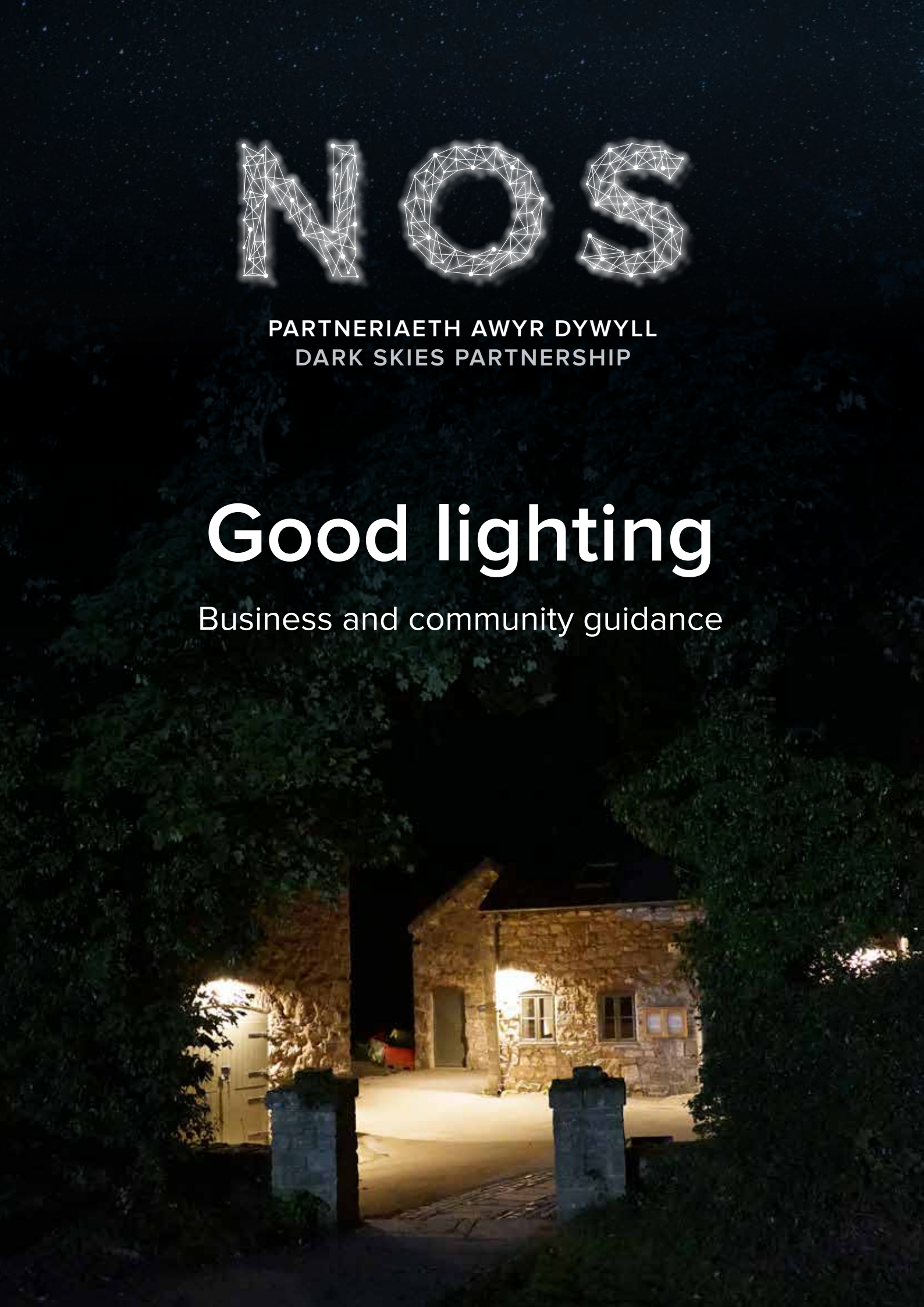
NOS

PARTNERIAETH AWYR DYWYLL
DARK SKIES PARTNERSHIP

Good lighting

Business and community guidance



Introduction

Artificial light at night has revolutionised the way we live and work outdoors, but it has come at a price. When used incorrectly, outdoor lighting can disrupt wildlife, impact human health, waste money and energy, contribute to climate change, and block our view of the night sky. Light pollution is increasing worldwide at twice the rate of global population growth and virtually every species studied is impacted by light pollution.

Businesses, organisations, communities and individuals can play a vital part in helping to create an environment that supports dark skies. You can become dark sky friendly with your own outside lighting and, in doing so, help north Wales become one of the best places in the world to view the wonders of the night sky.

Why become dark-sky friendly?

WILDLIFE
Plants and animals depend on Earth's daily cycle of light and dark to govern life-sustaining behaviours such as reproduction, nourishment, sleep and protection from predators. Evidence shows that artificial light at night has negative and deadly effects on many creatures including amphibians, birds, mammals, insects and plants. Over 60% of wildlife in the UK depends on darkness for its survival.

ENERGY & MONEY
Lighting that emits too much light or shines when and where it's not needed is wasteful. Wasting energy has huge economic and environmental consequences. Why waste energy and money on producing light that never hits the ground?

SECURITY
There is no clear scientific evidence that increased outdoor lighting deters crimes. It may make us feel safer, but it has not been shown to make us safer. Consider the placement of light and whether security cameras do need light for them to function.

HEALTH & WELLBEING
Humans evolved to the natural rhythms of night and day. The spread of artificial lighting means most of us no longer experience truly dark nights. The night-time environment is a precious natural resource for all life on Earth, but the glow of uncontrolled outdoor lighting has hidden the stars and changed our perception of the night.

The problems we face at home

AT HOME

Light pollution has a detrimental impact on wildlife because it disturbs the way animals and plants perceive daytime and night-time. Studies show that the natural behaviours of our British wildlife are being affected by the year-on-year increase in artificial light. How many exterior lights do you have around your home or property? Have you carefully considered each fixture's need, function or design? Are you minimising light pollution in your own back garden? Unfortunately, much of our outdoor residential lighting is inefficient, poorly installed, or altogether unnecessary.

UNSHIELDED

Light emissions from spherical or unshielded luminaries may have significant environmental effects when excessive light is released into the sky. These types of luminaries can be considered undesirable. For example, a typical bulkhead-style luminary emits light above 180 degrees and contributes to the problem.

Installation examples - a typical unshielded luminary is one whereby you can see the light source, (lamp).

OVERLY BRIGHT

Luminaries that are brighter than required to perform simple tasks are a common contributor to light pollution. Selecting the right brightness of luminaries is key to reducing your impact; in the case for dark skies, brighter is not always better.

Installation examples - If you can read small print newspaper outside, the area may be too bright for the intended use.

AIMING ANGLE

If luminaries are not angled correctly they can unintentionally emit light into the night sky, light emitted above the horizontal will cause significant skyglow and should be avoided.

Examples of inappropriate use of light

COLOUR TEMPERATURE

Both LED and metal halide fixtures contain large amounts of blue light in their spectrum. Blue light brightens the night sky more than any other colour of light and as such it is important to minimise the amount emitted. Exposure to blue light at night has also been shown to harm human health and endanger wildlife.

Installation examples - a blue light would be closer to daylight or a common LED touch light in its appearance.

UNCONTROLLED

It is important to ensure all light fittings have adequate control, whether it be manual switching or PIR (Motion Sensor), the more the light can be completely off the better all round. In addition to external light causing a nuisance to the night sky, internal light from buildings also contributes to sky glow.

The solutions

FULLY SHIELDED

Select fully shielded light fittings for all areas. Regardless of the light output of the light source. Consider the colour of the housing of the light fitting, the mounting system and the light distribution. The light distribution should not 'over illuminate' the light fitting, housing, bracket arm, pole or immediate surfaces such that they become a bright surface which distracts from the view of the night sky or the ambiance of the area. Use glare guards and snoots to limit the view of the light source and spill light.

Installation examples - if you are unable to see the light source (lamp) without lying underneath the fitting then it would be considered acceptable.

BRIGHTNESS

An old 100W tungsten light, would emit ~900lumens of light therefore to achieve a similar lighting level to that found in your lounge, you would use an LED equivalent lighting source with an output of ~900lm. However you need to consider the appropriate amount of light needed for each individual area and light it accordingly.

HEIGHT/AIMING ANGLE

Keep the height of the fittings as low as possible, e.g. think more about marker lights, pathway lights, low level bollards e.g. light fittings which are below the eye level of the occupants of the spaces and aimed downwards.

AIMING ANGLE

If luminaries are not angled correctly they can unintentionally emit light into the night sky, light emitted above the horizontal will cause significant skyglow and should be avoided.

Examples of appropriate use of light

COLOUR TEMPERATURE

Lighting with lower colour temperatures has less blue in its spectrum and is referred to as being "warm." Higher colour temperature sources of light are rich in blue light. Consider the colour temperature of the lamp against the material to be illuminated, however the maximum CCT allowable is 3000K for all external lighting and internal lighting which is visible from external spaces. 2700K would be preferred as it reduces the blue component further.

CONTROL

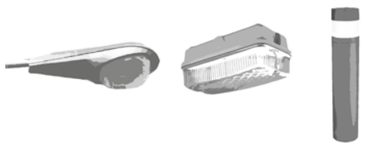
Ensure all light fittings have adequate control, whether it be manual switching or PIR. Lighting should only be on when needed. The lighting should come on when presence is detected, when no presence is detected the luminaries will be off. This will save on energy as well as not lighting areas that are not needing to be lit. Unwanted light spill from internal spaces can be negated by using a full length blackout blind to block the light from escaping. The blinds should be automatic to come down with the fading external daylight. This will eliminate the impact of internal light and its contribution to skyglow.

The problems we face at work

AT WORK

Many people believe that more and brighter lighting makes us safer, but there is no conclusive evidence suggesting that's true. A dark sky does not necessarily mean a dark ground. Smart lighting that directs light where it is needed creates a balance between safety and starlight.

Making small changes to the way we light our commercial properties can have a significant impact on the contribution to light pollution.



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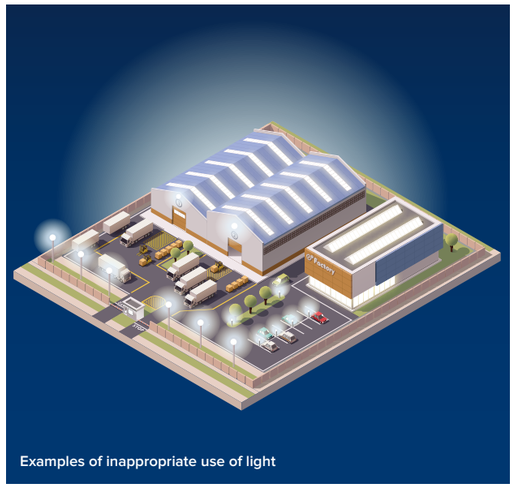

Examples of inappropriate use of light

COLOUR TEMPERATURE

Both LED and metal halide fixtures contain large amounts of blue light in their spectrum. Blue light brightens the night sky more than any other colour of light and as such it is important to minimize the amount emitted. Exposure to blue light at night has also been shown to harm human health and endanger wildlife.

Installation examples - a blue light would be closer to daylight or a common LED touch light in its appearance.

UNCONTROLLED

It is important to ensure all light fittings have adequate control, whether it be manual switching or PIR (Motion Sensor), the more the light can be completely off the better all round. In addition to external light causing a nuisance to the night sky, internal light from buildings also contributes to sky glow.

The solutions

FULLY SHIELDED

Select fully shielded light fittings for all areas. Regardless of the light output of the light source. Consider the colour of the housing of the light fitting, the mounting system and the light distribution. The light distribution should not 'over illuminate' the light fitting, housing, bracket arm, pole or immediate surfaces such that they become a bright surface which distracts from the view of the night sky or the ambiance of the area. Use glare guards and snoots to limit the view of the light source and spill light.

Installation examples - if you are unable to see the light source (lamp) without lying underneath the fitting then it would be considered acceptable.

BRIGHTNESS

It is important to consider the appropriate amount of light for the intended task. Guidance on lighting levels for commercial properties can be found in The British Standards, alternatively seek guidance from your local electrical contractor.

HEIGHT/AIMING ANGLE

Keep the height of the fittings as low as possible, e.g. think more about marker lights, pathway lights, low level bollards e.g. light fittings which are below the eye level of the occupants of the spaces and aimed downwards.

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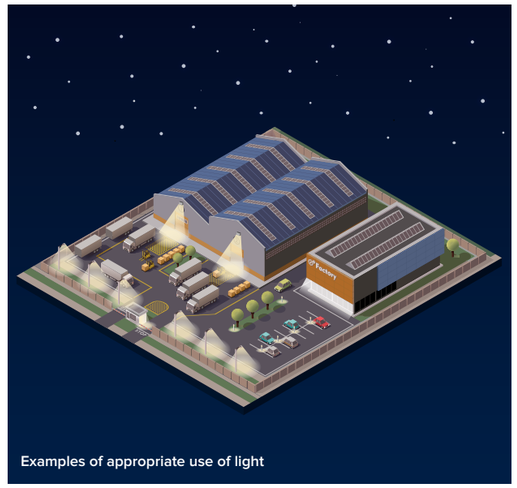
Lighting with lower colour temperatures has less blue in its spectrum and is referred to as being "warm." Higher colour temperature sources of light are rich in blue light. Consider the colour temperature of the lamp against the material to be illuminated, however the maximum CCT allowable is 3000K for all external lighting and internal lighting which is visible from external spaces. 2700K would be preferred as it reduces the blue component further.



Examples of appropriate use of light

CONTROL

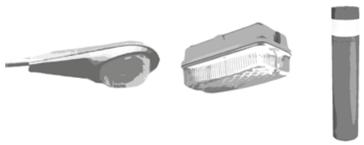
Ensure all light fittings have adequate control, whether it be manual switching or PIR. Lighting should only be on when needed. The lighting should come on when presence is detected, when no presence is detected the luminaries will be off. This will save on energy as well as not lighting areas that are not needing to be lit. Unwanted light spill from internal spaces can be negated by using a full length blackout blind to block the light from escaping. The blinds should be automatic to come down with the fading external daylight. This will eliminate the impact of internal light and its contribution to skyglow.

The problems we face on the farm

ON THE FARM

The farm yard is a busy work space operating all times of the day and night. But flood lighting or excessive light does not always throw light to where it is needed and can create shadows and glare. A dark sky does not have to mean a dark ground. Smart lighting directs light to where it is needed, when it is needed, creating a balance between safety and star light.

Making small changes to the way we light our work spaces can have a significant impact on the contribution to light



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Installation examples - A typical unshielded luminary is one whereby you can see the light source. This can create light glare and shadows reducing the over-all effectiveness of the light.

OVERLY BRIGHT

Luminaries that are brighter than required to perform simple tasks, are a common contributor to light pollution. Selecting the right brightness of luminaries is key to reducing your impact, in the case for dark skies, brighter is not always better.

Installation examples - If you can read small print newspaper outside, the area may be too bright for the intended use.

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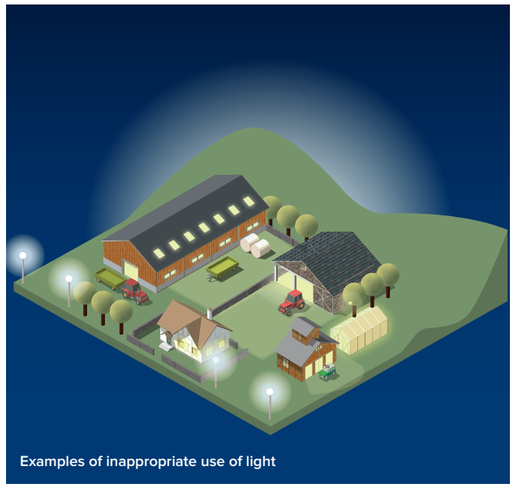

Examples of inappropriate use of light

COLOUR TEMPERATURE

Both LED and metal halide fixtures contain large amounts of blue light in their spectrum. Blue light brightens the night sky more than any other colour of light and as such it is important to minimize the amount emitted. Blue light at night has been shown to have a catastrophic impact on insects with a knock on effect throughout the ecosystem. Exposure to blue light has also been shown to be harmful to human health.

Installation examples - a blue light would be closer to daylight or a common LED touch light in its appearance.

UNCONTROLLED

It is important to ensure all light fittings have adequate control, whether it be manual switching or PIR (Motion Sensor), the more the light can be completely off the better all round. In addition to external light causing a nuisance in the night sky, internal lights left on inside open fronted sheds or large numbers of sky lights contribute to sky glow.

The solutions

FULLY SHIELDED

Select fully shielded light fittings for all areas. Regardless of the light output of the light source. Consider the colour of the housing of the light fitting, the mounting system and the light distribution. The light distribution should not 'over illuminate' the light fitting, housing, bracket arm, pole or immediate surfaces such that they become a bright surface which distracts from the view of the night sky or the ambiance of the area. Use glare guards and snoots to limit the view of the light source and spill light.

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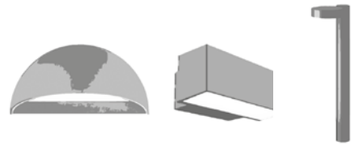

BRIGHTNESS

It is important to consider the appropriate amount of light for the intended task. Less light more efficiently directed can be more effective than brighter lights. Guidance on lighting levels for commercial properties can be found in The British Standards, alternatively seek guidance from your local electrical contractor.

HEIGHT/AIMING ANGLE

Keep the height of the fittings as low as possible, e.g. think more about marker lights, pathway lights, low level bollards e.g. light fittings which are below the eye level of the occupants of the spaces and aimed downwards.

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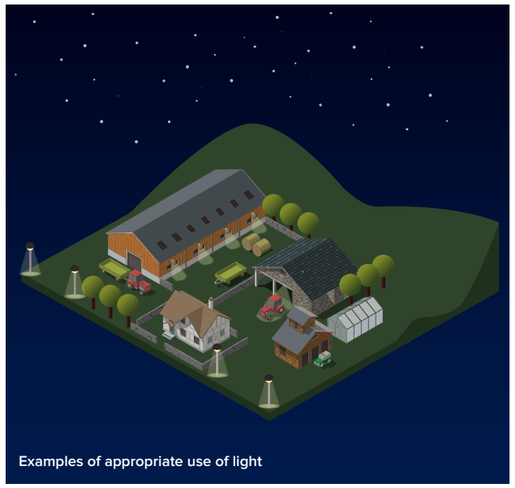

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Key principles

The 5 key principles below will help you evaluate your lighting environment and provide practical solutions to minimise the harmful effects of light pollution:

1. DOES THE LIGHT SERVE A CLEAR AND NECESSARY PURPOSE?

Light is useful for safe wayfinding and to help perform specific tasks. If you find that lights on your property are not necessary or useful, remove or disable them so that they are not accidentally turned on.

2. DOES THE LIGHT FALL ONLY WHERE IT IS NEEDED?

Direct the light down, not up into the sky, and target your fixtures so that light does not spill beyond where it is needed. The light source should not be visible from beyond your property. If the light spills beyond where it is needed, install proper shielding and/or re-orient the light so that it does not extend beyond where it is needed. Be especially mindful of light that spills up into the sky, or onto other people's property.

3. IS THE AMOUNT OF LIGHT APPROPRIATE FOR THE INTENDED TASK?

Use the lowest lighting level needed to perform the task. Light levels are measured in lumens, so check your light source and use the lowest lumens possible. Excessive light can contribute to glare, actually making it harder to see things well. If you find that the lighting level around your home is too bright for the task it is intended for, consider changing the fixture's bulb or installing a new fixture with a lower lumens value.

4. IS THE LIGHT CONNECTED TO ACTIVE CONTROLS?

All outdoor lighting should be connected to a light switch, timer, and/or motion sensor so that they are used only when they are needed. Outdoor lights that cannot be easily controlled with an on/off switch should be connected to a timer or motion sensor. Motion sensors should be set to times of 5 minutes or less. Dusk-to-dawn sensors are strongly discouraged as they release light when it is not needed. Make sure sensor triggers are set appropriately so that they light the area only when people are present.

5. IS THE LIGHT SOURCE WARM IN COLOUR?

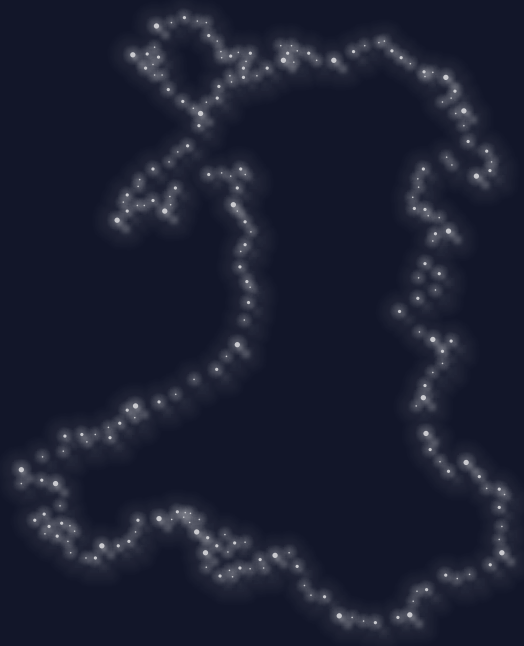
Most light bulbs manufactured today have a Kelvin rating printed on the bulb. Low Kelvin ratings (3000 Kelvin or less) are considered warm and generally emit less harmful blue light than high Kelvin. Higher levels of blue light can be particularly harmful to bats and flying insects which upsets the whole balance of the eco system. For home lighting, there are good options at 2700 Kelvin or less.

NOS

PARTNERIAETH AWYR DYWYLL
DARK SKIES PARTNERSHIP

This document has been prepared for Prosiect Nos, supported by a working group of officers from the North Wales Dark Sky Partnership.

This document is also available in Welsh.



For more information, visit:

www.discoveryinthedark.wales

Prosiect Nos **Prosiect.Nos** **Prosiectnos**

#SaveOurSkies

Bryniau Clwyd a Dyffryn Dyfrdwy
Clwydian Range and Dee Valley
Area of Outstanding Natural Beauty

Parc Cenedlaethol Eryri
Snowdonia National Park

Ardal o Harddwch Naturiol Eithriadol
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