A plan for achieving sustainable development a within quality lighting framework

A Joint Working Group of the IAU C.B7 & C.C1 Commissions

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1. **Introduction**

International and national bodies have set out broad principles of sustainable development. Resolution 42/187 of the United Nations General Assembly defined sustainable development as meeting the needs of the present without compromising the ability of future generations. A sustainable development strategy, *Securing the Future,* sets out five 'guiding principles' of sustainable development: living within the planet's environmental limits; ensuring a strong, healthy and just society; achieving a sustainable economy; promoting good governance; and using sound science responsibly.

These principles align with the International Astronomical Union XXVII General Assembly Resolution 2009 B5, which declares that there is a universal right to starlight. It recognizes that:

1. The night sky has been and continues to be an inspiration of humankind, and that its contemplation represents an essential element in the development of scientific thought in all civilizations,

2. The dissemination of astronomy and associated scientific and cultural values should be considered as basic content to be included in educational activities,

3. The view of the night sky over most of the populated areas of the Earth is already compromised by light pollution, and is under further threat in this respect,

4. The intelligent use of unobtrusive artificial lighting that minimizes sky glow involves a more efficient use of energy, thus meeting the wider commitments made on climate change, and for the protection of the environment,

5. Tourism, among other players, can become a major instrument for a new alliance in defense of the quality of the nocturnal skyscape.

The purpose of the plan is to contribute to the achievement of sustainable development to the three dimensions: economic, social and environmental through quality lighting (QL). These dimensions give rise to the need for the planning system to perform a number of roles:

- an economic role – contributing to building a strong, responsive and competitive economy, by ensuring that sufficient land of the right type is available in the right places and at the right time to support growth and innovation; and by identifying and coordinating development requirements, including the provision of infrastructure;
- a social role – supporting strong, vibrant and healthy communities, by providing the supply of housing required to meet the needs of present and future generations; and by creating a high quality built environment, with accessible local services that reflect the community's needs and support its health, social and cultural well-being; and
- an environmental role – contributing to protecting and enhancing our natural, built and historic environment; and, as part of this, helping to improve biodiversity, use natural resources prudently, minimize waste and pollution, and mitigate and adapt to climate change including moving to a low carbon economy.

Sustainable development has implications for quality lighting. The following questions will help to identify when the possibility of wrong lighting might arise in a new development plan or in an old installation:

- Does a proposed development plan, or a major change to an existing one, materially alter light levels outside the development and/or have the potential to adversely affect the use or enjoyment of nearby buildings or open spaces?
- Does an existing lighting installation make the proposed location for a development unsuitable? For example, this might be because:
  - the artificial light has a significant effect on the locality;
  - users of the proposed development (e.g. a hospital) may be particularly sensitive to light intrusion from the existing light source.
- Does a proposed development plan have a significant impact on a protected site or species e.g. located on, or adjacent to, a designated worldwide site or where there are designated worldwide protected species that may be affected?
- Is the development in or near a protected area of dark sky or an intrinsically dark landscape where it may be desirable to minimize new light sources?
- Are forms of artificial light with a potentially high impact on wildlife (e.g. white or ultraviolet light) being proposed close to sensitive wildlife areas, including near water ways?
- Does the proposed development include smooth, reflective building materials, including large horizontal expanses of glass, particularly near bodies of water? (The proximity to bodies of water may change *natural* light, creating polarized light pollution that can affect wildlife behavior.)

If the answer to any of the above questions is 'yes', local planning authorities and applicants should think about:

- where the light shines[1];
- when the light shines[2];
- how much light shines[3];
- what type of light shines (spectral response) and
- possible ecological impact[4].

IAU stresses in particular the educational, scientific, cultural, health and recreational importance of preserving access to an unpolluted night sky for all humankind for all the above mentioned reasons and facilitates the preservation and protection of the world's cultural and natural heritage of dark skies in places such as urban oases, national parks and astronomical sites.

2. The Goal of the Joint Working Group

The goal of the working group focuses on education, using the above concepts, since through educating future citizens we help reorient education towards sustainable development, in order to empower the world's 60 million teachers to become key agents of change, and through them reach local – global authorities and change the situation.

Using as a tool the following successive programs, as good practices and as a source of organized integrated knowledge

1. Globe at Night[5]
2. Cosmic Light Kit[6]
3. IYL Quality Lighting Teaching Kit[7]
4. NASE KIT[8]

we intend to establish a strong professional network with pre-service teacher courses as well as the in-service education of teachers, at all levels, education policy-makers, and authors of educational materials, with final target to integrate the concept of quality lighting and the Light Pollution topic to the national educational environmental curriculum.

In detail:

1. Establish a National Contact for the Quality Lighting Joint Working Group of IAU Com. C.B7 & C1 in each country with active members of the Commissions, through the main observatory of the country or other institution willing to support the activities of the National Contact, with the commitment to the transfer and sharing of knowledge.

2. The liaison will during 2017-2018

   2.1 Run locally the proposed programs of Quality Lighting education.

   2.2 Establish liaisons with governmental education organizations, UNESCO local offices, etc. The goal is to identify jointly the opportunities for inclusion of sustainability and dark sky protection in the curriculum, in the specific local context.

   2.3 Connect with environmental government bodies. The goal is to identify jointly the top priorities for sustainability and the opportunities to include dark sky protection, as well as to define ways to include those items in local and national curricula.

   2.4 Encourage citizen science programs that measure the level of light pollution in their countries and report results to international databases accessible to IAU C.B7 and C1.

   2.5 Identify cultural, natural or professional observatory sites in need of special dark sky protection within their country, and promote educational and outreach efforts that make the public case for that protection.

Finally, in 2019, where possible, all the achievements will be reported to the local Ministry of Education of each country with the goal of integrating the topic into the national environmental curriculum. Through the actions described, the goal is to draw political attention at the highest levels to the vital role of education in building a sustainable future. The goal is also to be actively engaged in promoting local legislation to prevent light pollution and promote quality lighting.

3. **About the WG structure**

Margarita Metaxa (in representation of C1) and Constance Walker (in representation of B7) are chairs of the WG. The chairs have invited members of the Union to be part of it.

See the membership list:

https://www.iau.org/science/scientific_bodies/working_groups/279/members/

References

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