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## Impact of lighting on health and well being of life forms : content curation of the web for the past ten years

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# IMPACT OF LIGHTING ON HEALTH AND WELL BEING OF LIFE FORMS CONTENT CURATION OF THE WEB FOR THE PAST TEN YEARS

## keywords

content curation, street lighting, life forms, one health, scoop.it

## ABSTRACT

Impact of public lighting on health and well being of life forms either human, animal and vegetal is more and more of concern since the last decade. We have been using content curation of information circulating on the web with Scoop.it to build and maintain a content hub on Street Lighting, Innovation and Design since 2011. Apart from technical developments, societal consequences of public lighting appeared as an increasingly major topic of interest on internet. We survey the information collected from the web on health and wellbeing related posts and discuss the knowledge gathered. The topic focusing initially on light pollution, supported by ecologists and dark side movement is more and more of concern for every actor of the lighting industry and for civil society, not only in western countries but also in the global world. Technical developments of lighting, economical aspects, ecological approaches, quality of life of humans and all type of living forms animal and vegetal became over the years major research interests and policy arguments in order to harmonize development and safeguarding the planet.

## INTRODUCTION

Street and public lighting is now an essential development pattern of planet earth and of human society. Consequences for security at night were among the first objectives of such implementation in previous centuries. Progress in energies availability and light sources allowed to build infrastructures first in cities then almost everywhere in the world.

More recently, technical developments with for instance introduction of LEDs gave hopes for savings, in some countries/cities willing to reduce their costs. Sun lighting and off-grid technologies is now offering opportunities in remote locations. Ecology movements developed in the past decades with for instance the Dark Sky movement in the eighties in reaction to obvious consequences of city lighting, such as disappearance of stars visibility in many world areas and to well-being, health and safety of both people and wildlife.

Evolution of human societies with migration of countryside populations to urban environments had major consequences on requirements for city management. In a more and more global world, new countries also became major actors either of lighting industry and as purchasers of lighting material for their populations. Health and Well being (in a changing urban environment) was a major initiative and programme proposed by ICSU (now ICS) at the end of last century [1]. It related not only to humans but also to every life forms on earth which might be impacted by environmental modifications. One Health emphasized this approach at the beginning of 21st century [2].

Diffusion and accessibility of information on the internet allowed awareness of the interest of the subject by lay people, city officials and policy makers but paradoxically information overload requires to collect ie find, select, elevate relevant material to help interested endusers students, as well as researchers and professionals discover or keep abreast of information. Content curation tools appeared on the internet at the same time. They allow to collect information by specialists, to build content hubs and share knowledge. Content and digital curation became a core competency for information literate individuals researchers and professionals [3,4].

We present a content hub initially devoted to Street Lighting Innovation and Design, where impact of public lighting on health and well being of life forms is more and more pregnant :

<https://www.scoop.it/topic/lighting-innovation-design>.

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## MATERIALS AND METHODS

Relevant information on street, road and public lighting was obtained/selected from material proposed by the web crawling engine of the content curation tool Scoop.it using keywords such as « street lighting » and « public lighting ». Other information found in parallel on social networks such as Twitter, LinkedIn and Facebook is also curated. Information was elevated and keywords coined accordingly. Every collected information linked to its original source is posted on the following Scoop.it webpage and is freely available. It can be reposted on various social networks.

To analyze material collected over the years, the inside search engine of the curation tool used either keywords or natural language such as health, well-being, safety, security.. ; among life forms, fishes, birds, insects, bats, bees, moths, pollinators, biodiversity.. ; among consequences of lighting, light pollution, dark sky.. ; among world countries and continents : USA, Europe, Africa, Asia...

## RESULTS AND DISCUSSION

The content hub collected more than ten thousands posts during the past 10 years, while for instance 30% more lights were present in France during the same period of time. In 2015, while LEDs and solar lighting represented 40% of posts, this societal watch found already almost 10% of information encompassing light pollution, costs of lighting, security and ecology concerns respectively of lights restriction and lights overuse.

Major technical developments of lighting influencing health and well being relied mainly, during the same period, on LEDs implementation and usage of presence detection to first make savings and then reduce light pollution in cities and countryside villages. Recently, light colors changes make the solution not as efficient as previously thought.

Technical developments of lighting, economical aspects, ecological approaches, quality of life of humans and all type of living forms animal and vegetal become over the years research interests and policy arguments in order to harmonize development and planet safeguard. Light pollution per se was indeed the initial ecological concern. Between 2012 and 2016, satellite measurements revealed that the global area polluted by artificial light grew by 2 each year. Light pollution (>500 posts) and Dark sky movement (>125 posts) have been widely present in the content hub. Now dark sky tourism information increase in many world areas.

Ecology concerns for animals and other life forms (insects, plants) are more and more documented concerning numbers of individuals, changes in behaviour and comportement, consequences on reproduction and biodiversity. Many species are listed on posts such as birds (>50 posts) and consequences for migration, fishes, turtles, bats... insects, moths, bees, pollinators appearing in biodiversity consequences.

Human health appeared in a few studies in USA linking breast, prostate, thyroid cancers to blue light of LEDs and lighting at night, as reported by newspapers in various countries. More documented in night-shift workers are influence of circadian disruption rhythms by public lighting [5].

Well being of humans related first to security and safety (>400 posts) during the night, and public lighting influencing many human activities, such as leisure, education and commerce at night. Groups such as women and isolated elderly seem to be the more fragile human subgroups. This appeared as a big concern on the internet in UK some years ago, when light cuts policies appeared to reduce costs of lighting. In France, similar policies are now appearing in many small cities and villages and/or try to use new techniques (LEDs, and presence detection) to lower costs

of lighting, with similar concerns. Developed and developing countries might have different approaches according to their needs and cultural habits. Indeed, Africa (>300 posts) and developing countries are of course willing to increase access to electricity for lighting in cities. Solar energy and off-grid technical solutions should help them to access better life conditions not only in cities but also in more remote areas.

All those aspects are integrated in the sustainable development approach of public and street lighting integrated into the smart city solutions (>1500 posts) which include smart lighting systems. This is now emphasized not only in big cities such as London, New York or San Diego but also in countryside villages in Europe, America, Asia and Africa.

Content curation can be defined as the process of collecting, analyzing, displaying and sharing information in order to derive new insights and knowledge and present these findings to a broader audience. Content curation by information and/or competent professionals involved in selecting, aggregating and sharing relevant information on a regular basis is a mean to focus the area of searching and untangle the information overload jungle. The collection of information from social networks (Twitter, LinkedIn, Facebook) allows to gather other type of information coming from local newspapers reporting more and more lighting local policies.

This content hub is a collection of information visible on the web related to street and public lighting. Collecting information from various types of publications, specialized journals as well as general press, and on social networks, it covers not only technical innovations but more and more societal consequences of lighting such as health and well being of all types of life forms.

## CONCLUSION

The Scoop.it Content Hub « Lighting Innovation Design » sampled and curated web information on impact of lighting on health and wellbeing of life forms during the past ten years and intend to pursue the effort to made more easily information available on this sensitive topic.

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