

Planning the night – light as a central issue

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Abstract

Illumination is not only a way of bringing the day into the night time-space. The consciousness of this concept had been growing in our cities since light became also way of art. Free time liberalization, combined with the increasing use of energy, offered night a new dimension. Lighting projects allowed to fix security assurance in problematic urban areas, at the same time that generated excess of light. Light pollution begin to be as issue related to urban centers, caused by a bad light use that spreads light in many directions. This diffusion of light obstructs sky view and stars knowledge. In order to avoid this situation, several countries gather policies to preserve night sky, alleging it is a common heritage and a right that must be guaranteed to the next generations – it is necessary to rethink night and plan lighting.

Key-words: light/lighting, planning, night, urban landscapes, sky protection

1. Introduction

There are few scientific studies that combine urban planning and the night dimension of light. Planning the light is usually left for the architects and projectors that think about the best way to illuminate a certain building, a piece of art or lightning a public space. Creating light games is only possible when the sun goes down in the horizon, and the darkness spreads away. In the cities, we are so concerned generating an artificial day into the night, in order to continue the sunlight hours activities, that we forget to look up. The starry night sky is almost forgotten by the ones who plan the urban illumination. One of the most perceptible effects of the artificial lightning is the light pollution. According to the Starlight Initiative (2007), light pollution is “a brightening of the night sky caused by artificial light being scattered by small particles in the air such as water droplets and dust”.

Planning the light orientation is essential not only to decrease the light pollution, but also to provide an adequate performance of light. Avoiding light waste we are

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simultaneously saving energy, illuminating rationally the object of our concern (may be a public garden, a waterfront or a notorious structure), encumber sky glow and even preventing the disturbance of the animals that are around.

An international initiative in defense of the quality of the night sky began in 2007 gathering a scientific committee working to maintain the right to observe the stars. Such regulation has the following commitments: reinforce public knowledge of the skies associated cultural expression; promote public awareness to conserve nocturnal landscapes; identify and encourage initiatives to enhance the value of cultural heritage associated with astronomy; create an opportunity for innovative forms of sustainable tourism assisting the sky observation (Starlight Conference 2007).

Urban areas possesses other structural problem upcoming with the night. When the night time arrives at the city, the central concern is to preserve the maximum quantity of light that is needed to work, to shop, to take a walk, to go to the gym, and extend the economic activities as late as possible. As so, lighting plays a crucial role in the night time life, not only for the ones who remain active, but also states importance in matters as security. Generally it is accepted that, the more illuminated a certain place is the safer it will be, therefore the night is a lot linked to the practice of less appropriated behaviors - the fear appears in the same proportion that the light decreases. And in this case, quantity of light is not always a synonym of lighting quality.

With this paper we intend to present several topics regarding light pollution and discuss what can be done by urban planning. Firstly we will analyze light through time, identifying the first uses, it's evolution and light recreations that had been happening in our cities. Secondly we will try to demonstrate that the light pollution is an ambiguous question: it is simultaneously a financial and an environmental problem, due to severe perturbations on the ecosystems, namely birds and plants, but fishes are affected too. Although, it is a problem that finds its origin combining a bad use of light in public city spaces, projecting light in wrong directions, causing sky glow. Thirdly the paper we intend to present some startled examples of good lighting practices answering the following crucial questions: What legislators and planners should be doing about light pollution? What local authorities should be doing about light pollution?

2. Light through times: uses, inventions and recreations

Sky contemplation has always been part of humankind evolution over the ages, playing an important role as instrument wisdom. Egyptian or Classical Greek architecture brought day and night light to its monuments, working illumination as an ornamented component of architecture. In Rome, the divine assumed as the central inspiration for designs and architects that projected meditation spaces in which light was filtered through blemished glass windows representing scenic religious figures. As PORTELA (2007:112) remarks, "(...) the humanized light of the Renaissance, the sublime light of the Baroque period and the fluid light that allows us to use glass enclosures in contemporary architecture, which almost manages to eliminate the difference in light between the interior and the exterior". Without star knowledge there have never been possible to navigators to embrace the magnificent journeys and discoveries of the XV and XVI centuries. "All the major civilizations and their fusion with the cosmos have to be studied to realize that none of them could do without this learning to forge their knowledge" (MORALES, 2007:69).

Birmingham, in United Kingdom, was the first world city to possess public illumination by the end of the thirties of the XVIII century. The first electricity experiences had taken place in 1844, with lighting of Luxor obelisk in the Place de la Concorde in Paris. In Portugal, public illumination appeared in Lisbon in the year 1780, using olive oil as combustible (SERRÃO, 1979), lamps using gas were introduced by the year 1848. About almost a century later (1929), electricity was multiplied in Lisbon, noticing several regional disparities in Portugal approximately at Second World War. Some rural areas experienced electricity after 1974, covering almost 95% of the country.

The spread of urban public illumination had changed people's habits forever. Gradually, we adjusted economic and social activities as we need the most, abandoning the ordinary day / night sequential moves (ALVES, 2009). Economic system have taken custody of artificial light seeking greater efficiency and increasing work productivity, by extending the number of hours worked and dissolving seasonal variations of light . All types of professional activities can enter deeper in the night period, transforming completely the geography of time as space. Night light transfigures, separates or put in evidence certain aspects in the territory "(...) good lighting, illuminates, clarifies, stimulates. Bad lighting, (...) dazzles, confuses and produces weariness" (PORTELA, 2007:113). Artificial light emerged as a powerful instrument to redesign a place, providing visibility and protection. In our modern societies it plays an increasing role in promoting leisure activities, well-being and the

most significant is that artificial light gives people the perception of night territory appropriation/domination (ALVES, 2009). In the same way, we have to recognize that more important than the amount of light, is the quality of that light we introduced in public places. Through the capacity of transmitting information using appropriate light, we can reach safety and comfort standards that are vital to living public places.

In spite of its common uses, light had appeared by the year 1900, as a way to beautify and redecorate monuments, places and spaces (NARBONI, 2003). Still, night continued to represent a barrier between the day, assumed as the stage of all human activities. This dichotomy separates day and night very clearly, in which night was associated with the unknown, provoking fears, mystery, curiosity and contradiction (GWIAZDZINSKI, 2005); it's the time-period where people must be in their homes, resting, and sleeping, respecting their biological needs. The human being biological cycles (circadian cycles) are faithfully related with the day-night (or vice-versa) transition, organizing their lives according to this sequence. Dawn and sundown gained more representativity in the urban context. Economic activities and the social behaviour are no longer restricted by a rigid schedule, taking place in different hours of day or night. In the heart of the night, among 1:30 a.m. and 4:30 a.m., the most part of the city is actually sleeping, the others that don't, distribute themselves into a mix of behaviours associated with choices they made (GWIAZDZINSKI, 2005) – in this period the city registers the lowest use taxes, however, bars and discos hit the highest point. The ones that stroll in the city are confronted by themselves and with others.

PAQUOT (2000) distinguishes a turning point in night perception, this is when social and cultural transformations come to colonize the night period, through the understanding of it as an extension of day activities. Night started to be the expression of taking advantage of the free time to rest or to amuse.

Quickly light became an instrument that allowed the city to get another projection in the international context. Safety was not the single theme on the decision sphere, the light raised up into the publicity campaigns - in 1925 Citroen stuck its name in shimmering letters on the Eiffel Tower (NARBONI, 2003). The publicity, through the luminous announcements begins to transform radically the image of the great cities; "(...) everyday human experience of terrestrial natural light derives from five major contributors: sunlight, skylight, twilight, moonlight, and starlight. Faintest and most fragile of these, starlight has served as a primal source of wonder and human aesthetic

experience, as well as a fundamental source of inspiration shared as a common heritage by astronomers and visual artists” (MADACSI, 2007:103).

However, starlight as the primal source of aesthetic inspiration have been decreasing in the same proportion that lighting stood permanent in the public places – artificial illumination is an enemy of sky contemplation. It started with some ephemeral appearance related with community celebrations, but later festival lighting switch stat, from an inconstant and punctual use, to stable using of artificial light as an art work (ALVES, 2009).

Above all, it was after to 2nd World War that the tendency of permanent city embellishment through light affirmed and consolidate it visibility (NARBONI, 2003). The technical innovations associated to the production and distribution of light, allowed to low the electricity prices, turning possible such changes, as the same way political transformations allowed to execute them. Public illuminations begin to grow as a social and essential god, more than a way to get profit (ALVES, 2009).

Until the sixties the development of the public illumination was made without planning and not including a previous strategy (NARBONI, 2003). The goal was to illuminate the public places, streets, avenues or squares, in the same way that monuments were put in evidence, so people could see and could be seen reciprocally. These options tend to reveal objects, forms or paths, creating the feeling of protection and of comfort, allowing an understanding of the urban night.

Firstly, the interventions were limited to the choice of the lamps and of the type of lighting (NARBONI, 2003). As the offer was poorly diversified, the lighting tended to standardized nocturne landscapes, with no respect for the diversity, nor the spirit of places.

It was defined in the previous studies that it would be necessary to divide urban lighting in hierarchies. This plan pointed a change in the urban structure, with the aim of differentiate and establish illumination typologies, according to the characteristics and the main use of the communication axis. From this moment on it settles down a significant evolution that allowed to separate the pedestrian and the automobiles roads, through differing the type of illumination, and so light started to be an instrument that could be used in the territorial planning (ALVES, 2009).

In the beginning of the eighties, in France, political power had been restructured in order to place additional effective power to local scale. This decentralization of power

allowed municipalities to intercede in the lighting administration, giving them, therefore, the capacity to decide on the new light facilities (NARBONI, 2003). Urbanism was consigned a new mechanism: the artificial light. Lighting was no longer regarded as a device that could be choose by catalogue, it started to be treated as an element of urban design, contributing to the decision process in developing regions (ALVES, 2007). For the design of urban spaces, managing light was associated with generating quality of life for its citizens.

This phase will be marked decisively by innovative interventions that give a new dimension at night. Through night becomes a palette of landscapes that have never seen before, transforming the image of the city from the outside, but also rearranging by art few particular inside views. Bringing objects alive is one of the main targets, giving them the visibility to attract visitants and other light designers. The urban light is no longer restricted to the interior of monuments or confined to built heritage areas (city center for example), now it includes new spaces, large landscapes, such as the design of the Ruhrgebiet in Germany. It triggers a reflection on the role that light should have the image in landscape and in living atmosphere of cities at night. The light can give sense to a place, giving new uses and new values.

Adjustments in light philosophy affected change in the urban discourse. To FACHARD (2003) these changes resulted from the fact that architecture and public spaces started to be considerate as vehicles to represent values, meanings, including aesthetic aspects. We witness a reorientation of light interventions, with the purpose of putting into people's service. By lighting presences are revealed, spaces magnified and forms and materials percept. A multiplicity of places and events are allowed to take place, contributing in a decisive way to create bonds of identity between people and places.

In parallel with this process of lighting assertion, there several environmental concerning that must be taken in consider: the waste of energy that occurs in the vast majority of initiatives related to light – for example, light pollution in U.S. send to heaven around 110 million dollars per year; ecosystems disturbance due to inappropriate spark light; disorientation of several animal species as a result of errors in use of light, causing the even the death (FACHARD, 2003).

3. Light Pollution

3.1. Ecological light pollution

According to ELBERTZHAGEN; KLUSSMANN (2007:177), ecological light pollution "(...) comprises direct glare, chronically increased illumination and temporary, unexpected fluctuations in lighting." There are various sources of ecological light pollution, such as sky glow, illuminated buildings, streetlights or fishing boats, which can frequently be found near a particular ecosystem. Light pollution produces countless stresses on the environment, affecting negatively animals, namely nocturne flight animals or migratory birds; plants metabolism can also be disturbed. "Life has emerged with natural patterns of light and dark, so disturbance of those patterns influences numerous aspects of animal behaviour. Light pollution can cause perturbations on animal navigation; change competitive interactions, alter predator-prey relations, and affect animal physiology" (ELBERTZHAGEN; KLUSSMANN, 2007:178). Light attracts birds at flight, causing several perturbations on their orientation, experts like ELBERTZHAGEN; KLUSSMANN (2007) suggests that the navigation system used by birds to orientate their routes are connect with the horizon line. One chance this guideline is affected by sky glow, birds do not know which way to take. The diffusion and increasing of artificial public light combined with higher buildings provoke dead among nocturne and migrant birds. ELBERTZHAGEN; KLUSSMANN (2007) explained that with the 'Fatal Light Awareness Program', in Toronto, Canada, it was possible to record 160 bird species victims of collisions with man-made structures for over 10 years. Solutions to reduce the negative effects of artificial lighting are required. Cities need o rethink light strategies, managing it attending to species preservation: (...) "it should be less intensive and in longer wave-lengths so it is less disruptive to the wildlife (...) light must be used more precisely" (ELBERTZHAGEN; KLUSSMANN, 2007:179).

3.2. Focus on urban problem

Nowadays, a great segment of population can be in this world without knowing how to identify the stars in a nocturne sky, being apart of its beauty. We can only take conscious of starry spectacular if darkness comes; it becomes necessary to enhance the contrast between light and shadow (CRATO, 2002). Dominating light opens a range of possibilities to discover new landscapes of sound and smell, and visual landscapes. Some of those resulting from artificial light, but can also result from the

beauty of natural night sky light, as the moonlight and stars light. Volcanoes eruption and thunderstorms, symbolize magnificent opportunities to live unique night experiences through the diversity of light created by nature (ALVES, 2009).

Light pollution is mainly an urban phenomenon, responsible for the changes that have been occurring in the way people understand and contemplate the sky. Such changes originated a clear separation between sky knowledge and human life, bringing up several problems related with nocturne landscapes preservation and security aspects: absent of light is frequently understood as a less safe place, because people are not familiarize with darkness, fearing the unknown.

According to the Starlight Initiative (2007), light pollution is “a brightening of the night sky caused by artificial light being scattered by small particles in the air such as water droplets and dust”. This occurrence is typical from an irrational programming of artificial light that in many situations does not focus what it should; projecting incorrectly the light through sky or through the sea or rivers, for example.



Source: Wikipedia, 2009. Image - Empire State Building Night



Source: www.astro.caltech.edu/.../images/viewjian2006: Bad example of public lighting

Light pollution also includes light intruding into our homes, such as a bright street light outside a bedroom window (Starlight Initiative, 2007). NARBONI (2003) pointed out that the main plans for light planning become simultaneously plans for maintaining darkness, by the awareness of losing sky contemplation in the cities. Planning light orientation is essential not only to decrease light pollution, but also to provide an adequate performance of light - bad projection or the excess of artificial light are the most quoted stresses of our cities.

Avoiding light waste we are simultaneously saving energy, illuminating rationally the object of our concern, encumber sky glow and even preventing the disturbance of the animals that are around. “There is no need to define what natural light is, but we do need to remember that this light allows us to define what is around us, by day and night: the changing perception of the things or the bodies on which it impacts, and the space that contains them. Light, or absence of light, can also transform this space in each season, each day of the year, each hour of the day, each moment” (PORTELA, 2007:111)

4. What planners and legislator should be doing about light pollution? – policies to regulate light pollution: the Sky Law Canary

One great example of an initiative is the Canary Sky Law. It concerns at the same time with sky preservation, with the correct use of artificial light in the urban concentrations and about stopping light waste focusing an economic and an environmental disaster. With the support of many other countries, it established laws and regulations that assist to the right of a clear night sky, mentioning that is a right as equal as other environmental rights. The Canary Islands parliament is a pioneer on this subject.

Observation celestial exceptional quality of the Canary Islands sky is protected by law. The Spanish Government adopted the Law on Protection of the Quality of the Astronomical Observatories of IAC, by proposal of the islands parliament in the year 1988. Although, only on the 13th March 1992 the Spanish government approved the Regulation law (R.D. 243/1992) that assures the protection of the sky at night. The law covers four basic aspects:

- i. Light contamination, the law regulates the exterior lighting on the island of Palma and the island of Tenerife;
- ii. Radio-electric contamination, the law establishes the levels of electromagnetic radiation that does not interfere with equipment and measures of observatories;
- iii. Atmospheric contamination, the law controlling the activities that can degrade the atmosphere around the observatories;
- iv. Air routes, the law regulating traffic on the observatories. (IAC.es, 2009).



Source: chawedrosin.wordpress.com: Tenerife

“Oficina Técnica para la Protección de la Calidad del Cielo” (OTPC) is a division of IAC that lead citizens to meet the terms of the law and supervise its implementation. The positive consequences of this law are not only the assurance of the sky quality, but also significant gains in economic terms, foremost by reducing the waste of natural resources. In addition, Canary economics profits are produced by the market that is created with sky observation activities. This department provides also technical reports for lighting projects and radio electric stations, as well as issuing lighting certificates (IAC.es, 2009).

OTPC alert for the incorrect current outdoor lighting model that has been used in the majority of cities. Its main mistake is that favours dazzling, introducing a great debate: excess of light increases visibility? OTPC states that occurs exactly the opposite – for the most times, abundance of artificial light confused people, especially if the light source is directly pointing for the visibility field. “Concepts such as false security, expressed in the statement that profusely lit cities or roads make for safe cities, or the tendency to confuse light excess with standards of living, prosperity or wealth.” (OTPC, 2007). This organization defends above all the preservation of the quality of night sky, darkness and stars integration on human everyday, so they argue that the light policy that is practice in urban centers is inefficient: “(...) is utterly senseless to illuminate the sky (...) when the idea is to illuminate the ground, enclosed spaces or house interiors.” (OTPC, 2007). The inefficiency that is related with the absence of planning, caused severe impacts on the ecosystems and on the economic system, due

to dissipate of energy – “Avoiding light-pollution of the sky is one of the few environmental questions with an economically viable solution” (OTPC, 2007). Main initiatives and organizations involved in preventing light pollution and promoting night sky defence had been inspired by the work develop in Canary: IDA International Dark-Sky Association; CIELOBUIO Coordinamento per la protezione del cielo notturno (Italia); Light Pollution Abatement Program (Canada); CIE International Commission on Illumination; ISTIL Light Pollution Science and Technology Institute (Italia); CELFOSC (Catalunya-Spain); ANPCN Association Nationale pour la Protection du Ciel Nocturne (France); CfDS The British Astronomical Association's Campaign for Dark Skies; ILPAC Irish Light Pollution Awareness Campaign; The European Greenlight Programme; ILE The Institution of Lighting Engineers (ILE); German dark sky initiative: “Initiative gegen lichtverschmutzung.

The Canary Sky Law allow the definition and identification of an astronomy reserve (European Northern Observatory, 2009), based on the unbelievable clearness that was established in Canarias, allowing magnificent sky views. Related to this opportunity, it begins in 2007 an international initiative in defence of the quality of the night sky inspired in guarantying the opportunity to interact with stars to the next generations. UNESCO had put the sky as a candidate for nomination as World Heritage "The future generations have the right to an Earth without pollution and destruction, including the right to a clear sky." (UNESCO, 1994).

Based on sustainable ideas Starlight initiative consists had grown with the help of a scientific committee. Several countries embraced this cause working to maintain the right to observe the stars. Such regulation has the following commitments: reinforce public knowledge of the skies associated cultural expression; promote public awareness to conserve nocturnal landscapes; identify and encourage initiatives to enhance the value of cultural heritage associated with astronomy; create an opportunity for innovative forms of sustainable tourism assisting the sky observation (Starlight Conference 2007).

5. What local authorities should be doing about light pollution? Good practices

There is a quote that explains the relation between causes and effects in our world. We must act local thinking about global. This means that it is extremely important to identify and act through the problems that we know at a local scale, maybe a region, a

municipality, or even in our yard. Those problems are probably someone else problems that spread along the globe, affecting other regions, municipalities or other people yards. About light pollution is known as a global problem, specially a typical issue occurred in cities or urban concentrations. Although, the light sprawls kilometres away, creating a mesh that continuously to grow gathering others and at last, we observe the sky at night viewing nothing more than a vast cloak. Nocturne landscapes are as important as day landscapes; they can also be rich in colours, senses or just in darkness. Locally, with the help of assertive policies we can protect the principles that were established by the Canary Sky Law, promoting the global preservation of the night sky.



Source: Wikipedia, 2009 – Earth at night seen from sky: Light Pollution

5.1. Problem identification:

The current lighting system generates a significant waste of natural resources, during the excessive consumption of fossil fuels and energy (MIZON, 2002). According to some estimates, about 50% to 60% of produced electricity dissipates into the sky, causing light pollution (ALVES, 2009).

Input of artificial light through the windows can force problems such as tiredness, insomnia and stress for people who live there. Bad lighting uses affect **human central system**. Over-lighting endangers also the nocturne landscape that characterizes every region (ALVES, 2009), preventing both the night vision of the stars and the knowledge development that is associated.

Environmental consequences of light pollution are of various orders: aggression of night ecosystems, causing imbalance in several species - changes the period of

photosynthesis in plants, modifying the cycles of marine plankton, decreases the number of insects, with impacts on levels of pollination plants, facilitates the emergence of pests due to the disappearance other insects; muddy migratory populations, such as birds and sea turtles; promotes the waste of natural resources, increases the emission of CO₂ for the production of unnecessary energy, generates highly toxic solid waste (ALVES, 2009).

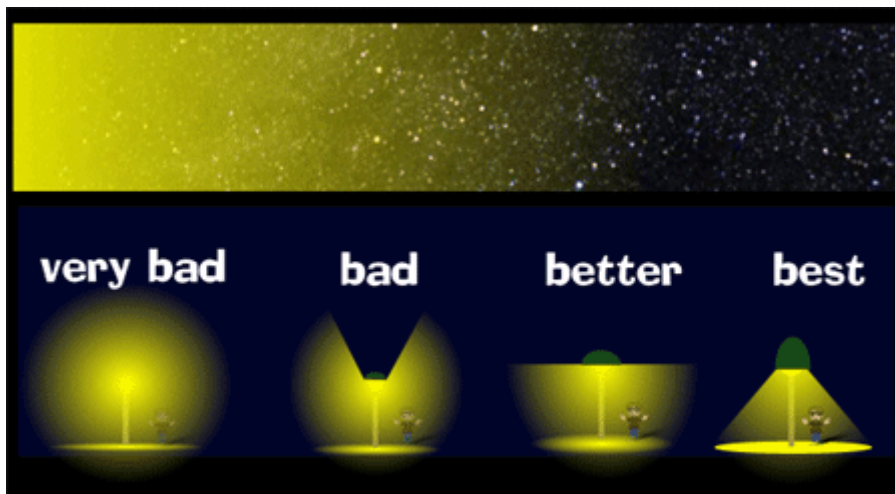
5.2. Simple acts result in great solutions

Lighting systems are generally a waste of public resources. As MIZON (2002:151) states, “in the absence of directives from central government, there is still much that local administration can do to mitigate light pollution (...)”. Residents concerns can pressure local authorities to re-orientate their policies in order to get eco-friendly options. Several local council’s take part of this mission, determined to reduce their environmental bill, simultaneously decreasing costs and negative effects on their territories. City of Tucson, Arizona, might be a model in matters of astronomical sensitivity through deliberation, on 1994 of the Revised Tucson and Pima County Outdoor Lighting Control Ordinances: this code proposes to “provide standards for outdoor lighting so that its use does not unreasonably interfere with astronomical observations” (Ordinance No. 8210., Section 1, 1994:152). The purpose of this code is “(...) to encourage, trough the regulation of the types, kinds, construction, installation, and uses of outdoor electrically powered illuminating devices, lighting practices and systems (...)” conserving “energy without decreasing safety, utility, security, and productivity while enhancing night-time enjoyment of property within the jurisdiction” (Ordinance No. 8210., Section 1, 1994:152). Tucson City introduces an interesting detail when mentioning not only the public illumination, but also the outdoors. Therefore, it represents an individual accountability in achieving the rules established for the preservation of the night sky. The code bring together a set of assumptions, like specific prohibitions of lamp types (Section 9); includes a shielding requirements table; recommends special uses (Section 10)and also establishes on Section 16, some enforcements and penalties (MIZON, 2002). Other local authorities, for example in the United Kingdom adopted forms of light pollution mitigation, increasing energy efficiency and preserving rural night landscapes into their plans (MIZON, 2002). Hinckley and Bosworth Borough Council (HBBC) can provide good lessons, adding an interesting topic that is consistent with the Canary Sky Law: “(...) excessive light in the night sky is visually intrusive and is also a significant waste of energy. The visibility of the stars is much reduced by light pollution.” (HBBC, 1994:158) By this statement they are in

agreement that for visual contact with the stars and at the same time store up energy, light pollution must be reduced or prevented – “(...) through good design of lighting, the reduction of light pollution should not conflict with the principles of crime prevention and safety.” (HBBC, 1994:158).

Wasting light or wasting energy is two different but complementary situations. One, wasting energy is related mainly with the expense of a resource that can be consumed in diverse ways: fridge feeding, lamps, air conditioned and so on. Its uncontrolled consumption causes waste of money and environmental consequences. But wasting light is an effect resulted from the other (wasting energy by inadequate lamps) that focus even more the damages of sky glow in the living communities, either human, animal or plants.

The main solution is the use of light sources that are directed to the ground, guiding all their light below. Thus, we can avoid environmental hazards, saving energy and natural resources and improve quality of life (MIZON, 2002). “Most experiments involving the replacement of conventional public lighting with adequately-shaded lamps focussed where illumination is required, and having the additional benefit of low energy consumption, have shown that overall power consumption is reduced between 25 and 30%” (OPTC, 2007).



Source: www.asc-csa.gc.ca/.../resources/stars/light.asp: scheme of artificial light projection

The Institute of Lighting Engineers (United Kingdom) recommends a range of guidance notes for reducing light pollution (MIZON, 2002: 180-181):

- do not over light (A1);
- switch off lights when not required for safety (A2);
- use specific design lighting equipment that minimises the upward spread of light near to, or above the horizontal (A3);

- keep glare to a minimum by ensuring that the main beam angle of all lights directed towards any potential observer is kept below 70 degrees (A4);
- for road lighting installations, light near to and above the horizontal should be minimised to reduce glare and visual intrusions (A5).

“The enjoyment of a dark sky therefore has a lot to do with our concept of rational energy use, not only in matters of intelligent lighting management, but also in aspects concerned with decisions regarding transport, or renewable energy options, which directly affect atmospheric quality. Thus, it could be stated that an energetically sustainable community is a community capable of enjoying the night sky.”(OTPC, 2007)

6. Conclusion

Social and cultural changes of the recent decades had increased the importance of space-time night. Among the changing drivers, we can highlight the following: the liberalization of social practices; demographic changes; the increasing of single people without limitations of time and free of charges related to family life; and the coming out of new urban life patterns – this range of situations had contributed to reduce the separation between day and night, at the same time that different rhythms of life are growing. In addition, social practices related to free-time gained a new projection in the social sphere – free time emerged as an important period of self valuing. These transformations are related to lighting technological innovations, which allow people to take up economic, cultural or political activities into the night, or simply having a space-time for themselves. We have been attending to a democratization of leisure as a group of night experiences, contributing to the development of new segments of economic activities that live only (some of them) in the night time period.

Artificial light is a key element of public places, playing a crucial role on the urban project. Planning light establishes the guide lines for design, orientation and efficiency of illumination projects. It generates urban life quality in terms of security; minimizing environmental risks; and constituting an opportunity to enjoy the night sky.

Light can be an instrument of transforming and constructing new landscapes: i) upgrading spaces and creating more suitable environments; ii) illuminate in order to reveal the most remarkable built heritage; iii) highlighting details, materials, and giving

the perception of new materiality's; iv) bringing public spaces alive by creating a functional day use and by promoting a night use of parks and gardens.

Illumination is also an issue of ecological awareness. The vast majority of energy wasting comes through light diffusion, bringing serious consequences for both economic and environment – planners, legislators and local councils must gather to think in the best way of assure a good light performance, suitable for urban safety, ecosystems friendly and guard the night sky.

Light planning is being redirected towards a rediscovery of night and darkness. The light can only be spectacular if the darkness comes; it becomes necessary to enhance the contrast between light and shadow. This does not mean a retreat of the importance of lighting, but rather to reaffirm the symbolic power that may be underlying when thinking about light interventions. This theme is increasingly present in urban planning as a way of creating a brand new image that differentiates the cities as an artistic way. Both cultural, economic and environmental policies should be taken into account when planning the night – simple acts, like projecting light to illuminate the ground or the specific objects of our concerns, can make great differences. Lamps and light orientation must be replaced, avoiding light diffusion that causes sky glow, the enemy of stars and astronomy knowledge.

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