

CEL FOOSC ASSOCIATION AGAINST LIGHT POLLUTION is an independent, nonprofit and state level association, founded in 2005. It represents more than 6,000 people and is the reference association in Spain working against light pollution. Its aims are:

- To study the phenomenon of light pollution and its effects
- To promote awareness and dissemination of the problems involved in light pollution
- To promote awareness and dissemination of solutions to light pollution
- To take actions aimed at minimizing light pollution, and
- To ensure law's compliance about nighttime lighting regulation to avoid light pollution.

Spain is affected by light pollution in a special way. According to the president of Cel Fosc, Carlos Herranz, if you look to the map of light pollution in Europe, as we saw on Monday, in the Iberian Peninsula you can see at a first glance many dark areas compared to other countries. But that is misleading, since in Spain is home to the most extreme cases. There are locations where light pollution appears in an exaggerated fashion hard to be equaled in the rest of the continent. On the other hand, there are not affected areas such as Castilla-León, Extremadura, Aragon that must be specially protected. Regarding the energy consumption data for lighting, Spain is in "the tail of efficiency." Spain is the EU country with a higher ratio of installed capacity per capita in public lighting, which causes that light pollution in our country evolved in recent years in a serious environmental, economic, public health, security, etc. issue. A Spanish citizen pays almost as twice as a French one, and triple as a German or Dutch one for public lighting. According to the data of energy consumption in lighting, Spain is at the tail of efficiency spending 116 kilowatts per capita and year, while in France and in Germany 91 kW and 43kW. And the latter is not considered an underdeveloped country, but seems to be the economic locomotive of Europe.

In Spain, things are getting wrong. We might think that, on the contrary, Spain is leading the production of energy from renewable systems. For example, hundreds of windfarms across our geography. To show you how good solutions are often counterbalanced by serious flaws (typical way to do things in this country) wind farms consume significant amounts of energy they are producing with the installation of powerful strobe lights to indicate the position of the mills: the installed capacity in high-intensity lights amounts 20,000 watts per park. The expense of this illumination, which works both day and night, amounts more than 25,000 euros per year per park. This consumption is a significant part of the energy generated by the windfarm itself, and constitutes an unacceptable waste of energy. Flashes of these luminaries cancel the vision of the starry sky in an area of at least 5 km to either sides of the line of wind turbines. The flashes are visible over 70 km, constituting a source of light pollution that seriously violates the Law of the Atmosphere, 2007.

This just explained case illustrates why Spain needs to increase the fight against light pollution more than in other countries. We are Mediterranean and the daytime, especially between the months of April and October, is flooded with sunlight, a factor highly valued by the other EU citizens who travel to our land to enjoy the sun and mild climate. However, accustomed to the daylight, we are pleased to follow the light at night too, looking for the continuation of a phenomenon that allows us to live day and night with no other limit than that imposed by the need for rest and alternating circadian cycles of our body. And the more natural light gives us our Mediterranean climate, the more we resist to limit the difference between day and night. This explains how Valencia is the most enlightened city of Europe and also the city that wastes more energy applied to lighting at night per person than any other.

We are Mediterranean, we have said, and given to exaggeration. The improvements to the lighting systems since the eighties, with a clear economic recovery that has led us to be fully-fledged European, but Mediterranean in our mentality, has led to abuses in the light as we have explained. But abuses are ancient, and with the increasing light pollution in Catalunya, the Spanish region where we began to notice during the early eighties the decreasing quality of the sky, the stars disappeared and the astronomical observation suffered major drawbacks. This led to one group of amateur astronomers and professionals to build our association. Already in 1994 during the Spanish Congress of astronomy held in Lleida, the Cel Fosc founder and first president, Pere Horts, presented an open letter to all the gathered amateur and professional astronomers to be signed during Congress, to make aware the public about the phenomenon of light pollution. About ten people configure the nucleus of Cel Fosc, which means Dark Sky in

Catalan language. Perhaps the foundation of our association structure dates to our June 1998 visit to the Department of Environment at the Generalitat de Catalunya (our regional government) to meet with senior policymakers for a technical talk about the great problem of the light pollution, based on three main premises:

- a) The waste of energy
- b) Environmental bias in wildlife, especially in invertebrate animals, base of the food chain of natural systems
- c) and not talking directly about our main concern, the demise of the night show, and inspirational study of mankind.

A few days later, on July 2, 1998, we were received in the Parliament of Catalunya, where we met with a representative from each political party.

This was the spark, started from a small number of astronomers that ignited the concern about the phenomenon of light pollution in the policy makers. This was the origin for the law 2001 / 6 issued on 12 September 2011, the day after the destruction of the Twin Towers in New York, and for the law regulations, promulgated in May 2005 with a noticeable delay, which explains why in our country's acceptance and understanding of the phenomenon of light pollution has been reached after the current rates of light pollution and the economic crisis and not earlier. When in 2005 the regulation was enacted Cel Fosc was just founded as a legal partnership with a president and a board of directors, coordinators, statutes, annual membership fee and well defined objectives. That year our association had already drawn attention far beyond the limits of Catalonia. Its foundation was defined to a state level to help expanding our experience and actions across all the autonomous communities.

Cel Fosc, Association against light pollution, is now a statewide association with about 125 members, including people both as individuals or as organizations or associations. According to our president, Carlos Herranz, it represents about six thousand people. The profile of its members is very broad: amateur and professional astronomy, teachers, media professionals, lighting engineers, ecologists, astronomical associations, an enterprise and a lawyer. Its purpose is to regulate light pollution, to provide solutions and report the breach of rules established to address the problem.

From this condition on we offer several easy solutions for public lighting: mainly not to send light upwards and to illuminate what is strictly necessary. According to Carlos Herranz, "this is very easy since there are international tables set, but almost nobody complies with them." There are also other ways to eliminate pollution, that is the use of proper lamps, which are more efficient but also produce light with a suitable color, and not white lights that are harmful to the ecosystem. Other measures are considering the reduction the amount of light at certain hours of the morning, when traffic and the presence of people on the streets is much less. On the other side decorative and advertising lighting have to be completely switched off at certain times.

Statutory regulations intervened by Cel Fosc

Night lighting is a matter mostly of local, provincial and autonomous governments, established according the Spanish constitution of 1978. They are responsible for their installation and management. Your action won't be needed if lighting professionals self-regulate or assumed a good practice. Because this is not the matter, we have to appeal the governing institutions and in this case the regional administrations who have the environmental management.

In 2001 Catalonia enacted the first law to protect the night sky. Then joined the Balearic Islands, Navarra, Cantabria and Andalusia. Further development of the regulations have had very different fate and success. Some of these laws were born already obsolete. This is because local and regional governments were ignoring the current scientific knowledge. Another problem is it has gone a lot of time between the law and the creation of the rules, something that prevented to take in time the measures before the situation worsens. Fortunately, the last law of Andalusia draws an exception. Andalusia developed a regulation, that was promulgated in August 2010, which is the most advanced of its kind in Spain at all. Many of the measures included can mean a real reduction of light pollution and, consequently, its pernicious effects on

the environment: energy expenditure of public economic resources and health problems of citizens. The Andalusian regulation has been well developed. They have been advised by the professional association of physicians, by Cel Fosc, by universities and by the astronomical observatory of Calar Alto, represented here by David Galadi, a Cel Fosc member and very active in this area. So it seems that Andalusia will incorporate measures in a more effective way than other autonomous communities. Although it has to be seen how will be the law applied, Andalusia marks a turning point for future lighting policies in Spain. We can not say the same of the older legislation, starting in Catalunya, because their rules obey to arguments of politicians, business man, architects and designers, who have never shown sensitivity to the problem of light pollution, and instead they have shown themselves sensitive to their own interests.

Despite the lack of regulations, from Cel Fosc we encourage citizens themselves to denounce the existing situation of light pollution, or to call the government for law based solutions. It has to be done for the sky, which helps us to have a better knowledge about who we are and what is our place in the universe.

Future Plans

To increase the number of partners at work or leisure where you can spread out these ideas about the disadvantages of light pollution.

To establish contacts with policy makers in Spain, both local and in the autonomous states, and to make them aware of harm that causes light pollution and to plan their actions in order to reduce the effects of light pollution.

To develop laws against light pollution in the autonomies that do not for the moment.

To study the legal base of white strobe lights signaling the windfarms to proceed legally against those lights and if possible to replace them by low intensity red lights. There is a budget already approved of 3500 euros for a law firm to examine the current legislation of all the autonomous communities of Spain, the state legislation and civil aviation regulations for marking obstacles to aviation. After studying the legal written complaints and legal resources to adapt these lights, Cel Fosc will go to the courts to establish the kind of lawsuits against lighting.

To warn the drawbacks of the current night lighting based on LED. As stated here on Monday, commercial managers have currently a disproportionate pressure to install lighting fixtures based on LED manufacturers unfamiliar with the argument that LED can save a lot, last longer than 100,000 hours, require no maintenance, are environmentally friendly because they have no Mercury and produce no light pollution. So they convince people who have no political responsibilities and expertise and appealing that yours will be the first population of Catalunya, Spain, or Europe completely illuminated with LEDs. And no matter if the light is bluish or decrease the level of illumination at a quarter, or if it glares, and whether the economic cost of LED lighting is double or triple that if you had used the technology shock. Nor does it matter that the period of return on investment is exceeding five years or more. Policy makers do not know that today is still cheaper and savings-friendly to use high pressure sodium or metal halide lamps than 3000 ° K ceramic LEDs.

Finally, we have much work to do and we have important challenges ahead. Cel Fosc will keep fighting light pollution in Spain to preserve the natural conditions of the night sky and also to save energy in the private and public lighting at night, and to spread out the culture of rationality in the use of lighting technologies in order to preserve our natural heritage for future generations, which is also repeated in this symposium.

Cel Fosc organization congratulates the present Dark Sky Symposium because this meeting has become a reality in Spain and welcomes all participants. We hope we can establish fruitful relationships with all of you to fight against light pollution. We are available at <http://www.celfosc.org/indice.html>. Surprisingly, one thing that unites all the inhabitants of the planet is the roof of the night sky. All landscapes are local, but the sky is global. Thank you very much.