



## CONTROLLING LIGHT POLLUTION & ENERGY CONSUMPTION

OTS HIGHLIGHT ARTICLE • TERRY PICHE • ONTARIO RECREATION FACILITIES ASSOCIATION • [WWW.ORFA.COM](http://WWW.ORFA.COM)

**“It’s good to be green” – Kermit the Frog.** Ontario’s greenspaces are not often thought of as being high energy users. Indeed, much has changed in the technology and techniques involved in the sports illumination process since its debut in 1883 when General Electric strung a handful of open-face lights across a minor-league field and night baseball was born. However, in the 21<sup>st</sup> century, some parks might be considered energy abusers. As an increase in light pollution awareness continues to grow across the continent, today’s facility manager must consider sports field electrical management as part of their energy reduction plans. The lifetime savings accrued from wise facility management can return many thousands of dollars which can support other recreational opportunities.

### Light Pollution

Light pollution is a broad term that refers to multiple problems, all of which are caused by inefficient, unappealing, or unnecessary use of artificial light. Since the early 1980s, a global dark-sky movement has emerged, with concerned people campaigning to reduce the amount of light pollution. Also known as photo-pollution or luminous pollution, it is excess or obtrusive light created by humans. Specific categories of light pollution include light trespass, over-illumination, glare, clutter and sky glow. A single offending light source often falls into more than one of these categories. Among other effects, it

disrupts ecosystems, can cause adverse health effects, obscures the stars for city dwellers, and interferes with astronomical observatories. Lights on a sports field, when not in use or not needed, fall into the category of light pollution and energy waste.

*Light Trespass.* Spill light that is either annoying or unwanted is referred to as light trespass. New construction of a sports field or the introduction of dwellings after the fact often results in light trespass issues. Light trespass occurs when unwanted light enters one’s property. Given that most houses are shown to prospec-

tive owners during daylight hours when a sports field may not be in use, new owners often see the recreation field next door as an asset. This opinion can often change when a strong light enters their windows causing problems such as sleep deprivation or the blocking of an evening view. Bright light sources can also affect a driver’s visibility because of glare. In addition, visual confusion can affect the ability to locate and recognize signal lights. Facility managers may not be able to change the existing use of the field but they must respect such issues by carefully scheduling, controlling and monitoring light use.

## WHAT LIGHT COLOUR IS BEST FOR FIELDS?

Type of Light	Colour	Efficiency (lumens per watt)
Low Pressure Sodium	Yellow	80 -200
High Pressure Sodium	Pink/Amber White	90 -130
Metal Halide	Bluish-white/white	60 -120
Mercury Vapour	Blue-Greenish white	13 - 48
Incandescent	Yellow/White	8 - 25

*Over-illumination.* Lighting is responsible for one fourth of all energy consumed worldwide. Over-illumination is the excessive use of light beyond what is required for the specific activity. It is calculated that over-illumination is responsible for approximately two million barrels of oil per day in wasted energy. Factors that contribute to these issues include:

- Improper use of controls (timers, occupancy sensors, etc.) that should extinguish lighting when it is not required.
- Improper lighting design, especially of workplace spaces, that specify higher light levels than what is required for the given task.
- Improper selection of fixtures or light bulbs, which do not direct light into the necessary areas.
- Improper selection of hardware that utilizes more energy than what is required to light the area.
- Inadequate training of building managers and users on the efficient use of lighting systems.
- Poor lighting maintenance practices resulting in higher energy costs and an increase in stray light.

### Selecting the Right Lighting System

So what light colour is best? The white light from metal halide is still the preferred lighting for most outdoor sports as it renders colour accurately. High pressure sodium (HPS) produces a yellowish light which is not as good for colour identification. New studies seem to show that people can see better under fewer lumens (measurement of light output) of white light than more lumens of yellow light (see table at the top of this page).

Purchasing the right bulb will take some research by facility management. Even if a manufacturer replaces a lamp

that fails prematurely, the time spent documenting the use of the lamp and the labour retrieving and replacing it are still a significant burden to the lighting owner.

Pulse-start technology extends lamp life considerably and stabilizes the colour shift associated with metal halide bulbs. It also reduces warm-up time to about two minutes and re-strike after a power interruption to about four minutes, considerably shorter than the nearly fifteen minutes needed for other HID systems.

Design lighting systems first for the area and then for energy-efficiency. The Illuminating Engineering Society of North America (IESNA) publishes "Recommended Practices for Sports and Recreation Area Lighting" (RP-6-01) which provides design criteria for new lighting systems and for existing systems.

Retrofitting a sports field requires some additional consideration. Whether or not the actual wattage may be dropped in any particular situation will depend upon your current lighting standards; the photometrics; installation of the specific luminaire; and whether or not the spacing of your poles is already at a maximum. Most retrofits seek to maintain the existing pole placements to contain costs; however, this is not always possible.

Group re-lamping is a practice that can reduce labour costs as well as lamp burn-outs at critical times. This type of maintenance also reduces energy consumption by making the best use of equipment and staff.

While more efficient lighting can help reduce energy consumption, the first thing to look at is scheduling. The more games played during daylight the better. Once a night schedule is set for the season it must then be managed properly. The longest day of the year is June 20<sup>th</sup>. After this date, light is reduced each evening by approximately 90-seconds. Scheduled lights

should be adjusted every 14 to 21 days from the start of the season to its end.

Controlling sports field use must be done through set policy and procedures. This should also include educating the user on the lighting practices of your facility. Consider the softball umpire who holds the key to controlling field lighting. Faced with presiding over three or four consecutive games on the diamond, the umpire may choose, for sake of convenience, to fire up the lights before the start of the first game, even though the sun may not set for another two hours. Systems that provide reports for light usage, lamp starts and customer usage are available.

Nothing is more frustrating to a taxpayer than seeing a fully illuminated sports field with no users on the field. Warm weather months can provide additional operational challenges as staffing levels are often increased with the addition of seasonal workers. Temporary workers may not have the skills or training that is necessary to recognize improper lighting practices. Seasonal workers require training and monitoring by skilled staff to guarantee success.

### Balancing energy consumption and user safety requires commitment

Sports field lights that shut-off all at once increase the risk for injuries. Consider also the on and off field safety of park users. Whenever possible, shut down lighting in stages. Sufficient lighting must be left on for the safety and security of users and patrons. Attention should also be given to ensure user safety after field lights are turned out.

Close coordination with user groups and good communication with neighbours will help to address issues and concerns. A successful energy management program requires ongoing commitment by all levels of recreation professionals for today's recreation facilities. ♦

### Sources

- IESNA RP-01 *Recommended practice for sports and recreational area lighting*, International Engineering Society of North America (IESNA), 2001.
- Energy Solutions Alberta, [www.energysolutionsalberta.com](http://www.energysolutionsalberta.com)
- Hydro One, [www.hydroone.com](http://www.hydroone.com)
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