Appendix G
Calculating Hourly Cost of Sports Field Lighting

Moreton Bay Regional Council
Sport and Recreation Club Manual
2023

Moreton Bay
Regional Council

Overview

The operation and replacement of sports field lights can represent a significant proportion of a sports club's annual running cost. Sufficient funds must be available to pay electricity accounts as they are received, undertake maintenance on the lights when required and replace the globes and/or fittings when they have deteriorated below acceptable levels. These are all costly exercises and few clubs have the financial resources on hand when required without planning ahead.

The calculated value should be used in two ways:

1) For every hour that the club operates the lights for its own use, it transfers the equivalent funds into a dedicated sports field lights sinking fund. These funds accumulate to pay electricity accounts, maintenance and replacements.
2) If the fields are hired to another organisation, the hourly cost for lighting can be charged to the hirer. The club can then be sure that it is not subsidising the true costs associated with the hire. The club may also choose to add an extra cost above this base hourly cost to cover items such as key issues and time spent by volunteers assisting the hirer.

Calculator

The following template is provided to assist clubs to calculate the hourly cost of operating sports field lights. The costs shown are examples and your club should check the individual costs with contractors or your electrician to understand your own specific circumstances.

Step	Action	Example
1	Find out the **input power** of each light fitting in kilowatts (kW). Check your original invoice or specification sheet provided at the time of installation.	2kW per light
2	Count the **number of light fittings** per field.	Field 1: 12 lights Field 2: 8 lights
3	Multiply the input power by number of fittings to calculate the **total power demand** for each field.	Field 1: 2 x 12 = 24kW Field 2: 2 x 8 = 16kW
4	Check your electricity account for your current **energy tariff rate**. Depending on the structure of your bill, you may need to take the total value of the account and divide by total consumption to get the cost per kilowatt-hour.	$0.25 / kWh
5	Multiply the total power demand for each field by the energy tariff rate for the **hourly electricity cost** per field.	Field 1: 24 x 0.25 = $6/hr Field 2: 16 x 0.25 = $4/hr
6	Repeat the same calculations above if the club utilises **training level lighting** in which less fittings are turned on during training. Note that the same input power will generally be required per light.	Field 1: 8 lights x 2kW x $0.25 = $4/hr Field 2: 4 lights x 2kW x $0.25 = $2/hr
7	Calculate the **number of hours each week** that the lights are used in training mode and in full (competition) mode. Note that these values may not correlate with actual training and competition hours, as some clubs train under higher level lighting and lights may be operated when fields are not in use. Be sure to account for all hours of use.	Field 1 only: Training level = 20 hrs Competition level = 5 hrs
8	Calculate the **total number of hours** the lights are in use per season or per year.	Training level = 20hrs x 40 wks = 800 hrs Comp. level = 5hrs x 30wks = 150 hrs Total = 950 hrs/yr

Step	Action	Example
9	Check the **estimated useful life** of the lamp component of the light. You may need to contact the manufacturer or check the product specification online. This is the number of hours that the light can be expected to operate before depreciating below useful output, to a 95% confidence interval. Some lights will blow before this time.	3,000 hours
10	Divide the useful life of the lamp by the number of hours each light is used per season or year to calculate the **estimated number of years from the lights**. If the same lights are used for training, these will deteriorate quicker than the lights that are only used when switched to competition level.	Lamps used at training and competition level: 3,000 / (800+150) = 3.16 yrs Lamps used at competition level only: 3,000 / 150 = 20 years
Note here that there is a significant difference. The best approach is to regularly switch the globes that are used for training to give a more even spread of use. The aim is to achieve a single bulk replacement of all lights as they near the end of their life.		
11	Calculate the **life expectancy of the lamps** if they are switched between training and competition fittings at the end of each year. Add until estimated useful life (Step 9) is reached.	
12	Determine the **annual cleaning/maintenance costs** for each field, incorporating: - Cherry picker hire - Labour cost to clean - Labour cost to switch bulbs between competition and training fittings - Lighting auditor	$800/hr x 4 hrs = $ 3,200 $150/hr x 3 hrs = $450 $150/hr x 1 hr = $150 $150/hr x 2 hrs = $300 TOTAL = $4,100
13	Determine the **replacement cost of lights** for each field, at the end of their useful life, incorporating: - Purchase of new lamps - Cherry picker hire - Labour cost to install new lights - Lighting auditor	$800/lamp x 12 lights = $9,600 $800/hr x 6 hrs =$4,800 $150/hr x 6 hrs = $900 $150/hr x 2 hrs = $300 TOTAL = $15,600
14	Sum the **total cost over the life** of the lights per field - Electricity cost - competition level (Steps 5, 8 & 11) - Electricity cost - training level (Steps 6, 8 & 11) - Annual cleaning/maintenance (Step 12) - End-of-life replacement (Step 13)	$6/hr x 150hrs x 5yrs = $4,500 $4/hr x 800hrs x 5yrs = $16,000 $4,100/yr x 4 yrs = $16, 400 $15,600 TOTAL = $52,500*
** Note that electricity costs account for less than half of the total whole-of-life costs associated with sports field lighting. Charging hirers or making contributions to a sinking fund on the cost of electricity alone will leave the club short of funds.*		
15	Calculate the **total lamp-hours** over the life expectancy of the lights. From Step 11, calculate the number of operating hours of the lights that were used for both training and competition in year 1. Calculate the number of operating hours of the additional lights that were only used during competition level lighting in year 1.	Training level lights in yr 1: 950+150+950+150+950 = 3150 8 lights x 3150 = 25,200 Comp. level lights in yr 1: 150+950+150+950+150 = 2350 4 lights x 2350 = 9,400 Total lamp-hours over 5yrs = 25,200 + 9,400 = 34,600 lamp hours
16	Calculate the **actual cost of operating one light** per hour. Divide the total life cost (Step 14) by the total number of lamp-hours (Step 15).	$52,500 / 34,600 = $1.52 per light per hour
17	Calculate the **actual operating cost of training level lighting and competition level lighting**. Multiply the operating cost per light (Step 16) by the number of lights in each configuration.	Training: 8 lights x $1.52 = $12.15/hr Competition: 12 lights x $1.52 = $18.21/hr
	Training level	**$12.15/hr**
	Competition level	**$18.21/hr**