AGRIFY™

2021 / Agrify Guide

The Grower's Guide to LED Lighting

The most common lighting-related grow room issues.

Many significant cultivation issues stem from lighting equipment. Some of the most common problems you may have encountered due to HPS or HID lighting include:

HEAT GENERATION

Grow room temperatures are fundamental to plant health – too high, and the risk of pathogen formation and terpene degradation goes up tremendously. HPS and HID lighting generate enough heat to alter room temperature, adversely affecting plant health and harvest yield. In addition, HVAC costs go up significantly to remove this heat and maintain a consistently ideal temperature for plant health.

OPERATION COST

Lighting is an unavoidable cost for cultivators, and it's one of the most significant expenses: Running lights as much as 18 hours a day can drive utility bills into the six figures annually. Unfortunately, there's no way to cut back on the amount of lighting required: Without it, a harvest simply won't succeed.

SHIFTING LIGHTING NEEDS

Not only does each cultivar have unique lighting requirements, but each growing stage performs best when subjected to different light colors and intensities. Relocating plants under other lighting fixtures for optimal outcomes can be a strategic nightmare for some grow operations. This ongoing rotation creates more labor in the grow facility, increases the chances that a plant may become exposed to pathogens, and increases cost, as additional fixtures need to be purchased.

LIMITED PLACEMENT AND USE

Most lighting fixtures, particularly HID lights, are limited in where they can be placed and how they can be used. That's because HID lights generate so much heat that they can cause irreversible damage to the plants. To counteract, HID lights need to be placed several feet away from the canopy, resulting in less photosynthesis-producing light getting to the cannabis. Unfortunately, this also limits how and where cannabis plants are placed in the grow facility, forcing all plants into a single horizontal layer that takes up precious space and limits scalability or expansion.

UNEVEN DISTRIBUTION

HID lights are positioned far from the plants to avoid light burn from the heat. As a result, plants directly underneath the HID fixtures get the most photons while the light intensity plummets for the rest of the canopy. This uneven light distribution can undermine efforts to achieve consistent, large yields.

CONSTANT MAINTENANCE

Many lighting fixtures require frequent maintenance for optimal performance. This includes, but is not limited to, bulb changes, height adjustments, and settings adjustments for each growth stage – assuming that plants aren't being moved altogether within the facility. As a result, this can take more time, increase the possibility of human error, cause a potential entry point for pathogens, and drive up the cost of supplies and labor.

How LED lighting solves these problems.

Use of LED lighting is on the rise: According to the Cannabis Business Times, as of 2020, **more than half of all cultivators utilize LED lighting** in all growth stages. This is up significantly from just a few years ago when only around one-fifth of cultivators were using LED lighting at any growth stage.

Here's what's driving this rapid growth:

MUCH LESS RADIANT HEAT

Unlike their HPS and HID counterparts, LED lighting is cool to the touch. The importance of this cannot be overstated in a grow room: Even the slight temperature change can encourage pathogen formation, alter yield outcomes and impact which and how many phytocannabinoids and terpenes form in flower. This also eliminates the chance of plants burning, allowing LED lights to get much closer to the plant canopy than HPS or HID lights.

UNIFORM LIGHT DISTRIBUTION

The number of photons that reach the plant canopy is vital for photosynthesis – in fact, it's a factor more important than any other specification LED lighting may offer. The farther away lights must hang, whether due to temperature or the direction of the light, the fewer photons are delivered to the plants. Because LED lights can get closer to the plants, many more photons make their way to the cannabis. In addition, positioning LEDs closer to the plants allow for a multi-tiered grow set up, simplifying scalability or expansion.

LESS ENERGY CONSUMPTION

LED lighting delivers similar performance and results to HPS and HID lighting, for around 40% less operating cost. That translates to five-figure reductions in energy bills annually without skimping out on the lighting cannabis plants need to thrive and growers' need for consistent, large yields. This figure is especially meaningful in a capital-intensive operation like a cannabis cultivation facility: According to the same Cannabis Business Times report, 40% of surveyed cultivators said that they estimated **45% or more of their utility costs to be tied to lighting.**

COST TO PERFORMANCE RATIO

Switching to LED lighting does not mean quality is sacrificed for all the other benefits listed in this guide. LED lighting delivers the same competitive performance as traditional HID lights while delivering the same, or even better, results. Cultivators can expect to see a return on their investment into LED fixtures after about one year of normal use.

LONGEVITY

LED lighting can last several years longer than HID lights without losing nearly as much output power. This results in fewer replacements and less maintenance over time.

Here's how that figure is calculated: HID lights typically last between 15,000 and 20,000 hours, but in reality, their output drops significantly - by about 50% - as the light reaches the -10,000-hour mark, directly contributing towards a reduction in crop yield. On the other hand, many LED fixtures are rated to last anywhere between 40,000 and 60,000 hours, without losing nearly as much light output.

Agrify's Model R lights, for example, are rated to last over 54,000 hours and hold at least 90% of their original light output that entire time). At this pace, when operating for 18 hours a day, LED lighting has a lifespan of over seven years, while HID lights can only last just over one year without significant impacts to crop yield.

Myth Debunked:

LEDs are not as good as HPS lights.

The debate around which lighting type is better for cannabis cultivation is nothing short of impassioned. One of the most common arguments is that LED lights simply cannot match the performance of HPS lights, nor can they produce the same high yields and quality as their HPS counterparts. However, when you directly compare the two side by side, it's evident that LEDs stack up – and even outperform – HPS lights.

Take the example of Greenstone Fire, a Denver-based cultivation facility, and an Agrify client. Greenstone Fire's cultivators conducted side-by-side test runs comparing their former HPS/LED setup with Agrify. Just by using Agrify's Model R lights, their yield jumped by an impressive 18%. Three more trial runs conducted with three other cultivars delivered even better results – as high as 43%.

Read The Greenstone Fire Case Study:

LEARN MORE

What to look for when choosing LED fixtures.

Not all LED lighting is created equal. Each has unique features and benefits that support large, consistent yields with each harvest. Here's what you should look for while evaluating your options:

1

INVEST IN "FUTURE-PROOF" ADJUSTABLE SPECTRUM MODELS

Adjustable spectrum lighting saves time and money. Instead of physically moving plants under new lighting setups throughout the grow cycle, the lights can be adjusted as needed for the plant's specific requirements at each growth stage. It also eliminates the need to purchase more than one set of lighting fixtures.

Importantly, as the cannabis industry matures and more is learned about lighting's impact on phytocannabinoid and terpene development, adjustable spectrum models ensure that the lights grow with the cultivator, now and into the future. When colors and intensity can be adjusted directly from the lights' controller, the same fixtures can work for any cultivar, even if different cultivars, each with its own lighting needs, are growing right next to each other.

2

CHECK IF THE FIXTURES ARE EASY TO CLEAN

Pathogens can lurk anywhere in the grow room, but cultivators may be surprised to learn that lighting fixtures may contribute to the problem. The design elements of many fixtures can harbor mold and mildew, even if a grow adheres to strict cleanliness practices. This can create a frustrating scenario for threat mitigation, allowing pathogens to "hide out" and spread even after infected plant material is removed and the grow room sanitized.

Consider prioritizing an LED light fixture design that's easy to sanitize. Look for fixtures that do not have design elements that make pathogens easy to evade sanitization, such as built-in hooks or hollow areas with openings that allow for airflow. You may even want to go a step further and look for LED lighting fixtures that are NSF rated: This food-grade standard of sanitation adds another layer of protection for your harvest, minimizing waste and subsequently increasing harvest size.

3

MAKE SURE THE LIGHTS YOU WANT ARE READY TO SHIP

Long lead times or shipping times mean implementation delays. If your chosen models take months to arrive, that could mean you won't see results for close to a year after ordering them, depending on your harvesting schedule. Ask your LED lighting provider if the models you want are in stock and ready to ship in a timely manner, so they can be installed and put to work as soon as possible after ordering.

4

LOOK FOR THIRD-PARTY CERTIFICATIONS

LED lighting fixtures should be backed beyond the word of the company you're considering. Look for models evaluated and certified by third-party quality and safety organizations, such as UL certification for electrical safety standards, DesignLights Consortium (DLC) for energy efficiency standards, and NSF International, as mentioned above, for a food-grade sanitation guarantee.

5

FIND A PARTNER, NOT JUST A SALES REPRESENTATIVE

Buying fixtures should not be the end of the transaction with your lighting provider. Expert-level support ensures that you can get the most out of your new LED lighting, including proper layout, installation, and operation instructions. Seek out an LED lighting supplier that notonly offers stellar customer support and a top-notch sales experience, but one that makes all their team's resources available to you. These can include:

- Facility planning
- Lighting layouts
- Fixture placement and planning
- Savings calculations
- Technical support for installation
- LED utility rebates and incentives

Recoup your investment with end-to-end LED rebate guidance.

Cultivators, you're in luck: You are likely eligible for LED rebates or incentives from your utility company when you make the switch to LED lighting. Unfortunately, though, the requirements for these programs can be difficult to track down, and even when tracked down, are often convoluted and complicated to follow.

Agrify uniquely offers end-to-end guidance when it comes to LED rebates and incentives. Instead of simply informing you that these programs exist, our experienced staff takes you through the process step by step, from the initial application to auditing to final sign-off. In addition, our experts have strong relationships with utility providers throughout the U.S., ensuring that you can maximize the available incentives. With Agrify's help, you can get back as much as 50% of your original investment into energy efficient LED lighting.

Read Dawn Star's LED Rebate Success Story:

LEARN MORE

Agrify LED lighting bolsters your grow.

At Agrify, our Model R LED lights support high yields and a healthy grow environment. Designed with no pathogen-harboring nooks and crannies, our NSF-certified lights are easily sterilized for a clean and safe grow environment. Our dimmable, adjustable spectrum lights can be set to accommodate any cultivar at any growth stage, so no matter where your plants are in their life cycle, Model Rs can support their lighting needs. Most importantly, our solutions outperform HPS and HID lighting, bolstering yields and supporting desired phytocannabinoid and terpene development.

With Agrify, you don't just receive lighting fixtures: You gain access to a full suite of professional tools, all of which ensure that your new fixtures thrive. Our team of experts is there to assist you through the technical and practical aspects of your installation process, and even navigate the LED rebate process for you.

When you make the switch to LED lighting, you have nothing but better yields to gain.

Contact Agrify now to learn how you can harvest the future of growth today.

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