HORNER
LIGHTING GROUP

LED LINEAR GROW LIGHTS

Case Study:

JACQUI SMITH | **Blue Grass Farm**

DISCLAIMER

Horner Lighting Group does not condone any illegal activities, nor have any widespread applications related to illegally growing/harvesting/producing illicit materials regulated by state/federal law.

Horner Lighting Group reminds readers that Horner Linear Grow Lights are designed to successfully integrate across a wide array of horticultural applications. Horner Grow Lights are not specific to cannabis, but are beneficial for crops from vegetables and herbs like broccoli and thyme, to flowers like roses and lilies.

WELCOME TO HORNER

Horner Lighting, and Horner Automation are individually unique organizations working within Horner APG (Advanced Product Group) – a subsidiary of Horner Electric. Horner Electric can trace it's roots back to 1949 when George and Mary Horner started their small, family-run business; with APG getting its start in 1985. Horner APG, and the organizations of which it comprises, is headquartered in Indianapolis, IN.

Horner Lighting Group

Horner Lighting Group prides itself on being the main driver of innovation in the fields of Solid State and Remote Phosphor LED Lighting. Horner's unique product designs have superior efficacy, glare reduction, even light distribution, and life cycle improvement. In addition to their innovative remote phosphor, solid state, and grow lighting technology, Horner also has a complete array of DLC-certified white LED products.

Horner Automation Group

Horner Automation Group designs, builds, and markets a wide array of industrial All-in-One controllers, consisting of programmable HMI, I/O, software and peripherals for the Industrial, Process Control and Building Automation markets.

Through well-calculated acquisitions and timely partnerships over the past 65+ years, Horner Electric has diversified into Horner Industrial Group, an industrial services company, and Horner APG. The milestones achieved by Horner over the years comprise the finest businesses in their respective fields, creating a comprehensive portfolio of services, products, and markets.

While many of Horner APG's products are manufactured and assembled in the United States, the reach of the organization is truly global; including a worldwide distributor network. With offices and locations across the globe from Brazil to China, you can easily find a Horner APG product almost anywhere you need.

HORNER APG

HORNER LIGHTING GROUP

HORNER AUTOMATION GROUP

Global HQ, Indianapolis, IN

Sales

Sales

European HQ, Cork, Ireland

Engineering and Sales

Sales

Manufacturing and Sales

Sales

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SITUATION

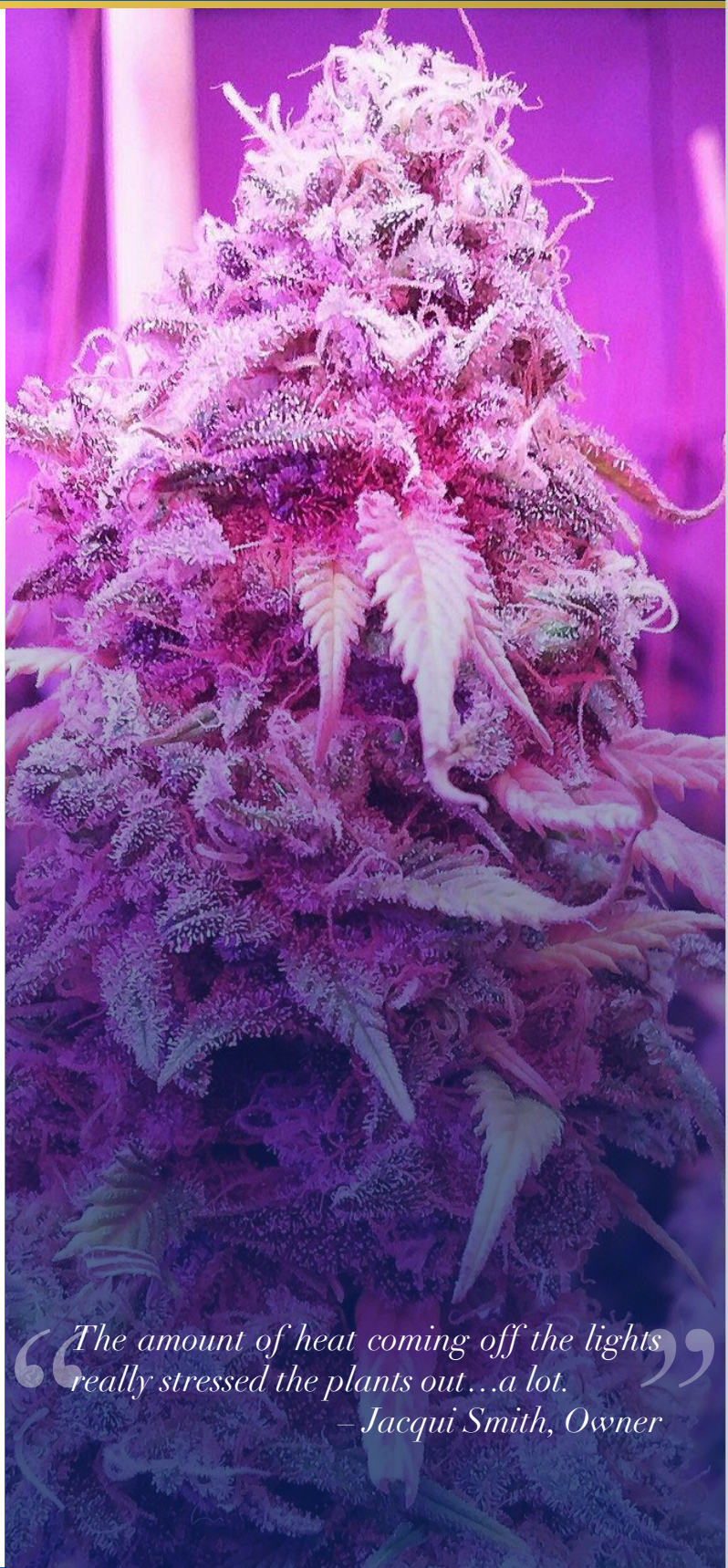
For over five years, Jacqui Smith has operated a successful medical marijuana farm, Blue Grass Farm in Maine. Three different rooms are used for various stages of growth: a clone room, a vegetative room, and a flowering room. Plants pass through the various rooms to ensure a fresh harvest for patients every week. The clone and vegetative rooms were outfitted with metal halide light fixtures for optimal growing. High pressure sodium lights were used in the flowering stage when the plants need the most intense light.

The first complaint the owners had about the traditional bulbs was the heat. One unlucky day, the air conditioners were not working properly, and the flowering room soared to 125°F. Even with constant air conditioning and large fans, staff saw signs of heat stress. They increased the amount of water and nutrients, and according to Jacqui Smith, "The amount of heat coming off the lights really stressed the plants out…a lot." After doing some research, the owners realized that the light spectrums in the traditional HID lights do not just emit heat, but also some wavelengths that were not beneficial for the plants.

In order to battle the heat, work crews made holes in the exterior walls for the ventilation system, which soon created another concern for the farm. Small insects and other contaminants were able to enter the facility. "You have to secure the hole, but there's still room for bugs…and mildew and things from the outside that you do not want in your space," reported Jacqui Smith. The cleaning staff needed to eliminate insect remains as well as monitor the rooms for signs of mildew to avoid contamination of the medical marijuana.

After the first three months of using the HID lights, the owners realized that all the bulbs needed to be changed because they were not emitting as much light. Although changing the bulbs every three months was not physically taxing, the cost and time needed for changing the bulbs became another unexpected expenditure and concern. "They are not environmentally friendly, those bulbs," explained Jacqui Smith. "If you're changing them every three months, you have to find someplace to get rid them so they can be safely disposed of." Blue Grass Farm struggled to find a reliable recycling company that would dispose of the HID bulbs in a safe manner.

The traditional bulbs forced the farm to use more energy and create more environmentally dangerous waste. However, Blue Grass Farm is not very traditional.



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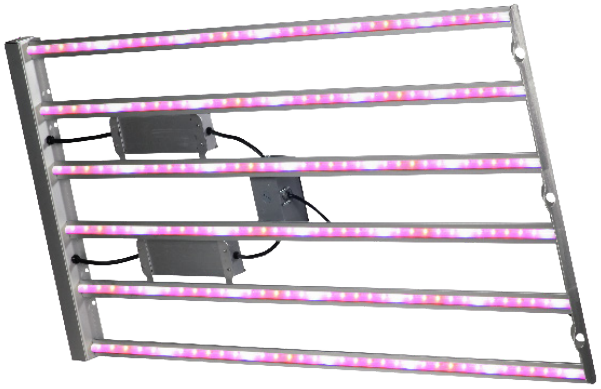
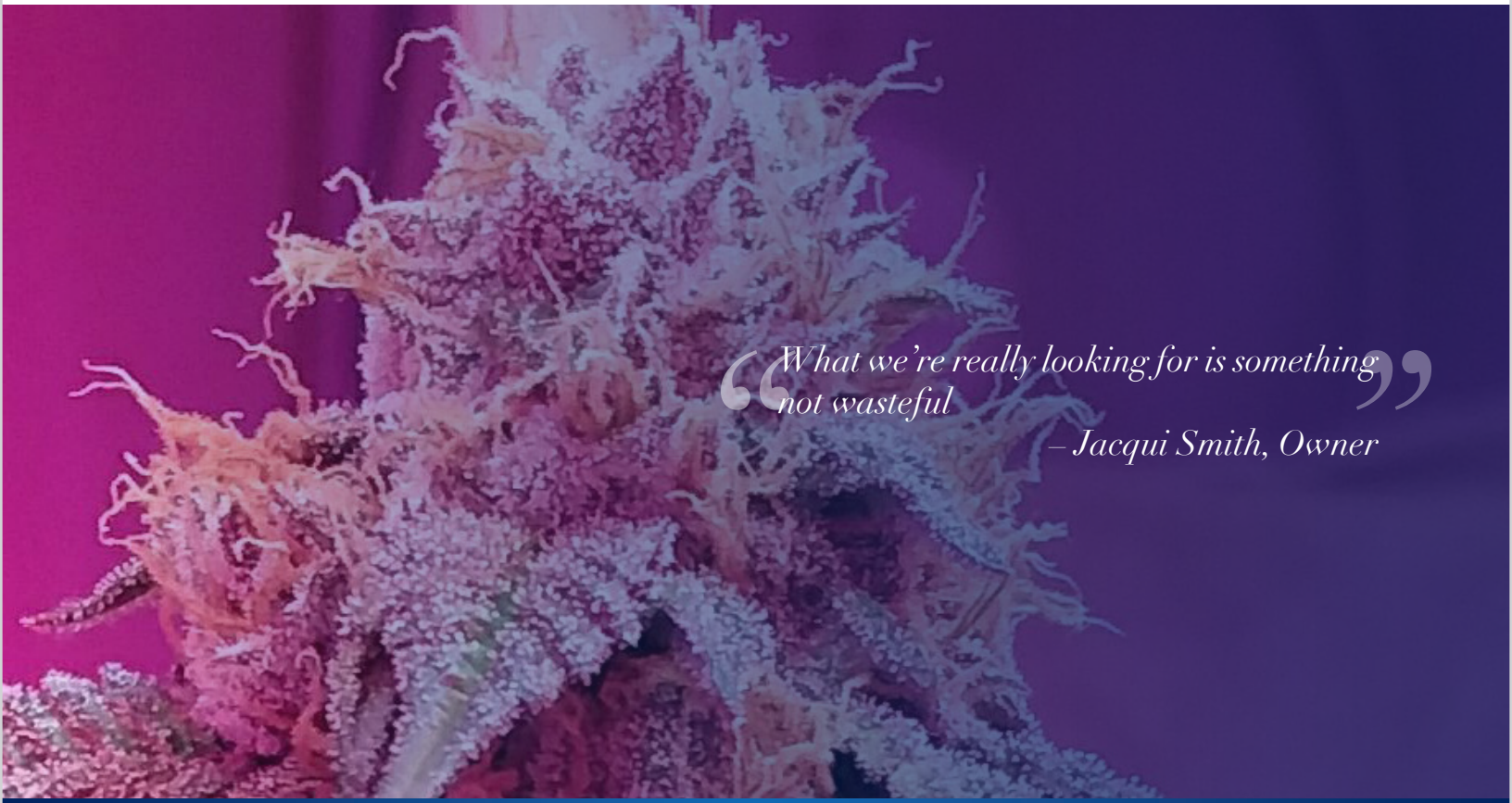
OPPORTUNITY

While buying equipment for their farm, they received a word-of-mouth recommendation for our LED Linear Grow Lights at Horner Lighting. The Blue Grass Farm owners had been reading about the benefits of LED lights over the traditional ones that they were using, but the cost was worrisome. Reflecting on financial and environmental concerns with the HID bulbs, the owners e-mailed Phil Horner, CEO, Horner Lighting.

Hoping for some long-term cost savings, the farm purchased LED Linear Grow Lights. Phil and one of our senior electrical engineers were in constant contact with the Blue Grass Farm owners as they piloted a customized fixture of a 9-LED module, 6 Red/3 Blue LED Linear Grow Light. This fixture contains a total of nine LED linear modules, six red and three blue. They also integrated other solutions from Horner Lighting, including a small controller called an XL4 All-in-One Controller, or OCS. This controller allows workers to adjust the red and blue light spectrums to the plants' cycle needs, and they are now learning how to use the timer and other features of the controller. Blue Grass Farm later added two more 6-module fixtures for a total of 21 LED linear grow lights.



Blue Grass Farm had a customized 9-tube module made for the farm. The 6-LED Module with a 5:1 Red Blue Spectral Distribution is the factory standard model. This fixture lowers the output of energy needed for environmental agriculture as well as improving the crop yields. The strategic combination of the PAR range color spectrum improves plant growth and helps maintain low facility costs.



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REDUCED HEAT STRESS

The immediate change after replacing the HID lights with LED linear grow light fixtures was the temperature change. Balancing temperature and humidity is always a challenge with greenhouses, but Blue Grass Farm no longer battled the extremely high temperatures that the HID lights produced.

After the first harvest, we received their observations. They reported the plants were not as tall, but they were fuller and the stocks looked thicker than before. They also noticed that the trichomes on the buds, small threads on the buds, had a more amber color, which is a very good sign because amber trichomes indicated more potent buds. Jacqui proclaimed, "The yields are better, and the buds look better. And those are really important things!" The LED linear grow lights grew a more bountiful harvest.

LED AND PRECISE SPECTRUM BALANCE

One reason that Blue Grass Farm wanted to try LED Grow Lights is that the spectrum range with our LED Linear Grow Lights is specific to plant growth. PAR, or photosynthetically action radiation, refers to the wavelength of the light that is useful to the plant. Ironically, the spectrum colors that we associate with sunshine and plants, yellow and green, are not helpful to plants and chlorophyll production. Plants need a mixture of red and blue at the beginning of their growth cycle, and then more red and far red during their flowering stage when they are near harvest (Table 1).

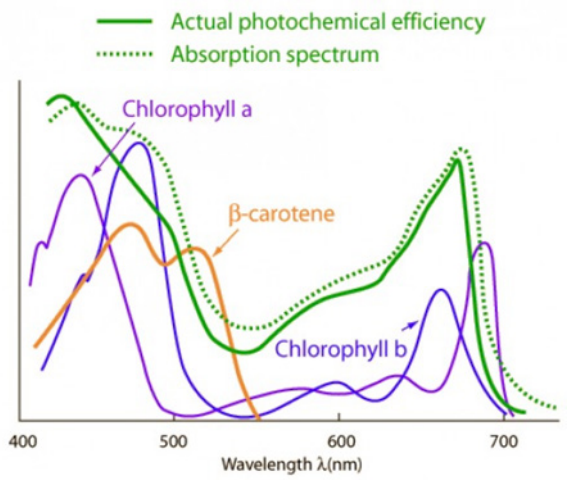
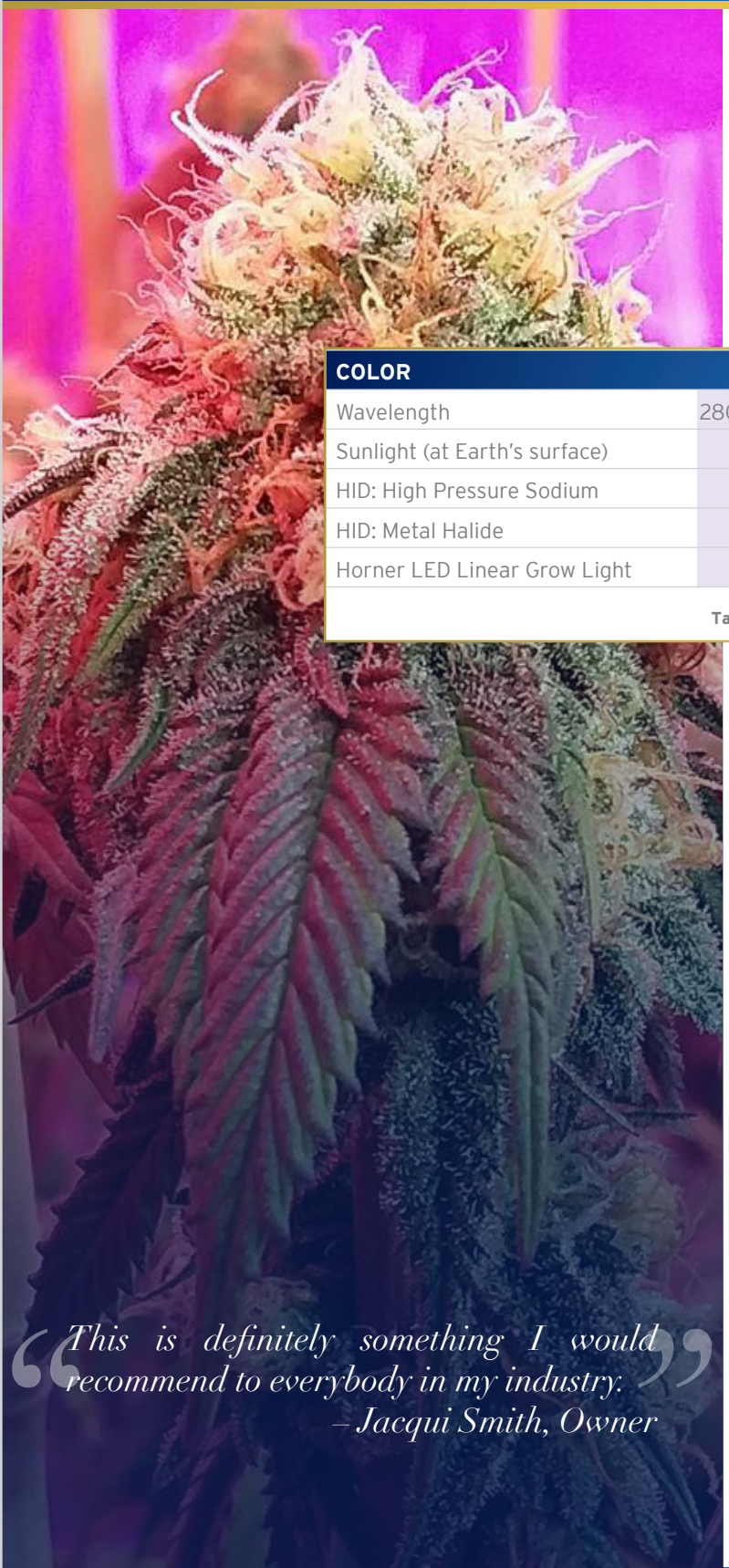


Table 1: Chlorophyll Absorption Spectrum

SOLUTION



For the traditional growing method, metal halide bulbs are used in the early stage to provide blue light. Then the high pressure sodium lights are used in later growth stages for the red light (Table 2). Neither metal halide nor high pressure sodium bulbs produce the PAR range for the entire growth cycle of a plant, but the LED Linear Grow Lights from Horner Lighting can be adjusted to very precise PAR ranges for different plants. Our LED Linear Grow Light is one light for the entire growth cycle.

COLOR	UV	BLUE	GREEN	YELLOW	ORANGE	RED	FAR RED
Wavelength	280-400	420-470	480-570	570-590	590-630	640-710	710-850
Sunlight (at Earth's surface)	✓	✓	✓	✓	✓	✓	✓
HID: High Pressure Sodium	–	–	–	✓	✓	✓	✓
HID: Metal Halide	✓	✓	✓	✓	✓	–	–
Horner LED Linear Grow Light	–	✓	–	–	✓	✓	✓

Table 2: Grow Light Comparison

LOWER ENERGY CONSUMPTION

Unlike the HID lights, LED lights do not produce the high heat. Our LED Linear Grow Lights can replace up to 2000W+ high-intensity discharge (HID) fixtures. The LED lights use 120-277 VAC operation (optional 347-480V). Blue Grass Farm quickly noticed a reduction in energy consumption after changing to our LED Linear Grow Lights. In addition, Blue Grass Farm is no longer operating as many air conditioning units and large fans, reporting a 25% overall decrease in energy costs.

LOWER MAINTENANCE

Insects are attracted to heat and light in the UV spectrum. Our LED Linear Grow Lights do not emit light in the UV spectrum nor do they emit much heat. In other words, they do not attract insects like the HID bulbs. Maintenance and cleaning at Blue Grass Farm has definitely changed for the better. The cleaning crew no longer cleans off insects adhered to the bulbs and fixtures. Now, they simply just wipe the LED lights to remove any dust or small debris, and the LED grow lights are UL damp rated, so they can easily and safely clean the lights.

Our LED Linear Grow Lights come with a 5-year warranty, but Blue Grass Farm is hoping to utilize them much longer than that. Additionally, Blue Grass Farm is elated that they no longer have to change and recycle the bulbs every three months.

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SOLUTION

ENVIRONMENTAL CONCERNS

Blue Grass Farm aims to help their patients through healthy and organic medicine. The HID bulbs used too many resources by using excessive energy forcing the plants to require more water and nutrients. After only three short months, those bulbs became an environmental hazard. In other words, Jacqui Smith was "looking for something...not wasteful."
LED Linear Grow Lights met all of these concerns. They do not emit heat, but they do emit optimal wavelengths for healthy and happy plants. Blue Grass Farm is also happy because they feel that they are truly growing into their vision of helping others as well as helping the earth.

GROWING BUSINESS

Horner LED Linear Grow Lights have helped reduce costs on the farm as well as improve their harvests. The owners of Blue Grass Farm are in the process of expanding their farm to a larger facility. Those plans already include solutions from Horner Lighting, and we look forward to helping them transform those dreams into a reality.

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