USDA Forest Service
U.S. DEPARTMENT OF AGRICULTURE

NREL
NATIONAL RENEWABLE ENERGY LABORATORY

# Sustainability Best Management Practice

presented by the Greening Fire Team

## Solar and Hybrid Light Towers

### What Are We Recommending?

Using solar and high-efficiency lighting and power solutions in lieu of traditional diesel light towers and generators when practical.

### Why Do We Recommend This?

These products have been used successfully on many incidents! This "Greening Fire" best practice aligns with Executive Order 14057 for federal agencies to achieve net-zero emissions from operations and procurement, as well as the Red Book requirement for sustainable incident operations (to include energy conservation and alternative energy).

Standard solar light tower, 2021 McClellan fire, California. *Photo by Denise Kusnir.*

### Environmental, Cost, and Other Benefits

If sufficient solar is available, **100% fuel reduction is possible** with any type of solar, hybrid, or battery-powered light tower! In 2022, we estimate that generators and light towers on all Type 1 and 2 fires consumed almost 2 million gallons of diesel fuel, costing $8.3 million. This is equivalent to 20,204 metric tons $CO_2$ or 4,392 passenger cars driven for a year. **Other major benefits** include less noise (better sleep), reduced emissions and fuel dependency, reduced carbon monoxide, less refueling vehicle traffic in fire camp (improved safety), less heat, and fewer bugs.

### Successes in the Field

Energy-efficient light towers are increasingly ordered on incidents from a variety of vendors (Available Vendor List). The following represent just a few examples:

- **Solar Light Towers:** In 2022, 20 solar units from Emergency Command Support on the Six Rivers Fire (CA) and 2 solar units from Top Gun Resources on the White River Fire (WA) each achieved 100% fuel reduction.
- **Hybrid Light + Power Trailers:** In 2022, 100% fuel reduction was achieved while powering one yurt, electronics, interior lighting, and area lighting for 7 days with a Dement Electric trailer on the High Park Fire (NM). Over a 32-day deployment on the Black Fire (NM), the Dement trailer reduced fuel use by an estimated 97% (saving 292 gallons and $1,218) while powering the communications trailer and providing area lighting.

### Footprint Focus

Energy and Fuel Conservation

### Best Management Practice

Replace diesel light towers (and generators)

### Resource Savings

Up to 100% reduction in fuel consumed for area lighting!

### Cost Savings

Up to 30% reduction in overall cost

### Operational Benefits

- Reduced fuel dependency
- Silent operation
- No fumes
- Improved safety from reduced refueling vehicle traffic

### Tools and Resources

- Federal and Interagency Sustainability Drivers
- High-Efficiency Light Tower Vendors
- General Message Template - Light Towers
- GFT Products and Services Overview

If you would like to provide feedback on "green" products and services you have used on incidents, please complete the survey via the QR code or https://forms.office.com/g/uwepC6rSut

## How Can You Do This?

- You will achieve the greatest savings by using these units for all-night applications (e.g., camp entrance and/or security area).
- Quiet light and power are ideal for areas that benefit from silent operation (e.g., sleeping areas, morning briefing areas).
- Units can be programmed for automatic on/off.
- Battery and/or diesel generator back-up allows for continued use in smoky or dusty conditions.

### Solar Light Tower

- Various sizes are available illuminating between 10,000 – 40,000 $ft^2$. Typical units have 4 LED lights, 2 – 4 solar panels, a battery, and a 20-ft telescoping tower. Some units provide auxiliary charging for small devices.

### Hybrid Light Tower

- Hybrid light towers have a back-up diesel generator in addition to solar panels and a battery. Units typically have 4 LED lights and can illuminate up to ~65,000 $ft^2$. Some units provide auxiliary charging for small devices.

### Hybrid Light + Power Trailer

- A larger version of a hybrid light tower, providing power in addition to light.
- A typical hybrid light + power trailer has 8 LED lights, 10 solar panels, a 100-gallon diesel back-up generator, and AC power outlets.
- Appropriate for lighting areas up to ~87,000 $ft^2$ (2 acres). Can also power one tent/yurt (with up to 3.5-ton air conditioning unit) or provide auxiliary power for equipment or communication systems.
- Most beneficial in areas where stand-alone light and power is needed (e.g,, supply, security, ground support, spike camps).

### Other High-Efficiency Lighting

- LED Balloon Lights with a battery can run for hours between charges and be recharged using under-utilized generators in camp. They can illuminate ~3,000 $ft^2$.
- If other low-carbon options are unavailable, diesel light towers with LEDs (instead of metal halide lights) can reduce fuel consumption and emissions.

## Things to Consider

- Solar units perform best in locations with maximum exposure to direct sunlight (i.e., unshaded areas).
- Look at the specifications for the model you are considering to ensure it meets your needs. Product capabilities and the square footage illuminated vary, and not every product type is available in all GACCs.
- **When ordering, request that the vendor deliver, set-up, maintain, and provide ability to relocate the unit as needed. Vendor should confirm that on-board batteries are in optimal operating condition.**
- Check availability before ordering! Some of these are widely available while others have more limited availability.

## Questions?

Contact the National Greening Fire Team at SM.FS.greeningfire@usda.gov

## Example Light Towers


Hybrid light tower (Top Gun Resources). *Photo by Top Gun Resources.*

Hybrid solar light + power trailer (Dement Electric). 2022 Black Fire, NM. *USDA Forest Service photo by Margie Guzman.*

Battery-powered, truck-mounted LED light tower (LED USA / OptoEngineering). *Photo from LED USA / OptoEngineering.*