



# Photoluminescent EXIT Signs

*No batteries, electricity, bulbs, maintenance or testing*



LumAware (MN8 Foxfire) started in 2010 as a firefighter-owned company selling Photoluminescent products and coatings to firefighters, fire departments, and government entities. LumAware expanded its product offerings into the industrial and building safety markets developing zero-energy photoluminescent exit signs and egress (exit) products, certified by Underwriters Laboratory as NFPA approved replacements for traditional EXIT signs that improve safety and reduce costs.



# Warehouse-Industrial Signs

## Traditional Signs vs. Photoluminescent Signs



**Replacement Batteries**  
**\$7-\$15**  
plus labor per sign



**No Batteries**



**Replacement Bulbs**  
**\$9-\$36**  
plus labor per sign



**No Light Bulbs**



**Operating Costs/Electric**  
**\$4-\$28**  
per sign per year

**Periodic Testing**  
**\$20-\$40**  
per sign per year



**No Electricity**

**No Testing**

# Customer/Public Area Signs



- No batteries, light bulbs, electricity or testing
- Significant cost savings (detailed information available upon request) over electric EXIT signs
- Can be recharged indefinitely with as little as 5 foot candles of ambient light (this will always be available anywhere egress lighting is required)
- These signs qualify for three different LEED credits (EA, MR, ID)
- Our signs have a 25 year warranty
- We have a former Ohio Fire Marshal and certified fire/building inspectors who are all available to personally assist in working with various fire inspectors and AHJ that would have any questions or concerns with replacing traditional signs with ours.



# Why LumAware?

## SAFETY

We began as a firefighter-owned company enabling firefighters with photoluminescent products to assist them in locating each other and their equipment. We are not just a sign or manufacturing company selling products...we are a safety organization delivering innovative solutions to increase safety and reduce costs.

## LEED/ENVIRONMENTAL SUSTAINABILITY

"Sustainable" LumAware utilizes energy free lighting technology. No radioactivity and no hazardous waste (batteries, light bulbs, etc.) These products reduce not only the use of batteries but also electrical energy – much of which is generated with fossil fuels. LumAware signs qualify for 3 different LEED credits (EA, MR, & ID)

## SERVICE/SUPPORT

Because of our relationship with fire professionals we can offer unique expertise and on going support to your local stores throughout the United States. We have on staff the former Ohio Fire Marshall along with numerous other fire inspectors and professionals. In addition, there are over 60,000 firefighters using our products nationwide.

## COST SAVINGS

The use of photoluminescent technology ultimately replaces the aging approach of electrical solutions. Both initial costs of installation and potential ongoing costs of maintenance and repair are reduced or eliminated.

**\$250-\$400+**  
new installation  
cost savings  
per sign.  
No electrical conduit,  
wiring or  
electrician required.

## Maintenance Free

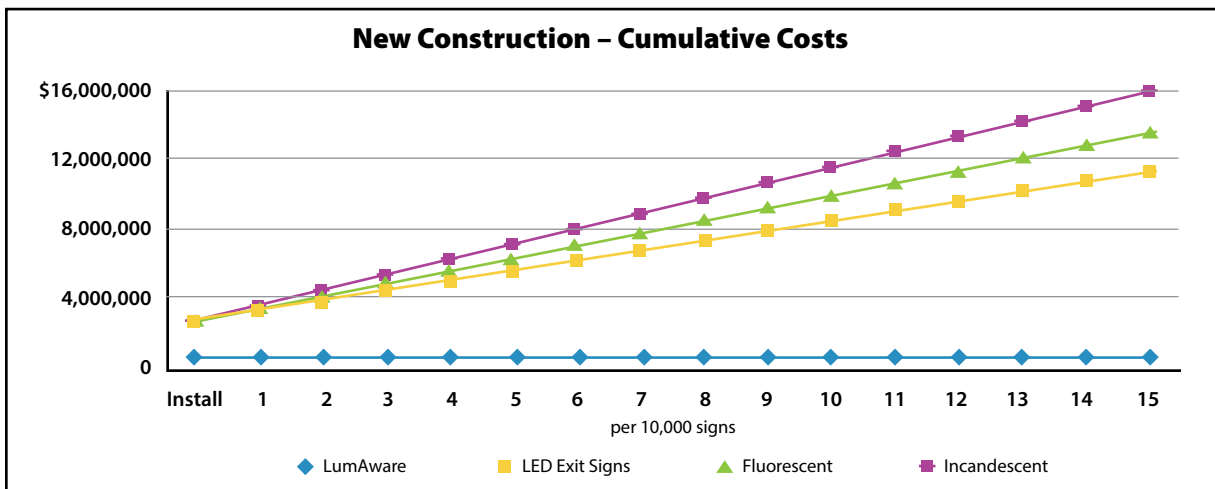
Never have to replace  
another exit sign.

*LumAware products  
are durable, easy-to-install  
and provide a long, reliable  
photoluminescent afterglow.*

UL listed to meet  
the NFPA standard  
for EXIT signs



UL Listed



## CERTIFICATE OF COMPLIANCE

**Certificate Number** 20150401- E363520  
**Report Reference** E363520-20150331  
**Issue Date** 2015-April-01

**Issued to:** EVP INTERNATIONAL, LLC DBA MN8-FOXFIRE  
10179 Wayne AVE  
Cincinnati OH 45215

**This is to certify that representative samples of** EXIT SIGNS, SELF-LUMINOUS AND PHOTOLUMINESCENT  
“See Addendum page”

Have been investigated by UL in accordance with the Standard(s) indicated on this Certificate.

**Standard(s) for Safety:** “See Addendum page”  
**Additional Information:** See the UL Online Certifications Directory at [www.ul.com/database](http://www.ul.com/database) for additional information

Only those products bearing the UL Certification Mark should be considered as being covered by UL's Certification and Follow-Up Service.

Look for the UL Certification Mark on the product.

*B. Mahrenholz*

Bruce Mahrenholz, Assistant Chief Engineer, Global Inspection and Field Services

UL LLC

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## Low Level EXIT signs

Remember those fire safety talks as a little kid? They told you to stay down low and crawl when you encounter smoke. Smoke rises and tends to increase in volume and intensity near doors and exits. Then why are traditional EXIT signs high above the door and ceilings.

Why do most codes require they be located near the ceiling when smoke would obscure them and render them useless?

The answer is simple – Tombstone Regulations.

Tombstone Regulations are basically waiting for people to die before requiring improvements in codes and regulations. One of the worst fires in the history of Las Vegas occurred when an out of control kitchen fire spread to the ventilation system of the famed MGM Grand Hotel. Smoke quickly filled the hallways and obscured most of the lights and EXIT signs. Panicked people did not know which way to egress and exit the building. eighty seven people never found the way to safety and perished.



Las Vegas learned from this tragedy and eventually required all hotels to require low level exit signage. If you walk down any hallway in Las Vegas you can see the results of these *tombstone regulations*. Why are virtually no other buildings outside of Las Vegas not following their lead?

It's great that low-level EXIT signs are installed but traditional electric EXIT signs do have some drawbacks.



One of the main problems with traditional plastic EXIT signs placed down low is that they are frequently damaged by luggage carts, vacuum cleaners and people accidentally kicking them. Additionally, they can be costly to install and maintain. Electric EXIT signs need to be tested monthly (as required by the NFPA) and are expensive to maintain because of electricity, replacement batteries and light bulbs. There is a better alternative. ...MN8 LumAware UL listed EXIT signs and photoluminescent wayfinding solutions.

LumAware's PL (photoluminescent) EXIT signs are a superior alternative as they are maintenance free, very durable and cost almost nothing to install. In addition to the benefits LumAware's many different styles of PL EXIT signs, LumAware also has a patented stairwell illumination system that has been tested by UL to meet the ASTM E2072/3 standards of the IBC, IFC, ICC codes. This stairwell illumination system can help people find their way down stairwells in the event of a fire or electrical failure that would normally leave them in complete darkness.





## EA Credit #1

*Energy and Atmosphere:*

*Optimizing Energy Performance*

To qualify for this LEED V2.2 Credit [worth up to 10 points] a building project must demonstrate improvement in the proposed building energy performance compared to a baseline criteria specified in ASHRAE/IESNA Standard 90.1, or comply with prescriptive measures of ASHRAE 'Advanced Energy Design Guide for Small Office Buildings', or comply with the 'Basis Criteria and Prescriptive Measures' of the Advanced Buildings Benchmark. More points are awarded to building projects using less energy than "baseline" guidelines prescribed by ASHRAE or the Advanced Buildings Benchmark.

With respect to exit signs, these guidelines are formulated on the basis of installing modern LED exit

signs which use about 5 watts of power. Although the impact of a few exit signs using 5 watts is not significant, larger facilities can employ thousands of exit signs in high and low applications. Recognizing that electrically powered exit signs must be energized 24 hours/day x 365 days/year, a typical large building project with 500 LED exit signs, each using 5 watts of power, burns nearly 22,000 kwh of electricity annually, costing about \$3,000 at \$.14/kwh.

Since MN8 LumAware Exit Signs are charged from nearby area lighting and require no direct power, there is no related electricity cost. Consequently, MN8 LumAware Exit Signs will positively contribute to the calculations that determine the energy efficiency of a building project. Depending upon the number of exit signs in your building, this additional energy savings can be significant in obtaining points toward EA Credit #1.



## MR Credit #4

*Materials and Resources:*

*Recycled Content*

MR Credit #4 requires that 10% of the dollar value of permanently installed project materials consist of recycled content. The recycled content value of a material is determined by its adjusted recycled weight [=100% post consumer component weight + 50% pre-consumer component weight] multiplied by the total dollar value of the assembly.

Since several MN8 LumAware Exit Signs are made primarily of metal with a high recycled content, these exit signs will contribute greatly toward this credit.



As an example, for a typical \$89.95 aluminum wall mount Photoluminescent Exit Sign that weighs approx. 12.8 ounces:

- Post-consumer recycled content component weight = 5.9 ounces
- Pre-consumer recycled content component weight = 2.5 ounces
- Non-recycled component weight = 4.4 ounces

$Recycled\ content\ value = [100\% \times [5.9/12.8 + .5 \times 2.5/12.8]] \times \$89.95\ Of\ one\ exit\ sign = \$49$



## ID Credit #1.1

*Innovation in Design:*

*Significant Environmental Benefits*

There are two avenues available to obtain Innovation in Design points. Using MN8 LumAware Exit Signs works best with the avenue whereby the project team demonstrates a comprehensive approach toward employing a product or technology that has significant environmental benefits not addressed or credited in other LEED categories. The comprehensive approach targets optimizing the benefits and trade-offs of an innovation proposal throughout its life cycle phases:

design, procurement, construction, operational and decommissioning. The advantages of MN8 LumAware Exit Signs span all the life cycle phases with the following environmental benefits:

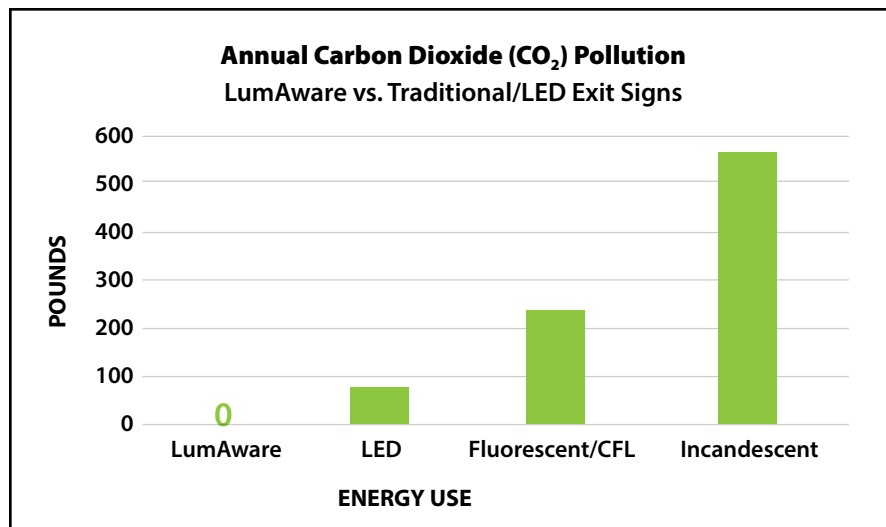
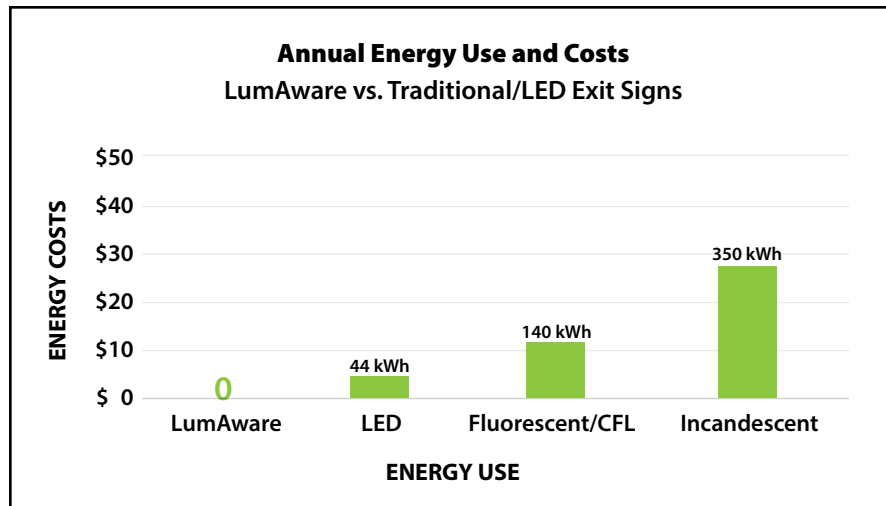
- Fewer Building Materials Required
- Energy Efficient
- High Percentage of Recycled and Recyclable Materials
- No Hazardous Materials or Wastes
- Longer Lifespan
- Less Maintenance



### Exit Sign Energy Use by the Numbers

Exit Sign Lighting Technology	Annual Energy Use	Annual Energy Costs	Lamp Service Life	Annual Carbon Dioxide (CO <sub>2</sub> ) Pollution
LumAware Photoluminescent	0 kWh	\$0	Not Applicable	0 Pounds
LED	44 kWh	\$4	10+ Years	72 Pounds
Fluorescent/CFL	140 kWh	\$11	10.8 Months	230 Pounds
Incandescent	350 kWh	\$28	2.8 Months	574 Pounds

Table from www.energystar.gov and modified to include LumAware Photoluminescent.





# LumAware Safety Analysis Summary

## Assumptions

It is widely believed that it costs between \$200 and \$500 for the sign cost and installation of a traditional or LED exit sign. For purposes of our analysis we have chosen costs in the low range at \$280.

We have estimated the annual operating cost of LED, fluorescent and incandescent signs to be \$57, \$71 and \$88 respectively. The LumAware exit sign has no annual operating costs.

Our analysis includes replacing each LED exit sign when they go bad at a cost of \$40 (\$30 for sign and \$10 for labor).

In our analysis of existing locations, we have increased the cost of installation by \$10 to remove the existing exit sign and cap the electricity.

ASSUMPTIONS				
	LumAware	LED	Fluorescent	Incandescent
<b>INSTALL</b>				
Sign Cost	\$120	\$ 30	\$ 25	\$ 20
Labor	<u>10</u>	<u>250</u>	<u>250</u>	<u>250</u>
	\$130	\$280	\$275	\$270
<b>ANNUAL COST</b>				
Batteries	\$ -	\$ 15	\$ 15	\$ 15
Bulbs	-	-	15	15
Periodic Testing	-	30	30	30
Electricity	-	4	11	28
Replacement Sign ( <i>\$30 ea x 20%</i> )	-	6	-	-
Replacement Labor ( <i>\$10 ea x 20%</i> )	<u>-</u>	<u>2</u>	<u>-</u>	<u>-</u>
	\$ -	\$ 57	\$ 71	\$ 88

**Annual Cost SAVINGS of \$50-\$85+ dollars per year per sign**

**Monthly inspections** – According to NFPA101, electric exit signs must undergo a 30-second test every month.



**Yearly inspections** – NFPA101 also requires that electric exit signs simulate being on battery backup for 90 minutes every year.

**NO ANNUAL TESTING REQUIRED WITH LUMAWARE SIGNS**

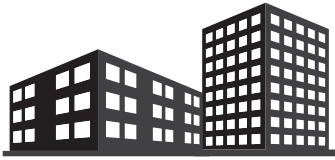
# LumAware Safety Analysis Summary (continued)

## LumAware Safety Exit Sign Savings per 10,000 Signs



### NEW CONSTRUCTION

	LumAware vs. LED	LumAware vs. Fluorescent	LumAware vs. Incandescent
Immediate Install Savings	\$ 1,500,000	\$ 1,450,000	\$ 1,400,000
15 Year Savings	\$10,050,000	\$12,100,000	\$14,600,000

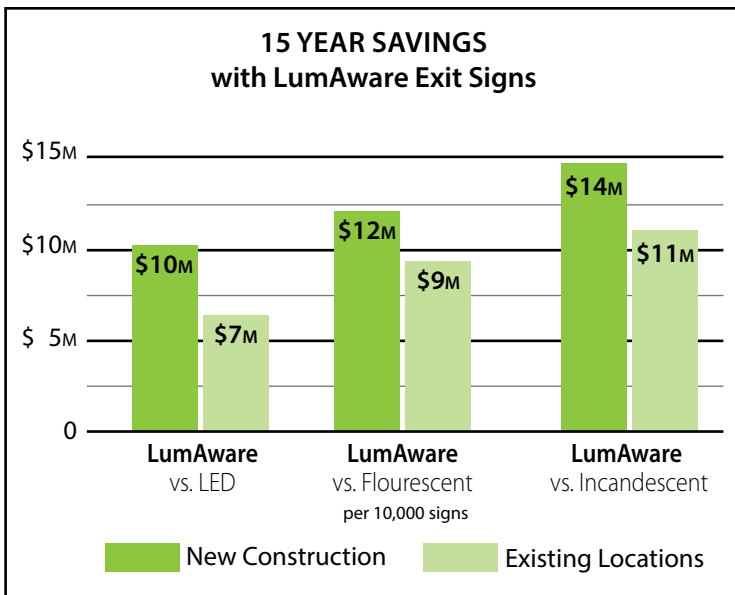


### EXISTING LOCATIONS

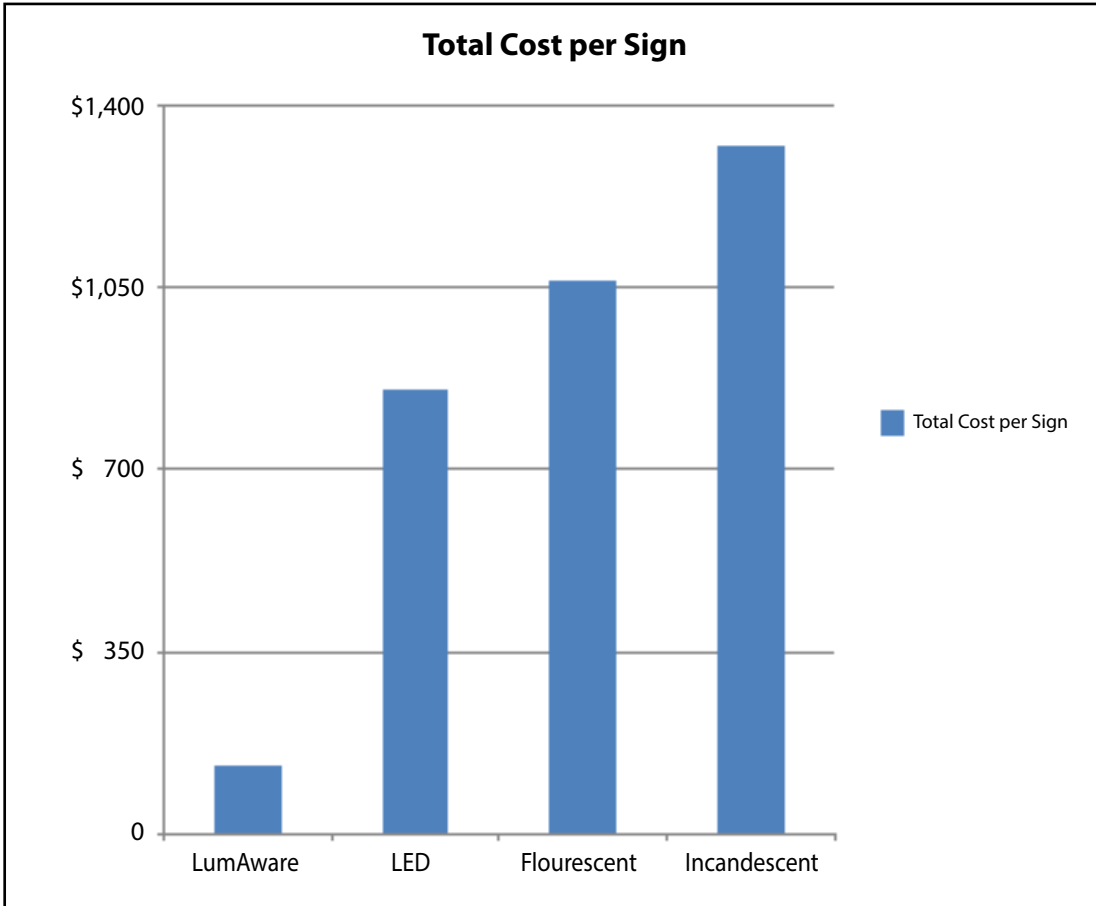
	LumAware vs. LED	LumAware vs. Fluorescent	LumAware vs. Incandescent
Initial Investment	\$ 1,500,000	\$ 1,500,000	\$ 1,500,000
ROI	570%	710%	880%
Total Savings (15 Years)	\$ 7,050,000	\$ 9,150,000	\$11,700,000
Payback in Years	2.6	2.1	1.7
IRR	38%	47%	59%

ROI - Return on Investment

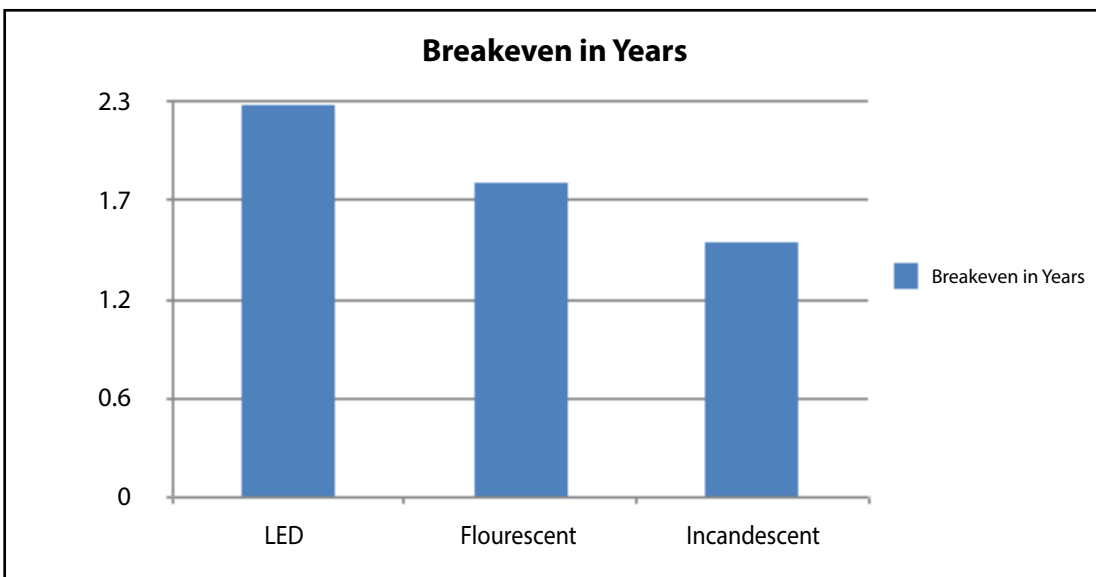
IRR - Internal Rate of Return



## Total 15 Year Costs – Existing Locations



## Breakeven in Years – Existing Locations



# Reference Letters

**Congress of the United States**  
**Washington, DC 20515**

The Honorable Stephen T. Ayers  
Architect of the Capitol  
SB-15, U.S. Capitol  
Washington, DC 20515

Dear Mr. Ayers,

Recent incidents at federal buildings, including the U.S. Capitol Complex, have been a sobering reminder of the unique challenges we face as we work to ensure the safety and security of the millions of Americans who visit and work in federal government buildings every day. Effective signage to guide people to safety is just one component of sound emergency preparedness.

I write to bring to your attention a new, state-of-the-art technology that I believe may provide a cost-effective solution to some of these unique safety challenges at federal buildings.

Photoluminescent technology may be used in the form of signage, such as exit signs for office buildings with complex architectural layouts. These photoluminescent signs offer several advantages over traditional signs because they do not require electricity to operate.

In the event of an emergency, people rely on exit signs to guide them to safety. However, the vast majority of traditional exit signs require electricity to operate. If a natural disaster, terrorist attack or power outage were to occur, a federal building's electricity supply could be compromised, rendering traditional electric signs, useless, jeopardizing the safety and security of all occupants.

Moreover, the electricity required to operate traditional electric safety signs increases building operational costs through higher electricity consumption.

Reports from [Energystar.gov](http://Energystar.gov) indicate that this technology is more energy-efficient and less costly than the old electric and LED signs.

As [Energystar.gov](http://Energystar.gov) indicates, Photoluminescent exit signs are a potential cost-saving alternative to the traditional signs in the following ways:

- Photoluminescent signs require no back-up batteries
- Photoluminescent signs require no light bulbs to replace
- Photoluminescent signs require no electricity
- Photoluminescent signs require no periodic testing

Because of these differences, photoluminescent technology can offer substantial cost savings. As we look for new and improved ways to ensure the safety and security of the people who visit and work in federal buildings in these dangerous times, I respectfully request that you give the use of photoluminescent exit and safety signs every full and fair consideration in accordance with all applicable laws and regulations.

This innovative technology has the potential to save lives while saving the taxpayers money. As such, I believe it is worthy of consideration as a viable alternative to the electric signs.

Thank you in advance for your consideration and should you require any additional information, please do not hesitate to reach out to Chris Hess in my office at [Chris.Hess@mail.house.gov](mailto:Chris.Hess@mail.house.gov) or 202-225-2216. Additionally, please feel free to make this correspondence part of any public record.

Sincerely,



Steve Chabot  
Member of Congress



Brad Wenstrup  
Member of Congress

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Web: www.LumAwareSafety.com

To Whom It May Concern,

My name is Robert Rielage and I was the Fire Marshal for the State of Ohio in the promulgation of the Ohio Fire and Ohio Building Codes. As with nearly 40 of the states, Ohio's codes are based on the International Code Council's (ICC) family of codes, i.e. the IBC, IFC, IPC as well as the NEC written in conjunction with the National Fire Protection Association (NFPA). Several other states use the NFPA 1 combined Building and Fire Codes as the basis for their state codes. Since 2009, both the ICC and NFPA have recognized photo luminescent (PL) Exit signs and PL egress systems as alternatives to the standard electric signs as long as they bear the certification of Underwriters' Laboratory (UL) or a similar independent testing agency.

LumAware's emergency EXIT signage includes this UL certification to assure compliance with these existing national standards. All of LumAware's EXIT signs are stamped with the UL seal along with LumAware's certification number. Hence, LumAware's signage complies with the ICC and NFPA family of codes used as the basis for statewide Building and Fire codes in the majority of States, including Ohio.

We all know, however, that some local AHJ's are not aware of change and especially the move toward LEED's or energy conservation. In part, it is my roles with LumAware to discuss the codes with these AHJ's and show how our signs are used interchangeably with those electrically powered. To date, with the exception of an AHJ requesting additional signs in a specific occupancy, we have had no jurisdiction reject the use of our certified PL signage.

I would be happy to assist you and your company with any future questions that may develop with new or renovated facilities. I would also suggest that we might discuss LumAware's PL emergency signage with those AHJ's at a pre-construction conference and my team and I would be happy to facilitate those discussions.

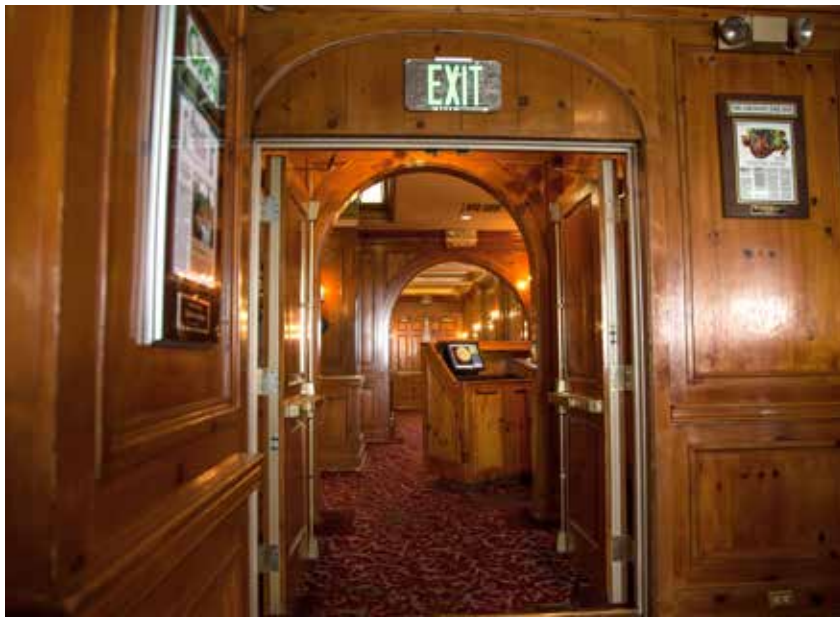
Sincerely,

Robert R. Rielage, CFO, EFO, FIFireE  
Sr. VP. Business Development

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Foxfire (LumAware) has won numerous awards and was named as a finalist in the 2010 Cincinnati Innovates Awards, named the Cincinnati Chamber's 2010 Emerging Business, and was a winner of the 2011 Cincinnati Innovates Awards. In 2013, MN8 Foxfire (LumAware) was named Entrepreneur of the Year by Governor Kasich at the Ohio Chamber of Commerce annual meeting. MN8 Foxfire's (LumAware) CEO recently testified as an expert witness in front of the US Congressional Small Business Committee in DC. and was recently featured in the 2015 Entrepreneur Magazine e360 List.

Foxfire (LumAware) is headquartered in Cincinnati, Ohio, and has expanded its community contribution by partnering with the Cincinnati Association of the Blind and Visually Impaired, "CABVI."

Foxfire and LumAware are divisions of



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For our complete line of products and ordering information, visit us at:  
[www.LumAwareSafety.com](http://www.LumAwareSafety.com) or call: (513) 761-7614