

Renewable Lighting & Energy

Street, Parking, Pedestrian Illumination & EV Charging



Street Lighting: Origin & Evolution

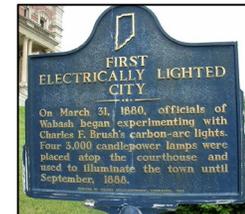
1792: The first gas lamp is introduced for the practical application of lighting, appearing at a small home in Great Britain

1803: The U.S. sees its first gas lamp installed in the state of Rhode Island

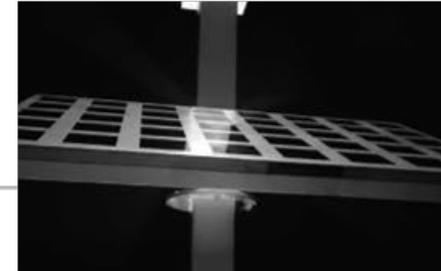
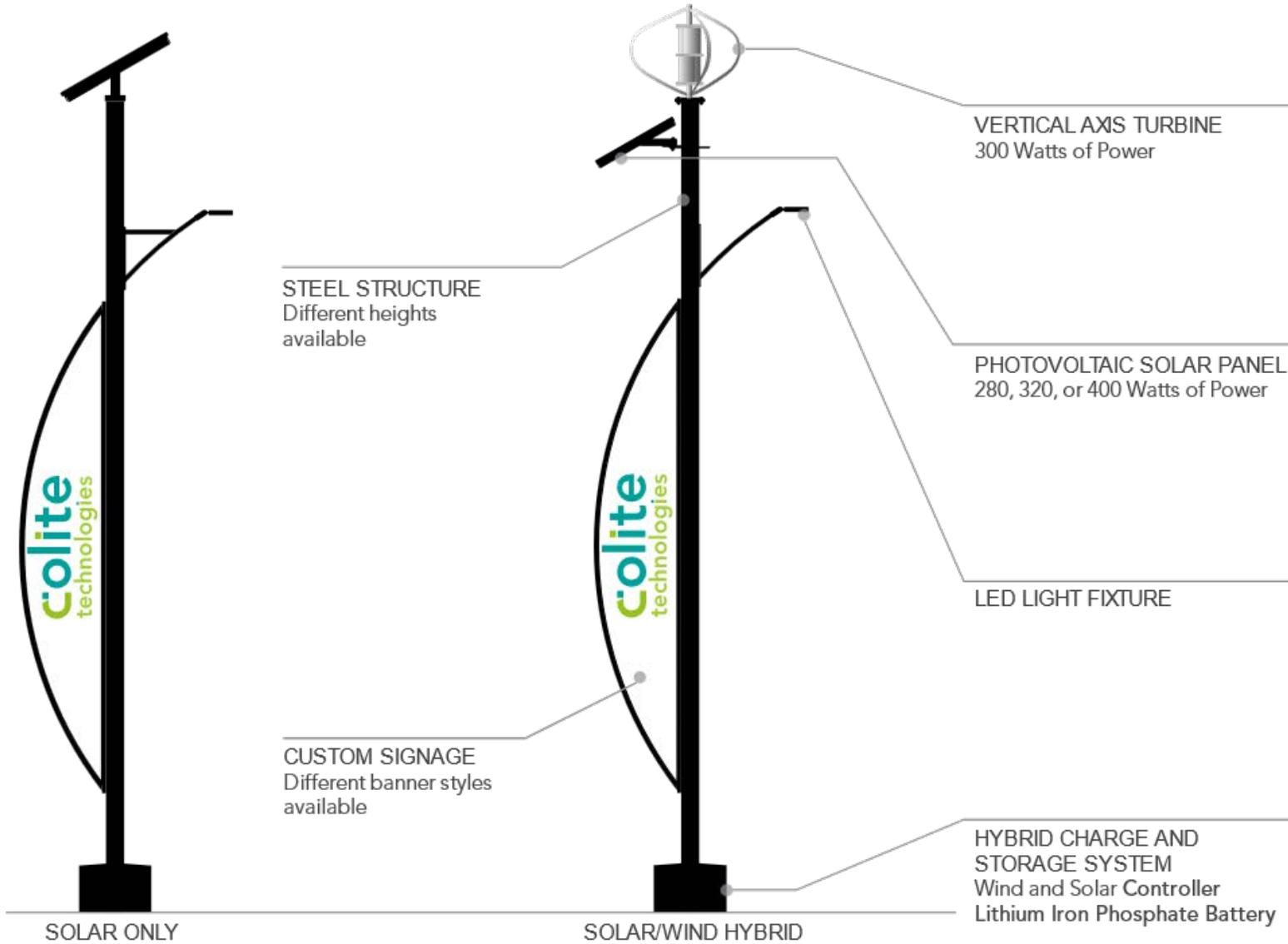
1880: The city of Wabash, Indiana becomes the "First Electrically Lighted City in the World"

2019: There are over 300 million *on-grid* street and parking lot lights worldwide.

We see this as a HUGE opportunity – for the use of renewable energy products.



Renewable Lighting: The Concept



WIND POWER
AND/OR
SOLAR POWER



CHARGE
CONTROLLER



BATTERY
STORAGE

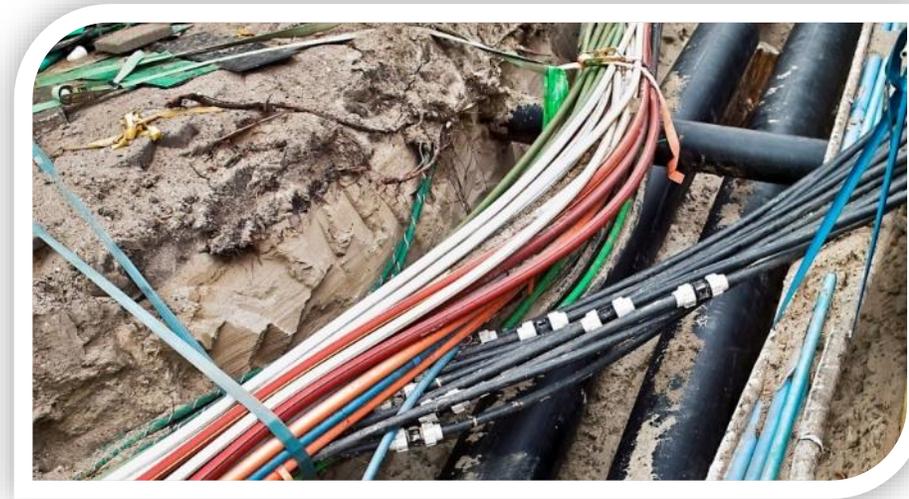


LIGHT

Renewable Lighting: System Overview

Key Benefits of Our System:

- Completely self-sufficient, still operates if grid power goes down
- No power bill, lifetime energy costs savings
- No trenching or underground wiring
- Federal and state economic incentives
- Main components can be easily removed if major storms are eminent
- Can be removed from the foundation and reinstalled at another location
- Attractive structure that draws interest
- Signage or custom designs can be added to further increase the structures' appeal and value



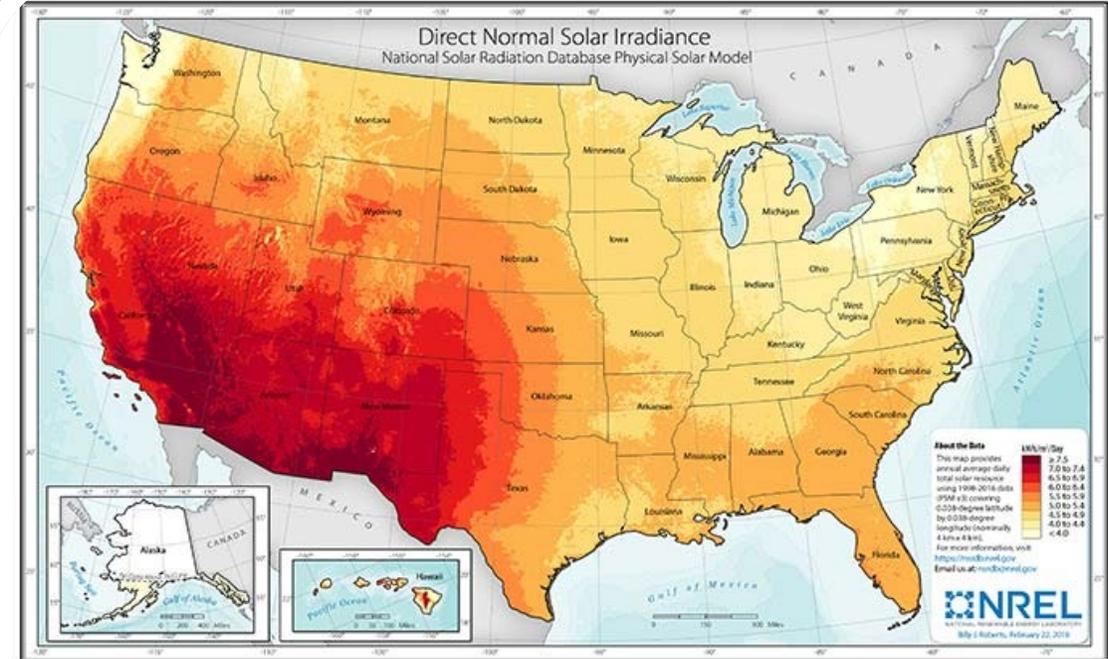
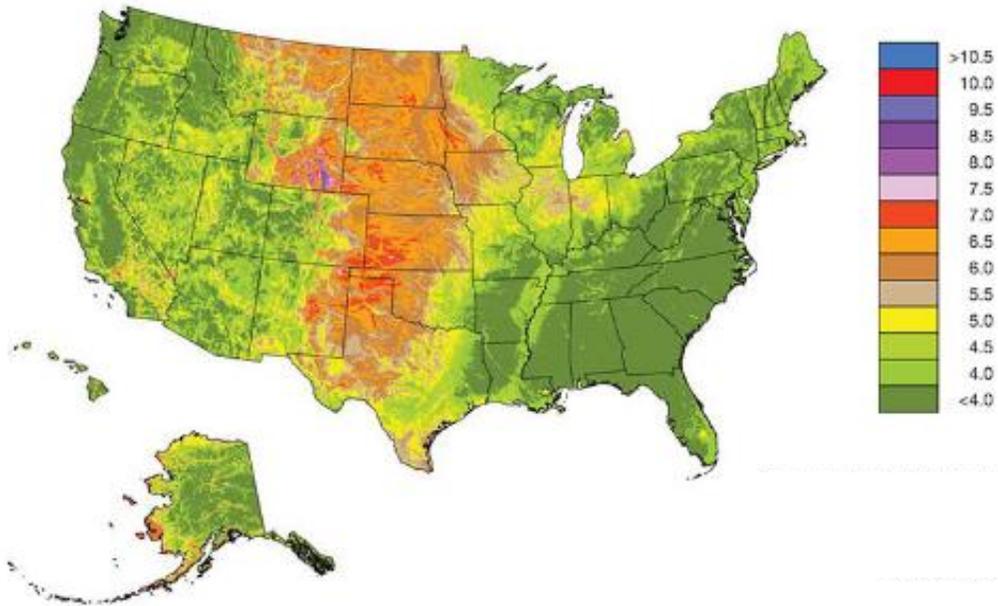
**We see this as a global solution
to many problems and challenges.**

SIGNAGE + LIGHTING + ENERGY

Renewable Lighting: Why Combine Wind & Solar?

Renewable Resources: Wind and Solar Energy Availability is Complimentary

Average Wind Speed (m/s) at 30 m



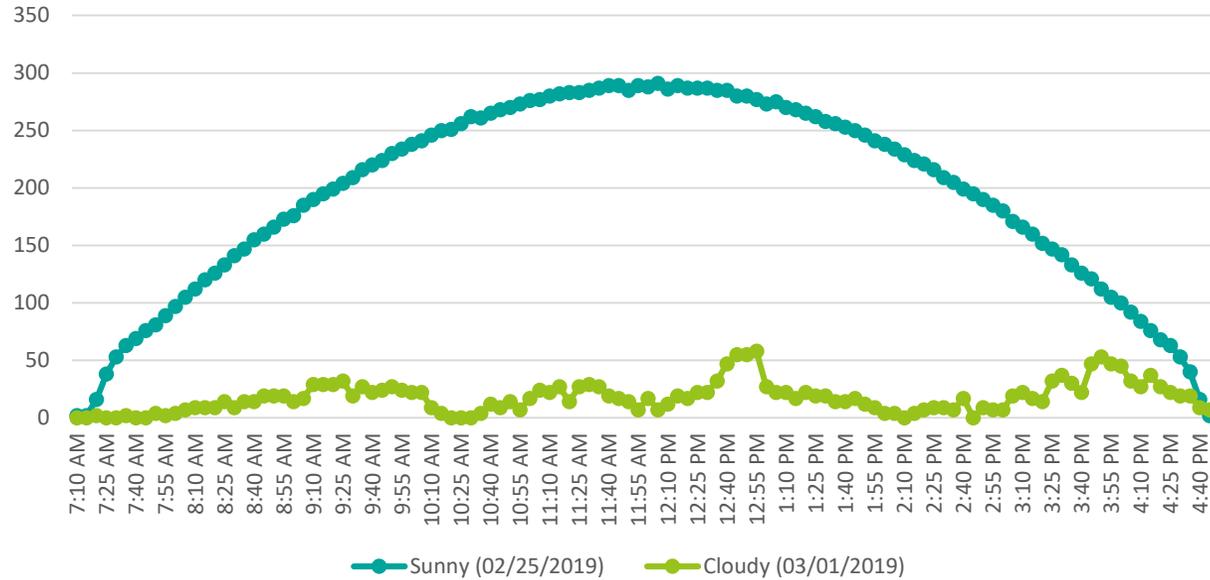
In many locations, solar or wind energy *alone* is insufficient.

The combination of wind and solar energy *together* works everywhere, every time.

Renewable Lighting: Solar Production - Sunny vs Cloudy Days



PV Production in Sunny vs. Cloudy Days (W)



- Energy Production on 02/25/2019 (Sunny Day): **1253 Whrs**
- Energy Production on 03/01/2019 (Cloudy Day): **226 Whrs**

Data Analysis											
	Day 1	Day2	Day3	Day4	Day5	Day6	Day7	Day8	Day9	Day10	Day11
Usable Battery Capacity (Whrs)	1296	1172	1048	924	800	676	552	428	304	180	56
+	+	+	+	+	+	+	+	+	+	+	+
New Production (Whrs) (Cloudy Day)	226	226	226	226	226	226	226	226	226	226	226
-	-	-	-	-	-	-	-	-	-	-	-
Average Daily Usage (Whrs) (100W Fixture)	350	350	350	350	350	350	350	350	350	350	350
=	=	=	=	=	=	=	=	=	=	=	=
Net Battery Capacity (Whrs)	1172	1048	924	800	676	552	428	304	180	56	-68

Analysis |

Product

- 300W Solar Panel
- Single 100W Fixture with motion sensed dimming on solar only pole

Situation

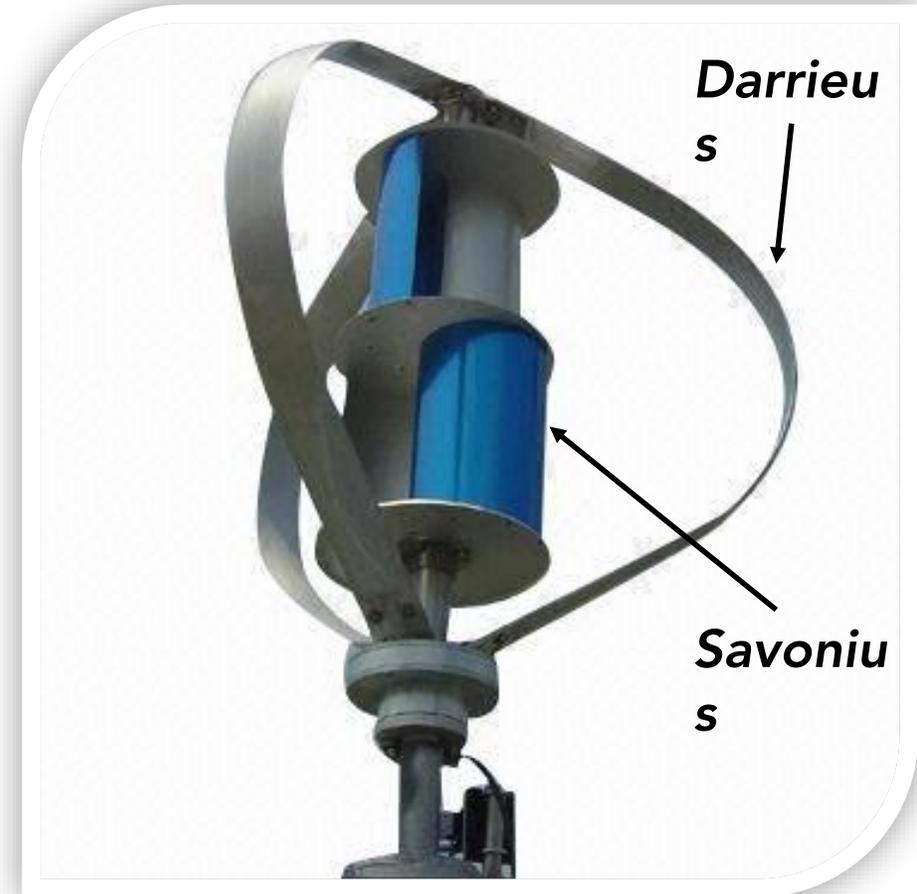
- Battery fully charged on day 1
- Cloudy day generates 10% - 25% of power production vs sunny day
- Lighting reliability would be impacted only if there were up to 10 straight days of clouds/rain.
- A sunny day during this 10 day period would restart the clock
- Longer summer days extend the reliability period even further

Renewable Lighting: Why Use Colite Technologies Vertical-Axis Wind Turbines?

Hybrid Darrieus/Savonius (DS) Vertical Access Wind Turbine (VAWT)

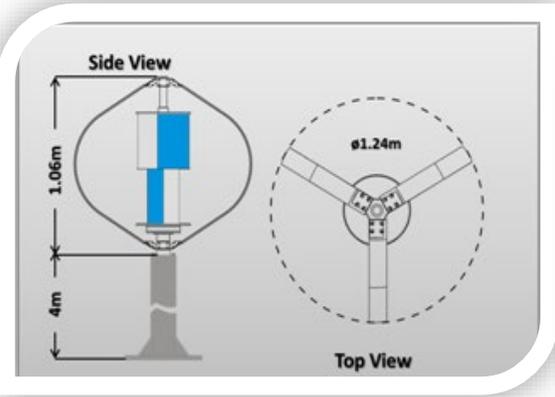
Design Colite Technologies DS Vertical-Axis Wind Turbines Offer:

- A thoroughly engineered & tested design
- A unique & attractive look
- Simple shipping & installation
- Reliable & consistent performance under most wind conditions
 - Minimal wind speeds
 - Any wind direction
- Efficient & effective uni-directional design
 - Eliminates pitch & yaw systems
 - Low maintenance
 - Low noise
- Extensive global installed base with over 10,000 units in operation

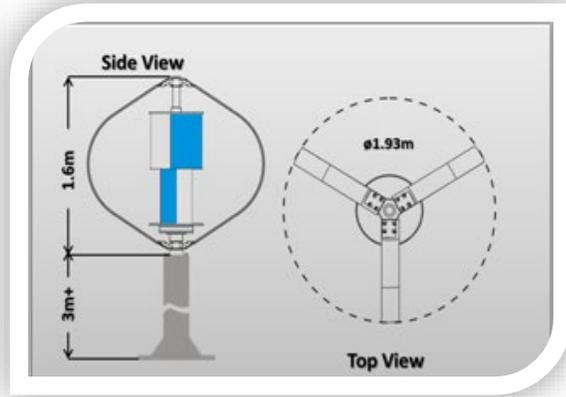


Renewable Lighting: Sizes & Scales of Turbine Units

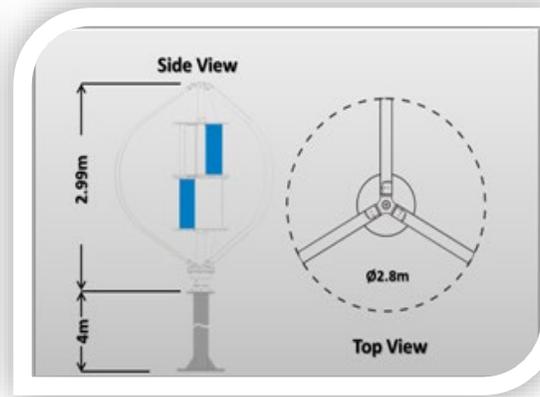
DS-300



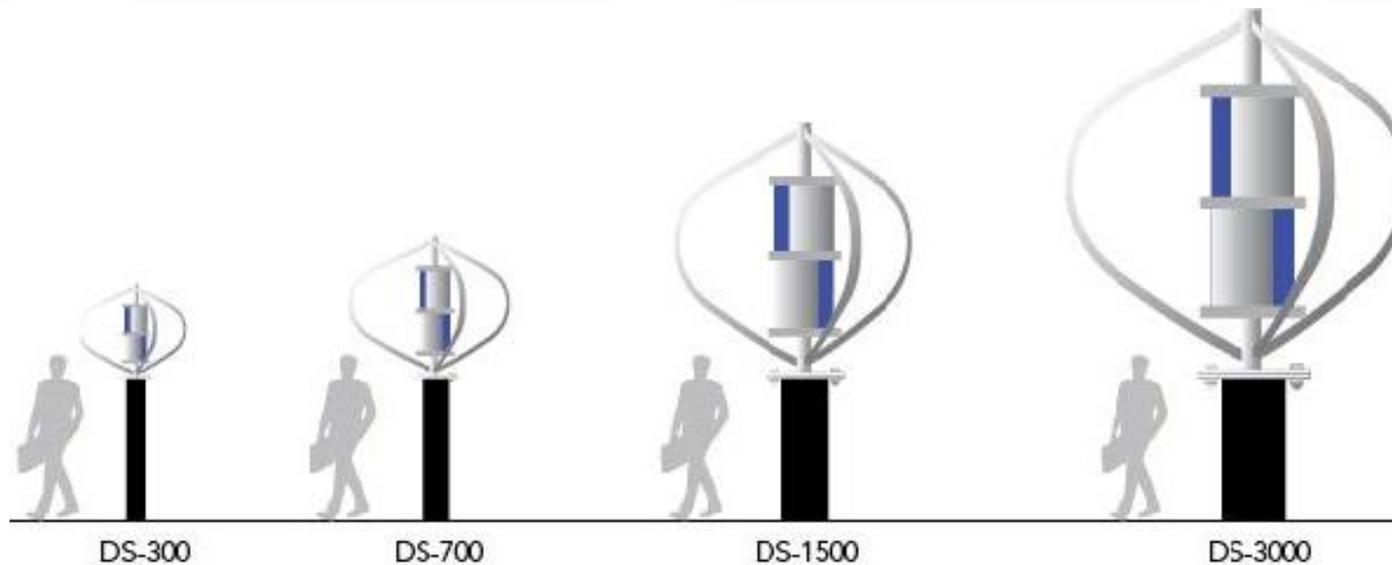
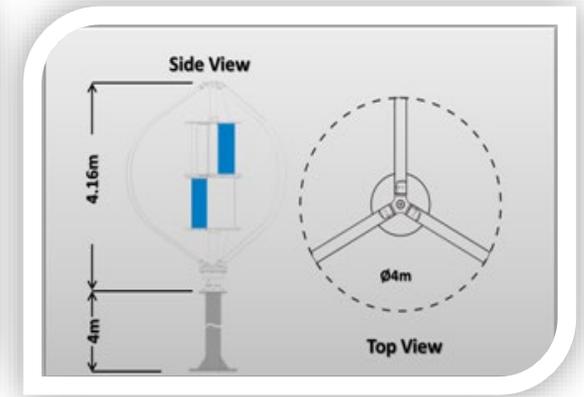
DS-700



DS-1500



DS-3000

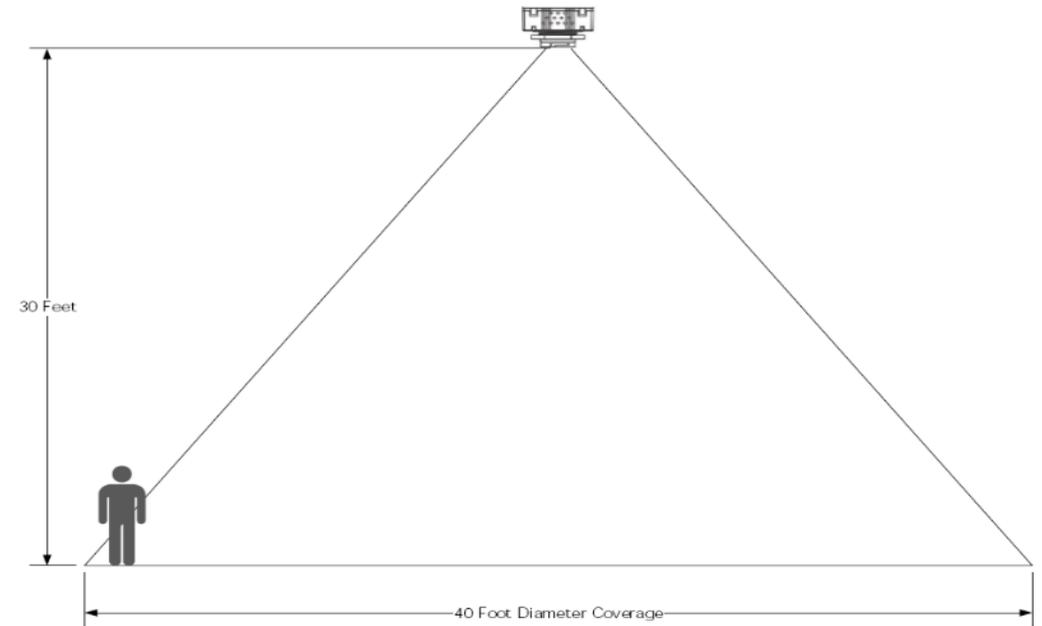


Motion & Dimming

Optional feature for motion sensing and dimming

How it works:

- Sensor has 40' range at a height of 30'
- No motion for 30 consecutive seconds, output goes to 50%
- Any motion within the range, output goes back to 100%
- Offers additionally lighting capacity without impacting system storage requirements

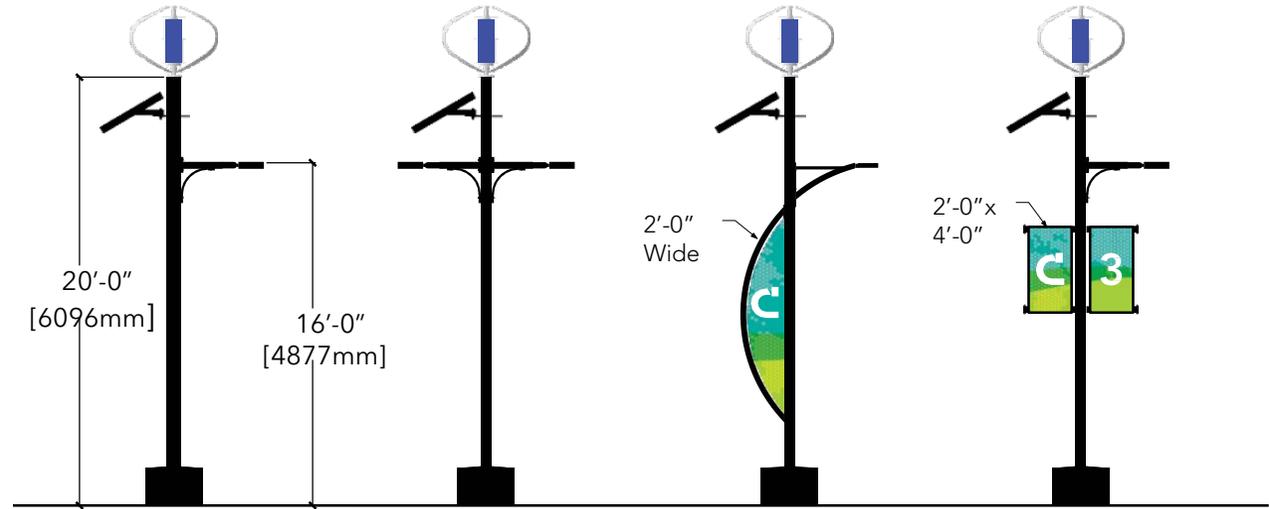


Renewable Lighting: Branding Potential

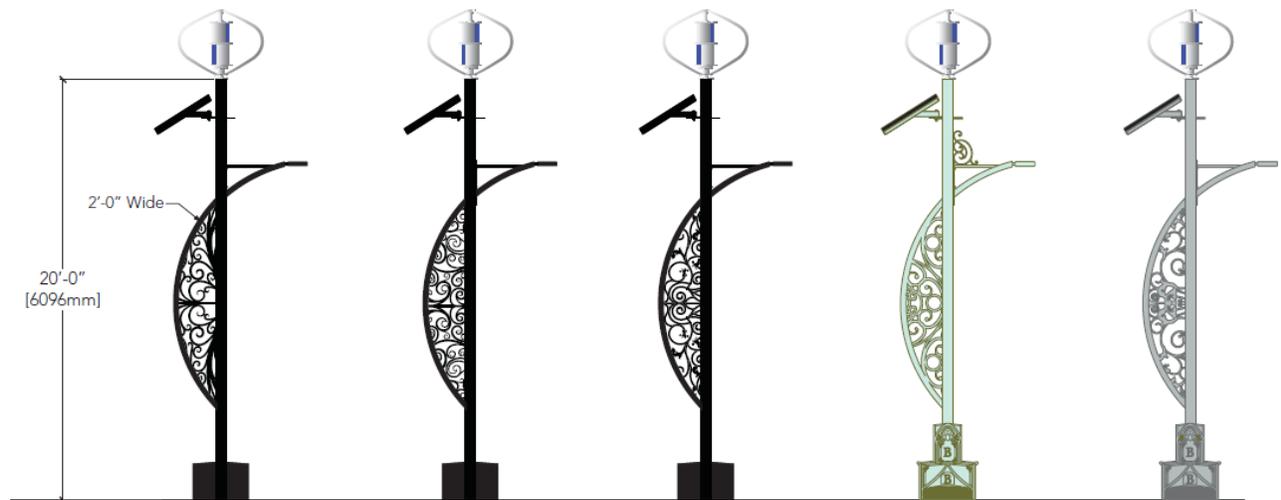
- Looks Innovative & Sparks Curiosity
- Visually Engaging & Makes a Statement
- Demonstrates a Commitment to Progress and a Healthy Environment



Simple...

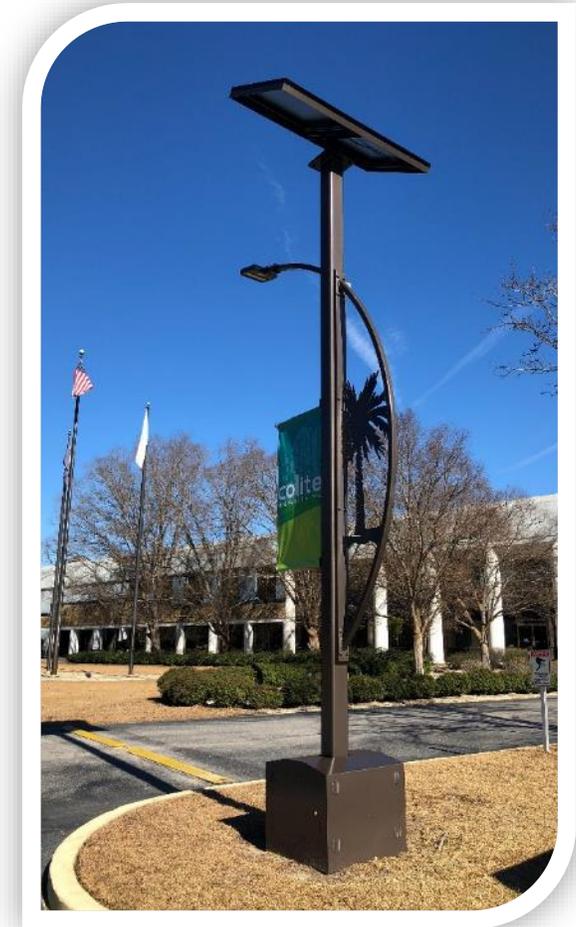
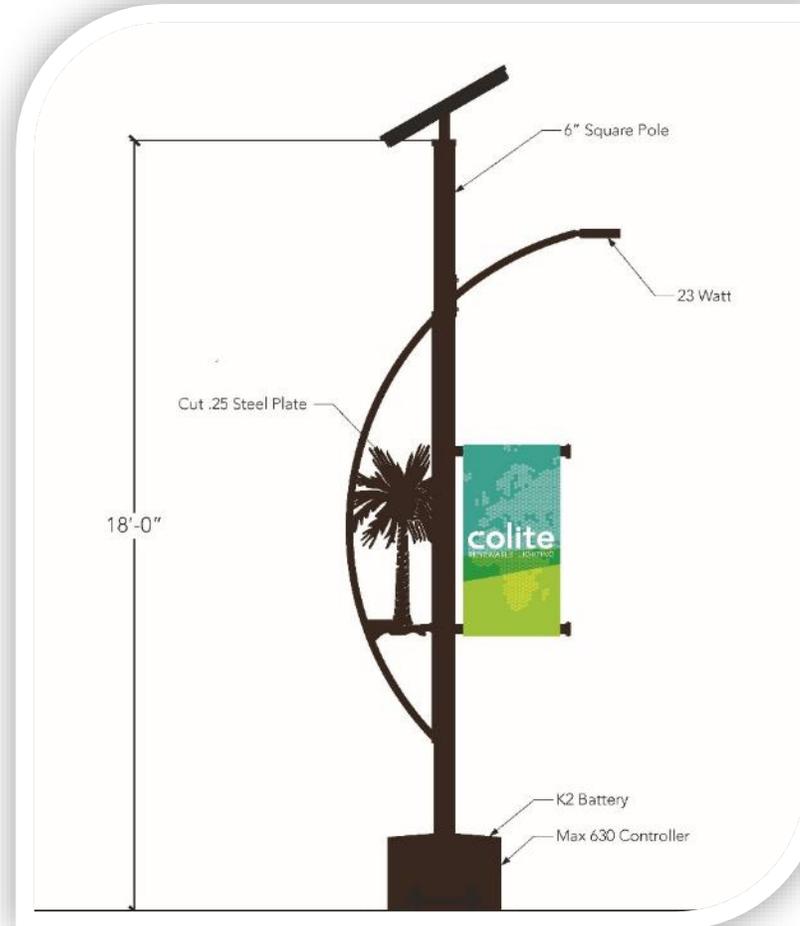


Complex...



Renewable Lighting: Solar-Only Options

- 60, 80, 100, 150 & 200 watt LED light options with dimming and motion sensing
- Foot candle output to accommodate project requirements
- Limitless design & decorative ornamental options



ADDITIONAL "SMART POLE" TECHNOLOGY & FEATURES

Cameras | Wi-Fi | Phone Charging Stations | Intelligent Data Collection in Development



Renewable Lighting: Smart Pole

Features

Monocrystalline solar panel
Lithium ion or AGM battery
LED lighting with motion sensor
Optional HD Camera
Optional USB charging ports
Optional wi-fi communications
Optional bench for seating

Benefits

Innovative design

Self-sustaining and off-grid

- No infrastructure costs
- Energy storage for reliable power when you need it

Clear sustainability commitment

Customized for each location

Security

- Remote HD Camera monitoring and data storage
- Motion sensing
- Bright LED lighting

Recreational

- Relaxation and socialization
- Wi-Fi connectivity
- Charging ports for small devices



Renewable Lighting: Wide Market Appeal



Business / Industrial Parks



Retail



Residential



Education



Hospitality

Renewable Lighting: Can be Very Competitive with Traditional Lighting

Renewable Lighting

Higher up-front capital outlay

Minus Federal and State Incentives (30% Tax Credit, Varies by State)

Minus NPV of lifetime energy costs

Minus NPV of accelerated depreciation tax benefit (1yr)

Other Benefits: Zero environmental impact over life of unit

Branding potential

Installed in a matter of hours

VS

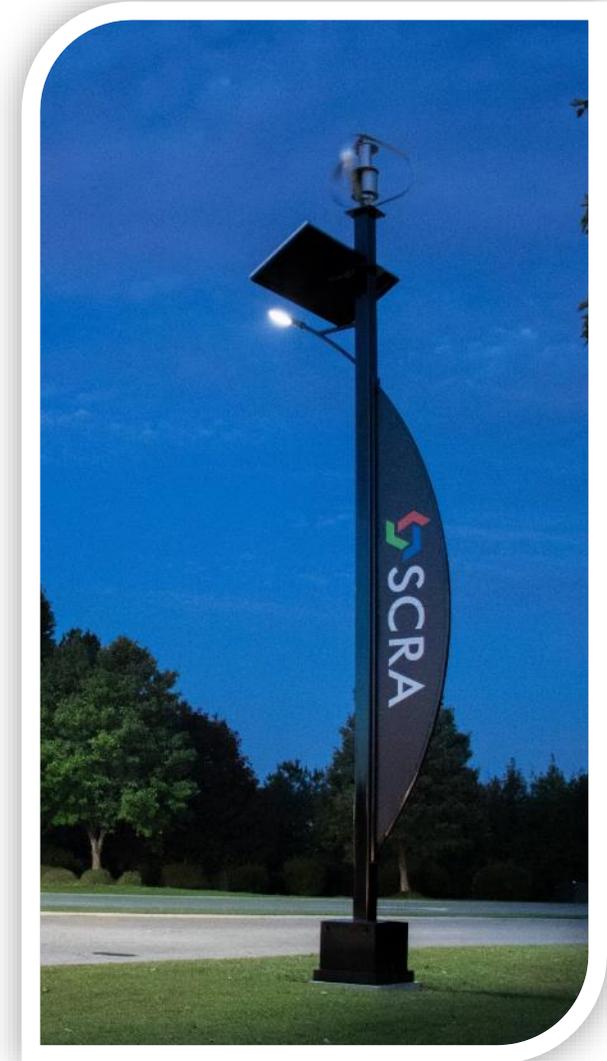
Traditional on-grid lighting

Cost per pole and fixture

Trenching & cable installation

Cost for pole installation

Minus NPV of traditional depreciation tax benefit



Renewable Lighting: What Is The Environmental Impact?

By taking just *one* 400W street light off of the grid...

Over 25 years, you would remove *28.5 tons* of CO₂ or the equivalent of:

Greenhouse gas emissions from



CO₂ emissions from



Greenhouse gas emissions avoided by



Carbon sequestered by



• Typical metal halide bulb can consume 400W/hour or 4kWh/day @ 10hrs/per

** Greenhouse gas equivalencies can be found on the epa.gov website

Renewable Lighting: Recent Projects

South Carolina Research Authority
Columbia, SC

Fosters SC's Innovation Economy by supporting entrepreneurs, enabling academic research and commercialization, and connecting industry to innovators



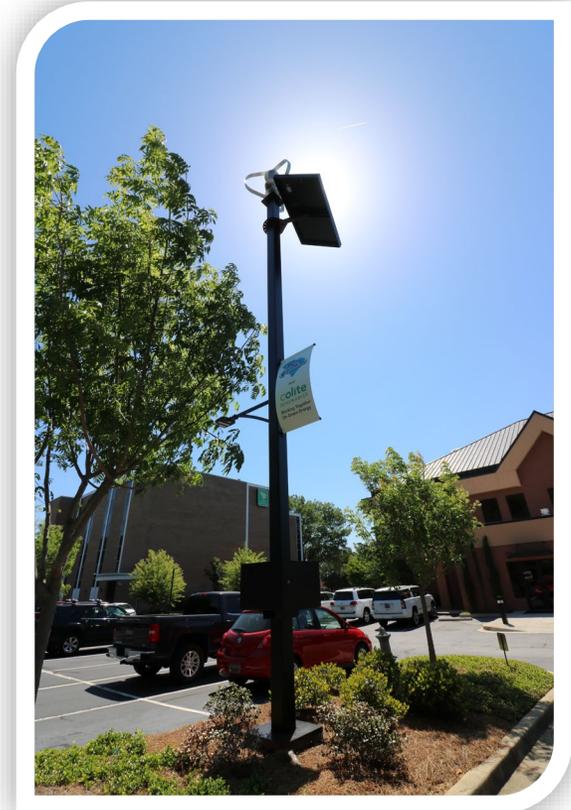
Clemson University
Charleston, SC

State-of-the-art wind energy research facility testing next-gen turbine technology



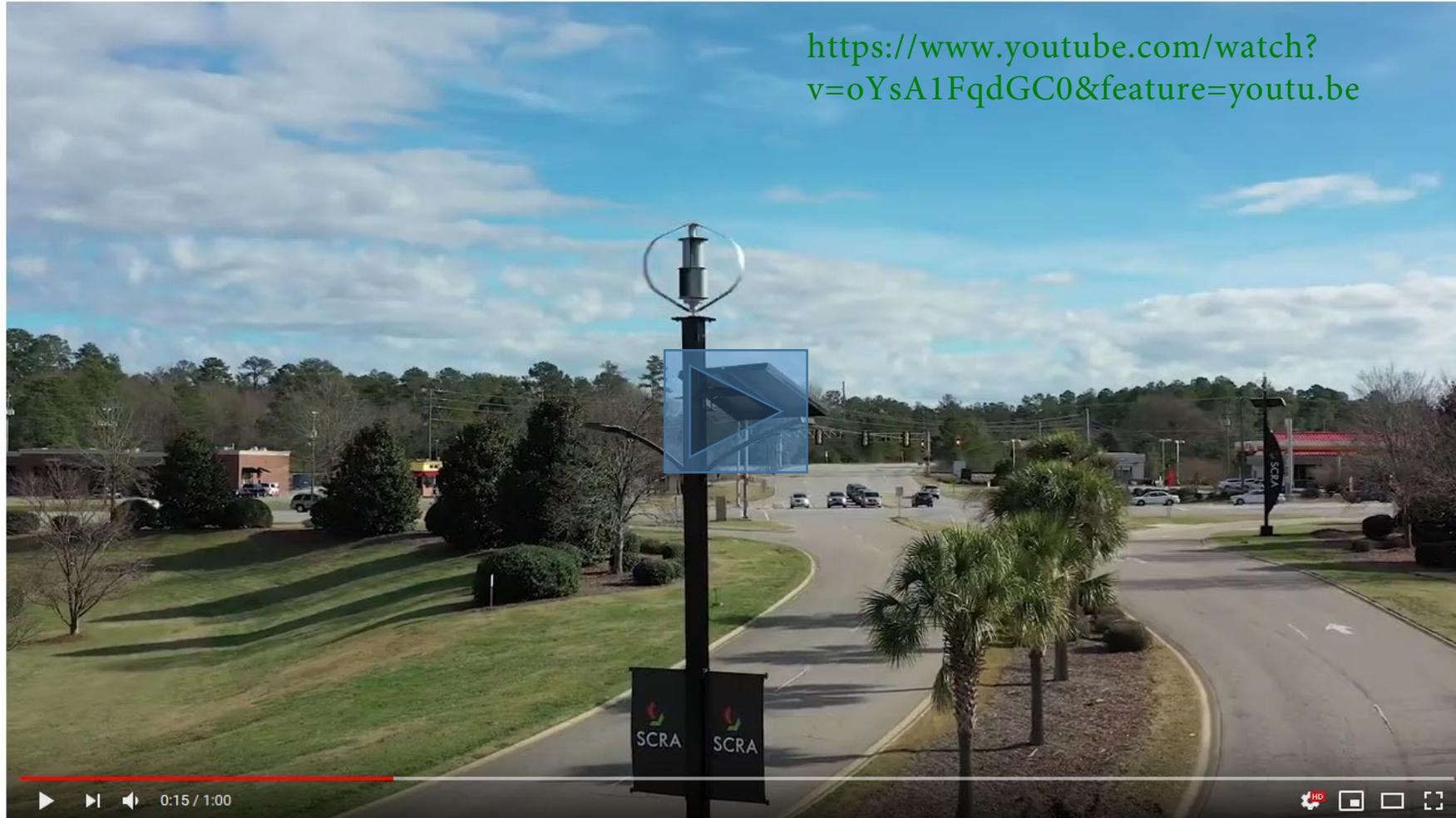
Electric Cooperatives of SC
Columbia, SC

State-wide association of electric cooperatives providing research, training, and programs



Renewable Lighting: Recent Installation Video

<https://www.youtube.com/watch?v=oYsA1FqdGC0&feature=youtu.be>



South Carolina Research Authority
Columbia, SC

Renewable Energy: EV Charging

To compliment our renewable-energy lineup, we've partnered with *Brightfield Transportation Solutions*.

Brightfield provides unique and environmentally-friendly EV car charging stations suited for a host of applications.



Renewable Energy: Why EV Charging?

By 2040: 54% of new car sales and 33% of the global car fleet will be electric.

Despite the advance of electric vehicles, EV charging infrastructure remains inadequate.

This is where the partnership and product offerings of Colite & Brightfield shine.

* Bloomberg New Energy Finance Report: *Electric Vehicle Outlook 2017*

Renewable Energy: EV Charging Market Potential

The potential for growth in this space is *unparalleled*.

Hotels



Retail



Workplace



Municipalities



Destinations



Universities

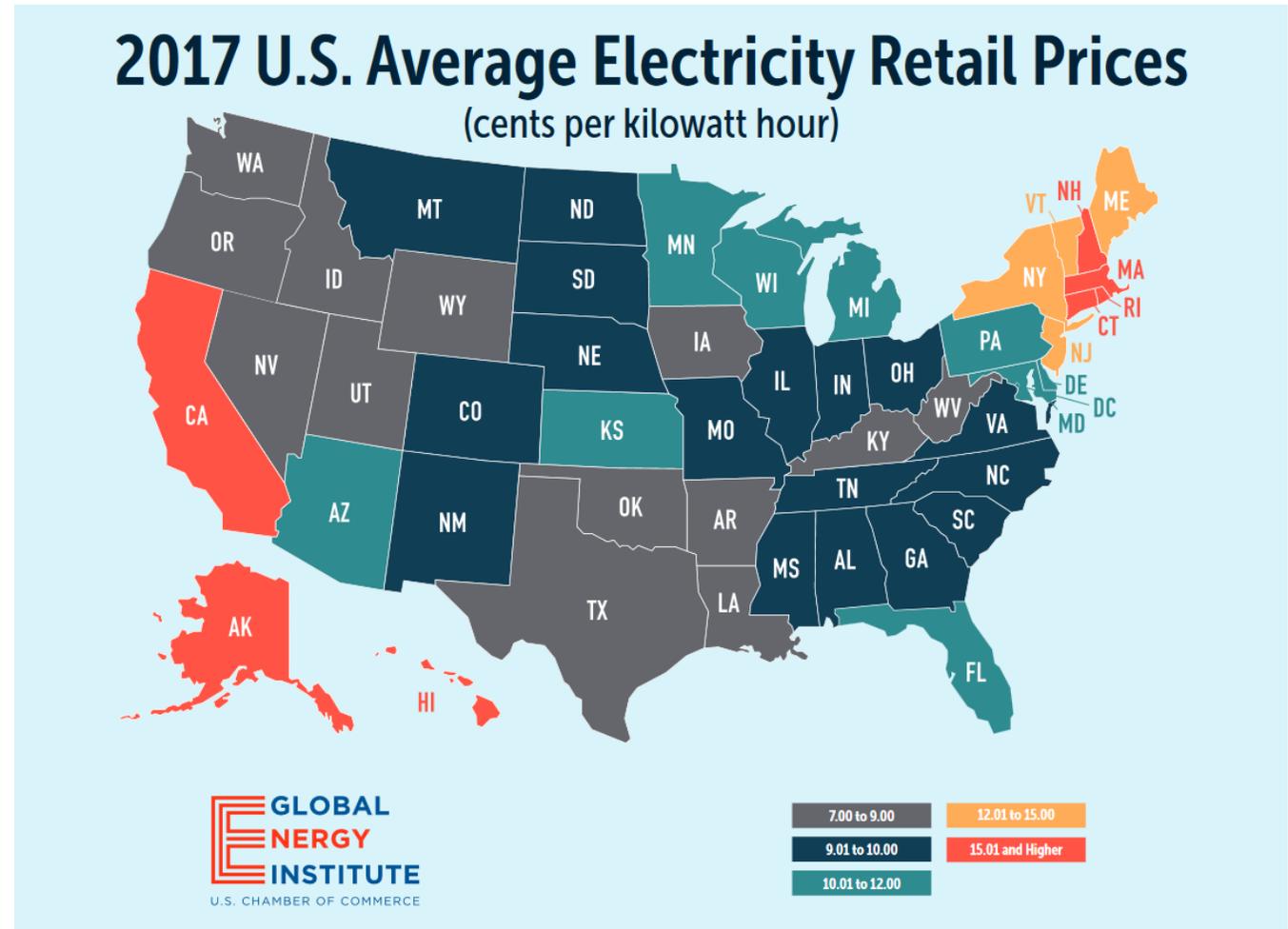


Renewable Energy: EV Charging Market Considerations



As electricity prices increase, the benefits of a renewable EV charging system like a Brightfield T1 become even clearer.

By offsetting the rising cost of electricity through power regeneration and selling back to the grid, we are able to protect against much higher utility rates in the future.



Renewable Energy: EV Charging Benefits

- Low or no-impact carbon footprint w/solar power generation offsetting electrical-grid energy consumption and rising costs
- High-impact visibility that engages customers and demonstrates a commitment to environmental stewardship
- Attract affluent customers, employees, residents, and visitors
- Build loyalty and guarantee repeat visits, retaining guests longer
- Gain recognition and meet compliance with many sustainability benchmarking standards including LEED, STARS, etc.





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