

Carmanah Technologies Corporation Product Portfolio



PV Ultra is Carmanah Official Representative

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Corp.

Company Overview



Company Mission

To deliver standalone solar lighting and solar power systems for industrial applications, worldwide.

- History:
 - Founded in 1996: Industry first in self-contained Solar Lighting
 - Corporate headquarters in Victoria, BC, Canada
 - > 300 employees
 - Global distributor network
- Core expertise:
 - Efficient energy management system optimizing solar, battery, and LED technologies
 - Compact, rugged, productized solar solutions
- Public Company:
 - Publicly listed on Toronto Stock Exchange (ticker: CMH)
 - Co-listed on the Berlin Stock Exchange & Deutsche Borse (ticker: QCX)

Award Winning Technology



Industry award-winning technology:

- BC Aviation Council Environmental Award, 2007
- B.C. Exporter of the Year, B.C. Export Awards 2007
- Named to the “Cleantech 10™” listing of top Canadian corporations, 2007
- "Company of the Year“, 2007 Technology Impact Awards, British Columbia Technology Industry Association
- “Global 100 Eco-Tech Award”, 2005 World Exposition, Aichi, Japan
- “2005 Canadian Exporter of the Year”, International Trade Canada

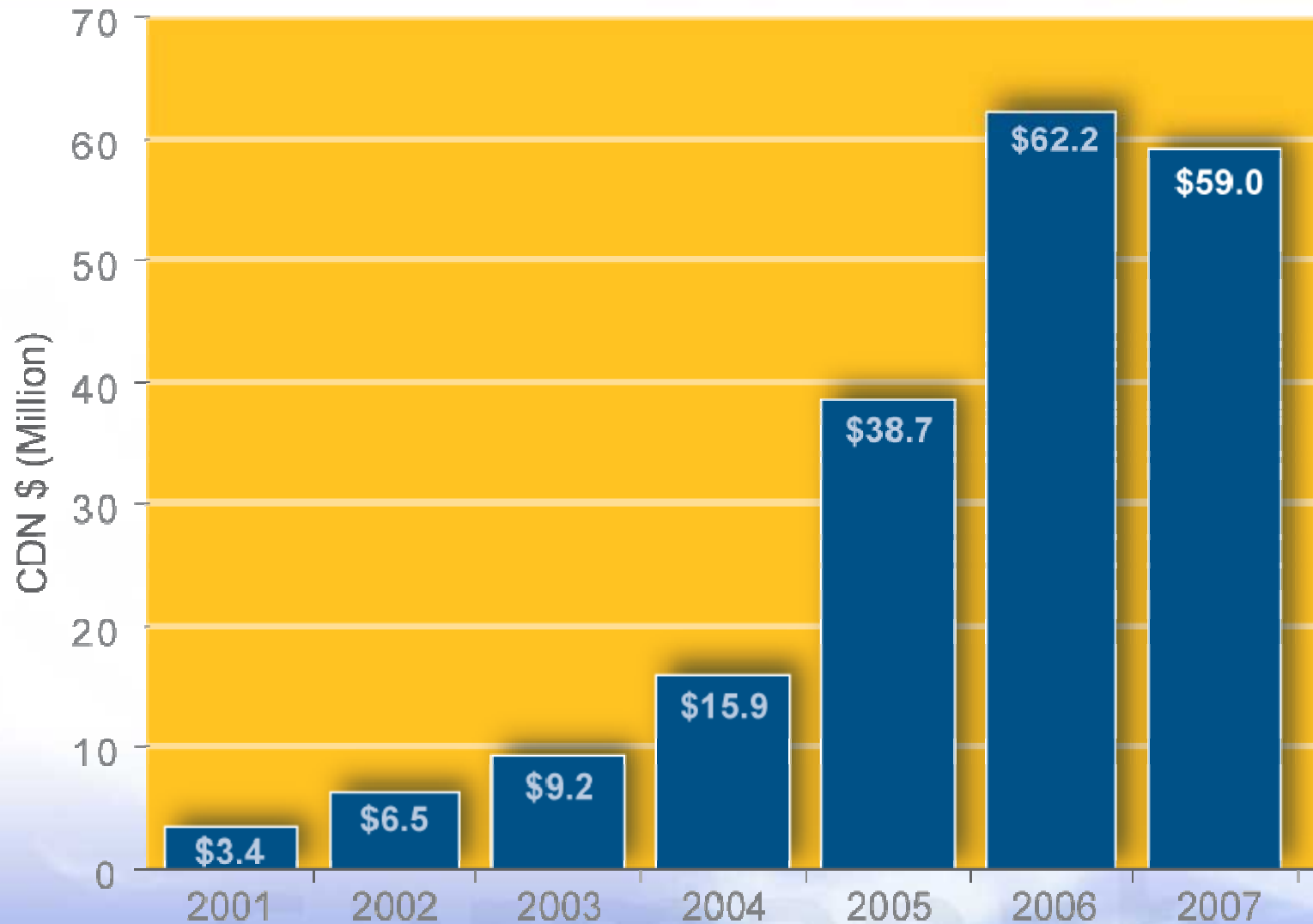


Impact of our Technology



- **Advancing solar technology from *components to products***
- **Improved Safety**
 - Lighting and security
- **Energy autonomy**
 - Reducing dependency on the grid
 - Enabling power for remote applications
- **Minimal environmental impact**

Carmanah's Growth



Solar Technology Businesses



Solar lighting and solar power systems

Solar Lighting Products*



Obstruction

**General
Illumination**

Aviation

Traffic

Marine

**All solar LED lighting products are manufactured to ISO 9001:2000 Quality Assurance Standards*

Solar LED Lighting



Clean, green solutions that save money:

- **Eliminate costly, time-consuming installation:** no need for trenching, wiring, cabling, permits or specialized work crews
- **Eliminate costly maintenance and repairs:** up to five years with no maintenance, LEDs last up to 100,000 hours – no bulbs/ballasts to change
- **Eliminate electrical bills:** operate free of electrical grid and generator connections
- **Eliminate worry over safety:** continue to function regardless of equipment failures or blackouts
- **Eliminate green house gas emissions:** conspicuous movement towards eco-friendly practices

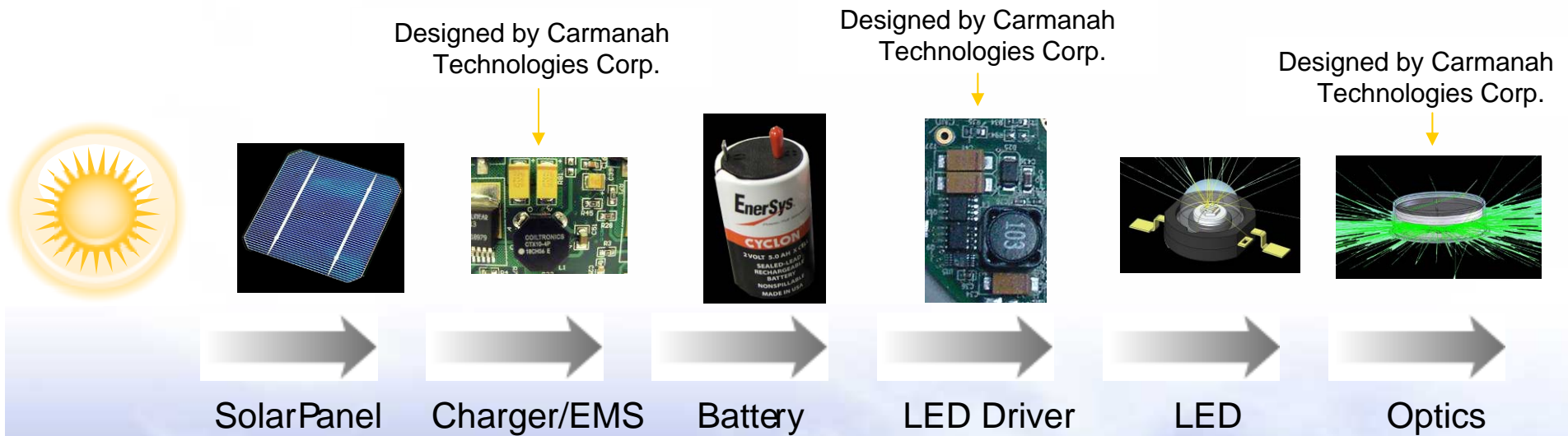
What makes us unique:

- **Reliable function at virtually any location on earth:** Carmanah energy management technology balances light output with available solar energy for continuous performance regardless of conditions
- **Durable, portable solar technology:** compact, self-contained design
- **Incorporation of leading-edge LED and solar technology:** high-quality solar panels, cutting edge LEDs, detail oriented approach to design
- **World-class customer base:** thousands of installations world wide, trusted supplier to US & international defense forces, coast guards, DOTs
- **Industry leading experience:** pioneers of solar LED technology, continued focus on research and development

Solar LED Lighting: Efficiency Management



- Conversion: sunlight → electricity → LED light
- Six main conversion steps
- Carmanah excels at designing robust systems that optimize every step of the conversion process



Solar LED Marine Lanterns



Solar LED Marine Lanterns



The marine market is where it all began:

- Foundational market that initiated the company's remarkable growth.
- Established and trusted provider of solar marine lanterns to US & Canadian Coast Guards, international navies.
- Provides lighting for a range of ever-expanding marine applications:
 - Aids-to-navigation
 - Marinas
 - Port & harbor facilities
 - Aquaculture
 - Off-shore oil & gas platforms

M502 Solar Marine Lantern

- 1.2cd intensity (approx. 1NM of visibility)
- Applications: low intensity navigation/hazard marking:
 - Small buoys
 - Docks
 - Marinas
 - Aquaculture weirs
- Programmable
- Seven standard flash codes



M601 Solar Marine Lantern

- Up to 6cd of intensity (approx. 2NM of visibility)
- Applications: navigation/hazard marking
- User programmable
- 250 flash patterns
- Available in all IALA chromaticity colors
 - Red
 - Green
 - Amber
 - White



M701 & M702 Solar Marine Lanterns

- Up to 18cd of intensity in flash mode (approx. 3NM of visibility)
- Applications: navigation/hazard marking in areas of varying solar illumination
- Integrated energy management technology
- 250 flash patterns
- Replaceable batteries
- Available in all IALA chromaticity colors
 - Red
 - Green
 - Amber
 - White



M704-5 Solar Marine Lantern

- 83cd of intensity (approx 4 to 5NM of visibility)
- Applications: navigation/hazard marking in areas of varying solar illumination
- Integrated energy management technology
- Ultra-bright LEDs for maximum vertical divergence & increased visibility in all weather conditions
- 250 flash patterns, replaceable batteries
- Available in all IALA chromaticity colors



Marine Customer List



- **US Coast Guard**
- **US Navy**
- **Canadian Coast Guard**
- **Canadian Navy**
- **Port of Sydney, Australia**
- **Malta Marine Authority**
- **National Ports Authority of South Africa**
- **Suez Canal, Egypt**
- **Middle East Navigation Aids Service**
- **Trinity House, UK**

Why Choose Carmanah



- **Reduced total cost of ownership:** no scheduled maintenance for up to five years, no bulbs to replace
- **Easy, cost-effective installation:** three bolt mounting system, no cables or connections
- **Prevention against theft and vandalism:** unique bolt fittings and all components housed in one rugged unit
- **Trusted technology:** installed by coast guards & navies around the world
- **Maximum performance:** attention to every detail of technology design allows reliable function in extreme environments and difficult conditions



Notable Marine Installations



- Canadian Coast Guard: MAM Project - \$30 million saved in installation and maintenance
- US Coast Guard: Replaced lighting on over 200 navigational aids in New York Harbour with Carmanah solar marine lanterns
- Busan, South Korea: installed Carmanah 702 GPS lights as leading and aids-to-navigation lighting

Built tough!

- Carmanah lantern survives trans-Atlantic trip from Canada's east coast to the Shetland Islands.
- Carmanah lantern submerged under ice for months, extracted by USCG still fully functioning.



Solar LED Airfield Lighting



Our aviation lights are trusted by some of the world's most demanding customers in some of the harshest environments on Earth.

- Primary supplier of solar aviation lighting to US defense forces, NATO and other international defense and security forces
- Commercial clients around the world: LAX, Vancouver International, Bahamas Civil Aviation Authority
- Aviation lighting applications:
 - Taxiway/runway
 - Threshold
 - Hazard/obstruction marking
 - Windsocks
 - Elevated runway guard lights

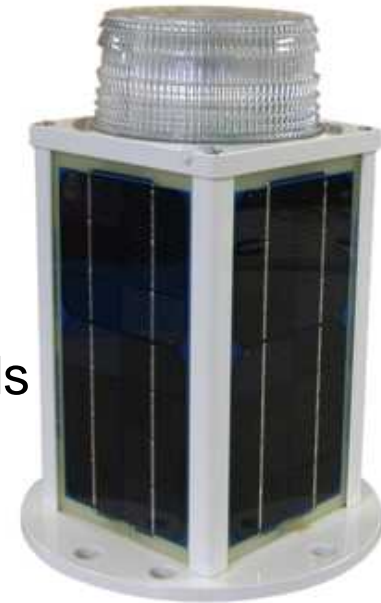
A601 Solar Aviation Light

- Up to 6cd of intensity (approx. 2NM of visibility)
- Applications: taxiway, barricade, helipad, obstruction lighting
- Low intensity airfield lighting
- Ideal for permanent, semi-permanent, emergency applications
- Easily recognizable markings for emergencies, unexpected runway closures and airfield construction zones



A702 Series Solar Aviation Lights

- First solar LED light ever to be used for commercial & defense aviation applications
- Up to 18cd of intensity in flash mode (approx. 3NM of visibility)
- Applications: threshold, helipad, obstruction lighting
- Ideal for permanent and temporary lighting needs
- Dusk-to-dawn operation
- Optional infrared capabilities
- Push button switch for emergency operation



A704 Solar Aviation Light

- Only solar-powered radio controlled airfield light on the market
- Up to 240cd of intensity in temp high mode.
- Applications: runway edge, threshold, helipad, obstruction, emergency lighting
- Wireless controller with 4km range
- High intensity visible and infrared dual-mode output – compatible with night vision goggles
- Integrated carrying handle
- AC/DC charging capabilities
- Dusk-to-dawn or on-command operation



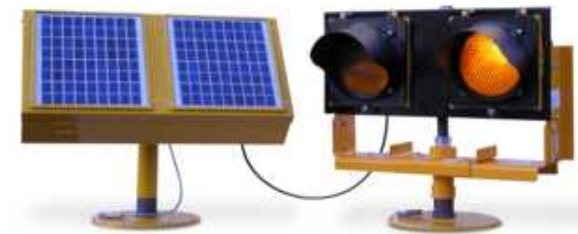
Internally Illuminated Solar Windsock

- Flexible, portable windsock solution
- Ideal for permanent, semi-permanent, temporary applications
- Permanent and portable options
- Can be placed anywhere on airfield/helipad



Solar Elevated Runway Guard Light (ERGL)

- Prevents runway incursions:
FAA's #1 airfield safety concern
- Provides visible, recognizable
indication of taxiway/runway
intersections
- Easy installation and relocation



Aviation Customer List



- **Dublin International Airport, Ireland**
- **Chicago O'Hare, USA**
- **Piarco International Airport, Trinidad Tobago**
- **Perth International Airport, Australia**
- **Vancouver International Airport, Canada**
- **US Air Force**
- **South African Police Service**
- **Royal Singapore Air Force**
- **Bahamas Civil Aviation Authority**



Why Choose Carmanah



- **Simple, cost-effective installation:** a 5000 ft. runway can be installed by two people in 60 minutes
- **Reduced total cost of ownership:** no bulbs to replace, no fuel or electricity costs, reduced maintenance cycles, no cables to replace or repair
- **Ensures safety:** immune to blackouts and electrical grid failures
- **Trusted technology:** used in freezing temperatures & desert conditions in mission critical locations
- **Maximum performance:** attention to every detail of technology design allows reliable function in extreme environments and difficult conditions



Notable Aviation Installations



Bahamas' Civil Aviation Authority: 20 commercial airfields, \$10 million saved in installation, maintenance and operation costs

Truckee Tahoe Airport: over \$1 million saved in installation costs

Chicago O'Hare International Airport: \$900 saved in batteries every 3 months

Designed for mission critical performance:

- Lights have survived being run over by utility vehicles and knocked into adjacent fields by jet blast.
- Trusted provider of solar lighting to NATO, US military and international defense forces.



Solar LED Obstruction Lighting



Carmanah obstruction lighting is designed to withstand the hard wear of industrial environments.

- Ideal for fixed obstruction marking in a variety of applications
- Easy relocation, reliable operation: Rugged, self-contained, portable design
- Applications:
 - Industrial worksites
 - Railway, mining, oil & gas applications
 - Towers, cranes, bridges, wind turbines, other fixed structure marking
 - Security and safety lighting

601 – Solar Obstruction Light

- Up to 6cd of intensity (approx. 2NM of visibility)
- Simple three bolt mounting system
- Incorporates easily onto existing barricades
- 250 user-programmable flash codes
- Ideal for permanent, temporary, emergency marking applications



702 Series Solar Obstruction Lights

- Up to 18cd (approx. 3NM) of intensity in flash mode
- Dusk-to-dawn operation
- GPS flash synchronization capability
- 250 user-programmable flash codes
- Optional infrared capability



704 Solar Obstruction Light

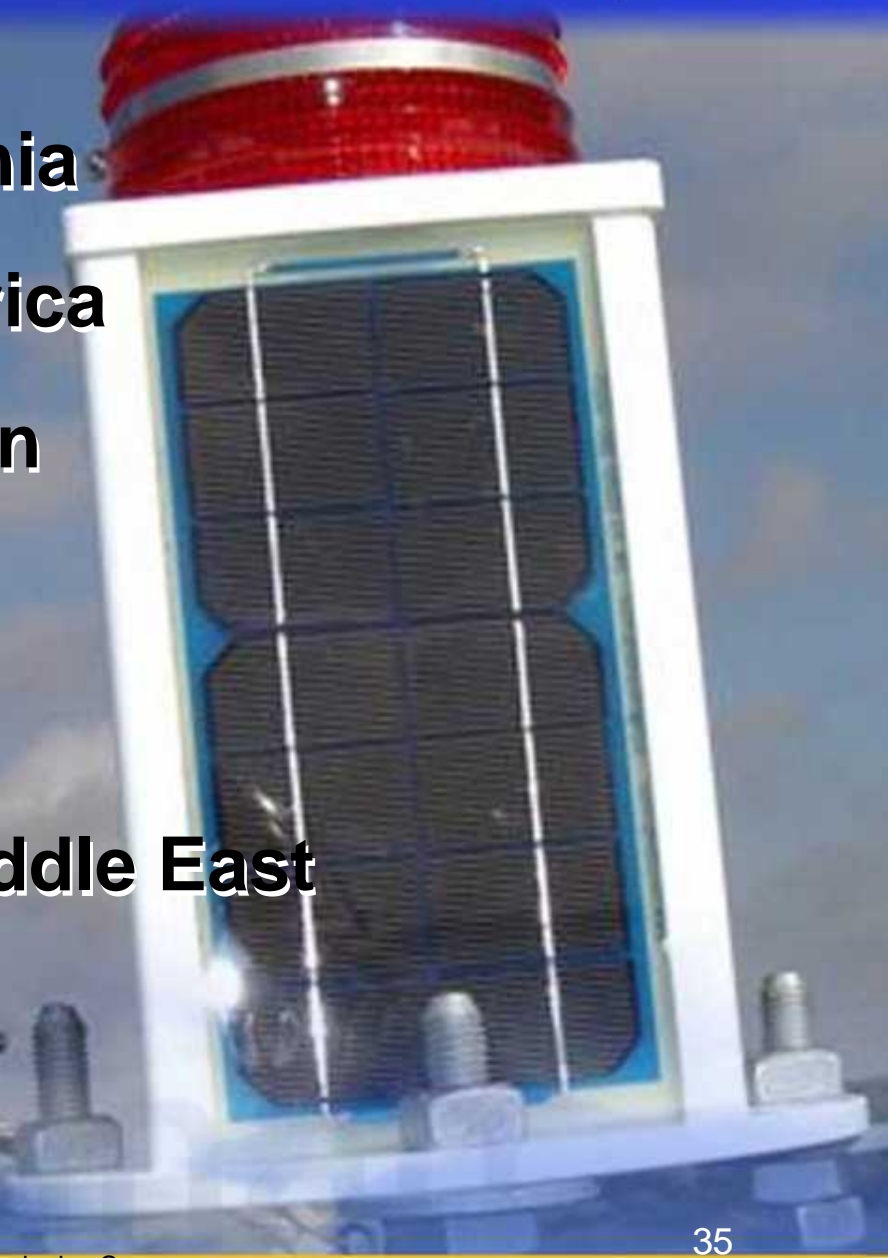
- Up to 83cd (approx. 4-5 NM) of visibility
- High intensity LEDs for maximum visibility
- Optional wireless control
- Control of lights in series (group)
- Flash synchronization
- 250 user-programmable flash codes
- Optional infrared capability



Obstruction Customers



- **Dar Es Salaam, Tanzania**
- **Suriname, South America**
- **Republic of Kazakhstan**
- **Galapagos Islands**
- **Sri Lanka**
- **Sultanate of Oman, Middle East**
- **Singleton, Australia**



Why Choose Carmanah



- **Easy, cost-effective installation:** light weight solution with simple three bolt mounting system
- **Reduced maintenance costs:** no maintenance for up to five years, no bulbs to replace
- **Reduced total cost of ownership:** no electricity costs, no cables to replace or repair
- **Ensures safety:** immune to blackouts and electrical grid failures
- **Maximum performance:** attention to every detail of technology design allows reliable function in extreme environments and difficult conditions



Notable Obstruction Installations



Telecom tower marking throughout Middle East

Wind turbine marking on Galapagos Islands

Vancouver International Airport:
barricade marking for construction barricades

Built to perform:

Carmanah obstruction lights have been known to withstand the impact of a falling tower and emerge still working.

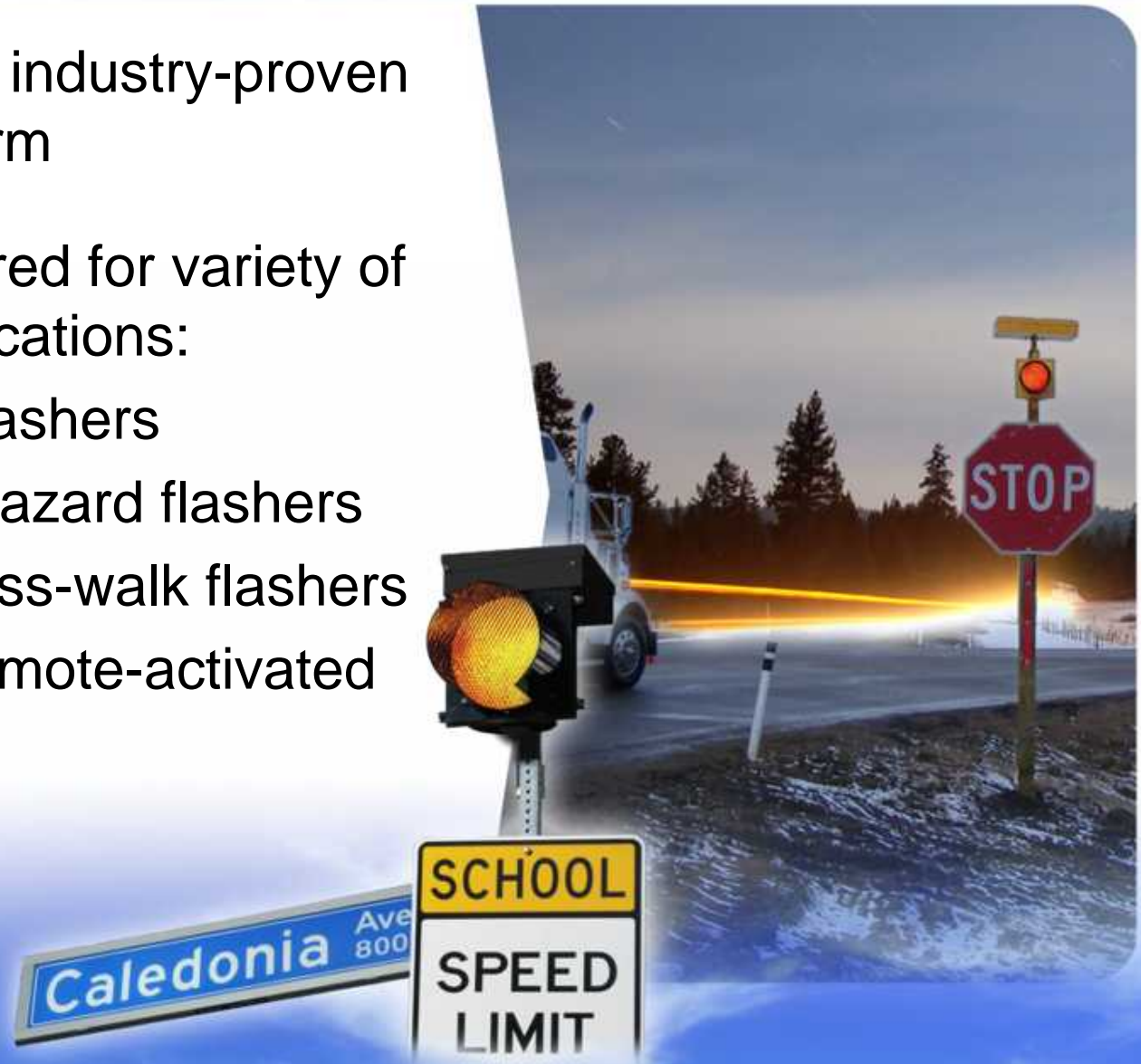


Solar Lighting for Traffic Applications



Solar Traffic Lighting

- Built on common, industry-proven technology platform
- Can be reconfigured for variety of road flasher applications:
 - School zone flashers
 - Warning and hazard flashers
 - Pedestrian cross-walk flashers
 - On-demand remote-activated flashers



R247 Solar Flashing Beacon

- Flashes 24 hours a day
- Added visibility for hazard and safety signs
- Available in red or yellow
- Set hours of operation or remotely activated



R820 Solar Pedestrian Crossing Flashing Beacon

- Push button activated
- Pedestrian-activated illumination for added safety at crosswalks
- Optional centralized control
- Ability to synchronize beacons in a system



R829 Solar School Zone Flashing Beacon

- Research shows flashing beacons reduce speed in school zones by five to seven mph
- Pre-program up to 500 days of operation to match school zone schedule
- Centralized control: remote programming using third-party devices
- Fit into Safe Routes to School (SRTS) infrastructure funding models



R409/R450 LED Illuminated Road Signs

- Improves visibility of street name and directional signage
- Ideal for tourist corridors, business improvement districts
- Addresses problems associated with aging driver population
- 90% less power consumption than fluorescent bulbs
- Even illumination, no bulbs/ballasts to change
- Slim design, rated for heavy wind loads
- 10 years of experience in LED illuminated street sign technology





i-STOP® Solar Transit Stop Lighting

- **Illuminated schedule**
 - Push button activated
 - Easy visibility of schedule information in night and low visibility conditions
- **i-SIGNAL™ flashing beacon**
 - Push button activated
 - Reduces rider pass-by's
 - Lets transit driver know when rider is waiting for pick-up
- **Security downlighting**
 - Push button activated
 - Increases rider comfort and perception of safety while waiting

Traffic Customers



- **Georgia DOT**
- **New York City**
- **Miami, Florida**
- **Nye County, Nevada**
- **New Orleans, Louisiana**
- **Victoria, B.C.**
- **Edmonton, Alberta**
- **Santiago, Chile**



Why Choose Carmanah



- **Easy retrofit onto existing poles:** requires only a wrench and screwdriver
- **Simple, cost-effective installation:** no need for specialized work crews, no trenching, electrical connections
- **Ensures safety:** immune to electrical grid failures, proven to endure harsh weather conditions
- **Reduced total cost of ownership:** eliminates electrical bills, reduced maintenance cycles
- **Compatible with federal funding programs:** eligible for SRTS infrastructure funding
- **Maximum performance:** attention to every detail of technology design allows reliable function in extreme environments and difficult conditions



Notable Traffic Installations



City of New York: Installed Carmanah internally lit LED signs around landmarks such as Grand Central Station and the Empire State Building

New Orleans: Installed Carmanah Solar Flashing School Zone Beacons throughout the city

Illinois: hundreds of Carmanah i-STOP solar traffic lighting solutions installed throughout Northeast region of state

Carmanah solar flashing beacons specified by DOT's throughout the United States



Solar LED Area Lighting



Solar Area Lighting



- Winner of Judges Citation Award at 2008 Lightfair Innovation Awards
- Pedestrian scale applications
 - Pathways
 - Bikeways
 - Pedestrian walkways
 - Perimeter and security lighting



Solar Area Lighting

- Allows for placement of area illumination in locations previously difficult or impossible to power
- Integrated energy management technology
- Leading LED technology from BetaLED
- Standard IES distributions
- Intelligent operating profiles
- Can help agency qualify for LEED renewable energy credits



**Featuring THE EDGE luminaire
from BetaLED**

Solar Area Lighting

**System performance dependant
on three factors:**

- Location
- Operating profile
- Engine size



Why Choose Carmanah



- **Combines technology from two industry leaders:** cutting edge solar technology from Carmanah with best-in-class LED technology from Beta Lighting
- **Maximum energy efficiency:** intelligent operating profile allows unique ability to dim light levels
- **Maximum performance:** attention to every detail of technology design creates maximum reliability
- **Flexibility of application:** can be placed in virtually any location, no need for electrical hook ups
- **Simple, cost-effective installation:** no need for specialized contractors, no trenching, cabling or wiring





carmanah®
we put solar to work



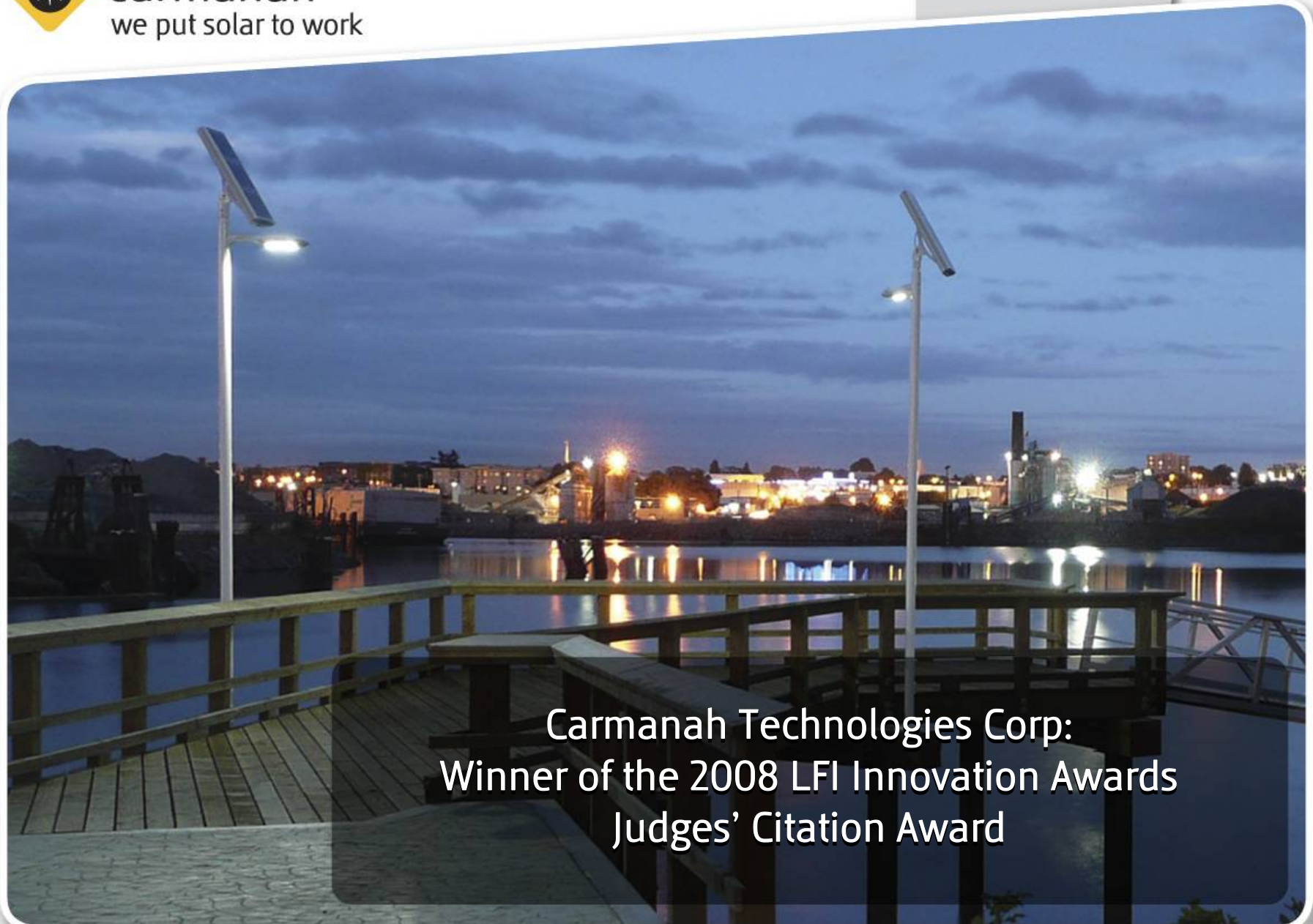


carmanah®
we put solar to work



beta
LED™

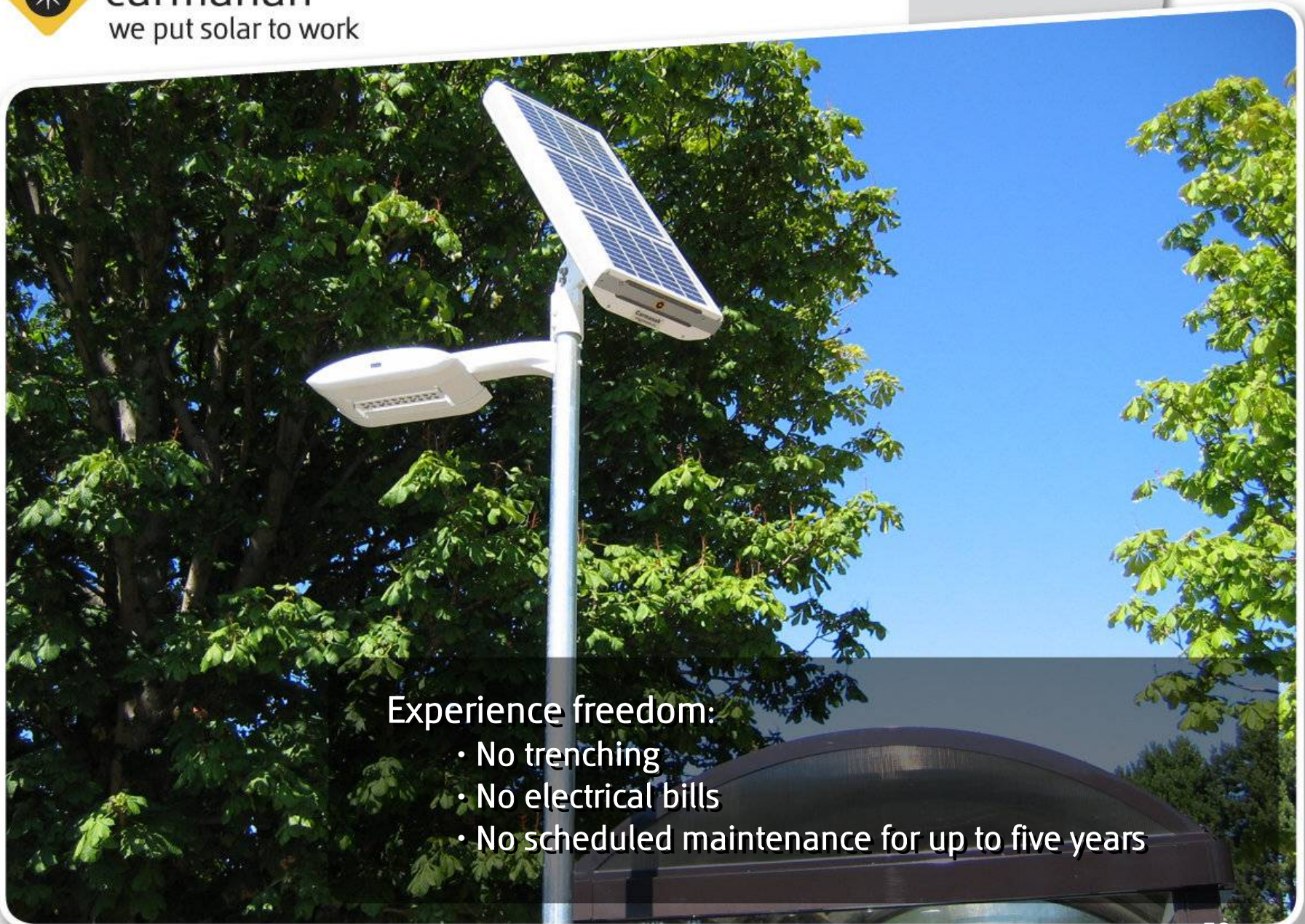
The world's best come together:
Carmanah and BetaLED – A perfect match.



Carmanah Technologies Corp:
Winner of the 2008 LFI Innovation Awards
Judges' Citation Award



carmanah®
we put solar to work

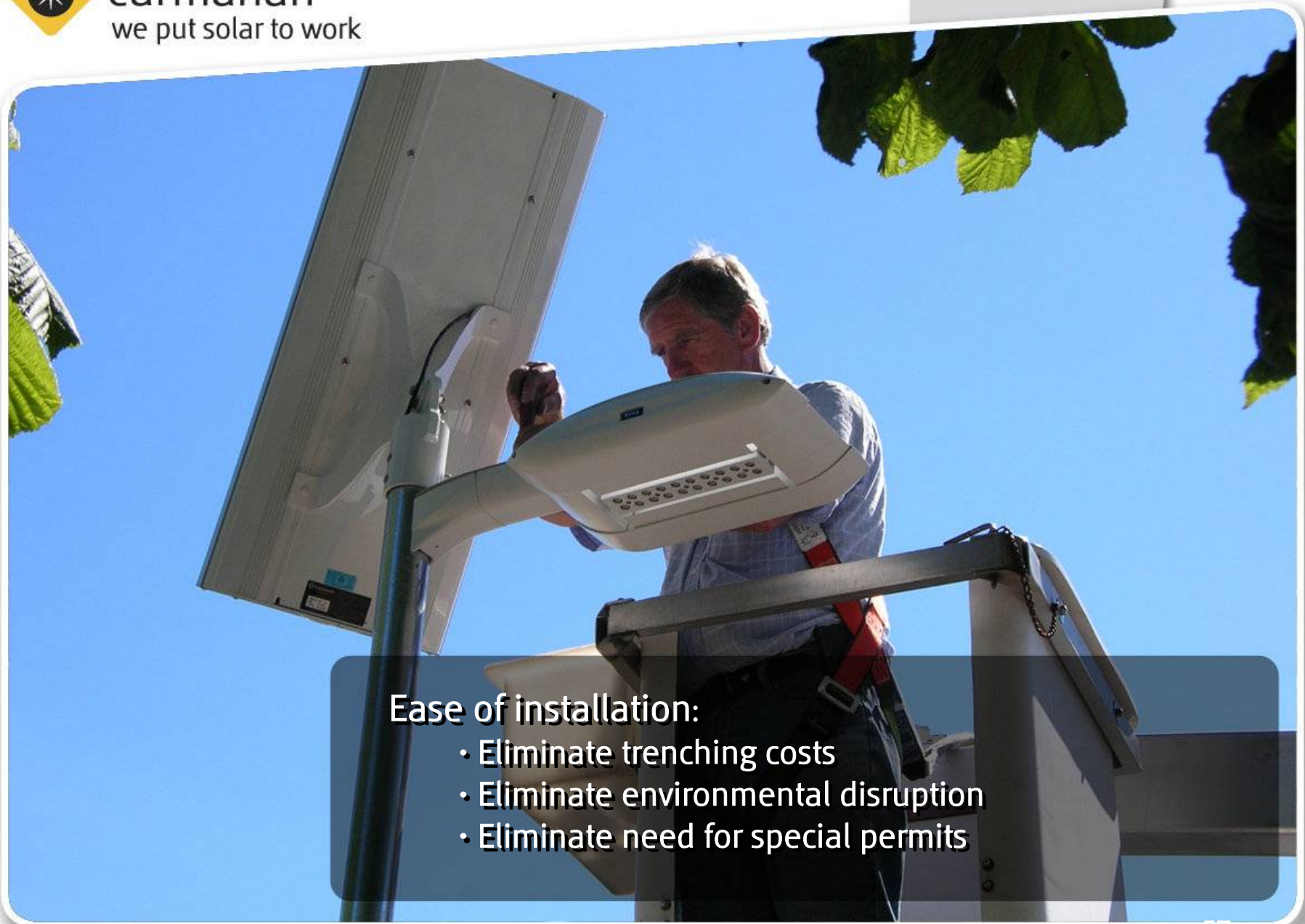


Experience freedom:

- No trenching
- No electrical bills
- No scheduled maintenance for up to five years



carmanah®
we put solar to work



Ease of installation:

- Eliminate trenching costs
- Eliminate environmental disruption
- Eliminate need for special permits



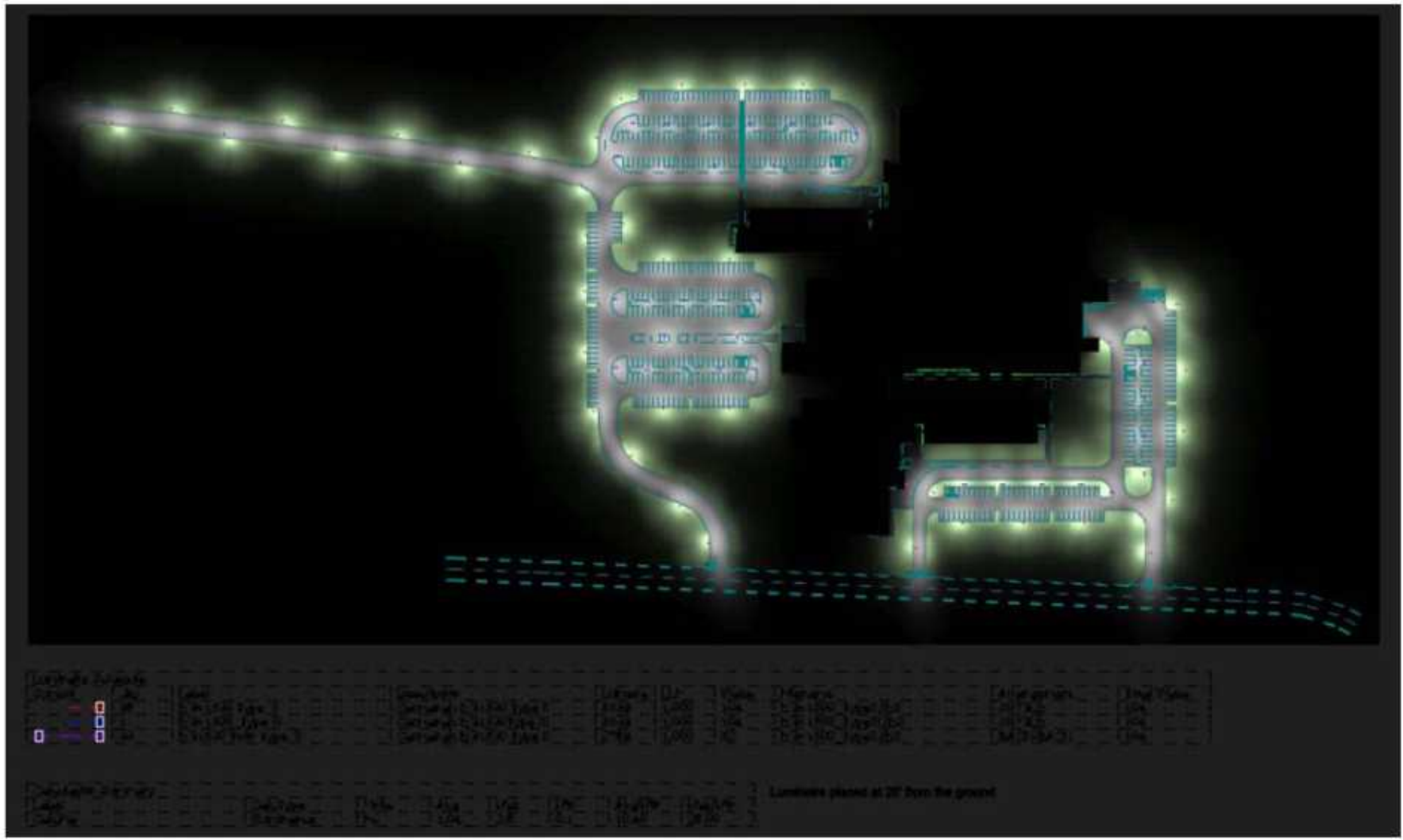
The Carmanah EverGEN 1710



The EverGEN 1710 offers the best solution for:

- Applications where day time appearance and integrated form factor are important
- Applications that accept motion sensing and operating profile functionality

Layouts



Solar Grid-Tie Systems



Carmanah offers:

- Largest market share of Canadian grid-tie projects
 - Carmanah has installed 60% of the solar grid-tie projects in Canada
- Completion of large grid-tie projects
- Extensive experience in installation and project management of grid-tie technology implementation



we put solar to work™



carmanah.com