



**REDHAWK**  
ENERGY



# ***Solar Power Systems***

**RedHawk Energy Systems, LLC**

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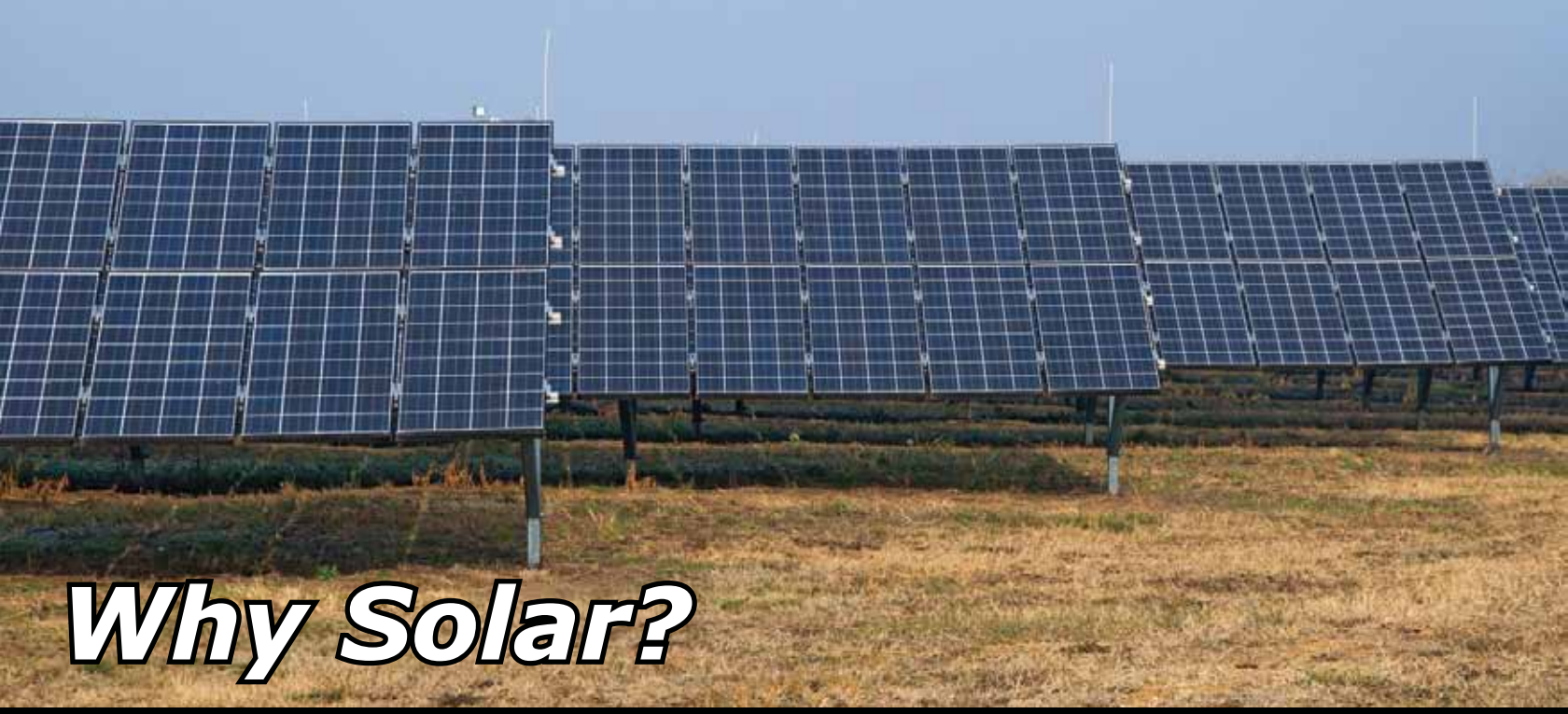
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RedHawk Energy Systems, LLC

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# Why Solar?

Solar energy is an infinite resource that has the potential to supply a significant percentage of the world's future electricity. Surging growth over the past decade has made solar energy one of the fastest growing sources of electricity.

## How Solar (PV) Works

Solar (PV) power systems provide a reliable, proven source of DC power by converting sunlight (photons) directly to electricity (voltage).

## Technology Benefits

- No Waste Byproducts / Emissions
- No Ongoing Fuel Costs
- Low Maintenance
- “Green” Energy Producer
- 20+ Years Life (panels)



## End User Benefits

- Stabilize Future Energy Costs
- Gain Energy Independence
- Meet Sustainability Objectives
- Reduce Carbon Footprint
- Encourage Educational Opportunities (Math & Science)
- Meet Renewable Energy Portfolio Standards (RPS)
- Take Advantage of Available Incentives & Programs
- Economic Alternative to Utility Connection (Off-grid systems)



# Markets We Serve



## Railroad

- Positive Train Control
- Remote Site Power
- Intermediate Signals
- Highway Crossings
- Track Circuit Power
- Control Points
- Telecom Power
- Grid-Tie Green Energy
- Pole Line Replacement Programs



## Remote Site

- Oil & Gas
  - Remote Monitoring
  - Well Heads
  - Gathering Sites
  - Pumping Stations
- Telecom Sites
- Weather Stations



## Commercial

- Corporate Offices
- Logistics Operations
- Retail Shopping Centers
- Grocery Stores
- Agricultural Enterprises
- Strip Malls
- Auto Dealerships
- Manufacturing Facilities



## Municipalities

- City Buildings
- Libraries
- Courthouses
- Water / Wastewater Treatment Plants
- Police & Fire Stations
- Community Centers
- Parking Structures / Carports



## Schools & Colleges

- K-12 Schools
- Colleges
- Research & Technical Labs
- Recreational Centers, Auditoriums & Arenas
- Educational Exhibits



We offer a variety of reliable Solar (Photovoltaic) Power Systems for utility grid-tie, remote site (off-grid) and critical backup power applications. Systems are configured for the specific geographical location and load demands of your application. Solar calculations and sizing is performed using the latest solar radiation data, surface meteorology data, and software sizing programs. Flexible mounting options are available to meet virtually any budget and/or site requirement. Our vast array of design and engineering services can help guide you step by step, ensuring that your system is appropriately sized, designed, and engineered for optimum performance.

### ***Grid-Tie Systems***

Grid-tie systems are systems connected to an electric utility via grid-tie inverters. Grid-tie systems allow the owner to use electricity generated and any surplus is supplied back to the electrical grid.

### ***Off-Grid Systems***

Off-grid systems are standalone systems not connected to the electric utility grid. Off-grid systems will often utilize an energy storage system (batteries) in order to store electricity generated for later use.



Commercial Rooftop Solar Application



Oil & Gas Valve Set Application

# Mounting Options



## Ground Mount

- Flexible and scalable mounting option when and where space permits.
- Easier to clean and maintain compared to other mounting solutions.
- We can provide ground mount solutions from virtually any racking manufacturer and can provide a high-level of customization based on the specific needs of your application.



## VersaTilt Mount

- Custom-designed mounting structure to allow solar arrays to be adjusted to reach multiple desired tilt angles horizontally from 0° to 55° because not all seasons are created equal.
- Gives the system owner the ability to achieve maximum performance no matter the season.



## Roof & Platform Mount

- Reduce energy costs by utilizing unused real estate.
- Mount flush to the roof or at a desired tilt angle.
- Designed in accordance with applicable fire codes for safety.
- We can provide roof & platform mount solutions from virtually any racking manufacturer and can provide a high-level of customization if desired.



## Retractable Pole Mount

- Innovative and patent pending RP Series Retractable Mast is a safe and convenient solution for mounting solar arrays to a pole structure at ground level.
- Features a movable exterior sleeve that travels up and down a fixed mast.
- Up to six (6) solar panels can be mounted to the pole structure at ground level and can then be raised and lowered along the same axis manually (hand-crank) or via a power drill.
- System remains fully operational, even in its lowered position.
- Provides unparalleled convenience and dramatically improved safety to the installation, operation, troubleshooting and maintenance of pole mounted solar power systems.
- We also offer **Fixed Pole Mount Systems** that can be equipped with an optional ladder (w/lockable guard) that extends up the back of the pole to help facilitate periodic maintenance and troubleshooting.

RP Mast is available in 20', 25' and custom height configurations



# System Components

## PV Panels / Modules

We source and offer the best PV Panels / Modules available on the market today from reputable manufacturers. We can accommodate clauses such as “Buy American” and others. We can also supply replacement panels for most of our systems currently in the field.



## Grid-Tie Inverters

A grid-tie inverter is used on grid-tie solar power systems to convert direct current (DC) electricity into alternating current (AC) and feed it into the electric grid. We source and offer a variety of grid-tie inverters from the leading manufacturers in the marketplace.

## Batteries

Batteries play a vital role within solar power systems, especially off-grid systems. Faced with complex charge/discharge cycling patterns imposed by the unpredictability of weather, the high cycling capabilities of the batteries we offer provide reliable power for solar, even in remote locations and harsh environments. We source and offer high quality nickel cadmium, lead-acid and lithium ion batteries from Saft, a world leader in high technology batteries.



Our parent company - Arthur N. Ulrich Co. is an authorized Saft Batteries manufacturer's representative agency.

# Our Capabilities



## Feasibility Analysis

- Site Survey
- Shade & Obstruction Analysis
- Energy & Utility Analysis
- Lifecycle Costing
- Incentive Analysis (if applicable)



## Design / Engineering

- Written Specifications
- System Sizing Reports
- Equipment Loading & Power Draw Estimation
- CAD Drawings, Schematics, Layouts & One-Lines
- Codes & Standards Compliance Docs



## Sourcing / Fabrication / Customization

- Material Procurement
- Pre-Wiring & Pre-Assembly (if applicable)
- System Component Integration
- Mounting Systems
- Hybrid System Integration
- Material & Workmanship Warranties












## Pre-Installation / Installation / Support

- System Interconnection Paperwork (Grid-Tie)
- System Installation and/or Assistance
- System Cutover & Supervision Training
- Detailed I&O Manuals, Drawings & Packages
- Preventive Maintenance Programs
- Safety & Maintenance Application Training
- Replacement & Disposal Services
- Technical Support



# About Us

RedHawk Energy Systems, LLC is a manufacturing and value-added subsidiary of the Arthur N. Ulrich Company. We specialize in the design, engineering, fabrication and installation of renewable energy systems, battery systems and battery maintenance accessories for critical remote site, utility grid-tie and backup power applications.

-  **Solar (PV) Power Systems**
-  **Wind Turbines**
-  **Fuel Cells**
-  **Thermoelectric Generators**
-  **Hybrids**
-  **Batteries**
-  **Battery Boxes & Enclosures**
-  **Battery Testers**
-  **Engineering Services**



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