Electro-Comm Distributing Inc

Your Broadband Wireless Source

MikroTik User Meeting
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Alternative Power Solutions for MikroTik

- Solar power systems are most common
- Hybrid systems provide additional reliability

Why Use Solar?

- For remote solutions outside of electrical grid
- For temporary installations where installing electrical is expensive
- Power grid is unreliable
- Any time solar may be more sensible

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Applications for Solar power

- Remote communications sites
- Telemetry/SCADA
- Signs
- Remote homes
- Wireless POPs
- Hotspots

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Examples of solar solutions we've done

Powering communications site in Argentina

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Examples of solar solutions we've done

Powering gas meter
for oilfield telemetry

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Examples of solar solutions we've done

Another telemetry application

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Examples of solar solutions we've done

Powering wireless POP in Colorado

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Components of solar power solutions

- Photovoltaic Solar panels
- Mounting hardware
  - Ground mount or pole/tower mount
- Wiring
- Charge controller
- Batteries
- Enclosures
- Other power sources/Hybrid
  - Wind, Hydro, Engine generator

Solar panels

Converts sun light directly into electrical power

Available in wide variety of sizes

2 watts to 170 watts

SHARP

MULTI-PURPOSE MODULE

NE-80EJEA

80 WATT

POWERFUL PERFORMANCE. SHARP RELIABILITY.

POLY-CRYSTALLINE SILICON PHOTOVOLTAIC MODULE WITH 80W MAXIMUM POWER

Sharp's NE-80EJEA photovoltaic modules offer industry-leading performance, durability, and reliability for a variety of electrical power requirements. Using breakthrough technology perfected by Sharp's 45 years of research and development, these modules incorporate an advanced surface texturing process to increase light absorption and improve efficiency. Common applications include cabins, solar power stations, pumps, beacons, and lighting equipment. Designed to withstand rigorous weather conditions, a junction box is also provided for easy electrical connections in the field, making Sharp's NE-80EJEA modules the perfect combination of advanced technology and reliability.

Solder-coated grid results in high fill factor performance under low light conditions.

Sharp multi-purpose modules offer industry-leading performance for a variety of applications.

FEATURES

- High-power module (80W) using 125mm square poly-crystalline silicon solar cells with 12.40% module conversion efficiency
- Sharp's advanced surface texturing process increases light absorption and efficiency while providing a more subdued, "natural" look
- Bypass diodes minimize the power drop caused by shade
- Water white, tempered glass, EVA laminate, plus aluminum frame for extended outdoor use
- Junction box for easy electrical connections in the field
- Nominal 12VDC output for battery charging applications
- UL Listings: UL 1703, cUL
- Sharp modules are manufactured in ISO 9001 certified facilities
- 25-year limited warranty on power output (see dealer for details)

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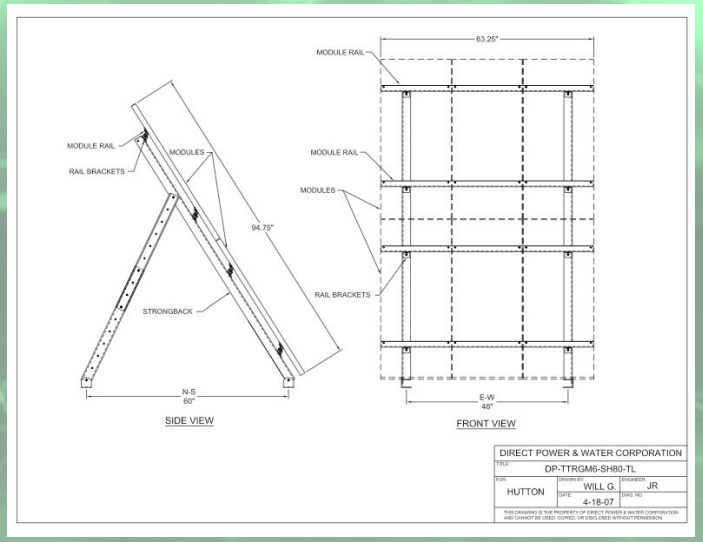
Mounting hardware

Supports the solar panels

Mount on the ground
Or mount on pole or tower



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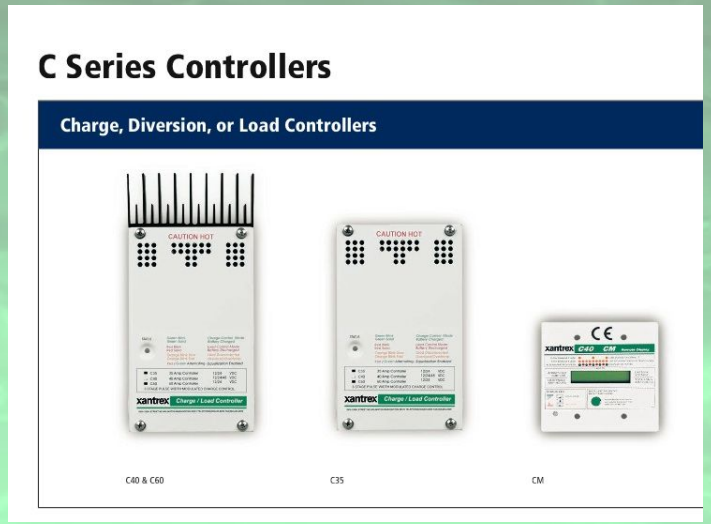
Wiring and Charge Controller

- Wire should be large gauge, #8-10
- Round outer shape to allow for weatherproofing in junction boxes

- Charge Controllers keep batteries from overcharging
  - Also may include:
    - Temperature compensation
    - Low Voltage Disconnect
    - Voltage and current meters
    - Telemetry outputs/Alarms

- Always use fuses



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Batteries

- Store electrical power for times without sun
  - Use deep cycle batteries (not car battery)
    - Small sealed gel cell batteries for very small systems
    - Golf cart or RV/Marine type for medium systems
    - Stationary batteries for large systems
  - Lots of battery
    - enough for several days
  - Keep temperature in mind

Enclosures

- Store batteries and controller out of the weather
- Insulated and ventilated
  - Don’t put your radios and routers in battery box

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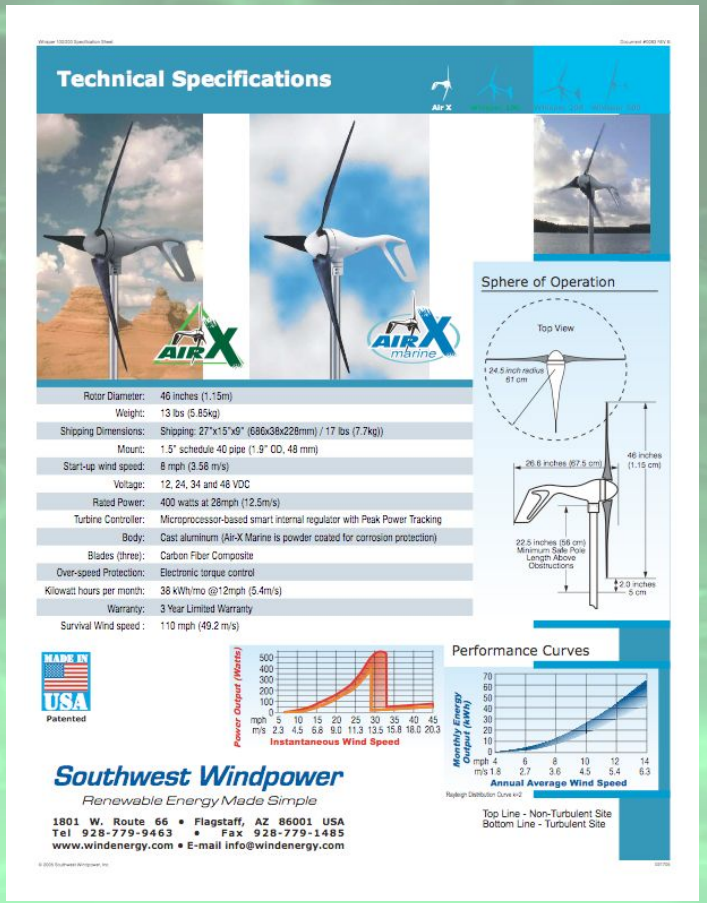
Hybrid Systems

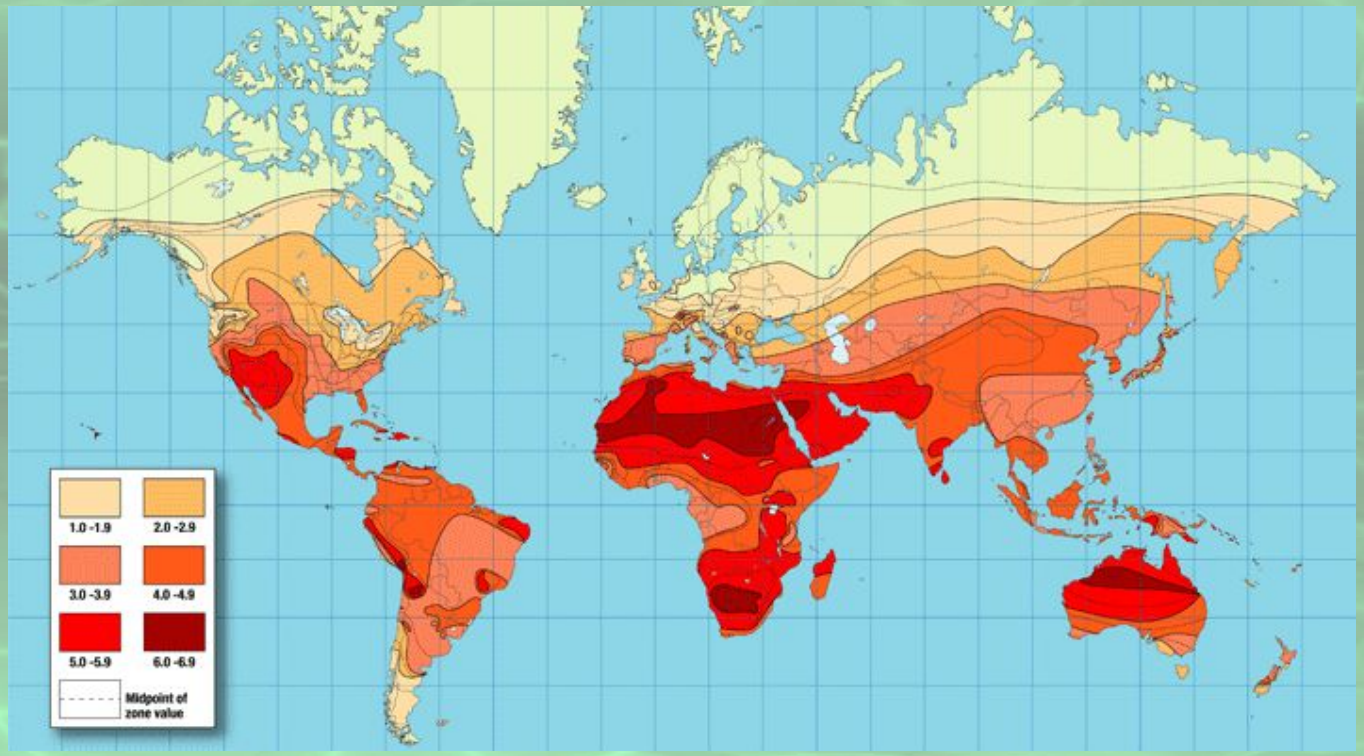
- Combine solar with other power supply to increase reliability
- Wind, Hydro, Engine generator, thermoelectric



Considerations for sizing a solar system

- What are we providing power for?
- What is the voltage needed?
  - DC, AC or both
- What is the power consumption?
  - In amps or watts
- What is the duty cycle?
  - Is power need consistent or changing
- What is the location?
  - Determines sun hours and temperature

How much sun do you get?



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Examples of solar sizing

One MikroTik RB153 with 3 cards

- Power supply is 1Amp at 18V DC
- Actual power need is 250 mA, plus radio cards
- SR2 needs 200 mA
- Total 850 mA

Add 15% safety factor, size based on 1 Amp, 100%

- Always build in plenty of safety factor

1 Amp x 24 hours = 24 AH

Examples of solar sizing

With a requirement of 24 AH

Look up Insolation data

Florida = 6 sun hours per day

Latvia = 1 sun hour per day

Florida - 24 AH / 6 sun hours = 4 Amps

One 80 Watt panel will provide 4 Amps peak

Latvia - 24 AH / 1 sun hours = 24 Amps

6 each 80 Watt panel to provide power