HYBRID POWER SYSTEMS FOR MISSION CRITICAL ENTERPRISE LAND MOBILE RADIO SITES

By:

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Radio System Overview

Hybrid Power Solution

Yes/No

Power

Backup Generator

Radio Equipment Room

Tower

R56 Compliant Comms Site

Commercial AC Power

Standard MSB Shelter

Self Supporting Tower

Build In Place or Tenant Improvement

Lightweight Shelter

Monopole

Existing Tower with Modifications
Remote Site Hybrid Power Supply Needs Assessment

- Cost effective as an alternative to high cost for commercial power
- Highly reliable and redundant power supply system
- System designed for worst case scenario – typically low solar months of Dec – Jan with expected radio traffic
- Battery backup is sufficient to allow normal preventative maintenance schedules
- System monitoring provides status of system at component level.
Hybrid Energy Power Solutions
Search of Marketplace for Manufacturers / Providers

- Solar
- Wind Turbines
- Fuel Cells
- Generators
- Non-Traditional
  - Geothermal
  - Hydro
  - Micro-CoGen
  - BioFuels
- Motorola Ventures efforts in this space (partnerships, investments, etc.)
Design and Cost Drivers for Remote Sites

- **Radio System Design**
  - Number of Radio channels
  - Duty Cycle (standby versus active)
  - Backhaul solution
- **Site Access**
  - Paved or Dirt road
  - Helicopter
- **Days of Autonomy**
  - Battery bank
- **Climate**
  - Temperature range
  - Humidity
  - Wind
- **Shelter Design and Size**
- **DC Load**
  - DC by Design
  - Load shedding
  - Lights
  - Wiring
Actual System Design

2000 Ah/Day Load – 7800 Ah Battery Bank – 35.8 KW solar plant (270 panels) – 4 wind turbines – 1.2 Design to Load Factor

• Radio System Design
  – 3 Radio channels
  – 8 hr Active Duty Cycle (standby versus active)
    – Backhaul solution – MW to HQ

• Site Access
  – Dirt road – 2 hr from paved

• Days of Autonomy
  – 3 Days – 7800 Ah Battery bank
  – Backup 35 KW propane generator

• Climate
  – Hot Summers – Cold Winters
  – Design includes HVAC system
  – 4 Wind Turbines – cliff edge – good wind

• 2 Shelter Design – one radio / one battery and solar system controller

• DC Load
  – Load shedding
  – All LED Lights

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Actual System Design

600 Ah/Day Load – 650 Ah Battery Bank – 2.6 KW solar plant (40 panels) – 2 wind turbines – 1.0 Design to Load Factor

• Radio System Design
  – 2 Radio channels
  – 8 hr Active Duty Cycle (standby versus active)
    – Backhaul solution – MW Loop

• Site Access
  – Helicopter

• Days of Autonomy
  – 3 Days – 650 Ah Battery bank
  – Backup 35 KW propane generator

• Climate
  – Hot Summers – Cold Winters
  – Heavy insulation – DC fan/louver system
  – 2 Wind Turbines – 400W

• smartShelter Design – Full DC shelter design with integrated controls

• DC Load
  – Load shedding
  – All LED Lights
Continuing need seen in our customer base

- Integrated systems with high reliability
- Remote site deployment solutions in a variety of climates and field conditions
- Low operations and maintenance costs
- Standard system designs with COTS components
- smartShelter design with full DC integrated, R56 compliant, components and standards
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