

US EPA ARCHIVE DOCUMENT



# Ramona Band of Cahuilla Indians

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## Ramona Tribe – Overview

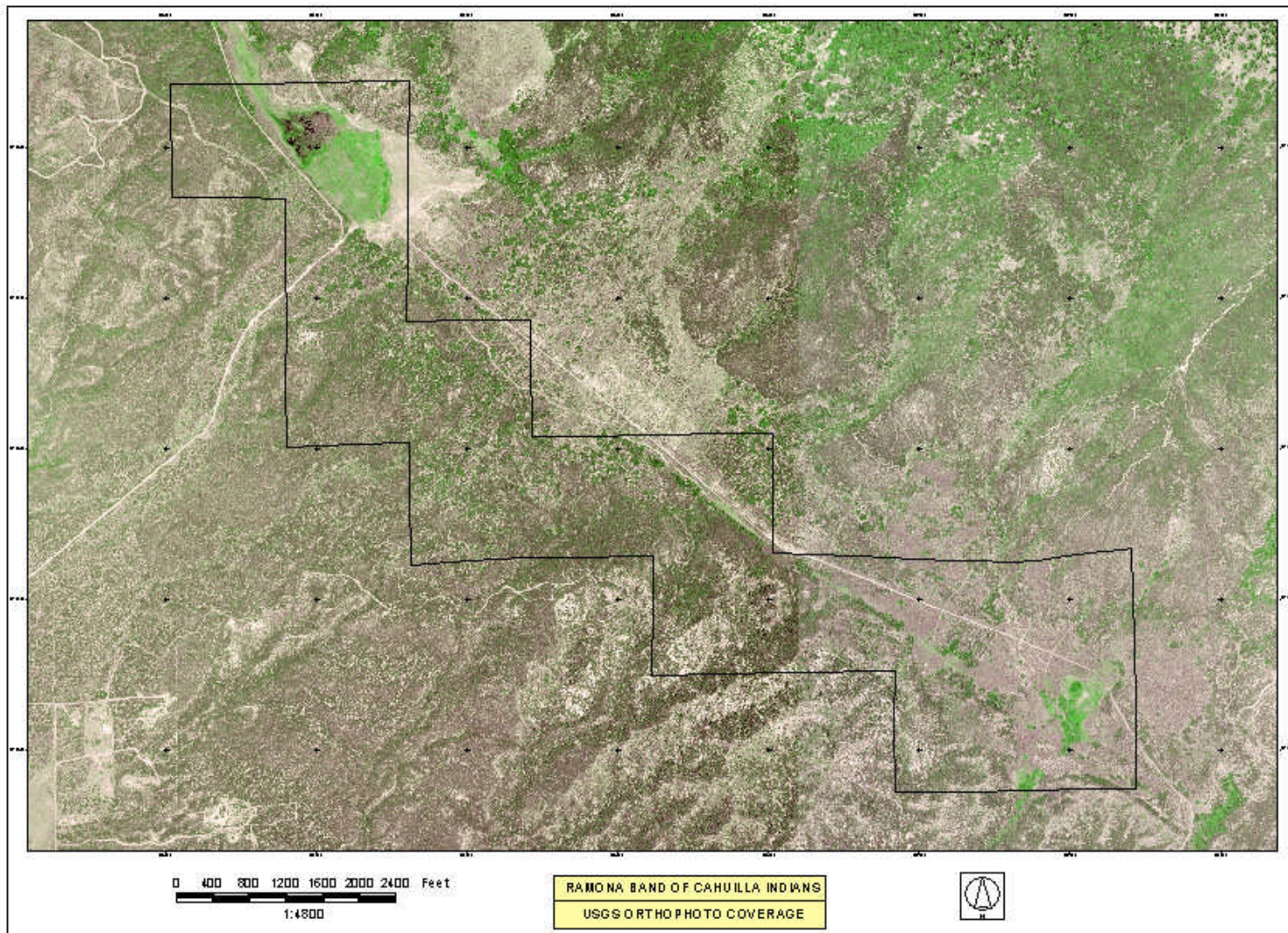
- **FIRST RESERVATION TO BE COMPLETELY OFF GRID**
- **ISSUES THE TRIBE FACES:**
  - REMOTE AND RURAL**
  - LAND LOCKED**
  - UTILITY COSTS ARE PROHIBITIVE**
- **ECO-TOURISM PROJECT**
- **HOUSING UNITS**



# RAMONA RESERVATION

Anza, CA

45 min. east of Temecula/45 Min. south of Palm Springs





## Ramona Indian Reservation Power Systems

- **Macro Grid Hybrid Power System: Eco-Tourism**
- **Micro Grid Hybrid Power System: Housing Units**



## RAMONA ECO-TOURISM PROJECT OBJECTIVE

- **TO PROVIDE POWER TO THE TRIBE'S ECOTOURISM BUSINESS VIA ALTERNATIVE ENERGY TECHNOLOGIES**



# PROJECT PARTICIPANTS

- **AGENCIES**

**TRIBE – SUPPLEMENTAL FUNDING**

**DOE – ECOTOURISM POWER**

**HUD CDBG – ECOLODGE**

**USDA RD - ECOTENTS**

**BOR – ECOTOURISM WATER**

**U.S. FOREST SERVICE – ROAD ACCESS**



# Macro-Grid Hybrid Power System

- **10kw Photovoltaic Array**
- **VRLA (Value Regulated Lead Acid) Battery Banks**
- **15kVA continuous inverter with 175A disconnect**
- **60kw 3 Phase Diesel Generator**
- **Power Station Building 12' x 16'**
- **Monitoring System, Inverter, Breaker Box, Wiring, etc.**





# EVERGREEN SOLAR CEDAR LINE PHOTOVOLTAIC MODULES EC-100 SERIES





## SOLAR PANELS – SIDE VIEW

- 60 Module Solar Array:  
175w operating at 100  
volts DC
- Total of 10,500w
- Feed two inverter banks
  - Main Lodge System
  - Ecotents





# POWER BUILDING FRONT VIEW





# POWER BUILDING SIDE VIEW





# ABSOLYTE IIP BATTERIES

- Battery Output: 10,800 Ah at 48 volts
- Life Capacity: up to 20 years
- Weight: 300 lbs per unit





# OUTBACK INVERTERS/CHARGERS

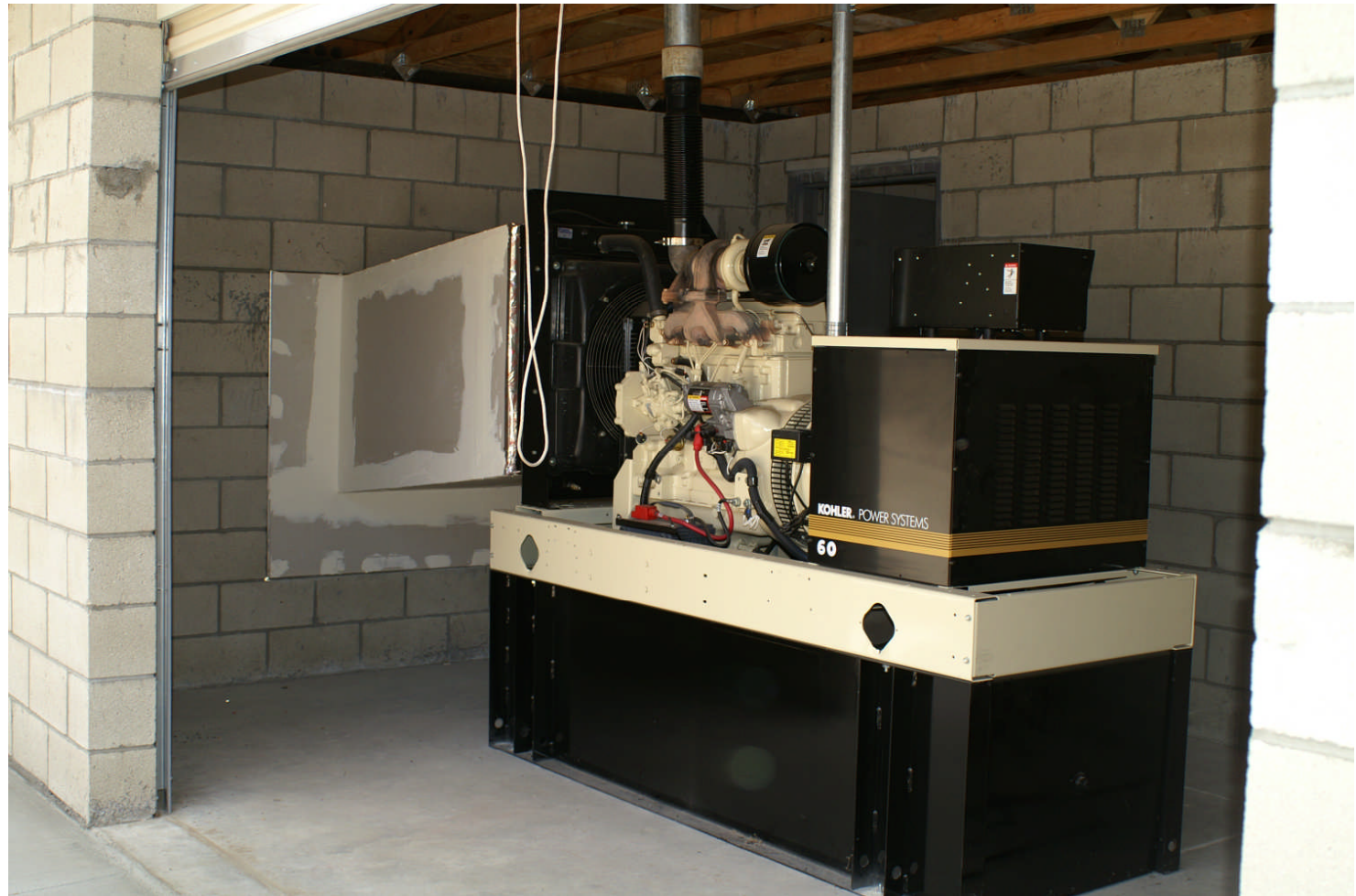
- 36 Kw Inverters
- 120/240 Volts





# KOHLER 60HZ GENERATOR

- 60Kw 3 Phase Diesel Generator





# RAMONA ECOTENTS

Funded by USDA Rural Development







# COMPLETED ECOTENTS





# ECOTENT SKYLIGHT OPENING





# COMPLETED SKYLIGHT OPENING





# VIEW INSIDE OF ECOTENTS





# VIEW INSIDE OF ECOTENTS





## TECHNICAL/MANAGEMENT ISSUES

- **COORDINATION OF MULTI-AGENCIES WHICH SLOWS PROJECT PROGRESS**
- **ENVIRONMENTAL RESTRICTIONS**
  - Need to coordinate with environmental departments to ensure all requirements are met prior to start of project.



## ACTIVITIES REMAINING

- **EXTEND LINES TO THE WATER SYSTEM**
- **CONSTRUCT ECOLODGE (RESTAURANT, EDUCATION CENTER, CONFERENCE CENTER, OFFICES, RESERVATION OFFICE, GIFT SHOP, ETC.)**
- **EXTEND LINES TO THE ECOLODGE WHEN COMPLETE**



## Housing Complex: Micro-Grid Hybrid System

- **2Kw wind turbine capacity with wireless controls**
- **6.3Kw large photovoltaic modular array**
- **VRLA (Value Regulated Lead Acid) battery banks**
- **25Kw propane generator**
- **One propane storage tanks**
- **Currently installing power gauge**





# Southwest Wind Power Skystream 3.7 Wireless Model





## Wind Turbine and Solar Cells for Housing Complex producing 8.3 Kw





# Power House (includes back-up propane generator, battery bank, and inverters/chargers)





# FUTURE PLANS

- **BUILD OUT OF THE ECOTOURISM DESTINATION RESORT INCLUDING ACQUIRING ADDITIONAL FINANCING**
- **DEVELOP ECOTOURISM PROGRAMS**
  - ALTERNATIVE ENERGY EDUCATION
  - CULTURAL – LANGUAGE, BASKETRY, & POTTERY
  - HERBOLOGY
  - PARTNERSHIP WITH U.S. FOREST SERVICE AND BLM
- **CONTINUE TO BE SELF SUFFICIENT**