



# Ramona Band of Cahuilla Indians

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**Presented by:**

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Program Director**

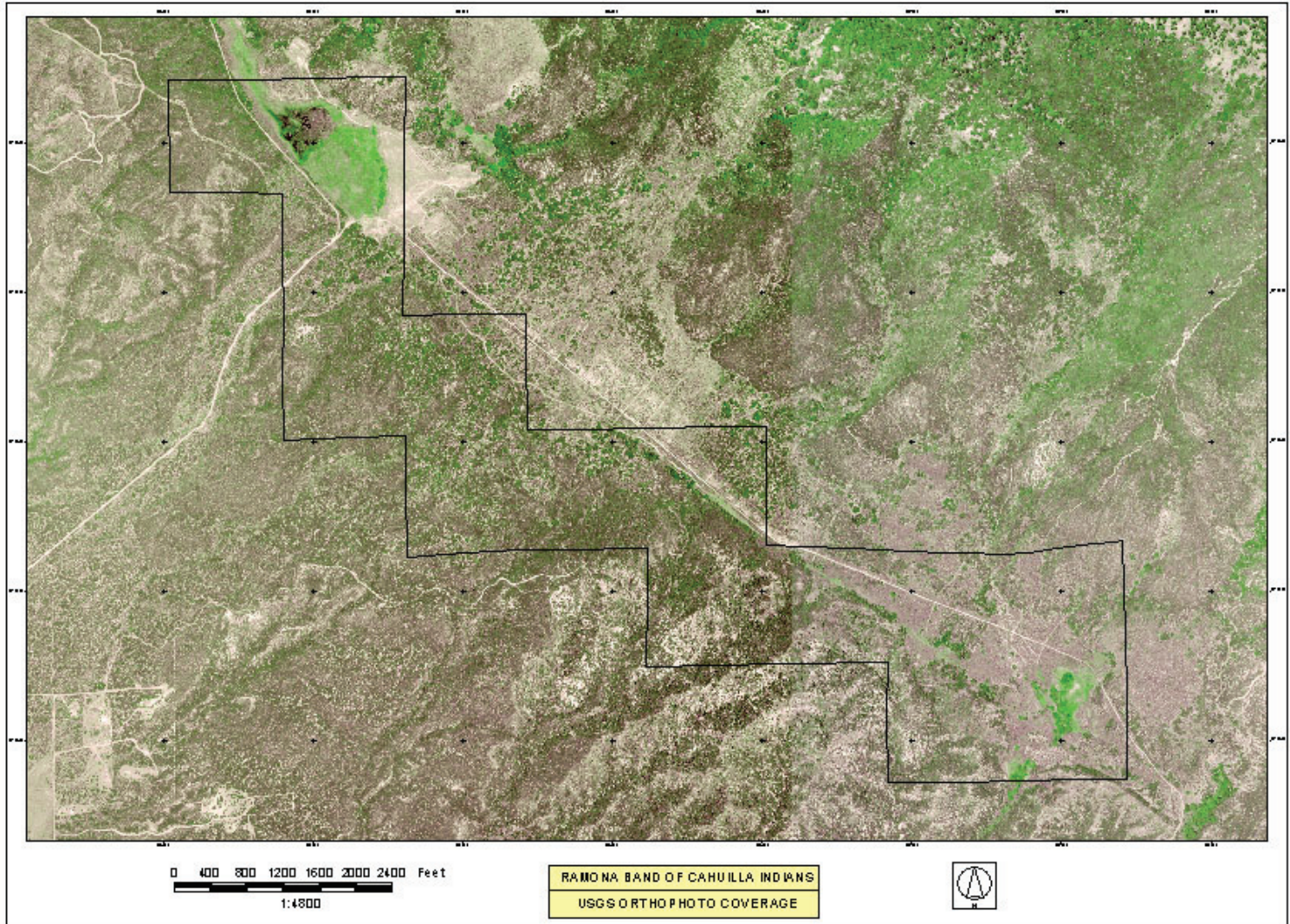


# Ramona Tribe – Overview

- **ONE OF THE FIRST RESERVATIONS TO BE COMPLETELY OFF GRID**
- **ISSUES THE TRIBE FACED:**
  - REMOTE AND RURAL**
  - LAND LOCKED- SURROUNDED BY FEDERAL LAND (BLM and USFS)**
  - UTILITY COSTS WERE PROHIBITIVE (Nearest point of access to grid as 1/2 mile through USFS Land)**
- **ECO-TOURISM PROJECT**
- **HOUSING UNITS**



# Ramona Indian Reservation





# 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**
- **PROTECTION AND PRESERVATION OF CULTURE AND HERITAGE**
- **TO SHOW RENEWABLE ENERGY PLANNING CAN WORK IN INDIAN COUNTRY**





# PROJECT PARTICIPANTS

- **AGENCIES**

**RAMONA BAND OF CAHUILLA – 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 (is being phased out)**
- **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

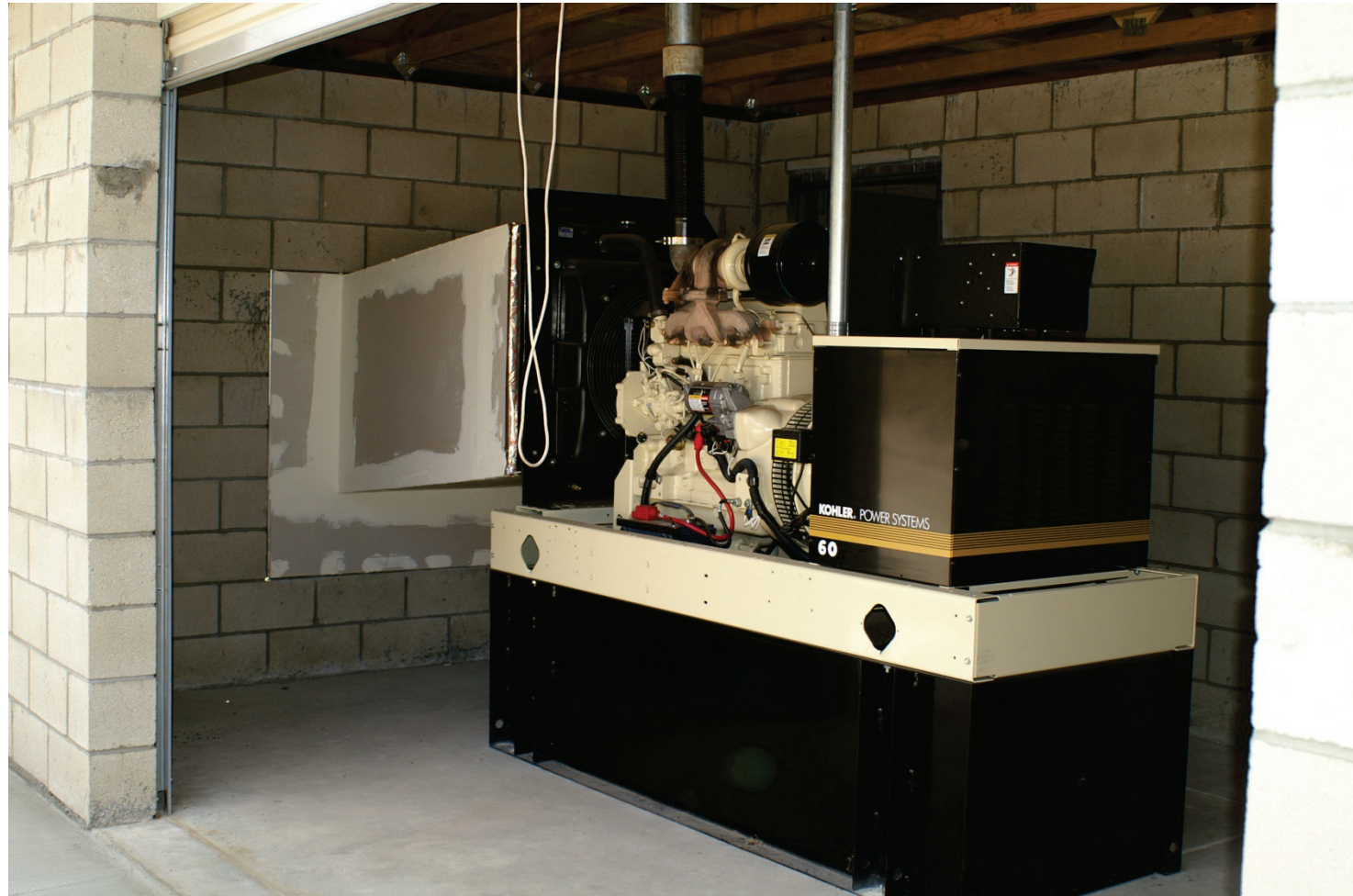
- 36 Kw Inverters
- 120/240 Volts





# KOHLER 60HZ GENERATOR

- 60Kw 3 Phase 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**
- **TRAINING OF TRIBAL MEMBERS AND STAFF IN USE AND MAINTENANCE OF SYSTEM**



# ACTIVITIES REMAINING

- **PHASE 1 - EXTEND LINES TO THE WATER SYSTEM**
- **PHASE 2 - CONSTRUCT ECOLODGE (RESTAURANT, EDUCATION CENTER, CONFERENCE CENTER, OFFICES, RESERVATION OFFICE, GIFT SHOP, ETC.)**
- **PHASE 2 - 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**
- **Propane storage tank**





# 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

- **COMPLETE CONSTRUCTION FOR POWER SUPPLY**
- **BUILD OUT OF THE ECOTOURISM DESTINATION RESORT INCLUDING ACQUIRING ADDITIONAL FINANCING**
- **DEVELOP ECOTOURISM PROGRAMS**
  - ALTERNATIVE ENERGY EDUCATION
  - CULTURAL – LANGUAGE, TRIBAL HISTORY, & TRADITIONAL GATHERING
  - HERBOLOGY
  - PARTNERSHIP WITH U.S. FOREST SERVICE AND BLM
- **CONTINUE TO BE SELF SUFFICIENT**



# Contact Information

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