



Ramona Band of Cahuilla Indians

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Presented by:

Theresa Dodson

Environmental Director

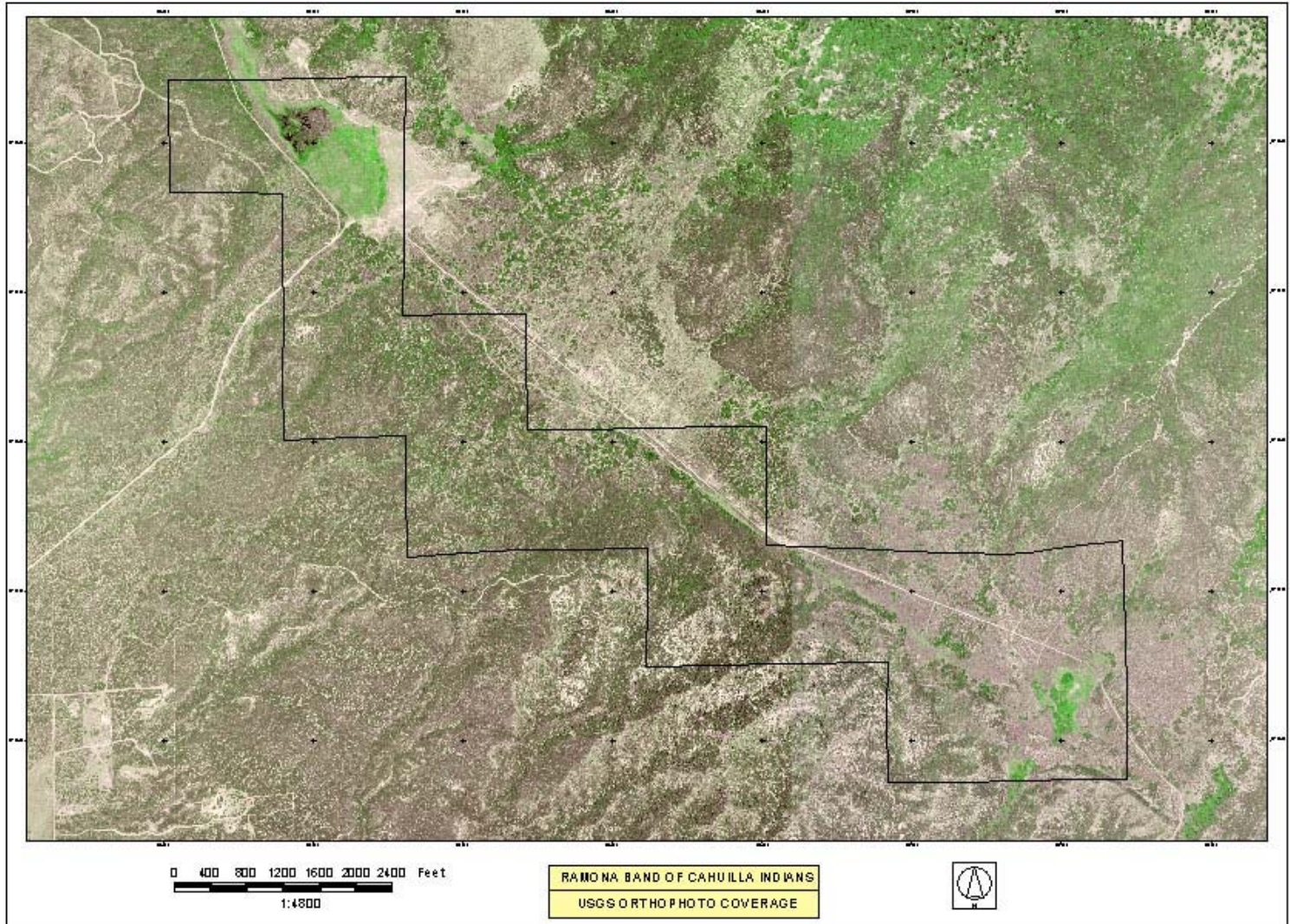


Ramona Tribe – Overview

- **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 LOCATION





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**



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**
- **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**
 - 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**
- **Propane storage tank**
- **Currently installing Data Loggers**



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, BASKETRY, & POTTERY
 - HERBOLOGY
 - PARTNERSHIP WITH U.S. FOREST SERVICE AND BLM
- **TRAIN TRIBAL MEMBERS AND STAFF FOR LONG TERM O/M OF THE POWER SYSTEMS**
- **CONTINUE TO BE SELF SUFFICIENT**