



Ramona Band of Cahuilla Indians Eco-Tourism Facility



Kevin Short
Short Electric

Project overview



- Stand alone micro grid energy system
- Energy efficiency requirements
- Capacity for facility use
- Expansion capability
- Visitor interactive systems

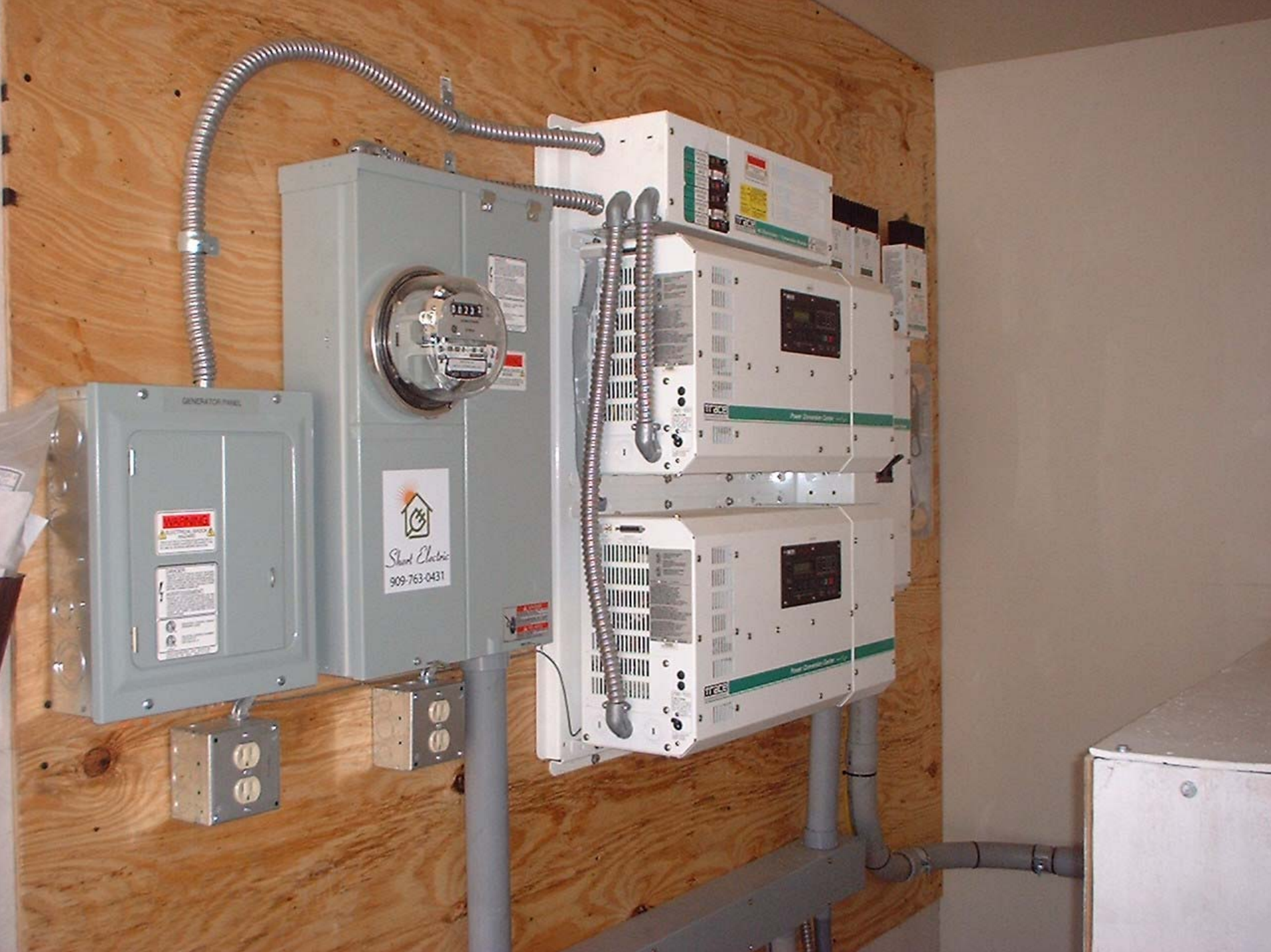
Energy production and storage



- Prime mover- 200Kw Caterpillar diesel generator, fired with B100 biodiesel, produced locally.
- Photovoltaic array
- Wind turbines
- Deep cycle battery bank
- Outback Power Systems Inverters
- System monitoring and data acquisition







GENERATOR PANEL

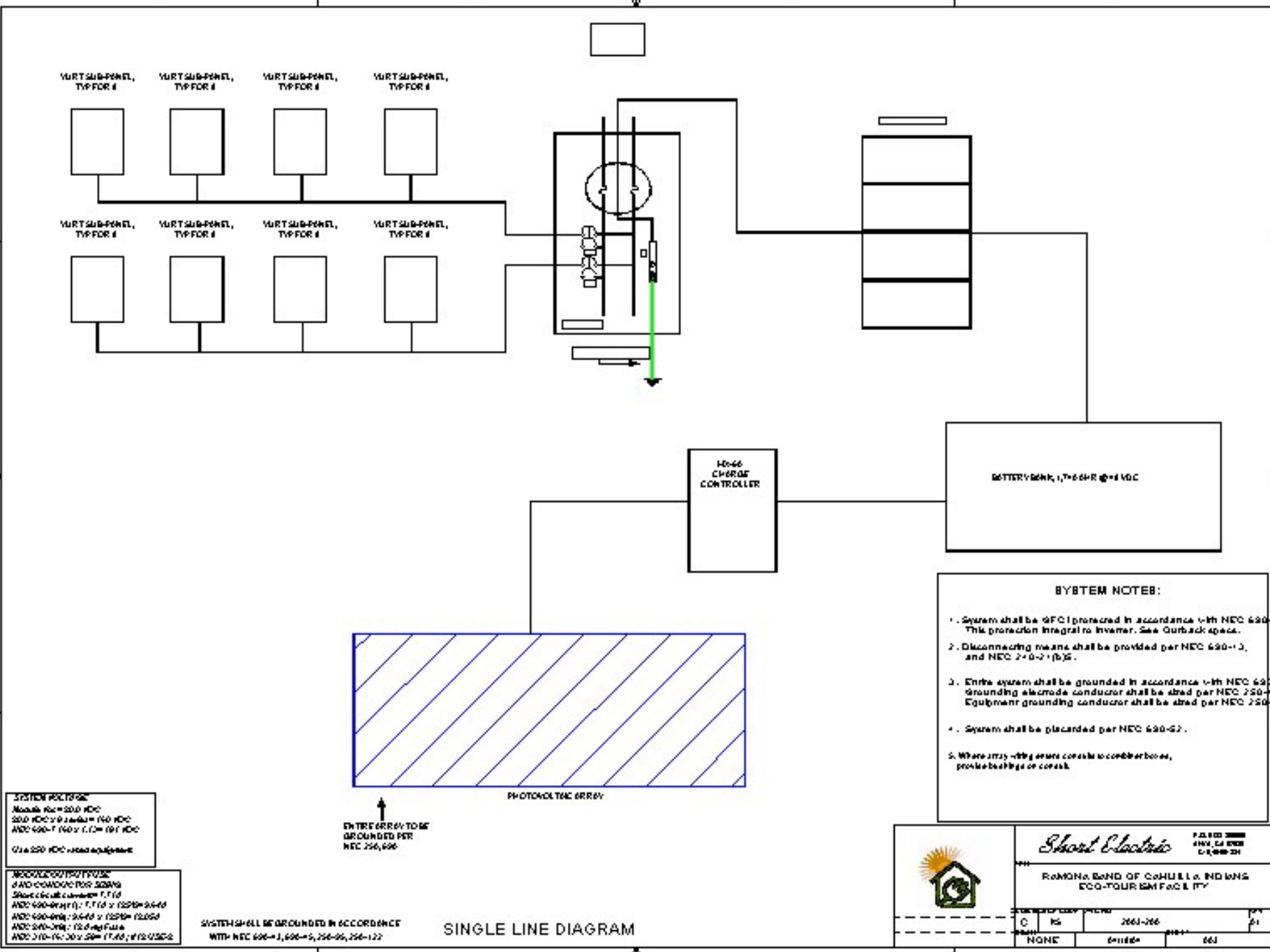
WARNING
DANGER OF ELECTRIC SHOCK
SEE INSTRUCTIONS


Shurt Electric
909-763-0431

Control Panel
Inverter/Charger

120V
Pure Sine Wave
Inverter/Charger

120V
Pure Sine Wave
Inverter/Charger



SYSTEM VOLTAGE
 Module Voc = 50.0 VDC
 200 VDC x 8 modules = 160 VDC
 AND 600-T (600V LDM) 160 VDC
 Use 200 VDC rated equipment

MODULES PER STRING
 # AND CONDUCTOR SIZE Sizing
 Short circuit current = 7.7 A
 AND 600-400(1) 7.7 A x 125% = 9.6 A
 AND 600-400(1) 9.6 A x 125% = 12.0 A
 AND 240-300(1) 12.0 A x 1.25 = 15.0 A
 AND 240-14(20) x 20 x 25% (1.6) = 8.0 A SEC2

SYSTEM SHALL BE GROUNDED IN ACCORDANCE
 WITH NEC 690-5.1, 690-5.2, 690-5.3, 690-5.4, 690-5.5

↑
 ENTIRE ARRAY TO BE
 GROUNDED PER
 NEC 250.69B

PHOTOVOLTAIC ARRAY

HD-66
 CHARGE
 CONTROLLER

BATTERY BANK, 1760AH @ 48VDC

- SYSTEM NOTE:**
- System shall be GFCI protected in accordance with NEC 690-5. This protection integral to inverter. See Gurback specs.
 - Disconnecting means shall be provided per NEC 690-1.3, and NEC 240-21(b)(5).
 - Entire system shall be grounded in accordance with NEC 690-5.3. Grounding electrode conductor shall be sized per NEC 250-66(c). Equipment grounding conductor shall be sized per NEC 250-122.
 - System shall be placed per NEC 690-5.2.
 - Where arrays with wires connect to combiner boxes, provide bonding or connect.

SINGLE LINE DIAGRAM

Short Electric

RAMONA BOND OF CALIFORNIA INCORPORATED
 ECO-TOURISM FACILITY

206J-266

DATE	REV	BY	CHKD	APP
C	K		206J-266	01
NONE	01/18/20		06J	

Efficiency strategies

- Passive solar, such as natural lighting, convective heating, rock bed heat storage
- SolarWall space heating, Radiant hot water space heating
- Energy efficient lighting
- Evaporative cooling
- High R-factor insulation



Restaurant area



- Ultra-efficient kitchen
- Recycling all container waste possible-cardboard, metal, paper, plastic
- Grease to the Biodiesel manufacturer
- Composting of green waste
- Promote local produce
- Grey water system
- Composting toilets

Energy 101



- Public education
- Energy awareness
- Sandia Labs class
- Local energy expo





®

Short Electric

PO Box 390656
Anza, Ca 92539
951-763-0431
CA C10,C46-591334
AZ K11-ROC194249

This program was produced with solar power!