# ELK VALLEY RANCHERIA, CALIFORNIA

## ENERGY EFFICIENCY AND ALTERNATIVE ENERGY ANALYSIS

# PROJECT CONSULTANT

THIS PROJECT HAS BEEN CONDUCTED IN COLABERATION WITH FRANK ZAINO AND ASSOCIATES

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# PROJECT LOCATION

- Extremely Isolated and rugged.
- Isolation contributes to increased cost of goods and services.

**Figure 1-3 Elk Valley Rancheria Overview Map**

# TRIBAL HISTORY

Elk Valley Rancheria is located in Del Norte County, California. Del Norte County is California's northernmost coastal county, located roughly halfway between Portland, Oregon (330 miles north) and San Francisco, California, (350 miles south). Elk Valley Rancheria is located just outside the city limits of Crescent City, California, population 8,000. The Rancheria was established in 1908 as a home for displaced Native Americans from Tolowa, Yurok and Hupa Tribes.

The original reservation is approximately 100 acres, of which the Tribe owns less than 15% . An additional 500 acres has been acquired and placed into Trust for the Tribe since 1989.

# ENERGY GOAL

The Tribe has developed a Tribal Energy Program to aggressively address energy utilization and efficiencies at their facilities to reduce the total overall energy used by 30% by alternative energies.

# PROJECT OVERVIEW

The intent of this grant is to evaluate the energy profile of four facilities on the Rancheria and investigate alternative energy system and calculate the most economical means to reduce the overall utilities used by alternative energy systems.

The study will also estimate each alternative energy system and provide calculations and payback schedules so the Tribe can correlate the decision of what systems provided them with the most benefit and energy savings.

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# EFFICIENCY CONSERVATION OBJECTIVES

**Energy Efficiency is the Backbone of any Program**

- Conduct Baseline Assessment
- Conduct Economic Screening Analysis
- Conduct Energy Conservation Analysis

# LOCATION OF FACILITIES TO CONDUCT ENERGY EFFICIENCY/SCREENING ANALYSIS

- **Casino**
  - 2500 Howland Hill Road
    Crescent City, California
    95531
  - Largest electrical demand


- **Administrative Building**
  - 2332 Howland Hill Road
    Crescent City, California
    95531
  - Potential Solar site
  - Roof exposure

# LOCATION OF FACILITIES TO CONDUCT ENERGY EFFICIENCY ANALYSIS

- **Community Center**

  2298 Norris Ave.
  Crescent City,
  California 95531

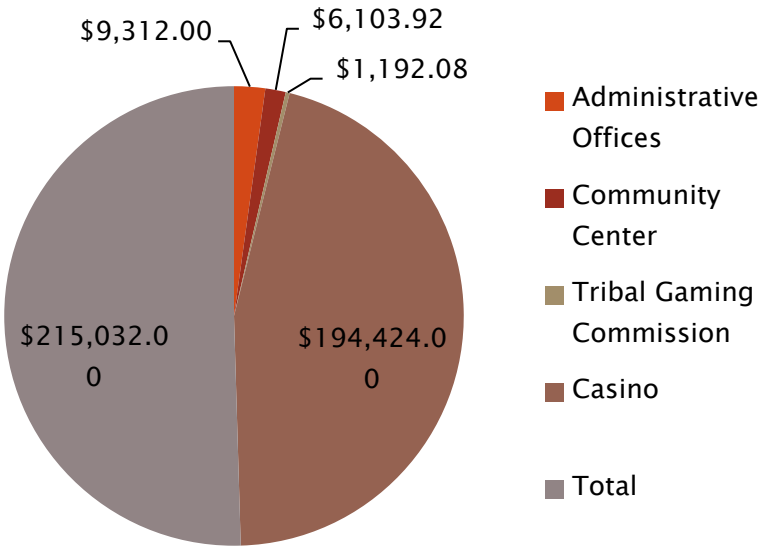
- **Gaming Commission**

  440 Mathews Street
  Crescent City,
  California 95531

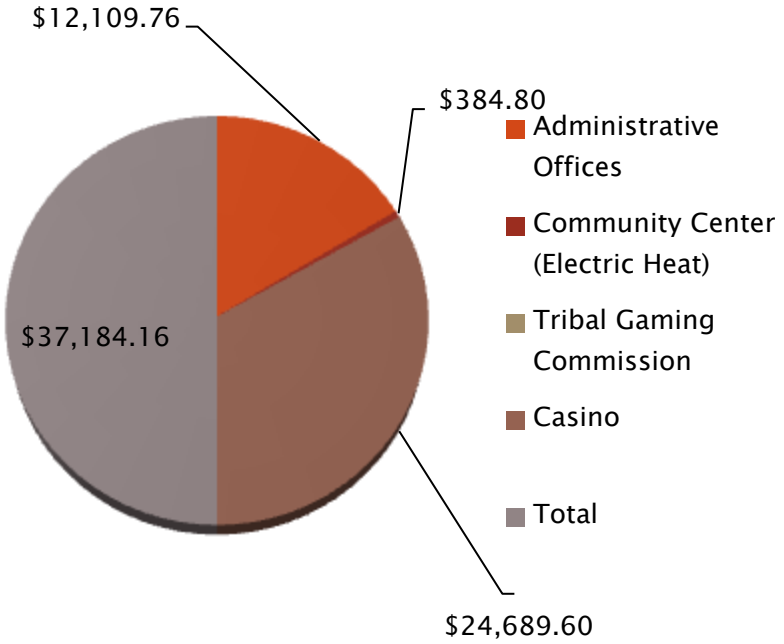
| Facility | Annual Usage (gal) | Monthly Average (gal) |
|---|---|---|
| Administrative Offices | 5,822 | 485 |
| Small Community Center | 185 | 15 |
| Tribal Gaming Commission | 0 | 0 |
| Casino | 11,870 | 989 |
| **Total** | **17,877** | **1,489** |

| Facility | Annual Usage (kwh) | Monthly Average (kwh) |
|---|---|---|
| Administrative Offices | 116,400 | 13,867 |
| Small Community Center | 76,299 | 6,358 |
| Tribal Gaming Commission | 14,901 | 1,242 |
| Casino | 2,430,300 | 202,525 |
| **Total** | **2,687,900** | **223,991** |

# TOTAL FACILITY ENERGY COST




## Annual Electric Costs




## Annual Fuel Cost

# ENERGY CONSERVATION

Money Isn't All You're Saving

Energy Conservation

- Saving
- Conserve
- Heat loss
- Education
- The Human Element

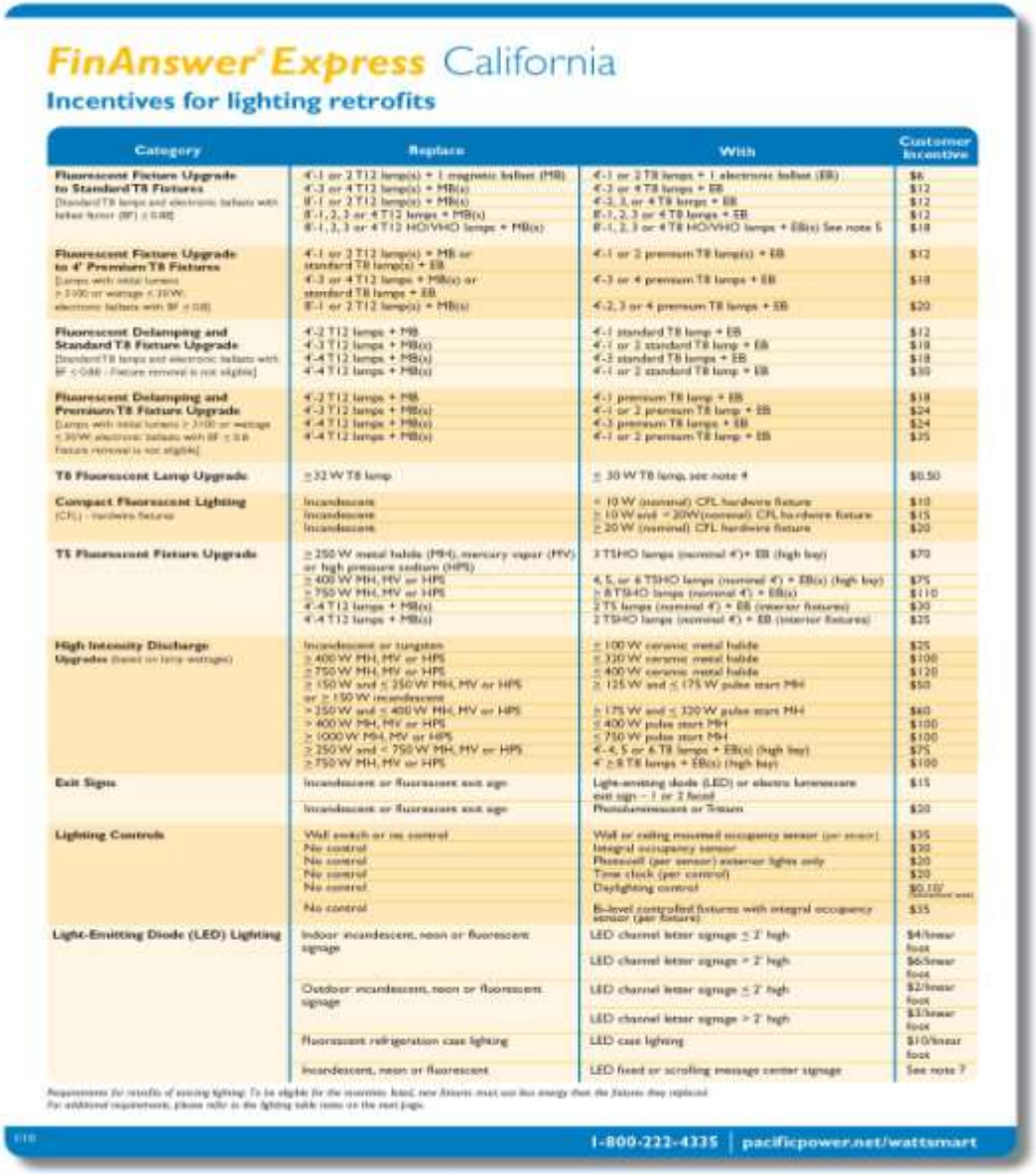
# ENERGY EFFICIENCY / CONSERVATION MEASURES

- Motion Detectors
- Update Heat-Pumps and Other Heating and Cooling Units
- Lighting
- Motors
- Refrigeration Replacement
- Weather Stripping
- Replace Incandescent Lamps
- Window Film
- Daylight Harvesting
- Operational Efficiency
- Lighting Retrofit
- Thermostat Control Audit

Money Isn't All You're Saving

# USE YOUR LOCAL RESOURCES

Pacific Power supplies Tribes Power needs largely based on hydroelectric from Bonneville . Rates are 7.5 cents a Kwh.



## FinAnswer® Express California

### Incentives for lighting retrofits

| Category | Replace | With | Customer Incentive |
|---|---|---|---|
| **Fluorescent Fixture Upgrade to Standard T8 Fixtures** [Standard T8 lamps and electronic ballasts with ballast factor (BF) ≥ 0.88] | 4'-1 or 2 T12 lamp(s) + 1 magnetic ballast (MB) | 4'-1 or 2 T8 lamps + 1 electronic ballast (EB) | $6 |
| | 4'-3 or 4 T12 lamp(s) + MB(s) | 4'-3 or 4 T8 lamps + EB | $12 |
| | 8'-1 or 2 T12 lamp(s) + MB(s) | 8'-1, 2, 3 or 4 T8 lamps + EB | $12 |
| | 8'-1, 2, 3 or 4 T12 lamps + MB(s) | 8'-1, 2, 3 or 4 T8 lamps + EB | $12 |
| | 8'-1, 2, 3 or 4 T12 HO/VHO lamps + MB(s) | 8'-1, 2, 3 or 4 T8 HO/VHO lamps + EB(s) See note 5 | $18 |
| **Fluorescent Fixture Upgrade to 4' Premium T8 Fixtures** [Lamps with initial lumens > 3100 or wattage < 30 W, electronic ballasts with BF ≥ 0.88] | 4'-1 or 2 T12 lamp(s) + MB or standard T8 lamp(s) + EB | 4'-1 or 2 premium T8 lamp(s) + EB | $12 |
| | 4'-3 or 4 T12 lamps + MB(s) or standard T8 lamps + EB | 4'-3 or 4 premium T8 lamps + EB | $18 |
| | 8'-1 or 2 T12 lamp(s) + MB(s) | 4'-2, 3 or 4 premium T8 lamps + EB | $20 |
| **Fluorescent Delamping and Standard T8 Fixture Upgrade** [Standard T8 lamps and electronic ballasts with BF ≥ 0.88 / Fixture removal is not eligible] | 4'-2 T12 lamps + MB | 4'-1 standard T8 lamp + EB | $12 |
| | 4'-3 T12 lamps + MB(s) | 4'-1 or 2 standard T8 lamp + EB | $18 |
| | 4'-4 T12 lamps + MB(s) | 4'-3 standard T8 lamps + EB | $18 |
| | 4'-4 T12 lamps + MB(s) | 4'-1 or 2 standard T8 lamp + EB | $30 |
| **Fluorescent Delamping and Premium T8 Fixture Upgrade** [Lamps with initial lumens ≥ 3100 or wattage < 30 W, electronic ballasts with BF ≥ 0.8 Fixture removal is not eligible] | 4'-2 T12 lamps + MB | 4'-1 premium T8 lamp + EB | $18 |
| | 4'-3 T12 lamps + MB(s) | 4'-1 or 2 premium T8 lamp + EB | $24 |
| | 4'-4 T12 lamps + MB(s) | 4'-3 premium T8 lamps + EB | $24 |
| | 4'-4 T12 lamps + MB(s) | 4'-1 or 2 premium T8 lamp + EB | $35 |
| **T8 Fluorescent Lamp Upgrade** | ≥ 32 W T8 lamp | ≤ 30 W T8 lamp, see note 4 | $0.50 |
| **Compact Fluorescent Lighting** (CFL) - Hardwire fixture | Incandescent | < 10 W (nominal) CFL hardwire fixture | $10 |
| | Incandescent | ≥ 10 W and < 20W(nominal) CFL hardwire fixture | $15 |
| | Incandescent | ≥ 20 W (nominal) CFL hardwire fixture | $20 |
| **T5 Fluorescent Fixture Upgrade** | ≥ 250 W metal halide (MH), mercury vapor (MV) or high pressure sodium (HPS) | 3 T5HO lamps (nominal 4') + EB (high bay) | $70 |
| | ≥ 400 W MH, MV or HPS | 4, 5, or 6 T5HO lamps (nominal 4') + EB(s) (high bay) | $75 |
| | > 750 W MH, MV or HPS | > 8 T5HO lamps (nominal 4') + EB(s) | $110 |
| | 4'-4 T12 lamps + MB(s) | 2 T5 lamps (nominal 4') + EB (exterior fixtures) | $30 |
| | 4'-4 T12 lamps + MB(s) | 2 T5HO lamps (nominal 4') + EB (interior fixtures) | $35 |
| **High Intensity Discharge Upgrades** (based on lamp wattages) | Incandescent or tungsten | ≤ 100 W ceramic metal halide | $25 |
| | ≥ 400 W MH, MV or HPS | ≤ 320 W ceramic metal halide | $100 |
| | ≥ 750 W MH, MV or HPS | ≤ 400 W ceramic metal halide | $120 |
| | ≥ 150 W and ≤ 250 W MH, MV or HPS or ≥ 150 W incandescent | ≥ 125 W and ≤ 175 W pulse start MH | $50 |
| | > 250 W and ≤ 400 W MH, MV or HPS | ≥ 175 W and ≤ 320 W pulse start MH | $60 |
| | > 400 W MH, MV or HPS | ≤ 400 W pulse start MH | $100 |
| | ≥ 1000 W MH, MV or HPS | ≤ 750 W pulse start MH | $100 |
| | ≥ 250 W and < 750 W MH, MV or HPS | 4'-4, 5 or 6 T8 lamps + EB(s) (high bay) | $75 |
| | ≥ 750 W MH, MV or HPS | 4' ≥ 8 T8 lamps + EB(s) (high bay) | $100 |
| **Exit Signs** | Incandescent or fluorescent exit sign | Light-emitting diode (LED) or electro luminescent exit sign - 1 or 2 faced | $15 |
| | Incandescent or fluorescent exit sign | Photoluminescent or Tritium | $20 |
| **Lighting Controls** | Wall switch or no control | Wall or ceiling mounted occupancy sensor (per sensor) | $35 |
| | No control | Integral occupancy sensor | $20 |
| | No control | Photocell (per sensor) exterior lights only | $20 |
| | No control | Time clock (per control) | $20 |
| | No control | Daylighting control | $0.15/ [illegible] watt |
| | No control | Bi-level controlled fixtures with integral occupancy sensor (per fixture) | $35 |
| **Light-Emitting Diode (LED) Lighting** | Indoor incandescent, neon or fluorescent signage | LED channel letter signage ≤ 2' high | $4/linear foot |
| | | LED channel letter signage > 2' high | $6/linear foot |
| | Outdoor incandescent, neon or fluorescent signage | LED channel letter signage ≤ 2' high | $2/linear foot |
| | | LED channel letter signage > 2' high | $3/linear foot |
| | Fluorescent refrigeration case lighting | LED case lighting | $10/linear foot |
| | Incandescent, neon or fluorescent | LED fixed or scrolling message center signage | See note 7 |

*Requirements for retrofits of existing lighting: To be eligible for the incentives listed, new fixtures must use less energy than the fixtures they replaced. For additional requirements, please refer to the lighting table notes on the next page.*



1-800-222-4335 | pacificpower.net/wattsmart

# REVIEW ENERGY ALTERNATIVES

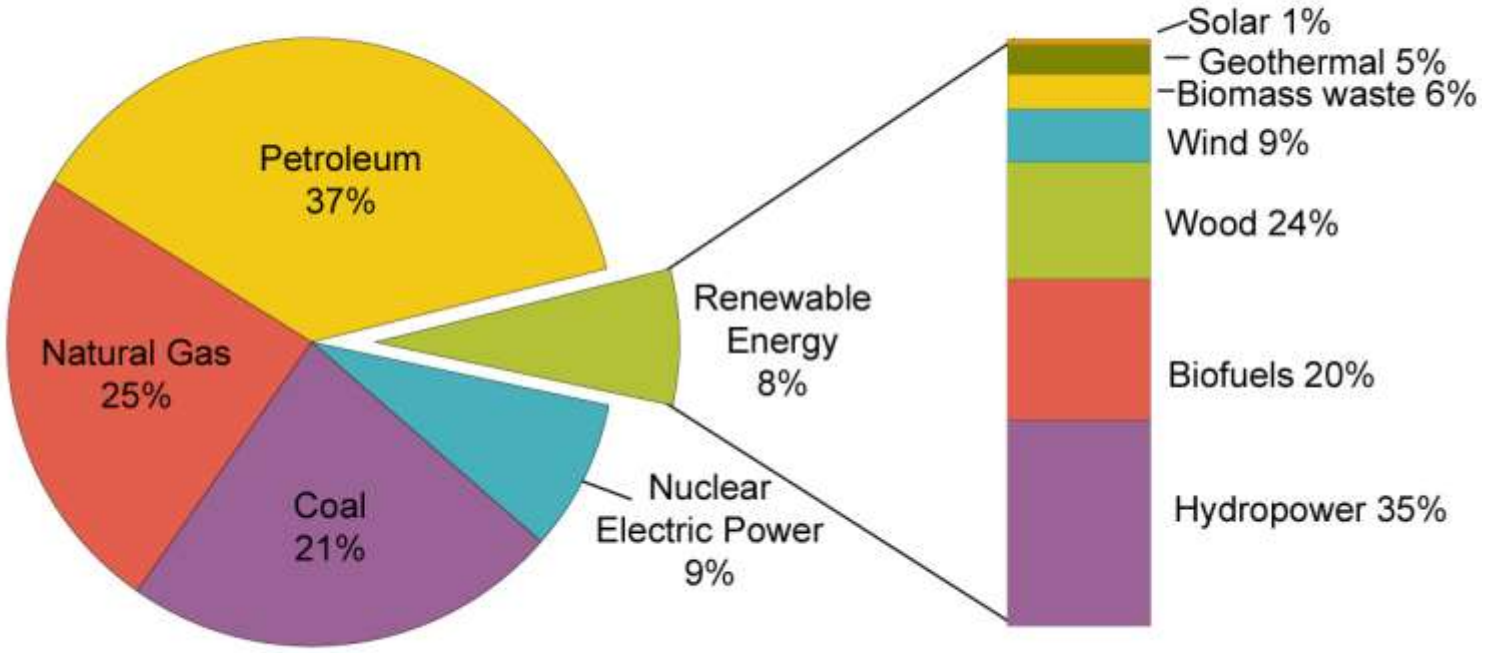
Review Alternatives with Tribal Council

- Solar
- Wind
- Small Hydroelectric
- Geo Thermal
- Wave Energy
- Bio Mass
- Nuclear

Determine advantages and disadvantages of renewable energy sources, including their potential environmental, cultural and social impacts.

# RENEWABLE ENERGY GOAL

**The Role of Renewable Energy in the Nation's Energy Supply, 2009**




Note: Sum of components may not equal 100% due to independent rounding.
Source: U.S. Energy Information Administration, *Annual Energy Review 2009*, Table 1.3, Primary Energy Consumption by Energy Source, 1949-2009 (August 2010).

# ENERGY ALTERNATIVE SOLUTIONS


## Fuel Cells

- Offset energy costs
- Incentives
- Fuel costs and Transportation

## Biomass

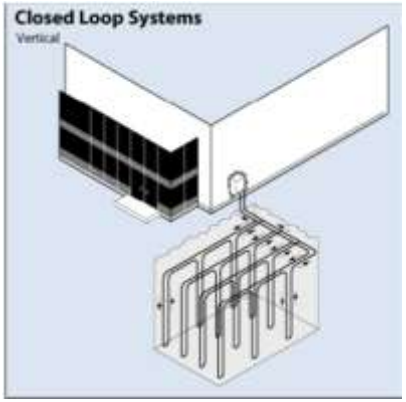
- Use local fuel supply
- Heat
- Power
- Transportation Costs

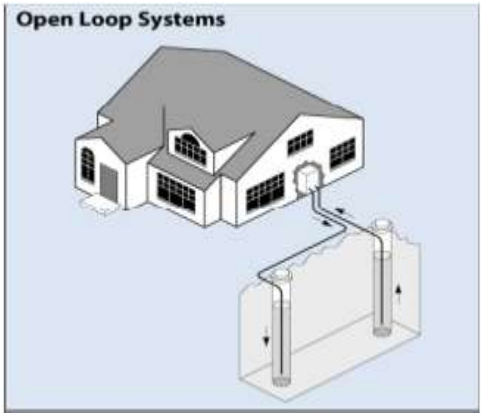
# Renewable Alternatives Assessment

## Selective Alternative and Assess Feasibility

- Annual Casino Energy Consumption: 2,430,300 kWH
- Cost Per kWH: **Average 0.08 cents**
- EVR currently has very low energy cost compared to the rest of California; the majority of power produced in the pacific northwest comes from hydroelectric.
- Best case scenario if technology, regulatory framework, O&M, utility grid and if the community would support development of EVR Wave Energy Project, cost to EVR would equal **0.52 cents/kWH**.

# ENERGY ALTERNATIVE SOLUTIONS




- Closed Loop
- Recycles medium for heat transfer
- Typical heat pump installation

- Ground Source Heat Pump
- Open Loop
- Draws heat from well with stable ground water temperature and returns to discharge well

# ENERGY ALTERNATIVE SOLUTIONS

Solar Panels

- Offset energy costs
- Incentives
- Success in Coastal Region

Wind Turbines

- Continuous output
- Offset energy cost
- Tall Trees

# ENERGY ALTERNATIVE SOLUTIONS

## Proposed Solar Array Locations


Proposed Solar panel locations to produce a total 2.5 million watts of energy when all phases are complete to be distributed to Pacific Power as a revenue source For Elk Valley Rancheria and to offset the energy cost to the Tribal properties. The proposed field to be installed in a phased approached to reduce capital costs. The area will cover an undeveloped site east of the Elk Valley Casino. This installation will be self ballasted solar panels placed on level land. The production is based on a witnessed solar array output in Arcata, California and this estimate is at 3066 hours of production. (8760 hours per year/2 = daylight hours- 30% overcast hours = 3066)

# ENERGY ALTERNATIVE SOLUTIONS


Proposed solar panel installation at the Tribal Community Center 2298 Norris Ave, Crescent City, California 95531

# SOLAR ARRAY CARBON FOOTPRINT SAVINGS

# GUIDEING PRINCIPLES

Elk Valley Rancheria Prides itself on the stewardship of the land and its resources.