

**Recipient Organization:** Bishop Paiute Tribe

**Project Title:** Bishop Paiute's Residential Solar Program Phase III

**Date of Report:** April 30, 2021

**Award Number:** DE-IE0000099

**Total Project Costs:** \$539,477

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**Project Partner:** GRID Alternatives Inland Empire, Executive Director, Jaime Alonso, [jalonso@gridalternatives.org](mailto:jalonso@gridalternatives.org)



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**2. Executive Summary:** The project consisted of the design, installation, inspection, interconnection and monitoring of 40 grid-tied solar electric systems, totaling up to 108 kW rated capacity, on qualified existing low-income single-family homes located within the Bishop Paiute Reservation. The systems are to provide at least 30-75% savings in displaced electricity totaling 175,000 kWh/year. After the DOE grant contract was signed, the Tribal Employment Rights Ordinance (TERO) board voted to reduce the tribal tax to work on the reservation for these low-income projects from 4% to 1%. This generous reduction was applied back into the community solar project and two additional tribal homes were added for a new total of 40 grid-tied solar electric systems, totaling up to 113 kW rated capacity (two more than originally planned) projects. Additionally, each homeowner was educated on energy efficiency, how solar electric systems work to reduce the energy purchased from the utility and how that will save money on electric bills. The estimated 75% savings on monthly electric bills brings financial relief to tribal homeowners and makes a significant difference on the reservation; giving low-income families money to spend on other essential items, while reducing their carbon footprint in this remote tribal reservation. The GRID IE program and this tribal project had a training component for tribal members to get free hands-on job training on 8 of the 40 homes. Those tribal members that came out to train with GRID IE could then be eligible for the “train to hire” portion of the program, on the remaining 32 homes. Overall, the triple impact of the Bishop Paiute Tribe Residential Solar Program Phase III—affordable energy for low-income families, on-site clean energy production, and hands-on solar installation jobs for local workers—these all help build the Tribe’s energy, economic, environmental goals and offers local self-sufficiency while supporting energy independence to the neediest on the Reservation.

## 3. Project Objectives:

The overall project goal is to deploy clean energy systems to achieve the Bishop Paiute Tribe’s long-term goals of energy self-sufficiency, environmental protection, and better lives for our Tribal members and community.

Project goals were to:

- 1) Install 40 grid-tied, net-metered rooftop solar electric systems on owner-occupied, single-family homes of low-income families living on the reservation with tribal job trainees
- 2) The new clean energy systems deployed will have at least 113 kW – AC rated capacity
- 3) The energy displaced was to be least 30-75 % of total electricity used, totaling at least 175,000 kWh/year

#### **4. Description of Activities Performed:**

The project consisted of a large outreach campaign, to identifying the potential homeowners. The tribe worked with the sub-recipient GRID Alternatives Inland Empire (GRID IE) to get the information out to the community in a timely way, to create a first come first serve, fair application process. GRID IE worked with the tribe to create content such as flyers, newsletters announcements, radio PSA's and a direct mail post card that was mailed out to all tribal residents to insure they received the program information. Once the homeowners applied and provided the program documents with GRID IE program, a list was created. The next step was to ensure the homes were solar suitable and a site inspection was completed. The roofs were inspected, measurements taken, and solar system sizing completed. The application list of fifty homes was reduced due to 40 due to construction factors such as:

- ✓ Roof in disrepair: shingles missing, roof leaking
- ✓ Age of roof/old roofing: roof needs to have at least fifteen year left to be solar suitable
- ✓ Shading: from trees, vents, other equipment on roof such as air conditioner
- ✓ Permanence: modular home or mobile trailer homes not on permanent foundation

All these factors are taken into consideration when approving a residence for a solar electric system. The final list then went to the tribal council for review and their final approval process. The solar systems were design and contracts were generated. Meetings and appointments were set with the 40 approved tribal families to review and explain the contract documents, go over what was to be expected during the solar installations, and share information timelines of the interconnection process happens and how their utility bills were going to change. GRID IE selected 8 homes to provide the hands-on job training education. GRID IE worked with the TERO office to get flyers out to those interested in signing up to learn solar installation. TERO helped facilitate the meetings for the GRID IE orientation classes. There were several in person and remote orientations offered and set up on different dates and times to provide folks with easy to attend meetings. There was a total of 15 people trained: 6 female and 9 males they completed a total of 136 hours of hands-on job training. TERO facilitated the program for the trainees to then be hired and paid \$15 dollar per hour on the remaining 32 homes receiving solar installations. Each of the 32 homes has 1 paid trainee and the list was rotated so everyone who trained received an opportunity to get hired at least on one home.

As the solar installations were completed, all 40 homes went through a thorough independent third-party inspections process. GRID IE processed all 40 local utility interconnection applications and all systems received permission to operate. After the interconnection process all 40 homeowners participated in home warranty meetings. Homeowners were provided warranty packets, which contains solar equipment guide sheets, energy saving tips, program feedback questionnaires and utility guide sheets to explain the new looking utility net metered electric bills. GRID IE takes this opportunity to review any questions homeowners may have about their new solar systems. Additionally, each homeowner was provided information and education on other California clean energy programs and encouraged to continue practicing conservation methods with energy efficiency behaviors. GRID IE shared other local savings

assistance programs with utility company and clean vehicle programs. GRID IE conducted one year of monitoring of the solar electric systems installed to ensure solar performance and system energy reductions. These 40 solar electric solar systems produced above the goal and have a 75.7% electrical offset, 7% more than the original estimated. The breakdown and schedule was as follows:

- Months 1-5: Homeowner clients re-qualified and educated
- Months 6-14: Site visits conducted; systems designed  
Homeowner client contracts signed. Solar rebates reserved.  
Interconnection application submitted  
TERO Compliance Plan and fee completed. Equipment and materials procured.  
Systems installed.  
Job trainees hired and supervised
- Months 15-21: Systems interconnected (clients received Permission to Operate [PTO])
- Months 22-28: Warranty training provided. Systems performance verified
- Months 29-30: Final reports completed

## Task Schedule

| Task Number Per Statement of Work | Title or Brief Task Description                                                          | Task Completion Date  |                 |        |                  | Progress Notes                                                                                                                   |
|-----------------------------------|------------------------------------------------------------------------------------------|-----------------------|-----------------|--------|------------------|----------------------------------------------------------------------------------------------------------------------------------|
|                                   |                                                                                          | Original Planned      | Revised Planned | Actual | Percent Complete |                                                                                                                                  |
| 1                                 | Task 1.0 NEPA; Re-Qualify and Educate Homeowners                                         | 10/1/2018-2/28/2019   |                 | 40     | 100%             | All applications are updated and complete                                                                                        |
| 2                                 | Task 2: Conduct System Design Site Visits and System Design                              | 10/1/2018-6/30/2019   |                 | 40     | 100%             | 40 homes are designed for in house and sub-contractor installation                                                               |
| 3                                 | Task 3: Complete Client Contracts, Rebate Reservations, and Interconnection Applications | 3/1/2019-11/30/2019   |                 | 40     | 100%             | 8 GRID in house and 40 sub-contracted projects are in contract and installed 10 are in process of inspection and interconnection |
| 4                                 | Task 4: Prepare for Solar System Installations                                           | 3/1/2019-11/30/2019   |                 | 40     | 100%             | All 40 projects installed                                                                                                        |
| 5                                 | Task 5: Install Solar Systems with Job Trainees                                          | 3/1/2019-11/30/2019   |                 | 40     | 100%             | 40 homes have been installed w trainees and/or paid trainees                                                                     |
| 6                                 | Task 6: Perform Post-Installation, Verification, and Final Reporting                     | 4/1/2019-3/31/2021    |                 | 40     | 100%             | 40 homes have been interconnected                                                                                                |
| 7                                 | Task 7: Monitoring                                                                       | 12/31/2019-12/31/2020 | Q2              | 40     | 100%             | 1 year of monitoring 40 systems                                                                                                  |

The Tribe and GRID are proud that the project was featured in Scientific American on-line:

<https://www.scientificamerican.com/article/solar-powers-benefits-dont-shine-equally-on-everyone/>

Here are training photos:





**Presentation - Educational Information shared with tribal participant homeowners:**



**Bishop Paiute Residential Solar  
Homeowner Orientation**

**GRID Alternatives**

**Tribal Manager, Lisa Castilone**

**951-471-7047**

**[www.EnergyforAllProgram.org](http://www.EnergyforAllProgram.org)**



# About GRID Alternatives



## Who we are

We are a 501(c)(3) certified nonprofit organization that brings together communities, volunteers and job trainees to implement solar power and energy efficiency for income qualified families.

## What we do

We install solar electric systems exclusively for income qualified homeowners providing energy cost savings, valuable hands experience, and a source of clean, local energy that benefits us all.

## How we do it

With the help of Gov't grants, Corporate funding, kind donations, volunteers & job trainees.

We also host special events (Solar Futures, Veteran's build) that help raise these funds.



## GRID Service Areas

### 6 CA Regional Offices

1. North Valley
2. Bay Area
3. Central Valley
4. Greater Los Angeles
5. Inland Empire
6. San Diego

### 4 National Offices

1. Colorado
2. Washington D.C.
3. National Tribal Program

### And now International...

1. Nicaragua
2. Nepal
3. Mexico



## GRID IE's Workforce Development Program

- Recruitment from TERO
- Free & Paid Training
- Placement
- Paid Internship Positions



## Energy for All Program



**The Energy for All Program** makes solar power accessible to families who need the savings most, while providing hands on solar installation experience to volunteers and job trainees.

### Our motto:

1. **PEOPLE** Income qualified homeowners
2. **PLANET** GRID solar electric systems
3. **EMPLOYMENT** Hands-on training for volunteer installers, no experience needed. Females are encouraged to apply!

## Client Qualifications

| Household Size | Maximum Household Income |
|----------------|--------------------------|
| 1              | \$42,100                 |
| 2              | \$48,100                 |
| 3              | \$54,100                 |
| 4              | \$60,100                 |
| 5              | \$64,950                 |
| 6              | \$69,750                 |
| 7              | \$74,550                 |
| 8              | \$79,350                 |

\*SASH Income Limit INYO COUNTY 2020

- Live on the reservation
- Be a Tribal member or linked to member
- Meet Income limits [at or below]
- Solar appropriate roof
- If you meet these qualifications, our program is at **NO COST** to you!

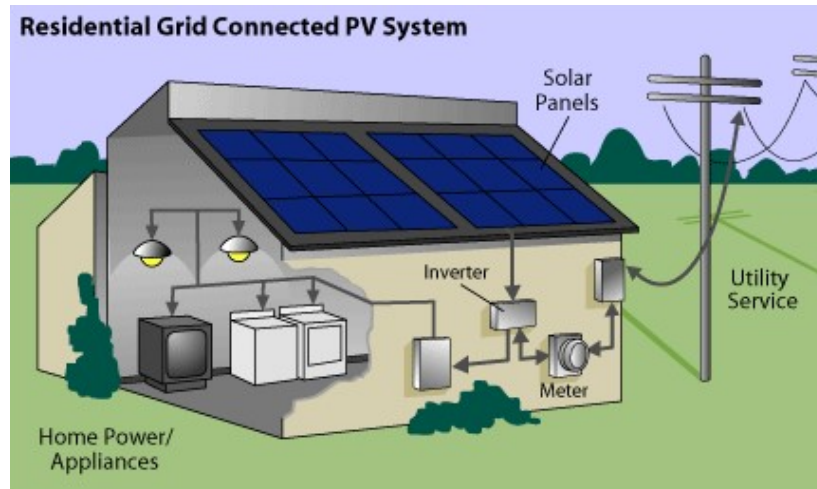
## Photovoltaic (PV) Systems

### Solar Electric System

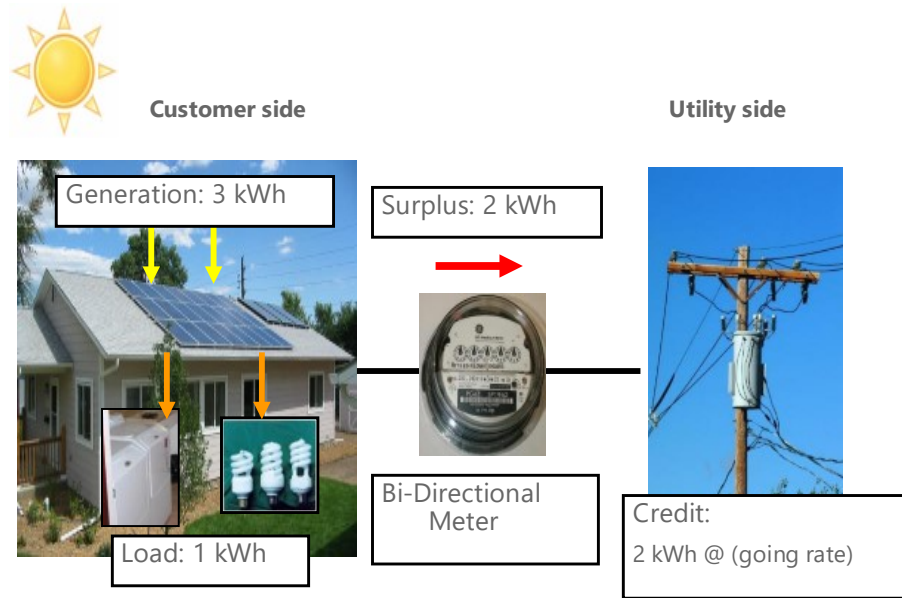
- Use the sun's light, not heat ("Photo" + "Volts")



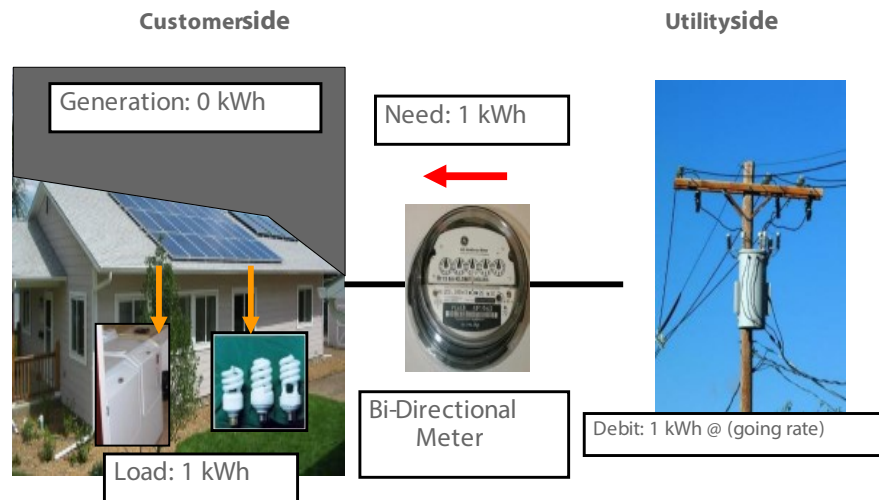
## Grid-tied System

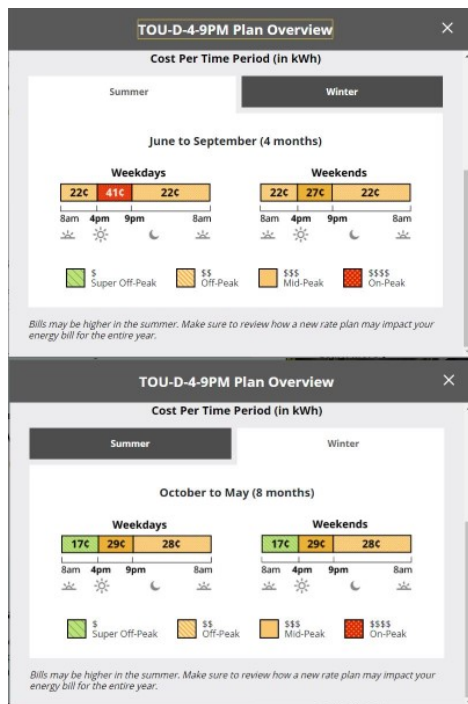


# Net Metering



# Net Metering





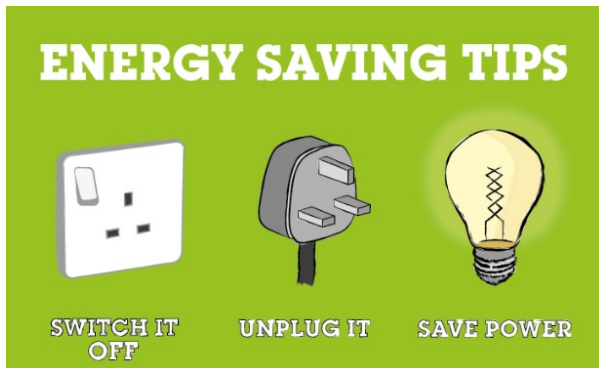
## NEM and TOU Rates

- All solar customer in Southern California Edison will be switched to Time-of-use (TOU) rates when they receive permission to operate
- With TOU, electricity is more expensive during "peak times" currently set at 4 -9PM (as of April 2019)
- The new TOU 4 -9PM and 5 -8PM plans offer low prices while the sun is shining and solar power is contributing to the power grid
- Electricity prices are typically lower early in the day, over night, and on the weekends
- Bills may be higher during the summer but overall annual energy costs can be lower
- You have options, call Southern California Edison at 1-866-743-1645 if you would like to switch from the default TOU -D-4-9-PM rate
- You can still be on CARE/FERA after going solar!

## PV System Maintenance



## Energy Saving Tips



**ENERGY FOR ALL**  
A program of GRID Alternatives

**\$200**

## Homeowner Referral Program

**Refer your family, friends, and coworkers to GRID! Once their system is installed, you get \$200. There is no limit to the number of referrals, so start today!**

## Clean Vehicle Assistance Program

GRID has partnered with Clean Vehicle Assistance Program (CVAP) to share information about a grant program to help you buy an electric vehicle. We also have information about other clean vehicle assistance programs!  
<https://cleanvehiclegrants.org/>



## Clean Vehicle Programs: Here's how it works

Talk with GRID staff  
about your needs

Look at the options  
and decide what's  
right for you

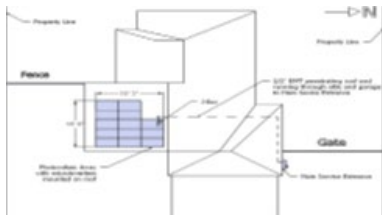
We'll walk you  
through the  
application process

## GRID Program Steps



1. Application all documents received
2. Construction Site Visit ~~Inspect~~ roof
3. System sized and designed
4. GRID returns with Contract
5. 1-2 Day Solar Installation
6. Independent Inspections (Third party)
7. Permission to Operate from SCE
8. Warranty Training and bill review
9. Start Saving with Solar Energy!

## Construction Site Visit



1. Evaluate Roof Space Requirements
2. System Orientation
  - South and Southwest is best
3. Age of the Roof
4. Shading [Trees, Vents, Chimney]

**GRID will bring back the roof layout showing you plans at contract time!**

## Installation day(s)



- 1-2-day Solar Installations
- Lead by GRID staff and a team of job trainees or SubContractor
- Homeowner provides lunch for crew for 1-2 days
- Homeowner allows use of restroom
- Homeowner invites others
- Driveway must be clear
- Someone 18+ must be home the entire time



**ENERGY FOR ALL**  
A program of GRID Alternatives

**Apply today at  
CDD**

**Funds are ending**

**First come First  
serve!**



[www.EnergyforAllProgram.org](http://www.EnergyforAllProgram.org)

## Example mailer: Post card mailed by Tribe:



## 5. Conclusions and Recommendations:

Below are examples of the impact of the installed electric systems.

Chart #1 shows the homeowner the direct impact of their solar system in solar electric savings, systems details and environment impacts. Chart #2 shows the impact of all 40 solar systems and the total kilowatts installed. The conclusion of the impact reports on these projects is that the solar systems performance was greater than expected. The solar systems provided more of an offset than expected, that will translate in more utility bill saving for the homeowners. The recommendation is to continue with search for homeowners who are interested in getting solar and continue looking for match funding. There were 50 applicants interested in getting solar, 7 of the 10 homeowners were disqualified due to roof issues, it would be recommended to see how funding could be identified to assist those tribal members needing roof repair, as GRID IE does not have program funds for that:

|                                    |        |
|------------------------------------|--------|
| Total kWh Historical Usage         | 248061 |
| Total Annual kWh Electrical Offset | 187823 |
| Total Annual Savings               | 75.70% |

### Example #1: Impact report for a home:

| Estimated Solar Savings                                         |             |
|-----------------------------------------------------------------|-------------|
| Estimated Savings from Solar (1 <sup>st</sup> year)             | \$501.51    |
| Estimated Savings from Solar (20 years) <sup>1a</sup>           | \$11,016.88 |
| Estimated Annual Bill Reduction from Solar                      | 64%         |
| Annual Electric Bill <u>Before</u> Solar                        | \$1,114.15  |
| Estimated Annual Electric Bill <u>After</u> Solar <sup>1b</sup> | \$284.01    |

| Solar System Details and Production  |                  |
|--------------------------------------|------------------|
| Solar System Size                    | 3.15 kW DC       |
| Historic Electric Usage (pre-solar)  | 5094 kWh         |
| Annual Solar Production              | 4124 kWh         |
| Your Original Rate Schedule          | D                |
| Your New Rate Schedule <sup>4a</sup> | TOU-D-4-9PM-NEM2 |

| Estimated Environmental Impacts Over Solar System Lifetime |                   |
|------------------------------------------------------------|-------------------|
| Equivalent Number of Tree Seedlings Planted                | 785               |
| Equivalent Number of Cars Taken off the Road               | 6                 |
| Greenhouse Gas Emissions Prevented                         | 33.73 tons of CO2 |

**Example #2: Impact report for all projects:**

\$0.171 National Average cost per kWh

|                  |                                                                                                                                                     |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>113.0</b>     | Total Kilowatts of Solar Installed                                                                                                                  |
| <b>4,637,393</b> | Lifetime kWh production - California                                                                                                                |
| <b>0</b>         | Lifetime kWh production - Colorado                                                                                                                  |
| <b>0</b>         | Lifetime kWh production - NY/Tri-State                                                                                                              |
| <b>0</b>         | Lifetime kWh production - Mid-Atlantic                                                                                                              |
| <b>0</b>         | Lifetime kWh production - National Average                                                                                                          |
| <b>4,637,393</b> | Total Lifetime kWh Production                                                                                                                       |
| <b>\$843,707</b> | Value of energy produced over systems' lifetimes - California                                                                                       |
| <b>\$0</b>       | Value of energy produced over systems' lifetimes - Colorado                                                                                         |
| <b>\$0</b>       | Value of energy produced over systems' lifetimes - NY/Tri-State                                                                                     |
| <b>\$0</b>       | Value of energy produced over systems' lifetimes - Mid-Atlantic                                                                                     |
| <b>\$0</b>       | Value of energy produced over systems' lifetime - National Average                                                                                  |
| <b>\$843,707</b> | Total value of energy produced over systems' lifetimes                                                                                              |
| <b>1,610</b>     | Tons of Greenhouse Gases Eliminated Over the Systems' Lifetime                                                                                      |
| <b>0</b>         | Tons of Greenhouse Gases Eliminated Over the Systems' Lifetime                                                                                      |
| <b>0</b>         | Tons of Greenhouse Gases Eliminated Over the Systems' Lifetime                                                                                      |
| <b>0</b>         | Tons of Greenhouse Gases Eliminated Over the Systems' Lifetime                                                                                      |
| <b>0</b>         | Tons of Greenhouse Gases Eliminated Over the System' Lifetime                                                                                       |
| <b>1,610</b>     | Total Tons of GHGs Eliminated <b>Over Systems' Lifetimes</b>                                                                                        |
| <b>308</b>       | Equivalent number of cars taken off the road for 1 year                                                                                             |
| Source           | <a href="https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator">https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator</a> |
| <b>37,455</b>    | Equivalent number of trees planted                                                                                                                  |
| Source           | <a href="https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator">https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator</a> |

|                                                         |  |  |  |  |  |  |  |  |  |
|---------------------------------------------------------|--|--|--|--|--|--|--|--|--|
| <b>Monitoring Report</b>                                |  |  |  |  |  |  |  |  |  |
| Title: DOE 3 Bishop Tribe Residential Project Phase III |  |  |  |  |  |  |  |  |  |
| Award Number: DE-IE000099                               |  |  |  |  |  |  |  |  |  |
| Sub-recipient: GRID Alternatives                        |  |  |  |  |  |  |  |  |  |

[illegible]

Recommendations: For future phases of solar implementations, it was agreed upon by the Tribe and GRID IE to maintain a close partnership while keeping the community apprised of future application opportunities. The GRID IE applications were printed and kept in various offices throughout the reservation. This was an effective plan and will continue moving forward.

**6. Lessons Learned:** There were lessons learned in two (2) areas: workforce and communications:

Workforce: To obtain a TERO tax reduction or waiver a formal written letter must be sent to the TERO commission prior to any scheduled commissioner meeting. The request must be put on in writing and placed on a scheduled agenda meeting, reviewed, voted on and approved by the TERO Commission. This task should be started at the onset of the grant application for two reasons: one reason if waiver is approved to reduce or be waived this would allow the tribe to count this as a greater portion of an in-kind grant contribution and second reason is it makes balancing the budget and keeping the reports simpler.

Job training to hire program for tribal members: this model works best when the training is completed and the train to hire program is relatively close together. During this grant the job training and the hiring were a bit spread out and many of the trained tribal members found other paying jobs or returned to school.

Communications: As it related to outreach to tribal members GRID Alternatives organization started a small referral reward program, to help promote the California SASH II program and increase client acquisition with less GRID staff effort. This model worked well on the reservation and many homeowners referred their family and friends to apply and were rewarded with a small incentive to promote the program.

Outreach by postcard physically mailed to all tribal residents worked very well in this tribal community. The post card did not have a lot of details like a letter, and no one needed to open an envelope, so we believe this method of outreach will continue in the next campaign.