

Title

SAND2011-5365C

Energy Efficiency & Renewable Energy Go Hand in Hand: Indians Canyons Trading Post – Agua Caliente Band of Cahuilla Indians

Objective

Poster will exemplify the benefits of energy efficiency and renewable energy implementation through the energy demand, cost, and emission savings incurred at the historical Indian Canyons Trading Post, a visitor's center and retail store owned and operated by the Agua Caliente Band of Cahuilla Indians in Palm Springs, California.

Background

- Buildings are the biggest users of energy
- Non-renewable energy resources are finite and are being depleted
- Agua Caliente Band of Cahuilla Indians in Southern California are committed to strategic energy planning
- Historical Indian Canyons Trading Post is two miles from Southern California Edison electric grid and connection to the grid is not an option
- Off-grid ~700 square feet visitor's center and retail shop
- Propane was used for several years to run a generator, refrigerator, and freezer
- High repair costs, off-grid, amount & price of propane fuel, and noise pollution
- 2005 DOE Tribal Energy Program grant provided funding for a Strategic Energy Plan
- 2009 DOI Bureau of Indian Affairs 638 Mineral Assessment Program provided funding for the implementation of a 8.25 kW photovoltaic array with diesel generator back-up

Methods

- Site visit
- Approval for the poster / paper from the Agua Caliente Band's Tribal Council
- Interviews
- Research & analysis

Results**ENERGY EFFICIENCY MEASURES**

- Electric Frigidaire Refrigerator/Freezer P/N 241851242 replaced the propane upright model refrigerator/freezer
- Electric Arctic Air Commercial Freezer Model Cf136 replaced the propane floor model freezer
- Ten 16w florescent rack lights replaced 25 19w spot and task lighting
- 1000w Euro Pro Toaster replaced a 1500w toaster
- Two ceiling fans were installed

- Unnecessary extra electric freezer was removed

Table 1: Comparison of Energy Demand Before and After Energy Efficiency Measures

	Before EE	After EE	Savings
Energy Demand	34 kWh/day	25 kWh/day	26% at 9 kWh/day

**Comparison of Energy Demand:
Before & After Energy Efficiency Measures**

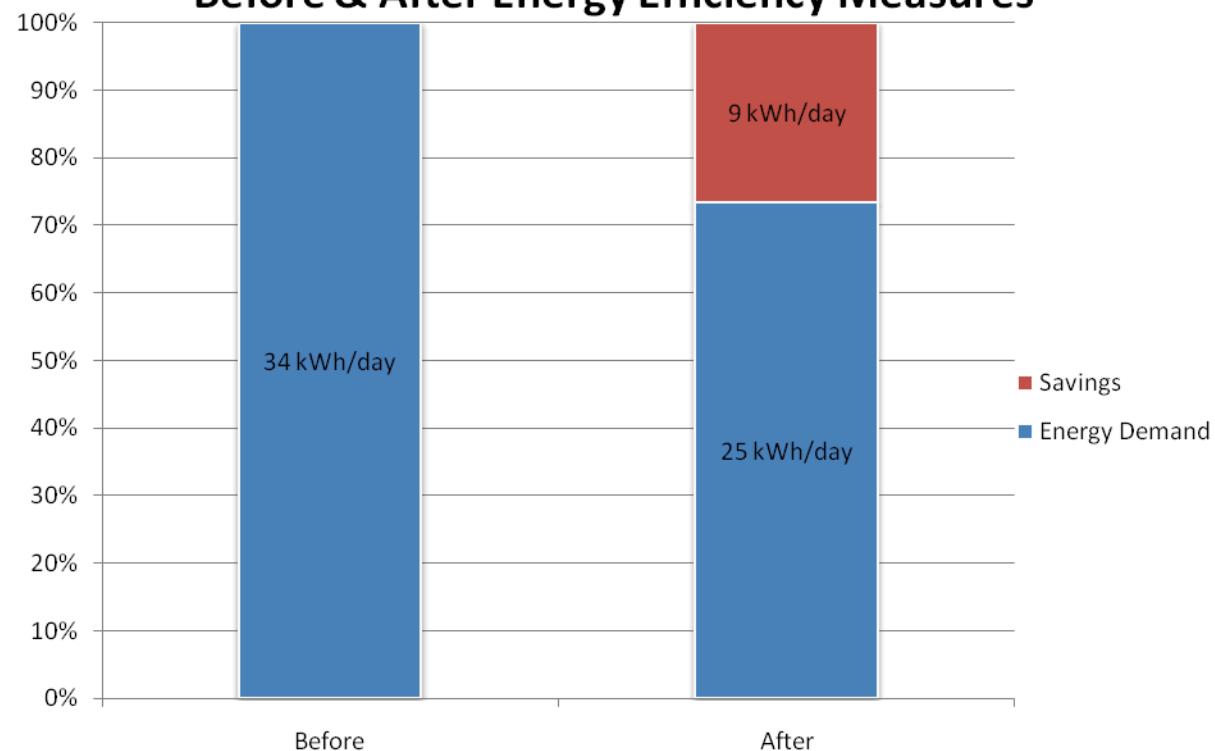


Table 2: Comparison of Off-Grid Costs Before and After Energy Efficiency & Renewable Energy Implementation

	BEFORE Propane	AFTER		Savings
		PV	Diesel	
Operations	\$1,194.27	\$160.00	\$4.00	80.0% at \$1,078.29
Maintenance	\$153.85	\$100.00	\$5.83	
Total Costs	\$1,348.12	\$269.83		

Comparison of Operations & Maintenance Costs Per Month: Propane, Solar, and Diesel



**Comparison of Total Costs Per Month:
Before & After Energy Efficiency & Renewable Energy Measures**

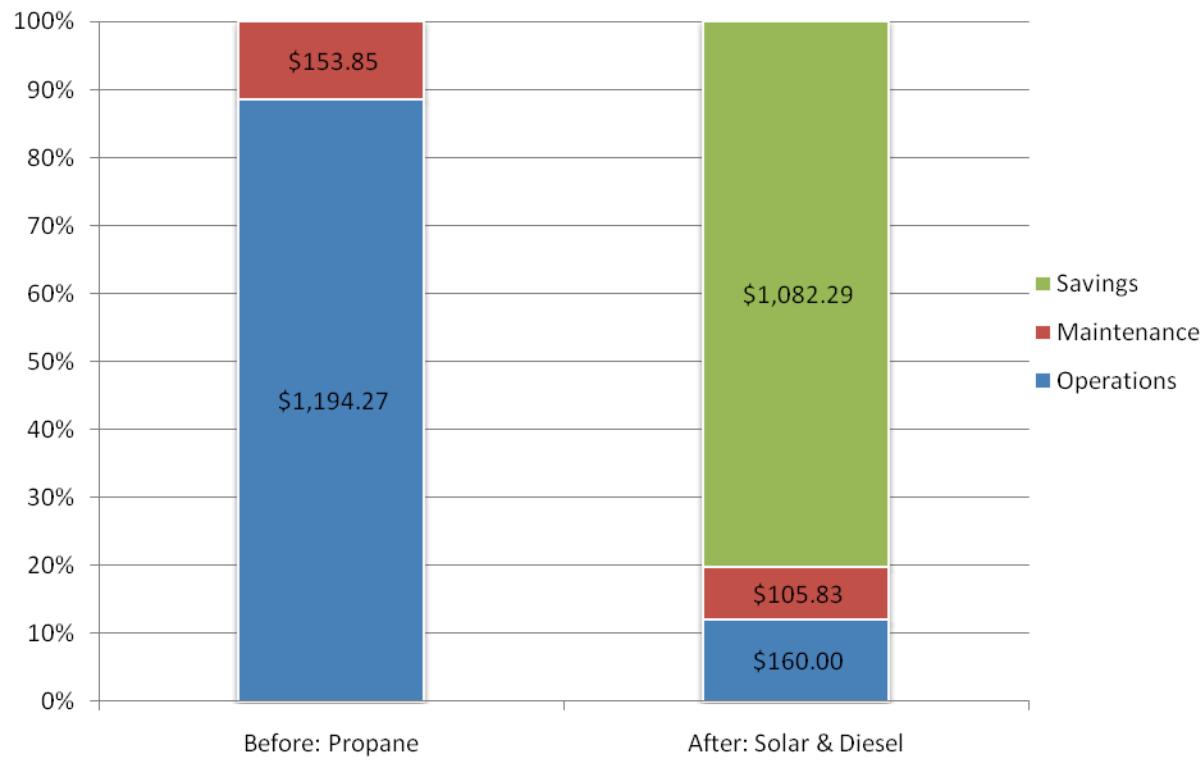
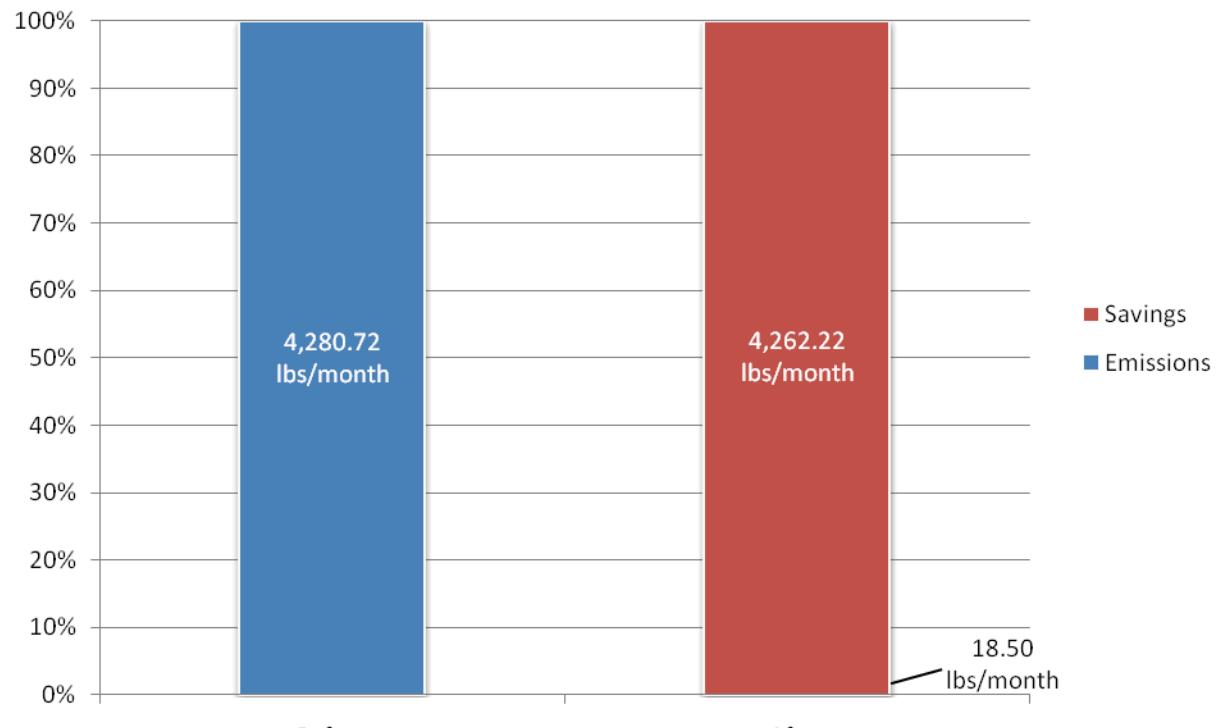


Table 3: Comparison of Off-Grid Carbon Emissions Before and After Energy Efficiency & Renewable Energy Implementation

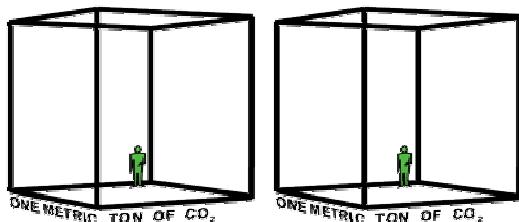
	BEFORE Propane	AFTER		Savings
		PV	Diesel	
Fuel Amount (gal/month)	329.39	-	0.83	99.6 % at 4,262.22
CO ₂ Emissions (lbs/month)	4,280.72	-	18.50	
Total CO ₂ Emissions (lbs/month)	4,280.72	18.50		

Comparison of CO2 Emission: Before & After Energy Efficiency & Renewable Energy Measures



Conclusion

- Installing a photovoltaic array was more cost effective than running business as usual.
- Cost savings of 80.0% at \$1,078.29 per month and carbon emissions savings of 99.6% at 4,262.22 pounds per month was achieved.
- 4,262.22 pounds = 1.93 metric tons per month



Source: Versus Carbon Neutral. (March 2011). *What Does a Metric Ton of CO2 Look Like?* Retrieved from <http://www.verus-co2.com/blog/?p=1964>

- Renewable energy systems are uniquely designed to the amount of energy consumed. If energy efficiency and conservation are taken first and energy demand is lower, then a renewable energy system can be more cost effective while operating more effectively.
- Indian Canyons Trading Post could look into marketing their business through a sustainability / green power lens.
- The Agua Caliente Band of Cahuilla Indians exercised their sovereignty and is a leader in renewable energy and energy efficiency implementation with their first renewable energy project, which is a part of their strategic energy plan.
- Not only did the tribe save money on fuel, it is taking part in slowing down and reducing the effects of climate change at a local and global level.