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Energy Efficiency & Renewable Energy Benefits

Indian Canyons Trading Post – Agua Caliente Band of Cahuilla Indians



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Overview



- Objective
- Background
- Methods
- Indian Canyons Trading Post
- History
- Renewable Energy
- Energy Efficiency
- Comparisons
- Conclusion

Objective



- Benefits of renewable energy & energy efficiency
 - Energy demand
 - Cost
 - Emissions



Background

- Global warming
- Climate change
- Non-renewable energy
- Biggest energy users: buildings
- Solutions: energy efficiency & renewable energy

Methods



- Site visit
- Approval from Agua Caliente Band Tribal Council
- Communication with tribe
- Research

Indian Canyons Trading Post

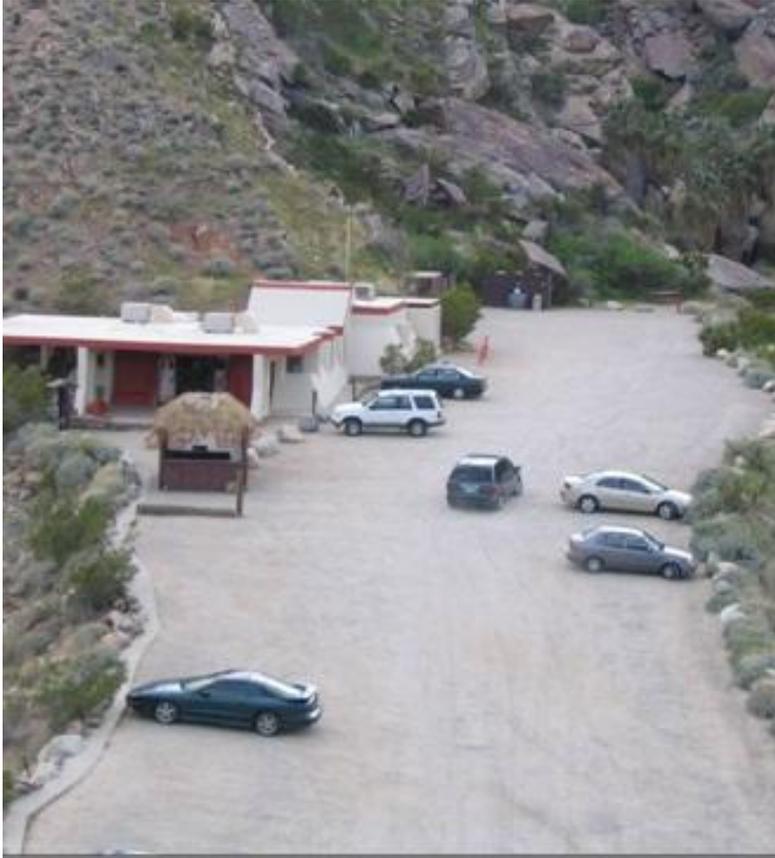


Photo showing Trading Post prior to PV installation, taken from Eastern view. Source: *Mineral Assessment Program Phase II*

- Historical site within tribal boundaries
- Situated within canyon
- Off-grid ~700 square feet visitor's center & retail shop

History

- Propane: generator, refrigerator, & freezer
 - High costs
 - Noise pollution
- 2005: DOE Tribal Energy Program Grant
 - Strategic Energy Plan
- 2009: DOI Bureau of Indian Affairs 638 Mineral Assessment Program Grant
 - Implementation

Renewable Energy

- 8.25 kW photovoltaic array
- Diesel generator back-up
- Propane designed equipment removal
- Roof repair



Picture showing Trading Post after PV installation, taken from Southwestern view. Source: Sandra Begay-Campbell

Energy Efficiency

- Electric Frigidaire Refrigerator/Freezer
- Electric Arctic Air Commercial Freezer Model
- Lights: 160w to 475w
- Toaster: 1000w to 1500w
- Two ceiling fans
- Unnecessary extra electric freezer

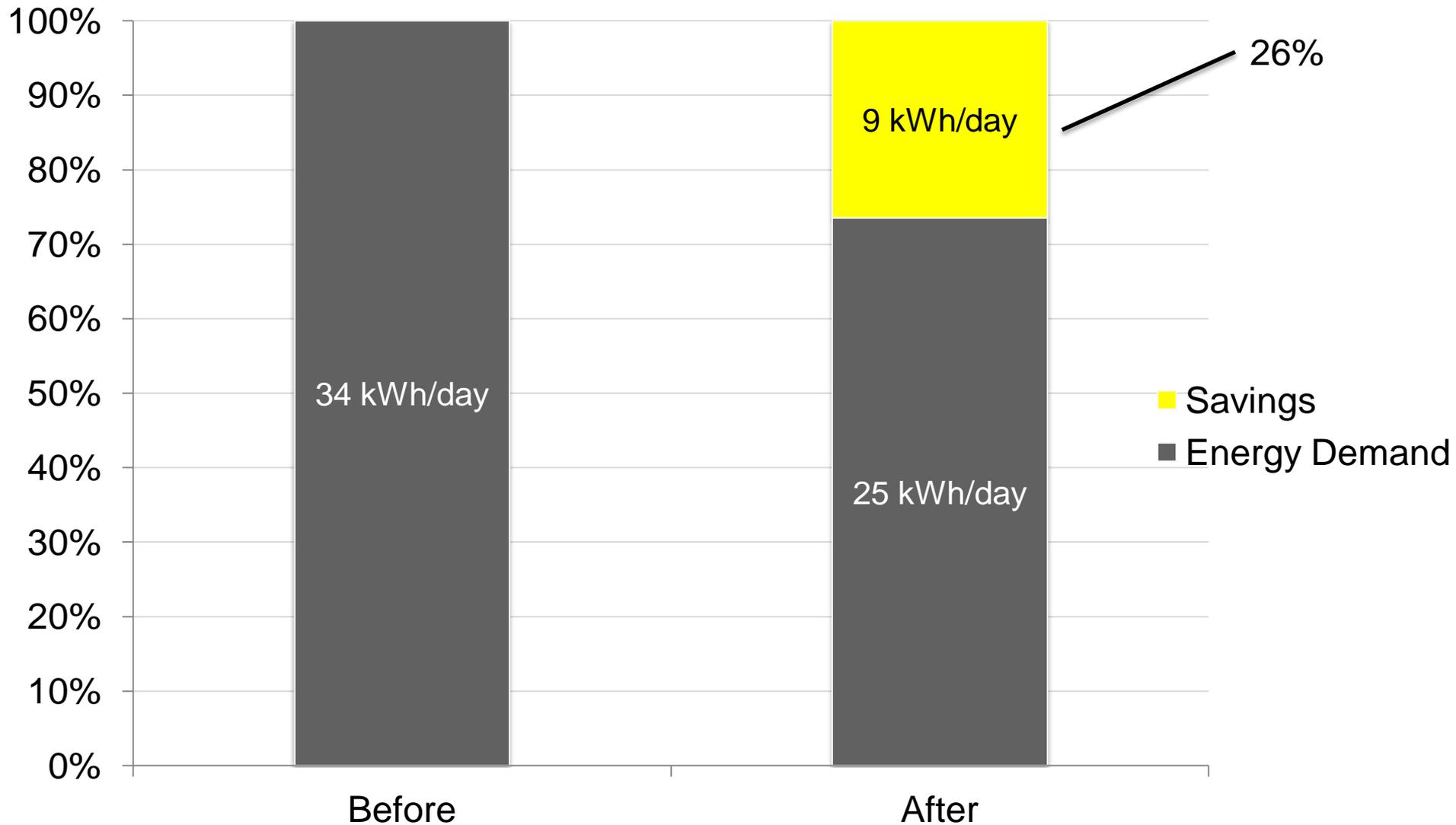
Energy Comparison



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

	Before EE	After EE
Energy Demand	34 kWh/day	25 kWh/day

Comparison of Energy Demand: Before & After Energy Efficiency Measures



Cost Comparison

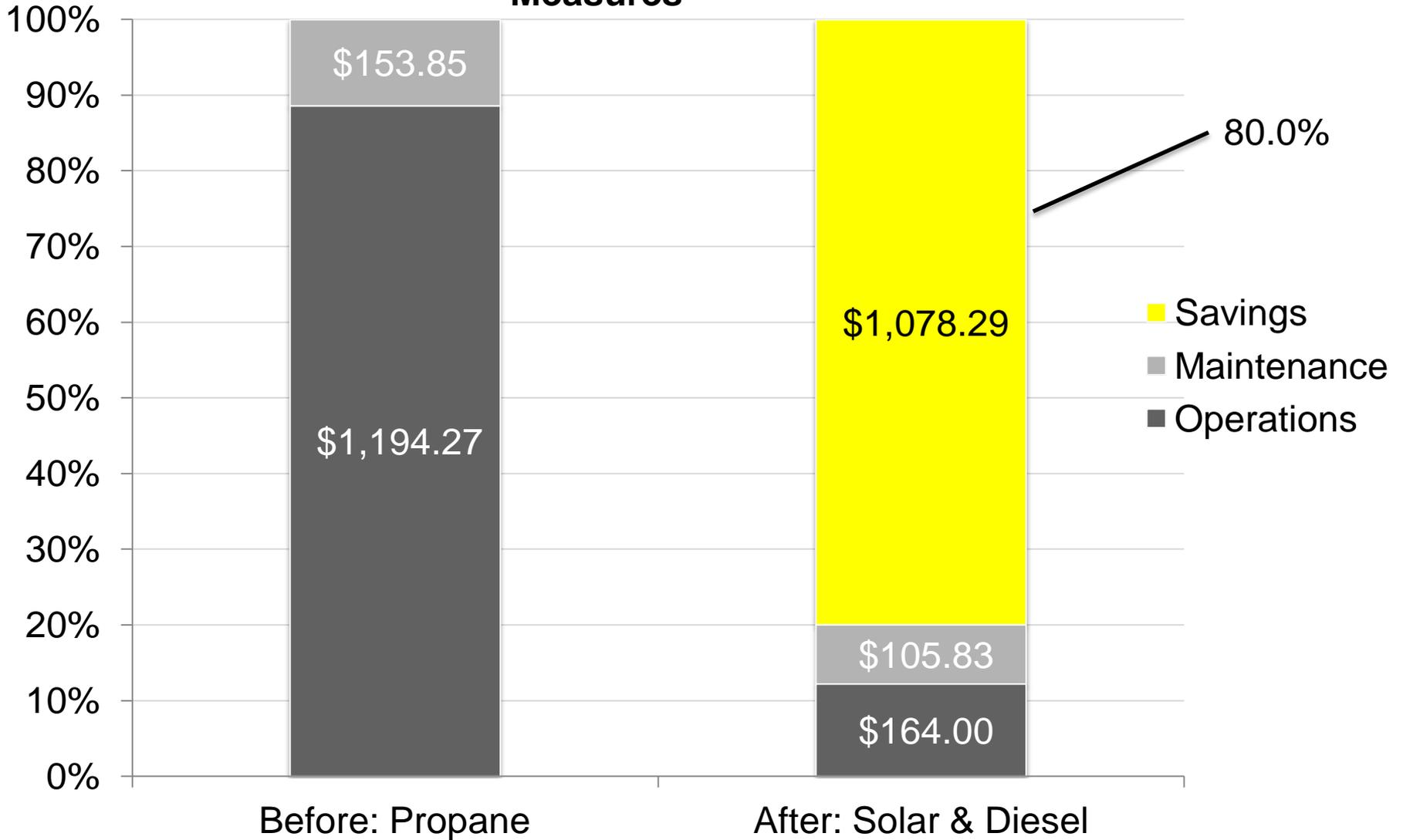


Table 2: Comparison of Off-Grid Costs Before and After Energy Efficiency & Renewable Energy Implementation

	BEFORE	AFTER	
	Propane	PV	Diesel
Operations	\$1,194.27	\$160.00	\$4.00
Maintenance	\$153.85	\$100.00	\$5.83
Total Costs Per Month	\$1,348.12	\$269.83	



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





Cost Savings

- \$12,939.48 per year
- \$129,394.80 per decade
- Initial cost of system = \$117,000
- Return on investment = ~9.5 years
- At 10 years: \$12,394.80 after investment
 - O&M costs for 3 years & 10 months

Emissions Comparison

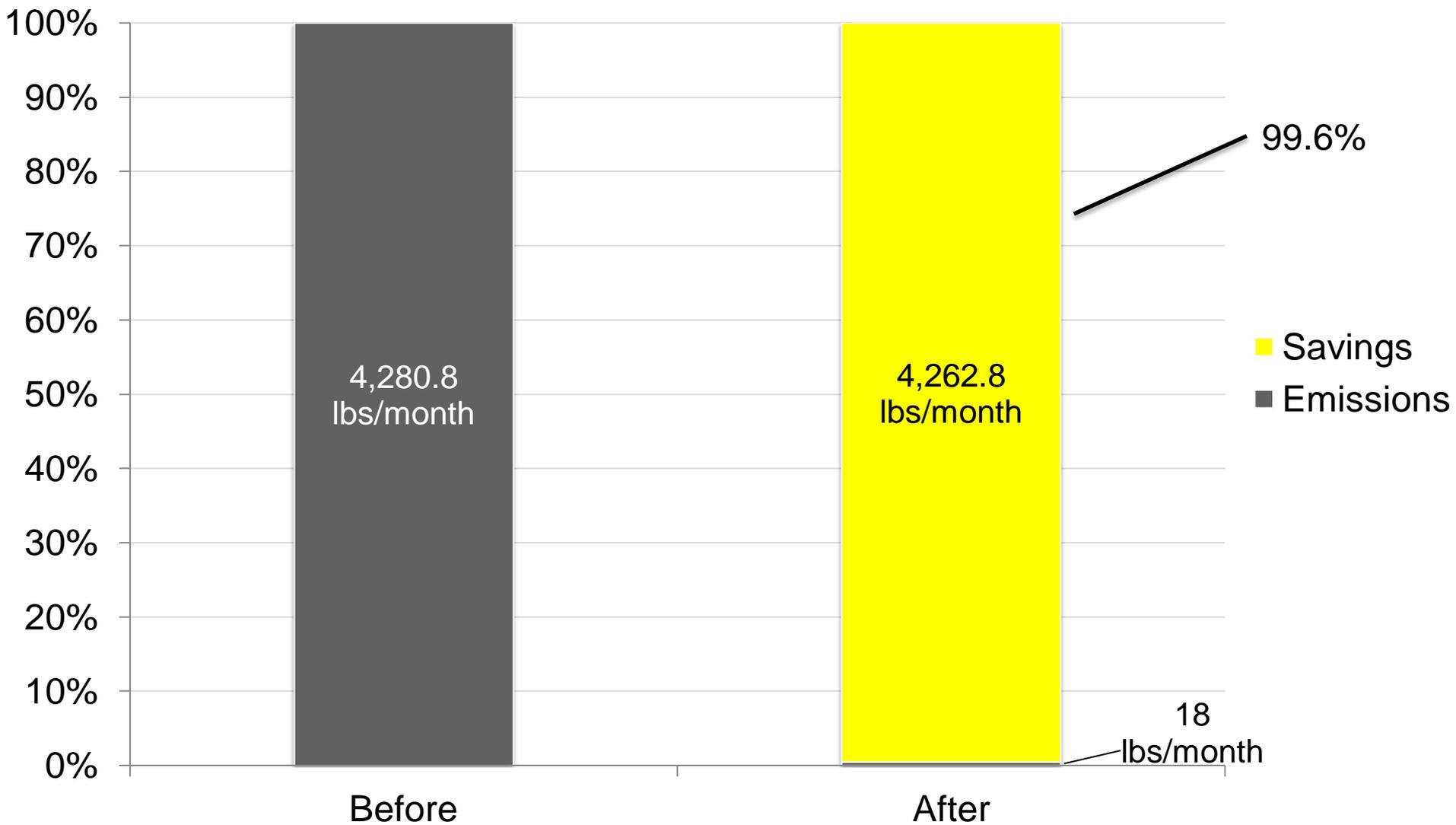


Table 3: Comparison of Off-Grid Carbon Emissions Before and After Energy Efficiency & Renewable Energy Implementation

	BEFORE	AFTER	
	Propane	PV	Diesel
Fuel Amount (per month)	329.39 gal	-	0.83 gal
CO ₂ Emissions (per month)	4,280.8 lbs	-	18 lbs

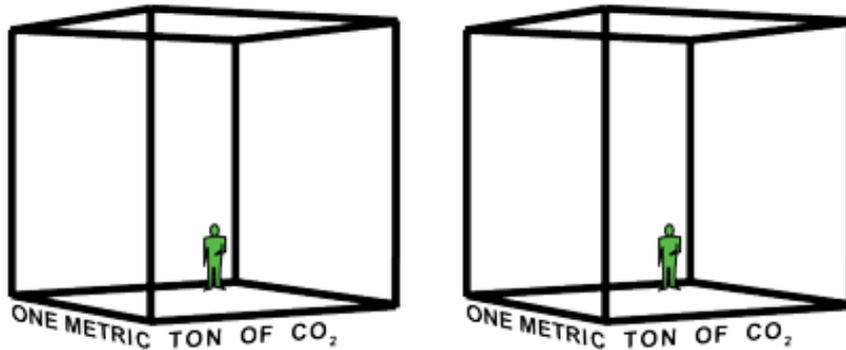


Comparison of CO2 Emission: Before & After Energy Efficiency & Renewable Energy Measures



Emission Savings

- 4,262.8 pounds = 1.9336 metric tons per month



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

- 23.203 metric tons per year

Conclusion



- Cost effective than running business as usual
- Uniquely designed systems
- Energy efficiency & conservation as 1st step
- Sustainable marketing
- Future implementation = future benefits
- Reducing effects of climate change

Before & After



Photo showing Trading Post prior to PV installation, taken from Eastern view. Source: *Mineral Assessment Program Phase II*



Picture showing Trading Post after PV installation, taken from Southwestern view. Source: Sandra Begay-Campbell

Thank You



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