

# SOLAR

## Solar Project 1

### Title

Design of a high yield integrated concentrated photovoltaic and solar thermal system that produces power and supports advanced water treatment of brackish water to serve remote and rural communities water and energy needs.

### Needs the Project Meets

Resolves a chronic water and power shortage for small remote/rural communities; introduces a viable model to meet the water and power needs of dispersed rural populations.

### Benefits of Project and Expected Outcomes

Improves public health through the development of reliable high quality drinking water and water/power for economic development. Optimized project design achieves sustainability within the capacity of population to pay operation, maintenance and replacement costs for reliable access to power and water.

- Outmigration to be reduced
- Transferrable model that can be applied in other communities
- Improved environmental impacts
- Drought mitigation
- Reduced vulnerability and risk to climate change

### Research Objectives

Define a system that integrates solar and advanced water treatment to produce (potable and non-potable) water and power to meet the demands of a small/rural community; a sustainable system within the user's capacity to pay operation, maintenance and replacement costs; minimizes waste generation and, integrates an operational system that manages the control of the cogeneration of power and water from both a demand and supply management perspective.

### Research Approach (numbered by task)

1. Analysis of (3) communities to capture a control group of poor condition, marginal condition and sustainable condition.
2. From pre-commercial and commercially available solar systems define the best energy and advanced water treatment technology portfolio as a package system to meet defined water and power demand.
3. Produce additional water as a storage of excess power produced from the solar energy system.
4. Define a control system that optimizes the operation and user data interface.
5. Define system design that minimizes brine disposal.
6. Report of findings in a Guidebook defining the planning process and system parameters.

## Estimated Project Budget and Schedule

\$520,000

## Proposed Partners

Reclamation, University of Arizona, University of British Columbia (RES'EAU WaterNet), ProDes, Kll, Inc./Suns River, and others to be defined.

## Known Prior Research on This Topic

Various

# WATER RESOURCES

## Water Resources Project 1

### Title

Desalination technologies and trace contaminants

### Needs the Project Meets

Aquifers with high salinity can also hold trace contaminants (ppb vs. ppm)

- $\text{ClO}_4^-$ , As, radioactivity, Cr, others
- Constituents could change over years of use
- Rural communities have limitations
- Impacted by recent MCLs
- Limited finances mean low technical experience
- Little funding for consultant studies
- Need assistance from Reclamation and other federal or state agencies

### Benefits of Project and Expected Outcomes

1. Rural communities
  - Education for health protection
  - Understand treatment needs and costs
  - Develop local water supplies
2. Industrial technology developers
  - Market identification