

## ACTION

### Action Project 1

#### Title

BGNDRF external actions for improved integrated renewable energy/water purification and desal research and testing

#### Needs the Project Meets

Preparing the BGNDRF facilities and test areas for accelerating research and testing opportunities with multiple groups and agencies for integrated renewable and distributed energy water and wastewater treatment for improved energy, water, and cost efficiency.

#### Benefits of Project and Expected Outcomes

Increases opportunities for additional funding and coordination of efforts with many groups

#### Research Objectives

Establish marketing, communication, and outreach plan for BGNDRF that can help coordinate funding, projects, etc. on integrated renewable energy and water treatment issues

#### Research Approach (numbered by task)

Develop a marketing, communication, and outreach plan for integrated renewable energy/water treatment research and testing

- Establish communication plan that can be used to increase knowledge about BGNDRF capabilities that includes info on testing conducted, up to date pictures, general results, etc
  - Develop communication materials for political reps, for Department of Energy/Department of Defense Environmental Protection Agency/others consideration
  - Develop groups that should be contacted and given updates: WaterReuse/American Water Works Association/American Membrane Technology Association/MSSC
- Develop outreach to other research groups including for Department of Energy/Department of Defense/Environmental Protection Agency and industry that are also looking at renewable energy and water treatment and desalination.
- Establish an integration review group to help BGNDRF make contacts with other federal agencies and industry groups

#### Estimated Project Budget and Schedule

\$0 - \$20,000

#### Proposed Partners

Develop an action team of industry, federal, and research experts to help review proposed plans and options developed

#### Known Prior Research on This Topic

Coordination is always helpful

## Action Project 2

### Title

BGNDRF internal actions for integrated renewable energy/water purification and desalination research and testing

### Needs the Project Meets

Preparing the BGNDRF facilities and test areas for research and testing of integrated renewable and distributed energy water and wastewater treatment for improved energy, water, and cost efficiency

### Benefits of Project and Expected Outcomes

- It provides an improved ease of coordination of technology testing and accelerates ability to test quickly at BGNDRF
- Provides a marketing benefit to potential users, providing ability to have results validated by independent third party

### Research Objectives

Not research objective but improves ability to accelerate testing opportunities

### Research Approach (numbered by task)

1. Develop standardized testing for integrated renewable energy/water treatment testing technologies
  - Utilize Federal Remediation Tech. Roundtable format and approach, and EPA/ETV approach as basis
2. Develop approach to provide a methodology for “performance verification” of technologies being tested and evaluated
  - Utilize EPA/ETV approach and report format as a basis
3. Develop “Master Plan” for integrated renewable energy/water treatment testing areas at BGNDRF
  - Consider layout of plumbing, electrical, communication
  - Integrate weather data collection needed with existing met station data collection
  - Consider pad and site layouts for 10-30 gpm water treatment options
  - Look at designs and layouts that will allow use of solar, wind, geothermal renewable energy considerations for water pretreatment, treatment, and concentrate management
4. Comparative analysis of technology attributes of water and energy technologies
  - Establish energy efficiency, waste energy of energy technologies
  - Establish water efficiency, waste water of water treatment technologies
  - Data can be used to help technology developers in integrating with other technologies

### Estimated Project Budget and Schedule

Up to \$30K

**Proposed Partners**

Develop an action team of industry, federal, and research experts to help review proposed plans and options developed

**Known Prior Research on this Topic**

Number of other federal programs that can be used as templates to help accelerate cost and performance assessments for technology developers

**ENVIRONMENTAL IMPACTS****Environmental Impacts Project 1****Title**

Development of cost-effective enhanced evaporation techniques

**Needs the Project Meets**

Small/stand-alone communities all around; Increases options of disposal concentrate from reverse osmosis system in inland areas

**Benefits of Project and Expected Outcomes**

Will increase water supply options for small communities by making membranes systems feasible in inland areas. It will also benefit large volume producers as well (after concentrate have been further concentrated using other techniques).

**Research Objectives**

Increase evaporation rates cost-effectively in order to reduce land areas required for final concentrate disposal.

**Research Approach (numbered by task)**

1. Set up WAIV system at BGNDRF
2. Develop/test other system that will increase surface area (continuous loop fabric system, nebulizers, etc.)
3. Investigate using solar energy to drive motors/fans as part of system

**Estimated Project Budget and Schedule**

\$500,000; two years

**Proposed Partners**

Water utilities (multistage salinity coalition)

**Known Prior Research on This Topic**

(Israeli research publications)