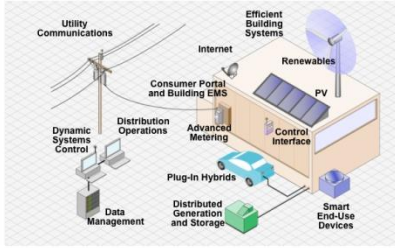


Investment in "Smart Grid" electricity infrastructure will be needed....

Freedom Field Renewable Energy Making Energy Work



Located at the Rock River Water Reclamation District
Established 2009
501 C (3) Educational
Key Volunteers

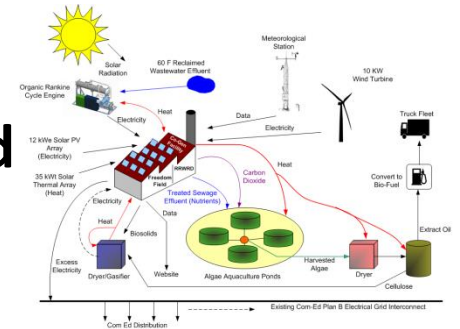




What is Available at Freedom Field

- Visual and Data Access Remote Lab
- LED Lighting Lab
- Inverter and DC Power Lab
- Energy Efficiency Demonstration Equipment
- Electrical Microgrid with Storage
- Heat Microgrid with Storage
- Remote Test and Monitoring Equipment (HOBO)
- Weather Station
- Monitored Green Roof
- DER/Microgrid and Renewable Energy Expertise
- Education, Training, and Meeting Space

Commitment to the Community
 Sponsor of Regional Energy and Sustainability Summits



Rock River Water Reclamation Leadership by Example



LEED Silver Headquarters

(CHP) Combined Heat and Power at RRWRD

- Gas Storage 432,000 Cubic Feet
- Gas Generation 400-600,000 CF per day
- Run Generators 24-28 Hours (1,2,or 3)
- Electric Value \$34,500 per month
- Water Heat 2.79 MBTU per Hour
- Exchanger Heat 1.69 MBTU per Hour



RRWRD System/Grid Integration Policy Questions



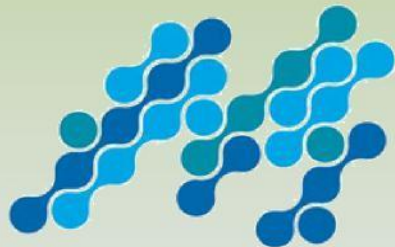
Implementing Cogeneration / CHP Projects

How do you **determine** Cogeneration **savings**
in a deregulated market ?

How do you **operate** a Cogeneration system in
a deregulated market ?

Both of questions are critical to
Implementing Effective Cogeneration / CHP

PUTTING ENERGY TO WORK



THE WATER COUNCIL

Water Energy Nexus Road Map Project

Some Technology Solutions

AC Drives

Coatings

Advanced membranes and filtration

Waste Water Treatment Chemistry Improvements

Advanced Controls

Renewable Energy Products

DER, Inverters, Sub Metering

Problems ? Opportunities ?

- Water Cycle
 - Water extraction and conveyance
 - Groundwater and surface water demand is driven by
 - Population growth
 - Economic development
 - Industrial development
 - Urban growth
 - Saline water demand driven by
 - Specialized industrial demand (mostly cooling on ocean margins)
 - Water Treatment and Distribution
 - Water Treatment
 - Environmental health and other environmental regulations
 - Increased demand for surface and groundwater (see above for drivers)
 - Desalt
 - Water scarcity
 - Demand for water supply (see above)
 - Water security
 - Climate change (more of a future issue than a present issue)
 - Distribution
 - Aged infrastructure replacement
 - Population growth
 - Wastewater Treatment
 - Population growth; MBR usually targets smaller municipalities and remote applications; conventional treatment for larger populations
 - Changing discharge regulations/permits/requirements – this is especially big in certain parts of the US, for example California