Power Purchase Agreements & Other Innovative Approaches

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By Guy Carpenter (HDR) and Mark Reader (Stone & Youngberg)
Why are we here?

The character of a society is the cumulative result of the countless small actions, day in and day out, of millions of people.

- Duane Elgin
Our Goals

- Help you brainstorm where opportunities might exist
- Leave you with a better understanding of how to fund & finance a project
- Make the connections between your concepts and a completed project
- Describe the mechanisms for funding, and the advantages & pitfalls
Your Goals

Where does your organization fall on this continuum?

Higher

- Restoration
- Design for sustainability
- Corporate social responsibility
- Integrated systems management
- Environmental cost accounting
- Resource productivity
- Reduce carbon footprint
- Stakeholder participation
- Material efficiency (recycling and reuse)
- Pollution prevention / waste minimization
- Impact reduction (EM&CP)
- Pollution control
- Compliance with regulations

Lower

Choosing the Right Shade of “Green”
What’s Your Dream?

- Energy/Facility Audits
- In-pipe turbines
- Solar panels
  - Reservoirs
  - Floating on recharge basins
  - Landfills
- Wind and wave powered desalination
- Gas powered drivers for WTP pumping
- Solar thermal desalination with combined heat and power generation
- Small scale open-channel hydro power
- Fuel cell evaluations
- Cogeneration
- Biosolids to solid fuel (EnerTech process)
- Pumped storage for hydro power generation and for desalination
- Energy Service Companies
- FOG to biodiesel
Wind Powered Desal – Large Scale

Perth, Australia:
- 10-20% reduction in rainfall in past 30 years
- Needed new water source
- Seawater Reverse Osmosis
- 82 MW detached wind farm provides renewable energy source on grid
  Wind farm: 272 GWh/year
  SWRO demand: 185 GW/year
- ERI isobaric energy recovery devices

Source: D&WR
Quarterly, November / December, 2006
Wind Powered Desal – Small Scale

- 3 MGD; Seminole, TX
- 2000 ppm TDS feed water
- Santa Rosa formation, ~1200 feet deep
- Traditional energy use for water treatment with RO - $3.10/1000 gal
- Wind energy drives the cost down to $2.60/1000 gal

Source: Michael Hightower, Sandia National Labs
Managing Biosolids: SlurryCarb

A technology that applies heat and pressure to biosolids in order to improve their mechanical dewatering efficiency.

The product E-Fuel is used as a replacement for fossil fuels such as coal.

EnerTech Environmental, Inc. 2007. All rights reserved.
Managing Biosolids: SlurryCarb

**Fuel Cost Savings**

- Total Fuel Cost Per Ton ($)
- Fuel Cost per mmBtu ($)
- Assumes 80% H₂O biosolids

**Energy Consumption**

Assumes 100 tons of biosolids at 80% H₂O

<table>
<thead>
<tr>
<th></th>
<th>H₂O Evaporated</th>
<th>Total Energy</th>
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</thead>
<tbody>
<tr>
<td>Drying</td>
<td>80 tons</td>
<td>160,000,000 Btu</td>
</tr>
<tr>
<td>SlurryCarb</td>
<td>18 tons</td>
<td>64,000,000 Btu</td>
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</tbody>
</table>

- SlurryCarb™ process requires 60% less fuel per ton compared to a conventional dryer

- SlurryCarb™
Lee County Biodiesel Processing Facility Design and Permitting Services, Florida

- HDR is providing design and permitting services for a 120,000-gallon-per-year B100 biodiesel processing facility.
- Fuel sources come from available waste vegetable oils and other potential feedstocks.
- The renewable fuel produced will be blended with petroleum diesel fuel used by the county’s vehicle fleet in an effort to reduce air emissions.
The Proper Steps

Conceptualize
- Have you performed a holistic audit/evaluation?
- What resources do you have?
- Where are your needs?
- Opportunities to connect resources to needs?
The Right Steps

- Conceptualize
- Perform Feasibility Study
  - Where can I put it / do I have enough space?
  - What partners do I have / need?
  - What benefits are gained now? Later?
  - What’s missing?
  - Understand and quantify the risks/rewards (SROI)
    - Quantify non-monetary elements
  - Determine the economics (TBL) of the solution independent of the funding & financing
The Right Steps

- Conceptualize
- Perform Feasibility Study
- Evaluate Funding & Finance Mechanisms
  - Inherent Cost Savings
    - Pay attention to effect on rate plans
    - Immediate savings may come from other part of solution
  - Federal & State Grants
  - Clean Renewable Energy Bonds (tax credit)
  - Qualified Energy Conservation Bonds (tax credit)
  - Low Cost Loans
  - Utility Credits
  - Power Purchase Agreements
Power Purchase Agreement is Last…

- Power Purchase Agreement (PPA)
  - Power provider builds infrastructure and produces energy on host’s site
  - Provider sells power to the host at a contract price for a term
  - Host may be able to purchase assets at end of term

- PPAs’ finest hour may have come and gone

- Get’s you “green”, but may not be smartest long term move

- Mark Reader w/ Stone & Youngberg is here to tell you why…