

Oh the Possibilities!

A Look at
Alternative and Innovative Sources

NHWWA Energy Symposium

Today's Topics

■ Pump Sys. Optimization

- The importance of collecting data.
- Using PSAT to identify savings opportunities.

■ Water Facility Operations

- Can yield unexpected savings.

■ Demand Response

- Improving operational integrity while reducing costs.

■ Buying Electricity in the Competitive Markets

- Introducing strategic energy procurement.

So...where do you start?



Where To Start?

Step 1 Get 'Energy Fit'

- Understand current usage
- Optimize operations
- Implement energy efficiency and load management

Step 2 Consider On-site Generation

- Solar water heating
- Geothermal heat pumps
- Solar PV
- Wind
- Other

- Demand response and strategic procurement

Step 1: Understand Your True Cost of Electricity

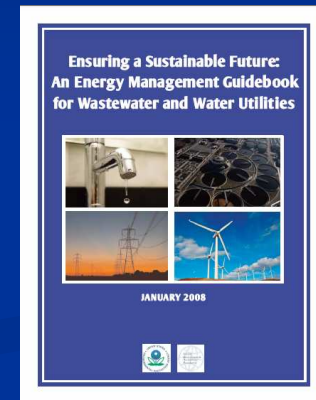
Examine your utility bills.

- Multiple components contribute to the total cost of energy.
- Two primary components are:
 - Energy Charges
 - Demand Charges
- Lowering overall energy use will reduce energy charges and may save on demand.

Step Two: Get the Most out of Every kW

Efficiency, Efficiency, Efficiency

- Planning
- Energy Audit
- Low cost / no cost measures
- Best opportunities
 - Operations
 - Processes and Equipment



www.epa.gov/waterinfrastructure/pdfs/guidebook_si_energymangement.pdf

Step 3: Smart Procurement

- Demand Response
 - Operational Integrity
 - Reduced Costs
- Strategic Procurement
 - Multiple Fuels
 - Reduced Costs

Step 4: Onsite Generation

Once your facility is energy fit, then consider on-site generation.

Some of the Benefits:

- Lower environmental impact
- Reduced pressure on the grid and public infrastructure
- Move towards energy independence – personally and nationally
- Fuel is free and inexhaustible
- Renewables are becoming more cost competitive
 - Incentives and tax credits
 - Low maintenance costs
 - Equipment carries long warranties

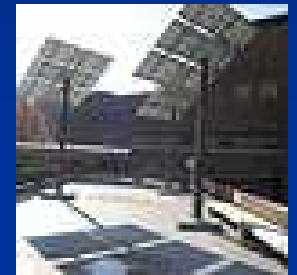
Innovative and Alternative Sources

- Clarify your objectives.
 - What is your goal?
 - How much electricity do you want to generate?
 - What is your budget?
 - Educational opportunity?
- Assess your site characteristics.
 - Solar opportunities
 - Wind
 - Geothermal

Solar PV and Water Heating

Considerations

- Does the array face south?
- Is the array shade-free *all day long*?
- How much productive space is available?
- Is your water heating load fairly consistent day-to-day and season to season?



Wind

Considerations

- Annual speeds of at least 10 mph are recommended (wind resources maps are available from the U.S. DOE)
- How much space is available?
 - Rotor Size: Usually referred to as the rotor diameter, i.e. the diameter of the circle defined by the rotating blades.
 - Tower Height: A general rule of thumb is for the bottom of rotor blades to be at least 30 ft. above any obstacle that is within 300 ft. of the tower.
- Check local ordinances



Geothermal (Ground Source Heat Pumps)

Considerations

- Best to install during construction or major renovation.
- Best applications are in buildings:
 - With fairly balanced annual heating and cooling loads.
 - That need independent climate control of many rooms.
 - Where space is an issue.
 - Where outdoor equipment poses a problem.
- System life is estimated at 25 years for the inside components and 50+ years for the ground loop.

Additional Options

- Microhydro
 - Dam
 - In-conduit
- Combined Heat and Power
- Gasification

Financing/Incentives

There are many resources available for efficiency and renewables:

- Utilities financial, technical and/or educational
- Federal tax credits
- State rebates and tax credits
- Grants – DOE
- Partners – PPAs and other third party owner arrangements

www.dsireusa.org

The Finished Picture

With an “energy fit” facility:

- You’ll know what you spend and where (energy audit, benchmarking)
- Optimize usage (efficiency & operations)
- Purchase wisely (DR and strategic procurement)
- Generate what you can on-site (renewables)
- Have taken advantage of available incentives (financing)
- Be thinking towards the future (continuous improvement).

Thank You



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