ALLIANCE TO
SAVE ENERGY
20 Years of Leadership

Kevin James

Who is the Alliance to Save Energy ?

- *NGO coalition of prominent business, government, environmental and consumer leaders who promote the efficient and clean use of energy worldwide to benefit the environment, economy, and national security*
- *Expertise in Building, Industrial, International, Financing, Utility, Policy, Market Development, and Education sectors*
- *Over 70 Alliance Associates*

Alliance Associates

3M Company
ABB
American Gas Association
American Plastics Council
Andersen Corporation
Armstrong International, Inc.
Association of State Energy Research and Technology Transfer Institutions
AT&T Foundation
BC Hydro
BP
Bonneville Power Administration
Brookhaven National Laboratory
Calmac Manufacturing Corporation
Cardinal Glass Industries
CertainTeed Corporation
Cinergy Corporation
City of Austin/Austin Energy
CMC Energy Services, Inc.
Dewey Ballantine
Edison Electric Institute
Electricity Innovation Institute
E-Mon LP
EPS Capital Corporation
Exelon Corporation
Fannie Mae Foundation
Frito-Lay
Gemstar Group
Goodman Global Holdings, Inc.
Great Lakes Window, Inc.
Hannon Armstrong
Home Depot
Honeywell
IBM
International Copper Association
Johnson Controls, Inc.
Johns Manville
Knauf Fiber Glass
Kimberly-Clark Corporation
Los Angeles Department of Water and Power
Lawrence Berkeley National Laboratory
Lithonia Lighting
Maytag Corporation
Midwest Energy Efficiency Alliance
National Grid USA
National Insulation Association
National Renewable Energy Laboratory
New York State Energy Research and Development Authority
Nexant, Inc.
North American Insulation Manufacturers Association
Oak Ridge National Laboratory
Ontario Power Generation
OSRAM SYLVANIA
Pacific Gas and Electric Company
Perseus, LLC
Polyisocyanurate Insulation Manufacturers Association
Qualmag, Inc.
Sacramento Municipal Utility District
Sandia National Laboratory
SchlumbergerSema
Sears, Roebuck and Co.
Sempra Energy
Solar Energy Industries Association
Southern California Edison
Spirax Sarco
Swagelok
Tennessee Valley Authority
Texas A&M University – Energy Systems Laboratory
Texas State Energy Conservation Office
Turbocor, Inc.
Viterra Energy Services AG
Washington Gas
Whirlpool Corporation
World Wildlife Fund
Xenergy, Inc.

Problem

Municipal water utilities are not fully taking advantage of cost effective efficiency measures to minimize their energy and water waste.

Why Is this Important?

- ***Water Equals Energy***
- ***Environmental Benefits***
  - *Reduced strain on ecosystems*
  - *Reduced air pollution from energy*

Air pollution produced per 1000 gallons treated in Austin, Texas:

Air pollution for Power use for Water and Wastewater Treatment Based on Austin Mix of Power Generation					
Pollutant	SO_2	NOx	Particulates	CO	CO_2
Grams/kWh*	1.58	1.22	0.13	0.16	540.0
Grams/1000 Gal.	6.2	4.8	0.5	0.6	2,277.3

*includes 7% line loss

Why Water Efficiency?

- ***Social Benefits***
  - *Lower water cost improves access*
- ***Economic Benefits***
  - *Often costs less to save a gallon of water than pump an additional gallon (ie Toronto efficiency = 1/3 cost of additional capacity)*
- ***Future Water Supply Issues***
  - *In many parts of the country, water Supplies being depleted faster than they can be replenished*

The scope of the opportunity- The Case of the State of Texas

- ***Background***
  - *Dry climate and limited water resources*
  - *Encompasses 261,914 square miles*
  - *20.1 million people.*
- ***Water and Electricity usage***
  - *2.5 kWh -4.0 kWh per 1000 gallons pumped*
  - *Nearly 3.0 billion gallons total of treated water*
  - *Total electricity usage between 2.8-4.8 billion kWh/year*
  - *Costs of $180-288 million yearly for electricity*
  - *An additional 0.02 to 0.10 kWh/1,000 gallons to produce chlorine and other water and wastewater treatment chemicals*

Potential Energy and Water Savings by Sector in Texas

- ***Water Utilities***
  - *By reducing utility loses by an amount equal to 5% of water distributed, Texas could save over 100 million kilowatt hours of electricity annually with a cost savings of approximately $7 million.*
  - *Energy efficiency improvements of 10% in the delivery system could save an additional 300 million kilowatt hours.*
- ***Residential***
  - *Studies conducted in Texas and supported by other sources highlight the opportunity for reductions of between 10% to 20% in residential water usage. If hot water usage was reduced by just 10%, Texas would save annually one billion kilowatt hours of electricity and 7 billion cubic feet of natural gas.*

Potential Energy and Water Savings by Sector in Texas

- ***Industrial***
  - *Currently, the industrial sector uses 2.8 billion gallons of water daily and has pumping and treating energy requirements of 0.5 to 2.0 kilowatt hours for every 1,000 gallons used. Reducing this amount by even 10 percent would save around .5 million kilowatt hours a year.*
- ***Conclusion***
  - *By striving to meet even very modest efficiency targets, Texas could not only improve its water resource situation, but could also plan on cost effectively saving 1.4 billion kilowatt hours and 7 billion cubic feet of gas.*

The Solution-Watergy Efficiency

WATERGY ***Efficiency***

Watergy Efficiency seeks to cost effectively deliver water services while minimizing water and energy use.

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Supply Side Efficiency Measures

Water supply systems offer multiple opportunities to directly reduce water and energy waste while better serving the customers' needs

•Leak and Loss Reduction
•Operations & Maintenance
•Pumping systems
•Primary/secondary wastewater treatment
•Pump systems

+

Demand Side Efficiency Measures

Consumers
Residential/Industrial

Reducing demand by helping the consumer use water more efficiently decreases the required water supply saving both energy and water

•Water efficient household appliances
•Low-flow toilets
•Low-flow showerheads
•Industrial water reuse
•Leak and water waste reduction

+

Comprehensive Demand Side/Supply Approach Synergies

Looking at a water system comprehensively and making sure efficiency projects are designed in tandem creates even greater efficiency opportunities

•Right sizing pump systems after reducing consumer demand
•Avoided wastewater treatment by promoting reuse and reducing demand

What can Municipalities do to Promote Watergy Efficiency?

- *Create management infrastructure*
- *Expand water metering and monitoring systems*
- *Develop baselines and metrics*
- *Carry out facility assessments*
- *Establish goals and benchmark success*
- *Develop an action plan for addressing waste*
- *Seek outside assistance*
- *Mobilize community action*
- ***Management and leadership are key***

Coordinating Supply Side and Demand Side Action

- *Supply Side*
  - *leaks*
  - *low c-value (high friction) for pipes*
  - *improper system layout*
  - *system over-design*
  - *incorrect equipment selection*
  - *old, outdated equipment*
  - *poor maintenance*
  - *wastage of usable water*
  - *inefficient pumps and motors, correcting power factors*
- *Demand Side*
  - *Ultra-Low Flow Toilets*
  - *Toilet Dams or other water displacement devices*
  - *Low-Flow Showerheads*
  - *Efficient Faucet Aerators*
  - *Efficient Clothes Washers*
  - *Xeriscaping*
  - *Drip Irrigation*

Supply Side- Identifying Savings Opportunities

- *Create/Expand Water Metering and Monitoring System*
- *Develop a Baseline and Metrics*
- *Carry Out Facility Assessments*
- *Identify and Procure the Proper Measurement Instrumentation*
- *Look to Create Goals and Benchmark Success*

Supply-Side Savings- Trumbull, CT

- ***Problem**- Sewage pumping station wasting energy with frequent breakdowns*
- ***Solution**-Replaced two intermittently operating 40HP pumps with one 10HP pump that operates more regularly*
- *Results-*
  - *44% energy use reduction*
  - *Reduced maintenance cost $6200/year*
  - *Increased system capacity 25%*

Producing Energy From Waste- Des Moines, Iowa

- *Anaerobic digesters produce and average of 26,200ft3 of methane gas that fuels three 600kW engines*
- *Heat from the engines is used to heat the buildings during winter and preheat sludge entering the digester*
- *Dewatered solid by-product is used as fertilizer*

Residential Demand Side Approaches

- Water audits
- Water efficiency kits
  - Toilet water displacement bags or toilet dams
  - Leak detection tablets
  - Low-flow faucet aerators
  - Low-flow showerheads
- Rebate/Installation Programs
  - Low-flow faucets
  - Ultra–low flush toilets
  - Efficient washing machines in apartment buildings

Industrial Demand Side Approaches

- *Water Audits*
- *Capacity Buy Backs*
- *Water Reuse-*
  - *Austin,Texas is developing an entire piping system for this recaptured water to be used in a large variety of industrial and irrigation purposes throughout the city saving 150 million liter per day*
  - *California reuses over 160 billion gallons of water for irrigation and industries*

Demand Side Policies

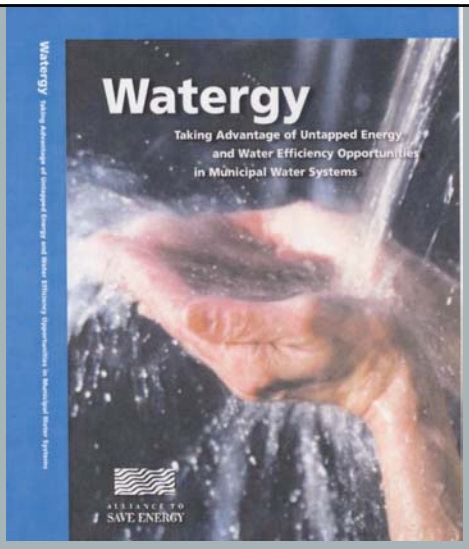
- *Proper Pricing and Revenue Generation-*
  The prices charged customers should reflect as closely as politically possible the cost of providing the water
  - *More efficiently meet the demands on the system,*
  - *Maintain sufficient revenue and recover costs for the company*
  - *Send true price signals to water users to promote cost-effective efficiency measures*
  - *Allow customer to make payments comfortably*
- *Building Codes/Equipment Standards*
- *Tax Incentives*

Demand-Side Action Case of Toronto Canada

- ***Goal-*** *Reduce peak water demand and waste water treatment by 15 percent (220 million liters per day) by 2015*
- ***Motivation****- Demand is predicted to outstrip supply in 10-15 years dictating the need for costly infrastructure investments*
- ***Process-*** *Created a cross sectional water efficiency team with both demand and supply side expertise*

Case of Toronto Canada

- ***Actions***
  - *Leak reduction program- reduced 30 million liters per day*
  - *Low flow toilet installation program*
  - *Horizontal Washing machine program*
  - *Industrial capacity buy-back program*
- ***Results***
  - *Efficiency measures cost 1/3 of building new capacity*



www.watergy.org

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