“Sustainability Incentives for Water Utilities”

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Sustainability Defined

- Iroquois Nation

  Impact on the Seventh Generation

- Brundtland Report

  Operating without compromising future generations' opportunities to operate

- Idaho Power Company

  Sustainability is sound and enduring financial, environmental, and social stewardship

Water Distribution Systems

- Water distribution systems are complex:
  - Multiple primary and booster pumping stations,
  - Reservoirs
  - Varying consumption profiles affected by customer usage and geographic location

Efficiency Opportunities

- Add VFDs to strategic parts of the system that are currently using throttling valves, pump bypass, or other energy-wasting methods to control system flow.

- Since these systems typically have wide swings in demand, energy can be saved by slowing down pumps via VFDs rather than running pumps full out and using throttling valves to control flow rates.

Efficiency Opportunities

- Pumps follow the affinity laws: power is cubically related to flow. Example: If a pump slows down 50% the power goes to 0.5*0.5*0.5 = 12.5% new power consumption

- First check with your electric utility's harmonics regulations which often reference IEEE519 and usually require some level of harmonic mitigation device installation in addition to the drive itself

Efficiency Opportunities

- Replace standard efficiency motors with premium efficiency motors and existing pumps with higher efficiency pumps.

- Many times this equipment is in service 20-30 years or more and even small increases in efficiency can lead to large gains over the life of the equipment.

Efficiency Opportunities

- The main purpose of water distribution systems is to transport water from one place to another so the major variable affecting system energy consumption is pressure drop also known as system head.

- Anything that can be done to reduce pressure drop within a system will save energy:
  - larger pipes,
  - less pipe fittings,
  - utilizing gravity wherever possible,
  - designing pump stations near point-of-use

Efficiency Opportunities

- Time-of-use rates: Electricity is priced differently depending on the time of day or time of year.

- Opportunity to use large storage reservoirs which can be filled with electric pumps when energy is cheap, and released using gravity to convey the water during more expensive energy times to potentially avoid using electrically operated pumps.

Efficiency Opportunities

- Basic office retrofits:
  - Lighting
  - Lighting Controls
  - Plug Load/Phantom Load

- Refer to your utility's website for information on assistance and incentives

Final Advice

- Call your utility first to discuss potential projects and savings/incentives