



American Water Works Association



Water Sector Meeting with the Honorable Ernest Moniz, Secretary of Energy

September 7, 2016

Energy and Water Sector — Challenges and Opportunities

Challenges and Opportunities: There are numerous energy and water management challenges and opportunities in water supply, treatment, and resource recovery, including:

- ✓ Legislation, policy, and regulation that support life cycle environmental responsibility
- ✓ Alternative Water Resources, Availability and Demand, Treatment
- ✓ Emerging Technologies and Processes
- ✓ Energy Efficiency, Water Conservation, and Demand Response
- ✓ Energy Recovery and Generation
- ✓ Climate Change Impacts
- ✓ Reliability and Resiliency
- ✓ Systems Complexity, Regional Challenges

Policy, Regulation, and Integrated Planning; Life Cycle Environmental Responsibility

- ✓ Water system processes and technologies designed to meet water quality regulations can be energy intensive, and not complementary to greenhouse gas emission reduction and air quality requirements.
- ✓ Wastewater from coal, oil, and gas production can result in drinking water source water quality and treatment issues.
- ✓ National policies and incentives are needed that can help municipal water utilities overcome their risk averse culture to implement projects and remove barriers for small distributed energy generators at water utility facilities to develop renewable energy projects (e.g., hydro, wind, biogas).
- ✓ Shared systems analysis would be valuable to the water, energy, and agriculture sectors.
- ✓ Co-locating facilities can result in beneficial uses.

Alternative Water Resources, Availability and Demand, Treatment

- ✓ Both the water and energy sector are using nontraditional water and finding beneficial uses for produced water. These technologies and innovative processes are applicable to both sectors.
- ✓ Fit-for-purpose treatment and regulatory structure can be developed to support energy and water optimization.
- ✓ A watershed approach is needed for water supply planning, demand management, and treatment, accounting for all beneficial uses of water supply.
- ✓ For water supply planning, water and electric utilities can develop and test new hydrologic models that account for land use and climate

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Emerging Technologies and Processes

- ✓ Synergies of technologies being researched and developed for energy and water can serve both sectors.
- ✓ Investments can be made to research innovative and emerging technologies such as membranes, membrane bioreactors, microbial fuel cells, and LED UV lamps, and processes such as odor control, deammonification sidestream processes, water reuse, and residuals management.
- ✓ Co-digestion of high-strength waste in anaerobic digesters is a proven valuable approach for energy conversion. Additional research is needed on enhancing and optimizing carbon management, advancing low energy alternatives to typical nitrification/denitrification processes for nitrogen control, gases separation, and developing technology to extract more energy from biosolids.

Energy Efficiency, Water Conservation, and Demand Response

- ✓ Opportunities exist to improve pump design and operation efficiencies, since pumping accounts for up to 80 percent of energy demand for water utilities.
- ✓ Improved demand management, energy tracking, and smart metering in water treatment facilities will help inform and manage energy use.
- ✓ Opportunities and incentives for investing in mutual energy and water conservation would benefit both sectors.
- ✓ Opportunities exist to improve anaerobic wastewater treatment technologies, since aeration often accounts for over 50 percent of energy demand at water resource recovery facilities.

Energy Generation

- ✓ There are 13 water resource recovery facilities that have achieved energy neutrality, 9 of which are in the United States. With incentives and research, there is the possibility to convert more of the 16,000 treatment plants in the United States.
- ✓ Opportunities exist to develop and improve recovery of thermal energy from wastewater.
- ✓ Capturing tidal energy can be explored for use in desalination facilities.
- ✓ The Energy Information Agency should track data on biogas generation at wastewater plants in the same manner as other renewables (i.e., landfill gas).

Climate Change Impacts

- ✓ Development and testing of new hydrologic models that integrate different climate change scenarios are needed to be responsive to challenges faced by both the water and energy sectors in future water resource planning.
- ✓ Climate change is impacting the availability, quality, and quantity of water supplies, which affects energy systems and needs to be effectively addressed with new approaches to technology, policies, and markets.

Reliability and Resiliency

- ✓ Reliability and resiliency are critical in the water and energy sectors for protection of public health and safety, the risks of which need to be assessed and mitigated especially within the context of water availability, climate change, and carbon footprint.

Systems Complexity; Regional Challenges

- ✓ Regional water and energy systems can be complex with local challenges specific to the region. Data and analysis are critical to inform understanding and opportunities of impact and interactions between the energy and water sector to identify regional solutions.