The Join Staff of the U.S. Senate Committee on Energy and Natural Resources

Roundtable on the Energy-Water Nexus with Non-Governmental Organizations

Summary Report

August 14, 2013

On July 11, 2013, in Washington, DC, select staff from the Senate Committee on Energy and Natural Resources convened representatives from the energy and water sectors, environmental groups, researchers, and academics to participate in a roundtable discussion on energy-water issues. The discussion was organized around four themes: data; research, studies, and assessments; incentives and barriers; and roles and responsibilities.

Data

This portion of the discussion addressed the availability of data related to water for energy and energy for water. Participants[1] at Roundtable No. 1 identified a number of data gaps and needs; some participants also discussed the need to identify purposes for which data are collected. Some of the overarching themes of the discussion were: desired data and related federal funding constraints, benefits of standardization and simplification of data collection and sharing, and centralized data warehousing.

- **Data of Higher Quality & More Consistent Reporting and Dissemination Needed.** Participants expressed interest in: higher quality data, more recent data, and new data.
  - Participants made numerous recommendations and observations, including:
    (1) higher quality of data on power plant water and reporting on water-related power plant incidents (e.g., curtailments) are needed;
    (2) consistent and reliable data on energy use by water utilities is needed; participants recommended a standard form to facilitate consistent water utility self-reporting;
    (3) data on the rates of water reuse and replacement (i.e., substituting freshwater with impaired water) in energy extraction and the associated costs are needed;
    (4) more data on water associated with biofuels are needed;
    (5) data should be able to be organized for use at the watershed level, and more data are needed on surface and groundwater availability, especially at the watershed level;
    (6) better differentiation between the different types of water (e.g., saline, oil and gas produced water, groundwater) is needed during data collection and analysis.
  - Participants also expressed support for federal funding of data collection. Reduced or less than full funding for programs already authorized to conduct some of energy-water data collection was noted (e.g., USGS water use and water census data collection). Participants suggested that the government has the means to improve data

[1] Participants refers to the invited representatives, not the congressional staff or CRS staff in attendance.

quality and data dissemination (e.g., requiring NSF grants recipients to discuss data quality and have dissemination plans).

- **Centralized Data Warehousing & Data and Methodology Standardization Needed.** Multiple participants noted that, while there are data gaps, a lot of information is available, but expressed frustration with: data stored in many different locations and in many different formats, which discourage their full use.[2] Developments of standards, protocols, and methodologies were identified as a priority.[3]

Research, Studies, and Assessments

This portion of the discussion focused on energy-water research, studies, and assessments. Participants identified a number of areas warranting research and federal involvement; some expressed a need to identify goals and priority for the energy-water research agenda. Participants noted the energy-water-food-land nexus as a priority research area for the sustainability of the nation. Participants noted that paths forward for research have been proposed by various stakeholders, and these may be useful resources.[4] Some of the overarching themes of the discussion were:

- **Research to Improve Decision Making is Needed.**
  - Participants recommended research supporting more informed and integrated decisions: research to inform development of regulations (e.g., building codes); integrated resource policy analysis (including within agencies) to inform federal agency decisions; research integrating energy-water concerns with data and research on climate change mitigation and adaptation (e.g., water use associated with carbon capture and storage; disaster preparedness in the water sector); research to identify energy generation opportunities within the water sector; and research to quantify the value and the cost of water.
  - Participants recommended a research agenda that identifies and focuses on stress points where energy sector-water issues are of particular significance (e.g., grid reliability security concerns) and technology that is scalable and place-based.
  - Some also raised the need to examine and research impacts of energy policy on water withdrawal and consumption.
- **Integration of Industry into the Energy-Water Research Effort is Recommended.** Participants expressed support for more federal partnership with industry on research, and encouraged federal leadership on research in early stages of development of key technologies (e.g., advanced power plant cooling technologies). Participants indicated

[2] Participants made numerous recommendations, including: (1) consolidating data and studies in a few locations and standardizing data collection, access, and formatting; (2) developing means to have academically generated data and knowledge warehoused with the other data sources; (3) promoting a standard methodology for measuring "embedded energy" (e.g., agreed on practice for accounting for the energy-intensity of delivering water). Some participants suggested a hesitancy to initiate new data collection efforts, so facilitating collection through websites, software platforms, standardized formats, and best practices policies for data management may increase willingness.

[3] Multiple participants identified the role and the process that the National Institute of Standards and Technology utilizes, as either the forum or as a useful model for development of energy-water data standards.

[4] For example, in July 2013, the Alliance for Water Efficiency and the American Council for an Energy-Efficient Economy released a report, "Water-Energy Nexus Research: Recommendations for Future Opportunities." Its recommendations include: collect embedded energy in water data to determine the impact nationally of energy use in the water sector; conduct detailed audits of embedded energy demands for an entire water and wastewater system; identify regulatory barriers to co-implementation of energy and water efficiency programs; develop water and energy industry accepted protocols for efficiency programs; and assess potential impacts to water supplies and quality from energy resource development and identify solutions to mitigate these impacts. The report is available at: http://www.allianceforwaterefficiency.org/WE-WhitePaper-PR.aspx.

support for federal research that illustrates the return on investment of energy-water efficiency actions and technologies, and encouraged a federal role in the scaling up and demonstration of efficiency technologies. A participant identified that private sector businesses have been conducting vulnerability assessments of business operations to water and energy, but noted that this research and data has not been made publically available for wider use and analysis.

Incentives and Barriers

This portion of the discussion addressed questions concerning barriers and incentives for water users to adopt more energy-efficient practices and technologies and for energy users to adopt more water-efficient practices and technologies. Participants identified a number of barriers, many of which apply both to water users and energy users.

- **Cost barrier.** A significant barrier is the cost of investing in new technologies (especially when existing technologies or options are cheaper). A related financial barrier is the way that many companies and utilities structure their capital and operation and maintenance (O&M) budgets, because investments in expensive water- or energy-efficiency technologies are typically funded through capital budgets, which are more complicated than if the investment were included in an O&M budget.
- **Information barrier.** Multiple participants identified lack of information as an important barrier. In general, public knowledge about water- or energy-efficient technologies is lacking, and could be improved through awards, recognition, and education and awareness programs. Labeling and voluntary certification programs such as Energy Star and WaterSense are good ways to increase efficiencies by giving information to users. One participant suggested that an Executive Order on water efficiency similar to the existing Executive Orders on energy intensity in federal buildings (E.O.'s 13423 and 13514) would be helpful. Participants identified several types of incentives that could address some of the barriers that they cited. For example, economic incentives or regulatory incentives such as accelerated permitting could help adoption of new technologies. Rebates for consumers are helpful economic incentives. Speakers noted that water is not priced correctly, thus giving incorrect price signals to users. Another type of information barrier concerns the scale of data and information that are generally available. Information on energy and water use typically is confined to a county or state-level. Real-time information on a larger watershed basis, such as the Mississippi River Basin, is not available, making it difficult to manage or think about energy and water use on a larger scale.
- **Need to partner with industry.** Research to develop information to implement new technologies is critical, one participant said, but the research program should not have its own barriers. Although basic research is important, a barrier to introducing new technologies is failure to partner basic research with demonstration projects with industry in order to integrate technologies into utilities. There may be opportunities for public-private partnerships to advance this type of research.
- **Using regulatory authority to limit water withdrawals.** Some participants said that there are instances in which it is appropriate to use regulatory levers. For example, in water-short areas or regions that experience prolonged extreme weather events, regulatory authority may be needed to limit total water withdrawals. The barrier in this case is that there are no regional regulatory bodies that deal with water quantity that are

equivalent to, for example, regional air pollution control agencies, which can require pollution control reductions from polluting sources.[5]

- **Water utilities face additional barriers.** Additional barriers are apparent concerning water utilities, which are local and fragmented, in contrast to electric utilities. Because most water utilities are municipally owned and operated and serve small, local populations, their fragmentation is a barrier to acceptance of new ideas. Although there is a national framework for addressing energy and power issues, there is no similar framework or common forum on water quantity. Other barriers exist that present challenges to water utilities. Financing is one such barrier, because it is difficult to get private capital into publicly owned water utilities. Decentralized regulation is another barrier (e.g., dealing with multiple local, state, and federal authorities separately for water withdrawal, water discharge, and air emission permits). Inconsistent state regulatory policies are a third barrier. For example, some states credit energy that is generated at a wastewater treatment plant towards the state's renewable portfolio standard, but others do not. The energy recovered from wastewater could be used, but instead may be flared and wasted.

Roles and Responsibilities

This portion of the discussion considered what role the federal government should play in gathering and analyzing comprehensive energy-water data and information, and if there were an energy-water clearinghouse, what should be its principal role(s) and priorities and how should it function. During Roundtable #1, the issue of the federal role had been addressed in connection with other topics, as well, for example concerning the need for improved data quality, standards, and metrics for measurement.

- **Defining the federal role.** Because water is a local and regional issue, there was a lot of discussion about what the federal role should be. Numerous views were expressed, including suggestions that the federal government could house data on energy and water use and could encourage data sharing. Several said that the federal government can provide funding for applied research and could build integrated funding sources, because federal agencies can bring in partners and divide up responsibilities. Others said that the federal government could leverage funding and provide synergy for public-private research partnerships.
- **Federal government can lead by example.** On an operational level, the federal government can lead by example. For example, regarding oil and gas activities on federal lands, the federal government can define best practices on water use. If the practices are well designed, industry will adopt them and spread their use beyond federal lands.
- **Organizing federal agencies is a challenge.** How the federal role should be organized regarding energy and water issues invited multiple suggestions to improve communication and coordination. One participant pointed out that there are 26 federal agencies with some responsibility for water. A single agency to manage all aspects would not be feasible, but speakers agreed that organizing into fewer organizational "silos" would be good. For example, organizing agencies into two or three groups (e.g., an electric power group, a biofuels group, a transportation fuels group) would improve coordination within the groups. Another suggested directing the White House Office of Science and Technology Policy (OSTP) to coordinate all agencies. Others said that the U.S. Energy Information Administration (EIA), which already collects energy data, would be a good model for gathering water data from the U.S. Geological Survey

[5] One participant noted that water use is not cohesively regulated in the United States and said that it is time to do so.

(USGS), National Institute of Standards and Technology (NIST), and others. Other suggestions included: after data are collected, DOE should be required to analyze water data; DOE and the Environmental Protection Agency (EPA) should be directed to evaluate the impact of their regulations on water use, which neither agency does now.

- **Possible models for a clearinghouse.** Discussion about what would be a good model or framework for a clearinghouse or other mechanism to engage all sectors and foster partnerships, conversation, and diffusion of new technologies led to several suggestions. As an example, one person described an existing group from DOE, EIA, and USGS that is working on improved data collection. Another cited example was OpenPV, a collaborative effort to compile a database of information on solar photovoltaic installation in the United States that is facilitated by the National Renewable Energy Laboratory (NREL). One speaker advised to avoid creating a water-energy czar or an entity that could implicate land-use planning. Others suggested possible models of reaching beyond government to help guide policy creation in the federal government, such as the Secretary of Energy's Advisory Board, the National Petroleum Council, or the group that was convened to develop a National Ocean Policy. Finally, one person noted that whatever approach is developed needs to involve all states, such as through state water resource research institutes.