EASTERN REGION
ENERGY-WATER NEEDS WORKSHOP
EXECUTIVE SUMMARY

SCOPE

The objective of this summary is to set out findings from the Eastern Region Energy-Water Needs Assessment Workshop for the management of both quality and quantity of our water resources as they relate to energy production and energy security.

This assessment is one step in the process of reviewing a set of data and the current practices and institutional management of water for energy in the United States for a technology roadmap. The intent of the Energy-Water Technology Roadmap is to ensure that regional plans tie into national technology transfer measures that address energy-water sustainability issues and targets.

The geographical area for this conference covered twenty-two states, the nation's capital, and two territories. The professional backgrounds and areas of subject matter expertise varied from power utility operations, water management, agricultural science, regulatory and policy specialists, environmentalists, state and federal agencies, tribal government, architectural, engineering and consulting firms, and national labs and universities that conduct research specific to water and energy concerns. The Demographic Analysis provides a detailed description of those who attended this conference. E-mail addresses are listed on the web site at the See Who Attended link.

PURPOSE

Each of the regional Department of Energy (DOE) Energy-Water Workshops was conducted to assess energy and water issues, and then to develop science and technology priorities.

Provisions in the U.S. Energy Policy Act of 2005 established DOE's role in energy and water-related issues. Currently there is no national research program that focuses explicitly on understanding the relationship between energy and water. DOE provided funding so that professionals could identify energy-water interdependencies, trends, and issues in energy and water use and production in order to answer a very specific question: *Will a stable, affordable supply of water exist to support the nation's future electricity demands?*

METHODS

The Executive Committee shared a list of potential conference attendees with the Energy-Water Workshop Project Leader. Each regional workshop leader then developed other contacts from the energy and power industry as well as water managers. Professionals were contacted in person, by a mail-out invitation (Eastern Region ONLY), by telephone, and by e-mail. Interested participants used the on-line process at the website to register for the conference. The workshop planner also permitted onsite registration.

Each regional workshop convened for two days. The sessions began with a review of emerging water and energy issues, trends, resource needs, projected availability, and a discussion of the intent of the Energy-Water Technology Roadmap process.

In the East, the plenary session included speakers who addressed modeling, the basic operations of a power plant, use of impaired water for power plants and in the extraction industry, agricultural and recreational use of water. The abstracts and/or plenary presentations for the region are available at this web site.

Participants were divided into five different Breakout Groups according to their professional backgrounds or interests. A facilitator and a note taker were assigned to each group for both days. On the first day of the workshop, the participants were asked to use the Energy-Water Workshop Matrices to define short-term and long-term problems with respect to the nation's energy supply and water supply. On the second day, the Breakout Group members identified needs and suggested solutions or improvements for the problems identified in the earlier meeting. The Summary Spreadsheet of the Workshop Discussion section of this report identifies the problems, needs, changes in energy and water technology applications, natural resource management, and policies to ensure reliable, secure, and sustainable water and energy supplies.

This site tracks those who visit the regional Energy-Water Workshop websites with a detailed site meter.

RESULTS

The real-time notes, flip chart documentation, informal end of session presentations, and the principal facilitator synopsis and notes are included in this summary. This information is posted according to each Breakout Groups A, B, C, D, and E. To encourage full expression and contribution, workshop participants were promised anonymity for information dissemination. Except where reference material was volunteered or the impromptu end of session presentations, there are no attributions for comments. Abbreviations and acronyms are listed for each group discussion. Participants were encouraged to rate the meeting, give feedback and make comments and suggestions using the Eastern Region Survey.

**Note: On Day Two, Group D participants worked with the other groups for the Needs/Solution matrix completion.*

The Eastern Region workshop participants identified five areas of short-term and long-term water and energy problems, needs, and solutions: data, modeling, aging infrastructure, alternative uses, and policy and economics.

Data

Given the multiple and sometimes competing uses of freshwater and its availability, the workshop participants emphasized the need for integrated management and resource planning which would ensure access to and sharing of water data for various sectors in society (energy industry, agriculture, recreation, and growing urban population).

Models

Simply put, water availability is governed by the hydrologic cycle. The way we use or misuse our rivers (and inevitably our river basins) affects urban and rural, industrial and agricultural interests as well as the coastal areas. Within the water resource itself, there are complicated interactions between water and the sediments, animal stock, plants, and contaminants in rivers, dams and wetlands. All this must be considered when creating models for the field of water management. Further, human activities can have a deleterious impact on climate variability -- thus water quantity and quality. Better prediction tools and models are required for this emerging issue that can also impact energy production.

Aging (Urban) Infrastructure

Even when water availability is not at issue, there can be concerns for water quality. It is a matter of public health for a municipality to provide a fresh, safe supply of potable water for drinking. That same municipality, which depends on pipes for transport, must also move solid waste and waste water from buildings. Deteriorating water and sewer systems that leak account for more than 25% water losses in some Eastern cities. Operating expenses include pumping water from the ground, purifying it, and adhering to health standards (for drinking water contaminants). The economic, health, and ecological costs for such losses are expensive and are typically passed on to the customer as a remedy for aging infrastructure.

Alternatives

Workshop participants suggested alternatives in addressing both water and energy supply technologies. These strategies varied:

- use of unconventional sources of water (i.e., desal or grey water from extraction)
- exploring unconventional renewable energy projects in the eastern region like off shore wind, ocean technologies
- increase of digester gas technology (biogas at waste treatment plants) to generate electricity and heat
- low head hydropower

Policy & Market Concepts

Each group addressed water and energy policy matters. The chief policy concerns in the area of water for energy include the following:

- Clarity on the roles and responsibilities of government at the state, regional (i.e., interstate), and national levels
- Minimum standards for water use, quality, and access equity
- Economics of water
- The value of water
- Role of local communities for management, maintenance, and operations
- Sustainability
- Protection of the environment (upstream incentives)
- Water utilization requirements
- Strategic regional resources and planning
- Rightful proportions (for energy industry, agriculture, domestic use, etc.)

Some participants called into question the riparian principle that has historically guided water allocation as an effective instrument for the Eastern states. The hope is to encourage either a regional or a national water policy, with the intent of using science and technology to change poor policies that affect surface and ground water in the United States. The following examples were cited for drinking water and waste water:

1. Regulatory requirements from the US EPA that mandate more stringent drinking water standards (i.e., disinfecting ground water that is pumped) result in increased electricity demands and
2. NPDES Requirements on wastewater discharge are in conflict with the philosophy behind recycling and can be confusing because they take precedence over other treatment requirements.

The law or national policy is the basis of our collective action and can be helpful in managing water resources required by energy production. Certain interstate disputes have grown into "water wars" – motivating some in the East to consider water management via multi-jurisdictional watersheds.

Market Challenges

Finally, we have not been successful in constructing the framework that helps to establish the value of water in every region of the country. Most water uses impact each industry that was invited to the conference. For example, unconventional sources of water, such as desalination, may relieve water stress, but require large amounts of energy and are extremely expensive. The same is true of biomass. Clearly, this suggests that in the long run, it will be financial resources, not water resources that impose the final constraint on some technological innovations. Ultimately, the cost of making changes to improve water and energy supplies must be accounted for in assessing the economic benefits of alternative water uses and developments in the electricity generation industry.

CONCLUSIONS

Over time, it has become impractical to manage either water or energy resources independent of one another. The failure to either consider or balance one in terms of the other is systemic. Those who are in a position to address the complex interactions, research, development and demonstration of new and innovative technologies must look at long-term sustainability of both water and energy resources. It is a matter of national security.

RECOMMENDATIONS

- Define sustainable water and energy resources.
- Provide a framework for development of regional and national requirements.
- Involve participants from the regional needs assessment workshop in the technology providers' workshop in a fashion commensurate with their areas of expertise.
- Establish working groups to develop definitions, metrics, practical applications, and exchange of information.
- Determine how to assess improvement, performance, and meeting customer/investor needs, and develop guidance on how to implement the set of requirements or technical solutions.