Energy Water Roadmap

Gaps Analysis Workshop
March 1-2, 2005
Albuquerque, NM

Executive Summary

The Energy-Water Gaps Analysis Workshop was the fourth in a series of five workshops developed as part of the Energy-Water Roadmap being developed for the Department of Energy. The Gaps Analysis Workshop was designed to take the results from the three Regional Needs Assessment Workshops (see www.sandia.gov/energy-water) conducted prior to the Gaps Workshop, and establish the major **national needs areas**. In the Gaps Analysis Workshop, the effort was to try and identify specific science and technology efforts that can be implemented to address the identified needs and gaps, with an emphasis on research and development efforts that will improve energy and water use efficiency, improve long-tern energy and water sustainability, and support steady economic growth and security.

To conduct the Gaps Analysis, over forty technical experts from around the country in each of the eight technical areas identified from the Regional Needs Worskshops were identified and invited to participate. In general, participants were drawn for the three regions of the country used in the Regional Needs Workshops, and most of the participants had been involved in these needs workshop efforts. This helped provide a context for the participants in conducting the gaps analyses.

In the Gaps Analysis Workshop we were interested in considering all detailed ideas suggested to meet current or expected Energy-Water Gaps. These included:

- As presented in the Summary of the Needs Workshops, a focus on the eight major needs categories identified including:
    - Enhanced characterization and monitoring of water supplies, future demands, and water data management
    - Cooperative approaches for energy water planning and improved decision support tools
    - Produced water treatment from oil and gas production
    - Reduction in water use in thermoelectric power generation
    - Reduction in water use in biofuels and biomass applications and development
    - Energy efficiency in water production and transportation
    - Renewable and hydroelectric improvements in energy production and treatment
    - Infrastructure improvement to improve energy and water efficiency
- Ideas that cover all phases of technology development and concept commercialization:
    - Including, research, development, demonstration, test and evaluation, and implementation (R,D,D, T&E, I) suggestions and ideas

- Ideas that cover any element needed to insure an improved strategy or approach can be effectively implemented:
    - This would include improved processes, new technologies, better decision models, improved sensors, improved science for policies and regulations, etc.
    - Additionally, all technical, policy, economic, and ecological and environmental research and development concepts that support approaches and insure good approaches can be implemented were considered

While the Energy Water Roadmap will be focused on efforts for DOE, the Roadmap must consider issues and ideas where DOE will need to cooperate or collaborate with other agencies such as the Department of the Interior, National Oceanic and Atmospheric Agency, Department of Agriculture, the Environmental Protection Agency, etc. All ideas that suggested how DOE could support or cooperate with these other agencies in developing the data and technology needed for long-term energy reliability were considered.

The general format for the discussions and collection of ideas included the following matrix:

Need Area:							
Concern	**Today's Performance**	**Near-term Goal (0-5 years)**	**R,D, Demo, T&E, I**	**DOE Lead or Support to what Group**	**Mid-Term Goal (5-10yrs)**	**R, D, Demo, T&E, I**	**Long-Term Goal (10-20yrs)**

As identified in the Gaps Analysis Workshop Agenda, each of the eight major needs areas were discussed over a two-day period on March 1-2, 2006 in Albuquerque. Based on the two days of discussions a series of recommendations were developed on the types and priorities of research and development needed to enhance and improve the efficiency of water use in energy production and generation and efficiency of energy use in water treatment and distribution.

Based on the Gaps Analysis Workshop discussions, the eight major needs areas were combined into six major research and development directions with suggested research, development, and implementation efforts and overall energy-water goals. These are included in the attached matrices for each needs area.