

**Statement of  
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of the  
MUNICIPAL ELECTRIC AUTHORITY OF GEORGIA  
(MEAG POWER) on behalf of the  
AMERICAN PUBLIC POWER ASSOCIATION**

**Submitted to the  
U.S House of Representatives  
Science and Technology Committee  
Energy and Environment Subcommittee**

**On  
A National Water Initiative: Coordinating and Improving Federal  
Research on Water  
And on  
H.R. \_\_, National Water Research and Development Initiative Act of 2008  
[Discussion Draft]**

**July 23, 2008**

APPA represents the interests of more than 2,000 publicly owned electric utility systems across the country, serving approximately 45 million Americans. APPA member utilities include state public power agencies and municipal electric utilities that serve some of the nation's largest cities. However, the vast majority of these publicly-owned electric utilities serve small and medium-sized communities in 49 states, all but Hawaii. In fact, 70 percent of our members are located in cities with populations of 10,000 people or less. Public power systems own approximately 10.1% of the total installed electric utility generating capacity in the United States. Hydroelectric projects comprise nearly 19% of public power's total generating capacity. There are 132

municipally-owned utilities with hydroelectric capacity, of which 94 are APPA members. The remaining mix of public power's generating capacity is comprised of approximately 27% coal, 36% gas, 8% nuclear and 8% oil.

Public power systems' primary purpose is to provide reliable, efficient service to their local customers at the lowest possible cost. Like hospitals, public schools, police and fire departments, and publicly owned water and waste water utilities, public power systems are locally created governmental institutions that address a basic community need: they operate to provide an essential public service, reliably and efficiently, at a reasonable, not-for-profit price.

The Municipal Electric Authority of Georgia (MEAG Power) is a public corporation whose primary purpose is to generate and transmit reliable and economical electric power to 49 Georgia communities that are Participants of MEAG Power. MEAG Power is Georgia's third-largest electric power supplier. Power is provided through co-ownership of two nuclear and two coal-fired generating plants, sole ownership of a natural gas-fired combined cycle facility, and ownership of over 1,300 miles of high voltage transmission lines and nearly 200 substations.

APPA and MEAG appreciate the opportunity to testify at this important hearing on "*A National Water Initiative: Coordinating and Improving Federal Research on Water*". In addition, APPA appreciates the opportunity to comment on the draft "National Water Research and Development Initiative Act of 2008" and to provide additional comments

about the water/electric generation nexus. Water availability is crucial to many types of electricity generation. For hydroelectric power, water is the energy source. For fossil and nuclear steam generation, water is needed for many in-plant process uses including for condensing steam. Water is therefore crucial for APPA's members to be able to deliver a reliable and reasonably priced electricity supply to residences and businesses in our communities in order to support a healthy environment and a vibrant economy.

The U.S. Department of Energy (DOE) released a report entitled: *Energy Demands on Water Resources: Report to Congress on the Interdependency of Energy and Water*. DOE found that: "Water is an integral element of energy resource development and utilization. It is used in energy-resource extraction, refining and processing, and transportation. Water is also an integral part of electric-power generation. It is used directly in hydroelectric generation and is also used extensively for cooling and emissions scrubbing in thermoelectric generation. For example, in calendar year 2000, thermoelectric power generation accounted for 39 percent of all freshwater withdrawals in the U.S., roughly equivalent to water withdrawals for irrigated agriculture (withdrawals are water diverted or withdrawn from a surface-water or groundwater source) (Hutson et al., 2004). Water withdrawal statistics for thermoelectric power are dominated by power plants that return virtually all the withdrawn water to the source. While this water is returned at a higher temperature and with other changes in quality, it becomes available for further use.

Today, APPA would like to offer several recommendations for the Committee to consider as it further develops the bill. The comments include: encouraging high quality data in developing the National Water Availability Research and Assessment Plan established in the draft legislation; discussing concerns with projected water usage increases with carbon capture and sequestration technology; and relating some positive experiences associated with a statewide water management plan adopted by Georgia earlier this year.

For some APPA members, there is an intrinsic relationship between serving water utility customers and electric utility customers. Many APPA members anticipate significant load growth in water and electricity as populations increase. End-use energy efficiency, water use efficiency, and renewable energy, although important, will not be sufficient to meet these increased electricity and water demands.

One of the common misconceptions is that surface and groundwater challenges are only in the arid Southwest. The challenges are not limited to that area of the country alone. For example, according to the Michigan Land Use Institute, nearly the entire western shoreline of Lake Michigan has water demand above available precipitation, and aquifers in that region have declined as much as 900 feet, and are declining as much as 17 feet per year in some cases. For these reasons, we need additional research on how to reduce water consumption from many industrial users (including power plants) which do not take away energy capacity. APPA, therefore, appreciates the draft legislation's national scope and acknowledgement of the challenges facing water use in the future.

**The Legislation Should Include Measures to Insure High Quality Data.**

Developing a National Water Availability Research and Assessment Plan, and conducting the research called for by the Plan to achieve the Water Research Outcomes, as proposed in the draft bill, will involve the production, analysis, and use of a significant amount of technical data. The data would include information on water quantity, water quality, technologies, consumption, and other criteria. A well-constructed Plan and the associated research will necessarily rely on accurate and reliable data.

APPA recommends that the bill consider available resources and guidelines intended to ensure that federal activities such as contemplated by the bill use data of high quality. An example of resources and guidelines can be found in the principles for the federal Data Quality Act of 2001 (also known as the Information Quality Act), which called for the Office of Management and Budget to “provide policy and procedural guidance to Federal agencies for ensuring and maximizing the quality, objectivity, utility, and integrity of information.” In the February 22, 2002 Federal Register, OMB published *Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility, and Integrity of Information Disseminated by Federal Agencies*. Since that time, many federal departments and agencies have developed data quality guidelines.<sup>1</sup>

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<sup>1</sup> See <http://www.ombwatch.org/article/archive/231?TopicID=13> for a list of Department and Agency guidelines and links to the guidelines.

Of particular importance is that, as appropriate, data used for implementing the bill be objective, transparent, peer-reviewed, unbiased, and reproducible. These criteria will especially help to insure that the data are credible and therefore useful for the intended purpose. Because many Departments and Agencies will participate in developing the Plan and conducting the research, coordination of high quality data among the parties by the Interagency Committee will be especially important.

**The Legislation Should Include Research Related to Projected Water Consumption Impacts with Carbon Capture and Sequestration Technology.**

Various global climate and greenhouse gas emission reduction bills in Congress have contemplated the future use of a technological process called Carbon Capture and Sequestration (CCS) or what EPA calls “geosequestration,” sometimes also referred to as carbon capture and storage. The intent of CCS is to “capture” carbon dioxide (CO<sub>2</sub>) resulting from the combustion of fossil fuels at power plants before the CO<sub>2</sub> is emitted, direct the captured CO<sub>2</sub> into an underground pipeline system, and store the piped CO<sub>2</sub> safely underground such as in a saline geologic formation.

According to studies done by the U.S. Department of Energy’s National Energy Technology Laboratory (NETL) and others, “capturing” the CO<sub>2</sub> at a power plant would require significant amounts of additional consumptive water use at the plant. For example,

data from two NETL reports<sup>2</sup> on CCS indicate that there would be approximately a doubling of water consumption, when comparing new pulverized coal plants of similar net capacity, with and without post-combustion CCS technology. The table below summarizes the DOE/NETL water data; the range for supercritical units shown represents the data in the two DOE/NETL reports. The same doubling of water consumption would likely occur with retrofitted coal generation. This significant increase of water consumption appears to run contrary to the goals of the draft “National Water Research and Development Initiative Act of 2008” – and therefore appears to be an issue ripe for research pursuant to the bill. Attached to this testimony are *APPA Comments to NERC on Reliability Impacts of Climate Change Initiatives*. Comment No. 7, Competition for Scarce Water Supplies, provides additional insight, information, and referenced materials that are relevant to this issue.

<b>CCS Water Use Impacts</b>	
<b>550MW Nominal Net Output Coal Unit</b>	
<b>Post-Combustion CCS Technology</b>	
<b>Subcritical Unit</b>	
<b>Without CCS</b>	<b>6,212 gpm</b>
<b>With CCS</b>	<b>12,187 gpm</b>
<b>% Increase with CCS</b>	<b>96.2%</b>
<b>Supercritical Unit</b>	
<b>Without CCS</b>	<b>5,441-5,443 gpm</b>
<b>With CCS</b>	<b>10,444-12,130 gpm</b>
<b>% Increase with CCS</b>	<b>92.0%-122.9%</b>

<sup>2</sup> See *Cost and Performance Baseline for Fossil Energy Plants*, DOE/NETL -2007/1281, May 2007, Revised Aug 2007; and *Pulverized Coal Oxycombustion Plants*, DOE/NETL-2007/1291, Aug 2007, Revised Oct 2007 and associated Nov 2007 presentation slides.

<b>Supercritical Unit</b>	
<b>Without CCS</b>	<b>4,720 gpm</b>
<b>With CCS</b>	<b>9,640 gpm</b>
<b>% Increase with CCS</b>	<b>104.2%</b>

**Data Are Needed on Geologic Formations Before Large Commercial Power Plants**

**With CCS Can Be Realistic.**

While APPA has not yet performed an exhaustive study of the impact of carbon sequestration on current or future water supplies, we are concerned that neither the state of the science nor the existing regulations are sufficiently developed to where carbon sequestration can seriously be considered as a greenhouse gas mitigation technique. It would be very difficult to do site characterization assessment properly in many locations because not enough is known about the subsurface geology and hydrology.

In April of 2007, APPA sent a letter to Full Committee Chairman Gordon in support of legislation designed to develop a methodology for, and complete a national assessment of, geological storage capacity for carbon dioxide. This legislation was ultimately included in the energy bill enacted into law in December of 2007 and we thank the Full Committee Chairman and the Committee as a whole for their hard work on this important matter and we look forward to the results being made available.

**Water Use, Energy and Discharge Temperatures**



APPA encourages DOE or other agency funding of ways to reduce thermal impacts from power plants (and industrial facilities) through less expensive cooling tower technologies. Today cooling towers have parasitic energy impacts which are very high. Parasitic power is the amount of the power used to run pollution controls, cooling towers, chemical processes to reduce pollutants, and to run booster compressors. This parasitic power takes away from the net energy output from the power plant. Additionally, it is very difficult to retrofit the current fleet with cooling towers due to both parasitic power capacity losses and due to physical space. Localized drought conditions and multiple dischargers of water can threaten to exceed the temperature limit of a receiving stream. In 2007 a major utility in the U. S. had to shut down its utility operation because the receiving waterbody's temperature could not tolerate the incoming water from the power plant. The confluence of population changes, density of population and location of manufacturing facilities will make this concern even more difficult in future years. New technologies or operational practices to reduce the effluent temperature from thermal power plants without causing parasitic power losses would be very helpful.

For municipal power plants associated with APPA communities that have both electric and water utilities, it would also be helpful to find additional ways to reduce the costs of desalinization plants (whether simple distillation or reverse osmosis) using waste heat from the power plant. This research could include the use of grey water, re-usable water, and even water that could be sufficiently cleaned for drinking water. Research in this area

could provide communities with additional surface water which would be enormously beneficial.

**The Legislation Should Insure Participation by States, Local Communities, and Stakeholders.**

Early in 2008, the state of Georgia adopted a *Georgia Comprehensive State-wide Water Management Plan*. The Georgia plan came about following an extensive stakeholder process involving agricultural and business interests, local governments, non-profit agencies, trade associations, and others. Under the guidance of Governor Purdue and Georgia Environmental Protection Division Director Dr. Carol Couch, the Georgia plan was approved by the state Water Council and the state General Assembly.<sup>3</sup> Of particular note is that the Georgia plan was successfully developed in a state experiencing both drought conditions and strong economic growth.

The success of the Georgia plan process suggests some similar processes that may be beneficial to the proposed National Water Availability Research and Assessment Plan called for in the draft bill. For example, the bill should consider extending the duties of the National Water Initiative Outreach Office to specifically bring states and local communities into the federal Plan development process, earlier and more extensively. Likewise, consideration should be given to extending the duties of the Outreach Office to

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<sup>3</sup> See <http://www.georgiawatercouncil.org/index.html> for the *Georgia Comprehensive State-wide Water Management Plan* and associated documents.

establishing a stakeholder group (those who may be affected by the research or its results) to provide input during the development of the federal Plan. These entities and groups should be able to provide valuable information (e.g. state and local plans already in place, ongoing research) to make the final federal Plan more efficient and effective.

### **New Energy Related Water Use Issues: Biofuels**

Due to the recent influx of investments in ethanol to provide alternatives to fossil fuel based gasoline (and other fuels), it is expected that there will be enormous water use impacts of this increase in the use of biofuels. While APPA does not have an official position on the use of ethanol, the impact that adding corn harvesting and ethanol processing will have on water use and the energy nexus is important. As referred to earlier in my testimony, the DOE Energy-Water Roadmap stated:

“The **potentially massive water demand posed by ethanol production** is a significant concern for those in the Central region. New directions in national biofuels supply and demand suggest that new research into techniques that do not require crops grown with fresh water are needed”.

### **Hydropower Challenges**

According to Energy Information Administration (EIA) data from 2006, hydropower accounts for almost 80 percent of renewable capacity in the United States. Hydropower has long been a vital piece of the United States electric utility industry and a driving force in the development of the economies in certain regions. Not only is hydropower a clean,

efficient and renewable source of electric power, the dams themselves are multi-purpose in nature – providing flood control, irrigation, industrial and municipal water, and fish and wildlife habitat improvements. Finally, the dams also provide transportation and recreational benefits.

Over 500 of the 2010 public power systems nationwide receive all or a portion of their power supply from the four federal Power Marketing Administrations (PMAs). The PMAs market federally generated hydropower from federal dams, and sell this hydropower to APPA members at cost-based rates plus interest (to be used to repay the cost of building the dams). The purchase price for this hydropower also factors in O&M for the hydropower facilities on these multi-purpose dams. However, because the rates paid by APPA members to the PMAs must go back to the Treasury and be appropriated back out by Congress annually, the funds for O&M at these facilities have often been used for other purposes thereby leaving a need for significant rehabilitation at these facilities.

The Bureau of Reclamation and the U.S. Army Corps of Engineers manage the dams and are responsible for the O&M for hydropower facilities at the dams. While we recognize that this committee does not manage the appropriations process, it is important to understand that by rehabilitating these hydropower facilities, a significant amount of zero-emissions, low-cost hydropower could be added to our generation mix without building another dam. Therefore, we hope that the committee would support increases in the federal appropriations for O&M at the Bureau of Reclamation and Corps of Engineers to undertake these rehabilitations.

Thank you for the opportunity to provide input into the bill development process. We hope that you will consider us as a resource for questions that may arise as the process moves forward.

Attachment: APPA Comments to NERC on Reliability Impacts of Climate Change Initiatives, July 16, 2008