UNIVERSITY OF FLORIDA

Joint Optimization of Urban Energy-Water Systems in Florida

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Description: Urban water infrastructure systems for providing water supply, collecting and treating wastewater, collecting and managing stormwater, and reusing wastewater and stormwater require major energy inputs. End users of the water require even more energy to heat this water for showers and baths, clothes washing, cooking and other uses. Increasingly, cities will rely on alternative water supplies such as desalination that require much more energy per gallon of water produced. Conservation is the ideal way to save energy and water by managing the demand for these precious commodities. Major strides have been made in reducing indoor water use from about 75 gallons per person per day to as low as 40 gallons per person per day. However, these gains are being offset by concurrent increases in outdoor water use for irrigation that range from 30 to 300 gallons per person per day depending on irrigation practices and the size of the landscape. From a water use perspective, perhaps the greatest challenge will be the expected growing competition for water if certain energy options are implemented in order to reduce our current dependence on foreign oil. Several recent national studies warn of this impending energy-water crisis. This project will build on our extensive experience in evaluating urban water conservation options to include the implications for energy use and to develop integrated energy-water management systems that are compatible.

Budget: $72,000
Universities: UF

Progress Summary

Efforts during the past six months have focused on the following areas associated with the water-energy nexus:

1. Estimating the energy expenditures for pumping drinking water through water distribution systems and the associated costs. Water distribution system models are used to estimate energy usage.
2. Further literature review on the water-energy nexus for urban systems.
3. Developing estimates of life cycle energy costs associated with water conservation best management practices.
4. Incorporation of these results into our water conservation model called EZ Guide and into an associated time series process simulation model for evaluating the impact of historical water use patterns on observed demand.