Using Municipal Scale Integrated Energy System Models to Fast Track Investments in Advanced Infrastructure and Management Practices

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Climate variability in the 21st century will hasten the need and pace for municipal environments to adapt to impacts ranging from sea level rise to the human health and

economic impacts of the Urban Heat Island. Energy system models can provide a flexible platform from which to accelerate the debate and decisions about infrastructure

investments needed to make cities survivable, sustainable, and desirable for human habitation. Decisions about how to manage solid and liquid materials flows

along with energy will need to be made on an integrated basis.

EPA Region II is developing two versions of a municipal scale energy system model that will look at technologies and management practices for reducing greenhouse gas emissions from primary energy (electricity), municipal solid waste, and wastewater. The output of the model based on the proven MARKAL platform (see www.etsap.org)

is designed to provide a “blueprint” for a municipal Environmental Management System.

(EMS)

Taking a series of “cost –benefit curves” of advanced technology and management practices and translating them into a municipal scale EMS is thought to be frontier

work in the area of Industrial Ecology. These models are the New York City MARKAL,

which to date has an energy loop and has examined at an electric utility substation level the impact of green building technologies as a mitigation measure for the electric distribution system of Consolidated Edison. It is hoped that a solid waste and waste water

loop will be added in 2006. The second model, which will serve as the justification for completion of the NYC model, is the Carolina Puerto Rico integrated MARKAL which

will contain electricity, waste water and solid waste loops. The results of the NYC Model

have sparked interest by EPA Region VI in Dallas Texas and numerous stakeholders in that area inclordeuding the Texas General Land Office and Austin Energy. The NYC model

was a collaboration of EPA Region II, Brookhaven National Laboratory, and the State University of New York at Stony Brook.

To be presented at the Eastern Region Energy Water Needs

Assessment Workshop, December 12-14, 2005, Baltimore, Maryland