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2004 Numeric Conservation Goals: Demand-Side Management Plan

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Executive Summary

In accordance with Rules 25-17.0021-.005, Florida Administrative Code, the Florida Public Service Commission (FPSC, or the Commission) must establish numeric conservation goals for JEA, as JEA is classified as an affected electric utility as defined in Section 366.82(1), Florida Statutes. This report presents JEA's proposed Demand-Side Management Plan (DSM Plan) for the next ten years, consistent with the FPSC Rules alluded to above.

JEA has a long history of supporting demand-side management and promoting conservation to its residential and commercial customers. In support of this priority, JEA has chosen to complete a comprehensive analysis of approximately 200 potentially cost-effective conservation measures for the 2004 Numeric Conservation Goals Filing. Demand and energy savings, the number of participants per measure, and participant and utility costs were generated for each of these measures from a variety of sources. Once all pertinent information was compiled, it was input to the FPSC-approved Florida Integrated Resource Evaluator (FIRE) model to evaluate the cost-effectiveness of these DSM measures. The FIRE model evaluates cost-effectiveness through three tests: the *Rate Impact Test*; the *Total Resource Test*; and the *Participant Test*.

From JEA's perspective, a DSM measure is only cost-effective if it passes the Rate Impact Test. This criterion is consistent with JEA's previous Numeric Conservation filings, as well as those of other Florida utilities. In this regard, JEA utilized the results of the Rate Impact Test to develop numeric conservation goals for the ten-year period encompassing 2005 through 2014.

Of the numerous DSM measures tested by JEA for cost-effectiveness, two measures passed the Rate Impact Test. However, upon closer examination, neither of these measures are capable of attracting sufficient participation to warrant the creation of a program. An explanation of the participation analysis of each program is provided in Section 5.0 of JEA's *2004 Numeric Conservation Goals: Demand-Side Management Measure Evaluation*, which is being filed with the FPSC in conjunction with this report. Based on this participation analysis, JEA is of the opinion that the apparent cost-effectiveness of these measures should not be included as numeric goals in its proposed numeric conservation goals. The proposed numeric conservation goals for JEA's residential, commercial, and industrial sectors are, therefore, zero.

Although JEA's proposed numeric conservation goals are zero, JEA has elected to voluntarily offer its existing demand-side management programs, which are described in the following sections. This decision is consistent with JEA's philosophy of environmental stewardship, and its long history of supporting conservation efforts.

1.0 Introduction

In accordance with Rules 25-17.0021-.005, Florida Administrative Code, the Florida Public Service Commission (FPSC, or the Commission) must establish numeric conservation goals for JEA, as JEA is classified as an affected electric utility as defined in Section 366.82(1), Florida Statutes. This report presents JEA's proposed Demand-Side Management Plan (DSM Plan) for the next ten years, consistent with the FPSC Rules alluded to above.

JEA's 2000 *Demand-Side Management Plan*, approved by the FPSC on February 21, 2001, established zero residential, commercial, and industrial goals for JEA. Although JEA's current numeric DSM goals are zero, JEA recognized the importance of energy efficiency and conservation and has offered various programs on a voluntary basis.

In general, many things have changed over the last few years leading to a decrease in customer participation and decreasing cost-effectiveness of DSM programs. As each program continues, participation tends to gradually decrease because the market for the program becomes saturated. Most of the customers that want to and are willing to participate will have done so early in the program.

The decrease in cost-effectiveness of DSM programs is a result of numerous factors. Government mandates have forced manufacturers to increase efficiency standards, thereby decreasing the incremental amount of energy savings achievable; the efficiency of new generation has increased and the cost of installing new generation has decreased; and with interest rates near all-time lows, the carrying costs of power plants have been greatly reduced. While these factors have resulted in it becoming more difficult for DSM to be cost-effective and to achieve high levels of customer participation, there are some factors that have increased the cost-effectiveness of DSM measures, the most significant of which is increased fuel prices.

JEA evaluated approximately 200 DSM measures to determine cost-effectiveness according to the FPSC-approved FIRE model for the 2004 Numeric Conservation Goals proceeding. The FIRE model performs a cost-effectiveness evaluation by computing three benefit to cost ratios consisting of the *Rate Impact Test*, the *Participant Test*, and the *Total Resource Test*. These tests, as well as the FIRE model methodology and inputs, are described in more detail in JEA's 2004 *Numeric Conservation Goals: Demand-Side Management Measure Evaluation*, filed with the FPSC in conjunction with this report.

JEA requires that DSM measures produce a Rate Impact Test value of greater than 1.0 in order to be considered cost-effective. Two of the measures evaluated passed JEA's criteria for cost-effectiveness: *Off-Peak Battery Charging* and the JEA educational

program *Constructing an Energy Efficient Home – Professionals*. However, as described in Section 5 of JEA's *2004 Numeric Conservation Goals: Demand-Side Management Measure Evaluation*, neither of these measures would be capable of attracting sufficient participation to warrant the creation of a program. Therefore, JEA is of the opinion that these measures should not be included as numeric goals. Consequently, the proposed numeric conservation goals for 2005 through 2014 are zero for JEA's residential, commercial, and industrial sectors.

Although JEA's proposed numeric conservation goals are zero, JEA believes that DSM is an important service to its customers and the community. Therefore, JEA proposes to voluntarily continue to offer its existing programs that focus on energy efficiency and conservation and that have garnered high participation in the past. In addition, JEA will voluntarily continue to consider new residential, commercial, and industrial programs that will benefit JEA customers and the community as a whole.

2.0 Demand-Side Management Plan

The DSM measure cost-effectiveness evaluation for the 2004 Numeric Conservation Goals proceeding resulted in proposed residential, commercial, and industrial numeric goals of zero. However, JEA's existing conservation programs have proven to be a valuable service to its customers and the community. As a result, JEA proposes to voluntarily continue to offer the existing conservation programs, as long as appropriate. JEA also proposes to continue to voluntarily examine new, potentially cost-effective programs. This section provides a discussion of each of the conservation programs currently offered by JEA.

2.1 Green/Clean Power Programs

In 2001, JEA developed its *Green Power Program* to encourage the widespread application of renewable energy technology in its service territory. JEA has established two Clean Power Capacity goals. The first, contained in JEA's internal Clean Power Strategic Initiative, calls for a minimum of four percent clean power capacity by 2007. The second, as stated in JEA's Memorandum of Understanding with the American Lung Association and Sierra Club entered into in 1999, calls for a minimum of 7.5 percent clean power capacity by 2015. To support these goals, JEA has installed over 230 kW of solar photovoltaic panels on high schools and other community buildings, and has invested in landfill gas renewable energy projects. In addition, JEA has started the solar incentive program to promote the acceptance and installation of solar energy systems in customers' homes and businesses.

2.1.1 Solar Incentive Program

As part of the Green Power Program, JEA implemented the *Solar Incentive Program* in early 2002. This program provides cash incentives for customers to install solar photovoltaic and solar thermal systems at their homes or businesses. As of March, 2004, JEA had provided incentives to over 600 solar systems installed throughout the community resulting in 4.5 MW towards its Clean Power Capacity goal. JEA expects demand reduction to total over 9 MW by 2007.

Under this program, pre-qualified solar contractors provide customers with a quote on a solar energy system inclusive of the incentive paid by JEA. Once the customer has signed a statement of satisfaction and the solar system passes inspection, JEA pays the incentive directly to the contractor. The incentives vary by project type and vendor location, with values of up to 30 percent of the system cost for photovoltaic systems and \$25 per square foot for solar water heater collectors. The amount of the

incentive paid is based on details of the individual installation and is limited to a maximum of \$25,000 for each installation. Table 2-1 summarizes the incentives for each type of solar energy installation. The customer benefits from this program by receiving a reduced cost for installation of a solar energy system, which provides a quicker return on investment, lower electric bills, and more energy self-sufficiency.

Table 2-1. Solar Incentive Program.		
Project Description	Local Vendor	Non-Local Vendor
Solar Photovoltaic		
Residential	30% of total installed cost	15% of total installed cost
Commercial	30% of total installed cost	15% of total installed cost
Solar Thermal		
Hot Water ¹	\$25 per square foot	\$15 per square foot
Pool Heaters ²	\$4 per square foot	\$2 per square foot
Commercial	30% of total installed cost	15% of total installed cost
Retrofits ³		
Restore existing solar hot water systems to working order	30% of total installed cost (up to \$500)	15% of total installed cost (up to \$250)
(\$25,000 maximum incentive per project)⁴		
Source: www.jea.com		
Notes:		
1. Medium temperature collector.		
2. Displaces an existing non-solar pool heater. Low temperature, unglazed collector.		
3. For systems installed before April 22, 1997. Retrofits apply to solar hot water systems and exclude the hot water heater tank.		
4. This maximum may be waived by JEA based on business conditions, availability of funds, and projected residual funds required to fund the Program for the balance of the year. This potential waiver does not guarantee that 100 percent of the potential incentive (above \$25,000) will be available.		

2.1.1.1 Residential Net Metering Policy

JEA has established a residential net-metering program to encourage the use of customer-sited solar photovoltaic systems. This policy stipulates that the solar photovoltaic system must be installed according to JEA engineering standards to ensure system compatibility and safety for JEA personnel. JEA will install a meter that turns backward when the customer's system is generating more energy than the customer is using. Thus, the amount of electricity that the customer is billed for by JEA is reduced by the amount of electricity exported to the JEA system. JEA does not pay the customer for any electricity in the event that the customer's system generates more energy than the customer uses for a given billing period. However, this amount is credited forward to the next billing cycle. This program, in combination with the *Solar Incentive Program*, has

created a strong incentive for the development of customer-sited solar photovoltaic generation.

2.1.2 Landfill Gas

JEA owns and operates three internal combustion engine generators located at the Garvin Road landfill. This facility was placed in service in July, 1997, and is fueled by gas produced by the landfill which consists of approximately 52 percent methane and 48 percent carbon dioxide and nitrogen. The facility originally had four generators with an aggregate net capacity of 3 MW. Since that time, gas generation has declined and one generator was removed and placed into service at the Buckman Wastewater Treatment facility. JEA also receives approximately 1,500 kW of landfill gas from the North Landfill, which is pumped to the Northside Generating Station and used to generate power in Unit 3.

2.1.3 Request for Proposals

On February 6, 2004, JEA issued a Request for Proposals (RFP) for Renewable Energy Generation for 1 MW to 300 MW. The RFP covers all renewable energy resources that result in energy being delivered to JEA's service territory. More than 80 companies requested a copy of the RFP. The pre-bid meeting was held on March 3, 2004, with bids due April 6, 2004. JEA received 16 responses to the RFP for a total of approximately 300 MW, consisting of renewable energy projects ranging from 1 MW to 80 MW. The proposal evaluation process is ongoing as of the date of this report, and no contract awards have been announced.

2.2 District Chilled Water Service

JEA offers chilled water service, utilizing central chilled water systems in place of central air conditioning systems in individual buildings by circulating cold water in a continuous flow throughout the buildings, then cooling the warmed water in a centralized chiller plant. JEA's chilled water system utilizes a central chiller plant to distribute chilled water via an underground network to multiple buildings for air conditioning needs. The multiple buildings served by a chilled water plant are collectively referred to as a district. The concept of district cooling traces back to 1889, and district cooling is currently used in downtown business districts, college campuses, military installations, and commercial developments nationwide.

District Chilled Water Service offers a consistent and reliable supply of chilled water to participating buildings, and provides customers with capital savings by eliminating on-site chillers and other possible redundancies, and operating costs are

reduced as well. Potential customers who may benefit from participation include building owners who are constructing new buildings, need to replace existing chillers, or need to increase chiller capacity.

2.3 Performance Contracting

JEA's *Performance Contracting Program* allows a building owner to make capital improvements to a facility, finance all associated costs, and have a guarantee that the resulting energy and operational savings will cover the project cost. The program evaluates energy savings opportunities, designs and engineers the solution, arranges financing, provides turnkey installation, and conducts on-going measurement and verification.

When involved in a Performance Contracting project, the specific needs of the client, in addition to a broad spectrum of energy conservation measures, are analyzed and investigated. Typically, systems targeted for improvements include lighting systems; heating, ventilation, and air conditioning (HVAC) equipment and systems; controls and automation (energy management systems); elevators, escalators, and conveyors; refrigeration equipment; computer facilities; process systems (motors, pumps, air compressor systems, etc.); water and wastewater systems (water heating, etc.); and the building envelope (walls, roofs, and duct installation).

Performance Contracting features turnkey energy, water, and wastewater solutions, third-party financing options, self-funded programs (resulting savings cover the cost of the improvements), and guaranteed savings. Participants also benefit from upgraded facilities and capital improvements, reduced energy and operational costs (usually 15 percent to 30 percent reductions per year), more environmentally friendly facilities, decreased maintenance backlogs, and increased personnel comfort, productivity, and safety. Facilities that may benefit from the program include those experiencing high energy and operating costs, aging facilities, facilities with indoor air quality issues, facilities subject to work and environmental safety factors, and those facilities without sufficient capital resources to make general improvements.

2.4 Power Quality and Reliability

One of JEA's primary goals is to deliver the highest quality of power to its commercial customers. However, like all other electric systems, JEA's distribution system occasionally experiences disturbances, many of which are outside of JEA's control, but nonetheless adversely affect modern, sensitive business equipment.

To address these issues, JEA offers power quality and reliability information to businesses in order to increase reliability, increase productivity, reduce downtime and

associated costs, reduce material and data loss, and protect equipment. JEA's *Power Quality and Reliability Program* consists of a number of components, discussed below.

2.4.1 Buried Cable Replacement

Similar to the buried cable at substation exits, JEA has buried cable in other parts of its system. While the higher electrical load at the substation exit makes it the most vulnerable part of a buried cable, faults from moisture or cable damage can occur in any cable which is buried directly in the ground. JEA no longer buries cable directly in the ground. The new cable is placed inside conduit, which provides greater protection and longevity. Cable in conduit is also faster to replace, with less property disturbance. New trenchless technology, such as directional drilling, have enabled JEA to perform these tasks with minimal disruptions of customer lawns, sidewalks, driveways, and roads.

2.4.2 Tree Trimming

JEA recently examined the statistics of tree growth in Jacksonville and the practices of other utilities for tree trimming and determined that the best tree trimming practice is a three year cycle as the routine, with hot spot trimming as needed. JEA continues to monitor the effectiveness of the three year cycle. In addition, JEA uses its internal data to determine when a circuit is having an increase in tree related events and take immediate action, called hot spot trimming. An effective tree trimming plan provides more reliable service for JEA's customers. Eighty trucks are involved in the tree trimming effort

2.4.3 Wood Pole Replacement or Repair

As part of JEA's ongoing inspection of its system, JEA found 101 wood poles on its 69 kV transmission lines had defects. These defects would eventually result in unplanned outages on the transmission grid. These poles were evaluated for repair versus replacement. In one third of the cases the poles were able to be repaired. The rest have been replaced. Through a change in its process, once JEA identifies a defective pole, the replacement can be done in just a few days, which decreases the likelihood of an unplanned outage due to pole failure.

2.4.4 Infrared Cameras

JEA is using these sophisticated cameras to help identify places of the electrical distribution system where preventative maintenance is required. One of these types of cameras uses infrared thermography to scan electric connections to locate trouble spots prior to a failure. Loose connections, hot switches, load imbalance, and moisture can

lead to deterioration, fatigue, and/or corrosion. Once identified by the camera, the replacement of these parts is then prioritized and scheduled, preventing costly equipment breakdowns and power outages.

2.4.5 Corona Cameras

JEA has recently begun to use another type of camera, called a corona camera, to evaluate insulators for impurities not visible to the eye. These impurities can cause flashovers or arcing of one phase into another phase. If impurities are seen with the corona camera, the insulator is washed and re-checked with the camera, to verify the washing removed the impurities.

2.4.6 Distribution Automation System

JEA is expanding its Distribution Automation System, which helps to minimize the number of customers who are affected by an outage.

2.4.7 Transformer Inspection Program

JEA has instituted a new systematic inspection program for its larger transformers, which will help to eliminate problems before they can cause an outage.

2.4.8 Continual Improvements

JEA is continually researching the latest technology in order to improve reliability. In recent years, the total number of minutes of outages of the JEA system declined significantly over previous years.

2.5 Lighting Solutions Program

JEA's *Lighting Solutions Program* helps customers improve their lighting systems, one of the most cost-effective measures a customer can take. Improving lighting not only saves money on energy bills, but the improvement increases the overall quality of the light provided by the system. In a typical office building lighting, heating, and cooling represent between 54 percent and 71 percent of total energy use, depending on the climate, making those systems the best targets for energy savings. With energy accounting for approximately 19 percent of total expenditures for the typical office building, improvements in these areas deserve consideration.

This program offers indoor and outdoor lighting services, including lighting energy audits, energy management programs, basic and advanced lighting design, retrofits and group re-lamping, lighting maintenance, and perimeter accent and site lighting. Customers receive the benefits of an evaluation of lighting opportunities, design

and engineering of lighting solutions, third-party financing, turnkey installation, and on-going maintenance. Lighting project implementation will provide the customer with reduced energy costs, increased energy efficiency, enhanced energy management, and increased productivity and overall comfort. Customers who may benefit from the *Lighting Solutions Program* include those using a high percentage of incandescent lighting, and customers who have not evaluated their lighting systems within the past five years.

2.6 Tree Planting Programs

In addition to the DSM initiatives, JEA has supported the planting of thousands of trees in the Jacksonville area over the past ten years. JEA initiated the following tree planting initiatives to benefit its customers and the Jacksonville community.

- *Treaty Oak Conservation Program* – this program initiated as a plan to provide low-cost live oak trees to plant on JEA properties and subsequently became a community-wide conservation effort. JEA supplies seedlings and growing supplies to the Montgomery Correctional Center, while the inmates provide the labor to grow the trees. This program has resulted in the donation of thousands of trees to non-profit groups in Jacksonville who plant trees in public parks and thoroughfares.
- *Tree Replacement Program* – this program was implemented to support the city ordinance which requires that any tree removed during construction must be replaced. This program has resulted in the planting of hundreds of trees throughout the Jacksonville area.
- *Tree Power Program* – this program is part of an American Public Power Association initiative to plant one tree for every public power customer (approximately 16 million). This initiative spawned the Future Tree Program and Free Tree Giveaways. The Future Tree Program was a cooperative effort between JEA, the Jacksonville Port Authority, and the Florida Game and Freshwater Fish Commission through which a total of 176,000 long leaf pine seedlings were planted at the Jacksonville International Airport and the Brannon Field Mitigation Park on Jacksonville's west side. The Free Tree Giveaways offered 30,000 one-gallon crepe myrtles (5,000 per month from April through September) to JEA customers during the program's five-year duration.
- *GreenPower Partnership* – this program, established in 1995 as a cooperative venture between JEA and Greenscape, donates between 300 and 500 trees per

year to Greenscape to be planted in area parks, tree deficient neighborhoods, and new homes constructed through the Habijax program.

- *Green It Up Assistance Program* – this program was developed to assist the City of Jacksonville’s “Green It Up, Clean It Up” initiative. The program resulted in the donation of 60,000 trees per year from 1998 through 2001.

2.7 Energy Audits

2.7.1 Low-Income Residential Audits

This program targets low-income residential customers. Audit recommendations usually require the customer to spend money replacing or adding energy conservation measures. Low-income customers may not have the discretionary income to make these changes. To alleviate this barrier, two types of low-income audits are offered.

One type of low-income audit is performed by the local weatherization agency, the Jacksonville Housing Partnership (JHP). JHP is under contract to JEA to perform this audit. During the audit, a conservation measure is installed or performed consistent with a priority list of measures established by JEA. JHP can only perform 150 installations per year since its overall mission is to perform a collection of major repairs on a limited number of owner occupied dwellings. The purpose of the weatherization program is to reduce the energy cost for low income households, particularly those households with elderly persons, disabled persons, and children, by improving the energy efficiency of their homes and ensuring a safe and healthy environment.

The other type of low-income energy audit, performed by JEA personnel, assesses the participating dwellings of the local public housing authority, the Jacksonville Housing Authority (JHA). This audit emphasizes behavioral solutions to high-energy use, and sometimes involves educational presentations to large audiences. In 1997, JEA staff began to perform audits on dwellings supervised by the JHA whenever JEA staff time permitted.

2.7.2 Residential and Commercial Energy Audits

JEA offers free energy audits to both its residential and commercial customers, providing an energy evaluation of the customers home, apartment, or business. The energy audits are available to JEA customers either in person, on-line, or by video. The audits offer customers cost-effective suggestions and ideas designed to help lower energy costs. The on-line audits are designed to be quick and simple, providing an instant energy savings analysis.

JEA's ENERGYsmart Library helps customers better understand how energy is used in the customer's facility and provides information on energy-related topics and technologies. The ENERGYsmart Library covers topics such as heating, cooling, weatherization, lighting, food storage and cooking, water heating and laundry, Energy Star, and light industrial equipment.

3.0 Proposed Numeric Conservation Goals

JEA proposed numeric conservation goals based on the FIRE model cost-effectiveness test results and DSM program implementation experience. Two of the numerous measures evaluated for cost-effectiveness yielded a Rate Impact Test value of greater than one. However, upon closer evaluation, neither of these measures could attract sufficient participants to justify the creation of a program and associated numeric goals. As such, JEA's proposed numeric conservation goals shown in Table 3-1 are zero for the 2005 through 2014 period. Details of the evaluation performed to support the proposed numeric goals, as well as a description of the FIRE model itself, can be found in JEA's *2004 Numeric Conservation Goals: Demand-Side Management Measure Evaluation*, filed with the Florida Public Service Commission in conjunction with this report.

Table 3-1.
 Proposed Numeric Conservation Goals

Year	Residential Reduction			Commercial/Industrial Reduction		
	Summer kW	Winter kW	MWh	Summer kW	Winter kW	MWh
2005	0	0	0	0	0	0
2006	0	0	0	0	0	0
2007	0	0	0	0	0	0
2008	0	0	0	0	0	0
2009	0	0	0	0	0	0
2010	0	0	0	0	0	0
2011	0	0	0	0	0	0
2012	0	0	0	0	0	0
2013	0	0	0	0	0	0
2014	0	0	0	0	0	0