



## Consumers' Attitude toward Energy Conservation and Energy Efficiency: The Role of Electric Rates

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With the recent volatility in energy prices, along with the growing concern that greenhouse gases are contributing to global warming, consumers and policy makers alike are looking for ways to reduce energy consumption. Household energy use accounts for nearly one-fourth of all energy consumed in the United States, amounting to more than \$200 billion per year spent by consumers.<sup>1</sup> Of particular note, prices for electricity consumed by urban households in the South rose by 11% from September 2007 through August 2008.<sup>2</sup>

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<sup>1</sup> The U.S. Governmental Accountability Office, "Energy Efficiency: Opportunities Exist for Federal Agencies to Better Inform Household Consumers," September 26, 2007, available at

<http://www.gao.gov/new.items/d071162.pdf>.

<sup>2</sup> U.S. Department of Labor, Bureau of Labor Statistics, South Region Consumer Price Index:

Every month, Floridians are billed for their use of electricity. The structure of prices to be paid in those bills is created in a process referred to as rate design. Through revenues generated from rates, utilities may recover the costs of providing electricity to their customers, including the cost of generating or purchasing power, the cost of transmission, and the cost of ensuring service reliability. They also may earn a profit from those operations.

In addition to providing for cost recovery and profits, rates may also be used to provide information to consumers. There is much debate among policymakers and academics on how to design rates most effectively to encourage two objectives on the part of consumers: energy conservation and energy efficiency. These objectives are not identical: Energy conservation strategies provide incentives for consumers to use less electricity by, for example, lowering the thermostat or using the dishwasher only when it is full of dishes. Energy efficiency strategies, on the other hand, result in the use of less fuel to generate the same amount of electricity or result in the

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September 2008, October 16, 2008, available at <http://www.bls.gov/ro3/cpiso.pdf>, at 4.

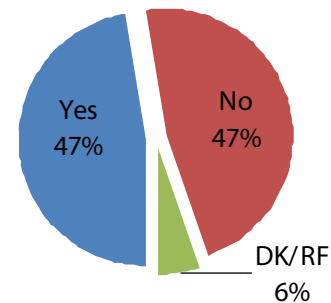
use of less electricity to accomplish the same end result. Often, improved efficiency involves a technological fix, such as higher energy ratings for appliances and changes in energy-related building codes and standards. Both types of strategies—energy conservation and energy efficiency—are considered “demand side responses.” If effective, they may reduce an electric utility’s need to either: 1) provide more electricity, whether by building new generating capacity or by purchasing more power; or 2) operate inefficient generating units at times of greatest demand.

From a rate design perspective, the incentive for consumers to reduce demand either through conservation or by increased efficiency, is a lower electric bill. However, other attitudinal factors may influence the decision to reduce consumption and purchase more efficient appliances: for example, whether consumers think there is a problem with meeting long-term electricity needs and how those needs might be met. Therefore, we pose two questions in this paper: 1) What are consumers’ attitudes toward energy conservation and energy efficiency as a means of meeting Florida’s energy needs? and 2) What has been done in Florida to encourage more efficient use of electricity? To respond to the first question regarding consumers’ attitudes, we analyzed responses to six survey questions included in two bimonthly surveys conducted in August 2008 by the Bureau of Economic and Business Research at the University of Florida (BEBR). A total of 502 randomly selected Floridians responded to the two surveys and their responses were aggregated for purposes of our analysis. To respond to the second question, we cite examples of electricity conserving measures currently used or under consideration by the Florida Public Service Commission and Florida electric utilities.

### Floridians’ Attitudes toward the State’s Energy Needs and Strategies for Reducing Consumption

As Figure 1 reflects, Floridians are evenly divided in their views about whether Florida will have a problem meeting its energy needs over the next 10 years, with 47% believing that it will be a problem and the same percentage believing it will not be one. Six percent did not know or did not respond.

**Figure 1. Do you think Florida will have a problem meeting its electricity needs over the next ten years?**



Florida’s utilities can meet their consumers’ electricity demand by either generating their own power or purchasing it from other utilities. There are different retail cost implications of decisions utilities make to generate or purchase power. Utility profits also may be impacted by decisions to sell excess power to wholesale customers. To ensure that there is some oversight for electric utility planning efforts, Florida law requires all major electric utilities in the state to submit to the Florida Public Service Commission ten-year site plans including proposals for addressing the need for capacity expansion or additional purchased power. The Commission evaluates those site plans to determine whether they are “suitable” or “unsuitable.” However, the Commission’s determination of suitability has no binding

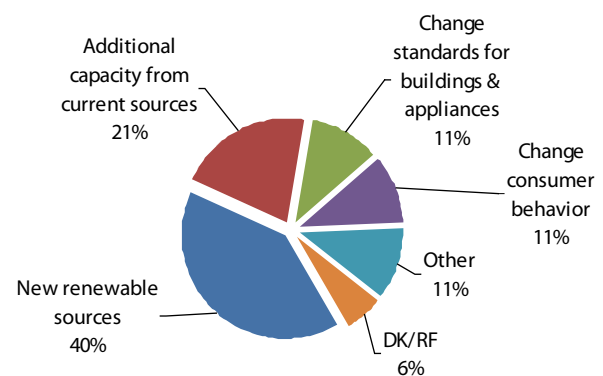
effect on the utilities' planning efforts. If concerns are raised about a utility's ability to meet long-term capacity needs of its retail customers, or plans to expand in order to profit by exporting power in the wholesale market to other states, they would need to be raised at a public hearing.

As Figure 2 shows, most Floridians (61%) seem to believe that the best way to meet Florida's electricity demand lies on the supply side (expanding the supply of resources). However, the majority of these respondents (40% of the total) think that the best way to meet new demand is through renewable resources. With growing public interest in reducing greenhouse gas emissions, this response is perhaps not too surprising. Much of the public policy discussion in recent years has been focused on the fuels that will be used to meet the expanding domestic demand for energy: a good example was the support by presidential candidates McCain and Obama for offshore drilling.<sup>3</sup> The Florida survey results are in line with national survey results. According to a survey by the Pew Center for the People & the Press, two-thirds of respondents favored

government policies to allow more offshore drilling of oil and natural gas.<sup>4</sup>

Far fewer respondents to the BEBR survey see changes to the demand side as the best way to meet Florida's long-term electricity needs: only 11% considered a change in consumer behavior and another 11% viewed higher building efficiency standards to be the best means of accomplishing that goal.

**Figure 2. What is the BEST way to meet Florida's electricity needs over the next ten years?**



These responses might be explained as follows: For many years, Americans did not have to make extensive behavioral or purchasing choices because electricity was relatively cheap and supply side strategies worked pretty well.<sup>5</sup>

<sup>3</sup> This aspect of energy policy is particularly pertinent to Florida's situation because approximately half of the state's electricity is generated using natural gas or petroleum fuels. According to the US Department of Energy, Energy Information Administration, "geologists believe that large deposits of oil and gas may be found in the federally administered Outer Continental Shelf (OCS) off Florida's western coast. The majority of those potential resources remain untapped due to a Federal moratorium on hydrocarbon development in the area." See U.S. Department of Energy, Energy Information Administration, November 6, 2008. "State Energy Profiles: Florida," available at [http://tonto.eia.doe.gov/state/state\\_energy\\_profiles.cfm?sid=fl](http://tonto.eia.doe.gov/state/state_energy_profiles.cfm?sid=fl), accessed November 10, 2008.

<sup>4</sup> See "Declining Public Support for Global Engagement," September 24, 2008, available at <http://people-press.org/report/?pageid=1385>. The Pew Center survey interviewed 2,982 people nationwide from September 9-14, 2008.

<sup>5</sup> Cheryl Abbot, "An Analysis of Southern Energy Expenditures and Prices, 1984-2006," Monthly Labor Review, April 2008, 3-18, available at <http://www.bls.gov/opub/mlr/2008/04/art1full.pdf>. Expenditures for electricity as a percentage of total annual household expenditures fluctuated during the period 1984-2006, but ranged on average from 2.6% and 2.9%, and in the South, from 3.3% to 3.6%. A closer look, however, reveals that from 2002-2006 there was a steady, but not rapid, increase in average household spending for electricity as a

There appears to be no significant relationship between political party affiliation and preference for demand-side responses described in the survey among the BEBR survey respondents. However, party affiliation does appear to have some relationship to the public's attitudes toward supply-side strategies. In the BEBR survey, almost twice as many Democrats as Republicans responded that the best way to meet Florida's electricity needs over the next 10 years is through renewable resources. Independents were less likely than Democrats but more likely than Republicans to hold that view. A preference for supply-side responses to increased demand for electricity from existing fuel sources came much more from Republicans than from Democrats and Independents.

A survey by the Pew Center for the People & the Press also found partisan divisions about U.S. energy policy, with far more Republicans than Democrats favoring the supply-side measures of increased off-shore drilling of oil and natural gas and increased use of nuclear power.<sup>6</sup>

Price signals for inducing people to reduce energy consumption are something most

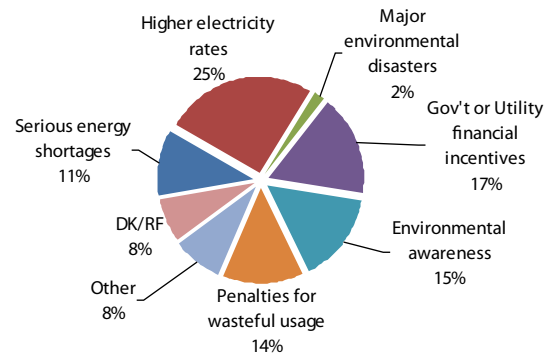
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proportion of total household expenditures both in the nation as a whole and the South. From 2002-2006, average annual household spending for electricity as a share of total household expenditures rose by 0.3%, from 2.4% in 2002 to 2.6% in 2006. In the South, that share increased by 0.3%, from 3.3% in 2002 to 3.6% in 2006.

<sup>6</sup> Ibid. Respondents to the Pew Center's survey were asked whether they favored or opposed government policies, including allowing more offshore drilling and promoting the increased use of nuclear power. According to the Pew Center's survey, 87% of Republicans, 55% of Democrats, and 67% of Independents favored offshore drilling; 68% of Republicans, 38% of Democrats, and 52% of Independents favored promoting more nuclear plants.

people understand. Indeed, when asked what factor would most likely encourage Floridians to use electricity more efficiently or consume less energy, approximately one quarter of all respondents replied: higher electricity rates.

**Figure 3. What factor would be MOST likely to encourage Floridians to use electricity more efficiently or consume less energy?**



There is considerable debate about the elasticity of electric rates. The 25% response rate in Figure 3 could reflect an awareness of that elasticity: consumers will reduce electric consumption if prices go up, particularly if the price increase is significant and happens quickly. They will also increase usage if prices go down. Indeed, those were the findings of a recent study by the RAND Journal of Economics about California households before and after the energy crisis in 2000.<sup>7</sup>

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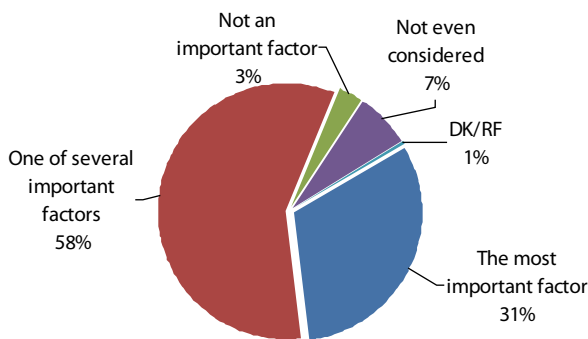
<sup>7</sup> Peter C. Reiss and Matthew W. White, "What Changes Energy Consumption? Prices and Public Pressures." *RAND Journal of Economics* 39.3 (Autumn 2008): 636-664. This study of 70,000 California households took place from October 1997-April 2002. It showed that the average household electricity use declined more than 13% within approximately 60 days after electricity prices soared unexpectedly and rapidly in 2000. In California at that time, retail electric rates were market-based. California households responded to this price increase by reducing consumption and purchasing more efficient appliances. However, due to public pressure, the California legislature subsequently imposed price caps or limits on electricity prices and consumption rebounded quickly.

Respondents to the BEBR survey who identified higher electricity rates as the most likely means of encouraging reduced consumption come from all income brackets. However, those with household incomes below \$40,000 tended to be older and unemployed. We might expect them to be more responsive to higher electric bills because they are probably at home more, rely more on fixed incomes, and utility costs could be a larger segment of their budgets, all things equal. Many of them probably still remember the aftermath of the oil embargos of the 1970s when energy conservation received heightened public attention and reduced energy consumption actually resulted.

As noted, at least a quarter of the respondents saw the value of higher electricity rates as the factor most likely to encourage Floridians to use electricity more efficiently and consume less energy. There is even more awareness that energy efficiency is an important if not the most important factor affecting the purchase of major appliances.

Roughly 45% of all respondents purchased a major appliance in the past two years. Of those who did, almost 90%, as reflected in Figure 4, noted that energy efficiency was either the most or among the most significant factors affecting selection of those purchases.

**Figure 4. In selecting the appliance(s), was energy efficiency:**



There are federal, state tax, and utility incentives for the purchase of energy efficient appliances. For example, the Energy Policy Act of 2005 authorized a 30% tax credit up to \$2,000 for solar electric and solar water heaters. There is a state sales tax exemption for solar energy systems and a statewide property tax exemption authorized by statute for the installation of solar water heaters, photo-voltaics, wind turbines, and geothermal heat pumps. There are also numerous rebates, grants, and loans offered by Florida's utility companies for improved energy efficiency and use of renewable resources.<sup>8</sup>

As Figure 3 shows, the use of utility and government incentives garnered the next highest response (roughly 17%) to the question of lowering consumption of electricity. Of the respondents who replied this way and also purchased appliances in the past two years, the majority said they considered efficiency to be the most important factor or among the important factors considered in their purchase decision. We do not know, however, to what extent government and utility subsidies had anything to do with their own purchase decisions. This was not one of the questions raised in the BEBR survey. However, for people on fixed incomes or with low incomes, affordability may be an issue and it is reasonable to think that properly structured economic incentives might help them afford the purchase.

### The Role of Electric Rates in Stimulating Less Energy Use

We know that it is possible for Americans to reduce their electricity consumption given the proper pricing signals. In the 1970s and early

<sup>8</sup> See Database of State Incentives for Renewables & Efficiency, last updated on October 24, 2008, available at <http://www.dsireusa.org>.

1980s, Americans responded to higher prices by consuming less. However, the situation has changed. In 1980, only two-thirds of homes in the South had air conditioning compared to 95% today. In addition, there are many more consumer appliances in homes and offices today, including plasma-screen TVs and personal computers. Assuming utility rates can be imposed today throughout Florida to prompt the same kind of overall response as 30 years ago, we might expect populations to be affected in different ways. Will poor people and renters be adversely affected if decoupling and other rate design schemes are adopted? Poor people may live in badly insulated houses with inefficient appliances and have few resources to reduce their consumption. Renters may also not be in a position to reduce their utility bills because they do not own their appliances and may lack the incentive or authority to better insulate their residences since they do not own the property. So rate design is not a simple exercise because some people may not have the flexibility to respond. Utility-sponsored energy conservation programs targeted to low-income households may be particularly useful.<sup>9</sup>

Although roughly a quarter of respondents viewed higher electricity rates as the predominant factor for using electricity more effectively, rates would need be structured differently on most Florida electric bills to relay the message. It is much the same message that was relayed by Harvard economist Edward Glaeser who favors transparent pricing signals for energy used for transportation: "Consumers have the ability to make wise decisions if they face price signals that accurately reflect costs.

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<sup>9</sup> For example, the Orlando-based municipal utility, OUC, through its Home Energy Fix-Up program, arranges for contractors to insulate the attic, pipes, water heaters; weather strip doors; and caulk windows. OUC pays 85% of the costs and consumers pay the rest without interest.

High prices may be painful but they convey a key nugget of information: Energy is scarce; use it wisely."<sup>10</sup>

Currently, Florida electric bills are bundled (rates combine the utility's fixed costs of operation with consumers' usage) so that Floridians may not necessarily see lower rates even if they reduce consumption. One measure touted by advocates to stimulate energy conservation or improve energy efficiency is through a change in the rate design that underpins consumer's energy bills. There are different ways to design rates with the intent of making consumers more aware of the actual cost of electricity use: inclining block rates so that one pays more if one consumes more; time of use rates so that one pays more at peak periods when the most major appliances are used; and revenue decoupled rates which break the link between a utility's sale of energy and its profits. Recently enacted Florida legislation (2008 HB 7135) authorizes the Florida Public Service Commission to analyze utility revenue decoupling and report its findings to the 2009 Legislature.

Other approaches may lower some households' electric bills without changing the overall rate structure. For example, Gulf Power Company through its GoodCents SELECT program, allows customers to program major appliances like central heating and cooling systems and electric water heaters to respond automatically to changing prices. The advantage to customers participating in the program is lower electric bills and the advantage to the utility is reduced peak

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<sup>10</sup>See Edward Glaeser, "Edward Glaeser Commentary: the Folly of 'Fixing' Energy Price Hikes," Harvard Kennedy School, reprinted from Boston Globe, available at

<http://www.hks.harvard.edu/news-events/news/oped/energy-price-hike>.

demand and, therefore, less need for the utility to operate its most costly generating units.<sup>11</sup> Progress Energy's EnergyWise program allows the utility to install at no cost to participating customers a small device on select electric equipment such as electric water heaters, or central heating or cooling systems. Whenever there is a high demand for power in the utility's service area, the utility can send a signal to all the devices installed in its service area and temporarily interrupt the power. Participating consumers receive a fixed monthly payment from Progress Energy regardless of whether or not their power is interrupted.

Rates that more closely capture the real cost of energy and programs that link reduced energy use to peak demand, such as the Gulf Power and Progress Energy programs, may be the first step to increasing consumers' consciousness that energy is scarce and they

should use it wisely, to coin Professor Glaeser's admonition. But heightened consciousness is only the first part of the equation. Will consumers be able to weatherize their homes, insulate their attics, and install the most efficient appliances? For their part, will electric utilities optimize their efficiency in delivering power to prevent costs from being disallowed by regulators in rate cases, or to prevent costs incurred through inefficiencies in utility operations from being passed on to consumers? Will policymakers provide utilities with the proper incentives to operate efficiently? Ultimately, our collective progress toward a more sustainable energy future will depend upon (1) proper pricing signals in electric rates, (2) Floridians' capacity to respond to them effectively, and (3) appropriate incentives to utilities to deliver electricity as efficiently as possible. The jury is still out as to whether these three conditions will be met.

**Acknowledgements:** We appreciate the review of an earlier version of this paper by the following people: Ms. Brenda Buchan, Florida Energy and Climate Commission; Ms. Mary Galligan, Kansas Legislative Research Department, and Dr. Mark Jamison and Mr. Ted Kury, Public Utility Research Center, the University of Florida.

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<sup>11</sup> See Jim Thompson, Gulf Power Company, "PURC Energy Policy Roundtable," October 31, 2006, available at [http://www.cba.ufl.edu/purc/docs/presentation\\_2006Thompson.pdf](http://www.cba.ufl.edu/purc/docs/presentation_2006Thompson.pdf).