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Dr. Sanem Sergici is a Principal in The Brattle Group’s Boston, MA office specializing in economic analysis of distributed energy resources (DERs); their impact on the distribution system operations and assessment of emerging utility business models and regulatory frameworks. She regularly assists electric utilities, regulators, law firms, and technology firms on matters related to innovative retail rate design, big data analytics, grid modernization investments, and alternative ratemaking mechanisms.

Dr. Sergici was part of the Brattle team advising the New York Department of Public Service Commissioners and led the development of a financial model to study the incentives required for and the impacts of incorporating large quantities of DERs on utility earnings and rates, during the early stages of the New York Reforming the Energy Vision (NYREV) initiative. Results of this model was instrumental in the development of key regulatory incentive mechanisms in NY. She has assisted several utility clients in developing short term and long term strategies involving new utility business models and regulatory frameworks enabling these models.

Dr. Sergici has been at the forefront of the design and impact analysis of innovative retail pricing, enabling technology, and behavior-based energy efficiency pilots and programs in North America. She led numerous studies in these areas that were instrumental in regulatory approvals of Advanced Metering Infrastructure (AMI) investments and smart rate offerings for electricity customers. She also has significant expertise in resource planning, development of load forecasting models and energy litigation.

Dr. Sergici is a frequent presenter on the economic analysis of DERs and regularly publishes in academic and industry journals. She was recently featured in Public Utility Fortnightly Magazine’s [“Fortnightly Under 40 2019”](#) list. She received her Ph.D. in Applied Economics from Northeastern University in the fields of applied econometrics and industrial organization. She received her M.A. in Economics from Northeastern University, and B.S. in Economics from Middle East Technical University (METU), Ankara, Turkey. Dr.

AREAS OF EXPERTISE

- Utility Regulatory and Business Models
- Innovative Rate Design and Impact Evaluation Studies
- Distributed Energy Resources
- Grid Modernization
- Resource Planning

SANEM I. SERGICI

EXPERIENCE

Utility Regulatory and Business Models

- Assisted the New York Department of Public Service to develop a comprehensive financial model of a representative (downstate) New York utility capable of demonstrating the impacts of REV initiatives upon utility financial performance. Our modeling effort included developing plausible incentive regulation frameworks, new incentive mechanisms, and potential platform frameworks, services and futures.
- Development of Performance Incentive Metrics for the Joint Utilities of New York. The Brattle Group worked with the New York PSC Staff and, subsequently, with the State's six investor owned electric utilities (Joint Utilities) in analyzing the feasibility and impacts associated with proposed earnings sharing mechanisms (EAMs), primarily the EAMs associated with load factor and system efficiency.
- Assisted a North American Utility with development of a short-term and long-term regulatory strategy to enable their 2030 Vision. Brattle team interviewed the executive team; identified consensus views and disagreements on alternative business models and regulatory models. Developed straw proposals for two potential regulatory models one focused on enabling shorter-term outcomes, and the other focused on enabling Company's longer-term vision.
- Assisted Pepco D.C. as they develop a multi-year rate plan and various traditional and emerging performance incentive metrics to be filed in their upcoming rate case. Brattle team developed and facilitated workshops to introduce Pepco's MYRP proposal to the stakeholders and assisted Pepco with incorporating stakeholder input to the final proposal.
- Assisted a Canadian Utility with a critical assessment of their custom incentive ratemaking model and discussed how it compares with other forms of PBR. We presented a jurisdictional scan of the PBR implementations across North America and Europe, and assessed pros and cons of each approach. We also advised them on currently proposed "Distributed Utility Models" and assess pros and cons of each model; reviewed "Alternative Regulatory Models" that were developed to ensure that utilities can coexist with the DERs and continue to maintain healthy balance sheets.

SANEM I. SERGICI

- For a Canadian electric utility, reviewed and summarized alternative regulatory frameworks and incentive models that would support a sustainable energy efficiency business. Investigated the pros and cons of these models, identified the implications of each model for the utility, and made a recommendation based on our findings. Utility will discuss the recommended approach with the regulator and seek an approval.
- For a large Canadian electric utility, assisted with the development of an alternative proposal to their current performance based regulation (PBR) framework. Examined and benchmarked several examples of performance based regulation schemes in place for other utilities, and advised on an enhanced PBR mechanism.

Innovative Rate Design and Impact Evaluation Studies

- Design, measurement and verification of Maryland Joint Utilities' PC44 TOU pilot. Brattle serves as the technical lead on behalf of the Maryland Joint Utilities, and led the pilot design and M&V methodology work streams in the PC44 workgroup process. Brattle will evaluate results from these three pilots in 2020.
- Assisted a New Zealand distribution utility with development of a peak time rebate pilot. Advised the client in pilot design principles and calculated sample sizes to yield statistically significant results. Undertook empirical testing of more than 150 different baseline methods using the client data and recommended an approach that leads to the highest accuracy and lowest bias in predicting the event day usage.
- Developed a model for the Ontario Energy Board to estimate a counterfactual hourly customer demand profile for multiple innovative pricing profiles of interest. Evaluated the economic efficiency of each alternative pricing option, taking into account system cost drivers including energy, ancillary services, generation capacity, and transmission and distribution capacity, as well as overall changes to consumer welfare driven by induced changes in demand. This represents one of few efforts to fully quantify the societal costs and benefits of innovative rate structures and involved close collaboration with the OEB team to ensure the Ontario-specific market structures were accurately reflected in our analysis.
- Technical Advisor to OEB on the New RPP Pilots. A Brattle team led by Dr. Sergici has developed a Technical Manual to guide the design and impact evaluation of new RPP pilots. Dr. Sergici has been closely working with the OEB RPP team as they oversee the implementation of these pilots in accordance with the guidelines

SANEM I. SERGICI

- Undertook impact Evaluation of Ontario’s Time-of-Use Rates on Behalf of Ontario Power Authority. A Brattle team led by Dr. Sergici provided an impact evaluation of Ontario’s province-wide roll-out of Time-of-Use (TOU) rates for its residential and general service customers on behalf of Ontario Power Authority. Brattle acquired hourly load data from the IESO and the LDCs, aggregated it for the pricing periods that correspond to the TOU rate, reinterpreted the full-scale deployment as a natural experiment, and analyzed it using econometric methods for three consecutive years.
- Undertook an extensive review of the rate designs and methodologies used by other jurisdictions/countries for a large Canadian Utility. We reviewed the rates that are currently offered by a large Canadian utility and compared them with best industry practices from around the globe. As a result of our analysis, we identify some near term and long term alternative rate design options for our client, which can help them to manage revenue risks and volatility due to the effects of disruptive threats, and at the same time to increase innovation and affordability in the rate options presented to the customers.
- Assisted Pepco Holdings, Inc. to evaluate the effectiveness of the AMI-enabled energy managements tools (EMTs) in reducing per capita energy use. Led a team of four researchers to compile and process data for four of the PHI jurisdictions; identify relevant control groups and methodology for impact evaluation and undertake an econometric analysis to quantify the EMT impact.
- Assisted an industry-leading provider of integrated demand response, energy efficiency, and customer engagement solutions in the design of and M&V plan for a behavioral demand response program. The plan included a detailed section on sampling selection for statistically valid and detectable program impact results.
- Prepared a comprehensive blueprint document for measuring the impacts of Baltimore Gas and Electric Company’s Smart Grid Customer Programs. BGE has started deploying smart meters to all of its residential customers in Spring of 2012 and is scheduled to complete the deployment over a three-year period. BGE developed a full-scale program, “Smart Energy Manager (SEM)” program, to meet a central objective of the Smart Grid Initiative - customer education and engagement in a Smart Grid environment. The blueprint documented the design elements of the SEM program and introducing the approaches that will be used to measure the impacts of different SEM tools once the program is in the field and sufficient data are collected.

SANEM I. SERGICI

- Measurement and evaluation for in-home displays, home energy controllers, smart appliances and alternative rates for FPL. Carried out a 2-year impact evaluation of a dynamic and enabling technology pilot program. Used econometric methods to estimate the changes in load shapes, changes in peak demand, and changes in energy consumption for three different treatments. The results of this study were shared with Department of Energy as to fulfill the data reporting requirements of FPL's Smart Grid Investment Grant.
- Pricing and technology pilot design and interim impact evaluation for Commonwealth Edison Company (ComEd). Assisted ComEd in the design of an ambitious pilot program that included approximately 25 different treatment cells. The pilot, which is the first "opt-out" pilot program of its kind, involved 8,000 customers and tested the impact of dynamic prices with and without customer education, informational feedback through basic and advanced feedback devices, and other enabling technologies in the summer of 2010. Conducted an interim impact evaluation study preceding the formal impact evaluation of the study, which is planned to be completed by the end of 2011.
- Pricing and technology pilot design and impact evaluation for Consumers Energy. Designed Consumers Energy's pricing and technology pilot and conducted the impact evaluation study after the pilot was completed in September 2010. The pilot tested critical peak pricing (CPP) and peak time rebates (PTR) in conjunction with information treatment and technology. The pilot also tested the potential "Hawthorne bias" for a group of control group customers who were aware of their involvement in the pilot.
- Member of a Technical Advisory Group (TAG), which was formed by Department of Energy (DOE) and Lawrence Berkeley National Laboratory (LBNL). Reviewed and provided feedback on the experimental designs of the utilities that were awarded Smart Grid Investment Grant projects and participated in periodic project review meetings with utilities to review and provide feedback on the interim results as they implement their projects. As part of this assignment, authored a guidance document that discussed different impact evaluation methods, which can be selected by the utilities. This document was shared with the utilities and other TAG members.
- For an Independent System Operator (ISO), designed, managed and analyzed a market research to help improve participation in retail electricity products that encourage price-responsive demand (PRD). The research determined customer preferences for various time-based pricing products that would help define PRD products that may be developed

SANEM I. SERGICI

in the ISO for each customer class. ISO will use the results of this research to assist in modifying wholesale market design to better support such PRD products.

- Assisted a client in conceptually developing a new product that would increase customer participation and performance in energy efficiency (EE) and demand response (DR) programs. Developed Total Resource Cost (TRC) tests for a few targeted EE and DR programs, and modeled the benefits and costs with and without the client's new product offering
- Co-authored a whitepaper reviewing the results from five recent pilot and full-scale programs that investigated low-income customer price-responsiveness to dynamic prices. The core finding of the whitepaper is that low income customers are responsive to dynamic rates and that many such customers can benefit even without shifting load.
- For a large California utility, conducted an econometric analysis, which investigated the role of weather conditions, smart meter installations, and electricity rate increases, among other control variables, in explaining the changes in the monthly usages and bills of a group of complaining customers. Estimated pooled regressions using a panel dataset, as well as individual customer regressions for more than 1,000 customers.
- Assisted an Illinois electric utility in the assessment of alternative baseline calculation for implementing peak time rebate (PTR) programs. Under a PTR program, participants receive a cash rebate for each kWh of load that they reduce below their baseline usage during the event hours. This requires establishment of a baseline load from which the reductions can be computed. The analysis involved simulating baselines for more than 2,000 customers using five alternative methodologies for several event days. Identified and recommended the baseline calculation methodology that yielded the most accurate baseline for individual customers, through the use of MAPE and RMSE statistics.
- Evaluated the Plan-It Wise Energy program (PWEP) of Connecticut Light and Power (CL&P) Company. PWEP tested the impacts of critical peak pricing (CPP), peak time rebates (PTR), and time of use (TOU) rates on the consumption behaviors of residential and small commercial customers. Each rate design was tested with high and low price variation as well as with and without enabling technologies. Conducted an econometric analysis to determine weather dependent substitution and daily price elasticities and subsequently quantified demand and energy impacts for each of the treatments tested in the PWEP. Developed optimal rate designs to be adopted in a full deployment scenario.

SANEM I. SERGICI

- For Baltimore Gas and Electric Company, assisted in the preparation of direct and rebuttal expert testimonies before the Maryland Public Service Commission, that explain the design and results of 2008 and 2009 Smart Energy Pricing (SEP) pilots.
- Evaluated the Smart Energy Pricing (SEP) pilot program of Baltimore Gas and Electric Company for three consecutive years. The pilot was designed to quantify the impacts of critical peak pricing (CPP) and peak time rebates (PTR) on residential customer consumption patterns. Conducted an econometric analysis to estimate demand systems and predict substitution and daily price elasticities for participating customers. Using the parameters of the demand equations, quantified demand, energy, and bill impacts associated with the programs. Impacts of the socio-demographic characteristics of the participants as well as their ownership of enabling technologies were separately identified on the demand response of the program participants.
- Co-authored a business practice manual for forecasting price responsive demand (PRD) in Midwest ISO. The draft manual introduces different methodologies for measuring and incorporating PRD into forecast LSE requirement for LSEs that are at different stages of rolling-out their out their dynamic pricing programs. The draft manual also proposes methodologies for the verification of the forecasted demand net of PRD for long term planning purposes.
- Assisted in the development of an affidavit that evaluates the implications of PJM's proposed revisions to the Operating Agreement (OA) on barriers to participation in PJM's Economic and Emergency Load Response programs.
- Co-authored a whitepaper on "Moving Toward Utility-Scale Deployment of Dynamic Pricing in Mass Markets" for Institute for Electric Efficiency. Whitepaper is intended to help facilitate nationwide progress toward the deployment of dynamic pricing of electricity by summarizing information that may assist utilities and regulators who are assessing the business case for advanced metering infrastructure (AMI).
- Assisted a New York utility in benchmarking their existing Demand Response (DR) portfolio to the best practice in U.S. and recommended improvements in their planned DR portfolio. Also assisted the utility in quantifying costs and benefits of pilot programs proposed in their DR filing before the State of New York Public Service Commission.
- Assisted an electric utility in developing a residential pricing pilot program that tests inclining- block rate (IBR) structure. More specifically, designed several revenue neutral

SANEM I. SERGICI

IBR alternatives and quantified load reduction and bill impacts from these IBR rates.

- Assisted an electric utility in their dynamic rate design efforts. Conducted impact analyses of converting from a flat rate design to alternative dynamic rate designs for each of the five major customer rate classes of the utility. Developed models that allow simulation of energy, demand, and bill impacts by season, day type and time period for an average customer from each of customer classes.
- Simulated the potential demand response of an Illinois utility’s residential customers enrolled in real time prices. Results of this simulation were used in recent Midwest ISO Supply Adequacy Working Group (SAWG) meeting to facilitate conversation about price responsive demand in the region. Simulations were run for different scenarios including historic versus spiky real-time prices; peak versus uniform allocation of capacity charges; and with and without enabling technologies.
- Designed a survey on Long-run Drivers of U.S. Energy Efficiency and Demand Response Potential on behalf of EPRI and EEI. Conducted statistical analyses to examine the survey responses, which were turned in by more than 300 power industry leaders and academic experts. Using the outcomes from this survey, assisted in the development of future scenarios to model energy efficiency and demand response impact through 2030.
- Assisted in the preparation of an EEI report that quantifies the benefits to consumers and utilities of dynamic pricing. Undertook a comprehensive review of the dynamic pricing programs across the U.S. and elsewhere. Also implemented price response simulations to quantify the likely peak demand reductions that would realize under alternative dynamic pricing schemes.

Distributed Energy Resources and Grid Modernization

- System Dynamics Modeling of DER Adoption and Utility Business Impacts. Led the development of Brattle’s Corporate Risk Integrated Strategy Platform (CRISP) model and assisted utility clients with the implementation of this model. CRISP is based on System Dynamics approach, which creates simulations based on dynamic feedbacks between utility policies and customer behavior, providing a new perspective on how much and how fast the “utility of the future” must evolve. The focus of these modeling efforts was to help utilities anticipate and accommodate distributed energy resources (DERs) as they become more economical and more widely adapted by retail electricity customers, and to evaluate the sustainability of their traditional cost-of-service business model in the face of such trends.

SANEM I. SERGICI

- Co-led a study for EPRI that analyzed a variety of approaches to representing DERs in utility planning models. Started with energy efficiency as the first DER to be analyzed, and undertook a comprehensive literature review to capture the complete range of options for evaluating EE in IRPs. Next, quantitatively evaluated the impact of the EE modeling method on important IRP objectives such as minimizing total resource costs, meeting environmental goals, and avoiding suboptimal resource planning decisions.
- Estimated NEM cross-subsidies using data from sixteen utilities. Used cost-of-service methodology to compare NEM customers costs on the system vs. revenue collection from these customers using company COS studies, and supplementing it by publicly available data on solar PV production profiles, installed DG capacity by utility and system load profiles.
- Wrote a comprehensive report for National Electrical Manufacturer's Association (NEMA) that reviews most recently approved 10 major grid modernization projects. Report discusses business cases and cost recovery mechanisms for each of these projects and documents how grid modernization technologies have benefitted customers and utilities.
- Analyzed the impacts of electric utility infrastructure investment on system reliability and resiliency for a Northeastern Utility, following major weather events. Primary area of analysis involved estimation of economic value of investments to customers using value of lost load (VOLL) metrics for electric system investments.
- Assisted Pepco Holdings, Inc. to analyze the Phase I of its Conservation Voltage Reduction (CVR) program in its Maryland Service Territory. First of its kind, this econometric study compares consumption of the treatment and control groups before and after the implementation of CVR. More specifically, a regression analysis was conducted to compare the usage levels of treatment and control group customers to determine whether the CVR treatment resulted in statistically significant conservation and peak demand impacts. The analysis accounts for exogenous factors such as weather, calendar and seasonality impacts as well as utility energy and demand savings programs.

Resource Planning

- Led the Brattle team that assisted the New York City Mayor's Office of Sustainability with the development of New York City's Roadmap to 80 x 50. The Brattle team analyzed the change in energy-sector greenhouse gas (GHG) emissions resulting from more than six future scenarios. These scenarios explored the impacts of aggressive energy efficiency

SANEM I. SERGICI

efforts, off-shore wind, and the continuance of low natural gas prices on the emissions footprint of New York City. The analysis shows that in order to reach 80 x 50, New York City will need to achieve a significant portion of its GHG reductions as a result of a dramatic shift towards a renewables-based grid. This shift towards renewables must overcome the anticipated retirement of nuclear facilities prior to 2050 and will be supported by the implementation of New York State's Clean Energy Standard and the declining cost of renewable energy.

- Conducted a study involving “solar to solar” comparison of equal amounts of residential- and utility-scale PV solar deployed in Xcel Energy Colorado’s Service Area. Calculated costs and benefits of each of these two different but equally sized solar options, i.e., avoided energy, capacity and distribution network costs and others. The study found carbon reductions were greater on utility scale systems because the solar energy per MW is much higher on utility-scale due to better placement and tracking capability.
- Advised Nova Scotia Power Inc. on the reasonableness of the DSM scenarios and strategies that are being modeled in their Integrated Resource Plan (IRP). This effort also involved advising the Company on a variety of DSM issues and building up a model that quantifies the rate impacts for program participants and non-participants based on the selected DSM scenario.
- Coauthored the State’s Annual Integrated Resource Plan (IRP) for the Connecticut Department of Energy and Environmental Protection (DEEP). This effort involved development of scenarios and strategies for an electric system to meet long-range electric demand while considering the growth of renewable energy, energy efficiency, other demand-side resources. Led the development of demand side management and emerging technology resource strategies and analyses involving these resources.
- Developed a model to assess the prudence of an electric utility’s power procurement strategy in comparison to several other alternative options. As a result of this model, she assessed whether it is prudent to recover the congestion and loss costs associated with utility’s chosen strategy from ratepayers in a state regulatory proceeding.
- Assisted in preparation of a marginal cost study for an integrated electric utility. The study estimated the incremental costs to the utility of serving additional demand and customer by time period, sub-region, and customer class. The costs were identified as energy, capacity and customer related for generation, transmission, and distribution

SANEM I. SERGICI

systems of the utility.

- Assisted in developing an integrated resource plan for major electric utilities. Contributed to the design of future scenarios against which the resource solutions were evaluated. Designed scenarios were driven by external factors including fuel prices, load growth, generation technology capital costs, and changes in environmental regulations. Forecasted the inputs series for the resource planning model consistent with each of the designed scenarios.

Demand Forecasting

- For an Asian utility considering an investment on a generation plant in PJM, we have reviewed, replicated, and developed alternative load forecasts using PJM's 2017 update. We have determined several uncertainty factors that are not fully captured in PJM's forecasting framework and developed "low load" and "high load" scenarios after accounting for these factors.
- For an electric utility in the Southeast, reviewed load forecasting models for residential and commercial customer classes. Assessed the accuracy and validity of the models by reviewing the historic and forecast period inputs to the model; model specification; in-sample and out-of-sample accuracy statistics; and incorporation of DSM impacts to the model, among many others. Also conducted an analysis using the U.S. Energy Information Administration's Annual Energy Outlook (AEO) data to determine the forecast errors during pre and post-recession periods.
- Developed a blueprint for integrating energy efficiency program impacts into the load forecasts for a Canadian Utility. This effort involved estimating the future impact of energy efficiency programs to be included in the load forecasts and developing price elasticity estimates that can be used to forecast the impact of the future changes in the price of electricity.
- Developed a load forecasting model for the pumping load of California State Water Project. Identified the main drivers of pumping load in major pumping stations. Through Monte Carlo simulations, quantified the uncertainty around load forecasts.
- Assisted in the preparation of testimony that evaluates the reasonableness of Florida Power and Light Co.'s total customer and monthly net energy for load (NEL) forecasting models. In addition to evaluating the methodology, also reviewed the reasonableness of the inputs used in the historic and forecast periods and assessed the soundness of ex-post

SANEM I. SERGICI

adjustments made to the forecasts.

- Assisted PJM in the evaluation of its models for forecasting peak demand and re-estimated new models to validate recommendations. Predicted forecasting errors of the existing models and helped improving the forecast methodology by introducing the state-of-the-art estimation techniques. Individual models were developed for 18 transmission zones as well as a model for the entire PJM system.
- Assisted a large utility in New York in understanding the decline in electric sales during the recent past and attributed the decline to a change in customer expectations of future income, based on declining consumer confidence that has been created by the lingering economic recession.
- Reviewed the structure of the Tennessee Valley Authority's energy sales forecasting models by sector, assessed the magnitudes of the price elasticities and the model specifications used to generate them, analyzed the ability of the models to generate a baseline forecast that could serve as a point of reference when evaluating the likely impacts and cost-effectiveness of a wide range of new energy efficiency and demand response programs.
- Developed a demand forecast model for one of the world's largest steam system operators. Estimated regression models to predict the price elasticities and switching behavior of different consumer classes. Also helped in the development of a model to forecast the impact of alternative steam tariffs on the consumption and switching patterns of consumers.

Energy Litigation and Market Power Analysis

- For the California Parties, provided Brattle witness with litigation support and testimony regarding manipulation of electric power and natural gas prices in the western U.S. during 2000-01. The proceeding, before the Federal Energy Regulatory Commission involved Enron, Dynegy, Mirant, Reliant, Williams, Powerex and many other suppliers in the U.S. and Canada.
- Part of a Brattle team that analyzed the impacts of a merger, involving FirstEnergy and West Penn Power, on competition in retail electricity markets on behalf of Brattle testifying expert Mr. Frank Graves. Both companies owned electric distribution companies, transmission assets, generation resources, and retail electricity providers in

SANEM I. SERGICI

several Mid-Atlantic States. The analysis involved assessment of whether the increased market share in wholesale energy markets affects retail competition, the number of suppliers in retail electricity markets, the ease of entry and exit to provide electricity to retail customers directly or through default service procurements, and the potential for abusing affiliate relationships with the electric distribution company to favor the retail electricity provider affiliate.

- Assisted in preparing affidavit before the Federal Energy Regulatory Commission examining whether the proposed acquisition of a power plant by an electric utility would lead to anti-competitive effects on wholesale market competition. In addition to performing market power tests required by FERC, directed an analysis that investigates the historical electric trading patterns between the acquiring utility and the other parties in the relevant geographical market. FERC agreed with the conclusion of the affidavit and authorized the transaction.
- Assisted in the development of testimony before the Postal Rate Commission involving calculation of mail processing variabilities and data quality issues. Addressed the endogeneity problems in the estimation of the variabilities using the instrumental variables approach.

OTHER PROFESSIONAL EXPERIENCE

- Taught Microeconomics for one year at Northeastern University. Also worked as a Research Assistant to Prof John Kwoka of Northeastern University on different utility industry projects.
- Worked as an adjunct research assistant for American Public Power Association and conducted an extensive literature survey on “Time-of-Use (TOU) Pricing in Electric Utility Industry.

ACADEMIC HONORS AND FELLOWSHIPS

- Excellence in Economics Award, Northeastern University, 2008
- Member, The Honor Society of Phi Kappa Phi
- Graduate Fellowship & Tuition Scholarship, Northeastern University, 2003-2007

SANEM I. SERGICI

- Tuition scholarship and stipend from the Turkish Ministry of Education towards the completion of B.S. Degree in Economics, 1999-2003
- Turkish Government Scholarship Examination, ranked 1st among 600,000 students in 1995

TECHNICAL AND EXPERT REPORTS

1. *Incorporating Distributed Energy Resources into Resource Planning: Energy Efficiency*, with Ryan Hledik, D.L. Oates, Tony Lee, and Jill Moraski, prepared for EPRI, May 2019.
2. *Status of DSM Cost Recovery and Incentive Mechanisms*, with Ahmad Faruqui, Elaine Cunha, and John Higham, prepared for Baltimore Gas & Electric, February 20, 2019.
3. *U.S. Alternative Regulatory Mechanisms: Scope, Status and Future*, with William Zarakas and Pearl Donohoo-Vallett, prepared for Baltimore Gas & Electric, Delmarva Power & Light and Pepco, February 19, 2019.
4. *A Review of Pay for Performance (P4P) Programs and M&V 2.0*, with Heidi Bishop and Ahmad Faruqui, prepared for Commonwealth Edison, July 20, 2018.
5. *Reviewing the Business Case and Cost Recovery for Grid Modernization Investments*, with Michelle Li and Rebecca Carroll, prepared for National Electrical Manufacturers Association (NEM), 2018.
6. *Pepco Maryland In-Home Display Pilot Analysis*, with Ahmad Faruqui, prepared for Pepco, June 2017.
7. *80x50 Energy Sector Model Assumptions and Results*, with Michael Kline and Pearl Donohoo-Vallett, prepared for the Mayor's Office of Sustainability, January 4, 2017.
8. *Impact Evaluation of Pepco District of Columbia's Portfolio of Energy Management Tools*, with Ahmad Faruqui and Kevin Arritt, prepared for Pepco District of Columbia, October 2016.
9. *Impact Evaluation of Delmarva Maryland's Portfolio of Energy Management Tools*, with Ahmad Faruqui and Kevin Arritt, prepared for Delmarva Maryland, April 2016.
10. *Impact Evaluation of Pepco Maryland's Portfolio of Energy Management Tools*, with Ahmad Faruqui and Kevin Arritt, prepared for Pepco Maryland, January 2016.
11. *Impact Evaluation of Pepco Maryland's Phase I Conservation Voltage Reduction (CVR) Program*, with Ahmad Faruqui and Kevin Arritt, prepared for Pepco Maryland, July 2015.
12. *Analysis of Ontario's Full Scale Roll-out of TOU Rates – Final Study*, with Neil Lessem,

SANEM I. SERGICI

Ahmad Faruqui, Dean Mountain, Frank Denton, Byron Spencer, and Chris King, prepared for Independent Electric System Operator, February 2016.

<http://www.ieso.ca/Documents/reports/Final-Analysis-of-Ontarios-Full-Scale-Roll-Out-of-TOU-Rates.pdf>

13. *Comparative Generation Costs of Utility-Scale and Residential Scale PV in Xcel Energy Colorado's Service Area*, with Bruce Tsuchida, Bob Mudge, Will Gorman, Peter Fox-Penner and Jens Schoene (EnernNex), prepared for First Solar, July 2015.
14. *Quantifying the Amount and Economic Impacts of Missing Energy Efficiency in PJM's Load Forecast*, with Ahmad Faruqui and Kathleen Spees, prepared for The Sustainable FERC Project, September 2014.
15. *Assessment of Load Factor as a System Efficiency Earning Adjustment Mechanism*, with William Zarakas, Kevin Arritt, and David Kwok, prepared for The Joint Utilities of New York, February 2017.
16. *Expert Declaration in a Patent Dispute Case involving a Demand Response Product*, July 2014. San Francisco.
17. *Measurement and Verification Principles for Behavior-Based Efficiency Programs, with Ahmad Faruqui, prepared for Opower*, May 2011.
http://opower.com/uploads/library/file/10/brattle_mv_principles.pdf
18. *Moving Toward Utility-Scale Deployment of Dynamic Pricing in Mass Markets*, with Ahmad Faruqui and Lisa Wood, IEE Whitepaper, June 2009.
19. *"The Impact of Dynamic Pricing on Low Income Customers,"* with Ahmad Faruqui and Jennifer Palmer, IEE Whitepaper, June 2010.

PUBLICATIONS

1. "Quantifying Net Energy Metering Subsidies," with Yingxia Yang, Maria Castaner, and Ahmad Faruqui, *The Electricity Journal*, forthcoming.
2. "Arcturus 2.0: A Meta-analysis of Time-varying Rates for Electricity," with Ahmad Faruqui and Cody Warner, *The Electricity Journal*, Volume 30, Issue 10, December 2017.
3. "Do Manufacturing Firms Relocate in Response to Rising Electric Rates?" with Ahmad Faruqui, *Energy Regulation Quarterly*, Volume 5, Issue 2, June 2017.
4. "Dynamic Pricing Works in a Hot, Humid Climate," with Ahmad Faruqui and Neil Lessem, *Public Utilities Fortnightly*, May 2017.
5. "The impact of AMI-enabled conservation voltage reduction on energy consumption and peak demand," with Kevin Arritt and Sanem Sergici, *The Electricity Journal*, 30:2, March

SANEM I. SERGICI

2017, pp. 60-65. <http://www.sciencedirect.com/science/article/pii/S1040619016302536>

6. "Integration of residential PV and its implications for current and future residential electricity demand in the United States," with Derya Eryilmaz, *The Electricity Journal*, 29 (2016) 41-52.
7. "Impact Measurement of Tariff Changes when Experimentation is not an Option – A case study of Ontario, Canada," with Sanem Sergici, Neil Lessem, and Dean Mountain, *Energy Economics*, 52, December 2015, pp. 39-48.
8. "Utility Investments in Resiliency: Balancing Benefits with Cost in an Uncertain Environment," by William Zarakas, Sanem Sergici et al., *The Electricity Journal*, Volume 27, Issue 5, June 2014.
9. "Low Voltage Resiliency Insurance: Ensuring Critical Service Continuity during Major Power Outages," by William Zarakas, Frank Graves and Sanem Sergici, *Public Utilities Fortnightly*, September 2013.
10. "Arcturus: International Evidence on Dynamic Pricing," by Sanem Sergici and Ahmad Faruqui, *The Electricity Journal*, 26:7, August/September 2013, pp. 55-65.
11. "Dynamic Pricing of Electricity for Residential Customers: The Evidence from Michigan," by Ahmad Faruqui, Sanem Sergici and Lamine Akaba, *Energy Efficiency*, 6:3, August 2013, pp. 571-584.
12. "Dynamic Pricing of Electricity in the Mid-Atlantic Region: Econometric Results from the Baltimore Gas and Electric Company Experiment," by A. Faruqui and S. Sergici, *Journal of Regulatory Economics*, 27(3), 235-262.
13. "The Untold Story of: A Survey of C&I Dynamic Pricing Pilot Studies," with Ahmad Faruqui and Jenny Palmer, *Metering International*, Issue 3, 2010.
14. "Divestiture policy and operating efficiency in U.S. electric power distribution," by John E. Kwoka, Jr., Michael Pollitt, and Sanem Sergici, *Journal of Regulatory Economics*, June 2010.
15. "Household Response to Dynamic Pricing of Electricity – A Survey of the Experimental Evidence," with Ahmad Faruqui, *Journal of Regulatory Economics*, October 2010.
16. "Rethinking Prices," with Ahmad Faruqui and Ryan Hledik, *Public Utilities Fortnightly*, January 2010.
17. "Piloting the Smart Grid," with Ahmad Faruqui and Ryan Hledik, *The Electricity Journal*, August/September 2009.
18. "The Impact of Informational Feedback on Energy Consumption - A Survey of the Experimental Evidence," with Ahmad Faruqui and Ahmed Sharif, *Energy-The International*

SANEM I. SERGICI

Journal, August 2009.

19. "Three Essays on U.S. Electricity Restructuring," Unpublished Ph.D. Thesis, Northeastern University, August 2008.

PRESENTATIONS

1. "Rate Reform in Evolving Energy Marketplace," presented at EUCI Residential Demand Charges/TOU Summit, May 30, 2019.
2. "Grid Modernization: Policy, Market Trends and Directions Forward," presented at the 4th Annual Grid Modernization Forum, Chicago, IL, May 21, 2019.
3. "Accelerating the Renewable Energy Transformation: Role of Green Power Tariffs and Blockchain," presented to EUCI Southeast Clean Power Summit, February 25, 2019.
4. "The Case for Alternative Regulation and Unintended Consequences of Net Energy Metering," presented to the 46th Annual PURC Conference, Gainesville, FL, February 21, 2019
5. "Reviewing Grid Modernization Investments: Summary of Recent Methods and Projects," presented to the National Electrical Manufacturers Association (NEMA), December 4, 2018.
6. "Enabling Grid Modernization Through Alternative Rates and Alternative Regulation," presented at the Energy Policy Roundtable in the PJM Footprint, November 29, 2018.
7. "Return of Pay-for-Performance Stronger with M&V 2.0," prepared for BECC Conference, Innovations in Models, Metrics, and Customer Choice, Washington DC, October 2018.
8. "Rate Design in a High DER Environment," presented at MEDSIS Rate Design Workshop, Washington DC, September 2018.
9. "Demand Response for Natural Gas Distribution," presented at the Center for Research in Regulated Industries (CRRI) 31st Annual Western Conference, Monterey CA, June 2018.
10. "Status of Restructuring: Wholesale and Retail Markets," presented at the National Conference of State Legislatures Workshop, "Electricity Markets and State Challenges," Indianapolis IN, June 2018.
11. "Dynamic Pricing Works in a Hot and Humid Climate: Evidence from Florida," presented at the International Energy Policy & Programme Evaluation Conference, Bangkok Thailand, November 2017.
12. "Understanding Residential Customer Response to Demand Charges: Present and Future,"

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- presented at the EUCI Residential Demand Charges Conference, Chicago IL, October 2016.
13. “Utility Leaders Workshop: An Evolving Utility Business Model for the Caribbean,” presented at the Caribbean Renewable Energy Forum, Miami FL, October 2016.
 14. “Impact of Residential PV Penetration on Load Growth Expectations,” presented at the AEIC Western Load Research Conference, September 2016.
 15. “Moving away from Flat Rates,” presented to Smart Grid Consumer Collaborative, Chicago, IL, September 2016.
 16. “Residential Demand Charges: An Overview,” presented at the EUCI Demand Charge Conference, Phoenix AZ, June 2016.
 17. “Conservation Voltage Reduction Econometric Impact Analysis,” presented at the AESP Spring Conference, Washington DC., May 2016.
 18. “Caribbean Utility 2.0 Workshop- Economics, Tariffs and Implementation: The Challenge of Integrating Renewable Resources and After Engineering Solutions,” co-hosted and presented at the Caribbean Renewable Energy Forum, Miami FL, October 2015.
 19. “Dispelling Common Residential DR Myths,” presented at the eSource Conference, October 2015.
 20. “Low Income Customers and Time Varying Pricing: Issues, Concerns, and Opportunities,” presented at NYU School Law’s Forum on New York REV and the Role of Time Varying Pricing, March 2015.
 21. “Dynamic Pricing: Transitioning from Experiments to Full Scale Deployments,” presented at the EDF Demand Response Workshop, Paris, France; July 2014 and Governors Association’s Michigan Retreat on Peak Shaving to Reduce Wasted Energy, August 2014.
 22. “Impact Evaluation of TOU Rates when Experimentation is not Option: A Case Study of Ontario, Canada,” presented at 2014 Smart Grid Virtual Summit, Boston, June 2014.
 23. “Residential Demand Response Opportunities,” presented at Opower Webinar Series, Boston, June 2014.
 24. “Impact Evaluation of TOU Rates when Experimentation is not Option: A Case Study of Ontario, Canada,” presented at 33rd Annual Eastern CRRRI Conference, May 2014.
 25. “The Arc of Price Responsiveness—Consistency of Results Across Time-Varying Pricing Studies,” presented at the Chartwell Webinar, Boston, May 2013.
 26. “Evaluation of Baltimore Gas and Electric Company’s Smart Energy Pricing Program,”

SANEM I. SERGICI

- presented at 9th International Industrial Organization Conference, Boston, MA, April 2011.
27. "Dynamic Pricing: What Have We Learned?" presented at the Electricity Markets Initiative Conference, Harrisburg, PA, April 2011.
 28. "Do Smart Rates Short Change Customers," presented at the Demand Resource Coordinating Committee Webinar, December 2010.
 29. "Opening Remarks and Session Chair of Day 1," at the FRA Conference on Customer Engagement in a Smart Grid World, San Francisco, CA, December 2010.
 30. "The Impact of Informational Feedback on Energy Consumption," presented at the 2010 National Town Meeting on Demand Response and Smart Grid, June 2010.
 31. "The Impact of In-Home Displays on Energy Consumption," presented before the Colorado Public Service Commission, June 2010.
 32. "Does Dynamic Pricing Work in the Mid-Atlantic Region: Econometric Analysis of Experimental Data," presented at the Center for Research in Regulated Industries (CRRI) 29th Annual Eastern Conference, May 2010.
 33. "Distributed Generation in a Smart Grid Environment," panel speaker at the Center for Research in Regulated Industries (CRRI) 29th Annual Eastern Conference, May 2010.
 34. "Power of Information Feedback: A Survey of Experimental Evidence," presented at the Peak Load Management Alliance (PLMA) Webinar, April 2010.
 35. "Customer Response to Dynamic Pricing - A Long Term Vision," presented at 2009 NASUCA Mid- Year Meeting, Boston, June 2009.
 36. "BGE's Smart Energy Pricing Pilot Summer 2008 Impact Evaluation," presented at Association of Edison Illuminating Companies (AEIC) Conference, Florida, May 2009
 37. "California and Maryland - Are They Poles Apart?," presented at the Western Load Research Association Conference, Atlanta, March 2009.
 38. "Experimental Design Considerations in Evaluating the Smart Grid," presented at the Smart Grid Information Session Massachusetts DPU, December, 2008.
 39. "Divestiture, Vertical Integration, and Efficiency: An Exploratory Analysis of Electric Power Distribution," presented at the 4th International Industrial Organization Conference, Boston, Massachusetts, 2006.

Liberty Utilities (Granite State Electric) Corp. d/b/a Liberty Utilities

DE 19-064
Distribution Service Rate Case

Staff Data Requests - Set 9

Date Request Received: 9/26/19
Request No. Staff 9-10

Date of Response: 10/10/19
Respondent: David A. Heintz

REQUEST:

Reference Heintz Testimony. Refer to Bates pp. II-306 and II-307. Explain how you developed the rate continuity cap, and how this cap compares to those used in other rate design efforts.

RESPONSE:

The rate continuity cap was established in consultation with the Company as a reasonable variance from the average distribution rate increase sought in the instant proceeding. Rate continuity caps are common in many jurisdictions, and employed by many rate design analysts as a means of promoting efficiency and allowing movement in rates towards their costs to serve that class. This approach was also used in Liberty's EnergyNorth Natural Gas utility rate case in Docket No. DG 17-048.

Liberty Utilities (Granite State Electric) Corp. d/b/a Liberty Utilities

DE 19-064
Distribution Service Rate Case

Staff Data Requests - Set 9

Date Request Received: 9/26/19
Request No. Staff 9-11

Date of Response: 10/10/19
Respondent: David A. Heintz

REQUEST:

Reference Testimony of Heintz, Bates II-308: Please explain in detail the reasoning behind Liberty's proposal to increase the customer charges for Rates D, D-10, G-1, G-2, G-3, T, and V by the Company's proposed percentage increase in temporary rates.

RESPONSE:

The fixed charges were increased by the overall percentage increase for temporary rates in an effort to promote rate continuity. This is similar to the approach employed in the EnergyNorth rate case, Docket No. DG 17-048. The reasoning was to establish a test year rate design updated for the new test year costs and billing determinants, thus establishing a base line upon which to design rates that can now also consider the implementation of revenue decoupling. See also Bates II-309, lines 1-13 regarding the influence of decoupling on rate design.

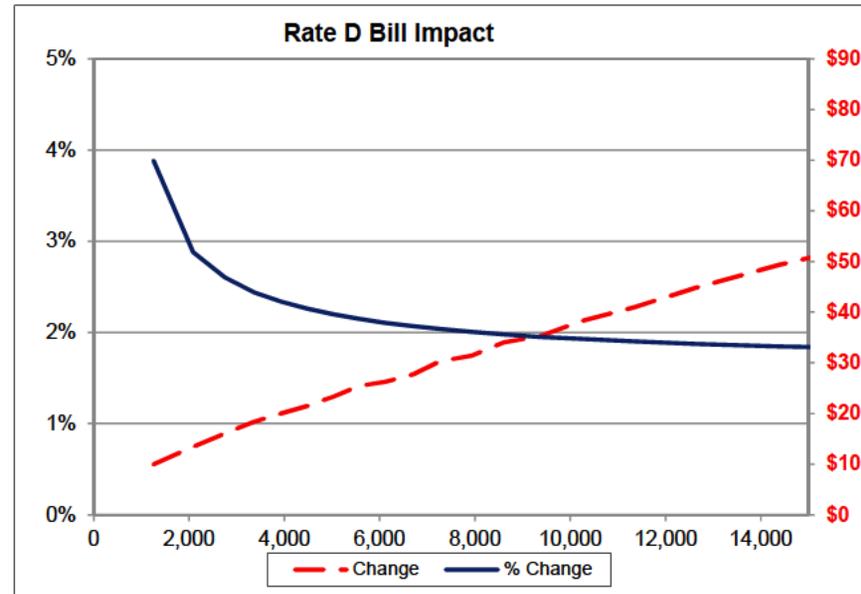
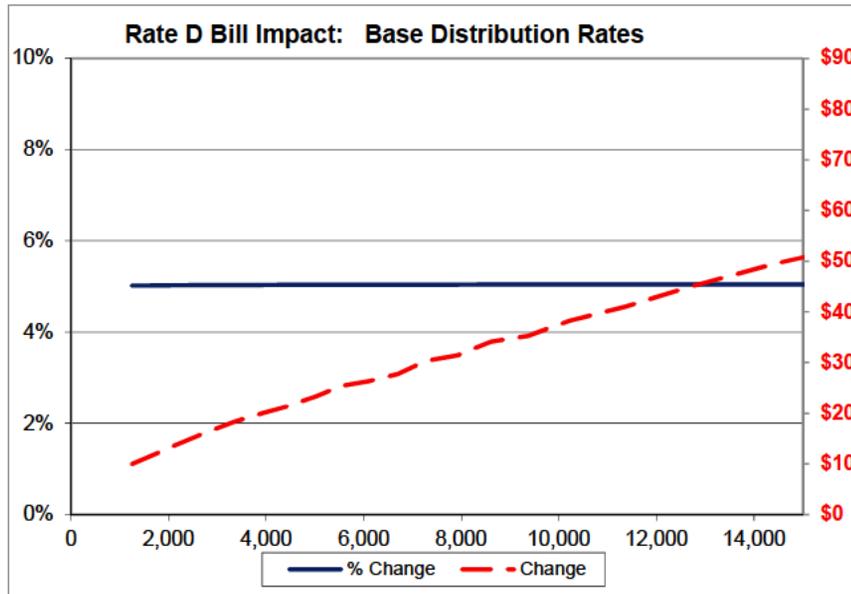
COMPARATIVE ANNUAL BILLS UNDER PROPOSED PERMANENT AND PROPOSED STEP ADJUSTMENT RATES
 RATE D : DOMESTIC SERVICE

D Proposed Permanent Rates	
Energy Services	\$0.08299
Other Tracking Mechanisms	\$0.03900
Customer charge	\$14.76
First 250 kWh	\$0.05737
Excess 250 kWh	\$0.05737

D Proposed Step Adj. Rates	
Energy Services	\$0.08299
Other Tracking Mechanisms	\$0.03900
Customer charge	\$15.50
First 250 kWh	\$0.06027
Excess 250 kWh	\$0.06027

D Proposed Permanent Rates	
Energy Services	\$0.00000
Other Tracking Mechanisms	\$0.03900
Customer charge	\$14.76
First 250 kWh	\$0.05737
Excess 250 kWh	\$0.05737

D Proposed Step Adj. Rates	
Energy Services	\$0.00000
Other Tracking Mechanisms	\$0.03900
Customer charge	\$15.50
First 250 kWh	\$0.06027
Excess 250 kWh	\$0.06027



COMPARATIVE ANNUAL BILLS UNDER PROPOSED PERMANENT AND PROPOSED STEP ADJUSTMENT RATES
 RATE D : DOMESTIC SERVICE

Line

D Proposed Permanent Rates		D Proposed Step Adj. Rates	
Energy Services	\$0.08299	Energy Services	\$0.08299
Other Tracking Mechanisms	\$0.03900	Other Tracking Mechanisms	\$0.03900
Customer charge	\$14.76	Customer charge	\$15.50
First 250 kWh	\$0.05737	First 250 kWh	\$0.06027
Excess 250 kWh	\$0.05737	Excess 250 kWh	\$0.06027

	Annual Use Range (kWh)		Average Annual Bills (Excluding Tracking Mechanisms)				Annual Bills (Including Tracking Mechanisms)				Customers in Ranges		
	Low	High	Current Rates	Proposed Rates	Change	% Change	Current Rates	Proposed Rates	Change	% Change	Number of customers	Cumulative customers	% Cumulative customers
10	0	1,248	\$198.32	\$208.27	\$9.95	5.0%	\$256.19	\$266.14	\$9.95	3.9%	1,733	1,733	5.0%
11	1,260	2,076	\$267.26	\$280.69	\$13.44	5.0%	\$465.77	\$479.21	\$13.44	2.9%	1,748	3,481	10.0%
12	2,088	2,760	\$320.87	\$337.02	\$16.15	5.0%	\$620.61	\$636.75	\$16.15	2.6%	1,728	5,209	15.0%
13	2,772	3,348	\$364.41	\$382.75	\$18.34	5.0%	\$750.76	\$769.11	\$18.34	2.4%	1,741	6,950	20.0%
14	3,360	3,936	\$398.41	\$418.47	\$20.06	5.0%	\$858.08	\$878.14	\$20.06	2.3%	1,710	8,660	25.0%
15	3,948	4,476	\$426.35	\$447.82	\$21.48	5.0%	\$949.97	\$971.44	\$21.48	2.3%	1,740	10,400	30.0%
16	4,488	5,028	\$463.26	\$486.60	\$23.34	5.0%	\$1,061.28	\$1,084.62	\$23.34	2.2%	1,726	12,126	35.0%
17	5,040	5,556	\$505.20	\$530.66	\$25.46	5.0%	\$1,184.44	\$1,209.90	\$25.46	2.1%	1,732	13,858	39.9%
18	5,568	6,108	\$521.53	\$547.82	\$26.29	5.0%	\$1,248.05	\$1,274.34	\$26.29	2.1%	1,749	15,607	45.0%
19	6,120	6,684	\$549.87	\$577.59	\$27.72	5.0%	\$1,339.80	\$1,367.52	\$27.72	2.1%	1,754	17,361	50.0%
20	6,696	7,272	\$602.18	\$632.54	\$30.36	5.0%	\$1,490.40	\$1,520.76	\$30.36	2.0%	1,719	19,080	55.0%
21	7,284	7,920	\$623.14	\$654.57	\$31.42	5.0%	\$1,565.63	\$1,597.06	\$31.42	2.0%	1,736	20,816	60.0%
22	7,932	8,604	\$675.72	\$709.80	\$34.08	5.0%	\$1,721.33	\$1,755.41	\$34.08	2.0%	1,731	22,547	65.0%
23	8,616	9,360	\$699.00	\$734.26	\$35.26	5.0%	\$1,805.89	\$1,841.15	\$35.26	2.0%	1,746	24,293	70.0%
24	9,372	10,212	\$757.69	\$795.92	\$38.23	5.0%	\$1,981.74	\$2,019.97	\$38.23	1.9%	1,729	26,022	75.0%
25	10,224	11,340	\$811.95	\$852.92	\$40.97	5.0%	\$2,153.38	\$2,194.35	\$40.97	1.9%	1,740	27,762	80.0%
26	11,352	12,624	\$887.14	\$931.91	\$44.77	5.0%	\$2,387.25	\$2,432.02	\$44.77	1.9%	1,734	29,496	85.0%
27	12,636	14,400	\$979.01	\$1,028.42	\$49.41	5.0%	\$2,674.25	\$2,723.66	\$49.41	1.8%	1,726	31,222	90.0%
28	14,412	17,580	\$1,116.00	\$1,172.34	\$56.34	5.0%	\$3,104.09	\$3,160.43	\$56.34	1.8%	1,738	32,960	95.0%
29	17,592	131,676	\$1,543.81	\$1,621.77	\$77.96	5.1%	\$4,443.22	\$4,521.19	\$77.96	1.8%	1,734	34,694	100.0%

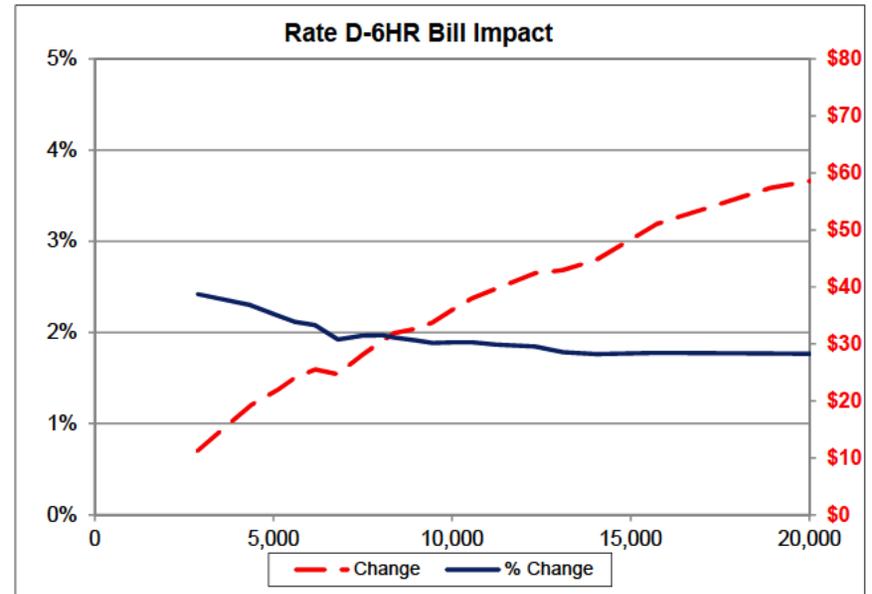
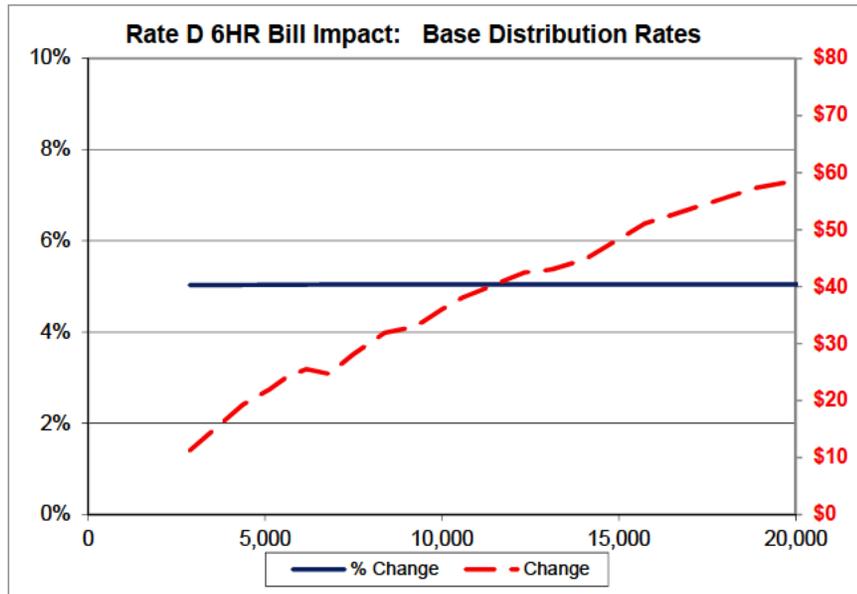
COMPARATIVE ANNUAL BILLS UNDER PROPOSED PERMANENT AND PROPOSED STEP ADJUSTMENT RATES
 RATE D : DOMESTIC SERVICE - Off Peak Use, 6 Hour Control

D Proposed Permanent Rates	
Energy Services	\$0.08299
Other Tracking Mechanisms	\$0.03900
Customer charge	\$14.76
Off Peak Use	\$0.05043
First 250 kWh	\$0.05737
Excess 250 kWh	\$0.05737

D Proposed Step Adj. Rates	
Energy Services	\$0.08299
Other Tracking Mechanisms	\$0.03900
Customer charge	\$15.50
Off Peak Use	\$0.05298
First 250 kWh	\$0.06027
Excess 250 kWh	\$0.06027

D Proposed Permanent Rates	
Energy Services	\$0.00000
Other Tracking Mechanisms	\$0.03900
Customer charge	\$14.76
Off Peak Use	\$0.05043
First 250 kWh	\$0.05737
Excess 250 kWh	\$0.05737

D Proposed Step Adj. Rates	
Energy Services	\$0.00000
Other Tracking Mechanisms	\$0.03900
Customer charge	\$15.50
Off Peak Use	\$0.05298
First 250 kWh	\$0.06027
Excess 250 kWh	\$0.06027



COMPARATIVE ANNUAL BILLS UNDER PROPOSED PERMANENT AND PROPOSED STEP ADJUSTMENT RATES
 RATE D : DOMESTIC SERVICE - Off Peak Use, 6 Hour Control

Line

D Proposed Permanent Rates		D Proposed Step Adj. Rates	
Energy Services	\$0.08299	Energy Services	\$0.08299
Other Tracking Mechanisms	\$0.03900	Other Tracking Mechanisms	\$0.03900
Customer charge	\$14.76	Customer charge	\$15.50
Off Peak Use	\$0.05043	Off Peak Use	\$0.05298
First 250 kWh	\$0.05737	First 250 kWh	\$0.06027
Excess 250 kWh	\$0.05737	Excess 250 kWh	\$0.06027

Annual Use Range (kWh)		Average Annual Bills (Excluding Tracking Mechanisms)				Annual Bills (Including Tracking Mechanisms)				Customers in Ranges			
Low	High	Current Rates	Proposed Rates	Change	% Change	Current Rates	Proposed Rates	Change	% Change	Number of customers	Cumulative customers	% Cumulative customers	
10	0	2,869	\$223.08	\$234.31	\$11.23	5.0%	\$463.70	\$474.93	\$11.23	2.4%	12	12	4.6%
11	2,869	4,355	\$381.89	\$401.12	\$19.23	5.0%	\$836.01	\$855.25	\$19.23	2.3%	13	25	9.5%
12	4,355	5,131	\$436.30	\$458.28	\$21.98	5.0%	\$1,006.46	\$1,028.44	\$21.98	2.2%	13	38	14.5%
13	5,131	5,614	\$479.05	\$503.20	\$24.14	5.0%	\$1,142.17	\$1,166.32	\$24.14	2.1%	13	51	19.5%
14	5,614	6,162	\$506.44	\$531.97	\$25.53	5.0%	\$1,228.04	\$1,253.57	\$25.53	2.1%	13	64	24.4%
15	6,162	6,802	\$489.74	\$514.44	\$24.70	5.0%	\$1,284.88	\$1,309.59	\$24.70	1.9%	13	77	29.4%
16	6,802	7,480	\$557.39	\$585.50	\$28.11	5.0%	\$1,430.08	\$1,458.19	\$28.11	2.0%	14	91	34.7%
17	7,480	8,054	\$605.68	\$636.22	\$30.55	5.0%	\$1,550.37	\$1,580.91	\$30.55	2.0%	13	104	39.7%
18	8,054	8,377	\$632.16	\$664.05	\$31.88	5.0%	\$1,638.95	\$1,670.83	\$31.88	1.9%	13	117	44.7%
19	8,377	8,985	\$647.79	\$680.47	\$32.68	5.0%	\$1,707.84	\$1,740.52	\$32.68	1.9%	13	130	49.6%
20	8,985	9,454	\$670.06	\$703.87	\$33.81	5.0%	\$1,795.23	\$1,829.04	\$33.81	1.9%	13	143	54.6%
21	9,454	10,019	\$714.51	\$750.56	\$36.05	5.0%	\$1,905.77	\$1,941.82	\$36.05	1.9%	13	156	59.5%
22	10,019	10,566	\$753.76	\$791.79	\$38.03	5.0%	\$2,010.85	\$2,048.88	\$38.03	1.9%	13	169	64.5%
23	10,566	11,214	\$786.15	\$825.82	\$39.67	5.0%	\$2,125.27	\$2,164.94	\$39.67	1.9%	14	183	69.8%
24	11,214	12,308	\$840.52	\$882.94	\$42.42	5.0%	\$2,297.19	\$2,339.60	\$42.42	1.8%	13	196	74.8%
25	12,308	13,102	\$851.28	\$894.25	\$42.97	5.0%	\$2,410.97	\$2,453.94	\$42.97	1.8%	13	209	79.8%
26	13,102	14,045	\$887.00	\$931.78	\$44.78	5.0%	\$2,541.80	\$2,586.58	\$44.78	1.8%	13	222	84.7%
27	14,045	15,727	\$1,010.80	\$1,061.83	\$51.03	5.0%	\$2,869.95	\$2,920.99	\$51.03	1.8%	13	235	89.7%
28	15,727	18,902	\$1,136.12	\$1,193.48	\$57.36	5.0%	\$3,238.65	\$3,296.01	\$57.36	1.8%	13	248	94.7%
29	18,902	34,757	\$1,483.47	\$1,558.40	\$74.92	5.1%	\$4,370.17	\$4,445.09	\$74.92	1.7%	14	262	100.0%

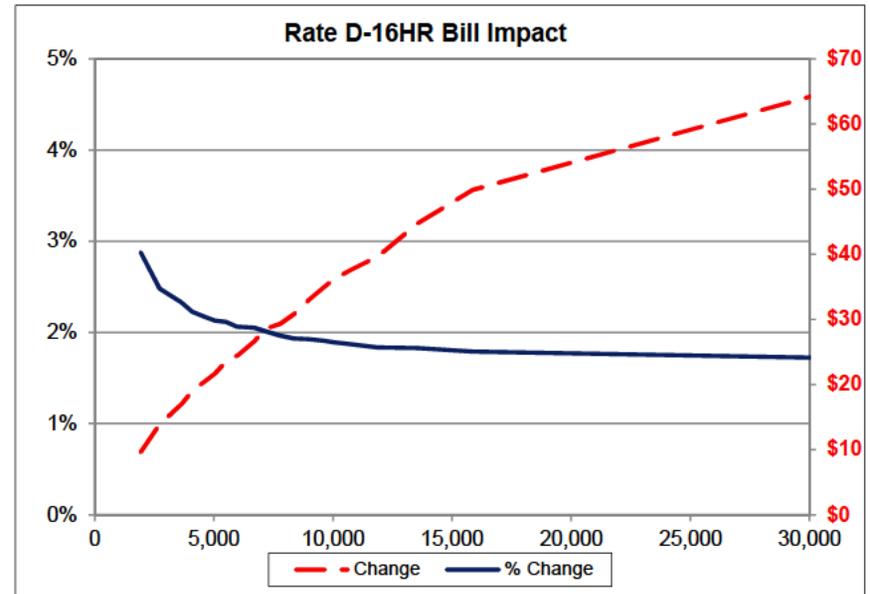
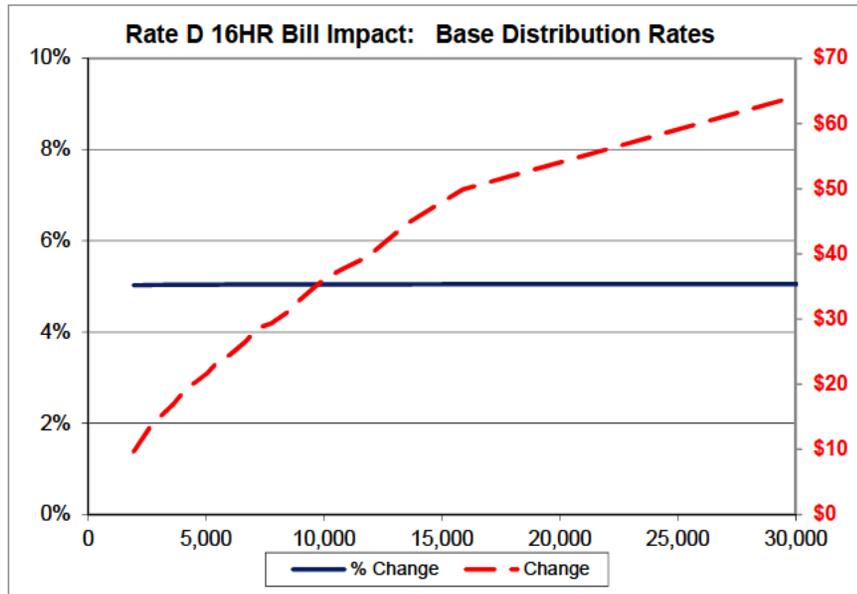
COMPARATIVE ANNUAL BILLS UNDER PROPOSED PERMANENT AND PROPOSED STEP ADJUSTMENT RATES
 RATE D : DOMESTIC SERVICE - Off Peak Use, 16 Hour Control

D Proposed Permanent Rates	
Energy Services	\$0.08299
Other Tracking Mechanisms	\$0.03900
Customer charge	\$14.76
Off Peak Use	\$0.04951
First 250 kWh	\$0.05737
Excess 250 kWh	\$0.05737

D Proposed Step Adj. Rates	
Energy Services	\$0.08299
Other Tracking Mechanisms	\$0.03900
Customer charge	\$15.50
Off Peak Use	\$0.05202
First 250 kWh	\$0.06027
Excess 250 kWh	\$0.06027

D Proposed Permanent Rates	
Energy Services	\$0.00000
Other Tracking Mechanisms	\$0.03900
Customer charge	\$14.76
Off Peak Use	\$0.04951
First 250 kWh	\$0.05737
Excess 250 kWh	\$0.05737

D Proposed Step Adj. Rates	
Energy Services	\$0.00000
Other Tracking Mechanisms	\$0.03900
Customer charge	\$15.50
Off Peak Use	\$0.05202
First 250 kWh	\$0.06027
Excess 250 kWh	\$0.06027



COMPARATIVE ANNUAL BILLS UNDER PROPOSED PERMANENT AND PROPOSED STEP ADJUSTMENT RATES
 RATE D : DOMESTIC SERVICE - Off Peak Use, 16 Hour Control

Line

D Proposed Permanent Rates		D Proposed Step Adj. Rates	
Energy Services	\$0.08299	Energy Services	\$0.08299
Other Tracking Mechanisms	\$0.03900	Other Tracking Mechanisms	\$0.03900
Customer charge	\$14.76	Customer charge	\$15.50
Off Peak Use	\$0.04951	Off Peak Use	\$0.05202
First 250 kWh	\$0.05737	First 250 kWh	\$0.06027
Excess 250 kWh	\$0.05737	Excess 250 kWh	\$0.06027

Annual Use Range (kWh)		Average Annual Bills (Excluding Tracking Mechanisms)				Annual Bills (Including Tracking Mechanisms)				Customers in Ranges			
Low	High	Current Rates	Proposed Rates	Change	% Change	Current Rates	Proposed Rates	Change	% Change	Number of customers	Cumulative customers	% Cumulative customers	
10	0	1,921	\$191.36	\$200.99	\$9.62	5.0%	\$334.36	\$343.99	\$9.62	2.9%	22	22	4.7%
11	1,921	2,715	\$275.71	\$289.59	\$13.88	5.0%	\$559.22	\$573.10	\$13.88	2.5%	23	45	9.6%
12	2,715	3,614	\$336.90	\$353.87	\$16.97	5.0%	\$727.70	\$744.67	\$16.97	2.3%	24	69	14.7%
13	3,614	4,072	\$377.19	\$396.19	\$19.01	5.0%	\$852.52	\$871.53	\$19.01	2.2%	23	92	19.7%
14	4,072	4,600	\$405.98	\$426.45	\$20.47	5.0%	\$940.39	\$960.85	\$20.47	2.2%	24	116	24.8%
15	4,600	5,067	\$432.48	\$454.28	\$21.80	5.0%	\$1,024.37	\$1,046.17	\$21.80	2.1%	23	139	29.7%
16	5,067	5,512	\$468.05	\$491.65	\$23.60	5.0%	\$1,116.35	\$1,139.95	\$23.60	2.1%	24	163	34.8%
17	5,512	5,988	\$485.32	\$509.79	\$24.48	5.0%	\$1,185.66	\$1,210.13	\$24.48	2.1%	23	186	39.7%
18	5,988	6,685	\$528.23	\$554.87	\$26.64	5.0%	\$1,298.97	\$1,325.61	\$26.64	2.1%	24	210	44.9%
19	6,685	7,185	\$567.73	\$596.36	\$28.64	5.0%	\$1,425.18	\$1,453.81	\$28.64	2.0%	23	233	49.8%
20	7,185	7,770	\$581.52	\$610.86	\$29.34	5.0%	\$1,494.07	\$1,523.41	\$29.34	2.0%	23	256	54.7%
21	7,770	8,358	\$610.79	\$641.62	\$30.82	5.0%	\$1,592.88	\$1,623.70	\$30.82	1.9%	24	280	59.8%
22	8,358	8,965	\$652.81	\$685.75	\$32.94	5.0%	\$1,710.64	\$1,743.58	\$32.94	1.9%	23	303	64.7%
23	8,965	9,621	\$693.04	\$728.02	\$34.98	5.0%	\$1,833.43	\$1,868.41	\$34.98	1.9%	24	327	69.9%
24	9,621	10,026	\$716.34	\$752.50	\$36.16	5.0%	\$1,913.11	\$1,949.27	\$36.16	1.9%	23	350	74.8%
25	10,026	10,750	\$745.49	\$783.13	\$37.63	5.0%	\$2,012.13	\$2,049.77	\$37.63	1.9%	24	374	79.9%
26	10,750	11,866	\$784.84	\$824.47	\$39.63	5.0%	\$2,156.73	\$2,196.36	\$39.63	1.8%	23	397	84.8%
27	11,866	13,530	\$885.41	\$930.11	\$44.71	5.0%	\$2,444.57	\$2,489.28	\$44.71	1.8%	24	421	90.0%
28	13,530	15,874	\$987.90	\$1,037.80	\$49.90	5.1%	\$2,786.64	\$2,836.54	\$49.90	1.8%	23	444	94.9%
29	15,874	30,062	\$1,271.21	\$1,335.45	\$64.24	5.1%	\$3,722.66	\$3,786.90	\$64.24	1.7%	24	468	100.0%

89C-11

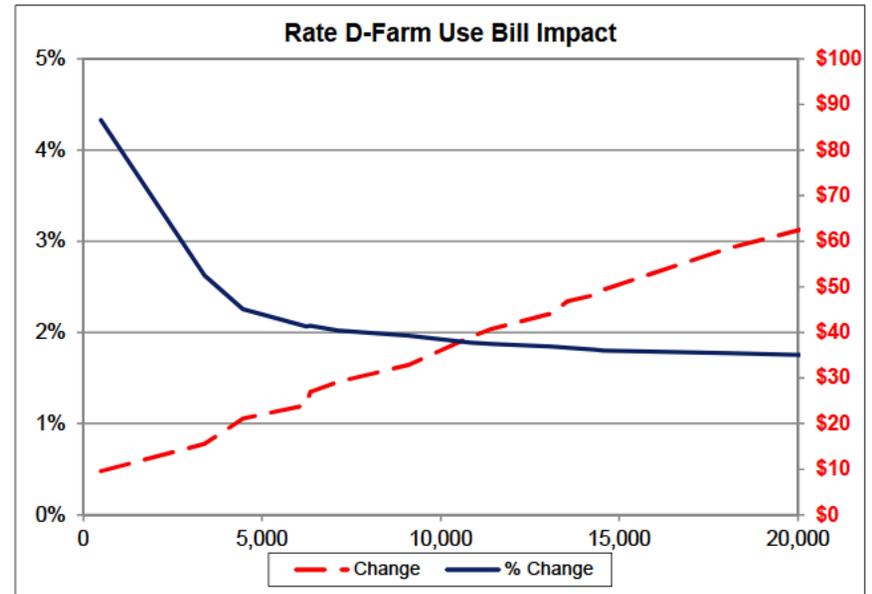
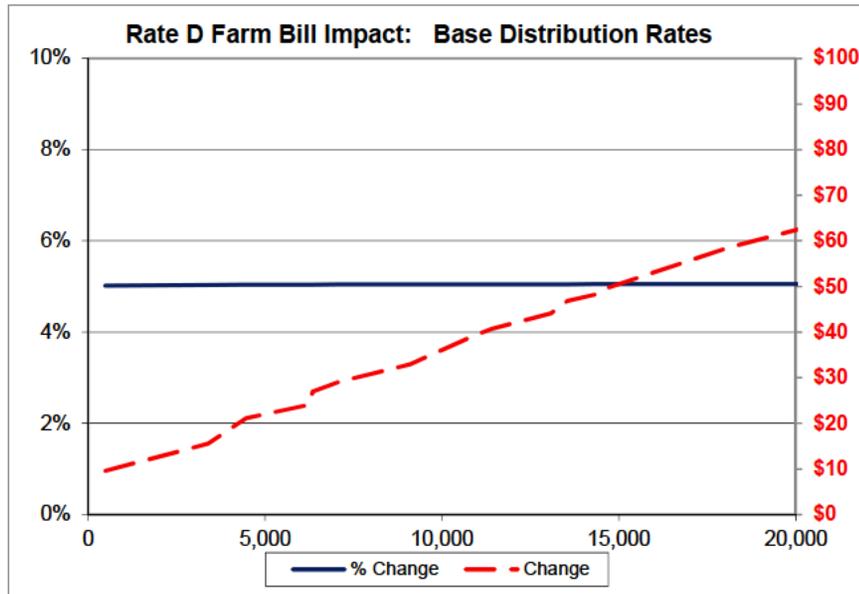
COMPARATIVE ANNUAL BILLS UNDER PROPOSED PERMANENT AND PROPOSED STEP ADJUSTMENT RATES
 RATE D : DOMESTIC SERVICE - Farm Use

D Proposed Permanent Rates	
Energy Services	\$0.08299
Other Tracking Mechanisms	\$0.03900
Customer charge	\$14.76
Farm Use	\$0.05413
First 250 kWh	\$0.05737
Excess 250 kWh	\$0.05737

D Proposed Step Adj. Rates	
Energy Services	\$0.08299
Other Tracking Mechanisms	\$0.03900
Customer charge	\$15.50
Farm Use	\$0.05687
First 250 kWh	\$0.06027
Excess 250 kWh	\$0.06027

D Proposed Permanent Rates	
Energy Services	\$0.00000
Other Tracking Mechanisms	\$0.03900
Customer charge	\$14.76
Farm Use	\$0.05413
First 250 kWh	\$0.05737
Excess 250 kWh	\$0.05737

D Proposed Step Adj. Rates	
Energy Services	\$0.00000
Other Tracking Mechanisms	\$0.03900
Customer charge	\$15.50
Farm Use	\$0.05687
First 250 kWh	\$0.06027
Excess 250 kWh	\$0.06027



COMPARATIVE ANNUAL BILLS UNDER PROPOSED PERMANENT AND PROPOSED STEP ADJUSTMENT RATES
 RATE D : DOMESTIC SERVICE - Farm Use

Line

D Proposed Permanent Rates		D Proposed Step Adj. Rates	
Energy Services	\$0.08299	Energy Services	\$0.08299
Other Tracking Mechanisms	\$0.03900	Other Tracking Mechanisms	\$0.03900
Customer charge	\$14.76	Customer charge	\$15.50
Farm Use	\$0.05413	Farm Use	\$0.05687
First 250 kWh	\$0.05737	First 250 kWh	\$0.06027
Excess 250 kWh	\$0.05737	Excess 250 kWh	\$0.06027

Annual Use Range (kWh)		Average Annual Bills (Excluding Tracking Mechanisms)				Annual Bills (Including Tracking Mechanisms)				Customers in Ranges			
Low	High	Current Rates	Proposed Rates	Change	% Change	Current Rates	Proposed Rates	Change	% Change	Number of customers	Cumulative customers	% Cumulative customers	
10	0	487	\$191.43	\$201.03	\$9.60	5.0%	\$221.87	\$231.47	\$9.60	4.3%	2	2	3.6%
11	487	3,385	\$309.30	\$324.86	\$15.56	5.0%	\$591.99	\$607.55	\$15.56	2.6%	3	5	9.1%
12	3,385	4,472	\$419.62	\$440.76	\$21.14	5.0%	\$937.38	\$958.52	\$21.14	2.3%	3	8	14.5%
13	4,472	6,235	\$477.21	\$501.27	\$24.06	5.0%	\$1,163.81	\$1,187.87	\$24.06	2.1%	3	11	20.0%
14	6,235	6,348	\$536.22	\$563.26	\$27.03	5.0%	\$1,304.39	\$1,331.43	\$27.03	2.1%	2	13	23.6%
15	6,348	7,125	\$579.08	\$608.29	\$29.20	5.0%	\$1,444.64	\$1,473.85	\$29.20	2.0%	3	16	29.1%
16	7,125	9,093	\$652.35	\$685.26	\$32.91	5.0%	\$1,674.87	\$1,707.78	\$32.91	2.0%	3	19	34.5%
17	9,093	10,838	\$773.67	\$812.72	\$39.05	5.0%	\$2,068.31	\$2,107.36	\$39.05	1.9%	3	22	40.0%
18	10,838	11,409	\$807.81	\$848.59	\$40.77	5.0%	\$2,174.46	\$2,215.24	\$40.77	1.9%	2	24	43.6%
19	11,409	13,076	\$874.28	\$918.42	\$44.14	5.0%	\$2,389.39	\$2,433.53	\$44.14	1.8%	3	27	49.1%
20	13,076	13,545	\$927.19	\$974.00	\$46.81	5.0%	\$2,556.28	\$2,603.10	\$46.81	1.8%	3	30	54.5%
21	13,545	14,316	\$955.52	\$1,003.78	\$48.26	5.1%	\$2,666.19	\$2,714.44	\$48.26	1.8%	3	33	60.0%
22	14,316	14,558	\$978.40	\$1,027.82	\$49.42	5.1%	\$2,742.92	\$2,792.34	\$49.42	1.8%	2	35	63.6%
23	14,558	18,073	\$1,158.65	\$1,217.18	\$58.53	5.1%	\$3,301.45	\$3,359.98	\$58.53	1.8%	3	38	69.1%
24	18,073	21,246	\$1,284.79	\$1,349.70	\$64.92	5.1%	\$3,724.51	\$3,789.42	\$64.92	1.7%	3	41	74.5%
25	21,246	26,756	\$1,632.92	\$1,715.45	\$82.53	5.1%	\$4,843.25	\$4,925.78	\$82.53	1.7%	3	44	80.0%
26	26,756	35,641	\$1,983.25	\$2,083.53	\$100.28	5.1%	\$6,007.70	\$6,107.98	\$100.28	1.7%	2	46	83.6%
27	35,641	50,091	\$2,636.25	\$2,769.57	\$133.32	5.1%	\$8,105.22	\$8,238.54	\$133.32	1.6%	3	49	89.1%
28	50,091	132,674	\$4,921.17	\$5,170.15	\$248.98	5.1%	\$15,552.03	\$15,801.01	\$248.98	1.6%	3	52	94.5%
29	132,674	722,508	\$19,962.72	\$20,972.11	\$1,009.39	5.1%	\$62,706.35	\$63,715.74	\$1,009.39	1.6%	3	55	100.0%

11-370

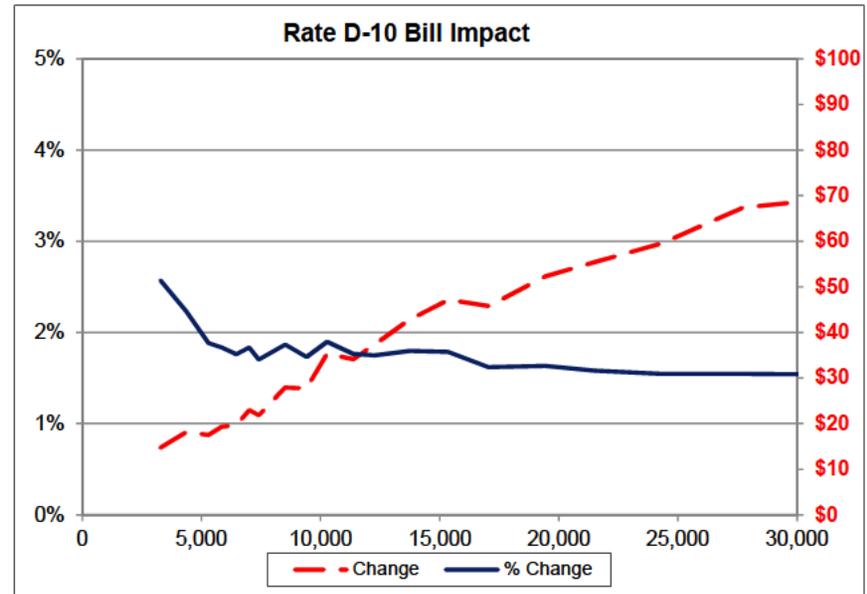
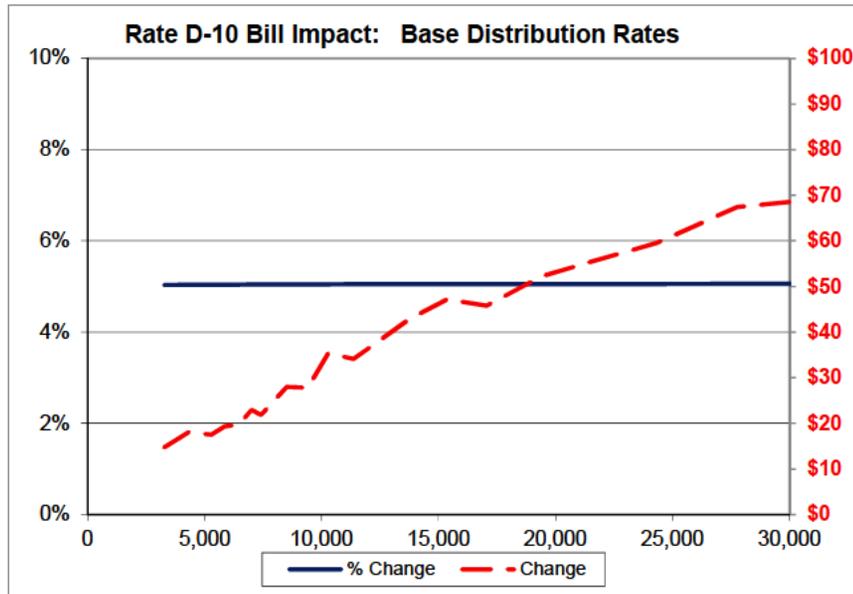
COMPARATIVE ANNUAL BILLS UNDER PROPOSED PERMANENT AND PROPOSED STEP ADJUSTMENT RATES
 RATE D-10 : DOMESTIC SERVICE Optional Peak Load Pricing

D10 Proposed Permanent Rates	
Energy Services	\$0.08299
Other Tracking Mechanisms	\$0.03505
Customer charge	\$14.76
Peak kWh	\$0.12200
Off Peak kWh	\$0.00169

D10 Proposed Step Adj. Rates	
Energy Services	\$0.08299
Other Tracking Mechanisms	\$0.03505
Customer charge	\$15.50
Peak kWh	\$0.12817
Off Peak kWh	\$0.00178

D10 Proposed Permanent Rates	
Energy Services	\$0.00000
Other Tracking Mechanisms	\$0.03505
Customer charge	\$14.76
Peak kWh	\$0.12200
Off Peak kWh	\$0.00169

D10 Proposed Step Adj. Rates	
Energy Services	\$0.00000
Other Tracking Mechanisms	\$0.03505
Customer charge	\$15.50
Peak kWh	\$0.12817
Off Peak kWh	\$0.00178



COMPARATIVE ANNUAL BILLS UNDER PROPOSED PERMANENT AND PROPOSED STEP ADJUSTMENT RATES
 RATE D-10 : DOMESTIC SERVICE Optional Peak Load Pricing

Line

1
2
3
4
5
6
7
8
9

D10 Proposed Permanent Rates	
Energy Services	\$0.08299
Other Tracking Mechanisms	\$0.03505
Customer charge	\$14.76
Peak kWh	\$0.12200
Off Peak kWh	\$0.00169

D10 Proposed Step Adj. Rates	
Energy Services	\$0.08299
Other Tracking Mechanisms	\$0.03505
Customer charge	\$15.50
Peak kWh	\$0.12817
Off Peak kWh	\$0.00178

	Annual Use Range (kWh)		Average Annual Bills (Excluding Tracking Mechanisms)				Annual Bills (Including Tracking Mechanisms)				Customers in Ranges		
	Low	High	Current Rates	Proposed Rates	Change	% Change	Current Rates	Proposed Rates	Change	% Change	Number of customers	Cumulative customers	% Cumulative customers
10	0	3,272	\$293.12	\$307.88	\$14.76	5.0%	\$573.89	\$588.65	\$14.76	2.6%	20	20	4.6%
11	3,272	4,337	\$359.63	\$377.75	\$18.12	5.0%	\$809.84	\$827.96	\$18.12	2.2%	22	42	9.6%
12	4,337	5,290	\$347.23	\$364.73	\$17.50	5.0%	\$928.05	\$945.55	\$17.50	1.9%	22	64	14.7%
13	5,290	5,859	\$383.41	\$402.74	\$19.33	5.0%	\$1,053.65	\$1,072.98	\$19.33	1.8%	22	86	19.7%
14	5,859	6,467	\$391.25	\$410.98	\$19.73	5.0%	\$1,120.18	\$1,139.91	\$19.73	1.8%	22	108	24.8%
15	6,467	7,006	\$455.15	\$478.11	\$22.96	5.0%	\$1,251.35	\$1,274.31	\$22.96	1.8%	22	130	29.8%
16	7,006	7,408	\$433.47	\$455.34	\$21.87	5.0%	\$1,283.05	\$1,304.92	\$21.87	1.7%	21	151	34.6%
17	7,408	8,506	\$553.77	\$581.72	\$27.95	5.0%	\$1,498.17	\$1,526.12	\$27.95	1.9%	22	173	39.7%
18	8,506	9,408	\$550.06	\$577.83	\$27.77	5.0%	\$1,605.54	\$1,633.31	\$27.77	1.7%	22	195	44.7%
19	9,408	10,276	\$700.15	\$735.51	\$35.36	5.0%	\$1,862.03	\$1,897.38	\$35.36	1.9%	22	217	49.8%
20	10,276	11,375	\$676.42	\$710.58	\$34.16	5.1%	\$1,932.79	\$1,966.95	\$34.16	1.8%	22	239	54.8%
21	11,375	12,247	\$739.42	\$776.77	\$37.35	5.1%	\$2,137.57	\$2,174.93	\$37.35	1.7%	22	261	59.9%
22	12,247	13,747	\$847.77	\$890.60	\$42.83	5.1%	\$2,383.96	\$2,426.79	\$42.83	1.8%	22	283	64.9%
23	13,747	15,366	\$933.73	\$980.91	\$47.18	5.1%	\$2,639.73	\$2,686.91	\$47.18	1.8%	21	304	69.7%
24	15,366	17,055	\$905.65	\$951.43	\$45.77	5.1%	\$2,828.48	\$2,874.25	\$45.77	1.6%	22	326	74.8%
25	17,055	19,418	\$1,034.52	\$1,086.81	\$52.29	5.1%	\$3,202.34	\$3,254.64	\$52.29	1.6%	22	348	79.8%
26	19,418	21,508	\$1,096.15	\$1,151.57	\$55.42	5.1%	\$3,506.67	\$3,562.09	\$55.42	1.6%	22	370	84.9%
27	21,508	24,317	\$1,178.03	\$1,237.60	\$59.57	5.1%	\$3,856.37	\$3,915.94	\$59.57	1.5%	22	392	89.9%
28	24,317	27,759	\$1,333.41	\$1,400.84	\$67.43	5.1%	\$4,359.88	\$4,427.31	\$67.43	1.5%	22	414	95.0%
29	27,759	64,654	\$1,702.65	\$1,788.78	\$86.13	5.1%	\$5,819.97	\$5,906.10	\$86.13	1.5%	22	436	100.0%

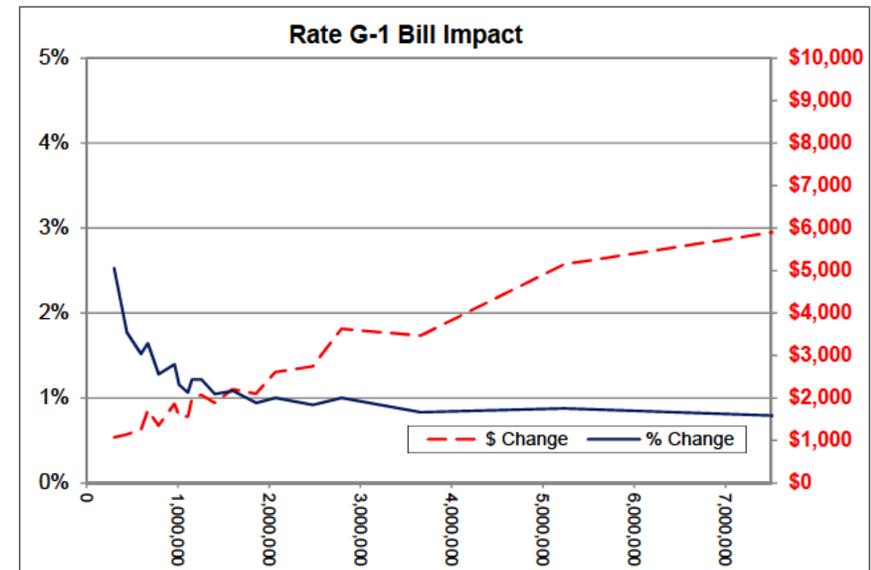
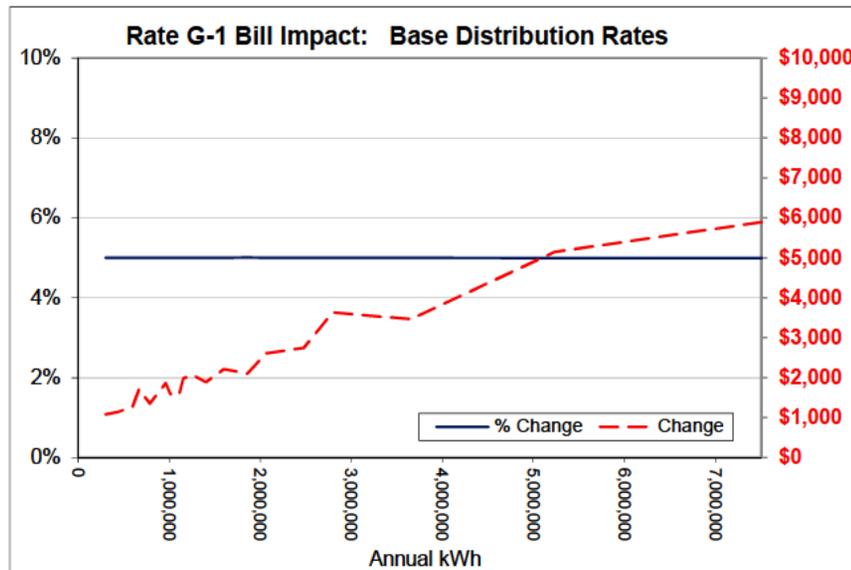
COMPARATIVE ANNUAL BILLS UNDER PROPOSED PERMANENT AND PROPOSED STEP ADJUSTMENT RATES
 RATE G-1: GENERAL SERVICE TIME-OF-USE

G-1 Proposed Permanent Rates	
Energy Services	\$0.07542
Other Tracking Mechanisms	\$0.03201
Customer charge	\$384.47
Demand Charge	\$8.22
Peak kWh	\$0.00528
Off Peak kWh	\$0.00158

G-1 Proposed Step Adj. Rates	
Energy Services	\$0.07542
Other Tracking Mechanisms	\$0.03201
Customer charge	\$403.87
Demand Charge	\$8.63
Peak kWh	\$0.00555
Off Peak kWh	\$0.00166

G-1 Proposed Permanent Rates	
Energy Services	\$0.00000
Other Tracking Mechanisms	\$0.03201
Customer charge	\$384.47
Peak kWh	\$0.00528
Off Peak kWh	\$0.00158

G-1 Proposed Step Adj. Rates	
Energy Services	\$0.00000
Other Tracking Mechanisms	\$0.03201
Customer charge	\$403.87
Peak kWh	\$0.00555
Off Peak kWh	\$0.00166



COMPARATIVE ANNUAL BILLS UNDER PROPOSED PERMANENT AND PROPOSED STEP ADJUSTMENT RATES
 RATE G-1: GENERAL SERVICE TIME-OF-USE

Line

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

G-1 Proposed Permanent Rates		G-1 Proposed Step Adj. Rates	
Energy Services	\$0.07542	Energy Services	\$0.07542
Other Tracking Mechanisms	\$0.03201	Other Tracking Mechanisms	\$0.03201
Customer charge	\$384.47	Customer charge	\$403.87
Demand charge	\$8.22	Demand charge	\$8.63
Peak kWh	\$0.00528	Peak kWh	\$0.00555
Off Peak kWh	\$0.00158	Off Peak kWh	\$0.00166

	Annual Use Range (kWh)		Average Annual Bills (Excluding Tracking)				Annual Bills (Including Tracking Mechanisms)				Customers in Ranges			Average Annual kWh	Average \$ per kWh	
	Low	High	Current Rates	Proposed Rates	Change	% Change	Current Rates	Proposed Rates	\$ Change	% Change	Number of customers	Cumulative customers	% Cumulative customers		Current Rates	Proposed Rates
10	0	299,386	\$21,564	\$22,643	\$1,078	5.0%	\$42,627	\$43,705	\$1,078	2.5%	6	6	4.4%	175,391	\$0.1230	\$0.1291
11	299,386	437,986	\$22,822	\$23,964	\$1,142	5.0%	\$64,373	\$65,515	\$1,142	1.8%	7	13	9.6%	366,979	\$0.0622	\$0.0653
12	437,986	595,428	\$25,281	\$26,547	\$1,266	5.0%	\$83,280	\$84,546	\$1,266	1.5%	7	20	14.8%	517,382	\$0.0489	\$0.0513
13	595,428	669,238	\$34,261	\$35,975	\$1,714	5.0%	\$104,225	\$105,939	\$1,714	1.6%	7	27	20.0%	640,708	\$0.0535	\$0.0561
14	669,238	787,986	\$27,103	\$28,459	\$1,356	5.0%	\$105,968	\$107,324	\$1,356	1.3%	6	33	24.4%	714,318	\$0.0379	\$0.0398
15	787,986	961,987	\$37,233	\$39,095	\$1,862	5.0%	\$133,499	\$135,361	\$1,862	1.4%	7	40	29.6%	871,224	\$0.0427	\$0.0449
16	961,987	1,011,107	\$31,778	\$33,369	\$1,590	5.0%	\$137,035	\$138,626	\$1,590	1.2%	7	47	34.8%	972,757	\$0.0327	\$0.0343
17	1,011,107	1,109,539	\$31,269	\$32,834	\$1,565	5.0%	\$146,802	\$148,367	\$1,565	1.1%	7	54	40.0%	1,061,363	\$0.0295	\$0.0309
18	1,109,539	1,153,487	\$39,635	\$41,618	\$1,983	5.0%	\$162,353	\$164,337	\$1,983	1.2%	6	60	44.4%	1,134,986	\$0.0349	\$0.0367
19	1,153,487	1,255,188	\$41,436	\$43,509	\$2,074	5.0%	\$169,933	\$172,006	\$2,074	1.2%	7	67	49.6%	1,181,570	\$0.0351	\$0.0368
20	1,255,188	1,400,986	\$37,669	\$39,555	\$1,886	5.0%	\$180,155	\$182,041	\$1,886	1.0%	7	74	54.8%	1,305,488	\$0.0289	\$0.0303
21	1,400,986	1,601,988	\$44,151	\$46,360	\$2,210	5.0%	\$203,652	\$205,862	\$2,210	1.1%	7	81	60.0%	1,455,987	\$0.0303	\$0.0318
22	1,601,988	1,855,786	\$42,018	\$44,122	\$2,104	5.0%	\$223,240	\$225,344	\$2,104	0.9%	6	87	64.4%	1,644,581	\$0.0255	\$0.0268
23	1,855,786	2,067,586	\$52,178	\$54,789	\$2,610	5.0%	\$260,471	\$263,081	\$2,610	1.0%	7	94	69.6%	1,908,611	\$0.0273	\$0.0287
24	2,067,586	2,480,391	\$54,917	\$57,664	\$2,748	5.0%	\$298,447	\$301,195	\$2,748	0.9%	7	101	74.8%	2,207,903	\$0.0249	\$0.0261
25	2,480,391	2,792,386	\$72,606	\$76,240	\$3,634	5.0%	\$362,011	\$365,645	\$3,634	1.0%	7	108	80.0%	2,649,323	\$0.0274	\$0.0288
26	2,792,386	3,656,788	\$69,281	\$72,747	\$3,467	5.0%	\$416,154	\$419,621	\$3,467	0.8%	6	114	84.4%	3,084,763	\$0.0225	\$0.0236
27	3,656,788	5,231,786	\$102,879	\$108,023	\$5,144	5.0%	\$585,863	\$591,007	\$5,144	0.9%	7	121	89.6%	4,270,802	\$0.0241	\$0.0253
28	5,231,786	8,164,189	\$122,252	\$128,365	\$6,113	5.0%	\$795,398	\$801,510	\$6,113	0.8%	7	128	94.8%	5,846,987	\$0.0209	\$0.0220
29	8,164,189	58,034,730	\$451,106	\$473,667	\$22,561	5.0%	\$2,774,417	\$2,796,978	\$22,561	0.8%	7	135	100.0%	14,501,914	\$0.0311	\$0.0327

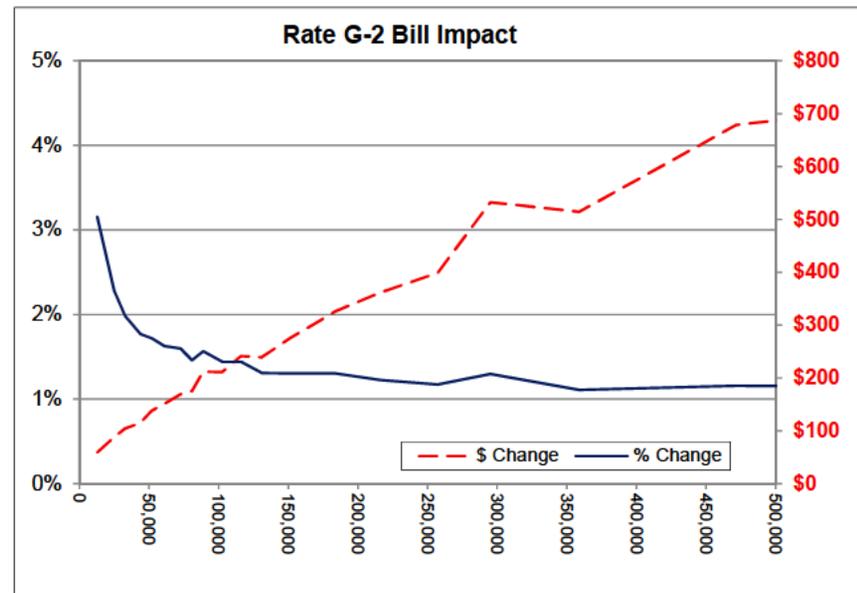
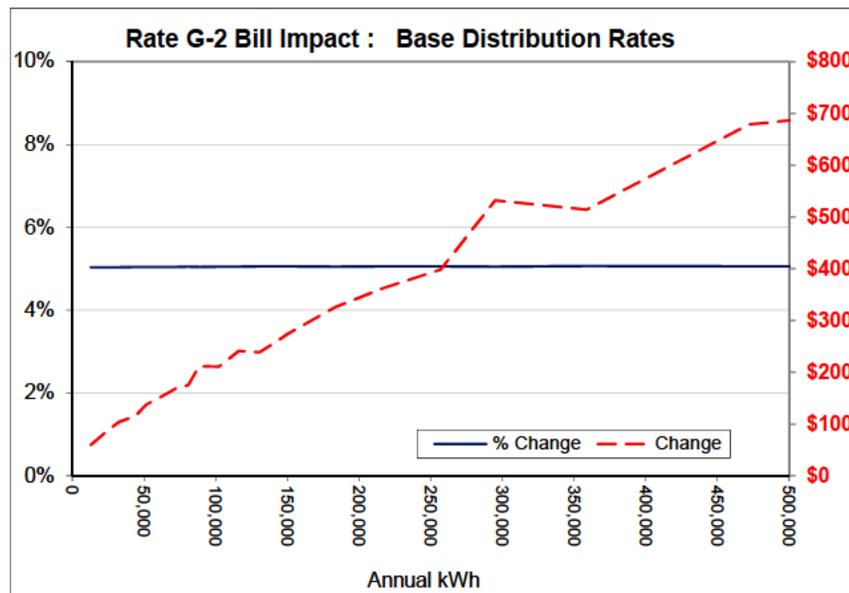
COMPARATIVE ANNUAL BILLS UNDER PROPOSED PERMANENT AND PROPOSED STEP ADJUSTMENT RATES
 RATE G-2: GENERAL LONG HOUR SERVICE

G-2 Proposed Permanent Rates	
Energy Services	\$0.07542
Other Tracking Mechanisms	\$0.03523
Customer charge	\$64.11
Demand Charge	\$9.19
kWh Charge	\$0.00283

G-2 Proposed Step Adj. Rates	
Energy Services	\$0.07542
Other Tracking Mechanisms	\$0.03523
Customer charge	\$67.35
Demand Charge	\$9.65
kWh Charge	\$0.00299

G-2 Proposed Permanent Rates	
Energy Services	\$0.00000
Other Tracking Mechanisms	\$0.03523
Customer charge	\$64.11
Demand Charge	\$9.19
kWh Charge	\$0.00283

G-2 Proposed Step Adj. Rates	
Energy Services	\$0.00000
Other Tracking Mechanisms	\$0.03523
Customer charge	\$67.35
Demand Charge	\$9.65
kWh Charge	\$0.00299



COMPARATIVE ANNUAL BILLS UNDER PROPOSED PERMANENT AND PROPOSED STEP ADJUSTMENT RATES
 RATE G-2: GENERAL LONG HOUR SERVICE

Line
 1
 2
 3
 4
 5
 6
 7
 8
 9

G-2 Proposed Permanent Rates		G-2 Proposed Step Adj. Rates	
Energy Services	\$0.07542	Energy Services	\$0.07542
Other Tracking Mechanisms	\$0.03523	Other Tracking Mechanisms	\$0.03523
Customer charge	\$64.11	Customer charge	\$67.35
Demand charge	\$9.19	Demand charge	\$9.65
kWh Charge	\$0.00283	kWh Charge	\$0.00299

	Annual Use Range		Average Annual Bills (Excluding Tracking)				Annual Bills (Including Tracking Mechanisms)				Customers in Ranges			Average \$ per kWh		
	Low	High	Current Rates	Proposed Rates	Change	% Change	Current Rates	Proposed Rates	\$ Change	% Change	Number of customers	Cumulative customers	% Cumulative customers	Average Annual kWh	Current Rates	Proposed Rates
10	0	12,846	\$1,184	\$1,243	\$60	5.0%	\$1,887	\$1,947	\$60	3.2%	39	39	4.5%	5,599	\$0.2114	\$0.2221
11	12,846	24,865	\$1,746	\$1,834	\$88	5.0%	\$3,841	\$3,929	\$88	2.3%	43	82	9.5%	18,654	\$0.0936	\$0.0983
12	24,865	32,964	\$2,075	\$2,180	\$105	5.0%	\$5,295	\$5,399	\$105	2.0%	44	126	14.6%	28,908	\$0.0718	\$0.0754
13	32,964	43,786	\$2,284	\$2,400	\$115	5.0%	\$6,513	\$6,629	\$115	1.8%	43	169	19.6%	37,969	\$0.0602	\$0.0632
14	43,786	51,821	\$2,736	\$2,874	\$138	5.0%	\$8,020	\$8,158	\$138	1.7%	43	212	24.6%	47,573	\$0.0575	\$0.0604
15	51,821	60,673	\$2,991	\$3,142	\$151	5.0%	\$9,259	\$9,410	\$151	1.6%	44	256	29.7%	56,448	\$0.0530	\$0.0557
16	60,673	72,534	\$3,355	\$3,525	\$169	5.0%	\$10,573	\$10,743	\$169	1.6%	43	299	34.6%	64,956	\$0.0517	\$0.0543
17	72,534	80,887	\$3,473	\$3,649	\$175	5.1%	\$12,003	\$12,178	\$175	1.5%	43	342	39.6%	76,892	\$0.0452	\$0.0475
18	80,887	88,708	\$4,196	\$4,408	\$212	5.0%	\$13,529	\$13,741	\$212	1.6%	44	386	44.7%	84,167	\$0.0499	\$0.0524
19	88,708	102,493	\$4,182	\$4,393	\$211	5.1%	\$14,654	\$14,865	\$211	1.4%	43	429	49.7%	94,319	\$0.0443	\$0.0466
20	102,493	116,102	\$4,781	\$5,022	\$241	5.1%	\$16,739	\$16,980	\$241	1.4%	43	472	54.7%	107,752	\$0.0444	\$0.0466
21	116,102	130,794	\$4,724	\$4,963	\$239	5.1%	\$18,223	\$18,462	\$239	1.3%	44	516	59.8%	121,668	\$0.0388	\$0.0408
22	130,794	151,193	\$5,448	\$5,724	\$275	5.1%	\$21,078	\$21,354	\$275	1.3%	43	559	64.8%	140,781	\$0.0387	\$0.0407
23	151,193	183,655	\$6,447	\$6,773	\$326	5.1%	\$24,953	\$25,279	\$326	1.3%	43	602	69.8%	166,489	\$0.0387	\$0.0407
24	183,655	216,195	\$7,146	\$7,508	\$362	5.1%	\$29,466	\$29,828	\$362	1.2%	44	646	74.9%	200,973	\$0.0356	\$0.0374
25	216,195	257,193	\$7,876	\$8,274	\$399	5.1%	\$33,916	\$34,315	\$399	1.2%	43	689	79.8%	234,386	\$0.0336	\$0.0353
26	257,193	295,033	\$10,528	\$11,061	\$532	5.1%	\$40,952	\$41,484	\$532	1.3%	43	732	84.8%	274,075	\$0.0384	\$0.0404
27	295,033	358,876	\$10,146	\$10,660	\$514	5.1%	\$46,236	\$46,750	\$514	1.1%	44	776	89.9%	324,711	\$0.0312	\$0.0328
28	358,876	471,796	\$13,406	\$14,085	\$679	5.1%	\$58,549	\$59,227	\$679	1.2%	43	819	94.9%	405,352	\$0.0331	\$0.0347
29	471,796	2,019,793	\$21,933	\$23,046	\$1,112	5.1%	\$110,006	\$111,118	\$1,112	1.0%	44	863	100.0%	760,776	\$0.0288	\$0.0303

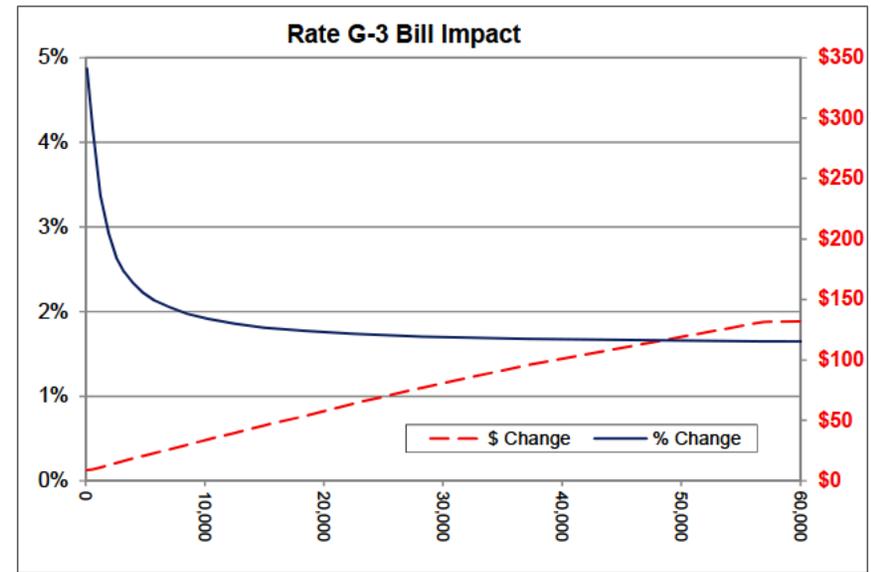
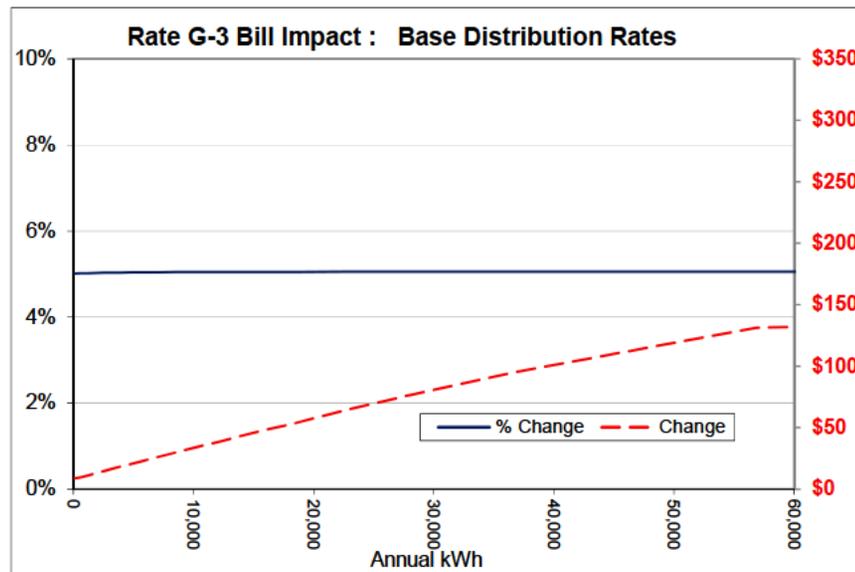
COMPARATIVE ANNUAL BILLS UNDER PROPOSED PERMANENT AND PROPOSED STEP ADJUSTMENT RATES
 RATE G-3: GENERAL SERVICE

G-3 Proposed Permanent Rates	
Energy Services	\$0.08299
Other Tracking Mechanisms	\$0.03541
Customer charge	\$14.76
kWh Charge	\$0.05333

G-3 Proposed Step Adj. Rates	
Energy Services	\$0.08299
Other Tracking Mechanisms	\$0.03541
Customer charge	\$15.50
kWh Charge	\$0.05603

G-3 Proposed Permanent Rates	
Energy Services	\$0.00000
Other Tracking Mechanisms	\$0.03541
Customer charge	\$14.76
kWh Charge	\$0.05333

G-3 Proposed Step Adj. Rates	
Energy Services	\$0.00000
Other Tracking Mechanisms	\$0.03541
Customer charge	\$15.50
kWh Charge	\$0.05603



COMPARATIVE ANNUAL BILLS UNDER PROPOSED PERMANENT AND PROPOSED STEP ADJUSTMENT RATES
 RATE G-3: GENERAL SERVICE

Line
 1
 2
 3
 4
 5
 6
 7
 8
 9

G-3 Proposed Permanent Rates		G-3 Proposed Step Adj. Rates	
Energy Services	\$0.08299	Energy Services	\$0.08299
Other Tracking Mechanisms	\$0.03541	Other Tracking Mechanisms	\$0.03541
Customer charge	\$14.76	Customer charge	\$15.50
kWh Charge	\$0.05333	kWh Charge	\$0.05603

	Annual Use Range		Average Annual Bills (Excluding Tracking)				Annual Bills (Including Tracking Mechanisms)				Customers in Ranges			Average Annual kWh	Average \$ per kWh	
	Low	High	Current Rates	Proposed Rates	Change	% Change	Current Rates	Proposed Rates	\$ Change	% Change	Number of customers	Cumulative customers	% Cumulative customers		Current Rates	Proposed Rates
10	0	120	\$176	\$185	\$9	5.0%	\$182	\$190	\$9	4.9%	182	182	3.3%	29	\$6.1832	\$6.4932
11	120	581	\$193	\$202	\$10	5.0%	\$232	\$242	\$10	4.2%	277	459	8.4%	333	\$0.5788	\$0.6079
12	581	1,235	\$224	\$235	\$11	5.0%	\$333	\$344	\$11	3.4%	278	737	13.5%	920	\$0.2433	\$0.2555
13	1,235	1,922	\$261	\$274	\$13	5.0%	\$448	\$461	\$13	2.9%	277	1014	18.6%	1,580	\$0.1651	\$0.1734
14	1,922	2,570	\$296	\$311	\$15	5.0%	\$564	\$579	\$15	2.6%	277	1291	23.7%	2,263	\$0.1308	\$0.1374
15	2,570	3,218	\$329	\$346	\$17	5.0%	\$672	\$688	\$17	2.5%	278	1569	28.8%	2,888	\$0.1140	\$0.1198
16	3,218	3,960	\$366	\$385	\$18	5.0%	\$788	\$807	\$18	2.3%	277	1846	33.9%	3,564	\$0.1027	\$0.1079
17	3,960	4,813	\$409	\$429	\$21	5.0%	\$926	\$947	\$21	2.2%	277	2123	38.9%	4,367	\$0.0936	\$0.0983
18	4,813	5,738	\$455	\$478	\$23	5.0%	\$1,075	\$1,098	\$23	2.1%	278	2401	44.0%	5,230	\$0.0870	\$0.0914
19	5,738	6,985	\$514	\$539	\$26	5.0%	\$1,261	\$1,287	\$26	2.1%	277	2678	49.1%	6,306	\$0.0814	\$0.0855
20	6,985	8,531	\$592	\$622	\$30	5.0%	\$1,514	\$1,544	\$30	2.0%	277	2955	54.2%	7,782	\$0.0760	\$0.0799
21	8,531	10,250	\$678	\$713	\$34	5.0%	\$1,789	\$1,823	\$34	1.9%	278	3233	59.3%	9,374	\$0.0724	\$0.0760
22	10,250	12,465	\$781	\$821	\$39	5.1%	\$2,121	\$2,161	\$39	1.9%	277	3510	64.4%	11,311	\$0.0691	\$0.0726
23	12,465	14,987	\$907	\$953	\$46	5.1%	\$2,530	\$2,576	\$46	1.8%	277	3787	69.5%	13,695	\$0.0663	\$0.0696
24	14,987	18,468	\$1,065	\$1,119	\$54	5.1%	\$3,039	\$3,092	\$54	1.8%	278	4065	74.6%	16,655	\$0.0640	\$0.0672
25	18,468	22,444	\$1,265	\$1,329	\$64	5.1%	\$3,679	\$3,743	\$64	1.7%	277	4342	79.6%	20,374	\$0.0621	\$0.0652
26	22,444	28,211	\$1,521	\$1,598	\$77	5.1%	\$4,507	\$4,584	\$77	1.7%	277	4619	84.7%	25,194	\$0.0604	\$0.0634
27	28,211	37,030	\$1,893	\$1,989	\$96	5.1%	\$5,701	\$5,797	\$96	1.7%	278	4897	89.8%	32,135	\$0.0589	\$0.0619
28	37,030	56,880	\$2,600	\$2,732	\$132	5.1%	\$7,980	\$8,112	\$132	1.6%	277	5174	94.9%	45,366	\$0.0573	\$0.0602
29	56,880	1,043,800	\$5,663	\$5,950	\$287	5.1%	\$17,843	\$18,130	\$287	1.6%	278	5452	100.0%	99,321	\$0.0570	\$0.0599

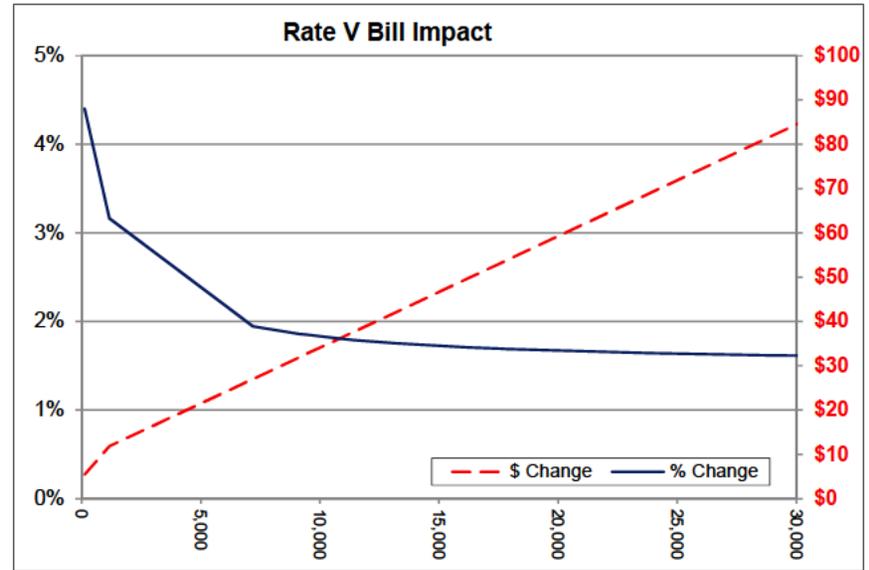
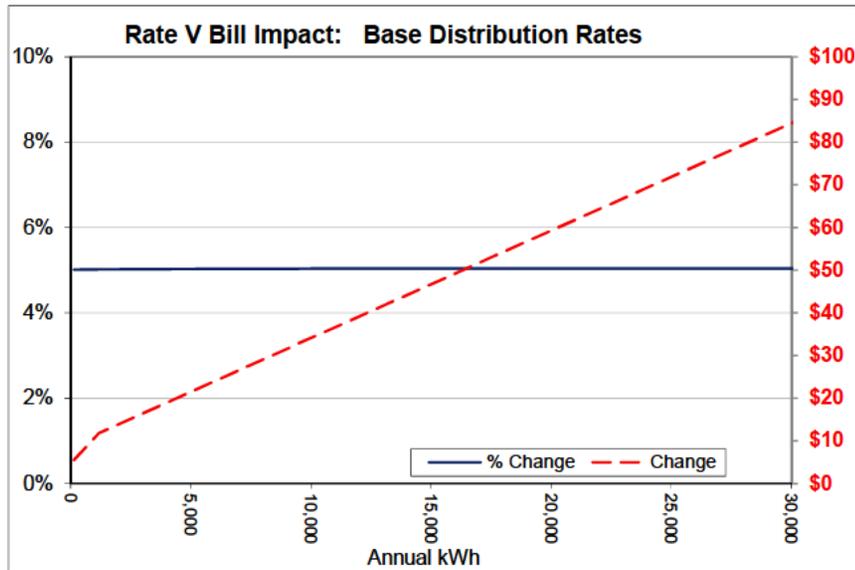
COMPARATIVE ANNUAL BILLS UNDER PROPOSED PERMANENT AND PROPOSED STEP ADJUSTMENT RATES
 RATE V: LIMITED COMMERCIAL SPACE HEATING

V Proposed Permanent Rates	
Energy Services	\$0.08299
Other Tracking Mechanisms	\$0.03549
Customer charge	\$14.76
kWh Charge	\$0.04988

V Proposed Step Adj. Rates	
Energy Services	\$0.08299
Other Tracking Mechanisms	\$0.03549
Customer charge	\$15.50
kWh Charge	\$0.05240

V Proposed Permanent Rates	
Energy Services	\$0.00000
Other Tracking Mechanisms	\$0.03549
Customer charge	\$14.76
kWh Charge	\$0.04988

V Proposed Step Adj. Rates	
Energy Services	\$0.00000
Other Tracking Mechanisms	\$0.03549
Customer charge	\$15.50
kWh Charge	\$0.05240



COMPARATIVE ANNUAL BILLS UNDER PROPOSED PERMANENT AND PROPOSED STEP ADJUSTMENT RATES
 RATE V: LIMITED COMMERCIAL SPACE HEATING

Line
 1
 2
 3
 4
 5
 6
 7
 8
 9

V Proposed Permanent Rates		V Proposed Step Adj. Rates	
Energy Services	\$0.08299	Energy Services	\$0.08299
Other Tracking Mechanisms	\$0.03549	Other Tracking Mechanisms	\$0.03549
Customer charge	\$14.76	Customer charge	\$15.50
kWh Charge	\$0.04988	kWh Charge	\$0.05240

	Annual Use Range		Average Annual Bills (Excluding Tracking)				Annual Bills (Including Tracking Mechanisms)				Customers in Ranges			Average \$ per kWh		
	Low	High	Current Rates	Proposed Rates	Change	% Change	Current Rates	Proposed Rates	\$ Change	% Change	Number of customers	Cumulative customers	% Cumulative customers	Average Annual kWh	Current Rates	Proposed Rates
10	0	128	\$109	\$115	\$5	5.0%	\$124	\$130	\$5	4.4%	1	1	6.3%	128	\$0.8532	\$0.8960
11	128	1,165	\$235	\$247	\$12	5.0%	\$373	\$385	\$12	3.2%	1	2	12.5%	1,165	\$0.2019	\$0.2121
12	1,165	7,187	\$536	\$563	\$27	5.0%	\$1,387	\$1,414	\$27	1.9%	1	3	18.8%	7,187	\$0.0745	\$0.0783
13	7,187	9,151	\$634	\$666	\$32	5.0%	\$1,718	\$1,750	\$32	1.9%	1	4	25.0%	9,151	\$0.0692	\$0.0727
14	9,151	9,440	\$650	\$683	\$33	5.0%	\$1,768	\$1,801	\$33	1.9%	1	5	31.3%	9,440	\$0.0689	\$0.0723
15	9,440	10,911	\$721	\$758	\$36	5.0%	\$2,014	\$2,050	\$36	1.8%	1	6	37.5%	10,911	\$0.0661	\$0.0694
16	10,911	11,408	\$746	\$784	\$38	5.0%	\$2,098	\$2,135	\$38	1.8%	1	7	43.8%	11,408	\$0.0654	\$0.0687
17	11,408	13,167	\$834	\$876	\$42	5.0%	\$2,394	\$2,436	\$42	1.8%	1	8	50.0%	13,167	\$0.0633	\$0.0665
18	13,167	16,199	\$985	\$1,035	\$50	5.0%	\$2,904	\$2,954	\$50	1.7%	1	9	56.3%	16,199	\$0.0608	\$0.0639
19	16,199	17,584	\$1,054	\$1,107	\$53	5.0%	\$3,138	\$3,191	\$53	1.7%	1	10	62.5%	17,584	\$0.0600	\$0.0630
20	17,584	17,799	\$1,065	\$1,119	\$54	5.0%	\$3,174	\$3,227	\$54	1.7%	1	11	68.8%	17,799	\$0.0598	\$0.0629
21	17,799	23,843	\$1,366	\$1,435	\$69	5.0%	\$4,191	\$4,260	\$69	1.6%	1	12	75.0%	23,843	\$0.0573	\$0.0602
22	23,843	28,803	\$1,614	\$1,695	\$81	5.0%	\$5,026	\$5,108	\$81	1.6%	1	13	81.3%	28,803	\$0.0560	\$0.0589
23	28,803	49,606	\$2,651	\$2,785	\$134	5.0%	\$8,529	\$8,663	\$134	1.6%	1	14	87.5%	49,606	\$0.0535	\$0.0561
24	49,606	50,878	\$2,715	\$2,852	\$137	5.0%	\$8,743	\$8,880	\$137	1.6%	1	15	93.8%	50,878	\$0.0534	\$0.0561
25	50,878	61,120	\$3,226	\$3,389	\$163	5.1%	\$10,467	\$10,630	\$163	1.6%	1	16	100.0%	61,120	\$0.0528	\$0.0554

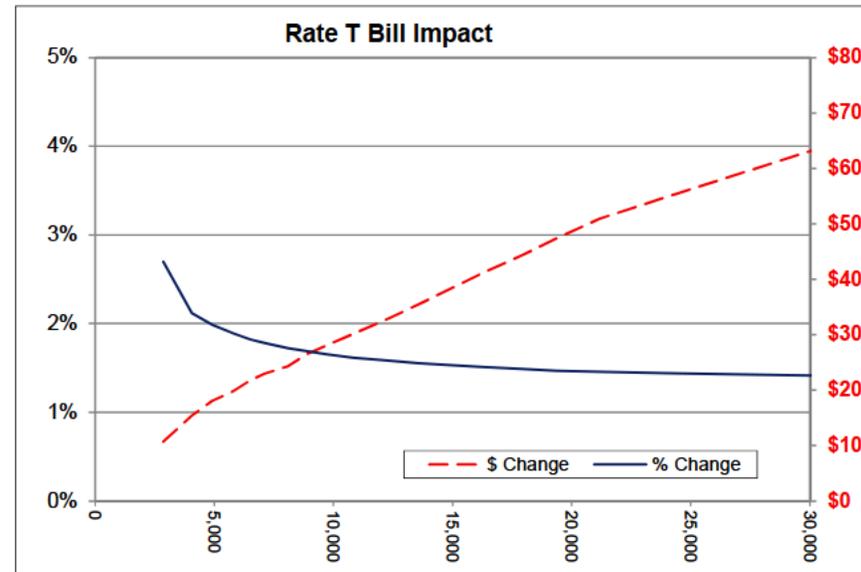
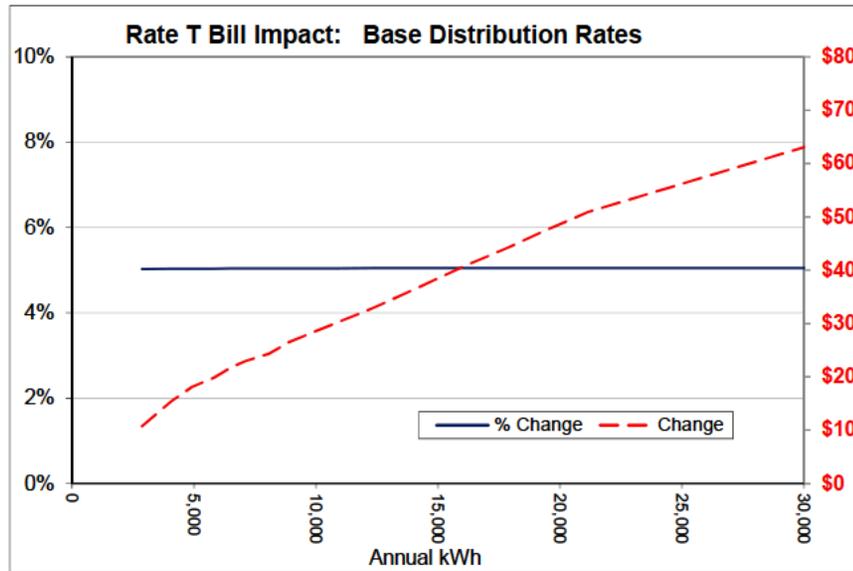
COMPARATIVE ANNUAL BILLS UNDER PROPOSED PERMANENT AND PROPOSED STEP ADJUSTMENT RATES
 RATE T: LIMITED TOTAL ELECTRICAL LIVING

T Proposed Permanent Rates	
Energy Services	\$0.08299
Other Tracking Mechanisms	\$0.03934
Customer charge	\$14.76
kWh Charge	\$0.04088

T Proposed Step Adj. Rates	
Energy Services	\$0.08299
Other Tracking Mechanisms	\$0.03934
Customer charge	\$15.50
kWh Charge	\$0.04295

T Proposed Permanent Rates	
Energy Services	\$0.00000
Other Tracking Mechanisms	\$0.03934
Customer charge	\$14.76
kWh Charge	\$0.04088

T Proposed Step Adj. Rates	
Energy Services	\$0.00000
Other Tracking Mechanisms	\$0.03934
Customer charge	\$15.50
kWh Charge	\$0.04295



COMPARATIVE ANNUAL BILLS UNDER PROPOSED PERMANENT AND PROPOSED STEP ADJUSTMENT RATES
 RATE T: LIMITED TOTAL ELECTRICAL LIVING

Line
 1
 2
 3
 4
 5
 6
 7
 8
 9

T Proposed Permanent Rates		T Proposed Step Adj. Rates	
Energy Services	\$0.08299	Energy Services	\$0.08299
Other Tracking Mechanisms	\$0.03934	Other Tracking Mechanisms	\$0.03934
Customer charge	\$14.76	Customer charge	\$15.50
kWh Charge	\$0.04088	kWh Charge	\$0.04295

	Annual Use Range		Average Annual Bills (Excluding Tracking)				Annual Bills (Including Tracking Mechanisms)				Customers in Ranges			Average Annual kWh	Average \$ per kWh	
	Low	High	Current Rates	Proposed Rates	Change	% Change	Current Rates	Proposed Rates	\$ Change	% Change	Number of customers	Cumulative customers	% Cumulative customers		Current Rates	Proposed Rates
10	0	2,864	\$214	\$224	\$11	5.0%	\$398	\$409	\$11	2.7%	40	40	4.9%	1,368	\$0.1561	\$0.1639
11	2,864	4,075	\$307	\$322	\$15	5.0%	\$731	\$746	\$15	2.1%	41	81	9.9%	3,436	\$0.0893	\$0.0938
12	4,075	4,915	\$359	\$377	\$18	5.0%	\$910	\$928	\$18	2.0%	41	122	15.0%	4,487	\$0.0799	\$0.0839
13	4,915	5,809	\$393	\$413	\$20	5.0%	\$1,050	\$1,070	\$20	1.9%	41	163	20.0%	5,347	\$0.0736	\$0.0773
14	5,809	6,514	\$432	\$454	\$22	5.0%	\$1,195	\$1,217	\$22	1.8%	41	204	25.0%	6,222	\$0.0695	\$0.0730
15	6,514	7,131	\$456	\$479	\$23	5.0%	\$1,291	\$1,314	\$23	1.8%	40	244	29.9%	6,800	\$0.0671	\$0.0705
16	7,131	8,084	\$482	\$507	\$24	5.0%	\$1,411	\$1,435	\$24	1.7%	41	285	34.9%	7,557	\$0.0638	\$0.0670
17	8,084	8,863	\$524	\$550	\$26	5.0%	\$1,562	\$1,588	\$26	1.7%	41	326	40.0%	8,467	\$0.0618	\$0.0650
18	8,863	9,703	\$555	\$583	\$28	5.0%	\$1,692	\$1,720	\$28	1.7%	41	367	45.0%	9,269	\$0.0599	\$0.0629
19	9,703	10,845	\$598	\$628	\$30	5.0%	\$1,864	\$1,894	\$30	1.6%	41	408	50.0%	10,325	\$0.0579	\$0.0608
20	10,845	12,325	\$652	\$685	\$33	5.1%	\$2,079	\$2,112	\$33	1.6%	40	448	54.9%	11,611	\$0.0562	\$0.0590
21	12,325	13,542	\$701	\$736	\$35	5.1%	\$2,275	\$2,311	\$35	1.6%	41	489	59.9%	12,829	\$0.0546	\$0.0574
22	13,542	14,873	\$756	\$795	\$38	5.1%	\$2,490	\$2,528	\$38	1.5%	41	530	65.0%	14,139	\$0.0535	\$0.0562
23	14,873	16,262	\$814	\$855	\$41	5.1%	\$2,722	\$2,763	\$41	1.5%	41	571	70.0%	15,559	\$0.0523	\$0.0550
24	16,262	17,876	\$875	\$919	\$44	5.1%	\$2,965	\$3,009	\$44	1.5%	41	612	75.0%	17,044	\$0.0514	\$0.0539
25	17,876	19,379	\$938	\$985	\$47	5.1%	\$3,222	\$3,270	\$47	1.5%	40	652	79.9%	18,634	\$0.0503	\$0.0529
26	19,379	21,158	\$1,007	\$1,058	\$51	5.1%	\$3,492	\$3,543	\$51	1.5%	41	693	84.9%	20,267	\$0.0497	\$0.0522
27	21,158	24,370	\$1,096	\$1,151	\$55	5.1%	\$3,844	\$3,899	\$55	1.4%	41	734	90.0%	22,390	\$0.0489	\$0.0514
28	24,370	30,990	\$1,275	\$1,339	\$64	5.1%	\$4,559	\$4,623	\$64	1.4%	41	775	95.0%	26,685	\$0.0478	\$0.0502
29	30,990	669,280	\$3,639	\$3,823	\$184	5.1%	\$14,000	\$14,184	\$184	1.3%	41	816	100.0%	69,131	\$0.0526	\$0.0553