ORDER NO. 83410

IN THE MATTER OF THE APPLICATION OF BALTIMORE GAS AND ELECTRIC COMPANY FOR AUTHORIZATION TO DEPLOY A SMART GRID INITIATIVE AND TO ESTABLISH A SURCHARGE FOR THE RECOVERY OF COST	* * * *	BEFORE THE PUBLIC SERVICE COMMISSION OF MARYLAND CASE NO. 9208

I. Introduction and Executive Summary

In this Order, we deny Baltimore Gas and Electric Company's ("BGE" or the "Company") Application for Authorization to Deploy a Smart Grid Initiative and to Establish a Surcharge Mechanism for the Recovery of Costs (the "Proposal"). Although we share BGE's (and others') hopes, and even enthusiasm, for the long-run potential and importance of the infrastructure upgrades known colloquially as the "smart grid," we find the business case for *this* Proposal untenable. The Proposal asks BGE's ratepayers to take significant financial and technological risks and adapt to categorical changes in rate design, all in exchange for savings that are largely indirect, highly contingent and a long way off. We are not persuaded that this bargain is cost-effective or serves the public interest, at least not in its current form. But we invite BGE to revisit its Proposal in light of this Order and to submit an alternative that addresses the issues we discuss below.[1]

On July 13, 2009, BGE filed the Proposal with the Public Service Commission of Maryland ("Commission"). The "Smart Grid Initiative" aspect of the Proposal consists of three primary components: (1) universal deployment of so-called "smart" meters and

[1] We note at the outset that the parties to this case strongly disagreed as to whether this Proposal would benefit Maryland consumers. The Maryland Energy Administration and Commission Staff urged that we ultimately approve the Proposal with certain modifications, while the Office of People's Counsel and AARP urged us to reject the Proposal in its entirety.

modules throughout BGE's service territory over a three-to-five-year period,[2] thereby replacing or upgrading all existing electric and gas meters; (2) installation of a related utility-to-meter-to-premise two-way communication network; and (3) implementation of a mandatory Smart Energy Pricing rate schedule for all residential electric customers ("R-SEP") that would, among other things, vary electricity rates during the months of June through September based on the time of day and day of the week during which the electricity is used (mandatory "time of use" or "TOU").

The Company estimates that the Proposal will cost $835 million – $482 million during the initial deployment period and an additional $353 million over the expected life of the program. To be clear, notwithstanding its name and the size of its anticipated price tag, the Proposal would not, in and of itself, enhance the electricity transmission grid or the Company's distribution "backbone." Rather, in order to realize the reliability and efficiency benefits of a "smart" and "self-healing" distribution system, the Company presumably would need to incur significant additional expense in order to deploy an advanced automated distribution control system that utilizes embedded sensors, intelligent electric devices, automated substations, "smart" transformers, analytical computer modeling tools, high-speed integrated communications, and reconfigured distribution circuits.

Nor would the Proposal result – at least not without further, substantial expenditures – in communication between the new, "smart" meters and appliances or

[2] The record is unclear concerning precisely how long BGE anticipates it would take to install the proposed "smart meters." *See, e.g.*, BGE Witness Butts, Prepared Direct Testimony ("Butts Direct") at 27 ("We expect the installation process to take approximately three years…"); BGE Initial Brief at 4 ("BGE will replace or upgrade" its meters "over a five-year period"); Proposal at 1 (citing a "4-5 year deployment period"). We therefore will assume that BGE expects the deployment period to last between three and five years.

other consumer products in BGE customers' homes to help them manage their energy use. Rather, the Company's advanced metering infrastructure ("AMI") Proposal encompasses "three foundational elements" of a broader "Smart Grid Initiative" that BGE envisions implementing at some future date.[3]

BGE's Proposal is not solely a request for approval of the deployment of AMI. It also is a request to establish a customer surcharge for advance recovery of the costs of the Proposal, thereby shifting all financial risk to BGE customers. The Company seeks approval to recover those costs through a "tracker" surcharge that would begin appearing on BGE bills for both gas and electric customers almost immediately upon the Commission's approval of the Proposal, but before any of the infrastructure is installed or any benefits are realized. In addition to recovering the Proposal's capital and operating costs through the tracker mechanism, the Company proposes that the surcharge be used, among other things, to collect a return on the Company's net investment under the Proposal, as well as to collect Company "incentives" tied to anticipated wholesale capacity revenue, wholesale energy revenue, and wholesale capacity price mitigation resulting from anticipated changes in its customers' energy use.[4] The tracker virtually guarantees that the Company will recover from its ratepayers the prudently incurred costs associated with the Proposal, a profit for its investors, and a portion of certain projected benefits, if they are realized. In other words, with the proposed tracker in place, the Proposal is a "no-lose proposition" for the Company and its investors. In its filings with this Commission, BGE repeatedly has stated that cost recovery via a tracker mechanism

[3] BGE Witness Case, Prepared Direct Testimony ("Case Direct") at 5.
[4] BGE Witness Vahos, Prepared Direct Testimony ("Vahos Direct") at 14-20.

is an "essential" element of the Proposal, and that it will withdraw the Proposal if the tracker is not approved.[5]

It is clear that the timing of BGE's Proposal was motivated in no small measure by "[t]he availability of funding for smart grid investments from the American Recovery and Reinvestment Act ("ARRA")."[6] We are mindful that during the pendency of its Proposal, BGE has received approval from the U.S. Department of Energy ("DOE") for $136 million in federal taxpayer funds that would partially offset the cost of the Proposal to BGE ratepayers.[7] We are equally mindful, however, that a $136 million "discount" on an $835 million ratepayer investment cannot dictate the outcome here. Rather, in order to approve the Proposal, we must determine that it is a cost-effective means of reducing consumption and peak demand of electricity by BGE customers.

After careful consideration of the entire record in this case, we conclude that we cannot approve the Proposal in its current form. As an initial matter, we disagree with BGE that surcharge recovery is appropriate here. The proposed project is, in our view, classic utility infrastructure investment that should be recovered through distribution rates, not in a supplemental surcharge that begins long before customers could realize any

---

[5] *See, e.g.,* Proposal at 2 (describing "[t]imely cost recovery, which can only be accomplished via a tracker," as "imperative" and an "essential ingredient" of the Proposal); BGE Initial Brief at 35-36 ("BGE cannot proceed without timely cost recovery through a tracker mechanism, as a steady cash flow is imperative to support an investment and program of this magnitude. BGE would regretfully withdraw its application if forced to recover in a traditional rate case or if BGE were denied the ability to recover its overall rate of return on this investment . . ."); *id.* at 38 ("Cost recovery through a traditional rate case or regulatory asset are not viable alternatives for BGE's proposed Smart Grid investment because it will create a delay in recovery of costs . . . "). *But see* BGE Witness Case, (Transcript ("TR") Tr. at 39– 40 (Nov. 10, 2009) (stating that BGE "would not draw a line in the sand" with respect to an alternative cost recovery proposal).

[6] Butts Direct at 17.

[7] In 2009, Congress passed the ARRA, which authorized the DOE to award grants up to 50% of the cost to facilitate the deployment of "smart grid" technologies, including AMI, up to a cap of $200 million. Public Law 111-5 (February 2, 2009). BGE's entire grant from the federal government amounted to $200 million. However, only $136 million applied to its AMI Proposal. BGE states that it will apply the remaining $64 million to reduce the *PeakRewards*[SM] ("PeakRewards") surcharge, currently paid by all ratepayers, by approximately 49 cents. BGE Witness Vahos, Prepared Reply Testimony ("Vahos Reply") at 5.

benefits from the project. Just as we have declined other companies' efforts to move a broader range of expenses out of rate base and rate cases,[8] we decline here to depart from the core principle that utilities recover the cost of infrastructure investments through distribution rates. If we were to approve a revised AMI proposal in the future, it would be appropriate to consider at that time whether to allow BGE to recognize a regulatory asset for the costs of the program.

At this time, we also will not approve a Proposal that imposes mandatory TOU rates on all BGE residential electric customers. A primary purpose of the Company's proposed TOU rates is to encourage customers to shift electricity use to less expensive, non-peak hours during the summer months.[9] We agree with Maryland Energy Administration ("MEA") witness Fred Jennings that before transitioning to TOU rates:

> [I]t is critical that customers: 1) Are provided sufficient education so as to understand the new tariff and how their behavior and decisions will affect their energy bill, and 2) Are provided the equipment and technology, such as in-home displays, orbs, electronic messaging, etc. to receive the requisite information that triggers behavior changes.[10]

Yet the Proposal contains no concrete, detailed customer education plan, includes no orbs or other in-home displays, and provides for grossly inadequate messaging, in our view, to trigger the behavior changes contemplated under the Proposal. Moreover, we are persuaded that some of the Company's most vulnerable residential customers, such as low-income households, elderly customers, customers with medical needs for electricity that cannot be shifted to off-peak hours, or other customers who are "stay at home" are less likely to realize the potential benefits of TOU pricing than would the "average" residential customer. Any future BGE AMI proposal should be supported by alternative

[8] Case No. 9192, Order No. 83040, at 2 and Order No. 83085, at 15.
[9] *See, e.g.,* BGE Witness Manuel, Tr. at 613–618 (Nov. 13, 2009).
[10] MEA Witness Jennings, Prepared Direct Testimony ("Jennings Direct") at 14.

business cases reflecting both opt-out and opt-in TOU scenarios, and should address, in detail, whether and to what extent those scenarios would affect the Company's business case.

We have concerns about other aspects of BGE's business case as well. Although the Proposal boasts a "robust" Total Resource Cost ("TRC") benefit-to-cost ratio of 3.2 (inclusive of DOE funding), a TRC ratio is only as useful as the assumptions on which it is based. On the projected cost side of the cost-benefit equation, the Company's business case does not include many costs that are inherent in, or will inevitably flow from, the Proposal. It does not include the approximately $100 million in undepreciated value of existing, fully operational meters that would be retired before the end of their useful lives, for example, or the estimated $60 million it will cost the Company for the new billing system necessary to implement the R-SEP rate schedule.[11] Nor does it include the cost of in-home display devices, which easily could exceed another $100 million dollars, or the cost of new customer appliances that the Company projects will one day be able to communicate with the proposed "smart meters." And it does not include the cost of retrofitting or replacing the emerging technology the Company proposes to install – technology that never has been tested in a full-scale deployment – in the event it becomes obsolete far earlier than its projected 10-to-15 year useful life.

On the benefits side of the equation, nearly 80% of the anticipated benefits of this Proposal arise not from operational savings, such as those expected to be realized from remote meter-reading capabilities, but from supply-side benefits, such as energy and capacity price mitigation, and monetizing in the PJM markets the value of projected

[11] The Company concedes that its current billing system functions perfectly well except for the inability to transmit hourly energy usage. BGE Witness Case, Tr. at 269-70 (Nov. 10, 2009).

energy and capacity reductions.[12] Those supply-side benefits, in turn, depend upon fundamental changes in residential customers' energy use and the way most residential customers think about energy pricing, upon the operations of relatively new and difficult-to-predict energy and capacity markets, and upon the results of small-scale pilot programs that differed in important respects from the Proposal before us. In summary, and as discussed more fully below, the nature and magnitude of the uncertainties underlying the Company's business case raise serious doubts regarding whether the Proposal is, in fact, a cost-effective means of reducing consumption and peak demand of electricity in Maryland.

Although BGE claims that the assumptions underlying its business case are sound, the Company would have its customers bear all of the risk in the event those assumptions prove incorrect. We strongly support the overall goals of BGE's Proposal, which are consistent with many of the energy efficiency, conservation, and demand response initiatives that we have approved previously, but we conclude that BGE ratepayers should not exclusively shoulder the burden in the event that costs associated with the Proposal are greater than expected, or that anticipated benefits do not materialize. We therefore invite BGE to submit an alternative proposal that: (1) foregoes any expectation of recovery by way of a tracker surcharge mechanism; (2) provides a detailed business case that addresses the costs and benefits of proceeding without mandatory TOU pricing; (3) includes a concrete and detailed plan for how BGE intends to educate its customers regarding its new proposed rate structure; and (4) provides a workable methodology by which BGE will mitigate and more fairly allocate between the

[12] PJM stands for the Pennsylvania New Jersey Maryland Interconnection, LLC, a regional transmission organization that coordinates the movement of wholesale electricity in all or parts of 13 states and the District of Columbia.

Company and its customers the risk that the proposal will not provide the benefits underlying BGE's business case, or that it will cost significantly more than BGE currently projects.

II. Background and Procedural History

A. Case No. 9111

On January 23, 2007, we initiated Case No. 9111 to consider BGE's request to implement Demand Side Management ("DSM," including energy efficiency/conservation and demand response) and Advanced Metering Infrastructure ("AMI") initiatives. The initiatives were intended, among other things, to "encourage customers to install cost-effective energy efficient equipment to reduce consumption of electricity and natural gas; help BGE manage electric peak demand; improve system reliability; and provide real-time, two-way communication between BGE and the customer."[13] With respect to AMI in particular, BGE anticipated that it would "transform the way we serve customers, including more efficient management of customer outages, more accurate meter reading, more timely collection efforts, and improved efficiency in handling service orders."[14] BGE further envisioned that AMI would "allow BGE to provide more innovative rate schedules and detailed consumption data to customers," and that it would provide customers "the tools to better manage their bills."[15] We approved BGE's demand response program on November 30, 2007 and its energy efficiency/conservation program on December 31, 2008.[16]

---

[13] Case No. 9111, Letter from Wayne Harbaugh to Commission Executive Secretary O. Ray Bourland at 1 (Jan. 23, 2007) ("Harbaugh Letter").
[14] *Id.* at 5.
[15] *Id.* at 5-6.
[16] BGE Initial Brief at 3.

BGE proposed to implement its AMI initiative in two phases. The Company projected that Phase I would occur between late 2007 and mid-2008, during which BGE would initiate a pilot program of approximately 9,000 advanced electric meters and gas modules to test deployment and system integration, confirm resource requirements and validate the business case.[17] Upon completion of the pilot program, BGE proposed to review the results thereof to determine whether they justified a full deployment. If the pilot results did warrant full deployment, BGE proposed to initiate Phase II, which would begin in late 2008. During Phase II, the Company anticipated full-scale installation of approximately two million advanced electric and gas meters over a two-to-three year period.[18] BGE estimated the cost of Phase I to be $7-10 million and sought approval to create a regulatory asset to recover those costs.[19]

We approved BGE's Phase I request on April 13, 2007, explaining that our approval was conditioned upon BGE:

> developing and proposing a comprehensive pilot, inclusive of a viable critical peak pricing pilot component to gather statistically significant, measureable, and meaningful information as to the potential positive effect of AMI on reducing peak system demand. In this regard, the Company is directed to file a complete and comprehensive pilot design for Commission review. Following review of the design by the Commission, the Company shall submit monthly progress reports with regard to pilot design, as well as continuing reports connected with pilot deployment.[20]

[17] Harbaugh Letter at 6.
[18] *Id.*
[19] *Id.*
[20] Case No. 9111, Letter Order of the Commission, Maillog # 106434 (Apr. 13, 2007).

We further stated that "[t]his decision does not reflect in any manner the Commission's position with regard to any proposed full deployment of AMI or any costs of such deployment."[21]

On June 25, 2007, BGE submitted a proposal for an AMI pilot program which addressed the conditions in our April 23 Order.[22] That proposal contemplated deployment of approximately 9,000 electric meters and gas modules in two specific geographic areas near downtown Baltimore and Westminster.[23] BGE described several broad research objectives, including validating its deployment strategy and verifying the performance levels of the proposed technology.[24] BGE also proposed to include a standard TOU rate coupled with Critical Peak Pricing ("CPP") during certain summer days.[25] BGE defined CPP as a form of dynamic pricing that included a higher than peak period price under a TOU rate to provide an incentive to customers to shift energy consumption when the transmission system is constrained and wholesale prices are very high.[26] Customers who failed to shift usage would pay higher energy costs than they would under a simple TOU rate structure.[27]

---

[21] *Id.*
[22] Case No. 9111, Baltimore Gas & Electric Company, Supplement 392 to P.S.C. MD. E-6, June 25, 2007 Informational Filing ("Informational Filing").
[23] *Id.* at 1.
[24] *Id.* at 5.
[25] *Id.* at 8.
[26] *Id.* at 9.
[27] The Proposal before us does not include this "penalty" for failure to shift usage during designated critical peak periods.

On September 28, 2007, we issued Order No. 81637, which, among other things, established "standards for AMI programs."[28] In that Order, we recognized that:

> the majority of benefit from AMI, which enables next generation demand response technologies with significant demand and energy saving potential, is likely to be in operational and distribution-related savings for the utilities.[29] Of course, we also recognize that the peak load reductions occasioned by AMI and an appropriate rate structure will provide significant benefits in terms of maintaining reliable service, as well as reductions in capacity and energy costs.[30]

To maximize these expected benefits, we identified certain minimum requirements for any proposal to implement an AMI system.[31] We declined to address the appropriate cost-recovery mechanism for AMI initiatives at that time.[32]

B. Summer 2008 and Summer 2009 Pilots

1. Summer 2008 Pilot

From June through September, 2008, BGE conducted a "Smart Energy Pricing" pilot program (the "Summer 2008 Pilot"). The Company contacted potential participants in Westminster and Baltimore by way of direct mailings and follow-up phone calls, and paid participants $100.00 or $150.00 to enroll in the pilot.[33] Ultimately, the Summer 2008 Pilot involved 1,375 residential customers, of whom 354 constituted the control

---

[28] Order No. 81637 at 1-2. We previously had issued Order No. 81448, establishing a collaborative process to review, *inter alia*, the "technical standards for and operational capabilities of advanced meters." BGE, Pepco Electric Power Company, Choptank Electric Cooperative, Potomac Edison Company, Southern Maryland Electric Cooperative and the technical staff of the Commission participated in this collaborative process. However, the process participants could not agree on the appropriate technical standards. *See* Case No. 9111, Report of the Advanced Metering Initiative/Demand Side Management Collaborative at 5 (July 6, 2007).

[29] As we discuss below, BGE's pending Proposal attributes only 21% of its anticipated benefits to these factors.

[30] Order No. 81637 at 4.

[31] *Id.* at 5.

[32] *Id.* at 7.

[33] Butts Direct at 26. Customers who participated in the Dynamic Peak Pricing structure received $150. Customers who participated in the Peak Time Rebates structure received $100. BGE Witness Faruqui, Prepared Direct Testimony ("Faruqui Direct") at 9. BGE's current Proposal contains no such one-time payment to induce participation.

group and the remaining 1,021 were subject to one of three forms of dynamic pricing.[34] The first dynamic pricing structure was a "Dynamic Peak Pricing" ("DPP") tariff, which combined a critical peak price with a time-of-use rate. Under this design, customers paid a higher rate between 2 pm and 7 pm on non-holiday weekdays. Additionally, customers paid an even higher rate between 2 pm and 7 pm during 12 BGE-designated critical peak days. Customers were charged $0.09/kWh, $0.14/kWh, and $1.30/kWh for their consumption during off-peak, peak, and critical peak periods, respectively.[35]

The two other rate designs tested by BGE during the Summer 2008 Pilot involved Peak Time Rebates ("PTRs") without any critical peak pricing or TOU component. Participants continued to pay the standard rate for electricity, but received a rebate for reduced energy consumption between 2 pm and 7 pm during 12 BGE-designated critical peak days.[36] Under one scenario, participants received a rebate of $1.16/kWh for load reduction below their baseline usage.[37] Under the second scenario, they received a rebate of $1.75/kWh for the same load reduction.[38]

The Summer 2008 Pilot also was designed to test the efficacy of two enabling technologies – an Energy Orb and an air conditioning cycling switch ("A/C Switch").[39] The Energy Orb is a sphere that emits different colors indicating off-peak, peak and

---

[34] *Id.* at 8. BGE installed approximately 5,300 smart electric and gas meters during the summer of 2008, but BGE installed the majority of these meters only to ensure that the capability of the meters to record usage and be able to relay that back to BGE and be able to send out an outage notification signaling power loss functioned properly. BGE Witness Case, Tr. 89-90 (Nov. 10, 2009); Butts Direct at 26.

[35] *Id.* at 6. The off-peak rate was lower than the rate then being paid by BGE customers who did not participate in the pilot program.

[36] *Id.* at 6-7.

[37] *Id.* at 7.

[38] *Id.*

[39] *Id.* at 8. As discussed below, the current Proposal does not include the cost of any in-home displays or enabling technologies.

critical peak hours.[40] The A/C Switch is a switch on the compressor of a central air conditioner that allows BGE to cycle the air conditioner during critical peak hours using a 50 percent cycling technology.[41] A group of customers in each of the three rate designs received both the Energy Orb and the A/C Switch, while other customers received only the Energy Orb.[42] A third group of customers were subject to one of the three rate designs without any enabling technology.[43]

The Summer 2008 Pilot results were evaluated by Dr. Ahmad Faruqui of The Brattle Group, an outside consulting firm retained by BGE for that purpose. Dr. Faruqui employed a "Constant Elasticity of Substitution Demand Model" to isolate the effects of the dependent and independent variables within the program.[44] Using two separate equations, this model purportedly evaluated: (1) a customer's willingness to substitute non-peak for peak hours; and (2) the effect of changes in price on a customer's overall energy consumption.[45] Dr. Faruqui then broke down the results for each "elasticity" among the three different rate structures combined with the two enabling technologies and those customers who participated without enabling technology, yielding eight different "cells" with the results for each elasticity.[46] Through a PRISM software program, he then calculated the load impact for each of these 16 results, and concluded that Summer 2008 Pilot participants demonstrated an 18-21% peak load reduction

[40] *Id.*
[41] *Id.*
[42] *Id.* at 8-9.
[43] *Id.*
[44] *Id.* at 12-13.
[45] *Id.* at 13-18. These equations are referred to respectively as the "Substitution Equation" and the "Daily Demand Equation". According to Dr. Faruqui, the first elasticity measures the percent change in the ratio of peak to off-peak consumption when there is a one percent change in the ratio of peak to off-peak prices. *Id.* at 13-14. The second elasticity measures percent change in the daily average consumption when there is a one percent change in the daily average price. *Id.* at 16.
[46] Three different rate structures and three different technology options actually yield nine different combinations. However, for reasons that are unclear, the dynamic peak pricing was not tested with the Energy Orb. *Id.* at 8.

without any enabling technologies and a 28-33% peak load reduction with these technologies.[47] Additionally, participants exhibited an overall reduction in energy consumption of 0.5%.[48]

2. Summer 2009 Pilot

During the summer of 2009, BGE conducted its second pilot program ("Summer 2009 Pilot"). Unlike 2008, BGE did not pay its customers any fee to participate in the Summer 2009 Pilot.[49] This pilot involved only 912 BGE residential customers, of whom 734 participated in the pilot program and 178 constituted the control group.[50] Between 600 and 700 of these participants had participated in the Summer 2008 Pilot.[51] The participating customers were placed on a PTR rate design similar to that tested in 2008, with the difference that all customers received a rebate of $1.50/kWh for all peak load reduction below their baseline usage during company-declared critical days. BGE did not include the CPP/TOU rate structure in the Summer 2009 Pilot.[52]

The Summer 2009 Pilot also tested the enabling technologies contained in the 2008 pilot, with the addition of a programmable communicating thermostat.[53] As in 2008, some participants received no enabling technologies, some received just the Energy

[47] *Id.* at 29.
[48] *Id.* at 26.
[49] BGE Witness Faruqui, Tr. at 328 (Nov. 10, 2009).
[50] This number of participants represents a decline of 287 people from the number of residential customers who participated in the Summer 2008 Pilot program (excluding "control group" members). Dr. Faruqui attributed this nearly one-third decline in enrollment to "natural attrition". Tr. at 311 (Nov. 10, 2009). As discussed in greater detail below, however, we are concerned that this decline could indicate that (1) fewer residential customers have an interest in exploring dynamic pricing options when they are not paid to do so, or (2) a significant number of BGE customers simply lost interest in the program after only one summer.
[51] BGE Witness Faruqui, Tr. at 327 (Nov. 10, 2009).
[52] BGE Witness Faruqui, Prepared Supplemental Testimony ("Faruqui Supp.") at 4.
[53] *Id.*

Orb and some received a combination of the Energy Orb and either the A/C Switch or the thermostat.[54]

Applying a similar methodology as in 2008, Dr. Faruqui concluded that customers reduced the average demand during company-declared critical days by 28% without any enabling technologies, 33.3% with the Energy Orb alone and 37.5% with a combination of the Energy Orb and either the A/C Switch or the thermostat.[55] Dr. Faruqui concluded that without the enabling technologies, participating customers reduced their overall monthly energy usage by 0.8% during the Summer 2009 Pilot.[56]

In an effort to isolate the effects of the enabling technologies versus unassisted customer control over load reduction, BGE performed an additional "Incremental Price Impact Analysis" approximately halfway through the Summer 2009 Pilot program.[57] For this analysis, BGE notified those participants with enabling technologies of only half of the critical peak days.[58] As Dr. Faruqui noted, "[t]he 2008 pilot program did not investigate the incremental impact of pricing over and above that of the enabling technology."[59] This analysis was limited to a two-month period involving a fraction of the overall participants, from which Dr. Faruqui concluded that participants who consistently received notice of a critical peak event achieved a load reduction 13.3% higher than they would have achieved through the enabling technology alone.[60] Finally, Dr. Faruqui performed a "Persistence Analysis" through which he compared the load

[54] *Id.* at 5-6.
[55] *Id.* at 7.
[56] *Id.* at 7, 17. Unlike the Summer 2008 Pilot program, the Summer 2009 Pilot also included a small number of BGE commercial customers. However, Dr. Faruqui has not yet performed an analysis of the results of the Summer 2009 Pilot program related to BGE's commercial customers. *Id.* at 4.
[57] *Id.* at 8.
[58] *Id.*
[59] *Id.* at 11.
[60] *Id.* at 10.

reductions of those customers who participated in both the Summer 2008 and 2009 Pilot programs, concluding that their load reduction increased during the second pilot program.[61]

C. Case No. 9208

On July 13, 2009, BGE filed its current Proposal and supporting testimony, seeking authorization for full-scale AMI deployment, the establishment of a tracker mechanism for cost recovery, and the implementation of the R-SEP as the standard rate schedule for BGE's residential customers. On July 29, 2009, we issued Order No. 82823, which initiated this case to evaluate BGE's Proposal. Several parties participated in this proceeding, including BGE, the Commission's staff ("Staff"), the Maryland Energy Administration ("MEA"), the Office of People's Counsel ("OPC"), AARP and the Montgomery County Office of Consumer Protection ("MCOCP").

Shortly after submitting its Proposal, BGE asked us to adopt an expedited schedule which would include legislative-type hearings open to public comment rather than a full evidentiary hearing.[62] BGE claimed this expedited schedule would assist its request for partial federal funding from the Department of Energy.[63] On July 27, 2009, OPC, MCOCP and AARP filed initial comments, objecting to BGE's request that we adopt an expedited, legislative-type alternative to a full evidentiary hearing.[64]

On July 29, 2009, we denied BGE's request that we waive a full evidentiary hearing and adopt the Company's expedited schedule. While mindful of BGE's parallel efforts to obtain federal funding, we nonetheless concluded that we "must and will

[61] *Id.* at 13-15.
[62] July 22, 2009 correspondence from Ms. Kimberly Curry to Executive Secretary Terry Romine.
[63] *Id.*
[64] *See* July 27, 2009 "Initial Comments" of OPC, AARP and MCOCP.

undertake a thorough and careful review before approving programs of this cost and magnitude."[65]

At the close of discovery, we held three days of hearings on November 10, 12, and 13, 2009. As testimony progressed, it became clear that additional hearings would be necessary to develop a full evidentiary record. We therefore scheduled an additional three days of hearings on December 4, 9, and 11, 2009. During the course of these hearings, we heard from eighteen different witnesses for BGE, Staff, OPC, AARP, and MEA. Following the hearings, all parties except the MCOCP submitted briefs, with OPC and AARP urging that we reject BGE's Proposal entirely, while MEA and Staff recommended that we approve the Proposal with certain modifications. It is upon this fully developed record that we reach the conclusions reflected in this Order.

III. The Proposal

BGE proposes to replace or upgrade all of its approximately 1.36 million electric meters and 730,000 gas meters for residential, commercial, and industrial customers over a three-to-five year period[66] with new AMI meters and modules. BGE intends to install meters for its residential and small commercial customers first, followed by its large commercial and industrial customers.[67] BGE estimates that this deployment will cost $346 million (after receipt of $136 million in DOE grant funding) during the initial deployment period, as well as approximately $353 million in additional operating and

[65] Order No. 82823 at 2. On September 29, 2009, we issued a "Notice of Amended Procedural Schedule" which moved the initial hearing date to November 10, 2009 and allowed approximately two additional weeks for the parties to file testimony.
[66] See footnote 2, *supra*.
[67] Butts Direct at 27.

maintenance (O&M) costs over the life of the program, which BGE projects to be 15 years.[68]

Several network infrastructures and information technology systems would support the new "smart" meters. The first communication system would connect the utility to the meters. It consists of two different networks. The first network is a local area network ("LAN") that transmits data between the meters and various collection devices throughout BGE's service territory.[69] BGE expects this network to be provided by an as-yet-undetermined AMI technology vendor and projects that it likely will communicate over a wireless radio network.[70] The second network is a wide-area network ("WAN") or backhaul, which transmits data between the collection devices and the AMI head-end system.[71] BGE has not yet determined whether this network will be provided within a private BGE infrastructure or by an outside vendor.[72]

The second communication system would allow the meter to communicate with the customer's residence by way of a ZigBee chip located inside the meter. Theoretically, the ZigBee chip would be able to interact with appliances and other consumer products in the customer's home – assuming that those appliances and other products also were equipped with ZigBee technology – to encourage greater energy management by the customer.[73]

---

[68] Butts Direct at 27; BGE Initial Brief at 4. Staff recommended ten years as the more likely useful life of the program, and BGE did not object to this recommendation. Asp Direct at 30-31; BGE Witness Butts, Prepared Reply Testimony ("Butts Reply") at 11.
[69] Butts Direct at 21.
[70] *Id.*
[71] *Id.*
[72] *Id.*
[73] Butts Direct at 22-3. Zigbee is an IEEE standards-based technology that is being developed to operate low data rate and low power consumption communications. Zigbee devices operate in the unlicensed 2.4 GHz frequency band along with Wi-Fi networks, cordless phones, security systems, and microwave ovens. Zigbee has been used in pilot implementations of home automation, smart energy, commercial building

BGE's proposal also includes certain supporting information technologies: (1) an AMI head-end system intended to ensure the connectivity of the network devices; (2) a meter data management system that would store, validate and edit meter data; and (3) a customer web portal to allow customers to review their hourly usage data for the previous day over the Internet.[74] BGE also proposes to improve its communications networks to allow for the increased flow of data, although they have not yet identified the specific technology or vendors.[75]

It also is important to be clear about what BGE's Proposal does not include. BGE proposes only to install new, advanced meters and the communications networks necessary to operate those meters. Despite referring to its Proposal as a "Smart Grid Initiative", BGE does not propose to upgrade the electricity transmission grid or its distribution system, enhancements often associated with the term "smart grid".[76] BGE's Proposal does not include so-called "in-home displays" or "enabling technologies" even though these devices were an integral part of its pilot programs. And it does not include the cost of ZigBee-equipped appliances or other consumer products, and therefore would not, without more, enable communication between the new meters and a customer's appliances.[77]

---

automation, and home area networking devices. Staff Witness Afflerbach, Prepared Direct Testimony ("Afflerbach Direct") at 27.

[74] BGE Initial Brief at 5.

[75] BGE Initial Brief at 5-6. As we discuss below, the AMI system also will require BGE to install a planned Customer Care & Billing System ("CC&B") to generate bills for its R-SEP program. The cost for this system is estimated at $60 million and is not included in the cost of BGE's Proposal. BGE Witness Case, Tr. at 269-70 (Nov. 10, 2009).

[76] MEA Witness Howatt, Prepared Direct Testimony ("Howatt Direct") at 10.

[77] BGE Witness Case, Tr. at 64-5 (Nov. 10, 2009); BGE Witness Manuel, Prepared Direct Testimony ("Manuel Direct") at 9; AARP Witness Alexander, Prepared Direct Testimony ("Alexander Direct") at 27-8.

For residential customers, BGE proposes to link these meter upgrades to the implementation of its residential "Smart Energy Pricing Program", which consists of two components.[78] The first component would allow customers to earn Peak Time Rebates ("PTRs") from 2:00 pm to 7:00 pm on company-declared critical days during the summer, excluding weekends and holidays, as well as during PJM-declared emergencies.[79] The Company proposes to notify customers of declared critical days through telephone calls, email and/or text messages prior to 6:00 pm the day before such an event.[80] Through PTRs, BGE would credit those customers who reduce their energy consumption during those critical periods below a pre-calculated baseline.[81] The Company has set the initial amount of the rebate at $1.25/kWh,[82] and proposes to adjust the rebate in subsequent years to reflect the estimated long-term value of capacity in the Southwest MAAC region.[83]

The second component of the residential Smart Energy Pricing Program would impose upon all residential customers a two-tier rate schedule consisting of higher energy prices between 2:00 pm and 7:00 pm on weekdays during the months of June through September, excluding holidays, and lower energy prices at all other times.[84] BGE

[78] BGE also intends to request Smart Energy Pricing for its small commercial customers, currently designated in the G and GS rate schedule, should its ongoing analysis of the response of its commercial customers to the 2009 Summer Pilot program warrant such a change. Proposal at 9; Case Direct at 29.

[79] Case Direct at 29; Manuel Direct at 4. Based upon internal load research data, BGE selected this five-hour period as the time when BGE faced the highest Locational Marginal Prices ("LMP") for energy. *Id* at 9.

[80] Staff Witness Norfolk, Prepared Direct Testimony ("Norfolk Direct") at 12.

[81] BGE proposes to calculate this baseline by identifying each customer's three highest usage days from the last ten previous weekdays (excluding holidays and declared critical demand days), and averaging the usage from those days between 2:00 pm and 7:00 pm. BGE Ex. JMBM-3.

[82] Manuel Direct at 6. BGE calculated this amount based upon the Southwest MAAC Net Cost of New Entry ("NetCONE") of $176.44 per MW-day for the 2012-13 delivery year. *Id.*

[83] Southwest MAAC is the PJM geographic region in which BGE's service territory is located.

[84] Manuel Direct at 4. The R-SEP rates included in BGE's Proposal are merely examples of what the rates would be if in place today. BGE intends to file its R-SEP rates and tariffs in the future, and the actual rates could be higher or lower. *Id.* at 4-5; *see also* Alexander Direct at 9.

proposes to phase out existing rate structures as soon as AMI meters are implemented in the customers' geographic area.[85]

BGE believes its AMI system will enhance customer service in several important respects. For example, AMI would virtually eliminate the need for an employee or contractor to access a customer's meter to read it, thereby improving the efficiency and accuracy of meter reading.[86] AMI also would improve BGE's ability to respond to various customer requests by allowing for remote connection/disconnection services and more efficient generation of account information, such as a final bill or changes in account status.[87] In addition, AMI would allow BGE to detect outages remotely, thereby reducing the response time for power restoration.[88]

BGE's Proposal also includes its business case, in which BGE projects a number of financial benefits that it believes will accrue to ratepayers, and thereby justify the cost of the Proposal to ratepayers which, after federal funding, is estimated at $699 million. BGE divides these benefits between those attributable to AMI (21%) and the much larger, hoped-for supply-side benefits associated with the R-SEP rate schedule (79%). The chart below summarizes these projected benefits:

---

[85] Manuel Direct at 4. To administer a dynamic pricing program like R-SEP requires the ability to collect energy usage data in at least one-hour intervals, something which BGE's current Encoder-Receiver-Transmitter ("ERT") meters cannot do. Butts Direct at 5-6.
[86] *Id.* at 6.
[87] *Id.* at 8-9.
[88] *Id.* at 7-8.

	In millions **Net Present Value**	**Total**
O&M Savings	$ 170	$ 408
Avoided Capital Costs	97	204
Total AMI Benefits	**$ 267**	**$ 611**
Capacity Revenues	$ 264	$ 661
Energy Revenues	26	61
Energy Conservation	190	452
Capacity Price Mitigation	335	580
Energy Price Mitigation	69	104
Avoided Capital Costs	116	166
Total SEP Benefits	**$ 1,000**	**$ 2,024**
Total Benefits	**$ 1,267**	**$ 2,635**[89]

The Operation and Maintenance ("O&M") savings and avoided capital costs reflect anticipated savings and avoided costs related to meter reading, meter operations and distribution management costs.[90] BGE expects to reduce manual meter reads by approximately 95% and eliminate the vast majority of meter reading personnel.[91] The Company also projects non-labor capital savings by eliminating most manual meter reading support systems and IT systems.[92]

BGE further claims the proposed AMI system will generate savings related to meter operations by reducing the number of field operational calls and collections visits as well as the avoided costs of maintaining the current ERT meters.[93] The Company also

89 BGE Ex. DMV-1 at 3; Vahos Direct at 5.
90 BGE Ex. DMV-1 at 6-11.
91 BGE Ex. DMV-1 at 10. BGE projects it will save $237.2 million in reduced O&M Costs attributable to meter reading. *Id.* at 7.
92 BGE Ex. DMV-1 at 10. BGE projects it will save $18.2 million in reduced capital expenses attributable to meter reading. *Id.* at 8.
93 BGE Ex. DMV-1 at 8-9. BGE projects it will save $108.2 million in reduced O&M costs attributable to its meter operations. *Id.* at 7.

anticipates capital savings from the avoided costs of replacing its existing TOU and ERT meters as they reach the end of their battery life.[94]

Regarding the management of its distribution system, BGE expects to generate savings by more efficiently responding to outages, especially during severe storm events.[95] The Company also expects capital savings through better capital planning as a result of increased knowledge of its electric load.[96]

These meter reading, meter operations, and distribution management cost projections are based, in part, upon current known expenses that the Company can readily quantify and that are, to a certain extent, within the Company's control. By contrast, nearly 80% of BGE's projected benefits depend upon accurately predicting the amount of six different supply side benefits associated with BGE's R-SEP program. All six of these benefits depend upon anticipated changes in customer behavior, and four depend upon additional assumptions regarding the energy and capacity markets. Among the latter four, BGE believes it will realize $661 million in capacity revenue by monetizing the value of reduced peak load in the PJM-administered RPM auctions.[97] The Company projects an additional $61 million in benefits from the energy revenue it believes will result from monetizing the value of the projected reduction in energy use in the day-ahead or real-time energy markets.[98] BGE further projects that it will generate $580 million in capacity price mitigation benefits and $104 million in energy price mitigation

---

[94] BGE Ex. DMV-1 at 9. BGE projects it will save $147.4 million in reduced capital expenses attributable to its meter operations. *Id.* at 8.

[95] BGE Ex. DMV-1 at 10-11. BGE projects it will save $50.5 million in reduced O&M costs attributable to its distribution system management. *Id.* at 7.

[96] BGE Ex. DMV-1 at 11. BGE projects it will save $38.2 in reduced capital expenses attributable to its distribution system management. *Id.* at 8. BGE also attributes $11.6 million in O&M savings to a variety of "other" factors. *Id.* at 7.

[97] BGE Ex. DMV-1 at 12, 15.

[98] BGE Ex. DMV-1 at 12, 17-18.

benefits through reduced capacity and energy prices as a result of increased energy resources.[99]

Additionally, BGE forecasts that its new dynamic pricing, combined with customer use of its web portal, will generate $452 million in benefits by reducing overall energy consumption by 1%.[100] Finally, BGE projects that it will generate $166 million in benefits by reducing the peak load carried by its transmission and distribution ("T&D") infrastructure, thereby reducing the need for additional T&D infrastructure.[101]

Unlike its AMI-related benefits, BGE's business case for its R-SEP-related supply-side benefits relies upon numerous key assumptions, including, among others:

> (1) customers will continue to receive a PTR rebate equal to the initial estimate of $1.25/kWh;
>
> (2) 70% of non-PeakRewards residential customers and 50% of non-PeakRewards small commercial customers will participate in shifting their energy use during declared critical peak periods;
>
> (3) those non-PeakRewards residential customers who do participate will reduce their peak load by an average of 0.49 kW and those non-PeakRewards small commercial customers who do participate will reduce their peak load by an average of 0.60 kW;
>
> (4) 90% of PeakRewards residential customers and 50% of PeakRewards small commercial customers will participate in shifting their energy use during declared critical peak periods;
>
> (5) those PeakRewards residential customers who do participate will reduce their peak load by an average of 0.10 kW and those PeakRewards small commercial customers who do participate will reduce their peak load by an average of 0.12 kW, both of these in addition to their PeakRewards peak load reduction;
>
> (6) R-SEP and customer access to certain data through the web portal will reduce overall consumption by 1%; and

---

99 BGE Ex. DMV-1 at 12, 15-19.
100 BGE Ex. DMV-1 at 12, 14.
101 BGE Ex. DMV-1 at 12, 19-20.

> (7) capacity prices subsequent to the 2012-13 delivery year will, on average, equal the 2012-13 SWMAAC NetCONE value of $176 per MW-day.[102]

BGE testified that its commercial customers will assume approximately 45% of the costs of deployment of the electric meters only.[103] BGE also intends to apportion that same percentage of the DOE grant money attributable to "smart grid" ($136 million) to its commercial customers.[104] BGE has presented no evidence to support any projected demand response from its commercial customers and has testified that it does not yet know what that response might be, but that it expects it to be "relatively minor".[105] For the balance of this Order, we will refer exclusively to the benefits that BGE alleges its residential customers will generate as the record is silent otherwise.

Finally, BGE's Proposal requests approval of a "Smart Grid Tracker", which would allow BGE to immediately begin recovering the costs associated with its Proposal at the Company's latest authorized rate of return through a surcharge added to customers' bills, rather than waiting to recover these costs through a traditional rate case.[106] This proposed tracker would include projected capital costs amortized over the expected

[102] BGE Ex. DMV-1 at 13-14. BGE does not explain how it calculated these projected levels of participation and peak load reduction for its small commercial customers. In fact, these projections contradict testimony by BGE elsewhere to the effect that the Company expects very little, if any, demand response from its commercial customers. *See* footnote 105, *infra*. Additionally, BGE's Summer 2008 Pilot program did not include commercial customers, and the Company has not yet analyzed the demand response of its commercial customers in the Summer 2009 Pilot program. BGE Witness Case, Tr. 157 (Nov. 10, 2009); Faruqui Supp at 4. The record therefore provides no basis upon which to believe that BGE's small commercial customers will reduce their peak load at all, much less to a greater extent than the Company's residential customers.

[103] BGE Witness Case, Tr. at 261-2 (Nov. 10, 2009); BGE Witness Manuel, Tr. 717 (Nov. 13, 2009).

[104] BGE Witness Case, Tr. at 261 (Nov. 10, 2009).

[105] BGE Witness Case, Tr. at 263 (Nov. 10, 2009) ("While we are evaluating whether dynamic pricing will work for commercial customers, if there's any benefit at all, it's going to be relatively minor."); BGE Witness Manuel, Tr. at 623 (Nov. 13, 2009) ("[c]learly the most bang for the buck can be gained from the residential customer class…."); BGE Witness Case, Tr. at 157 (Nov. 10, 2009) ("I think early indications are there's not a lot of incremental demand reduction that commercial customers said they're willing to make."). BGE expects that its commercial customers will indirectly benefit from the lower capacity and energy costs that the Company expects to realize through its residential customers, assuming those benefits actually materialize. *Id.* at 157-8.

[106] Vahos Direct at 14-15.

useful life of the AMI system, all operating costs, the costs of the Summer 2008 Pilot program amortized over five years, all projected savings related to meter reading, monetized benefits associated with capacity and energy, a Company incentive based upon peak load reduction, and an annual true-up mechanism.[107] The annual true-up would reconcile the forecasted revenues and rates with the actual results at year-end.[108]

IV. Statutory Standard

In 1991, the General Assembly added § 7-211 to the Public Utility Companies Article ("PUC"), requiring gas and electric utilities to propose and the Commission to adopt cost-effective DSM programs. Specifically, § 7-211(f), as amended, provides:

> The Commission shall:
>
> (1) require each gas company and electric company to establish any program or service that the Commission deems appropriate and cost-effective to encourage and promote the efficient use and conservation of energy;
> (2) adopt rate-making policies that provide cost recovery and, in appropriate circumstances, reasonable financial incentives for gas companies and electric companies to establish programs and services that encourage and promote the efficient use and conservation of energy; and
> (3) ensure that the adoption of electric customer choice under subtitle 5 of this title does not adversely impact the continuation of cost-effective energy efficiency and conservation programs.

When reviewing such programs, PUC § 7-211(i) requires that we consider:

> (i) cost-effectiveness;
> (ii) impact on rates of each ratepayer class;
> (iii) impact on jobs; and
> (iv) impact on the environment.[109]

[107] *Id.* BGE proposes allocating costs by customer class based on the number of meters in each class. Manuel Direct at 14.
[108] Vahos Direct at 15.
[109] Although this Order focuses on the Proposal's cost-effectiveness, we have considered all four factors set forth in the statute.

With respect to AMI and "smart grid" in particular, the General Assembly has emphasized that the primary factor in our evaluation is whether the proposed technology is "cost-effective in reducing consumption and peak demand of electricity in Maryland."[110] Before we approve a proposal under this sub-section, the parties advocating approval must establish that it satisfies this requirement.

V. Analysis

A. The Proposed Tracker Mechanism

In its Proposal, BGE states that it will not proceed with its AMI initiative if we do not permit cost recovery by way of the Company's requested surcharge.[111] The Company argued throughout its written testimony (and despite a recent credit rating upgrade in the wake of our Order in Case No. 9173) that it wanted surcharge cost recovery for this project because traditional rate recovery would place an undue strain on the Company's balance sheet. During the hearing, BGE appeared to retreat from this position.[112] In its post-hearing brief, however, the Company once again described this issue as a deal-breaker.[113] With the exception of Staff, all parties actively opposed the use of a tracker surcharge, and Staff "preferred" that BGE recover its costs through a

---

[110] 2008 Md. Laws, ch. 131, § 2.

[111] Proposal at 3 ("Absent Commission approval of a tracker mechanism that appropriately recovers costs in a timely manner, . . . BGE with great reluctance would be forced to respectfully withdraw or defer this application.").

[112] BGE Witness Case, Tr. at 39-40 (Nov. 10, 2009).

[113] *See, e.g.,* BGE Initial Brief at 3 ("Due to the magnitude of the investment in this project, without Commission approval of a cost recovery mechanism that permits BGE to recover costs in a timely manner and to avoid significant regulatory lag, BGE with great reluctance would be forced to respectfully withdraw this application."); *id.* at 35-36 ("BGE cannot proceed without timely cost recovery through a tracker mechanism, as a steady cash flow is imperative to support an investment and program of this magnitude. BGE would regretfully withdraw its application if forced to recover in traditional rate case . . ."); *id.* at 38 ("Cost recovery through a traditional rate case or regulatory asset are not viable alternatives for BGE's proposed Smart Grid investment because it will create a delay in recovery of costs . . . ").

regulatory asset.[114] For the reasons that follow, we will not approve cost recovery by way of a surcharge.

We begin with first principles. For one hundred years, since this Commission was created by the General Assembly in 1910, one of our primary functions has been to establish the rates that public service companies can charge their customers. We and our predecessors have done this by comprehensively reviewing the companies' costs and revenues, defining the rate base, establishing an appropriate rate of return, and translating the resulting revenue requirement into rates. The precise application of these general principles to different industries has evolved over the decades. In the electricity and gas industries, we establish the rates utilities charge for their distribution services according to traditional cost-of-service principles, and those fundamental principles have not changed.

This case comes to us in the context not only of the movement toward "advanced metering" and "smart grid" investments, but what we see as a general trend in which Maryland utilities (and undoubtedly others) seek to remove as many streams of costs as possible out of distribution rates, and to recover them instead through surcharges. This trend perhaps has gained some traction from our approval in recent years of surcharges to support energy efficiency and demand response programs.[115] The programs for which we have approved surcharges, however, are fundamentally different in purpose and function than this Proposal. Neither energy efficiency nor demand response programs build utility infrastructure. The communications systems and load-control devices

---

[114] Staff Initial Brief at 17.

[115] *See, e.g.,* Case No. 9154, Order No. 82384 (Dec. 31, 2008) (approving BGE energy efficiency programs, the costs of which will be recovered through a surcharge).

installed in connection with the PeakRewards program, for example, serve only that specific program and have no other utility uses.

Our other decisions allowing surcharges are consistent with this distinction. We also have approved surcharges to cover the costs of procuring Standard Offer Service ("SOS") electricity, the last vestige of supply-side costs we are obliged to allow in a deregulated world. But we have rejected other requests to impose surcharges for non-infrastructure utility charges.[116] For example, we rejected Delmarva Power & Light's request, in the context of its recent rate case, to remove the company's costs for uncollectibles, pension and OPEB out of rates and into surcharges.[117] We made there the same distinction we make here, defining in similar, core utility service terms the narrow range of circumstances in which surcharges are appropriate. We explained that "surcharges guarantee dollar-for-dollar recovery of specific costs, diminish the Company's incentive to control those costs, and exclude classic, ongoing utility expenses from the standard, contextual ratemaking analysis."[118] We therefore limited this recovery mechanism to "very large, non-recurring expense items that have the potential to seriously impair a utility's financial well-being and that do not contribute to the Company's rate base" as opposed to "classic, ongoing costs of running a utility company."[119]

This project would represent a large, but classic, investment in BGE's distribution infrastructure.[120] At the end of the day, BGE's distribution network would have been

---

[116] *See e.g.*, our rejection of the utilities' requested surcharge to cover expenses associated with the purchase of the receivables of their electric suppliers. Maillog # 116827 (BGE), Maillog # 116829 (Delmarva) and Maillog # 116824 (Potomac Edison).
[117] Case No. 9192, Order No. 83040 at 2 and Order No. 83085 at 15.
[118] Order No. 83085 at 15.
[119] *Id.*
[120] BGE Witness Vahos, Tr. at 922 (Dec. 4, 2009).

enhanced dramatically – there would be a new meter in every house, and a comprehensive new communications system throughout. BGE has covered the costs of meters in rates ever since there have been meters. The last time BGE upgraded its meters, to the ERT system, there was no dispute that it would recover those costs in rates. The Company admitted as much during the hearing, but attempts to distinguish this project by the scale of the investment and by the now-predictable arguments about the possible negative reaction of rating agencies to a decision not to allow surcharge recovery.[121] But we are not in the business of attempting to predict rating agency reactions, nor of calibrating our decisions to what the utilities say the agencies want or expect.

Additionally, unlike a regulatory asset, the requested surcharge requires ratepayers to bear the costs of this substantial investment immediately, despite BGE's expectation that they will receive no benefit at all until 2012,[122] at the earliest, and that some BGE customers will not be eligible to realize fully the anticipated benefits of the Proposal until full AMI deployment is completed in or around 2014.[123] Obviously, a customer who relocates outside BGE's territory in the interim will have partially subsidized this investment with no return consideration.[124] BGE has provided no persuasive reason why its customers should subsidize this program in that manner.

Accordingly, we will not authorize cost recovery for any approved "smart grid" or AMI project through a surcharge. We would consider instead authorizing the creation of

---

[121] *Id.*; Case Direct at 21-27.
[122] BGE Ex. 3 at 2.
[123] BGE Ex. 3 at 2; *See also* footnote 2, *supra* (regarding range of projected deployment duration).
[124] BGE Ex. 3 at 1; BGE Ex. 11 at 1; Vahos Direct at 11-12. According to BGE's estimate, the surcharge would amount to an average monthly charge to residential electric customers of $.038 beginning in 2010 and would reach a peak of $3.78 by 2013. *Id.* at 27.

a regulatory asset appropriate to whatever project we might approve. If BGE intends to pursue a modified AMI proposal consistent with the parameters set forth in this Order, BGE may not premise its cost recovery on a surcharge mechanism.

B. Mandatory Time of Use Rates

At this time, we will not approve an AMI proposal that includes mandatory TOU rates.[125] To be clear, we support encouraging customers to shift peak-time energy use whenever possible. The Proposal's cost-effectiveness, however, depends upon a fundamental change in the way BGE customers use energy and think about energy pricing. Yet the Proposal does not specify *how* BGE intends to implement the type of comprehensive educational program necessary to bring about that change. Nor does it include Energy Orbs or other in-home displays that might facilitate such a change. Because a shift to dynamic pricing will depend so heavily upon customer understanding of its potential benefits, we are concerned that premature implementation on a mandatory basis will cause customer confusion and will result in higher energy bills for customers who have not yet embraced the concept.

We also are concerned that a mandatory TOU rate structure could disadvantage low-income customers, elderly customers, customers with medical-related energy needs, and others who may have difficulty shifting their usage to off-peak times.[126] BGE's Summer 2008 Pilot program revealed that many seniors and low income households saw

[125] In this regard, we note that no other electric distribution company has sought to impose mandatory TOU rates on its residential customers. BGE Witness Faruqui, Tr. 287 (Nov. 10, 2009).

[126] AARP Witness Alexander calculated that up to 40% of low income customers would see higher summer energy bills and up to 15% would see higher annual energy bills. Alexander Direct at 16-17.

increased energy bills based upon TOU rates alone.[127] AARP witness Alexander, a consumer affairs consultant, also analyzed the data of the Summer 2008 Pilot program, concluding that:

> there is a fairly large segment of the residential class that will experience higher bills under the time-based rates mandated by BGE. Over 25% of each of the customer groups presented above would have paid higher electricity bills in the summer of 2008 had the TOU rate been in effect. A significant percentage of low income households and seniors would be adversely impacted by this rate structure.[128]

BGE has not provided a comprehensive analysis that informs us whether its business case remains cost-effective under non-mandatory TOU.[129] To the contrary, BGE's testimony has been inconsistent on this issue. BGE Witness Manuel testified that R-SEP "must be mandatory for all" or "BGE's business case would be significantly damaged."[130] However, BGE Witness Case testified that "implementing time of use pricing is not a core element of Smart Grid."[131] In its response to OPC Data Request 2-7, BGE claims that "[n]one of the projected benefits are due to TOU rates."[132] Further, in its Reply Brief, BGE accepts MEA's opt-out proposal as a reasonable alternative to its request for mandatory TOU.[133] It is unclear whether the statements above indicate that the Company believes its business case remains unchanged under an opt-in scenario as

---

[127] BGE Ex. 15, at 19, 23 and 25. BGE seeks to deflect this finding by arguing that the same data reveals that all ratepayers saw lower energy bills (although the decrease for some households was *de minimis*) when TOU was combined with PTR. *Id.* at 20, 24, and 26. We believe that customers who could lower their energy bills even more by combining PTR with SOS rates should be permitted to do so.

[128] Alexander Direct at 17-18.

[129] Staff Witness Hurley did produce testimony and a chart that adjusted the Total Resource Cost of the Proposal based upon varying degrees of customer participation. Exhibit DJH-3 at 30. Although there is likely some correlation between degrees of participation within a mandatory TOU rate structure and the percentage of consumers who choose to participate in a non-mandatory TOU rate structure, we expect BGE to calculate the effect of this latter analysis on its business case in any future AMI proposal.

[130] BGE Witness Manuel, Prepared Reply Testimony ("Manuel Reply") at 9-10.

[131] Tr. at 102 (Nov. 10, 2009).

[132] BGE Response to OPC Data Request 2-7, attached to Brockway Prepared Direct Testimony ("Brockway Direct").

[133] BGE Reply Brief at 27.

well. Rather than attempt to decipher the effect of either non-mandatory TOU scenario on BGE's Proposal, we simply order that any future proposal address the projected supply-side benefits that would flow from non-mandatory TOU rates under both an opt-in and opt-out scenario.

Additionally, we note that BGE's business case projects that non-PeakRewards residential customers will reduce peak load, on average, by 0.49 kW while PeakRewards residential customers will, in addition to their PeakRewards peak load reduction, reduce their average peak load substantially less: 0.10 kW.[134] This significantly reduced figure reflects the lower baseline for PeakRewards customers that will limit their ability to further reduce their load during critical peak periods. We are concerned that this same principle will apply to customers who actively engage with TOU, whether having opted in or out. The record appears to support the possibility that a significant shift in usage to obtain the benefits of lower off-peak prices under TOU could reduce those customers' ability to further reduce load during critical peak periods and thereby lower their rebate and undermine one of BGE's key assumptions regarding the extent of reduced critical load from non-PeakRewards customers. We therefore order BGE to address this concern in the revised business case for any future AMI proposal.

Because we believe the success of any TOU rate schedule will depend heavily on a significant investment of time and resources in customer education prior to implementation, we expect the Company to provide, in any future proposal involving TOU pricing, a detailed education plan that will prepare its ratepayers for the coming changes. BGE has testified that the Company has reserved between $30 million and $50

[134] BGE Ex. DMV-1 at 13.

million toward such a customer education program over the life of the Proposal.[135] Even $50 million, however, may be insufficient to cover the unprecedented amount of effort that a successful program might require. Indeed, MEA's Director of Planning, Mr. Howatt, thought the ultimate cost may approach $100 million.[136]

The ultimate cost cannot be estimated with confidence, however, until we know what the customer education plan will be. Although BGE has set aside money to educate its ratepayers, it has not provided us with any details as to how this money will be spent.[137] We believe a detailed and comprehensive education plan is essential *before* BGE begins implementation of any AMI system or associated dynamic pricing.[138] This education campaign may include print, radio and television media, as well as live in-person question and answer sessions for customers such as town hall meetings and hands-on demonstrations. We do not currently believe a working group is necessary to create an effective education plan. However, we encourage BGE to benefit from the suggested approaches to customer education offered by the other parties. We also expect BGE to provide a timeline informing us when these educational measures will occur during the various stages of any future AMI deployment or associated changes in its tariffs.

Unlike a mandatory TOU, we invite BGE to propose Peak Time Rebates for all BGE customers, even those who remain on SOS rates. The parties agree that the opportunity to earn these rebates is essentially a no-lose proposition for BGE ratepayers.[139] OPC has raised the possibility that customers currently enrolled in

---

[135] BGE Witness Case, Tr. at 200 (Nov. 10, 2009); BGE Witness Butts, Tr. at 1031 (Dec. 4, 2009).
[136] Tr. at 1119-20 (Dec. 9, 2009).
[137] BGE Witness Manuel, Tr. at 729 (Nov. 13, 2009) ("I'm not aware of any concrete plans related to educating customers on time of use rates. That will be developed in the future.").
[138] MEA Witness Jennings testified that the industry generally initiates customer education five months before deploying the first 5-10% of meters. Tr. at 438 (Nov. 12, 2009).
[139] BGE Initial Brief at 20; MEA Initial Brief at 32; Staff Initial Brief at 11-13.

PeakRewards might not understand how PTRs interact with their current rewards, as well as the possibility that current PeakRewards participants will have a depressed baseline, leading to lower PTRs than non-PeakRewards customers.[140] However, BGE has currently structured its PTR program to provide its customers with the larger of the earned PTR or the PeakReward.[141] Therefore, at worst, PeakRewards customers would receive the same reward they receive currently with the possibility of further reducing their energy bills through additional energy conservation. However, we expect BGE's education plan to address all aspects of any proposed PTR program, including issues specific to its current PeakRewards customers.

C. BGE's Ratepayers Should Not Assume the Entire Risk of This Significant Investment in Unproven and Evolving Technology.

BGE characterizes the AMI deployment and R-SEP pricing set forth in the Proposal as "the natural next steps" following implementation of the Company's Commission-approved PeakRewards demand response program, conservation/energy efficiency program, and small-scale AMI/SEP pilots.[142] As the Company has acknowledged, however, time pressures imposed by the availability of federal funding

---

[140] OPC Initial Brief at 34-37; MEA Witness Jennings also expressed concerns regarding confusion in the calculation of energy usage baselines, but he did not object to implementing full-scale PTR eligibility. He only observed, and we agree, that this is a potential area of concern that we will want to monitor closely. Tr. at 417-422 (Nov. 12, 2009).
[141] BGE Witness Manuel, Tr. at 786-7, 791 (Nov. 13, 2009).
[142] Proposal at 3.

from the Department of Energy are driving the timing of this Proposal.[143] We are concerned that this pressure to adopt new, unproven technology could potentially cause ratepayers to be saddled with an infrastructure that will be obsolete before the end of its anticipated useful life or incompatible with AMI technology standards expected to evolve in the near future. As BGE's Proposal currently stands, BGE ratepayers will assume 100% of the risk should these technological concerns materialize, and BGE will receive a guaranteed rate of return on its entire investment whether or not the technology it has selected becomes obsolete or otherwise fails to deliver the promised benefits to ratepayers.

As with any new wireless technology, the smart meter industry is currently addressing significant cyber-security and inter-operability risks.[144] Cyber-security in the context of the "smart grid" refers to the security of the information passing over the communications of the "smart grid" as well as security of the controls over system components.[145] AMI is an enormous complex of inter-connected networks designed to administer dynamic pricing and manage grid function.[146] Such an extensive network is vulnerable to security risks in many different ways, including physical tampering,

---

[143] Butts Direct at 17 (listing as the first reason BGE wants to implement the Proposal now "[t]he availability of funding for smart grid investments from [ARRA]"); *cf.* Staff Witness Asp, Prepared Direct Testimony ("Asp Direct"), at 40 ("I am concerned, though, that they [BGE] appear to have accelerated their implementation and vetting process with the vendor due to the potential opportunity to receive federal DOE stimulus funding. Without the carrot of the stimulus funding, I would not expect that they would be requesting approval for 100 percent implementation so quickly."); Afflerbach Direct at 9 ("[I]n discussions with BGE staff, BGE stated that, in the absence of the time pressure imposed by its U.S. Department of Energy Smart Grid grant application, it would first implement the system in a 20,000-customer area before finalizing the design and deploying a utility-wide system. However, BGE reported it is accelerating its schedule in order to be competitive for the grant.").

[144] The Department of Energy also recognizes the undeveloped state of the necessary standards and recently released a "Request for Information", seeking comments and information from state governments and private industry regarding efforts to protect "Smart Grid privacy and data collection policies." 75 Fed. Reg. 26203 (May 11, 2010).

[145] Brockway Direct at 30.

[146] *Id.*

intercepting or blocking the wireless signals that connect the smart meters to data collection points, or obtaining customer password information used on the web portal.[147] Unauthorized access to smart meters could allow a hacker to artificially increase energy bills or shut off power entirely.[148]

The National Institute of Standards and Technology ("NIST") is tasked with addressing these cyber-security concerns and, on February 2, 2010, posted the second draft of its NIST IR 7628, *Smart Grid Cyber Security Strategy and Requirements* for public comment.[149] BGE testified that the Company and its vendors are working diligently to comply with these requirements "as they develop",[150] but these standards remain a work in progress. Even if BGE's vendor agreements include cyber-security safeguards, BGE faces the real possibility that its meters and communication systems will require expensive upgrades to comply with future standards, or worse, will not be upgradeable at all.[151]

NIST also is drafting standards to address issues of inter-operability between AMI vendors and, on September 24, 2009, it issued its "roadmap" for developing the necessary standards (the draft NIST Framework and Roadmap for Smart Grid Interoperability Standards).[152] This roadmap targets the end of 2010 for the release of the most important standards,[153] but NIST has cautioned that "several hundred standards that are identified

---

[147] *Id.* at 31.
[148] Afflerbach Direct at 10.
[149] This draft can be found at http://csrc.nist.gov/publications/PubsDrafts.html#NIST-IR-7628. NIST also has created a privacy sub-working group to identify specific privacy concerns related to "smart grid" and propose standards by which to address them. At present, BGE has yet to develop an AMI-specific protocol to protect the privacy of detailed individual customer energy-usage data available through AMI. BGE Witness Butts, Tr. at 1023 (Dec. 4, 2009); BGE Witness Case, Tr. at 106-7 (Nov. 10, 2009).
[150] Butts Direct at 30-33.
[151] Afflerbach Direct at 11.
[152] Brockway Direct at 37. The roadmap can be found at http://www.nist.gov/smartgrid/.
[153] Brockway Direct at 37.

or developed over the span of several years may be required to achieve secure, end-to-end interoperability across a fully implemented Smart Grid."[154]

Most utilities experimenting with the current state of AMI technology are doing so on a pilot basis or through limited regional developments.[155] Although several states have approved a full-scale implementation of AMI, these projects are in the initial development stage and therefore do not provide useful data regarding the actual costs and benefits of full-scale AMI deployment. BGE's own pilot programs employed technology by a different vendor than it intends to use in its Proposal, took place over only two four-month periods, and involved a relatively small sample size.[156]

Additionally, much of the technology BGE intends to rely upon has yet to be tested in an environment comparable to Maryland. Staff witness Afflerbach, the Chief Executive Officer and Director of Engineering for Columbia Telecommunications Corporation, explained the significance of this current gap in the development of smart meter technology:

> **Chairman Nazarian**: That type of technology [the technology proposed by potential BGE vendors] you testify has not been tested on larger scale conditions closely matching those of Maryland?
>
> **Witness**: That particular technology by that particular vendor has not been implemented in an environment similar to Maryland.
>
> **Chairman Nazarian**: My question is, can you be more specific about what you mean by environment similar to Maryland?
>
> **Witness:** Yes. I think what we have in Maryland is a particular sort of physical environment as far as the trees,

---

[154] *Id.*
[155] Asp Direct at 21.
[156] Afflerbach Direct at 14.

> the rolling hills, the mixture of urban, suburban and rural. This is in contrast to an environment that's more tropical, an environment that's more arid, an environment where things are somewhat flatter and you have more of a big sky, so to speak.[157]

The risk that BGE will expend enormous sums installing meters that will become obsolete or outdated prior to the end of their expected useful lives, or that they will not have sufficient interoperability with related technology to achieve future anticipated benefits is not merely theoretical. Several utilities in the past few years have moved forward with deployment of one technology, only to replace that technology within two-to-three years.[158] In the AMI field, Connecticut Light & Power, Potomac General Electric and Oncor all invested in technology for which ratepayers had to pay the costs of early obsolescence.[159]

Currently, the ZigBee chip BGE intends to install in its smart meters is the dominant technology in the AMI market, but that reality could change for any number of reasons. No appliance manufacturer has yet adopted ZigBee technology,[160] and Staff Witness Afflerbach, an expert on the state of the current technology, explained some of the risks BGE is asking its ratepayers to assume:

> …we have a very dynamic world in terms of manufacturers of equipment, software, hardware, and what's happening with energy. I wouldn't rule out something along the lines of a very unusual, out of the box play by an entity like a Google or somebody along those lines to make a play with the technology that for whatever reason is not the ZigBee technology, maybe because there's more comfort level by that manufacturer with the other technology. Maybe it's because there's a feeling that unlike ZigBee, Wi-Fi is the devil we know.

[157] Tr. at 1171 (Dec. 9, 2009).
[158] Asp Direct at 29.
[159] *Id.* at 30.
[160] Afflerbach Direct at 21.

> I'm just throwing out a lot of possibilities. I have seen this sort of technological evolution before where major vendors were all just about to adopt something and it didn't transpire exactly as the pundits or conventional wisdom said.[161]

If it turns out that appliance manufacturers decide to adopt some alternative to ZigBee technology, the expectation that the proposed "smart meters" will one day be capable of communicating with a customer's "smart" appliances evaporates.[162] BGE ratepayers will then be stuck paying higher rates for a white elephant, while customers of utilities that prudently waited to allow the industry to mature will enjoy the benefits of a wiser and safer "smart grid" deployment.

The field of modern technology is replete with examples of innovations once considered the leaders into a new era that were never widely adopted. All the federal funding in the world would not have made Sony's Betamax a wise investment, for example. Those who invest in new technology as it becomes available often find themselves re-investing much sooner than they anticipated. And while we do not profess to know the future of any specific AMI technology, we are concerned that BGE proposes to bet ratepayer money while avoiding any of the substantial financial risks inherent in this investment. Any future AMI proposal BGE might choose to submit in the near term should include an amended business plan that details how BGE will mitigate and more

---

[161] Tr. at 1173-4 (Dec. 9, 2009). Numerous other witnesses echoed this sentiment as well. *See e.g.*, Asp Direct at 29 ("For both BGE and PHI the largest risk is not missing the opportunity to get DOE stimulus funding – the largest risk is the potential of seeing AMI network functional obsolescence before the AMI investment is fully depreciated, requiring a substantial investment to increase functionality or replace the network prematurely."); Staff Witness Godfrey, Prepared Direct Testimony ("Godfrey Direct") at 26.

[162] Possible alternatives that could supplant ZigBee include the Wi-Fi technology currently used for home networking, devices that use the same mesh communications as the proposed AMI devices, or HomePlug technology using internal home power wiring. Afflerbach Direct at 22.

fairly allocate between the Company and its customers the costs associated with upgrading or replacing its AMI technology to respond to the risks we have outlined.

D. BGE's Business Case Does Not Take Into Account All Costs Inherent in Its Proposal.

BGE employed a Total Resource Cost ("TRC") analysis to demonstrate the Proposal's cost-effectiveness. Simply put, this analysis totals the estimated costs and benefits of the project and then reduces those totals to their Net Present Value, thereby obtaining a ratio of present day benefits to costs. If BGE's projected benefits and costs are accurate, its TRC analysis produces a "robust" benefit-cost ratio of 3.2-1, inclusive of funding from the Department of Energy.[163] However, a TRC analysis is only as useful as the estimates of costs and benefits on which it rests, and the Company's business case does not take into account substantial additional costs – again to be borne by its ratepayers – that are inherent in the Proposal.[164]

For instance, as BGE has acknowledged, implementation of its Proposal is dependent upon installation of a new billing system capable of storing and transmitting the energy consumption data obtained from the smart meters.[165] The Company estimates that this new billing system would cost ratepayers another $60 million, but that cost is not factored into the cost side of the Company's TRC equation.[166]

Additionally, BGE will seek to recover approximately $100 million from ratepayers for accelerated depreciation due to the early retirement of its existing, fully-

[163] Vahos Reply at 2.
[164] Additionally, as we discuss in the next sub-section, BGE's projected supply-side benefits rest upon numerous assumptions that could well prove overly optimistic.
[165] BGE Witness Manuel, Tr. at 686 (Nov. 13, 2009).
[166] BGE Witness Case, Tr. at 269-70, 275 (Nov. 10, 2009).

functioning meters.[167] Ratepayers already are paying for these meters through distribution rates currently appearing on their bills.[168] Like the cost of the new billing system, however, this cost is not included among those the Company used to make its business case. And as we discussed above, costs for a comprehensive, effective customer education program could far exceed the $30-$50 million that BGE has budgeted for that purpose.

Furthermore, as we observed at the outset, the Proposal seeks only to upgrade BGE's meters, to install a utility-to-meter-to-premise two-way communications network, and to implement a form of mandatory dynamic pricing. Implementation of the Proposal would not enhance the electricity transmission grid. It would not automate the Company's distribution "backbone." And it would not, in and of itself, enable communication between "smart" meters and appliances or other consumer products in BGE customers' homes. Rather, BGE views its current Proposal as merely the "foundational elements" of its future "smart grid" initiative.[169] Translating the proposed AMI deployment into a fully functioning and integrated "smart grid" will require a substantial future investment. The costs and benefits of those next phases of BGE's "Smart Grid Initiative" are unknown, but additional costs are inevitable if the potential benefits of AMI and "smart grid" are to be fully realized. MEA Witness Howatt testified that he could not even estimate the order of magnitude of these future expenses once we begin down BGE's "Smart Grid Initiative" path:

> **Mr. Howatt:** …One of the things that MEA wanted the Commission to be aware of is that this is a transformational step for the Commission, for Maryland ratepayers, for BGE

[167] BGE Witness Vahos, Tr. at 802 (Nov. 13, 2009).
[168] Staff Witness Hurley, Prepared Direct Testimony ("Hurley Direct") at 4.
[169] Case Direct at 5; Tr. at 258 (Nov. 10, 2009) ("Is this the end of the road? Not by any stretch.").

> ratepayers. Once you go down the path of Smart Grid, and, as I think we've heard in a lot of the other parties' testimony, this becomes kind of a path that you have to continue to follow. And it's going to be hard to reverse that process and move back to the existing dumb meters, as they have referred to them, as they are currently out there now.
>
> I think everybody has to recognize that once you move down this path, there is going to be added costs, but there are also going to be added benefits…
>
> **Mr. Erwin**: We've heard, Mr. Howatt, repeatedly how the metering, if you will, this proposal is sort of the basic platform for upgrades of the balance of the distribution system that will come later. Don't you think the Commission needs to have at least an order of magnitude of what's coming down the pike in the next five to ten years?
>
> **Mr. Howatt:** I guess it would be nice to know an approximation of that number. But a lot of it will depend on exactly what direction this effort takes.[170]

We understand that the development of a fully functional "smart grid" must begin somewhere, but we also are mindful that the Proposal before us will provide the full range of smart grid benefits to customers only after additional significant investment in infrastructure, which BGE undoubtedly will expect its ratepayers to finance.

We also believe it likely that many of the benefits that BGE projects ultimately will require the purchase of ZigBee-compatible appliances, in-home displays, and customer access to real-time information about energy prices and their own energy usage. Without these additional expenditures, consumer appliances will be unable to communicate with the proposed ZigBee chip in their smart meters, customers will not receive real-time price signals, and customers' access to information regarding their own energy use will remain limited, at best, to the stale and non-appliance-specific

[170] Tr. at 1116-7 (Dec. 9, 2009).

information to be available through the proposed web portal. But none of these additional costs is included in the Company's business case. BGE has indicated that it has not yet determined what it intends to propose regarding these enhancements, or how it intends to finance them.[171] To the extent that the Company can provide information in any future AMI deployment proposal about the likelihood and extent to which BGE ratepayers will bear the cost of these or other future elements of the Company's "Smart Grid Initiative," such information would aid the Commission in determining whether any such proposal likely represents a cost-effective investment for BGE ratepayers.

On the surface, the TRCs calculated by the Company and Staff might suggest a cost-effective Proposal. It is clear, however, that those calculations do not include substantial additional costs – both inherent in this Proposal and anticipated in future stages of the Company's "Smart Grid Initiative." And as we discuss more fully below, it is equally clear that the benefits promised under the Proposal rely largely upon assumptions that may well prove incorrect. In our view, before BGE's ratepayers set out on the "smart grid" path, BGE should mitigate and more fairly allocate between itself and its customers the risk that the journey will be more expensive than anticipated.

E. BGE's Ratepayers Should Not Assume the Entire Risk that BGE's Proposal Will Generate Far Smaller Benefits than Its Business Case Currently Projects.

1. Summary of Projected Benefits

When we initially approved BGE's investigation into the feasibility of adopting "smart grid" technology, we stated that we expected the majority of benefits to result

[171] BGE Witness Case, Tr. at 65-67 (Nov. 10, 2009).

from "operational and distributional savings for the utilities."[172] Instead, BGE's Proposal inverts our expectation and attributes only 21% of its projected benefits to such savings. Instead, a full 79% of the projected benefits in BGE's business case depend upon accurate predictions of supply-side benefits attributable to energy and capacity revenues in the PJM markets, energy conservation, energy and capacity price mitigation, and avoided transmissions capital expenditures.[173] Should these benefits fail to materialize, BGE's business case plummets to a cost-ineffective TRC of 0.8.[174] The speculative nature of these benefits is especially relevant because BGE does not propose to assume any of the risk should its Proposal fail to produce the benefits it projects.[175]

The estimated $2 billion in total supply-side benefits ($1 billion when reduced to net present value ("NPV")) that BGE anticipates generating through this Proposal include the following:[176]

---

[172] Order No. 81637 at 4. Many witnesses have commented on BGE's unusually heavy reliance on such speculative benefits. *See e.g.*, MEA Witness Jennings, Tr. at 457 (Nov. 12, 2009) ("I have never seen an AMI business case that leveraged as heavily on conservation, demand reduction, and other market factors in calculating the TRC or the cost/benefit ratio."); Staff Witness Asp, Tr. at 1099 (Dec. 4, 2009) ("Yes. The supply side I agree is very, very uncertain and it could swing quite a ways."); OPC Witness Brockway, Prepared Supplemental Testimony ("Brockway Supp.") at 7-8 ("[P]roceeding with SEP deployment on the schedule and at the scale proposed by BGE involves serious risks that benefits will not cover costs, and that vulnerable customers will be adversely impacted."). Even BGE witness Vahos admitted that his "estimates and judgments are subject to risks, uncertainties, and other important factors that could cause the actual costs and benefits to be different from the amounts estimated." Vahos Direct at 10.

[173] BGE Ex. DMV-1 at 3; OPC Witness Hornby, Prepared Direct Testimony ("Hornby Direct") at 18.

[174] Staff Witness Hurley, Prepared Rebuttal Testimony ("Hurley Rebuttal") at 3.

[175] In contrast to its electric meters, BGE does not expect to generate any supply-side benefit from the upgrade or replacement of approximately 730,000 gas meters. Rather, the gas meters will generate only operational benefits through meter-reading savings. BGE Witness Manuel, Tr. at 689 (Nov. 13, 2009). No party contends that the installation of "smart" gas meters, standing alone, will generate a cost-effective TRC. To the contrary, MEA witness Jennings estimated a TRC of 0.7 for installing gas meters alone, and Staff witness Hurley estimated a TRC of 0.8 for the same project. Jennings Direct at 23; Hurley Rebuttal at 4-5. Both witnesses ultimately supported approval of the joint electric-gas installation project, concluding that it would be illogical to maintain a stand-alone manual gas meter reading system utilizing meter readers. *Id.* However, the evidence clearly demonstrates that BGE gas-only customers would not receive sufficient benefits to offset the cost of the Proposal reflected in their gas bills.

[176] For the balance of this discussion, we will refer to the Net Present Value of the specific benefits.

	In millions: **Net Present Value**	**Total**
Capacity Revenues	$ 264	$ 661
Energy Revenues	26	61
Energy Conservation	190	452
Capacity Price Mitigation	335	580
Energy Price Mitigation	69	104
Avoided Capital Costs	116	166
Total SEP Benefits	**$ 1,000**	**$ 2,024**[177]

As a preliminary matter, we agree with Staff Witness Asp that ten years, rather than BGE's proposed fifteen years, more accurately reflects the likely useful life of the AMI meters.[178] This is a budding industry. We do not expect today's smart meters to remain the standard for as long as past BGE meters, and we do not want to repeat the situation that could have resulted in the event of approval of BGE's Proposal, in which BGE ratepayers might continue paying the undepreciated value of meters despite no longer receiving benefits from them. Using a 10-year instead of a 15-year useful life reduces the present value of BGE's projected benefits from $1.267 billion to $1.031 billion.[179] With that as a backdrop, we discuss below each category of supply-side benefits on which BGE's business case relies.

2. <u>Projected Energy and Capacity Revenues and Price Mitigation Benefits</u>

All of BGE's substantial, hoped-for supply side benefits rest upon several assumptions that may prove largely illusory. BGE projects that its Proposal will generate $264 million in "capacity revenue" that it will receive from monetizing the value of the peak load reducing capability of its proposed R-SEP dynamic pricing in PJM-

[177] BGE Ex. DMV-1, at 3.
[178] Asp Direct at 30-31. Although BGE maintains that fifteen years is a more appropriate useful life, it also acknowledged that the Company would "be supportive of using a ten-year recovery period as recommended by Staff." Butts Reply at 11.
[179] Hurley Direct at 5.

administered Reliability Pricing Model ("RPM") auctions.[180] BGE projects an additional $26 million in "energy revenue" the Company expects to receive by monetizing in the day-ahead or real-time energy markets the value of the energy savings it expects to realize from R-SEP.[181] The Proposal projects an additional $335 million in benefits from "capacity price mitigation" and $69 million in benefits from "energy price mitigation" which BGE attributes to downward pressure on capacity and energy prices resulting from its proposed R-SEP.[182]

All of these estimates depend upon highly optimistic assumptions regarding the number of customers who will change their energy use as well as the extent and long-term persistence of any such changes. Should BGE's optimism prove unwarranted, its ratepayers will essentially have spent close to $700 million – at a minimum – for a mere 21% of the financial benefit projected in the Company's business case. As we have discussed, the pilot programs on which BGE relies to project the Proposal's supply-side benefits differ in many important respects from the Proposal now before us. Yet based upon the resulting data, BGE now claims to be able to ascertain the extent to which 1.1 million of its customers will respond to a State-wide roll-out and a different proposed PTR of $1.25 per kWh over a fifteen-year period.

Specifically, BGE projects that 70% of all residential customers not currently enrolled in PeakRewards will exhibit an average peak load reduction of 0.49 kW,[183] and that 90% of residential customers currently enrolled in PeakRewards will achieve an

---

[180] BGE Ex. DMV-1 at 3.
[181] *Id.*
[182] *Id.* BGE's business case assumes that the energy markets will eventually re-calibrate and erase the energy price mitigation by 2017 and the capacity price mitigation by 2019. BGE Ex. 11; BGE Witness Vahos, Tr. at 907-8 (Dec. 4, 2009).
[183] BGE Ex. DMV-1 at 13.

average peak load reduction of 0.10 kW beyond what they achieve through PeakRewards.[184] Although BGE's estimates may reflect accurate statistical extrapolations from the data provided by its Summer 2008 Pilot program, we are not convinced that they will accurately reflect sustained demand response under a State-wide roll-out, because the current Proposal differs from that pilot in many important respects. For instance, BGE's pilot program lasted only four months and involved only 253 PTR participants that were not provided some form of enabling technology, technology not included in the present Proposal.[185] Also, the current Proposal, unlike the Dynamic Peak Pricing portion of the Summer 2008 Pilot, does not penalize those customers who do not shift usage by imposing even higher prices during declared critical days.

BGE's pilot program solicited volunteers randomly through the mail and fully 20-25% of potential customers declined to enroll in the program, which in our view does not bode well that ratepayers will respond as enthusiastically as BGE anticipates.[186] Pilot participants could have been skewed towards those more committed to energy conservation. Also, unlike the current Proposal, participants in BGE's Summer 2008 Pilot program received either $100 or $150 in compensation.[187] And despite the existence of a control group, participants in the pilot programs were more likely than the typical ratepayer to own their own home, a swimming pool, a dishwasher, programmable thermostats; to possess a college education; to earn over $75,000; and to use central air conditioning.[188]

---

[184] *Id.*
[185] Faruqui Direct at 9.
[186] BGE Witness Case, Tr. at 95 (Nov. 10, 2009).
[187] Faruqui Direct at 9.
[188] Brockway Direct at 11; BGE Ex. AF-2, App. 4.

By definition, those customers who chose to participate in BGE's pilot programs knew the structure of the program and the advantage of shifting peak time energy consumption. Having received compensation for their efforts, these participants likely felt obligated to actively respond to BGE's declared critical days during the course of the four-month program. We are far from certain that the typical ratepayer will respond similarly, at least in the absence of any concrete plan to educate them on the complexities of the proposed meter upgrades and new rate tariffs.

As it currently stands, a four-month study of such a limited sample does not convince us that 1.1 million residential ratepayers will replicate the pilot's results over a 10-to-15- year period. To the contrary, BGE's past experiment with voluntary time-of-use rates revealed a steady decline in participation since its peak in 1999.[189] Should the current Proposal realize a similar gradual decline in interest, a substantial portion of the projected benefits in this Proposal will disappear with no corresponding reduction in either the costs of the Proposal or in BGE's revenue stream. We do not purport to know the extent to which ratepayers ultimately will participate in a dynamic pricing schedule such as the one BGE proposes, but we do not have a high level of confidence in BGE's predictions on that score, and we do not believe BGE's ratepayers should exclusively

[189] Godfrey Direct at 17. Some portion of this decline is due to the recent unavailability of TOU rates to certain BGE ratepayers. However, many regulators in other states have seen a similar phenomenon with TOU rates – a short-term engagement followed by a decline in interest. *See* Brockway Direct at 21 ("If we look back to the efforts of regulators to introduce time-of-use pricing in the 1970s and 1980s, we see a pattern of initial interest in the rates, participation leveling off, and eventual consumer abandonment of the rates.").

bear the risk that participation will fall far short of the Company's projections.[190]

BGE combines assumptions about customer participation with additional assumptions about the sustained clearing price in the Reliability Pricing Model ("RPM"), PJM's capacity market construct. Begun in 2007, the RPM conducts a centralized auction three years in advance of the delivery year to procure necessary resources for anticipated load. The clearing prices of the RPM auctions conducted since its inception have varied significantly. Accordingly, predicting future auction results is highly speculative.

Nonetheless, despite this somewhat short history, BGE assumes that the capacity revenues from the PJM-administered RPM will reflect a capacity value of $176.44 per MW day (the NetCONE for the Southwest MAAC for 2012-13) over an extended period.[191] Although BGE claims that its business case does not depend significantly on changes in this NetCONE[192], it conceded that under the Proposal, a decrease in the NetCONE will cause a corresponding decrease in the amounts of the Peak Time Rebates to customers.[193]

In its Proposal, BGE will receive its RPM revenues based upon the RPM capacity price rather than the price of NetCONE, requiring an annual true-up to reconcile any differences between the two. The RPM capacity price for the 2012-13 delivery year in

---

190 A recent report prepared for the staff of the Federal Energy Regulatory Committee concluded that customer participation and associated demand response reductions were by far the most significant uncertainties when assessing demand response in AMI programs. The Brattle Group, Freeman Sullivan & Co., Global Energy Partners LLC, *A National Assessment of Demand Response Potential*, June 2009. Brockway Direct at 13. Echoing this theme, BGE conceded in its discovery responses that it could not provide statistics regarding its customer participation in dynamic pricing by territory or jurisdiction because "AMI is still in the process of being rolled out around the country, and since dynamic pricing cannot be offered to customers without AMI." Hornby Direct at 10.

191 BGE Initial Brief at 8. NetCONE is the Net Cost of New Entry for a new gas-fired combustion turbine, generally expressed in $ per MW-day.

192 BGE Initial Brief at 8.

193 BGE Witness Manuel, Tr. at 678 (Nov. 13, 2009).

SWMAAC is only $133 per MW-day, more than $40 below BGE's projected base for calculating its PTR.[194] While BGE may ultimately be correct that the price of NetCONE accurately reflects the cost of capacity in the long-term, this conclusion is far from certain.[195] If BGE's necessarily speculative projections are incorrect, and $176.44 significantly exceeds RPM capacity prices during the life of this project, the level of supply-side benefits upon which the Proposal's business case is based will not materialize.

3. Benefits Related to Energy Conservation

BGE's business case also predicts that the Proposal will generate $190 million in benefits from "energy conservation" by reducing overall energy consumption by 1%.[196] BGE believes it can reduce overall consumption through improved feedback to customers primarily through its proposed web portal.[197] In other words, the Company does not contend that TOU rates or PTRs will reduce consumption. Indeed, California's statewide pricing pilot revealed that dynamic pricing only compelled customers to shift their usage rather than reduce overall consumption.[198] Nor does BGE rely upon its pilot programs

[194] Ex. DMV-1 at 14. We note incidentally that the auction for 2013-2014 for BGE reflected a clearing price of $226.15, indicating the highly fluctuating nature of capacity clearing price.
[195] OPC Witness Hornby lists a number of possible market factors that could reduce the market price of wholesale capacity, including "low load growth, increased utilization of existing capacity due to reduction in transmission constraints, and capacity additions from renewable resources driven by Renewable Portfolio Standards." Hornby Direct at 26.
[196] BGE Ex. DMV-1 at 3, 14.
[197] BGE Witness Case, Tr. at 36, 92 (Nov. 10, 2009).
[198] Alexander Direct at 28. Additionally, at most the PTRs alone apply to only sixty (60) hours annually, less than 1% of the entire year. Hornby Direct at 11-12.

for this particular benefit.[199] In the final analysis, this 1% projection appears largely without foundation.[200]

BGE's proposal does not include any in-home displays that might help customers reduce their energy bills by reducing their energy usage. Rather, the web portal will tell customers how much energy they used on an hourly basis, and even that information is at least a day old. Customers will receive no information as to how they reached these energy usage levels, such as the extent to which certain appliances contributed to the overall energy use, leaving it unclear exactly how they should adjust their behavior in the future.[201] BGE claims that the ZigBee chip will allow BGE to provide appliance-specific information as well as direct communication with a customer's appliances in the future,[202] but concedes that this will only be possible after the customer purchases new appliances with ZigBee-compatible communication technology.[203] Additionally, BGE's web portal will be entirely unavailable to those 30% of BGE customers who lack a computer with Internet access.[204] Because the elderly and financially disadvantaged are

---

[199] BGE Witness Case, Tr. at 93 (Nov. 10, 2009) (The pilot "was not focused on the conservation benefit nor did we provide the tools that would enable the conservation benefit.") As we've already observed, BGE's pilot programs resulted in less than the 1% conservation projected in the Company's business case. Faruqui Direct at 26; Faruqui Supp. at 17.

[200] BGE also relies in part on a 2006 summary of the results of various studies that purports to show a 5%-15% reduction in energy consumption from increased feedback regarding usage history. Butts Direct at 10-11. BGE Ex. DMV-1 at 26. However, the results of those studies are inconsistent with BGE's own pilot results. Faruqui Direct at 26; Faruqui Supp. at 17. Additionally, most of the studies upon which BGE relies either occurred outside of the United States, included utility home visits or are too outdated to provide a reliable parallel to the Company's current Proposal. Brockway Direct at 15-17.

[201] BGE Witness Case, Tr. at 82 (Nov. 10, 2009).

[202] In its own testimony regarding its web portal technology, BGE concedes that the ability to provide meaningful information to customers will likely exist "within a reasonable period of time, a couple of years, there will be more ability of the systems to identify here's the heating load when it kicked on or here's the air conditioning load when it kicked on. So that's still somewhat in its infancy. But that is the way the industry is going." BGE Witness Case, Tr. at 83 (Nov. 10, 2009).

[203] BGE Witness Butts, Tr. 1061-2 (Dec. 4, 2009). As previously noted, no appliance manufacturer has currently adopted ZigBee technology.

[204] BGE Witness Case, Tr. 200 (Nov. 10, 2009).

disproportionately likely to lack Internet access, BGE's proposal provides no information to those customers most in need of reduced energy bills.

We do not believe this extremely limited information could possibly support the estimated 1% reduction in energy consumption that BGE predicts. To the contrary, both its 2008 and 2009 pilot programs revealed that pilot program participants without enabling technologies only reduced their overall consumption by 0.5% and 0.8%, respectively, during the hottest months of the year.[205] In fact, dynamic pricing might cause some customers to increase their consumption by allowing them to use more energy at the same price by maximizing their energy use during less expensive, non-peak periods.[206]

If BGE's projected benefits are as conservative as BGE claims,[207] we believe it is appropriate to require BGE to mitigate and more fairly allocate between the Company and its customers the risk that these benefits will not materialize as predicted. Any future BGE AMI proposal should include a mechanism by which it will do so.

VI. Conclusion

As we have noted repeatedly throughout this Order, we believe whole-heartedly in the intentions behind BGE's Proposal. Nothing in this Order should be construed as a vote of "no-confidence" in smart-grid technology's ability ultimately to lower energy bills, improve customer service and relieve peak-time pressure on the transmission and distribution infrastructure. Our desire that BGE share the risks associated with such an

---

205 Faruqui Direct at 26; Faruqui Supp. at 17.
206 Jennings Direct at 26-7 (citing BGE presentation regarding its pilot program).
207 BGE Witness Case, Tr. at 19 (Nov. 10, 2009). We should add that although BGE does calculate lower TRC results in the event one of its assumptions proves unfounded, it did not perform a sensitivity analysis that manipulated more than one variable at a time. BGE Witness Vahos, Tr. at 884-5 (Dec. 4, 2009). Therefore, a combination of expensive technological upgrades, significant additional costs, and reduced benefits could drive the Proposal's TRC far below any scenario addressed in the record.

investment at this juncture is in no way an indication that we believe an investment in AMI ultimately will prove unwise. We simply think it more equitable that BGE and its ratepayers venture into this relatively unknown territory as partners.

Therefore, we invite BGE to submit an alternative proposal that mitigates and more fairly allocates between the Company and its customers the risk that the reality of this project will not reflect the projections BGE has provided to this Commission. We also expect any alternative proposal to include a revised business case that addresses both opt-in and opt-out TOU scenarios as well as the detailed customer education plan we have outlined above.

IT IS THEREFORE, this 21st day June, in the Year Two Thousand Ten by the Public Service Commission of Maryland,

ORDERED: (1) That, for the reasons set forth above, the Application for Authorization to Deploy a Smart Grid Initiative and to Establish a Surcharge Mechanism for the Recovery of Costs filed by Baltimore Gas and Electric Company is denied, without prejudice for further filings consistent with this Order.

/s/ Chairman Douglas R.M. Nazarian

/s/Commissioner Harold D. Williams

/s/ Commissioner Susanne Brogan

/s/ Commissioner Lawrence Brenner

/s/ Commissioner Therese M. Goldsmith