STATE OF MAINE

BEFORE THE

MAINE PUBLIC UTILITIES COMMISSION

CENTRAL MAINE POWER COMPANY REQUEST FOR NEW ALTERNATIVE RATE PLAN	)))	DOCKET NO. 2007-215 PHASE II

SUPPLEMENTAL TESTIMONY OF

J. Richard Hornby

ON BEHALF OF THE

MAINE OFFICE OF PUBLIC ADVOCATE

OCTOBER 30, 2008

INTRODUCTION / SUMMARY

Q. PLEASE STATE YOUR NAME, EMPLOYER, AND PRESENT POSITION.

A. My name is J. Richard Hornby. I am a Senior Consultant at Synapse Energy Economics, Inc., 22 Pearl Street, Cambridge, MA 02139.

Q. ON WHOSE BEHALF ARE YOU TESTIFYING IN THIS CASE?

A. I am testifying on behalf of the Maine Office of Public Advocate (OPA).

Q. PLEASE DESCRIBE SYNAPSE ENERGY ECONOMICS.

A. Synapse Energy Economics ("Synapse") is a research and consulting firm specializing in energy and environmental issues, including: electric generation, transmission and distribution system reliability, market power, electricity market prices, stranded costs, efficiency, renewable energy, environmental quality, and nuclear power.

Q. PLEASE SUMMARIZE YOUR WORK EXPERIENCE AND EDUCATIONAL BACKGROUND.

A. I am a consultant specializing in planning, market structure, ratemaking, and gas supply/fuel procurement in the electric and gas industries. Over the past twenty years, I have presented expert testimony and provided litigation support on these issues in approximately 100 proceedings in over thirty jurisdictions in the United States and Canada. Over this period, my clients have included staff of public utility commissions, state energy offices, consumer advocate offices and marketers.

Prior to joining Synapse in 2006, I was a Principal with CRA International and, prior to that, Tabors Caramanis & Associates. From 1986 to 1998, I worked with the Tellus Institute (formerly Energy Systems Research Group), initially as Manager of the

Natural Gas Program and subsequently as Director of their Energy Group. Prior to 1986, I was Assistant Deputy Minister of Energy for the Province of Nova Scotia.

I have a Master of Science in Energy Technology and Policy from the Massachusetts Institute of Technology (MIT) and a Bachelor of Industrial Engineering from the Technical University of Nova Scotia, now merged with Dalhousie University. I have attached my current resume to this testimony as Exhibit___(JRH-1).

Q. PLEASE SUMMARIZE YOUR EXPERIENCE WITH ENERGY EFFICIENCY AND DEMAND RESPONSE MEASURES AND POLICIES.

A. My experience with energy efficiency measures and policies began over thirty years ago as a project engineer responsible for identifying and pursuing opportunities to reduce energy use in a factory in Nova Scotia. Subsequently, in my graduate program at MIT I took several courses on energy technologies and policies, and prepared a thesis analyzing federal policies to promote investments in energy efficiency. After MIT, I spent several years with the government in Nova Scotia, during which time I administered a provincial program to promote energy conservation in the industrial sector and later included energy conservation in all sectors as part of energy plans developed for the province. Over the past twenty years as a regulatory consultant I have helped review and prepare numerous integrated resource plans in the gas and electric industries

Over the last eighteen months I have analyzed several utility filings proposing investments in advanced metering infrastructure (AMI), dynamic pricing, real-time pricing and/or direct load control (DLC) in the residential sector on behalf of consumer advocates in Washington, Maine, New Jersey, Pennsylvania, Maryland and the District of

Columbia. In Exhibit___(JRH-2) I provide a whitepaper on the implications of AMI for residential customers that I prepared for the New Jersey Department of the Public Advocate, Division of Rate Counsel.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. In May 2007 Central Maine Power ("CMP" or the "Company") requested approval of an AMI project as part of its request for an Alternative Rate Plan. That AMI project would entail, among other aspects, replacing 100 % of existing meters with new "smart" meters. In a filing dated September 29, 2008 CMP provided updated information regarding its AMI project. Based upon that updated information, and several other factors discussed in its September filing, CMP stated that it now believes "...it should not move forward with AMI at this time."

The OPA retained Synapse to review the merits of CMP's proposal to suspend its AMI project as well as to provide suggestions regarding research and analyses that CMP should complete before re-submitting a request for AMI in a future proceeding. The purpose of this testimony is to present my suggestions, and the basis for those suggestions.

Q. WHAT DATA SOURCES DID YOU RELY UPON TO PREPARE YOUR TESTIMONY AND EXHIBITS?

A. In order to prepare my testimony I reviewed portions of the testimony regarding AMI filed by the Company and OPA witnesses in this Docket, as well as sections of transcripts and responses to relevant data requests. In addition, my testimony is informed by my detailed analyses of utility filings proposing AMI, dynamic pricing, real-time pricing

and/or direct load control on behalf of clients in proceedings in Washington, Maine, New Jersey, Pennsylvania and Maryland. Finally, I have reviewed various orders issued in other proceedings regarding AMI and dynamic pricing, as well as numerous reports on those technologies and rate designs.

Q. PLEASE SUMMARIZE YOUR MAJOR CONCLUSIONS REGARDING THE IMPLICATIONS OF AMI FOR RESIDENTIAL CUSTOMERS BASED UPON THE UTILITY PROPOSALS YOU HAVE REVIEWED TO DATE.

A.: I have four major conclusions regarding the implications of AMI for residential customers based upon the utility filings I have reviewed to date:

- utilities have not demonstrated that reductions in peak demand resulting from AMI-enabled dynamic pricing will produce significant reductions in annual electric energy use or the annual air emissions, such as carbon dioxide, associated with annual electricity use;
- utilities have not demonstrated that "AMI plus dynamic pricing" is the least-cost approach to achieving the twin goals of reducing distribution system costs and reducing customer electricity supply costs;
- utilities have projected reductions in peak demand from AMI-enabled dynamic pricing based upon questionable assumptions regarding customer participation, reductions per participant and persistence of reductions per participant; and
- utilities have projected savings in wholesale generation supply costs due to reductions in peak demand from AMI-enabled dynamic pricing based upon questionable assumptions regarding the impact of those reductions on wholesale

markets for generation capacity and energy, and mechanisms for crediting the resulting savings in wholesale generation costs to ratepayers.

Q. PLEASE SUMMARIZE YOUR CONCLUSION REGARDING THE MERITS OF CMP'S DECISION TO SUSPEND ITS AMI PROJECT.

A.: My conclusion is that CMP has made the correct decision by suspending its AMI project at this time. First, CMP has avoided the financial risk of proceeding with a major investment whose projected costs and benefits are quite uncertain based upon the information it has assembled to date. Second, CMP has retained the option of re-submitting its request for an AMI project after it has collected and analyzed the information needed to reduce the uncertainty regarding these projected costs and benefits.

Q. PLEASE SUMMARIZE YOUR RECOMMENDATIONS REGARDING CMP'S DECISION TO SUSPEND ITS AMI PROJECT BASED UPON THE AMI PROPOSALS YOU HAVE ANALYZED

A: Based upon the AMI proposals I have analyzed, and my review of the record in this proceeding, I recommend that the Maine Public Utilities Commission (Commission) accept CMP's decision to suspend its AMI project at this time. In addition, I recommend that the Commission require the Company to complete the following research and analyses before re-submitting a request for AMI in a future proceeding:

- evaluate a range of technology/rate design approaches for reducing distribution system costs and customer electricity supply costs to determine if an "AMI plus dynamic pricing" is the least-cost approach;

- collect and analyze data, ideally as Maine-specific as possible, to support assumptions regarding customer participation, reductions per participant and persistence of reductions per participant; and
- analyze the operation of the wholesale markets for generation capacity and energy in order to support its projections of savings in wholesale generation supply costs due to reductions in peak demand and the mechanisms through which those savings would be credited to ratepayers.

DISCUSSION

Q. PLEASE BEGIN BY EXPLAINING WHY YOU HAVE FOCUSED UPON THE IMPLICATIONS OF AMI FOR RESIDENTIAL CUSTOMERS IN YOUR REVIEW OF VARIOUS AMI PROPOSALS.

A: I have focused on the implications for residential customers because much of the justification for AMI is based upon projected savings in electricity supply costs from price-driven reductions in demand by residential customers.

Most utility AMI filings propose replacement of 100% of existing residential meters, in addition to other components of the AMI system. These AMI filings usually attempt to justify, at least in part, the universal replacement of meters with projections that AMI will "enable" a portion or percentage of residential customers to realize savings by voluntarily reducing their electricity use in response to some form of time-differentiated pricing during critical peak periods. AMI enables these demand response savings through the installation of a "smart meter", which has the ability to record customer electricity usage hourly, and through a two-way communication system for

sending signals from the utility to the customer and vice versa. (This functionality is new for residential customers, and would require a new meter, but it is not new for those non-residential customers who currently have interval meters). The question for the residential rate class is whether the savings in electricity supply costs from price-driven reductions in demand by the sub-set of residential customers who actually voluntarily respond, combined with the portion of utility operational savings allocated to residential rate classes, will be large enough to justify the cost of replacing the existing meters of all residential customers.[1]

Q. WHAT IS THE BASIS FOR YOUR CONCLUSION REGARDING THE IMPACT OF AMI-ENABLED DYNAMIC PRICING ON ANNUAL ELECTRICITY COSTS AND ANNUAL AIR EMISSIONS, SUCH AS CARBON DIOXIDE.

A.: The electric utility proposals I have reviewed do not forecast investments in AMI, or dynamic pricing enabled by AMI, to produce material reductions in the annual energy use of residential customers. As a result, they are not forecasting material reductions in the annual electricity bills of ratepayers or in annual air emissions.

Dynamic pricing enabled by AMI is typically projected to produce reductions in customer energy use in less than 100 hours each year. For example, CMP witness George based his estimates on reductions during 72 hours, i.e. Peak Time Rebate events of six hours each occurring on 12 days[2]. The Brattle Group, in their analysis for Atlantic City Electric in New Jersey, based their estimates on 48 hours, i.e., events of 4 hours each

[1] A similar questions exists for many non-residential customers.

[2] Rebuttal Testimony of Stephen S. George, Ph. D. Volume IV, Demand Response Component Of Advanced Metering Infrastructure, November 9, 2007, Appendix A, page 4 and Table A-5.

on 12 days.[3] These critical peak periods, during which customer demand is at or near the system annual peak, represent less than 1% of the hours in the year. In response to a large reduction in peak demand suppliers in the wholesale market are expected to defer, or permanently avoid, the cost of a new "peaker" unit, such as a gas-fired combustion turbine. However, that reduction in peak demand is not projected to materially reduce the annual quantity of electricity generated from existing generating units or to delay the construction of new "base load" generating units, which are built as a source of annual electric energy rather than as a source of peak capacity. In contrast, a" base load" type energy efficiency measure that reduced electricity use by 5% in every hour of the year (e.g., 8,760 hours) would lead electricity supply service providers to reduce the quantity of capacity they hold by 5%, as well as reduce the quantity of electricity they bought in every hour of the year by 5%. That reduction in annual electricity generation reduction would produce a corresponding decrease in a participating customer's annual bill. It should also provide a corresponding reduction in air emissions, including avoided carbon dioxide associated with the avoided electric energy.

Q. WHAT IS THE BASIS FOR YOUR CONCLUSION REGARDING THE COST-EFFECTIVENESS OF AMI AND DYNAMIC PRICING RELATIVE TO ALTERNATIVE COMBINATIONS OF OTHER TECHNOLOGIES AND RATE DESIGNS.

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[3] Atlantic City Electric, New Jersey BPU Docket No. EO07110881, *Blueprint for the Future, Exhibit C, Quantifying Customer Benefits from Reductions in Critical Peak Loads from PHI's Proposed Demand-Side Management Programs*, page 18.

A. The electric utility AMI filings I have reviewed attempt to justify rate recovery of their proposed investments in AMI based upon the combined value of projected savings in distribution system costs and projected savings in customer electricity supply costs. These filings have often failed to identify the range of technology/ rate design combinations available to achieve the twin goals of reducing distribution system costs and reducing customer electricity supply costs, and to assess the cost of achieving those goals via AMI/dynamic pricing relative to other approaches. For example, in many states one feasible alternative is a combination of Automated Meter Reading (AMR), voluntary Direct Load Control (DLC) and voluntary Dynamic Pricing (DP) supported by interval meters and Internet access. (That alternative is acknowledged in a January 2008 report prepared for the Edison Electric Institute by the Brattle Group, which is a major supporter of AMI enabled dynamic pricing.)[4]

Q. WHAT IS YOUR RECOMMENDATION FOR CMP BASED UPON THAT CONCLUSION.

A: Before it re-submits a request for AMI in a future proceeding I recommend that CMP identify the range of technology/ rate design combinations available to achieve its twin goals of reducing distribution system costs and reducing customer electricity supply costs, and to determine if an "AMI plus dynamic pricing" is the least-cost approach.

Q. WHAT IS THE BASIS FOR YOUR CONCLUSION REGARDING THE PROJECTED REDUCTIONS IN PEAK DEMAND FROM AMI-ENABLED DYNAMIC PRICING.

[4] Faruqui, Ahmad and Wood, Lisa. *Quantifying the Benefits of Dynamic Pricing in the Mass Market.* Edison

A. The projected reductions in peak demand from AMI-enabled dynamic pricing hinge upon three key assumptions, i.e. the number of customers who will voluntarily participate, the average reduction per participant and the persistence of that level of reduction per participant. There is considerable uncertainty associated with each of these assumptions.

First, the pilot projects conducted in other jurisdictions provide little or no guidance regarding the percentage of customers who will voluntarily participate. These pilots, such as the California Statewide Pricing Pilot (SPP), offer customers "appreciation" payments that can range from $75 to $175 in order to attract them to participate. In contrast, a full-scale dynamic pricing tariff would not include those incentives to participate.

Second, there is no indication that dynamic pricing supported by AMI will enable participating residential customers to achieve greater reductions in peak period use than some combination of DLC and time-differentiated pricing tariffs supported by existing modes of communication and the installation of interval meters. This alternative approach would only require investments in technologies for the sub-set of residential customers who chose to participate.

Third, in terms of persistence, the various pilots have only operated for two to three years. Moreover, empirical evidence from the past does not support assumptions about long-term persistence of reductions in responses to time-of-use rates. In addition, studies of price elasticity indicate that reductions in the short-run are attributable to behavioral change but reductions in the long-run are attributable to improvements in the

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Electric Institute, January 2008, pages 41 and 42.

efficiency of equipment and building shell. In other words, participants in dynamic pricing are unlikely to respond to critical peak prices with "behavioral changes" every summer for 15 summers.

Q. WHAT IS YOUR RECOMMENDATION FOR CMP BASED UPON THAT CONCLUSION.

A: Before it re-submits a request for AMI in a future proceeding I recommend that CMP collect and analyze data, ideally as Maine-specific as possible, to support assumptions regarding customer participation, reductions per participant and persistence of reductions per participant. For example, CMP should undertake load research to:

- identify the distribution of peak demand per customer within the residential sector in order to identify the sub-set of residential customers with the largest kw and hence the potential for the largest reduction per participant;
- conduct market research on that sub-set of large use residential customers to determine the load reduction programs in which they would voluntarily participate, e.g. how many would enroll in DLC, how many would enroll in a dynamic pricing tariff; and
- determine whether customers with multiple window air conditioners would respond to dynamic pricing in the same manner as a customer with a central air-conditioner.

Q. WHAT IS THE BASIS FOR YOUR CONCLUSION REGARDING THE PROJECTED SAVINGS IN WHOLESALE GENERATION SUPPLY COSTS DUE

TO REDUCTIONS IN PEAK DEMAND FROM AMI-ENABLED DYNAMIC PRICING.

A. The projected savings in wholesale generation supply costs due to reductions in peak demand from AMI-enabled dynamic pricing hinge upon assumptions regarding the impact of those reductions on wholesale markets for generation capacity and energy as well as assumptions regarding mechanisms for crediting the resulting savings in wholesale generation costs to ratepayers. Again, there is considerable uncertainty associated with these assumptions.

One of the public policy benefits cited by proponents of AMI-enabled dynamic pricing is that reductions in peak demand by a sub-set of customers will lead to reductions in the prices of capacity and energy in the wholesale market, which will benefit all electricity users. While I agree that this benefit is consistent with economic theory, it is very difficult to quantify. Moreover, any quantification has to reflect the procedures through which the wholesale prices for capacity and energy are set, and the associated timeline. For example, in order for reductions in peak demand from dynamic pricing to affect the price of capacity in the ISO-NE Forward Capacity Market, those reductions must affect either the demand for capacity or the supply of capacity. In order to affect the demand for capacity, the system planners at ISO NE must "see" the reductions in peak demand for several years in order to reflect their impact in the algorithms they use to prepare their long-term forecast of peak demand. Thus, at a minimum, there will be a delay of a few years before the impact is felt. Similarly, if the reductions are to be considered as a "supply" of capacity, their impact must be bid into

the FCM by CMP or some other curtailment service provider as a firm demand resource. The bidder will incur a financial penalty if the reductions do not actually materialize.

In addition to quantifying the impact of these reductions on the market, one must also understand the mechanism through which any reductions in wholesale generation costs will flow to participants and/or all ratepayers. In Maine Standard Offer Providers are responsible for acquiring wholesale capacity and energy, and for whatever actual wholesale costs they incur in order to provide Stand Offer service. Currently they are under no obligation to flow any savings in their wholesale capacity or energy costs back to ratepayers during the term of their contract. Moreover there is no direct or transparent connection between the market prices for wholesale capacity and energy that wholesale providers expect to incur to provide Standard Offer service and the prices they bid in the periodic SOS supply auctions. Therefore, implementation of dynamic pricing would require either CMP to take responsibility for bidding the reductions into the FCM, or an arrangement with Standard Offer Providers to track the reductions in customer use, record the savings in capacity and energy costs resulting from those reductions, and follow the disposition of those cost savings from Standard Offer Providers to ratepayers.

Q. WHAT IS YOUR RECOMMENDATION FOR CMP BASED UPON THAT CONCLUSION.

A: Before it re-submits a request for AMI in a future proceeding I recommend that CMP analyze the operation of the wholesale markets for generation capacity and energy in order to support the projected savings in wholesale generation supply costs due to

reductions in peak demand and the mechanisms through which those savings would be credited to ratepayers.

Q. DOES THIS COMPLETE YOUR DIRECT TESTIMONY?

A. Yes.