STATE OF MAINE
PUBLIC UTILITIES COMMISSION
Docket No. 2010-267

MAINE PUBLIC UTILITIES COMMISSION

Investigation into Need for Smart Grid Coordinator and Smart Grid Coordinator Standards

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Direct Testimony of J. Richard Hornby and Martin R. Cohen

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Exhibits

I. INTRODUCTION / SUMMARY

Q. PLEASE STATE YOUR NAMES, EMPLOYERS, AND PRESENT POSITIONS.

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

My name is Martin R. Cohen. My address is 2633 W. Sunnyside Ave., Chicago, IL 60625.

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

A. We are testifying jointly on behalf of the Maine Office of the Public Advocate (OPA).

Q. MR. HORNBY, PLEASE SUMMARIZE YOUR EXPERIENCE AS A REGULATORY CONSULTANT.

A. I am an energy regulatory consultant specializing in planning, market structure, ratemaking, and gas supply/fuel procurement in the electric and gas industries. Since 1986 I have presented expert testimony and provided litigation support on these issues in more than 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. Since 2008 I have reviewed the economics of smart grid proposals in New Jersey, Maine, Maryland, the District of Columbia, Pennsylvania, Nevada and Texas. I have attached my resume to this testimony as Exhibit___(JRH/MRC-1).

Q. **MR. COHEN, PLEASE DESCRIBE YOUR PROFESSIONAL EXPERIENCE.**

A. I am the principal of Martin Roth Cohen and Associates. I provide consulting services on energy policy and other regulatory matters. These services include issue analysis, research, writing, and expert testimony in regulatory proceedings. I have been involved in energy policy issues, primarily as a consumer advocate, for more than 25 years. I was employed by the Citizens Utility Board (CUB), an organization created by the Illinois

General Assembly to represent the interests of consumers in regulatory matters, from February, 1985 to September, 2005. I served as CUB's Executive Director from 1991 until I was appointed Chairman of the Illinois Commerce Commission in 2005. I served in that position for two months until receiving one vote less than necessary for confirmation by the state senate because of my prior service as the state's lead consumer advocate. From January 2006 until February 2008 I served as the Director of Consumer Affairs in the office of the Illinois governor. I founded Martin Roth Cohen and Associates in February 2008. My resume is attached as Exhibit___(JRH/MRC-2)

Q. WHAT IS THE PURPOSE OF YOUR JOINT TESTIMONY?

A. In March 2010 the Maine Legislature passed "An Act to Create a Smart Grid Policy in the State" (the "Act" or the "Smart Grid Act")" which, among other things, provides that the Commission shall determine if it is in the public interest to have a smart grid coordinator(s) (hereinafter referred to as "Coordinator"). The Act defines the Coordinator as an entity that "manages access to smart grid functions and associated infrastructure, technology and applications." The Act has adopted the definition of smart grid functions in Section 1306(d) of the federal Energy Independence and Security Act of 2007 (EISA), which defines nine smart grid functions eligible for federal funding support.

The Commission has initiated this generic proceeding to make that determination. The purpose of this Phase I of the proceeding is to address the question of whether it is in the public interest to have a Coordinator. If the Commission decides that a Coordinator is in the public interest, it will initiate a Phase II of the proceeding to address the standards governing the establishment of a Coordinator. (The Commission has not indicated the process through which a specific Coordinator would be selected for a specific utility, should the Commission determine that a Coordinator is in the public interest).

The OPA retained us to help them evaluate whether it is in the public interest to have a Coordinator and, if so, the appropriate standards for such a Coordinator. The purpose of our testimony in this Phase of the proceeding is to present our evaluation of whether it is in the public interest to establish a Coordinator.

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

A. In order to prepare our testimony we reviewed the Smart Grid Act, the Commission notice of investigation and orders in this proceeding, the settlement and Commission Order in Central Maine Power (CMP) Docket 2008-255, the Commission Orders approving the AMI projects of CMP and of Bangor Hydro Electric (BHE), and the materials filed in BHE Docket 2010-14. In addition, we reviewed recent major reports and initiatives regarding the implementation of smart grid by national organizations and by agencies in other states. Finally, our testimony is informed by our participation in proceedings regarding smart grid proposals and related matters in Illinois, New Jersey, Pennsylvania, Maryland, the District of Columbia, Nevada and Texas.

Q. PLEASE SUMMARIZE YOUR MAJOR CONCLUSIONS REGARDING THE ESTABLISHMENT OF A COORDINATOR IN MAINE.

A. We have four major conclusions based upon our analyses:

- First, utilities have the responsibility, financial incentive and expertise needed to achieve the direct benefits to their transmission and distribution systems enabled by smart grid technology. However, various barriers need to be overcome in order to readily and fully achieve the economic, energy and environmental benefits to customers and society enabled by this technology. In particular, maximizing cost-effective smart grid enabled benefits for residential and small commercial customers will require active management and customer engagement;

- Second, for a sub-set of smart grid functions, the concept of establishing a Coordinator is sufficiently in the public interest to justify moving to Phase II of this proceeding. That sub-set consists of EISA function 6 and portions of EISA functions 1, 2, 3, 8 and 9 as adopted by the Smart Grid Act;

- Third, a final determination of whether establishment of a Coordinator will, or will not, be in the public interest cannot be made until Phase II issues are successfully resolved. Such a determination will depend on whether a reasonable approach can be identified for structuring, implementing, and regulating the Coordinator; and

- Fourth, determining the best approach to structuring a Coordinator will require consideration of utility-specific and statewide issues. The facts presented in Phase II and/or in subsequent proceedings may demonstrate that the public interest is best served by selecting different Coordinators for each service territory, the same Coordinator for more than one service territory, or a single statewide Coordinator.

Q. PLEASE SUMMARIZE YOUR RECOMMENDATIONS REGARDING THE ESTABLISHMENT OF A COORDINATOR IN MAINE.

A: Based upon those four conclusions we recommend that the Commission:

- determine that the concept of establishment of a Coordinator is sufficiently in the public interest to move to Phase II for EISA function 6 and portions of EISA functions 1, 2, 3, 8 and 9 as adopted by the Smart Grid Act;
- find that Phase II of this proceeding should examine whether a Coordinator will be in the public interest by determining if the projected benefits to ratepayers of establishing a Coordinator will exceed the additional cost of establishing a Coordinator; and
- examine whether a single, state-wide Coordinator would manage smart grid functions more effectively than a different Coordinator for each utility service territory.

Q. HOW IS THE BALANCE OF YOUR TESTIMONY ORGANIZED?

A. The balance of our testimony is organized in three sections. To place our comments in context we begin with an overview of Maine's existing electricity market structure and regulatory framework, and the major smart grid initiatives already underway in the state. Our testimony then describes our high-level analysis of the potential for a Coordinator to be in the public interest, i.e., from a conceptual perspective. Finally we discuss the major factors that will affect whether a Coordinator will, or will not, be in the public interest.

The organization of our testimony is consistent with the flexibility allowed in the October 27 Procedural Order which states: "Finally, the outline, which we adopt at this time, is not intended to compel a party to provide testimony or information or to comment in areas or where the information sought is not available to the party or is outside of the party's area of expertise. Nor should the outline be seen as limiting information which a party believes is relevant to the objectives of this phase of the investigation, but does not readily fit into one of the sections of the outline." Our testimony is relevant to this phase but does not readily fit into any one of the sections of the outline in the October 27 Procedural Order.

II. OVERVIEW OF EXISTING MARKET STRUCTURE, REGULATORY FRAMEWORK AND SMART GRID INITIATIVES IN MAINE

Q. WHY DOES YOUR ANALYSIS BEGIN WITH A REVIEW OF THE EXISTING MARKET STRUCTURE, REGULATORY FRAMEWORK AND SMART GRID INITIATIVES IN MAINE?

A. The existing market structure, regulatory framework and smart grid initiatives in Maine provide the "base case" or reference point against which we evaluate whether establishment of a Smart Grid Coordinator has the potential to be in the public interest. In addition, this information informs our assessment of which smart grid functions the Commission should consider assigning to the Coordinator. Most, if not all, of the parties currently participating in Maine's electricity market will have some role to play in achieving the goals of the Act, be affected by initiatives to achieve those goals, or both. Moreover, if a Coordinator is established for a utility service territory, that Coordinator will need to work with most if not all of these parties. Therefore in order to determine whether a Coordinator has the potential to be in the public interest it is essential to understand the existing market structure, regulatory framework and smart grid initiatives.

Q. THE ACT ESTABLISHES SPECIFIC GOALS TO PROMOTE THE IMPLEMENTATION AND USE OF SMART GRID FUNCTIONS. ARE ALL OF THOSE SMART GRID FUNCTIONS COMPLETELY NEW TO MAINE?

A. No. Neither smart grid technologies nor the initiatives they can enable are completely new to Maine. Thus the Act's goals to promote implementation and use of smart grid functions relate more to providing access to new classes of customers and to using those functions to support new distributed generation, storage, demand-side management and electric vehicle applications than to the system-wide introduction of completely new technologies.

The state's local transmission and distribution utilities ("T&D utilities") have been routinely investing in new and improved communication, monitoring and control technologies on their systems for years. For those utilities, today's smart grid technologies represent a new phase in the ongoing modernization of their systems. On the customer side of the meter, large commercial and industrial customers have had access to the equivalent of many of these functionalities for many years. Customers in those sectors have several years of experience, either on their own or through their competitive electricity provider ("CEP") or curtailment service provider ("CSP"), in modifying their usage patterns in response to hourly energy prices and to capacity prices in peak periods.

What is new to Maine is the extension of these smart grid functions to customers in the residential and small commercial sectors, which we will refer to as "mass market" customers. What is also new is the use of these functions to enable or support distributed generation, storage and new customer-side applications such as electric vehicles and new forms of demand-side management in all sectors.[1]

Q. PLEASE SUMMARIZE THE KEY CHARACTERISTICS OF THE EXISTING MARKET STRUCTURE AND REGULATORY FRAMEWORK THAT UNDERLIE YOUR ANALYSES.

A. Three key characteristics of the existing market structure and regulatory framework are particularly relevant to our analyses. These characteristics are the major differences in customer attributes by sector, the separate provision of retail services (i.e. electricity supply, local T&D, efficiency) and the differences between the regulation and financial incentives of the parties who provide those separate services.

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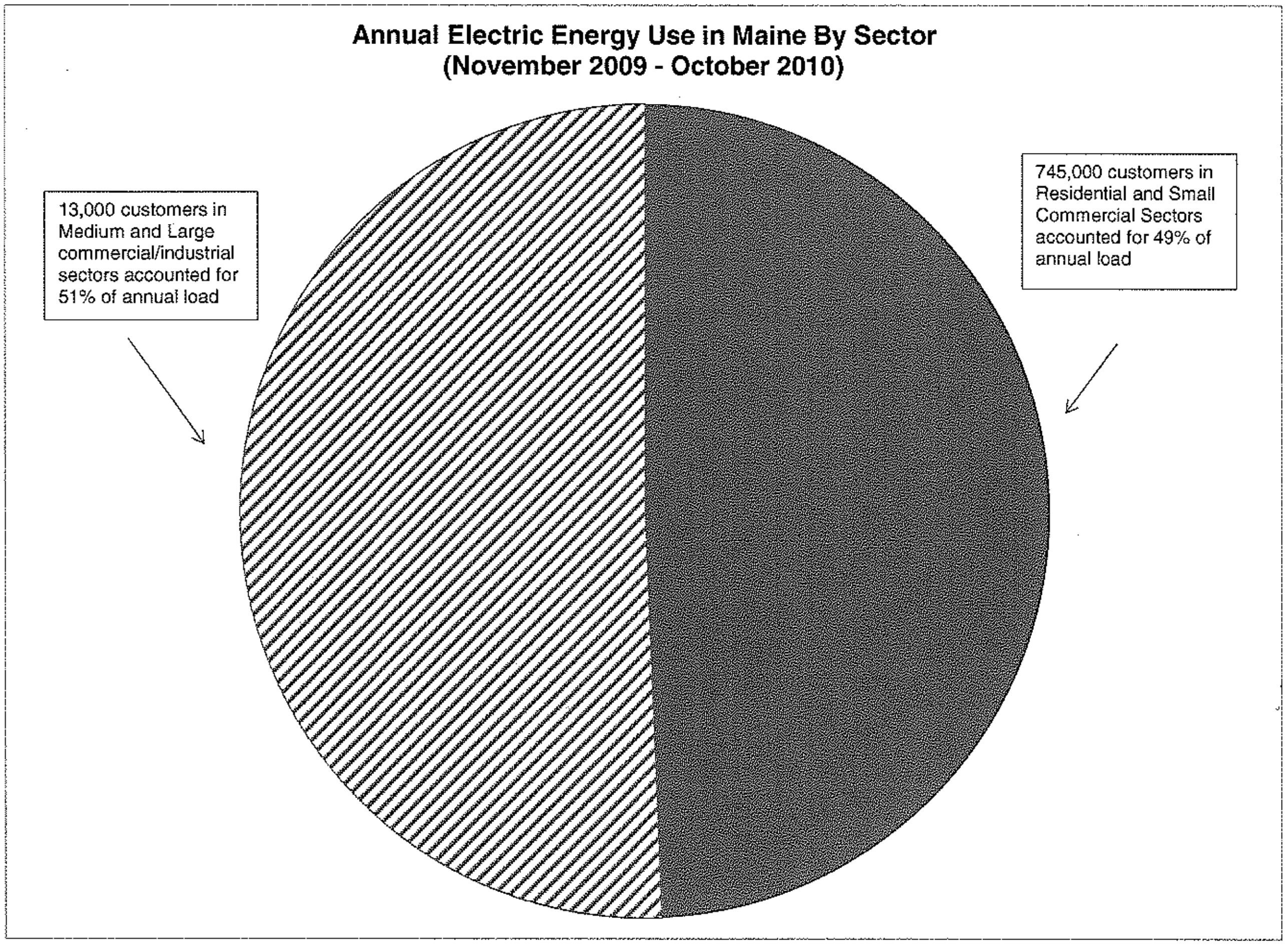
[1] Smart grid implementation may enable or lead to new applications by customers in the medium and large commercial/industrial sectors.

Q. PLEASE SUMMARIZE THE MAJOR DIFFERENCES IN CUSTOMER ATTRIBUTES BY SECTOR, AND THE IMPLICATIONS OF THOSE DIFFERENCES FOR ACHIEVING THE GOALS OF THE ACT.

A. For ratemaking and statistical reporting purposes customers are generally categorized into one of three classes – residential and small commercial, medium commercial and industrial or large commercial and industrial sector. The attributes of customers vary substantially from rate class to rate class, as well as from segment to segment within each rate class. We have limited our analysis to distinguishing customers by rate class according to two high-level attributes, i.e. the quantity of electricity used per customer and their capability to control that usage.

There is a marked difference in those high-level attributes between customers in the residential and small commercial class, whom we will also refer to as "mass market" customers and customers in the medium and large commercial and industrial classes. As a result, Maine, like most states, has a bifurcated electricity market consisting of a large number of relatively low usage mass market customers and a small number of relatively high usage customers in the medium and large commercial and industrial sectors, as shown in the chart below from Exhibit (JRH/MRC-3).



The dramatic difference in usage per customer is illustrated by the following statistics. In 2007 an average medium commercial/industrial customer in Maine consumed twice as much electric energy as an average mass market customer. An average large commercial/industrial customer used 70 times as much. As a result, approximately 85,000 medium and large commercial/industrial customers accounted for 62% of annual electricity use in that year. In contrast, over 650,000 mass market customers accounted for the remaining 38%. These statistics are presented in Exhibit (JRH/MRC-3). Customers in each of these broad classes can be further segmented into sub-groups according to more granular differences in usage per customer, understanding and consumer behavior.

There is a corresponding dramatic difference in customers' understanding of their electricity usage, costs and options. Medium and large commercial/industrial customers may have staff or consultants who specialize in this area, as well as vendors who actively market energy services to them. In contrast, mass market customers often know little if anything about their electricity use and options.

The dramatic differences in these attributes between mass market customers and medium and large commercial/industrial customers have two implications for achieving the goals of the Act.

- First, customers in the medium and large commercial/industrial segment of the market generally have a demonstrated financial incentive and capability to access and use smart grid functions. Some of those customers are, in fact are already using those functions or their equivalent. Moreover the CEPs and CSPs who are actively competing to capture those customers may help them take advantage of those functions.
- Second, customers in the mass market segment generally do not have either a demonstrated material financial incentive or a demonstrated capability to access and use smart grid functions. (That capability includes attributes such as knowledge, expertise, time and financial means.) Experience from pilot and system-wide deployment of smart grid functions in other states indicates that only a small percentage of mass market customers are taking advantage of smart grid enabled functions. The participation has been low even where programs are offered to educate those customers on how to benefit from smart grid functionalities and where initiatives are offered to encourage those customers to pursue those benefits. That experience also indicates that competitive service providers equivalent to CEP[2]s or CSPs are not offering such programs and initiatives to all mass market customers on a sustained basis.

Q. PLEASE SUMMARIZE THE SEPARATION OF SUPPLY, T&D AND EFFICIENCY SERVICES, AND THE IMPLICATIONS OF THOSE SEPARATE SERVICES FOR ACHIEVING THE GOALS OF THE ACT.

[2] Different states have different names for competitive electricity providers.

A. Maine has a competitive retail electricity supply market under which electricity supply service has been unbundled from local T&D service. In addition energy efficiency and demand response (DR) services have been unbundled from local T&D service. Under this structure customers acquire their local T&D service from their local utility at rates regulated by the Commission, shop among competing CEPs for their electricity supply or purchase Standard Offer Service (SOS)[3] and acquire efficiency and DR services from their CEP, other competitive contractors or ratepayer funded efficiency programs from Efficiency Maine Trust.[4]

There is a major difference in the extent to which customers shop for their electricity supply between mass market customers and customers in the medium and large commercial/industrial sectors. Large and medium commercial/industrial customers buy the vast majority of their electricity from among approximately 80 CEPs who are competing to serve them[5]. In contrast, mass market customers buy less than 5% of their supply from CEPs. The difference in levels of shopping between those two segments of the market is illustrated in the chart below from Exhibit (JRH/MRC-3).

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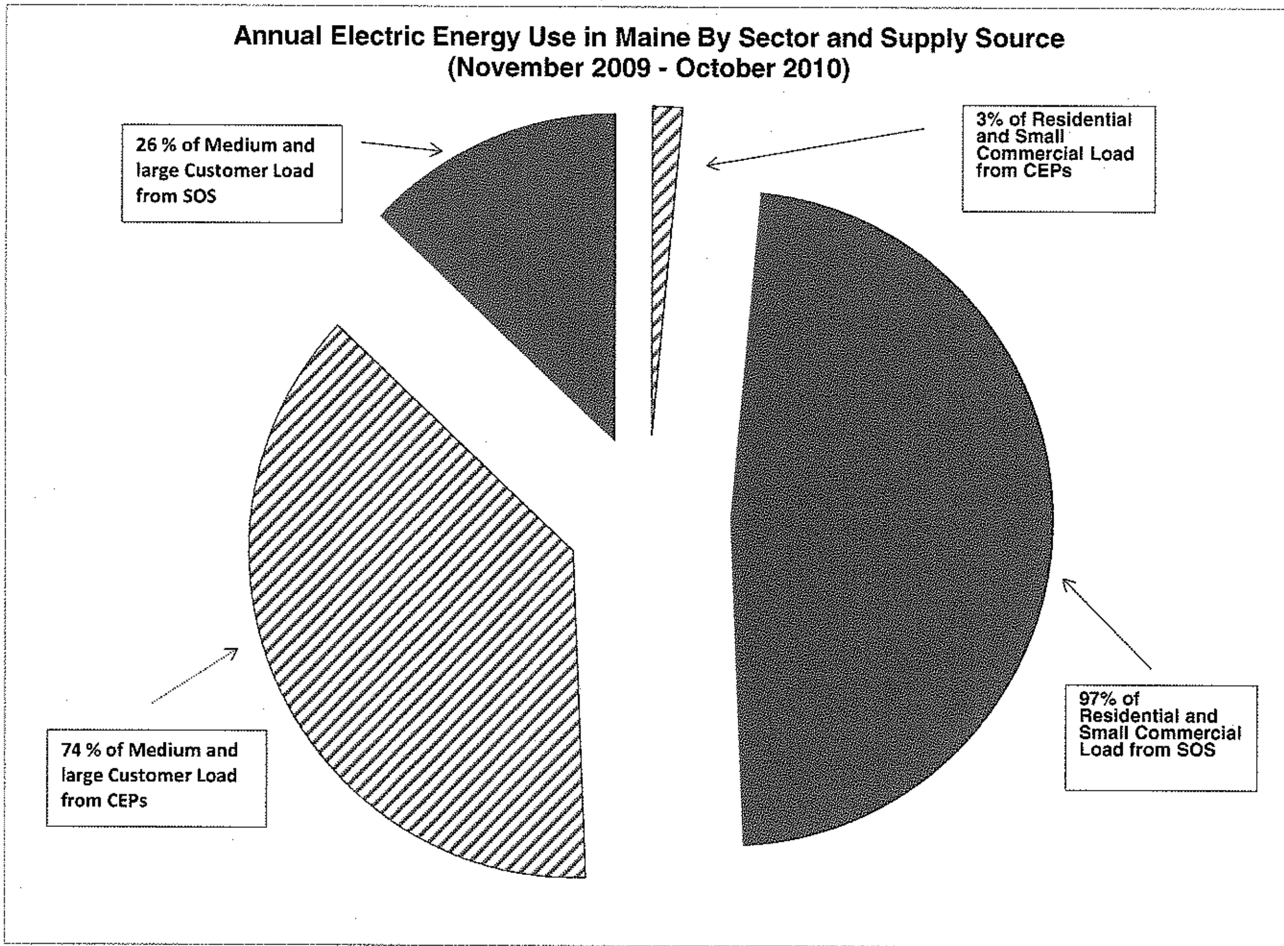
[3] Wholesale supply for SOS is acquired from suppliers chosen through periodic auctions conducted by Staff of the Commission. The SOS offerings differ by customer class.

[4] Very large customers in the large commercial/industrial sectors who take service at sub-transmission voltage of 34.5 kV or higher do not pay for and are not eligible for programs offered by Efficiency Maine Trust per Efficiency Maine Trust Act, 35-A M.R.S.A. § 10110(6).

[5] Data as of 11/23/2010 from http://www.maine.gov/mpuc/electricity/list_of_suppliers.shtml



The separate provision of local T&D service, electricity supply and energy efficiency programs has several implications for achieving the goals of the Act. First, in order to provide customers on SOS an opportunity to take advantage of smart grid functions that "enable" new pricing options, such as time of use pricing or dynamic pricing, new pricing options will have to be implemented for that service. Second, CEPs have not gained a significant share of the mass market and it is not realistic to expect they will be a principal source of smart grid enabled pricing and product offerings to those customers, at least not in the near term. Third, it appears that Efficiency Maine Trust has the authority to offer new DR and efficiency programs and initiatives enabled by smart grid technologies if the Commission approves funding for those new activities.

Q. PLEASE SUMMARIZE THE DIFFERENCES IN REGULATION AND FINANCIAL INCENTIVES OF THE PARTIES PROVIDING SUPPLY,

DISTRIBUTION AND EFFICIENCY SERVICES IN MAINE AND THE IMPLICATIONS OF THOSE DIFFERENCES FOR ACHIEVING THE GOALS OF THE ACT.

A. There are two major differences in regulation and financial incentives between the parties providing supply, distribution and efficiency services in Maine that are relevant to achieving the goals of the Act. Those differences relate to their obligation to serve and the alignment of their financial incentive with reductions in the annual electricity use of their customers.

The differences in obligation to serve occur between CEPs, CSPs and other parties providing supply and efficiency services on a competitive basis and local T&D utilities which are regulated monopolies and Efficiency Maine Trust which is a special state agency subject to oversight by the Commission[6]. Parties providing services on a competitive basis are not obligated to provide those services to all customers nor are they obligated to provide those services beyond the term of any contractual obligation. In contrast, Maine's T&D utilities and Efficiency Maine Trust do have obligations to provide their services on a non-discriminatory basis for the long-term.

The differences in alignment of financial incentive with reductions in the annual electricity use of customers occur between Maine's T&D utilities and all other parties. Maine's T&D utilities have a positive financial incentive to make capital investments in their T&D systems, including investments in smart grid technologies. This positive incentive is the return they are allowed to earn on the un-depreciated portion of those investments, referred to as their rate base. This financial incentive is not aligned with encouraging their customers to reduce their annual electricity use because a significant portion of utility revenues, which funds their operating costs and provides that return, are a function of the quantity of electric energy (kWh) they deliver to their customers. Thus, they do not have a positive financial incentive to actively support any initiative that will

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[6] The Trust was established by the Efficiency Maine Trust Act passed in June 2009.

reduce those annual deliveries and the annual revenues associated with those annual deliveries.

This financial incentive may not align with acquisition of non- transmission alternatives (NTA) to enhance reliability, such as distributed generation or storage. If the T&D utility pursues reliability by purchasing an NTA from a third party rather than investing capital in a traditional T&D project it loses the opportunity to earn a return on that investment. On the other hand, the T&D utility could have a positive incentive if it could invest in the NTA, but that incentive would be lower to the extent the NTA was less expensive than the conventional T&D project.

These differences in regulatory obligations and financial incentives have important implications for achieving the goals of the Act and for determining whether a Coordinator is in the public interest. Our review indicates that no individual entity, or category of entities, currently providing services in Maine's electricity market has either the regulatory obligation or the financial incentive, or both, to proactively manage access to all smart grid functions.

Q. PLEASE SUMMARIZE THE MAJOR EXISTING SMART GRID INITIATIVES UNDERWAY IN MAINE AND ELSEWHERE AND THEIR IMPLICATIONS FOR ACHIEVING THE GOALS OF THE ACT.

A. There are a several smart grid initiatives underway in Maine and elsewhere that are relevant to our analysis.

CMP and BHE, who in combination serve approximately 90 % of the customers and annual electric load in the State, are each deploying advanced metering infrastructure (AMI) systems with completion projected by 2012. A number of large and small utilities in other states are also projecting to complete their system-wide deployments of certain smart grid technologies over similar timeframes. The experience of CMP and BHE, and other utilities, with their respective deployments may provide useful information for Maine Public Service and the other ten customer owned utilities who serve the State's remaining customers.

The Commission Order approving CMP's deployment cites the Company's commitment to work with Staff, Efficiency Maine Trust and other interested parties on the development and promotion of AMI-enabled pricing programs. BHE has filed a proposal to test dynamic pricing. Utilities in several states have conducted pilot programs to test the design of various new pricing and communication programs enabled by smart grid technologies and to determine the most effective techniques for encouraging mass market customers to take advantage of those new programs[7]. The initiatives committed to and or proposed by CMP and BHE, if approved, will provide valuable information regarding the potential for a Coordinator to be in the public interest

In December 2010, GridSolar and CMP are expected to file a proposed Pilot Plan to test the concept of a Coordinator.[8] The Pilot Plan filing will provide important insights into the projected incremental costs and benefits of a specific Coordinator for a specific utility service territory.

The key implication of the smart grid initiatives underway in Maine and other states for achieving the goals of the Act is that they provide Maine the opportunity to "get it right". There is a growing recognition that system-wide implementation of smart grid technologies, and new initiatives enabled by those technologies, raises a host of complex technical and consumer issues which require careful analysis and testing. In a short paper intended to assist Commissions in developing a systematic approach to smart grid deployment, *Smart Grid: How Can State Commission Orders Produce the Necessary Utility Performance,* the National Regulatory Research Institute (NRRI) recommends a deployment sequence built upon a clear mission and lessons from pilot programs[9]. Maine has the opportunity to follow that sequence by initially gaining experience from the CMP and BHE deployments and from pilots to test alternative methods of managing access to smart grid functions.

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[7] Pilots have been conducted in CA, MD, DC, and elsewhere. Pilots are underway in IL, PA and elsewhere

[8] According to section V b of stipulation in 2008-255, CMP and GridSolar are to file their proposed Pilot Plan within 6 months of the Commission Order in that Docket, which would be December 2010.

[9] Hempling, Scott and Stanton, Tom. *Smart Grid: How Can State Commission Orders Produce the Necessary Utility Performance.* NRRI

III. POTENTIAL FOR A COORDINATOR TO BE IN THE PUBLIC INTEREST

Q. PLEASE SUMMARIZE THE PROCESS THROUGH WHICH YOU EVALUATED THE POTENTIAL FOR A COORDINATOR TO BE IN THE PUBLIC INTEREST.

A. We evaluated whether it is in the public interest to have a Coordinator in three steps. First, we reviewed the seven specific goals of the Smart Grid Act to establish their relationship to the public interest. Second, we reviewed those seven specific goals relative to Maine's existing electricity market structure and regulatory framework to assess the potential for those goals to be achieved more effectively with a Smart Grid Coordinator than without one. Third, we reviewed the role that a Coordinator could play in managing smart grid functions.

Specific Goals of Act Relative to Public Interest

Q. What are the specific goals of the Smart Grid Act?

A. The Smart Grid Act establishes seven specific goals that promote widespread access to, and use of, smart grid functions and associated infrastructure, technology and applications. The seven specific goals from Section 3 of Title §3143, "Declaration of policy on smart grid infrastructure" are as follows:

3. Smart grid policy; goals. In order to improve the overall reliability and efficiency of the electric system, reduce ratepayers' costs in a way that improves the overall efficiency of electric energy resources, reduce and better manage energy consumption and reduce greenhouse gas emissions, it is the policy of the State to promote in a timely and responsible manner, with consideration of all relevant factors, the development, implementation, availability and use of smart grid functions and associated infrastructure, technology and applications in the State through:

> *A. Increased use of digital information and control technology to improve the reliability, security and efficiency of the electric system;*

> *B. Deployment and integration into the electric system of renewable capacity resources, as defined in section 3210-C, subsection 1, paragraph E, that are interconnected to the electric grid at a voltage level less than 69 kilovolts;*
>
> *C. Deployment and integration into the electric system of demand response technologies, demand-side resources and energy-efficiency resources;*
>
> *D. Deployment of smart grid technologies, including real-time, automated, interactive technologies that optimize the physical operation of energy-consuming appliances and devices, for purposes of metering, communications concerning grid operation and status and distribution system operations;*
>
> *E. Deployment and integration into the electric system of advanced electric storage and peak-reduction technologies, including plug-in electric and hybrid electric vehicles;*
>
> *F. Provision to consumers of timely energy consumption information and control options; and*
>
> *G. Identification and elimination of barriers to adoption of smart grid functions and associated infrastructure, technology and applications.*

Q. ARE THE STATE'S SMART GRID GOALS AND THE FEDERAL SMART GRID POLICY COMPLEMENTARY?

A. Yes, they are largely identical. The national smart grid policy goals are stated in Section 1301 of the EISA. Those goals, which are referenced in the Smart Grid Act are presented in Exhibit (JRH/MRC-4).

Q. ARE THE SPECIFIC GOALS OF THE SMART GRID ACT DIRECTLY RELATED TO THE PUBLIC INTEREST?

A. Yes. The Act establishes those specific goals based upon an implicit expectation that they will help achieve several broad public policy goals, and in so doing will be in the public interest. The broad public policy goals listed in the Act are to:

- improve the reliability and efficiency of the electric system;

- reduce ratepayers' costs in a way that improves the overall efficiency of electric energy resources; and
- reduce and better manage energy consumption and reduce greenhouse gas emissions.

Q. DOES THE SMART GRID ACT ALLOW THE COMMISSION TO EXERCISE JUDGMENT IN THE PURSUIT OF THOSE SPECIFIC GOALS?

A. Yes. The Act explicitly states that it is the policy of the State to promote the development, implementation, availability and use of smart grid functions and associated infrastructure, technology and applications through the seven specific goals subject to the condition that this promotion is done in a "*...responsible manner, with consideration of all relevant factors*". We are advised by counsel that this condition allows the Commission to exercise its judgment in decisions regarding pursuit of the seven goals.

Specific Goals Relative to Existing Electricity Market Structure

Q. WHY DID YOU REVIEW THE SPECIFIC GOALS IN THE ACT RELATIVE TO MAINE'S CURRENT ELECTRICITY MARKET STRUCTURE AND REGULATORY FRAMEWORK?

A. We reviewed the seven specific goals in the Act relative to Maine's existing electricity market structure and regulatory framework as an initial high-level assessment of the potential for those goals to be achieved more effectively with a Smart Grid Coordinator than without one.

The Act defines a Smart Grid Coordinator in §3143(5) as an entity that "...manages access to smart grid functions and associated infrastructure, technology and applications." As indicated by this proceeding, establishment of a Coordinator could represent a major modification to the existing market structure and regulatory framework. If our initial high level analysis were to demonstrate the potential for the specific goals of the Act to be achieved effectively without establishment of a Coordinator, then we might not need to conduct a more detailed analysis at the level of smart grid functions.

Q. ARE ALL SEVEN SPECIFIC GOALS OF THE ACT LIKELY TO BE ACTIVELY PURSUED WITHOUT A SMART GRID COORDINATOR?

A. No. Our review of the current electricity market structure and regulatory framework indicates that only one of the seven goals is likely to be pursued on a statewide basis if a Coordinator is not authorized.

The one goal likely to be pursued on a state wide basis is "*A. Increased use of digital information and control technology to improve the reliability, security and efficiency of the electric system.*" We expect that Maine's T&D utilities will pursue that goal because it is in their financial interest to do so and because they are obligated to do so. Under Section 101 of Maine's public utility statute, local T&D utilities subject to Commission regulation have the responsibility and authority to ensure safe, reasonable and adequate service at rates that are just and reasonable.

Under Maine's existing electricity market structure and regulatory framework no party has an obligation to achieve all of the remaining six goals.

- No party is obligated to achieve goals B or E, development of renewable capacity less than 69 kV and deployment of storage respectively;
- The obligation of T&D utilities only applies to portions of goals D, F and G regarding deployment of technologies, provision of consumer information and identification of barriers respectively;
- The obligation of Efficiency Maine Trust applies to the energy-efficiency portion of goal C and to the demand response portions to the extent the Commission approves funding for those portions.

The results of our review are summarized in Exhibit___(JRH/MRC-5).

Q. DO T&D UTILITIES HAVE A POSITIVE FINANCIAL INCENTIVE TO ADVANCE THE OTHER SIX GOALS IN THE ACT?

A. No. As described earlier, the T&D utilities do not have a positive financial incentive to encourage actions that lead to a reduction in their overall deliveries of electricity on their system or to development of NTAs. The Act explicitly acknowledges the possibility of "…financial disincentives for T&D utilities to promote smart grid functions."

Q. ARE THERE OTHER STATES DIRECTLY COMPARABLE TO MAINE WHO HAVE CONSIDERED ESTABLISHING A COORDINATOR TO ACHIEVE A SIMILAR SET OF SMART GRID GOALS?

A. No. Some other states have smart grid goals similar to those in the Smart Grid Act. However we are not aware of any other state which is directly comparable to Maine in all major respects, e.g. market structure, regulatory framework, financial incentives of major market participants. Nor are we aware of another state that is considering establishing a Coordinator.

Q. PLEASE SUMMARIZE THE RESULTS OF YOUR REVIEW OF THE EXISTING MARKET STRUCTURE RELATIVE TO THE SPECIFIC GOALS IN THE ACT?

A. Our review indicates that the financial incentives and regulatory obligations of the parties currently operating under Maine's existing electricity market structure and regulatory framework are not fully aligned with the achievement of all seven goals in the Smart Grid Act. Because of those gaps, the potential for all seven specific goals of the Act to be achieved effectively is higher with a Smart Grid Coordinator than without one.

Potential Role of Coordinator

Q. DID YOU FOLLOW UP YOUR HIGH LEVEL ANALYSIS WITH A REVIEW OF THE SMART GRID FUNCTIONS TO WHICH A SMART GRID COORDINATOR MIGHT MANAGE ACCESS?

A. Yes. Since our high level analysis indicated the potential for the specific goals of the Act to be achieved effectively to be higher with a Smart Grid Coordinator than without one, we reviewed the smart grid functions to which a Coordinator might manage access.

Q. HOW DOES MAINE LAW DEFINE SMART GRID FUNCTIONS?

A. For the purpose of defining smart grid functions, Maine has adopted Section 1306(d) of EISA, which defines smart grid functions eligible for federal funding support. Those nine smart grid functions, with our phrase for each in parentheses, are as follows:

(1) The ability to develop, store, send and receive digital information concerning electricity use, costs, prices, time of use, nature of use, storage, or other information relevant to device, grid, or utility operations, to or from or by means of the electric utility system, through one or a combination of devices and technologies. (develop and use digital information via electric utility system)

(2) The ability to develop, store, send and receive digital information concerning electricity use, costs, prices, time of use, nature of use, storage, or other information relevant to device, grid, or utility operations to or from a computer or other control device. (develop and use digital information via computers and other devices)

(3) The ability to measure or monitor electricity use as a function of time of day, power quality characteristics such as voltage level, current, cycles per second, or source or type of generation and to store, synthesize or report that information by digital means. (measurement and monitoring)

(4) The ability to sense and localize disruptions or changes in power flows on the grid and communicate such information instantaneously and automatically for purposes of enabling automatic protective responses to sustain reliability and security of grid operations. (automatic response to maintain reliability),

(5) The ability to detect, prevent, communicate with regard to, respond to, or recover from system security threats, including cyber-security threats and terrorism, using digital information, media, and devices.(protection of electric system security

(6) The ability of any appliance or machine to respond to such signals, measurements, or communications automatically or in a manner programmed by its owner or operator without independent human intervention.(automatic response by end-user equipment)

(7) The ability to use digital information to operate functionalities on the electric utility grid that were previously electro-mechanical or manual. (use digital information to operate grid)

(8) The ability to use digital controls to manage and modify electricity demand, enable congestion management, assist in voltage control, provide operating reserves, and provide frequency regulation. (control of demand, supply and/or delivery

(9) Such other functions as the Secretary may identify as being necessary or useful to the operation of a Smart Grid. (other)

Q. CAN THOSE NINE FUNCTIONS BE EASILY CATEGORIZED FOR PURPOSES OF MANAGING ACCESS TO THEM?

A. No. In order to analyze the issues associated with managing access to these functions we began by categorizing them according to the party or parties who could potentially be involved in providing the function.

Our analysis, presented in Exhibit___(JRH/MRC-6), identifies the following parties as potentially being involved in providing certain functions:

- T&D utilities;
- Customers or agents acting on their behalf such as Efficiency Maine Trust and providers of small scale distributed generation and storage. We refer to this group as customers;
- Developers of utility scale distributed generation (DG) and storage. We refer to this group as Non-Transmission Alternatives;
- Customers with and/or vendors of plug-in electric vehicles, a group we will refer to as EV; and
- ISO-New England (ISO-NE).

Our analysis demonstrates that most of the functions do not fall into simple, distinct categories because several different parties could be involved in providing them. The potential involvement of several parties is not surprising because many of the functions involve communications between the T&D utility and these other parties.

According to our analysis, only three of the nine functions can be categorized as involving only the T&D utility. The three functions are 4 (automatic response to maintain reliability), 5 (protection of electric system security) and 7 (use digital information to operate grid). Function 6 (automatic response by end-user equipment) could involve customers, Non-Transmission Alternatives and EV. The remaining five functions would involve the T&D utility and could involve customers, Non-Transmission Alternatives and EV. (Function 8 could possibly also involve ISO-NE.) The five functions are 1 (develop and use digital information via electric utility system), 2 (develop and use digital information via computers and other devices), 3 (measurement and monitoring), 8 (control of demand, supply and/or delivery) and 9 (other).

Q. IS IT CLEAR THAT PARTIES OTHER THAN THE COORDINATOR WILL PROVIDE ALL NINE FUNCTIONS IN A MANNER THAT WILL ACHIEVE THE GOALS OF THE ACT?

A. No. As noted above, our review of Maine's existing electricity market structure and regulatory framework identified major gaps between the seven specific goals and the parties with an obligation to meet those goals. As we will discuss further below, there are similar reasons to expect that some or all customer, Non Transmission Alternative and EV parties may not choose to provide the functions relevant to them, or may not provide those functions in a manner designed to achieve all seven specific goals of the Act.

These possibilities raise two important questions regarding the potential role of the Coordinator. First, should the Coordinator be authorized to provide, or ensure the provision of, functions in addition to managing access to functions? Second, should the Coordinator be authorized to manage access to functions in a manner designed to achieve all seven specific goals of the Act, i.e. to manage "actively" rather than passively?

In order to address each question it is useful to begin with the Act's definition of the Coordinator as an entity that "manages access to smart grid functions and associated infrastructure, technology and applications." A narrow reading of this definition implies that other parties are expected to be providing all the functions and associated infrastructure, technology and applications and that the role of Coordinator is limited to making the smart grid accessible. However, that narrow interpretation raises the question of what, if anything, a Coordinator is expected to do in a circumstance in which no party is providing the function and associated infrastructure, technology and applications or a situation in which some parties are not providing those functions readily and fully, thus preventing the goals of the Act from being achieved.

Responding to the second question requires an interpretation of the meaning and intent of "manages access." For example, achievement of the Act's seven goals will require active and ongoing management of mass market customer access to these functions and associated applications, entailing active engagement and education of consumers. If managing access is defined as largely a passive activity for the Coordinator, and responsibility and accountability for successful program design and management are not assigned at the outset, many consumer benefits are likely to be denied or deferred, while the costs of smart grid deployment and operation are paid for by customers. It is unlikely that Maine will achieve the goals of the Smart Grid Act if access to functions that are cost-effective is managed passively according to a philosophy of "if you build it they will come". In fact, a Coordinator has the potential to play an important role in achieving the Act's goal of "…identifying and addressing barriers to achieving smart grid benefits" if it is charged with that responsibility and given the necessary authority and resources.

Q. COULD A COORDINATOR OPERATE SUCCESSFULLY WITHOUT THE COOPERATION AND PARTICIPATION OF THE T&D UTILITY?

A. No. the T&D utility provides, either partially or fully, eight of the nine functions to which the Coordinator is expected to manage access. Thus, in order to realize the State's smart grid goals, the utility has to be an active and willing participant in programs and initiatives involving access to functions that involve its system and other parties in the customer, Non Transmission Alternative and EV groups.

A close working relationship with the utility would be essential for an entity responsible for implementing smart grid-enabled programs for residential customers, including outreach, engagement, and education. It would also be essential to ensure maintenance of safe and reliable utility service. For example, increasing deployment of plug-in electric vehicles, one of the statutory smart grid goals, may occur in coming years. While these vehicles may have environmental benefits and operational cost advantages over conventional gasoline-powered vehicles, their demand on electricity distribution infrastructure may place significant strain on the capacity of existing transformers and other equipment, particularly when multiple vehicles are charging simultaneously on the same circuit. These issues would have to be considered and addressed jointly by the Coordinator and the utility before they potentially lead to localized reliability, safety, and customer satisfaction issues.

Q. IS IT POSSIBLE THAT THE GOALS OF THE ACT WOULD BE BEST ACHIEVED THROUGH A SINGLE STATE-WIDE COORDINATOR RATHER THAN THROUGH A SEPARATE COORDINATOR FOR EACH SERVICE TERRITORY?

A. Yes. The Act allows the Commission to establish "one or more smart grid coordinators," provided there is "no more than one smart grid coordinator within each transmission and distribution utility service territory." We are advised by counsel that the Act does not require that the Commission authorize a separate entity to be Coordinator for each service territory but instead that it allows the Commission to authorize one entity to be Coordinator for more than one service territory. While the selection of a specific Coordinator, or Coordinators, is beyond the scope of this phase of the proceeding, we recommend that Phase II explore whether the public interest would be best served by selecting a different Coordinator for each service territory, the same Coordinator for more than one service territory, or a single statewide Coordinator.

Q. WHAT APPROACHES SHOULD THE COMMISSION CONSIDER TOWARDS THE ROLE OF A COORDINATOR?

A. Given the broad set of responsibilities entailed and the different types of expertise and activities required, the Commission should consider limited approaches to the role of Coordinator, at least initially. One approach would be to authorize the Coordinator to manage a limited sub-set of functions, with the T&D utility assigned to manage the remaining functions.

For example, the Commission could authorize the Coordinator to manage access to the customer, Non Transmission Alternative and EV portions of functions 1 (develop and use digital information via electric utility system), 2 (develop and use digital information via computers and other devices), 3 (measurement and monitoring), 6 (automatic response by end-user equipment), 8 (control of demand, supply and/or delivery) and 9 (other). It could authorize T&D utilities to manage functions 4 (automatic response to maintain reliability), 5 (protection of electric system security) and 7 (use digital information to operate grid) and the T&D portions of functions 1, 2, 3, 8 and 9.

Alternatively, the Commission could authorize the Coordinator to be responsible for all functions as an "umbrella organization." Under this approach a Coordinator would undertake any activities and functions appropriate to its core competence and outsource others to the utility and third parties as designated by the Commission. Whatever the functional approach, the Coordinator would have to work collaboratively with Maine stakeholders and utilities to achieve smart grid policy objectives.

The rationale for these suggested approaches is presented below.

Q. DID YOUR REVIEW OF MAINE'S CURRENT ELECTRICITY MARKET STRUCTURE AND REGULATORY FRAMEWORK INDICATE THAT T&D UTILITIES COULD MANAGE ACCESS TO SOME SMART GRID FUNCTIONS WITH NO CHANGE TO THEIR CURRENT RESPONSIBILITY, AUTHORITY AND FINANCIAL INCENTIVE?

A. Yes. It appears that T&D utilities could manage access to functions 4 (automatic response to maintain reliability), 5 (protection of electric system security) and 7 (use digital information to operate grid) with no change to their current responsibility, authority and financial incentives. They could also manage access to their portions of functions 1 (develop and use digital information via electric utility system), 2 (develop and use digital information via computers and other devices), 3 (measurement and monitoring), 8 (control of demand, supply and/or delivery) and 9 (other).

Q. DID YOUR REVIEW OF MAINE'S CURRENT ELECTRICITY MARKET STRUCTURE AND REGULATORY FRAMEWORK INDICATE THAT A COORDINATOR MAY BE REQUIRED TO MANAGE ACCESS TO SOME SMART GRID FUNCTIONS INVOLVING CUSTOMERS AND THIRD PARTIES?

A. Yes. A Coordinator may be required to manage customer and third party access to functions 1 (develop and use digital information via electric utility system), 2 (develop and use digital information via computers and other devices), 3 (measurement and monitoring), 6 (automatic response by end-user equipment), 8 (control of demand, supply and/or delivery) and 9 (other).

Q. DO YOU KNOW WHICH OF THOSE FUNCTIONS WILL EVENTUALLY PROVIDE THE GREATEST NET BENEFITS TO CUSTOMERS?

A. No. Smart grid, particularly as it enables consumer-oriented applications, is in an embryonic state. Advanced Metering Infrastructure (AMI) has not yet been widely deployed. How and to what extent consumers on a large scale will ultimately use smart grid functionalities cannot be predicted. It is not known if eventually a "killer app" will emerge as the most popular or beneficial consumer smart grid application. The most productive and cost-effective use of smart grid may turn out to involve demand response, such as adoption of "smart house" technology, which would entail automatic control of energy usage. Or it may turn out that the greatest consumer benefits from smart grid eventually develop on the supply side, involving distributed generation and storage. Or a technology that combines supply and demand side technologies, such as grid-connected electric vehicle charging and discharging may emerge as the prime source of consumer benefit. Changes in technology, policy, electricity prices, markets, and consumer behaviors will determine the evolution of smart grid applications and utilization over time.

In Maine a Coordinator has the potential to play an important role in the development and implementation of appropriate and timely strategies for achieving smart grid goals and responding to the evolving needs of Maine consumers. However it will be essential to ensure that such strategies are cost-effective based upon the electricity market in Maine.

For example, residential customers in Maine use an average of 500 kWh per month, which is less than sixty percent of the national average. Less than 5% of those customers have central air conditioning, one of the major sources of demand reduction, as opposed to other states where penetration of residential central air conditioning is over fifty percent. Further, the value to Maine's mass market customers of reducing demand may be much less than the value to mass market customers of utilities in states such as California, Maryland and Pennsylvania. For example, the price for capacity in 2013 in the New England forward capacity market is approximately $36 per kW-year, much less than the values of $50 to $60 per kW-year and above in some other parts of the country.

Q. DID YOUR REVIEW OF THE EXPERIENCE WITH SMART GRID PROJECTS IN OTHER STATES INDICATE THAT A HIGHER PERCENTAGE OF MASS MARKET CUSTOMERS WILL USE THESE NEW SMART GRID FUNCTIONS IF THEY RECEIVE ACTIVE ENCOURAGEMENT AND ASSISTANCE?

A. Yes. The potential benefits of smart grid functions to the mass market are generally projected to come initially from voluntary customer participation in programs enabled by those functions, i.e., programs that encourage customers to change their usage patterns and levels in response to new pricing options and new detailed usage information. The primary benefit is expected from demand response, via direct load control and dynamic pricing. Experience with deployment of smart grid projects in pilots and full deployment in other states demonstrates that the percentage of mass market customers who will take advantage of smart grid enabled programs will be higher if customers are provided active motivation and assistance. However, it is important to note that, to date, even with active motivation and assistance the percentage of mass market customers voluntarily electing to participate in dynamic pricing and other smart grid enabled programs has generally been well less than 10 percent.

Q. IS THERE EVIDENCE FROM OTHER JURISDICTIONS DEMONSTRATING THAT DIFFERENT APPROACHES TO CUSTOMER ENGAGEMENT BY NON-UTILITY ENTITIES MAY PRODUCE DIFFERENT LEVELS OF CONSUMER RESPONSE AND PARTICIPATION?

A. Yes. For example, in Illinois, residential customers in two different utility service territories who were offered market-based hourly pricing have responded at different levels of participation. By statute, Illinois has required its two largest utilities to offer voluntary hourly pricing tariffs reflective of wholesale market prices to residential customers since 2007. Together they comprise the largest residential hourly pricing program in the country, with a combined enrollment of more than 20,000 customers.[10] Each utility has retained a different third party to market and administer their program.[11] In one service territory the overall participation rate is more than four times higher than in the other. The response to direct mail solicitations for participation have been reported as .27% for the lower performing program, as opposed to 1.25% for the higher performing program. The costs to acquire participants show an even greater divergence, with the lower-participation program spending $262 per enrollee and the higher participation achieved at $30 per enrollee. Yet in each of the service territories, participating customers are achieving substantial and similar savings compared to standard flat rates. We conclude that a significant part of the difference in performance of these programs is due to the way in which they are designed and managed. We cite this example only to show that pricing program outcomes and costs can vary widely depending on their design and the methods and messages used to engage and enroll customers.

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[10] While employing dynamic pricing, these are not smart grid programs because the meters do not communicate with the utility or the customer. Instead, the participating customers receive on-premises recording meters to determine hour-by-hour usage. Pricing information is communicated to the customer through "high-price alerts" delivered by phone or email, rather than directly to in-home displays or devices. We cite these Illinois Residential Real Time Pricing programs because they are the type of program that might be offered in Maine after deployment of AMI.

[11] While the programs are not identical and they operate in different RTOs, the standard flat residential rates of the utilities are comparable. In fact, the average standard residential flat rate of the utility with lower participation in the hourly pricing program is higher than the average rate of the utility that has achieved higher participation.

Q. ARE THERE OTHER REASONS WHY A NON-UTILITY ENTITY MIGHT HAVE MORE SUCCESS IN MAXIMIZING CONSUMER SMART GRID BENEFITS?

A. Yes. Customer skepticism of utility assurances about the benefits of smart meters has been widely reported across the country. At least three municipalities in Maine have requested a delay in installation of advanced metering because of perceived health and privacy risks. Whether well founded or not, these concerns demonstrate that utilities do not have complete credibility in the eyes of some customers and local governmental units.

An independent consumer-oriented third party could have another advantage in achieving maximal participation in smart grid-enabled consumer programs, simply by virtue of the fact that it is not the distribution utility company. Residential customers have a narrow transactional relationship with the utility which is primarily associated with receipt and payment of a monthly bill. In our experience, a typical consumer may be inclined to discount or ignore an invitation by a utility to "save money," "reduce energy use," or "help the environment" by participating in a utility-sponsored program. Offerings of an independent commission-sanctioned entity with an agenda devoted to helping consumers use energy more efficiently would not face the same level of initial customer skepticism as those of a utility company. This could result in greater customer participation than if the programs originated with the utility, were marketed by the utility, and solely carried the utility brand.

It is also possible, however, that customers in Maine would respond positively to messages from, or endorsed by, their T&D utility. Market research and testing could provide information a Coordinator could use to identify messengers, messages, and methods that would most effectively promote use of smart grid functionalities and optimize programs to achieve maximum benefits for customers and society in general.

Q. DID YOUR REVIEW OF MAINE'S CURRENT ELECTRICITY MARKET STRUCTURE AND REGULATORY FRAMEWORK INDICATE THAT A COORDINATOR MAY BE REQUIRED TO MANAGE ACCESS TO SOME

SMART GRID FUNCTIONS INVOLVING NON TRANSMISSION ALTERNATIVES?

A. Yes. A Coordinator may be required to manage the access of providers of Non Transmission Alternatives to functions 1 (develop and use digital information via electric utility system), 2 (develop and use digital information via computers and other devices), 3 (measurement and monitoring), 6 (automatic response by end-user equipment), 8 (control of demand, supply and/or delivery) and 9 (other), particularly if there is clear evidence that the local T&D Utility does not have a regulatory obligation or adequate positive financial incentive to pursue those alternatives. As noted earlier, in a situation where distributed generation or demand response programs could be employed to relieve a local constraint in the transmission and distribution system, a utility would receive the greatest financial benefit by increasing its rate base through wires investment, even if the Non Transmission Alternatives were cost-effective and preferable from the point of view of customers.

Q. DID YOUR REVIEW OF MAINE'S CURRENT ELECTRICITY MARKET STRUCTURE AND REGULATORY FRAMEWORK INDICATE THAT A COORDINATOR MAY BE REQUIRED TO MANAGE ACCESS TO SOME SMART GRID FUNCTIONS INVOLVING EVS?

A. Yes. The electricity usage characteristics of EVs will be very different from those of existing electrical appliances and applications. Those differences will include intermittent but relatively high and potentially localized electricity demand as well as the potential to be mobile storage devices. As a result, integrating EVS into the electric system will pose new challenges to the utility system. For the purpose of promoting deployment and integration of EV, a Coordinator may be required to manage access to functions 1 (develop and use digital information via electric utility system), 2 (develop and use digital information via computers and other devices), 3 (measurement and monitoring), 6 (automatic response by end-user equipment), 8 (control of demand, supply and/or delivery) and 9 (other).

Q. DOES YOUR ANALYSIS OF THE SMART GRID ACT RELATIVE TO THE EXISTING STRUCTURE OF MAINE'S ELECTRICITY MARKET INDICATE

THE POTENTIAL FOR A COORDINATOR TO BE IN THE PUBLIC INTEREST?

A. Yes. We have analyzed the goals of the Smart Grid Act, as well as its definition of smart grid functions and Smart Grid Coordinator, relative to the existing structure of Maine's electricity market. The results of that analysis indicate that establishment of a Coordinator has sufficient potential to be in the public interest to proceed to Phase II. Our analysis also indicates that whether establishment of a Coordinator is in the public interest is contingent on successful resolution of Phase II issues. We recommend that the Commission proceed to Phase II and evaluate whether a coordinator will, or will not, be in the public interest in a "*...responsible manner, with consideration of all relevant factors*".

IV. FACTORS AFFECTING WHETHER A COORDINATOR WILL, OR WILL NOT, BE IN THE PUBLIC INTEREST

Q. WHY WILL IT NOT BE POSSIBLE TO DETERMINE IF ESTABLISHMENT OF A COORDINATOR IS IN THE PUBLIC INTEREST UNTIL PHASE II ISSUES ARE SUCCESSFULLY ADDRESSED?

A. The establishment of a Coordinator raises a host of difficult organizational design issues including assignment of responsibility and authority relative to existing parties and the design of appropriate compensation, including financial incentives. The Commission has identified these as issues to be addressed in Phase II. If these standards are designed and implemented well, establishment of a Coordinator may be in the public interest; if they are not, establishment of a Coordinator may not be in the public interest. Thus, determination of the public interest is contingent on successful resolution of Phase II issues. Such a determination will depend on whether a reasonable approach can be found for answering the range of questions raised by establishment of a Coordinator. For example, what are the functions of the coordinator, the funding and financial incentive structure, the accountability structure, and the relationships with other stakeholders? Is it a feasible, acceptable and credible structure? What are the expected incremental benefits and incremental costs? What is the allocation of risk between the Coordinator, the utility and ratepayers?

Q. PLEASE DESCRIBE YOUR PROPOSED TEST FOR DETERMINING WHETHER A COORDINATOR WILL, OR WILL NOT, BE IN THE PUBLIC INTEREST.

A. The primary test for determining whether a Coordinator will, or will not, be in the public interest should be a demonstration that the projected benefits to ratepayers of establishing a Coordinator will exceed the additional cost of establishing a Coordinator. The Commission has approved the deployment of AMI by CMP and BHE, and their recovery of those deployment costs. This proceeding is examining whether it is in the public interest to build upon those deployments by establishing a Coordinator, which will impose incremental costs on ratepayers. Thus the question for ratepayers, and for Maine in general, is whether the incremental benefits from establishing a Coordinator will exceed the incremental costs of that Coordinator.

The need to identify incremental costs arises because there could be significant incremental costs associated with establishment of a Coordinator. For example, our analyses of utility smart grid filings indicate that investments in "back office" hardware and software to support the communications and data processing associated with smart grid functionality can be quite substantial. The creation of a new, third party Coordinator raises the prospect of additional, potentially duplicate, investments in computer hardware and software. On the other hand, it is possible that a new, third party Coordinator could be established at a relatively low cost if it limited its management of access to initiatives such as specifying procedures for access and data timeliness and to resolution of problems between various parties accessing the functions. (We expect that many standards applicable to technical aspects such as data format, data quality and communication protocols will be set at the national level).

The need to identify incremental benefits arises because there continues to be considerable uncertainty regarding the timing and magnitude of the benefits from these functions, particularly the benefits from smart grid enabled programs and initiatives for mass market customers. As noted earlier, the potential benefits of smart grid functions to the mass market are generally projected to come initially from customers voluntarily electing to take service under new pricing options, such as dynamic pricing, and direct load control programs as well as customers changing their level and/or pattern of use in response to new detailed usage information. Those projected potential benefits hinge upon numerous assumptions regarding the long-term value of reducing peak demand, the percentage of customers who will enroll in these programs, the degree to which that sub-set of customers will change the pattern and level of their usage, the mechanisms through which customers will be compensated for those changes and the persistence of their changes. Various national groups, such as the National Association of Regulatory Utility Commissioners (NARUC) and the Smart Grid Consumer Collaborative, recognize the uncertainty associated with those assumptions and have established special committees to examine them.

We are proposing that the key test for whether establishment of a Coordinator is in the public interest be a determination that the incremental benefits from establishing a Coordinator will exceed the incremental costs of that Coordinator.

Q. IS THE ESTABLISHMENT OF ONE OR MORE MAINE SMART GRID COORDINATORS IN THE PUBLIC INTEREST?

A. Conceptually, yes. However, actual public benefits of establishing a Coordinator are contingent on matters beyond the scope of this phase of this proceeding. This initial phase of what may become a multiphase proceeding is intended to determine "whether it is in the public interest to have one or more smart grid coordinators in the State." We conclude that having a Coordinator is in the public interest, provided that:

1. its agenda is to maximize cost-effective customer and societal benefits from smart grid deployment;
2. its role is well-defined, including its relationship with the public utility and other stakeholders;
3. it is accountable to the Commission;
4. it has incentives to operate efficiently and to achieve public smart grid goals;

5. its operation is consistent with provision of safe, reliable, affordable service, and will result in fair treatment of consumers with regard to privacy, security, and other smart grid-related policies;

6. it is transparent in its operation and seeks stakeholder input into key decisions; and

7. it is compensated in a manner that is reflective of a reasonable allocation of risk between it, the distribution utility, and customers in the service territory who are paying its costs.

Q. ARE THE ISSUES YOU RAISE CONSISTENT WITH ADDRESSING THE STANDARDS ENUMERATED IN THE NOTICE OF INVESTIGATION IN THIS DOCKET NO. 2010-267?

A. Yes. The Notice of Investigation in Docket No. 2010-267 states:

Should we find that it is in the public interest to retain one or more smart grid coordinators, the commission will then address the standards regarding the smart grid coordinator, including, but not limited to:

1. Eligibility, qualifications and selection criteria;

2. Duties and functions;

3. The application or exemption from any provisions of this Title otherwise applicable to public utilities;

4. The relationship between a smart grid coordinator and a transmission and distribution utility;

5. Access to information held by the smart grid coordinator by 2nd and 3rd parties;

6. Data collection and reporting; and

7. What steps should the Commission take to ensure that applicable regional, national, an international grid safety, security, and reliability standards are met.

The issues we have identified are consistent with these seven categories of enumerated standards to be addressed in Phase II of this proceeding. Ultimate outcomes in the public interest will require that these issues be successfully addressed for each service territory.

Q. WHAT PROCEDURAL STEPS COULD MOST EFFECTIVELY ADDRESS THESE ISSUES AND LEAD TO OUTCOMES THAT ARE IN THE PUBLIC INTEREST?

A. If the Commission determines that establishment of a Coordinator is conceptually in the public interest in this Phase I of the proceeding, it can address the specific issues associated with establishing a Coordinator in Phase II. At some point during its examination of those issues we recommend that the Commission explore whether the public interest would be best served by selecting a different Coordinator for each service territory, the same Coordinator for more than one service territory, or a single statewide Coordinator. We expect that assessment will need to consider utility-specific issues, incremental costs and incremental benefits. If after its deliberations the Commission ultimately determines that authorization of a Coordinator, or Coordinators is in the public interest; their selection could be accomplished through an RFP process.

Q. PLEASE SUMMARIZE YOUR MAJOR CONCLUSIONS AND RECOMMENDATIONS FROM THIS SECTION.

A. Our major conclusions from this section are that:

- A final determination of whether establishment of any Coordinator will, or will not, be in the public interest cannot be made until Phase II issues are successfully resolved. Such a determination will depend on whether a reasonable approach can be identified for structuring, implementing, and regulating the Coordinator; and
- identifying a reasonable approach for structuring, implementing, and regulating a Coordinator for a specific utility service territory will require consideration of the specific characteristics of that specific utility service territory, as well as the potential synergies of having a statewide Coordinator.

Our recommendations based on those conclusions are that the Commission should make the following findings:

- an ultimate determination of whether a Coordinator for a specific utility service territory will, or will not, be in the public interest will depend on whether a reasonable approach can be identified for structuring, implementing, and regulating that Coordinator for that service territory;
- Phase II of this proceeding shall address the issues raised by parties in Phase I in addition to the issues listed in the Notice of Investigation of September 8, 2010 ; and
- the Commission shall examine the relative benefits and costs of authorizing a single statewide Coordinator versus authorizing multiple separate Coordinators for separate service territories prior to authorizing a specific Coordinator for a specific utility.

V. CONCLUSION

Q. PLEASE SUMMARIZE YOUR OVERALL CONCLUSION AND RECOMMENDATION.

A. Implementation of smart grid technology is integral to the modernization of electric utility systems. Moreover, utilities have the responsibility, financial incentive and expertise needed to achieve the benefits to their system enabled by this new technology. However, various barriers may prevent customers, in particular mass market customers, from readily and fully achieving the economic, energy and environmental benefits potentially enabled by this technology. Those barriers include inadequate positive financial incentives for utilities and retail energy suppliers, customer engagement challenges, lack of core competencies in certain key areas, and uncertainty regarding how best to achieve those benefits. Additional barriers may exist to deployment of Non Transmission Alternatives such as utility-scale distributed generation and storage. There may also be barriers to deployment and integration of EVs.

The core assumption underlying the concept of a Coordinator in Maine is that customers and society might see "greater and sooner" net benefits, i.e. net of costs, from smart grid technology if access to some, or all, of its functions were managed proactively by an entity devoted solely to achieving those benefits. Our analysis indicates that authorizing a Coordinator to manage access to certain smart grid functions in one or more service territories has the potential to be a positive step for Maine. However, determination of whether having a Coordinator will actually be in the public interest requires resolution of structural and policy issues beyond the scope of this phase of the proceeding and analysis of utility-specific information. In particular, the determination of public interest requires an assessment of whether the incremental benefits of having a Coordinator are likely to exceed the incremental costs of a Coordinator.

We recommend that the Commission proceed to Phase II in order to seek answers to the wide range of questions raised by establishment of a Coordinator prior to making a decision as to whether to retain a Coordinator in any service territory.

Q. DOES THIS COMPLETE YOUR DIRECT TESTIMONY?

A: Yes.

LIST OF EXHIBITS

Exhibit___(JRH/MRC-1)	Resume of James Richard Hornby
Exhibit___(JRH/MRC-2)	Resume of Martin R. Cohen
Exhibit___(JRH/MRC-3)	Maine Electric Market Statistics
Exhibit___(JRH/MRC-4)	Federal Smart Grid Policy Goals
Exhibit___(JRH/MRC-5)	Specific Goals of Smart Grid Act Relative to Obligations and Incentives of Existing Entities
Exhibit___(JRH/MRC-6)	Smart Grid Functions in Smart Grid Act Relative to Functions Provided by Existing Entities

J. RICHARD HORNBY

PROFESSIONAL SUMMARY

Thirty-five years of energy sector experience as a regulatory consultant, senior civil servant, and project engineer. Expert witness on a wide range of electric and gas industry planning and ratemaking issues in over 120 cases before state commissions and arbitration panels in 30 states and provinces.

EXPERIENCE

Synapse Energy Economics, Inc., Cambridge, MA. 2006 - present
Senior Consultant -- Responsible for economic analyses, project management, and business development. Primary areas of analyses and expert testimony are aligning utility incentives with energy efficiency, electricity resource planning and smart grid. Clients include staff of regulatory commissions, consumer advocates, and environmental groups.

CRA International/ Tabors Caramanis, Cambridge, MA, 1998- 2006[1]
Principal. Responsible for economic analyses, project management and business development. Prepare and present advice, written reports and expert testimony on management and economic issues in electricity and natural gas markets, both wholesale and retail. Clients include regulators, utilities and marketers in the U.S., Canada and United Arab Emirates. Projects include expert testimony in energy contract price arbitration proceedings, management consulting to improve service quality and cost performance of electric distribution system, expert testimony on rates for unbundled utility services, procurement of electricity via aggregation, and development of a regulatory framework for a green-field natural gas retail market.

Tellus Institute, Boston, MA, USA, 1986-1998

Vice-President and Director of Energy Group (1997-1998). Directed energy consulting practice. Led analyses of utility restructuring/deregulation, pricing/ratemaking, economic viability, and environmental impacts. Prepared reports and presented expert testimony on policy issues, strategic plans, utility regulation, and ratemaking. Clients included federal and state energy and environmental agencies, public utility commissions, consumer advocates, environmental organizations and utilities.

Manager of Natural Gas Program (1986-1997). Developed and managed gas program covering a range of gas industry issues including restructuring, unbundled services, ratemaking, efficiency programs and supply planning.

Nova Scotia Department of Mines and Energy, Halifax, Nova Scotia, 1981-1986

Member, Canada-Nova Scotia Offshore Oil and Gas Board (1983–1986)
Member of federal-provincial board responsible for regulating petroleum industry exploration and development activity offshore Nova Scotia.

[1] CRA International acquired Tabors Caramanis and Associates in November 2004.

Assistant Deputy Minister of Energy (1983–1986)
Responsible for analysis and implementation of provincial energy policies and programs, as well as for Energy Division budget and staff. Directed preparation of comprehensive energy plan emphasizing energy efficiency and provincial resources. Senior advisor on implementation of fiscal, regulatory, and legislative regime to govern offshore gas.

Director of Energy Resources (1982-1983) Directed the analysis and implementation of policies to promote development of provincial coal, peat, gas and tidal power resources

Assistant to Deputy Minister. (1981-1982) Provided planning and management support.

Nova Scotia Research Foundation, Dartmouth, Canada, 1978–1981.
Consultant. Editor of Nova Scotia's first comprehensive energy plan. Administered government funded industrial energy conservation program.

Canadian Keyes Fibre, Hantsport, Canada, 1975-1977.
Project Engineer. Responsible for energy cost reduction and pollution control projects.

Imperial Group Limited, Bristol, England, 1973-1975.
Management Consultant. Provided industrial engineering consulting services.

EDUCATION

M.S., Technology and Policy (Energy), Massachusetts Institute of Technology, 1979
Thesis: "An Assessment of Government Policies to Promote Investments in Energy Conserving Technologies"

B.Eng. Industrial Engineering (with Distinction), Dalhousie University, Canada, 1973

Martin R. Cohen

PROFESSIONAL EXPERIENCE:

2/08 – present
Martin Roth Cohen & Associates

- Independent consultant specializing in energy regulatory policy; clients include government agencies, consumer advocacy organizations and environmental protection groups
- Expert witness in regulatory proceedings regarding smart grid policy, utility cost recovery; author of renewable electricity cost/benefit and economic development studies; facilitator of statewide smart grid policy collaborative with 300 participating stakeholders; advisor to state energy procurement agency;
- Author of papers on state economic development opportunities of renewable resources and integration of distributed energy resources

1/06 – 1/08 State of Illinois, Office of the Governor
Director of Consumer Affairs

- State policy leader on energy, telecommunications, and consumer protection issues
- Coordinator of public policy initiatives among government, business, and public interest groups

9/05 – 11/05 State of Illinois
Chairman, Illinois Commerce Commission

- First consumer advocate appointed to head state utility regulatory agency

1985 – 2005 CUB
Executive Director (1991-2005), Citizens Utility Board

- Leader of consumer advocacy organization created by the Illinois General Assembly; key achievements included negotiation of $1.3 billion rate refund (1993), landmark utility restructuring legislation (1997), 9-year statewide rate reduction and freeze (through 2005)
- Directed 25-person staff in executing outreach, media, legal and legislative strategy. Served as National Secretary of the National Association of State Utility Consumer Advocates (NASUCA)

1982 – 1984 Washington for Mayor, Simon for U.S. Senate
Political Campaign Organizer

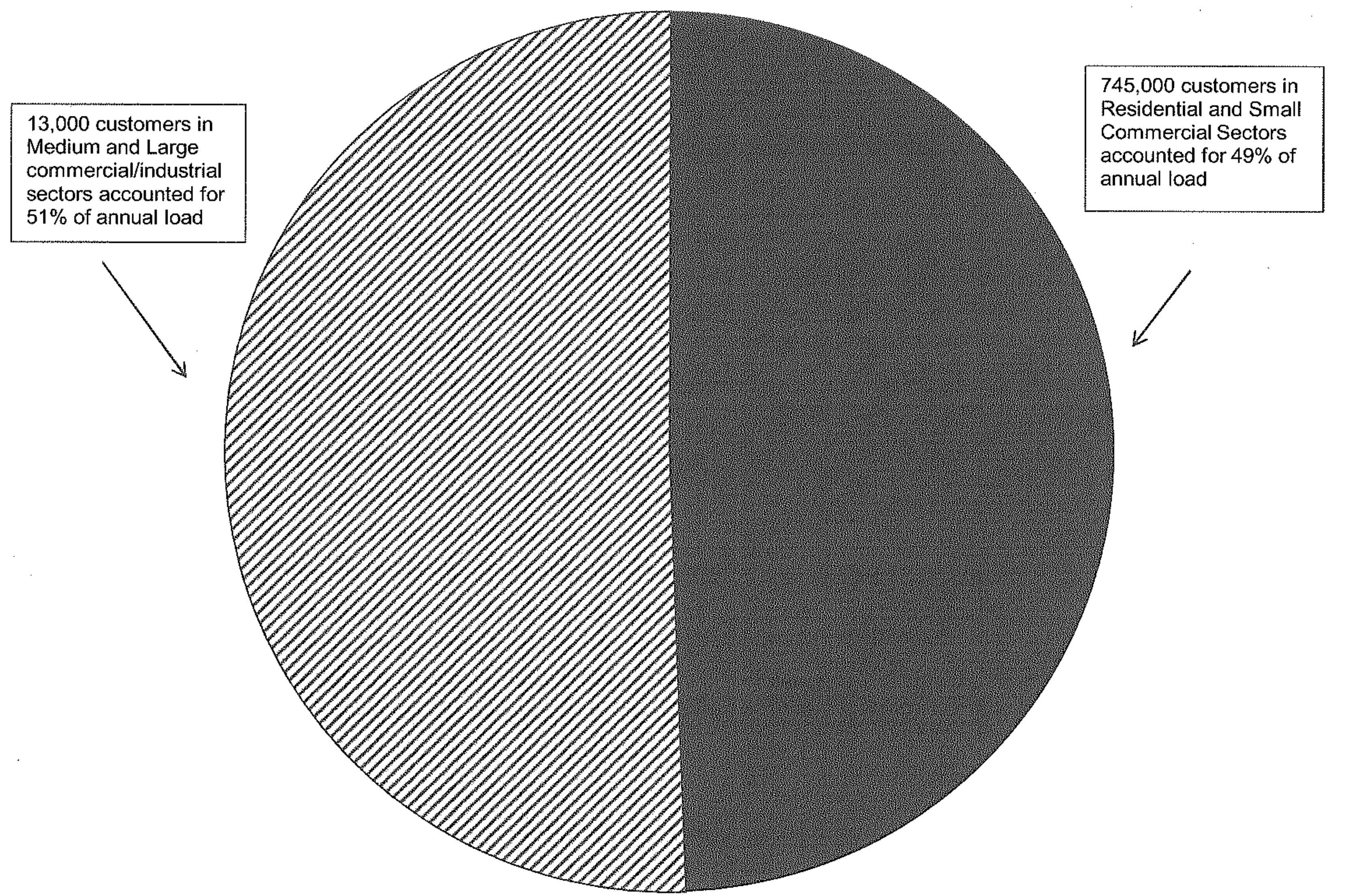
- Directed field operations for successful campaign of Senator Paul Simon in four Cook County townships and seven Chicago wards; regional events and outreach coordinator for successful primary and general election campaigns of Harold Washington for Mayor of Chicago.

1975 – present LillStreet Art Center
Small Business Founder, Owner, Manager

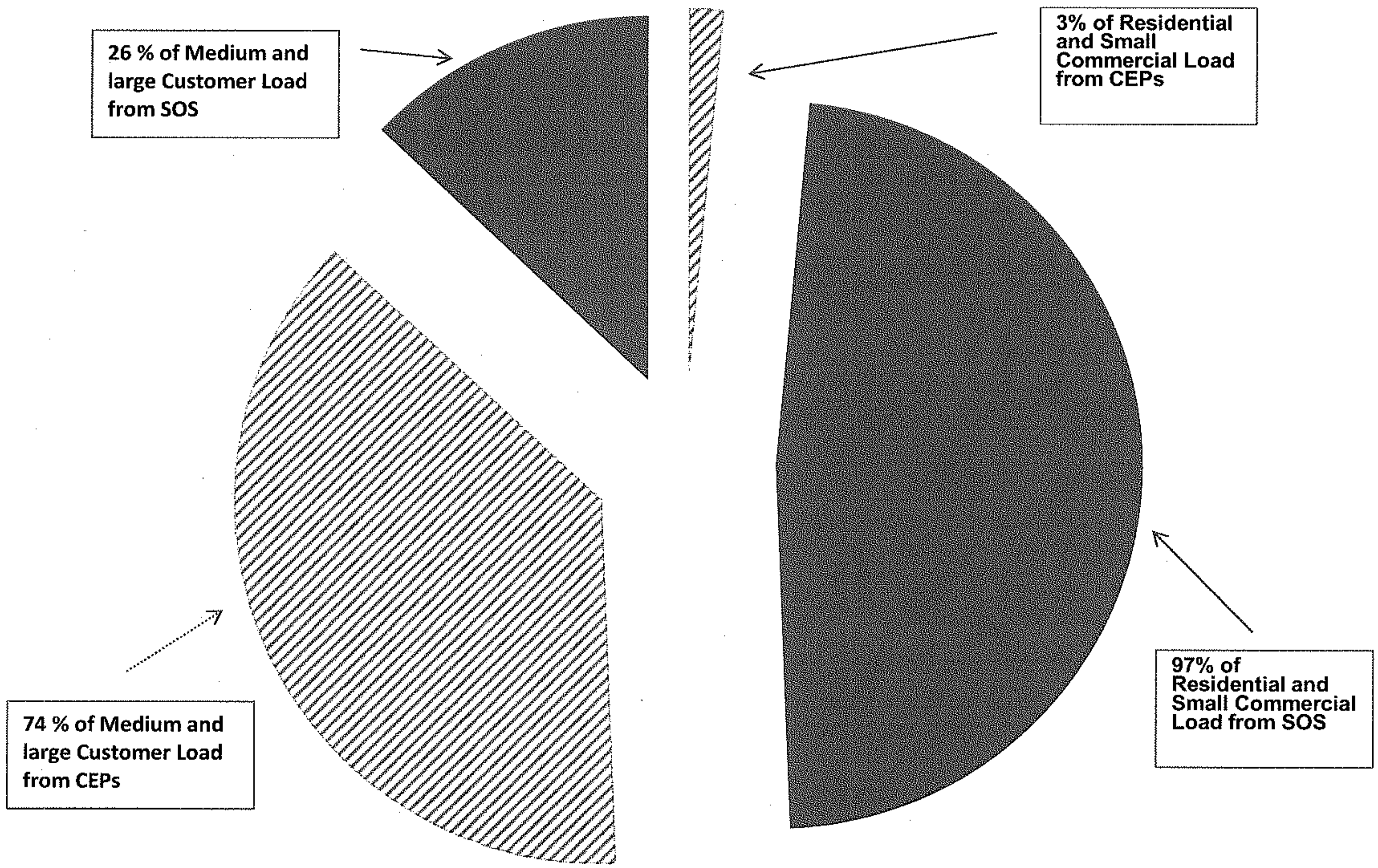
- With a partner, founded and managed Chicago's largest art center, including galleries, studios, supply company, and school; remains co-owner.

EDUCATION: Bachelor of Arts (1973), Washington University, St. Louis, MO

Annual Electric Energy Use in Maine By Sector (November 2009 - October 2010)



Annual Electric Energy Use in Maine By Sector and Supply Source (November 2009 - October 2010)



Summary of Maine Monthly Migration Statistics: Twelve Month Average (November 2009 to October 2010)				
Sector	Service	Average Daily Energy Load (MWh)	Percent of Sector Load	Average Number of Customers
Overall Statistics				
Residential and Small Commercial Customers	All	14,674	49%	744,966
Combined Medium and Large Customers	All	15,062	51%	13,456
Monthly Migration Statistics Disaggregated by Service				
Residential and Small Commercial Customers	CEP	438	3%	13,785
	SOS	14,236	97%	731,181
Combined Medium and Large Customers	CEP	11,193	74%	4,936
	SOS	3,869	26%	8,519

Notes

CEP: Competitive Electricity Supplier

SOS: Standard Offer Service

Data from Maine Monthly Migration Statistics available at
http://www.maine.gov/mpuc/electricity/choosing_supplier/migration_statistics.shtml

Maine 2007 Electricity Statistics

Utility	Residential and Small Commercial	Medium Commercial and Industrial	Large Commercial and Industrial	Lighting	Total Customers	Residential and Small Commercial Sales (MWh)	Medium Commercial and Industrial Sales (MWh)	Large Commercial and Industrial Sales (MWh)	Lighting Sales (MWh)	Total Sales (MWh)
Investor Owned Utilities										
Central Maine Power	536,133	49,402	12,035	562	598,132	3,468,333	559,405	5,041,447	36,812	9,105,997
Bangor Hydro Electric	99,940	14,720	2,270	16,460	133,390	595,090	154,175	827,864	8,706	1,585,835
Maine Public Service	30,249	5,690	275	1,259	37,473	179,864	93,846	277,953	3,392	555,055
Investor Owned Utilities Total	**666,322**	**69,812**	**14,580**	**18,281**	**768,995**	**4,243,287**	**807,426**	**6,147,264**	**48,910**	**11,246,887**
Consumer Owned Utilities										
Eastern Maine Electric Coop	10,504	1,738	132	164	12,538	55,223	20,248	15,889	2,547	93,907
Houlton Water Co.	3,909	875	157	374	5,315	28,551	11,814	58,288	861	99,514
Van Buren Light & Power	1,147	229	19	62	1,457	7,266	2,573	3,263	390	13,492
Kennebunk Light & Power	5,295	749	61	46	6,151	46,715	27,853	28,117	571	103,256
Madison Electric Works	2,217	280	20	21	2,538	17,528	4,541	284,561	321	306,951
Fox Island Electric Coop	1,624	282	0	27	1,933	6,297	2,889	0	113	9,299
Swan's Island Electric Coop.	572				572	2,169				2,169
Isle-Au-Haut Electric Power						241				241
Matinicus Plantation Electric Co.						334				334
Mohegan Plantation Power Dist.						295				295
Consumer Owned Utilities Total	**25,268**	**4,153**	**389**	**694**	**30,504**	**164,619**	**69,918**	**390,118**	**4,803**	**629,458**
Maine Statewide										
Total	**691,590**	**73,965**	**14,969**	**18,975**	**799,499**	**4,407,906**	**877,344**	**6,537,382**	**53,713**	**11,876,345**

Maine 2007 Investor Owned Utilities and Statewide Electricity Summary Statistics

	Residential and Small Commercial	Medium Commercial and Industrial	Large Commercial and Industrial	Lighting	Total
Investor Owned Utilities					
Consumption (kWh per Customer)	6,368	11,566	421,623	2,675	14,625
Percent Total Customers	86.6%	9.1%	1.9%	2.4%	100%
Percent Total Energy Sales	37.7%	7.2%	54.7%	0.4%	100%
Statewide					
Consumption (kWh per Customer)	6,374	11,862	436,728	2,831	14,855
Percent Total Customers	86.5%	9.3%	1.9%	2.4%	100%
Percent Total Energy Sales	37.1%	7.4%	55.0%	0.5%	100%

Data from Maine PUC available at:
http://www.maine.gov/mpuc/electricity/delivery_rates.shtml

NATIONAL SMART GRID POLICY

It is the policy of the United States to support the modernization of the Nation's electricity transmission and distribution system to maintain a reliable and secure electricity infrastructure that can meet future demand growth and to achieve each of the following, which together characterize a Smart Grid:

(1) Increased use of digital information and controls technology to improve reliability, security, and efficiency of the electric grid.

(2) Dynamic optimization of grid operations and resources, with full cyber-security.

(3) Deployment and integration of distributed resources and generation, including renewable resources.

(4) Development and incorporation of demand response, demand-side resources, and energy-efficiency resources.

(5) Deployment of ''smart'' technologies (real-time, automated, interactive technologies that optimize the physical operation of appliances and consumer devices) for metering, communications concerning grid operations and status, and distribution automation.

(6) Integration of ''smart'' appliances and consumer devices.

(7) Deployment and integration of advanced electricity storage and peak-shaving technologies, including plug-in electric and hybrid electric vehicles, and thermal-storage air conditioning.

(8) Provision to consumers of timely information and control options.

(9) Development of standards for communication and interoperability of appliances and equipment connected to the electric grid, including the infrastructure serving the grid.

(10) Identification and lowering of unreasonable or unnecessary barriers to adoption of smart grid technologies, practices, and services.

Specific Goals in Act	Parties with an existing obligation to achieve goal, fully or partially
A. Increased use of digital information and control technology to improve the reliability, security and efficiency of the electric system	T&D utility
B. Deployment and integration into the electric system of renewable capacity resources, as defined in section 3210-C, subsection 1, paragraph E, that are interconnected to the electric grid at a voltage level less than 69 kilovolts	None
C. Deployment and integration into the electric system of demand response technologies, demand-side resources and energy-efficiency resources;	Efficiency Maine for resources and technologies used by customers connected at less than subtransmission voltage of 34.5 kV
D. Deployment of smart grid technologies, including real-time, automated, interactive technologies that optimize the physical operation of energy-consuming appliances and devices, for purposes of metering, communications concerning grid operation and status and distribution system operations;	T&D utility for deployment of technologies on its system, including meters; **No party has obligation on customer side of meter.**
E. Deployment and integration into the electric system of advanced electric storage and peak-reduction technologies, including plug-in electric and hybrid electric vehicles;	**None**
F. Provision to consumers of timely energy consumption information and control options;	Efficiency Maine for information and control options that lead to reductions in peak demand and annual use; CMP per its Order approving AMI
G. Identification and elimination of barriers to adoption of smart grid functions and associated infrastructure, technology and applications.	T&D utility for barriers to deployment on its system, including meters. **No party has obligation on customer side of meter**

SMART GRID FUNCTIONS Per 1306 (d) of Energy Independence Act of 2007 (as referenced in Maine Smart Grid Act)	Summary Phrase	Groups providing all or portion of underlying functions
(1) The ability to develop, store, send and receive digital information concerning electricity use, costs, prices, time of use, nature of use, storage, or other information relevant to device, grid, or utility operations, to or from or by means of the electric utility system, through one or a combination of devices and technologies.	develop and use digital information via electric utility system	T&D utilities, customers, Non-Transmission Alternative (NTA), Electric Vehicle (EV)
(2) The ability to develop, store, send and receive digital information concerning electricity use, costs, prices, time of use, nature of use, storage, or other information relevant to device, grid, or utility operations to or from a computer or other control device.	develop and use digital information via computers and other devices	T&D utilities, customers, NTA, EV
(3) The ability to measure or monitor electricity use as a function of time of day, power quality characteristics such as voltage level, current, cycles per second, or source or type of generation and to store, synthesize or report that information by digital means.	measurement and monitoring	T&D utilities, customers, NTA, EV
(4) The ability to sense and localize disruptions or changes in power flows on the grid and communicate such information instantaneously and automatically for purposes of enabling automatic protective responses to sustain reliability and security of grid operations.	automatic response to maintain reliability	T&D utility
(5) The ability to detect, prevent, communicate with regard to, respond to, or recover from system security threats, including cyber-security threats and terrorism, using digital information, media, and devices.	protection of electric system security	T&D utility
(6) The ability of any appliance or machine to respond to such signals, measurements, or communications automatically or in a manner programmed by its owner or operator without independent human intervention.	automatic response by end-user equipment	T&D utilities, customers, NTA, EV
(7) The ability to use digital information to operate functionalities on the electric utility grid that were previously electro-mechanical or manual.	use digital information to operate grid	T&D utility
(8) The ability to use digital controls to manage and modify electricity demand, enable congestion management, assist in voltage control, provide operating reserves, and provide frequency regulation.	control of demand, supply and/or delivery	T&D utilities, customers, NTA, EV
(9) Such other functions as the Secretary may identify	other	Unknown