BEFORE THE
MAINE PUBLIC UTILITIES COMMISSION

GRIDSOLAR, LLC Re: Request for Approval of Designation as the Smart Grid Coordinator for the State of Maine and of Gridsolars Initial 5-Year Smart Grid Implementation Plan	Docket No. 2013-00519

DIRECT TESTIMONY OF
J. RICHARD HORNBY
AND
MARTIN R. COHEN

ON BEHALF OF THE
MAINE PUBLIC ADVOCATE OFFICE

August 28, 2014

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Exhibit___(JRH/MRC-4)	Examples of Smart Grid-Related Proceedings in Other States
Exhibit___(JRH/MRC-5)	Electric Supply Purchasing Statistics for Maine

I. INTRODUCTION / APPROACH

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., 485 Massachusetts Ave, Suite 2, 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 Public Advocate (OPA).The OPA has retained us to help them evaluate whether it is in the public interest for GridSolar to be appointed as Smart Grid Coordinator to provide the functions and services it has proposed in its Amended Petition in this proceeding.

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 30 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, Texas, Arkansas, and Illinois. 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, group process facilitation, and expert testimony in regulatory proceedings. I

have been involved in energy policy issues, primarily as a consumer advocate, for more than 29 years. I was employed by the Citizens Utility Board (CUB), an organization created by the Illinois General Assembly to represent the interests of residential customers in regulatory matters, beginning in February, 1985. I served as CUB's Executive Director from May, 1990 to September, 2005. I served in state government for two years, briefly as Chairman of the Illinois Commerce Commission in 2005 and subsequently as the Director of Consumer Affairs in the office of the Illinois governor. I founded Martin Roth Cohen and Associates in February, 2008. I was an expert witness in smart grid regulatory proceedings in Illinois and Maine, and was facilitator of the Illinois Statewide Smart Grid Collaborative. My resume is attached as Exhibit___(JRH/MRC-2).

Q. HAVE YOU FILED TESTIMONY IN MAINE REGARDING SMART GRID ISSUES IN PRIOR PROCEEDINGS?

A. Yes. We submitted joint testimony on behalf of the OPA in Phase I of the Smart Grid Coordinator proceeding, Docket 2010-267. Our joint testimony in that proceeding is attached as Exhibit___(JRH/MRC-3).

Q. PLEASE DESCRIBE THE BACKGROUND OF THIS PROCEEDING.

A. The Commission began considering Smart Grid Coordinator (SGC) issues in March 2010 following passage by the Maine Legislature of "The Smart Grid Act." That legislation sets the state's smart grid policy goals and, among other provisions, instructs the Commission, upon petition, to determine if it is in the public interest to have one or more SGCs in Maine, and if so to adopt SGC standards. The Smart Grid Act defines the SGC as an entity that "manages access to smart grid functions and associated infrastructure, technology and applications" (35-A §3143(1)(B)). The statute lists a series of SGC standards that may be adopted, including qualifications, selection criteria, duties and functions, the relationship between an SGC and a T&D utility, access to information, data collection, and reporting.

These issues were initially addressed in Docket 2010-267, a generic proceeding structured in two Phases. Phase I was to address the question of whether it is in the public interest to have an SGC. If the conclusion of the Commission after Phase I was positive,

Phase II was to be opened to address the standards to govern establishment of an SGC. The proceeding was dismissed without prejudice following a stipulation among the parties "based largely on the pendency of the [Boothbay Region] pilot project."[1]

Q. PLEASE SUMMARIZE THE NATURE OF THIS PROCEEDING.

A. On December 16, 2013, GridSolar filed an Amended Petition in this docket requesting that the Commission (a) determine that there is a need for a statewide smart grid coordinator, (b) designate GridSolar as the Coordinator for the State of Maine, (c) approve GridSolar's Amended Business Plan, and (d) adopt standards regulating GridSolar as a public utility. In its Amended Petition, GridSolar proposed to provide Non-Transmission Alternative (NTA) services, and services not directly related to NTAs ("non-NTA services").

In its Order of April 25, 2014, the Commission determined that the Petition "should be considered on the merits rather than waiting until a final report is filed" in the Boothbay pilot. The Commission decided that it will determine "(1) whether it is in the public interest to have a smart grid coordinator to perform the functions proposed by GridSolar and (2) the other aspects of the Petition."[2] That Order ends by encapsulating the Commission's view of this proceeding: "…we conclude that examining the specifics of the petition regarding the functions and costs of a smart grid coordinator as outlined by GridSolar are necessary for determining whether having a smart grid coordinator is in the public interest. Specifically, we will need to address both costs and benefits of having a smart grid coordinator perform the various functions outlined in the GridSolar Petition in order to determine that it is in the public interest to have a smart grid coordinator."[3]

On June 13, 2014, GridSolar filed an Amended Petition plus an Amended Business Plan. (Since the Amended Business Plan contains confidential material, GridSolar also filed a

[1] Order on Process of the Maine Public Utilities Commission, Docket 2013-00519, April 25, 2014, page 2.

[2] Ibid. page 6.

[3] Ibid. pages 6-7.

Redacted Amended Business Plan. Our review refers to public material from the Redacted Amended Business Plan.) In its June filing, GridSolar described its proposed NTA and non-NTA functions and services as follows:

> **NTA services** are provided in response to a specific utility project or utility system need. They are near-term solutions, require geo-targeted initiatives, require agreements with the utility, must meet utility reliability and long-term availability requirements. For example, GridSolar proposes to "secure distributed generation resources through capacity contracts with developers as non-transmission alternatives to grid reliability issues, or as part of programs targeted at ancillary benefits (e.g. line loss reductions, voltage support, power quality, etc.)."

> **Non-NTA services** are not related to a specific utility project or utility system need. Instead they are aimed at improving the efficiency at which customers use their electricity, which will result in an improvement in the efficiency with which the utility system is used. GridSolar has identified five non-NTA services: (1) intervening on rate design issues in rate cases and providing comments on the value of distributed solar study; (2) educating the public about how to use electricity more efficiently; (3) conducting pricing trials to test the effect of different types of rate structures on consumer behavior; (4) market segmentation, which includes analyzing data collected from the smart grid to gain insight on how customers use electricity and provide the insights from those analyses to relevant stakeholders; and (5) interacting with the technology industry and facilitating customer trials.

With its Amended Petition GridSolar also sponsored supporting testimony by five witnesses. The witnesses providing supporting testimony were Mr. Peter Evans of New Power Technologies, Mr. David Flanagan and Mr. Arthur Adelberg (former CMP executives), Michael Hopkins of Ice Energy, Mr. William Behrens of ReVision Energy and Johannes Rittershausen and James Tarpey of Convergent Energy + Power, LLC.

Q. PLEASE DESCRIBE THE APPROACH YOU USED TO EVALUATE WHETHER GRIDSOLAR'S REQUESTS ARE IN THE PUBLIC INTEREST.

A. GridSolar has asked the Commission to make four inter-related determinations: 1) whether there is a need for a statewide smart grid coordinator; 2) designate GridSolar as the smart grid coordinator for the State of Maine; 3) approve GridSolar's Amended Business Plan; and 4) adopt standards regulating GridSolar as a public utility.

As instructed by the Commission in its April 25 Order, we have limited our evaluation to the material GridSolar has provided in its proposal. In order to determine if the GridSolar proposal was in the public interest, we began by examining whether the benefits of having an SGC perform the NTA and the non-NTA functions and services proposed in GridSolar's Amended Petition would exceed their costs. This is the standard the Commission implied on page 7 of its April 25 Order, and is the primary standard we applied in our 2010 testimony (page 32, lines 6 to 8).

To apply that standard, we examine each of the SGC functions GridSolar proposed and assess the following attributes:

1) Need for the function to be provided;
2) Need for the function to be provided by an SGC versus other entities; and
3) Demonstrated expertise of GridSolar in the functional area.

Our assessment is specific to the Amended Petition at hand. While some of our observations and positions are applicable to the general question of whether the appointment of one or more SGCs is in the public interest, our recommendations are more narrowly confined to the merits of this particular proposal at this time.

Based upon the results of our evaluation of GridSolar's proposed NTA and non-NTA functions and services, we addressed whether there is a need for a statewide smart grid coordinator, whether GridSolar should be designated as Smart Grid Coordinator for the State of Maine, whether the Commission should approve GridSolar's Amended Business Plan, and whether the Commission should adopt standards regulating GridSolar as a public utility.

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

A. Our testimony is primarily based upon the GridSolar Amended Petition and Amended Business Plan of June 2014 and the testimony other parties filed in support of its petition, responses to data requests on that petition and supporting testimony, explanations provided during the July 2014 technical conferences, and responses to on-the-record data requests posed at those technical conferences. Our testimony is also informed by the materials we reviewed in Docket No. 2010-267 and our participation in relevant proceedings in other states. Finally we have reviewed Commission orders in this proceeding, and in Docket 2013-00168, CMP's rate case, addressing the audit of CMP's AMI program and CMP's proposed rate design.

II. EVALUATION OF PROPOSED NTA FUNCTIONS AND SERVICES

Q. PLEASE BEGIN BY SUMMARRIZING THE FUNDAMENTAL DIFFERENCE BETWEEN THE PURPOSE OF NTA SERVICES AND THE PURPOSE OF NON-NTA SERVICES.

A. The fundamental difference between the purpose of NTA services and non-NTA services is the primary client for those services, i.e., the local utility versus the retail customers of the local utility.

The primary client for NTA services is the local utility. The need for NTA services arises when a utility is facing a potential problem serving its projected future load in a specific region within its system. The question is whether the utility should solve its problem using a traditional "wires" solution, or whether it should solve that problem using an NTA. An NTA is composed of some combination of efficiency, demand response, and distributed generation resources. Because the NTA is solving a utility reliability problem the resources it employs must be geo-targeted, implemented in the short-term, and meet utility reliability and long-term availability requirements.

In contrast, the primary clients for non-NTA services are the customers of the local utility. The non-NTA services GridSolar is proposing are enabled by the advanced

metering infrastructure (AMI) or "smart grid" that CMP and Emera have deployed on their respective systems. GridSolar is proposing to provide various non-NTA services to the customers of these utilities to help those customers reduce their bills by using their electricity more efficiently.

Q. DO THE BENEFITS OF NTAS HAVE THE POTENTIAL TO EXCEED THEIR COSTS?

A. Yes. The Maine Legislature recognized the potential for the benefits of NTAs to exceed their costs when it passed the Omnibus Energy Act of 2013 requiring the Commission to examine NTAs before approving proposals for certain categories of transmission line projects. This requirement recognizes the potential for NTAs to meet the need driving these proposed projects at a lower total cost to ratepayers in Maine.

NTAs have begun to receive more attention in Maine and other jurisdictions due to a number of factors. First, technological advances are providing greater information and control of the grid, enabling more efficient grid operation. Second, the combination of declining costs for distributed energy resources and improvements in communication infrastructure are contributing to the increasing cost-effectiveness of NTAs. Third, the cost of building new transmission lines is high and siting major transmission lines that require new right of way can be very difficult.

Jurisdictions other than Maine that are pursuing NTAs include California, New York, and Vermont.

a. Since 2001, the California Public Utilities Code has required that electric utilities in their distribution planning process "…consider nonutility owned distributed energy resources as a possible alternative to investments in its distribution system in order to ensure reliable electric service at the lowest possible cost."[4] California recently opened a rulemaking to develop principles to guide the utilities' Distribution Resources Plan Proposals (DRPs) (Exhibit___(JRH/MRC-4).

[4] California Public Utilities Code, Section 353.5

b. On June 20, 2007, the Vermont Public Service Board approved a Memorandum of Understanding which created the Vermont System Planning Committee to address reliability issues in Vermont's electric transmission system. The planning process provides an "explicit process for analysis and explicit standards for evaluation of cost-effective non-transmission alternatives to solving reliability deficiencies."[5]

c. In New York, Consolidated Edison, as part of a rate case settlement, agreed to use distributed resources to reduce investment needs in Brooklyn.[6] In April 2013 the New York Commission initiated a Reforming the Energy Vision (REV) proceeding. One of the issues that proceeding is examining is electric utility use of NTAs.[7]

1. Context of GridSolar Proposed NTA Functions and Services

Q. DOES GRIDSOLAR MAINTAIN THAT ITS PROPOSED NTA FUNCTIONS AND SERVICES ARE CONSISTENT WITH THE GOALS OF THE SMART GRID ACT?

A. Yes. The Maine Smart Grid Policy has seven specific goals (35-A M.R.S.A.§3134(3) A through G). Our 2010 testimony discusses those goals and presents our assessment of the parties who have some obligation to achieve them. GridSolar maintains that its proposed NTA functions would help achieve the first five of those goals, listed below:

> 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;

[5] Vermont Public Service Board, *Vermont's Comments on the U.S. Department of Energy's Preparation for the 2012 Congestion Study*, January 31, 2012, page 5

[6] Joint Proposal, before the State of New York Public Service Commission, Cases 13-E-0030, 13-G-0031, 13-S-0032, 13-M-0376, 13-M-0040, 09-E-0428, December 31, 2013

[7] NYS Department of Public Service Staff Report and Proposal, Case 14-M-0101, April 24, 2014.

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.

Our evaluation indicates that the NTA functions GridSolar is proposing would primarily help achieve A, the first goal. GridSolar's proposed NTA functions would have an indirect impact on achieving goals B, C and E and likely little impact on achieving D.

Q. PLEASE DESCRIBE THE PROCESS THROUGH WHICH GRIDSOLAR ANTICIPATES THE COMMISSION WILL DETERMINE THE NEED FOR NTA SERVICES, AND THE ROLE GRIDSOLAR IS PROPOSING TO PLAY IN THAT PROCESS.

A. GridSolar anticipates that the Commission will determine the potential need for NTA services through a five-step process. GridSolar proposes to play a role in three of those five steps.

1) GridSolar expects the Commission will initiate a process to determine the potential need for an NTA under the requirements of the Omnibus Energy Act of 2013. That Act requires consideration of an NTA when a utility applies for a CPCN for a transmission line equal to or greater than 69 kV. It also requires consideration of an NTA when a utility proposes a transmission project capable of operating at less than 69 kV with a projected cost in excess of $20 million.

2) GridSolar proposes to develop and submit an NTA to the Commission, if applicable. The NTA will include enforceable commitments from NTA resource

owners regarding cost, timing, and performance.[8] GridSolar will not invest in the NTA resources themselves,[9] nor will it include an agency fee in the cost of the NTA.

3) Following GridSolar's submission of an NTA proposal, it expects the Commission or its consultant will evaluate GridSolar's NTA versus the utility's proposed wires solution to determine which provides a lower cost solution.

4) If the Commission determines that GridSolar's proposed NTA meets the reliability need at a lower cost than the wires solution and approves the proposed NTA, GridSolar proposes to oversee its implementation.

5) Following implementation of the NTA, GridSolar proposes to be responsible for operation of the NTA.

Q. IS IT CLEAR THAT THE COMMISSION WILL FOLLOW THAT PROCESS TO DETERMINE THE NEED FOR NTA SERVICES?

A. No. We understand that the Omnibus Energy Act does not require, or contemplate, the second step GridSolar has proposed – at least not in that sequence. Instead, it is our understanding that in step 2 the Commission would retain an independent third party to evaluate whether NTAs have the potential to meet the identified reliability need of a proposed transmission project at a lower total cost, as specified under Section 3132-A. GridSolar should not fulfill that initial role since it would have an incentive to favor development of an NTA over a transmission solution.

2. Evaluation of GridSolar Proposed NTA Functions and Services

Q. WHICH OF GRIDSOLAR'S PROPOSED NTA FUNCTIONS AND SERVICES HAVE YOU EVALUATED?

[8] Technical Conference Transcript, July 30, 2014, page 95.

[9] Direct Testimony of Adelberg & Flanagan, June 13, 2014, page 15.

A. We have evaluated all of the major NTA functions and services GridSolar has proposed. We have done this by incorporating its proposed step 2 in the NTA process into its proposed step 4. In sum, we have evaluated GridSolar's proposal to provide the following two sets of NTA functions and services:

- Development and implementation of NTAs. This would include designing an NTA and securing enforceable commitments from NTA resource owners regarding cost, timing, and performance. It would also include managing the implementation of the NTA, i.e., bringing it into service.

- Operation of NTAs. This would include overseeing operation of the NTA resources.

Q. PLEASE SUMMARIZE GRIDSOLAR'S RATIONALE FOR WHY IT SHOULD BE GIVEN A MONOPOLY ON DEVELOPMENT AND IMPLEMENTATION OF NTAS.

A. GridSolar maintains that it should be given a monopoly on developing and overseeing the implementation of NTAs for four main reasons. First, GridSolar interprets Maine law as prohibiting Maine utilities from providing this service.[10] Second, GridSolar maintains that Maine utilities have a conflict of interest in performing this function, since it is in the financial interest of utility shareholders to increase rate base through investments in traditional "wires" solutions.[11]Third, GridSolar states that it has not witnessed other independent third parties expressing interest in providing this service. For example, it notes that no prospective NTA developers have intervened in this proceeding requesting to be considered to provide this service. Finally, GridSolar states that the state would benefit from administrative efficiencies and cost savings if it was given this designation.

[10] Technical Conference Transcript, July 30, 2014, page 89, lines 3-6

[11] Ibid. page 95, line 20.

Q. WHAT IS YOUR EVALUATION OF THE FOUR REASONS GRIDSOLAR HAS PRESENTED TO JUSTIFY BEING GIVEN THE MONOPOLY ON DEVELOPING AND IMPLEMENTING NTAS?

A. We cannot comment on the first reason GridSolar has presented as it calls for a legal interpretation. The remaining three reasons GridSolar has presented each have merit.

We recognize that NTA development and implementation is not a "natural monopoly" according to economic theory. Utilities in other jurisdictions identify and select NTAs and/or NTA resources through a Request for Proposal (RFP) process. However, those RFP processes are typically overseen either by an independent evaluator chosen by the regulatory commission, or by commission staff.[12] Thus, there is a cost associated with that type of RFP process. The question, then, is whether it will be less costly for Maine to develop and implement NTAs by giving GridSolar the monopoly for that role or by relying on an RFP process overseen by an independent evaluator.

Our evaluation indicates that it will be potentially less costly for Maine to develop and implement NTAs by giving GridSolar the monopoly for that role. If Maine chooses the RFP process, ratepayers will ultimately pay the costs associated with applying that process for every NTA opportunity. In contrast, by giving GridSolar that role, it should be able to develop NTAs more cost-effectively. GridSolar will be able to build up its knowledge of each utility's system and of the viability of developing various types of NTA resources in Maine. As witnesses Flanagan and Adelberg noted in response to OPA-1-27:

> *The development and implementation of NTA resources is likely to be unique for each project/circuit. Because of this the job of the NTA coordinator (Smart Grid Coordinator, or SGC) will vary based on each circuit's specific needs assessment, the response to RFPs, the mix of resources bid, and a host of other NTA-specific and circuit-specific details. Thus, we do not believe it would be efficient to procure the services of an NTA coordinator (SGC) through competitive bidding.*

[12] Technical Conference Transcript, July 30, 2014, page 89, lines 3-6

Moreover, it makes no sense to conduct repetitive competitive bids to perform such services. Rather, we see value in accumulating institutional knowledge in the hands of a SGC that functions as a utility with fiduciary obligations to ratepayers.

Based upon the potential for GridSolar to provide a less expensive method of developing and implementing NTAs, and its demonstrated success with the Boothbay pilot, our evaluation indicates that it is in the public interest for the Commission to give GridSolar that monopoly for an initial period of 4 to 5 years.

Q. IF THE COMMISSION GIVES GRIDSOLAR THE MONOPOLY TO DEVELOP AND IMPLEMENT NTAS, DOES THIS MEAN GRIDSOLAR SHOULD TAKE RESPONSIBILITY FOR DEVELOPING THE GEO-TARGETED EFFICIENCY RESOURCES USED IN THOSE NTAS?

A. No. The role of GridSolar with respect to developing and implementing NTAs is to be the agent, or master contractor. In that role if GridSolar wishes to acquire geo-targeted efficiency resources as part of a particular NTA it should acquire them through Efficiency Maine Trust (EMT). EMT has well-established expertise and experience in developing and implementing efficiency resources. There is no need for GridSolar to duplicate EMT's energy efficiency related functions and services.

Q. DOES YOUR EVALUATION ALSO INDICATE THAT IT IS IN THE PUBLIC INTEREST FOR THE COMMISSION TO GIVE GRIDSOLAR THE MONOPOLY TO OVERSEE THE OPERATION OF THE NTAS THAT IT DEVELOPS?

A. Yes. If GridSolar is going to have responsibility for developing and implementing NTAs, our evaluation indicates that it should have the corresponding or associated responsibility for overseeing their operation. As noted earlier, NTA must meet utility reliability and long-term availability requirements. If GridSolar develops an NTA for a utility, it is reasonable to expect the utility will want GridSolar to take responsibility for ensuring that the NTA, once in operation, meets that utility's reliability and availability requirements on an ongoing basis in the long-term. In addition, by overseeing the operation of existing

NTAs, GridSolar will be able to identify and take advantage of opportunities to achieve further savings by increasing their scale over time.

Q. PLEASE ADDRESS GRIDSOLAR'S REQUEST TO BE GIVEN THE MONOPOLY TO PROVIDE THESE NTA FUNCTIONS AS A UTILITY.

A. GridSolar has requested that the Commission give it the monopoly to provide NTA and non-NTA functions as a utility. In the section that follows we explain why it is not in the public interest for it to be granted that monopoly for non-NTA services.

As noted earlier, our evaluation indicates it is in the public interest to give GridSolar the monopoly to provide NTA functions. However, our evaluation further indicates that GridSolar should be given this monopoly for an initial period of 4 to 5 years on a contractual basis—not as a utility.

Q. PLEASE EXPLAIN WHY YOU RECOMMEND THAT GRIDSOLAR BE GIVEN THIS MONOPOLY UNDER A CONTRACTUAL ARRANGEMENT FOR AN INITIAL PERIOD RATHER THAN BE DESIGNATED AS A PUBLIC UTILITY.

A. Designating GridSolar as a new public utility is an extraordinary step with long-term ramifications. It is premature to make that serious designation at this time. Once GridSolar was designated as a public utility it would likely be very difficult to revoke that designation in the event the Commission determined it was no longer in the public interest.

Awarding GridSolar this monopoly under a contractual arrangement is consistent with the Smart Grid Act. The Smart Grid Act, 35-A M.R.S.A. § 3143(5), provides that the SGC may operate as a T&D utility, under a Commission-approved contract with a T&D utility, or in some other manner approved by the Commission. Under this approach GridSolar could enter a Commission-approved contract with each utility. These contracts could include provisions addressing the need for accountability, reporting, and other public interest considerations particular to the responsibilities of an NTA coordinator. The Commission could review whether it is in the public interest to award GridSolar public utility status at the expiration of our recommended initial 4 to 5-year period.

Awarding GridSolar this monopoly under a contractual arrangement for an initial period gives the Commission and all parties the opportunity to evaluate the benefits and costs of having GridSolar provide these functions. Upon expiration of the contracts with each utility, the Commission would have the additional options of changing the terms of those contracts or determining there is no further need for GridSolar to provide these functions.

Q. WILL GRIDSOLAR HAVE TO MODIFY THE FINANCIAL ASSUMPTIONS AND PROJECTIONS IN ITS AMENDED BUSINESS PLAN TO REFLECT THIS LIMITED SCOPE OF FUNCTIONS AND CONTRACTUAL APPROACH?

A. Yes. One of the factors GridSolar will have to consider when modifying its Amended Business Plan is the uncertainty regarding the number, scale, and timing of future NTA opportunities. That uncertainty will likely affect the level of staff and operations GridSolar can propose in those revised financial projections.

III. EVALUATION OF PROPOSED NON-NTA FUNCTIONS AND SERVICES

Q. WHAT NON-NTA FUNCTIONS AND SERVICES DOES GRIDSOLAR PROPOSE TO PROVIDE AS SMART GRID COORDINATOR (SGC)?

A. As SGC, GridSolar proposes to "go beyond NTAs to proactively seek out a wide variety of solutions to meet the goals of the Smart Grid Policy Act, including such activities as early grid-targeting of efficiency and distributed generation, smarter rate design that incentivizes more efficient use of the grid, pricing and technology trials, public education, streamlining two-way consumer access to energy usage information, and education and development of the nascent market in provision of smart grid energy services." (Vol. 1, Amended Petition, p.30 line 6).

GridSolar's Amended Business Plan specifies five non-NTA functional areas in which GridSolar proposes to provide services:

1. Rate Design
2. Public Education
3. Pricing Trials

4. Market Segmentation
5. Technology

Q. HOW DO THOSE FIVE PROPOSED FUNCTIONS AND SERVICES RELATE TO THE SGC FUNCTIONS AND SERVICES IDENTIFIED IN MAINE'S SMART GRID ACT?

A. GridSolar's five proposed functions and services do not correspond directly to the nine smart grid functions Maine adopted from Section 1306(d) of EISA. (Our joint testimony in Docket 2010-267 discusses those nine functions). In response to OPA DR 001-001, GridSolar states that the services listed "are not intended to be exhaustive but only representational." GridSolar did not provide a complete list of its intended services.

Q. HAS GRIDSOLAR DISCUSSED WITH AFFECTED UTILITIES THE SPECIFICS OF ITS PROPOSED ROLES IN PROVIDING SMART GRID SERVICES?

A. No. In its answers to questions in the technical conference on July 30, GridSolar indicated it had not discussed these roles with the T&D utilities. (7/30 tr. at p.66).

Q. HAS GRIDSOLAR DEFINED THE ROLES OF ENTITIES OTHER THAN UTILITIES IN PROVIDING THE SMART GRID SERVICES IT PROPOSES?

A. No. OPA DR 001-003(d) and (e) ask GridSolar to define, for the provision of each of the eight example applications listed beginning of p.21 line 13 of the Petition, the roles GridSolar expects to be played by other entities including the T&D utility, EMT, unregulated for-profit entities, the Commission, and others. GridSolar's response does not indicate the role of other entities beyond the T&D utility.

Q. IS MAINE UNIQUE IN ITS INTEREST IN THE IMPLEMENTATION OF COST-EFFECTIVE FUNCTIONS AND SERVICES ENABLED BY SMART GRID TECHNOLOGY?

A. No. Many states are grappling with the complex set of regulatory issues associated with how best to minimize the economic and environmental costs associated with electricity use by maximizing the cost-effective use of distributed energy resources (DER) and of

smart grid enabled technologies. DER include energy efficiency, demand response, distributed generation, and storage.

Several states have conducted or initiated generic proceedings to examine how to make the best use of smart-grid-enabled functions and services, often in conjunction with DER. As indicated in Exhibit___(JRH/MRC-4), these states include California, New York, , Massachusetts, Hawaii, Illinois, and Maryland. Each state operates under its own regulatory framework, is at its own stage of smart grid deployment, and is addressing these issues in its own way. However, we are not aware of any state that has established an independent entity to be a Smart Grid Coordinator, or its equivalent.

Q. PLEASE DESCRIBE YOUR EVALUATION OF GRIDSOLAR'S PROPOSED PROVISION OF SMART GRID-RELATED SERVICES IF APPOINTED SGC.

A. Our review of GridSolar's five proposed non-NTA functions and services is presented below.

1. Rate Design

Q. PLEASE DESCRIBE GRIDSOLAR'S PROPOSAL WITH REGARD TO UTILITY RATE DESIGNS.

A. GridSolar asserts that the current rate structure is "wholly inadequate for today's utilities…" (Vol. 2, p.11). Therefore, as SGC, GridSolar would "intervene in all electricity rate and rate design cases before the MPUC to advance the general principal [sic] that retail electric rates should send clear and accurate price signals to Maine consumers encouraging electricity use where and when it is efficient and discouraging use where and when it is inefficient…" (Vol. 2 p.12).

Q. WOULD GRIDSOLAR AS SGC GO BEYOND ATTEMPTING TO ADVANCE THIS GENERAL RATE DESIGN PRINCIPLE?

A. Yes. As SGC GridSolar would develop its own proposals and "advocate forcefully for the adoption of its proposed rate design." (Vol. 2 p.12). GridSolar has already done so as an

intervenor in the CMP Rate Case Docket 2013-00168, and in its Amended Business Plan it has vowed to advocate a rate design proposal for Emera Maine in Docket 2014-00172.

Because views differ on what constitutes clear and accurate prices signals and to what extent rate design should also include other considerations such as customer impacts, rate designs are often vigorously contested by intervening parties and utilities.

Q. SHOULD RATE DESIGN ADVOCACY BE AN SGC FUNCTION?

A. No. The statute allows the Commission to adopt standards for an SGC that include the specification of duties and functions. Rate design advocacy is not an appropriate function for an SGC because it is duplicative of efforts of other public interest intervenors, including the Office of the Public Advocate, which is statutorily authorized to represent ratepayer interests regarding "the reasonableness of rates charged or proposed to be charged by any public utility." (35-A M.R.S.A. § 1702). The Commission benefits further from ratepayer funded viewpoints provided by EMT, Staff and other interested parties. That GridSolar has strong views about rate design issues and has advocated for a particular rate design that it believes will advance smart grid policy does not demonstrate that the public interest will be served by it continuing such advocacy at ratepayers' expense. To the extent that the Commission has specific smart grid related goals it wishes to pursue through changes to rate design, it has the tools and opportunity to do so through its regulatory authority and the participation of Staff and other interested parties in related proceedings.

2. Public Education

Q. WHAT DOES GRIDSOLAR PROPOSE TO DO AS SGC TO ADVANCE PUBLIC EDUCATION ABOUT SMART GRID?

A. GridSolar views public education about how to use electricity more efficiently as one of its "most important functions" as SGC. (Vol. 2, p.13). It proposes to "coordinate its activities with EMT to seek out opportunities to educate the public." Its list of intended public education efforts includes media campaigns, testimonials, editorials, and public service announcements.

Q. WHAT IS THE GRIDSOLAR PLAN FOR CONSUMER EDUCATION?

A. GridSolar provides an overview of its consumer education intentions in the Amended Business Plan. It plans to conduct educational forums, work with individual customers, hold briefings for a broad range of interest groups including "those that provide energy conservation and efficiency technologies and equipment to companies, those that install distributed solar PV systems, local and regional Chambers of Commerce, competitive electricity suppliers and marketers...EMT…environmental organizations, CAP agencies, local civic organizations, as well as municipal governments and local school districts." (Vol. 2 Sec. 5.2, p.21). GridSolar intends to hire a marketing and communications firm to develop materials for a multi-year, paid, multimedia campaign to reach the public using broadcast, print, and online advertising, beginning in the fall of 2015 and continuing through spring of 2019, to be "refreshed" in each subsequent year.

Q. DID GRIDSOLAR IDENTIFY THE SPECIFIC INFORMATION IT WOULD PROVIDE TO CONSUMERS ON HOW TO USE SMART GRID TECHNOLOGY AND APPLICATIONS TO CONTROL THEIR BILLS?

A. No.

Q. DOES GRIDSOLAR HAVE EXPERIENCE AND EXPERTISE IN THE FIELD OF CONSUMER EDUCATION?

A. No. The information presented by GridSolar in its Petition and Amended Business Plan and its responses to data requests of parties do not demonstrate significant experience and expertise in developing and executing consumer education programs. OPA DR 001-019(a) asked GridSolar to describe its experience in providing consumer education and outreach. In response GridSolar referred to its responses to data requests EMME 001-0015 and CLF-001-004. Its responses to those requests do not describe its experience in providing consumer education and outreach. Instead they describe GridSolar's experience finding experienced NTA providers.

Q. **IS GRIDSOLAR PROPOSING THAT ITS STAFF WOULD PROVIDE THESE CONSUMER EDUCATION ACTIVITIES?**

A. No. During the technical conference on July 30, Dr. Silkman explained that GridSolar would contract with other entities to implement consumer education programs, stating "…That would not be done by the smart grid coordinator, just like CMP doesn't necessarily do all of the aspects of its advertising. It contracts with people to do the development of the ads, to buy the media time, to put together the plan. And we would see ourselves operating the same way." (7/30 tr. at p.131).

Q. DO YOU AGREE THERE IS A NEED TO EDUCATE CUSTOMERS ON THE OPPORTUNITIES FOR CONTROLLING THEIR ELECTRIC BILLS VIA SMART GRID?

A. Yes. For electricity customers—particularly residential and small non-residential customers—to benefit from smart grid functionalities and applications available to them on the "customer side of the meter," they must first come to a basic understanding of smart grid technology and the opportunities it provides them. Given the general lack of familiarity by most consumers with how the electric system works and the difficulty of engaging them on this subject, consumer education is a tall order.

Q. IS ANY SMART GRID CONSUMER EDUCATION TAKING PLACE IN MAINE?

A. Yes. Maine utilities are currently providing some information to customers about smart grid.

An example of this information provision is found on CMP's website, which has a section, "Answering Your Questions About Smart Grid." (see: http://www.cmpco.com/smartmeter/). Emera Maine also provides information about smart grid (e.g., see http://www.emeramaine.com/media/1358/smart_grid.pdf) and also has an application it calls "Power Smart Maine," which it describes as "a free online tool that allows you to track how much energy you use and when you use it."

Q. WOULD AN EFFECTIVE CONSUMER EDUCATION AND OUTREACH PROGRAM INCLUDE NON-UTILITY INFORMATION SOURCES?

A. Yes. Although it is the responsibility of a utility to inform its customers about the functionalities of its meters and to provide tools that enable customers to access information about energy usage and use it to become more efficient, that is only part of an effective consumer education program. As GridSolar emphasizes, the transmission and distribution utility has little incentive to maximize customer behavioral changes or use of smart-grid-enabled applications that would reduce electricity sales. Also, messages from the utility may tend to be "tuned out" by customers who do not see them as a valued source of advice. For these reasons a smart grid education program would benefit from consumer engagement by independent non-utility sources that customers are likely to view as credible, "consumer-friendly" sources of information and advice.

Q. CAN EFFECTIVE CONSUMER EDUCATION BE ACCOMPLISHED IN THE ABSENCE OF AN SGC?

A. Yes. While an SGC could play a positive role in educating Maine consumers, this function could be undertaken by other non-utility entities. GridSolar intends to "coordinate its activities with EMT to seek out opportunities to educate the public." (Vol. 2 Sec. 3.6.1 p.13) However, without an SGC in place, EMT could expand its activities to include consumer education and engagement on smart grid opportunities. As a trusted and well-established third party, EMT has the potential to become an effective smart grid education provider. That function appears to be in keeping with the statutory description of EMT's duties: "the trust administers and disburses funds and coordinates programs to promote reduced energy costs, energy efficiency, and increased use of alternative energy resources in the State." (35-A M.R.S.A. §10104)

With regard to the potential of EMT to provide smart grid consumer education, the 2012 NARUC publication Investigation into Needs and Standards for a Maine Smart Grid Coordinator states: "EMT could play an important role in both educating consumers about opportunities and helping encourage them to make the best service choices by providing carefully designed measures that effectively combine consumer education and

action with quality control and quality assurance."[13]Because EMT already provides consumer education relating to energy efficiency programs, its cost for smart grid consumer education would be incremental to the cost of its current activities.

Q. HAS GRIDSOLAR DEMONSTRATED THAT IT WOULD BE THE ENITITY BEST QUALFIED AND EQUIPPED TO PROVIDE CONSUMER EDUCATION IN MAINE?

A. No. Particularly in light of the fact that GridSolar would contract with vendors for provision of education-related services, which other entities also could do, it has provided no evidence from which to conclude that it would be a superior provider of this key service. GridSolar has not demonstrated that it has the experience, the expertise, or an education plan to make it a more effective and efficient source of consumer education than if the utilities and EMT were to add additional education on smart grid opportunities to the information they are currently providing Maine consumers.

3. Pricing Trials

Q. WHAT DOES GRIDSOLAR ENVISION WITH REGARD TO PRICING TRIALS?

A. GridSolar plans two pricing trials, eighteen months apart, intended to "(a) evaluate whether certain types of energy pricing structures are more or less effective in impacting customer behavior to reduce electricity usage, and (b) to determine whether there are certain types of communications and interactions with customers that reinforce customer behavior." (Vol. 2, Section 5.3, p. 22). GridSolar intends to conduct trials that include real-time spot prices and fixed time-of-use prices. GridSolar's role would be to design the trials, do PR, educate participants, and provide reports and evaluations.

HAVE OTHER JURSDICTIONS CONDUCTED PRICING TRIALS OF TIME VARYING RATES ENABLED BY SMART METERS?

[13]/www.naruc.org/Publications/FINAL%20Maine%20SERCAT_NRRI_Jan%202012%20stanton%20changed%20pages%20and%20security.pdf p.46).

A. Yes. More than 200 pricing trials, focused on a variety of time-variant products, have been conducted around the country and internationally for more than a decade.[14] These include real-time hourly pricing, fixed period time-of-use pricing, critical peak pricing, peak period rebates, and other dynamic pricing variants. Many trials (or pilot programs) also have tested the effects of various enabling technologies such as in-home displays and price responsive or programmable equipment, and some evaluations have segmented results by income brackets and other variables.

Q. GIVEN THIS INFORMATION FROM OTHER JURISDICTIONS, IS IT CLEAR THAT MAINE WOULD BENEFIT FROM AN SGC CONDUCTING PRICING TRIALS?

A. No. In assessing the potential benefit of implementing a series of pricing trials, the threshold question is whether the characteristics of Maine electricity usage and pricing are sufficiently different from other states to justify the effort and expense of conducting and evaluating Maine-specific trials. Such an assessment would consider factors such as the relatively limited residential air-conditioning load in Maine, and the prevailing prices and price differentials compared to other jurisdictions. As an initial step, the Commission and/or an SGC would be well advised to analyze the volumes of publicly available information and analysis of time-variant pricing trials and rollouts. This would be consistent with the statutory directive to develop policy that "takes into account the implementation of smart grid functions in other jurisdictions." (35-A M.R.S.A.§. 3143(3))

Q. HAS GRIDSOLAR DISCUSSED HOW THE PRICING TRIALS IT IS PROPOSING WOULD RELATE TO MAINE'S EXISTING ELECTRICITY MARKETPLACE?

[14] See "Arcturus: International Evidence on Dynamic Pricing," Ahmad Faruqui and Sanem Sergici, Electricity Journal, 8/13

A. No. The GridSolar proposal regarding pricing trials does not identify how those trials would relate to the current structure through which residential and small commercial customers in Maine acquire their electricity supply.

As described in our 2010 Joint Testimony, Maine has a competitive retail electricity supply market under which electricity supply service is provided separately from local T&D service. Under this structure customers acquire their supply either by buying from a Competitive Electricity Provider (CEP) or by purchasing Standard Offer service. Large and medium commercial/industrial customers buy approximately 80% of their electricity from CEPs. In contrast, approximately 66% of residential and small commercial customers receive supply from the Standard Offer. These statistics are as of July 31, 2014 and are presented in Exhibit___(JRH/MRC-5).

CEPs presently cannot offer time-variant rates (TVR) because the utility billing systems are not able to accommodate them. The only TVR that has been offered in Maine that we are aware of was an experimental time of use program of CMP. As we are seeing in areas of the country where utility systems have been upgraded to accommodate interval usage data, electricity providers are beginning to offer TVR where they believe there is customer demand for it.

Q. WOULD GRIDSOLAR BE ABLE TO CONDUCT PRICING TRIALS OF ITS OWN DESIGN?

A. Not necessarily. Grid Solar faces a significant barrier in designing and executing pricing trials to advance its public-interest goals, stemming from the fact that GridSolar will need to "seek out suppliers to participate ..." (Vol. 2 p.23). As discussed above, under Maine's competitive retail electricity market structure, CEPs—not utilities or Standard Offer service providers—are intended to be the primary providers of time-variant supply products. They can be expected to participate in a pricing trial only if and when they believe they will benefit from it. They would reasonably want the trial to include rate structures, terms, and conditions that allow for eventual profitability and protect competitively sensitive information.

Therefore, a trial designed by GridSolar to test consumer responses to a particular set of prices or a pricing structure it devises might not attract suppliers. If all information from the pricing trials were to be made public (with the exception of the participating customers' identities) that would further deter supplier participation.[15] As Mr. Isaacson put it during the July 30 technical conference when explaining the desire of marketers to keep confidential the results of their own pricing programs, "There'll be an inverse relationship between the degree of success and the degree to which they wish to make it public." (7/30 tr. at p.132).

GridSolar recognizes the constraints of pricing trials when it asserts that participating customers must "face trials that are reflective of market conditions." (Vol 2, p.23). Because of their voluntary but essential participation in pricing trials, CEPs would have a primary role in designing trial rates and rate structures, as they would in the actual marketplace. In such pricing trials, the factor that would be least reflective of market conditions would be the role of GridSolar as a promoter of CEP products.

Q. ARE THE SPECIFIC PRICING TRIALS TO BE CONDUCTED BY GRIDSOLAR IDENTIFIED IN THE PETITION OR AMENDED BUSINESS PLAN?

A. No. The pricing trials generally described by GridSolar might not be similar to those they would actually propose to conduct if appointed SGC, as acknowledged by Dr. Silkman: "So rather than lay out a full blown proposal for doing a pricing trial and incorporate it in our rate design and then have it be moot based upon a Commission decision, we view this as an evolving process." (7/30 tr. at p.69).

[15]However, the record is not clear as to what information from pricing trials GridSolar intends to be proprietary. GridSolar DR Response to OPA-001-018(g2): "GridSolar believes that certain information regarding the trials should be kept confidential – that the participating suppliers should be protected from price discovery by their competitors." In contrast, during the Technical Conference of July 30, in response to a question from Mr. Hornby regarding what information from a pricing trial would be made public, Dr. Silkman replied, "We would expect to make everything available except for the customer identity." [7/30 transcript P.64, lines 1-10].

Q. IF THERE WERE NO PRICING TRIALS WITH PARTICIPATION BY GRIDSOLAR, WOULD THERE STILL BE A LIKELIHOOD OF TIME-VARIANT PRICING TRIALS BEING CONDUCTED IN MAINE?

A. Yes. If suppliers want to test whether or not time-variant electricity products have market viability they can do so. With pricing trials needing as few as 100 participants (GridSolar DR Response to OPA-001-018(b)) and GridSolar having "no special arrangements with the T&D utility" (GridSolar DR Response to OPA-001-018(c)), CEPs with access to interval data could be expected to design and execute their own pricing trials as part of their market research, at no expense to ratepayers.

The comments of Electricity Maine regarding CMP's AMI data plan indicate the intention of this prominent CEP to begin TVR trials when utility systems allow it: "Once they can avail themselves of real-time information, CEPs will create the services that are envisioned by the Commission and others, services that will maximize the efficiency potential in AMI..."[16]

4. Market Segmentation

Q. PLEASE PROVIDE YOUR UNDERSTANDING OF GRIDSOLAR'S PROPOSAL FOR MARKET SEGMENTATION ACTIVITIES.

A. Market segmentation is a form of market research. GridSolar intends to access and analyze smart grid data to gain insight into how customers use electricity and to provide elements of this analysis to individuals, NTA service providers, and EMT, as described in Section 3.8 of the Amended Business Plan. GridSolar does not state whether it would also provide its analyses of market segmentation data to utilities, CEPs, academic

[16] *Maine Public Utilities Investigation into Central Maine Power Company's AMI –Related Programs, Central Maine Power Company, Request for Alternative Rate Plan*, , Docket Nos. 2010-00132 and 2013-00168, Comments of Electricity Maine at 4. (August 22, 2014).

researchers, local governments, community and civic groups, the Commission, and the interested public.

Techniques GridSolar intends to employ to study the market include focus groups and discussion panels. A key element of the market segmentation plan is referred to as the "Big Data Initiative" (BDI) which involves "carefully structured data mining of the billions of pieces of customer information for more than 700,000 customer accounts with smart meters to identify usage patterns, characteristics and irregularities that can be provided to individual customers to affect their usage of electricity and to EMT for market segmentation and improved delivery of their energy efficiency and conservation programs." (Vol 2 Sec 3.8, p.14). This type of research is often referred to as data analytics.

Q. IS MARKET SEGMENTATION AS DESCRIBED BY GRIDSOLAR AN APPROPRIATE AND NECESSARY FUNCTION?

A. Yes. Market segmentation is an appropriate function. Data analytics are being used to inform programs and efforts similar to those generally described by GridSolar in jurisdictions without an SGC, under contract to utilities and energy efficiency providers. Such consumer-feedback services use pattern-recognition software to disaggregate customer energy usage and identify opportunities for efficiency. Many firms are now providing various services to utilities and energy efficiency providers based on analysis of customer usage data. One prominent example is the "OPower" program that provides comparisons of a customer's usage with neighboring households' usage in similar dwelling units.[17] Other companies are providing data analytic services for interval data, including Tendril, Simple Energy, Pulse Energy, Bidgely, and PlotWatt.

[17] See: http://opower.com/

Q. ARE THERE PRIVACY CONCERNS ASSOCIATED WITH THE ANALYSIS OF ENERGY USAGE DATA?

A. Yes. Market segmentation raises a number of concerns regarding data privacy and data access. Because it can be used to identify usage characteristics and other attributes of individual customers, electricity interval data is sensitive personal information deserving of privacy protection and subject to customer authorization prior to release. Unauthorized use of the data to identify customers who are likely targets for marketing of certain products, even if done with the intention of helping customers become more energy efficient, may provoke customer backlash and should not be undertaken without approval of the Commission after a detailed program assessment.

Like other elements of an SGC program, a data analytics program should be subject to cost/benefit analysis prior to being approved for implementation. No such analysis has been done for the proposed BDI.

Q. CAN EFFECTIVE MARKET SEGMENTATION BE ACCOMPLISHED IN THE ABSENCE OF GRIDSOLAR AS SGC?

A. Yes. CMP and Emera certainly have the ability to implement the type of BDI that GridSolar is proposing to analyze through the data they collect from their meter data management systems for market segmentation and other purposes. In fact it appears that CMP is either in the process of, or planning, such an initiative.[18]

In Vermont the state's utilities are cooperating to create a single electronic warehouse for electric usage data from all of the participating utilities. Vermont Energy Investment Corporation (VEIC) is working with the utilities to identify how best to use and analyze this data in order to design and support various "customer facing" initiatives (e.g. behavioral / feedback energy efficiency programs, portal for individual customers to use). They also expect to use this detailed usage data to design better informed efficiency programs, including geo-targeted programs.

[18] Technical Conference Transcript, July 30, 2014, pages 103 to 105.

Q. DOES THE INFORMATION PROVIDED BY GRIDSOLAR INDICATE THAT IT WILL HAVE THE IN-HOUSE CAPABILITY TO SUCCESSFULLY EXECUTE ITS PROPOSED BDI?

A. No. Its response to ODR-001-007 and discussion at the July 30 technical conference indicate that for the BDI GridSolar intends to develop its own queries of the interval usage database. While no information about specific queries is provided, this in-house approach is likely to limit the depth of information gleaned and make it difficult to achieve the described ambitions of the BDI. It is likely that to achieve its BDI goals GridSolar would have to contract with vendors who have developed sophisticated software and proprietary algorithms for this sort of consumer energy data mining which would add significantly to BDI costs.

5. Technology

Q. PLEASE DESCRIBE WHAT TECHNOLOGY-RELATED FUNCTIONS AND SERVICES GRIDSOLAR PROPOSES TO PROVIDE AS SGC.

A. In its Amended Business Plan GridSolar observes that technology in the electric industry is rapidly advancing and is providing new opportunities for enhanced energy management and efficiency. It describes the difference between active and passive technologies and the growing trend toward automatic response by energy systems and equipment. As SGC, GridSolar vows to "keep abreast of new technologies by functioning as a point of contact within Maine for companies that are developing and testing new technology prototypes." (Vol2 p.15). GridSolar would use its customer information database to identify customer samples to be used by companies with new technology they wish to test in Maine. By monitoring customer responses "in real-time and in great detail," GridSolar believes it would be providing "a unique platform in the industry to conduct product research, commercialization studies and product rollouts." (Vol 2, p.16).

Q. ARE THESE TYPES OF TECHNOLOGY FUNCTIONS AND SERVICES APPROPRIATE?

A. Yes. Technology support is an appropriate SGC function but may not be a necessary one. Whether technology companies would want to test products in Maine and whether they would need assistance and support of the sort GridSolar is able to provide is unknown. It is not clear that GridSolar would in fact provide a "unique platform in the industry," as opportunities exist elsewhere for technology providers to test new smart grid related products. One example is the "test bed" in Illinois. In that state, large utilities are required by statute to maintain facilities that "provide an open, unbiased opportunity for testing programs, technologies, business models and other…innovative smart grid-related technologies and services."[19] These test beds are presently operating in Illinois.

Q. DOES GRIDSOLAR HAVE A FULL UNDERSTANDING OF THE CAPABIILITIES OF SMART METERS AND OTHER TECHNOLOGIES BEING DEPLOYED BY MAINE UTILITIES?

A. No. GridSolar does not fully understand the capabilities of smart meters currently deployed by Maine utilities. During the July 30 technical conference, in response to the question, "Are you familiar with the latent capabilities of CMP's smart meters?" Dr. Silkman replied, "Not all of the latent capabilities." He went on to speak more specifically with regard to a meter capability about which GridSolar is uncertain: "...we don't know, for instance, whether or not the AMI meters are passing back up to CMP voltage at the customer premise. We believe that the AMI meters have the capability of recording voltage and measuring it." (7/30 tr. at p.59).

In a discussion of the capability of the existing CMP and EMERA meters to capture the potential of what GridSolar asserts are underutilized infrastructure assets, Mr. Isaacson agrees that they don't know what the capabilities of those are but "I suspect it's one thing we will find out." (7/30 tr. at p.61).

[19] See: http://www.ilga.gov/legislation/ilcs/fulltext.asp?DocName=022000050K16-108.8

Until the conclusion of the next Commission proceeding regarding the design of CMP's new billing system and policies such as those affecting data access, all parties will have to wait to find out. That eventual system capabilities are unknown at this time suggests that GridSolar's plans to provide technology support are speculative and premature.

Q. CAN EFFECTIVE TECHNOLOGY SUPPORT BE ACCOMPLISHED IN THE ABSENCE OF GRIDSOLAR AS SGC?

A. Yes. EMT has expertise presently devoted to energy efficiency technologies and programs, to which technology support would be complementary. EMT has business programs, provides professional training, and partners with energy professionals to provide services. Their energy technology knowledge base and capabilities could be expanded to include smart grid technology support. As an independent, not-for-profit agency operating under the auspices of the Commission and the State Legislature, EMT is well-positioned to provide technological assistance, advice, and support for smart grid-related businesses, should the need for such activity in Maine arise. If so, EMT's cost to provide it would be incremental to the cost of its current activities.

6. Summary Evaluation of Proposed Non-NTA Activities

Q. PLEASE SUMMARIZE YOUR CONCLUSIONS REGARDING EACH OF THE FUNCTIONAL AREAS IN WHICH GRIDSOLAR HAS PROPOSED TO UNDERTAKE ACTIVITIES AS SGC.

A. We have reviewed the Petition of GridSolar and the accompanying Amended Business Plan, the Responses to Data Requests, the transcripts of the technical conferences, and other materials cited in this testimony. With regard to each of the five functional areas proposed by GridSolar for its non-NTA activities as SGC, using the evaluation framework laid out at the beginning of this testimony, we conclude as follows:

a) Rate Design is not a function appropriate or necessary for provision by an SGC.

b) Public Education is an appropriate SGC function but it can likely be provided more efficiently and effectively by existing entities, such as Efficiency Maine Trust and the utilities, as an addition to the information they are currently providing to customers.

c) Pricing Trials may be useful, but it is not clear that an SGC would have the authority to either design or implement such trials.

d) Market Segmentation is an appropriate SGC function but can be provided more effectively by other existing entities.

e) Technology support is not a necessary SGC function, and it can be provided more efficiently by other existing entities.

Q. WHAT IS YOUR RECOMMENDATION WITH REGARD TO APPOINTING GRIDSOLAR SGC FOR THE PURPOSE OF PROVIDING THOSE PROPOSED NON-NTA FUNCTIONS AND SERVICES?

A. We conclude that the evidence in this proceeding does not demonstrate the public interest will be served by appointing GridSolar as SGC for non-NTA activities in Maine because the prospective benefits of its proposed functions have not been demonstrated to exceed their costs.

IV. SUMMARY EVALUATION OF GRIDSOLAR REQUESTS FOR DETERMINATIONS AND APPROVALS

Q. Please summarize your approach to evaluating whether GridSolar's requests are in the public interest.

A. GridSolar requested that the Commission make four inter-related determinations, i.e., determine that there is a need for a statewide smart grid coordinator, designate GridSolar as the Coordinator for the State of Maine, approve GridSolar's Amended Business Plan, and adopt standards regulating GridSolar as a public utility. We have evaluated whether each of those requests is in the public interest based on the results of our evaluation of GridSolar's proposed NTA and non-NTA functions and services.

Q. Has GridSolar demonstrated a need for a statewide Smart Grid Coordinator.

A. No, not as proposed in the GridSolar petition.

Q. Is GridSolar's request to be designated as Smart Grid Coordinator for Maine in the public interest?

A. No, not as proposed in the GridSolar petition. The results of our evaluation indicate that it is only in the public interest for GridSolar to be given a monopoly on providing NTA functions for an initial period of 4 to 5 years on a contractual basis.

Q. Are GridSolar's requests for approval of its Amended Business Plan and for adoption of standards regulating it as a public utility in the public interest?

A. No, not as proposed in the GridSolar petition.

James Richard Hornby, Senior Consultant

PROFESSIONAL EXPERIENCE

Synapse Energy Economics, Inc., Cambridge, MA. *Senior Consultant,* 2006 – present.

Provides analysis and expert testimony regarding planning, market structure, ratemaking and supply contracting issues in the electricity and natural gas industries. Planning cases include evaluation of resource options for meeting tighter air emission standards (e.g. retrofit vs. retire coal units) in Kentucky, West Virginia and U.S. Midwest as well as development of long-term projections of avoided costs of electricity and natural gas in New England. Ratemaking cases include electric utility load retention rate in NS, various gas utility rate cases and evaluation of proposals for advanced metering infrastructure (smart grid or AMI) and dynamic pricing in MD, PA, NJ, AR, ME, NV, DC and IL.

Charles River Associates (formerly Tabors Caramanis & Associates), Cambridge, MA. *Principal,* 2004 – 2006, *Senior Consultant,* 1998 – 2004.

Expert testimony and litigation support in energy contract price arbitration proceedings and various ratemaking proceedings. Productivity improvement project for electric distribution companies in Abu Dhabi. Analyzed market structure and contracting issues in wholesale electricity markets.

Tellus Institute, Boston, MA. *Vice President and Director of Energy Group*, 1997 – 1998. *Manager of Natural Gas Program,* 1986 – 1997.

Presented expert testimony on rates for unbundled retail services, analyzed the options for purchasing electricity and gas in deregulated markets, prepared testimony and reports on a range of gas industry issues including market structure, strategic planning, market analyses, and supply planning.

Nova Scotia Department of Mines and Energy, Halifax, Canada.

Member, Canada-Nova Scotia Offshore Oil and Gas Board, 1983–1986.

Assistant Deputy Minister of Energy, 1983–1986.

Director of Energy Resources, 1982-1983.

Assistant to the Deputy Minister, 1981-1982.

Nova Scotia Research Foundation, Dartmouth, Canada. *Consultant*, 1978–1981.

EDUCATION

Massachusetts Institute of Technology, Cambridge, MA
Master of Science in Energy and Technology Policy, 1979

Dalhousie University, Nova Scotia, Canada
Bachelor of Engineering, Industrial Engineering, 1973. Distinction.

Martin R. Cohen

2/08 – present
Martin Roth Cohen and Associates

- Independent consultant specializing in energy regulatory policy; clients include government agencies, consumer advocacy organizations, environmental groups and public utilities.
- Expert witness in regulatory proceedings; advisor on "Smart Grid" policies; author of renewable electricity studies; facilitator of collaborative process.

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

- Only consumer advocate ever appointed as head of state utility regulatory agency.

1985 – 2005 Citizens Utility Board
Executive Director, CUB

- 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); conducted hundreds of media interviews as leading consumer protection expert.
- Administrative Director (1985-88), Associate Director (1989-90); Acting Executive Director (1990-91); Executive Director (1992-2005); left CUB when appointed ICC Chairman.

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
Business Co-founder, Owner, Manager

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

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

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

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

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December 16, 2010

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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

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.

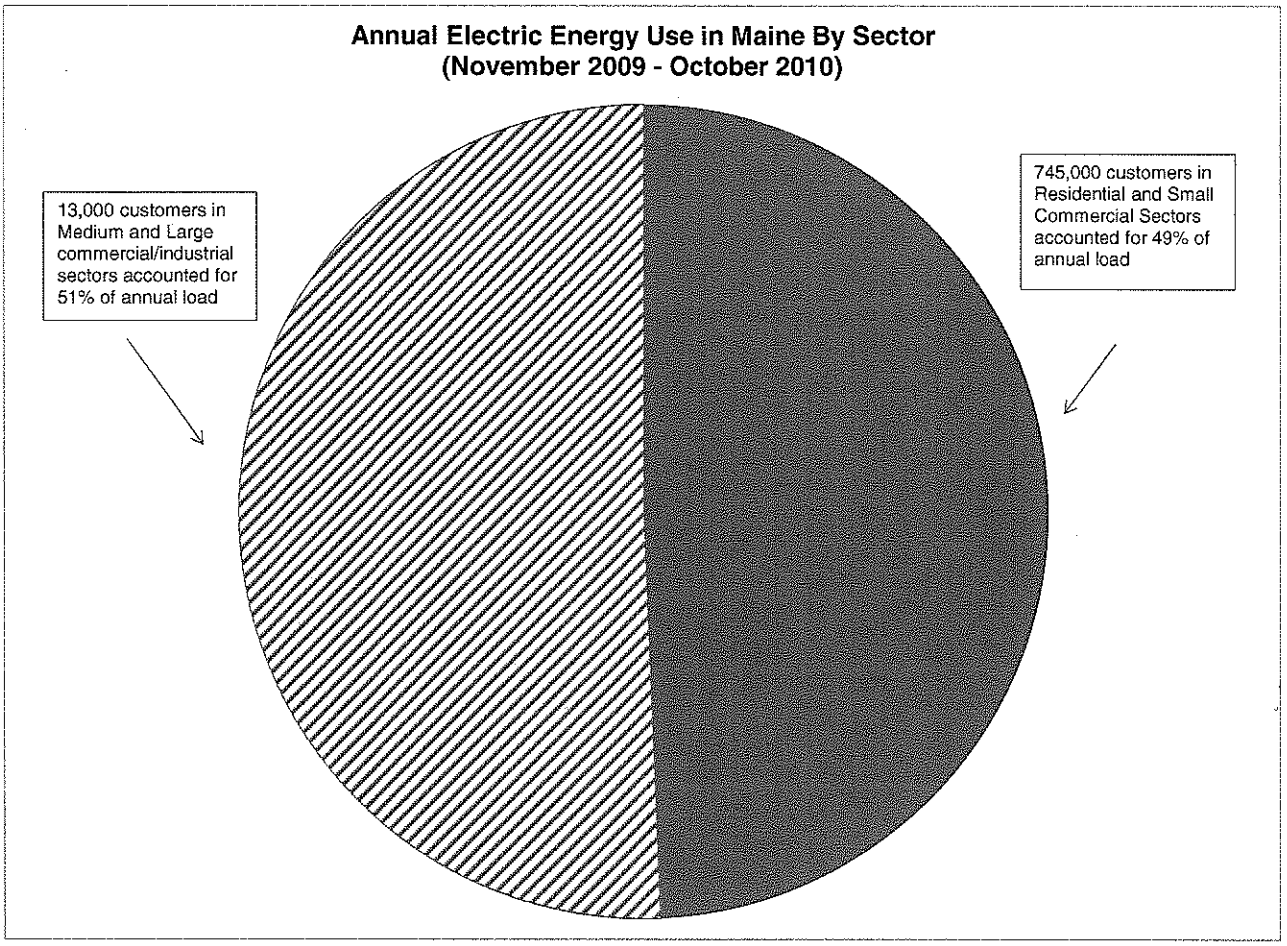
A. Three key characteristics of the existing market structure and regulatory framework are particularly relevant to our analyses. These characteristics are the major differences in customer attributes by sector, the separate provision of retail services (i.e. electricity supply, local T&D, efficiency)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

[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.

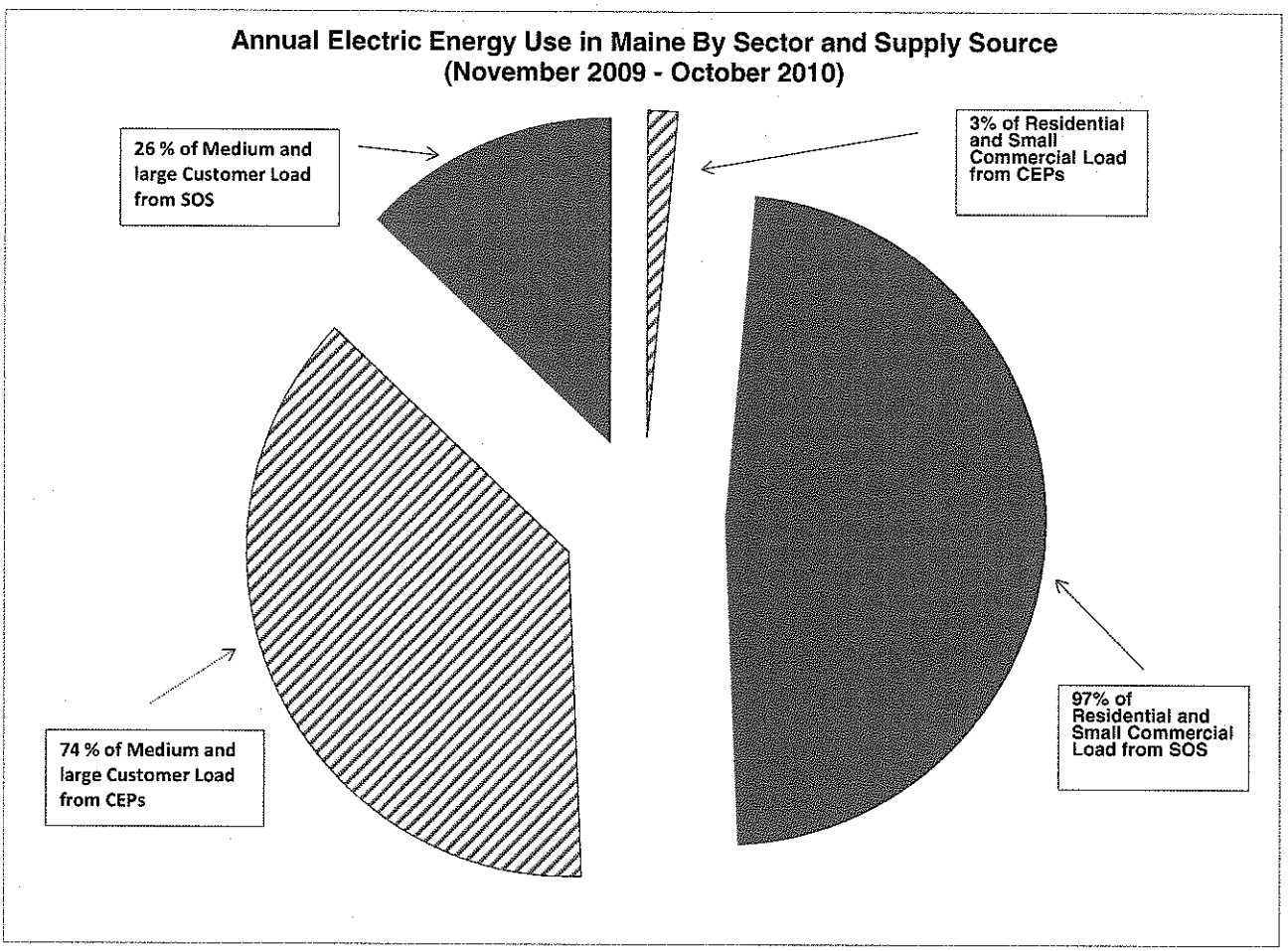
A. Maine has a competitive retail electricity supply market under which electricity supply service has been unbundled from local T&D service. In addition energy efficiency and demand response (DR) services have been unbundled from local T&D service. Under this structure customers acquire their local 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).

[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

[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

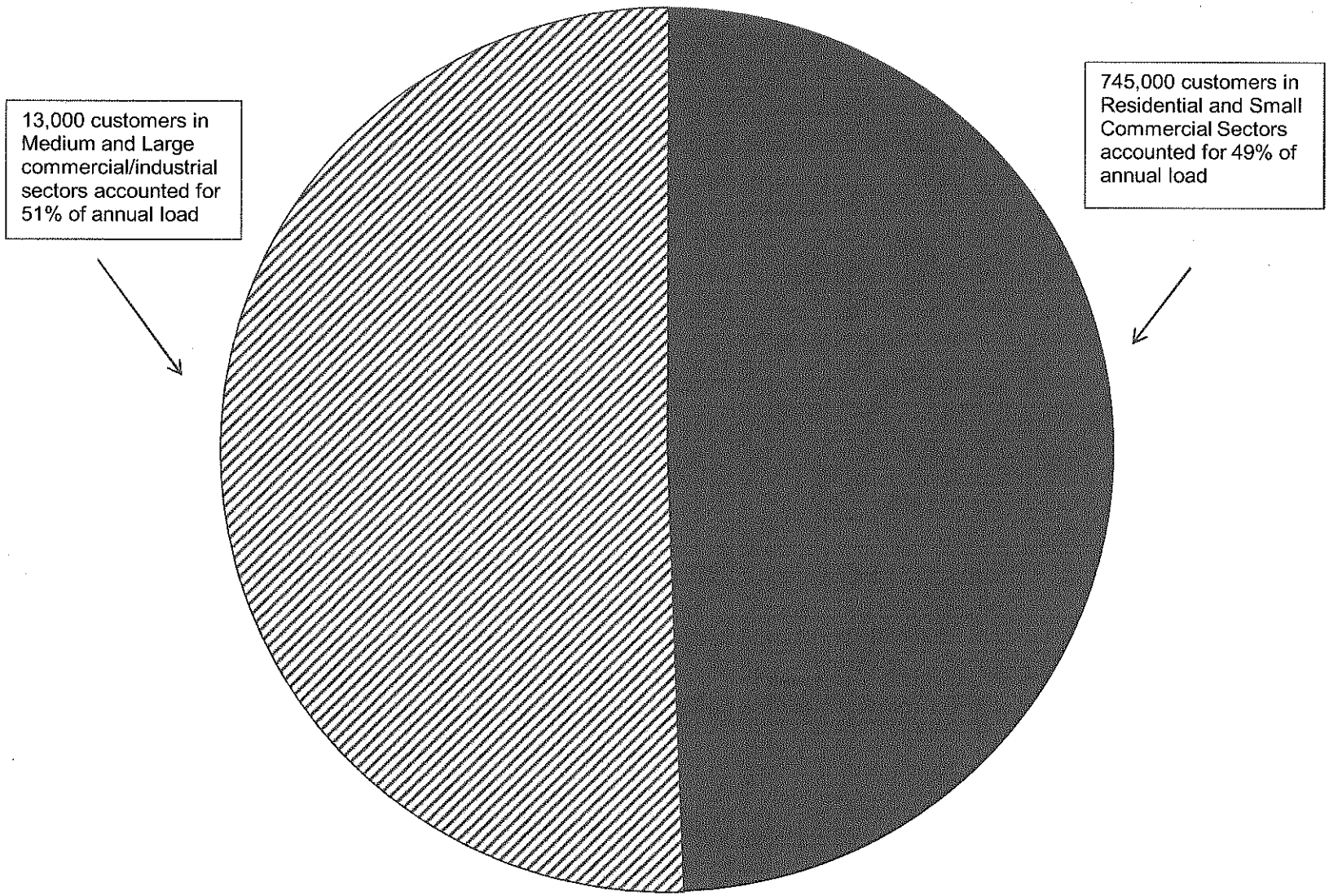
- Directed field operations for successful campaign of Senator Paul Simon in four Cook County townships and seven Chicago wards; regional events and outreach coordinator for successful primary and general election campaigns of Harold Washington for Mayor of Chicago.

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

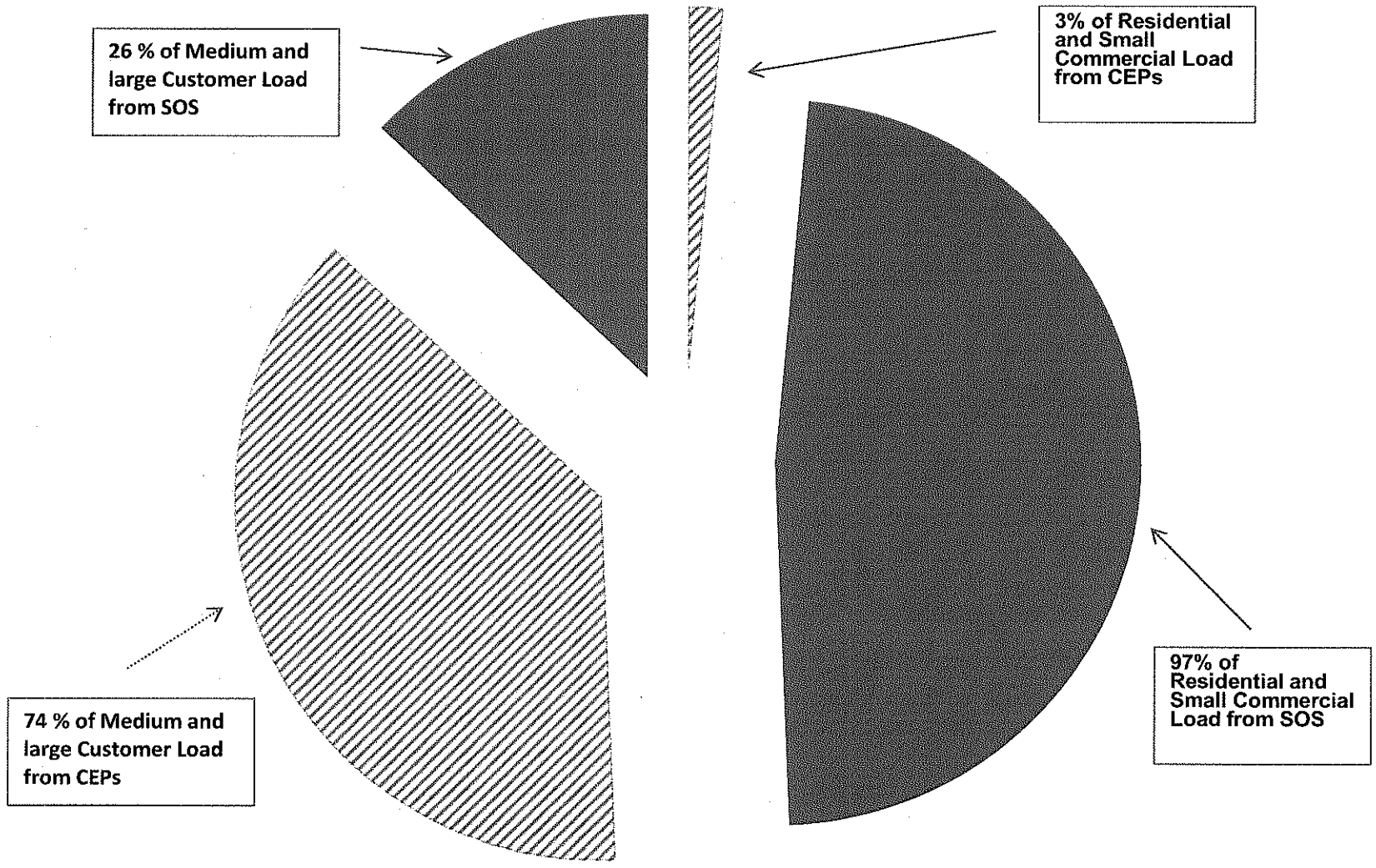
- With a partner, founded and managed Chicago's largest art center, including galleries, studios, supply company, and school; remains co-owner.

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

Exhibit___(JRH/MRC-4)

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.

Exhibit (JRH/MRC – 5)

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

Recent Smart Grid-Related Proceedings and Projects

Several states have conducted or initiated projects or generic proceedings to examine how to make the best use of smart grid enabled functions and services, often in conjunction with DER. Selected recent examples are summarized below.

1. **New York:** On April 25, 2014, the New York Public Service Commission commenced its Reforming the Energy Vision initiative. The goal of this initiative is to institute regulatory changes that "promote more efficient use of energy, deeper penetration of renewable energy resources such as wind and solar, wider deployment of "distributed" energy resources, such as micro grids, on-site power supplies, and storage… [and] promote greater use of advanced energy management products to enhance demand elasticity and efficiencies."[1] On August 22, 2014, the Staff of the New York Department of Public Service released its *Straw Proposal on Track One Issues*.

2. **California:** On August 14, 2014, the California Public Utilities Commission opened a rulemaking to develop principles to guide the utilities' Distribution Resources Plan Proposals (DRPs). The rulemaking will address the utilities' distribution planning procedures in order to better incorporate DERs into the operation of the electric distribution system.[2]

3. **Massachusetts:** On June 12, 2014, the Massachusetts Department of Public Utilities issued Order D.P.U. 12-76-B, requiring utilities to make progress on grid modernization in order to (1) reduce the effects of outages; (2) optimize demand (including reducing system and customer costs); (3) integrate distributed resources; and (4) improve workforce and asset management. [3]

4. **Hawaii:** On April 28, 2014, the Hawaii Public Utilities Commission issued a report titled *Commission's Inclinations on the Future of Hawaii's Electric Utilities*, which provided guidance to the state's utilities regarding generation modernization, transformation of the transmission and distribution grid, and regulatory policy and rate structure changes needed to achieve a clean energy future.[4]

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[1] New York State Public Service Commission, Docket 14-M-0101: Reforming the Energy Vision website, available at http://www3.dps.ny.gov/W/PSCWeb.nsf/All/26BE8A93967E604785257CC40066B91A?OpenDocument

[2] California Public Utilities Commission, Order Instituting Rulemaking Regarding Policies, Procedures and Rules for Development of Distribution Resources Plans Pursuant to Public Utilities Code Section 769, August 14, 2014, available at http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M102/K036/102036703.pdf

[3] Massachusetts Department of Public Utilities, Investigation by the Department of Public Utilities on its own Motion into Modernization of the Electric Grid, Docket D.P.U. 12-76-B, June 12, 2014, available at http://www.mass.gov/eea/docs/dpu/orders/dpu-12-76-b-order-6-12-2014.pdf

[4] Hawaii Public Utilities Commission, Decision and Order No. 32052 Regarding Integrated Resource Planning, Exhibit A, available at http://puc.hawaii.gov/wp-content/uploads/2014/04/Commissions-Inclinations.pdf

5. **Maryland:** In response to a recommendation from the Governor's Task Force on Grid Resiliency, the Energy Future Coalition developed a pilot design to test new technologies, strategies, and practices for electric utility service; and changes in utility business models and regulatory structure. The pilot is designed to evaluate attributes of the "electric utility of the future," including supporting utility investment in smart grid technologies.[5]

6. **Illinois:** Illinois passed the Energy Infrastructure Modernization Act in 2011 to facilitate grid modernization efforts. Electric utilities were initially required to meet performance targets related to improved reliability and a narrowly-defined list of customer benefits (reduced issuance of estimated electric bills, reduced consumption on inactive meters, reductions in unaccounted for energy and reduced uncollectible expenses).[6] These performance targets were expanded in 2014 to include distributed generation projects, customers enrolled in time-varying rates, overall energy savings, and enrollment in energy efficiency programs.[7] In addition, the Illinois Commission has directed Ameren to "continue innovating and creating new and cost-effective energy efficiency programs for consumers that work to integrate smart devices, such as consumer smart phones, electronic thermostats and other energy saving devices into their energy efficiency and demand response plans…."[8]

[5] Energy Future Coalition, *Utility 2.0: Piloting the Future for Maryland's Electric Utilities and their Customers*, Submitted to Governor Martin O'Malley, March 15, 2013, available at http://cleanenergytransmission.org/uploads/Utility%202-0%20Pilot%20Project-reduced.pdf

[6] Commonwealth Edison Company's Multi-Year Performance Metrics Plan, December 8, 2011. https://www.comed.com/Documents/customer-service/rates-pricing/rates-information/proposed/Exhibit_1_0_Performance_Metrics_Plan.pdf

[7] http://www.edf.org/news/pioneering-smart-grid-energy-metrics-will-help-measure-customer-benefits-illinois?utm_source=feedburner&utm_medium=feed&utm_campaign=Feed%3A+EnvironmentalDefense%2FPressReleases+%28EDF.org+-+Press+Releases%29

[8] ICC Directs Utilities to Integrate Smart Devices in Energy Efficiency Planning, ICC News Release, January 29, 2014

Electric Supply Purchasing Statistics for Maine

As of July 31, 2014

	Billed by CEPs				Billed by Standard Offer				
	Total	Customer		kWh		Customer		kWh	
	Count	Count	%	Count	%	Count	%	Count	%
1. Residential	547,781	155,703	28.42%	100,982,955	33.24%	392,078	71.58%	202,854,054	66.76%
2. Small C & I (SGS < 20 kW)	51,558	19,235	37.31%	17,938,001	38.41%	32,323	62.69%	28,760,618	61.59%
3. Medium C & I (20 - 399 kW)	12,485	5,660	45.33%	110,221,906	59.70%	6,825	54.67%	74,395,695	40.30%
4. Large C & I (Over 400 kW)	398	350	87.94%	244,927,402	96.16%	48	12.06%	9,779,930	3.84%
5. Deemed (AL Only Accounts)	5,596	913	16.32%	71,139	9.09%	4,683	83.68%	711,749	90.91%
	617,818	**181,861**	**29.44%**	**474,141,403**	**59.97%**	**435,957**	**70.56%**	**316,502,046**	**40.03%**

Source http://www.cmpco.com/SuppliersAndPartners/MainesElectricityMarket/CompProviderService/default.html