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To: Donna Williams, Contracting Officer, United States Department of Energy

From: Rick Hornby, Bob Fagan, Bruce Biewald

Date: May 6, 2009

Re: Notice of Intent for the Smart Grid Investment Grant Program (NOI)
Solicitation DE-FOA-0000058A posted April 16, 2009

Synapse Energy Economics (Synapse) is submitting comments in response to the Notice of Intent (NOI) published by the Department of Energy (DOE) regarding its plan to issue a competitive Funding Opportunity Announcement for grant applications under the Smart Grid Investment Grant Program (NOI). Our comments address two elements of the NOI, the criteria for evaluating grant applications and the anticipated maximum levels of grants.

Synapse commends the DOE for providing parties an opportunity to comment upon this important program. We understand the DOE's desire to achieve public benefits in conjunction with the investments underway to modernize electric distribution systems. However, we also understand that ratepayers and taxpayers will ultimately be required to pay for those investments and that they have legitimate concerns that such investments be justified based upon rigorous criteria and evaluation rather than on simplistic, unverified assumptions. For example, ten years ago proponents of retail competition maintained that it was "obvious" that the majority of mass market customers would want to shop for their electricity. That unchallenged assumption apparently led many states to implement retail access only to find that, in fact, only ten per cent or less of residential customers want to shop for electric supply.

Synapse is offering these comments to assist the DOE in ensuring the most effective use of taxpayer monies to achieve the public benefits identified in the NOI. We do not have any

financial interest in the outcome of any DOE decisions to award or not award a grant in support of any particular smart grid related technology or to any particular applicant.

Prior to presenting our specific comments we briefly describe Synapse and the consumer concerns regarding the justification for rate recovery that we have identified in our reviews of various utility proposals for smart grid investments in several states. The utility proposals that we have reviewed have referred to investments in advanced metering infrastructure ('AMI'). However, these AMI proposals are essentially proposed investments in smart grid as the functions they typically propose to provide match either most or all of the smart grid functions listed in the NOI).

In summary, we generally support the criteria proposed in the NOI. However, we suggest that certain criteria be either specified in more detail or clarified.

First, the criteria should indicate a preference for projects that "enable" customers to improve the efficiency with which they use electricity throughout the year, rather than just enabling reductions in demand in the top 50 to 100 hours each year. Projects that enable customers to materially reduce their annual electricity use will produce the greatest quantity of public benefits, in addition to also reducing peak demand. In contrast, projects that focus primarily if not entirely on enabling customers to reduce their demand in the top 50 to 100 hours each year appear to have limited long-term public benefits. Moreover, those demand response oriented projects may be difficult to justify in regions with low wholesale capacity prices and/or low penetrations of residential central air-conditioning.

Second, the final criteria should require applicants to:

- identify the uncertainty associated with key assumptions underlying the forecast benefits and costs of their project and the steps they propose to address those uncertainties
- describe the baseline or reference point against which they will measure the benefits and costs of their project;
- describe the capital and operating costs of their project, without and with a Smart Grid Investment grant, including any stranded distribution equipment costs they propose to recover;

- describe the physical units they propose in order to quantify each benefit from their project, as well as their proposed approach for estimating the corresponding monetary values of each benefit where applicable;
- describe the institutional arrangements through which customers will be offered new time-differentiated pricing for electricity supply service, the installed costs of control equipment customers will incur to automate their responses to those prices, and the arrangements through which customers will receive any resulting savings in electricity supply costs; and
- provide an estimate of the **net** jobs created by the project after identifying any reductions in existing jobs due to the project

With respect to the maximum level of grants, we expect that DOE will receive comments recommending that it set the cap for grants much higher than \$20 million. If DOE does decide to increase the cap above \$20 million, we suggest that it only allow one grant to corporations with operating companies in multiple states. In other words, we suggest the DOE limit or cap the number of grants to one per holding company.

INTRODUCTION

Synapse, founded in 1996, is a research and consulting firm that specializes in energy, economic and environmental issues. Our primary emphasis is on analyzing policies that lead to sustainable, efficient and equitable energy production and use. Our senior staff has over thirty years experience in the technical and economic aspects of energy and environmental policies.

Synapse provides research, testimony, reports and regulatory support to a variety of clients. Our clients include consumer advocates, regulatory commissions, state energy offices, federal agencies, environmental organizations, and others. Descriptions of our various projects are provided on our web site, www.synapse-energy.com.

Synapse staff have analyzed, and are analyzing, utility proposals for investments in advanced metering infrastructure (AMI), dynamic pricing, real-time pricing and direct load control (DLC)

in Washington, Maine, New Jersey, Pennsylvania, Maryland, the District of Columbia and Nova Scotia.

CONSUMER CONCERNS REGARDING THE JUSTIFICATION FOR RATE RECOVERY OF UTILITY INVESTMENTS IN ADVANCED METERING INFRASTRUCTURE (AMI)

Concerns raised regarding the merits of rate recovery for utility investments in AMI have sometimes been characterized as short-sighted opposition to any increase in rates. That is not the case. Instead, consumer advocates, utility regulators and energy policy makers are raising legitimate questions because they have an obligation to ensure that the types of public benefits identified in the NOI are achieved in the most cost-effective manner.

The NOI states:

These investments will help implement the necessary digital upgrades to the electric grid enabling it to work more efficiently, as well as making it capable to effectively integrate renewable and energy efficient technologies and demand management practices. In addition to promoting grid modernization, the program will also provide a stimulus to the nation with respect to expanding economic opportunities, creating jobs for American workers, and increasing worker skills.

The utility AMI proposals we have reviewed typically entail replacing 100% of existing meters with advanced or “smart” meters, installation of a new or upgraded communication network and installation of a new or upgraded computer system to support that enhanced communication system and processing of meter data. Thus, these AMI proposals are typically designed to provide essentially all eight of the smart grid functions listed in the NOI. The utilities who submit these proposals provide a “business case” or value proposition to justify their investment. The business case presents two categories of projected benefits, i.e., projected savings in distribution system operating costs and projected savings in electricity supply costs from reductions in demand during the 50 to 100 hours of highest system demand each year in response to some form of time-differentiated retail pricing, such as dynamic pricing, during those critical

peak periods (cpp). The net present value (NPV) of projected savings in distribution service costs is typically not large enough to fully offset the AMI investment, e.g. they may be 60% to 70% of the NPV of the AMI investment, and hence justify the AMI project.

Reviews of such AMI proposals conducted by ourselves and others have found that the estimates of benefits and costs that their utility proponents provided do not stand up to rigorous scrutiny and, as a result, do not justify recovery in distribution service rates. In other words, the rates that would be required to recover those AMI investments would not be “just and reasonable”.

These reviews have identified the following major weaknesses in the utility estimates of the benefits and costs of their proposed AMI projects:

- failure to compare benefits and costs of the AMI project to alternative approaches that will achieve the same major objectives at less cost. For example, the utility AMI proposals we have reviewed only quantify a limited number of benefits, primarily reductions in meter-reading costs and “enabled” reductions in residential demand to dynamic pricing during 50 or so critical peak hours each year. If those are the only major benefits of an AMI investment, then an approach involving automated meter reading technology and direct load control of residential central air-conditioners would be more cost-effective;
- under-estimation of AMI project costs. Most proposals do not include the value of “stranded” existing meter costs they propose to recover, and some do not include estimates of the software and hardware costs that would be incurred to modify billing systems in order to prepare bills based on hourly usage data collected from all customers;
- under-estimation of physical benefits and/or cost savings from improving distribution system reliability and/or reducing energy losses on the distribution system. Most filings allude to those benefits but do not provide quantitative estimates;
- over-estimation of the net savings in electricity supply costs. First, most proposals do not include estimates of the costs of control equipment that most customers will likely have installed in their premises in order to automate their response to time-differentiated pricing. (For example, some percentage of residential customers who wish to control their central air conditioner usage in response to time-differentiated prices would do so by

spending \$300 to have a “smart thermostat” installed and thereby automating his or her response). Second, there is considerable uncertainty regarding the percentage of residential customers and small volume customers who will voluntarily reduce their use in critical peak periods on a sustained basis, year-after-year. (For example, no empirical support for assumptions that 20 % to 25% of residential customers will respond to dynamic pricing). Third, utilities which provide only distribution service do not have control over the implementation of time-differentiated pricing for electricity supply service and therefore, without the approval of their regulator and the entities providing supply service, the distribution utility cannot guarantee either the design of such a tariff and/or its link to changes in the quantity and/or price of wholesale capacity that entity providing supply service would have to purchase.

- little or no net reductions in annual electricity use. The filings project little or no, net reduction in annual electricity use from demand response, instead they project customers will simply shift load from critical peak periods to off-peak periods;
- little or no net reductions in annual air emissions because there is little reduction in annual electricity use. Moreover, in some states a shift in electricity use from critical peak periods to off-peak periods will lead to higher air emissions as the marginal source of off-peak load may be a less efficient unit or a coal unit. (Reductions in demand in the top 100 hours would reduce NOx emissions);
- failure to demonstrate incremental impacts on customer investment in on-site generation from renewables and /or customer purchases of plug-in hybrid electric vehicles. A residential customer wishing to invest in either of these technologies simply needs an interval meter. The filings do not indicate that a 100% smart meter project will lead to a greater level of investments in either on-site generation from renewables, or purchases of plug-in hybrid electric vehicles, than a no “100% smart meter” scenario.

Based upon those weaknesses, organizations responsible for representing the interests of residential customers have legitimate reason to be concerned regarding the justification for rate recovery of electric utility investments in AMI. The proposals we have reviewed indicate that while investments in AMI will provide net benefits to shareholders in the form of increased

earnings it is not clear that the net increases in ratepayer bills from those investments will be offset by the projected benefits from those investments.

COMMENTS REGARDING CRITERIA FOR EVALUATING APPLICATIONS FOR SMART GRID INVESTMENT GRANTS

The Smart Grid Investment Grant Program has the opportunity to address the consumer concerns regarding smart grid investments by awarding grants to projects which will address the weaknesses and uncertainties identified in utility AMI filings to date. By applying the evaluation criteria listed in the NOI the Program has the potential of ensuring that the public benefits identified in the NOI are achieved through the most effective use of taxpayer monies.

These comments are offered solely to assist the DOE ensure the most effective use of taxpayer monies to achieve the public benefits identified in the NOI. We have no financial interest in the outcome of any DOE decision to either award or not award a grant for an investment in any particular smart grid related technology or to any particular applicant.

Each comment begins with a quote of the relevant section on the NOI criteria in bold italics.

2. Project Impact

Applications will be evaluated based on the overall impact on advancing program goals and achieving public benefits gained by the deployment of smart grid functions within the electric industry.

Comment.

The criteria should indicate a preference for projects that “enable” customers to improve the efficiency with which they use energy throughout the year, rather than just enabling reductions in demand in the top 50 to 100 hours each year. Projects that enable customers to materially reduce their annual electricity use will produce the greatest quantity of public benefits, in addition to also reducing peak demand. In contrast, projects that focus primarily if not entirely on enabling customers to reduce their demand in the top 50 to 100 hours each year appear to have limited long-term public benefits. Moreover, those demand response oriented projects may be difficult to justify in regions with low wholesale capacity prices and/or low penetrations of residential

central air-conditioning. For example, a utility in Maine was basing its rates for dynamic pricing on an assumed value of avoided capacity price of approximately \$100 per kw-year but it appears that the wholesale price of capacity in New England from June 2011 onward will be approximately 40%, or less, of that amount.

There are alternative approaches to achieving the public benefits identified in the NOI. The criteria should require applicants to describe the baseline or reference scenario of future distribution system and demand response initiatives against which they propose to measure the benefits and costs of their project. In other words applicants should compare the incremental costs of their project to its incremental benefits.

The criteria should require applicants to identify the uncertainty associated with key assumptions underlying the forecast benefits and costs of their project and the steps they propose to address those uncertainties

Applications will be evaluated based on the extent that they

a. Create the public benefits, including:

i. Reduced emissions,

ii. Lower costs,

iii. Enhanced cost-effectiveness,

iv. Increased reliability,

v. Greater energy security,

vi. Flexibility to accommodate new energy technologies, including renewable, intermittent and distributed sources, and

vii. Other public benefits that derive from the project.

Comment.

In addition to requiring identification of a baseline, the criteria should require applicants to describe the physical units they propose to use in order to measure, quantitatively, each benefit

from their project. The criteria should also encourage applicants to estimate the monetary value of each benefit.

Applications will be evaluated based on the extent that they

a. Create the public benefits, including:

ii. Lower costs,

Comment

The criteria should require applicants to provide the following information regarding estimated costs

- The “business case” for their project, both without a grant and with a grant. The business case should include their proposal for recovery of “stranded” existing meter costs; and
- an estimate of the installed costs that customers will incur for controls installed in their premises in order to automate their participation in programs or pricing “enabled” by the AMI project.

Applications will be evaluated based on the extent that they

a. Create the public benefits, including:

and

Re a and re Special Instructions for Applicants Submitting to Smart Grid Areas – With respect to the above, for applications that involve the installation of advanced metering devices, the applicant will be evaluated based on the extent to which any and all time-varying and other incentive-rate structures will be made available to customers.

Comment.

This is a key criterion. As noted above, the electricity supply benefits of AMI projects often hinge upon customer response to a new design of electricity supply pricing and on the entities

providing electricity supply to return cost savings to their customers. However, if the utility investing in AMI is providing only distribution service, it has no control over either the design of the electricity supply service prices, e.g. offering service at high prices in critical peak periods, or the return of savings in wholesale capacity and energy costs to customers. Moreover, even a vertically integrated utility needs approval of its regulator to implement a new pricing design.

Thus the criteria should require that if the electricity supply benefits of the AMI project hinge upon customer response to a new design of electricity supply pricing, the applicant should describe indicate the process through which that new tariff or pricing will be approved and implemented.

The criteria should require applicants that no longer have direct supply obligations for capacity and energy for customers who would receive “smart meters” to describe the mechanisms through which projected electricity supply cost savings would flow back to those customers. In particular for such applicants, if there are claimed capacity and energy savings resulting from smart meter installations the applicants should describe exactly how these savings will show up in rates to customers.”

c. Enable active participation by consumers of electricity.

Comment.

We suggest that the DOE clarify what it means by “active” participation. For example, in the residential sector we expect that most customers will not want a program under which they have to actively respond to prices every hour, or even every day, year after year. Instead, many residential customers may want a program under which they can automate their response, i.e. technology that they can “set and forget” rather than having to take actions every day or even every critical peak day, year after year.

g. Utilize dynamic pricing of electricity consumption rather than pay for demand reduction, to the extent applicable.

Comment.

We suggest that the DOE modify this criterion to encourage applicants to test various program delivery approaches. As noted above, in the residential sector direct load control of major appliances may be far more cost-effective than dynamic pricing. One of the potential problems with achieving reductions in demand through dynamic pricing is the absence of any explicit link between system capacity planning, or wholesale capacity markets, and the anticipated reductions. Those problems can be eliminated if the distribution utility is willing to work with its ISO to bid reductions from dynamic pricing into the wholesale capacity and energy markets. That approach would place dynamic pricing on a par with demand management programs operated by utilities and curtailment service providers who bid their anticipated reductions into wholesale capacity markets. Those entities can, and do, submit the expected reductions from their programs to the relevant ISO and/or into forward capacity markets where applicable.

h. Devise a randomized assignment mechanism based on key variables.

Comment.

This is another key criterion. A random assignment of some form is essential in order to obtain a truly representative and objective estimate of the percentage of customers who will voluntarily enroll in some form of new pricing tariff enabled by AMI and pay all the associated costs, including the incremental costs of an AMI meter and any associated in-home displays and controls. In addition, a control group and a statistically valid sample are essential to provide a baseline against which to measure incremental changes in use and reliability enabled by the AMI project.

One need only look at the experience with retail access to see the problems that will arise with AMI if no effort is made to truly determine the willingness of customers to voluntarily enroll in some form of new pricing tariff enabled by AMI. This is particularly true for residential customers who have limited options for reducing demand and who will not see dramatic savings

in electricity supply costs from demand reductions, particularly after paying \$300 to have a smart thermostat installed. Simplistic, unverified, assumptions that all or most customers want to see prices on an hourly or daily basis and will respond to those prices are not acceptable.

Approximately ten years ago many states approved retail access on the basis of similar simplistic, unverified, assumptions that all or most customers want to shop for everything, including electricity supply. There is now ample empirical evidence from those states that, in fact, only a very small percentage of small volume customers see any benefit in shopping for electricity supply.

The criteria proposed in the NOI seem well designed to avoid the retail access experience as well as one of the major flaws in almost all AMI pilot projects conducted to date. Those AMI pilots have failed to determine the willingness of customers to voluntarily enroll in some form of new pricing tariff enabled by AMI because they have given financial inducements to customers to enroll in those pilots. Those inducements have been either in cash as an “enrollment payments” or in kind as a free smart meters and/or a free in-home display. In contrast, a utility implementing a full, system-wide roll-out of AMI would not provide those types of financial inducements to all customers to take service under the special pricing tariff.

3. Estimate of Job Creation

The applicant should provide an estimate of the number of jobs created and retained as a result of their grant.

Comment.

The methodology for estimating the extent of job creation from the project should estimate the **net** jobs created. In other words, if the project will result in a reduction in existing jobs, meter readers for example, those reductions should be included in the calculation of job impacts.

COMMENTS ON ANTICIPATED MAXIMUM LEVELS OF GRANTS

Comment.

We expect that DOE will receive comments recommending that it set the cap for grants much higher than \$20 million. If DOE does decide to increase the cap above \$20 million, we suggest that it only allow one grant to corporations with operating companies in multiple states. In other words, we suggest a cap of one grant per holding company. This proposed limit should help ensure sufficient funds remain to award grants to a wide range of applicants despite an increase in the maximum grant.

CONCLUSION

Synapse commends the DOE for providing parties an opportunity to comment upon this important program. By applying the criteria proposed in the NOI, with the clarifications we have suggested, the DOE should be able to ensure the most effective use of taxpayer monies to achieve the maximum public benefits from the investments underway to modernize electric distribution systems at a reasonable cost.