STATE OF ARKANSAS

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of the Application of	**)**	
Entergy Arkansas, Inc. for	**)**	**Docket No. 09-084-U**
Approval of Changes in Rates for	**)**	
Retail Electric Service	**)**	

DIRECT TESTIMONY OF

PAUL CHERNICK

ON BEHALF OF

THE NATIONAL AUDUBON SOCIETY, INC.

AND

AUDUBON ARKANSAS

Resource Insight, Inc.

FEBRUARY 26, 2010

TABLE OF CONTENTS

TABLE OF EXHIBITS

I. Identification and Qualifications

Q: Mr. Chernick, please state your name, occupation and business address.

A: I am Paul L. Chernick. I am president of Resource Insight, Inc., 347 Broadway, Cambridge, Massachusetts.

Q: Summarize your professional education and experience.

A: I received an SB degree from the Massachusetts Institute of Technology in June 1974 from the Civil Engineering Department, and an SM degree from the Massachusetts Institute of Technology in February 1978 in technology and policy. I have been elected to membership in the civil engineering honorary society Chi Epsilon, and the engineering honor society Tau Beta Pi, and to associate membership in the research honorary society Sigma Xi.

I was a utility analyst for the Massachusetts Attorney General for more than three years, and was involved in numerous aspects of utility rate design, costing, load forecasting, and the evaluation of power supply options. Since 1981, I have been a consultant in utility regulation and planning, first as a research associate at Analysis and Inference, after 1986 as president of PLC, Inc., and in my current position at Resource Insight. In these capacities, I have advised a variety of clients on utility matters.

My work has considered, among other things, the cost-effectiveness of prospective new generation plants and transmission lines, retrospective review of generation-planning decisions, ratemaking for plant under construction, ratemaking for excess and/or uneconomical plant entering service, conservation program design, cost recovery for utility efficiency programs, the valuation of environmental externalities from energy production and use, allocation of costs of service between rate classes and jurisdictions, design of retail and wholesale

rates, and performance-based ratemaking and cost recovery in restructured gas and electric industries. My professional qualifications are further summarized in Exhibit____PLC-1.

Q: Have you testified previously in utility proceedings?

A: Yes. I have testified more than 230 times on utility issues before various regulatory, legislative, and judicial bodies, including the utility regulators of twenty-eight states, five Canadian provinces, New Orleans, the District of Columbia, and two U.S. Federal agencies.

Q: Please summarize your experience in the planning and promotion of energy-efficiency programs.

A: I have testified on demand-side management (DSM) potential, economics and program design in approximately 54 proceedings since 1980. In the 1990s, I participated in several collaborative efforts among utilities, consumer advocates, and other parties, including those for Potomac Electric Power, Baltimore G&E, Delmarva Power, Potomac Edison, Washington Gas Light, Central Vermont Public Service, Vermont Gas, and New York State E&G. More recently, I have participated in collaboratives related to Con Edison's gas and electricity efficiency programs and New York statewide program rules and objectives.

Q: Please summarize your experience regarding recovery of utility energy-efficiency program costs and associated revenue losses.

A: I first proposed a combined revenue-stabilization and conservation-funding mechanism in testimony on alternatives to the Seabrook nuclear power plant before the New Hampshire Public Utilities Commission in Docket No. DE1-312 in October 1982. My qualifications list a number of subsequent engagements related to ratemaking for energy-efficiency, including recovery of direct costs and lost revenue.

I have supported broader revenue stabilization than proposed by the utilities in some cases (e.g., in Ontario), and proposed modifications to utility decoupling proposals in other situations (e.g., for Con Edison's electric sales, Vectren's Indiana gas territories). I have also worked on issues of cost recovery in collaborative efforts among utilities, consumer advocates, and other parties, including Con Edison's gas revenue-per-customer decoupling collaborative. Most recently, I developed and testified in support of the proposals of Philadelphia Gas Works for recovery of DSM costs and lost revenues.

II. Introduction and Summary

Q: On whose behalf are you testifying?

A: My testimony is sponsored by the National Audubon Society, Inc., and Audubon Arkansas (collectively, "Audubon").

Q: What is the purpose of your direct testimony?

A: I have been asked to review the proposal by Entergy Arkansas, Inc. (EAI or Entergy) for recovery of revenues lost due to its DSM programs and for incentives for DSM performance. These proposals are embedded as two components of EAI's proposed Formula Rate Plan (FRP): the Lost Contribution to Fixed Costs and the Energy Efficiency Shared Savings Mechanism. These components are described in EAI Exhibit ODW-1, Attachments G and H, respectively.

Q: What documents have you reviewed?

A: I have reviewed the relevant testimony and exhibits of EAI Witnesses Hugh McDonald, Jeff Makholm, Oscar Washington, and Kurtis Castleberry in this docket.

Q: Please summarize your testimony.

A: Entergy has proposed two very important changes to ratemaking—recovery of lost revenues and shareholder incentives for DSM achievements—that may be critical in facilitating EAI's transition to operating comprehensive energy-efficiency programs. Given the vast potential benefit to ratepayers of improved energy efficiency, it is encouraging that EAI has undertaken to adjust ratemaking procedures to be consistent with major DSM undertakings. The Commission should move forward with both of these ratemaking enhancements, and approve both a lost-revenue (or revenue-decoupling) mechanism and shareholder incentives for EAI.

I have identified a number of specific points in EAI's proposed treatment of lost revenues and incentives that should be improved. As discussed in more detail in the following sections, I recommend that the Commission approve a lost-revenue or revenue-decoupling mechanism for EAI that incorporates the following measures:

- Require that EAI use the best available estimate of the reduction in billing determinants—based on comprehensive tracking, monitoring, verification and evaluation efforts—rather than the deemed savings used for program planning.
- Require that EAI use the most accurate feasible estimate of the lost revenues, rather than assuming a single cents-per-kWh rate for all measures implemented at any time in the year for all customers on all rate schedules within a customer class.
- Eliminate the potential for double-counting lost revenues, by including lost revenues in the computation of earned return.

I further recommend that the Commission take the following steps:

- Require that EAI compute the incentive from the best available estimate of savings and measure lives at the time the programs are implemented, while leaving EAI responsible (and hence liable) for keeping those data up to date.
- Include participants' costs in the computation of net benefits for setting incentives.
- Require Commission approval of the avoided costs to be used in the incentive mechanism.
- Tie the incentive structure to the definition of comprehensiveness and the determination of specific performance goals and targets in Docket No. 08-144-U.
- Start the incentives at a significant portion (probably around 75%) of the goal for each year set by the Commission.
- Establish penalties for inadequate performance.
- Establish a process for refining the incentive mechanism (preferably as a collaboration among EAI and the parties) to encourage a diverse and comprehensive portfolio approach to DSM, including market transformation.

III. Problems in Entergy's Proposal for Recovery of Lost Revenues

Q: What is the purpose of computing the lost contributions to fixed costs resulting from utility energy-efficiency programs?

A: The principal purpose of energy-efficiency programs is to reduce costs to customers, including fuel, variable O&M, net purchased power, and new generation, transmission, and distribution investments. Entergy reconciles its costs for fuel and purchased power. In the short term (e.g., a year or two), DSM

load reductions generally have little effect on other O&M or investment, so every kWh that a customer does not use due to an energy-efficiency program reduces Entergy's earnings. As a result, Entergy has a financial incentive to delay implementation of DSM, especially measures that have particularly large effects on revenue.

Q: What approaches are generally used for recovery of lost revenues?

A: The three principal approaches are as follows:

- *Projection of DSM program effects* in estimating sales and setting rates in general rate proceedings. These are the full-year effects of measures installed prior to the rate year (both preceding the rate filing and during the rate proceeding), plus partial-year effects of measures installed during the rate year. This approach is most effective if rate proceedings are filed every year, and may have difficulties dealing with situations in which projections of installations turn out to be dramatically wrong.
- *After-the-fact computation of lost revenues,* from the count of measures installed, the estimated savings per measure, and the lost revenues per kWh, in roughly the same manner as Entergy proposes. The establishment of a lost-revenue mechanism is conceptually simple, but dependent on many details of tracking the number of installations and estimating their effect on sales and revenues. Lost-revenue mechanisms were more widely employed in the 1990s, but have been replaced with decoupling in several jurisdictions.
- *Decoupling of revenues from sales,* by setting a revenue target, reconciling actual revenues to that target, and returning the difference to the customers or utility (depending on whether the utility over- or under-collects the revenue target). Decoupling, or rate stabilization, does not usually distin-

guish among the causes of these revenue deviations. Unlike lost-revenue mechanisms, decoupling mechanisms are generally straightforward to operate, but great care must be taken in the details of mechanism design.

Q: How do computations of lost revenues typically work?

A: The basic approach in computing lost revenues comprises the following steps, for each measure covered by an energy-efficiency program:

1. Count the number of measures installed under the program.
2. Estimate the annual sales effects of each measure.
3. Estimate the percentage of the savings that would have occurred without the program, and that thus do not reflect any program-related revenue loss.[1]
4. Estimate the extent of spillover from the program to non-participants.[2]
5. Determine the types of customers participating in the program, differentiated by rate class and by any other factors that affect lost revenues per kWh saved.
6. Compute when the savings from each measure would start, given both the installation schedule and any seasonality of the affected load (e.g., space-heating efficiency measures installed in May do not save much energy until the following November).
7. Determine the lost contribution to fixed charges, in cents per kWh, for each group of customers. This computation requires determination of the

[1]The participants who would have invested in efficiency without the program are often called "free riders." That terminology incorrectly suggests that they are somehow getting a better deal than other participants.

[2]Examples of spillover would include installations that occur because engineers, architects and contractors come to habitually specify efficient equipment, or because efficient equipment becomes the standard equipment stocked in warehouses and stores and is hence easier to find and less expensive than inefficient equipment.

customer's bill saving per kWh saved, net of any short-run savings to the utility and net of any costs that will be reallocated through reconciliation mechanisms.

8. Compute the resulting lost contribution to fixed cost as the product of the kWh savings and the lost contribution per kWh, by class.

Q: How would a revenue-stabilization mechanism operate?

A: A revenue-stabilization or decoupling mechanism would compare actual revenues to a target revenue level, and adjust rates to flow the difference to EAI or its customers. Revenue decoupling is a simpler variant of the return-on-equity band adjustment proposed by EAI as part of the FRP.

Q: Would a revenue-stabilization mechanism have any advantages compared to a lost-revenue mechanism of the type proposed by EAI?

A: Yes, at least three. First, a revenue-stabilization mechanism would eliminate any weather-related over- and under-collections, stabilizing bills for customers and revenues for EAI. After a particularly hot summer or cold winter, when electric bills have strained customers' budgets, customers would receive rate reductions offsetting the non-fuel part of the increased cost. After particularly mild weather, when customer bills and Entergy earnings would tend to be lower than normal, customers would give up some of those benefits and Entergy earnings would rise toward normal.

Second, the projection of sales in a rate proceeding would no longer be of great import. Were the forecast overstated, the revenue-stabilization charge would increase; if understated, the charge would decrease and perhaps even become negative. Reducing the weight of the sales forecast in rate proceedings should reduce the cost and burden for EAI, the Commission Staff, the Attorney General, and other parties.

Third, lost-revenue adjustments also generally cannot account for savings resulting from EAI's role in encouraging or supporting efforts there is difficulty measuring the savings or allocating a specific share to EAI. Examples would include providing information and other indirect support for energy-efficiency investments, as well as the effects of market-transformation efforts, governmental codes and standards, and other programs. A revenue-stabilization mechanism does not differentiate among the possible reasons for differences between target and actual revenues, and hence would protect EAI's revenues from the effect of all sorts of efficiency programs, regardless of who administers those programs.

Q: Would a revenue-decoupling mechanism have any disadvantage compared to a lost-revenue mechanism?

A: The major potential disadvantage of a revenue-decoupling mechanism is that, unless otherwise specified, it trues up revenues for all variations in sales, including economic cycles. Thus, in an economic downturn, a revenue-decoupling mechanism would protect the utility shareholders from economic conditions, when almost everyone else—households, businesses, state and local governments—is suffering.[3] This would often be viewed as unfair. Hence, some modification of decoupling in the event of serious economic disruption is probably justified.

Q: What is Entergy's stated goal in proposing the Lost Contribution to Fixed Costs (LCFC)?

A: Entergy says that it wants to recover "actual lost contribution to fixed costs" resulting from its DSM programs (Castleberry, p. 21; Washington, p. 11).

[3]Entergy's proposed true-up for return on equity would have a similar effect.

Q: Would EAI's proposed LCFC achieve that goal with sufficient accuracy?

A: Probably not. The formula Entergy proposes—the product of the lost contribution rate (LCR) per kWh multiplied by the deemed energy savings actually achieved during the period—would not match actual lost revenues for three reasons:

- the difference between deemed and actual savings,
- oversimplication of the lost contribution rate, and
- the possibility of double counting.

A. Deemed Savings

Q: What energy savings does EAI propose to use in the LCFC?

A: According to EAI Witness Castleberry,

> The estimate of the lost contribution to fixed costs for each Evaluation Period would be the product of the Company's lost contribution rate ("LCR") per kWh multiplied by the deemed energy savings estimated to occur in the period. The actual lost contributions to fixed cost for the projected Evaluation Period would be trued-up in the subsequent year's filing. The true-up would compare the actual lost contribution to fixed costs calculated as the product of the Company's LCR per kWh multiplied by the deemed energy savings actually achieved during the period to the estimated amount.
>
> The deemed energy savings utilized in the calculations would be based on the list of energy efficiency measure savings in kWh included in EAI's energy efficiency program plans that have been approved by the Commission in Docket No. 07-085-TF. In instances where a measure of deemed savings is not on the list, industry standard evaluation, measurement and validation protocols will be used to estimate the energy savings. (Castleberry, p. 21)

In other words, if a deemed savings value has been established for a measure, EAI would claim savings at the deemed level. For other measures, including custom measures for large customers, EAI would use the best available

data. The deemed savings would be used both for forecasting lost revenues and in the subsequent reconciliation.[4]

Q: What are these deemed savings?

A: The initial deemed savings were filed by the utilities in Docket No. 07-152-TF, including the following reports:

- Arkansas Deemed Savings Quick-Start Programs Commercial Measures, Final Report, Nexant, November 16 2007 ("Nexant");
- Residential Deemed Savings, Installation & Efficiency Standards, Arkansas Statewide Quick-Start Programs, Frontier Associates, January 11 2008 ("Frontier").

Those deemed energy savings are the estimates used in designing a program, projecting savings, and estimating cost-effectiveness. They are not the best estimate of energy savings after the fact.

Q: Are deemed savings appropriate for use in estimating lost revenues?

A: Not in all cases. The deemed savings are tools for screening and planning, and may be reasonable sources of forecasts for lost revenues. Some of the deemed-savings estimates are structured in a manner suitable for estimating actual savings, after the fact, and reconciling lost revenues, but in many cases the deemed-savings estimates will not be the best estimate of savings after the fact.

Q: How are the deemed savings expressed and how are they used for their intended purposes?

A: Those a priori estimates are often stated per application (per house, per commercial customer, per appliance replaced). They are based on guesses borrowed

[4]The use of the deemed savings "utilized in developing the Company's energy efficiency plan" for both projection and reconciliation of lost revenues is also specified in EAI's proposed tariff language, in Appendix G of the FRP (EAI Exhibit ODW-1, p. 18).

from other jurisdiction (with different energy prices, building codes, climates, and DSM incentives) regarding the size of the equipment installed, the size of the load (e.g., the house, room, or building receiving the measure), the pre-DSM efficiency and the post-DSM efficiency, annual hours of use, and other factors. Deemed savings estimates may be sufficient estimates of total program savings for planning purposes, and in many cases for cost-effectiveness screening, as well. In some programs, such as a point-of-sale lighting rebate, either the measure (e.g., a rebate on a 20W compact fluorescent lamp) is offered or not; if it is included in the program, the savings will be determined by the conditions (e.g., hours of use) of the average fixture that the average participant puts in it.

However, in other measures screening must look beyond averages and consider whether measures that pass on average (e.g., for lights used eight hours daily) also pass under less favorable circumstances (a closet lamp used only a few minutes daily), and whether measures that would fail on average would pass if directed to particularly favorable situations (e.g., lighting on all the time).

Q: What is the problem with extending the deemed savings from their uses in screening and planning to the after-the-fact estimation of lost revenues?

A: The actual installations achieved by any particular measure in a particular year can vary widely from those assumed for the typical deemed savings.

The actual mix of participating installations may differ from the a priori assumptions, as the following examples illustrate:

- The deemed savings currently filed in Arkansas assume that existing commercial cooling equipment would have continued in place, and compute savings from the "efficiency of the existing cooling equipment"

(Nexant p. 2-24).[5] Many actual replacements will be after failure, or close to failure, so the actual lost revenues are more like the difference from standard new equipment to efficient new equipment. This is particularly true if the customer incentives or rebates are based on the cost difference between new efficient and standard equipment, since the incremental initial cost of replacing a working unit are much greater. In that case, the difference at issue would be (1) the full cost of the efficient unit, not just the increment for efficiency, plus (2) the full installation cost for properly installing an efficient unit, not just the incremental cost over a standard installation for a standard unit.

Entergy's commercial cooling rebates are far too little to cause any early retirements.[6]

- Nexant (p. 2-27)) assumes each programmable thermostat saves 14,771 kWh, based on the assumption that it controls "a 10-ton HVAC unit with an efficiency of 1.3 kW/ton." Obviously, many programmable thermostats will control much less HVAC capacity, with higher or lower efficiencies. Some programmable thermostats will control baseboard heat or a fan unit in a single office or classroom, while others will control temperature for an entire floor or building.

[5]Where the efficiency of the existing equipment is "unavailable," as in new construction, the deemed savings would be computed from the minimum allowed efficiency for new units (Nexant p. 2-24). The corresponding residential deemed savings are computed from a baseline of a low-efficiency new unit. (Frontier, p. 10).

[6]The incentives may also be too little to cause any significant additional high-efficiency installations, in which case the free-ridership rate would be very high. The monitoring-and-evaluation process should determine the status of the replaced equipment, and hence the incremental savings from the program.

- Each occupancy sensor is assumed to save 30% of lighting energy, regardless of whether the space is usually unoccupied, or almost always occupied (Nexant p. 2-17).

The differences between the a priori deemed savings and ex ante estimates of savings per application can vary widely.

Q: Is it more important that savings estimates be precisely accurate for program design or for lost-revenue recovery?

A: Accuracy is much more important in lost-revenue recovery. In many cases, changing the assumed savings of a measure by a considerable margin would make no difference in program design. A measure with a benefit-cost ratio of 3.0 will remain cost-effective even were the estimate of its savings found to be overstated by 100%. For lost-revenue recovery, that same error of estimating savings at twice their actual value would result in EAI recovering twice its lost revenues, potentially millions of dollars across a DSM portfolio.

Q: What problems arise from the differences between deemed savings and ex ante estimates of savings?

A: Those problems produce problems with fairness, incentives, and gaming. The fairness problem arises because EAI may get much more (or less) back in lost revenues than it actually loses, and customers pay much less (or more) for fixed costs than without the DSM program.

The problem of incentives is even more serious than that of fairness. If EAI realizes that it will be overpaid for some installations, and underpaid for other installations, it will have an incentive to encourage participation by customers in the first group and discourage participation by customers in the second group. If lost-revenue recovery for a particular measure is apt to be less than the actual lost revenues, EAI would have an incentive to discourage implementation of that

measure, perhaps by imposing additional administrative burdens or reducing rebates.

The gaming problem is very similar to the incentive problem, but with a more active role by EAI. If EAI anticipates that it will be overpaid for some installations, and underpaid for other installations, it will have an incentive to steer the programs to the most profitable installations. For example, EAI can promote a program heavily to small customers, so they get a lot of deemed savings, but not much in real savings. Conversely, EAI managers will know that earnings will be hurt by really good projects that save a lot of energy in ways that do not show up in the deemed savings. That will encourage them to promote the options with high deemed and low actual savings.

Q: What is the solution to the problems raised by deemed savings?

A: The standard for estimating savings for lost-revenue recovery should be the best information available at the time EAI files its LCFC reconciliation. That information may be the same as the deemed savings, especially for those measures for which the deemed savings are computed based on the characteristics of installations. But the lost-revenue recovery should also reflect data available from the installation-tracking process and any other new information. The resulting recovery may be more or less than would been computed from the deemed savings. This important point is that the lost-revenue recovery should recover "*actual* lost contribution to fixed costs" (Castleberry, p. 21; Washington, p. 11; emphasis added).

Q: What actions are necessary to ensure availability of the information needed to estimate actual lost contribution to fixed costs?

A: In order for the lost-revenue mechanism to be effective, the tracking mechanism must record all the information necessary to estimate the incremental savings

attributable to the DSM programs, such as equipment size, existing equipment status, building size, and hours of use. In addition, monitoring, verification, and evaluation efforts must be sufficient to test and correct a range of other assumptions about the effectiveness of various measures and their interactions. Most of these efforts are important for other purposes—load forecasting, cost-effectiveness determination, improved program design—so the incremental costs of monitoring, verification, and evaluation to support lost-revenue recovery should not be substantial.[7]

B. Lost Contribution Rate

Q: How does EAI propose to estimate the lost-contribution rate?

A: EAI proposes to estimate the LCR per kWh for each rate class as all non-customer-charge revenues divided by the class sales.

Q: Is this approach appropriate?

A: No, for two reasons. First, Entergy appears to be proposing to compute the LCR for only three rate classes, each representing an average across multiple rate schedules. The three classes—residential, small general service, and large general service—are shown in Table 1 of EAI Witness Castleberry (p. 23). It is not clear to me how Entergy proposes to assign rate schedules (such as the agricultural schedules) to the large and small general service classes for these purposes, but I assume LPS, LGS, GST, and PST are all in the large general service class.

[7]Due to EAI's strong self-interest in the monitoring, verification, and evaluation process, that process should be directed by collaboration among EAI, the Attorney General, Audubon, and other consumer interests. (Whether the Commission's General Staff should be a participant or observer in this process is a policy issue for the Commission.)

In 2008, the two major groups within the residential rate class, regular and water-heating (referred to as schedules RS and RW in EAI's FERC Form 1), had non-customer-charge base revenues of 5.4¢/kWh and 4.7¢/kWh, respectively. The variation within the large general service class was even larger, as shown in Table 1.

Table 1: Large General Service Base Revenues per kWh

Rate Schedule	Cost (per kWh)
LGS TOU Interruptible	1.4¢
LPS TOU Interruptible	1.7¢
LGS Interruptible	1.9¢
LPS Interruptible	2.3¢
PST LPS TOU	2.5¢
GST LGS TOU	2.7¢
LPS Large Power Service	3.3¢
LGS Large General Service	3.4¢

Source: EAI FERC Form 1, 2008, p. 304

Second, the non-customer-charge revenue per kWh varies within each rate schedule, due to rate-design features. For instance, the residential rates include a declining-block energy charge in the winter, with the following results:

- Measures that affect only air conditioning will save energy mostly in the summer, at the higher first-block rate (5.944¢/kWh).
- Measures that affect only heating will save energy in the winter; for most customers, that energy will be priced mostly at the lower second-block rate (2.956¢/kWh) that applies to usage over 1,000 kWh/month.[8]
- Measures that affect sales in both summer and winter will save energy entirely at the first-block rate for most non-heating customers (since their winter use will be less than 1,000 kWh/month) and at the second-block rate

[8]Average residential monthly usage in 2008 was about 1,000 kWh, or 1,400 kWh for customers on the grandfathered water-heating rate.

for some winter months for many heating customers and some large non-heating customers.

Other rate-design features similarly cause the non-customer-charge revenue per kWh to vary, as follows:

- Seasonal rates for various large general-service rates similarly result in different lost revenues per kWh, for heating, cooling and baseload measures. The winter rates vary from 55% to 85% of the corresponding summer rates; see Table 2.[9]

Table 2: Seasonality in Large General-Service Rates

	Energy (per kWh)		**Demand** (per kW-month)		**Off-Peak Energy** (per kWh)		**Off-Peak Demand** (per kW-month)	
	Summer	*Winter*	*Summer*	*Winter*	*Summer*	*Winter*	*Summer*	*Winter*
LGS	1.934¢	1.376¢	$8.37	$7.09				
LPS	1.934¢	1.376¢	$8.11	$6.82				
GST	1.410¢	0.776¢	$11.49	$9.68	1.006¢	0.665¢	$3.38	$2.93
PST	1.410¢	0.776¢	$11.87	$10.00	1.006¢	0.665¢	$3.48	$3.02

- Seasonal rates also affect the average energy rates avoided by the sales reduction depending on measure installation dates, even for baseload measures that save about the same amount of energy and billing demand in each month. Since the FRP year is July 1 through June 30, baseload measures installed in the early part of the year (e.g., July) would save a mix of one-third summer and two-thirds winter energy and demand, while saving from measures installed in October would be one ninth at summer rates (in June) and eight-ninths at winter rates, and those installed in May would save half at winter rates and half at summer rates.
- The time-of-use rates also introduce large differences in rates among measures, depending on the timing of savings. Efficiency measures for

[9]For the time-of-use rates, the on-peak rates are reported in the "Energy" and "Demand" columns.

outdoor lighting, as well as set-back thermostats and occupancy sensors will save mostly off-peak energy, while office daylighting controls and chiller efficiency improvements will tend to reduce energy use primarily in the peak period. The general-service off-peak energy rates are 71% in summer and 86% in winter; the off-peak capacity rates (which may not be avoided by off-peak savings) are 30% of the on-peak rates.

- Demand charges exacerbate the dispersion of lost contributions by time-of-use rates, and introduce similar differences for non-time-of-use rate schedules. For example, for summer measures on the LGS rate, demand charges would have the following effects:
  - A measure that does not reduce the customer's maximum billing demand (such as outdoor lighting or an economizer cycle on cooling equipment) would reduce base revenues by 1.9¢/kWh,
  - A totally baseload measure (such as exit lighting) would reduce revenues by 3.1¢/kWh,
  - A measure that avoids one kW of billing demand per 300 kWh of savings would reduce revenues by 4.7¢/kWh, and
  - A measure that avoids one kW of billing demand per 150 kWh of savings would reduce revenues by 7.5¢/kWh.
- The SGS schedule includes both a demand charge and an energy charge that is 3.8¢/kWh for the first 150 kWh per kW of billing demand (150 hours of demand usage), and 2.6¢/kWh for higher energy use. Most customers appear to have some usage in the second block (MFR Schedule H-3 shows no typical bills below about 180 hours usage), so measures that do not affect billing demand will mostly avoid sales at the lower 2.6¢/kWh rate. Measures that reduce billing demand will reduce the demand charge (at $2.94/kW-month) and shift 150 kWh/kW from the lower second block to

the higher first block (increasing the customer's bill by $1.67/kW-month). The revenues avoided would be about $2.9¢/kWh for baseload measures, 3.5¢/kWh for a measure with 200 hours use (close to the class average), and 4.3¢/kWh for a measure with 100 hours use.

Q: What is the significance of these variations in lost revenues across measures, customers, and rate schedules?

A: Again, these problems raise issues about fairness, incentives, and gaming, just as do the problems with deemed savings. Under EAI's approach of using a single LCR for an entire customer class, EAI would have incentives to take the following actions:

- promote savings for the lower-rate schedules and customers within the class and discourage participation by other customers within the class,
- promote off-peak and winter energy savings, which will typically result in lost revenue below the average non-customer-charge revenue for the class,
- discourage on-peak and summer savings, which will typically result in lost revenue above the average non-customer-charge revenue for the class.

Q: What is the solution to the problems raised by the range of LCR within a rate class?

A: The problems are easily solved by better information and a few more computations. Entergy should track participation by rate schedule. For each rate schedule, EAI should estimate the lost revenues for each type of measure. At a minimum, that computation should include at least heating, cooling and baseload measures. Depending on the rate schedule (and the DSM measures applicable to the customers on that schedule), it may be appropriate to further distinguish among measures (e.g., economizers, outdoor lighting) or subsets of customers on the rate schedule (e.g., SGS customers under 6 kW).

C. Double-counting

Q: What is the double-counting problem to which you refer?

A: It appears from the FRP proposal (EAI Exhibit ODW-1) that EAI proposes to exclude the LCFC from the ROE bandwidth computation. This point shows up in at least three places in the FRP:

- The "Lost Contribution to Fixed Costs for the next 12 month period…will be reflected in Rider FRP outside the ROE Bandwidth ..." (EAI Exhibit ODW-1, p. 7, §44.6.3.D(1))
- "The … revenue … effects associated with any riders or other rate mechanisms EAI may have in effect during the Evaluation Period which recover specific costs are to be eliminated" from the computation of earned ROE (EAI Exhibit ODW-1, p. 13, Attachment C, §1.B).
- The revenue effects associated with the "Energy Efficiency Lost Contribution to Fixed Costs and Shared Savings Mechanism as per §44.6.3.D.... that EAI may have in effect during the Evaluation Period are to be eliminated" (EAI Exhibit ODW-1, p. 14, Attachment C, §§4.B and C).[10]

This could result in the same sales reduction being recovered twice, once as lost revenues and once as an ROE shortfall.

Q: Please provide an example of that double-counting.

A: If EAI's equity return (not counting the LCFC revenues) falls $1 million below the lower ROE band, and the LCFC revenues are $3 million, EAI's proposed FRP would appear to raise revenue by (1) about $1.7 million (including the revenue conversion factor) to bring revenues to the lower band, (2) another $6 million or

[10]I have merged the text of these two items for clarity.

so to bring the return to the allowed level,[11] and (3) about $3 million for the LCFC, for a total of nearly $11 million. If the DSM had not occurred, revenues would have been about $3 million higher, EAI's equity income would have been within the ROE dead band, and no other adjustment would occur. Thus, EAI would wind up with revenues $3 million higher than required to earn its allowed ROE.

Q: How can this problem be avoided?

A: The simplest approach would be to compute the ROE including the actual revenues from the LCFC, plus the LCFC reconciliation to be collected in the next year.

IV. Shareholder Shared-Savings Incentive

A. The Purpose of Shareholder Incentives for Demand-Side Management

Q: What is EAI's justification of shareholder incentives for DSM?

A: At least three EAI witnesses argue that an incentive is necessary to compensate EAI for some sort of asymmetry in the recovery of costs that makes generation more advantageous than DSM, from the perspective of EAI shareholders.

> [The] barriers or disincentives that discourage additional electric utility investment in energy efficiency resources [include] the lack of opportunity to earn a comparable return on energy efficiency programs as would be available with the investment in additional generating resources …. The Formula Rate Plan would provide … the Company an earnings opportunity on its investment in energy efficiency comparable to the earnings that would be available from an investment in additional generating resources .... (McDonald, pp. 28–29)

[11] I estimated this value from equity of $1,456 million (MFR Schedule D-1(a), p. 1), the 0.25% band proposed by EAI, and a 1.7 revenue conversion factor.

> Traditional rate regulation presents several bafflers or disincentives that discourage electric utility investment in energy efficiency resources. These include … the lack of an earnings opportunity adequate to earn a comparable return on energy efficiency programs compared to other utility investment in generating resources .... (Castleberry, p. 8)

> The recovery of incremental program expenses plus the return of and on the relatively minor capital costs needed to support energy efficiency … does not allow the Company to earn a similar return, in terms of the potential earnings opportunity available from its investment in the energy efficiency programs as compared to the potential earnings available from an investment in additional generation resources. (Castleberry, p. 12)

> investments in energy efficiency do not offer returns comparable to those in traditional investments in generation. To prevent the Company from being penalized with lower earnings as the result of their investment in lower cost energy efficiency programs, Rider FRP includes a shared savings mechanism for Commission-approved energy efficiency programs. (Makholm, p. 14)

Q: Are the EAI witnesses correct about the rational for shareholder incentives?

A: No. Entergy would earn exactly the same return on an *investment* in energy efficiency as it does for traditional investments in generation, transmission, or distribution.[12] However, EAI is not investing significantly in energy efficiency; almost all of the costs are expensed and recovered quite quickly. Hence, there is no asymmetry in the treatment of DSM and supply under traditional ratemaking. Entergy does not earn a return on DSM expenses or on its other expenses: fuel, purchased power, labor, and purchased services.

Q: If EAI can charge customers a return on generation, transmission or distribution investments, but not for its expenditures on DSM, are Entergy shareholders better off with the supply alternative?

[12]The EAI witnesses refer only to generation. In reality, DSM also avoids transmission and distribution investment.

A: Not if the Commission has set the allowed return on equity at the cost of that equity. In this docket, EAI Witness Samuel Hadaway (p. 46) estimates that the cost of equity for EAI is 11.5%. This is the value that EAI uses in computing its required rate of return (MFR Schedule D-1-(a)). Dr. Hadaway explains that his estimate of the cost of equity is intended to be only the cost of attracting capital:

> the appropriate ROE is determined by reviewing capital market data and comparing the risks and rates of return available from other investments. Through ROE, utility investors should receive the same level of profit they could get from other investments of similar risk. By providing the same return as expected on similar investments, ROE is a fair rate of return to investors, and it ensures that utility customers pay no more than is necessary to attract required capital. (Hadaway, p. 5)

In other words, existing shareholders make no profit on the additional investment, since the additional earnings built into rates are required to pay the additional shareholders for the additional equity required by the investment. The additional shareholders do not get any windfall either, since they "receive the same level of profit they could get from other investments of similar risk."

Q: Can you provide a mathematical illustration of this point?

A: Yes. Suppose EAI invests $100 million in new supply facilities, of which $50 million is financed with equity. Assuming for the purpose of illustration that the Commission finds that the cost of equity is 11%, rates would be set to provide shareholders with an additional $50 million × 11% = $5.5 million annually.[13] That $5.5 million would be the cost of getting shareholders to invest the additional $50 million in equity, so there is nothing left from the $5.5 million to benefit the existing customers. Those new investors would get about the same return they would have gotten from other similar investments, and are no better

[13]Rates would also be raised to cover the income taxes on the equity return.

off than they would have been if Entergy had not invested in the supply facilities.

Q: Do regulators apply the same reasoning to other expenses?

A: No. Following EAI's reasoning, the Commission should also give EAI an incentive for other expense activities that avoid investments, such as maintenance of equipment to extend its life, renting office space (as opposed to buying), contracting for wholesale power purchases, or buying gas combined-cycle plants (with low capital investment and high fuel costs) rather than building new coal plants (with high capital investment and low fuel costs).

I do not know of any regulator that attempts to compensate utilities for spending money as expenses rather than investments.

Q: Is there a justification for shareholder incentives?

A: Yes. While not justified to maintain a return to shareholders, incentives may be necessary to promote real and sometimes difficult shifts in organizational culture and practice. For instance, utilities may resist aggressive utility investment in DSM due to inertia, distraction by more-traditional organizational priorities, lack of positive experience with aggressive DSM, inadequate expertise, and even a perception that it energy efficiency may conflict with legitimate corporate goals. Senior utility management is more familiar with supply planning than with demand planning, and supply advocates tend to be more powerful within the organization than are the demand-side advocates.[14] Senior managers are often professionally trained in power-plant construction and operation, and may be more interested in building plants and retaining a first-rate construction department than building a center of excellence in DSM. Staff

[14]I understand that EAI has only one full-time DSM employee.

members who have spent their entire lives encouraging the use of electricity may have difficulty adapting to a policy of discouraging its use. In particular, utilities are used to evaluating their performance and competitiveness by tracking rates in cents per kWh; employees with that perspective may have a hard time believing that DSM (even with favorable recovery of costs and lost revenues) will not harm their company.[15]

In addition, utility management may prefer higher sales, since a larger and faster-growing company is more exciting to manage. The growing company will present more opportunities for hiring and promoting staff, making dramatic decisions about expansion projects, and being feted by investment banks and equipment suppliers. For particular groups within utility management, such as power-plant and transmission planners, the reduction in the need for and importance of their services may be threatening.

It is this combination of inertia and the very real self-interest of utility management that creates the need for some incentive to overcome internal resistance to energy efficiency. Even if the lost-revenue mechanism or decoupling would create a level playing field in objective financial terms, an explicit incentive might be necessary to balance the inertia of history and managerial psychology.

B. Entergy's Shared-Savings Proposal

Q: Please describe EAI's proposed shared-savings incentive.

[15]Some utility managers may also believe the assertions of EAI Witnesses Castleberry and Makholm that DSM harms shareholders, and hence their own prospects. This is yet another barrier to DSM implementation.

A: The Energy Efficiency Shared Savings Mechanism is described in the FRP (EAI Exhibit ODW-1, p. 19, Attachment H). EAI is asking for 10% of the difference between (1) the present value of deemed savings times avoided costs over the life of the deemed life of the measures, and (2) the utility costs of the DSM program.

These computations would not be conducted for the same program year ("Evaluation Period") used for the costs and lost revenues, but for "the calendar year immediately preceding the Evaluation Period." The filing in October 2013 would include costs and lost revenues for the period July 2012–June 2013, but incentives for 2011.[16]

Q: What is your reaction to this approach?

A: Offering the utility a share of the savings resulting from their energy-efficiency programs is a reasonable approach to shifting corporate culture towards implementation of energy-efficiency resources. Variants on this general approach have been used in other jurisdictions; Arkansas can build on that experience to improve on past efforts and on Entergy's initial proposal.

Q: Do you have any specific concerns about the mechanism proposed by Entergy?

A: I have immediate concerns about the following four aspects of this approach:

- the use of deemed savings and deemed lives,
- the exclusion of the costs incurred by participants in the DSM programs,
- the method for setting avoided costs,

[16]Since the incentive will not be in place until the end of this proceeding, well into 2010, I assume that 2011 would be the first calendar year for which incentives would be recovered. There is no point in providing incentives for actions that the incentive could not affect, because the utility did not know that it would be eligible for the incentive at the time.

- the structure of the incentive, specifically lack of penalties for inadequate results and the payment of incentives from the first dollar of savings.

In addition, any incentive mechanism developed in this proceeding should be considered to be an interim mechanism, and the interested parties should work together on developing a more sophisticated mechanism over the first year following the Commission's order in this case. The updating of the incentive mechanism can implemented in a subsequent phase of this docket, in a docket the Commission may establish for that purpose, or in one of the existing dockets, such as Docket No. 08-144-U.

C. Deemed Savings

Q: What are your concerns about the use of deemed savings in computation of shareholder incentives?

A: The issues parallel those raised by the use of deemed savings in computing lost revenues. Incentives should be based on the best available information, not on values previously selected for some other purpose.

Q: Should the measure of savings for incentives be the same as that used in the LCFC?

A: Not necessarily. Unlike the LCFC, incentives should use the best information available at the time the utility is implementing the program. The purpose of the incentive is to encourage EAI to strive to do more of the things that are identified as contributing to the objectives set out by the Commission. For the incentive to be effective, and not frustrate or confuse utility management, EAI must have a fairly clear idea of the incentives related to various levels of activity. If a particular measure appears to have net benefits of $500 per installation at the time that EAI is committing to the installations, EAI should be able to count on

that value in estimating the incentive it will earn. Changing the assumptions after the fact is likely to give inconsistent signals and undermine the relationship between achievements and rewards.

Q: Do you recommend that the assumptions used in computing incentives remain fixed for the entire DSM plan, or for an entire year?

A: No. Management should implement the DSM plan on the basis of the best available information from time to time during the plan implementation period. As soon as new information becomes available, the incentives for future commitments should be based on the improved information, and EAI (working with other interested parties) should determine whether any modifications to the program are appropriate.

Nor should EAI be allowed to insulate itself from new information. There must be mechanisms—a vigorous consultative process would be perfect—for stakeholders to provide EAI with evidence that an assumption is wrong. The utility should retain the responsibility for determining how to review the evidence and whether to change its assumptions. If EAI does not respond appropriately to the evidence (seriously reviewing it and revising assumptions as appropriate), EAI should be at risk for disallowance of incentives that depend on the unexamined assumptions. In addition, EAI should be at risk for expenditures that appeared to be cost-effective with the utility inputs, but not with ex-post estimates that correspond to the ignored suggestions.

D. Treatment of Participant Costs

Q: How does EAI propose to treat participant costs in the computation of the incentive?

A: Entergy proposes to base the shared-savings incentives on the difference between benefits and utility costs, ignoring the participant costs. That will overstate the true net benefits and give EAI more than 10% of the net benefit.

Q: Does the exclusion of participant costs have any incentive effects?

A: Yes, in three ways. First, the incentive mechanism would cause EAI to prefer programs and measures in which participants pay more of the costs over those in which EAI pays more of the costs, even if the latter are preferable in all other dimensions: saving more energy, saving higher-cost energy, saving more capacity, producing greater net benefits, reaching hard-to-serve markets, and whatever other objectives the Commission sets.

Second, within each program, EAI would have an incentive to reduce its expenditure per measure, even if it costs the participant $2 or $10 to do what would cost EAI $1. This effect is likely to be most important in choices between direct installation and rebates for residential and small commercial customers; the utility direct-installation contractor may be able to charge much less than a third-party contractor, who must price and bid on several jobs for each actual project and deal with billing and collection problems. Hence, the third-party contractor is likely to charge more (potentially much more) than the contractor working directly for the utility.

Third, EAI would have an incentive to reduce its share of the cost of a measure, even if that results in a substantial reduction in participation. Table 3 illustrates this problem. The example assumes (realistically) that participation rises as EAI pays more of the cost of the measure and the participants pay less. As the EAI share of the measure cost rises, TRC net benefits rise (due to increased participation) but the measure of benefits that EAI proposes to use in computing

the incentive falls. Hence, if EAI did the right thing for its customers, its incentive would suffer.

Table 3: Participation and Incentives
$40 Avoided Costs

		Measure Costs		Unit Net Benefit		Total Net Benefit	
Case	**Participants**	*EAI*	*Participant*	*TRC*	*EAI[a]*	*TRC*	*EAI[a]*
1	11,000	$5	$15	$20	$35	$220,000	$385,000
2	14,000	$15	$5	$20	$25	$280,000	$350,000
3	17,000	$20	$0	$20	$20	$340,000	$340,000

[a]proposed.

E. Avoided Costs

Q: What is your concern about the setting of avoided costs for the purpose of computing incentives?

A: The FRP describes the avoided costs to be used in the incentive computation as follows:

> Based on the market price of energy during each year that savings were achieved from energy efficiency measures installed during the calendar year immediately preceding the Evaluation Period. The Avoided Energy Cost Rate ($ per MWh) values are used in the cost-benefit tests that are required as part of EAI's energy efficiency programs that are filed each year in Docket No. 07-085-TF. (EAI Exhibit ODW-1, p. 19, Attachment H, Note 6)

There are two definitions in this note. The first says that the avoided cost will be "based on the market price of energy during each year that savings were achieved from energy efficiency measures." This definition appears to refer in the past tense to actual historical market prices. Since these prices will only be known over the period that savings are achieved, it is not clear how they could be used in the front-loaded incentive mechanism that EAI seems to be proposing.

The second definition says that the "Avoided Energy Cost Rate values are used in the cost-benefit tests that are required as part of EAI's energy efficiency

programs that are filed each year in Docket No. 07-085-TF." This appears to leave the avoided-cost computation to EAI's discretion.[17]

Q: How might this problem be resolved?

A: The avoided costs used in the incentive computation should be those approved the Commission at the time that EAI is planning and implementing the DSM programs.

F. Incentive Structure

Q: On what aspects of EAI's proposed incentive structure do you have comments?

A: I am concerned about three aspects of the incentive structure: the linearity of EAI's proposed incentive, from zero benefits to 30% of program costs; the relationship between incentives and program spending; and the limitation of the incentive to net benefits.[18]

Q: What is the problem with the linearity of EAI's proposed incentive?

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[17]As an example of how that discretion might be abused, EAI Exhibit KWC-1 reports avoided capacity costs of $104.73/kW-year for 2010–2026, described as "the levelized annual value based on the cost to install capacity in 2010." Since there is a substantial capacity surplus in Entergy and surrounding areas, and since existing modern generators are selling at prices well below the cost of similar new generation, the starting price is clearly too high. In addition, EAI applies that levelized cost to a non-levelized and rapidly-declining load reduction, overstating the overall value of the load reduction. The avoided generation capacity cost should be based on market costs in the near term, followed by a real-levelized cost of new peakers once new capacity is required. (If the expected costs of any planned generation-resource acquisition exceeds the total generation avoided costs, either the acquisition is uneconomic or the market prices have been underestimated, perhaps by ignoring the cost of securing firm prices). On the other hand, EAI has ignored avoided T&D costs.

[18]As noted above, EAI uses the wrong definition of net benefits.

A: Entergy notes that incentives should reward exemplary performance (Castleberry, p. 16), but asks for 10% of its exaggerated version of net benefits from the first dollar of net benefits. Incentives should start once EAI has achieved a substantial amount of savings or benefits. That threshold should be based on what other utilities have achieved, taking into account the ramp-up required to get to full DSM implementation. In various states, these thresholds have been set at 70% to 100% of savings targets.

Q: How should the Commission set the threshold for EAI's incentive?

A: The threshold should be set in conjunction with the definition of "comprehensive" programs and savings goals and targets to be set in the Sustainable Energy Resources Docket No. 08-144-U. Once the annual targets are set, the Commission should set the incentive threshold. The more aggressive the goals and targets, the lower the thresholds can be as a percentage of those targets.

Entergy should also be exposed to penalties for performance below a threshold, which may be lower than the threshold for earning incentives. Again, the appropriate penalty threshold and penalty rate should be set to be consistent with the goals and targets.

Q: Once EAI's performance reaches the threshold, what should happen with the incentive?

A: Entergy should be eligible for incentives in proportion to the estimated performance minus the threshold. In other words, if the incentive rate is 10%, the estimated benefits are $10 million and the threshold is $8 million, the incentive should be ($10–$8) × 0.1 = $0.2 million.

Q: Are EAI's proposed incentives reasonable, compared to program spending?

A: No. EAI requests that it be allowed to earn incentives up to 30% of its program expenditures. In the incentive example in EAI Exhibit KWC-1, the 2010

incentive is about 22% of total program costs. Most incentive schemes provide for much smaller incentives as a percentage of program costs, such as the following examples:

- Arizona: 10%
- Colorado: 20% for lost-revenue compensation plus incentive[19]
- Connecticut: 8% (at 130% of goal)
- Massachusetts: 5%
- New Hampshire: 8%–12%
- Texas: 20%
- Vermont: 2.6%

Considering that Connecticut, Vermont, and Massachusetts are some of the leading jurisdictions in energy efficiency, there does not appear to be any need for incentives to exceed 10% of program spending, and much less is probably adequate.

Q: What is your concern with the limitation of EAI's proposed incentive to net benefits?

A: If properly computed, net TRC benefits are an important measure of the success of a DSM program. Unfortunately, exclusive focus on maximizing TRC benefits, especially in the short term, can result in the utility concentrating almost excessively on a small subset of programs and measures that are easy to implement and produce high TRC benefits, primarily lighting retrofits for large commercial customers and sometimes residential screw-in compact fluor-

[19]At EAI's current levels of spending of about $5 million annually (Entergy Arkansas, Inc. Energy Efficiency Quick Start Programs 2008 Program Year Annual Report, p. 39) and lost revenues of about $1 million annually (Castleberry Direct, p. 10), this cap would exclude any incentive for EAI.

escents.[20] To prevent excessive concentration of effort in these narrow market segments, various jurisdictions have moved beyond shared savings to base incentive mechanisms at least partly on such factors as the following:

- Achievement of minimum savings levels in various customer classes, such as residential and non-residential.
- Savings achieved in hard-to-reach market segments, such as low-income residential and small general-service customers.[21]
- Energy- and demand-reduction goals.
- Geographical equity in program implementation.
- Weighted average measure life.
- Achievements in new construction, training, and other market-transformation activities.

These factors can be accommodated as separate incentives, or as thresholds or modifiers to a shared-savings mechanism. Development of complex incentive mechanisms is best accomplished through a collaborative process among the concerned parties, rather than in litigation.

Q: Does this conclude your testimony?

A: Yes.

[20]These measures are valuable, but relatively short-lived; the programs are also time-limited, as Federal efficiency standards phase out standard incandescent lamps and the linear fluorescents now standard in commercial installations.

[21]It may also be appropriate to include an incentive for efficiency improvements for industrial customers, who often require more complicated customized solutions, compared to comparable-sized commercial customers.