

STATE OF ILLINOIS
ILLINOIS COMMERCE COMMISSION

CENTRAL ILLINOIS LIGHT COMPANY)
d/b/a AmerenCILCO)
CENTRAL ILLINOIS PUBLIC SERVICE COMPANY)
d/b/a AmerenCIPS)
ILLINOIS POWER COMPANY)
d/b/a AmerenIP)
Approval of the Energy Efficiency and)
Demand-Response Plan.)

Docket No. 07 - 0539

Direct Testimony of
Philip H. Mosenthal
On Behalf of
The People of the State of Illinois

December 14, 2007

OFFICIAL FILE

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1 **I. Identification and Qualifications**

2 **Q. Please state your name and business address.**

3 A. Philip H. Mosenthal, 14 School Street, Bristol, VT 05443.

4 **Q. On whose behalf are you testifying?**

5 A. I am testifying on behalf of the People of the State of Illinois.

6 **Q. By whom are you employed and in what capacity?**

7 A. I am the founding partner in Optimal Energy, Inc., a consultancy
8 specializing in energy efficiency and utility planning. Optimal Energy advises
9 numerous parties including utilities, non-utility program administrators,
10 government and environmental groups.

11 **Q. Please provide a summary of your qualifications and experience.**

12 A. I have 24 years of experience in all aspects of energy efficiency, including
13 facility energy management, policy development and research, integrated resource
14 planning, cost-benefit analysis, and efficiency and renewable program design,
15 implementation and evaluation. I have developed numerous utility efficiency plans,
16 and designed and evaluated utility and non-utility residential, commercial and
17 industrial energy efficiency programs throughout North America, Europe and
18 China.

19 I have also completed or directed numerous studies of efficiency potential
20 and economics in many locations, including China, Colorado, Kansas, Maine,
21 Massachusetts, Michigan, New England, New Jersey, New York, Quebec, Texas,
22 and Vermont. These studies ranged from high level assessments to extremely
23 detailed, bottom-up assessments evaluating thousands of measures among
24 numerous market segments. Recent examples of the latter are analyses of electric
25 and natural gas efficiency and renewable potential along with development of

1 suggested programs for New York State, on behalf of the New York State Energy
2 Research and Development Authority (NYSERDA).

3 Beginning in 1998 I led development of commercial and industrial
4 programs for the Long Island Power Authority (LIPA). I continue to advise LIPA
5 on program design, planning and implementation issues, and have recently been
6 involved in assessment of the achievable electric potential from an expanded
7 portfolio of electric and gas efficiency programs on Long Island.

8 I was the chief architect and developer of the nation's first "energy
9 efficiency utility," Efficiency Vermont, in the late 1990s, including all planning,
10 program design and analysis, and testimony. I am currently a lead advisor for
11 business energy services at Efficiency Vermont. I also currently advise non-utility
12 parties in the Massachusetts Collaborative on commercial and industrial efficiency
13 planning, program design and evaluation issues, working closely with the utility
14 program administrators in that state.

15 Prior to co-founding Optimal Energy in 1996, I was the Chief Consultant
16 for the Mid-Atlantic Region for XENERGY, INC. (now KEMA). I have a *B.A.* in
17 Architecture and an *M.S.* in Energy Management and Policy, both from the
18 University of Pennsylvania.

19 **Q. Have you previously testified before the Illinois Commerce Commission ("the**
20 **Commission" or "ICC")?**

21 **A. No.**

22

23

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25

1 **II. Introduction and Summary of Testimony**

2 **Q. What is the purpose of your testimony in this proceeding?**

3 A. My testimony assesses the 2008 – 2010 Energy Efficiency Plans filed by
4 Commonwealth Edison (ComEd), the Ameren Illinois utilities (collectively
5 AmerenCILCO, AmerenCIPS and AmerenIP), and the Illinois Department of
6 Community Economic Opportunity (DCEO). My testimony focuses on the
7 following:

- 8 1. The need for an effective independent collaborative process that includes all
9 relevant stakeholders to resolve program design, implementation and
10 evaluation issues and monitor and verify performance.
- 11 2. The portfolio of proposed programs, and the need to effectively coordinate
12 between three program administrators and potentially multiple
13 implementation contractors.
- 14 3. Monitoring and evaluation, including the issue of deeming savings.
- 15 4. Rate impacts and spending caps.
- 16 5. The use of “banking” efficiency savings in excess of goals in one year to
17 reduce the future year’s goals.

18 **Q. Please summarize your testimony.**

19 A. First, I conclude that ComEd, Ameren and DCEO (collectively the Program
20 Administrators or “PAs”) have done a thorough job, using an appropriate planning
21 process, to develop their plans. Overall, the portfolio is a reasonable start, and
22 provides a platform to develop a comprehensive set of effective programs.
23 However, I do have some concerns with the plans in terms of their ability to
24 provide consistent and coordinated initiatives statewide, the allocation of resources

1 across programs, as well as some of the program design details and administrative
2 strategies.

3 Second, the success or failure of the PAs will depend heavily on the many
4 detailed decisions that need to be made to flesh out the program designs and
5 implement them. As the PAs have suggested, engaging other stakeholders in a
6 collaborative process is important. Such a collaborative should be structured as an
7 independent, effective and on-going forum for addressing these program details, as
8 well as for addressing monitoring and evaluation (M&E) issues. While I comment
9 on some of the programs designs as presented in the plan, I believe it is appropriate
10 for the ICC to allow program design issues to be worked out through a
11 collaborative process that commences when this docket closes. As such, I do not
12 offer a comprehensive critique of all the program details, nor do I comprehensively
13 review the measure and savings related issues because I would defer to a
14 collaborative process to work out these issues in greater detail.

15 Third, the PAs' desire to minimize their performance risk inappropriately
16 puts too much of the performance risk on ratepayers. The Illinois Power Agency
17 Act (Public Act 095-0481, hereinafter "The Act" or "legislation") calls for specific
18 levels of performance, and it is incumbent on the PAs to show they have met the
19 targets.¹ I agree that some "deemed" savings, as the PAs suggest, is appropriate.²

20

¹ PA 095-0481 220 ILCS 5/12-103(b).

² Central Illinois Light Company d/b/a AmerenCILCO, Central Illinois Public Service Company d/b/a AmerenCIPS, Illinois Power Company d/b/a Ameren IP ("Ameren Illinois Utilities" or "Ameren") Exhibit 2.1, Section 5.4, page 112; Commonwealth Edison (or "ComEd") Exhibit 1.0, Section 5.4, page 117; Ameren Exhibit 4.0, page 34, line 735 ff. ComEd Exhibit 6.0, page 36, line 747 ff.

1 However, I believe it should be more limited than the PAs propose, and not
2 all evaluation findings should be only prospective. I agree with the PAs that the
3 evaluation budget does not allow all studies one might like to do.³ However, it is a
4 reasonable allocation, on the low side but well within the typical range of about 3-
5 5% in most jurisdictions, and allows substantial opportunities to focus on those
6 areas of greatest uncertainty in time to inform the performance milestones
7 established by Section 103 of the legislation.⁴

8 Fourth, I address the spending caps calculated by ComEd and Ameren, and
9 the possibility of amortizing costs over the life of the savings associated with
10 energy efficiency and demand-response programs, similar to investments in supply.
11 This approach would minimize short term rate impacts and/or make additional
12 funds available if necessary.

13 Finally, I disagree with ComEd's proposal that "banking" efficiency
14 savings from one year to another is appropriate, as explained below.

15
16 **III. General Program Design, Implementation and Evaluation**

17 **Q. Please summarize your recommendations for how specific program design,**
18 **implementation and evaluation details should be addressed.**

19 A. I agree with the PAs that a collaborative is an appropriate mechanism to
20 work out many of these details,⁵ provided that the collaborative allows meaningful
21 involvement by all relevant stakeholders and works toward a goal of reaching
22 consensus on the program details.

³ For example, ComEd Exhibit 7.0, line 183ff.

1 It is not clear exactly what type of collaborative the PAs have in mind,
2 however. It is also not clear whether the utilities are familiar with the benefits that
3 collaborative processes have produced in other jurisdictions, and could produce in
4 Illinois. Indeed, Ameren admits that they “did not review or give consideration to
5 other collaborative processes.” See AG Ex. 1.1, Response of Ameren Illinois to the
6 Environmental Law and Policy Center (ELPC) Data Request 2.11.

7 This simply shows that more work needs to be done soon to work out the
8 details of the collaborative structure, parties and roles. ComEd’s proposal to meet
9 quarterly⁶ is insufficient to deal with the many program and policy details that need
10 to be addressed, particularly in the first year.

11 **Q Are there examples of effective collaboratives?**

12 A. Yes. Good examples are past or current collaboratives in Connecticut,
13 Maryland, Massachusetts and Vermont. In these collaboratives parties have
14 committed to a process of working closely together to reach consensus on a wide
15 array of issues as an alternative to litigation. They address policy, program design,
16 budget allocation, implementation, and monitoring and evaluation issues.

17 **Q. Do you have any recommendations on the key functions and structure of a**
18 **stakeholder collaborative?**

19 A. Yes. Collaborative approaches in the Northeast mentioned above provide
20 examples of how stakeholders can work together on demand-side management

⁴ 220 ILCS 12/5-103(b).

⁵ Ameren Exhibit 2.1, Section 2.2.2, page 26; ComEd Exhibit, page 12.

⁶ Commonwealth Edison Company’s 2008 – 2010 Energy Efficiency and Demand Response Plan (“ComEd Plan”), November 15, 2007, ComEd Exhibit 1.0, p. 11.

1 (DSM) implementation and evaluation as well as what the key functions and
2 structure should be.

3 Ultimately, the PAs bear responsibility for their plans and actions – and the
4 many decisions that will need to be made after the close of this proceeding to
5 implement the programs needed to comply with the statutory standards. An
6 effective collaborative is a method to involve stakeholders in these decisions and
7 to, whenever possible, avoid or resolve disagreements that might otherwise give
8 rise to litigation. If consensus cannot be reached, collaborative stakeholders should
9 still be free to seek resolution of the disagreement at the ICC or in another forum.

10 The Illinois collaborative should meet frequently (i.e., every or every other
11 month) to review and discuss program design details as well as discuss regular
12 progress or status reports (e.g., quarterly), implementation issues and approaches,
13 and performance results.

14 It is important that the Collaborative be independent and facilitated by a
15 neutral party, not by the PAs. The scope must include program design details,
16 analysis of the programs and planning, implementation issues including contractors
17 and procedures, monitoring, verification of savings and evaluation.

18 **Q. Do you recommend the ICC direct PAs to specific implementation methods or**
19 **design details?**

20 A. No. I believe that flexibility is important. The PAs, with Collaborative
21 agreement, need to be able to modify programs over time based on market
22 conditions and feedback on the effectiveness of their implementation efforts.
23 Ultimately, the ICC's role should be in verifying and ensuring that the goals of the
24 legislation are met, including the net savings achieved and the rate impact caps.

25

1 **IV. The Energy Efficiency and Demand Response Program Portfolios**

2 **Q. Summarize your concerns with the Energy Efficiency program portfolios?**

3 A. As mentioned above, I believe the methods used in developing the
4 portfolios are reasonable. I disagree with the PAs characterization that the savings
5 goals for 2008 – 2010 are aggressive. ComEd states “within four years the level of
6 investment in and harvest of energy efficiency savings will place Illinois second
7 only to California.”⁷ This is not true in any relative sense. By 2011 the goals are to
8 achieve 0.8% incremental savings.⁸ This is well below what many leading states
9 are achieving, and even further below what is achievable. For example, many states
10 in the Northeast and West Coast are at or above about 1% incremental savings,
11 with plans for substantial ramp up over the next few years. Vermont’s new goals
12 established by the Public Service Board call for approximately 2% statewide
13 incremental savings in 2008 (VT is currently at about 1.5%) and about 10% savings
14 over just 2 years in “geographically targeted”⁹ areas.¹⁰ New York has established a
15 goal of 15% reduction by 2015, or roughly 2% per year starting immediately.¹¹
16 Massachusetts is on the verge of passing legislation that will require at least 2% per
17 year.¹² While Illinois ultimately ramps up to similar levels, the PAs have 8 years to

⁷ *Ibid*, p. 18.

⁸ PA 095-0481, 220 ILCS 5/12-103(b).

⁹ “Geographically targeted” areas refer to regions where load reductions can cost-effectively help defer or avoid significant capital expenditures on the transmission and distribution system.

¹⁰ Efficiency Vermont Annual Plan 2007-2008, Prepared for the Vermont Public Service Board by Vermont Energy Investment Corporation, 1 June 2007.

¹¹ NY Public Service Commission, *Proceeding on Motion of the Commission Regarding an Energy Efficiency Portfolio Standard, Case 07-M-0548*, 16 May 2007.

¹² The Massachusetts House passed HB 3965 155-0 on November 15, 2007. The Senate is currently working on its version and has very broad support. Governor Deval Patrick also supports the bill and has indicated it would pass it.

1 get there. States such as Vermont have shown they can ramp up much more rapidly
2 to higher levels of savings than is required by the Illinois legislation.

3 That said, I do recognize that the infrastructure and capability for DSM
4 programs existing now in Illinois is fairly minimal and that it makes sense to start
5 with some straightforward programs while developing the infrastructure and
6 capability for more comprehensive portfolios in the future. As discussed in more
7 detail in the sections that follow, my main concerns are that:

- 8 • Programs should be consistent throughout the state as much as possible,
9 and rely on a limited number of contractors to ensure effective and
10 comprehensive treatment of markets and customer service while
11 limiting the number of parties that any customer, trade ally, or design
12 professional would need to engage.
- 13 • More resources should be initially focused on those efficiency savings
14 from already planned investments in the market (“lost opportunities”),
15 and less on time-discretionary early retirement strategies (“retrofit”).
- 16 • I have a number of specific issues with the preliminary program
17 designs. I recognize that the plans are not yet comprehensive – in that
18 many design details are yet to be determined – and that the PAs reserve
19 the right to modify virtually any program design detail. With that
20 caveat, I offer the following program design recommendations (more
21 fully described below), as well as some general comments on the
22 quantitative analysis:

- 1 ○ Residential programs targeted at all-electric customers should
- 2 better address the primary area of savings potential – namely
- 3 space heating.
- 4 ○ The PAs should, at a minimum, drop room air conditioners from
- 5 the appliance recycling program, and should consider dropping
- 6 the whole program, or at least dramatically scale it back.
- 7 ○ The PAs should immediately begin planning for implementation
- 8 of the Residential New HVAC programs to be in place by
- 9 January 2009 or earlier to capture the opportunities during the
- 10 spring 2009 cooling season.
- 11 ○ The PAs should immediately implement point of purchase
- 12 promotions to encourage customers to select efficient
- 13 appliances, possibly in lieu of the appliance recycling program.¹³
- 14 ○ PAs should consider upstream buydowns rather than coupons for
- 15 the Residential Lighting Program.
- 16 ○ PAs should implement a commercial and industrial (C&I) new
- 17 construction program as soon as possible, and should not limit
- 18 participation to projects enrolled in the U.S. Green Building
- 19 Council’s Leadership in Energy and Environmental Design
- 20 (“LEED”) program.¹⁴

¹³ Note that Ameren does propose a new appliance program, however ComEd does not.

¹⁴ Ameren appears to be limiting participation to only customers pursuing LEED certification. This will likely lead to very high freeridership and ignore the majority of C&I new construction opportunities. Ameren Exhibit 2.1, Section 4, p. 92 (Commercial New Construction Program); Ameren Exhibit 2.0, Line 357ff.

- 1 ○ PAs should consider delaying the start of the
- 2 retrocommissioning program, and/or consider some
- 3 modifications to the approach.
- 4 ○ PAs should consider eliminating the Small Commercial CFL
- 5 retrofit kit, but ensure that commercial customers can participate
- 6 in the residential retail lighting program.
- 7 ○ PAs should not promote technologies that represent baseline
- 8 practice or are suboptimal, such as:
 - 9 ▪ LED exit signs, except in retrofit situations.
 - 10 ▪ Electroluminescent exit signs.
 - 11 ▪ Standard T8 fluorescent lighting.

12 **Q. What are your concerns about consistency and coordination and the proposed**
13 **administrative approach?**

14 A. The experience of other PAs has shown that organizing implementation
15 efforts around program definitions, rather than market structures, lowers the level
16 of participation by customers and efficiency service and product suppliers. Take,
17 for example, a customer who owns a three-story structure in a mixed-use
18 neighborhood with a store on the first floor, leased low-income apartment space on
19 the second floor, and the customer's own apartment on the third floor. That
20 customer is ideally looking for one person to contact to obtain energy efficiency
21 services for the entire building. However, the approach proposed by the PAs could
22 require that customer to engage with different people or contractors to participate in
23 one program for the storefront, a separate program for the leased low-income space,
24 and yet a third program for the residence.

1 The initial program designs indicate that the PAs will likely send out
2 requests for proposals (“RFPs”) to retain the services of implementation contractors
3 for each program, and possibly different contractors for each of the utilities. The
4 PAs do indicate that they will bundle their implementation contracts along the
5 following umbrellas: Business energy solutions (prescriptive and custom
6 incentives), Commercial new construction, Residential appliance recycling,
7 Residential mid- and upstream programs, and Residential energy solutions (all
8 programs aimed at the residence).¹⁵ This arrangement can still result in the need for
9 a single customer or “market channel” (e.g., contractor, distributor, retailer,
10 designer) to work with multiple implementation contractors. For example, a
11 statewide HVAC contractor that installs residential and commercial units might
12 need to work with Ameren’s and Commonwealth Edison’s separate Residential
13 Energy Solutions (for the Residential HVAC Diagnostics & Tune-Up and
14 Residential New HVAC programs), Business Energy Solutions (for the C&I
15 Custom Incentive, C&I Prescriptive Incentive, and C&I Retro-Commissioning
16 programs), and Commercial New Construction implementation contractors, not to
17 mention DCEO on public sector projects. A statewide electrical distributor
18 supplying residential and commercial markets might have this set of contractors as
19 well as the Residential Mid- and Upstream contractor. A statewide retailer might be
20 working with separate Ameren and Commonwealth Edison Residential Mid- and
21 Upstream contractors to negotiate upstream incentives or buy-downs for residential
22 products.

¹⁵ Ameren Exhibit 2.1, Section 6.2.1, p. 117ff; ComEd Exhibit 1.0, Section 4.2, p. 105ff.

1 I recommend that, to the greatest extent possible, the PAs organize their
2 contractor selection around functional commonalities – e.g., one contractor to work
3 with HVAC contractors, the same or another contractor to work with electrical
4 contractors and distributors, a separate contractor to work with retailers – rather
5 than aligning these contractors by program. It would also be advantageous for
6 Ameren and Commonwealth Edison to issue joint RFPs by function to promote
7 statewide consistency in program design and implementation. At the very least, the
8 scopes of work should require regular meetings with and coordination across
9 parallel contractors in the two service territories.

10 In addition to coordination and minimization of multiple contractors
11 working in the same or related markets, PAs should work to resolve any program
12 differences and offer consistent statewide programs. Markets do not neatly
13 separate by utility territory. As a result, offering different incentive levels for the
14 same products, having different rules about minimum qualifying efficiency or
15 installation practices, etc. will create confusion in the market for trade allies,
16 vendors, design professionals and customers with facilities in more than one utility
17 territory.

18 **Q. What are “lost opportunities” in the context of energy efficiency or demand**
19 **response programs?**

20 A. “Lost opportunities” offer efficiency savings at the time of natural or
21 planned investment in equipment and systems. As a result, they are time-
22 dependent, and if a program does not capture the energy savings, those savings are
23 “lost” until the next planned replacement. For example, if a business buys an
24 inefficient chiller, they will likely use that inefficient chiller for the next 25 years or
25 more. Similarly, a new building that does not adopt efficiency measures at the time

1 of construction will have poor performance far into the future, and many of the
2 foregone efficiency opportunities may no longer be cost-effective to install until
3 much later.

4 **Q. Why do you recommend a greater focus on lost opportunity programs?**

5 Because retrofit measures are discretionary decisions to retire functioning
6 equipment early, those projects can be undertaken at any time, and can be
7 addressed after the initial ramp-up of the PA programs. Also, retrofit projects
8 generally provide lower long-term savings than their initial savings estimates; the
9 replaced piece of equipment would have been replaced naturally at the end of its
10 useful life, lowering the true savings at that point to the difference between
11 installed equipment and what would have been purchased at that point in the future.
12 For example, the discretionary replacement of a functioning 17-year-old
13 refrigerator today might save 1,900 kWh in the first and some subsequent years;
14 but had that refrigerator failed in two years, it would have been replaced with a unit
15 at least meeting the 1992 Energy Policy Act efficiency requirements. Thus, in the
16 third year, the actual savings from this measure in the refrigerator replacement
17 program would be much less than 1,900 kWh per year. I have not verified whether
18 the quantitative analyses done by the PAs consultant, ICF, has taken these long
19 term effects into account.

20 In addition, because lost opportunity programs focus on changing decisions
21 at the time of investment, the costs of efficiency are only the *incremental* costs of
22 the high efficiency equipment compared to the standard efficiency equipment.
23 Retrofit measures require expenditure of the full materials and labor cost for an
24 investment that would otherwise not have been made. For example, the extra cost
25 of buying a new efficient central air conditioner (as compared to a standard

1 efficiency one) might be about \$300. However, the full installed cost of a new air
2 conditioner for someone not already planning to purchase one might be \$3,000. As
3 a result, lost opportunities should be considered the highest priority.

4 **Q. Is it possible to meet the goals with a focus on lost opportunity programs?**

5 A. Absolutely. Illinois should be able to meet the relatively low 2008 – 2010
6 goals even without any retrofit programs. For example, Efficiency Vermont
7 ramped up to roughly 1% incremental savings before expanding substantially into
8 retrofit markets. I am not suggesting the PAs should avoid all retrofit markets.
9 Rather, I believe that an initial focus on lost opportunity markets is appropriate,
10 with retrofit markets being addressed later as needed — exactly the reverse of the
11 current plans.

12 **Q. What specific changes do you propose to better promote lost opportunities in**
13 **the residential sector?**

14 A. For residential programs, I believe promotion of incremental improvements
15 in new appliance purchases is a higher priority and more cost-effective than the
16 retrofit appliance recycling program. While Ameren proposes to do both, ComEd
17 does not propose any lost opportunity appliance program at this time.¹⁶ In addition,
18 I recommend reversing Ameren's allocation of more resources to appliance
19 recycling than new efficient appliances.

20 There are well functioning programs that promote high efficiency
21 appliances, and in fact the strategies are very similar to the retail CFL promotion

¹⁶ ComEd plan, p. 30.

1 the PAs plan.¹⁷ Com Ed notes that they will consider adding these later to the CFL
2 program.¹⁸ It is not significantly harder to field appliance promotions than it is to
3 promote CFLs as many of the strategies and retail partners are the same. Given the
4 lost opportunity nature of these resources this should be a higher priority than
5 appliance recycling.

6 Also, promotion of new appliances generally has significant market
7 transformation benefits. The strategies focused “upstream” in the market (*e.g.*, to
8 retailers, distributors and manufacturers, as opposed to strictly customers) serve to
9 increase stocking, availability, promotion and awareness of the high efficiency
10 equipment; increase market penetrations; reduce incremental costs of efficiency
11 over time; and lead the way for effective codes and standards. Also, many of these
12 appliances (refrigerators, washers, air conditioners, etc.) have relatively long useful
13 lives and therefore provide durable savings.

14 In contrast, ComEd’s appliance recycling program only allows participation
15 by customers with appliances that are at least 16 years old.¹⁹ As a result, most
16 equipment removed will be close to or past its typical lifespan, and any savings
17 captured will be short lived.²⁰

18 **Q. What specific changes do you propose to capture lost opportunities in the**
19 **commercial and industrial sectors?**

20 For commercial and industrial (C&I) programs, it is important that a new
21 construction program begin as soon as possible to avoid losing the efficiency

¹⁷ See for example the Northeast Energy Efficiency Partnership’s Residential Lighting and Appliance program that is offered by most of the PAs throughout the Northeast U.S.

¹⁸ *Id.*

¹⁹ ComEd Plan, p. 46.

²⁰ This is particularly true for room AC, where typical measure life is often estimated to be 10-15 years. I have not scrutinized the duration of savings PAs propose to claim for this program.

1 opportunities associated with new buildings. Many jurisdictions have begun and
2 ramped up these programs very quickly. Even though the time from initial design
3 to final construction can be over a year for C&I projects, some savings should
4 result in 2008 from activities already in the works that can adopt incremental
5 changes, and with aggressive implementation C&I new construction programs can
6 be relatively mature by 2010 and capturing a large share of the new construction
7 market.

8 I disagree with Ameren's plans to target LEED new construction projects.²¹
9 Customers that commit to the LEED program will need energy-efficient design to
10 attain the rating, and a focus on LEED projects will result in a very high level of
11 free-ridership. New construction programs that target a wide range of C&I
12 customers are some of the most common DSM programs, and excellent models
13 exist for the PAs to build on. There is no need to wait until 2009 to begin.

14 As with the residential sector, C&I new construction programs also offer
15 much more durable savings than retro-commissioning services, which is also
16 difficult to do effectively. Many jurisdictions that have had aggressive DSM for
17 years are only now tackling this market.

18 **Q. Why should the PAs focus on more durable or long lasting efficiency**
19 **measures?**

20 **A.** The longer savings last the greater the economic and environmental benefits
21 to ratepayers and Illinois as a whole. The PAs have focused a fair amount of
22 resources on very short lived savings measures such as compact fluorescent lamps,

²¹ Ameren Exhibit 2.1, Section 4, p. 92 (Commercial New Construction Program); Ameren Exhibit 2.0, p. 16, Line 357ff.

1 appliance recycling, HVAC tune-up, and retrocommissioning, while ignoring
2 longer lived measures like new appliances and all-electric home heating measures.
3 By ignoring many of the longer lived measures and focusing on less durable
4 efficiency, the result is that the long term cumulative savings and benefits from the
5 PAs portfolios will be substantially lower than they could be.

6 **Q. Please explain more fully your specific program design concerns.**

7 A. As mentioned above, I am not addressing every possible concern or
8 program design issue. The PAs have noted that they will rely heavily on
9 implementation contractors for detailed designs and reserve the right to modify any
10 of the conceptual designs articulated in the plans.²² Also, major information such
11 as incentive levels are not provided for all measures. However, based on the
12 conceptual designs that the PAs have provided, I do offer some suggestions set
13 forth below with a general recommendation that these and other details ultimately
14 be resolved by a collaborative process.

15 **Q. Why should residential programs targeted at all-electric customers address
16 space heating?**

17 A. ComEd's and Ameren's plans include two programs specifically targeted to
18 all-electric residential customers — the Multifamily All-Electric Sweep and the
19 Single Family Home Energy Performance.²³ However, these programs are
20 primarily focused on a few inexpensive technologies that do not address the vast
21 majority of the efficiency potential in these buildings.²⁴ Specifically, ComEd

²² Ameren Exhibit 2.1, Section 6.2.2, p. 118; ComEd Exhibit 1.0, Section 4.0, p. 107.

²³ ComEd Exhibit 1.0, page 50ff and page 68ff; Ameren Exhibit 2.1, page 37ff.

²⁴ Note that Ameren does offer more services targeted at space heating for single family, but not multifamily. ComEd should look to Ameren to coordinate these services consistently. *Ibid.*

1 proposes to install compact fluorescent lamps and some low cost water heating
2 measures such as showerheads and flow restrictors.²⁵ ComEd does offer an “audit”
3 to customers to recommend other more comprehensive measures, however, little
4 assistance is provided to ensure these will be acted on.²⁶ What this means is that
5 essentially, customers are left on their own to hire contractors and make
6 improvements. They are unlikely to have sufficient information, handholding and
7 financial incentives to act in large numbers.

8 It is unclear why ComEd is targeting all-electric customers while ignoring
9 the areas that make these customers unique. In fact, ironically these customers will
10 have the least savings from the primary measure — CFL lamps — of any
11 customers because of the loss of waste heat (from incandescent bulbs) that will
12 have to be made up with electric heat.

13 **Q. What would you recommend as an alternative program for all-electric**
14 **customers?**

15 A. The PAs correctly note that comprehensive building shell treatment is not
16 generally cost-effective under the Illinois total resource cost test (TRC) guidelines
17 because fossil-fuel benefits can not be counted.²⁷ However, all-electric customers
18 are the one customer group where this comprehensive treatment is likely to be
19 highly cost-effective and provide customers with greater comfort and large bill
20 savings. Measures should include blower-door guided air sealing, duct sealing,
21 improved insulation, heating system tune-ups, and controls.

22 **Q. What are your concerns about the proposed appliance recycling program?**

²⁵ ComEd Exhibit 1.0, page 50ff and page 68ff.

²⁶ *Ibid.*

1 A. This program will only replace appliances 16 years old or older. Window
2 air conditioners typically have a life of no more than about 15 years,²⁸ which means
3 that it is unlikely substantial savings from this measure will last very long. In
4 addition, for the relatively small rebate offered, it is unlikely that customers who
5 regularly use their air conditioners would agree to give them up. As a result, many
6 of the air conditioners turned in may be rarely if ever used. Finally, Energy Star
7 new air conditioners can be purchased now for under \$100. If customers in fact do
8 use their air conditioners, they will most likely simply replace them with new ones.
9 While this would improve efficiency somewhat, the savings reductions would be
10 far less than the PAs' estimates, which assume complete removal without
11 replacement. Promoting the purchase of Energy Star new air conditioners, as
12 mentioned above, would be far more effective in terms of long term savings.

13 **Q. What changes do you recommend for the proposed appliance recycling**
14 **program?**

15 A. First, I suggest that the PAs omit removal of room air conditioners as a
16 measure. Even with removal of the room air conditioner measure, the Appliance
17 Recycling Program is likely to suffer from very high freeridership, relatively short
18 lived savings, and high costs. Many customers willing to give up a working
19 refrigerator for \$25 are likely to not be actively using it and simply looking for a
20 convenient and inexpensive disposal alternative. Greater focus should be on
21 transforming markets for new equipment.

²⁷ ComEd Exhibit 6.0, p. 16-17ff; Ameren Exhibit 4.0, p. 15, line 328ff.

²⁸ For example, Ameren uses 12 years in its analysis. Ameren Exhibit 2.1, p. B-16.

1 **Q. Please explain your recommendation that PAs consider upstream buydowns**
2 **rather than coupons for the Residential Lighting Program.**

3 A. ComEd asserts that pursuing a retail coupon program will be faster and
4 easier to set up, and the company may consider moving to an upstream “buydown”
5 approach over time.²⁹ A buydown approach refers to offering incentives directly to
6 manufacturers or retailers, based on the wholesale costs, that reduce the retail cost
7 of CFLs in the store. This can simplify the transaction for customers who do not
8 have to fill out coupons. Contrary to ComEd’s assertion, setting up an upstream
9 buydown approach should be easier, faster, and cheaper than a customer coupon
10 program. Many national chains such as Home Depot already have established
11 mechanisms to participate in these programs in other areas. As a result, Illinois
12 does not have to reinvent the wheel and go through the same learning process that
13 other regions have already been through. In fact, in the Northeast programs have
14 generally shifted from coupon approaches to buydowns simply because they are
15 more effective, easier for consumers, easier for retailers, require lower
16 administrative burdens and cost less.³⁰

17 A buydown approach requires dealing with less parties — a few
18 manufacturers and major national chains that already know how to do these
19 programs and have systems already set up. In addition, many supermarket chains
20 have not participated in retail coupon programs but will participate in upstream
21 buydowns because their systems make it difficult to handle customer point of sale

²⁹ ComEd Exhibit 1.0, p. 40.

³⁰ Northeast Energy Efficiency Partnership ENERGY STAR® Products Initiative
(www.neep.org/html/ES_Products_index.html).

1 coupons.³¹ Because many consumers buy lights at supermarkets a buydown
2 approach can offer greater participation.

3 Buydowns are also cheaper for two reasons. First, because the buydown is
4 done upstream, the incentive can be less because it is applied at the wholesale level,
5 rather than at retail. Second, administrative costs are dramatically reduced by
6 eliminating the need for coupon processing.

7 Finally, buydowns offer another significant advantage in terms of
8 estimating savings. Retailers may provide the PAs with CFL sales data from the
9 prior year which can establish a valid Illinois baseline of market penetration and
10 allow much more accurate estimation of the net effect of the program and Illinois
11 specific net-to-gross ratios. As I discuss below, deeming a net-to-gross ratio for a
12 CFL program based on California data makes no sense because CFL market
13 transformation may be far more advanced in California than in Illinois.

14 **Q. Why do you suggest eliminating the Small Commercial CFL retrofit kit but**
15 **recommend commercial customers participate in the residential retail lighting**
16 **program?**

17 A. ComEd proposes mailing 100,000 CFL lamps to small commercial
18 customers.³² While this is not a bad thing to do, I believe it is not the most
19 effective use of funds for a few reasons:

- 20 • Each customer will only receive 2 lamps. The possible CFL
21 opportunities will likely be far greater.

³¹ Personal communication with Chris Neme, Director of Planning and Evaluation Services, December 13, 2007. Mr. Neme is an advisor on residential program design for Efficiency Vermont.

³² ComEd Exhibit 1.0, page 86ff.

- 1 • The 2 lamps provided may not be the appropriate size or wattage for the
2 customers needs.
- 3 • Because these are unsolicited and may not fit the available applications,
4 this strategy will likely result in a low “in-service” rate — the portion of
5 bulbs that actually get installed. In fact, many of them may end up in the
6 commercial customer’s home, rather than business. While this outcome
7 would produce energy savings, it would not provide the same level of
8 savings ComEd would obtain from a business application.
- 9 • It does not necessarily provide a strong encouragement for customers to
10 go out and purchase more lamps on their own.

11 **Q. What do you recommend as an alternative?**

12 I propose that all business customers be eligible to participate in the
13 residential CFL program. This approach is used very successfully in VT, where a
14 significant portion of CFL retail sales and savings come from business. Under the
15 coupon approach PAs propose (which, as noted above I don’t recommend), PAs
16 can directly and separately track business and residential purchases and assign
17 savings accordingly. With a buydown approach, a survey can be conducted to
18 derive an estimate of the split to better estimate savings. This approach is much
19 cheaper for the PAs and ratepayers, and ensures the bulbs purchased are in fact the
20 style, wattage and size desired by the business. Likely lamp usage and savings will
21 be greater, costs less and markets better transformed.

22 **Q. Please elaborate on your concerns the proposed plans promote baseline or**
23 **suboptimal technologies.**

1 A. My biggest concern is the promotion of standard T8 lighting technology in
2 the commercial and industrial sector.³³ The PAs propose offering incentives for
3 both standard and high performance (HP) T8s. Standard T8 lighting is a fluorescent
4 system developed in the late 1980s that is more efficient than the old T12
5 fluorescent systems. It has been widely promoted by DSM programs for C&I
6 markets since approximately 1990. However, in about 2004 HPT8 systems became
7 available that have improved efficiency over standard T8s at relatively little
8 incremental cost. Many programs have transitioned from promotion of standard
9 T8s to HPT8s as a result.³⁴ HPT8s are widely available, and made by all the major
10 lighting manufacturers.

11 As a result, standard T8s are now a suboptimal efficiency solution, and in
12 fact are generally baseline practice for virtually all new C&I lighting installations.
13 In fact, some utilities are now finding customers who previously received program
14 rebates for standard T8 retrofits are now applying for new rebates to install
15 HPT8s.³⁵

16 The bottom line is that promotion of standard T8s will result in very little
17 savings, high freeridership, and lost opportunities by not installing the optimum
18 technology at the time of customer engagement.

19 **Q. Are HPT8s widely available?**

³³ See AG Exhibit 1.2, ComEd to AG Data Request 2.3, and AG Exhibit 1.3, Ameren Response to AG Data Request 2.3.

³⁴ See for example, programs offered by: Efficiency Vermont, Energy Trust of Oregon, Efficiency Maine, Efficiency New Brunswick, California utility programs, Massachusetts utility programs.

³⁵ For example, in Massachusetts programs have recently moved to limit retrofits to not allow these customers to participate because of budget constraints so they can focus first on replacement of the still existing T12 systems.

1 A. While HPT8s may not be widely available yet in Illinois, these programs
2 can help promote them and work upstream to ensure they are stocked and available.
3 Efficiency programs should strive to advance markets, rather than promote
4 technologies that offer less cost-effective savings and are already widely adopted.
5 An example that shows availability issues can be overcome rapidly is in New
6 Brunswick. I assisted Efficiency New Brunswick (ENB) last year with
7 development of an upstream HPT8 program. New Brunswick had no existing
8 efficiency programs, and meetings with lighting distributors determined there was
9 virtually no penetration of HPT8 and in fact many distributors were not even
10 familiar with them. I am happy to report that within about 6 months of program
11 implementation ENB believes they have virtually transformed this market such that
12 virtually all new fixtures being sold in NB now come pre-wired with HPT8s.

13 **Q. What other technologies do you believe the PAs should not be promoting?**

14 A. I have not done a comprehensive review of every measure the PAs are
15 considering, nor have they fully identified every possible prescriptive measure they
16 may promote. However, I do have concerns about exit signs.

17 The PAs propose prescriptive C&I incentives for both LED and
18 electroluminescent exit signs.³⁶ LED exit signs use about 2 Wt each, and last for
19 approximately 100,000 hours. LED exit signs have achieved widespread adoption
20 and are generally baseline practice in new exit sign installations.³⁷ However, they
21 still offer substantial retrofit opportunities to replace existing incandescent or CFL

³⁶ Ameren Exhibit 2.1, page 56; ComEd Exhibit 1.0, page 79.

³⁷ For example, a C&I new construction baseline study conducted by RLW for Long Island Power Authority in 2001 found 98% penetration of LED exit signs. Anecdotal evidence from discussions with lighting

1 signs. As a result, I propose the PAs offer incentives for LED exit sign retrofit kits,
2 but not new signs.

3 My concern with electroluminescent is simply that they are less cost-
4 effective than LED signs. While they use no electrical power, they are quite
5 expensive and generally have had much lower customer acceptance. Given that
6 LED signs offer greater net benefits and require much lower incentives, I believe
7 electroluminescent signs do not need to be promoted with rebates.

8 9 V. Monitoring and Evaluation

10 **Q. Do you agree with the PAs proposal to deem savings for the planning period?**

11 A. Not entirely. I do agree it is reasonable to allow some savings factors to be
12 deemed for some measures. However, I believe the PA's proposal unnecessarily
13 shields the PAs from much of the risk and shifts this risk to the customers. I
14 recommend that deeming be more limited, with M&E plans focused to establish
15 some of the most uncertain values in time to inform performance.

16 **Q. ComEd argues that deeming savings limits risk to both it and its customers.³⁸**
17 **Why do you assert that deeming savings shields only the PAs from risk and**
18 **exposes the ratepayers to greater risk?**

19 A. ComEd is proposing that without deemed savings it is exposed to
20 unreasonable "evaluation risk."³⁹ However, evaluation itself does not introduce
21 risk. Evaluation is simply the formal assessment of actual performance: it seeks to

vendors in Vermont indicates most vendors don't even sell compact fluorescent or incandescent signs anymore.

³⁸ ComEd Exhibit 2.0, p. 46, ll. 1028 – 1032.

³⁹ ComEd Plan, p. 31.

1 measure that which is exposed to risk. By deeming savings, the utilities minimize
2 the risk of penalties from poor performance. However, the ratepayers ultimately
3 will pay for the efficiency programs and should be assured they receive the benefits
4 (e.g., energy savings and economic benefits, reduced environmental risks and
5 pollutant emissions, and downward pressure on supply costs.). Underperformance
6 hurts ratepayers.

7 **Q. Do you agree with Com Ed on any aspects of its deemed savings proposal?**

8 A. Overall, I agree with ComEd Witnesses Jensen and Hall that it is reasonable
9 to deem savings where there is a great deal of certainty about savings from past
10 studies and to therefore focus evaluation resources on those areas that are less
11 certain.⁴⁰ I also agree that the evaluation budget does not allow for everything to be
12 studied and that it is unreasonable to address all uncertainties within the first three
13 year planning period.⁴¹

14 As a result, I agree with ComEd Witness Jensen that deeming the gross
15 savings estimates (kWh and kW) for prescriptive lighting is appropriate.⁴² These
16 are generally well evaluated measures: the uncertainty of gross savings is small. I
17 also believe it is appropriate to establish "savings algorithms" and assumptions for
18 many other prescriptive measures. However, I disagree with the PAs' approach to
19 deeming the net-to-gross (NTG) ratios.

20 **Q. Please explain what Net-to-Gross ratios are.**

⁴⁰ Ameren Exhibit 4.0, p. 35, line 761ff; ComEd Exhibit 6.0, p. 37, line 772ff.

⁴¹ ComEd Exhibit 7.0, p. 9, line 183ff.

⁴² Ameren Exhibit 4.0, p. 35, line 761ff; ComEd Exhibit 6.0, p. 37, line 772ff.

1 A. As ComEd Witness Jensen explains, net-to-gross ratios generally adjust for
2 two things – freeridership and spillover.⁴³ Freeriders are customers who participate
3 in a program but who would have installed the efficiency measure anyway.⁴⁴
4 Spillover refers to customers who were influenced by the program to save energy,
5 although did not directly participate in a program. To estimate the net savings
6 (compared to what would have occurred without the program), the gross tracked
7 savings from all the measures installed in the program must be adjusted for these
8 factors.

9 **Q. Why do you believe all NTG ratios should not be deemed?**

10 A. Gross savings from well understood and predictable measures such as a
11 compact fluorescent lamps are fairly certain. They are based on a few factors –
12 essentially the wattage reduction times the hours that they are operating. The
13 former is well established and fairly easy to measure.⁴⁵ The latter can vary from
14 one customer to the next, but on average should be similar to facilities in
15 California. In essence, the gross savings are really a function of the technology and
16 average customer, and I do not oppose the PAs' proposal to adopt gross technology
17 savings values based on California data. However, NTG ratios are very different,
18 and much less based on the technology and how it is operated.

19 ComEd Witness Brandt states:

20 “[T]he policy behind deeming NTG ratio values is based on the
21 same logic as deeming the measure savings values. These values

⁴³ ComEd Exhibit 6.0, p. 26, line 544ff.

⁴⁴ Freeriders can also be partial ones who would have captured some portion but not all of the savings without program intervention.

1 have been evaluated numerous times over several years, and
2 projections of the NTG ratio from these other analyses will provide
3 ComEd with reasonable projections of their expected results. There
4 is not reason to use limited evaluation dollars to conduct new
5 analyses of this data.”⁴⁶

6 I strongly disagree with Mr. Brandt. NTG ratios, unlike gross savings, are
7 very dependent on program design and implementation, and also can significantly
8 change over time and by area. The biggest issue for NTG ratios for most of the
9 programs proposed is freeridership. While gross savings simply counts the savings
10 from all participants in the program, net savings seeks to subtract out those that
11 would have captured the savings on their own in the absence of a program.
12 Freeridership can and is significantly influenced by program design. The PAs
13 propose simply adopting California NTG ratios. ComEd notes:

14 “Our analysis of program cost-effectiveness is based on net program
15 savings estimated using NTG ratios included in the California Public
16 Utilities Commission Energy Efficiency Policy Manual and the
17 DEER database. These ratios are based on over a decade of
18 evaluated program impacts”⁴⁷

19 ComEd is correct that California has decades of DSM experience, and a
20 generally more aggressive and comprehensive portfolio of programs than Illinois

⁴⁵ Of course, the wattage reduction depends on what would have been installed in the absence of the efficiency measure (the baseline). As a result, uncertainty is introduced in that for prescriptive measures it is necessary to assume a baseline efficiency. However, this is fairly common practice throughout the industry.

⁴⁶ ComEd Exhibit 2.0, p. 46, lines 1019 – 1023.

⁴⁷ ComEd Plan, p. 25.

1 will have from 2008 – 2010. In addition, many of its programs are very mature and
2 have high levels of participation.⁴⁸

3 These factors make their NTG ratios estimated over a prior period not
4 particularly applicable to Illinois' programs. For example, if CA has an aggressive
5 C&I new construction program that reaches a very large share of the new
6 construction and offers high incentives, their freeridership is likely to be low (and
7 hence NTG would be high). In contrast, with a relatively new C&I new
8 construction program with lower incentives and participation levels, it is likely that
9 a high percentage of participants in the early years would be freeriders.

10 To illustrate this, imagine that 10% of new construction activity will
11 naturally be efficient in any given year. These customers are highly likely to
12 participate in a program that offers them financial incentives to do something they
13 are already planning on doing anyway. If the program is able to capture 20%
14 participation but all those that had already planned to be efficient apply, then
15 freeridership would be 50% (i.e., 0.1 divided by 0.2). On the other hand, a mature
16 program capturing 50% of the eligible market would only have a 20% freeridership
17 rate (i.e., 0.1 divided by 0.5).

18 **Q. Can program design and administration affect a program's NTG ratios?**

19 A. Absolutely. Program design and implementation decisions can have a
20 significant impact on NTG ratios. For example, in general offering low financial
21 incentives will tend to increase freeridership, while paying more generous
22 incentives will minimize it. Similarly, requiring things like pre-approval and
23 offering comprehensive technical services will tend to minimize freeridership.

⁴⁸ Ameren Exhibit 4.0, p. 35, line 761ff; ComEd Exhibit 6.0, p. 26, line 772ff.

1 Often, capturing participation from freeriders is easier and more expedient than the
2 hard work of truly changing behavior. I do not suggest the PAs would intentionally
3 manipulate programs to increase freeriders. However, they could, and in theory
4 deeming NTG ratios could provide a perverse incentive to do that.

5 **Q. Have you seen instances where program administrators encourage**
6 **freeridership?**

7 A. Yes. In working with numerous program administrators, I have found
8 instances where decisions were made to encourage freeridership because it allowed
9 the recording and claiming of additional program savings, even though it was clear
10 that actual savings would not be increased. For example, I have seen instances
11 where program staff focus on obtaining completed rebate forms from customers or
12 vendors who have already installed or sold efficient equipment, under prescriptive
13 programs that do not require pre-approval of incentives prior to installation.

14 **Q. Doesn't allowing NTG ratios to be modified retrospectively expose the PAs to**
15 **unfair risk?**

16 A. I don't believe so. It certainly exposes them to more risk because they won't
17 be able to lock in savings based simply on tracking participation, and run the risk
18 that savings might have to be adjusted downward after evaluation of the NTG ratio.
19 However, the objective here is to ensure Illinois achieves meaningful reductions in
20 electricity usage.⁴⁹ It is not focused on simply spending a set amount of money –
21 but on achieving performance. As part of the privilege of implementation, the
22 utilities should be held responsible for showing that they actually did achieve the
23 goals, not simply that they performed specific activities.

1 **Q. Do you agree with the statement that evaluation funds are very limited and**
2 **they cannot capture results in time to modify their actions?**

3 A. Somewhat. I disagree with ComEd Witness Hall's characterization that 3%
4 of spending on evaluation is unreasonably low and well below other jurisdictions.⁵⁰
5 I have not done a formal survey, however, in my experience 3% is fairly typical,
6 perhaps on the low side. California is a notable exception; California has
7 committed far more resources than any other state to evaluation.

8 I do agree that not all things can be studied adequately within the 2009
9 program year, when results would be necessary for any retrospective adjustments to
10 determine whether the PAs should be subject to any penalties for under-
11 performing. However, those areas where there is significant uncertainty can be
12 focused on very early. In fact, for freeridership, evaluators could even begin to
13 study this issue before the end of the first year. In addition, freeridership studies
14 are generally less expensive and take less time than many of the more data
15 intensive billing and metering analyses the PAs seem to envision. I believe the
16 evaluation budget is sufficient to effectively measure NTG ratios for all the
17 important markets, and this represents perhaps the greatest area of savings
18 uncertainty. While 3% may seem small, over the three year planning period, total
19 funds would be approximately \$9.25 million (3% of \$246 million for ComEd and
20 \$62.4 million for Ameren).

21 For example, properly estimating freeridership for the residential compact
22 fluorescent lamp (CFL) program is critical, because freeridership may be quite

⁴⁹ PA 095-0481, 220 ILCS 5/12-103 (b).

⁵⁰ ComEd Exhibit 7.0, p. 9, line 183ff.

1 high, the market for CFLs is evolving rapidly, and a large portion of the expected
2 savings will come from this program. Ameren itself notes that their portfolio
3 savings estimate is highly sensitive to the NTG ratio for CFLs in both residential
4 and commercial markets (Ameren Ex. 2.1[part 1], p. 146).

5 On the other hand, low income programs rarely have any freeriders or
6 spillover, so deeming 100% NTG ratios may be entirely appropriate for these
7 savings.

8 **Q. Please comment on the California NTG ratios proposed by the PAs.**

9 A. The California NTG ratios proposed by the PAs are 0.8 for all programs
10 except for the residential appliance recycling program, which suggests 0.35 for
11 refrigerators and 0.54 for freezers.⁵¹

12 This is inappropriate. The 0.8 NTG ratio is proposed for virtually the entire
13 portfolio of programs.⁵² Assuming the same ratio for a retail CFL program and a
14 direct install low income program makes no sense and clearly ignores the very real
15 differences in these markets and programs. Low income customers rarely make
16 any significant efficiency investments on their own, and as a result have virtually
17 no freeridership. On the other hand, CFL adoption is changing rapidly, and they
18 are becoming much more widely available and promoted by national chains.

19 **Q. What do you suggest as an alternative?**

20 A. As with the program design and implementation details, I recommend the
21 collaborative work out appropriate NTG ratios by program and in some cases by
22 end-use and/or technology within a program. The collaborative can also identify

⁵¹ ComEd Ex. 6.0, p. 42, table.

⁵² *Id.*

1 those areas that are most important to evaluate as well as appropriate evaluation
2 methods and timing. They can agree, if appropriate, to deem some of them and
3 only change them prospectively, while for others it may be appropriate to recognize
4 they are just *a priori* estimates that will be modified when newer information
5 becomes available.

6 The PAs should also look for evaluation results that may be more
7 appropriate for the proposed programs. These could be from nearby utilities or
8 states or from programs delivered by the PAs themselves in their other service
9 areas (e.g., Ameren's efficiency programming in Missouri).⁵³ It is surprising to me
10 that the PAs would simply propose adoption of California values (many of which
11 are a few years old), when California experience and current markets are not likely
12 to be all that similar to Illinois. In their own backyard, there are ample studies from
13 places like Wisconsin and the Midwest Energy Efficiency Alliance that would be
14 more appropriate as a first step in estimating NTG ratios for planning purposes, and
15 perhaps in some cases for deeming values.⁵⁴

16 **Q. How do you suggest the PAs manage their portfolios if they don't know ahead
17 of time what NTG ratio they might need to adopt?**

18 A. The energy efficiency plans include fairly thorough discussions about risk
19 management.⁵⁵ The PAs note they plan to "over shoot" as a hedge against possible
20 adjustments to savings based on verifications and evaluations.⁵⁶ This is an

⁵³ See AG Exhibits 1.3 to 1.10, Ameren Responses to EPLC Data Requests 2.03, Attachments 1 through 7.

⁵⁴ For example, see AG Exhibit 1.9, Ameren's Response to ELPC Data Request 2.03 Attachment 2, Table 6, p. 13, Ameren provides an evaluation of an appliance recycling program they deliver in Missouri. Ironically, this evaluation estimated only 1,038 kWh per refrigerator savings, yet the PAs are asking to deem 1,900 kWh per refrigerator based on the California DEER Database.

⁵⁵ Ameren Exhibit 2.1, Section 3.3, page 29ff; ComEd Exhibit 1.0, Section 2.1, page 31ff.

⁵⁶ ComEd Exhibit 7.0, line 309ff.

1 appropriate way to approach this risk. The year 1 and 2 goals are relatively modest
2 (well below what leading states and utilities are currently capturing) and leave
3 plenty of room for hedging. Also, in many cases the PAs would have a full year to
4 ramp up program efforts if they found freeridership was higher than expected.
5 While retroactive adjustments clearly provide less certainty to PAs, the goal should
6 be to capture real savings, and the risk of not performing should fall to the PAs, as
7 they are the ones with the responsibility and authority to deliver the savings.

8 **Q. Should the PAs be required to retroactively adjust savings estimates as a**
9 **result of evaluation activities?**

10 A. Yes, I believe that in some cases this would be appropriate. As I noted
11 earlier, there is likely to be greater confidence in some deemed savings estimates
12 (e.g., C&I prescriptive lighting, low-income direct install) than in others (e.g.,
13 residential CFLs). I believe that the collaborative should determine which deemed
14 savings estimates or factors are most critical to evaluate in the first year or two of
15 program implementation and further agree on which evaluation results will be
16 applied retroactively and which applied only for future program savings
17 determinations.

18 **Q. What evaluation activities do you believe can be accomplished within the**
19 **proposed three percent budget?**

20 A. I believe there is ample time and budget to estimate virtually all
21 significantly uncertain NTG ratios.⁵⁷ Unlike gross technology performance which

⁵⁷ I recognize that NTG ratios include effects of spillover as well as freeridership. Spillover tends to build over time as programs transform markets, and also will require greater lag time to measure in many cases. However, in the first few years the programs are at such a low level spillover will be a fairly small factor.

1 is well understood and relatively stable, NTG factors are affected by many things
2 such as the economy, current market penetrations, program designs and
3 implementation strategies. While it may be appropriate to deem some NTG ratios,
4 I believe the evaluation budgets and timing are sufficient for most NTG ratios to be
5 studied and applied retroactively.

6 **Q. Do you agree with the PA's deemed values?**

7 No, not in all cases. I have not conducted a complete review of all the
8 deemed savings estimates provided by the PAs, but I have noted some examples
9 that appear to be inappropriate, listed below. That said, I believe the most
10 appropriate venue for negotiation of deemed savings estimates is the collaborative,
11 rather than this proceeding.

- 12 ▪ The per-lamp savings for CFLs presented by DCEO as part of it's
13 Lights for Learning program appear to be significantly higher than
14 those presented by the other PAs. For example, DCEO states the
15 savings for a 25W CFL as 110 kWh/yr, while Ameren's value is 60
16 kWh/yr.
- 17 ▪ The per-fixture savings estimated for Ameren (Ameren Exhibit 4.0,
18 p. 39) showed greater savings for a standard T8 than a high-
19 performance T8 system with the same baseline (84 watts versus 42
20 watts).
- 21 ▪ The savings estimate for refrigerator recycling is 1,900 kWh per
22 year with a Net-to-Gross ratio of 0.35. An evaluation for AmerenUE

Freeridership will dominate the NTG ratio variability until programs are more fully developed and more focused on future market transformation.

1 on its Refrigerator Recycling and Rebate Program shows that,
2 despite a program design claim of 1,718 kWh per year, the realized
3 savings were actually 1,038 kWh per year, or 60 percent of the
4 expected value. AG Exhibit 1.4, Ameren Response to ELPC Data
5 Request 2.03 Attachment 2

6 **VI. Cost Recovery and Spending Limitations**

7 **Q. What methods of cost recovery have ComEd and Ameren proposed?**

8 A. For the vast majority of spending, the utilities propose to collect all funds
9 from ratepayers contemporaneous with spending, on an annual basis.⁵⁸ For a small
10 portion of expenses (e.g., planning costs and demand response equipment), ComEd
11 proposes amortizing costs over a longer period.

12 **Q. Do you have any concerns with that approach?**

13 A. Yes. Amortizing program costs over a longer period of time would
14 minimize rate impacts and allow higher budgets, especially in the early years when
15 budgets may be tight. In fact, ComEd has proposed just this type of amortization
16 for its expenditures on demand response control equipment, recognizing that this
17 investment will produce long term benefits.⁵⁹ Energy efficiency resources should
18 be put on an equal footing with supply-side resources, whose cost are generally
19 amortized over the life of the resource. If utilities attempted to recover the entire
20 cost of a supply-side resource in the year it was built, it is unlikely that any power
21 plants would ever be built.

22 **Q. Why is it appropriate to amortize DSM costs?**

⁵⁸ See generally Ameren Exhibit 4.0 and ComEd Exhibit 5.0 discussing cost recovery proposals.

⁵⁹ Commonwealth Exhibit 5.0, line 178ff.

1 A. When an investment is made in efficiency measures, the savings accrue for
2 the life of the measure – often 10 years or more. Fully recovering all these costs in
3 the year the expenditure is made unnecessarily increases rates in the short term and,
4 increases the likelihood of hitting the statutory spending caps.

5 **Q. Isn't the method of cost recovery proposed by the utilities fairly common?**

6 A. Yes, especially since the advent of deregulation and the adoption of system
7 benefit charges (also called public benefits funds or public goods funds). However,
8 it is by no means the only method of cost recovery.

9 **Q. Wouldn't amortizing costs and recovering them over a longer period cost the**
10 **utilities money?**

11 A. No. Utilities can amortize the costs using the appropriate cost of capital
12 interest rate, and thus be made whole over time.

13 **Q. As spending levels climb and then even out over time after ramping up**
14 **efficiency efforts, won't this erode the benefits of amortization?**

15 A. Yes. Because in say year 10, PAs would be recovering a portion of past
16 efforts as well as current efforts, rate impacts would be similar under an
17 amortization approach. However, ComEd and Ameren have both indicated concern
18 with the early year spending caps and the risk of non-performance. As they gain
19 experience, build capability, and benefit from economies of scale the rate impact
20 caps will become less burdensome. Also, as discussed below, amortization can
21 resolve one of ComEd's concerns about banking savings.

22

23 **VII. Banking Savings**

24 **Q. What is "banking" of savings?**

1 A. ComEd has proposed banking, which it defines as the ability to count any
2 savings in excess of its annual goal toward the following year's goals.⁶⁰ For
3 example, if in 2008 ComEd exceeds its target savings by 1,000 MWh, then its 2009
4 goal would be reduced by 1,000 MWh.

5 **Q. Why do you oppose banking?**

6 A. If the PAs show they are capable of higher performance in a given year, the
7 PAs should have an easier time meeting and perhaps exceeding the following
8 year's goals. Illinois should take advantage of any over-performance by advancing
9 the ramp up to higher goals as fast as possible. The sooner that all cost-effective
10 efficiency savings are captured, the greater the economic and environmental
11 benefits to all Illinoisans.

12
13 **VIII. Conclusion**

14 **Q. Does this conclude your testimony?**

15 A. Yes.

⁶⁰ Commonwealth Exhibit 7.0, line 309ff.

AmerenCILCO's, AmerenCIPS', and AmerenIP's
Response to
Energy Law & Policy Center (ELPC) Data Requests
ICC Docket No. 07-0539
Approval of Energy Efficiency and Demand Response Plan

ELPC 2.11 Is Ameren familiar with the collaborative process NRDC recommends in its Comments or the New England collaborative model? If so, has Ameren considered these approaches for the new collaborative?

Response: Objection, the data request is immaterial and irrelevant, and not likely to lead to the discovery of admissible evidence. Further, who or what is "NRDC" or the New England collaborative is not explained. Without waiving the objection, the Ameren Illinois Utilities did not review or give consideration to other collaborative approaches.

Prepared By: Richard A. Voytas
Title: Manager, Energy Efficiency and
Demand Response
Phone: 314-554-4777
Date: December 12, 2007

ICC Docket No. 07-0540

**Commonwealth Edison Company's Response to
AG's (AG) Data Requests 2.0, 2.1, 2.3 and 2.4
Dated: December 5, 2007**

REQUEST NO. AG 2.3:

Please state whether Commonwealth Edison plans to offer any prescriptive rebates in the future as a part of any program for standard (as opposed to high performance) T8 lamps, ballasts or fixtures. If Commonwealth Edison plans to offer such prescriptive rebates, please provide detail on the types of rebates proposed and what assumptions were used to determine the level of the proposed rebates. If Commonwealth Edison does not plan to offer such prescriptive rebates, please explain what assumptions were used in reaching that decision.

RESPONSE:

Person responsible for response

Michael Brandt, Commonwealth Edison Company

In the modeling of its C&I Prescriptive Rebate program, ComEd did model standard T8 lamps, ballasts and fixtures. ComEd does plan to offer rebates for these technologies in this program. The rebates used in the analysis of the program were based on a review of incentives offered by other utilities. ComEd expects that the final mix of technologies and rebate levels will be determined as part of final program design, with input from both the program implementation contractor and the parties to the proposed collaborative process.

AmerenCILCO's, AmerenCIPS', and AmerenIP's
Response to
Office of the Illinois Attorney General (AG) Data Requests
ICC Docket No. 07-0539
Approval of Energy Efficiency and Demand Response Plan

AG 2.3 Please state whether the Ameren Companies plan to offer any prescriptive rebates in the future as a part of any program for standard (as opposed to high performance) T8 lamps, ballasts or fixtures. If the Ameren Companies plan to offer such prescriptive rebates, please provide detail on the types of rebates proposed and what assumptions were used to determine the level of the proposed rebates. If the Ameren Companies do not plan to offer such prescriptive rebates, please explain what assumptions were used in reaching that decision.

Response: The analysis underlying the Plan did include an assumption that rebates would be provided for replacement of existing T12 lamps and magnetic ballasts with standard T8s and electronic ballasts. The initial analysis assumed T8 incentive (8 foot lamp with electronic ballast) is \$14/fixture. This level is based generally on the SCE Express Efficiency rebate level of \$7.50 per 8 foot lamp; the fixture modeled in the Ameren Illinois Utilities' analysis was a 2-lamp configuration. It is also assumed that rebate levels would be adjusted during final design, and that the design would address key baseline issues to ensure that incentives are not paid for standard T8s in situations where a standard T8 is considered the baseline.

Prepared By: Val R. Jensen
Title: Senior VP, ICF International
Phone: (415) 677-7113
Date: December 12, 2007



EVALUATION OF AMERENUE'S CHANGE A LIGHT REBATE PROGRAM

Prepared for
AMERENUE

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In Partnership With
GDS ASSOCIATES

June 2007

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Executive Summary

The AmerenUE Change a Light rebate program promotes the sale of Energy Star® qualified lighting through a range of mechanisms including instant rebate coupons, product markdown efforts with manufacturers and retailers, and customer education efforts. The program is implemented by Midwest Energy Efficiency Alliance (MEEA) and based on the EPA program Change a Light, Change the World. (Further details on the program can be found in Section II.)

Based on the findings from this evaluation, program accomplishments between October 2003 and December 2006 include:

- Nearly 200,000 CFLs sold
- Forty seven participating retail locations where AmerenUE customers purchased program CFLs, with approximately 26 participating locations within AmerenUE territory
- A large number of first-time purchasers as a result of the program, and
- Over 79,831 MWh saved over the lifetime of the bulbs.

These program accomplishments are described in Section III.

Among non-participants within AmerenUE's service territory, 56% are not using any CFLs and 44% appear to be not very familiar with CFLs (i.e., 34% unfamiliar and 10% slightly familiar). This is similar to participant awareness of CFLs prior to program participation. Overall awareness in AmerenUE's territory is low compared to similar areas, and the AmerenUE program appears to be raising awareness of CFLs and reducing first costs. In addition, almost all participants in the program (94%) are satisfied with the CFLs that they purchased through the AmerenUE program, and 93% of participants report that they are likely to purchase CFLs in the future.

In addition to the high level of overall satisfaction among participants, the results of our impact analysis indicate that the program does lead to cost-effective energy savings. The impacts of the program (approximately 80 GWh) are relatively consistent with prior program estimates (described in more detail in Section IV), although our analysis made adjustments to the prior algorithm to more accurately reflect current trends in Missouri. Overall, therefore, this program is the most cost effective program in AmerenUE's current portfolio of energy efficiency programs, with more than ten times the savings of the other programs (and as much as 80 times the savings of some programs).

Based on our findings described in this report, we recommend that AmerenUE and the Collaborative consider the following process recommendations for future programs:

- Continue to offer the program to raise awareness among the 56% of non-participants who are not using CFL bulbs, and increase penetration of bulbs by reducing first cost
- Support mark down efforts since the program has been able to cost effectively move large numbers of bulbs this way

- Partner with additional retail locations to expand the reach of the program (particularly among those customers who are unaware)
- Expand the types of CFLs offered through the program and consider whether additional brands or wattages would increase program sales
- Conduct additional research with Home Depot stores to better understand in-service rates and other customer-based information for program purchases made through markdowns
- Expand advertising efforts to reach out to more non-participants who are not very familiar with CFLs
- Support and enhance in-store promotions
- Promote the benefits of CFLs including energy savings and other factors such as the environmental benefits and longer lifetime
- Keep good tracking databases while eliminating small inconsistencies and data gaps.

Details on each of these recommendations is provided in Section V.

I. Introduction and Methodology

The AmerenUE Change a Light rebate program promotes the sale of Energy Star® qualified lighting through a range of mechanisms including instant rebate coupons, product markdown efforts with manufacturers and retailers, and customer education efforts. The program is implemented by Midwest Energy Efficiency Alliance (MEEA) and based on the EPA program Change a Light, Change the World.

Since 2003, AmerenUE has offered a \$2 instant rebate coupons for qualified CFLs at participating retailer locations throughout its service territory. In 2006, AmerenUE also coordinated with Home Depot stores in the St. Louis area to mark down the price of qualified multi-packs of CFLs at the retailer level (i.e., no rebate coupons are required for participating customers).

This report provides a process and impact evaluation of the Change a Light Program, conducted by Opinion Dynamics Corp. in partnership with GDS Associates. This evaluation report is based on (1) our review of the program databases 2003-2006, (2) our review of MEEA's annual reports 2003-2006, (3) in-depth interviews with the MEEA program administrator and program stakeholders, (4) telephone interviews with program participants, and (5) telephone interviews with non-participating customers.

ODC interviewed 71 participating customers who used a rebate coupon to purchase a CFL at an Ace Hardware store in the Fall 2006. Our participant survey is based only on participants who used a rebate coupon at an Ace Hardware store since the program does not collect customer contact information for those who purchased CFLs through the markdown effort at Home Depot. Participant interviews were conducted between March 29, 2007 and April 1, 2007.

ODC also interviewed 100 AmerenUE customers who have not participated in the Change a Light rebate program. AmerenUE provided ODC with zip codes that fall within its service territory. Using this list, ODC obtained a random sample of phone numbers from these zip codes. We removed program participant phone numbers from this sample and conducted the non-participant interviews in April 2007.

We do not provide all of the detailed tables in the body of the write-up for the purpose of keeping the write-up as succinct as possible. Key tables are provided in the body of the write-up, with additional detailed tables denoted by the letter "D" and provided in Section VI of this report.

II. Program Description

AmerenUE has been participating in the Change a Light, Change the World lighting campaign since 2003. AmerenUE provides funding to MEEA which coordinates a regional promotion of Energy Star lighting products and engages in an educational Energy Star lighting campaign to train retailers and consumers on the value of and how to sell Energy Star products. The campaign includes incentives, advertising and point-of-purchase materials.

Over the four years of the program, total program costs amounted to approximately \$493,000, or 78% of the total amount budgeted for the program.

Table 1: Program Funds 2003-2006*

	Budget			
	2003	2004	2005	2006 [^]
TOTAL PROGRAM BUDGET	\$170,000	\$170,000	\$170,000	\$120,000
Marketing	\$17,777	\$29,883	\$14,587	\$1,343
Rebates/Markdowns	\$73,691	\$68,231	\$54,619	\$70,827
MEEA Administration	\$22,110	\$19,747	\$20,000	\$10,800
Retailer materials (POP)	\$1,184	\$100	\$ -	\$ -
Implementation and field services	\$18,645	\$16,565	\$22,494	\$9,435
Fulfillment	\$5,964	\$7,276	\$5,517	\$2,209
TOTAL PROGRAM COST	\$139,371	\$141,801	\$117,218	\$94,613
TOTAL 4-YEAR PROGRAM COSTS			\$493,003	

*Program costs are from MEEA for the period July 1st to June 30th (e.g., program year 2004 runs from July 1, 2004 thru June 30, 2005). MEEA has indicated that this corresponds closely to sales within the respective calendar year (e.g., the budget described above is for bulb sales in 2004 since the promotions are generally in the fall, and administrative costs go into the next year.) This is slightly different than actual costs reported by AmerenUE, but the differences are less than \$150 per calendar year.

[^] Program year 2006 is through March 31, 2007.

According to MEEA Annual Reports, AmerenUE's lighting program sought to sell between 65,856 and 73,241 bulbs per year, with slight increases occurring in 2004 and 2005, and a 9% increase for 2006.

Table 2: CFL Sales Goals

Year	CFLs
2003	65,856
2004	66,609
2005	67,026
2006	73,241
TOTAL SALES GOAL	272,732

Since 2003, the program has distributed bulbs through Ace Hardware stores. Several other stores also played a role in the program between 2003 and 2006, to various degrees:

- In 2003 only, in addition to Ace Hardware, Lowes also sold program bulbs. Lowes, however, participated in the program for only one year and did not sell rebated bulbs after 2003.
- In 2004, the only retailer was Ace Hardware.
- In 2005, the program sold bulbs through Ace Hardware and five other retailers, but the number of bulbs sold through the non-Ace stores was limited. Home Depot was one of the retailers that sold program bulbs in 2005. However, program records document that they sold only a small number of program bulbs due to the fact that many Home Depots had problems tracking and submitting coupons in 2005.
- In 2006, the program was changed (partly in response to prior difficulties with coupons at Home Depot). The program continued to offer rebate coupons for single GE CFLs sold at Ace Hardware stores outside of the St. Louis area, and introduced a markdown on 6-packs of Commercial Electric CFLs sold at Home Depots inside the St. Louis area. Thus, in 2006, there were two very distinct aspects of the program.

The variety of bulbs sold through the program has increased since the early years of the program. Only 3 types of bulbs were sold through the program in 2003 and 2004, while customers received rebates for 15 different types of compact fluorescent bulbs in 2005 and 13 types of bulbs in 2006. (See Table 3.) Notably, however, in the St. Louis area in 2006, Home Depot promoted only one bulb type, a 13 watt 6-pack of CFLs.

Table 3: Number of Unique Bulb Types Sold Through the Program

CFL Wattage	2003	2004	2005	2006
	# of Bulb Types Sold through the Program			
10W	--	--	--	1
11W	--	--	--	2
13W	--	--	1	2
14W	--	--	2	--
15W	1	1	5	4
20W	1	1	1	1
23W	--	--	2	--
26W	1	1	2	2
29W	--	--	1	--
32W	--	--	1	1
TOTAL	3	3	15	13

With the addition of Home Depot, the program expanded from only offering GE CFLs, to offering Commercial Electric CFLs. The program also expanded from offering single packs to multi-packs, and the rebate amount per unit increase accordingly (as shown in **Error! Reference**

source not found.)¹. Again, however, as mentioned above, in 2006, the program only offered one type of bulbs through Home Depot (a 13-watt 6-pack of Commercial Electric CFLs). The other 12 types were offered at Ace Hardware stores outside of St. Louis.

In addition to the money spent on rebates, the program also investing in marketing and consumer education. The 2003-2006 marketing efforts included co-op advertising with Ace Hardware, the main retailer.² This advertising included print advertising in newspapers and Ace Hardware "shoppers" and circulars. All of the print advertising included the Change a Light, Change the World logo, price after instant rebate and listed AmerenUE as the program sponsor. For the 2006 campaign MEEA created a CFL ad template. By creating this ad template, it made the approval process much more efficient. The only requirement was that the retailer needed to use the AmerenUE logo. Also in 2006 AmerenUE began advertising the program though bill inserts to Missouri customers.³

The program also held CFL press/sales events. These events were designed to generate media coverage and PR for sponsors, educate customers on the benefits of CFLs, promote instant rebate and boost sales, and attract new retailers to the program. Five of these events per year were held in Missouri in both 2003 and 2004, three were held in 2005. Also in 2005 Ace retailers invited local radio stations to broadcast live from their stores in late October

In order to offer a coherent regional message to Midwest consumers, MEEA used the same point of sale (POS) template created for Wisconsin's Focus on Energy program. Materials were customized to have the AmerenUE logo included. MEEA coordinated the delivery of the POP materials to participating retailers such as Ace to ensure retailers received them and properly displayed them. These materials included directional signage, shelf shouters, promotional banners, reward forms, fact sheets and a promotional outline.

There was also a toll-free phone number customers could call to get more information on the program.

¹ We do not provide all of the detailed tables in the body of the write-up for the purpose of keeping the write-up as succinct as possible. Detailed tables not provided in the body of the write-up are provided in Section VI, and are denoted by the letter "D."

² In addition to co-op advertising, the 2003 program also relied on the national public relations efforts to bring awareness of the program. However due to the limited budget MEEA was unable to ensure that the local media knew there was a local story to tie to a national story though they were able to get some local radio coverage.

³ Despite the small budget for marketing in 2006, the MEEA annual report indicates that this occurred.

III. Program Accomplishments

Between 2003 and 2006, program accomplishments include:

- Nearly 200,000 CFLs sold
- Forty seven participating retail locations where AmerenUE customers purchased participant bulbs, with approximately 26 participating locations in AmerenUE territory
- A large number of first-time purchasers as a result of the program, as well as 66% of the CFLs in participant's homes purchased through the program, and
- Over 79,831 MWh saved over the lifetime of the bulbs

These accomplishments are described in more detail below.

Nearly 200,000 Compact Fluorescent Light Bulbs Sold

Between 2003 and 2006, the AmerenUE program moved 196,807 compact fluorescent light bulbs into their market. Interestingly, the number of bulbs moved each year decreased from 2003 to 2005, but then increased to nearly 61,000 in 2006 with the addition of the "markdown" offering by Home Depot. In 2006, Home Depot was able to move as many bulbs as in earlier years for a much lower cost. This was primarily due to the fact that Home Depot sold 6-pack units through a markdown promotion.

Table 4: Total Number of Bulbs Purchased by Program Year (2003-2006)

Year	Total Number of Bulbs Purchased	Average Program Cost per Bulb ^a	Estimated Cost per Bulb based on Goals
2003	49,170	\$2.83	\$2.58
2004	47,056	\$3.01	\$2.55
2005	39,635	\$2.96	\$2.54
2006	60,946	\$1.55	\$1.64
Total	196,807	\$2.51	--

a. Number of bulbs sold is from calendar year while program costs are for a fiscal year that generally runs from June to July.

Notably, however, the number of bulbs sold in this four year period falls short of the original program goals shown in Table 2 in the prior description of the program and program goals. Some of the budget was not spent since costs came in under budget. In looking at the average cost per bulb against the original goals, the average costs of the program was higher in 2003-2005 but the addition of the markdown in 2006 brought down the average cost significantly—even lower than originally anticipated (i.e. \$1.55 per bulb compared to an estimated \$1.64 per bulb).

While the number of unique households was not available for all program years, a review of the 2005 data gives some indication of the number of customers touched by the program. Based on our review of the 2005 data, 6,508 unique households received rebates in 2005. The average number of CFLs sold through the program per home was approximately six.

Customer information was not available for all bulbs sold in 2006 because Home Depot offered a markdown where customer data was not collected. However, based on the 2006 data for Ace Hardware purchases, 2,077 unique households received rebates through an Ace Hardware store in 2006. In addition, we estimate that between 4% and 11% of non-participants were touched by the markdown component of the program based on interviews with non-participants. Based on our survey results, at least 4% of non-participants purchased bulbs through the Home Depot mark downs; these respondents reported purchasing multi-packs of CFLs that were marked down or on sale. An additional 5% of non-participants stated that they purchased a multi-pack of CFLs from Home Depot but stated that they paid full price for the pack and another 2% did not recall if they paid full price (see **Error! Reference source not found.**).

Thus, while not a perfect estimate, the number of households served through this program between 2003-2006 could be as large as 32,000⁴—however, this is most likely an overestimate due to program overlap between years, and the fact that in 2006, many of the purchases were 6-packs through Home Depot, which would increase the average number of bulbs sold per home (and decrease the overall number of homes affected).

Forty Seven Participating Retail Locations Where AmerenUE Customers Purchased Program Bulbs, Approximately 26 Participating Locations in AmerenUE Territory

Table 5 shows a total of 47 stores where AmerenUE customers purchased rebated CFLs in 2006. Many of these were outside of AmerenUE's territory (because this is a regional rebate program so some border AmerenUE customers may purchase at stores in other areas) and sold only a small number of bulbs to AmerenUE customers. Less than two-thirds of those 47 stores (or 26) sold more than 100 bulbs. (MEEA reports that 29 stores in AmerenUE's territory were participating stores in 2006.)

⁴ Total program bulbs divided by the average number of bulbs sold per home, six.

Table 5: Total Number of Locations where AmerenUE Customers Purchased Rebated CFLs

Store Type	2003		2004		2005		2006	
	# of Stores 2003	# of Stores With >100 Bulbs Sold in 2003	# of Stores 2004	# of Stores With >100 Bulbs Sold in 2004	# of Stores 2005 ^a	# of Stores With >100 Bulbs Sold in 2005	# of Stores 2006	# of Stores With >100 Bulbs Sold in 2006
Ace Hardware	14	12	42	25	26 ^b	16	25	10
Do It Best	--	--	--	--	2	0	--	--
Home Depot	--	--	--	--	8 ^c	3	15	15
Hy-Vee	--	--	--	--	--	--	2	1
Lowe's	12	9	--	--	--	--	--	--
Menards	--	--	--	--	4	0	1	0
Theisens Farm & Home	--	--	--	--	1	0	--	--
True Value	--	--	--	--	3	0	4	0
TOTAL	26	21	42	25	44	19	47	26

Note: The revised data that we received did not include information on the stores where bulbs were sold in 2003.

^a Two locations (one Home Depot and one Ace) were referred to in two different ways so we combined them to reflect one unique location.

^b Twelve locations and 1,318 bulbs were not accounted for in the *AmerenUE Ace Orders 2005.xls* file.

^c Three Home Depot locations were only included because customers mailed in the rebate coupons and 2,370 of the Home Depot bulb sales were listed under "Home Depot" with a location of Atlanta, GA.

The overall trend is that the number of locations where customers purchase program bulbs has not increased a whole lot. The 2005 and 2006 programs included the addition of some Home Depot stores, but a commensurate reduction in the number of Ace Hardware stores. Thus, while the program has attempted to include two types of stores (that is, hardware stores and home improvement stores), the number of locations has fluctuated over the years and the stores selling more than 100 bulbs per year has not shown an increasing trend over the four year period. (See Table 5.)

Ace Hardware has been the most consistent retailer over the program period covered, with the majority of the bulbs moved by Ace Hardware. However, while the majority of bulbs sold through the program over the program period 2003-2006 were sold through Ace Hardware, there was a decrease in the number of Ace Hardware stores that sold rebated bulbs between 2004 and 2005. In 2006, the number of bulbs sold through Ace Hardware also significantly decreased. (See Table 6.)

Program sales at Home Depot, however, increased drastically in 2006 with the introduction of the markdown of 6-packs of bulbs. Home Depot sold 75% of all bulbs in 2006, followed by Ace Hardware which sold most of the remaining 25% of bulbs in 2006.

Table 6: Total Number of Bulbs Purchased by Store Type

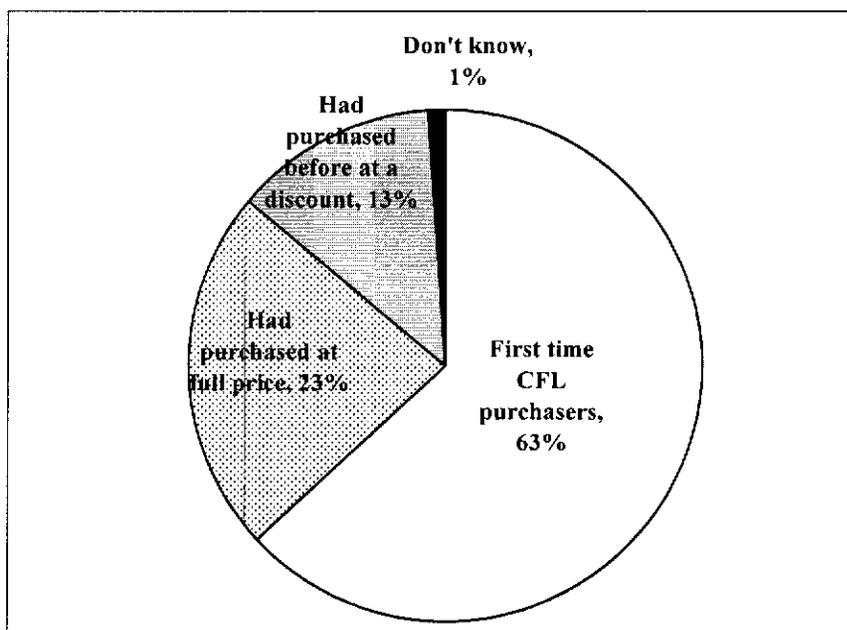
Store Type	# of Bulbs Purchased in 2003	# of Bulbs Purchased in 2004	# of Bulbs Purchased in 2005	#Bulbs Purchased in 2006	Total
Ace Hardware	39,380	47,056	35,547	15,076	137,059
Home Depot	--	--	4,012	45,684	49,696
Lowe's	2,899	--	--	--	2,899
Hy-Vee	--	--	--	148	148
True Value	--	--	36	34	70
Do It Best	--	--	20	--	20
Menards	--	--	14	4	18
Theisens Farm & Home	--	--	6	--	6
Unaccounted for ^a	6,891	--	--	--	6,891
TOTAL	49,170	47,056	39,635	60,946	196,807

^a These bulbs were included in the *Sales-Data - AMEREN_Final.xls* file but not *2003 cal Ameren data.xls* file where stores were included.

A Large Number of First-time Purchasers

Nearly two-thirds (63%) of the program participants were first time CFL purchasers (See Figure 1).

Figure 1: Previous CFL Purchases Among Participants



Many (47%) of the first time purchasers found out about the program because they saw it in a store, while others heard about it through a bill insert (9% of first time purchasers) or a newspaper ad (13%) (See Error! Reference source not found.).

Overall, participants report having a median of eight CFLs installed per home (See **Error! Reference source not found.**) compared to non participants, where the median is zero CFLs installed per home.⁵ Based on survey results, we estimate that 66% of all CFLs currently installed in participants homes were installed through the AmerenUE rebate program.⁶

Over 79,831 MWhs Saved Over the Lifetime of the Bulbs

Our impact analysis, described below, shows that 79,831,392 kWh are estimated to be saved over the lifetime of the program bulbs. The average savings per bulb is estimated to be between 48 kWh-51 kWh per year, or 0.0034-0.0036 kW, based on the changing types of bulbs sold over the 2003-2006 program period.

For the 2006 period alone, we estimate that the 60,946 bulbs sold resulted in 2,469 kW saved, and an annual savings of 2,432,941 kWh (or 48 kWh per bulb per year).

⁵ We used median instead of mean given outliers. The mean for non-participants is four because of a small percentage of homes that report many CFLs.

⁶ Total number of CFLs installed is based on QS1 and QS2 (749 CFLs). Number of CFLs purchased with a rebate and currently installed is based Q8, Q9, Q10 and Q11a. Q8 and Q9 verify and correct the number of CFLs purchased with a rebate and Q10 and Q11 ask how many of these bulbs are installed. Overall there are 496 rebated bulbs currently installed. $496 \text{ CFLs} / 749 \text{ CFLs} = 66\%$

IV. Impacts and Cost Effectiveness Analysis

The standard calculation for CFL energy savings is based on two assumptions: 1) an estimate of the difference between wattage of the incandescent lamp and wattage of the CFL that replaces it, and 2) an estimate of the average number of hours the CFL is used, or "hours of operation" as shown in the algorithm below.

Compact Fluorescent Lamp Savings Calculation

$$\text{kWh} = \text{watts saved} * (\text{hrs of operation per day} * 365 \text{ days})$$

$$\text{verified gross kWh} = \text{watts saved} * (\text{hrs of operation per day} * 365 \text{ days}) * \text{installation rate}$$

$$\text{realization kWh} = \text{verified gross kWh} * (1 - \text{freeridership rate}) * (1 + \text{spillover rate})$$

Assumptions of installation rate, spillover, and freeridership are then taken into account. For our analysis, these three factors come from the Opinion Dynamics Corporation survey of participants conducted for the evaluation (and described above). The survey found an installation rate of 84%, a spillover range from 7.7-12.8% (so an average of 10.25% was used), and a freeridership rate of 28%. These factors are described in more detail below.

Table 7 below, shows out estimated of savings for this program. The savings used in this evaluation are denoted as ODC/GDS. Quantities for number of CFLs purchased are obtained from the program databases, described above.

Table 7: Summary of CFL Savings

	Gross				Lifetime
	Purchased Light Bulbs	Demand Reduction / CFL	Saved Connected kW	Annual kWh Savings	kWh Savings
ODC/GDS 2003	49,170	0.0036	2,543	2,505,837	20,341,648
<i>MEEA 2003</i>	49,047	0.0036	2,522	3,237,102	22,659,714
ODC/GDS 2004	47,056	0.0036	2,415	2,380,377	19,323,200
<i>MEEA 2004</i>	47,056	0.0036	2,420	3,105,696	21,739,872
ODC/GDS 2005	39,635	0.0035	2,009	1,979,533	1,662,808
<i>MEEA 2005</i>	39,616	0.0036	2,037	2,024,377	2,024,377
ODC/GDS 2006	60,946	0.0034	2,939	2,896,358	2,432,941
<i>MEEA 2006*</i>	53,170	0.0036	2,734	2,716,986	2,282,268
Total ODC/GDS Savings from Program Bulbs:					79,831,392 kWh

*MEEA's 2006 data is currently being updated. The number of purchased light bulbs will be increased.

In the table below, we compare our findings to earlier findings reported in the MEEA annual reports. As the table above shows, our estimates are lower than MEEA's estimate of gross savings. This is suspected to be due: (1) adjustments made to hours of operation, (2) adjustments made to the displaced wattage, and (3) adjustments made to the lifetime of the bulbs. The specific assumptions behind our estimate of energy savings are laid out below.

Displaced Wattage

The distribution of bulbs sold through the program varied from year to year (i.e., the average wattage of the bulbs sold through the program in 2004 is 17.5 watts compared to 14.2 watts in 2006 because most of the bulbs sold were 13 watts).

Table 8: Total Number of Bulbs Purchased By Wattage Type

CFL Wattage	2003		2004		2005		2006	
	Number of Bulbs Sold	Percentage of Bulbs Sold	Number of Bulbs Sold	Percentage of Bulbs Sold	Number of Bulbs Sold	Percentage of Bulbs Sold	Number of Bulbs Sold	Percentage of Bulbs Sold
10W	--	--	--	--	--	--	8	<0.1%
11W	--	--	--	--	--	--	3	<0.1%
13W	--	--	--	--	14	<0.1%	45,688	75%
14W	--	--	--	--	3,280	8.3%	--	--
15W	36,939	75.1%	34,406	73.1%	27,464	69.3%	10,430	17.1%
20W	1,297	2.6%	3,630	7.7%	2,022	5.1%	1,827	3.0%
23W	--	--	--	--	732	1.8%	--	--
26W	10,934	22.2%	9,020	19.2%	5,874	14.8%	2,985	4.9%
29W	--	--	--	--	223	0.6%	--	--
32W	--	--	--	--	26	0.1%	5	<0.1%
TOTAL	49,170	100%	47,056	100.0%	39,635	100.0%	60,946	100%
Average Wattage	17.6 watts		17.5 watts		17.0 watts		14.2 watts	

The estimate of gross savings for CFLs assumes an incandescent comparable wattage for light bulbs being converted to CFLs. The values for these wattages come from the manufacturer's website when possible. On the websites are listed the CFL wattages and their equivalent incandescent wattages by CFL model number. When the manufacturer information was not available, we used standard equivalents from the Energy Star website. Most wattages came from the Energy Star website.

Table 9: Watts Saved Based on Standard Assumptions

CFL Wattage	Standard Equivalent ^a	Watts Saved
10w	40w	30w
11w	40w	29w
13w	60w	47w
14w	60w	46w
15w	60w	45w
20w	75w	55w
23w	100w	77w
26w	100w	74w
29w	100w	71w
32w	150w	118w

^a http://energystar.custhelp.com/cgi-bin/energystar.cfg/php/enduser/std_adp.php?p_faqid=2563&p_created=1148315013&p_sid=pO4ygPui&p_accessibility=0&p_redirect=&p_lva=&p_sp=cF9zcmNoPTEmcF9zb3J0X2J5PSZwX2dyaWRzb3J0PSZwX3Jvd19jbnQ9MzkmcF9wcm9kecz0zMTUmcF9jYXRzPSZwX3B2PTEuMzE1JnBfY3Y9JnBfcGFnZT0x&p_li=&p_topview=1

Prior estimates from MEEA did not look at the specific bulbs sold through AmerenUE's program, and assumed that the average bulb sold through the program was a 17 watt bulb.

Hours of Use

Our study used an hours of use estimate of 2.7 hours/day. A review of the hours of use assumptions that MEEA used to estimate savings shows that for 2003 and 2004, MEEA assumed that the average CFL use was 3.5 hours/day. MEEA then revised their assumption in 2005 (based on refined research in other areas of the country⁷) down to 2.7 hours a day for 2005 and 2006. Several of the assumptions behind MEEA's (and WI Focus on Energy's) early hours of use estimate stem from values determined by surveys, studies and reports. The early estimate of 3.5 hours of operation for CFLs is based off of a study completed in 2005 by Glacier Consulting Group, LLC. However, in the memo "Adjustments to CFL Operating Hours – Residential", the report notes how Focus on Energy's default use of 3.5 hours per day was too high. Their study concluded an average use of 2.7 hours per day was more accurate. In our analysis, we use the 2.7 hours/day estimate since this has been shown to be a more accurate estimate of usage.

Lifetime of Bulbs

The rated life in hours is also listed on the manufacturer's website. Hours of life vary between bulbs. The rated life was determined by the specifications for each bulb, as listed on the manufacturer's website. Lifetime savings are calculated using each bulb's rated life.

Our estimates differ from MEEA's earlier estimates because MEEA uses a lifetime of seven years for all CFLs while GDS uses the rated life in hours provided by the manufacturer of the CFLs. (The WI values that MEEA adopted assumed a straight 7-year bulb life regardless of the lamp use per day. The rationale used for that analysis was that the average manufacturer reported lamp life was between 5,000 and 10,000 hours. Seven years was deemed an average life by the program.)

In-service or Installation Rate

Based on our survey of participants in 2006, the majority of the CFLs (84%) purchased through the program are currently installed and most of those that are not are in storage for future use. We note, however, this may be different for purchasers at Home Depot in 2006 since these bulbs were sold as 6-packs. The number from our survey, based on participants at Ace Hardware, is used as a best estimate at this time.

⁷ May 23, 2005 memo from WI Focus on Energy evaluation contractor to the Public Service Commission of Wisconsin regarding adjustments to CFL operating hours for the residential program.

Table 10: CFLs Purchased Through Program

	Use of Program Bulbs
Currently installed	84%
Stored for future use	12%
Given away	4%
Removed	<1%
In place but no longer working	<1%

Freeridership

In our survey, we asked participants standard freeridership questions concerning what they would have done in the absence of the rebate program. About one-third (35%) would have been willing to pay the full cost of the CFL (\$2 more than they paid with the rebate coupon).

Table 11: Willingness to Pay

	Total (n=71)
Would have paid \$2 more	35%
<i>First time CFL purchaser</i>	17%
<i>Purchased CFLs prior to participating</i>	17%
Would have paid \$1 more	30%
<i>First time CFL purchaser</i>	18%
<i>Purchased CFLs prior to participating</i>	11%
Would not have paid more	30%
<i>First time CFL purchaser</i>	24%
<i>Purchased CFLs prior to participating</i>	6%
Don't know	5%
<i>First time CFL purchaser</i>	4%
<i>Purchased CFLs prior to participating</i>	1%

Participants who were willing to pay the full cost of the CFL were then asked how many CFLs they would have purchased if there had not been a rebate available. We used this question to adjust the level of freeridership for any respondent to account for partial freeridership as the program may enable someone to purchase more CFLs than they otherwise would have. Based on these responses overall freeridership is 28% as shown in the table below.

Table 12: Freeridership Calculation

Purchased CFLs Without Program	Freerider Scoring	Total (n=71)	Free-Ridership Score
Definitely would have purchased the same number or more	100%	12%	12%
Probably would have purchased the same number	90%	6%	5%
Probably would have purchased fewer	75%	11%	8%
Definitely would have purchased fewer	50%	4%	2%
Would have purchased but don't know how many	100%	1%	1%
Would not have purchased	0%	65%	0%
FREE RIDERSHIP RATE			28%