STITES & HARBISON PLLC
ATTORNEYS

421 West Main Street
Post Office Box 634
Frankfort, KY 40602-0634
[502] 223-3477
[502] 223-4124 Fax
www.stites.com

December 2, 2009

Mark R. Overstreet
(502) 209-1219
(502) 223-4387 FAX
moverstreet@stites.com

HAND DELIVERED

Jeff R. Derouen
Executive Director
Public Service Commission
211 Sower Boulevard
P.O. Box 615
Frankfort, KY 40602-0615

RE: P.S.C. Case No. 2009-00339

Dear Mr. Derouen:

On November 25, 2009, Kentucky Power filed its Responses to the Commission Staff's first set of Data Requests. Pages 2-46 of the Response to Data Request No. 4 inadvertently were omitted.

Please find and accept for filing the original and ten copies of the Company's complete response to Data Request No. 4.

By copy of this letter I am serving of a copy of the complete response on counsel for Kentucky Industrial Utility Customers, Inc., Kentucky Department for Energy Development and Independence, and the Attorney General. Please do not hesitate to contact me if you have any questions.

Very truly yours,

Mark R. Overstreet

cc: Quang D. Nguyen (without enclosure)
Dennis G. Howard, II
Michael L. Kurtz
John Davies

Kentucky Power Company

REQUEST

Refer to page 3-8, specifically, the last paragraph in Section E.4. and Exhibit 3-3 of the IRP.

a. Confirm whether the programs identified on the graph in the exhibit are the programs recommended in the Indiana Market Potential Study ("MPS').

b. If the answer to part a. of this request is yes, provide the description from the Indiana MPS of each of the programs identified in the exhibit

RESPONSE

a. Yes.

b. Please see the attached Pages 2 through 46. Note: The Demonstrations and Renewables program (pages 10-11 of attachment) was not modeled because this program contains five program elements and each of these program elements are currently non-cost effective and together, the set is not cost-effective. The demand response programs (pages 4-9) were evaluated but are not depicted on Exhibit 3-3 of the IRP.

WITNESS: Errol K Wagner

DSM PROGRAMS

Programs bundle related energy savings measures or demand reduction measures. The cost effectiveness of the individual measures is shown in the measure tables in the previous section of this report, where individual measure rankings may be reviewed. In moving from the level of consideration of individual measures to the program level, we have included the program administrator's program costs (sometimes called the utility program costs) along with the costs of the individual measures that have been assembled into each program. The cost-effectiveness tests applied at the program level include the additional costs to manage the programs and costs of program evaluation. Cost-effectiveness testing of the programs requires assumptions about the relative frequency of individual measures included in each program option. Using this approach, recommended programs are listed in Table 17.

I&M will, of course, make the final selection of programs to be submitted for regulatory approval. For programs ultimately selected and approved, I&M will then develop a scope of work and will then (for most programs – any that are not determined to be best run internally) issue a RFP to the program vendor community to elicit proposals from which a vender may be selected. Each vendor will propose full program designs in their bid package. The final program designs (the ones actually implemented) will be based on the planned design as approved by the Commission, the scope of work developed by I&M, and the selected vendor's proposal.

Today, most DSM programs are managed with a small internal staff responsible for vendors who do most of the work to implement the programs, develop relationships essential to increasing customer participation, carry out day-to-day operations, and perform the work of data entry for program tracking.[11] There will need to be a sufficient internal I&M DSM staff to insure that program control is efficient and effective and that responsibilities and lines of accountability of vendors to I&M are kept crystal clear.

The programs presented below were designed to capture the most cost-effective opportunities from the Energy Efficiency Measures (EEMs) identified earlier in this report. Cost effectiveness results are presented for all of the programs in the following section of the report. Each of the program plans presented in this section contains information on program design, participation, expected savings, tracking concerns, and implementation budget. This information is organized as follows:

- Description of program design including measures and incentives. This description leads off each program plan.
- Rationale for the program. This is a brief description of the logic of the program.
- Participation and measures included in the program, along with expected energy savings. This provides a five-year overview of number of participants and expected energy savings (annual kWh savings and kW reductions).

[11] Be sure to require vendors to provide consistent and timely tracking system inputs as a condition of submitting a bid. The program tracking system is usually best internal to the company (so it will be consistent across programs rather than each vendor bringing their own system), but the detailed input is usually best made part of program vendor responsibilities (so as to avoid duplication of input effort).

- Marketing Plans. A brief description of suggested marketing efforts specific to the program.[12]
- Program Tracking Considerations
- Detailed Budget Plans. Annual program implementation budgets for five years.
- In addition to the specific plans for each program, it is recommended to have a general marketing and promotional effort to support DSM and to help customers become aware of the programs. This will include effective energy efficiency education efforts, including education in the schools and an energy audit web tool.

Note that in some of the program descriptions organizational or product names are given. These are not recommendations of specific groups or brands, but are included as links for developing further information.

Table 17. Program Recommendations

No.	Program Name	Description	Recommended
Direct Load Control Programs			
1	C&I Peak Reduction	Air conditioner DLC for commercial, industrial and institutional customers	Yes
2	Residential Peak Reduction	Air conditioner and electric hot water heater DLC for residential customers	Yes
Research and Demonstration Projects			
3	Renewables & Demonstrations	Demonstrations to push limits and learning for new technologies; and to build customer attention to green and DSM/DR programs	Yes
Commercial and Industrial Programs			
4	C&I Incentives	Sets of improvements or special measures proposed for individual situations	Yes
5	C&I Rebates	Prescriptive measures for non-residential customers	Yes
6	C&I Retro-Commissioning Lite	Tuning of controls	No
7	C&I HVAC Optimization	Check and optimization of HVAC units	No
8	C&I Audit	Audit program focused on food processing and refrigeration (supermarkets and restaurants)	Yes
9	C&I New Construction	New buildings	Yes
Residential Programs			
10	Residential Whole House	Free remote audits with kit available to all customers; on-site audit with direct install of low-cost items and kit for fifty dollars (refundable against installation cost of items recommended in audit)	Yes
11	Residential Rebates	Energy efficient lighting and clothes washers	Yes
12	Residential Appliance Recycling	Pick-up and environmental disposal	Yes
13	Residential New Construction	New buildings	No
14	Residential Solar Siting	Solar orientation, passive design, work on codes	Yes
15	Residential Low & Moderate Income Weatherization	Homes with electric heat and electric hot water, income at or below 150% of the federal poverty level or at or below 80% of median income	Yes

[12] While marketing is addressed for each program, we recommend bundling the programs so that from a customer perspective there are no more than nine options. Although programs will be selected and evaluations performed on the individual programs, for customer communications a simplified menu approach is more appropriate. For a model of how the menu approach works, go to http://www.pge.com/index.html. This site divides into "For my Home," and "For my Business." Then programs are listed branching from these two options. The programs as they appear to the customer are constructed to make sense from the logic of customer communication and the logic of efficient program administration, rather than as many individual programs.

Program 1. Commercial and Industrial Peak Reduction

Approximately 10,000 South Bend, Indiana area customers of I&M are taking part in a demonstration of new metering technologies. In this effort, I&M is collaborating with the Indiana Utility Regulatory Commission (IURC) and the Indiana Office of Utility Consumer Counselor (OUCC).[13] The pilot is also part of an initiative with General Electric. The pilot is a deployment of "smart grid" technologies, and is expected to be a precursor to eventual system-wide implementation of the technologies. Currently, the pilot is limited to homes and businesses located west and northeast of downtown South Bend, Indiana.

GE smart meters, which are digital meters connected to a two-way radio frequency communications network provide immediate feedback information both to the customer and to the utility company.[14] The smart meter technology supports:

- Time-of-use prices, where the cost of electricity is lower during off-peak periods and higher during times of peak use,
- Direct load control, a feature that allows automatic adjustments to central air conditioning units during periods of peak demand during summer months in exchange for price incentives on electric rates, and
- The ability to pre-pay for electricity service.

The company will also work with homebuilders to install advanced energy controls in fifty new homes. For the South Bend pilot, all systems will be in use by the second quarter of 2009 and will be evaluated for one year.

For this program, we focus on load control, although clearly the new smart grid technologies offer the opportunity to explore development of several other kinds of customer service initiatives, including time of use pricing. A load control program is a dispatch program. In a dispatch program, a switch can be engaged to send a signal which directly reduces load. Direct load control is an important approach to peak reduction because it offers low cost to the company and is dispatchable.

Rationale

Load (KW) constraints are one of the most costly events a utility encounters. During peak times when demand escalates and there is a problem with meeting demand with additional generation supply (either physically or at reasonable cost), the cost per kW to the company can escalate exponentially. For this reason, in these situations load control is essential to control costs and insure service.

Participation and Measures

Measures are shown below.

Table 18. Measures – C&I Peak Reduction

Measures
DLC – Non Res AC

[13] I&M and the OUCC worked collaboratively to define the scope of the program, select the technology, develop programs, design experimental tariffs, and will work together to measure the results.
[14] The project includes General Electric's ENMAC system. ENMAC is a fully integrated, advanced network management system that automates the real-time management, monitoring and control of electrical distribution networks.

Projected participation by year is shown in the table below.

Table 19. Estimated Participation and Savings – C&I Peak Reduction

Potential participants				10,290
Per participant savings (kWh):				0
Per participant savings (kW):				9.5
Program Year	**Incremental Participants**	**Percent Participation**	**kWh Saved**	**kW Saved**
Year 1	206	2.0%	-	1,964
Year 2	515	5.0%	-	4,910
Year 3	617	6.0%	-	5,882
Year 4	720	7.0%	-	6,864
Year 5	823	8.0%	-	7,846
Cumulative	2,881	28.0%	-	27,466

Marketing Plans

Since DLC will proceed with the roll out of new meters following the model of the South Bend pilot, marketing will likely be targeted to specific areas within the I&M Indiana service territory. Marketing should take advantage of current concerns for mitigating climate problems by emphasizing a green marketing theme and can include the following elements:

- Proposed marketing efforts are to include mention of the program in any communications with Commercial, Industrial, and Institutional customers regarding energy efficiency program options such as bill inserts, recognition window stickers for participating businesses, customer service representatives, and promotion using the I&M website.
- The program can involve key customer account managers to interact with customers regarding the benefits of the program.

Program Tracking Considerations

Direct load control is data intensive and load management data is precise. When load events are called either for capacity shortages or as tests, the systems self-validate. Care needs to be taken to insure the collection of data elements sufficient to show the baseline condition at the time an event is called and the response to the call as a kW effect. The duration of each event for evaluation purposes should also last long enough to show the affected units back on line to demonstrate there are no unexpected effects.

Detailed Budget Plans

An estimated five-year budget for this program is provided below. The anticipated cost to I&M for offering this program to customers involves budgets for:

- A participant incentive of $250 each summer (5 monthly payments of $50).
- Cost of equipment prorated to the DLC effort ($100) plus the cost of connecting the controlled equipment ($150).

Cost to the participants is to accept the temporary load control when incidents are called.

Table 20. Estimated Five-Year Program Budget - C&I Peak Reduction

	Cost per Participant	Year 1	Year 2	Year 3	Year 4	Year 5	5-Yr Total	Percent of Total
Fixed Program Costs								
Implementation & Other Annual Cost		$50,000	$0	$0	$0	$0	$50,000	2%
DSM Staffing		$44,000	$44,000	$66,000	$66,000	$88,000	$308,000	10%
Program Monitoring & Evaluation		$15,000	$15,000	$15,000	$15,000	$15,000	$75,000	2%
Variable Program Costs								
Incentives (paid annually to participants)	$250	$51,500	$180,250	$334,500	$514,500	$720,250	$1,801,000	58%
Delivery & Other	$303	$62,315	$155,788	$186,643	$217,800	$248,958	$871,503	28%
Total Budget		$222,815	$395,038	$602,143	$813,300	$1,072,208	$3,105,503	100%

Program 2. Residential Peak Reduction

Approximately 10,000 South Bend, Indiana area customers of I&M are taking part in a demonstration of new metering technologies. In this effort, I&M is collaborating with the Indiana Utility Regulatory Commission (IURC) and the Indiana Office of Utility Consumer Counselor (OUCC).[15] The pilot is also part of an initiative with General Electric. The pilot is a deployment of "smart grid" technologies, and is expected to be a precursor to eventual system-wide implementation of the technologies. Currently, the pilot is limited to homes and businesses located west and northeast of downtown South Bend, Indiana.

GE smart meters, which are digital meters connected to a two-way radio frequency communications network provide immediate feedback information both to the customer and to the utility company.[16] The smart meter technology supports:

- Time-of-use prices, where the cost of electricity is lower during off-peak periods and higher during times of peak use,
- Direct load control, a feature that allows automatic adjustments to central air conditioning units during periods of peak demand during summer months in exchange for price incentives on electric rates, and
- The ability to pre-pay for electricity service.

The company will also work with homebuilders to install advanced energy controls in 50 new homes. For the South Bend pilot, all systems will be in use by the second quarter of 2009 and will be evaluated for one year.

For this program, we focus on Residential load control, although clearly the new smart grid technologies offer the opportunity to explore development of several other kinds of customer service initiatives, including time of use pricing. A load control program is a dispatch program. In a dispatch program, a switch can be engaged to send a signal which directly reduces load. Direct load control is an important approach to peak reduction because it offers low cost to the company and is dispatchable.

Rationale

Load (KW) constraints are one of the most costly events a utility encounters. During peak times when demand escalates and there is a problem with meeting demand with additional generation supply (either physically or at reasonable cost), the cost per kW to the company can escalate exponentially. For this reason, in these situations load control is essential to control costs and insure service. The Residential water heaters are included not to deal directly with peak calls (the residential AC serve that purpose) but to reduce the rebound effect from the residential air conditioners as they come back into service following a peak call.

[15] I&M and the OUCC worked collaboratively to define the scope of the program, select the technology, develop programs, design experimental tariffs, and will work together to measure the results.
[16] The project includes General Electric's ENMAC system. ENMAC is a fully integrated, advanced network management system that automates the real-time management, monitoring and control of electrical distribution networks.

Participation and Measures

Measures are shown below.

Table 21. Measures – Residential Peak Reduction

Measures
DLC – Residential AC
DLC – Residential Hot Water

Projected participation by year is shown in the table below.

Table 22. Estimated Participation and Savings - Residential Peak Reduction

Potential participants				234,850
Per participant savings (kWh):				0
Per participant savings (kW):				0.9
Program Year	Incremental Participants	Percent Participation	kWh Saved	kW Saved
Year 1	4,697	2.0%	-	4,274
Year 2	11,743	5.0%	-	10,686
Year 3	14,091	6.0%	-	12,823
Year 4	16,440	7.0%	-	14,960
Year 5	18,788	8.0%	-	17,097
Cumulative	65,759	28.0%	-	59,841

Marketing Plans

Since DLC will proceed with the roll out of new meters following the model of the South Bend pilot, marketing will likely be targeted to specific areas within the I&M Indiana service territory. Marketing should take advantage of current concerns for mitigating climate problems by emphasizing a green marketing theme and can include the following elements:

- Proposed marketing efforts are to include mention of the program in any communications with customers regarding energy efficiency program options such as bill inserts, recognition window stickers for participating homes, media coverage of how to manage electric bills, customer service representatives, and promotion using the I&M website.
- Residential communications for the program can reach out to customers with high bill complaints and to customers with payment problems as well as to general promotion to customers concerned with keeping costs low and interested in mitigating global warming.

Program Tracking Considerations

Direct load control is data intensive and load management data is precise. When load events are called either for capacity shortages or as tests, the systems self-validate. Care needs to be taken to insure the collection of data elements sufficient to show the baseline condition at the time an event is called and the response to the call as a kW effect. The duration of each event for evaluation purposes should also last long enough to show the affected units back on line to demonstrate there are no unexpected effects.

Detailed Budget Plans

An estimated five-year budget for this program is provided below. The anticipated cost to I&M for offering this program to customers involves budgets for:

- A participant incentive of $25 each summer (5 monthly payments of $5).
- Cost of equipment prorated to the DLC effort ($100) plus the cost of connecting the controlled equipment ($150).

Cost to the participants is to accept the temporary load control when incidents are called.

Table 23. Estimated Five-Year Program Budget – Residential Peak Reduction

	Cost per Participant	Year 1	Year 2	Year 3	Year 4	Year 5	5-Yr Total	Percent of Total
Fixed Program Costs								
Implementation & Other Annual Cost		$30,000	$0	$0	$0	$0	$30,000	0.1%
DSM Staffing		$44,000	$44,000	$66,000	$66,000	$88,000	$308,000	1.3%
Program Monitoring & Evaluation		$15,000	$15,000	$15,000	$15,000	$15,000	$75,000	0.3%
Variable Program Costs								
Incentives (paid annually to participants)	$25	$117,425	$411,000	$763,275	$1,174,275	$1,643,975	$4,109,950	17.5%
Delivery & Other	$288	$1,350,388	$3,376,113	$4,051,163	$4,726,500	$5,401,550	$18,905,713	80.7%
Total Budget		$1,556,813	$3,846,113	$4,895,438	$5,981,775	$7,148,525	$23,428,663	100.0%

Program 3. Renewables and Demonstrations

This program contains five program elements: Solar photovoltaic, solar hot water, ground source heat pumps, LED streetlights[17], and the "Go Deep" project. Each of these program elements is currently non-cost-effective and together, the set is not cost-effective. However, this program in included in the recommended programs for three reasons. First, it is a source for a small number of technology demonstration projects that can be used for promoting interest in energy efficiency. This can include a small number of solar demonstration projects at schools, a ground source heat pump demonstration and sponsoring a few homes for the "Go Deep" project. In addition, LED streetlights are starting to become available – a demonstration in a small parking lot could be used to demonstrate this new technology.

Since most people are interested in "Green" programs, these examples will fit with and encourage this interest. Second, each of the demonstrations is at the edge of current technology in its area. This will keep key company staff current in solar, ground source, and "Go Deep" technologies. Third, each of these has sufficient scale possibilities that make them sufficiently powerful to address climate change and, at the same time running these demonstrations will place the company in with companies in a leadership role in developing these technologies.

Rationale

Each of these program elements push technology beyond current cost-effective limits, but, at the same time, present coherent pathways towards the future of energy efficiency applications. The "Go Deep" project is based on a German model using a "passive house" strategy. The goal is to reduce energy use by eighty percent in existing homes. The principles of this approach include tight super-insulated homes with a thick building envelope and high performance windows and doors. According to the organizer of the "Go Deep" project, Linda Wigington, "Our housing is facing a crisis of obsolescence, and we have a lion share of existing houses that need to be dealt with to reduce energy in the near term." In this approach structure and appliances are parts of the solution as is "how a family lives in a house." "Go Deep" is a national project in which individual utilities sponsor a small number of homes in the 1,000 home pilot. Early results suggest that attaining the savings goal is possible, and the focus is on system replacements and increasing efficiencies.

[17] Although some cities are now putting in large numbers of LED streetlights, MEEA is currently recommending them on a demonstration basis for use in parking lots that have cobra-headed lights with shorter (about twenty feet high) poles. The LED units snap in to replace the old cobra bulb, making use of the existing cobra head and the existing poles. MEEA informally estimates an approximate current payback in the Midwest of about nine years. AEP is a MEEA member, and so may contact Jay Wrobel, Program Director (312) 587-8390, extension 16, for information on specific brands and current costs in developing a demonstration pilot.

Participation and Measures

Measures are shown below.

Table 24. Measures and Incentives – Renewables and Demonstrations

Measure/Program Element	Measure Number	Incentive Amount
Solar PV	R-1	100%
Solar Hot Water	R-39	100%
Ground Source Heat Pump	R-20	100%
Go Deep	Demo	100%
LED Streetlights	Demo	100%

Because this is a promotional and R&D program there will be only a very small number of projects each year.

Table 25. Estimated Participation and Savings - Renewables and Demonstrations

Potential participants				10,000
Per participant savings (kWh):				3,579
Per participant savings (kW):				1.3
Program Year	**Incremental Participants**	**Percent Participation**	**kWh Saved**	**kW Saved**
Year 1	5	0.0%	17,895	7
Year 2	5	0.0%	17,895	7
Year 3	5	0.0%	17,895	7
Year 4	5	0.0%	17,895	7
Year 5	5	0.0%	17,895	7
Cumulative	25	0.0%	89,475	33

Marketing Plans

These projects will be used to create interest in energy efficiency through public demonstration projects and to provide referrals to the other programs.

Program Tracking Considerations

Since these are demonstration programs data collection will focus on technical documentation of each project.

Detailed Budget Plans

An estimated five-year budget for this program is provided below.

Table 26. Estimated Five-Year Program Budget - Renewables and Demonstrations

	Cost per Participant	Year 1	Year 2	Year 3	Year 4	Year 5	5-Yr Total	Percent of Total
Fixed Program Costs								
Implementation & Other Annual Cost		$25,000	$0	$0	$0	$0	$25,000	4%
DSM Staffing		$22,000	$22,000	$22,000	$22,000	$22,000	$110,000	17%
Program Monitoring & Evaluation		$20,000	$20,000	$50,000	$20,000	$50,000	$160,000	24%
Variable Program Costs								
Incentives	$7,590	$37,950	$37,950	$37,950	$37,950	$37,950	$189,750	29%
Delivery & Other	$7,000	$35,000	$35,000	$35,000	$35,000	$35,000	$175,000	27%
Total Budget		$139,950	$114,950	$144,950	$114,950	$144,950	$659,750	100.0%

Program 4. Commercial and Industrial Incentives

This program targets only commercial, industrial and institutional accounts. The program is a totally custom program, designed to develop exceptionally productive energy savings opportunities in cooperation with the customer. Each project will be specially designed. The incentive will be thirty percent of incremental cost. It is expected that projects will need to be carried out in narrow time windows as dictated by conditions specific to the customer's operations and that evaluation will consist primarily of short term instrumentation and spot metering. For the first nine months of each program year, no project may be allocated more than ten percent of the measures budget allocated for this program. The hurdle rate for projects under this program will be set to insure only the most cost-effective projects are selected so as to insure cost recovery.

Rationale

Some commercial and institutional customers will offer special opportunities for energy savings, either brought to I&M by the customer (or the customer's ESCO), or as identified by company account representatives and engineers. By providing a thirty percent cost share in co-developing projects, plus a thirty percent "buy down," customer projects will be likely to move forward. Experience will show whether a thirty percent buy down is enough to attract projects. If this percentage proves too low (based on response to the program) the percentage buy down will be raised. Experience with similar projects in the Northeast has led utilities to offer 90 percent to 75 percent buy downs in this program sector. The hurdle rate (payment for savings) for the program will be set to insure I&M only acquires cost-effective projects.

Participation and Measures

Measures are shown below.

Table 27. Measures and Incentives – C&I Incentives

Measure	Measure Number	Incentive Amount
Custom Program – designed to meet a selected cost-benefit ratio	Custom	Thirty percent (30%) of cost of study to develop project proposal and thirty percent (30%) of energy efficiency improvements

Because of the custom nature of the project, there will not be a large number of participants in any one year.

Table 28. Estimated Participation and Savings - C&I Incentives

Potential Participants				4,000
Per participant Savings (kWh):				247,284
Per Participant Savings (kW):				40.6
Program Year	**Incremental Participants**	**Percent Participation**	**kWh Saved**	**kW Saved**
Year 1	5	0.0%	1,236,420	203
Year 2	10	0.0%	2,472,840	406
Year 3	10	0.0%	2,472,840	406
Year 4	15	0.0%	3,709,260	610
Year 5	15	0.0%	3,709,260	610
Cumulative	55	0.0%	13,600,620	2,235

Marketing Plans

This program is in every respect a custom program. An example of this type of program is NSTAR Electric's Compressed Air Leak Detection and Remediation Program (www.compressedairchallenge.org & www.nstaronline.com/business/energy_efficiency). Also see Pacific Power's Energy FinAnswer and Energy FinAnswer Express programs at www.pacificpower.net/Navigation/Navigation925.html. It is expected that these will be high return projects in terms of savings achieved. As a program control tool, for the first nine months of each program year, funds to any one participant will be capped at ten percent of program funds allocated to incentives for this program.

Program Tracking Considerations

Data requirements will vary with the specifications for each project. In some cases, utility billing meter information is capable of the level of detail required to assess program impacts. In other cases, spot metering or other types of assessment may be required. In any case, the program manager should collect, at a minimum, information about all customer electrical equipment, hours of operation, etc. It is expected that evaluations will primarily take the form of short term instrumentation and spot metering with engineering review. Since these are custom projects, it will be particularly important in insure provision is made to assess the kWh and/or kW condition that constitutes the baseline, and then measure the change due to the DSM improvements.

Detailed Budget Plans

An estimated five-year budget for this program is provided below. The anticipated cost to I&M for offering this program to customers involves budgets for:

- Administrative costs to develop, advertise, oversee and monitor the program.
- A customer incentive of thirty percent to defray the cost and energy study and improvements.

Costs to participating customers include the remainder of energy study cost to develop project proposals, provision for staff involvement in developing and monitoring the project, and the remainder of equipment costs.

Table 29. Estimated Five-Year Program Budget – C&I Incentives

	Cost per Participant	Year 1	Year 2	Year 3	Year 4	Year 5	5-Yr Total	Percent of Total
Fixed Program Costs								
Implementation & Other Annual Cost		$30,000	$0	$0	$0	$0	$30,000	2%
DSM Staffing		$44,000	$44,000	$44,000	$44,000	$44,000	$220,000	14%
Program Monitoring & Evaluation		$40,000	$80,000	$80,000	$120,000	$120,000	$440,000	27%
Variable Program Costs								
Incentives	$14,840	$74,200	$148,400	$148,400	$222,600	$222,600	$816,200	51%
Delivery & Other	$2,000	$10,000	$20,000	$20,000	$30,000	$30,000	$110,000	7%
Total Budget		$198,200	$292,400	$292,400	$416,600	$416,600	$1,616,200	100.0%

Program 5. Commercial and Industrial Rebates

This program targets non-residential customers eligible for prescriptive measures. These will include commercial, industrial, and institutional customers. For-profit, non-profit and public agencies (such as schools) will be included.

Rationale

Rebates are straightforward reimbursements of a portion of customer cost of specific rebated energy efficiency items. Many customers have concerns about the high first cost associated with some of the larger energy efficiency investments (e.g. HVAC systems or energy management systems). I&M's proposed incentives will help remove that barrier. Some customers may also need technical assistance to determine what equipment is appropriate for their facilities. I&M will help address that problem by pre-qualifying ESCOs and then making the list of pre-qualified ESCOs available to interested customers. As an example of this program type, NYSERDA's EnergySmart(SM) Commercial/Industrial Performance Program (CIPP) is implemented entirely by ESCOs. Since the program started in 2004, the number of qualifying ESCOs in New York State has increased significantly, thus facilitating program implementation. ESCO involvement will provide customers with technical expertise to determine what equipment is most appropriate for them, as well as energy savings monitoring.

Participation and Measures

Representative measures are shown in the table below. Measures may be added or deleted from the prescriptive list as information is gained during program planning and administration. The incentive level for these measures is twenty-five percent.

Table 30. Measures and Incentives – C&I Rebates

Measure	Measure Number	Incentive Amount
Energy Saving Lighting Measures	C-17, C-18, C-19, C-20	25%
Motors/Drives/Pumps	C-11, C-12	25%
Energy Star Transformers	C-14	25%
Refrigeration Efficiency	C-10	25%
Efficient Vending Machines	C-31	25%

A rigorous analysis of program cost effectiveness is presented in the next section but all of the measures included in this program are cost effective based on the measure specific benefit-cost ratio (see Table 14) except for measure C-20. LED traffic lights (C-20) were included because the benefit-cost ratio was close to one.

Projected participation by year is shown in the table below.

Table 31. Estimated Participation and Savings - C&I Rebates

Potential Participants				42,400
Per participant Savings (kWh):				17,025
Per Participant Savings (kW):				2.7
Program Year	**Incremental Participants**	**Percent Participation**	**kWh Saved**	**kW Saved**
Year 1	424	1.0%	7,218,600	1,148
Year 2	848	2.0%	14,437,200	2,296
Year 3	1,272	3.0%	21,655,800	3,444
Year 4	1,696	4.0%	28,874,400	4,592
Year 5	2,120	5.0%	36,093,000	5,741
Cumulative	6,360	15.0%	108,279,000	17,222

Marketing Plans

I&M will need to advertise this program during its initial stages, and also will need to actively recruit ESCOs to work in its service territory. We recommend some general advertising, primarily in the form of brochures and mailings targeted to potential program participants. I&M should work directly with business associations and contact some customers through account representatives. The budget below provides for some general advertising at business events, as well as brochures and premiums. The incentive level for the program is recommended at twenty-five percent.

Program Tracking Considerations

The program manager should insure that the vendor managing this program has an excellent tracking system and provision should be made to gather in-service date and technical data about equipment being replaced as well as the energy savings measures that will replace old equipment.

Detailed Budget Plans

An estimated five-year budget for the Commercial and Institutional Rebate Program is provided below. The anticipated cost to I&M for offering this program to customers involves budgets for:

- Administrative costs to develop, advertise, oversee and monitor the program.
- A customer incentive to defray the cost of an energy audit for those customers, although the primary strategy will be for ESCO development of audits.
- Incentives for installing energy efficient equipment.

Costs to participating customers include the remainder of equipment and installation costs.

Table 32. Estimated Five-Year Program Budget – C&I Rebates

	Cost per Participant	Year 1	Year 2	Year 3	Year 4	Year 5	5-Yr Total	Percent of Total
Fixed Program Costs								
Implementation & Other Annual Cost		$50,000	$0	$0	$0	$0	$50,000	1%
DSM Staffing		$44,000	$44,000	$66,000	$88,000	$88,000	$330,000	3%
Program Monitoring & Evaluation		$10,000	$7,500	$80,000	$7,500	$80,000	$185,000	2%
Variable Program Costs								
Incentives	$1,350	$572,400	$1,144,800	$1,717,200	$2,289,600	$2,862,000	$8,586,000	86%
Delivery & Other	$130	$55,120	$110,240	$165,360	$220,480	$275,600	$826,800	8%
Total Budget		$731,520	$1,306,540	$2,028,560	$2,605,580	$3,305,600	$9,977,800	100.0%

Program 6. Commercial and Industrial Retro-Commissioning Lite

This program targets commercial and institutional customers with a usage profile that indicates a possible high value from retro-commissioning. Although direct requests may also be received, typical the program begins off-site with a scan of billing records using EZ Sim or a similar tool. This screening process will select a pool of buildings for which it looks like retro-commissioning is highly likely to produce substantial energy savings. Building commissioning is a process that is associated with new buildings; a quality assurance process that is followed to facilitate new buildings performing as designed. Retro-commissioning applies a similar process to existing buildings. The goal is insure that a building operates efficiently and effectively. The focus of this pilot program is in insuring efficient operation, rather than on upgrading equipment. The program conducts a low-cost "tuning" of electricity related building systems. The tuning typically involves control systems such as energy management systems that may be improperly programmed, or controls that are out of calibration. When problems are identified and demonstrated, they may have major economic effects. When this type of problem exists, retro-commissioning resolves such problems at low cost.

There is single measure, retro-commissioning. This project will also feed participants towards the Commercial & Institutional Prescriptive Measures Program and the Commercial & Institutional Incentives Program.

Rationale

Most buildings have never been commissioned, so the commissioning of an existing building may be able to identify and correct high priority operating deficiencies and verify proper operations. The focus will typically be on energy-using equipment, lighting, and controls. Further, this program is designated as "retro-commissioning lite," since it will involve engagements of about $4,000 per building[18], rather than the $10,000 to $52,000 associated with full retro-commissioning.[19] The objective will be to find the best buildings for the program. These will be buildings with significant energy problems that can be easily detected and easily fixed. Energy savings will be documented by engineering calculations and evaluated using EZ Sim. The persistence of energy savings will also be tested.

Participation and Measures

Measures are listed below.

Table 33. Measures and Incentives – C&I Retro-Commissioning Lite

Measure	Measure Number	Incentive Amount
Retro Commissioning Engagement	C-4	$2000 (50%)

[18] This is per building; an individual project may have more than one building.
[19] See Haasl &Terry Sharp, A Practical Guide for Commissioning Existing Buildings. Washington, DC: Office of Building Technology, State and Community Programs, US Department of Energy. Prepared by Portland Energy Conservation, Inc. and Oak Ridge National Laboratory, April 1999.

Because it will take some time to put the program in place and to reach the targeted customers, we plan for participation in the program's first year to be lower than in subsequent years, and expect that many of the first year participants are likely to be smaller businesses with more flexibility in their decision making.

Table 34. Estimated Participation and Savings – C&I Retro-Commissioning Lite

Potential Participants				42,400
Per participant Savings (kWh):				20,316
Per Participant Savings (kW):				3.4
Program Year	**Incremental Participants**	**Percent Participation**	**kWh Saved**	**kW Saved**
Year 1	424	1.0%	8,613,984	1,430
Year 2	848	2.0%	17,227,968	2,860
Year 3	1,272	3.0%	25,841,952	4,290
Year 4	1,696	4.0%	34,455,936	5,721
Year 5	2,120	5.0%	43,069,920	7,151
Cumulative	6,360	3.0%	129,209,760	21,452

Marketing Plans

We recommend some general advertising within the business community, primarily in the form of brochures and mailings targeted to potential program participants; also coordination with business associations. The budget below provides for some general advertising at business events, as well as brochures and premiums. Since this program will operate using internal prescreening, direct contacts to selected businesses and institutions will also be useful. Air Advice is currently running a similar program for the Oregon Energy Trust.

Program Tracking Considerations

The program manager should collect, at a minimum, information about all customer electrical equipment, hours of operation, etc. The major concern will be for complete and accurate documentation of "before" and "after" energy use and demand impacts. In addition, a way to monitor the duration of energy savings and demand reduction.

Detailed Budget Plans

An estimated five-year budget for this program is provided below. The anticipated cost for offering this program to customers involves budgets for:

- Administrative costs to develop, advertise, oversee and monitor the program.
- Incentives for installing energy efficient equipment20. (Incentive amounts are based on the average incentive given in NYSERDA's EnergySmartSM CIPP program, discounted to allow participation by smaller commercial customers.)

Costs to participating customers include the remainder of equipment costs.

[20] Incentive amounts are based on the average incentive given in NYSERDA's EnergySmartSM CIPP program, discounted to allow participation by smaller commercial customers. The average CIPP program participant receives $17,000 in incentives. We have discounted that number to $9,750.

Table 35. Estimated Five-Year Program Budget – C&I Retro-Commissioning Lite

	Cost per Participant	Year 1	Year 2	Year 3	Year 4	Year 5	5-Yr Total	Percent of Total
Fixed Program Costs								
Implementation & Other Annual Cost		$50,000	$0	$0	$0	$0	$50,000	0%
DSM Staffing		$44,000	$44,000	$44,000	$44,000	$44,000	$220,000	2%
Program Monitoring & Evaluation		$10,000	$7,500	$80,000	$7,500	$80,000	$185,000	1%
Variable Program Costs								
Incentives	$2,000	$848,000	$1,696,000	$2,544,000	$3,392,000	$4,240,000	$12,720,000	97%
Delivery & Other	$0	$0	$0	$0	$0	$0	$0	0%
Total Budget		$952,000	$1,747,500	$2,668,000	$3,443,500	$4,364,000	$13,175,000	100.0%

This program also serves as a feeder program for the prescriptive program (Program 5, C&I Rebates).

Program 7. Commercial and Industrial HVAC

This program was designed on the premise that much commercial, industrial, and institutional Heating Ventilation and Cooling is not operating as planned. A typical assignment envisioned in this program is to do on-site testing of HVAC units, and review their operation as an integrated building system. For example, out of twelve rooftop units, it is likely that two will be operating out of specification due to improper installation, subsequent damage to units, or problems with controls. In the case of a large school, built in sections over time, it would not be unusual to find adjacent units, some cooling and some heating, and other units damaged while most units are performing as designed.

Rationale

Most buildings have never had a focused look at the working of the HVAC systems. This program will deploy HVAC specialists to test units and make recommendations for their efficient operation as a building system. This will primarily involve repair of units and control adjustments, but may also involve recommendations for modification to air circulation within buildings.

Participation and Measures

Measures are listed below.

Table 36. Measures and Incentives – C&I HVAC Optimization

Measure	Measure Number	Incentive Amounts
Small HVAC units	C-2	25%

Participation is indicated in the table below.

Table 37. Estimated Participation and Savings – C&I HVAC Optimization

Potential Participants				25,100
Per participant Savings (kWh):				11,233
Per Participant Savings (kW):				1.9
Program Year	**Incremental Participants**	**Percent Participation**	**kWh Saved**	**kW Saved**
Year 1	251	1.0%	2,819,483	484
Year 2	502	2.0%	5,638,966	969
Year 3	753	3.0%	8,458,449	1,453
Year 4	1,004	4.0%	11,277,932	1,937
Year 5	1,255	5.0%	14,097,415	2,421
Cumulative	3,765	15.0%	42,292,245	7,264

Marketing Plans

It is likely that company representatives can help develop lists of buildings that will be likely candidates for this program. In addition, there should be coordination with business associations. The budget below provides for some general advertising at business events, as well as brochures and premiums.

Program Tracking Considerations

This is an applied technical program that will be dependent on the quality and completeness of technical drawings and brief technical explanation provided by the program staff. Evaluation will rely on this information and may also involve spot metering and (where applicable) billing analysis.

Detailed Budget Plans

An estimated five-year budget for this program is provided below. The anticipated cost for offering this program to customers involves budgets for:

- Administrative costs to develop, advertise, oversee and monitor the program.
- Incentives to cover HVAC inspection and evaluation of air flows where necessary.

Costs to participating customers include the remainder of costs (for repairs to HVAC equipment and remodeling to permit better airflow within buildings).

Table 38. Estimated Five-Year Program Budget – C&I HVAC Optimization

	Cost per Participant	Year 1	Year 2	Year 3	Year 4	Year 5	5-Yr Total	Percent of Total
Fixed Program Costs								
Implementation & Other Annual Cost		$50,000	$0	$0	$0	$0	$50,000	2%
DSM Staffing		$44,000	$44,000	$44,000	$44,000	$44,000	$220,000	8%
Program Monitoring & Evaluation		$10,000	$7,500	$80,000	$7,500	$80,000	$185,000	7%
Variable Program Costs								
Incentives	$570	$143,070	$286,140	$429,210	$572,280	$715,350	$2,146,050	83%
Delivery & Other	$0	$0	$0	$0	$0	$0	$0	0%
Total Budget		$247,070	$337,640	$553,210	$623,780	$839,350	$2,601,050	100.0%

This program also serves as a feeder program for the prescriptive program (Program 5, C&I Rebates).

Program 8. Commercial and Industrial Audit

This program is targeted to food service facilities and grocery store/supermarkets. It consists of refrigeration improvements, improvements to refrigeration to reduce load, and restaurant commissioning audits (designed to optimize controls and limit energy losses in food service facilities). The program will also serve as a feeder to Program 5, C&I Rebates.

Rationale

There are consistent energy savings to be obtained from food service facilities (primarily restaurants) and the refrigeration end-use in grocery stores and supermarkets. There are three DSM measures in this program, listed in the table below.

Participation and Measures

Measures are listed below.

Table 39. Measures and Incentives – C&I Audit

Measure	Measure Number	Incentive Amount
Restaurant Audit	C-28	25%
Refrigeration Tune-Up	C-29	25%
Refrigeration Casework	C-30	25%

Participation is indicated in the table below.

Table 40. Estimated Participation and Savings – C&I Audit

Potential Participants				2,470
Per participant Savings (kWh):				20,595
Per Participant Savings (kW):				2.9
Program Year	**Incremental Participants**	**Percent Participation**	**kWh Saved**	**kW Saved**
Year 1	25	1.0%	514,875	73
Year 2	49	2.0%	1,009,155	143
Year 3	74	3.0%	1,524,030	216
Year 4	99	4.0%	2,038,905	289
Year 5	124	5.0%	2,553,780	362
Cumulative	371	15.0%	7,640,745	1,084

Marketing Plans

It is likely that company representatives can develop lists of buildings that will be likely candidates for this program. In addition, there should be coordination with business associations. The budget below provides for some general advertising at business events, as well as brochures and premiums.

Program Tracking Considerations

This is an applied technical program that will be dependent on the quality and completeness of technical drawings and brief technical explanation provided by the program staff developed on-site for each project. Evaluation will rely on this information and may also involve spot metering and (where applicable) billing analysis.

Detailed Budget Plans

An estimated five-year budget for this program is provided below. The anticipated cost for offering this program to customers involves budgets for:

- Administrative costs to develop, advertise, oversee and monitor the program.
- Incentives to cover audits and tune-ups.

Costs to participating customers include the remainder of costs (for repairs to HVAC equipment and remodeling to permit better airflow within buildings).

Table 41. Estimated Five-Year Program Budget – C&I Audit

	Cost per Participant	Year 1	Year 2	Year 3	Year 4	Year 5	5-Yr Total	Percent of Total
Fixed Program Costs								
Implementation & Other Annual Cost		$50,000	$0	$0	$0	$0	$50,000	8%
DSM Staffing		$22,000	$22,000	$22,000	$22,000	$22,000	$110,000	18%
Program Monitoring & Evaluation		$10,000	$7,500	$80,000	$7,500	$80,000	$185,000	30%
Variable Program Costs								
Incentives	$610	$15,250	$29,890	$45,140	$60,390	$75,640	$226,310	37%
Delivery & Other	$130	$3,250	$6,370	$9,620	$12,870	$16,120	$48,230	8%
Total Budget		$100,500	$65,760	$156,760	$102,760	$193,760	$619,540	100.0%

This program also serves as a feeder program for the prescriptive program (Program 5, C&I Rebates).

Program 9. Commercial and Industrial New Construction

This program targets new commercial, industrial, and institutional construction. The program provides rebates for developing projects that are at least thirty percent more efficient than current building code. Incentives are offered to project owners or, for government buildings, to the design team. These incentives will cover fifty percent of the incremental cost difference between standard and energy efficient equipment, or the amount of the incentive will be enough to decrease the incremental cost to a 1.5 year payback, whichever is less. The focus of this program is on integrated design. Prospective vendors should be asked to propose a method of determining incremental cost for I&M review. As a control tool, for the first nine months of each year, no project may be allocated more than ten percent of the budget allocated for efficiency improvements for this program.

This program is based on National Grid's Design 2000 Plus program. For comparison, Western Mass Electric's (WMECo's) Energy Conscious Construction program covers most costs plus, for larger and complex projects, provides design assistance.[21] National Grid's Design 2000 Plus program initially covered 60 to 90 percent of incremental cost plus a comprehensive design approach for larger and complex projects.[22] More recently, as a mature program, National Grid Design 2000 Plus now covers 75 percent of incremental cost.[23] The program will follow the Advanced Buildings System approach developed by the New Buildings Institute.[24]

Rationale

This program is designed to overcome first cost barriers by providing incentives that cover the incremental cost, and to provide information to project developers and design teams.

Participation and Measures

Measures are listed below.

Table 42. Measures and Incentives – C&I New Construction

Measure	Measure Number	Incentive Amounts
Design Assistance	C-9	50% of Incremental Cost

[21] See: www.wmeco.com/business/saveenergy/energyefficiencyprograms.
[22] See: www.aceee.org/utility/9angriddesign2000.pdf.
[23] See: www.nationalgridus.com/masselectric/business/energyeff/4_new.asp.
[24] See: http://www.advancedbuildings.net/index.htm. Note that leading programs are adopting the NBI approach.

Projected participation is shown in the table below.

Table 43. Estimated Participation and Savings - C&I New Construction

Potential Participants				424
Per participant Savings (kWh):				56,171
Per Participant Savings (kW):				5.1
Program Year	**Incremental Participants**	**Percent Participation**	**kWh Saved**	**kW Saved**
Year 1	8	2.0%	449,368	41
Year 2	11	2.5%	617,881	56
Year 3	13	3.0%	730,223	66
Year 4	14	3.3%	786,394	71
Year 5	23	5.5%	1,291,933	117
Cumulative	69	3.3%	3,875,799	352

Marketing Plan

The target of the marketing effort will be the project owners and the design teams. Programs of this type usually involve direct personal relationship building, training sessions or seminars, direct marketing, and meetings.

Program Tracking Considerations

New construction projects present a particular challenge for program tracking since there is not an actual baseline building to compare to the new structure. This means that the contrast to baseline conditions will require simulation software that can model the incremental energy efficiency improvements. The specific assumptions built-in to the model should be recorded so that they are evident, and the simulation software package employed must be in general use for DSM applications in which current practice (as built) conditions are used to develop the energy savings that derive from the measures installed. Simulation software is required to take sometime complex interaction effects into account.

Detailed Budget Plans

An estimated five-year budget for this program is provided below. The anticipated cost to I&M for offering this program to customers involves budgets for:

- Administrative costs to develop, advertise, oversee and monitor the program.
- Incentives for the installation of recommended measures as demonstrated through the provision of receipts by the customer.

Costs to participating customers include the customer share of the costs of covered measures and equipment and installation costs.

Table 44. Estimated Five-Year Program Budget – C&I New Construction

	Cost per Participant	Year 1	Year 2	Year 3	Year 4	Year 5	5-Yr Total	Percent of Total
Fixed Program Costs								
Implementation & Other Annual Cost		$20,000	$0	$0	$0	$0	$20,000	2%
DSM Staffing		$22,000	$22,000	$22,000	$22,000	$22,000	$110,000	11%
Program Monitoring & Evaluation		$10,000	$7,500	$80,000	$7,500	$80,000	$185,000	18%
Variable Program Costs								
Incentives	$9,520	$76,160	$104,720	$123,760	$133,280	$218,960	$656,880	65%
Delivery & Other	$500	$4,000	$5,500	$6,500	$7,000	$11,500	$34,500	3%
Total Budget		$132,160	$139,720	$232,260	$169,780	$332,460	$1,006,380	100.0%

Program 10. Residential Whole House

This program includes the two residential energy assessment options that are carried out remotely, by mail or Internet and an on-site audit with direct installation of minor measures. In both remote options, a residential customer can conduct a residential energy assessment using a computerized home energy auditing program. The remote audit program is the same for both the Internet and mail options, and works by linking to actual billing data for the residential account. The remote program is open to all customers and free to all customers. However, the program will work best for electric heat customers and this is the focus of the remote audit program. In addition, for electric heat customers who complete the remote audit, I&M will send a small kit of energy efficiency items (shown in the first column of Table 23). As a more advanced option, the program will also offer an on-site audit for I&M's electric heat customers for a $50 fee, as discussed below. The savings in the remote elements of this program are computed based on the items in the kit, and no savings is assumed for the remote audit step.

Rationale

The remote elements of this program are open to all residential customers at no charge to provide easy access to energy efficiency recommendations tailored to the home. Since it is conducted by Internet or mail, it can be done to suit a customer's schedule. The remote elements are an entry-level degree of customer engagement, providing a way for customers to begin to get direct information on what they can do to make their home more energy efficient.

For homes with electric heat, the separate program element for an on-site energy audit with direct install of minor measures provides the option of a higher level in-home audit for a small fee, *refunded if audit recommendations are implemented.* The on-site audit program element targets households in existing single family homes and condos and (with a different permission structure) for multifamily dwellings. The program includes an on-site audit and encourages households to save electricity through the installation of energy efficiency measures. The audit, for example, might recommend air sealing, insulation, and other measures.

The On-Site Audit with direct install program element will provide households with a walk-through examination of their home by a trained auditor/contractor using standard audit software for identifying existing conditions related to electric energy usage. The auditor will identify specific energy saving opportunities that could be installed by the contractor upon approval of a job scope by the customer. The contractor will convey energy saving tips during the walk-through, and attempt to be comprehensive in their assessment of opportunities regardless of their particular specialization. Customers will pay $50 of the audit cost, and have their audit cost credited to their bill if they proceed with installation of *at least one* of the recommended measures. The recommendations of the auditor are expected to be standard measures associated with whole house weatherization, such as ceiling insulation, wall insulation, air sealing, etc.

At the same time, during the walk-through audit, the contractor will install the measures in the Direct Install Kit at no cost to the customer and additional low-cost measures (see table). At the conclusion of the site visit, customers will be provided with a check list of preliminary recommendations from the audit, to be followed within one week

by a full report generated by the audit software. The program will take credit for kit measures after degrading the kit savings for expected installation rates. Expected installation rates of 80 percent for CFL's, 60 percent for showerheads, and 75 percent for aerators were used to calculate program savings for the mailed kits. Savings from the onsite audit are only counted for installed measures at the time of the audit and recommended measures subsequently installed and rebated. There is a fifty percent incentive for recommended measures beyond those directly installed during the audit.

The package of direct install measures is modeled after Wisconsin's Home Performance with Energy Star program with emphasis on their E-Saver Kit component, which includes these measures plus a programmable thermostat, but only included one CLF.[25] Programmable thermostats have recently become controversial (see Appendix). To overcome problems with programmable thermostats, the program will focus on easy-to-read, easy-to-use equipment and provide customer education.

The remote elements provide easy access to energy saving information tailored using computerized energy use information and an electronic protocol. The on-site audit with direct install of minor measures program element provides a step up to an on-site audit. This program element, in addition, may serve as a predecessor to a full Home Performance with Energy Star program, providing a framework to work with contractors to develop Home Performance with Energy Star, if such a program is desired in the second program cycle.

Participation and Measures

Measures are shown in the table below, and may be added or subtracted during the program based on experience.

Table 45. Measures and Incentives – Residential Whole House

Measures – Remote Program Elements	**Measure Number**	**Incentive Amount**
CFLs (4)	R-32	100%
Showerheads (2) and Aerators (3)	R-36	100%
Hot Water Thermometer	Kit Add-In	100%
Refrigerator Thermometer	Kit Add-In	100%
Measures – On-Site Program Element		
All of Remote Program Elements plus:		
Wall Insulation	R-21	50%
Ceiling Insulation	R-16	50%
Programmable Thermostat	R-15	50%
Duct Sealing	R-6	50%
Refrigerant Charge Check	R-6	50%
House Sealing	R-18	50%
CFLs (12 additional)	R-32	50%
Electric Water Heater Wrap & Pipe Wrap	R-35	50%

All of the measures included in this program are cost effective based on the measure specific benefit-cost ratio (see Table 13) except for measures R-6 and R-18. Given the relatively close to one benefit-cost ratio of these measures,

[25] State of Wisconsin Department of Administration Focus on Energy Statewide Evaluation, Evaluation of the Home Performance with Energy STAR Whole House Component, April 24, 2003.

the imprecise nature of the measure screening, and the importance of peak savings associated with each of these measures, they were included in the program design.

There is no cost in the remote program elements to participating customers for the remote audit and kit. There is a $50 fee for the on-site audit, however this is credited to the bill if at least one program recommended measure is installed (recommended measures will be supported by the company at a 50% rebate).

Projected participation by year is shown in the table below. Ninety-two percent of all participants are expected to be remote only with the remainder receiving the on-site audit.

Table 46. Estimated Participation and Savings - Residential Whole House

Potential Participants				69,455
Per participant Savings (kWh):				726
Per Participant Savings (kW):				0.2
Program Year	**Incremental Participants**	**Percent Participation**	**kWh Saved**	**kW Saved**
Year 1	1,389	2.0%	1,008,414	266
Year 2	2,778	4.0%	2,016,828	531
Year 3	4,167	6.0%	3,025,242	797
Year 4	4,862	7.0%	3,529,812	930
Year 5	4,862	7.0%	3,529,812	930
Cumulative	18,058	26.0%	13,110,108	3,454

Marketing Plans

I&M will need to actively market this program in customer communications, such as bill stuffers. Employees can also make customers aware of this program if they contact the company about energy efficiency or a need to lower bills. The remote program elements are low-involvement lead-in programs that will help develop prospects for other programs.

In developing the kit for the remote program elements, strategic attention should be placed on the kit as a marketing tool. First, insure that the kit items are attractively packaged and that the package itself is attractive. The focus should be on making the kits attractive and interesting as well as technical. Possibly some non-energy but useful health and safety items can be included, as well as helpful literature. Since many customers are more interested in "green" items to try to reduce carbon and save the planet, marketing staff should ask for suggestions and perhaps create a "green" theme. For example, one year the Washington DC Energy Office obtained a tire gauge for inclusion in each kit, donated by a local business. For the basic kit items, it is important to consider the value of paying a bit more for "higher end" better performing and better looking items. Again, the kit is part of the marketing and promotion of this program. The kits should also be available at cost from the company's website.

The on-site program element represents a step up in engagement and commitment for an on-site energy audit that can lead to full weatherization retrofit with a fifty-percent level of support from the utility company. As noted above, the on-site element can be developed into a full Home Performance with Energy Star program for the second program cycle.

Program Tracking Considerations

The program elements in this program (remote and on-site) are packaged programs provided by a vendor. All data requirements should be part of the program database.

Detailed Budget Plans

An estimated five-year budget for this program is provided below. The anticipated cost to I&M for offering this program to customers involves budgets for:

- Administrative costs to develop, advertise, oversee and monitor the program.
- Direct program costs, including a vendorized Internet/mail-in energy assessment program.
- Direct program costs for the audit/direct install vendor.

There is no cost in the remote program elements to participating customers for the remote audit and kit. There is a fifty dollar fee for the on-site audit, however this is credited to the bill if at least one program recommended measure is installed (recommended measures will be supported by the company at a 50% rebate).

Table 47. Estimated Five-Year Program Budget – Residential Whole House

	Cost per Participant	Year 1	Year 2	Year 3	Year 4	Year 5	5-Yr Total	Percent of Total
Fixed Program Costs								
Implementation & Other Annual Cost		$20,000	$0	$0	$0	$0	$20,000	1%
DSM Staffing		$44,000	$44,000	$44,000	$44,000	$44,000	$220,000	11%
Program Monitoring & Evaluation		$10,000	$7,500	$80,000	$7,500	$100,000	$205,000	10%
Variable Program Costs								
Incentives	$68	$94,730	$189,460	$284,189	$331,588	$331,588	$1,231,556	60%
Delivery & Other	$20	$27,780	$55,560	$83,340	$97,240	$97,240	$361,160	18%
Total Budget		$196,510	$296,520	$491,529	$480,328	$572,828	$2,037,716	100.0%

Program 11. Residential Rebates

The Residential Rebates program is focused on rebates for CFLs and Energy Star Appliances (Energy Star Clothes Washers).

The promotion will provide rebate coupons to I&M customers toward the purchase of CFLs, LEDs, and Energy Star clothes washers. The coupon approach gives the I&M program administrator direct control over where coupons will be made available and for which sales outlets.[26]

The dollar amount for the appliance incentive for this promotion is *lower than might be expected* based on industry experience in prior years. This is due in part to recent changes in the Energy Star program and the overall success of the Energy Star strategy as demonstrated by the gradual increase in energy efficiency of base case (non-Energy Star) equivalent products. This is also why refrigerators and dishwashers are not included among the appliances for which rebates are provided.

For clothes washers, MEEA utilities have been using a $75 to $100 rebate, however this amount includes an arranged manufacturer rebate of $25 to $50. According to a September 2006 Consortium for Energy Efficiency (CEE) report, Alliant Energy provided a $50 rebate for vertical axis and a $100 rebate for horizontal axis clothes washers. To communicate a consistent message, the rebate for clothes washers is set at $100. Efficiency Vermont provided a $50 rebate for a CEE Tier 3a clothes washer and $25 for a room AC. The Long Island Power Authority clothes washer rebate is $15, $35, or $50 to customers along with a $50 clothes washer rebate for builders who install a clothes washer with a modified energy factor (MEF) of 2.0 or higher.[27] National Grid provides a $100 clothes washer rebate for washers with MEF of 1.8 or higher. United Illuminating and Connecticut Light & Power both provide a $20 or $50 clothes washer rebate. Sacramento Municipal Utility District (SMUD) has clothes washer rebates at $75 and $125 depending on CEE tier level.

[26] The coupon approach is available as a "packaged" approach through Energy Federation Incorporated (EFI), which can also provide coupon processing services (www.efi.org). WECC administers several similar programs. Marketing and promotional plans for this program area have been developed collaboratively through the Consortium for Energy Efficiency (CEE). Part of the reality of this kind of program is the need to work through a program vendor. The vendor offers a full package of features, one of the most important of which is contact with the national offices of big-box and other chain stores. Indiana Michigan Power may also want to explore making promotions available through locally owned and operated stores. Big-box stores are already primed and looking for cooperation with utilities and program vendors in this area will already have relationships with national offices of the big-box stores that can be activated for Indiana Michigan Power. For lighting promotions, Wal-Mart has announced a major CFL initiative designed to introduce at least one CFL to each of its 100 million US customers over the next few years. In initiating this campaign, Wal-Mart has devoted additional shelf space to CFLs and arranged with GE for an initial 21 percent cut in the price of CFLs. We can expect a number of promotions for 4-packs, 6-packs, 12-packs, an increasing variety of bulb types, and possible additional price reductions. Although this initiative has received major buzz, other stores, such as Home Depot and Lowe's are implementing similar CFL promotions, and a trip to any of these big-box stores will show that extensive shelf space is now dedicated to promotion of a wide variety of Energy Star CFLs. These big-box initiatives are compatible with the lighting promotion design and can be viewed as additional leverage for program efforts. Utilities with current CFL DSM programs have been working with both local and big box retailers, and see any further contributions on the part of manufacturers and retailers in cutting prices and extending promotions as contributing to their programs.

[27] The higher the MEF, the more efficient the clothes washer.

Rationale

The appliance and lighting program elements both improve the product mix in favor of energy efficient technologies for the service territory by promoting the purchase and stocking of efficient replacement units. Appliance promotions are best developed on a national level with participation by utilities and governments. Energy Star has overcome all of the defects of the earlier local or regional promotional programs through a single national program structured to periodically advance program standards and regulate minimum efficiencies. At the same time, it is structured to work with regional marketing initiatives and local promotion.[28]

CFL promotions are also best developed by leveraging national campaigns (such as "Save a Light - Save the World"), including federal investments in marketing and promotion by EPA and the now coordinated efforts developed through utility cooperation with big-box stores.

Participation and Measures

Measures are shown in the table below.

Table 48. Measures and Incentives - Residential Rebates

Measures/Program Element	Measure Number	Incentive Amount
Energy Star Clothes Washers	R-28	$100 per unit
Energy Star CFL Instant Coupon	R-32	$1
Energy Star CFL 2-Pak Coupon	R-32	$2
Energy Star CFL 4-Pak Coupon	R-32	$4
CFL 6-Pak Coupon	R-32	$6
CFL 8	R-32	$8
LED Holiday Light Strings	NA	Up to 3 free if 3 or more traded in

LED Holiday Light Strings, the last measure listed in Table 48 is included as a promotional item, and is not part of Measure R-32 or a tested measure. The Holiday Lighting Exchange has proven to be a very well accepted part of the energy efficiency efforts in California and Alaska. In California it helps focus public attention on the greater energy efficiency effort. In the California programs (run throughout the state) in the month of December the utilities include LED Holiday Light Strings in their standard CFL exchange programs. Customers may bring in three or more strings of old inefficient holiday lights and exchange them for up to three strings of LED Holiday Lights.[29]

[28] For example, for the history of the residential clothes washer initiative, see Shel Feldman Management Consulting, Research into Action incorporated, and Xenergy incorporated, The Residential Clothes Washer Initiative, A Case Study of the Contributions of a Collaborative Effort to Transform the Market, prepared for the Consortium for Energy Efficiency, June 2001 (http://www.cee1.org/eval/RCWI_eval.pdf).

[29] The new light emitting diode (LED) holiday lights use only 0.04 watts per bulb (compare with 0.4 watts for newer miniature lights or 5 watts per bulb for C7 screw-in lights, or 10 watts per standard bulb). The retail cost of a string of 100 LED lights is approximately three times the cost of a string of 100 miniature lights. To work out a comparison, assume that lights are used five hours per day or one-hundred and fifty hours for a month. For current information, see Questline, "Lighting Up the Holidays: An Energy Cost Comparison" at www.questline.com/Article.aspx?userID=365464&articleID=3457&NL=5439. We thank Betsy Krieg at Pacific Gas & Electric for this updated information. When run as an exchange, we have observed that the majority of strings turned in appear to be the 10 watt and 5 watt bulbs. For strings of 100 bulbs this replacement by 0.04 watt LED bulbs is a major difference for this end use.

Projected participation by year is shown in the table below.

Table 49. Estimated Participation and Savings - Residential Rebates

Potential Participants (yearly)				389,500
Per participant Savings (kWh):				332
Per Participant Savings (kW):				0.1
Program Year	**Incremental Participants**	**Percent Participation**	**kWh Saved**	**kW Saved**
Year 1	27,265	7.0%	9,051,980	2,053
Year 2	46,740	12.0%	15,517,680	3,520
Year 3	66,215	17.0%	21,983,380	4,986
Year 4	85,690	22.0%	28,449,080	6,453
Year 5	105,165	27.0%	34,914,780	7,920
Cumulative	331,075	17.0%	109,916,900	24,932

Marketing Plans

Proposed marketing efforts include the use of utility bill stuffers, and coordinated advertising with selected retail outlets. This type of program is best implemented using implementation vendors and the program elements already exist in nationally available programs for utilities to implement, and selection of a regional vendor will provide added value in the form of detailed program and technology knowledge and relationships. A basic assumption in the development of this program is that it is not so much the size of the rebate so much as the existence of a rebate and the skill in developing engaging promotions and long-term relationships with the appliance industry and dealers that will help move the more energy-efficient products.[30, 31]

The basic marketing goals for the appliance program elements come from the Consortium for Energy Efficiency and are provided below:[32]

1. Consumers understand and value the benefits from energy-efficient features.
2. Retail sales force is knowledgeable about Energy Star and considers it a meaningful distinction for making a sale.
3. Manufacturers market and promote energy-efficient products and/or features.
4. Energy efficiency, defined by Energy Star performance levels, becomes a standard feature or is available across all manufacturers' product lines.
5. Energy Star represents the most energy efficient quality products available.

The Energy Star residential lighting promotion will parallel the Energy Star appliance promotion to reach residential customers through retail outlets. The lighting promotion provides direct incentives to consumers to

[30] See the WECC paper on residential appliances at http://www.aceee.org/utility/ngbestprac/wecc.pdf. Note that this paper is for a natural gas clothes washer program, however "lessons learned" regarding relationships and promotion would apply across appliance programs.

[31] A review of rebates offered across the US indicates that most utilities are offering rebates from this kind of marketing and promotional perspective rather than from a direct resource acquisition perspective. See the Database of State Incentives for Renewables & Efficiency, (DSIRE), maintained by the North Carolina Solar Center for the Interstate Renewable Energy Council (IREC) funded by the U.S. Department of Energy (DSIRE) at (http://www.dsireusa.org/library/includes/techno.cfm?EE=1&RE=0).

[32] CEE's National Residential Home Appliance Market Transformation Strategic Plan, December 2000 (http://www.cee1.org/resid/seha/seha-plan.php3).

facilitate their purchase of energy-efficient lights. The incentive is in the form of discounted pricing available for lighting products that carry the Energy Star logo.

This program is justified based on direct energy savings targets but also has a significant market transformation dimension. Generally, throughout the US, the Energy Star program has been affecting the types of lighting products available in stores:

- The relative amount of available lighting shelf space assigned to Energy Star lighting products is increasing dramatically in "big box" stores.
- The quality of CFL lighting has dramatically increased.
- The diversity of CFL styles and applications has greatly increased.
- There has been as sizable decrease in the cost of energy-efficient lighting, and with it an increase in store sponsored promotions featuring price discounts.
- At the same time, there is still variation in lighting quality between manufacturers and types of CFLs.

In this program, I&M will be an active participant in the US Energy Star campaign. Through this participation, it is expected that the company will move more Energy Star lighting into retail stores, help make energy efficient lighting more affordable to its customers, and provide a continuing and responsible guidance and energy efficiency education message to customers.

Incentives will be implemented by coupons, in-store markdowns, or upstream manufacturer buy-downs. A coupon approach is more suitable for a service territory because it gives the program administrator direct control over where coupons are available and for which sales outlets.[33] The lighting promotion program is modeled after a set of promotional programs that is implemented by Energy Federation Incorporated. These programs are sponsored by Connecticut Light and Power, United Illuminating Company, the Cape Light Compact, National Grid, NSTAR Electric, and Western Massachusetts Electric.

Program Tracking Considerations

Data collection and documentation for program purposes and monthly/annual reporting will be included as features of the vendor program "package." Data estimation of the baseline market and market potential for the specific Energy Star appliances promoted should be refined as a part of the vendor services and developed for each product type. Data estimation of the baseline market and market potential for Energy Star bulbs and fixtures in I&M's service territory should be refined as a part of the vendor services and developed for each product type (CFL, type of CFL, CFL pack, LED holiday lights). In addition, for the program evaluation, data collection to compute free riders and spillover effects for computing Net-to-Gross ratios will need to be worked out prior to program implementation, and responsibilities for collecting data inputs will need to be carefully defined along with workable accountability relationships.

[33] An alternative or parallel approach is the "lighting catalog," which can be an extensive catalog of lighting options offered by a fulfillment vendor or a simple option for purchase of limited types of CFLs over the I&M website. For customers not near a cooperating big box or local store, an Internet option is a valuable addition from a customer service perspective. At the same time, there is a 'trade off' since the market transformation dimension of this program is better met by working with existing supply channels and existing retail outlets.

Detailed Budget Plans

As in the other programs, the anticipated cost to I&M for offering this program to customers involves budgets for:

- Administrative costs to develop, advertise, oversee and monitor the program.
- Vendor services for the program vendor (assuming use of existing turnkey program elements).
- Incentives for the installation of approved measures as demonstrated through the provision of coupons collected and processed from the retail outlets.

The cost to participating customers is the customer's share of the cost (cost of product after the rebate).

Table 50. Estimated Five-Year Program Budget – Residential Rebates

	Cost per Participant	Year 1	Year 2	Year 3	Year 4	Year 5	5-Yr Total	Percent of Total
Fixed Program Costs								
Implementation & Other Annual Cost		$20,000	$0	$0	$0	$0	$20,000	0%
DSM Staffing		$22,000	$22,000	$22,000	$22,000	$22,000	$110,000	2%
Program Monitoring & Evaluation		$10,000	$0	$100,000	$7,500	$80,000	$197,500	4%
Variable Program Costs								
Incentives	$8	$214,848	$368,311	$521,774	$675,237	$828,700	$2,608,871	57%
Delivery & Other	$5	$136,325	$233,700	$331,075	$428,450	$525,825	$1,655,375	36%
Total Budget		$403,173	$624,011	$974,849	$1,133,187	$1,456,525	$4,591,746	100.0%

Program 12. Residential Appliance Recycling

The recycling program improves the in-service technology mix for the service territory by removing energy hog appliances and deleting them from existence in an environmentally friendly way. Appliance recycling is available primarily through two national program vendors, both of which bring the necessary environmentally sound technologies and procedures to the program.

This program targets households with second refrigerators or freezers. The program will provide free refrigerator and or freezer pick up. If a home also has an old AC unit, the AC unit will also be picked up. The contractor will pick up, disable, and recycle the unit(s). Once I&M receives verification that the refrigerator has been recycled, the customer will receive a $30 incentive. This number is based on the amount offered by Nevada power Company.[34]

Rationale

This program targets residential customers with second refrigerators or freezers, preferably those older than 1997. The program is designed to take these inefficient older refrigerators off the market entirely, and to do so in an environmentally-sustainable manner. I&M will pay a $30 incentive to each customer to help persuade them to get rid of the second refrigerator or freezer, and will also cover the cost associated with removing the refrigerator or freezer and recycling its components. As a program option, old window AC units may also be picked up ($20 customer incentive) from homes in which a visit is scheduled to pick up a refrigerator or a freezer. This option is now being developed by the firms that operate this type of program and may be explored with the bidders.

Participation and Measures

Measures are shown below.

Table 51. Measures and Incentives – Residential Appliance Recycling

Measure	Measure Number	Incentive Amount
Refrigeration/Freezer Recycling	R-26	$30
Window AC Unit Recycling	(Optional, may be developed)	$20

Table 52. Estimated Participation and Savings – Residential Appliance Recycling

Potential Participants				136,325
Per participant Savings (kWh):				1,150
Per Participant Savings (kW):				0.2
Program Year	**Incremental Participants**	**Percent Participation**	**kWh Saved**	**kW Saved**
Year 1	4,090	3.0%	4,703,500	990
Year 2	5,453	4.0%	6,270,950	1,319
Year 3	6,816	5.0%	7,838,400	1,649
Year 4	8,180	6.0%	9,407,000	1,979
Year 5	9,543	7.0%	10,974,450	2,309
Cumulative	34,082	5.0%	39,194,300	8,246

[34] The $30 incentive is based on the Nevada Power Company incentive, which has elicited a strong positive response from customers. Wisconsin Public Services offers a $50 incentive, but we believe I&M's program will be successful with the lower incentive amount.

Marketing Plans

This program will be marketed directly to consumers through bill inserts, direct mailing materials, and through refrigerator distributors. The program will need to mail information to customers on a regular schedule (twice a year basis, or more frequently as needed to produce the desired participation rates), and through point-of-purchase information at trade ally facilities. The two primary program vendors for this type of program are Appliance Recycling Centers of America, Inc. (ARCA), 7400 Excelsior Blvd., Minneapolis, MN 55426 [952-930-9000] [www.arcainc.com]; and JACO Environmental, Inc. (JACO), 7115 Larimer Road, Everett, WA 98208 [425-290-6291][www.jacoinc.net].

Program Tracking Considerations

The program vendor will be required to supply a detail database sufficient to demonstrate the age and condition of units picked up and also to demonstrate that the units are properly destroyed and recycled. In addition, the database should be sufficient to supply data necessary for program evaluation.

Detailed Budget Plans

An estimated five-year budget for this program is provided below. The anticipated cost to I&M includes:

- Administrative costs to develop, advertise, oversee and monitor the program.
- Incentive payments to customers of $30.
- Contractor payment.

There are no costs to participating customers.

Table 53. Estimated Five-Year Program Budget – Residential Appliance Recycling

	Cost per Participant	Year 1	Year 2	Year 3	Year 4	Year 5	5-Yr Total	Percent of Total
Fixed Program Costs								
Implementation & Other Annual Cost		$20,000	$0	$0	$0	$0	$20,000	0%
DSM Staffing		$22,000	$22,000	$22,000	$22,000	$22,000	$110,000	2%
Program Monitoring & Evaluation		$10,000	$0	$100,000	$7,500	$80,000	$197,500	3%
Variable Program Costs								
Incentives	$165	$674,850	$899,745	$1,124,640	$1,349,700	$1,574,595	$5,623,530	94%
Delivery & Other	$0	$0	$0	$0	$0	$0	$0	0%
Total Budget		$726,850	$921,745	$1,246,640	$1,379,200	$1,676,595	$5,951,030	100.0%

Program 13. Residential New Construction

This is a "beyond Energy Star" strategy for new residential construction. A second program element, Energy Star manufactured homes would have been included except that the relatively small stock and yearly increment of manufactured homes in I&M's Indiana service territory are too small to support a program.[35]

Recent changes in Energy Star and the general success of Energy Star in improving the performance of baseline (Non Energy Star) new homes have negatively affected the cost-effectiveness of the standard Energy Star program. In the Energy Star program, there are many builder pathways (called Building Options Packages) to enable manufacturers to meet Energy Star criteria. Many Energy Star builders, in order to be sure of meeting the Energy Star criterion, now build beyond it. From a utility perspective, supporting "beyond Energy Star" homes is the only viable option to insure cost-effectiveness of this program element.

Energy Star homes are homes that are independently certified and are more efficient, comfortable and durable than standard homes constructed according to local building codes. Energy Star homes feature additional insulation; better windows, doors and bath ventilation; and high efficiency appliances such as furnaces, AC units, heat pumps, and water heaters. These improvements beyond current practice typically cost home buyers a factor of two to three times the actual cost to builders for the energy efficiency improvements. This provides excellent leverage in an upstream program model that can provide something like two to three times the customer value for each dollar of upstream buy down.

The builder pathway indicated in the table above is an example taken from the set of possible pathways – builder options that that will produce a "beyond Energy Star" result. A package such as this is essential to keep the program cost-effective. The incremental cost of $3,000 per home plus a $400 inspection fee in the illustrative measure package represents a generalized measure package.

Incentives for new residential buildings programs vary greatly across utilities. For example, the Eugene Water and Electric Board (EWEB) provides incentives of $250 or $1,000, and other utilities in the Pacific Northwest states provide $1,000, $1,500, or $2,000. NYSERDA and Long Island Power Authority (LIPA) in New York provide incentives from $750 to $3,500 to builders of Energy Star homes. New Hampshire utilities provide up to $3,000. Southern California Edison provides incentives up to $700, depending on climate zone.

Rationale

The Energy Star Plus program element is necessary due to the overall success of the Energy Star concept. Baseline homes have become increasingly energy efficient, enough so that to mitigate the risk of not being cost-effective, program homes must be taken to a beyond Energy Star level of performance.

[35] A manufactured home program could work as a joint utility funded statewide program.

Participation and Measures

Measures are shown below.

Table 54. Measures and Incentives – Residential New Construction

Measures	Measure Number	Incentive Amounts
Energy Star New Home (Building Options Package)	R-25	$1,500
Lighting and Appliance Bonus when 10 energy efficient fixtures and 3 labeled Energy Star appliances are included (or equivalent upgrade)		
Inspection Service Fee		$200

Projected participation by year is shown in the table below.

Table 55. Estimated Participation and Savings - Residential New Construction

Potential Participants				350
Per participant Savings (kWh):				4,222
Per Participant Savings (kW):				1.4
Program Year	**Incremental Participants**	**Percent Participation**	**kWh Saved**	**kW Saved**
Year 1	35	10.0%	147,770	49
Year 2	70	20.0%	295,540	98
Year 3	105	30.0%	443,310	148
Year 4	105	30.0%	443,310	148
Year 5	105	30.0%	443,310	148
Cumulative	420	120.0%	1,773,240	590

Marketing Plans

For beyond Energy Star homes, only the top income segments are likely to be effectively in the market for very energy efficient new homes. This is particularly so now with problems in mortgage markets and general tightening of credit. The financial incentive is provided directly to homebuilders to help offset the additional cost to build an Energy Star home. This gives the incentive a multiplier of between two and three. This program element is a vendor delivered program requiring an experienced Energy Star program vendor. The program vendor provides all of the detailed knowledge and relationships to put the program in place with a restricted set of measures to reach savings levels significantly beyond Energy Star using a set of builder options packages. While the customer has higher first cost, the customer pays less for energy over the life of the home and on a life cycle basis comes out well ahead financially. The program vendor will also provide the established channels to national builders, establish relationships with local builders, and will come supplied with all manner of promotional materials.

The key, according to the Texas Energy Star program is in promoting the value of the brand to builders who would like to differentiate their product. Marketing methods include:

1. Newspaper and real estate guide ads
2. Signage
3. Marketing materials
4. Builder and subcontractor training and ongoing technical assistance
5. Training in the advantages of Energy Star homes for all the builders, sales staff, realtors, and the lending community.

6. Seminars and literature targeted at consumers. This is a valuable addition to a marketing effort because consumers can create a market pull.

Key points to include in a beyond Energy Star program element are:[36]

1. Establish a single stable multi-year approach. This will give stability to builders and allow the program to grow more readily.
2. Establish a single, simple, and high program standard of efficiency. This is important because it lets builders know where they stand and what is expected.
3. Establish good relationships with area builders and developers.
4. Ensure that staff professionalism, delivery systems, equipment, marketing materials and quality assurance are all of high quality.
5. Maintain strict adherence to specifications based on sound building science and economics to maintain program credibility and consistency.
6. Establish a process for certifying and documenting homes built to requirements.[37]
7. Develop a solid infrastructure of experienced, well-known and respected organizations.
8. Develop targeted incentives that are well coordinated with marketing and other service-related materials.
9. Coordinate with health and safety standards and codes for residential construction.
10. Provide ongoing technical training for builders and subcontractors.
11. Promote builders buy-in into the program by getting them financially invested in the program through advertising, building requirements, and training so they will support all aspects of the program.[38]
12. New construction is an excellent area to review for strategic combination of gas and electric energy efficiency measures.

Program Tracking Considerations

As Energy Star homes, Energy Star Plus homes are certified by HERS raters, and I&M will need to work with the HERS raters and the program vendor to establish a workable data tracking system. There are several models for this system, for example the "Dashboard" system developed by Paragon Consulting Services.

Detailed Budget Plan

An estimated five-year budget for this program is provided below. The anticipated cost to I&M for the beyond Energy Star program element involves costs for:

- Administrative costs to develop, oversee, and monitor the program. A vendor contract to market and deliver the new home program, including funding of HERS raters.
- Cooperative advertising budget as part of an inclusive marketing and promotional budget.
- Incentives to be paid to the builder.

Costs to participating customers include the customer's outlay for any remaining incremental cost of the Energy Star Plus home.

[36] Drawn from Vermont Energy Star Program, managed by Efficiency Vermont.
[37] Texas Energy Star Program.
[38] Texas Energy Star Program.

Table 56. Estimated Five-Year Program Budget – Residential New Construction

	Cost per Participant	Year 1	Year 2	Year 3	Year 4	Year 5	5-Yr Total	Percent of Total
Fixed Program Costs								
Implementation & Other Annual Cost		$10,000	$0	$0	$0	$0	$10,000	1%
DSM Staffing		$22,000	$22,000	$22,000	$22,000	$22,000	$110,000	10%
Program Monitoring & Evaluation		$15,000	$10,000	$60,000	$10,000	$60,000	$155,000	14%
Variable Program Costs								
Incentives	$1,500	$52,500	$105,000	$157,500	$157,500	$157,500	$630,000	57%
Delivery & Other	$500	$17,500	$35,000	$52,500	$52,500	$52,500	$210,000	19%
Total Budget		$117,000	$172,000	$292,000	$242,000	$292,000	$1,115,000	100.0%

Program 14. Residential Solar Siting

Passive solar design and orientation reduce a home's heating and cooling costs and makes the home more comfortable with better lighting and better internal temperature control. Here we focus on orientation only - reorienting a new home to take advantage of the warmth of the sun (we include in the orientation shifting *existing* plans for windows to place more on the south side of the home and additional passive solar measures may be optionally included).[39] This program differs from the others in that, in addition to assisting with solar siting of individual homes, I&M will work with local, county and state code authorities with the goal of inserting a preference for solar siting into building codes. This provision would require consideration of solar siting, but would not make solar siting mandatory. It would also remove all legal barriers to solar siting.

Rationale

Passive solar orientation places a home on the building site in such a way that the home takes full advantage of the sun's natural heat. With the long side of the home facing to the south, the structure will capture solar heat in the winter and block solar gain in the summer.[40] While there is no need to change the house design, moving windows to the home's south side will enhance its solar performance. If the south-facing window area reaches eight to ten percent of floor area, the home can be called "sun tempered." This is an inexpensive way to gain a substantial and long term energy savings advantage.

A full-fledged "passive solar" home has south facing glass area of 15 to 20 percent of floor area. With this much glass, additional features must be added, such as thermal storage mass and summer shading. Many builders choose to keep the project simple by sticking to the sun-tempered level.

Solar orientation, in itself, can reduce annual home heating costs for a home in Northern Indiana by from ten to twenty percent (extrapolating from a Bonneville Power Administration study for the Pacific Northwest), and, if the home also has air conditioning, reduce cooling costs similarly (based on California studies). If "sun tempering" or fully passive solar improvements are also made, the savings increase. Also, people generally feel more "natural" and comfortable in a home that takes maximum advantage of natural lighting.

Costs for the solar orientation program element will also include staff work with municipalities, counties and state offices to work towards codes that remove all barriers to solar orientation, and require documentation of builder/home owner consideration of solar orientation.

[39] We expect that insuring solar orientation will lead to most homes also increasingly adopting elements of passive solar design, however, for this program we assume only solar orientation.
[40] If, further, south-facing window area is at least ten percent of floor area, the home is "sun tempered" resulting in higher energy efficiency. As a further step, a fully passive solar home will add thermal storage mass and summer shading, and special windows will be used.

Participation and Measures

Measures are shown below.

Table 57. Measures and Incentives – Residential Solar Siting

Measures	Measure Number	Incentive Amounts
Inspection Service Fee	R-23	100% (up to $500)
Solar orientation of new homes		
Work on local, county and state codes	Internal staff work	100% I&M effort

Projected participation by year is shown in the table below.

Table 58. Estimated Participation and Savings – Residential Solar Siting

Potential Participants				350
Per participant Savings (kWh):				1,500
Per Participant Savings (kW):				0.3
Program Year	**Incremental Participants**	**Percent Participation**	**kWh Saved**	**kW Saved**
Year 1	35	10.0%	52,500	11
Year 2	70	20.0%	105,000	22
Year 3	105	30.0%	157,500	33
Year 4	105	30.0%	157,500	33
Year 5	105	30.0%	157,500	33
Cumulative	420	120.0%	630,000	131

Marketing Plans

The solar orientation program element is targeted to all markets segments for which new housing is being constructed. Since we limit the focus to solar orientation (while expecting this focus to also increase participation in other solar options), there is no new cost to the builder or buyer for this feature. The aim of the codes effort will be to have codes changed to require that builders and home buyers actively consider the advantages of solar orientation in placement of homes on lots and to insure that local, county, and state codes remove all barriers to solar orientation. There are no substantial customer costs for orienting a home on a lot to take natural advantage of energy supplied freely by the Sun, though it is expected that once builders and home owners consider solar orientation, it will lead towards rapid adoption of "sun tempered" and fully passive solar designs.

Program Tracking Considerations

For the solar orientation program element, a careful process evaluation of the company's effort to improve municipal, county and state codes will provide necessary documentation of effort. For individual homes affected by this program, there should be a certification as to proper solar siting, and of other aspects of passive design to the extent they are included.

Detailed Budget Plans

An estimated five-year budget for this program is provided below. The anticipated cost to I&M for the Solar Siting program element involves costs for:

- Administrative costs to develop, oversee, and monitor the program.
- Cooperative advertising budget as part of an inclusive marketing and promotional budget.
- Incentives
- Costs to work with municipal, county and state government codes organizations.

Table 59. Estimated Five-Year Program Budget – Residential Solar Siting

	Cost per Participant	Year 1	Year 2	Year 3	Year 4	Year 5	5-Yr Total	Percent of Total
Fixed Program Costs								
Implementation & Other Annual Cost		$10,000	$0	$0	$0	$0	$10,000	2%
DSM Staffing		$22,000	$22,000	$22,000	$22,000	$22,000	$110,000	23%
Program Monitoring & Evaluation		$15,000	$10,000	$60,000	$10,000	$60,000	$155,000	32%
Variable Program Costs								
Incentives	$500	$17,500	$35,000	$52,500	$52,500	$52,500	$210,000	43%
Delivery & Other	$0	$0	$0	$0	$0	$0	$0	0%
Total Budget		$64,500	$67,000	$134,500	$84,500	$134,500	$485,000	100.0%

Program 15. Residential Low and Moderate Income Weatherization

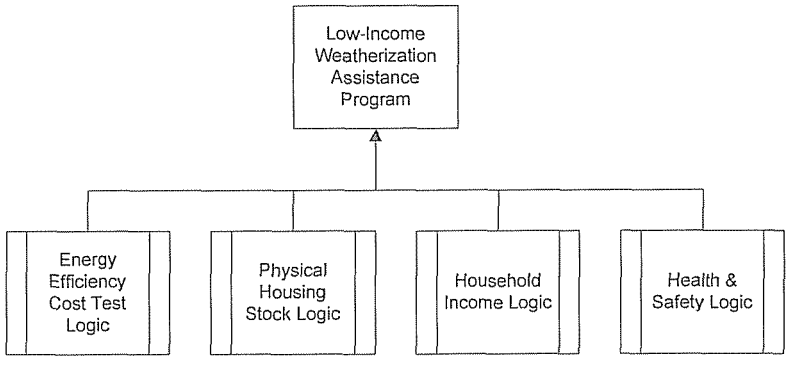
This program will serve residential customers. There are two program elements, based on household income. The first program element is the Residential Low Income Program which will serve customers up to an including 150 percent of the Federal Poverty Level. It is modeled on the federal Weatherization Assistance Program (WAP) and the Indiana Weatherization Assistance Program. The second program element is to serve income limited households from 150 percent of the Federal Poverty Level to 80 percent of the state median household income (this is the upper limit of eligibility for public housing under federal Department of Housing and Urban Development regulations). It is modeled on the "Gap" programs now implemented by many US electric and gas utilities to assist households with income deficiencies, but above the cut off level for low income programs. The two program elements will be identical except for the income cut offs to determine eligibility.

It is expected that the homes served by these program elements will be primarily single family owner occupied homes and manufactured owner occupied homes. However, and although the permission structure is different, and typically much less work can be done in a rental unit than in an owner-occupied home, we recommend that rules be developed for inclusion of apartments and rental units in this program.

Rationale

Low-income programs are different from traditional DSM programs. They are a special case in that they attempt to cover four objectives:

1. Like other DSM programs, a core objective is to provide energy savings (DSM savings).
2. Unlike other DSM programs, a second core objective is to provide repairs necessary to install energy savings improvements in a part of the housing stock that is often old and substandard in comparison to middle and upper income housing.
3. Provide DSM service to customers who otherwise could not obtain DSM improvements due to cost.
4. Due to problems with low-income housing stock, address health and safety concerns.



For these reasons, the prevailing practice in the area of low-income programs is not to focus solely on the "California tests" traditionally used in DSM program review.[41] Instead, commissions have been adopting different

[41] For low-income programs, program cost-effectiveness is a lesser issue, although still an important objective. Because of their particular focus on the special needs of disadvantaged households, low-income energy efficiency programs are generally not held to the same cost-effectiveness criteria as utility energy-efficiency "resource" programs (i.e., they are not judged with a

tests for low-income programs. For example, the DC Commission uses an "Expanded All Ratepayers Test" (incorporating several "non-energy benefits" for low-income programs if the Benefit Cost ratio on the initial test is 0.8 or above; the California commission uses a "Modified Participant Test" and Utility Cost Test (including "non-energy benefits") for screening measures for low-income programs. A measure is accepted into the program if it passes either test. Thus, the Total Resource Cost (TRC) test result for the Southern California Edison Low-Income Energy Management Assistance Program was 0.63 for 2004 and 0.61 for 2005. Similarly, the TRC for Pacific Gas & Electric's Low-Income Energy Partners Program was 0.41 for 2004.

Participation and Measures

The types of weatherization measures to be offered are shown in the table below. This program is free to qualifying participants each year until funds are exhausted.

Table 60. Measures – Residential Low & Moderate Income Weatherization

Measure	Measure Number
Wall Insulation	This program is designed to supplement the Indiana Weatherization Assistance Program and will adopt their measure list and state regulations and procedures.
Ceiling Insulation/Attic Insulation	
Programmable Thermostat	
Duct sealing & Check on Charge Levels & Furnace Filters	
House Sealing	
CFLs (8)	
Showerhead (2.0 GPM) and Flow Restrictors	
Water Heater Blanket	
Primary Window Replacement (if broken or deteriorated beyond repair)	

For developing participation, the Low Income program limit of 150 percent of the Federal Poverty Level has been retained for the new program to facilitate compatibility and cost sharing with the Indiana Weatherization Assistance Program.[42] However, consistent with the direction of current practice, the upper limit for the Moderate Income Weatherization Assistance Program is 80 percent of median household income. This conforms closely to the Department of Housing & Urban Development upper limit of low income used to determine eligibility for public housing.[43]

strict "total resource cost" test, or TRC). More typically, the focus is on the magnitude of utility bill savings to participating customers, rather than the utility system avoided energy supply costs. Also, low-income programs often include broader "non-energy benefits" (NEBs) such as lowered credit and collection costs and avoided bad debt for the utility, and improved health and safety for customers. See: Kushler, Martin, Dan York & Patti Witte, "Meeting Essential Needs: The Results of a National Search for Exemplary Utility-Funded Low-Income Energy Efficiency Programs." Washington, DC: American Council for an Energy-Efficient Economy, Report Number U053, September 2005.

[42] For methods and advantages of cost coordination, see Hill, Lawrence J. & Marilyn A. Brown, "Estimating the Cost-Effectiveness of Coordinated DSM Programs." *Evaluation Review*, Vol. 19 No. 2, April 1995, Pp. 181-196.

[43] The federal poverty metric, though updated using the Consumer Price Index each year, is a corrupted metric that is based on wildly inaccurate assumptions regarding household composition, availability of foodstuffs, and overlooks significant household costs. Replacing the poverty metric, many states rely at least in part on percentages of median income. The best metric of income insufficiency is developed using the family budget study method, developed by Wider Opportunities for Women and the Ford Foundation. Using the Department of Housing and Urban Development definition of low income (80% of median income) rather than the Department of Health and Human Services definition (60% of median income) goes a long way towards making the eligibility criterion reflect the material reality of household economic situations today.

Table 61. Estimated Participation and Savings - Residential Low & Moderate Income Weatherization

Potential Participants				28,114
Per participant Savings (kWh):				3,714
Per Participant Savings (kW):				1.3
Program Year	**Incremental Participants**	**Percent Participation**	**kWh Saved**	**kW Saved**
Year 1	422	1.5%	1,567,308	545
Year 2	492	1.8%	1,827,288	635
Year 3	562	2.0%	2,087,268	725
Year 4	590	2.1%	2,191,260	761
Year 5	604	2.2%	2,243,256	779
Cumulative	2,670	1.9%	9,916,380	3,445

As a rough guide, income for Indiana counties served by I&M was analyzed with the following results:

- 16.6 percent of households are between zero and 150 percent of the federal poverty level;
- 26.5 percent of households are between zero and 200 percent of the federal poverty level;
- 28.7 percent of households are between zero and 60 percent of Indiana median household income; and
- 40.1 percent of households are between zero and 80 percent of Indiana median household income.[44]

These percentages are not exact for the Indiana service territory of I&M, but they are close enough to use reliably for estimating eligibility.

Marketing Plans

Marketing for this program is expected to be coordinated with INCAA and the state weatherization program, which already has outreach activity through the sub-grantee agencies. The number of program slots to be allocated to the Moderate Income program is expected to be a matter for continuing decision as economic conditions change. It is very important to have the capability to serve electrically heated homes above the 150 percent of poverty level since the federal poverty measurement system is systematically off by a factor of approximately two, and the situation of a home somewhat above the 150 percent cut off may easily be more difficult than a home just below the 150 percent cut off. The assignment of slots between the Low Income and Moderate Income programs is likely to depend on circumstances that will develop and change. Care will need to be taken to try to insure that the programs are not oversubscribed in any given year.

- The delivery contractor will be responsible for recruitment, taking into account referrals from I&M.
- Proposed marketing efforts include the use of utility bill stuffers for customer education, and mention of the program in communications with customers regarding energy efficiency program options.
- Customer relations and collections staff will be trained to refer customers if they are within the income range and enquire about weatherization or experience payment problems. (And have electric heat.)

Program Tracking Considerations

Data collection and documentation for program purposes and annual reporting will require a tracking system. The selected delivery contractor will be requested to carry out most of the data entry for this system.

[44] Source: Calculated from data in "Hoosiers by the Numbers."

Detailed Budget Plans

An estimated five-year budget for this program is provided below. Costs to participating customers will be customer's time and permitting access to the home for improvements. As with the current low-income programs, attempts should be made to coordinate through INCAA and other sources for program delivery and cost sharing.

Table 62. Estimated Five-Year Program Budget – Residential Low & Moderate Income Weatherization

	Cost per Participant	Year 1	Year 2	Year 3	Year 4	Year 5	5-Yr Total	Percent of Total
Fixed Program Costs								
Implementation & Other Annual Cost		$20,000	$0	$0	$0	$0	$20,000	0%
DSM Staffing		$22,000	$22,000	$22,000	$22,000	$22,000	$110,000	1%
Program Monitoring & Evaluation		$10,000	$10,000	$85,000	$10,000	$90,000	$205,000	2%
Variable Program Costs								
Incentives	$1,585	$668,701	$779,623	$890,545	$934,914	$957,098	$4,230,882	43%
Delivery & Other	$2,000	$844,000	$984,000	$1,124,000	$1,180,000	$1,208,000	$5,340,000	54%
Total Budget		$1,564,701	$1,795,623	$2,121,545	$2,146,914	$2,277,098	$9,905,882	100.0%