Designed for Comfort California Campus Housing Efficiency (DfC CACHE)

A Third Party Proposal for SCG Service Territory

Proposal No. p03-11

Other Programs Proposed:

DfC CACHE – SCE; DfC CACHE – PG&E; DfC CACHE – SDG&E
DfC EAH – PG&E; DfC EAH – SCE; DfC EAH – SCG; DfC EAH – SDG&E

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1. PROGRAM OVERVIEW

The California Public Utilities Commission seeks qualified consultants to provide energy efficiency program services for program years 2004 and 2005 (PY04-05). This proposal describes a program concept designed by the HESCHONG MAHONE GROUP, INC., the capabilities of HMG in this field, and the rates we propose to charge for these services.

The HESCHONG MAHONE GROUP, INC. is an established firm providing professional consulting services in the field of building energy efficiency. The Principals, Lisa Heschong and Douglas Mahone, have more than fifty years' experience in the building energy field between them. Both were originally trained and are registered as architects. They have since specialized in the applications of building design and construction technology to the problem of making buildings more efficient. They are joined by a technical staff with diverse and complementary skills in architecture, engineering and construction, and economics, along with building, surveying, technical, writing and project management skills.

The experience of the HESCHONG MAHONE GROUP, INC. principals and staff has led to a variety of project work for major utilities and government agencies, including:

- Program implementation: *Designed for Comfort*, PY2000 as a TPI for SDG&E; *Designed for Comfort*, PY2001 as a TPI for SCE; *California Energy Star New Homes (CAES MF), Multifamily*, PY2002-3 for SCE; *CAES MF Design Professional Training*, PY2003 as a subcontractor to D&R International for SCE and PG&E.
- Program design and development: *Savings By Design*, PY1999 for SDG&E on behalf of the three electric IOUs – HMG managed the process of program development working with the NRNC program managers from each utility; *Designed for Comfort*, PY1999 for SDG&E – HMG developed the program design under contract to SDG&E to meet their desire to have a 3rd Party Multifamily New Construction program.
- Program measurement and evaluation: under contract to SCE, HMG manages the statewide NRNC measurement and evaluation activities (Py2000-2003); HMG is the EM&V contractor for *DEEP*, the City of Davis' CPUC approved program; HMG is the EM&V contractor for the Local Government Commission's CPUC approved program; HMG is the EM&V contractor for SMUD's nonresidential programs.

1.1 Program Concept

Student housing is a category that is unserved by either the statewide nonresidential new construction program, *Savings By Design (SBD)* or the statewide residential new construction program, *California Energy Star New Homes Multifamily (CAES MF)*. One does not serve residential occupancies and the other does not serve master-metered buildings.[1] This new program, *Designed for Comfort California Campus Housing Efficiency* (*DfC CACHE*), will build on the success that HMG has helped the investor owned utilities (IOUs) achieve through the statewide multifamily program, *CAESMF*. It will match in virtually every aspect – differing only where appropriate to serve the niche market of student housing. It will provide design assistance and incentives for design teams that don't need assistance, provide nominal Developer Incentives for achieving 20% improvement beyond Title 24[2], provide oversight of and rebates for third party verification of measures, and will enter the data on qualifying projects into the CHEERS[3] registry of California ENERGY STAR multifamily buildings. *DfC CACHE* will include marketing and training similar to that of the statewide program but tailored to the niche market.

1.2 Program Rationale

Over the next eight years the University of California (UC) system will be building close to 40,000 new units[4] of student housing[5]. 12,100 units are already approved for construction. The California State University (CSU) system is planning on building 6,880 units of student housing in the next 2½ years[6]. Eleven community college campuses also provide student housing and may be expanding within the next few years. These housing units meet the CPUC's definition of hard-to-reach because they are multifamily rental units and many of them will be in rural areas. Each student housing unit built represents an opportunity for long-term energy savings through reductions in energy usage for heating, cooling, and water heating by up to 50%. Our experience with the

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[1] For PY2003 and, subject to CPUC approval, PY2004, the IOUs do serve master metered projects designed for particularly hard to reach groups, such as a veterans' facility that offers services as well as residential spaces. They stated clearly in emails during August 2003 that they do not consider student housing to be in that category and that they will not serve them with the statewide MF program.

[2] Although the statewide multifamily program targets a 15% improvement over Title 24, we use the 20% level to be consistent with recently adopted goals of the UC and CSU systems.

[3] CHEERS is the California Home Energy Efficiency Rating Service.

[4] "Units" in the context of student housing means "beds," or in the case of family student housing "occupant spaces." This is in contrast to the statewide *CAES MF* program definition of "unit" meaning an apartment, regardless of the number of beds or bedrooms.

[5] *UC HOUSING for the 21st Century: A Report of the University of California Housing Task Force.* November 2002

[6] *CSU Newsline* reports on CSU Stanislaus, CSU San Jose, and Cal Poly SLO; from <www.calstate.edu/newsline> September 5, 2003.

current multifamily programs persuades us that at least 20% is possible at virtually no incremental cost. Our experience also convinces us that because the expertise to find and achieve that improvement (20%-50%) is lacking in the design community, the savings would be lost with the false belief that it is not cost-effective.

Although the UC has adopted a policy of beating 2001 Title 24 by 20% on all new construction associated with the UC campuses[7], it is predicated on a finding that the savings are cost-effective. The majority of construction will be "design/build" projects, wherein the developer's profit normally shrinks with each hour spent analyzing options or each measure that adds any incremental cost. Further, it is our experience that design teams often do not know how to find cost-effective solutions, or may feel too time pressured to do so on their own. At an average of 40 kBtu/ft^2 annual use for these buildings, the lost electrical savings alone could represent over 930 MWh per year, just for the next three years' construction of student housing.

An alternative option for meeting the program requirements will be to comply with the proposed 2005 Title 24 requirements, which are nearing adoption by the CEC. This would result in approximately the same energy savings for heating, cooling and water heating (varying by Climate Zone and building type), would result in lighting energy savings outside the calculation programs approved for compliance by the CEC, and would have the added benefit of helping to prepare the industry for the new standards that will be effective in 2006. Using either of the alternative approaches will qualify a project for a Developer Incentive of $100/unit.

The most valuable element of this program may be the training and design assistance calculated to change the practices of those involved in designing and constructing student housing in California, which will having on-going lasting benefits to the state. However, we also expect to produce direct energy savings and demand reductions, and the program will be evaluated upon its ability to deliver those savings – using the same evaluation criteria and methodology as the statewide *CAES MF* program.

1.3 Program Objectives

If the proposed program is able to affect 60% of the units to be built during the course of the program, it will result in over 1,200 occupant units being improved to minimize wasteful use of energy. We estimate that the electricity savings

[7] On July 17, 2003, the UC Regents passed a comprehensive Green Building and Clean Energy Standard for the UC system.

would be on the order of 94 MWh per year.[8] Additionally, we project a demand reduction of 0.15 megaWatts (many of these units may not be used during summer peak events), and natural gas savings of about 19,200 therms per year.

We also have several non-energy objectives:

- the training of university architecture and engineering students in the use of MICROPAS and EnergyPro as design tools in the investigation of energy efficiency options
- enhancing the ability, knowledge, and experience of design teams, who specialize in campus housing design, to evaluate cost-effective options for energy efficient student housing
- presentation of multifamily energy efficiency options to meetings or conferences of design professionals, university personnel, and developers of campus housing

[8] Estimates of electricity and therms savings, and demand reductions are based on some average energy use per square foot estimates, average student housing size, and the minimum savings of 20% over Title 24 requirements. Inevitable variations in unit sizes and energy use per SF (by project, campus, and climate zone) make this a rough estimate. See Section 4 for an explanation of the methodology and assumptions.

2. PROGRAM PROCESS

This section discusses the proposed approach of the HESCHONG MAHONE GROUP, INC. in developing and implementing the proposed program on behalf of the California Public Utilities Commission.

2.1 Program Implementation

The HESCHONG MAHONE GROUP has been in discussions with the University of California Office of the President, the California State University system, and the Alliance to Save Energy. We are very aware of the proposals that these three entities are submitting. Representatives of each entity have agreed to seek opportunities to coordinate activities. The proposed UC and CSU program will focus on obtaining energy savings through retrofits of existing campus buildings, including retrofits of existing campus housing. The program ASE is proposing will seek to educate students and change behaviors that should result in significant energy savings through both conservation and efficiency related activities. Our proposed program, by contract, will focus on new construction opportunities and should have no conflict with these programs, nor with the statewide new construction programs (*California Energy Star New Home, Multifamily*, and *Savings By Design*). We will coordinate our training on building modeling with the IOUs' program staff as well as through the relevant university and college departments.

There are no current programs, either statewide IOU programs or third party initiatives, that provide this kind of service to the colleges and universities in California. Our proposed approach to *DfC CACHE*, however, will provide the same services that the statewide program, California Energy Star New Homes Multifamily program offers to other multifamily projects, and which have proven so effective. Those services include design assistance to project design teams, Design Team Incentives to help defray the cost of the additional analysis, training sessions for design professionals, Developer Incentives to help offset some of the incremental cost of achieving higher efficiency levels, rebates to cover some of the cost of having third party HERS raters verify installation of measures, and CHEERS registry recording for appropriate projects (currently, only those less than four stories). Coordination with the statewide program will be facilitated by the fact that we have worked with three of the four main IOUs on multifamily new construction energy efficiency programs, currently are administering SCE's

PY2002 and PY2003 programs, and are training energy consultants, architects, engineers and developers on the program on behalf of PG&E and SCE.[9]

2.2 Marketing Plan

The primary marketing of *DfC CACHE* will be to the decision makers at the colleges and universities which will be building student housing during the 2004-2006 timeframe. This marketing will be top-down in that we will cooperate with the UC Office of the President and the CSU Chancellor's Office to arrange participation by individual campuses. Since the program will also target private universities, we will develop both electronic and glossy flyers offering the services of the program.

A secondary marketing effort will focus on the design community and potentially interested student analysts (prospective energy consultants). We will offer no-fee training to these groups on the benefits of energy efficiency, information on energy efficiency technologies and techniques, and some basic strategies for determining which are the most cost-effective options for their specific projects. We will develop both electronic and glossy materials to attract design community and student participants to the training.

In the interests of coordination, we will also make our electronic and glossy marketing pieces available to the contractors for the statewide marketing and outreach effort. Additionally, we will work through the two programs that the UC and Alliance to Save Energy are proposing, should they be accepted by the CPUC for PY04-05 program funds.

2.3 Customer Enrollment

We will enroll participant projects by creating interest in the program from several different directions. We will capitalize on the existing interest of the UCOP and CSU Regents, since offers of assistance and incentives coming through the top of the university systems should receive a positive reception. We will also offer no-cost AIA accredited training to designers who focus on this market, so that they will not only be accepting of the change in practice, but should promote the program for us (in search of Design Team Incentives and ENERGY STAR recognition for their projects). Finally, through our training (coordinated with the UC and ASE programs) of potential student energy analysts, we will connect with and enroll projects on the trained students' campuses. Enrollment itself will be

[9] Until PY2000, there was no program at any of the four IOUs to provide energy efficiency services to the multifamily market. In 1999, SDG&E contracted with HMG to develop such a program, which we launched as a third party program in 2000. In 2001, we ran the program as a third party program in SCE's service territory. In 2002, the four utilities agreed to have a uniform statewide program and essentially used our TPI as the template. We contracted with SCE in PY02 and PY03 to administer the program for them. We know the programs and the program managers at each of the utilities very well.

via the same application process that we implement for SCE's *CAES MF* program.

2.4 Materials

DfC CACHE is not a direct-install program and will not provide any equipment or construction materials to the schools or their selected building contractors. Equipment and materials that the program participants choose to install will be based on meeting the overall building efficiency requirements for the program. Such equipment will be selected, specified and installed as part of their normal new construction processes.

2.5 Payment of Incentives

The Developer Incentive ($100/unit) will be paid upon verification by program staff that all requirements of the program have been met. Specifically, this means that analysis will be complete, materials and equipment chosen to meet the efficiency improvement are installed, third party Home Energy Rating System (HERS) verification of the installation is complete, and the school or their designated developer has submitted a request for payment of the incentive.

The Design Team incentive ($40/unit up to a cap of $5000) will be paid in two installments. One half the incentive amount will be paid when the analysis of the project (showing compliance with the efficiency requirements) is complete. The other half will be paid when the Developer Incentive is paid. The Design Team Incentive will be paid to the party designated on the Design Team Incentive Application.

The HERS rater rebate ($50/unit up to a cap of $6000) will be paid to the university or college at the same time that the Developer Incentive is paid. This is designed to offset most of the cost of the third party verification.

2.6 Staff and Subcontractor Responsibilities

HESCHONG MAHONE GROUP (HMG) will be the prime contractor and D&R International and Pat Davis Design will be subcontractors. Douglas Mahone will be the Responsible Managing Principal for HMG, and Nehemiah Stone will be the Project Manager in charge of daily program operations.

Julieann Summerford will be the manager of the D&R team and will direct their activities, which will include marketing the Design Team Training sessions and assisting with delivery of those sessions.

Pat Davis will be the manager of the Pat Davis Design (PDD) team. PDD will create the designs for the program brochures, case studies and any other print materials needed, and manage the printing of materials.

2.7 Work Plan and Timeline for Program Implementation

The following discussion and tables begin with the assumption that PY2004-05 programs will be able to launch on January 1, 2004. If circumstances prevent this from happening then the milestone dates will all have to be shifted accordingly. Since this program targets universities and colleges, many of the activities (training in particular) are confined to an 8-9 month window of the year. Therefore, adjustments of due dates cannot simply be an equal shifting of all dates by the amount of a delay.

Further, there are numerous influences that can affect universities' and colleges' decisions about building campus housing, or participation in any program. Probably chief among these is the current state of California's budget and economy. Knowing this, we feel that we can work around most of the constraints and likely achieve the goals below on schedule.

The following table provides the target project goals of this program and the dates by which we anticipate meeting the goals. By "project goals," we mean new construction housing units associated with university and college campuses in California.

Program Participant Goals/Milestones (cummulative):	*Number of Units*	*Date*
Prioritized Prospect List of New Campus Housing	2,000	February 15, 2004
Initial Database	n.a.	March 15, 2004
Applications received		
31% of Program Total	375	May 15, 2004
63% of Program Total	750	September 15, 2004
94% of Program Total	1,125	January 1, 2005
125% of Program Total	1,500	April 1, 2005
Applications complete/reviewed		
31% of Program Total	375	June 29, 2004
63% of Program Total	750	October 30, 2004
94% of Program Total	1,125	February 15, 2005
125% of Program Total	1,500	May 16, 2005
Units in verified viable projects		
25% of Program Total	300	August 13, 2004
50% of ProgramTotal	600	December 14, 2004
75% of Program Total	900	April 1, 2005
100% of Program Total	1,200	June 30, 2005
Units in completed, HERS rated projects		
25% of Program Total	300	March 11, 2005
50% of Program Total	600	July 12, 2005
75% of Program Total	900	October 28, 2005
100% of Program Total	1,200	January 1, 2006
"Total" target is 60% of the expected 2,000 units to be built during this time period, or 1,200 units. If development and production schedules are delayed (for example, by state budget constraints, then the total will obviously be lower).		

Figure 1 : Campus Housing Unit Goals

Nearly half of the activities of this program will not be directly associated with any campus housing construction projects, but are informational. The following table provides the dates by which we propose to achieve the major objectives of the program (other than the participant project related goals).

Other Program Goals/Milestones:	*Date*
Program Brochure (printed)	March 31, 2004
Case Study 1 (printed)	December 21, 2004
Case Study 2 (printed)	April 18, 2005
Case Study 3 (printed)	August 3, 2005
Complete Curricula for Designer Training	May 10, 2004
Begin Designer Training	May 26, 2004
Complete Curricula for Student Analyst Training	May 7, 2004
Begin Student Analyst Training	May 19, 2004
First Year-End Report	January 30, 2005
Final Report	March/31/2006

Figure 2 : Target Dates for Other Milestones

3. CUSTOMER DESCRIPTION

3.1 Customer Description

DfC CACHE will target all new student housing to be built at campuses of the University of California system, the California State University system, private California universities (e.g., UOP, USC, Stanford), and the community colleges. Most of the housing is expected to be on campus, but a significant amount of the housing will be constructed off-campus through agreements with the universities. We plan to work directly with the campus housing directors, architects and engineers, developers and builders associated with campus housing projects. This class of buildings meets the hard-to-reach category of multifamily residential. But more than that, it is a class of buildings that no other program serves – not Savings By Design because they are residential, and not California Energy Star New Homes because they are master metered.

3.2 Customer Eligibility

The customers for the incentive portion of this program include campuses of the University of California system, the California State University system, private California universities (e.g., UOP, USC, Stanford), and the community colleges, as well as private developers of student housing associated with university and college campuses. Only new construction campus housing projects are eligible.

3.3 Customer Complaint Resolution

HMG will not secure contractors for property owners nor become a party to any agreements between property owners and contractors or suppliers. There are existing dispute resolution procedures for contractors established by the Contractors State License Board.

The process by which DfC CACHE program staff will assist and provide an incentive to property owners is a gradual one marked by iterative efforts to understand the participant's needs, and to educate the participant on available options. We have found in this environment little cause for disputes. None have arisen during the four years that we have operated a third party multifamily program nor during the two years we have implemented SCE's multifamily program (CAES MF) as a contractor. The participant agreement we will execute with the customer organizations will spell out clearly what measures and actions are required of them in order to meet the qualifying target efficiency improvement. Incentive payments will not be made before the measures are installed. If the participant chooses at any point not to install the measures, they are under no obligation. Therefore it is highly unlikely that a dispute would arise.

However, there is still the potential for a dispute should a program participant have measures installed that they mistakenly felt would qualify them for the incentive. We would make every effort to help them determine if there are any additional cost-effective measures that could be added, which would then qualify the project for the incentive. If all our efforts fail to satisfy the participant's complaint, we would notify the administering Utility and submit the dispute to arbitration. Participant agreements will contain language that binds both parties to arbitration in the event of an otherwise unresolveable dispute.

3.4 Geographic Area

DfC CACHE will target projects being planned for all eligible campuses within SCG's service territory.

4. MEASURE AND ACTIVITY DESCRIPTIONS

4.1 Energy Savings Assumptions

In order to estimate potential energy savings, we applied a methodology used by the CEC in its estimates of energy code impacts. Figure 4 presents the results of MICROPAS runs of the CEC prototypical MF building in eight of the sixteen climate zones, showing the range of typical energy use (30.1 to 50.5 kBtu/sf) across the California climate zones. DfC CACHE will target a reduction of energy use in new campus housing of 20% below the levels required under current Title 24 energy standards requirements. The energy use per square foot is currently estimated to be 40kBtu/sf, using the CEC's prototypical multifamily building.[10] We conservatively estimated student housing units to be 300 square feet in size, and we estimated that we would get about 60% of the units planned for the next two years. We also conservatively assumed that 1/3 of the energy saved will be electricity and 2/3 will be gas.[11]

To estimate the peak demand reduction impact, we multiplied the kWh/yr estimate by a 0.003 conversion factor. This factor comes from a PG&E report on demand impacts of residential new construction program measures[12]. Conversion factors in the report range from 0.1626 (Climate Zone 1 or CZ1) to 0.0006 (CZ15), but most are between 0.0015 and 0.0055 for combinations of measures. We further took the conservative step of reducing the kW demand reduction estimate by ½ since many campus housing units are not occupied during the summer.

The following table shows the range of savings estimates that we considered, and indicates the calculation method. The **bold** row is the set of values used in the workbook.

[10] This is the prototype MF building used by the CEC to support the 2005 revisions to Title 24.

[11] In the cost-effectiveness calculation, this is a conservative assumption since the $/kBtu value of electrical energy is higher than the $/kBtu value of gas energy.

[12] "Residential New Construction – Demand Impact: Final Report." Pacific Gas and Electric Company; Mary Kay Gobris. October 25, 2001. Prepared by the HESCHONG MAHONE GROUP.

	%		kBtu/sf			kBtu/yr	Savings (assm. 1/3 elct.)			Per Unit Savings (assm. 1/3 elct.)		
Units	pent.	sf/unit	base	savings %	savings		MWh/yr	MW	therms/yr	KWh/yr	KW	therms/yr
2,000	0.60	300	25	0.20	5	1800000	58.6	0.09	12,000	48.83	0.073	10.00
2,000	0.60	400	25	0.20	5	2400000	78.1	0.12	16,000	65.11	0.098	13.33
2,000	0.60	300	30	0.20	6	2160000	70.3	0.11	14,400	58.60	0.088	12.00
2,000	0.60	400	30	0.20	6	2880000	93.8	0.14	19,200	78.13	0.117	16.00
2,000	0.60	300	35	0.20	7	2520000	82.0	0.12	16,800	68.37	0.103	14.00
2,000	0.60	400	35	0.20	7	3360000	109.4	0.16	22,400	91.15	0.137	18.67
2,000	**0.60**	**300**	**40**	**0.20**	**8**	**2880000**	**93.8**	**0.14**	**19,200**	**78.13**	**0.117**	**16.00**
2,000	0.60	400	40	0.20	8	3840000	125.0	0.19	25,600	104.18	0.156	21.33
2,000	0.60	300	45	0.20	9	3240000	105.5	0.16	21,600	87.90	0.132	18.00
2,000	0.60	400	45	0.20	9	4320000	140.6	0.21	28,800	117.20	0.176	24.00

Figure 3 : Energy Savings and Demand Reduction Estimates

It should be noted that any projects for which the campus officials or project developers choose to meet the requirements of the program by complying early with the 2005 Title 24 standards will also result in significant lighting energy savings. Since this is an alternate means of qualifying for the program, and since we have no prior estimate of how many participants will choose this path, we do not include energy savings from the lighting requirements of the 2005 standards in this estimate (based on residential lighting savings estimates for the 2005 standards, however, they could be substantial).

4.2 Deviations in Standard Cost-effective Values

We did not deviate from the standard values for net-to-gross (0.80) and estimated useful life (20 years) for the cost-effectiveness calculations in the workbook. Incremental measure cost is a bit more difficult to nail down. Here is the rationale for the value used in this estimate.

After several years of operating our own multifamily programs or implementing them for the IOUs, we have found that the cost of meeting the requirement of the statewide program, or this program (i.e., 15-20% improvement over Title 24), ranges from zero to over $200/unit depending upon (a) the basic building design,[13] (b) how early in the process the program can offer design assistance, and (c) dynamic prices of building materials and equipment. However, HMG has been generally successful in identifying options for participants that allow them to make the required improvements for only slightly more than the incentive amount.

For the statewide multifamily program, the incentive amount is $150/unit. The average multifamily units in the statewide program are roughly fifty percent larger than campus housing units.[14] Fenestration and water heating are the two areas that afford the largest energy savings, and costs for upgrading both are more related the overall building size than anything else. The cost of measures, as

[13] It generally costs somewhat more to make improvements to high-rise residential buildings, to those with individual water heaters, and to buildings where there is more than the usual amount of glass.

[14] These are based on rough estimates that have a wide variation to them among the different types of multifamily buildings as well as among individual buildings.

well as the appropriate incentive level, should be proportional. Therefore, the incremental cost should be slightly more than $100/unit; and we chose $120/unit for this analysis.

4.3 Rebate Amounts

The proposed incentive amount for the building owners participating in *DfC CACHE* is $100/unit[15]. This amount is less "per unit" than for *CAES MF* but appropriate to this market (just as the incentive amount in *CAES* varies between single family and multifamily due to size of units and cost of meeting the target efficiency level). Campus housing units are smaller in square footage than other multifamily units, yet the incentive is tied to a higher level of performance (20% better than 2001 Title 24, or compliance with 2005 Title 24) than *CAES MF*. While it is sometimes possible in multifamily projects to achieve nearly 20% improvement over Title 24 at virtually no cost, often the package of upgrades required does add significantly to the cost. We will re-evaluate our cost estimates and rebate amounts after the first year of the program, and may propose a modification to the incentive amount if we find that $100/unit is either too high or too low.

Just as CAES MF offers Design Team Incentives of $40/unit, *DfC CACHE* will provide $40/unit to help offset the design team's cost of examining alternative energy efficiency solutions and analyzing the cost-effectiveness of them. Like *CAES MF*, the incentive will be capped at $5000 per project. It will only be available to design teams that do the energy analysis themselves, and is meant to help defray some of the cost of the additional analysis required to identify and select cost-effective energy efficient technologies and designs.

DfC CACHE will also provide a $50/unit rebate to help offset the cost of third party verification (HERS raters), with a cap of $6000 per project. This is the same rate and cap that is used in *CAES MF*. This rebate is required at this point to (a) help stimulate the HERS raters to develop interest and expertise in this market,[16] and (b) reduce the significant cost hurdle for developers that the HERS rating represents.

4.4 Activities Descriptions

The primary activities of *DfC CACHE* will be those associated with increasing the energy efficiency of campus housing new construction: working with specific project design teams to develop and document improved building efficiency, verifying that construction matches the proposed efficiency level, and processing rebates. However, many *DfC CACHE* activities will not be associated with direct energy savings.

[15] See the discussion the definition of "unit" in Section 1.2.

[16] All but a few HERS raters in California currently focus exclusively on single family residential projects.

Two of these ventures include training of design professionals and training of students on the campuses that we will be targeting for participation. Training for design professionals will be coordinated with the statewide *CAES MF* program but will focus on those design professionals who have student housing as part of their specialization. Based on our work to provide training for the current statewide program, we estimate the training cost of the program to be $1,000[17] in up-front costs (development plus AIA accreditation) plus $2,500 per session (in addition to the marketing costs). We expect to deliver one session in 2004.

DfC CACHE training for students will be a little more flexible and tailored to the needs of the students and how it can best be incorporated with their curricula or complementary programs (e.g., UC's or ASE's). As a base plan, we anticipate providing a 1-2 hour classroom style session at 2 campuses, a more in-depth training on the use of MICROPAS and EnergyPro at 1 campus, and on-going training for 2-3 students at 1 campus with new student housing construction participating in the program.

The first stage of the student training will cost $800[18] for development plus $1,875 per session for presentations. Again, this is in addition to the marketing costs. The second stage of training will cost $500[19] for development and $3,950 each for presentation. The 2nd stage training will be tailored to serve five to ten students each. The third stage of student training will be very similar to the design assistance for actual project design teams, but will support 2-3 students as a virtual design team for the project(s) on their campus. Ideally, the students will be able to be integrated into the actual design team, depending mostly upon the class time and construction time constraints. We expect each of these training exercises (1) to cost $5,000.

[17] Estimate is a pro-rated amount based on an estimate of statewide training effort for all four utilities ($10,000). Actual amount for individual utility may change based upon the nature of the project award.

[18] Estimate is a pro-rated amount based on an estimate of statewide training effort for all four utilities ($8,000). Actual amount for individual utility may change based upon the nature of the project award.

[19] Estimate is a pro-rated amount based on an estimate of statewide training effort for all four utilities ($5,000). Actual amount for individual utility may change based upon the nature of the project award.

5. GOALS

Using the prototype multifamily building created to model changes to the code within the CEC's process, we analyzed the energy use across eight climate zones for a building that just complies with Title 24 requirements using the Prescriptive Package measures, but using the Performance approach, for both the 2001 (current) Title 24 requirements and the 2005 (proposed) requirements. Virtually all multifamily new construction currently uses the Performance approach, which means project energy budgets must be at or below the 2001 Performance Compliance number. Due to a few loopholes in the standards as they apply to multifamily new construction, many Prescriptive Package measures can be "stripped out," and the building will still comply. The 2005 code will close those loopholes. The table below presents an estimate of the energy savings to be obtained by meeting the 2005 code versus the 2001 version. The average energy use under the current standards is about 41 kBtu/sf. To derive the performance goals for *DfC CACHE*, we assumed a current statewide average energy use of 40 kBtu/sf.

	Performance Compliance			
	2001	**2005 (source)**	kbtu/sf/yr Saved	% Saved
CZ 03	33.53	27.88	5.65	16.9%
CZ 07	30.09	23.98	6.11	20.3%
CZ 09	36.58	27.75	8.83	24.1%
CZ 10	41.16	31.76	9.40	22.8%
CZ 11	45.73	38.77	6.96	15.2%
CZ 12	42.37	34.28	8.09	19.1%
CZ 13	47.35	38.50	8.85	18.7%
CZ 14	50.45	33.94	16.51	32.7%

Figure 4 : Comparison of MF Building Energy: 2001 VS 2005 Title 24

DfC CACHE will require a reduction in that energy use of 20% for participating buildings, based on the 2001 standards. As an alternative, the builder can simply comply with the proposed 2005 standards, which have lighting savings that don't show up in the "Budget" for heating, cooling, and water heating.[20] The primary advantage of offering this alternate approach is that it will help the building industry prepare for the revisions that are coming in 2006, and the energy saved will be approximately the same.

The table in Figure 5 shows the energy and demand reduction goals for *DfC CACHE*. These are the program measurable goals as defined in the *Policy Manual*. The number of units we impact will be verifiable from the agreements

[20] We do not include an estimate of any lighting savings from this approach in our workbook because we have no sense of whether any projects will use this approach. However, we will estimate the savings in our reports if any developers do use this route.

signed with the builders or owners of the campus housing. The energy and demand reduction goals will be verifiable from the kBtu reductions for each project as estimated through modeling using the CEC approved programs.

Number of Units	kWh/yr	KW	Therms/yr
1200	93,760	141	19,200
per unit	78.13	0.117	16.0

Figure 5 : Measurable Energy Efficiency Performance Goals

The methodology for calculating the peak demand reduction goal is discussed in Section 4.1 above.

As mentioned above, the gas savings goal is based on an assumption that 2/3 of the savings will be in gas. Should more of the projects than we have assumed be in areas with significant cooling loads, it is possible that we would not achieve our natural gas savings goal and still find the program to more cost-effective than we are estimating (due to the higher cost/Btu of electricity).

Outside of the direct energy savings goals of the program we also have targets of

- training 8 designers (architects, engineers, and energy consultants) and builders on energy efficiency options in campus housing design
- giving over 20 students an introduction to the potential for energy efficiency improvements in MF design and their options for helping to achieve energy savings in new construction design
- training over 6 students in the use of CEC-approved modeling tools for examining energy efficiency options in MF new construction
- training to 2 students on project specific analysis of cost-effective energy efficiency options and designs

Although each of these activities will lead to energy savings by making incremental changes in the way that the market works, no direct savings are claimed for them.

6. PROGRAM EVALUATION, MEASUREMENT AND VERIFICATION (EM&V)

In our proposal, we dedicate 5% of the cost of delivering the program to the budget for EM&V. This amounts to $15,200, within a budget of approximately $315,000.

We propose that DfC CACHE should be evaluated in exactly the same manner as the statewide California Energy Star New Home, Multifamily program. If exactly the same manner" is not possible, then the evaluation should match the statewide program evaluation as closely as possible. Therefore, until the CPUC approves the statewide program for PY2004-05, and the EM&V plan is developed for it, we believe that it would be inappropriate to lay out what might end up being an alternate plan. We do however, recommend that the evaluation of both the statewide program and DfC CACHE contain both surveys of customers and engineering analysis of the savings.

Our first choice for EM&V contractor is the contractor (as yet unknown) who will be performing the evaluation of the statewide program – for consistency. Obviously, if the CPUC approves this contractor for the statewide program EM&V, then s/he is by default deemed qualified.

As our second choice, The HESCHONG MAHONE GROUP (HMG) respectfully submits the following evaluation candidate: KEMA/Xenergy Consulting, Inc. to conduct required EM&V activities for *DfC CACHE*.

- Xenergy has performed numerous studies of residential program processes and impacts. These include a 1999 study (Impact Evaluation of PG&E 1997 Residential Energy Management Services Program) with Hagler Bailly Consulting, a 2001 study (2000 Market Effects Study of the TOSER EEM Program) for PG&E, and a 2002 study (Volume I: Impact Evaluation of the 2000 Statewide Low-Income Energy Efficiency (LIEE) Program) for PG&E.
- There are no financial, contractual or other relevant relationships between HMG and XENERGY that would affect the independence of XENERGY in the role of EM&V contractor on HMG's program, "California Campus Housing Efficiency."
- HMG has neither been a contractor to nor contracted with XENERGY Consulting.
- We know of no "factor[s] that might lead a reasonable person to question whether the Contractor [XENERGY Consulting] is actually independent of the Recipient [HMG].
- We know of no reasons why the Commission might not select XENERGY Consulting.

7. QUALIFICATIONS

7.1 Primary Implementer

The HESCHONG MAHONE GROUP has been involved in multifamily new construction programs since 1999 when SDG&E contracted with HMG to create the first MF new construction program to be offered by an IOU in California. We launched Designed for Comfort in PY2000 and later that year SDG&E took it in-house, renamed it Home Energy Partnership and offered it until the statewide multifamily program was created. In PY2001 we operated Designed for Comfort as a third party program in SCE's service territory. By the end of 2001, all the IOUs determined that it would be better to make it a statewide program under their management. They created the multifamily element of their existing California Energy Star New Homes program. SCE contracted with HMG to implement the program for them in PY2002. In PY2003, SCE again contracted with HMG for implementation. Under contract to PG&E, HMG also provided design assistance to participants in PG&E's program in both PY2002 and 2003. In PY2003, HMG teamed with D&R International (a subcontractor in this proposal) on a contract with SCE and PG&E to provide training for design professionals, developers and others interested in multifamily energy efficiency.

HMG has operated a successful third party program under the auspices of the CPUC since August 2002. The program, Efficient Affordable Housing, provides assistance to local housing authorities and affordable housing owners to increase the efficiency of affordable multifamily housing.

Under contract to PG&E, HMG also assisted the CEC with revisions to Title 24 in both the AB970 (2001) round and the 2005 round. One PG&E 2005 Title 24 proposal on which HMG prepared the analysis and code language included changes to the way that water heating energy is calculated for multifamily buildings. This change will close one of the largest loopholes in the current version of Title 24, and result in cost-effective water savings of up to 35%.

As well as managing the multifamily efforts listed above, Nehemiah Stone, the Program Manager on this proposal, has been an invited speaker on multifamily energy efficiency at Housing California (2001, 2002), Multifamily Buildings 2003,[21] the San Diego Housing Federation (2001, 2002, 2003), and other venues.

The following summaries introduce the qualifications and experiences of the HESCHONG MAHONE GROUP, INC.

[21] Multifamily Buildings 2003 was a three-day conference in New York in June of 2003, sponsored by DOE, the Association for Energy Affordability, and the New York City Housing Authority.

7.1.1 Program Design, Management, and Administration

Efficient Affordable Housing

A "local, third party" program to encourage existing affordable housing property owners to improve the energy efficiency of their rental units. The program provides design assistance and financial incentives to affordable property owners, and provides guidance to public housing authorities to reduce regulatory barriers to energy efficiency in the affordable housing projects in their jurisdiction. A key component of this program is the assistance and training of the housing authority staff on the adoption and implementation of a two-tiered utility allowance.

San Diego County Housing Authority Assistance

The program works with public housing authorities in the County of San Diego to encourage existing affordable housing property owners to improve the energy efficiency of their rental units. The program provides guidance to public housing authorities to adopt a second-tier utility allowance to provide an incentive for energy efficiency for the existing stock of affordable housing in their jurisdiction.

Two Tiered Utility Allowance Support, SDG&E: Assistance to San Diego Housing Commission

HMG first identified a regulatory barrier to energy efficiency within San Diego Housing Commission's (SDHC) affordable housing guidelines in 1998. HMG developed a program to turn this barrier into an incentive for greater investment in energy efficiency. HMG worked with SDG&E's Residential Program Manager to provide SDHC with analysis, case studies, and other support leading to the adoption of a two-tiered utility allowance schedule. The two-tiered schedule recognized the value and impact of energy efficiency upgrades in multifamily new construction. The second (efficiency) tier provided lower tenant utility allowances and higher rents, thereby providing the developer with a return on efficiency investments, while still giving the tenant a lower housing burden (rent plus utilities).

Butte County Two-Tiered Support

Using the Two Tiered Utility Allowance strategy developed for SDG&E's Residential Program, the Heschong Mahone Group is working with BCHA to turn a regulatory barrier to energy efficiency within their affordable housing guidelines into an incentive for greater investment in efficiency. HMG is also working with a design team led by Mogavero, Notestine and Associates to provide BCHA with design assistance for an energy efficient, comfortable, and economic new senior housing complex in Chico, CA. When completed, this project will represent the first application of the two tiered utility allowance for Butte County.

PG&E Statewide Multifamily Baseline Study

HMG provided design assistance to developers of multifamily projects in PG&E's service territory to help them identify measures needed to achieve 15% or 20% better than the Title 24 minimum requirements. A key program element included training to developers and designers of MF buildings on how to achieve cost-effective energy efficiency improvements.

Designed for Comfort, 3rd Party Multifamily New Construction Energy Efficiency Program in SCE's service territory

HMG modified the multifamily new construction utility incentive program originally developed for San Diego Gas and Electric called *Designed for Comfort* to meet the needs of customers in Southern California Edison's service territory. The program included design assistance to developers and designers of moderate income multifamily projects, recognition and advertising of energy efficient apartments, developer incentives, and design team incentives based on a whole building, computer simulation approach. HMG was responsible for the complete design and implementation of the program, including: overall program design, coordination of the engineering analysis required for the estimation tool, brochure development, new construction representative training, developer and energy consultant outreach, and verification of building qualification. The project began with an assessment of the residential new construction market, identification of barriers to more energy efficient construction and a survey of market participants to gain input on potential interventions. The program was the first to recognize barriers to efficiency posed by pre-existing housing authority regulations, and to include a unique approach (the two-tiered utility allowance) to transform the barrier into efficiency opportunities.

CES Multifamily

The program recruits and assists developers of multifamily buildings in SCE's service territory to improve the energy efficiency of their planned new construction units to 15% better than Title 24. HMG markets the program, coordinates the application process, monitors the project developments process, provides design assistance, manages the verification process for the improvements, and delivers the incentive checks.

Multifamily High-rise Criteria, PG&E Multifamily New Construction Energy Efficiency Program Development

HMG provided analytical services to determine the potential efficiency improvements to high-rise multifamily buildings for Pacific Gas and Electric Company, as part of PG&E's development of a multifamily new construction program for PY2002. The Heschong Mahone Group developed the base case building description relying primarily on data from high-rise projects in Designed for Comfort during 2000 and 2001. We analyzed the impact of thirteen individual measures, at approximately three efficiency levels each, across three representative Climate Zones. Following this step, we analyzed packages of

measures in five of PG&E's climate zones to achieve approximately 15%, 20% and 25% improvement over the minimum requirements of the Title 24 energy code. This resulted in a database that allowed PG&E to estimate the cost-effectiveness of various target efficiency levels and therefore the likely market effect of various incentive levels.

PG&E MF Design Assistance

HMG continues to provide design assistance to developers of multifamily projects in PG&E's service territory to help them identify measures needed to achieve 15% better than the Title 24 minimum requirements. HMG also provided training to developers and designers of MF buildings on how to achieve cost-effective energy efficiency improvements in support of their *California Energy Star New Homes Multifamily* program.

Designed for Comfort, SDG&E Multifamily Residential New Construction Energy Efficiency Program

HMG designed a multifamily residential new construction program (*Designed for Comfort*) for San Diego Gas & Electric that complemented their existing program focused on production homes. The program included design assistance, recognition and advertising of energy efficient apartments, owner incentives, and design team incentives based on a whole building, computer simulation approach. The HESCHONG MAHONE GROUP was responsible for the complete implementation of the program, including: overall program design, coordination of the engineering analysis required for the systems approach, brochure development, new construction representative training, energy consultant training and training material development. The project began with an assessment of the residential new construction market, identification of barriers to more energy efficient construction and a survey of market participants to gain input on potential interventions. SDG&E took the program "in-house" and renamed it *Home Energy Partnership*.

Savings By Design, CA Statewide Non-Residential New Construction Energy Efficiency Program

HMG facilitated the design and development of a statewide coordinated nonresidential new construction program for Pacific Gas and Electric, San Diego Gas and Electric and Southern California Edison. The program includes design assistance and owner and design team incentives based on a whole building, computer simulation approach, or a simplified systems approach. HMG was responsible for the overall program design, coordination of the engineering analysis required for the systems approach software tool, brochure development, utility new construction representative training and training material development.

New Buildings Institute Organization and Management

HMG developed a feasibility study and business plan for the New Buildings Institute, a national collaborative to develop and support workable energy codes

and advanced design guidelines. The Institute retained the Heschong Mahone Group to provide administrative support services, with Douglas Mahone as the Institute's Founding Executive Director. While serving as executive director, the Institute added three permanent staff members and undertook the management of over $2 million per year in research projects and code development support activities.

Cool Roof Rating Council

For the Cool Roof Rating Council, Interim Administrators for the founding and first six month of operation of the CRRC. We established the Council's business systems, and organized meetings of the Board of Directors and the membership. This included preparing brochures, mailing lists, registration materials, meeting reports and other support services. Nehemiah Stone was the Council's first Chairman of the Board of Directors.

Marketing of Utility Energy Services

HMG developed a prototype of a marketing tool for use by sales reps in presenting energy efficiency alternatives to customers. The rep used a laptop computer with an on-screen "slide show" featuring a branching script that could be readily adjusted to the interests and needs of the audience. The presentation also included "live" calculations that could be modified interactively with the customer to develop cost estimates and to print out a service proposal customized to the customer's application. The prototype also included an enterprise-wide sales contact management system that enabled the company to track and maintain information on all marketing contacts with customers. This system was intended to help the utility develop state-of-the-art sales and presentation capabilities for competitiveness in an unregulated environment.

7.1.2 Training and Technical Writing

SCE and PG&E Multifamily Training

HMG worked with staff of Southern California Edison and Pacific Gas and Electric to provide training to design professionals. HMG developed custom training curriculum and conducted eight half-day seminars for developers and design professionals in the multifamily new construction industry.

Bi-level Lighting Control Design Guide

For San Diego Gas and Electric Company, HMG wrote a design brief for bi-level lighting. This design brief discusses appropriate application scenarios and provides sample specifications. It also discusses the energy savings potential in different occupancy types.

Advanced Lighting Guidelines

Lisa Heschong served as executive editor, for the 2001 update to the Advanced Lighting Guidelines, coordinating the editorial approach and content of the team

of five authors. She also authored the chapters on Lighting and Human Performance, and Lighting Impacts and Policies. The project was sponsored by utilities, state and federal agencies, and the Guidelines document is published by the New Buildings Institute.

Improving Building Energy Efficiency Through Design Guidelines

This project took those aspects of Southern California Gas Company's past energy efficiency program measures which were proven to be effective, and transformed them into advanced design guidelines. For each efficiency measure, low cost guidelines were published by the New Buildings Institute to assist motivated building owners, designers, and managers of voluntary programs to promote more energy efficient buildings. The design guidelines encourage and assist market transformation, and will help to move the practices of energy efficiency forward.

7.1.3 Codes and Standards Research and Development

California Codes and Standards Residential Program Support

HMG provides ongoing support to residential building codes and standards program activities for changes that will be incorporated into the 2005 Title 24 Energy Code. We developed detailed code change proposals for residential hardwired lighting, multifamily water heating and envelope changes, modifications for existing buildings, measures to increase the efficiency of air conditioning systems, and improving process of implementations of the standards. We prepared gap analysis, cost/benefit analysis, draft and final reports. We also represented PG&E as the technical lead for workshops supporting the process. We also tracked the overall adoption and rulemaking process, contributed comments and improvements to other proposals, and advised Pacific Gas & Electric program manager on technical matters related to the proceedings.

7.1.4 Build*i*ng Science Research and Analysis

SCE Research Support for Energy Efficient Improvements to Existing Buildings

HMG provides research and planning to support the CEC in meeting the AB 549 mandate, a new rulemaking to recommended energy efficiency improvements for existing buildings (both residential and nonresidential) to decrease energy consumption and especially peak-load, in California's existing buildings. HMG evaluated the efficacy of various regulations through building or appliance standards and through a variety of trigger mechanisms. A key deliverable was an estimate the potential state-wide energy savings for the proposed measures.

Residential New Construction Demand, PG&E Analysis of the Demand Impact of Statewide RNC Programs 1999-2000

HMG managed a project to evaluate the demand impact of the most common upgrade efficiency measures installed as a result of the four IOU's residential new construction programs in 1999 and 2000. Working with Enercomp and Berkeley Solar Group, we calculated the energy impact of six different measures and two packages of measures, and the demand impact of each measure. Relying on recent research on use patterns, AC sizing anomalies, distribution losses and other factors, we adjusted the nominal peak demand impacts to estimate the average system wide impact of each measure or package on a per house, and per square foot basis. We presented the findings in a report and at a meeting of the Market Assessment Evaluation Statewide Team of Research Organizations (MAESTRO).

Market Transformation in Residential New Construction

HMG consulted on market structure of the residential new construction industry, and identified key indicators of market transformation in the residential market.

7.2 Subcontractors

7.2.1 D&R International

D&R is an energy and environmental consulting firm dedicated to raising the profile and marketability of efficient products and services. The company commands an in-depth understanding of the residential housing market, including the obstacles and perceptions that cause resistance to change. D&R has extensive experience working with the residential new construction and appliance and lighting markets.

D&R was founded in 1985 and is certified as a small, disadvantaged business by the U.S. Small Business Administration's 8(a) program. The company's 90 employees boast strong skills in communications and marketing, graphic arts, program management and design, strategic planning, engineering, building science, architecture, information technology, economics, recruiting, and consensus building. Headquartered in Silver Spring, Maryland, the company has satellite offices near San Francisco, California; in San Diego, California; and in Madison, Wisconsin.

Over the past 17 years, D&R's clients have included the California Public Utilities Commission (through the Commission's Third Party Proposal program), San Diego Gas and Electric, Southern California Edison, Pacific Gas & Electric, the California Energy Commission, DOE, EPA, the U.S. Department of Housing and Urban Development (HUD), manufacturers, retailers, and many others.

D&R International is currently under contract with PG&E to market its portion of the statewide program, California Energy Star New Homes Multifamily. D&R

also marketed the program for PG&E in PY2002, and is partnering with HMG to provide design team training for SCE and PG&E in PY2003.

Julieann Summerford, D&R's program manager for this proposal, ran the residential new construction programs for SDG&E from 1999 until she left SDG&E to join D&R International at the beginning of 2002.

7.2.2 Pat Davis Design (PDD)

Pat Davis Design (PDD) will subcontract to do the design work for the program brochure, the case studies and other incidental printed materials. Pat Davis will be the manager for this subcontract. In 1999, PDD created the layout and designs for the Savings By Design (SBD) brochures and other collateral materials under contract to HMG.[22] PDD has provided similar services to PG&E and SDG&E on revisions to the SBD materials and other programs from that point through the present.

The current staff at Pat Davis Design Group is comprised of key management with 30-plus years of industry experience, project management staff with many years of energy-specific experience, and an award-winning design staff also heavily experienced within the industry. Additional personnel in nearly every service category are available and on-call to our firm.

PDDG serves clients in every industry imaginable. Over the past five years, they have developed a niche specialty within the energy and municipalities industry. They have been fortunate to work with the four largest independently owned utilities (SCE, SCG, SDG&E, and PG&E) over the past five years, as well as with our local Sacramento-based Municipal Utility District. Additional experience with the energy efficiency industry has included several years' work with Heschong Mahone Group, Henwood Energy Services, Schott Applied Power Corporation, and RWE Schott Solar of Germany. PDDG also received a three-year contract with the California Energy Commission as a subcontractor for work on Transportation Technologies.

PDDG has provided design development services for the Savings By Design, Express Efficiency, and Designed for Comfort programs. Each program was branded and created by the firm. PDDG has continued to work on all collateral for these programs since their creation. The firm also has extensive experience working with photovoltaics, turbine, and hydro power, in that RWE Schott Solar of Germany is one of the top five solar and sustainable power firms in the world. They have contracted with PDDF on nearly thirty collateral and media projects since late last year.

[22] PG&E, SCE and SDG&E collectively contracted with HMG in 1999 to manage the process of creating Savings By Design.

7.3 Resumes and Description of Experience

The HESCHONG MAHONE GROUP, INC. provides professional consulting services in the field of building energy efficiency. The Principals, Lisa Heschong and Douglas Mahone, have more than 50 years' experience in the building energy field between them. Both were trained and are registered as architects. They have specialized in applying building design and construction technology to the problem of making buildings more efficient. This has led to a variety of project work for major utilities and government agencies, including:

- Measurement and Evaluation of Energy Efficiency Programs
- Energy Efficiency Research, Program Design and Marketing Support
- Energy Standards Development and Implementation
- Professional Training and Seminar Development
- Production of Technical Manuals, and Software Development
- Technical Review of Energy Efficiency Proposals

THE HESCHONG MAHONE GROUP, INC. is a woman-owned small business. The firm offers direct, personal service to its clients. Broad experience with both utility and government clients allows HMG to provide customized, expert consulting services tailored to the needs of the project, its budget and schedule.

The following summaries introduce the Principals and Staff of the HESCHONG MAHONE GROUP, INC.

Douglas Mahone is an architect who has specialized in the field of building energy efficiency since 1974. He is an acknowledged expert on energy efficiency codes and standards for buildings, and is currently leading a team of consultants in the development of upgrades for both residential and nonresidential energy codes in California. He served as a committee member for ASHRAE in the development of the national model energy code, ASHRAE/IESNA Standard 90.1-1999. He has also trained design professionals and utility personnel on the technical aspects of energy codes, such as California's Title 24 (residential and commercial), the national Model Energy Code (residential) and the ASHRAE/IESNA 90.1 Code (commercial).

Mr. Mahone has had a long history of collaborations with major utilities in developing and evaluating their energy efficiency programs. He is currently the Nonresidential New Construction (NRNC) Program Area Manager for statewide market assessment studies in California. He is also leading a consultant team to provide high level evaluation assistance to NYSERDA's Energy $mart program. Mr. Mahone has consulted extensively in energy efficiency program design and implementation. He took the lead in facilitating development of the California NRNC efficient buildings program, Savings By Design. For the Northwest Energy Efficiency Alliance (NEEA), he assisted the Board in developing a long-term strategic plan for energy code support.

As Principal and CEO of the Heschong Mahone Group Inc., Mr. Mahone manages a diverse and growing multidisciplinary staff with training in architecture, engineering and economics. He provides direction and training for project managers and technical staff on a wide range of projects for some of the leading energy efficiency organizations in the nation.

In addition to his private practice, Mr. Mahone was the Founding Executive Director of the non-profit New Buildings Institute. He also taught building science and energy subjects at the MIT School of Architecture as an Assistant Professor. Mr. Mahone received his B.Sc. and Master of Architecture degrees at the Massachusetts Institute of Technology. He is a licensed architect, registered in Massachusetts and California.

Lisa Heschong is a principal of Heschong Mahone Group and a licensed architect who has divided her professional practice between energy research, writing and building design.

As a researcher, she is leading the project team analyzing the impacts of daylighting on human performance for the *Daylighting and Productivity Studies* funded through PG&E and CEC. She also led the team that analyzed baseline lighting characteristics and created a computer model of lighting energy use for the State of California Energy Commission. As a writer, she worked with Lawrence Berkeley Laboratories to synthesize their research into *Residential Windows: A Guide to New Technologies and Energy Performance* (WW Norton*)*. She also is author of *Thermal Delight in Architecture* (MIT Press), a co-author of the *Advanced Lighting Guidelines,* the *CHPS Best Practices Manual,* and the *Skylighting Guidelines,* all web-based publications*.* As a lighting expert, she has developed the successful web-based training program for the Federal Energy Management Program (FEMP) and conducted workshops across the country for DOE. She has published scholarly papers, written for trade magazines, and conducted numerous lectures and workshops across the country on issues of school design, energy efficiency, and human comfort.

As an architect, Ms. Heschong has managed projects to design high-rise office buildings, K-12 schools, and residences. She also taught studio design at the Architecture Department of the University of California at Berkeley. She is experienced working with multi-disciplinary building design teams. She understands the construction process and the dynamics of getting a building project initiated, funded, designed, and occupied. Ms. Heschong was awarded her B.Sc. at UC Berkeley, Summa Cum Laude, and her Master of Architecture degree at the Massachusetts Institute of Technology with the AIA Medal.

Nehemiah Stone has significant experience in DSM policy development, program design and management, establishment and operation of national energy efficiency collaboratives, and multifamily energy efficiency issues. He is currently a senior project manager at the HESCHONG MAHONE GROUP (HMG). In PY2000, he led the effort to develop a multifamily new construction program, ***Designed for Comfort***, for San Diego Gas and Electric. In PY2001, he modified the program to focus mostly on low-income multifamily buildings and managed

Designed for Comfort as a third party program in Southern California Edison's (SCE) service territory. In PY02-03, he managed HMG's contract with SCE to administer their portion of the statewide *California Energy Star New Homes Multifamily* Program. Under his direction, HMG also provided design assistance for Pacific Gas and Electric's (PG&E) portion of the statewide program and energy efficiency training for the design community under a contract with SCE and PG&E. He designed and manages HMG's PY02/03 CPUC Third Party Initiative: *Efficient Affordable Housing (EAH),* which provides energy efficiency related assistance to housing authorities and affordable housing owners. He helped to launch, and was one of the directors of, the California Multifamily Consortium, a new collaborative sponsored by US DOE and the CEC.

Mr. Stone is a contributor to both the California Energy Commission's and Pacific Gas and Electric Company's efforts to research and develop revisions to Title 24 Building Energy Efficiency Standards for 2005. In particular, he led the effort to develop a set of standards appropriate to central water heating in multifamily buildings. In the 2001 and 2005 Title 24 revisions, he assisted PG&E in quantifying the contribution of code assistance work toward statewide long-term energy savings.

Immediately after joining HMG, he managed the development of the statewide nonresidential new construction program, *Savings By Design*. He also managed a project to determine the demand impact of the utilities' residential energy efficiency efforts, and assisted with fenestration testing, research, and code changes.

Nehemiah was a panel leader for the Commercial Building Programs panel at ACEEE's 2002 Summer Study at Asilomar and has been selected to be a panel leader for the Residential Program Panel for 2004. In 2002, he also presented a paper and co-authored others on the value of codes and standards programs and the nexus between them and "standard" resource acquisition programs.

Prior to joining HESCHONG MAHONE GROUP, Mr. Stone was a special advisor to Energy Commissioner Bob Laurie and Chairman Charles Imbrecht. He was recruited by the California Energy Commission in 1989 to help rewrite the state's Building Energy Standards.

Mr. Stone helped to form and served on the Board of Directors of the National Fenestration Rating Council (NFRC), helped to launch and was the first Chairman of the Board of the Cool Roof Rating Council (CRRC), and was the 2002 Chair of the California Straw Builders Association (CASBA). Prior to joining the CEC, he was a home builder, building inspector, plans examiner, chief building inspector for Humboldt County, California, and instructor in energy efficient design at the **College of the Redwoods**, (Eureka, CA). He received his Bachelors in Environmental Studies and Economics from California State University at Sacramento.

Catherine Chappell, P.E. (mechanical) has a long list of project management accomplishments, especially in the area of utility program evaluation. As Senior Project Manger for the HESCHONG MAHONE GROUP, she has worked on numerous

Measurement and Evaluation (M&E) projects. These projects address several issues including energy use and technology baselines, net-to-gross analysis and market effects.

She is currently project manager for the multi-year Measurement & Evaluation Study of SMUD's SB5X Energy Efficiency Programs. For this project, she developed program evaluation plans for a wide variety of energy efficiency programs, including: residential air conditioner rebates, refrigerator pick up and recycling, small, medium and large commercial and industrial lighting rebates, vending machine controls program and refrigeration tune up programs. For each of these nine programs, she manages the development of the evaluation plans, program databases and energy savings estimate protocols.

She is currently managing the Evaluation Assistance contract for NYSERDA's Energy $mart Program, that provides high level consulting services to NYSERDA's measurement and evaluation group. The work involves a variety of tasks to improve, coordinate and summarize the overall evaluation effort for the program.

She is also involved in Market Assessment and Evaluation (MA&E) studies for Southern California Edison, including tracking statewide nonresidential new construction program activities. For the Edison project, she coordinates contractor activities, including establishing protocols, providing technical guidance, reviewing data and reports and serving as the Nonresidential New Construction representative to California's Market Assessment and Evaluation Statewide Team of Research Organizations (CAL-MAESTRO).

Her project management work involves coordination of survey teams, supervision of data analysts preparation of consulting reports, developing and tracking budgets, schedules and deliverables. She also works with the HMG principles to create business development strategies and company-wide administrative policy.

She is an experienced Title 24 consultant, having worked with hundreds of commercial building projects to achieve energy code compliance and providing training to building officials and other energy consultants on the nonresidential energy standards. From 1988 through 1991 she was a member of the California Energy Commission Professional Advisory Group, as a representative of the California Association of Building Energy Consultants (CABEC). Ms. Chappell received her B.Sc. in Environmental Engineering from California Polytechnic State University in San Luis Obispo.

Charles "Chas" Ehrlich is a Project Manager with HMG and formerly a Principal Research Associate at Lawrence Berkeley National Laboratory. Prior to LBNL, he worked at the Pacific Gas and Electric, Pacific Energy Center as a Building Science Specialist coordinating seminars and developing new software supporting energy efficiency. His duties at the HESCHONG MAHONE GROUP, INC. include a variety of activities associated with energy efficiency research and analysis, technical training, energy code review, and program development. Mr. Ehrlich has been involved in the development and delivery of the firm's multifamily residential new construction incentive program for Southern California

Edison, *Designed for Comfort*. For this program, he established program criteria protocols, researched and published fact sheets on cool roofs, radiant barriers and other efficiency measures, and developed a web site tool to estimate energy savings and incentive levels. At the sunset of that program, Chas played a key role in the administration of Southern California Edison's version of the statewide California Energy Star New Homes Program.

His other work includes preparing code change proposals for residential lighting measures for Pacific Gas and Electric Company. Mr. Ehrlich was also responsible for project management of the retail daylighting and productivity studies funded by the Public Interest Energy Research (PIER) program.

Mr. Ehrlich earned his Bachelor of Architecture degree from the University of California at Berkeley, College of Environmental Design in 1989. In 1990, he established the private consulting firm called Space & Light focusing on the use of Radiance for lighting analysis. Mr. Ehrlich is a member of the Illuminating Engineering Society of North America and the CIE. He is active in the daylighting committee of the IESNA and is a contributing editor to the daylighting chapters of the IES Handbook. In 2002, Mr. Ehrlich completed psychophysical research in support of a Masters of Science degree in Architecture with an emphasis in Building Science through the UC Berkeley College of Environmental Design.

Rocelyn Dee joined HESCHONG MAHONE GROUP, INC. in January 2003 as a Project Manager. She is currently working with multifamily residential programs, such as Energy Star and Efficient Affordable Housing, promoting the programs to developers, verifying project performances, and monitoring projects' progress to ensure compliance with program goals.

Rocelyn is also involved in different PIER research projects. She helped develop a design guideline for incorporating skylights in commercial buildings with suspended ceiling systems, and analyzed skylight products' heat and light transmission properties.

She received her Bachelor of Science degree in Architecture from the University of the Philippines (Diliman) and is a registered architect in the Philippines. She later worked as a project coordinator for an architecture firm, where she was responsible for the management of various projects, including high-end private residences to mixed-use high-rise developments.

She received her Master of Science degree in Architecture Studies from the Massachusetts Institute of Technology, where she specialized in energy efficiency and real estate development. She worked as a research associate for MIT's Department of Building Technology developing sustainable design guidelines for a low-income housing project in Shenzhen, China.

Sean Denniston joined the HESCHONG MAHONE GROUP in July 2001 as a Research Associate. He earned his Bachelor of Architecture degree from the School of Architecture and Allied Arts at the University of Oregon in 2001.

Mr. Denniston provides a wide variety of technical and analytical expertise to the Heschong Mahone Group. He was involved in the California Energy Commission's PIER project, completing data collection and analysis on the correlation between daylighting and productivity in schools and retail stores. He also was recently involved in a research program for Southern California Edison doing on-site data collection, monitoring and analysis of photocontrol systems, examining what trends lead to a system being successful or unsuccessful at controlling electric lighting and saving energy. He does extensive field work, including data collection and equipment installation verification. He also developed the self-paced automated quiz component of the web-based lighting course, FEMP lights for the Department of Energy, using javascript and html.

He is currently working on the *Efficient Affordable Housing* program for Southern California Edison, analyzing buildings for program qualification and potential energy savings, and providing design assistance toward that goal. For the same project, he has also been involved in creating and promoting new utility allowance schedules for housing authorities so that renters, landowners and housing authorities can take fuller advantage of energy efficiency.

At the University of Oregon (UO), he studied issues of energy efficiency in architecture, especially as it pertains to passive cooling and passive solar heating. His education also had a strong emphasis on historic preservation and architectural history. He defended his thesis "A Design for an Environmental Learning Center for Fourth and Fifth Graders at Cama Beach State Park on Camano Island in the Puget Sound" in the Clark Honors College at UO.

While at the University of Oregon, Mr. Denniston served as network administrator and head of computer support for the Robert D. Clark Honors College. He was responsible for computer system design and configuration as well as staff training. He also wrote grants for computer equipment purchases and assisted in equipment procurement, with an emphasis on longevity and ensuring low obsolescence rates.

References - the following individuals with direct personal knowledge of the work of the HESCHONG MAHONE GROUP, INC., may be contacted for references.

Mr. William Pennington
California Energy Commission
1516 Ninth St., MS 28
Sacramento, CA 95814
Tel: (916) 654-5013

Ms. Michelle Thomas
Residential New Construction Program Manager
Southern California Edison
2244 Walnut Grove Ave.
Quad 2B
Rosemead, CA 91770
Tel: (626) 302-8994

Ms. Mary Kay Gobris
Residential New Construction Program Area Manager
Pacific Gas and Electric
245 Market St., 6th Floor, N6G
San Francisco, CA 94105
Tel: (415) 973-1319

Mr. Cyane Dandridge
President
Strategic Energy Innovations
175 No. Redwood Dr., Ste 150
San Rafael, Ca 94903
Tel: (415) 507-2184

Mr. Charles Angyal
San Diego Gas and Electric
8335 Century Park Court-CP12G
San Diego, CA 92123-1569
Tel: (858) 636-5725

Mr. Pat Eilert
Program Manager
Pacific Gas and Electric
202 Cousteau Place, Suite 150
Davis, CA 95616
Tel: (530) 757-5261

Mr. Matthew Jumper
President
San Diego Interfaith Housing Foundation
2130 4th Avenue
San Diego, CA 92101
Tel: (619) 231-0288 x203

Mr. John Wilson
Advisor to Commissioner Arthur Rosenfeld
California Energy Commission
1516 Ninth St., MS 31
Sacramento, CA 95814
Tel: (916) 654-5056

8. BUDGET

8.1 Summary Budget

Following is a summary budget for the DfC CACHE program for SCG's service territory:

Task		*Budget*	*% of Total Program Budget*
Total Administrative	**$**	**48,427**	**15.38%**
Managerial & Clerical	$	21,906	6.96%
HR Support & Development	$	11,807	3.75%
Travel & Conference Fees	$	4,482	1.42%
Overhead	$	10,232	3.25%
Total Marketing	**$**	**11,835**	**3.76%**
Total Direct Implementation	**$**	**239,461**	**76.04%**
Financial Incentives	$	206,400	65.54%
Activity	$	29,746	9.45%
Installation	$	-	0.00%
Hardware & Materials	$	-	0.00%
Rebate Processing & Inspection	$	3,315	1.05%
Total EM&V Costs	**$**	**15,200**	**4.83%**
EM&V Activity	$	7,129	2.26%
EM&V Overhead	$	8,071	2.56%
Financing Costs	**$**	**-**	**0.00%**
Total Program Budget	**$**	**314,923**	
Potential Performance Award	**$**	**22,045**	**7.00%**
Total Budget	**$**	**336,968**	

Figure 6: Summary Budget

Note that we have calculated energy savings based upon the financial incentives provided to the customers. Approximately 20% of the budget is for the informational portion of the proposal. This includes training provided to architects, engineers and developers, training provided to students at the targeted campuses, case studies, and presentations to professional group meetings or conferences. These customer training activities will lead to additional energy savings by making incremental changes in the way that the market works, but no direct savings are claimed for them.

8.2 Rates and Schedule

The following are our normal fully loaded billing rates, which were the basis for this cost proposal. We used our historic costs for indirect labor, overhead and other normal costs of business to derive the cost items called for in the CPUC workbook. Billing rates that will be charged for all services provided under this

proposal are a percentage of these based on historical cost of supporting services for which we do not normally break-out rates. The rates in the attached workbook (CPUC format) are the actual rates that apply to this proposal.

Douglas Mahone	$160/hour
Lisa Heschong	$160/hour
Nehemiah Stone	$130/hour
Catherine Chappell	$130/hour
Charles Ehrlich	$90/hour
Abhijeet Pande	$90/hour
Puja Manglani	$75/hour
Rocelyn Dee	$75/hour
Shefali Modi	$75/hour
Cynthia Austin	$70/hour
Sean Denniston	$70/hour
Support Staff	$55/hour

Figure 7: HMG Fully Loaded Hourly Billing Rates

The attached workbook, "DfC CACHE PY04-05proposalworkbookv03_SCG.xls," provides the breakout of labor costs in the format requested by the CPUC.Direct Expenses, such as express delivery, report copies, travel, etc. will be billed at cost. We have reviewed the CPUC's financial requirements, and find no objectionable requirements. From our past business dealings with the CPUC, we feel comfortable in meeting your reporting and cost specifications. Records will be kept and invoices presented in a format acceptable to the CPUC.

The following page contains the proposed contract schedule.

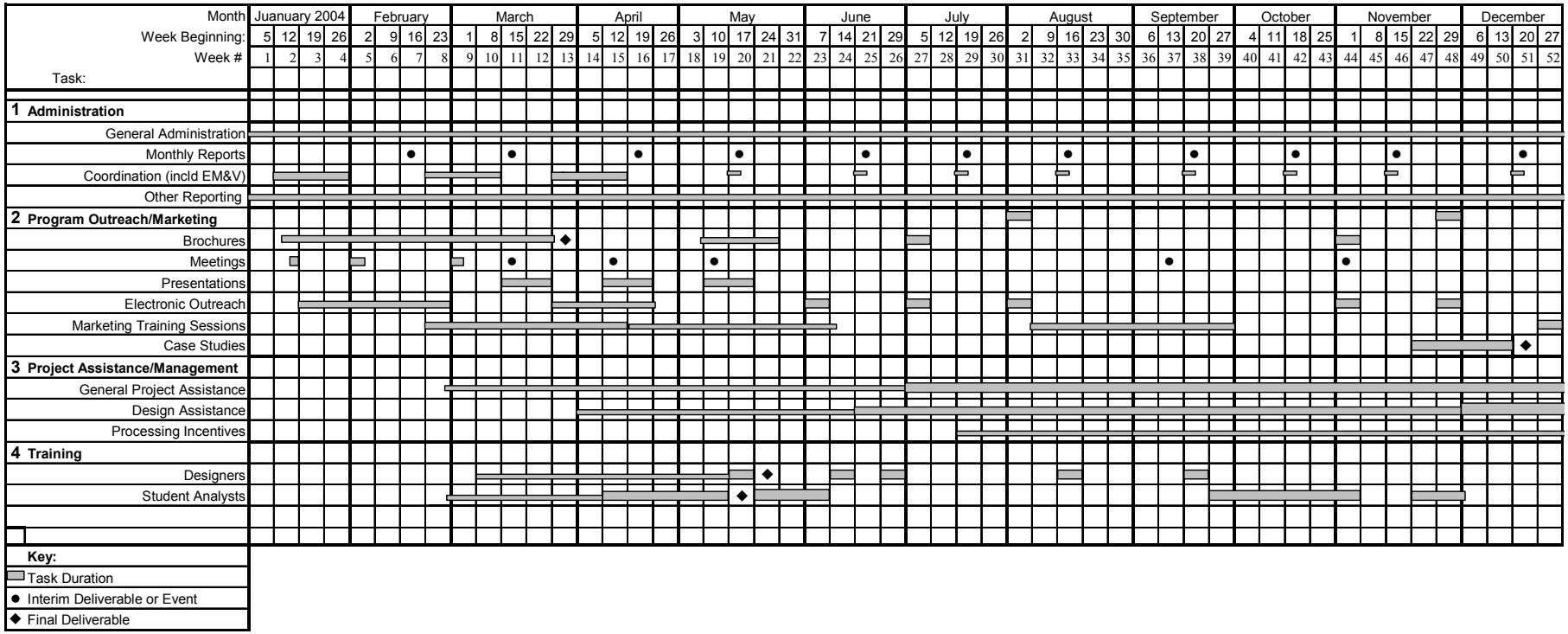

Figure 8 : First Year Schedule

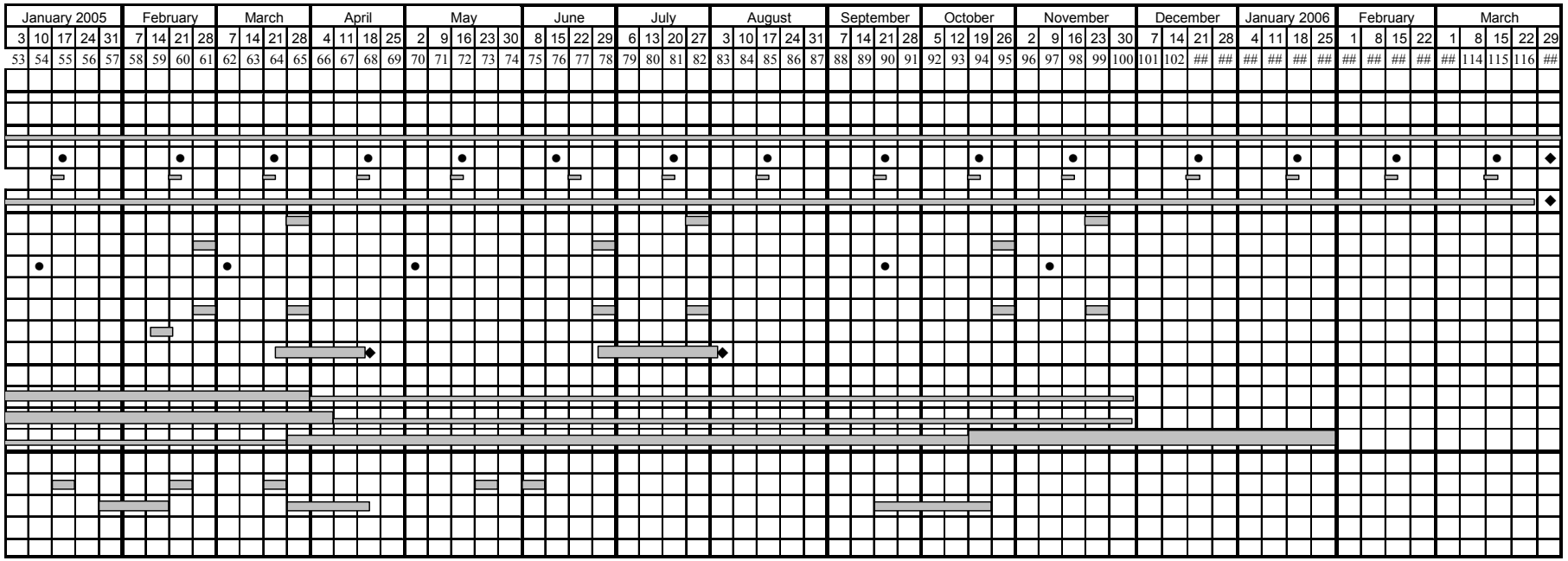

Figure 9 : Second Year Schedule

9. OTHER BUSINESS

Terms and Conditions. We do not take exception to any of the terms and conditions contained in the RFP or sample contract.

Conflicts of Interest. We know of no conflicts of interest which would compromise our ability to conduct this work.

Woman-Owned Small Business. The HESCHONG MAHONE GROUP, INC. is 51% owned by Lisa Heschong. We have been certified with the WMBE Clearinghouse. We are also certified as a small business by the California Department of General Services. Copies of both certificates are available upon request.

Professional Licensing. Douglas Mahone is a California registered architect, license number C 18205, expiration date 2/03. Lisa Heschong is a California registered architect, license number C 19296, expiration date 7/03. Catherine Chappell is a California registered mechanical engineer, license number M 27182, expiration date 6/03. Jon McHugh is a California registered mechanical engineer, license number M31756, expiration date 6/05.

Insurance. HESCHONG MAHONE GROUP, INC. has General Liability and Automobile insurance coverage in the amount of $2,000,000/$4,000,000. Our employees are covered by Workmen's Compensation and Permanent Disability Insurance. Insurance certificates are available upon request.

Equipment. The HESCHONG MAHONE GROUP, INC. has networked PC-type microcomputer equipment of the Pentium through Pentium IV classes, with adequate hard disk and RAM capability to meet all anticipated analysis needs. We have a central Windows 2000 Server, and perform full nightly backups to ensure data safety. We also have implemented state-of-the-art antivirus and anti-spam protections. We have laser printers and desktop publishing software for professional-quality reporting. We also have hard copy and fax modem capabilities for facsimile transmissions between the HESCHONG MAHONE GROUP, INC. our clients and third parties.

Software. The HESCHONG MAHONE GROUP, INC. has standardized on the Microsoft Windows 2000 operating system and the MS Office 97 Professional suite of applications software (Word, Excel, Access, PowerPoint); Office XP Professional is also available. We are also licensed users of DOE-2.1E and Comply 24 for building energy analysis, and have expertise in Radiance.

Internet. The HESCHONG MAHONE GROUP, INC. maintains a DSL connection to the Internet. We house our own Exchange 2000 mailserver, and make extensive use of e-mail both for messages and file attachments. HMG also maintains its own web site, and we are experienced web site developers.

Federal Tax ID Number:. 81-0585234

10. APPENDIX - RESUMES

The following pages contain the resumes of the HESCHONG MAHONE GROUP, INC. Principals, Douglas Mahone and Lisa Heschong, and senior staff, Nehemiah Stone, and Catherine Chappell.

Douglas Mahone, Principal

Mr. Mahone is a licensed architect specializing in building energy efficiency. He is a managing principal of the HESCHONG MAHONE GROUP INC.. He is an acknowledged expert in codes and standards, and has a long history of collaborations with major utilities in the measurement and evaluation of their energy efficiency programs.

AREAS OF EXPERTISE

- Energy Code Analysis and Development
- Market Assessment and Research
- Building Science Research
- Program Design and Marketing
- Building Energy Simulation and Analysis
- Program Measurement and Evaluation

RELEVANT EXPERIENCE

HESCHONG MAHONE GROUP INC., **PRINCIPAL 1989-PRESENT**
Mr. Mahone plans, develops and implements building energy efficiency projects for a wide variety of clients. He is currently leading an effort for the Pacific Gas and Electric Company to prepare code change proposals for the California's 2005 Building Energy Efficiency Standards. As Principal, he provides a leadership role for market assessment, evaluation, program development and building research activities. Mr. Mahone mentors and directs the efforts of a talented multidisciplinary staff of architects, engineers and analysts. He is also a nationally known presenter, trainer and technical writer.

NEW BUILDINGS INSTITUTE INC., **FOUNDING EXECUTIVE DIRECTOR 1996-2000**
Mr. Mahone was responsible for developing the Institute, hiring its first staff and managing its start-up business affairs. Projects included an update to the Advanced Lighting Guidelines and the Gas Technology Guidelines, development of a three-year PIER Program research agenda for the California Energy Commission, and participation in upgrades to national model energy codes.

ADM ASSOCIATES**, DIRECTOR - ARCHITECTURAL RESEARCH, SACRAMENTO, CA 1989-1993**

Mr. Mahone managed nonresidential impact evaluations for Southern California Edison, Pacific Gas and Electric Company and San Diego Gas and Electric Company. He also helped design a nonresidential new construction program, Savings Through Design, for San Diego Gas and Electric Company. He managed development of the Nonresidential Manual to accompany the 1992 California Building Energy Efficiency Standards.

***ELEY ASSOCIATES,* SENIOR ASSOCIATE, SAN FRANCISCO, CA 1985-1989**

While at Eley Associates, Mr. Mahone wrote or edited several guidebooks including: the LBL/AAMA Skylighting Handbook, the CEC Advanced Lighting Guidelines, 1st ed., the Public Works Canada Daylighting Handbook, the CEC ACM Approval Manual, and the Masonry Thermal Properties Guidebook. He also provided Title 24 compliance and plan review, and extensive Title 24 training for architects, engineers, lighting designers and building officials

***VAN DER RYN, CALTHORPE & MATTHEWS,* ASSOCIATE, SAUSALITO, CA 1981-1985**

Mr. Mahone developed the SCM User's Manual and Hand Calculation Method for the California Building Energy Efficiency Standards. He also provided daylighting design & energy analysis for:

- Pacific Bell San Ramon Valley Admin. Center, Skidmore, Owings & Merrill, Architects
- UC Davis Food & Ag. Sciences Lab & Office, Hellmuth, Obata & Kassabaum, Architects

EDUCATION

Massachusetts Institute of Technology, Master of Architecture 1977
Honors: AIA and AIAF Scholastic Award, Tucker-Voss Award (Building Technology)
Massachusetts Institute of Technology Bachelor of Science in Art & Design 1972

PROFESSIONAL REGISTRATIONS, CERTIFICATIONS AND AFFILIATIONS

Architect, State of California #C18205 1985
Architect, Commonwealth of Massachusetts #E5160 1981
ASHRAE, Associate Member. Served on SSPC 90.1 (Commercial Buildings Model Energy Standard)

PUBLICATIONS

- *Upgrading Title 24 - Residential and Nonresidential Building Energy Standards Improvements in California*, ACEEE Summer Study on Energy Efficiency in Buildings, with Steven Blanc, Patrick Eilert, Gary Fernstrom and Marshall Hunt, 2002
- *Efficient Buildings Through Linkages of Voluntary, Public Purpose and Regulatory Mechanisms*, organizer of Roundtable Session, ACEEE Summer Study on Energy Efficiency in Buildings, with Patrick Eilert, Gary Fernstrom, Ted Pope, Nehemiah Stone et al, 2002
- *A Comprehensive Approach to Program Information & Evaluation – Nonresidential New Construction*, International Energy Program Evaluation Conference, August, 2001 with Catherine Chappell, Marian Brown, Roger Wright, et al

- *Time Dependent Valuation of Energy for Developing Building Efficiency Standards - Summary Report,* for Pacific Gas & Electric Co. December, 2000
- *Bi-Level and Automatic Shut-off Controls* - Code Enhancement Initiative for the AB 970 Emergency Rulemaking. For the New Buildings Institute and PG&E. November, 2000 with Catherine Chappell, Roger Wright, et al
- *The Comprehensive Approach to Commercial New Construction Program Impact Evaluations – Lessons Learned in California,* ACEEE Summer Study on Energy Efficiency in Buildings, 1998
- *Energy Codes and Market Transformation in the Northwest: A Fresh Look* ACEEE Summer Study on Energy Efficiency in Buildings, with Jeff Harris, 1998
- *New Construction Codes and Programs: Are We Capturing Lost Opportunities?,* International Energy Program Evaluation Conference, Panel Moderator 1997
- *Leveraging Expensive On-Site Survey Data: A New Residential Evaluation Survey Technique*, ACEEE Summer Study on Energy Efficiency in Buildings 1996, with David Sumi, Eskinder Berhanu, and Warren Lindeleaf.
- *Fort Collins Energy Code Guide to the ASHRAE 90.1 Code,* City of Fort Collins, Colorado, 1995, with Jon McHugh.
- *Establishing a Baseline in Commercial New Construction DSM Impact Evaluation - Comparison of Three Approaches*, ACEEE Summer Study on Energy Efficiency in Buildings, 1994, with Taghi Alereza, Athena Besa, Anne G. Lee, Sharon K. Noell.
- *The Integrated Approach to Evaluating New Commercial Buildings: Does It Work?*, 2nd National New Construction Programs for Demand-Side Management Conference, 1993, with Elsia O. Galawish, Anne G. Lee, and Eric Makela.

Nehemiah Stone, Senior Project Manager

Mr. Stone specializes in building energy use in the multifamily sector. He also manages utility programs and is a project manager for codes and standards and market assessment and evaluation studies. He has significant experience in DSM policy development, program management and design, and the establishment and operation of national energy efficiency collaboratives.

AREAS OF EXPERTISE

- Program Development and Implementation
- Building Energy Analysis
- Codes and Standards Research and Impacts
- Building Market Research and Analysis

PROFESSIONAL EXPERIENCE

***HESCHONG MAHONE GROUP,* SR. PROJECT MANAGER, 1998 - PRESENT**

Mr. Stone managed the development of numerous utility programs, including the statewide nonresidential new construction program, *Savings By Design*. In PY2000, he led a team to develop a multifamily new construction program, *Designed for Comfort*, for San Diego Gas and Electric. In PY2001, he modified the program to focus mostly on affordable multifamily buildings and managed it as a third party program in Southern California Edison's service territory. In PY2002, he managed the creation of a local "third party" program, Efficient Affordable Housing, which builds on his experience with multifamily buildings, assisting housing authorities with energy efficiency. He now manages the implementation of that program. He also manages an HMG team in a contract to administer SCE's portion of the statewide multifamily new construction program (the successor of *Designed for Comfort*) and to provide training to energy consultants on multifamily energy efficiency for both SCE and PG&E. He led a team to develop multifamily water heating revisions to California's Title 24 Building Energy Efficiency Standards for 2005. He is currently managing evaluation, measurement and verification efforts for (1) the Local Government Commission's third party program to establish Regional Energy Authorities in two California Counties, and (2) Northwest Energy Efficiency Alliance's Commercial Window Initiative.

***CALIFORNIA ENERGY COMMISSION,* SPECIAL ADVISOR, SACRAMENTO, CA 1989 - 1998**

Mr. Stone was a special advisor to Energy Commissioner Bob Laurie and Chairman Charles Imbrecht. He was recruited by the California Energy Commission in 1989 to help rewrite the state's Building Energy Standards. Later, while in the Commission's Demand Analysis Office, Mr. Stone managed research into the cost effectiveness of the Demand Side Management programs of the state investor owned and municipal utilities. This research included analysis of hundreds of impact evaluations for the purposes of assessing alternative methods of estimating net benefits, identifying programs that increased the likelihood of cost effective energy savings and developing energy efficiency program policy of the state.

***HUMBOLDT COUNTY PLANNING AND BUILDING DEPT.,* PLANS EXAMINER AND CHIEF BUILDING INSPECTOR, EUREKA, CA 1985-1989**

Mr. Stone was responsible for the day to day quality control on issuance of building permits, including all plan checking. His efforts helped streamline the permitting process to a maximum of three weeks from application to issuance. He developed a regular forum for communication of code changes to, and input from the building community. He created a bimonthly bulletin to the building community regarding changes, interpretations and product warnings. While at Humbolt County, Mr. Stone also served as an instructor for Energy Efficient Residential Design and trained fellow building officials on the California Energy Code.

***ISRAEL/DUNN CONSTRUCTION COMPANY,* SENIOR PARTNER, FORTUNA, CA, 1982-1985**

As a senior partner of the company, Mr. Stone worked on numerous remodeling contracts such as CalTrans-owned Victorian houses in the Highway 101 right-of-way corridor through Eureka, CA,
US Farm Home Bureau, California Housing and Community Development, Century 21 Realty, Fortuna and on rural properties in western Humboldt County.

EDUCATION

California State University, Sacramento, CA
Bachelor of Arts in Environmental Studies and Economics

PROFESSIONAL CERTIFICATIONS AND AFFILIATIONS

ADPSR Architects, Designers and Planners for Social Responsibility
NFRC National Fenestration Rating Council: Board Member, 1995-1998
Technical Steering Committee Member, 1991-1994
Long Term Energy Performance Subcommittee Chair, 1993-1994
Accreditation Policy Committee Member, 1992-1994
CASBA California Straw Builders Association; Advisory Board Member, 2002 Chair
CABEC Certified Energy Plans Examiner, Residential
CRRC Cool Roof Rating Council: Chairman of the Board, 1998
PSSBC Planning Summit for Sustainable Building Codes:
Steering Committee Member
ACEEE Panel leader for 2002 Summer Study on Building Energy Efficiency
CMC Member and steering committee member of the California Multifamily Consortium

PUBLICATIONS

- *"What's A Utility Program Worth, Anyway"*, Proceedings, 2002 ACEEE Summer Study on Energy Efficiency in Buildings, 2002.
- *Energy and Straw Bale Walls: Basic Heat Transfer,* The Last Straw No. 28, 2000.
- *Transforming Design Practices: A Statewide Program*, Proceedings of the 10th National Energy Services Conference, Tucson, AZ, The Association of Energy Services Professionals International, December 1999
- *PHASE I Results of the NFRC U-value Procedure Validation Project* 1993, with Dariush Arasteh, Fred Beck, William DuPont, Chris Mathis and Michael Koenig.
- *The Progress Toward Energy Efficient Fenestration Products in California*, Proceedings, 1996 ACEEE Summer Study on Energy Efficiency in Buildings, 1996.
- *California Title 24 Building Energy Code Update,* Proceedings of the West Coast Energy Management Congress '98, The Association of Energy Engineers, with Michal Moore and DeeAnn Ross.
- *Setting the Standards for Straw Bale Construction,* California Energy Commission publication, 1998, with Tav Commins.
- *The potential Effect of Electric Industry Restructuring and Regulatory Choices on Utility DSM Programs* DSM ISSUE PAPER, 1995, with Michael Messenger and Rosella Shapiro.

Catherine Chappell, PE, Senior Project Manager

Catherine Chappell is a licensed mechanical engineer specializing in measurement and evaluation project management. Her work involves studying energy use and technology baselines, net-to-gross analysis and market effects. She supervises and trains survey teams, evaluates and manages work performed by technical subcontractors, analyzes data and prepares draft and final reports.

AREAS OF EXPERTISE

- Energy Impacts Research
- Building Energy Analysis
- Building Market Research and Analysis
- Utility Program Project Management

PROFESSIONAL EXPERIENCE

HESCHONG MAHONE GROUP, SR. PROJECT MANAGER, FAIR OAKS, CA 1997 - PRESENT
Ms. Chappell specializes in market assessment and evaluation (MA&E) and program measurement and evaluation (M&E). She develops evaluation plans, establishes protocols and coordinates the work of data collection and analysis teams. She also trains and coordinates survey teams, supervises data analysis preparation by staff and outside consultants, and writes evaluation reports. She works with and creates energy use and technology baselines, and estimates market effects.
As a project manager, she supervises staff and consultants, tracks budgets, schedules and deliverables. She also works with the HMG principles to create business development strategies and to set company-wide administrative policy. Currently, for Southern California Edison, Ms. Chappell, along with HMG partner Douglas Mahone, represents the utility as a member of the Statewide MA&E group comprised of utility representatives. The purpose of the group is (1) to provide market and product assessment studies and analyses useful to energy efficiency program planners and policy makers; and (2) to evaluate the performance of energy efficiency programs. Ms. Chappell has also served as HMG project manager for the development of a statewide program of Market Assessment and Evaluation (MA&E) of energy efficiency programs aimed at the nonresidential new construction market in California. Other current duties include managing the Evaluation Assistance contract for NYSERDA's Energy $mart Program, managing the multi-year Measurement & Evaluation Study of SMUD's SB5X Energy Efficiency Programs and leading the effort of tracking and verifying CPUC-mandated milestones associated with Southern California Edison Energy Efficiency Programs for program years 1999 through 2002.

***ADM ASSOCIATES,* SENIOR PROJECT MANAGER, SACRAMENTO, CA 1993 - 1997**

As project manager, Ms Chappell managed detailed energy program evaluations, utilizing telephone surveys, on-site surveys, energy simulations, and monitoring equipment. While at ADM, she performed Impact Evaluations for Portland General Electric, Northern States Power, Sacramento Municipal Utility District, B.C. Hydro and Detroit Edison.

***VALLEY ENERGY CONSULTANTS,* SENIOR ASSOCIATE, SACRAMENTO, CA 1991 - 1993**
For Valley Energy Consultants Ms. Chappell used her experience as a Title 24 consultant as a trainer and technical advisor. She worked with architects and other engineers to analyze residential and nonresidential buildings for energy code compliance and utility program eligibility. She trained building officials, energy commission staff, and utility staff on the California Building Energy Efficiency Standards. She also contributed to the Residential and Nonresidential Compliance Manuals.

***ENERGY COMPLIANCE SYSTEMS,* ENERGY CONSULTANT, SENIOR ASSOCIATE, SACRAMENTO, AND SAN JOSE, CA 1985 – 1991**
For Energy Compliance Systems, Ms Chappell analyzed buildings for code analysis, provided plan review services and prepared load calculations. She worked with architects and other engineers to analyze residential and nonresidential buildings for energy code compliance and utility program eligibility. She served on the nonresidential standards development professional advisory committee.

EDUCATION
California Polytechnic State University, San Luis Obispo, CA
B.Sc. in Environmental Engineering, 1985

PROFESSIONAL CERTIFICATIONS AND AFFILIATIONS
1991 - Mechanical Engineer, State of California #M27182
American Society of Heating, Refrigeration and Air-conditioning Engineers

PUBLICATIONS
- *Does it Keep the Drinks Cold and Reduce Peak Demand? An Evaluation of a Vending Machine Control Program, ACEEE Summer Study on Energy Efficiency in Buildings Conference Proceedings, 2002*
- *A Profile of a Refrigerator Recycling Program, ACEEE Summer Study on Energy Efficiency in Buildings Conference Proceedings, with Cynthia Austin, 2002*
- *Lighting Quality And Lighting Measurement Assessment, International Energy Program Evaluation Conference Proceedings, 2001*
- *Evaluation of SMUD's New Construction Program*, 4th Energy Efficient New Construction Conference Proceedings (with Warren Lindeleaf), 1996.
- *Evaluation of Gross Savings Impacts of BC Hydro's New Building Design Program*, 3rd National New Construction for DSM Conference (with Diane Fielding & Mohsen Abrishami), 1995.