



Building
Performance
Institute, Inc.

California Energy Commission

DOCKETED

12-EBP-1

TN # 68008

OCT. 23 2012



October 23, 2012

Via email to: docket@energy.ca.gov; Docket number 12-EBP-1 "Comprehensive Energy Efficiency Program for Existing Buildings (AB758) Scoping Report Staff Workshop"

RE: Building Performance Institute Comments on Comprehensive Energy Efficiency Program for Existing Buildings (AB758) Scoping Report

Docket 12-EBP-1
California Energy Commission

Thank you for the opportunity to comment on the AB758 Scoping Report and workshop. The California Energy Commission (CEC) held a public workshop on the scoping report (October 2, 2012) and invited public comments on the workshop and the scoping report. BPI appreciates this opportunity to comment and we look forward to ongoing participation in the development of AB758 to support and achieve California's strategic goals. We commend the Commission and Energy Division Staff on the tremendous effort of compiling and promoting the open discussion of the scoping results.

BPI is the nation's premier building performance credentialing, quality assurance and standards setting organization. BPI develops technical standards using an open, transparent, consensus-based process built on sound building science, and is accredited as a standards developer by the American National Standards Institute, Inc. (ANSI). More than 150 programs across the U.S. rely on BPI standards and professional credentials as the foundation of their REE, carbon reduction, and weatherization activities including 52 Home Performance with ENERGY STAR® (HPwES) programs, manufacturer high performance programs and manufacturer commissioning.

BPI offers the following:

- national standards to ensure top quality, consistent protocols are being followed throughout the home performance and weatherization workforce including standards relating to Heating, Air Conditioning/Heat Pump, and Multifamily Boiler Operation;
- certification of individuals in building analyst, heating, air conditioning/heat pump, shell/envelope, multi-family, and manufactured housing designations;
- accreditation of contracting companies committed to delivering quality home performance improvements;
- quality assurance to verify conformance with BPI Standards and provide feedback for continuing improvement; and
- partnerships with testing organizations that deliver BPI services in their market.

BPI's comments focus on the Residential Retrofit aspect of the scoping report, including both single and multifamily homes, but also points out intersections of the needs and goals of California that are best leveraged through continued development of a well-rounded and certified professional workforce to evaluate, install, and maintain energy efficiency improvements in existing and future homes of California.

AB758 - What Does it Really Say?

The Legislative Counsel's Digest is often quoted as if it were the law. "(1) Existing law requires the State Energy Resources Conservation and Development Commission (Energy Commission), in its biennial energy conservation report,

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to report on the progress made to implement a statewide home energy rating program." (emphasis added). This statement refers to the progress made on implementing a home energy rating up to the point of that report. It does not require establishment of a broader home energy rating program or require implementation of a home energy rating program statewide beyond the bounds previously required. The Digest continues:

"This bill would require the Energy Commission, by March 1, 2010, to establish a regulatory proceeding to develop a comprehensive program to achieve greater energy savings in the state's existing residential and nonresidential building stock."

The mandate of AB758 is NOT to implement home energy ratings. Rather, the mandate is to achieve energy savings in all existing buildings.

SEC. 2. Section 25943 is added to the Public Resources Code, to read: 25943. (a) (1) By March 1, 2010, the commission shall establish a regulatory proceeding to develop and **implement a comprehensive program to achieve greater energy savings** in California's existing residential and nonresidential building stock. This program shall comprise **a complementary portfolio of techniques, applications, and practices that will achieve greater energy efficiency** in existing residential and nonresidential structures that fall significantly below the current standards in Title 24 of the California Code of Regulations, as determined by the commission.

(2) The comprehensive program **may include**, but need not be limited to, a broad range of energy assessments, building benchmarking, energy rating, cost-effective energy efficiency improvements, public and private sector energy efficiency financing options, public outreach and education efforts, and green workforce training. (emphasis added).

In short, AB758 considers ratings to be an optional, potential measure that the CEC may consider appropriate for approval in the portfolio, but the legislative directive places the emphasis on identifying components of the portfolio including energy assessments, cost-effective improvements, and workforce training that are equal to or more important than ratings. Ratings may have their place in the market, but ratings have been demonstrated in many settings to 1) not improve the energy efficiency of buildings, 2) not drive homeowners to action, and 3) not necessarily result in better performance even when required for new homes.

If the goal were to collect data about the state of the existing building stock, then ratings would be the solution. The goal of AB758 is to actually **achieve greater energy savings** and support **practices that will achieve greater energy efficiency**. This will only come from providing home and building owners with a comprehensive set of solutions and the ability to follow through on recommendations for installation and maintenance to ensure savings are persistent. This is done through a network of qualified contractor companies with the ability to carry through and complete improvements, and maintain a relationship with that building and its occupants for the long-term.

Workshop Questions

The CEC Staff asked a number of questions for panelists to address during the October 2, 2012 Workshop. BPI will take the approach of first addressing the workshop questions that required elaboration or those on which BPI did not have an opportunity to comment at that time, then addressing any remaining comments. These comments identify some key areas that need additional consideration, including: broad-based, skill-oriented workforce training directed to professional individual certification focused on whole building performance rather than single measures, and meaningful Quality Assurance through contractor company accreditation to increase accountability and credibility to the public. Energy efficiency improvements that are persistent and sustainable cannot be separated from quality assurance. The goal is increasing energy efficiency in all buildings. Real energy efficiency improvement cannot be achieved without applying and enforcing quality standards through the use of credentialed professionals across the broad spectrum of skills necessary

to conducting a comprehensive work scope. BPI also supports and encourages CEC and staff to closely review the *Home Performance Contractors Desired Outcomes*¹ and *Energy Upgrade California™ Contractor's Workflow*², previously submitted as workshop comments, as well as Efficiency First California/CBPCA and Build It Green comments submitted on the scoping report.

1. What customers are choosing building performance upgrades today? Where are the opportunities for scaling upgrades?

Research and surveys by California programs are consistent with findings by other states, programs and DOE which show that the market segment of higher-income homeowners are most likely to decide to install home performance upgrades. Climate zones can affect participation rates. The high-participation market segment includes homeowners who are technology-adoption leaders and values-driven.

Within these segments, decisions to upgrade, and the extent to which single-measure or comprehensive installations are actually implemented, are substantially affected by program incentives and policies. Program characteristics affect the extent to which the incentives lead to deeper retrofits. Program characteristics that lead to deeper retrofits include:

- Audits and assessments are performed by professionals who work for, or have agreements with, contractors that can provide upgraded retrofit services (as opposed to independent auditors).
- Audits are not free, or priced so low that there is no pre-qualification of consumers according to their interest in making investments in upgrades.
- Potential participants are immediately referred to knowledgeable, qualified contractors.
- Contractors receive pre-qualified leads identified through their own marketing channels, programs or other voluntary information resources which educate consumers and enable contractors to further pre-qualify potential customers.
- Audits and assessments are performed by professionals trained and certified in whole-house building science.
- Incentives and rebates are scaled to reward consumers for implementing multiple measures and a whole-house approach.
- Financing is available to consumers in easy-to-understand and easy-to-pay form.
- Rebates and incentives are rationalized for consumers, to clarify what assistance is available to them as affected by their location in utility service areas or communities; to clarify measures that qualify for specific incentives, and to explain deductions or “stackability” of incentives.
- Consumer relationships with contractors who do high-quality work and offer longer term plans for incremental retrofits.
- Monitoring and reporting for customers on actual energy savings and reductions in energy consumption.

Consumers respond to education about the value of deeper EE upgrades before they respond to incentives and financing. Education is very effective coming from local governments and community organizations.

2. What value do building assessments bring to the homeowner and/or contractor? What should be their role in upgrade programs?

Comprehensive building assessments that are simple and customer-friendly are an essential component of educating and persuading consumers. Complex modeling should have no role in direct customer relationships, should not complicate the on-site assessment process, and should not be a part of customer-facing assessment results. Whole Building Assessments are an essential component of upgrade programs because they:

¹ http://www.energy.ca.gov/ab758/documents/2012-10-08-09_workshop/comments/Contractors_Desired_Outcomes_by_Devon_Hartman_2012-10-12_TN-67698.pdf

² http://www.energy.ca.gov/ab758/documents/2012-10-08-09_workshop/comments/Job_Process_Flow_Charts-Contractors_Workflow_2012-10-12_TN-67701.pdf

- Are a sales tool for a contractor to upsell from single-measure to a comprehensive job - whole building performance jobs are larger jobs, with better margin than one-off jobs, and are more likely to result in a long-term relationship with a satisfied client who will continue to rely on that contractor for ongoing maintenance and improvements;
- Allow the contractor to educate the building owner about their property, as well as demonstrate the value of their own skills and differentiate themselves from potential competition;
- Allow the contractor to provide the building owner with a "road map" for improving the building that may be done in a single comprehensive job, or staged with appropriate loading order over time;
- Allow programs to: address the need for deeper energy saving measures to be installed during retrofits without creating lost opportunity; and
- Create a skilled workforce that can continue to implement improvements, as well as maintenance over time-- maintenance of the improvements is fully as important as the initial installation if savings are to be persistent.

As assessment capabilities mature, they will help programs reach customers for demand side management, load control, or load shaping through contractor services and residential energy services agreements. Such agreements are likely to be sold and supported by contractors, and penetrate deeper into markets through the normal course of business at critical decision points: purchase or sale of a home; emergency replacement; major remodel; or thoughtful and informed decisions to improve a capital investment or reduce environmental impact.

Customers don't come to utilities to address all of these issues; they call a contractor to fulfill a specific need. The market needs a skilled, informed, and trusting contractor network that knows it is supported by the program that can respond to this consumer interest. When these contractors respond, the penetration is deep, persistent, and promotes the overall change from business as usual to the point where building performance is business as usual.

3. What is the role of rebates in efficiency upgrade programs? How can financial products/financing strategies motivate deeper retrofits in lieu of rebates? Are both needed to motivate deeper retrofits?

At this stage in developing plans to transform markets and extend adoption of deep energy savings, both rebates and financial products play an important role. Both are important to broadening the market for residential efficiency beyond affluent market segments, and educating and motivating potential participants.

Rebates are effective attention-getters that interest consumers in EE upgrades. Rebates are more likely to motivate consumers to purchase single-measure solutions, especially HVAC equipment, than deep energy retrofits, but rebates and single measures are an important entryway to consumer education and commitment to deeper EE upgrades. Rebates and other incentives should be scaled based on the energy savings impact of the EE upgrade project.

To encourage long-term, incremental retrofits, rebates and other incentives should be offered at each stage of a consumer's EE retrofit. Receiving an incentive for one measure should not disqualify a consumer from receiving additional rebates and incentives for additional measures. This policy results in consumer motivation to go forward with additional measures as their own financial capability develops. In addition, it supports the longer-term contractor-customer relationships that are a strong foundation for continuing retrofit investments.

Financial products, such as no-interest or low-interest loans, become more important as consumer commitments to greater energy savings increase. The cost of deeper retrofits – which may range from \$2,000 to \$13,000 – exceeds the cash-on-hand of most consumers and enters a price range in which consumers expect to be offered financing. No-interest or very-low-interest financing is commonly available for appliances, HVAC equipment, cars and many home improvements. Credit card financing is available for almost any purchase. EE retrofit loans should be just as available, and just as simple to qualify for.

Deep retrofits are likely to be evaluated by consumers in terms of their return-on-investment (ROI) through energy cost savings. In most cases, payback based on actual savings occurs over five to ten years, which may be a longer period than the consumer expects to stay in their house and benefit from the savings. For this reason financing strategies, such as on-bill financing, that distribute the costs as well as the benefits of EE upgrades to subsequent homeowners is essential for moving the EE upgrade market toward deeper retrofits.

Making financing simple and available depends not just on products and policies, but on contractors' ability to explain and provide the financial tools. BPI supports efforts to promote financing tools that encourage contractors to increase their own financial success by using incentives to "upsell" customers on a continuing pathway to comprehensive measures. Financial tools should ensure that qualified contractors, who are committed to performing quality work, consistently benefit from financial incentives as a customer installs additional eligible improvements.

Contractor training in the use of financial tools, and the products that are available, should be part of any residential EE financing plan. Using financial tools to market whole home performance jobs needs to be supported by supplemental training along with marketing and sales, in addition to technical training in assessing a home, recommending a comprehensive workscope, and installing high quality comprehensive improvements.

Financial strategies should leverage and align with the existing contractor requirements for the WHUP Advanced Path of the investor owned utility programs. This will allow significant timesaving and enable leveraging the existing trained workforce already actively engaged in the retrofit market. It will improve cost-effectiveness by allowing utilities, lenders, and local governments to avoid costly recruitment, re-screening, and re-qualifying of contractors on terms different than those of WHUP. It will also help target the financing to a deep retrofit market that the state goals seek to reach. This has the additional advantage of maintaining a level of quality assurance that is consistent, if not throughout the state, at least throughout each IOU's territory.

In developing financial strategies, programs should:

- avoid requiring contractors, who generally work across program territories, to re-qualify for financing in each of the IOU or REN programs where EE Financing is implemented;
- leverage standards, professional credentials and quality assurance already in use;
- ensure streamlined presentation to customers, with consistent marketing and improvement requirements;
- implement a fast-track process for loan approval to increase customer satisfaction, close rate, and job completion; and
- allow for financing of pre-loan work completed as part of an energy upgrade when related to an emergency replacement or "reactive" situation.

Because ratepayer funds will play an important role in this effort, those funds must be safeguarded. The "holder rule" protects the lenders, but it is also important to ensure that safeguards are in place to protect the homeowner from lenders who aren't knowledgeable in the area of whole home performance contracting. It is important to contrast California's efforts with other programs that require little in the way of building science training, no health and safety testing, and minimal quality assurance. California is leading the way in true whole building performance efforts, and should not take a step back when financial tools come into play.

4. How can "reactive" interaction with customers (e.g., HVAC tune-ups or water heater replacements) best be leveraged to encourage whole house upgrades? How can such customer interaction encourage or enable future upgrades?

Both “reactive” customers, who are responding to an immediate need or crisis, and “proactive” customers, who are ready to make more thoughtful upgrade commitments, should be leveraged to encourage whole house upgrades. The reactive customers can be the most productive market over the long term, because almost every homeowner is sooner or later is part of this group. At this “reactive” point, homeowners are thinking about their air quality and comfort and communicating with contractors who are the most important vehicle for selling efficiency upgrades. Whether that upgrade ends with a high-efficiency furnace, or leads to a whole house assessment and deep energy savings, depends on the training and motivation of the contractor “at the kitchen table” of the sales process.

Reactive customers include HVAC tune-up customers, who are already targets for long-term service agreement marketing for successful contractors. Planning for long-term energy services is a natural and successful environment for contractors to “upsell” to deeper retrofits.

Contractors can learn to take advantage of these market opportunities. BPI and other organizations such as the Electric and Gas Industries Association (EGIA) the Affordable Comfort Institute (ACI) and Efficiency First have held hundreds of conference sessions, webinars and program events in which successful contractors discuss their business models, and their transition from single-measure to whole-house services. Understanding successful contractor business models is an effective tool for motivating contractors to sell customers on moving toward greater efficiency investments.

Future marketing and outreach planning should incorporate the communication of successful whole house transition models into contractor outreach and training, along with training in sales and marketing tools.

5. What milestones and metrics are most appropriate for measuring success of programs to motivate upgrade activity? Against what criteria or guiding principles should potential AB758 program initiatives be assessed and prioritized?

A guiding principle for all AB758 program initiatives is BPI’s guiding principle: “raise the bar in home performance and weatherization.” AB758 programs must support and increase high quality home performance using measurable quality assurance (QA) tools. The goal of AB758 and the CPUC Energy Efficiency Strategic Plan is “market transformation” to make cost-effective energy efficiency upgrades accessible and accepted across residential and commercial markets. High quality installation of comprehensive efficiency measures is the key to meeting the underlying energy savings goals. As CPUC in its strategic goals has already recognized what CEC must do when moving forward on AB758 regulations: the market must deliver high-quality, effective upgrades to be accepted by consumers and to realize energy savings. Awarding contractors who deliver these high quality upgrades, and moving lower-performing contractors to deliver work based on higher standards, is the objective that will meet this goal.

A corollary principle is that standards must be consistent. Consistent standards across programs and to guide consumers are the foundation of cost-effective contractor training and consumer education. Consistent standards over time are flexible but offer stability so that participants in the market have a “level playing field” and certainty in their planning and decision-making.

CEC should adopt statewide criteria for program QA. Performance of utility programs should be measured for adoption of and compliance with QA standards. Metrics for measuring QA performance include:

- number of programs that adopt model QA standards;
- the number of contractors certified in skills and experience that shows they are capable of delivering high quality services;
- the number of companies doing business in the market that have the necessary staffing and processes to deliver quality services;

- the number of retrofit projects that meet post-retrofit testing standards, including a sampling of retrofits through on-site audits;
- verification and validation of predicted savings through measured by actual energy usage; and
- the number of retrofits that achieve the level of savings expected.

BPI supports adoption of a range of additional program metrics and milestones. Some of these that have been identified in the Strategic Plan and should be considered for implementation of AB758 are:

- Specific metrics and measurements for the effectiveness of efforts to move the HVAC industry increasingly into EE services;
- Capital investment in the home performance market;
- The number of home performance projects accomplished which meet program standards;
- The number of home performance projects performed that do not meet program standards;
- Man-hours used in residential retrofits, associated with workforce development goals; and
- The number of retrofits that are single-measure, multi-measure and comprehensive, and the rate at which consumers upgrade to more comprehensive measures.

6. How can quality assurance be provided without excessive impact on the customer experience?

Quality Assurance (QA) will always have a positive impact on the customer experience if it is inherent in the way programs and contractors do business. To accomplish this, QA must be standardized by both programs and contractors, applying tested processes that have been developed with customer satisfaction in mind. Programs should set the standards and implement effective but minimally invasive QA, while contractors determine how to integrate QA into their own business processes.

As a first rule, customer experience is best safeguarded by revoking the right to participate in a program for contractors that chronically do not comply with QA standards.

QA is simply part of a company Quality Management System (QMS) that integrates goals, processes and continual improvement. Customer Focus is the first principle of a QMS. This is true for manufacturers, utility customer services and government services as well as contractors, whether or not they are part of an energy efficiency program. QMS considers the customer impact of all operations and ensures that operations have positive customer impact.

BPI offers QA services to programs through direct contracting, and directly to contractors through its Accredited Contractor certification. BPI's guidance and "lessons learned" for providing QA that has a positive impact on customers – and contractors -- include the following.

- Conduct QA primarily through contractor documentation, verified by field audits.
- Limit on-site field audits (at customers' homes) for each contractor to 5% or less of completed (customer has been billed) home performance jobs.
- Schedule field audits in cooperation with contractors and only with ready acceptance by the customer, at a customer-convenient time.
- Simplify and integrate QA into the job with appropriate leave behinds, customer surveys via postcard, email, or phone, and potentially by encouraging customers to self-select for QA on-site visits.
- Convey in all customer communications that the audit, although independent, is part of the contractor's own quality assurance and continual improvement program.
- Do not convey any audit observations or conclusions regarding the audit to customers.
- Provide immediate feedback to contractors.
- Provide guidance to contractors regarding how to make QA a customer-positive part of an internal QMS.

BPI contractor accreditation offers standardized QA that aligns with these successful practices. BPI contractor accreditation is a nationally accepted approach that has been proven effective in multiple program environments. Programs can conduct third-party QA through BPI without adding burdensome program costs. Accreditation costs can be subsidized by programs or shared with contractors.

Effective QA starts with Quality Control (QC), which is an internal process that contractors should have in place to ensure they have met the client's requirements as well as the program requirements. QC is part of the QMS process. QA is third-party oversight conducted to ensure compliance with programmatic or code requirements. The QA process must be efficient and practical for all parties, which will be true if it is part of a QMS.

Programs traditionally incentivize contractors and homeowners on a single-measure basis, without quality verification. This works against the development of QMS for whole house projects by removing a company's motivation and need to integrate sales and delivery of whole house services and QA into business processes. Alternatively, when a program such as EUC understands the value of addressing the house as a system, contractors who step up to the plate, become part of a QA-based system, and are willing to modify their business model and reputation as professional business people, have adopted a QMS that meets higher customer expectations.

In too many programs and companies, QA is conducted on the "kindergarten" level, encouraging companies to make minimal efforts to comply with QA requirements and to not comply in a systematic and cost-effective manner. The current EUC program has been through the kindergarten QA approach. (QA levels exceed 100% both before and after the job in some service territories, which is a clear indication that QA is not being accurately measured.) The result has been slow uptake of systematic QA by contractors, and contractor QA business practices that have not been planned to be part of customer satisfaction. Failure to satisfy customers creates contractor resistance to QA, in a continuing downward spiral of effectiveness. Poor processes discourage new market entrants, dramatically slow job completion, and interfere with contractor success in the higher-quality-demand market.

Contractors cannot make QA part of a successful business system if they are faced with inconsistent QA standards. Currently, QA protocols and qualifications of inspectors vary across programs and service territories. Consistent QA should be adopted for programs and for statewide performance criteria.

BPI can provide consistent QA and statewide program criteria. BPI has been conducting QA in the NYSERDA program, by far the largest program in the nation, for more than a decade. BPI QA at the rate of 5% on-site field audits on completed contractor jobs has shown impressive results. Although NYSERDA has an implementation contractor that does a statistical oversampling -- in essence "QA on the QA" -- no significant problems have been uncovered at the rate that QA is done by BPI. (California has no method of performing QA on the QA when implementation contractors are used.)

BPI Accreditation and QA services can level the playing field across programs for all of the contractors, improve state wide consistency and mobility for contractors working in multiple jurisdictions, and reduce overall program administration costs. BPI systems have been in place and in use for over a decade and don't need to be invented from scratch. Adoption of BPI Accreditation and the QA Program for California has broad-based contractor support. The requirements for QA that the BPI program provides include:

- QA Protocols and Standards to be applied must be clear and documented for both contractors and inspectors, so everyone is on the same page going in, and knows how to effectively explain the process and interact with the client.
- QA is tiered to provide adequate sampling at various levels of contractor skill and experience, including prior history, without overburdening the contractor or their customers, or interfering with the sales process.

- QA protocols are conducted as a statistical sampling of completed work to identify problem areas and provide guidance for continuous improvement.

As statistical principles demonstrate, you will get better results from a smaller sampling that is done consistently and accurately, than if you attempt to sample the entire population and have inconsistent sampling protocols or poor data collection.

Nothing is gained from pre-job inspections that simply slow the job, without adding any value to the process. Adequate data collection showing pre- and post- conditions, even after the job is completed, will identify outliers and simply liars, who can be weeded from the system.

BPI understands that accreditation would be a big step for all California programs. However, it is imperative that QA issues be resolved before AB758 moves to implementation. As part of its program services enhancement, BPI has developed two alternatives to provide accreditation level quality assurance to programs who have not yet instituted an accreditation requirement for their contractor network. Traditionally, BPI has only provided QA services for accredited companies. As BPI has expanded its role in the national market and particularly in California, the need for consistent QA done by properly qualified QA inspectors at all program levels is increasingly apparent. BPI now offers independent QA services, including audits and contractor qualification, directly to programs.

Programs persistently refer to "certified contractors," which is an inappropriate term, because certification is a recognition or verification of knowledge, skills and abilities for an individual. Certified professionals work for contractors, and may in fact be the owner. An organization or company may be accredited as meeting standards. A BPI Accredited Contractor is a company providing home performance and whole house upgrade services. Accreditation obligates an entire organization to have appropriately certified professionals and trained staff in all the areas where they provide service (envelope, mechanical, diagnostics), and to address the house as a system on every upgrade job. Certified crew leaders oversee staff performing the work, and also the work of subcontractors. After a certain period, subcontractors are also required to be accredited. This ensures a continuity of competence in the delivery of energy savings to the homeowner. Standards alone, without qualified people to implement them, cannot have that impact.

Certified individuals, without a company obligation, may have little control over the final work scope. When accreditation is not required and the company is not on the line with a direct commitment to comply with the BPI standards, the programs should match credentialing requirements so they are consistent with all the skills needed to perform all aspects of whole-house upgrades, and incorporate all the various skills into their training programs. Not every professional needs to be a building analyst. California has a need for competent, entry level air leakage control and insulation installers, as well as experienced energy auditors, retrofit installers, and crew leaders.

Proposed Alternative to Current Quality Assurance Schemes

As part of its program services enhancement, BPI has developed two alternatives to provide accreditation level quality assurance to programs who have not yet instituted an accreditation requirement for their contractor network.

A. QA on the QA

BPI is willing to consider a contractual role that would provide training for QA providers in the BPI QA process, provide QA on the QA providers using BPI's qualified QA provider network with both office and on-site inspections, and could provide a consistent QA reporting mechanism for consistency and quality data sharing for the entire statewide program, as well as providing technical support on standards implementation and interpretation and dispute resolution assistance in case of QA provider and contractor disagreement. This would ensure consistent QA for all participating companies that have certified staff. This is not equivalent to accreditation, but would provide an accreditation level QA for the program.

B. BPI QA Program for the entire state-wide EUC program

BPI is willing to consider a contractual role to provide truly neutral, third party QA services directly for all participating contractors in the AB758, EUC, and/or Flex Plan (if adopted) programs, at agreed upon inspection rates using BPI's qualified QA provider network, QA protocols, and QA reporting process and appropriate data sharing schemes. Where programs have additional installation or diagnostic requirements above and beyond the BPI standards, the variance could be reviewed and appropriate QA supplementation could be agreed upon.

The second option provides the CEC, CPUC, the utilities, local governments (Regional Energy Networks) and the contractors with consistent, qualified QA statewide, with no additional burden on the contractors, and likely substantially reduced cost to the programs (which can improve cost-effectiveness).

CEC recognizes the importance of reducing administrative obstacles and burdens on contractors. The BPI QA Program has been developed, tested, and utilized in other major energy efficiency programs for over a decade, and meets the cost-effectiveness requirements needed to support contractor participation.

The cost effectiveness of adopting BPI Accreditation and/or contracting for quality assurance services can be demonstrated by comparing current QA implementation costs per retrofit to the cost of BPI accreditation QA.

7. How can Marketing, Education & Outreach efforts leverage and coordinate with other efficiency programs, implementers and regions?

BPI agrees with California Building Performance Contractor's Association's comments on Public Education and Marketing³. Marketing, Education and Outreach efforts are very important to convey to the public the "urgency, visibility, and validity of the power and benefits of energy efficiency".

- Convey a sense of urgency to the public about of the size and scope of our energy supply/cost and greenhouse gas emissions problems and the incredible power of building efficiency to provide a solution.
- Leverage on-going and frequent validation from the most visible politicians and state leaders – IOUs, CPUC, CEC, Governor, Senators, Mayors, Supervisors, movie stars, and other high-profile and respected leaders.
- Incent marketing/education program implementers based on contractor lead-to-sales-to-production performance (both quantity and speed of throughput) like any professional marketing program that needs to prove return-on-investment.
- Market whole-house upgrades to building owners as the "ultimate step" among the many simpler and more economical stepwise options by all IOU and local government programs and contractors. Combine whole-building upgrade marketing with all other efficiency opportunities, including behavior change, in all state, county, and IOU energy efficiency education efforts.
- Institute "hyper-local" marketing/education programs that coordinate city hall and community organizations with specific contractors for both wide and deep penetration within individual cities and then co-fund the cities' marketing efforts.
- Use flexible and substantial coop marketing to optimize contractor marketing costs.
- Leverage federal programs for messaging and marketing content (such as Better Buildings or Home Performance with ENERGY STAR) that will have broad market recognition.

BPI supports leveraging existing efforts and lessons learned from successful programs in marketing, education and outreach in the state. Future ME&O efforts should build upon existing brand and marketing efforts that have gained recognition.

³ CBPCA Comments "Home Performance Contractor Desired Outcomes", P. 5

When combined with consumer confidence, an important unconventional marketing tool is certification. A skilled employee base greatly improves customer service (increased professionalism and customer satisfaction), and time management (getting the job done right the first time, every time). Customer referrals and recognition of quality increase consumer confidence in each company and the industry as a whole.

8. What workforce development is desirable for the residential sector?

The success of energy efficiency in buildings program depends on qualified contractors executing high-quality jobs profitably and rapidly. Currently, we have many technically trained contractors with a very narrow range of specialized skill sets. WE&T efforts to date, whether under ARRA, the IOUs or CEC programs, have failed to provide adequate advanced training in all topics necessary to comprehensive building performance, including competence in business, marketing, quality, and installation expertise.

- Workforce development must be widespread and more broadly defined in terms of technical training and mentoring at the auditor, crew leader, installation, and internal quality control levels, as well as the Quality Assurance inspector level.
- Marketing, sales, and business management training for home performance companies is essential. Whole building performance is a business model shift for the majority and needs to be planned; selling whole building performance is also a specialized skill set, and one that is not likely to reside in the building analyst or energy auditor, although some do acquire those skills and become effective sales people.
- Deliver sufficient pre-qualified, credible, new-hire candidates to upgrade contractors through workforce development programs, community colleges, and trade tech systems. Finding qualified new-hires for field crews is currently a huge bottleneck. Numerous post-secondary schools, non-profit, and for-profit training organizations throughout California are ready, willing, and eagerly preparing a workforce to move this direction, but need to have skill sets identified and coordination with the energy centers to supply not only single family skills, but also multifamily for both the low-income weatherization and building performance professions.
- Commit to BPI Certification and Standards as the foundation of the workforce for consistency, national recognition, and continuous improvement. BPI Certification will provide the ability to attract skilled workers, and also provide migrating skilled workers with viable options across the nation.
- Avoid "retooling" (changing certifications) the workforce with each new program cycle; if necessary leverage other existing specialty certifications, such as HVAC installer certifications, that are not covered by--but are recognized by--BPI for accreditation purposes (e.g., NATE).
- Offer incentives and/or financing for necessary contractor investments in equipment.
- Participate actively in national efforts to improve standards and certifications which will create consistent training and certainty for Contractor investment.

BPI believes that aligning residential training programs and building career paths will be beneficial. Requiring consistent standards, certification and installation requirements--across all programs and income levels--not only ensures retrofit work will be more consistent and better performing (with better communication between programs), but allows a smoother transition between low-income agencies and for profit companies for the workers. Many home performance professionals began their careers in low-income weatherization. BPI has always supported weatherization workers and hosts a job board for the weatherization and home performance industry.⁴ BPI identified the national need for consistency and worker reliability across all whole-building performance and home improvement sectors and has launched four new Home Energy Professional certifications to the nation's weatherization and home performance workforce. Administered by BPI and funded by the U.S. Department of Energy (DOE) and its National Renewable Energy Laboratory (NREL), the four certifications focus on the most common job classifications in the home energy upgrade industry: energy auditor,

⁴ BPI Green Jobs Connection. <http://www.bpi.org/greencollar.aspx>. Free job postings for employers seeking qualified workers, and free resume postings for BPI Certified Professionals.

retrofit installer, crew leader and quality control inspector.⁵ These certifications have a suite of prerequisite and experiential requirements that will help provide the "work-ready" verification demanded by employers and sought by programs. Local governments piloting programs could call out the new certifications to support the workforce development in their local communities and community action agencies providing weatherization services and verify performance in advance of state-wide program adoption.

These new certifications will support both supply-push and demand-pull aspects. Employers must carefully consider every hire, even when subsidized, to identify those candidates that bring reliability and both technical and soft skills necessary to remain profitable and viable, while achieving consistent customer satisfaction, referrals, and life-time customers. "High-road" strategies must be viewed cautiously. Although noble in intent, they can increase costs, particularly in the current economy, such that small residential contractors may find program work unprofitable, or the business itself may become unviable.

Ensuring and protecting the viability of the numerous small businesses participating in the residential programs throughout the state, and particularly in the whole-house programs of Energy Upgrade California, is paramount to achieving California's goals.

BPI strongly supports efforts to review training and certification standards available and in use. The assessment need is to identify how these resources can evolve into a coherent, contractor-friendly, and customer-friendly workforce pathway. Important questions related to streamlining WE&T should be investigated in the context of an already almost universal recognition among program managers and advisors: consistent training, standards and certifications must be required, utilizing the national and state resources, ranging from ANSI accredited standards development organizations and certification bodies to local community colleges. There is no need for California to recreate the wheel. However, California does need to address the "contractor as a system", and ensure that a well-rounded workforce is supported. Focusing on a single certification, such as BPI Building Analyst or NATE Air Conditioning installer, will not transform the market without the full suite of professionals that touch the home also having an understanding of the house as a system. A whole house contractor should have full-scope capabilities, from audit to air leakage control (see BPI's ANSI accredited installer certification: Residential Building Envelope Whole House Air Leakage Control Installer Certification Scheme Handbook (RBE-WHALCI)⁶. Staff should work under a qualified supervisor, for example: Envelope Professional to Heating Professional and AC/Heat Pump Professional level supervisors acting as Crew Leaders; Quality Control Inspectors ensuring on-site compliance with standards and work order. The retrofit takes a team that works as a system to perform an effective and comprehensive retrofit.^{7,8}

BPI agrees with the Commission in that "Training and education should be offered in a sequence of certifications or credentials that can be accumulated over time to increase an individual's qualifications and allow one to move up a career ladder to higher-paying jobs. A stackable credential framework is one that creates career pathway models within industries with high unmet needs for skills".⁹ BPI already has a mechanism in place for this - the Home Energy Professional Certifications to the nation's weatherization and home performance workforce. The new certifications complement and build upon BPI's existing credentials in the home performance career ladder, where increased knowledge and skills lead to advancement. They are designed to allow professionals in the home energy upgrade industry build both a stackable and lateral career lattice. Requiring consistent standards, certification and installation requirements--across all programs and income levels--not only ensures retrofit work will be more consistent and better performing (with better communication between programs), but allows a smoother transition between low-income agencies and for profit companies for the workers.

⁵ BPI Introduces Four New Home Energy Professional Certifications http://www.bpi.org/news_expansion.aspx?selectedID=819

⁶ http://www.bpi.org/tools_downloads.aspx?selectedTypeID=15&selectedID=102

⁷ http://www.bpi.org/professionals_designations.aspx

⁸ http://www.bpi.org/tools_downloads_pilot.aspx

⁹ AB758 Comprehensive Energy Efficiency Program for Existing Buildings Scoping report, P. 41.

The Home Energy Professional certifications are designed to create a complete crew to perform energy efficiency work, but they are targeted at this time to weatherization workers participating in the Weatherization Assistance Program. Over time, this is intended to provide a smooth transition from weatherization to full home performance, and to provide home performance contractors with a resource for knowledgeable, skilled, experienced workers to select from. The certifications for Energy Auditor, Crew Chief, Installer, and Quality Control Inspector are now in pilot and moving toward ANSI accreditation. The SWS should be examined, and could be compared to other technical skills to assist with a California gap analysis. DOE has expressed the intent that all weatherization workers will be required to be certified in the future, beginning with Quality Control Inspector on each crew by the end of 2014. The DOE Home Energy Professional certifications mirror the team organization of most home performance contractors. They address the specific skills necessary to perform leadership tasks at an advanced level, with substantial experiential pre-requisites and training requirements.

HVAC Integration into Whole Building Performance

When considering workforce needs and determining the roles contractors will play in the implementation of AB758, it is important to consider how the broad HVAC market can be integrated into the programs. Compliance with pulling permits is very low, and compliance with Title 24 verification and compliance inspections is a small percentage of that number. Developing a broadly skilled workforce and engaging the HVACR community in performance based contracting is paramount to all of these programs.

BPI is an active committee member of the Western HVAC Performance Alliance (WHPA) Council of Advisors, serves on the WHPA Whole-building Performance Committee, and HVAC Workforce, Education & Training (WE&T) subcommittee. BPI supports the identification and development of proper professional standards, certifications, and organizational accreditation, as well as facilitation of training opportunities to address whole building performance by identifying needs in the HVACR as well as other whole-building related skills. BPI actively participates in the rulemaking processes with both the CPUC and the CEC. California has embraced a whole buildings performance approach and understands at the regulatory level the need to address buildings as systems, rather than as single measure components, without relationship to each other (e.g., Energy Upgrade California and AB758).

The Challenge

CPUC articulated the challenge to the California HVAC workforce when stating its desire to transition to a "Certified" workforce by 2020 and improve the quality of its work in order to reduce energy consumption. "In the ideals of the Strategic Plan, all technicians and installers will obtain relevant certification by the end of 2020 in order to get an HVAC contractor license."¹⁰ The CPUC takes this position, stating in the January 2011 update: "The HVAC industry has struggled to provide qualified technicians, and market conditions rarely value quality installation and maintenance (QI/QM). Less than 10 percent of HVAC systems obtain legally required pre-installation local building permits and 30-50 percent of new central air conditioning systems are not being properly installed. As a result, Californians pay a large price for the lack of quality installation and maintenance, with commensurate poor performance."¹¹ CPUC prioritizes proper performance of the mechanical systems in relationship to the whole building for both residential and commercial installations, including climate considerations.

Many of the current certificates and professional certifications (NATE, Green Mechanical Council) do not emphasize performance, but focus on installation technique without regard to the whole building system. Others focus on supervisor level system evaluation for performance, optimization and commissioning, such as BPI's standards and certification for

¹⁰ California Energy Efficiency Strategic Plan, HVAC Action Plan, Heating Ventilation Air Conditioning 2010-2012, p. 23.

¹¹ California Energy Efficiency Strategic Plan, January 2011 Update, P. 53

the small residential Heating Professional and AC/Heat Pump Professional certifications. Some provide training or certification without a third-party verified process; others provide standards that do not have an accompanying certification to demonstrate competency (e.g., ACCA standard 5: HVAC Quality Installation Specification and ACCA standard 9: HVAC Quality Installation Verification Protocols). BPI develops professional personnel certifications that leverage, and provide a meaningful opportunity to implement, existing, excellent, industry standards developed by non-certification bodies, such as ACCA's Quality Installation and Quality Maintenance Standards. BPI is specifically interested in recognizing or adopting ACCA standard 5: HVAC Quality Installation Specification and ACCA standard 9: HVAC Quality Installation Verification Protocols, and producing a professional certification for each. It will aid the home performance community by providing a set of certifications in the marketplace that establish the knowledge, skills and abilities of those who install HVAC systems to the QI 5 specifications or verify the installations to the QV 9 protocols. The QIV certification could also tie into the QC Inspector designation currently in pilot as a Home Energy Professional designation, developed by BPI with support of DOE and NREL. The adoption and continuous development of performance based standards and competency certifications for HVAC technicians will revitalize the HVAC industry and deliver increased energy efficiency and reduce peak usage of air conditioning systems. In addition, the adoption of competency based certifications will provide a standard measure of technical knowledge resulting in clear guideposts for training institutions and add value to the occupation leading to a more stable and professionalized workforce¹².

BPI understands that transition requires management buy-in before an organizational transition can occur. A successful transition includes 1) an allegiance to whole building science, 2) management tools that support a transitioning organization, and 3) opportunities to participate in markets that provide a sustainable, viable business model. BPI has recognized certain LiUNA, NATE, NORA and RSES certifications for BPI Accreditation of HVAC companies.¹³ ESCO Group and National Comfort Institute have both initiated discussions on the potential recognition of their respective certifications for BPI Accreditation.

This need for transition is not limited to HVAC. It also encompasses thermal envelope measures, such as the air sealing and quality installation of insulation, and particularly those envelope measures that often result in lost opportunity for energy efficiency improvements, such as window and siding replacements.

Throughout the ARRA funding period and the first phase of EUC, the training focus has been on diagnostics and data collection, with BPI Building Analyst (BA) being the primary focus of training. The skills of the BA are essential to evaluating the home, but rarely is the BA the supervisor over the installation, and even more rarely is the BA the installer. Those tasks are performed by a crew chief with a specialty certification for the components on which they will work. The need has already been identified by the programs to broaden the training to include envelope, heating, and air conditioning evaluation, installation, and performance verification and air leakage control and insulation installation.

BPI has supervisor level certifications for each of these primary parts of a whole-home system that are used best in conjunction with a skilled technician (i.e., BPI AC/Heat Pump Professional + NATE AC technician; BPI Heating Professional + NATE heating technician; BPI Envelope Professional + BPI RBE-WHALCI). When the home energy professional team is treated as a complete system, whole home performance results will be enhanced and improved.

BPI certifications do not replace the need for licensing, they support licensing requirements and expand into performance and quality that is not addressed by licensing and contemplated by CPUC for its 2020 goals. The need for rigorous code enforcement is not eliminated by certification; however it does provide opportunity for another area of study, for example, are contractors with certified professionals on staff more likely to pull and close a permit and obtain all necessary inspections than without certified professionals? Ultimately, it is not the certified technician on the job site who is

¹² Donald Vial Center on Employment in the Green Economy (2011). California Workforce education and Training Needs Assessment: For Energy Efficiency, Distributed Generation and Demand Response: University of California Berkeley.

¹³ BPI Works with NATE and NORA to Expand Accreditation Options for the HVAC Contractor, http://www.bpi.org/news_expansion.aspx?selectedID=842; BPI Works with RSES to Expand Accreditation Options for the HVAC Contractor, http://www.bpi.org/news_expansion.aspx?selectedID=898.

responsible for making the decision to pull a permit or not, to perform a quality job or not, to call for a Title 24 inspection or not. It is the home performance business owner that makes these decisions, so the true test would be to evaluate the difference between accredited companies participating in EUC and non-accredited companies who are participating solely in single measure programs.

9. Under what conditions would it be appropriate to include an energy rating in an upgrade project?

BPI agrees with California Building Performance Contractor's Association's comments on the Home Energy Rating System in the Policy Environment section.¹⁴ The conditions under which an energy rating would be beneficial in an energy upgrade projects are specific and should reflect the following guidelines:

- Keep the home energy "rating" process separate from the energy upgrade sales and retrofit process or create program flexibility that will allow contractors to conduct their sales and retrofit process without the "program friction" (that is, complications to project implementation caused by program processes) of accommodating a parallel and simultaneous rating process that delays project implementation, requires additional home visits, and causes consumer confusion regarding the function of a rating versus a contractor test-in/project scope inspection. The rating process should be separate and optional for Energy Upgrade customers.
- Create a rating method that is supported by building scientists and contractors – not just regulators and program managers. As currently conceived, the California Whole-House Home Energy Rating (i.e., HERS Whole House Rating) is seen as inaccurate, confusing, too costly, and potentially damaging to market confidence once the inaccuracy of system's energy savings estimates are demonstrated in the marketplace. As currently conceived, the HERS Whole House Rating program is not supported by the states' leading building scientists and the majority of leading-edge home performance contractors, and its required use in the California Public Utility Commission (CPUC) building efficiency program has been deferred. This lack of support by industry experts is a huge program design schism that will drag down program implementation statewide.
- Create both an operational analysis and an asset rating system (or a combination) to serve both contractor project planning and State energy evaluation needs. Building performance contractors are concerned that confidence in performance outcomes are and will continue to be eroded by inaccurate asset modeling and a lack of post-upgrade performance data based on actual energy usage. Innovation (both in upgrading buildings and manufacturing equipment) and market financing tools are dependent on reliable and predictable performance outcomes."¹⁵

Examples from across the country, from Wisconsin to Sacramento, have demonstrated that independent audits or ratings do not have the ability to convert homeowners to action and create completed projects at the scale necessary to achieve California's goals. They can be very effective at collecting data on the existing housing stock, but are not effective at transforming it.¹⁶

The Commission should take this opportunity to examine the possible benefits of adopting the national standards for software to qualify energy savings modeling software specifically for existing homes. Rating software designed for evaluation of new homes has been shown to consistently over-estimate energy savings. "Over large populations, HERS ratings could predict annual energy usage and cost but the accuracy diminished considerably when individual homes were considered for predicted versus actual cost. In particular, a wide disparity was found for older homes. It was further concluded that using actual billing data to calibrate HERS ratings could improve average accuracy over the whole population of rated homes, but does not affect variance."¹⁷ SENTECH conducted a further literature review of rating software and concluded that in the last six to eight years the literature describes many of the BESTest and RESNET-

¹⁴ CBPCA Comments "Home Performance Contractor Desired Outcomes", P. 2.

¹⁵ CBPCA Comments "Home Performance Contractor Desired Outcomes", P. 2.

¹⁶ Also see: http://www.energy.ca.gov/ab758/documents/2012-10-08-09_workshop/comments/Elton_B_Sherwin-Workshop_Presentation_2012-01-30_TN-67699.pdf

¹⁷ Stein, J.R., and A. Meier. 2000. Accuracy of Home Energy Rating Systems, Energy (25) 339-354. p.38-39.

accredited software packages investigated during its study and reaches the conclusion that issues identified with rating software are still relevant today.¹⁸

"For estimated energy savings and recommended energy efficiency measures to be deemed credible by trade contractors, lenders, homeowners, energy efficiency program sponsors, and the home performance industry at large, they must approximate real-life conditions before and after a retrofit. Tool accuracy should be evaluated on its ability to emulate the actual energy use of a dwelling, predict energy savings for improvements, estimate or report the "real-world" cost of improvements, and then use cost, energy savings, and interactions between energy efficiency measures to "package" and prioritize home energy improvements."¹⁹ Contractors don't trust the currently approved EUC software²⁰, and the Commission is encouraged to explore alternatives. National Renewable Energy Laboratory BESTest compliant software is the most commonly used and widely available. Since the SENTECH report was issued in November 2010, BPI has published an ANSI-accredited national standard for software: BPI-2400-S *Standardized Qualification of Whole House Energy Savings Estimates*.

10. At what other points in the life of a building would an energy rating be desirable?

The energy ratings serve the objective to collect data on existing housing stock for a program designed to gather data on the current housing stock environment, not on the impact of the housing stock. For programs whose goal is to reduce energy use by improving the existing housing stock, whatever the "as-found" condition, home performance retrofits, rather than ratings, are the logical choice.

11. What market barriers exist that limit the growth of the voluntary market for HERS ratings and assessments? Is there a role for ratepayer or public funding to overcome these barriers, if so, what level is appropriate and commensurate to benefits?

- There are many barriers that limit the growth of the voluntary market for HERS ratings and assessments. In order for ratings to lead to energy retrofit and savings, they must be tied to an upgrade project. In its current format the ratings interfere with the delivery process of energy efficiency upgrades.
- Homeowners do not recognize the value of HERS ratings in their present format. The average cost for a HERS rating is \$492.11, which is not a justified price for the average homeowner.²¹ Often, HERS ratings are priced in excess of \$700, and since they must be conducted both before and after a project to determine the estimated improvement, the combined price is prohibitive to the average homeowner. The Scoping Report quotes that "Over the whole program, homeowners were substantially less likely to take action during the program period to complete upgrades when they started with an independent HERS Rating than with a performance contractor (conversion rate of 44 percent starting with performance contractors, 7 percent starting with HERS Raters)."²² For this system to become clearer for the homeowners, HERS rater and contractor must work together.
- HERS ratings are not aligned with national standards so customers are less likely to recognize them or seek them out. The infrastructure for training, certifying, maintaining, providing quality assurance is underdeveloped with only three HERS providers in existence. The results are reflected in the low compliance rates which are less than the state-wide code compliance of about 2%.

12. Is there a role for HERS providers and HERS raters in the whole house upgrade programs offered by utility providers or in financing offerings supported by public dollars?

¹⁸ SENTECH, Inc., Review of Selected Home Energy Auditing Tools. In Support of the Development of a National Building Performance Assessment and Rating Program. Prepared for the U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy. November 2, 2010. p. 37.

¹⁹ Id., p. 14.

²⁰ http://www.energy.ca.gov/ab758/documents/2012-10-08-09_workshop/comments/MacFarland_HERS-2_and_Home_Performance_2012-10-12_TN-67700.pdf

²¹ Presentation from EUC Coordinating Group Meeting on Oct. 3, 2012 "HERS II Integration in EUC", Slide 20.

²² AB758 Scoping Report- CEC, P. 57.

HERS providers and HERS raters are integral to the whole house upgrade process in their role as providing verification and compliance testing of certain types of improvements for Title 24 compliance.

Whole-home ratings should not be incentivized with rate payer dollars, as ratings in and of themselves by their very nature, have no ability to provide verifiable energy efficiency improvements. With the exception of the few qualified Building Performance Contractors, raters are not allowed to have a relationship with or refer customers to a contractor to complete recommended improvements. Without that connection, there is no connection to the installed savings. Contractors do not trust the raters testing results because of the lack of a comprehensive test-in and test-out process, thus they will do their own testing. This imposes an unnecessary and expensive double burden on homeowners.

13. What improvements could be made to the California HERS program and its use in utility whole house upgrade programs?

Residential upgrades for energy efficiency improvements in this context should not be confused with or integrated with ratings. A separation of AB758 and HERS II ratings must be maintained. In the marketplace, few homeowners seek a rating--they seek a roadmap from a trusted professional who can show them what they need to fix, and then fix it. It is not different from any traditional sales model--be it a doctor, a mechanic, or a home performance contractor--where consumers wish not for a simple diagnosis and a "score", they wish for concrete identification of the problem and a solution, preferably to be performed as soon as possible by the person making the recommendation. Auditors and raters who follow a consulting model are available to those homeowners who seek a rating or information only, or who want a thorough and constructive roadmap but are not yet ready to take action. However, neither an audit nor a rating ever saved energy. Energy is saved and Big Bad Goals are achieved when action is taken and jobs are completed.

Rating software designed for evaluation of new homes has been shown to consistently over-estimate energy savings.²³ "Over large populations, HERS ratings could predict annual energy usage and cost but the accuracy diminished considerably when individual homes were considered for predicted versus actual cost. (...) It was further concluded that using actual billing data to calibrate HERS ratings could improve average accuracy over the whole population of rated homes, but does not affect variance."²⁴ SENTECH conducted a further literature review of rating software and concluded that in the last six to eight years the literature describes many of the BESTest and RESNET-accredited software packages investigated during its study and reaches the conclusion that issues identified with rating software are still relevant today.²⁵

20. What are the major barriers to accomplishing comprehensive data collection and centralized public access to market data?

(This question is answered together with question 37.)

37. How should building energy simulation software be used to make recommendations for energy upgrades? How could actual energy use, before and after the upgrade, be considered?

IOUs, regulators, and HERS providers face substantial obstacles and challenges to their data management systems. BPI supports efforts by IOUs and the encouragement and assistance of the CPUC in helping the systems evolve to meet EE goals.

²³ Stein, J.R., and A. Meier. 2000. Accuracy of Home Energy Rating Systems, Energy (25) 339-354, p.38-39.

²⁴ SENTECH, Inc., Review of Selected Home Energy Auditing Tools. In Support of the Development of a National Building Performance Assessment and Rating Program. Prepared for the U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy. November 2, 2010. p. 37.

²⁵ Id.

The major barrier to accomplishing data management objectives is the piecemeal approach insulated from contemporary market development resulting from the dominance of uncoordinated program decision-making in the market. Data collection standards, use of building energy simulation software, verifying accuracy of projections, centralized data storage, and public access to data are all part of a data management system. Programs and contractors both have been poorly served, and the goals of data collection and management have clearly not been met, by the piecemeal approach that has characterized residential retrofit industry data management. Some software developers have benefited by current approaches, but these will either be left behind or will change their products as this system matures.

This system must be nationally accessible and data collection and exchange tools must be interoperable if the goal is to provide contractors tools that help them run a successful business, while creating extensive data pools that contribute to building science and program evaluation.

Recognizing these needs, and with the leadership of forward-thinking and technically competent experts in the field, BPI has been developing a set of interrelated standards that better enable programs to deliver high-quality whole-house energy efficiency retrofits. Data is crucial to the home performance industry. High-quality data is central to many of the activities that define the industry, such as energy modeling and quality assurance. High-quality data is also a basis for the analytic work necessary to develop energy efficiency into a quantifiable resource that can be bought and sold--a requirement for the home performance industry to grow to scale. BPI anticipates that the remaining data standards will be available for public review and comment by the end of 2012.

- **BPI-2100: Standard for Home Performance-Related Data Collection:** This standard lists and defines a universe of data elements used in the home performance industry, and specifies several sub-sets of data associated with particular uses, such as the data set that should be collected during an assessment conducted in accordance with BPI-1100 (Home Energy Auditing Standard)²⁶. This standard has the potential to greatly reduce the time involved in data collection, and to increase the quantity, accuracy and comparability of data collected, by enabling IT developers to create software and databases with respect to a standard, rather than customizing products for each program and sponsor.
- **BPI-2101: Standard Requirements for a Certificate of Completion for Whole-House Energy Efficiency Upgrades:** This standard defines the data elements that should be included in a certificate issued by a program to a homeowner at the conclusion of a home performance energy efficiency upgrade. Certificates containing the standard set are intended to be uploaded into Multiple Listing Service (MLS) databases, providing a means for information about energy upgrades to be incorporated into real estate transactions, and over time enabling identification of an “energy efficiency premium” resulting from upgrades.
- **BPI-2200: Standard for Home Performance-Related Data Transfer:** This standard defines an XML protocol, HPXML, that will enable all participants in the home performance industry (e.g., contractors, program administrators, utilities, state energy offices, Federal agencies) to transfer home performance-related data easily and in a way that ensures the accuracy and consistency of the data. The protocol is based on the universe of data elements defined in BPI-2100.
- **BPI-2100 and BPI-2200** are necessary mechanisms for ensuring that the appropriate data is collected during home performance upgrades and transferred in a way that ensures its accuracy and consistency. BPI-2400 provides further checks to enhance the accuracy of the modeling process that uses this data. These standards are designed to be used together in an energy efficiency upgrade system as defined by the RIGRS standard. It is anticipated that as a result of the high quality of the data resulting from references to these standards that the energy efficiency upgrade system using them would perform well in a RIGRS analysis.

The RIGRS Project

²⁶ Home Energy Auditing Standard Published as BPI Standard http://www.bpi.org/news_expansion.aspx?selectedID=1053; BPI 1100 may be read in its entirety at: http://www.bpi.org/files/pdf/BPI-1100-T-2012_Home%20Energy_Auditing_Standard_7-27-12.pdf

Concurrent with this data standards development, BPI is a co-manager, with the National Home Performance Council and Efficiency.org, in the Residential Investment Grade Resource (RIGRS) project to identify a national standard for verifying the accuracy of savings projections by comparing pre-measure or pre-upgrade deemed or modeled savings to actual utility usage. RIGRS is the basis for both long-term public policy and long-term private sector investment in EE. RIGRS will be developed by BPI as an American National Standards Institute (ANSI) standard through an open, consensus-based stakeholder process.

The RIGRS project integrates identification of barriers with solutions and their impacts on residential retrofit market participants.

There is no current standardized methodology for consistently and accurately projecting energy savings. Programs and market players adopt a wide variety of approaches ranging from deemed savings to simulation models. For these projected savings to have real value, they should be compared to actual energy savings, as indicated by actual utility usage (i.e., kWh and MMBTUs). The RIGRS system will provide a test that compares projections to actual savings, allowing measurement of the accuracy of different programs and different approaches to projecting savings.

The inherent lack of precision related to energy savings projections constitutes an important barrier to attracting the private capital necessary to scale up the residential energy efficiency (REE) industry. Although energy efficiency is now widely recognized as an effective means for achieving economic and environmental benefits, the private market is only now beginning to recognize the potential value of energy efficiency as a resource and is being held back from investing due to a lack of data or a system to validate actual results that meets the rigorous requirements of the market.

The single most important barrier preventing the development of a self-sustaining market for energy efficiency upgrades is the lack of reliable data demonstrating the relationship between residential energy retrofits and measurable reductions in energy consumption. To manage risk and attract the large-scale investment required to reach aggressive goals, the energy efficiency upgrade market needs accurate data and measurement systems. In the short term, public policy can serve as a proxy for market forces that are on the sidelines. However, a model driven solely by public incentives or regulations will simply become too expensive to scale.

In order to create a market where all stakeholders in the market can value residential energy efficiency, it is necessary to clearly define the different approaches to achieving savings through energy efficiency, and to measure the extent to which each approach achieves and can actually project those savings.

Efficiency is increasingly viewed as an alternative resource that is effective in deferring and replacing the need to invest capital and operating resources in conventional fuel generating capacity. Measuring efficiency must be aligned with ratemaking tools and cost-effectiveness evaluation. Accurate savings projections supported by actual results are essential to the development and sales of commodities – "products" -- and scaling of EE products to larger markets.

Data Collection Software Tools

BPI recommends that CEC explicitly recognize that the goal of software tool development is not to "re-define" one tool for adoption by CPUC and IOU programs – an approach that has resulted in frustration for contractors and programs, and shortcomings in the usefulness of data on program results. The emphasis should be on independent evaluation of various software tools to verify their accuracy and ease of use. Training in using software tools is essential, and this training, and certification of proficiency, should be provided by the developers and owners of the software products, according to program criteria.

BPI has taken a fundamental step toward creation of a consistent platform for residential retrofit modeling software. BPI 2400, "Standard Practice for Standardized Qualification of Whole-House Energy Savings Predictions by Calibration to Energy Use History" (aka the "Delta Standard") specifies the requirements and process for the calculation of standardized predicted savings: a difference (delta simulation) between the modeled energy usage before an energy upgrade (or set of upgrades) and modeled energy use after an upgrade (or set of upgrades), using approved building energy simulation software. This standard specifies a process for using an approved building energy simulation software tool and actual energy bills to calibrate the model to the actual energy use of the home, and provides a set of criteria to be used in the final calculation of standardized estimated savings that may be considered in compliance with this standard. BPI 2400 is an accredited ANSI standard.²⁷

The BPI standard does not dictate selection of any software tool but sets a standard for accuracy, against which all residential energy improvement modeling software can be evaluated. The standard was developed under ANSI processes for open, transparent, consensus based standards development.

With respect to the RIGRS data collection system explained above, note that a participant (e.g. a utility) that contributes data to a RIGRS management system does not have to contribute information related to identity of an individual consumer. Aggregate data can be provided in a manner that meets all corporate and regulatory privacy requirements.

33. What is the proper role for regulations to achieve energy efficiency through AB758? What are the appropriate points in the life of buildings (trigger points) where regulations could be applied?

(This question is answered together with question 36.)

36. What process improvements or funding solutions would facilitate better compliance with the Building Energy Efficiency Standards? What actions could be taken to encourage contractors to pull permits?

Many state and local governments adopt forward-looking energy efficiency codes for residential buildings, but do not enforce the codes. In part, enforcement is weak because of the massive scale of non-compliance – a chicken-and-egg situation that affects compliance resources and compliance resistance. Enforcement of energy codes for existing homes is particularly difficult due to the issue raised by Question 33 – what are appropriate “trigger points” that are fair to homeowners? Solutions should focus on contractor economics, and funding should flow to contractor business improvements and to code enforcement organizations.

Code enforcement may be triggered for existing buildings when substantial financial investments are being made, for example when a cost estimate for a remodeling or repair job (which can include major additions) reaches a specific threshold, and when a building is sold.

But no state code, and no local energy efficiency code, will be effective for meeting AB758 goals if current enforcement (or non-enforcement) persists. The California Contractors State License Board estimated that 98% of residential remodeling projects do not comply with existing building codes, and that contractors fail to even obtain building code permits for 98% of their work. Even in areas considered to be advanced in performance aspects, such as Sacramento, compliance may be as low as 25% (verbal testimony of John Proctor, October 2, 2012 Workshop).

Such massive non-compliance means that code compliance costs are probably not included in most contractor bids for remodeling or repair work. Any contractor that does comply with code requirements would be at a disadvantage on purely a price basis, or work on a lower profit margin.

²⁷ BPI's "Delta Standard" Published as American National Standard. http://www.bpi.org/news_expansion.aspx?selectedID=1126; BPI 2400 may be read in its entirety at:http://www.bpi.org/Web%20Download/BPI%20Standards/BPI-2400-S-2012_Standard_Practice_for_Standardized_Qualification_of_Whole-House%20Energy%20Savings_9-28-12_sg.pdf.

The first barrier to compliance, and the first process to fix, is the permitting process. Qualified contractors, such as BPI Accredited contracting companies with a verified certified professional staff, should be allowed specially licensed as whole home performance contractors and allowed to pull a special “whole house performance” permit that incorporates all aspects of an energy upgrade, and reduces the number of code inspections necessary for completion and sign-off. There could even be a more streamlined process where the QA inspector sign off would suffice for the local jurisdictional inspection, especially in this challenging economy where the building departments are often understaffed and undertrained. A streamlined process would lower permitting costs, speed job completion, and reduce contractor resistance to compliance.

Additional actions should go further and give competitive advantages to contractors in compliance. Contractors who comply – or want to comply – with codes should be encouraged, allowed to succeed, and rewarded for compliance. Compliance can be rewarded by offering contractors incentives such as such as the following.

- No fee for applying for or obtaining permits for remodeling or repair work that includes qualifying energy efficiency retrofits;
- Reductions in taxes on income from permit-documented energy efficiency jobs;
- Guidance in sales and advanced business management systems or technology that specifically help contractors develop bids and marketing that highlight code compliance quality to consumers;
- Government certification to consumers of code compliance, and consumer awareness that they should expect this certification; and
- Free and widely available training in energy efficiency code compliance.

34. How could the real estate industry play a role to encourage assessments, rating and upgrades as a means of differentiating homes where owners have invested in upgrades?

Representatives of the real estate industry are currently participating in a BPI standards development process to create criteria for a standard certificate that documents the results of a whole house energy upgrade (HEU) (BPI-2101-S-2011).²⁸ The certificate, when developed by, for example, a program or industry group, can be branded and used by home energy upgrade programs or by individual contractors. The certificate criteria will be designed to be used as a standard for reference documents by real estate agents during the home sale process, and can be uploaded into MLS databases.

To date, no single, widely-recognized method for documenting completion of an HEU has been created. In the absence of such a document, it has been difficult to verify that an HEU adds value to a property, or to quantify the increase in value. A single, universally-recognized set of data elements to be included in a certificate that documents that an HEU was completed, and that provides information about the measures implemented during the HEU, would play a crucial role in addressing this issue. The document could be used as the basis for indicating in an MLS database that a home has received an HEU, as well as the source for more detailed information about measures implemented during the HEU. Inclusion in an MLS system would assist the homeowner in selling the home and provide buyers interested in energy efficiency with the data that they need to make an informed choice. Qualification for the certificate would be the first step to accumulating the data necessary to document the value that an HEU adds to a home. HEUs have been integrated into the Home Performance with ENERGY STAR program in Illinois, and are listed on the MLS. This move was supported by the real estate community, utilities, and DOE, and has demonstrated value in the sales process.

In addition to representatives of the real estate industry and the MLS listing service, the standards process is coordinating with:

- Department of Energy
- National Association of Realtors

²⁸ A list of members of the BPI Standards Technical Committee developing a draft standards can be found at: http://www.bpi.org/standards_committee.aspx#group9

- Appraisal Institute
- National Renewable Energy Laboratory
- RESNET
- Better Buildings grantees (e.g. Chicago, Portland, Bedford NY, and New Hampshire)
- State energy offices and agencies (e.g. New York, Colorado and Oregon)
- Energy efficiency modeling software developers

BPI encourages the CEC, CPUC, and the California real estate industry to coordinate with development of this standard. A national standard is important to establish recognition in the MLS, which is critical to the credibility and acceptance of a certificate.

35. Should non-energy benefits (NEBs) be recognized in cost-effectiveness criteria for an upgrade program, and if so, how? Are there important distinctions between ratepayer-funded and other publicly funded upgrade programs in how NEBs are addressed?

BPI supports the use of non-energy benefits in determining cost-effectiveness of an upgrade program to include health, comfort, jobs and the environment. These externalities are not currently taken into consideration when calculating program costs and they should be. BPI recommends that the Commission considers the recommendations in the “Measure It Right: Best Practices in the Selection and Implementation of Cost-Effectiveness Tests” white paper, published by the National Home Performance Council.²⁹ The paper recommends the use of the Societal Cost Test (SCT) or Total Resource Cost Test (TRC) to evaluate and compare the benefits and costs of programs from the perspective of utility and ratepayers within a utility service area and the society served by the utility in question.

38. Should California pursue a “HERS-lite” rating option (see page 65 of AB758 Scoping Report)? Could this be used as a screening tool? How could it be used?

BPI recommends considering the purpose of a potential scoring system as a sales tool to help contractors urge a homeowner toward a purchase decision. A scoring system must be simple, easily understood system that can be incorporated into the standard test-in procedures, and that can be tied to an improvement label at the completion of the job by demonstrating the improved score at test out. The scoring system should rely on diagnostic information including blower door and duct pressure testing, but should avoid complicated modeling or double-entry of data. The report misses the point when it says: "Home Energy Score was not designed to pursue the California energy policy drivers discussed earlier in this chapter. It is not clear to what extent Home Energy Score would encourage climate specific design and installation of energy efficiency measures in a manner comparable to existing building energy efficiency standards and HERS Rating calculation tools." The point of AB758 is not to collect data, but to drive energy efficiency solutions. The customer will not determine what is "climate-specific design" or "energy efficiency measures" (...) comparable to existing building energy efficiency standards". Those are items the contractor will decide and incorporate into a work order, if the contractor is properly trained in whole home performance contracting. The alternative is a complicated score contractors do not want to, or cannot, provide, that homeowners don't understand, and that stifles all work.

39. How effective are workforce training efforts to prepare building officials, experienced contractors and new workforce entrants for energy upgrade programs? What education or training gaps exist?

Building officials, experienced contractors and new workforce entrants for energy upgrade programs are each in unique positions to popularize, publicize and sell whole house retrofits. The biggest gaps exist in the training of building officials who may understand the basics of construction but lack a fundamental knowledge of building science and energy

²⁹ http://www.nhpci.org/publications/NHPC_White-paper-Measure-it-Right_201206.pdf

efficiency, and not only can't adequately inspect advanced home performance installations, but often rely on code as the upper limit of performance, rather than as the "lowest legal option allowed", and sometimes interfere with, or even prohibit above-code performance contracting in their own jurisdictions.

BPI has responded to wide-spread demand for a basic certificate addressing fundamental knowledge of building science. The Building Science Principles Certificate will be launched late in 2012. This Certificate will be available to building officials, home inspectors, realtors, entry level whole house workers, high school students and community college students in environmental, conservation, and renewable energy studies, regulators, and utility program managers, and others seeking to enter or understand the residential energy efficiency home improvement field. This will be a knowledge-based certificate provided through an on-line exam. It will not be a skills-based professional certification, but will fill a gap in the industry that will allow all of the different market actors to speak the same whole house language, and have a common understanding not only of terminology, but of the physics and systems that drive whole building performance. It will be an excellent pre-screening tool and pre-requisite to enter various training or employment programs.

Thank you for your consideration of these recommendations. BPI is committed to a robust, national home performance program that supports both national and local objectives, while ensuring a viable contractor business model that provides persistent, sustainable results for programs and the homeowner.

Respectfully submitted,

Building Performance Institute

By: /s/ Tiger Adolf

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Building Performance Institute