A Strategic Framework for PGC Planning: Strategic Linkages Between Codes and Standards and Resources Acquisition

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ABSTRACT

In California, the potential for energy shortages in 2001 caused the California Public Utilities Commission (CPUC) to significantly deviate from its long-term policy objective of sustainable commerce in energy efficiency through market transformation (MT). MT efforts were generally put on hold and replaced by resource acquisition (RA), or incentive-style programs. While carried out to achieve immediate reductions in electrical demand, the rapid switch to RA also caused disruptions in Energy Efficiency (EE) programs and customer dissatisfaction.

The objective here is to define a planning framework that satisfies objectives for both short-term reductions in electrical demand and long-term sustainability of these savings. If successful, policy makers would possess a moderate policy alternative to existing competing options. The proposed framework is an extension of activities in California in 2001 undertaken in response to the energy "crisis," or the perceived short-term deficit in electrical supply. While RA (a voluntary intervention) was harnessed to achieve immediate reductions in electrical demand, enhancements to building and appliance standards were adopted to achieve long-term savings through minimum efficiency requirements for new buildings and equipment.

We begin with the simple precept that a code can be an explicit exit strategy for EE program technologies or practices. Activities supporting code change prerequisites (cost effectiveness, reliability, availability, stakeholder support) are identified and organized to move emerging technologies through the market and into code, as rapidly as possible. As integrated elements of a single effort, synergistic linkages increase the efficacy for both long-term (code) and short-term (RA) activities while reducing risk, compared to independent efforts. RA and C&S are merged into a single effective effort.

Conceptual Framework

Prior to 1998, investor owned utilities (IOU's) in CA conducted EE efforts as vertically integrated efforts including research and development (R&D), incentive and information programs, code enhancement support, measurement and evaluation (M&E), etc., that evolved into a stable, mature industry over two decades. In 1996, AB 1890 directed the California Energy Commission (CEC) to conduct PGC-funded R&D, thus separating, or fragmenting, R&D from utility program efforts, and from 1998 to 2000, the CPUC directed the IOU's to emphasize sustainability through MT. In 2001, the "energy crisis," or the risk of rolling blackouts in California, motivated the shift away from MT towards RA to maximize demand savings. In 2002, the CPUC reaffirmed its objectives for both short-term

and long-term energy savings, but also decided to further fragment PGC-funded EE efforts vertically, by taking marketing and advertising dollars away from IOU's, and horizontally through an RFP process that increased the number EE providers.

Fragmentation and policy shifts in CA have caused rapid makeovers in EE programs and, absent a coherent planning framework, the aggregate PGC effort has become ineffective compared to the ideal. Experienced EE practitioners know that radical swings in policy have severe detrimental effects on the efficacy of programs. Fragmentation decreases the ability to design coherent market interventions that, in turn, impede market development for the supply of EE technologies and services. Discontinuous program efforts cause EE allies to lose patience with public purpose programs, so any attempt to improve the situation in CA requires combining short-term RA and long-term MT goals. Moreover, the framework must provide synergistic ways to organize activities and be clearly justifiable in terms of cost effectiveness.

RA as the Short-Term Strategy

The short-term objective is to widen the margin between supply and demand by improving efficiency and reducing the need for generation, transmission and distribution systems, as rapidly as possible. The corresponding strategy, RA, is to focus on project-level interventions through tactics such as technology-specific incentives for offsetting first costs, and promotion of improved building design. Such project-level interventions, promoting the inclusion of energy-efficient technologies in individual projects, are familiar to the EE industry, are straightforward, and short-term (less than 5 years).

While vertically integrated RA efforts may include a wide variety of activities, narrowly defined efforts limit information activities to customer outreach and program-specific training. Program delivery is usually consistent with minimizing total cost. For example, program offerings for low-cost, consumer items are usually promoted through mass marketing. More complex program offerings, for example, performance incentives for new commercial buildings, require intervention through a trained project manager.

RA "works" it that it provides a **clear objective** and clear signals from policy makers to implementation managers and program designers, connecting the policy objective to practical needs of the market place. Customers understand the straightforward RA value proposition, so implementers can usually achieve savings without highly trained delivery agents. Verifiable savings answer the need for accountability, and measurement and evaluation methods have been developed to quantify risks and verify societal benefits.

RA's project focus is, however, the reason for its failure as a long-term strategy. For most industries, EE projects represent infrequent occurrences between builders (supply) and customers (demand), so EE communication is likewise infrequent. Project incentives from EE programs do not communicate the relationship between corporate business concerns and EE. Poor communication equates incentives to an emphasis on technology and a concentration on supply, at the expense of long-term demand creation.

Codes and Standards as the Long-Term Strategy

The commonly accepted goal of MT is to achieve sustainable commerce in EE through modified behavior of market actors. MT requires a strategic, long-term planning horizon (5-20 years) with established processes to support such a time horizon. While a

handful of MT successes have been touted by MT advocates, they have often been unintended and do not guarantee 100% market penetration.

In 2001 and 2002, the CPUC rejected MT as a paradigm for general PGC planning. Although the "energy crisis" compelled the decision, problems with MT as practiced from 1998 to 2000, proved it untenable. Quantifiable savings were few compared to RA, and M&E was difficult given MT's subjective nature. Practically speaking, there was no linkage between the policy objective and program designers.

Three strategies for achieving sustainability, however, have been previously identified (Eilert 2000). Of these, enhancements to codes and standards present the clearest path to sustainable, verifiable, long-term energy savings, and Table 1 illustrates their impact on EE programs and markets from selected AB 970 building and appliances standards.[1] Program effects range from elimination of the need to continue RA efforts to the redesign of performance-based programs. Market effects range from elimination of inefficient products from the CA market to permanent change in the design community.

Table 1. Effects of C&S on Programs and Markets

AB 970 Code Enhancement	Program Effect	Market Effect
Appliance standard limiting traffic signal input power to 17 W (red), 15 W (green), and 25 W (yellow) on or after March 1, 2003 in CA.	Elimination of LED traffic signals from EE programs, releasing PGC funds for support of new or different EE technologies	Discourages the sale of incandescent lamps for traffic signal modules, causing permanent market change and savings that exceed those from incentive programs.
Residential building standard beginning June 1, 2001, requiring verification of tight ducts (or equivalent) in CA, reducing the energy budget.	Increases residential program efficiency (or performance) baselines for new construction, eliminating incentives for tight ducts and releasing program dollars for other measures.	Increases the practice of tight duct verification, causing permanent change in the housing industry, and savings that exceed those from incentive programs.
Nonresidential CA building standard, requiring 0.2 watts per square foot assumption for task lighting in office buildings, unless actual is specified.	Effectively increases nonresidential program baselines, compels the search for new measures, and causes program upgrades and redesign.	Compels lighting designers to permanently shift towards more energy efficient lighting designs in all commercial workspaces, and long-term energy savings.

Adoption into code **guarantees** relatively unambiguous energy savings, assures ***sustainable change*** in market behavior, and provides exit strategies for RA efforts. From a general social marketing perspective the involuntary nature of codes, is inconsequential to achieving the objective of sustainability. In practice, codes represent an involuntary intervention only to those who fail to adopt good standard practice with respect to EE.

Having achieved adoption of a code or standard as a mandatory measure, the adoption rate for a technology quickly approaches 100 percent (permanently) and further EE support is

[1] AB 970 C&S proceedings were conducted in during 2001, culminating in new building standards effective June, 2001, and new appliance standards adopted in February, 2002 effective in future years.

no longer required. This releases funds for other efforts, allowing EE experts to continually push the efficiency envelope. Like RA, C&S "works" in the sense that a **clear policy objective** can be linked to practical effects in the marketplace through PGC-funded program intervention (discussed below). Builders understand the reduced-liability, "value proposition" in complying with code. Moreover, C&S answers the need for accountability through concrete energy savings (also discussed below), thus providing a **second significant source of "income"** for the CPUC to justify PGC investments.

C&S also satisfy the CPUC's major objectives for EE programs (for example, long-term savings) shown in Table 2, and are complementary to RA. Whereas RA is weak with respect to achieving long-term energy savings, the involuntary nature of C&S effectively provides long-term, statewide savings and permanent change in the market. C&S enhancements effectively (and cost effectively) change developer's behavior in ***hard-to-reach customer*** segments, for example residential and small commercial. A relatively modest C&S investment can transform niche markets too small to be addressed by RA programs in a cost-effective manner. ***All ratepayers benefit*** from C&S.

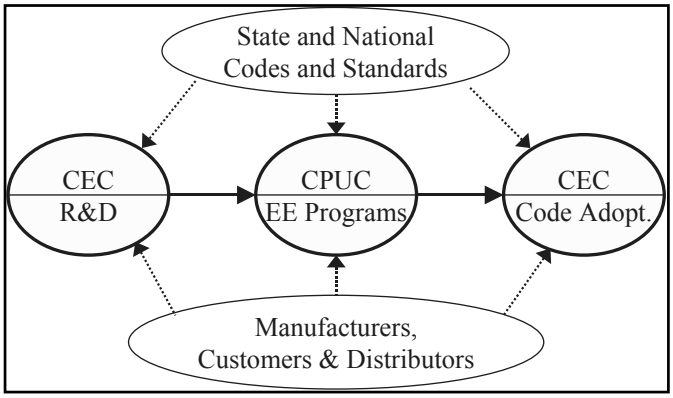
Table 2. CPUC EE Program Objectives Versus C&S Benefits

CPUC Objectives	C&S Benefits
Long-term annual energy savings	As an involuntary intervention, new standards guarantee sustainable change and apply to the entire state and the entire building.
Cost effectiveness	After a new standard is adopted, savings accumulate **at less than 1/10th the cost** of that for incentive programs.
Addressing market failures	C&S are particularly effective at addressing first-cost (or split incentive) market failures, protecting hard-to-reach customers.
Equity considerations	C&S is the only intervention that affects all customer classes, guaranteeing to all the benefits of the PGC.

C&S and the EE Industry in California

The CA model represents a passive approach to conducting EE through C&S, which fails to capture the benefits of linking major functions (Figure 1). While the CEC performs R&D and code adoption functions, the CPUC conducts transactions with the market and builds the EE infrastructure.

Figure 1. Industry Functional Groups



Ideally, a continuum with respect to planning would exist from R&D to C&S but, in reality, it does not. Only infrequent interaction occurs between the IOU's and the CEC during PIER research among decision makers, and few serious discussions have occurred regarding joint activities for handoff to EE programs. Greater communication occurs during code adoption as part of IOU advocacy, but these efforts are unreliable since support for IOU C&S activities is inconsistent and insufficient to support a

robust long-term effort. Combining RA with C&S, and optimizing PGC investments in CA requires linking the three major, functional groups into a single effort.

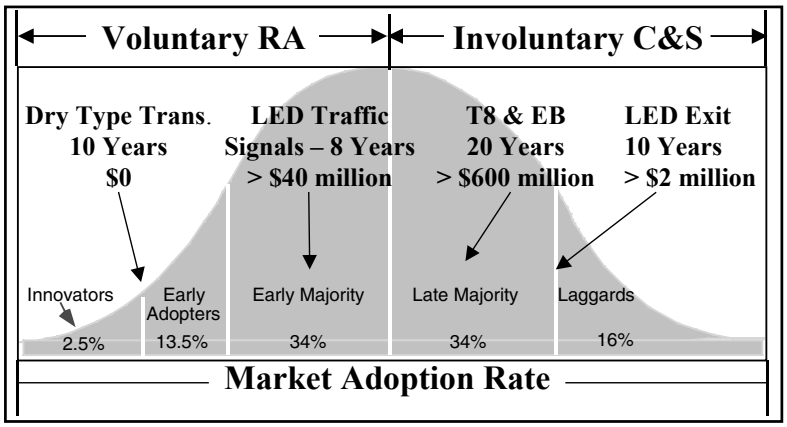
The Multi-Faceted View of Codes

Figure 2 illustrates a generic social system based on Diffusion of Innovations (DOI) (Rogers 1995), and adopter groups through which an innovation must pass to achieve 100 percent adoption, or market penetration. Adopter groups (e.g., early adopters) have distinct propensities to adopt innovations and have dissimilar communication needs, and DOI can be used to "analyze" the building industry customers as a large, loosely organized, social system.

Within the building industry, a minority of actors can generally be counted on to respond to EE program offerings in a voluntary manner. Voluntary participants in EE include innovators and early adopters (EA) whose predispositions are in harmony with EE program offerings. Early majority (EM) actors will participate in EE programs if energy-efficient technology substitutions lead neither to design changes nor delayed project schedules, and if program participation is convenient. Late majority (LM) actors are similar to EM actors in their decision-making process but are more skeptical.

An ***important insight*** from DOI is the decreasing propensity by groups (left to right in Figure 2) to adopt innovations, and a corresponding increase in cost to influence adopters through voluntary means. While the incentive required to influence an early adopter is a fraction of incremental measure cost, the incentive required for a laggard will exceed 100% (incremental cost plus program administration). By default, involuntary interventions, such as codes or standards, must be employed at some point to guarantee 100 percent adoption, for most EE innovations.[2] So C&S efforts comprise an extremely important **functional component** of the CPUC's program portfolio.

Figure 2. Code Adoption Versus Market Adoption Rate



The point at which adoption can occur, however, varies greatly. Figure 2 shows the point of adoption for four technologies as a function of market adoption rate, years of RA support, and cumulative statewide incentives. In particular, note that while LED exit signs were adopted into code at about an 85% market adoption rate, dry type transformers were adopted into codes at roughly a 3%.[3] ***A second important insight*** is that neither time nor adoption rate constitute critical constraints on code adoption. Many EE practitioners, for example, believe that a 60 percent adoption rate is necessary to attempt a code change, and that market acceptance for EE technologies

[2] Substitute EE products, less expensive than inefficient products provide exceptions to this generality.
[3] Transformers shows how adoption can occur without passing through EE program phase.

requires 20 years to achieve. Without these "constraints," there are no barriers to a smooth, efficient transition from RA to C&S efforts.

How much earlier could LED exit signs have been adopted and how many of the $2 million in RA dollars could have been saved? Alternatively, how many PGC dollars would have been wasted to purchase an 85% market share for dry type transformers? Similar questions arise for the traffic signal and T8 examples leading to a ***third important insight***.[4] Since the cost of supporting code enhancements is generally a small fraction of RA costs, we assert that many millions of RA dollars could have been saved had a concerted effort been directed at moving them into code as fast as possible, and that benefits from codes and standards can be attributed to the expenditure of PGC funds.

The Value of CPUC-Funded C&S Efforts and Earlier Adoption

In 2000 and 2001, CPUC funded IOU C&S efforts, led by PG&E, that contributed significantly to the CEC's AB 970 rulemakings for new building and appliance standards, adopted in mid-2001 and early-2002 respectively. While the total 10-year, forecasted demand savings from both rulemakings is estimated to be 3,650 MW, the CPUC's contribution, effected through the utilities, is conservatively estimated to be 769 MW (Stone, 2002). Moreover, the IOU C&S statewide effort was funded at about one percent of the total CPUC budget for EE programs, and the actual investment in the AB 970 efforts was approximately $1.5 million.

The CPUC's code enhancement efforts were predominantly successful, in part, due to the third-party standing of the IOU's with respect to the rulemaking. As arbiters of a political process the CEC must balance the interests of diverse stakeholders, some of which routinely oppose enhancements to code despite their merits. Given this "political" component of the public process, strong third-party advocacy by IOU's is favorable to the political balance, and particularly effective due to the IOU's firsthand knowledge of EE in CA, and credibility derived from market neutrality.

Tables 3 and 4 illustrate relative contribution ratios in terms of $/kW reduction in peak demand on electric generation, transmission, and distribution systems from RA and C&S efforts respectively. Demand reduction costs for RA vary from $1,800/kW during the MT era in 1998, to $800 in 2001 during the RA drive to mitigate the "energy crises." RA demand savings are derived project by project and accumulate within a specific year.

Table 3. Statewide Contribution Ratios for CPUC, RA Programs[5]

	1998	1999	2000	2001
PGC Expenditures ($ millions)	232	223	278	362
Peak Demand Savings (MW)	129	189	196	453
Contribution Ratio - RA Programs ($/kW)	1,808	1,179	1,422	800

Source: CPUC, 2002.

Demand reduction costs from AB 970 C&S efforts vary from $25/kW to $2/kW depending on the time horizon chosen for estimating savings. Building and appliance standards enhancements are, by definition, systemic changes that cause more efficient

[4] T8 technology was effectively adopted through nonresidential lighting power density reductions in 1998.
[5] PGC expenditures and MW savings are statewide totals.

buildings to be constructed (or appliances to be sold), year after year. Assuming savings for only the first three years after a new standard takes effect (typically one code cycle) demand reduction costs are approximately $8/kW. A less modest, but defensible, claim for ten years of savings provides and estimated cost of $2/kW per kW.

Table 4. Contribution Ratios for the 2000-2001, CPUC, C&S Effort

	First Year	Three Year	Five Year	Ten Year
PGC Expenditures ($ millions)	1.5	→	→	→
Peak Demand Savings (MW)	60	180	320	769
Contribution Ratio - C&S Program ($/kW)	25	8	5	2

Source: Stone, 2002.

Figure 3 illustrates the magnitude and multiyear effect of the CPUC's contribution to demand savings from AB 970, relative to statewide demand savings achieved from RA efforts in recent years. C&S demand savings are shown (from the expenditure of approximately one percent of PGC funds) assuming a 10-year horizon for savings claims. Total statewide RA program benefits are shown from 1998 to 2001.

Figure 3. Combined RA/C&S Savings

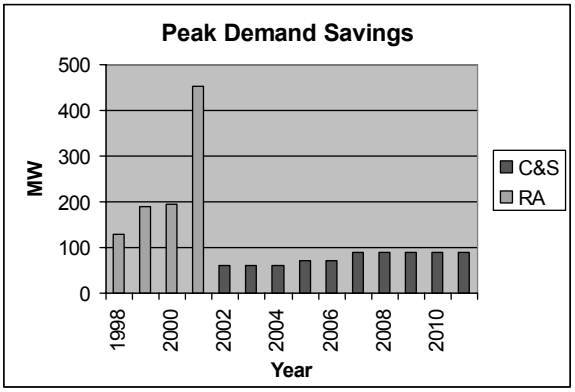


Table 5 provides rough estimates for the overall economic benefit of the AB 970 enhancements to building and appliance codes and standards (Stone, 2002). Estimates include a number of assumptions: a) a 3% real discount rate, b) the CEC's most recent forecast for stream of energy costs, c) a 30 year life for residential measures, d) a 15 year life for nonresidential measures other than envelope measures, and e) a 30 year life for nonresidential envelope measures. For appliance standards, all measures were counted as nonresidential measures except small air conditioning units, water heaters and torchieres. Impacts of measures are included only after their effective dates.

Table 5. Estimated Economic Value of AB 970 Enhancements to Standards

	1st Year Impacts		Three Year Impacts		Five Year Impacts		Ten Year Impacts	
	$million Electicity	$million Gas	$million Electicity	$million Gas	$million Electicity	$million Gas	$million Electicity	$million Gas
Residential Standards	**$ 270**	**$ 8.5**	**$ 1,625**	**$ 55.4**	**$ 4,047**	**$ 129**	**$ 14,831**	**$ 479**
Nonresidential Standards	**$ 125**	**$ 2.3**	**$ 626**	**$ 21.5**	**$ 1,501**	**$ 64**	**$ 5,208**	**$ 232**
Appliance Standards	**$ 224**	**$ -**	**$ 921**	**$ 170.5**	**$ 2,328**	**$ 569**	**$ 13,770**	**$ 5,880**
TOTAL	**$ 619**	**$ 10.8**	**$ 3,172**	**$ 247.5**	**$ 7,876**	**$ 762**	**$ 33,809**	**$ 6,591**

Table 5 also illustrates the value of earlier or faster adoption. Assuming a proactive effort, several years earlier, to link RA to future standards, was carried out to prepare AB-970 measures for the 1998 code cycle instead of the 2001 cycle, the additional economic benefit to the CA economy would have increased by at least the three-year estimated impacts, or $3.4 billion.

It should be noted that explicitly adding C&S savings to the CPUC's portfolio also reduces risk in three ways. Recognizing and claiming savings from C&S drastically increases potential savings claims. Diversification in two investments (business units) reduces risk even if the second is riskier. Savings achieved from C&S are inherently less risky than those from RA, since they do not carry project level performance risks.

Finally, the C&S part of the CPUC portfolio embodies attributes that otherwise require exceptional planning or policy decisions to attain. For example, addressing the needs of hard-to-reach customers must be specified and managed without C&S as an explicit objective. Addressing hard-to-reach customers through C&S is automatic.

Strategic Planning Framework

In general, a combined RA/C&S effort to move a technology from R&D into code as rapidly as possible would improve the cost effectiveness of the overall PGC effort. Corresponding objectives for C&S are: a) ***earlier code adoption*** in the diffusion process, shifting adoption from the late majority into the early majority (or even earlier), and b) ***faster code adoption***, reducing the number of years from R&D to adoption, for example, by one three-year code cycle (or two). Innovations that require extensive design integration or training require more time and greater market share prior to adoption.[6]

Section 25402 of the CA Public Resources Code requires standards to be cost effective, feasible, attainable, etc. In practice, these criteria determine the code change prerequisites necessary for earlier and faster adoption: ***reliability***, ***availability***, ***cost effectiveness***, and ***stakeholder support***. Table 6 identifies program activities or interventions in support of each of these and can be aimed at the appropriate customer group. Interventions are assigned with respect to greatest applicability since some interventions, especially RA, affect more than one customer group.

Consistency between program interventions and adopter group criteria is critical. For example, the likelihood of acceptance of an innovation is increased by conducting demonstrations (for the purpose of testing reliability or feasibility) with innovators that have a high tolerance for risk. The risk of rejection within the social system is limited since innovators are not considered opinion leaders. Alternatively, conducting exemplary projects (for the purpose of showcasing market-ready technologies) with innovators has much less market impact than with early adopters. Such projects have limited risk and have greater impact if associated with opinion leaders.

Understanding how RA fits into C&S objectives is of particular importance since it represents the greatest cost in an EE innovation's market cycle. Cost effectiveness is perhaps the most essential prerequisite to code change and RA is the most explicit intervention for achieving it, given the association of cost to volume in manufacturing. Yet RA's direct applicability is limited to early adopters who have the financial strength to assume limited risk, and use technical information (case studies or technical program brochures) in a methodical decision-making process. Early majority adopters, however, make adoption decisions based on interpersonal communication with early adopters or peers. The application of mass marketing is even more limited since it typically "speaks to" innovators, who seek information from outside the social system.

[6] Later adoption into code reduces opposition by designers and suppliers during public hearings.

Table 6. Activities That Link Functional Groups[7]

Code Prerequisites	Program Activity or Intervention	Customer Group
Reliability	PIER research and development	Innovator
	Emerging technology demonstration projects (proof of concept projects carried out jointly by CPUC and IOU's)	Innovator
	Documentation of EE program readiness	Early Adopter
	Development of test standards	Innovator
	Development of related standards…ASHRAE, NFRC, etc.	Innovator
Availability	Customer industry conferences & workshops…within strategically defined industries, for example, high-tech.	Early Majority
	Education and information…general EE education and support for information transfer infrastructure, including energy centers	Early Adopter
Availability	Procurement standards…EE technology procurement guidelines for large private companies and public institutions	Early Adopter
	Reach codes…advanced local government EE codes and planning	Early Adopter
Cost Effectiveness	Resource acquisition…incentive programs plus related education and training required for effective delivery	Early Adopter
Stakeholder Support	Emerging technology exemplary projects	Early Adopter
	Technology CASE studies…documentation of code readiness	Early Maj.
	Advocacy through participation in the public process	Early Maj.
	Support for code credits	Early Adopter
	M&E studies that reflect code change prerequisites	Early Adopter

RA also deserves scrutiny with respect to minimizing cost. Significant reductions in sales and marketing cost can be achieved through strategic activities (vis-à-vis simple customer outreach) that reflect EE program offerings. For example, large corporations could adopt procurement standards defined to automatically comply with nonresidential EE programs. Local governments could adopt EE ordinances that reflect RA programs targeting residential, small commercial, and other hard-to-reach groups. Continuously updating such standards so that they lead future statewide building standards would provide another direct link between direct customer activities and code efforts.

Other kinds of strategic (market transformation)[8] interventions could further decrease the time and market adoption rate required for code adoption. Corporate and local government participants could be solicited to a greater extent than they already are, to advocate for code change during public hearings. This is especially important when well-organized industry associations oppose proposed standards. A mature procurement standards effort, involving large national companies, would provide influence with manufacturers that

[7] N/A indicates that the activity is not meant to directly influence customers.
[8] Our focus on the combined RA-C&S model relegates MT to a tactic.

protect nationwide homogeneity of markets through federal preemption of appliance standards.[9] Supported by consistent long-term funding, local government standards could evolve from individual cities to groups of cities in a contiguous region. The effect would be to codify regional demand for EE products and services, in turn increasing their availability.

Cost effective influence of early majority adopters is another significant issue. Since they make decisions by "asking around," their participation in EE programs constitutes free ridership, at least in part. Considering interpersonal communication needs leads to possible solutions in the form of industry workshops, conferences and other intra-industry activities.[10] The goal of these activities is to increase interpersonal contact between early adopters and the early majority, thereby accelerating adoption and demand for new EE products and services.

Organization of Activities and Planning

Effective organizations employ vision statements to provide strategic focus. With increasing fragmentation of the EE effort in CA, the need for a common vision among policy makers, implementers, and public advocates is probably greater than that for a large company. Strategic focus may be the most important part of a strategic planning framework, and the working *policy objective* here is to *maximize short and long-term energy and peak demand savings* or avoided cost benefit from the PGC.

Maximizing the avoided cost benefit begins with the acknowledgement that most verifiable energy savings in CA come from two actions within the EE industry, participation in EE incentive programs and adoption of stricter building and appliance standards. Since incentive programs (RA) and enhancements to standards (C&S) directly fulfill short-term and long-term objectives, they should constitute the primary objectives for PGC funding, with other activities in support.

Defining an organization and appropriate support requires understanding the nature of RA and C&S businesses, as compared in Table 7. One remarkable observation is the dissimilarity between activities and staffing requirements associated with each goal. Since clarity of goals is fundamental to maximizing organizational output, asking a single program manager (or group) to concurrently achieve two broadly contrasting goals causes internal conflict and leads to mediocre performance with respect to both.

Table 7 implies a separation between RA and C&S activities into discrete business units and separate sources of funding. Separation, in turn, implies that business units function independently, yet be complementary. To ensure long-term public support for both business units, they need to be independently cost effective, and the dual "income" from RA and C&S objectives satisfies this necessity.

Separation into two business units does not, however, imply further fragmentation of the PGC effort. Both businesses are customer-focused in nature and the intent here is to provide a framework for planning that recognizes and realizes the value of CPUC-funded, C&S activities, and increase productivity through reorganization.

[9] This kind of effort would also provide support for national EE organizations since manufacturers protect volume related profits by through nationwide homogeneous markets.

[10] For example, support for industry associations (training, Web sites, etc.).

Table 7. RA and C&S Business Units

Resource Acquisition Business Unit	Codes & Standards Business Unit
Short term (1-3 years), project focus.	Long term (3 – 10 years), systemic change.
Simple customer value propositions.	Complex, high touch, industry involvement.
Direct training and outreach support.	Building industry infrastructure support.
Trusted as being objective by customers with respect to EE.	Trusted as being objective by C&S stakeholders and representative of a large sector of public.
Geographically extensive "sales" force.	Small, interdisciplinary teams.
Change agent assistants…staff understands customer needs and can communicate at a personal level.	Change agents…staff understands highly technical and strategic implications and can solve complex problems.
Minimum funding duration…2 years with annual review.	Minimum funding duration…6 years with annual review.

The CPUC's ***RA business unit*** would be based in part on the proven, stable model from the pre-1998 RA era, focusing on customer energy savings with a clear mandate to improve cost effectiveness. Cost effectiveness would continue to be based on savings from retrofit and new construction projects, and consumer rebate programs, and RA would continue to provide training related to program offerings. While the primary objective would be to maximize the benefits of allocated PGC funds, RA would be linked to C&S during planning to provide formal input on program-ready technologies.

The CPUC's ***C&S business unit*** would be new, but build on previous successful efforts to upgrade building and appliance standards, and intermittent efforts to develop emerging technologies. Given the strategic nature of the C&S work, activities would be pursued within the context of a variety of other industry efforts to, for example, solve technical compatibility problems or to increase demand through industry-specific communication. Cost effectiveness would be derived from savings produced by improving codes and standards, realizing that savings would be created at the end of each code enhancement cycle instead of annually. The C&S business unit would have a clear mandate to provide continuity (including the handoff from PIER to EE program managers) for EE products and services throughout their market cycles, in essence, building a "CASE file" as technologies move through market cycle phases.

The C&S business unit would:

a) Develop long-term strategic plans and coordinate with PIER;
b) Conduct emerging technologies activities and verify readiness for RA;
c) Conduct strategic activities, including information dissemination,
d) Support general education and information infrastructure development, and
e) Provide support and advocacy for adoption into code.

These activities are consistent with the code adoption objective and, hence, are consistent with maximizing avoided cost benefits from codes and standards.

Funding Allocation and Considerations

For PY 2002 EE programs in CA, the CPUC allocated EE program funds through an RFP process to statewide and local programs, explicitly setting aside $100 million over two years, for non-IOU bidders. Considerations for funding allocation include the following.

1. Maintain a minimum funding level for RA business unit sufficient to guarantee overall cost effectiveness, preferably at 2002 levels or above.
2. Provide C&S business unit funding, sufficient to fund long-term activities (approximately $18 million, or 10 percent of the annual PGC budget).
3. Require alignment between local government programs, and RA and C&S objectives.

Conclusions

The planning framework outlined in this paper provides a way to systematically realize short-term savings needs and long-term sustainability objectives, without the need to shift policy from year to year. We explicitly define RA as a strategy for achieving short-term energy savings, and C&S as a strategy or achieving sustainability. We then provide the rationale for linking the RA to C&S strategies through two, cost effective, complementary business units that provide benefits greater than the simple sum of independent efforts. Moreover, the framework provides clear objectives around which to organize overly fragmented EE initiatives in CA.

In addition to realizing short and long-term energy goals, adopting this framework provides direct cost effective solutions to otherwise unsolvable market failures, and increases equity with respect to real impact on customers.

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