# ORA

**Office of Ratepayer Advocates**
**California Public Utilities Commission**
**State of California**

# Public Financing for Self-Generation: Costs and Benefits of Onsite Photovoltaic, Fuel Cell, and Micro-turbine Systems

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## Executive Summary

In the face of California's current energy crisis, several pieces of legislation have been proposed, and some adopted, for programs to expand public financing support for efficiency and self-generation programs. These proposals and laws commit, or would commit, substantial amounts of public funds to these programs. As a tool for judging the best use of public funds, the Office of Ratepayer Advocates (ORA) provides this analysis on the relative cost-effectiveness of energy efficiency and self-generation programs.

California has a long history of funding energy efficiency programs through its public utilities, but does not have as much experience with the newer self-generation technologies. This analysis assesses the status of the leading self-generation products, the status of the industry, the primary customer markets where self-generation products are most cost-effective, and possible program administration structures.

The report also provides a benefit/cost analysis of a self-generation portfolio that would help finance photovoltaics, fuel cells and microturbines, compared to the current portfolios of the four UDCs that provide financial assistance for more traditional energy efficiency products. The analysis is limited to the three self-generation technologies listed above and excludes self-generation projects for large customers (above 500 KW).

ORA's analysis concludes that self-generation programs may be substantially more cost-effective for removing load from the grid than energy efficiency programs. Although all estimates (for energy efficiency of self-generation) contain considerable "risk and uncertainty) ORA's the analysis suggests that a Self-Generation Program of about $300 million (the "size" of current energy efficiency activities at the CPUC) can:

- remove approximately 320 MW of load per year from the centralized electric grid from one year's worth of projects (as compared to 160 MW for energy efficiency);
- remove approximately 2000 Gwh of load per year from the centralized electric grid from one year's worth of projects (as compared to 620 Gwh for energy efficiency);
- produce an overall benefit-cost ratio of about 2.0 (as compared to 1.6 for energy efficiency).

ORA also concludes that the program design should be exclusively in the form of a standard offer, modeled after the "Standard Performance Contracting" program currently offered for designated energy efficiency products. This program design provides assurances that the customers and contractors choose the specific products and determine the costs of installation, and share the benefits over time depending on the performance of the installed products.

For program administration, ORA recommends that the programs be administered in 2001 by PG&E, SoCalGas, and the San Diego Regional Energy Office. While there exists a conflict of interest in having the utilities administer self-generation programs, ORA urges consideration of establishing a statewide network of qualified, CPUC-

certified, or regional energy offices to become administrators of both Energy Efficiency Public Purpose Program activities and a Self-Generation Program.

**I. Background and Context**

Public funds (taxpayer and/or ratepayer) have been used in recent years to help consumers of electricity purchase and install self-generation technologies. This effort, however, has been very limited in terms of the self-generation technologies eligible for financial assistance, and the amount of funds available to help finance self-generation projects.[1]

In September of 2000, Governor Davis signed into law legislation that could substantially increase funds, from the ratepayers of the investor-owned utilities, to provide financial assistance for a variety of self-generation projects. The relevant sections of the Energy Security and Reliability Act (ESRA) of 2000 are as follows:

> SEC. 7. Section 399.15 is added to the Public Utilities Code, to Read:
> 399.15. Notwithstanding any other provision of law, within 180 days of the effective date of this section, the commission, in consultation with the Independent System Operator, shall take all of the following actions, and shall include the reasonable costs involved in taking those actions in the distribution revenue requirements of utilities regulated by the commission, as appropriate:
>
> (6) Incentives for load control and distributed generation to be paid for enhancing reliability.
> (7) Differential incentives for renewable or super clean distributed generation resources.
> (8) Reevaluation of all efficiency cost-effectiveness tests in light of increases in wholesale electricity costs and of natural gas costs to explicitly include the system value of reduced load on reducing market clearing prices and volatility.

In October of 2000, the CPUC directed its Energy Division to prepare a plan that will respond to this ESRA directive to the CPUC. As of this writing, the plan has not been released for public comment.

[1] For several years, taxpayer funds (in the form of tax credits for photovoltaics and batteries used to store electricity generated by photovoltaic systems) and ratepayer funds (in the form of the Renewables Public Purpose Program) have been used to help finance photovoltaic systems; recently, the CEC has made fuel cell projects eligible for financial assistance in a portion of the Renewables PPP. At least one municipally owned utility in California—SMUD—has used ratepayer revenues to help finance rooftop photovoltaic systems and others—notably LADWP—have announced plans to help finance fuel cells and microturbines.

More recently (January 5, 2001), the State Treasurer's Office proposed the creation of the California Power and Conversation Financing Authority which, among other things, would:

> "finance and/or facilitate delivery of clean-burning, decentralized energy capacity (e.g., microturbines, fuel cells, photovoltaics, etc) so as to help overcome the shortage of power as quickly as possible as well as to enhance reliability."[2]

In his State of the State address, Governor Davis further demonstrated the need and benefits for self-generation projects with a focused directive on a specific group of customers---public sector higher education campuses:

> "And we'll require all 141 campuses of the University of California, the State University system and the Community Colleges to move toward energy independence through co-generation and other means."[3]

In yet another recent development, proposed legislation (SBx5) would use almost a billion dollars of general fund revenues to provide financial assistance for both energy efficiency and self-generation projects at both the CPUC and the CEC. [4] Depending on the size of the distribution charge established by the CPUC to comply with the AB970 directive, and depending on amounts of taxpayer funds established by SBx5, the CPUC would be responsible for public agency oversight of about one billion dollars to assist consumers in reducing their electric and natural gas consumption (for participants in the self-generation program) "unplug" from the centralized electric grid.

Each of these various activities to help finance self-generation would contribute to the existing State policy of "self-sufficiency," such as the one contained in the ESRA:

> "It is the policy of the state to encourage and support the development of cogeneration as an efficient, environmentally beneficial, competitive energy resource that will enhance the reliability of local generation supply, and promote local business growth."[5]

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[2] This proposal includes a feature that would, as a matter of state law, eliminate standby charges that are currently assessed by the electric utilities against customers who install self-generation technologies. The initial version of legislation that would establish the California Power and Conservation Financing Authority (SBx6), however, makes no reference to self-generation technologies and no reference to the elimination of standby charges.

[3] No mention was made in the Governor's speech on whether or how public financing would be provided in this push for energy independence of the higher education system; on the other hand, the state's Department of General Services has existing bond-based funds that it has recently been made available for financing some types of self-generation projects in public sector buildings, including higher education facilities. ORA is unaware of any public document that spells out the details of the DGS plans for financing self generation projects.

[4] The January 19, 2001 version of SBx5 contains taxpayer funding for CPUC in the amounts of $344 million for energy efficiency and $180 million for self-generation. These amounts are in addition to approximately $350 million that is currently being collected from electric and gas customers for the Energy Efficiency Public Purpose Program (EEPPP) and the Low Income Energy Efficiency (LIEE programs).

[5] When chaptered, this feature (SEC. 6) of the AB970 will amend Section 372 of the Public Utilities Code.

With this recent flurry of interest and activity in providing public financing for a variety of self-generation products, ORA believes that it is important to assess:

- the status of the leading self-generation products that are available to remove significant portions of customer electric loads from the centralized grid;

- the status of the industry that can assist customers in making choices between competing self-generation products and choices between multiple public financing opportunities that are available or are expected to become available;

- the primary customer markets where self-generation products are most cost-effective; and,

- the possible program administration structures and program design options that can best serve these emerging energy markets by provided the "most removed load with the fewest public financing costs."

In undertaking this analysis, ORA believes it is necessary and useful to employ methods used to estimate costs and benefits of another group of choices facing customers in reducing their bills—energy efficiency investments. As described further below, ORA's assessment of the self-generation markets is constructed in a manner that enables a side-by-side comparison of the relative costs and benefits of different self-generation products with current estimates of costs and benefits of energy efficiency investments.

The intent of this analysis is to avoid a rush to judgement by policy-makers to solve the current California energy crisis by committing public funds and resources to affect two consumer-based threshold choices facing customers of electricity and natural gas from PG&E, SCE, SoCalGas, and SDG&E:

- Invest (with or without public funding support) in high efficiency appliances that will reduce their dependency on purchases of electricity and/or natural gas, but remain dependent on rates established by the CPUC, the Utility Distribution Companies (UDC's), Merchant Power Producers, federal/state "partnership" entities (the FERC/EOB/ISO/PX arrangements) and Energy Service Providers (ESP's);

- Invest (with or without public fund support) in self-generation products that will establish electric energy self sufficiency and total bill (electric and natural gas) stabilization , with zero or minimal dependency on the electric rates determined by the CPUC, the UDCs, Merchant Power Producers, and federal/state "partnership" entities (the FERC/EOB/ISO/PX arrangements).

These two basic threshold choices for consumers of electricity and natural gas are not new. What is "new" is:

(1) the increased awareness that a self-generation choice can be as or more cost-effective for many customers than investing in more traditional energy efficiency products;
(2) a compelling case can be made that Self-Generation Program can be as or more cost-effective than current energy efficiency programs; and,
(3) a compelling case can be made that a Self Generation Program can be more effective in removing electric loads (MW and MWH) from the central grid than current energy efficiency programs administered at the CPUC.

## II. Comparative Benefit/Cost Analyses: Methods and Approaches

Existing law, and long-standing Commission practice, includes an expectation that energy efficiency activities funded with public (ratepayer) revenues should be "cost-effective."[6] No such expectation is associated with self-generation financial assistance activities to be funded from the distribution charge established by ESRA. Nevertheless, ORA believes it is useful to assess the cost effectiveness of a Self-Generation Program relative to the cost-effectiveness of energy efficiency activities.

For more than twenty years, California has provided billions of dollars of public funds (taxpayer and ratepayer) to help consumers finance the costs of "conventional" energy efficiency products, ranging from high efficiency lighting, refrigeration, heating and cooling in residential and commercial buildings to more complex and high cost industrial processes. Over these years, the Commission has developed and applied standard procedures for assessing the costs and benefits of energy efficiency investments and programs, such as the Energy Efficiency Public Purpose Programs (EEPPP) that are intended to provide financial assistance to customers to install high efficiency products. [7]

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[6] During the period of about 1990 through 1997, "cost-effectiveness" for the non-low income energy efficiency programs was established and maintained through a set of CPUC-adopted Policy Rules, reporting requirements, shareholder incentive mechanisms, and post-implementation measurement, evaluation, and verification procedures. Since 1998, electric revenues collected and spent on energy efficiency activities carried with it a legislative expectation for cost-effectiveness; beginning with 2001, a comparable legislative expectation for cost-effectiveness is in place for gas revenues collected and spent for non-low income energy efficiency activities. For many years, legislation governing low income energy efficiency assistance has NOT carried an expectation for cost-effectiveness.

[7] In very general terms, the "standard methods" employed at the Commission for cost-effectiveness is based primarily on a "life-cycle method," in which the expected benefits of the energy efficiency activity over the "life" of the effect is compared to the expected costs over the same time period. With this method, if lifecycle benefits exceed expected costs over the same period, cost-effectiveness is accomplished and expressed in terms of either a Benefit-Cost Ratio (BCR) over 1.0 or greater, or "net benefits" (the dollar amount by which benefits exceed costs). This is different from other "measures" of cost-effectiveness such as a "payback" criteria in which is based on the number of years it takes to for accumulated benefits to equal the initial investment costs. A "payback" criteria is often used in private sector "business" decisions and is used by some public agencies in determining eligibility for funding specific project proposals. The most relevant example of the latter is the Department of General Services (DGS) energy efficiency assistance program (which recently was "opened" up to include some self-generation projects), which currently uses a 5 year payback criteria when considering financial assistance for projects in public sector buildings such as state buildings, local government buildings, and public schools.

The standard tests of cost-effectiveness for energy efficiency can be used to develop estimates of the costs and benefits of self-generation choices available to consumers. As with energy efficiency choices and investments, these standard methods can be used to assess the affects of different sources of public funds (taxpayer and ratepayer) as well as different means of public financing (loans, full or partial rebates, bonds, "standard offers") and the different kinds of program administrative structures.

Using the UDC-reported estimates of costs and benefits from their Program Year (PY) 2001 applications at the Commission as an example, it is clear that the Commission expects the UDCs:

- to collect and spend approximately $300 million of "public goods charge" funds during 2001 (approximately $227 million in electric revenues and $75 million in gas revenues);

- to successfully solicit an additional $100 million from participants in the form of a "customer contribution" to the financial assistance provided for energy efficiency investments; and,

- to remove electric load from the centralized grid in the amount of 161 Mw of (annualized) electric load for at least 10 years.

Based on the use of standard methods of cost-effectiveness, the lifecycle benefits of these EEPPP programs for PY2001 are expected (expressed as the value of avoided costs of electricity purchases from central power plants) to be about $665 million. Since these benefits exceed both types of costs (program costs, including administration, advertising, shareholder earnings, and financial assistance) and total costs (program administration/advertising/earnings plus the total cost of the products, without any financial assistance), it is clear that the EEPPP activities for PY2001 are expected to be cost-effective.

Given the rapid emergence of self-generation markets in the last year or so, and more recent public policy support for using public funds to help finance these markets, customers can expect to be facing new choices and new opportunities to reduce bills. Indeed, for many customers, the versions of self-generation technologies that are available will allow some customers to have a zero dollar electric bill, accompanied by a a lower, comparable, or modestly higher gas bill, with the potential for long term fixed natural gas rates.

For policy-makers considering the amounts of public funds to raise to help finance self-generation projects as well as determining which kinds of public financing (low interest loans, rebates, tax credits, or "standard offer" type programs), it is useful to consider comparisons of the relative costs and benefits of public-financed self generation programs to the energy efficiency investment programs currently being administered by the four Utility Distribution Companies (UDCs).

## III. Costs and Benefits of a Self-Generation Program Relative to Costs and Benefits of Energy Efficiency Public Purpose Programs

ORA's analysis consists of a benefit/cost analysis of a self-generation program portfolio that would help finance three self-generation technologies---photovoltaics, fuel cells and microturbines—compared to the current portfolios of the four UDC's that provide financial assistance for more traditional energy efficiency products. For purposes of facilitating "comparability", the Self-Generation Portfolio is "sized" (in terms of the amount of public funds used) to the level of annual funds collected and spent by the four UDCs for Energy Efficiency Public Purpose Program (EEPPP) activities. As suggested above, this annual amount of public funding is about $300 million per year.

The three self-generation technologies considered in this comparative analysis share one general attribute with energy efficiency products—they reduce electric consumer's need to purchase electricity from the centralized electric grid for many, if not most or all hours of the year, for many years into the future. As such, these three self-generation technologies, as with traditional energy efficiency investments, are distinctly different from :

- "conservation" (which typically requires temporary changes in behavior for a few hours of the year and may or may not become permanent changes in practice); or,

- various kinds of "load control" (which may simply shift consumption from hours of peak demand to off-peak demand). [8]

ORA's analysis of self-generation is limited to three leading self-generation technologies that are best suited for providing most if not all of the electricity needs of residential and small/medium buildings on a sustainable basis. The primary technology and market characteristics associated with the self-generation technologies included in the Self-Generation Portfolio are as follows:

- Photovoltaic systems are assumed to be "rooftop" systems consisting of "integrated building materials", with all electricity generated by these systems used to meet on-site electric demand, with no on-site storage in residential and small/medium commercial buildings;[9]

- Fuel cell and microturbine products are assumed to be fueled by natural gas (or propane), and installed either on roof-tops of commercial buildings (including multi-

[8] The AB970 directive to the Commission includes reference to "load control" programs; these activities are being addressed in R. 00-10-002.

[9] These PV systems typically are installed on insulation material which should provide additional benefits in the form of reduced heating and cooling needs; these benefits are not included in this analysis due to the extremely cite-specific nature of these effects. Although PV systems can be installed along with batteries, thereby making it possible—in some instances—for the PV system to provide complete self-sufficiency, the benefit/cost analysis does not include estimates of battery/PV systems, due to the extremely cite-specific nature, and relatively high cost, of batteries.

family buildings) or other on-site locations where the heat produced by these products can be used to provide on-site thermal needs (heating/cooling) of the building where the electricity is produced and used; [10]

- Financing for the self-generation projects consists of paying for 50% of the installed costs of the identified products.

Other potential self-generation technologies, such as wind, are not included due to limited applicability in urban/suburban situations and due to the likelihood that such systems will need to be heavily dependent on electric grid interconnectivity issues. This limitation (exclusion of self-generation technologies other than PV and natural gas fired fuel cells and microturbines) is made for purposes of simplifying the analysis, not as a matter of prescription.

One customer class--large customers (above 500 kw)—is excluded from the analysis. Although large customers represent a significant amount of load on the centralized electric grid (about 20%) and would benefit from financial assistance from a publicly-funded Self-Generation Program, this customer class is excluded from this analysis because these customers: (1) already own and operate most of the self-generation systems that exist today in California; (2) the benefits to these customers (i.e., the costs of NOT becoming self-sufficient) on an individual basis are so substantial that they are much more likely to make the investment in self-generation technologies without public financing than non-large customers;[11] (3) the ability to get assistance to off-set the costs of becoming self-sufficient is far greater than for non-large customers.[12]

Finally, ORA's analysis of the costs and benefits of a Self-Generation Program assume: (1) no customer "export" (sale) of self-generated electricity to "the grid"; and, (2) no standby charges or interconnectivity fees. The assumptions are made for purposes of simplifying the analysis, not as a matter of prescription.[13] Both assumptions represent "deficiencies" in terms of the benefit/cost analysis; on the other hand, this limitation is

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[10] Some fuel cell products can be fueled by renewable energy sources such as hydrogen or biomass, but such applications are not included due to limited potential of such applications at this time, and to simplify the analysis. Fuel cell and/or microturbine projects for single-family homes are not included due to the limited availability of these products for single-family electric loads (typically less than 10 kw) at this time or in the very near future. Some fuel cell and/or microturbine products can be operated on fossil fuels other than natural gas or propane, such as diesel; such applications are not included due to environmental/citing considerations, and to simplify the analysis.

[11] If nothing else, the chronic imbalances in supply-demand in California have shown the especial vulnerability of the high-tech communications industry to ANY kind of interruption in grid-provided electric service, as well as the increasing recognition that much of this industry has contributed to the unexpected increase in electric energy usage, thereby aggravating the supply-demand imbalances.

[12] Some of the electric and natural gas Energy Service Providers who provide "direct access" electricity and natural gas, for example, already provide private financing for customer investments in energy efficiency and self-generation products. In addition, large customers have considerable "leverage" with local governments who want to attract/retain them to "extract" concessions in the form of tax breaks.

[13] Such matters are in dispute at the CPUC, with some resolution possible this year, and may be addressed in legislation this session.

somewhat muted by the fact that the first assumption understates the potential benefits of self-generation technologies and the second understands the potential costs. [14]

Given these assumptions, the ORA analysis of a Self-Generation Program suggests the following:[15]

1. approximately 320 MW of load per year can be removed from the centralized electric grid from one year's worth of self-generation projects (compared to the estimated 160 MW of load expected to be reduced from the PY2001 EEPPP activities);

2. approximately 2000 Gwh of load per year can be removed from the centralized electric grid from one year's worth of self-generation projects (compared to the estimated 620 Gwh of load expected to be reduced from PY2001 EEPPP activities);

3. a Self-Generation Portfolio of self-generation projects can be expected to produce an overall benefit-cost ratio of about 2.0 (compared to the expected overall benefit-cost ratio of about 1.6 the PY2001 EEPPP portfolios).

Needless to say, these program level estimates of expected impacts from comparably-sized public investments in self-generation and energy efficiency are not "guaranteed." As with the UDC-produced forecasts of EEPPP effects, the ORA-produced forecasts of a Self-Generation Program effects is based on plethora of underlying assumptions regarding customer response, product availability, per unit costs and benefits, and the mix of products actually installed in a given year, and the location of the projects. In each case (EEPPP plans and any Self-Generation Program plan), actual results will differ from planned/forecasted impacts.[16]

As with the EEPPP activities, any estimate of outcomes from a Self-Generation Program needs to account for two key considerations: (1) the Program Administration structure; and, (2) key program design features (e.g., the kind and type of public financing).

## IV. Program Cost Efficiencies: Program Administration and Program Design

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[14] Whether or not these two assumptions are absolutely off-setting is a determination that can only be made on a site-specific basis that accounts for: (1) the amount of any standby and/or interconnectivity charges; (2) the amount, timing and pricing of electricity available from any self-generation equipment for "export" to the grid; (3) the rates that would be paid if the customer chooses to export power instead of using the power on-site.

[15] See Tables A-1 for a more complete set of comparisons of costs, benefits, and effectiveness of a Self-Generation Program, per ESRA, and the PY2001 EEPPP plans; Tables A-2 and A-3 provide additional documentation and details on the costs and benefits of the "ESRA-based" Self-Generation Program, if the Commission establishes a distribution charge that is comparable to the existing distribution charges for energy efficiency.

[16] The same would be true for any "plan" for supply-side projects, such as the ISO/FERC plan for temporary peaking plants "on the table" to address supply-demand imbalances. This "peaker program" is under investigation at the CPUC in OII 00-11-001. As of this writing, insufficient information on this ISO/FERC program is available to assess the relative costs and benefits of that program/plan with the costs and benefits of either EEPPP plans or any Self-Generation Program.

The ESRA directs the Commission to establish a distribution charge and use these revenues to provide financial assistance to promote various self-generation technologies. Existing law (ESRA) does not specify, however, such matters as:

- how much the distribution charge should be;
- whether this charge should be assessed against electric or gas ratepayers, or both;
- how long (how many years) this charge should last;
- which self-generation/co-generation/renewable technologies are to be eligible for financial assistance;
- the amount of financial incentives (e.g., "full cost" or "partial cost");
- what kind of program administration structure should be established to actually administer/implement the program;
- whether, when, who, or how the "answers" to all of the above can or should be reviewed, modified, or abandoned.

SB5x raises additional questions regarding public financing and program administration for self-generation projects and for "new" moneys to expand existing energy efficiency programs at the CPUC. Similarly, SBx6 could produce another source of public financing for energy efficiency and possibly self-generation projects, and raise additional questions and issues regarding the program administrative structure.

In the previous sections, the ORA analysis is suggestive of some "answers" to some of the program administration and program design issues, but does not address others. The purpose of this section of the analysis is to provide further analysis of the program administrative structure and program design alternatives.

In terms of responding to the ESRA directive, the options for the Program Administration structure are numerous. The Commission could do any one of the following:

(1) direct the Commission's Energy Division and Fiscal Office staff to serve as the on-going program administrator of revenues collected by the electric and/or gas UDCs;
(2) direct one or more of the UDCs to become program administrators, and add these revenues, self-generation technologies and program design features for financial assistance to their EEPPP program activities, much like occurs with "public goods charge" programs at some of the municipal utilities;[17]
(3) direct the UDCs to collect the designated revenues for self-generation to the CEC, as is currently done with electric ratepayer funds for the Renewables program and the Public Interest Energy Research (PIER) programs;

[17] Current law (AB1890) requires the municipals to establish "public purpose programs", but does not (as it does with PG&E, SCE, and SDG&E) establish restrictions/guidelines regarding "co-mingling" between various activities such as low income and non-low income energy efficiency assistance, or energy efficiency and renewables. SMUD and LADWP either are, or are planning on, offering financial assistance in various forms to customers to help financial self-generation technologies such as PV and fuel cells, as well as traditional energy efficiency.

(4) direct the UDC's to collect the designated revenues for self-generation to the state's Department of General Services, and add these revenues, self-generation technologies and program design features for financial assistance to DGS's energy efficiency/self-generation program, with the understanding that these program funds would (a) supplement the DGS bond-funded activities and (b) be opened up to private sector customers;
(5) direct the UDC's to collect the designated revenues for self-generation and "hold" these revenues until (and if) the legislature creates, and makes operational, the proposed California Power and Conversation Financing Authority.

Each of these options would carry with it significant questions and issues associated with program administration cost efficiencies (e.g., which entity can be expected to maximize integration with energy efficiency investment choices and do so with a minimum of additional administrative costs), effectiveness (e.g., which entity can be expected to most aggressively and effectively promote self-generation), and timeliness (which option carries with it the most likely chance of "ramping up" to the challenge in the near term). There is no obvious, clear-cut answer to these questions in terms of the five "most likely" Program Administrative structure options identified above.

The very fact that there are so many "options" does not bode well for the ability of consumers to know that (or if) meaningful financial assistance to move toward self-sufficiency is on the way. Nor does it bode well for manufacturer's of self-generation products or providers/installers of these products and associated energy services who may be looking for "a message" that California is becoming a meaningful and sustainable market.

The decision on the optimal Program Administrative structure is also best considered in conjunction with optimal program design features in terms of the form of financial assistance for a Self-Generation Program. Based on the "record" of decades of support for traditional energy efficiency, for example, ORA posits the following observations:

- Financial assistance in the form of rebates (much like tax credits and grants) provide no assurances that the products will perform as expected, that the owners will keep the rebated products, are difficult and costly to administer due to the potential wide range of products that are seeking "rebate eligible" status;

- Financial assistance in the form of low-interest loans (from bonds or other sources) offer the promise of the "lowest cost" impact on public funds (since they are re-paid over some period of time), but may have limited appeal to debt-sensitive consumers, and provide limited assurances that the benefits from installed products are being realized;

- A "standard offer", such as being provided for designated energy efficiency products in nonresidential buildings in the current "Standard Performance Contracting" (SPC) program encourages/allows participation by "third party providers" ("energy service

companies") capable of providing bundled services of long term electricity and natural gas contracts, multi-year contracts for energy efficiency services, and, potentially, multi-year contracts for self-generation products), thereby providing assurances that the costs of installation and specific products are determined by customers and the ESCOs and benefits are shared over time depending on the performance of the products, and the "subsidy" (the standard offer, established in advance in terms of cents per annualized kwh for demonstrated and verified self-generated load and paid over a designated time period) provides considerable certainty to manufacturers and installers of the eligible products.

ORA believes that a Self-Generation Program, with a program design that provides financial assistance exclusively in the form of a standard offer, represents the most optimal "balance" between providing meaningful reductions in front end installation costs and assurances to participants and non-participants that the "subsidy" will produce long-lasting benefits (avoided purchases from the centralized grid).

The current UDCs, as opposed to the other "candidates" for program administration, are familiar with the SPC program design, as are the 100 plus Energy Efficiency Service Providers (EESPs) that have sponsored energy efficiency projects and could sponsor self-generation projects. As such, the most "seamless" means of complying with the ESRA directive to establish a self-generation would be for the Commission to determine that one or more of the UDC's should be the program administrator(s) of the Self-Generation Program expected to be "implemented" by March 1, 2001.

A "dual designation" of financial assistance in the form of an SPC program design and one or more "UDC's" as program administrators, however, need not be seen as permanent and need not include all four UDCs. To direct all four UDCs to administer the Self-Generation Program would replicate and expand the administrative inefficiencies that exist from having too many program administrators with competing and conflicting interests vis-à-vis common interests.

ORA believes, therefore, that administrative efficiencies—and program effectiveness--for a Self-Generation Program can be assured by directing PG&E to act as program administrator for its service territory and SoCalGas as administrator for the combined service territories of SCG and SCE. In each case (PG&E and SCG), these UDCs can be further directed to establish a program administrative staff in their respective Energy Centers, which can and should become the "bricks and mortar" platforms for administering the Self Generation Program.

For SDG&E customers, ORA believes the Commission should immediately designate the San Diego Regional Energy Office (REO) as the program administrator. SDG&E can be directed to provide the San Diego REO all revenues collected from SDG&E customers to fund the Self Generation Program, and to establish a contract with the SD REO that will require it to administer a Self Generation Program that is comparable to the one established for PG&E and SCG. The term of the SDG&E contract with the SD REO should be through the end of 2002. As with PG&E and SCG, the SD REO should be

allowed to use a designated amount of Self-Generation funds for administrative duties (staffing, advertising, and reporting costs and benefits to the CPUC).[18]

Since at least 1997, the Commission has recognized that the UDC's (the incumbent program administrators of the EEPPP programs) have an inherent and serious conflict of interest in terms of the UDC's interest in increasing consumption/sales/purchases of energy, whereas consumers would prefer (all other things being equal) lower bills associated with reduced consumption/payments for energy. Having failed (in late 1998) to construct an Independent Program Administrative structure for energy efficiency, the Commission has promised a revisitation of this issue prior to the beginning of PY2002.

A similar conflict of interest attends a Self Generation Program. In this case, however, the worst of these conflicts can be avoided/minimized by designating PG&E, SCG, and the SD REO as program administrators. When the Commission revisits the issue of the appropriate role for the UDC's for energy efficiency beyond PY2001, ORA will urge consideration of establishing a statewide network of qualified, CPUC-certified, Regional Energy Offices to become administrators of both EEPPP activities and a Self-Generation Program.

## IV. **Conclusions**

ORA believes that the best, if not only, means of complying with the ESRA directive to establish a distribution charge and use these revenues to fund a Self-Generation Program, is to take the following steps:

1. Immediately direct PG&E, SCE, SoCalGas, and SDG&E to establish a distribution charge for electric and gas customers that is comparable in size to the amounts charged for energy efficiency, per current law ($300 million per year).

2. Determine that the Self-Generation Program will be in effect through the end of the term of the ESRA (end of 2004), with periodic program design modifications based on an annual review of program accomplishments, including any modifications needed to account for financial assistance for self-generation products, and supplemented with revenues that may become available from additional legislative such as SBx5 and SBx6.

3. Direct PG&E and SoCalGas to immediately establish an administrative capability to manage, from their respective Energy Centers, a Self-Generation Program with the following program design characteristics: (1) eligible products for financial assistance are Photovoltaics, natural gas fueled fuel cells and natural gas fueled microturbines; (2) eligible customer markets are non-public sector electric customers with connected load of less than 500 kw; eligible projects using fuel

[18] The SD REO has had a contract with SDG&E for the last two years, as part of SDG&E's EEPPP programs.

cells or microturbines are those where the heat produced by the devices is used on-site to provide thermal loads (heating and/or cooling); (3) eligible products using photovoltaics are those which also provide significant, integrated, materials that provide a thermal break on the roof of the building; (4) financial assistance, until further notice, will be in the amount equal to no more than 50% of installed project costs; (5) payments to qualified projects will be identical to the terms and conditions established for the nonresidential (small/meduim) SPC program for energy efficiency.

4. Direct SDG&E to establish a contract, through the end of 2002, with the SD Regional Energy Office (REO) to provide administrative services and program designs for a San Diego County Self Generation Program comparable to those established by PG&E and SoCalGas.

5. Direct the Commission's Energy Division to establish a network of Regional Energy Offices that can assume major program administration responsibilities for both EEPPP and Self-Generation programs by the year 2002.

**TABLE A-1**
**ENERGY EFFICIENCY AND SELF-GENERATION PROGRAMS OVERSEEN BY CPUC: EXISTING AND PROPOSED**

| | SBx5 (PROPOSED)* xpected Impacts (annualize | | | PY2001 PLANS (PGC+ESRA)** Expected Impacts (annualized)*** | | | | | TOT. (curr. + prop'd) Exp'd Impacts (annualized) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | $ (mill) | (MW red) | MW/Mill | $ (mill) | (MW red) | (GWh red | MW/Mill | WH/Mill | (mill) | (MW red) | MW/Mill$ |
| **TOTAL SELF-GEN AND ENERGY EFFI** | **$524** | **771** | **1.5** | **$666** | **487** | **2,586** | **0.2** | **5,315** | **$1,190** | **1257** | **1.1** |
| | | | | | | | | | | | |
| **TOTAL SELF-GENERATION** | **$180** | **39** | **0.2** | **$298** | **320** | **1953** | **1.1** | **6,105** | **$478** | **359** | **0.8** |
| Res/small commer PV financing | $40 | 11 | 0.3 | $100 | 60 | 131 | 0.6 | 2,190 | $140 | 71 | 0.5 |
| Fuel Cell/MT/PV/Wind financing | $60 | 16.8 | 0.3 | $198 | 260 | 1822 | 1.3 | 7,008 | $258 | 277 | 1.1 |
| Self Gen for state and munic buildings | $80 | 11.2 | 0.1 | | | | | | $80 | 11 | 0.1 |
| **ENERGY EFFICIENCY:** | **$344** | **732** | **2.1** | **$368** | **167** | **632** | **0.5** | **3,798** | **$712** | **898** | **1.3** |
| Low Income Energy Effic (LIEE) expansion | $60 | 6 | 0.1 | $79 | 6 | 15 | 0.1 | 2,778 | $139 | 12 | 0.1 |
| *Residential Program Area:* | $108 | 290 | 2.7 | $102 | 41 | 168 | 0.4 | 4,081 | *$210* | *331* | *1.6* |
| Res High Effic AC | $50 | 125 | 2.5 | | | | | | | | |
| Incent to stock and purch high effic appliances | $25 | 60 | 2.4 | | | | | | | | |
| Res whole house fans | $8 | 40 | 5.0 | | | | | | | | |
| *Nonres Program Area:* | $76 | 115 | 1.5 | $132 | 81 | 346 | 0.6 | 4,275 | *$208* | *196* | *0.9* |
| Educ commerc customers | $8 | 20 | 2.5 | | | | | | | | |
| Comm thermstats/EMC devices | $28 | 40 | 1.4 | | | | | | | | |
| Thermal Energy Storage (TES) | $10 | 5 | 0.5 | | | | | | | | |
| Industrial High Efficiency pumps | $20 | 20 | 1.0 | | | | | | | | |
| waste water pumps | $10 | 30 | 3.0 | | | | | | | | |
| *New Construction Program Area:* | $70 | 221 | 3.2 | $55 | 39 | 104 | 0.7 | 2,656 | *$125* | *260* | *2.1* |
| High Effic Mobile Homes (new) | $15 | 38 | 2.5 | | | | | | | | |
| Blder incentives (exceed T24 by 30%) | $25 | 83 | 3.3 | | | | | | | | |
| EE design at point of permitting (remodel or n | $30 | 100 | 3.3 | | | | | | | | |
| *other:* | $30 | 100 | 3.3 | | | | | | | | |
| Augment CEC Demand Resp technologies and | $30 | 100 | 3.3 | | | | | | | | |

* SBx5 (Burton/Sher), January 18th, 2001 version; expected impacts (taxpayer dollars and expected reductions in electric peak deman load, are identified in the bill, by a

** "PY2001 Plans (PGC+ESRA)" refers to costs and benefits of CPUC-supervised "public purpose programs", per R 98-07-037 consisting of:

(1) "cost-effective energy efficiency and conservation" annual electric revenues identified in AB1890 (approx $230 million);

(2) low income energy efficiency assistance in annual electric revenues identified in AB1890 (approx $30 million);

(3) "cost-effective energy efficiency and conservation" annual gas revenues identified in AB1002 (approx $75 million);

(4) low income energy efficiency assistance in annual gas revenues established by AB1002 (approx $ 50 million);

(5) amount to be established by the Commission from a distribution charge established by the Energy Security and Reliability Act (ESRA/AB970).

*** Load impacts for PGC activities are from plans for 2001 from energy efficiency activities administered by PG&E, SCE, SCG, and SDG&E.

Load Impacts for Self-Generation are from estimates developed by ORA, from onsite PV, Fuel Cell, and Microturbine projects in non-public sector buildings.

**TABLE A-2**
**SUMMARY OF FORECASTED EFFECTS OF SELF-GENERATION PLAN (per ESRA/AB970)**

| | Total Portfolio | PV | MicroTurbines | Fuel Cells |
|---|---|---|---|---|
| **PER UNIT CHARACTERISTICS (1)** | | | | |
| Product Costs | $394,000 | $20,000 | $50,000 | $324,000 |
| Product Size (kw) | | 6 | 50 | 100 |
| Price $/kW | | $3,333 | $1,000 | $3,240 |
| Product Life (years) | | 20 | 20 | 20 |
| Hours of Operation | | 2,190 | 7,008 | 7,008 |
| Annual Kwh Impacts (avoided elect grid usage) | | 13,140 | 350,400 | 700,800 |
| Annual Therm Impacts (increm incr in gas purch)* | | | 14,016,000 | 28,032,000 |
| **PROGRAM PLAN ASSUMPTIONS** | | | | |
| Participants (# of units) | 14,600 | 10000 | 4000 | 600 |
| Fin. Assist (% of Costs) | | 50% | 50% | 50% |
| Fin. Assist ($ per project) | | $10,000 | $25,000 | $162,000 |
| **FORECASTED MARKET EFFECTS** | | | | |
| Measure Costs | $594,400,000 | $200,000,000 | $200,000,000 | $194,400,000 |
| Program Costs: | $297,695,000 | $100,165,000 | $100,165,000 | $97,365,000 |
| Financial Assistance | $297,200,000 | $100,000,000 | $100,000,000 | $97,200,000 |
| Administration | $500,000 | $165,000 | $165,000 | $165,000 |
| Mw reduction | 320 | 60 | 200 | 60 |
| Gwh reductions (annual) | 1,953 | 131 | 1402 | 420 |
| MMTherms (increases) | 72,883,200 | | 56,064,000 | 16,819,200 |
| **FORECASTED C-E EFFECTS** | | | | |
| Participant Tests: W/O Fin Assistance | | | | |
| Costs (capital) | $594,400,000 | $200,000,000 | $200,000,000 | $194,400,000 |
| Costs (fuel) | $872,834,489 | | $671,411,146 | $201,423,344 |
| Benefits (elect) | $2,951,505,045 | $198,531,729 | $2,117,671,781 | $635,301,534 |
| Net Benefits | $1,484,270,556 | -$1,468,271 | $1,246,260,636 | $239,478,191 |
| Benefit Cost Ratio | 2.01 | 0.99 | 2.43 | 1.61 |
| Participant Tests: With Fin Assistance | | | | |
| Costs (capital) | $297,200,000 | $100,000,000 | $100,000,000 | $97,200,000 |
| Costs (fuel) | $872,834,489 | | $671,411,146 | $201,423,344 |
| Benefits (elect) | $2,951,505,045 | $198,531,729 | $2,117,671,781 | $635,301,534 |
| Net Benefits | $1,781,470,556 | $98,531,729 | $1,346,260,636 | $336,678,191 |
| Benefit Cost Ratio | 2.5 | 1.99 | 2.75 | 2.13 |
| Program Administrator Tests | | | | |
| Costs (capital) | $297,695,000 | $100,165,000 | $100,165,000 | $97,365,000 |
| Costs (fuel) | $698,267,591 | | $537,128,916 | $161,138,675 |
| Benefits (elect) | $2,361,204,036 | $158,825,384 | $1,694,137,425 | $508,241,227 |
| Net Benefits | $1,365,241,445 | $58,660,384 | $1,056,843,508 | $249,737,553 |
| Benefit Cost Ratio | 2.4 | 1.59 | 2.66 | 1.97 |
| Total Resource Cost Tests (Societal version) | | | | |
| Costs (capital) | $476,015,000 | $160,165,000 | $160,165,000 | $155,685,000 |
| Costs (fuel) | $698,267,591 | | $537,128,916 | $161,138,675 |
| Benefits (elect) | $2,361,204,036 | $158,825,384 | $1,694,137,425 | $508,241,227 |
| Net Benefits | $1,186,921,445 | -$1,339,616 | $996,843,508 | $191,417,553 |
| Benefit Cost Ratio | 2.0 | 0.99 | 2.43 | 1.60 |

(1) costs per unit values based on literature search and company surveys by Rafael Freedman, PG&E,
per CALMAC agreement (AB970 Cost-Effectiveness study, first phase). Procedures and results available upon request.
(2) costs and benefits do not account for standby charges or charges associated with interconnectivity
* Natural gas load impacts (increased purchases) represent on-site loads net of heating or cooling thermal loads that were provided by natural gas heating and/or cooling equipment prior to installation of natural gas-fueled self-generation produ

| | | |
|---|---|---|
| Net-to-Gross ratio | 0.80 | ("default" value agreed upon for use in PY2001 EE forecasts) |
| Annualized avoided costs (electric:cen | 7.6 | Present value of 20 year forecast used for EE (PY2001) |
| Annualized avd csts for PV | 7.6 | Present value of 20 year forecast used for EE (PY2001) |
| Annualized avoided costs (gas:cents/th | 59.9 | Present value of 20 year forecast used for EE (PY2001) |
| program load factor: (gwh/8.760)/mw | 0.70 | |
| product load factor: (kwh/8760)/kw | 0.25 | 0.80 0.80 |

**TABLE A-3**

*SOURCES OF INFORMATION ON SELF-GENERATION PRODUCT COSTS*

| Manufacturer | kW | $/kW | When | Maintenance | |
|---|---|---|---|---|---|
| | Fuel Cells | | | | |
| International Fuel Cells, Phosphoric a | 200 | 4500 | Now | $.02/kWh | |
| International Fuel Cells, PEM | 5 | 1500 | 2003 | | |
| Fuel Cell Energy, Inc. (Enron) | 250 | 5000 | Now (LADWP proto) | | |
| Plug Power | | 1000 | Next year ? | | |
| Plug Power | | 570 | 2004? | | |
| DUA/CEC/CARB Study, PEM | 500 | 1000 | Soon | | $0.02 |
| DUA/CEC/CARB Study, PhosAcid | 250 | 1720 | Soon | | $0.02 |
| GE Microgen, PEM | 7 | 2000 | Now | | |
| GE Microgen, PEM | 7 | 1000 | Soon | | |
| | Microturbines | | | | |
| Alturdyne | 50 | 1000 | Future possible | | |
| Bowman | 45 | 1333 | In field trials | | |
| Bowman | 80 | 900 | ? | | |
| Bowman | 200 | 465 | ? | | |
| Capstone | 30 | 1000 | now | | |
| Capstone | 60 | 916.6666667 | now | | |
| Elliot | 45 | 678 | In production? | | |
| GE/Honeywell/Allied Signal | 45 | 678 | "introductory" prices | | |
| GE/Honeywell/Allied Signal | 80 | 544 | "introductory" prices | | |
| GE/Honeywell/Allied Signal | 200 | 363 | "introductory" prices | | |
| Generic (EPRI estimates) | 30 | 1000 | Soon | $.01/kWh | |
| Generic (EPRI estimates) | 50 | 843 | Soon | $.0086/kWh | |
| Generic (EPRI estimates) | 75 | 646 | Soon | $.0067/kWh | |
| DUA/CEC/CARB Study | 45 | 575 | Soon | $.01/kWh | |

**TABLE A-4**
**SUMMARY OF FORECASTED EFFECTS OF ENERGY EFFICIENCY**

| Statewide (PY2001, PG&E, SCE, SCG, and SDG&E ($millions) | Total Portfoli ($millions) | RES ($millions) | NR ($millions) | NC ($millions) |
|---|---|---|---|---|
| **Total Resource Cost Tests (Societal version)** | | | | |
| Costs (total) | **$412** | **$169** | **$182** | **$62** |
| costs(admin) | $174 | $65 | $77 | $33 |
| costs(Financial Assistance) | $115 | $37 | $57 | $20 |
| costs (Shareholder Incentives) | $20 | $3 | $5 | $2 |
| costs(Incremental Measure Costs) | $227 | $101 | $101 | $26 |
| Benefits | **$665** | **$184** | **$346** | **$134** |
| Net Benefits | **$200** | **-$3** | **$142** | **$62** |
| Benefit Cost Ratio | **1.61** | **1.09** | **1.90** | **2.18** |
| **Program Administrator Cost Tests** | | | | |
| Costs (total) | **$299** | **$102** | **$132** | **$55** |
| costs(admin) | $164 | $62 | $70 | $33 |
| costs(Financial Assistance) | $115 | $37 | $57 | $20 |
| costs (Shareholder Incentives) | $20 | $3 | $5 | $2 |
| Benefits | **$665** | **$184** | **$346** | **$134** |
| Net Benefits | **$366** | **$82** | **$214** | **$80** |
| Benefit Cost Ratio | **2.22** | **1.81** | **2.62** | **2.46** |
| | | | | |
| **Load Impacts (annual load reductions)** | | | | |
| Net MW | **161** | **41** | **81** | **39** |
| Net MWh | **617** | **168** | **346** | **104** |
| Net Therms (000s) | **15,449** | **9,285** | **5,275** | **890** |
| **Previous PY Load Impacts: Net Mw *** | | | | |
| PY2000 (Planned) | **239** | **55** | **130** | **54** |
| PY1999 (recorded) | **161** | **39** | **98** | **24** |
| PY1998 (not reported)** | | | | |
| **Previous PY Load Impacts: Net Mwh*** | | | | |
| PY2000 (Planned) | **1,274,031** | **461,610** | **646,548** | **165,874** |
| PY1999 (recorded) | **785,547** | **174,923** | **525,642** | **84,981** |
| PY1998 (not reported)** | **582,085** | **134,712** | **385,664** | **61,709** |
| **Previous PY Load Impacts: Net Therms (000)*** | | | | |
| PY2000 (Planned) | **36,605** | **11,566** | **26,320** | **11,344** |
| PY1999 (recorded) | **6,775** | **9,909** | **3,447** | **9,524** |
| PY1998 (not reported)** | **17,106** | **2,555** | **13,776** | **776** |

* includes "committed projects", some of which have or will "fail"; "commitments" from all PY's have not been verified, and have yet to be "trued-up" in the Commission's Annual Earnings Assessment Proceeding.

**TABLE A-4a**

**SUMMARY OF FORECASTED EFFECTS OF ENERGY EFFICIE**

| PG&E | Total Port ($millions) | RES ($million | NR ($millions | NC ($millions) |
|---|---|---|---|---|
| Total Resource Cost Tests (Societal version) | | | | |
| Costs (total) | $210 | $94 | $92 | $24 |
| costs(admin) | $92 | $37 | $40 | $15 |
| costs(FA) | $48 | $13 | $27 | $8 |
| costs (S.I.) | $10 | | | |
| costs(IMC) | $117 | $57 | $51 | $9 |
| Benefits (elect) | $271 | $68 | $157 | $45 |
| Net Benefits | $61 | -$26 | $66 | $22 |
| Benefit Cost Ratio | 1.29 | 0.73 | 1.72 | 1.92 |
| Net MWh 2001 (proposed) | 235,511 | 44,161 | 157,669 | 33,681 |
| Net MWh 2000 (planned) | 619,777 | 303,038 | 240,915 | 75,824 |
| Net MWh 1999 (recorded) | 202,138 | 56,603 | 133,340 | 12,195 |
| Net MWh 1998 (recorded) | 212,330 | 42,763 | 165,937 | 3,630 |
| Net MW 2001 (proposed) | 71 | 15 | 37 | 19 |
| Net MW 2000 (planned) | 100 | 36 | 41 | 23 |
| Net MW 1999 (recorded) | 49 | 18 | 24 | 7 |
| Net MW 1998 (recorded) | 76 | 2 | 57 | 17 |
| Net Therms (000s) 2001 (p | 5,949 | 4,719 | 955 | 276 |
| Net therms 2000 (planned) | 27,976 | 6,766 | 21,098 | 112 |
| Net therms 1999 (recorded | 3,870 | 2,105 | 1,770 | -6 |
| Net therms 1998 (recorded | 1,883 | 1,191 | 589 | 103 |

| SDG&E | Total Port ($millions | RES ($millions | NR ($millions) | NC ($millions) |
|---|---|---|---|---|
| Total Resource Cost Tests (Societal version) | | | | |
| Costs (total) | $61 | $24 | $26 | $12 |
| costs(admin) | $16 | $6 | $5 | $4 |
| costs(fin. asst) | $18 | $4 | $10 | $4 |
| costs (S.I.) | $3 | $1 | $1 | $1 |
| costs(IMC) | $43 | $17 | $19 | $7 |
| Benefits (elect) | $98 | $27 | $48 | $23 |
| Net Benefits | $31 | $3 | $21 | $7 |
| Benefit Cost Ratio | 1.60 | 1.16 | 1.86 | 1.92 |
| Net MWh 2001 (proposed) | 112,606 | 30,940 | 55,032 | 26,634 |
| Net MWh 2000 (planned) | 103,315 | 29,129 | 61,272 | 12,915 |
| Net MWh 1999 (recorded) | 120,883 | 17,415 | 81,403 | 22,065 |
| Net MWh 1998 (recorded) | 101,630 | 34,916 | 37,317 | 29,397 |
| Net on-peak MW 2001 (pro | 33 | 3 | 23 | 7 |
| Net MW 2000 (planned) | 19 | 1 | 11 | 7 |
| Net MW 1999 (recorded) | 21 | 1 | 12 | 7 |
| Net MW 1998 (recorded) | 14 | 3 | 4 | 7 |
| Net Therms (000s) 2001 (pr | 2,809 | 1,612 | 680 | 518 |
| Net therms 2000 (planned) | 4,002 | 556 | 3,154 | 293 |
| Net therms 1999 (recorded) | 1,466 | 507 | 921 | 37 |
| Net therms 1998 (recorded) | 2,994 | 236 | 2,085 | 673 |

**TABLE A-4b**

**SUMMARY OF FORECASTED EFFECTS OF ENERGY EFFICIE**

| SCE | Total Portfol ($millions) | RES ($million | NR ($millions | NC ($millions) |
|---|---|---|---|---|
| Total Resource Cost Tests (Societal version) | | | | |
| Costs (total) | $98 | $35 | $44 | $19 |
| costs(admin) | $47 | $16 | $20 | $11 |
| costs(FA) | $38 | $14 | $18 | $5 |
| costs (S.I.) | $6 | 1.523929 | 2.937907 | 1.129164 |
| costs(IMC) | $45 | $17 | $21 | $7 |
| Benefits (millions) | $235 | $64 | $123 | $47 |
| Net Benefits (millions) | $92 | $12 | $59 | $21 |
| Benefit Cost Ratio | 2.40 | 1.85 | 2.83 | 2.44 |
| Net MWh 2001 (proposed) | 247,566 | 85,637 | 131,326 | 30,603 |
| Net MWh 2000 (planned) | 550,939 | 129,443 | 344,361 | 77,135 |
| Net MWh 1999 (recorded) | 462,526 | 100,905 | 310,899 | 50,721 |
| Net MWh 1998 (recorded) | 268,125 | 57,033 | 182,410 | 28,682 |
| Net on-peak MW 2001 (pr | 48 | 19 | 21 | 7 |
| Net MW 2000 (planned) | 120 | 17 | 79 | 24 |
| Net MW 1999 (recorded) | 91 | 20 | 62 | 9 |
| Net MW 1998 (recorded) | | | | |

| SoCalGas | Total Portfo ($millions | RES ($millions | NR ($millions) | NC ($millions) |
|---|---|---|---|---|
| Total Resource Cost Tests (Societal version) | | | | |
| Costs (total) | $44 | $16 | $21 | $7 |
| costs(admin) | $19 | $6 | $11 | $2 |
| costs(fin. asst) | $10 | $5 | $2 | $3 |
| costs (S.I.) | $2 | $1 | $0 | $0 |
| costs(IMC) | $22 | $9 | $9 | $4 |
| Benefits (elect) | $61 | $24 | $18 | $19 |
| Net Benefits | $15 | $8 | -$4 | $12 |
| Benefit Cost Ratio | 1.39 | 1.53 | 0.84 | 2.80 |
| Net MWh 2001 | 21,374 | 6,979 | 1,595 | 12,801 |
| Net on-peak MW 2001 | 9 | 3 | 0 | 6 |
| Net Therms (000s) 2001 (pr | 6,691 | 2,954 | 3,641 | 97 |
| Net therms 2000 (planned) | 4,627 | 4,244 | 2,068 | 10,939 |
| Net therms 1999 (recorded) | 1,439 | 7,297 | 756 | 9,493 |
| Net therms 1998 (recorded) | 12,229 | 1,128 | 11,102 | 0 |

**TABLE A-5**
**SUMMARY OF FORECASTED EFFECTS OF ENERGY EFFICIENCY FOR LOW INCOME CONSUMERS**

| Statewide (PY2001, PG&E, SCE, SCG, and SDG&E) | Total Portfoli ($millions) | PG&E ($millions) | SCE ($millions) | SCG ($millions) | SDG&E ($millions |
|---|---|---|---|---|---|
| **Total Resource Cost Tests (Societal version)** | | | | | |
| Costs (total) | | | | | |
| costs(admin) | | | | $2 | $2 |
| costs(Financial Assistance) | | | | $16 | $7 |
| costs (Shareholder Incentives) | | | $0.3 | $0.3 | $0.1 |
| costs(Incremental Measure Costs) | | | | | |
| Benefits | | | | $2 | $2 |
| Net Benefits | | | | | |
| Benefit Cost Ratio | | | | | |
| **Program Administrator Cost Tests** | | | | | |
| Costs (total) | $79 | $44 | $7 | $19 | $9 |
| costs(admin) | | | | $2 | $2 |
| costs(Financial Assistance) | | | | $16 | $7 |
| costs (Shareholder Incentives) | | | $0.3 | $0.3 | $0.1 |
| Benefits | | | | | |
| Net Benefits | | | | | |
| Benefit Cost Ratio | | | | | |
| **Load Impacts (annual load reductions)** | | | | | |
| Net MW | 6 | | | | 1 |
| Net MWh | 15,425 | | 16,132 | | 4,200 |
| Net Therms (000s) | 207 | | | 513 | 204 |
| **Previous PY Load Impacts: Net Mw *** | | | | | |
| PY2000 (Planned) | 5 | 2 | 3 | | |
| PY1999 (recorded) | 7,791 | 7,788 | 3 | | |
| PY1998 (not reported)** | | | | | |
| **Previous PY Load Impacts: Net Mwh*** | | | | | |
| PY2000 (Planned) | 20,042 | 7,411 | 11,225 | | 1,406 |
| PY1999 (recorded) | 26,240 | 7,788 | 16,248 | | 2,204 |
| PY1998 (not reported)** | | | | | |
| **Previous PY Load Impacts: Net Therms (000)*** | | | | | |
| PY2000 (Planned) | 1,083 | 334 | | 573 | 176 |
| PY1999 (recorded) | 2,464 | 1,631 | | 573 | 260 |
| PY1998 (not reported)** | | | | | |

(Information not shown was not reported by the UDC)