STATE OF CALIFORNIA

BEFORE THE PUBLIC UTILITIES COMMISSION

Application of Pacific Gas and Electric Company to Revise its Gas Rates and Tariffs to be Effective October 1, 2018 (U 39 G)	))))	Application 17-09-006 (Filed September 14, 2017)

DIRECT TESTIMONY OF

PAUL CHERNICK

ON BEHALF OF

SMALL BUSINESS UTILITY ADVOCATES

Resource Insight, Inc.

JUNE 20, 2018

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I. Identification & Qualifications

Q: Mr. Chernick, please state your name, occupation, and business address.

A: My name is Paul L. Chernick. I am the president of Resource Insight, Inc., 5 Water St., Arlington, Massachusetts.

Q: Summarize your professional education and experience.

A: I received a Bachelor of Science degree from the Massachusetts Institute of Technology in June 1974 from the Civil Engineering Department, and a Master of Science degree from the Massachusetts Institute of Technology in February 1978 in technology and policy.

I was a utility analyst for the Massachusetts Attorney General for more than three years, and was involved in numerous aspects of utility rate design, costing, load forecasting, and the evaluation of power supply options. Since 1981, I have been a consultant in utility regulation and planning, first as a research associate at Analysis and Inference, after 1986 as president of PLC, Inc., and in my current position at Resource Insight. In these capacities, I have advised a variety of clients on utility matters.

My work has considered, among other things, the cost-effectiveness of prospective new electric generation plants and transmission lines, retrospective review of generation-planning decisions, ratemaking for plants under construction, ratemaking for excess and/or uneconomical plants entering service, conservation program design, cost recovery for utility efficiency programs, the valuation of environmental externalities from energy production and use, allocation of costs of service between rate classes and jurisdictions, design of retail and wholesale rates, and performance-based

ratemaking and cost recovery in restructured gas and electric industries. My professional qualifications are further summarized in Exhibit PLC-1.

Q: Have you testified previously in utility proceedings?

A: Yes. I have testified over three hundred times on utility issues before various regulatory, legislative, and judicial bodies, including utility regulators in thirty-seven states and six Canadian provinces, and three U.S. Federal agencies. This testimony has included many reviews of the economics of power plants, utility planning, marginal costs, and related issues.

Q: Have you testified previously before the California Public Utilities Commission?

A: Yes. I testified in Rulemaking 12-06-013, on residential electric rate design. I was also the principal author of the "Evaluation and Cost Effectiveness" chapter of the PUC-mandated "California Evaluation Framework" in 2004. Additional information on my qualifications are provided in Appendix A and Appendix K to this report.

II. Introduction

Q: On whose behalf are you testifying?

A: I am testifying on behalf of Small Business Utility Advocates.

Q: What is the scope of your testimony?

A: I reviewed the filing of Pacific Gas and Electric (PG&E) in this proceeding and identified one issue with the allocation of utility system costs and several issues with the allocation of energy-efficiency program costs.

Q: Please summarize your conclusions and recommendations.

A: I recommend that demand-related distribution costs be allocated on design-day load, not normal-year peak load.

With respect to the allocation of energy-efficiency program costs, I conclude that PG&E's proposal overstates the portion of the costs attributable to small commercial customers. In the absence of additional data on the causation of the energy-efficiency resource costs, I recommend that those costs be allocated in proportion to class gas energy savings, net of increases in gas use due to electric efficiency. I also provide detailed analyses of the non-resource energy-efficiency costs and other energy-efficiency costs, in Sections IV.B and IV.C.

III. Allocation of Demand-Related Distribution Costs

Q: How does PG&E allocate the demand-related costs of its gas distribution lines?

A: PG&E allocates those costs in proportion to estimated class contribution to the peak day load in a normal year.

Q: Is that approach appropriate?

A: No. PG&E (like almost any other gas utility) designs its distribution system to meet a design peak resulting from colder-than-normal weather.[1] If the system (including mains, transmission, and storage) were only designed to meet the peak day in a normal year, it would be unable to meet loads in years with a day colder than normal, which could be roughly half the years.

Q: Why does PG&E use normal load, rather than design load, for cost allocation?

[1] The peak load may be driven by weather on a single day, or a cold snap of several days;

A: According to PG&E, the use of normal weather was approved by the Commission in Conclusion of Law #2 of Decision 92-12-058[2] . Since 26 years have passed, it seems reasonable to improve the relationship of the allocation process to cost causality.

Interestingly, Decision 92-12-058 indicates that the Commission intended to order the use of design-day peaks for allocating distribution costs:

> For a local distribution gas utility, core peak demand drives the system peak demand and core demand varies primarily with temperature, reaching its peak in winter with space heating demand. Therefore, forecasting peak day demand implies two steps: first, forecasting the abnormal (or extreme) peak day temperature; and second, using this peak day temperature forecast to forecast the peak day demand. We will address each of these issues, in turn. By the nature of its definition as an extreme value, the abnormal peak temperature will not recur every year. Instead, the LDC must select a reasonable recurrence interval…[3]

> In the future, refinement of the cost allocators that we adopt today will require more complete and accurate end-use data. Although significant work has been done in the area of extreme temperature forecasting and its translation into demand, [costing] methodologies will benefit through more accurate data and refinement of forecasting techniques. We believe that the LDCs could benefit from a critical examination of the relative benefits of each other's formulation of both the forecast of extreme temperature and the translation of this information into demand forecasts.[4]

The Commission then chose demand measures "for computing and allocating marginal cost revenues…those that best reflect cost responsibility,"[5] as reproduced in Table 1.

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[2] Appendix C (SBUA Data Requests to PG&E, set two), Question 9.

[3] Decision 92-12-058 (Re Order Instituting Investigation on the Commission's own motion into implementing a rate design for unbundling gas utility services consistent with policies adopted in Decision 86-03-057) ("D. 92-12-058"), p. 28.

[4] *Id.,* pp. 29-30.

[5] *Id.*, p. 30

Table 1: Demand Measures from Decision 92-12-058

	PG&E	SoCal	SDG&E
Backbone Transmission	Cold Year Winter Season	Cold year	
Local Transmission	Cold Year Coincident Peak Month		Cold Year Coincident Peak Month
Storage	Cold Year Winter Season	Cold Year Winter Season	Cold Year Winter Season
Distribution	Cold Year Peak Day	Cold Year Peak Day	Cold Year Peak Day

Conclusion of Law #2 repeats all of the conclusions from page 30 of the Decision—requiring the use of "cold year" conditions for backbone and local transmission, high-pressure distribution, and storage—except for part (d) Distribution, for which it lists "Peak Day for PG&E and SoCal, and Cool Year Peak Day for SDG&E."[6] Since the Conclusion of Law appears to contradict the discussion above, the obvious explanation of this discrepancy is that the Conclusion of Law included a typographical error.

Q: What would be the effect on cost allocation if PG&E were to use design loads, rather than normal loads, in its allocation?

A: I do not know. SBUA asked PG&E for that information, and PG&E declined to provide the allocation results [7]

IV. Energy-Efficiency Cost Allocation

Q: How much energy-efficiency program cost does PG&E include in its cost allocation?

A: PG&E reports a total of about $77.4 million in programs with quantifiable benefits (EE Resource programs); programs without quantifiable benefits

[6] D. 92-12-058, p. 73.

[7] Appendix C (SBUA Data Requests to PG&E, set two), Question 10b.

(EE Non-Resource programs); and a mixed bag of Other EE costs related to evaluation, codes and standards, and two Renewable Energy Networks (REN).

Q: How does PG&E propose to allocate these costs?

A: Table 2 summarizes the manner in which PG&E proposes to allocate the various categories of energy-efficiency costs.[8]

Table 2: PG&E's Allocations of Energy-Efficiency Costs to Gas Customer Class

	PG&E EE Cost Allocators			
Gas Customer Class	**EE Resource**	**EE Non-Resource**	**EE Other**	**EE Total**
Residential	36.9%	5.1%	33.8%	33.8%
Small Commercial	31.5%	45.6%	32.9%	32.9%
Large Commercial	2.1%	0.2%	1.9%	1.9%
Industrial Distribution	8.8%	29.4%	10.8%	10.8%
Industrial Transmission	20.6%	19.8%	20.5%	20.5%
Source	Table 4A-2	Table 4A-3	Table 4a-4	Table 4a-5

These shares are very different from the class shares of load and of energy-efficiency savings, as shown in Table 3.

Table 3: Class Shares of Throughput and Energy-Efficiency Savings

Gas Customer Class	**Throughput**			**EE Therms**		**Gas Bill Savings**	
	2015	2016	2017	2015	2016	2015	2016
Residential	42.1%	42.0%	41.5%	45.3%	59.7%	61.3%	77.2%
Small Commercial	16.9%	17.0%	17.5%	24.6%	16.9%	23.4%	14.2%
Large Commercial	1.7%	1.7%	1.6%	1.5%	0.6%	1.1%	0.4%
Industrial Distribution	5.5%	5.5%	5.4%	11.6%	3.8%	6.7%	1.8%
Industrial Transmission	33.9%	33.9%	33.9%	17.0%	19.0%	7.5%	6.3%

Computed From Ch 2 B-D Workpaper Conf and DR SBUA 002-Q11

Note that the allocations of costs to the small commercial class are much higher than its share of gas delivery or energy-efficiency services delivered, while the allocations to the residential class are much lower than its share of sales or energy-efficiency services.

[8] In addition, PG&E continues to allocate the costs of the Energy Savings Assistance program, which helps income-qualified residential customers install energy saving measures, entirely to the residential class.

Q: Does PG&E provide any general explanation of its approach to energy-efficiency cost allocation?

A: Yes. PG&E says that:

> For each cost category, expenditures are allocated to a gas customer class based on the benefits data available.
>
> When benefits data is available and gas customer class or classes is known, a program's expenditures were assigned directly. Otherwise, the available benefits data tied to known gas customer classes from other similar programs was used to assign costs.[9]

Q: How are those benefits by customer class defined and determined?

A: PG&E's definition of "benefits" is essentially whatever comes out of the Energy and Environmental Economics, Inc. (E3) EE Calculator (version 17.2).

> PG&E does not own the Calculator or have full insight into all of the backend calculations. To the best of PG&E's knowledge, the gas benefits calculated by the Calculator are avoided gas costs, which include procurement costs (gas supply), greenhouse gas emissions costs, and Transmission & Distribution costs.[10]

The benefits computation thus appears to distort the class cost allocation in at least three ways:

- Using the undocumented benefits supposedly resulting from the installations in the class's facilities, rather than expenditures for the class or reductions in revenue requirements to the class.
- Treating the participating class as if it retained all the benefits of the costs avoided by the energy-efficiency program, rather than reflecting the fact that benefits are redistributed across classes in the ratesetting process.

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[9] *Pacific Gas and Electric Company 2018 Gas Cost Allocation Proceeding Prepared Testimony* (Sept. 14, 2017) ("PG&E Testimony") Chapter 4A, p. 4A-3.

[10] Appendix C (SBUA Data Requests to PG&E, set two), Question 14b.

- Ignoring the costs to participants of participating in the program, which overstates the benefit to the participating classes to varying degrees.[11]

Interestingly, PG&E says that it used some measure of class benefits to allocate the Non-Resource programs (which "do not generate quantifiable savings"[12]) and Other EE costs (which "are either not directly attributable or lack sufficient data to attribute to a specific gas customer class,"[13]). It is difficult to allocate costs on class benefits when PG&E cannot determine the total benefits, let alone the class shares of those benefits. In fact, PG&E used its estimates of the class benefits of the Resource programs to allocate the benefits of the Non-Resource and Other EE programs.

Q: How do PG&E's estimates of the class benefits of the energy-efficiency programs compare to the estimates of class energy savings?

A: Table 4 reproduces the resource-program savings and benefits by class reported by PG&E for 2015.

Table 4: PG&E-reported Savings and Benefits by Class, 2015

	Savings (therms)	Benefits	Benefit per therm
Residential	6,329,421	$19,164,305	$3.0
Small Commercial	3,439,830	$33,429,724	$9.7
Large Commercial	215,505	$2,448,076	$11.4
Industrial Distribution	1,621,491	$12,967,507	$8.0
Industrial Transmission	2,373,386	$34,609,485	$14.6
Total	13,979,633	102,619,096	$7.3

Sources: DR SBUA 002-Q11; Chapter 4A Workpaper, Resource Tab.

The residential class has the highest savings, but the third-highest reported benefits.

[11] I assume that PG&E and other program administrators do not pay 100% of measure costs, directly or through rebates.

[12] PG&E Testimony, Chapter 4A, p. 4A-5.

[13] *Id.*, p. 4A-6.

For some reason, PG&E reports that the system benefit from a therm of residential class energy-efficiency savings are much smaller than those for the other classes and only about 40% of the average benefit per therm. Perhaps the residential programs have shorter measure lives, or perhaps they are less heavily on peak, or perhaps the Calculator is unreliable.

A. Resource Costs

Q: How did PG&E use the estimated benefits to allocate the EE Resource costs?

A: PG&E explained its allocation process as follows.

> In cases where gas benefits were negative the gas benefits were set to zero for this analysis. For measures and programs not directly designed for a single gas customer class, the reported program sector was used to determine which gas customer classes the program was designed for, and the benefits were allocated proportionally across benefitting gas customer classes.[14]

The Chapter 4A Workpaper (Benefits tab)[15] shows that PG&E broke the benefits for most programs into multiple categories, which may be rate codes or other aggregations. It is not clear whether this disaggregation is the result of record-keeping of participant classes or some sort of allocation. The categories are treated in one of two ways.

First, the reported benefits for which a rate code is listed, amounting to 69% of the total benefits, are allocated to a single customer class. I will call these Type 1 benefits. Second, the remaining benefits (Type 2) are allocated according to the percentages shown in Table 5, taken from Chapter 4A

[14] PG&E Testimony, Chapter 4A, p. 4A-4.

[15] Workpaper for PG&E Testimony, Chapter 4A, Excel document titled: 2018GCAP-WP-Chp4A 090817 v47.xlsx ("Chapter 4A Workpaper").

Workpaper (Proxy Lookup tab).[16] PG&E computed these percentages from the distribution of all the Type 1 benefits within each EE Sector.[17]

Table 5: PG&E Table of Allocations from EE Sector to Customer Class

		Commercial		Industrial	
EE Sector	**Residential**	**Small**	**Large**	**Distribution**	**Transmission**
Commercial	0.2%	84.5%	2.7%	4.4%	8.2%
Industrial	–	4.5%	3.8%	19.1%	72.5%
Agricultural	–	19.8%	0.6%	40.1%	39.6%
Residential	100.0%	0.0%	–	–	–
Cross Cutting	5.6%	43.4%	–	31.3%	19.7%

This approach produces some strange results. For example, the Type 1 Savings by Design benefits are allocated 45% to small commercial and 55% to large commercial. The much larger group of Type 2 Savings by Design benefits is allocated on the Commercial line of Table 5, with 84% going to small commercial. The high allocation of Commercial sector programs to the small-commercial class is largely due to the high concentration on small commercial in the Type 1 portion of the large Commercial Deemed Incentives program, which I understand to be very different from Savings by Design.

In summary, PG&E's allocation of the Resource program costs has three suspect components:

- Rather than allocating program costs in proportion to the costs incurred for each customer class, or savings to the class, or bill reductions for the class, PG&E allocates each program's costs in proportion to the reported benefits for each class.
- PG&E reports some of those benefits (Type 1) by rate class, without a clear explanation of the disaggregation of the benefits.

[16] Chapter 4A Workpaper.

[17] The cells with a "–" are exactly zero, while the 0.0% allocation of residential sector programs to the small commercial class is actually 0.05%.

- The other benefits (Type 2) are allocated among rate classes based on the distribution of Type 1 estimated benefits for very different programs.
- If a customer class is burdened by negative gas benefits of a program, PG&E pretends that the program those negative benefits do not exist, rather than crediting the class for the increased gas usage.

Q: What is the problem with setting negative gas benefits to zero?

A: Programs that generate negative gas savings burden the customer classes that experience those negative benefits, and reduce the total benefits to the customer class. If costs are to be allocated in proportion to benefits, the allocation of those costs should reflect the net benefits of the program to the class.

Q: Have you been able to determine the magnitude of this problem?

A: No. PG&E does not appear to have provided the negative benefits.

Q: Is PG&E's allocation appropriate for resource programs?

A: Not in general. Most utilities with which I am familiar allocate energy-efficiency program costs either to the customers classes for whose premises the costs are incurred (direct allocation) or in proportion to the class's energy use (system-benefit allocation).

Q: Why is direct allocation of costs more appropriate than PG&E's benefit-based allocation?

A: PG&E's approach results in customers whose energy-efficiency programs are less expensive and more productive subsidizing the classes for whom the programs are more expensive. Table 6 provides an example of a program with $200,000 in spending, split equally between two classes, A and B. Class B has benefits three times those of Class A.

Table 6: Comparison of Allocation on Cost versus Allocation on Benefits

	Class A	Class B	Total
Spending	$100,000	$100,000	$200,000
Benefit:cost ratio	1.1	3.0	
Benefits	$110,000	$300,000	$410,000
Class Share			
on Spending	50%	50%	
on Benefits	27%	73%	
Cost Allocation			
on Spending	$100,000	$100,000	$200,000
on Benefits	$53,659	$146,341	$200,000
Net Benefits after cost recovery			
on Spending	$10,000	$200,000	$210,000
on Benefits	$56,341	$153,659	$210,000

Under the spending-based allocation, each class winds up with the same net benefits (which I define as benefits minus the allocation of EE costs) that it would have without the other class. Other than any economies of scale the classes both benefit from, each class should be indifferent to whether the other class participates in the program.

Under the benefits allocation, Class A is much better off with the participation of Class B, and Class B is much worse off due to Class A's participation. If the representatives of Class B have any influence on the process, they will try to reduce the activity of Class A, to reduce the additional burden on Class B.

There may be some resource programs for which PG&E would not be able to identify the distribution of spending among customer classes, but rebates, technical assistance, direct installation and many other expenses will be associated with specific customer accounts or (as in new construction programs) customer classes. And if PG&E cannot determine where the funds are being spent, I do not see how it could determine the class benefits, either.

Q: What are the advantages of the system benefits allocation?

A: An allocation based on throughput is much easier to administer than one that tracks spending, savings, bill reductions or benefits across customer classes.

The system benefits allocation is also consistent with the perspective that the energy-efficiency program is being operated to solve common problems, such as reducing congestion and market prices for gas, avoiding T&D expenditures, and reducing carbon emission.

Q: What allocation approach do you recommend for the Resource program costs?

A: PG&E's benefits approach is inherently inequitable and tremendously complicated, in addition to requiring the use of a black-box model that even PG&E does not understand. Instead, the Commission should direct PG&E to allocate energy-efficiency program costs among the classes (or those classes eligible to participate in one or more program) in one of the following two ways:

- in proportion to annual throughput, or
- in proportion to therm savings in the class, to eliminate the arbitrary weighting of the allocation by estimated cost-effectiveness.

If PG&E can track costs incurred by class, direct assignment could be instituted in the future.

B. Non-Resource Costs

Q: How did PG&E allocate the Non-Resource energy-efficiency costs?

A: PG&E's explanation of its approach is that "The proportion of EE Resource Program benefits for each gas customer class in each EE sector was used to estimate the allocation of expenditures among gas customer classes."[18]

In other words, PG&E rolls all the errors from its allocation of the EE Resources into the Non-Resource allocation, and adds the assumption that

[18] PG&E Testimony, Chapter 4A, p. 4A-5.

the Non-Resource costs are distributed in the same manner as the Resource costs.

Based on this methodology, PG&E allocates almost half the costs of the non-resource programs to small commercial customers.

Q: What are the Non-Resource programs, and what are PG&E's allocation results?

A: Table 7 provides PG&E's allocation of the Non-Resource programs' costs, from SBUA Data Requests to PG&E, set one, on Question 6[19] and the Chapter 4A workpaper.[20]

[19] Appendix B (SBUA Data Requests to PG&E, set one), Question 6.

[20] Chapter 4A Workpaper.

Table 7: PG&E's Proposed Non-Resource Program Cost Allocations

		2015 Gas	Market		Commercial		Industrial	
Program ID	Program Name	Expenditures	Sector	Residential	Small	Large	Dist	Trans
PGE21033	Agricultural Continuous Energy Improvement	29,566	Agricultural	0.0%	19.8%	0.6%	40.1%	39.6%
PGE21042-NR	Lighting Innovation	162,517	Cross Cutting	5.6%	43.4%	0.0%	31.3%	19.7%
PGE21043	Lighting Market Transformation	45,119	Cross Cutting	5.6%	43.4%	0.0%	31.3%	19.7%
PGE21061	Technology Development Support	219,761	Cross Cutting	5.6%	43.4%	0.0%	31.3%	19.7%
PGE21062	Technology Assessments	578,631	Cross Cutting	5.6%	43.4%	0.0%	31.3%	19.7%
PGE21063	Technology Introduction Support	641,072	Cross Cutting	5.6%	43.4%	0.0%	31.3%	19.7%
PGE21013	Commercial Continuous Energy Improvement	202,688	Commercial	0.2%	84.5%	2.7%	4.4%	8.2%
PGE21081	Statewide DSM Coordination & Integration	(2,934)	Cross Cutting	5.6%	43.4%	0.0%	31.3%	19.7%
PGE21023	Industrial Continuous Energy Improvement	89,819	Industrial	0.0%	4.5%	3.8%	19.1%	72.5%
PGE21071	Centergies	1,428,169	Cross Cutting	5.6%	43.4%	0.0%	31.3%	19.7%
PGE21072	Connections	376,968	Cross Cutting	5.6%	43.4%	0.0%	31.3%	19.7%
PGE21073	Strategic Planning	148,423	Cross Cutting	5.6%	43.4%	0.0%	31.3%	19.7%
PGE21074	Builder Energy Code Training	2,074	Cross Cutting	5.6%	43.4%	0.0%	31.3%	19.7%
PGE21075	Green Building Technical Support Service	846	Cross Cutting	5.6%	43.4%	0.0%	31.3%	19.7%
PGE210124	Ozone Laundry Energy Efficiency	(399)	Commercial	0.2%	84.5%	2.7%	4.4%	8.2%
PGE210137	Waypoint Connect	155,668	Commercial	0.2%	84.5%	2.7%	4.4%	8.2%
PGE210139	SEI Energize Schools	96,671	Commercial	0.2%	84.5%	2.7%	4.4%	8.2%
PGE210134	ICF BESO	48,048	Cross Cutting	5.6%	43.4%	0.0%	31.3%	19.7%
PGE2110052	Strategic Energy Resources	1,351,578	Cross Cutting	5.6%	43.4%	0.0%	31.3%	19.7%
PGE2109L	On-Bill Financing Loan Pool	1,175,783	Cross Cutting	5.6%	43.4%	0.0%	31.3%	19.7%
	Total	6,750,069	Dollars	346,768	3,074,465	15,865	1,982,121	1,333,680
			Percent	5.1%	45.5%	0.2%	29.4%	19.8%

Q: Are these allocations of non-resource program costs reasonable?

A: No, for a couple of reasons. First, I see no reason for gas customers to be charged for Non-resource programs that are not designed to reduce gas use, such as the Lighting Innovation and Lighting Market Transformation programs. These programs, by reducing electric use and waste heat, increase gas consumption. On its face, they should be funded entirely by electric customers.

Second, there is no reason to believe that the non-resource programs benefit classes in proportions similar to the resource programs. Some non-resource programs facilitate customer participation in resource programs, although not necessarily equally across the programs or classes, while others facilitate energy-efficiency efforts outside the resource programs.

Third, as I discuss above, PG&E's allocation of program costs on the estimated benefits from the Calculator are inequitable. Using those allocations to allocate the non-resource costs exacerbates that problem.

Q: What would be appropriate allocators for these Non-resource program costs?

A: The following list provides a brief description of the manner in which, based on available information, I believe each program (omitting those with small positive or negative costs) should be allocated among rate classes.

- **Lighting Innovation** and **Lighting Market Transformation**: These programs' costs should not be collected from gas customers. If for any reason the Commission allows PG&E to charge gas customers for the lighting program, those costs should be recovered from the residential or industrial gas consumers, who are hurt less by the lighting program than are the commercial customers.

- **Technology Development Support, Technology Assessments and Technology Introduction Support**: These programs make up the Statewide Emerging Technologies Program, which seeks to develop, evaluate, demonstrate and deploy new technologies, which appear to be useful to all classes in proportion to their energy use.
- **Commercial Continuous Energy Improvement**: This program appears to be targeted to large commercial customers, since it requires that the "organization must have: Past experience with at least one certified process improvement initiative such as Lean Six Sigma, Total Quality Management, Preventative (or Predictive) Maintenance Program or Capital Asset Management; willingness to assign a CEI Program Manager/Energy Champion from within the organization; and demonstrated support from executive leadership to pursue energy management as a strategic initiative and to involve the organization in a change management process."[21] It is possible that some of these large organizations would be served under the small commercial gas tariff. I recommend allocating this program equally between the small and large commercial classes.
- **Industrial Continuous Energy Improvement** serves industrial load, and should be allocated to the industrial load. PG&E allocates some of the industrial CEI to commercial classes and some of the commercial CEI to industrial classes.
- **Centergies** "offers training and education to workers that serve commercial and residential customers with the goal of achieving energy

[21] Appendix D (*Continuous Energy Improvement: Developing a Strategic Energy Management Plan* (Dec. 2011)), *available at* www.pge.com/includes/docs/pdfs/shared/energysavingsrebates/fs_CEI.pdf.

savings and demand reduction in the state. Training and education is provided through displays, equipment testing, technical consultations, technology demonstrations, tool lending, and courses. Courses include classes, workshops, educational seminars, and interactive training exhibits." [22] This program would benefit at least residential and commercial customers, regardless of whether they participate in the formal Resource programs. Since many of the same skills will be useful to industrial customers (and their energy-efficiency service providers), some of those costs would likely benefit them, as well. Provisionally, I suggest allocating these costs in proportion to the residential and commercial classes' usage.

- **Connections** is intended to "inspire interest in energy careers, new and emerging technologies, and future skills development," along with Centergies.[23] This program should be feeding energy professionals to all classes and their efficiency contractors, and should be allocated to all classes.
- **Strategic Planning** appears to be the planning support for Centergies and Connections, and should be allocated to all classes.
- **Builder Energy Code Training** "provides in-depth codes and compliance education at no cost to help the residential new construction and alterations building industry."[24] It is entirely residential.

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[22] Appendix E (*D, 2010 – 2012 WE&T Process Evaluation, Vol. 1* (Dec. 2012)), *available at* http://www.calmac.org/%5C/abstract.asp?id=2945.

[23] Appendix F (*Workforce Issues and Energy Efficiency Programs: A Plan for California's Utilities*, by Carol Zabin, et al. (May 2014)), Appendix 1A, page 5, *available at* http://laborcenter.berkeley.edu/pdf/2014/WET-Plan-Appendices14.pdf.

[24] Appendix G (California Energy Commission Energy Division, Blueprint (Jan. – Feb. 2014), p. 4, *available at*

- **Waypoint Connect** is an outreach program to "the nation's leading and largest public property management firms…managing over 60 millions square feet of office and retail space".[25] This cost should be allocated to commercial classes. The savings may be concentrated in the largest buildings, but until better information is available, I recommend allocating the costs between the commercial classes in proportion to gas consumption.
- **SEI Energize Schools**: Since schools are included in the commercial class, these costs should be recovered from the commercial classes.
- **ICF BESO** trains contractors in financing options and enhanced sales skills for small- and medium-sized commercial businesses and increases availability of skilled entry-level workers.[26] I suggest allocating this cost on small-commercial and half of large-commercial energy use.
- **Strategic Energy Resources** is a Local Government Partnership, which includes "energy and climate action planning, green building codes, and

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http://energycodeace.com/download/14549/file_path/fieldList/Energy-Code-Ace_2016-T24-Resources_Useful-Links.pdf.

[25] Appendix J (*Pacific Gas and Electric Company 2013–2014 Energy Efficiency Portfolio, Local Program Implementation Plan, Innovative Designs For Energy Efficiency Approaches (IDEEA365), Third Party Program Waypoint Connect Program* (July 2014)), *available at* http://eestats.cpuc.ca.gov/EEGA2010Files/PGE/PIP/Clean/13-14%20PGE%20IDEEA365%20Waypoint%20Connect%20PGE%2021037%20July%202014.pdf.

[26] Appendix H (*Pacific Gas and Electric Company 2013-2014 Energy Efficiency Portfolio, Local Program Implementation Plan, Third Party Innovative Designs For Energy Efficiency Approaches (IDEEA365), ICF Bridges To Energy Sector Opportunities, PGE210134* (July 2014)), p. 3, *available at* http://eestats.cpuc.ca.gov/EEGA2010Files/PGE/PIP/Clean/13-14%20PGE%20IDEEA365%20ICF%20BESO%20PGE210134%20July%202014.pdf.

benchmarking policies and training."[27] This appears to cover all customer classes.

- **On-Bill Financing Loan Pool**: As I understand it, this program is available to all non-residential customers, and should be recovered from commercial and industrial classes in proportion to load.

Table 8 summarizes my recommendations and the resulting change in allocation of the Non-Resource costs.

[27] Appendix I (*2017 Energy Efficiency Programs Annual Report* (May 2018)), pp. 66–67, *available at* eestats.cpuc.ca.gov/EEGA2010Files/PGE/AnnualReport/PGE.AnnualNarrative.2017.1.pdf.

Table 8: Revised Allocation of Non-Resource Costs

Program Name	2015 Gas Expenditures	Revised Allocation	Residential	Commercial		Industrial	
				Small	Large	Dist	Trans
Agricultural Continuous Energy Improvement	$29,566	As PG&E	0.0%	19.8%	0.6%	40.1%	39.6%
Lighting Innovation	$162,517	R+C+½I	51.3%	21.2%	2.1%	3.4%	22.0%
Lighting Market Transformation	$45,119	R+C+½I	51.3%	21.2%	2.1%	3.4%	22.0%
Technology Development Support	$219,761	All	41.1%	16.9%	1.7%	5.4%	35.1%
Technology Assessments	$578,631	All	41.1%	16.9%	1.7%	5.4%	35.1%
Technology Introduction Support	$641,072	All	41.1%	16.9%	1.7%	5.4%	35.1%
Commercial Continuous Energy Improvement	$202,688	C		50%	50%		
Statewide DSM Coordination & Integration	-$2,934	As PG&E	5.6%	43.4%	0.0%	31.3%	19.7%
Industrial Continuous Energy Improvement	$89,819	I				13.4%	86.6%
Centergies	$1,428,169	R+C	68.8%	28.4%	2.8%		
Connections	$376,968	All	41.1%	16.9%	1.7%	5.4%	35.1%
Strategic Planning	$148,423	All	41.1%	16.9%	1.7%	5.4%	35.1%
Builder Energy Code Training	$2,074	R	100.0%				
Green Building Technical Support Service	$846	R+½SC	82.9%	17.1%			
Ozone Laundry Energy Efficiency	-$399	As PG&E	0.2%	84.5%	2.7%	4.4%	8.2%
Waypoint Connect	$155,668	C		91.0%	9.0%		
SEI Energize Schools	$96,671	C		91.0%	9%		
ICF BESO	$48,048	SC+½LC		95.3%	5%		
Strategic Energy Resources	$1,351,578	All	41.1%	16.9%	1.7%	5.4%	35.1%
On-Bill Financing Loan Pool	$1,175,783	C+I		28.6%	2.8%	9.2%	59.4%
Total	$6,750,069		$2,453,471	$1,728,361	$259,975	$318,020	$1,998,206
Change from PG&E			$2,106,702	–$1,346,104	$244,110	–$1,664,100	$664,526
Share			36.3%	25.6%	3.9%	4.7%	29.6%
Percentage Point Change from PG&E			31.2%	-19.9%	3.6%	-24.7%	9.8%

C. Other Energy-Efficiency Costs

Q: What does PG&E list as the other energy-efficiency costs?

A: Table 9 shows PG&E's summary of what it calls "Other EE" costs, comprising advocacy and support for codes and standards; evaluation, monitoring and verification (EM&V); and the costs incurred by two renewable energy networks (REN). The share of these costs treated as gas-related in the last column is 18% of the total cost, the value that PG&E applies to the entire Other EE category.

Table 9: Other Energy-Efficiency Costs

Program	Sub-Category	Total Cost	Gas Share
Building Codes Advocacy	Codes & Standards	$3,296,640	$593,395
Appliance Standards Advocacy	Codes & Standards	$5,129,082	$923,235
Compliance Improvement	Codes & Standards	$2,776,489	$499,768
Reach Codes	Codes & Standards	$669,053	$120,429
Planning and Coordination	Codes & Standards	$910,251	$163,845
EM&V ED STAFF	EM&V	$10,473,870	$1,885,297
EM&V PG&E	EM&V	$3,722,532	$670,056
Bay Area Regional Energy Authority	REN	$14,403,008	$2,592,542
Marin Energy Authority	REN	$124,539	$22,417

From Chapter 4A Workpaper, tab "Other."
The names of the two public authorities in the Workpaper are incorrect. PG&E Testimony, Chapter 4A, p. 4A-7 describes the energy authorities as "Bay Area Regional Energy Network (BayREN) and Marine Clean Energy (MCE)," which are correct other than the misspelling of "Marin."

Q: What is the basis of the 18% allocation of the Other EE costs to gas?

A: PG&E does not explain this allocation, but it appears to be the ratio of the estimated gas benefits to estimated total benefits from the Chapter 4A workpaper (Benefit tab).[28]

[28] Chapter 4A Workpaper.

Q: How does PG&E propose to allocate among classes the Other EE costs it has estimated to be gas-related?

A: PG&E allocates the Other EE costs in proportion to its allocation of the sum of Resource and Non-resource costs, as shown in Table 2. About one third of the costs are allocated to each of the residential class, the small commercial class, and the industrials (combining distribution and transmission customers).

Q: Is this approach appropriate?

A: Not for all the costs. The three groups of Other EE costs (codes and standards, EM&V, and the renewable energy networks, or RENs) have characteristics that are very different from one another and generally different from the Resource and Non-resource costs.

Q: What drives the costs of the Codes and Standard programs?

A: The Codes and Standards subcategories benefit customers who purchase appliances and occupy buildings that are more efficient as a result of more stringent or better-enforced costs and standards. Appliance standards benefit primarily residential and small-commercial customers, regardless of their participation in the resource programs, while the benefits of building codes are spread over all the major classes.

Pending receipt of additional information from PG&E, I recommend allocating the Codes and Standards costs in proportion to weighted class gas usage. For appliance standards, I recommend allocating on gas usage on the usage of the residential and small commercial classes. For the three building code programs, I recommend allocating on residential and commercial gas use, plus 10% of industrial use, to reflect the fact that industry uses a greater percentage of gas for non-building uses. Finally, I recommend allocating the

Codes and Standards Planning and Coordination costs on the cost-weighted average of the four other Codes and Standards programs.

Q: How are EM&V cost incurred, and how should they be allocated?

A: The EM&V expenditures are incurred to fine-tune the program designs. Since most of the EM&V studies address a single program, it should be possible to directly assign EM&V costs to the resource (or in some cases, non-resource) programs. In the absence of that breakdown of EM&V costs, they could be allocated based on a combination of the number of programs evaluated and the spending on each program (which is probably correlated with the effort expended on evaluating the program.

Q: How should the costs of the Renewable Energy Networks be allocated?

A: Ideally, the costs of the programs administered by the RENs should be allocated to the customers served by each REN. I do not see any particular reasons for customers in other counties to pay for the programs, for which they are not eligible and without receiving comparable services.

Whether the costs are isolated to the REN's service territory or spread to all PG&E customers, the costs should be allocated to reflect the spending in those programs across classes, rather than the spending in other programs.

Table 10 shows the distribution of BayREN's expenditures. The Commercial category would include customers on small commercial, large commercial and perhaps some industrial rates, while the Water-Energy Nexus program is targeted primarily to residential customers.

Table 10: BayREN Actual or Budgeted Cost by Class

	2016	2017	2018	2019	2020	2021
Residential	$15,673	$14,650	$16,537	$16,595	$16,707	$15,170
Commercial	$432	$252	$2,883	$4,544	$5,401	$5,762
Public			$450	$701	$1,157	$1,715
Water-Energy	$402	$361	$1,051	$944	$831	$824
Residential + Water	97%	98%	84%	77%	73%	68%
Commercial + Public	3%	2%	16%	23%	27%	32%

Table 10 reflects spending for both gas and electric programs. The BayREN Annual Reports indicate that gas savings in 2015 (the year PG&E uses for its allocations) through 2017 were almost entirely in the residential sector. The BayREN programs are heavily skewed towards residential customers, much more than PG&E's allocation recognizes.

The filings by the much smaller MCE program also shows almost entirely residential gas savings. Table 11 shows the class shares of gas savings from MCE's Energy Efficiency Annual Reports for 2015 (Table 4), 2016 (Table 4) and 2017 (Table 3), and projections from MCE's 2017 Energy Efficiency Business Plan (Appendix A). The commercial gas savings in 2015 and 2016 were negative, due to the increased heating requirements to replace the water heat from lighting and refrigeration. The historical savings are all residential; MCE's business plan includes new efforts in industrial gas use. For simplicity, given the small size of the MCE gas program, I will treat the program as 100% residential.

Table 11: Marin Clean Energy Class Shares of Gas Savings

	Reported Actual			Planned	
	2015	2016	2017	2018/19	2020/21
Residential	106.1%	107.3%	100.0%	61.2%	75.6%
Commercial	-6.1%	-7.3%		1.4%	0.9%
Industrial				36.1%	22.7%
Agricultural				1.4%	0.9%

Q: How do you recommend the Commission allocate the Other EE costs?

A: Table 12 summarizes my recommendations from the previous discussion.

Table 12: Revised Allocation of Other EE Costs

	Gas Spending	Allocator	Residential	Commercial Small	Commercial Large	Industrial Dist	Industrial Trans
Building Codes Advocacy	$593,395	R+C+10%I	64.4%	26.6%	2.6%	0.9%	5.5%
Appliance Standard Advocacy	$923,235	R+SC	70.8%	29.2%	-	-	-
Compliance Improvement	$499,768	R+C+10%I	64.4%	26.6%	2.6%	0.9%	5.5%
Reach Codes	$120,429	R+C+10%I	64.4%	26.6%	2.6%	0.9%	5.5%
Planning and Coordination	$163,845	Wtd Avg	67.2%	27.7%	1.5%	0.5%	3.1%
EM&V ED STAFF	$1,885,297	Therms saved 2015–16	52.5%	20.7%	1.1%	7.7%	18.0%
EM&V PG&E	$670,056						
BayREN	$2,592,542	Spending 2016–21	83.0%	12.0%	1.2%	3.9%	-
Marin Clean Energy	$22,417	Savings 2015–17	100%				
Total ($k)	$7,471		$5,060	$1,479	$93	$307	$532
Revised Share			67.73%	19.79%	1.25%	4.12%	7.12%
PG&E Share			33.84%	32.86%	1.94%	10.82%	20.54%

Q: Please summarize your recommendations for the allocation of energy-efficiency costs.

A: Table 13 summarizes PG&E's proposals and my recommendations.

Table 13: Summary of Energy-Efficiency Allocation Recommendations

	PG&E Proposal				My Recommendation			
	Resource	Non-Resource	Other	Total	Resource	Non-Resource	Other	Total
Residential	36.9%	5.1%	33.8%	33.8%	52.5%	36.3%	67.7%	52.6%
Small Commercial	31.5%	45.6%	32.9%	32.9%	20.7%	25.6%	19.8%	21.1%
Large Commercial	2.1%	0.2%	1.9%	1.9%	1.1%	3.9%	1.2%	1.4%
Industrial Distribution	8.8%	29.4%	10.8%	10.8%	7.7%	4.7%	4.1%	7.1%
Industrial Transmission	20.6%	19.8%	20.5%	20.5%	18.0%	29.6%	7.1%	17.9%

Q: Does this conclude your direct testimony?

A: Yes.