

# **California's Green Power Market: Current Status and Appeal to Industrial Consumers**

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## **ABSTRACT**

In early 1998, California opened the doors for a competitive green power market by launching a \$540 million renewable energy market transformation program designed to impact all major aspects of the green power market. Regional Economic Research, Inc. (RER) recently evaluated this program, administered by the California Energy Commission. The California Renewable Energy Program provides production incentives to power generators and purchase incentives to Energy Service Providers with pass through to their customers. The Program also funds consumer education and marketing efforts. Because of our independent evaluation efforts of this half billion-dollar renewable energy program implemented over the past year, RER has identified and assessed the essential issues emerging from this new and evolving market. Surprising to some, many large industrial customers, such as Sony Records, an automobile assembly plant and a large wine producer wanted to purchase Green Power through the customer credit program. The objective of this paper is to present the primary issues affecting the development of a competitive green power market in California and to make some comparisons between industrial customers and other nonresidential customers.

## **Introduction**

Nearly two and a half years ago, California opened the doors for a competitive green power market by launching a \$540 million market transformation program designed to impact all aspects of the green power market. The California Energy Commission designed and administers the Renewable Energy Program (REP) structured to support both the supply and demand aspects of the market. Regional Economic Research, Inc. (RER) recently evaluated the program, as the independent entity selected to perform the preliminary program review for the California State legislature. A final evaluation of the current Program is scheduled to be completed by November 2002.

The REP provides tailored financial incentives and consumer-oriented information to existing and new power generators, Energy Service Providers (ESPs), power marketers and end-use customers. In addition, education outreach and marketing support are funded through the Consumer Education and Emerging Technology elements of the Program. As a result of these recent evaluation efforts, RER has performed market research with the program stakeholders and assessed the key issues emanating from this evolving California energy market. This paper will focus primarily upon the results of the Customer Credit element of the REP as it relates to the industrial customer class.

## Customer Credit Program Background

The Customer Credit Program began operating in April of 1998. The program is designed to provide a vehicle to rebate funds efficiently from the Renewable Resource Trust Fund to end-use customers who purchase qualified renewable energy from certified ESPs. Energy Service Providers register to participate in the program and must provide eligible renewable electricity to California customers currently served by utilities that are paying into the California Public Goods Charge Fund.

The Customer Credit Program was designed to meet the following objectives (CEC March 1997<sup>1</sup>):

- To reduce the cost premium for renewable energy that customers pay, thus encouraging them to buy renewable power,
- To help build a green market infrastructure by helping renewables become competitive with nonrenewable generation technologies, and
- To facilitate consumer choice of renewable power.

The Customer Credit Program pays an incentive to registered ESPs who purchase eligible renewable electricity<sup>A</sup> and sell it to San Diego Gas & Electric, Southern California Edison, Pacific Gas & Electric, or Bear Valley Electric customers. Currently, the incentive is \$10.00 per MWh and will remain at this level through June 2001. Every six months, the Commission is scheduled to re-evaluate the program activity and remaining funds and, if deemed necessary, change the incentive amount for the subsequent six-month period. Table 1 presents the variation of the incentive level since the beginning of the program.

**Table 1. California Customer Credit Program Incentive Levels (CEC Website<sup>2</sup>)**

Effective Time Period	Incentive (\$ per MWh)
April 1998 through November 1999	\$15.00
December 1999 through June 2000	\$12.50
July 2000 through December 2000	\$10.00

Due to anticipated market growth over time, the Fund is scheduled to provide an increasing allocation over the life of the program. Table 2 presents the planned allocation for the Customer Credit program as stated in the AB 1890 Renewables Policy Report.

<sup>A</sup> Providers and wholesalers of green power must register their products with the Commission in order to be considered eligible for Customer Credit incentives. Eligible green power products must be generated by an in-state renewable electricity generation technology as defined by Public Utilities Code section 383.5(a).

**Table 2. Allocations to the Customer Credit Subaccount (CEC, June 2000<sup>3</sup>)**

	1998	1999	2000	2001	Overall
Renewable Resource Trust Fund Allocation (in millions)	\$135	\$135	\$135	\$135	\$540
Annual Percent Allocated to Customer Credit	8%	12%	16%	20%	14%
Annual Allocation to Customer Credit (in millions)	\$10.8	\$16.2	\$21.6	\$27.0	\$75.6

As shown, the Customer Credit program has been allocated \$75.6 million, representing 14% of the entire Trust Fund. The allocation ranges from \$10.8 million in 1998 (representing 8% of the first year's overall allocation from the Trust Fund) to \$27.0 million in 2001 (representing 20% of that year's allocation).

ESPs actively participating in the program file monthly performance reports with the Commission. Each report presents 1) data on a particular month's sales of eligible green power to customers, 2) data on when the power was generated and purchased, and 3) data on the technology (fuel type) of the purchased energy. Sales and purchases need not occur in the same month, as the program allows ESPs to bank excess purchases or excess load served and true it up annually.<sup>B</sup> Incentives are paid to providers, however, only when power purchased is balanced or matched to power delivered.

The Program places an annual ceiling or "cap" on the incentives paid for service to customers who are not designated as either residential or small commercial by their utility rate schedule. These *Other* Customers would typically fall into the customer classes of medium to large commercial and industrial, agricultural, or public lighting. Program incentives paid for service to these *Other* customers are capped at \$1,000 per year. Furthermore, there is a maximum of \$15 million that this entire class of customers may receive from the Fund over the life of the Program.

The approach used in this study included an analysis of the following three areas.

### **Program Performance**

Using the program data supplied by the Commission, the performance of the program was evaluated based on program goals and a set of proximate indicators developed during the initial stage of the analysis. The indicators used included program participation, growth of green power sales, and distribution of funds according to planned allocations.

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<sup>B</sup> Through November 1999, the amount banked was valued at the quantity of kWh multiplied by the current incentive rate. In December 1999, the program changed banking procedures so that the quantity of kWh was banked. With the new procedure, the value of the banked kWh amount is determined at the time the credit is passed on to consumers. At the end of every year, a true up is calculated.

## Consumer Attitudes and Opinions

Consumer survey responses were analyzed to determine attitudes and perceptions toward green power as well as understanding of the market and of the Customer Credit program.

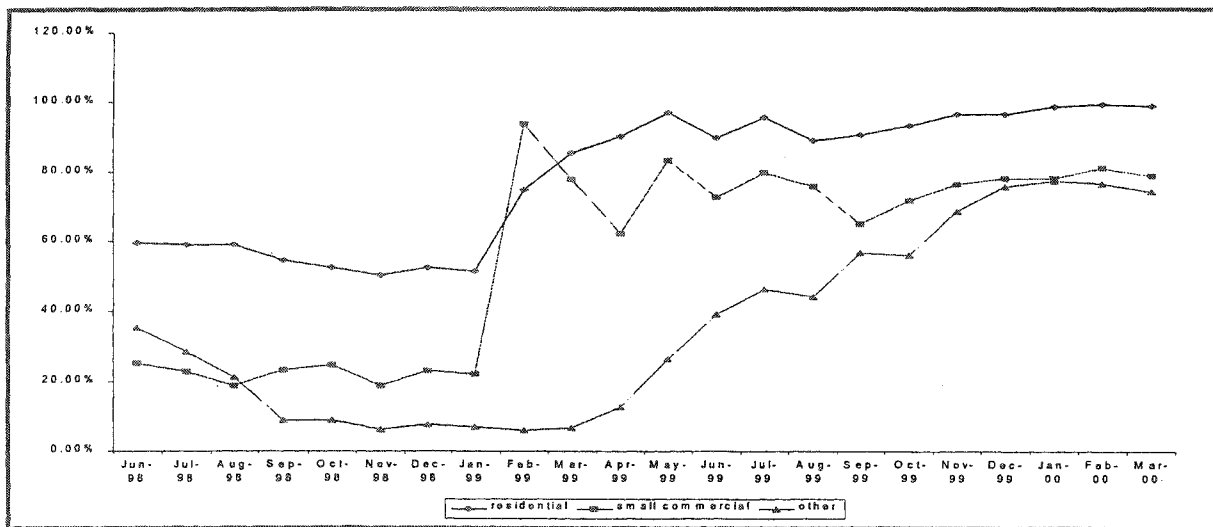
## ESP Market Perceptions and Experience

Interviews with participating and nonparticipating ESPs revealed how they are responding to the program and to the ongoing development of a retail green power market in California.

## Market Trends

The number of customers purchasing green power in California was compared with the number of Direct Access customers statewide.<sup>C</sup> Overall, the percentage ranged from a minimum of 39% in November 1998 to a maximum of 94% in February 2000. Figure 1 presents the monthly trends for each customer segment. As shown, the percentage of Small Commercial switchers who purchased green power jumped from 22% to 94% in February 1999, while increases in the Residential and "Other" (nonresidential/non-small commercial) segments were made more gradually during the spring and summer of 1999. All customer segments appear to have at least temporarily peaked in January - February 2000.

Figure 1. Percentage of Switchers Who Buy Green Power by Segment



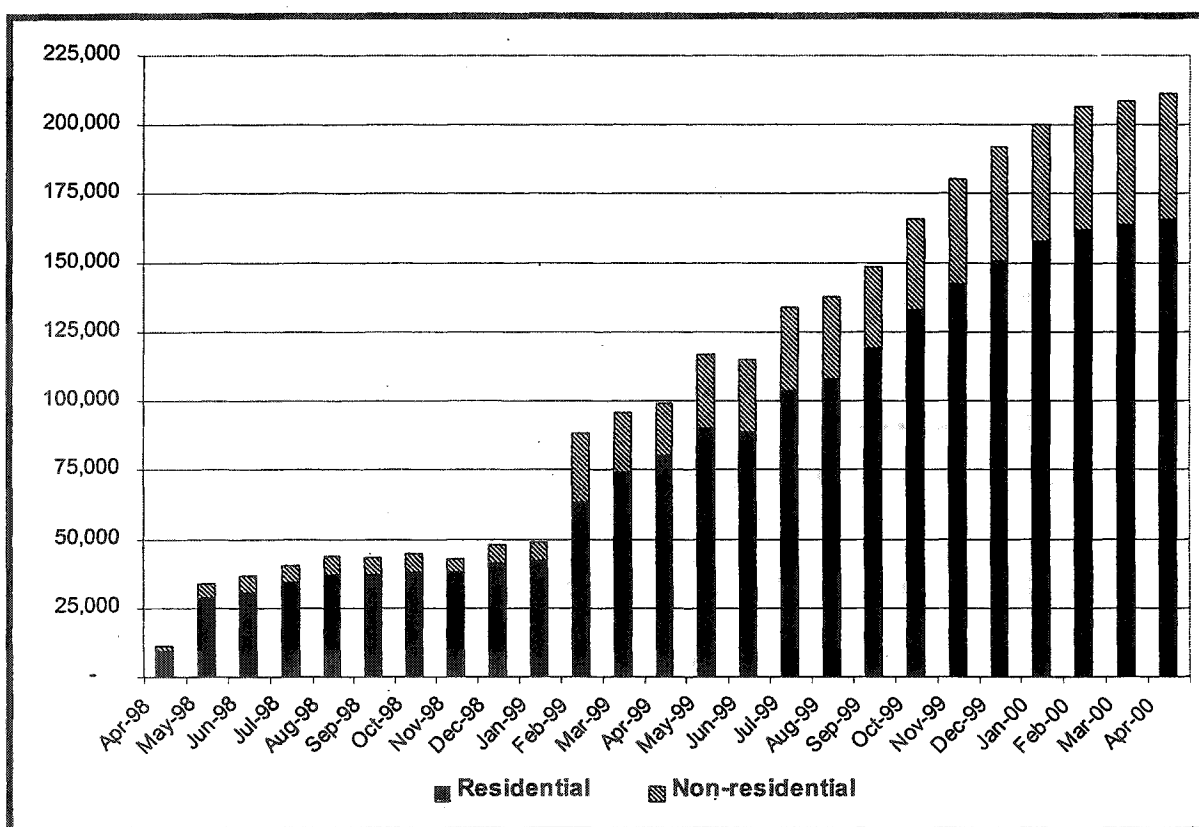
Activity in the Customer Credit Program was evaluated for the period of April 1998 (program inception) through April 2000. For this 25-month period, the participation of ESPs selling green power under the program, the number of customers of those ESPs, and the MWh of green power served were evaluated.

<sup>C</sup> Direct access customers, or switchers, are customers who have switched from their utility to another energy provider.

## Customers Served

Customers served under the Customer Credit Program ranged from roughly 11,059 to 211,498 over the period evaluated. Figure 2 illustrates the increase of customers served over the period April 1998 through April 2000. As shown, the number of customers served under the program steadily increased through this period for the residential segment. Large changes in February 1999 for the Residential and Small Commercial segments reflect the beginning of reporting for one ESP in the program. Furthermore, the Small Commercial segment increased nearly five-fold in February 1999 due to the addition of an ESP to the program who started to report customers in February 1999.

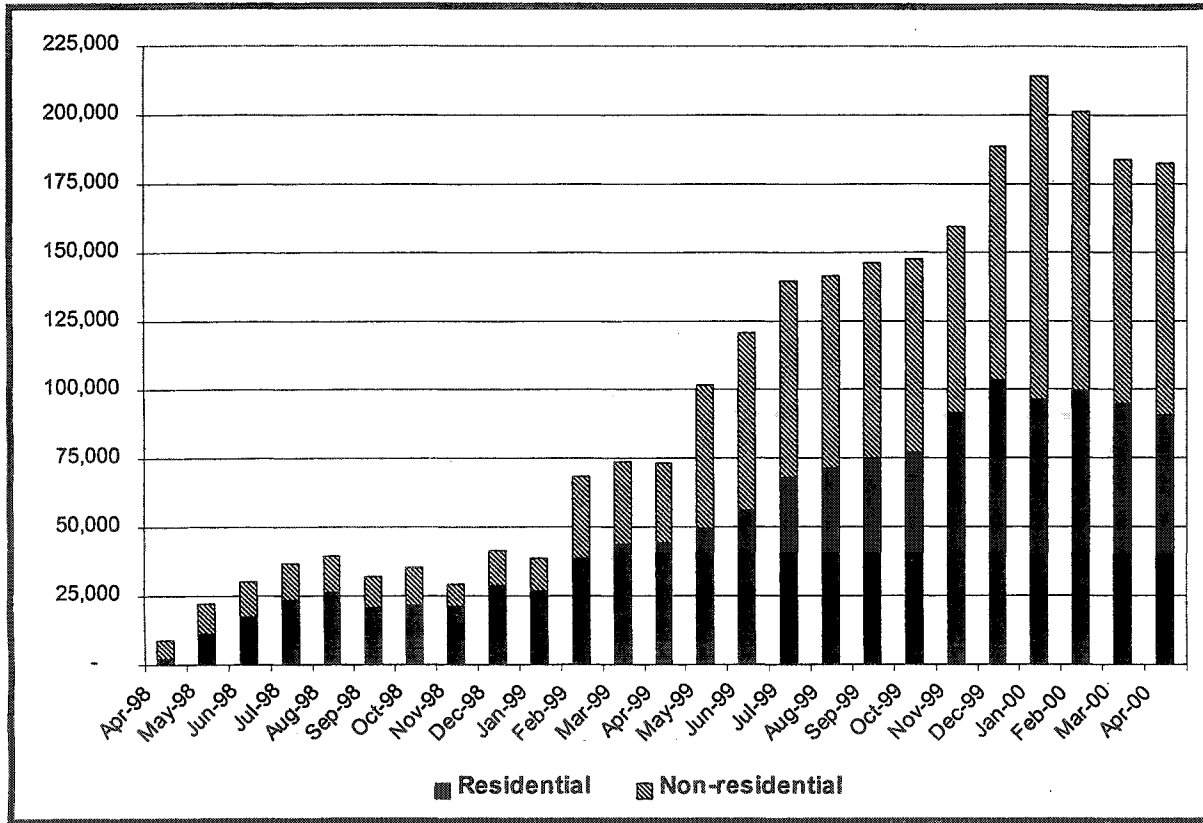
**Figure 2. Number of Customers Served by ESPs**



## MWh Served

Figure 3 illustrates the monthly provisions of MWh reported by participants. Note that the reported MWh of eligible green power provided under the Program peaked in January 2000 at 214,083 MWh. Overall, the majority of green power was provided to residential customers (53%), with 22% and 25% sold to the Small Commercial and Other segments respectively.

**Figure 3. Monthly MWh Provided by Participant ESPs**



Green power provided to the *Other* customer segment more than doubled in May 1999 as two participant ESPs started reporting sales in that month. Furthermore, large increases in load reported by two ESPs in January 2000 caused the MWh sales to increase sharply for this segment. A new ESP to the program started reporting in that month as well.

### Survey Results for Industrial Customers

RER conducted a survey of California electricity customers in the investor-owned utility territories in order to assess the impact of the California Energy Commission's Customer Credit Program. The survey respondents included 462 nonresidential customers of whom 42% purchased green power.<sup>D</sup> Included in the nonresidential customers were 59 customers who were classified as industrial. Of these, 49% reported purchasing green power.

Respondents were asked a series of questions to determine how aware they were of their options for purchasing electricity. Table 3 presents the mean results.

<sup>D</sup> This percentage is not representative of the population. In order to insure some respondents would be Program participants, green power customers were oversampled.

**Table 3. Awareness of Options for Purchasing Electricity**

Response	Industrial		Other Nonresidential	
	Nongreen	Green	Nongreen	Green
The way I buy electricity currently is different from a year or two ago.	0% (0.00) n = 28	41% (0.09) n = 29	12% (0.02) n = 209	55% (0.04) n = 165
In the past two years, I have received information in the mail or by telephone from companies asking me to switch my energy provider.	63% (0.09) n = 30	86% (0.07) n = 28	49% (0.03) n = 222	66% (0.04) n = 175
If yes to above, number of offers they recall having received	3.0 (0.81) n = 17	3.0 (0.46) n = 21	2.2 (0.13) n = 93	2.6 (0.23) n = 102
Extent informed of their options (0 to 4 scale)	2.07 (0.19) n = 30	3.03 (0.17) n = 29	2.06 (0.07) n = 222	2.91 (0.07) n = 176

Standard errors shown in parentheses

As shown, a higher proportion of green industrial respondents reported they changed the way they buy electricity than nongreen respondents. However, the difference in mean responses between the green industrial and green other categories is insignificant.<sup>E</sup> Furthermore, one must keep in mind the sample sizes for industrial customers are small.

Most respondents in all categories had received offers from Energy Service Providers (ESPs) with an average of roughly three offers each. Respondents were also asked to rate how informed they were about their options with a 0 meaning unawareness and a 4 meaning they were extremely informed. As shown, green respondents in both categories reported they were more informed than nongreen respondents. However, there is no significant difference between the responses of industrial and other customers.

Respondents were asked a series of questions to determine how aware they were of green power. Table 4 presents the results. Again, the small sample sizes of industrial customers must be kept in mind when reviewing the results.

<sup>E</sup> Significance throughout this analysis is reported at the 95% level of confidence.

**Table 4. Awareness of Green Power**

Response	Industrial		Other Nonresidential	
	Nongreen	Green	Nongreen	Green
I am aware I can choose to buy power generated from renewable sources, often called "green power."	54% (0.10) n = 28	72% (0.08) n = 29	54% (0.03) n = 211	72% (0.03) n = 172
I have received information in the mail or by telephone from companies selling green power.	45% (0.09) n = 29	48% (0.09) n = 29	29% (0.03) n = 221	46% (0.04) n = 176
If yes to above, number of offers received	1.5 (0.35) n = 13	1.3 (0.13) n = 13	1.8 (0.14) n = 56	1.7 (0.13) n = 63
I am familiar with the power content label. <i>(Note: a picture was displayed in the survey.)</i>	3% (0.03) n = 30	11% (0.06) n = 28	6% (0.02) n = 216	20% (0.03) n = 172
The energy I am purchasing is significantly different from the average California power system mix contained on the power content label.	0% (0.00) n = 28	4% (0.04) n = 28	3% (0.01) n = 210	18% (0.03) n = 170
I have seen the Green-e logo. <i>(Note: a picture was displayed in the survey.)</i>	3% (0.03) n = 30	7% (0.05) n = 28	5% (0.01) n = 220	7% (0.02) n = 174
I have heard of the term "Green-e certified."	0% (0.00) n = 30	14% (0.07) n = 29	7% (0.02) n = 223	10% (0.02) n = 175

As shown, a higher proportion of green respondents reported they were aware of green power than did nongreen respondents. Interestingly, the mean responses for both industrial and other nonresidential customers were the same. Roughly 30% to 48% of respondents had received offers from ESPs selling green power with the average number of offers close to two each. When asked about the power content label, respondents in all categories reported low awareness. Furthermore, with the exception of the difference between green and nongreen respondents in the other nonresidential category, the differences in mean responses between categories for this question are insignificant. Few green respondents were aware that their electricity was different from the California power system mix. Awareness of the green-e logo or the term "green-e certified" was also very low among respondents with no significant difference among industrial customers as compared with other nonresidential customers.



Respondents were asked to rate a number of factors according to how influential they were when making the decision to switch providers. Responses were given on a scale of 1 to 5 where 1 meant “not at all influential” and 5 meant “very influential.” Table 5 presents the mean results. As shown, “cost of electricity” received the highest mean response.

**Table 5. Influence of Factors in Choosing to Change Providers**

Response	Industrial		Other Nonresidential	
	Nongreen	Green	Nongreen	Green
Hassle of changing companies	3.7 (0.23)	3.3 (0.22)	3.8 (0.09)	3.2 (0.11)
Research involved in making the switch	3.6 (0.18)	3.1 (0.22)	3.8 (0.07)	3.4 (0.10)
Quality of customer service	4.3 (0.15)	3.9 (0.19)	4.3 (0.07)	4.1 (0.08)
Reliability of customer service	4.6 (0.15)	4.4 (0.22)	4.6 (0.06)	4.3 (0.09)
Safety	4.4 (0.17)	3.9 (0.24)	4.2 (0.08)	3.8 (0.10)
Location of provider (in-state vs. out-of-state)	2.8 (0.22)	2.7 (0.27)	3.19 (0.10)	2.5 (0.10)
Contract commitments	3.6 (0.26)	4.1 (0.18)	4.1 (0.08)	3.8 (0.10)
Cost of electricity	4.7 (0.13)	4.7 (0.12)	4.7 (0.05)	4.5 (0.07)
Source of electric generation (gas/oil/nuclear/green)	3.2 (0.23)	2.5 (0.19)	3.5 (0.09)	3.1 (0.11)
Sign-up incentives (bonus airline miles or free electricity)	2.8 (0.20)	2.7 (0.23)	3.3 (0.09)	2.8 (0.11)
Sample Sizes	30	29	223	177

Among the responses shown for industrial customers, only “source of electric generation” showed a significant difference between green and nongreen respondents. In comparison, nearly all factors showed significant differences between mean responses for green and nongreen customers in the other non-residential category.<sup>F</sup> Moreover, there was very little difference in mean responses of industrial customers as compared to other nonresidential customers.<sup>G</sup>

<sup>F</sup> The difference in means for the factor “quality of customer service” was insignificant.

<sup>G</sup> Specifically, only two factors differed: industrial green customers rated “source of electric generation” lower than did other residential green customers; also, industrial nongreen customers rated “sign-up incentives” lower than did other residential nongreen customers.

Respondents were also asked to rate various features of green power according to how important they were when making the decision to buy green power. Responses were given on a scale of 1 to 5 where 1 meant “not at all important” and 5 meant “very important.” Table 6 presents the mean results.

**Table 6. Importance of Green Power Features**

Response	Industrial		Other Nonresidential	
	Nongreen	Green	Nongreen	Green
Reduction of carbon dioxide emissions (known to affect global climate change)	3.9 (0.23)	3.8 (0.19)	4.0 (0.08)	3.9 (0.10)
Reducing ground and water pollution and environmental damage (such as acid rain impacts)	4.1 (0.22)	3.8 (0.21)	4.3 (0.07)	4.1 (0.09)
Support the use of renewable energy resources (conserve fossil fuels)	4.1 (0.24)	3.7 (0.19)	4.1 (0.08)	4.0 (0.09)
Increased electric price stability during oil production shortages	4.1 (0.18)	4.1 (0.16)	4.2 (0.07)	4.0 (0.08)
Cleaner air for future generations (less fossil fuel)	4.2 (0.20)	3.9 (0.18)	4.3 (0.07)	4.2 (0.08)
Fewer nuclear power plants	3.6 (0.28)	3.2 (0.25)	3.7 (0.10)	3.7 (0.12)
Support the development of a “green energy” industry in California	3.6 (0.25)	3.4 (0.25)	3.8 (0.09)	3.8 (0.11)
Sample Sizes	30	29	220	169

While at first glance it appears that industrial customers rated these factors slightly less important than did other nonresidential customers, in fact there are no significant differences between the mean responses of all categories.

Respondents were further asked to describe their willingness to pay for green power. Table 7 presents the results.

**Table 7. Willingness to Pay for Green Power**

Response	Industrial		Other Nonresidential	
	Nongreen	Green	Nongreen	Green
I would purchase green power over conventional power if the cost were the same.	88% (0.06) n = 26	92% (0.05) n = 26	88% (0.02) n = 209	87% (0.03) n = 167
I would pay nothing more for green power	50% (0.09) n = 30	86% (0.07) n = 29	62% (0.03) n = 225	56% (0.04) n = 178
I would pay 5% more for green power	30% (0.09) n = 30	10% (0.06) n = 29	18% (0.03) n = 225	19% (0.03) n = 178
I would pay 10% more for green power	13% (0.06) n = 30	3% (0.03) n = 29	14% (0.02) n = 225	14% (0.03) n = 178
I would pay 25% more for green power	0% (0.00) n = 30	0% (0.00) n = 29	0.9% (0.01) n = 225	3.4% (0.01) n = 178
I would pay more than 25% more for green power <sup>H</sup>	0% (0.00) n = 30	0% (0.00) n = 29	0.4% (0.00) n = 225	2.2% (0.01) n = 178

As shown, most respondents in all categories reported they would purchase green power if the cost were the same as conventional power. Interestingly, a significantly higher proportion of industrial green customers reported they would pay nothing more for green power than did nongreen industrial customers or green other nonresidential customers. Furthermore, none of the industrial customers would pay more than a 10% premium for green power while a small proportion of other nonresidential customers reported they would pay a higher premium.

### Comments from Green ESPs Pertinent to Industrial Customers

Twenty-two ESPs were also interviewed as part of this study. Several of them focused on providing power to customers who were neither residential nor small commercial. The most common comment heard about this segment of customers is that they will not pay more for green power. For example, two respondents who focus on this segment explained that they tell customers they offer green because it is good for the environment but customers focus on price and therefore have little interest in green power. On the other hand, other ESPs

<sup>H</sup> There were two positive responses to this statement: one respondent reported he would pay 50% more and another reported he would pay 100% more for green power over conventional power.

reported receiving inquiries from businesses in the nonresidential/non-small commercial customer segment for green power pricing because they wanted to brand themselves as environmentally conscious or because their employees were asking for it.

Another comment heard from ESPs who focus on this nonresidential/non-small commercial segment was their concern that there are not enough economic incentives for suppliers to build more renewable generating facilities. One commented that he thought more incentives should be paid to suppliers to encourage long term commitments. A general comment heard from ESPs serving all segments was that customers in general are unaware of the power content label and that it is ineffectual as a consumer education tool. While some ESPs noted that customers who were already aware and educated about green power noticed and read the label, most said that customers in general did not make use of it.

## Summary

These results show relatively little difference in overall attitudes toward green power between industrial and other nonresidential customers. One area where a difference was found is that fewer industrial customers are willing to pay a premium for green power than are other nonresidential customers. Furthermore, for those industrial customers who were willing to pay a premium, the amount they were willing to pay was lower, on the average, than that reported by other nonresidential customers.

Another interesting result that applies across all nonresidential customers is low awareness of the power content label and the "green-e" designation. Customer survey responses and comments from ESPs indicate the need to reassess the effectiveness of this consumer education tool.

Not surprisingly, responses of green customers indicated more awareness of electricity purchasing options and of green power than did responses of nongreen customers. However, there were minimal differences in awareness between industrial and other nonresidential customers.

## References

California Energy Commission. March 1997. *Policy Report on AB1890 Renewables Funding.*

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[http://www.energy.ca.gov/renewables/current\\_past\\_credit\\_levels.html](http://www.energy.ca.gov/renewables/current_past_credit_levels.html)

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