

Customer Energy Efficiency Program  
Measurement and Evaluation Program

**PACIFIC GAS & ELECTRIC COMPANY'S  
PY97 AGRICULTURAL ENERGY EFFICIENCY INCENTIVES:  
PUMPING AND RELATED MARKET EFFECTS STUDY  
STUDY ID #335A  
TECHNICAL APPENDICES**

*March 30, 1999*

Measurement and Evaluation  
Customer Energy Efficiency Policy & Evaluation Section  
Pacific Gas and Electric Company  
San Francisco, California

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As part of its Customer Energy Efficiency Programs, Pacific Gas and Electric Company (PG&E) has engaged consultants to conduct a series of studies designed to increase the certainty of and confidence in the energy savings delivered by the programs. This report describes one of those studies. It represents the findings and views of the consultant employed to conduct the study and not of PG&E itself.

Furthermore, the results of the study may be applicable only to the unique geographic, meteorological, cultural, and social circumstances existing within PG&E's service area during the time frame of the study. PG&E and its employees expressly disclaim any responsibility or liability for any use of the report or any information, method, process, results or similar item contained in the report for any circumstances other than the unique circumstances existing in PG&E's service area and any other circumstances described within the parameters of the study.

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# **Equipoise Consulting, Inc.**

Energy Analysis

Project Management

Training

## **Technical Appendices for**

### **Pacific Gas & Electric's PY97 Agricultural Energy Efficiency Incentives: Pumping and Related Market Effects Study Study ID #335A**

Submitted by:

## **Equipoise Consulting Incorporated**

in association with

**Dr. Kirtida Parikh and  
Field Research Corporation**

March 30, 1999

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***Appendix A***  
***CADMAC Waiver***

**PACIFIC GAS & ELECTRIC COMPANY  
REQUEST FOR RETROACTIVE WAIVER FOR  
1997 AGRICULTURAL SECTOR  
ENERGY EFFICIENCY INCENTIVES (EEI) PROGRAMS**

Study ID: 335A (Pumping), 335B (Refrigeration), and 335C (Greenhouse Heat Curtain)

Date Approved: June 17, 1998

**Summary of PG&E Request**

This waiver requests deviations from, or clarifications of, the Protocols<sup>1</sup> by PG&E for the 1997 Agricultural Sector Energy Efficiency Incentives (EEI) Evaluation<sup>2</sup>. PG&E seeks approval to: (1) use a Simplified Engineering Model supported by telephone surveys and on-site data collection to estimate the gross impacts for the refrigeration and greenhouse end-uses, and (2) conduct a market effects study in place of a net-to-gross analysis, applying a default net-to-gross ratio to the sector. (Note: items numbers (1) and (2) above referred to in each of the following sections.)

Each of these requests evolve from the evaluation of the 1994 through 1996 PG&E Agricultural programs, the reviews of those program evaluations, the limited size of the participant population, and the limited size of the PG&E agricultural sector in general.

**Proposed Waiver**

PG&E seeks CADMAC approval to: (see Table A for Summary)

**(1) Allow the use of Simplified Engineering Models** (as specified in Appendix A, page A-2 of the Protocols) supported by census telephone survey and on-site data collection to estimate impacts for the refrigeration and greenhouse heat curtain end-uses.

**Parameters and Protocol Requirements**

Table C-6 is unclear as to the method required to compute gross impacts. Under “Participant Group”, item 2 would suggest that a Simplified Engineering Model would be adequate, while item 4 suggests that if billing analysis is not used, “the analysis will rely on direct end-use metering”.

**Rationale**

PG&E’s 1997 PG&E agricultural program includes 9 greenhouse heat curtain sites and 13 refrigeration sites representing approximately 11 and 12 percent of the agricultural sector avoided cost, respectively. Metering of these sites would be prohibitively expensive and is unlikely to result in improved estimates of savings. Therefore, PG&E seeks approval to use a participant-based engineering model supported by field data collection for a census of all participants to estimate the impacts for these 22 sites.

A similar waiver was granted for the 1995 (approved October 1996) and 1996 (approved July 22, 1997) for PG&E’s Agricultural Sector evaluations.

**(2) Instead of a net-to-gross study, allow the use of a default net-to-gross ratio of 0.75 for the agricultural sector, subject to the condition that PG&E conduct a telephone survey based market effects study of four key market barriers for the pumping and pumping related end-use.** The final report for this study would be submitted to CADMAC by March 30, 1999. (A short study description is attached.)

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<sup>1</sup> Protocols and Procedures for the Verification of Costs, Benefits, and Shareholder Earnings for Demand-Side Management Programs

<sup>2</sup> The first year earnings claim for the 1997 Agricultural Sector is approximately \$1,220,000.

Parameters and Protocol Requirements

Table 5, item B.2. requires the estimate of net impacts. In the Agricultural Sector this has been accomplished by estimating a gross impact and multiplying it by an estimated Net-to-Gross ratio.

Rationale

Allowing PG&E to substitute a forward-looking market effects study for the Protocol required net-to-gross assessment would (1) supply useful information on the program’s effectiveness in modifying the market, and (2) further assess the usefulness of this technique for measuring program effects on market barriers. As this is a small program, a market effects study only makes sense for the largest end-use, pumping, since the other end-uses have fewer than 13 participants each.

This is similar to a waiver granted for PG&E’s 1996 Agricultural Sector EMS Program evaluation (approved July 22, 1997, modified November 21, 1997).

Conclusion

PG&E is seeking retroactive waivers to clearly define, in advance, acceptable methods for performing the 1997 Agricultural impact evaluation of the EEI programs. Recommendations in this waiver are designed to maximize the quality and value of evaluation results. The proposed waiver allowing engineering modeling clarifies the protocol requirements while supporting reasonable estimations of gross program impacts. The waiver allowing a market effects study rather than conducting a net-to-gross analysis seeks to maximize information useful to future programs.

**TABLE A**

<b>IMPACT MEASUREMENT REQUIREMENTS - TABLE C-6 AND TABLE 5</b>			
<b>Parameters</b>	<b>Protocol Requirements</b>	<b>Waiver Alternative</b>	<b>Rationale</b>
End Use Consumption and Load Impact Model	LIRM or CE (calibrated engineering) or Simplified Engineering Model	Allow Simplified Engineering Model supported by telephone and field data collection to estimate the impacts for the refrigeration and greenhouse end-uses.	Small number of sites makes use of LIRM or regression method impossible. End-use metering is prohibitively expensive for the complex sites and effort is disproportionate to savings.
Net Load Impacts	Study-based Net Load Impacts	Use of a NTG ratio of 0.75 for sector conditioned on conducting a survey-based market effects study of four key pumping end-use market barriers.	A market effects study would supply information that is more useful to future agricultural pumping programs and future market effects assessment efforts.

### ***Proposed 1997 Agricultural Sector Market Effects Study***

Pacific Gas & Electric (PG&E) proposes conducting a market effects study of the PG&E's Agricultural Sector pumping end-use. The study will attempt to assess the market for efficient technologies and practices and test or study the market effects of PG&E's 1994-1997 Energy Efficiency Incentives (EEI) Programs. A market characterization will guide the formulation of the research plan and survey instrument. In particular, the effects will be measured in terms of the extent to which the program has been able to reduce the 'barriers' faced by the market for repairs/retrofit of pumps or pumping related equipment. At this stage we anticipated using discrete choice models based on the billing data and information from a survey of EEI participants and a comparison group.

The planned approach will collect data via telephone interviews of a census of participants (~136) and a larger sample of nonparticipants (250). Experience has shown that limiting the survey length to 12 minutes results in high completion rates (~80%) in this sector. Since the population of participants is relatively small, high participant completion rates are required. The goal of the survey is to determine the level of awareness among customers regarding efficient technologies/practices, their beliefs/attitudes regarding the use of energy efficient technologies/practices, and beliefs/attitudes regarding projected future purchasing decisions. In order to assess the change in the level of awareness or attitude, information is required for the same customers over a period of time. Participants can be relied on to correctly report current and future perceptions/beliefs. However, since it is not possible to determine a participant's true pre-participation attitude, comparison group responses will be used as a proxy for pre-participation beliefs.

In the best of worlds it would be preferable to identify a control area that has not been affected by a utility agricultural incentives program, then survey the control area customers for use as a baseline reference. This is not practical in the current study because (1) under the currently evolving deregulation environment obtaining customer names and telephone numbers would be difficult and time consuming, and (2) the current evaluation/reporting timeline does not allow the time necessary to develop this information, conduct the survey, complete the analysis and report the results.

Along with the customer survey used to reveal the demand side effects, a survey of pump dealers is planned to attempt to assess the supply side effects. The demand side effect and the supply side effect will be compared.

It is anticipated that the data will be analyzed using discrete choice analysis techniques. The possible use of multinomial logit or probit model forms, and proxy quantitative data or revealed preference data to be used along with the survey, will be reviewed. Criteria will include the applicability of the modeling approach to the study objectives, the availability and cost of appropriate modeling software, and whether the data collection approach and the modeling approach are compatible. Modeling alternatives were reviewed during the 1996 EMS Agricultural Market Effects Study. This review revealed that specialized software for the specific type of modeling planned was either not available or extremely expensive for a one-time application. General statistical software packages (such as SAS) were able to perform such modeling when applied under specific constraints. An appropriate balance will be sought among the primary objectives of (1) developing a causal relationship between the changes in the customers' perception, opinions, and purchase decisions about efficient technologies/practices and the program participation, and (2) contributing to the art of measuring market effects. The final choice of modeling approach will be discussed with the PG&E project manager, along with the reasons for rejection of alternative approaches. A discussion of the model selection process will be included in the project report.



***Appendix B***  
***Market Characterization***

## ***Market Characterization for Pacific Gas & Electric Agricultural Pumping Market***

### **1 INTRODUCTION**

This market characterization study was conducted as part of Pacific Gas & Electric Company's (PG&E) 1997 Agricultural Energy Efficiency Incentives (AEEI) impact evaluation. A Retroactive Waiver (Waiver) for the PG&E's 1997 AEEI Evaluation was approved by the California DSM Measurement Advisory Committee (CADMAC) on June 17, 1998. Part of this Waiver allowed the substitution of a market effects study of the pumping and related end-use for the agricultural sector net-to-gross analysis. The market effects study defined in the Waiver included a market characterization based upon existing data and data sources. The primary sources identified during question and answer sessions on the Waiver were: (1) the 1998 SCE Hydraulic Services Program Market Effects Study, (2) information from PG&E's 1996 Agricultural Sector EMS Market Effects Study survey responses, and (3) the experience of the evaluation team, which includes California AgQuest Consulting, a firm with more than 22 years of consulting to growers in PG&E's service territory. This market characterization used the primary sources as well as discussions with Pete Canessa (an agricultural engineer with many years experience) and PG&E employees with knowledge of the agricultural sector.

### **2 DEFINITION OF MARKET CHARACTERIZATION**

There is not currently a single accepted definition of market characterization. Based on three industry accepted definitions (Attachment 1) Equipoise Consulting Incorporated has composed the following definition of a Market Characterization Study:

*A market characterization study should describe the specific market or market segments targeted by the program (technologies, services or products offered). It should identify the geographic boundaries of the market or market segment, the structure of the market, and a description of the type of interactions and the market events (such as a decision to remodel) that trigger an interaction between buyers, intermediaries, and sellers. The characterization should also provide approximate estimates of the number of buyers, intermediaries, and sellers in the market, and the order of magnitude of the annual sales of any technologies targeted by the program.*

While not necessarily part of the market characterization, the market characterization study should lead to (1) the identification of the possible market barriers that exist in the market, and (2) hypotheses of which market barriers could be reduced or eliminated by a market transformation effort.

### **3 MARKET CHARACTERIZATION**

The remainder of this report is separated into sections addressing the main characteristics contained in this definition.

#### ***3.1 Geographic Boundaries***

The geographic boundaries for the market being studied are the boundaries of PG&E's service territory (Attachment 2). The service territory can be segregated into six 'agricultural' regions (Attachment 3). The PG&E divisions within these regions can be considered to have similar agricultural characteristics (e.g., weather). However, the actual level of agricultural activity within each region is not equal.

The AEEI Program is offered to customers within the PG&E service territory. Since the AEEI Program is expected to have direct effects on these customers, the focus of the analysis will also be limited to PG&E's service territory. It is possible that some of the market actors are located outside PG&E's service territory, however, this analysis will not deal with possible effects outside the territory.

#### ***3.2 Market Segment Description***

The market being studied is the agricultural pumping and related equipment market. This market segment is different than most classic high-efficiency product-oriented market segments because for the primary source of energy consumption, the pump, there is no actual "high efficiency" product. Pumps are chosen based on the specific design of the water delivery system. As the pump wears out, the energy efficiency of the system, as exhibited by the pump energy use, degrades. System energy efficiency can also degrade because of system changes that alter pressure or flow rate. Such changes include increases or reductions in acreage served (increased flow) or addition of filtration or fertilizer systems (altered pressure). When the pump efficiency degrades due to wear, repair of the pump is required to return it to optimum efficiency. If the system efficiency degrades due to system changes, the system can be brought back to optimum efficiency by retrofitting the existing bowls and impeller with a model chosen to meet the new system condition. Thus, there is no "high efficiency pump", but rather each pump is chosen to supply the optimum efficiency for the existing situation.

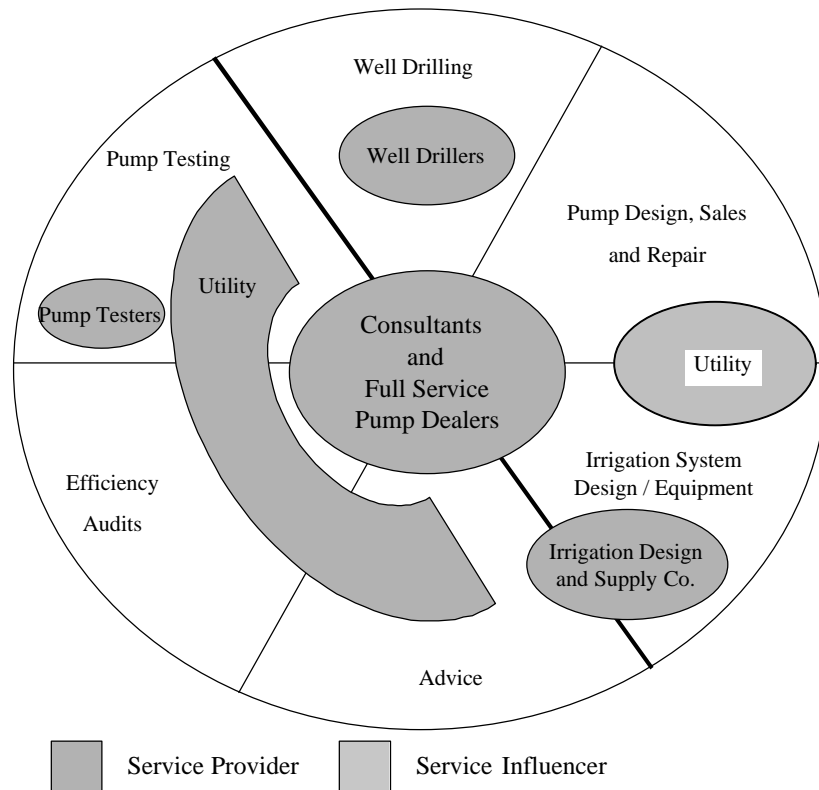
In addition, the agricultural pumping and related equipment market includes energy efficiency products that reduce the energy use of the pump. The most predominant of these products is Micro Irrigation (MI) systems that deliver only the required amount of water to the plant root system. These products are discussed further under "Technologies" below.

Although high efficiency motors can be applied to any pump to improve the Operating Plant Efficiency (OPE), the gain is very small when compared to the cost. As in other market segments, experience has shown that installation of energy efficient motors is only considered practical when entire motor replacement is necessary or when a new installation is considered.

PG&E's AEEI Program does not actually supply any physical product *per se*, but rather supplies financial incentives to customers for the products and services. Thus, the following discussion centers on the services required by the agricultural customers in PG&E's service territory.

Within the agricultural pumping and related equipment market, there are six main services. These are shown in Exhibit 1, along with the market actor offering the service.

**Exhibit 1**  
**Services Offered to Agricultural Pumping Customers**



These services are:

- (1) Well Drilling,
- (2) Pump Design, Sales and Repair,
- (3) Irrigation System Design/Equipment,
- (4) Pump Testing,
- (5) Efficiency Audits, and
- (6) Advice.

For agricultural customers with pumps, most of these services are required for creation and maintenance of a pumping system. The first three services are 'essential' or 'necessary' services for irrigation. The last three (pump test, efficiency audits, and

professional advice) are not ‘necessary’ or needed for a pumping system to work, but are required for optimization of the system. Since the program offers rebates for pump repairs and irrigation changes, the study will be focused on this segment of the market. Thus these two services are expanded on further here:

**Pump Repair.** A pump repair is a service required by only those agricultural customers who use a pump. A pump uses energy efficiently only when it runs at optimum level of operating plant efficiency (OPE). The OPE of a pump in use is apparently unknown to most customers, as determined in the PG&E’s 1996 Agricultural Sector Evaluation. There are various reasons why a pump may not function optimally. The bowls and impeller may be worn and fitting incorrectly, causing a decrease in lift supplied for the same amount of work done by the pump. Also, the well casing may be cracked, bringing in excess soil and decreasing the flow of water for the same amount of work. Different repairs are needed depending on the type of damage or impairment. For a pump with a poor bowl/impeller fit, a pump repair or pump replacement are the only ways of increasing the OPE to optimum level. With respect to cost, both are expensive, but a pump replacement is more expensive than a pump repair. Therefore, at a reasonable cost, a pump repair is the only way to improve energy efficiency of a pump with poor bowl/impeller fit.

A pump test is the only way to find out the efficiency of a pump directly. Very few customers get their pumps tested regularly. Most of the customers get their pumps tested when they observe high electricity bills or when the performance of the pump, in terms of flow of water, is not satisfactory. A pump failure or a breakdown is an extreme situation of unsatisfactory flow of water. In case of pump failure/breakdown, a pump test is not required to prove that the performance is not satisfactory. Thus, there are two sources of demand for a pump repair - pump test results and pump failure/breakdown. Overall this indicates that the demand for pump repair is need-based.

A need-based demand for a service that does not have any other real substitute services can indeed be price inelastic. However, the high price plays an important role in deciding the timing of any required action. If a pump is in use and it fails, then the customer has no choice but to repair it immediately. However, if a pump is working but a repair is desirable to improve efficiency of working pump, then the customer would evaluate the cost of making the pump more efficient now versus the benefits of repairing the pump. The benefits of repairing a pump not only include the kWh savings, but also include the benefit of potentially not losing a future crop due to pump failure. It is equally likely that even if the performance of the pump is not satisfactory, the high cost of repairing the pump may discourage the customers from repairing the pump and the customer may wait until they have enough money, time, or reason (actual failure) to proceed. However, their decisions to wait may result in inefficient use of energy. For a given crop, sufficient water at a specific time is extremely important. The high initial capital required dictates a complicated cost-benefit analysis that includes capital costs as well as site-specific opportunity costs of time and money.

**Design Services for Irrigation System Changes.** Design services are offered by Full Service Pump Dealers, Irrigation Design/Equipment Supply Companies, and to some extent by Agricultural Consultants. When a grower becomes interested in changes in their irrigation system, they will talk to one of these three market actors. Who they contact is

usually dependent upon who they work with most often. A prime example of such a change is a conversion from sprinklers to a MI system.

MI is a water distribution system that has three main advantages: (1) efficient use of energy, (2) effective use of water, and (3) better use of fertilizers. Effective use of water is becoming more and more important with fluctuations in the availability of the surface water. Since fertilizer costs are high as a proportion of the total costs, better use of fertilizer is also very important.

A big disadvantage is that the movement from high or low pressure sprinkler nozzles to MI requires a filtration system and changes in the pump. Because of this, the cost tends to be high. Also, the grower must walk the fields and check each emitter to assure that the system is working properly as opposed to standing in one spot and seeing each sprinkler head as they sprinkle.

Though MI conversions can in concept be used on many crops, it is most cost effective if used for certain crops like fruits and almonds where fewer emitters are required. Once the system is properly laid out, conversion MI requires very little change and the installation time would not be expected to adversely affect the crop. However, MI systems tend to require more maintenance than sprinkler systems. This could lead to concerns of higher operating costs by growers considering installation. For example, if the customers are not aware of the increased maintenance required, and as a result do not properly service the filters and emitters, then the performance is likely to be affected. The awareness and the time required to maintain the system is very important to achieving the expected performance.

Thus, the demand for conversion to MI is affected by crop type, water requirements, and the relative cost of the conversion compared to low or high pressure sprinkler systems.

### **3.2.1 Technologies**

The following discussion of technologies focuses on pumps and the irrigation technologies that show the largest potential for energy savings. There is a wide variety of low cost, no cost, and design measures/features which if properly applied on a site-specific basis should result in energy savings. These are not discussed in detail.

#### **3.2.1.1 Pump Types**

There are three main types of pumps used by the agricultural pumping customer: 1) turbine (both vertical deep well and submersible), 2) horizontal centrifugal, and 3) axial flow.

*The turbine pump* is the usual choice for pumping groundwater. A vertical deep well turbine has the motor above ground with the impellers and bowls below ground. A line shaft connects the motor and impellers. In a submersible turbine the motor is in the water below the pumping level. It may be used when the well cannot be driven with a straight bore for the shaft or the use of a shaft is not economical such as in very deep wells. The depth of the well will vary based upon the underlying water table. Generally, the southern

San Joaquin Valley has a lower water table and wells may reach up to 500 feet deep while the northern areas may only have 40 foot deep wells. However, the depth of the water table varies within all the regions and there may be wells within a few miles of each other with significantly different depths. The deeper the well, the more energy it takes to bring the water to the surface. Additionally, the soil in the south tends to be more sandy and more abrasive on the pump, causing the pump efficiency to decrease faster than in a non-sandy soil.

*Horizontal centrifugal pumps* (often called booster pumps) are used at the surface. They pressurize irrigation systems and pump surface water (such as moving water from a reservoir or canal). The size of the pump is the key variable in the energy use.

*Axial flow pumps* are used to move high volumes of water at a low pressure. This type of pump is often used in water district pumps when thousands of gallons per minute of water need to be lifted with only a small pressure increase (less than 15 pounds per square inch). Again, it is the size of the pump that makes the difference in the energy use.

These pumps are found throughout the service territory, depending on the specific application. The choice of technology is very specific to the site and its requirement.

### **3.2.1.2 Irrigation Technologies**

In the PG&E service territory, irrigation is accomplished by one of the following techniques:

- Flood irrigation where the field is flooded periodically,
- Furrow irrigation where furrows between the crops are flooded periodically,
- Sprinkler irrigation where the water is supplied via a pressurized sprinkler system,
- Micro irrigation where the water is supplied under pressure directly onto the ground at the root system.

The main energy efficiency technologies that apply to these irrigation approaches are the various forms of MI systems:

*Micro Irrigation systems* supply water to the crop by either locally sprinkling or dripping it onto the soil above the crop roots. The systems are composed of distribution pipes or tubes with “emitters” (either micro sprinkler or drip emitter) at each plant. Because the cost of the system is proportional to the numbers of emitters, the system is most applicable to crops with a smaller number of plants (e.g., almond trees rather than lettuce). The careful metering of water to the plants allows opportunities for more controlled fertilization than is possible with other irrigation approaches. The installation of MI systems also requires installation of a filtration system (which increases costs) in order to avoid emitter fouling. Even with a properly installed filter system, emitter fouling can be a maintenance issue for MI systems. In addition, since the MI system operates at a low system pressure compared to a sprinkler system, installation of the MI system requires a pump retrofit in order to reap the planned energy benefits.

### **3.3 Market Structure and Market Size**

The relationship between the service providers and service users in the pumping and irrigation market defines the market structure. The number of service providers and users indicate the size of the market.

Our understanding of the market indicates that there are eight market players (or actors). Of these, the first seven listed below are service providers and the last one is the service user.

- (1) **Manufacturers:** Manufacturers produce the equipment required for irrigation.
- (2) **Well Driller:** Well drillers offer one specific service - drilling a well. There are 50-100 well drillers within the PG&E service territory.
- (3) **Full service dealer:** Full service suppliers provide various types of services. Occasionally, a full service pump dealer may also include the well drilling service. They can also provide irrigation system design and equipment. Only full service pump dealers offer pump sales and repair services. There are approximately 200 full service pump dealers within the PG&E service territory.
- (4) **Irrigation Design/Equipment Supply Companies:** Irrigation Design/Equipment Supply Companies design the irrigation system and most often supply the equipment required as well. These companies can be either independent suppliers with many manufacturer lines or they can be manufacturer specific. There are around 100-150 irrigation designer/equipment supply companies.
- (5) **Consultants:** Consultants may provide some or all of the services. There are fewer than 25 independent consultants within PG&E's service territory. It is interesting to note that since deregulation, a few consultants have found a niche market in which they help determine the best energy rates for their clients.
- (6) **Independent pump testers:** there are independent pump testers who charge a fee to test the efficiency of a customers' pumps. There are fewer than 25 independent pump testers within PG&E's service territory.
- (7) **Utility:** As shown in the Exhibit 1, the utility (PG&E) provides several services to their agricultural customers - pump testing, efficiency audits, and advice. Although the utility does not supply the specific services of pump design/pump repair and irrigation system design, they do influence the customer actions through the AEEI program incentives, results of the pump-testing service, efficiency audits, and advice. PG&E's 1994 through 1997 AEEI programs offered rebates for a variety of pumping and related measures. Three measures, pump repairs, customized pumping measures, and conversion to a MI system represent 85% of the contribution (based on avoided cost) to the actions taken by the customers. (See Attachment 4 for a complete list of measures and avoided costs.)
- (8) **Pumping Customers:** There is a minimum of 20,293 unique agricultural pumping customers (buyers) within PG&E service territory.

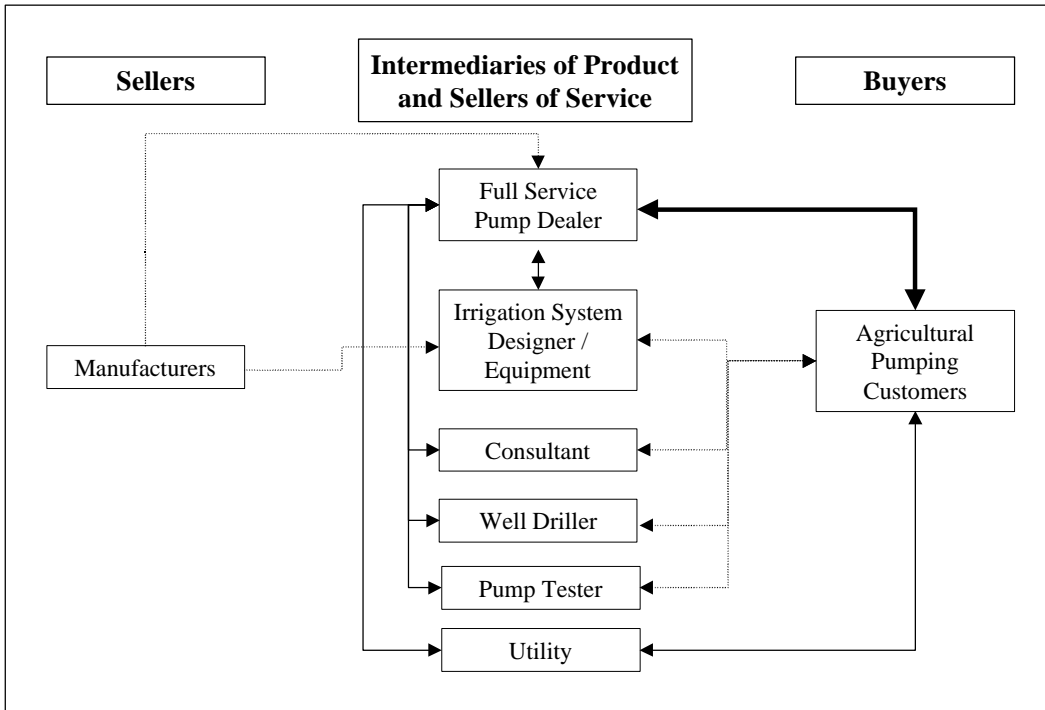
The interactions between these actors with respect to the pumping and related equipment market (the focus of the market effects study) are shown in Exhibit 2. The weight of the



lines provides an indication of the significance of the interactions between the market actors. The irrigation services offered by the full service pump dealer and Irrigation Design/Equipment Supply Companies supply approximately 90% of the irrigation design and sales, while consultants perform the remaining 10%.

While manufacturers produce the equipment, their role in the market for services is limited. This understanding is confirmed by the SCE study (Southern California Edison Hydraulic Services Program Market Effects Study, Study ID #3507, February, 1998). Therefore, manufacturers for either pumping or irrigation products were not addressed in this market characterization since they play a small role in this market. However, pump manufacturers do offer specific pump types to deal with problems associated with difficult climatic and geographic conditions, such as high sand entrainment in pumped water.

**Exhibit 2**  
**Flow Diagram of Market Interactions**



Very strong allegiances usually exist between the customer and a full service pump dealer. The dealer tends to provide all or most of the services desired by the customer. If they do not have a particular service in house, the pump dealer can recommend a consultant who can provide the service. The relationship between the customer and the pump dealer is generally long standing and hinges on how well the pump dealer performs during crisis periods (e.g., how fast can a well or pump be fixed when it breaks). Pump dealers tend to supply one specific brand of pump. This association is primarily driven by familiarity with pump products and favorable pump prices. Pump dealers will use alternate brands if they are not able to meet their customers needs with their usual brand.

Irrigation system designers, well drillers and other consultants also provide services to the customer. Those interactions are shown with a dotted line because the level of service is

substantially smaller than the full service pump dealer and the pump dealer is often the point of referral, not an independent connection. This may vary depending on the level of sophistication of the customer. Larger customers (i.e. bigger energy users and bigger farms), while maintaining the most constant relationship with their pump dealer, do tend to call the other intermediaries directly when their services are needed. Smaller customers generally go through their pump dealer if a unique service is required.

The utility has participated in the market in the past by providing the full service pump dealer with brochures covering the utility programs or a tabletop display about the programs. Other market actors find out about utility participation in the market, especially incentive programs, through the utility representative, their pump dealer, or conversations with growers. The utility representatives interact directly with the customers. However, the actual number of contacts the utility representative may be able to make is few compared to the number of customers.

While not indicated in Exhibit 2, one of the most influential interactions is among the customers themselves. Discussions between growers about what they have done, what is working well, and from whom they obtained the service plays a major role in the decision-making process.

### ***3.4 Customer Characteristics--Sales Practices***

Overall, market movement towards efficiency would benefit the customers in particular and the society in general. Customers' awareness about the efficiency of the pumps in use is a key to moving towards efficiency or optimal operation of the irrigation system.

The findings from the Market Effects Study of PG&E's 1996 EMS Program (April, 1998) indicates that customers can be grouped into three categories:

*Alert customers* - those who keep themselves up-to-date with information regarding the latest efficient technologies/practices, the sources of information, and its advantages and disadvantages,

*Cautious customers* - those who may be willing to change their attitude and thinking towards efficient technologies/practices but need some encouragement, and

*Unaware/unexposed customers* - those who are either not exposed or not concerned at all about energy efficiency.

The present composition of customers based on the telephone survey performed during the PG&E 1996 EMS Study indicated that:

- Approximately 57% of all customers interviewed believe that they know the efficiency of their pumps because they have had their pumps tested or the equipment is new. These customers probably fall into the category of "alert customers".
- 11% of all customers interviewed think that they know their pump is efficient by observing the flow or pressure and/or they think that checking the pump's efficiency is expensive. These customers need some encouragement to check the efficiency. They can be considered "cautious customers".

- The remaining 32% of the customers have not given thought to learning about their pump efficiency, they do not consider it worthwhile, they do not know/understand, or they are ignorant about how to get it done. These customers need some education/guidance regarding pump testing and its importance. They should be considered “unaware or unexposed customers”.

There are generally three types of activities that trigger pump retrofits: pump failure, pump test results indicating low efficiency, and other system changes.

*Pump Failure* – Pump failure is used here to indicate any event that causes the pump owner to question the efficiency of the pump, and thus trigger some type of an action. The failure may be a high electricity bill or insufficient water supply to meet the crop needs.

*Pump Test Results* – A small portion of the agricultural pump user population performs routine pump test to track pump efficiency. These are usually the larger growers with preventative maintenance programs in place. These growers already recognize the money (and energy) that can be saved by maintaining pumps at optimal efficiency.

*System Changes* – System changes such as changing from high-pressure sprinklers to low pressure sprinklers or drip irrigation system may require a pump retrofit. Other system changes such as adding acreage or dropping water levels can precipitate pump retrofits.

From the information collected from 400 customers in the telephone survey performed during the PG&E 1996 EMS Study, the most important indicators for pump repair were found to be:

- The electricity bill. If the bills tend to increase over a period of time, the customers tend to inquire whether or not their pump requires a repair, and if it does, then they get it repaired.
- The performance of the pump (i.e., water output or system pressure). If the pressure is low, the output is marginal, or if the pump is broken, the customers are more likely to get their pumps repaired.
- The pump test results.
- The recommendation by independent consultants and/or pump dealers.

Growers may move towards MI systems for many reasons, although ultimately it comes down to dollar savings. The PG&E 1996 AEEI telephone surveys indicate that these systems are installed: 1) to save energy, 2) to save water, 3) to make better use of fertilizers, 4) because the current equipment was not performing well, or 5) because they wanted to improve the equipment reliability.

Virtually all new grapevine fields install MI systems (including micro emitter and drip systems). Sprinkler systems are installed only for frost protection in these fields. Similarly for new orchards, sprinkler or micro systems are the normal installation. Field crops may use micro or sprinklers systems for more control of the application of water. As opposed to a furrow irrigation system, the sprinkler system can help a crop germinate. The retrofit market is undoubtedly affected by the current new systems being installed.

### **3.5 Annual Sales**

The total annual sales for the agricultural pumping retrofit market within the PG&E service territory were estimated using the data from the 1996 PG&E Agricultural Evaluation. During that evaluation 42 randomly selected nonparticipants premises were surveyed. Out of these 42 unique premises, 43 pump repairs occurred during 1996. Since there is a minimum of approximately 20,293 unique premises with pumps in PG&E's service territory, this indicates that there are an estimated 20,776 pump repairs annually in the service territory ( $20,293 \times 43/42$ ). PG&E program records indicate that the weighted average cost for a pump repair completed from 1994 through 1997 as part of the AEEI Program is \$9,421. Multiplying the 20,776 pump repairs per year by the \$9,421 per pump repair cost indicates an estimated total pump repair market size of approximately \$195,737,000. It should be realized that this estimate is based on a relatively small sample (42 customers) and thus inherently may have a wide uncertainty.

We were not able to obtain information on the size of the market for MI systems.

## **4 SUMMARY**

This market characterization addresses the agricultural pumping market, with the specific segment being the pump retrofit market in the PG&E service territory.

There are eight market actors in the in agricultural pumping market. Four of these market actors play a major role in the pumping and related service market affected by the AEEI Program; full service pump dealers, consultants, utility, and customers. Customers, while accounting for only one market actor, talk to each other often and influence decision making. The intermediaries offer both products and services to the customers. Of the six main services offered, half are necessary if a pump is to be used for irrigation. The other half provide services that can help to optimize the system performance. There are relatively few intermediaries for all the customers (e.g., 1 intermediary for every 1,000 customers). Long-term relationships play a major role in the interactions between the customers and the full service pump dealers.

There are three main events, which trigger interactions between the market actors; pump failure, pump test results, and system changes. Based on previous telephone survey information, pump failure (i.e., low flow, low pressure, or complete failure) is the most important in determining whether an action will be taken by the customer.

The overall size of the pump repair market in the PG&E service territory is estimated to be about \$200,000,000 annually.

June 18, 1998

To: Mary Dimit, Pacific Gas & Electric Company

From: Tim Caulfield, Equipoise Consulting Incorporated

Re: **Definition of Market Characterization**

As a result of the June 17, 1998 CADMAC acceptance of the retroactive waiver for the 1997 PG&E EEI Agricultural Sector Evaluation retroactive waiver, the Equipoise Team will be performing a market characterization. The first step in conducting a market characterization is to define just what one is. Since there seemed to be disagreement among CADMAC members about the definition, I contacted Patrice Ignelzi (a member of the Resource in Action summary study team) to request their best definition. She said that one had not evolved from the workshop, but pointed me in the direction of the CBEE Web Page Library, one section of the Phase 1 Market Effects Summary Study, and suggested the original scoping study. The first two yielded two definitions, the scoping study resulted in none, and we were able to glean an additional one from the Market Effects Subcommittee Guidelines. Each of these definitions is repeated below with part of the context in which it was presented.

Since these definitions did not completely agree, we crafted the following common definition that agrees with our perception of market characterization.

***Market Characterization Study: A market characterization study should describe the specific market or market segments targeted by the program. It should identify the geographic boundaries of the market or market segment, the structure of the market (technologies, services or products offered), and a description of the typical sales practices and the market events, such as a decision to remodel, that trigger them, between key buyers, intermediaries, and sellers. The characterization should also provide approximate estimates of the number of buyers, intermediaries, and sellers in the market, and the order of magnitude of the annual sales of any technologies targeted by the program.***

While not necessarily part of the market characterization, the market characterization study should lead to the (1) identification of the market barriers that exist in the market, and (2) hypotheses of which market barriers can be reduced or eliminated by a market transformation effort.

We will start to work from this definition. Given that this market characterization is based on existing data sources, we may not be able to define all market elements in this study.

**Discussion of Source Definitions**

As you will see, one area of divergence is whether a market characterization encompasses definition of market barriers, and resultant assessment of their sensitivity to market intervention. While not completely separable, we believe that these elements result from, but are not inherently part of a market characterization study.

The definitions we found are:

**Source 1:** Suggested Guidelines for evaluating the market effects of Energy Efficiency Programs, Adopted by the Market Effects Subcommittee on May 20, 1997, Principal Editor Mike Messenger

“A market effects research plan should contain the following elements:

1. Program and Market Characterization- Identify the specific market(s) addressed and the proposed or actual delivery approach to influence the market actors targeted by the program. The market characterization should identify the geographic boundaries of the market or market segment, the structure of the market (technologies, services or products offered), and a description of the typical sales practices, and the market events, such as a decision to remodel, that trigger them, between key buyers, intermediaries, and sellers. The characterization should also provide approximate estimates of the number of buyers, intermediaries, and sellers in the market, and an order of magnitude estimate of the annual sales of any technologies targeted by the program.”

**Source 2:** CBEE WebPage/Library/RFP filing May 13, 1998, Attachment 1, Definition of Terms in RFP, Page 4.

**“Market Assessment:** An analysis function which provides an assessment of how and how well a specific market or market segment is functioning with respect to the definition of well-functioning markets or with respect to other specific policy objectives. Generally includes a characterization or description of the specific market or market segments, including a description of the types and number of buyers and sellers in the market, the type and number of transactions that occur on an annual basis, and the extent to which Energy Efficiency is considered an important part of these transactions by market participants. This analysis may also include an assessment of whether or not a market has been sufficiently transformed to justify a reduction or elimination of specific program interventions. Market assessment can be blended with strategic planning analysis to produce recommended program designs or budgets. One particular kind of market assessment effort is a *baseline study*, or the characterization of a market before the commencement of a specific intervention in the market, for the purpose of guiding the intervention and/or assessing its effectiveness later.”

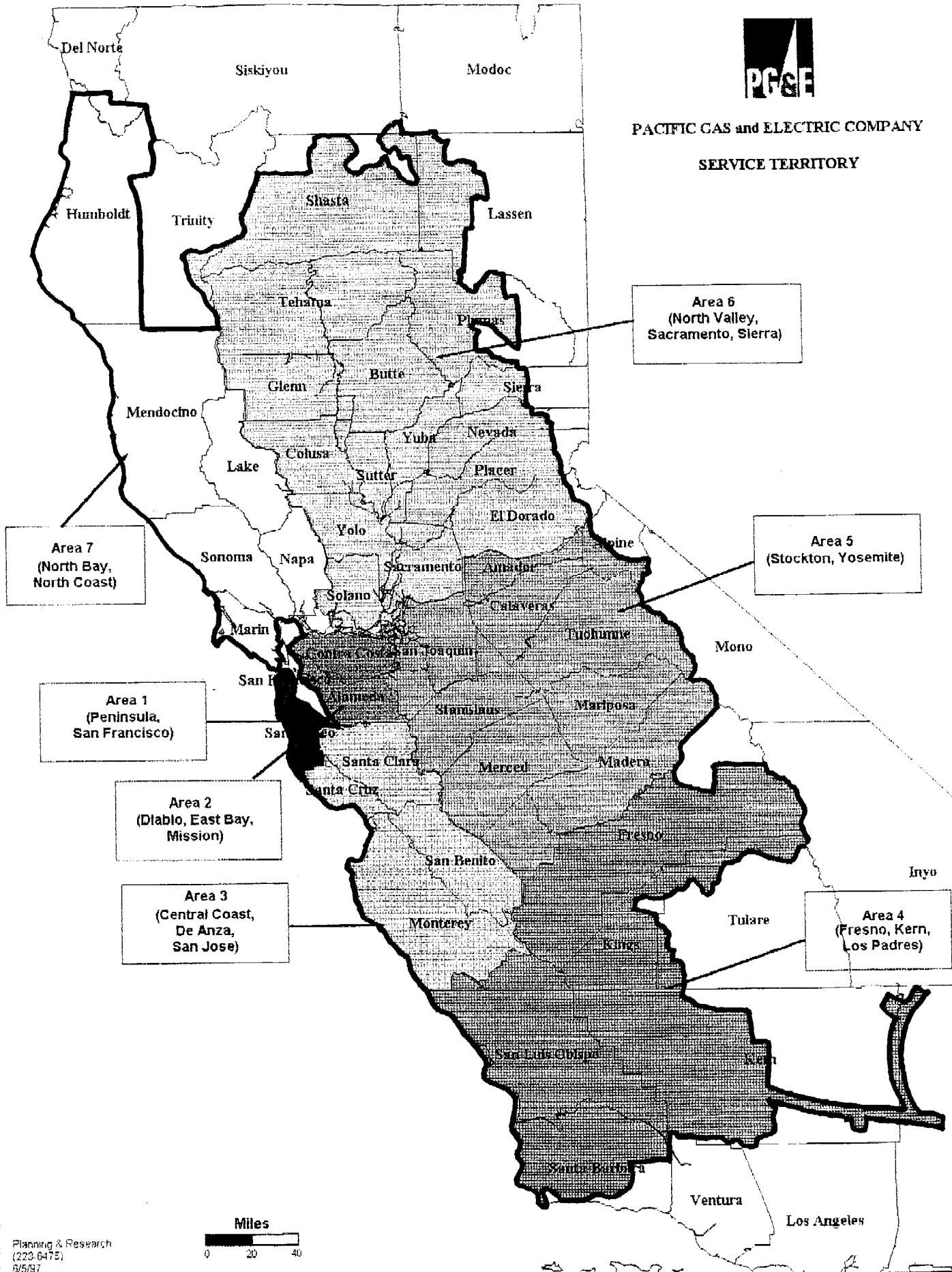
**Source 3:** Phase 1 Market Effects Summary Study, Page 25

“Well-planned market transformation efforts are expected to begin with a market assessment or market characterization study that discovers the market structure and operation, and the market barriers that both exist in the market and that can be reduced or eliminated by a market transformation effort. The design of the market transformation program can then occur while a baseline study is conducted to provide baseline

measurement of the proximate, distant, and ultimate indicators. These efforts will provide an excellent foundation for a well-focused before/after measurement of the market transformation effects.”



PACIFIC GAS and ELECTRIC COMPANY  
SERVICE TERRITORY



Area 7  
(North Bay,  
North Coast)

Area 6  
(North Valley,  
Sacramento, Sierra)

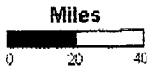
Area 5  
(Stockton, Yosemite)

Area 1  
(Peninsula,  
San Francisco)

Area 2  
(Diablo, East Bay,  
Mission)

Area 3  
(Central Coast,  
De Anza,  
San Jose)

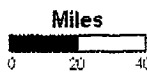
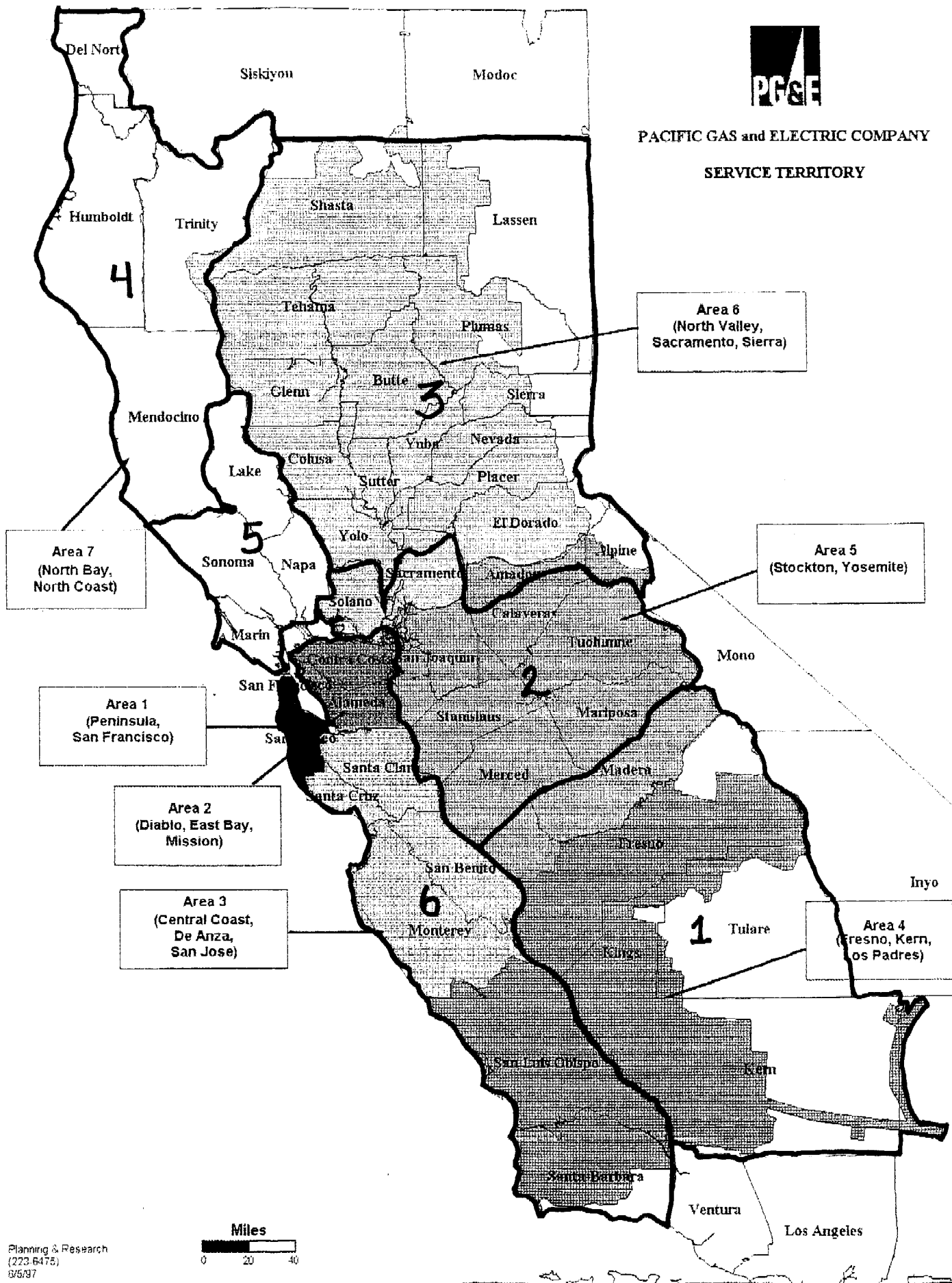
Area 4  
(Fresno, Kern,  
Los Padres)







PACIFIC GAS and ELECTRIC COMPANY  
SERVICE TERRITORY



**Attachment 4**  
**Contribution to Avoided Cost by Measure**  
**Program Years 1994 through 1997 Combined**

<b>Measure Description</b>	<b>Measure Code</b>	<b>Avoided Cost</b>	<b>% of Sector Avoided Cost</b>	<b>% of Pumping Avoided Cost</b>
<b>Pump Retrofit</b>	A1	\$ 16,214,188	23%	43%
<b>Customized Ag Measures</b>	A0, AN0, P0, 629, 670	\$ 12,420,353	18%	33%
<b>Sprinkler to Micro</b>	A44 / A45 / A47 / A51 / A55	\$ 4,563,533	7%	12%
<b>Pump Adjustment</b>	A4	\$ 2,011,385	3%	5%
<b>Low Pressure Nozzles</b>	A41 / A42 / A43	\$ 1,916,792	3%	5%
<b>Well Water Measurement Device</b>	A6	\$ 360,133	1%	1%
<b>Energy Efficient Motors</b>	M20-M38	\$ 197,634	0%	1%
	<b>Total</b>	\$ 37,684,018	54%	100%

*Appendix C*  
*Market Effects Telephone Instrument*

Field Research Corporation  
San Francisco, CA

161-002  
092198

**1997 Agricultural Sector Evaluation Telephone Survey  
-- MAIN QUESTIONNAIRE --**

1. Do you have irrigation pumps that have been in use at any time since January 1, 1994?
- |                 |     |             |
|-----------------|-----|-------------|
| Yes .....       | 11  | → CONTINUE  |
| No .....        | 12  | } TERMINATE |
| Don't know..... | DK  |             |
| Refused .....   | REF |             |

2. Do you know what a bowl and impeller pump repair is?

Yes .....	11
No .....	12
Don't know.....	DK
Refused .....	REF

3. What type of irrigation system do you use? Is it: (READ LIST; ENTER ALL THAT APPLY)?

	YES	NO	DK	REF
a. Drip or micro.....	1	0	DK	REF
b. Sprinkler.....	1	0	DK	REF
c. Furrow.....	1	0	DK	REF
e. Flood .....	1	0	DK	REF

**IF (YES TO Q2 OR YES TO Q3a OR Q3b), THEN CONTINUE. ELSE THANK AND TERMINATE**

**TIME STARTED: \_\_\_\_\_**

First, I would like to ask you some general questions about your business or organization.

4. Which of the following is your largest source of revenue? (**READ ENTIRE LIST; CODE ONLY ONE THAT BEST FITS**)?

- Vegetables or field crops ..... 1
- Livestock ..... 2
- Ornamental nursery..... 3
- Indoor crops (greenhouse)..... 4
- Packing plant ..... 5
- Vineyard/winery ..... 6
- Orchard ..... 7
- Dairy farm..... 8
- Water district ..... 9
- Other? (**SPECIFY**) \_\_\_\_\_ .... 0
- Don't know (**DO NOT READ**).....DK
- Refused (**DO NOT READ**) ..... REF

5. Does your business own this property?

- Yes ..... 11
- No ..... 12
- Don't know.....DK
- Refused ..... REF

6. Would you consider your business or organization operated by a family or operated by a company?

- Family ..... 11
- Company..... 12
- Not applicable ..... 13
- Don't know.....DK
- Refused ..... REF

7. Compared to other businesses or organizations similar to yours, would you categorize this business or organization as small, medium or large?

- Small ..... 11
- Medium..... 12
- Large ..... 13
- Don't know.....DK
- Refused ..... REF

8. How long has your company or organization been operating at this location? (**READ LIST**)

- 1 to 3 years ..... 11
- 4 to 10 years..... 12

- More than 10 years ..... 13
- Don't know (**DO NOT READ**).....DK
- Refused (**DO NOT READ**) ..... REF

9. If you grow crops, do you grow annual or permanent crops?

- Annual..... 11
- Permanent ..... 12
- Both annual and permanent ..... 13
- Don't grow crops ..... 14
- Don't know.....DK
- Refused ..... REF

10. How many water pumps are used in your operation?..... (NUMBER OF PUMPS) \_\_\_\_\_

11. Of these pumps, how many are/is this pump: (**READ LIST**)

- a. Less than 20 horsepower..... (NUMBER OF PUMPS) \_\_\_\_\_
- b. 20 HP to 75 horsepower ..... (NUMBER OF PUMPS) \_\_\_\_\_
- c. 76 HP to 200 horsepower..... (NUMBER OF PUMPS) \_\_\_\_\_
- d. Over 200 horsepower..... (NUMBER OF PUMPS) \_\_\_\_\_
- (TOTAL SHOULD ADD TO NUMBER IN Q10) \_\_\_\_\_

12. What is your estimate of the average age of the pumps?

\_\_\_\_\_ (Average # of years) **OR RECORD RANGE:** From \_\_\_\_\_ to \_\_\_\_\_ years old

13. On average, how many months are the pumps used during the year? (**READ LIST**)

- Less than 3 months ..... 11
- 3-6 months ..... 12
- 7-9 months ..... 13
- Year round ..... 14
- Don't know (**DO NOT READ**).....DK
- Refused (**DO NOT READ**) ..... REF

14. Approximately, what percentage of your total annual costs is spent in electricity bills?

\_\_\_\_\_ (Approximate %) **OR RECORD RANGE:** From \_\_\_\_\_ % to \_\_\_\_\_ %

15. How important is it for you to be sure that your pumps and irrigation systems make efficient use of electricity? Is it: (**READ LIST**)?

- Very important..... 11
- Somewhat important..... 12
- Not too important, or ..... 13
- Not at all important..... 14

Don't know (**DO NOT READ**).....DK  
Refused (**DO NOT READ**) ..... REF

16. Do you know that use of efficient technologies, products, system design, and services can affect your electricity bills?

Yes ..... 11  
No ..... 12  
Don't know.....DK  
Refused ..... REF

17. How easy is it to get information about alternative ways of reducing energy use in pumps or irrigation systems? Would you say it is: (**READ LIST**)?

Very easy ..... 11  
Somewhat easy ..... 12  
Not too easy, or..... 13  
Not at all easy..... 14  
Don't know (**DO NOT READ**).....DK  
Refused (**DO NOT READ**) ..... REF

18. How willing are you to spend time looking for information on ways to reduce energy use? Would you say you are: (**READ LIST**)?

Very willing ..... 11  
Somewhat willing ..... 12  
Not too willing, or..... 13  
Not at all willing ..... 14  
Don't know (**DO NOT READ**).....DK  
Refused (**DO NOT READ**) ..... REF

19. How satisfied are you with the available information on alternative irrigation systems for your site? (**READ LIST**)

Very satisfied ..... 11  
Somewhat satisfied ..... 12  
Not too satisfied, or..... 13  
Not at all satisfied ..... 14  
Don't know (**DO NOT READ**).....DK  
Refused (**DO NOT READ**) ..... REF

20. How easily do you think such information will be available in the future? (**READ LIST**)

Very easy ..... 11  
Somewhat easy ..... 12  
Not too easy, or..... 13  
Not at all easy..... 14  
Don't know (**DO NOT READ**).....DK

- Refused (**DO NOT READ**) ..... REF
21. How willing are you to pay for information regarding alternative ways of reducing energy use at the pump? (**READ LIST**)
- Very willing ..... 11
- Somewhat willing ..... 12
- Not too willing, or ..... 13
- Not at all willing ..... 14
- Don't know (**DO NOT READ**).....DK
- Refused (**DO NOT READ**) ..... REF
22. How do you usually first learn about energy-efficiency options? Do you first learn: (**READ LIST**)?
- When you approach a vendor or contractor ..... 11
- When you approach PG&E 12
- Through PG&E brochure in the mail or a bill insert ..... 13
- Through television/radio/newspaper ads ..... 14
- When a PG&E rep. contacts you ..... 15
- When a contractor or vendor contacts you ..... 16
- By word of mouth..... 17
- Or is it family tradition/recommendation ..... 18
- Anything else? (**SPECIFY**) \_\_\_\_\_ ..... 19
- Don't know (**DO NOT READ**).....DK
- Refused (**DO NOT READ**) ..... REF
23. How familiar are you with PG&E's pump test or site survey programs? Would you say you are: (**READ LIST**)?
- Very familiar..... 11
- Somewhat familiar..... 12
- Not too familiar, or ..... 13
- Not at all familiar ..... 14
- Don't know (**DO NOT READ**).....DK
- Refused (**DO NOT READ**) ..... REF
24. How familiar are you with PG&E's rebate programs? Would you say you are: (**READ LIST**)?
- Very familiar..... 11
- Somewhat familiar..... 12
- Not too familiar, or ..... 13
- Not at all familiar ..... 14
- Don't know (**DO NOT READ**).....DK
- Refused (**DO NOT READ**) ..... REF



25. How many times has the PG&E service representative contacted you in the past four years? **(READ LIST)**

- Once..... 11
- Twice ..... 12
- Several times, or ..... 13
- Never..... 14
- Don't know (**DO NOT READ**).....DK
- Refused (**DO NOT READ**) ..... REF

26. Typically, who decides to install energy-efficiency improvements? **(READ LIST; ENTER ALL THAT APPLY)**

- |  | <u>YES</u> | <u>NO</u> | <u>DK</u> | <u>REF</u> |
|--|------------|-----------|-----------|------------|
| a. The owner(s)/landlords .....                  | 1.....     | 0.....    | DK ...    | REF        |
| b. A partner or partners .....                   | 1.....     | 0.....    | DK ...    | REF        |
| c. The farm manager .....                        | 1.....     | 0.....    | DK ...    | REF        |
| d. An agricultural engineer or a consultant..... | 1.....     | 0.....    | DK ...    | REF        |
| e. Is it a group decision process?.....          | 1.....     | 0.....    | DK ...    | REF        |
| f. Anyone else? ( <b>SPECIFY</b> ) _____.....    | 1.....     | 0.....    | DK ...    | REF        |

27. Which of these financial methods do you typically use to evaluate energy-efficiency improvements? **(READ LIST; CIRCLE ONE RESPONSE)**

- Simple payback..... 11
- Lowest initial investment..... 12
- A more complex financial analysis..... 13
- Don't know (**DO NOT READ**).....DK
- Refused (**DO NOT READ**) ..... REF

28. How easy would it be for you to get financing for irrigation equipment changes or upgrades that cost \$800–\$1,000 per acre? **(READ LIST)**

- Very easy ..... 11
- Somewhat easy ..... 12
- Somewhat difficult, or ..... 13
- Very difficult..... 14
- Not applicable (**DO NOT READ**)..... 15
- Don't know (**DO NOT READ**).....DK
- Refused (**DO NOT READ**) ..... REF

29. How often have you not made necessary changes in the irrigation systems due to lack of financing? **(READ LIST)**

- Often ..... 11
- Sometimes ..... 12
- Not too often, or..... 13

- Never..... 14
- Don't know (**DON'T READ**).....DK
- Refused (**DON'T READ**) ..... REF

30. Suppose an irrigation system requires an improvement at your site and you had only two options. One option has low initial costs and less benefits and the other option has high initial cost and more benefits. Which option are you most likely to select: (**READ LIST**)

- Low initial costs with less benefits ..... 11 (GO TO Q31)
- High initial cost with more benefits..... 12 (GO TO Q32)
- Don't know (**DON'T READ**).....DK
- Refused (**DON'T READ**) ..... REF } GO TO Q33

**IF LOW INITIAL COST (CODE 11), ASK:**

31. Why would you select this option? Was it because: (**READ LIST**)?

	<u>YES</u>	<u>NO</u>	<u>DK</u>	<u>REF</u>
a. You do not have enough information about long term benefits ...	1.....	0.....	DK ...	REF
b. You're not sure if the performance of the system is worth the higher cost.....	1.....	0.....	DK ...	REF
c. It depends on who has recommended the option.....	1.....	0.....	DK ...	REF
d. Too many indirect costs are involved.....	1.....	0.....	DK ...	REF
e. The possibility of high <u>unexpected</u> costs.....	1.....	0.....	DK ...	REF
f. Limited financing .....	1.....	0.....	DK ...	REF
g. You have a habit of selecting low initial cost option.....	1.....	0.....	DK ...	REF
h. That is how all the investment decisions are made in your organization .....	1.....	0.....	DK ...	REF
i. You have to wait too long for the benefits .....	1.....	0.....	DK ...	REF
j. Anything else? ( <b>SPECIFY</b> ) _____ _____ ...	1.....	0.....	DK ...	REF

**NOW GO TO Q33**

**IF HIGH INITIAL COST (CODE 12), ASK:**

32. Why would you select this option? (**READ LIST**)

	<u>YES</u>	<u>NO</u>	<u>DK</u>	<u>REF</u>
a. The information and benefits are adequate and convincing .....	1.....	0.....	DK ...	REF
b. You are sure the performance is worth the higher cost .....	1.....	0.....	DK ...	REF
c. You trust the agency that recommended the system.....	1.....	0.....	DK ...	REF
d. You know there are no indirect costs involved .....	1.....	0.....	DK ...	REF
e. You know that there are no <u>unexpected</u> costs.....	1.....	0.....	DK ...	REF
f. You can spare the funds required for the change .....	1.....	0.....	DK ...	REF
g. Initial cost is evaluated in conjunction with the long-term benefits .....	1.....	0.....	DK ...	REF

- h. That is how all the investment decisions are made  
in your organization .....1..... 0..... DK ... REF
- i. Long-term benefits are more important.....1..... 0..... DK ... REF
- j. Anything else? (SPECIFY) \_\_\_\_\_  
.....1..... 0..... DK ... REF

**NOW GO TO Q33**

33. If you were considering options to increase the efficiency of electricity use by installing new equipment or repairing old equipment, how important would (ITEM) be in your decision?

	Very Important	Somewhat Important	Not too Important	Not at all Important	Don't Know	Refused
a. reliability of the equipment	11	12	13	14	77	88
b. potential energy savings	11	12	13	14	77	88
c. general health of the economy	11	12	13	14	77	88
d. current equipment's performance	11	12	13	14	77	88
e. initial cost	11	12	13	14	77	88
f. operating and maintenance costs	11	12	13	14	77	88

**REFER TO Q2. IF YES, AWARE OF BOWL AND IMPELLER PUMP REPAIR, ASK Q34-42.**

**IF NO, SKIP TO Q39.**

34. With respect to the repair of pumps, currently how certain are you about the claim that a pump repair would save energy? (READ LIST)

- Very certain..... 11
- Somewhat certain..... 12
- Not too certain, or ..... 13
- Not at all certain..... 14
- Don't know (DO NOT READ).....DK
- Refused (DO NOT READ) ..... REF

35. How important is it for you to be certain about the energy savings claim before making the decision to repair a pump? (READ LIST)

- Very important..... 11
- Somewhat important..... 12
- Not too important, or ..... 13
- Not at all important..... 14

Don't know (**DO NOT READ**).....DK  
 Refused (**DO NOT READ**) ..... REF

36. In the future, how certain do you believe you will be about the claim that a pump repair would save energy? (**READ LIST**)

Very certain ..... 11 } **GO TO Q37**  
 Somewhat certain ..... 12 }  
 Not too certain, or..... 13 } **GO TO Q38**  
 Not at all certain..... 14 }  
 Don't know (**DO NOT READ**) .....DK } **GO TO Q45**  
 Refused (**DO NOT READ**)..... REF }

**IF VERY/SOMEWHAT CERTAIN, ASK:**

37. Would you be certain because of your: (**READ LIST; RECORD ONLY ONE**)

Previous experience with pump repairs..... 11  
 Experience of other growers ..... 12  
 The person you talked to is knowledgeable..... 13  
 Something else? (**SPECIFY**) \_\_\_\_\_ .. 14  
 Don't know (**DO NOT READ**) .....DK  
 Refused (**DO NOT READ**)..... REF

**NOW GO TO Q45**

**IF NOT TOO/NOT AT ALL CERTAIN, ASK:**

38. Would you not be certain because of your: (**READ LIST; RECORD ONLY ONE**)

Previous experience with pump repairs..... 11  
 Experience of other growers ..... 12  
 The person you talked to is not knowledgeable ..... 13  
 Something else? (**SPECIFY**) \_\_\_\_\_ .. 14  
 Don't know (**DO NOT READ**) .....DK  
 Refused (**DO NOT READ**)..... REF

**NOW GO TO Q45**

**39. REFER TO Q3. IF YES TO (A) DRIP OR MICRO OR YES TO (B) SPRINKLER, ASK Q40-Q49.**

40. With respect to micro irrigation systems, currently how certain are you about the overall predicted performance of this type of system? (**READ LIST**)

- Very certain..... 11
- Somewhat certain..... 12
- Not too certain, or ..... 13
- Not at all certain..... 14
- Don't know (**DO NOT READ**).....DK
- Refused (**DO NOT READ**) ..... REF

41. How important is it for you to be certain about the overall predicted performance of a micro irrigation system before making the decision to install it? (**READ LIST**)

- Very important..... 11
- Somewhat important..... 12
- Not too important, or ..... 13
- Not at all important..... 14
- Don't know (**DO NOT READ**).....DK
- Refused (**DO NOT READ**) ..... REF

42. In the future, how certain do you believe you will be about the predicted performance of a micro irrigation system? (**READ LIST**)

- Very certain..... 11 } GO TO Q43
- Somewhat certain..... 12 } GO TO Q43
- Not too certain, or ..... 13 } GO TO Q44
- Not at all certain..... 14 } GO TO Q44
- Don't know (**DO NOT READ**).....DK } GO TO Q45
- Refused (**DO NOT READ**) ..... REF } GO TO Q45

**IF VERY/SOMEWHAT CERTAIN, ASK:**

43. Would you be certain because of your: (**READ LIST; RECORD ONLY ONE**)?

- Previous experience with micro irrigation..... 11
- Experience of other growers ..... 12
- The person you talked to is knowledgeable..... 13
- Something else? (**SPECIFY**) \_\_\_\_\_ .. 15
- Don't know (**DO NOT READ**) .....DK
- Refused (**DO NOT READ**)..... REF

**NOW GO TO Q45**

**IF NOT TOO/NOT AT ALL CERTAIN, ASK:**

44. Would you not be certain because of your: **(READ LIST; RECORD ONLY ONE)?**

- Previous experience with the micro irrigation..... 11
- Experience of other growers ..... 12
- The person you talked to is not knowledgeable ..... 13
- Something else? **(SPECIFY)** \_\_\_\_\_ .. 15
- Don't know **(DO NOT READ)** .....DK
- Refused **(DO NOT READ)**..... REF

**NOW GO TO Q45**

45. If you were to consider options to save energy, you may want to learn about the advantages and predicted energy savings of the options. As you may know, you may get that information from PG&E, from pump dealers, from consultants, or from irrigation system designers.

46. How confident are you in the advantages and predicted energy savings if they were projected by PG&E? Would you be: **(READ LIST)**?

- Very confident ..... 11
  - Somewhat confident ..... 12
  - Not too confident, or..... 13
  - Not at all confident ..... 14
  - Don't know **(DO NOT READ)**.....DK
  - Refused **(DO NOT READ)**..... REF
- } GO TO Q47
- } GO TO Q48
- } GO TO Q49

**IF VERY/SOMEWHAT CONFIDENT, ASK:**

47. Is your confidence based on: **(READ LIST; RECORD ONLY ONE)?**

- Your previous experience with PG&E..... 11
- The experience of other growers ..... 12
- The person you talked to is knowledgeable..... 13
- The fact that you feel they are unbiased ..... 14
- Something else? **(SPECIFY)** \_\_\_\_\_ .. 15
- Don't know **(DO NOT READ)** .....DK
- Refused **(DO NOT READ)**..... REF

**IF NOT TOO/NOT AT ALL CONFIDENT, ASK:**

48. Are you not confident because of: **(READ LIST)**

- Your previous experience with PG&E..... 11
- The experience of other growers ..... 12
- The person you talked to is not knowledgeable ..... 13
- The fact that you feel they are biased ..... 14
- Something else? **(SPECIFY)** \_\_\_\_\_ .. 15
- Don't know **(DO NOT READ)** .....DK
- Refused **(DO NOT READ)**..... REF

49. How confident are you in the advantages and predicted energy savings if they were projected by a company other than PG&E? Would you be: **(READ LIST)?**

- Very confident ..... 11
- Somewhat confident ..... 12 } GO TO Q50
- Not too confident ..... 13
- Not at all confident ..... 14 } GO TO Q51
- Don't know **(DO NOT READ)**.....DK
- Refused **(DO NOT READ)** ..... REF } GO TO Q52

**IF VERY/SOMEWHAT CERTAIN, ASK:**

50. Is your confidence based on: **(READ LIST; RECORD ONLY ONE)?**

- Your previous experience with them/long-term relationship  
with them ..... 11
- The experience of other growers ..... 12
- The person you talked to is knowledgeable..... 13
- The fact that you feel they are unbiased ..... 14
- Something else? **(SPECIFY)** \_\_\_\_\_ .. 15
- Don't know **(DO NOT READ)** .....DK
- Refused **(DO NOT READ)**..... REF

**IF NOT TOO/NOT AT ALL CERTAIN, ASK:**

51. Are you not confident because of: **(READ LIST)?**

- Your previous experience with them..... 11
- The experience of other growers ..... 12
- The person you talked to is not knowledgeable ..... 13
- The fact that you feel they are biased ..... 14
- Something else? **(SPECIFY)** \_\_\_\_\_ .. 15
- Don't know **(DO NOT READ)** .....DK
- Refused **(DO NOT READ)**..... REF

52. Now suppose that in the future, PG&E did not offer any information about the advantages and predicted savings from these options. How confident would you be if they were projected by someone else in the future? (**READ LIST**)

- Very confident ..... 11
- Somewhat confident ..... 12
- Not too confident, or ..... 13
- Not at all confident ..... 14
- Don't know (**DO NOT READ**) ..... DK
- Refused (**DO NOT READ**) ..... REF

53. Before you decide to make any changes in the irrigation system, how important is it for you to double-check the recommendation made? (**READ LIST**)

- Very important ..... 11
- Somewhat important ..... 12
- Not too important, or ..... 13
- Not at all important ..... 14
- Don't know (**DO NOT READ**) ..... DK
- Refused (**DO NOT READ**) ..... REF

54. If you were to install a new micro irrigation system, currently how concerned would you be about possible unexpected costs of the irrigation system? (**READ LIST**)

- Very concerned ..... 11
  - Somewhat concerned ..... 12
  - Not too concerned, or ..... 13
  - Not at all concerned ..... 14
  - Don't know (**DO NOT READ**) ..... DK
  - Refused (**DO NOT READ**) ..... REF
- } GO TO Q56

55. How likely are these concerns to affect your decision to install a micro irrigation system? (**READ LIST**)

- Very likely ..... 11
- Somewhat likely ..... 12
- Not too likely, or ..... 13
- Not at all likely ..... 14
- Don't know (**DO NOT READ**) ..... DK
- Refused (**DO NOT READ**) ..... REF

56. In the future, if you were to install a new micro irrigation system, how concerned would you be about possible unexpected costs of the irrigation system? (**READ LIST**)

- Very concerned ..... 11
- Somewhat concerned ..... 12
- Not too concerned, or ..... 13
- Not at all concerned ..... 14



Don't know (**DO NOT READ**).....DK  
 Refused (**DO NOT READ**) ..... REF

57. Is your opinion based on: (**READ LIST; RECORD ONLY ONE**)

Previous experience ..... 11  
 Experience of other growers ..... 12  
 Confidence in the source of information of the irrigation system ..... 13  
 Something else? (**SPECIFY**) \_\_\_\_\_  
 \_\_\_\_\_... 14  
 Don't know (**DO NOT READ**).....DK  
 Refused (**DO NOT READ**) ..... REF

58. How many bowl and impeller pump repairs have you had since January 1, 1994?

\_\_\_\_\_ (**SPECIFY #**)

59. How many pump repairs have you had since January 1, 1994 without getting a rebate from PG&E?

\_\_\_\_\_ (**SPECIFY #**)

60. How many of these were done in 1998?

\_\_\_\_\_ (**SPECIFY #**)

61. What are some of the main reasons why you repair a pump? (**READ LIST; ENTER ALL THAT APPLY**)

	<u>YES</u>	<u>NO</u>	<u>DK</u>	<u>REF</u>
a. The pump is broken .....	1.....	0.....	DK ...	REF
b. Poor performance of the pump .....	1.....	0.....	DK ...	REF
c. To increase the reliability of the pump.....	1.....	0.....	DK ...	REF
d. Previous experience of pump repairs.....	1.....	0.....	DK ...	REF
e. To reduce the electricity bills .....	1.....	0.....	DK ...	REF
f. Advice and/or rebate from PG&E.....	1.....	0.....	DK ...	REF
g. Advice from dealer/consultant.....	1.....	0.....	DK ...	REF
h. Anything else? ( <b>SPECIFY</b> ) _____ _____	.....1.....	0.....	DK ...	REF

62. Did you convert any sprinkler systems to micro irrigation systems or install any new micro irrigation systems since January 1, 1994?

Yes ..... 11 GO TO Q63  
 No ..... 12  
 Don't know.....DK } GO TO Q67  
 Refused ..... REF

63. If you received a rebate for micro irrigation system conversion from PG&E, did you also convert or install any new micro irrigation systems since January 1, 1994 without a rebate?

- Yes ..... 11 GO TO Q64
- No ..... 12 GO TO Q66
- Not applicable ..... 13 } GO TO Q67
- Don't know ..... DK }
- Refused ..... REF

**IF YES, ASK:**

64. How many acres did you convert or install without a rebate?	_____ (# of acres)
65. Of these, how many acres were installed in 1998?	_____ (# of acres)

66. What are some of the main reasons you decided to install a micro irrigation system regardless of whether you received a rebate or not? (**READ LIST; ENTER ALL THAT APPLY**)

	<u>YES</u>	<u>NO</u>	<u>DK</u>	<u>REF</u>
a. The old system was broken .....	1.....	0.....	DK ...	REF
b. Low performance of the old irrigation system.....	1.....	0.....	DK ...	REF
c. To increase the reliability of the irrigation system.....	1.....	0.....	DK ...	REF
d. Previous experience with micro irrigation.....	1.....	0.....	DK ...	REF
e. To reduce the electricity bills .....	1.....	0.....	DK ...	REF
f. To use water more efficiently .....	1.....	0.....	DK ...	REF
g. It was better for the crop .....	1.....	0.....	DK ...	REF
h. It saves on fertilizer costs.....	1.....	0.....	DK ...	REF
i. Advice and/or Rebate from PG&E.....	1.....	0.....	DK ...	REF
j. Advice from dealer/consultant.....	1.....	0.....	DK ...	REF
k. Anything else? ( <b>SPECIFY</b> ) .....	1.....	0.....	DK ...	REF

67. Those are all my questions. On behalf of PG&E, I thank you very much for your time.

**NOTE: IF RESPONDENT REQUESTED CONTACT INFORMATION FOR PG&E, CHECK BOX AT BOTTOM OF CONTACT RECORD SHEET.**

**NOTE: IF RESPONDENT WANTED COMMENTS FORWARDED TO PG&E, ENTER THEM HERE:**

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**RESPONDENT NAME:** \_\_\_\_\_

**SAMPLE ID NUMBER:** \_\_\_\_\_

**INTERVIEWER ID:** \_\_\_\_\_

**TIME ENDED:** \_\_\_\_\_

**DATE:** \_\_\_\_\_

***Appendix D***  
***Survey Methodology and Disposition***

## **DETAILS OF THE SURVEY METHOD**

### **General Approach**

The survey was completed via telephone interviews from central location calling facilities. Interviews were completed with agricultural customers of PG&E, including both those who had participated in PG&E energy efficiency programs as well as those who had not participated. Equipoise Consulting was responsible for providing the questionnaire and the sample for the study. Field Research Corporation was responsible for the CATI programming, data collection, and initial data processing.

### **Respondent Eligibility**

Potential respondents were screened by interviewers to determine their eligibility. All respondents were screened to be sure they had irrigation pumps that have been in use at any time since January 1, 1994. In addition, respondents were qualified on the basis of either knowing what a "bowl and impeller" pump repair is or on the basis of using a drip/micro irrigation system or a sprinkler irrigation system. All respondents were self-identified as the best person to answer questions about pumps and/or other equipment at their business.

### **Sample Design**

The sample design called for completing approximately 400 interviews in total, of which at least 200 interviews were to be with agricultural customers who have participated in PG&E's agricultural energy efficiency programs and at least 200 interviews with customers who had not participated in these programs. Both the participant and non-participant samples were divided into four strata each according to their energy usage, with those in Strata 1 having the lowest usage and those in Strata 4 having the highest usage.

In addition to the above, some of those in the participant sample were identified as having participated in PG&E's EEI (Energy Efficiency Incentive) program. However, no quotas were set to complete a specific number of interviews with EEI participants. For this research, the proportion of completed interviews with EEI participants was allowed to fall naturally

## **Interviewing Procedures**

Interviewing was conducted from Field Research Corporation's central location CATI facilities. Listings were placed into the automated sample management system which controls for callbacks. Interviewers made up to four attempts on usable numbers to complete the interview, except in Strata 4 where up to eight attempts were made. All callbacks were made on different days and at different times of the day to increase the chance of reaching the qualified respondent. Interviewing on the survey was conducted from 7:00 a.m. to 9:00 p.m. on weekdays (with concentrated effort between 12:00 and 2:00 p.m. and after 5:00 p.m.) and 10:00 a.m. to 4:00 p.m. on weekends. Interviews averaged about sixteen minutes.

Rather than setting quotas to complete a specific number of interviews in each strata, calling was prioritized to complete interviews in the higher strata first. There was a limited number of listings in the higher strata for both participants and non-participant, reflecting the entire population in these groups. As such, attempts were first made to complete as many interviews as possible in the Strata 4 groups from the listings provided. Attempts were then completed on the Strata 3 group, trying to get as many completes as possible in these groups. Interviewing continued in the Strata 2 and Strata 1 groups, with maximums applied to Strata 1 groups to limit the totals in these groups.

All interviewing was completed between October 14 and November 9, 1998. A total of 429 interviews were completed, of which 215 were with participants and 214 with non-participants. A complete disposition of the interviewing attempts is shown on the table on the following page:

Calling Disposition for 1998 PG&E Agricultural Sector Evaluation Telephone Survey									
	Total	Participant				Non-participant			
		Strata 1	Strata 2	Strata 3	Strata 4	Strata 1	Strata 2	Strata 3	Strata 4
Total listings attempted (one or more times)	3605	847	601	275	125	366	456	495	440
Disconnected/not in service	436	98	69	28	10	50	59	69	53
Wrong number	271	38	44	34	12	31	44	26	42
Fax Machine/modem	25	5	6	1	1	1	1	7	3
Moved/left area	12	3	0	1	0	1	2	4	1
No answer/ans. machine (on final attempt)	1166	331	225	76	39	72	119	170	134
Busy (on final attempt)	31	7	4	4	1	3	5	4	3
Respondent not avail./callback	447	119	72	22	15	28	55	74	62
Communication barrier	61	6	7	6	2	10	13	7	10
Duplicate/already interviewed	20	5	2	3	1	1	2	2	4
Other	144	26	23	19	5	19	19	17	16
No pumps used since 1994	102	11	14	5	10	22	9	15	16
Ineligible in Q2 and Q3	35	4	6	2	0	9	6	4	4
Refusal before eligibility determined	298	68	45	31	8	37	40	39	30
Refused after eligible	114	22	15	10	4	17	20	7	19
Stopped interview	14	2	5	1	0	1	3	0	2
Completed interview	429	102	64	32	17	64	59	50	41
Records unused	510	160	0	0	0	250	100	0	0

## **Data Processing**

All data processing was conducted in-house at Field Research Corporation. Data were checked for logical consistency. The “clean” data were then formatted into a “card-image file” and sent to Equipoise Consulting along with full documentation.



***Appendix E***  
***Telephone Survey with Frequencies***

-- MAIN QUESTIONNAIRE --**START OF SURVEY**

1. Do you have irrigation pumps that have been in use at any time since January 1, 1994?

Yes ..... 1 → CONTINUE  
 No ..... 2  
 Don't know .....DK } TERMINATE  
 Refused ..... REF

Q1	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	429	100.0	429	100.0

2. Do you know what a bowl and impeller pump repair is?

Yes ..... 1  
 No ..... 2  
 Don't know .....DK  
 Refused ..... REF

Q2	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	5	1.2	5	1.2
1	368	85.8	373	86.9
2	56	13.1	429	100.0

3. What type of irrigation system do you use? Is it: (**READ LIST; ENTER ALL THAT APPLY**)?

	YES	NO	DK	REF
a. Drip or micro.....	1	2	DK	REF
b. Sprinkler.....	1	2	DK	REF
c. Furrow.....	1	2	DK	REF
e. Flood.....	1	2	DK	REF

Q3A	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	1	0.2	1	0.2
1	177	41.3	178	41.5
2	251	58.5	429	100.0

Q3B	Frequency	Percent	Cumulative Frequency	Cumulative Percent
-----	-----------	---------	----------------------	--------------------

&	1	0.2	1	0.2
1	235	54.8	236	55.0
2	193	45.0	429	100.0
<hr/>				
Q3C	Frequency	Percent	Cumulative Frequency	Cumulative Percent
<hr/>				
&	4	0.9	4	0.9
1	151	35.2	155	36.1
2	274	63.9	429	100.0
<hr/>				
Q3E	Frequency	Percent	Cumulative Frequency	Cumulative Percent
<hr/>				
&	2	0.5	2	0.5
1	207	48.3	209	48.7
2	220	51.3	429	100.0

**IF (YES TO Q2 OR YES TO Q3a OR Q3b), THEN CONTINUE. ELSE THANK AND TERMINATE**

**TIME STARTED:** \_\_\_\_\_

FIRST, I WOULD LIKE TO ASK YOU SOME GENERAL QUESTIONS ABOUT YOUR BUSINESS OR ORGANIZATION.

4. Which of the following is your largest source of revenue? (**READ ENTIRE LIST; CODE ONLY ONE THAT BEST FITS**)?

- Vegetables or field crops ..... 1
- Livestock..... 2
- Ornamental nursery ..... 3
- Indoor crops (greenhouse) ..... 4
- Packing plant..... 5
- Vineyard/winery ..... 6
- Orchard ..... 7
- Dairy farm ..... 8
- Water district..... 9
- Other? (**SPECIFY**) ..... 0
- Don't know (**DO NOT READ**).....DK
- Refused (**DO NOT READ**) ..... REF

Q4	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	2	0.5	2	0.5
0	22	5.1	24	5.6
1	124	28.9	148	34.5
2	38	8.9	186	43.4
3	15	3.5	201	46.9
4	6	1.4	207	48.3
5	3	0.7	210	49.0
6	63	14.7	273	63.6
7	134	31.2	407	94.9
8	21	4.9	428	99.8
9	1	0.2	429	100.0

RESPONSES TO 'OTHER' QUESTION : Q04	RESPONDANT ID
water grass, for the kids of school.****	30034
HOBBY****	30054
has 3 cows****	30085
trees****	30100
fish farming****	30136
Almonds****	30183
oil company****	30202
fruit nut trees and water lawn. ****	30280

NULL****	30297
nut crops****	30443
Fruit - Strawberry****	30492
horse ranch****	30520
organic herb farm****	30596
Equally - livestock & field crops****	30627
raisins****	30657
grape nursery****	30703
Horse Farm****	30753
permanent pasture.****	30841
PASTURE****	30866
walnuts****	31025
oil fields****	31098
Timber****	31123
Horses****	31128
Horse Farm****	31141
fruits and nuts****	31210

5. Does your business own this property?

Yes ..... 1  
 No ..... 2  
 Don't know .....DK  
 Refused ..... REF

Q5	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	8	1.9	8	1.9
1	372	86.7	380	88.6
2	49	11.4	429	100.0

6. Would you consider your business or organization operated by a family or operated by a company?

Family..... 1  
 Company ..... 2  
 Not applicable ..... 3  
 Don't know.....DK

Refused ..... REF

Q6	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	1	0.2	1	0.2
1	370	86.2	371	86.5
2	49	11.4	420	97.9
3	9	2.1	429	100.0

7. Compared to other businesses or organizations similar to yours, would you categorize this business or organization as small, medium or large?

Small ..... 1  
 Medium ..... 2  
 Large ..... 3  
 Don't know ..... DK  
 Refused ..... REF

Q7	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	2	0.5	2	0.5
1	194	45.2	196	45.7
2	180	42.0	376	87.6
3	53	12.4	429	100.0

8. How long has your company or organization been operating at this location? (**READ LIST**)

1 to 3 years ..... 1  
 4 to 10 years ..... 2  
 More than 10 years ..... 3  
 Don't know (**DO NOT READ**) ..... DK  
 Refused (**DO NOT READ**) ..... REF

Q8	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	1	0.2	1	0.2
1	4	0.9	5	1.2
2	51	11.9	56	13.1
3	373	86.9	429	100.0

9. If you grow crops, do you grow annual or permanent crops?

Annual ..... 1  
 Permanent ..... 2

Both annual and permanent.....	3
Don't grow crops.....	4
Don't know.....	DK
Refused .....	REF

Q9	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	1	0.2	1	0.2
1	135	31.5	136	31.7
2	171	39.9	307	71.6
3	92	21.4	399	93.0
4	30	7.0	429	100.0

10. How many electric water pumps are used in your operation?. (NUMBER OF PUMPS) \_\_\_\_\_

Q10	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	2	0.5	2	0.5
000000	3	0.7	5	1.2
000001	78	18.2	83	19.3
000002	81	18.9	164	38.2
000003	45	10.5	209	48.7
000004	29	6.8	238	55.5
000005	27	6.3	265	61.8
000006	29	6.8	294	68.5
000007	14	3.3	308	71.8
000008	9	2.1	317	73.9
000009	13	3.0	330	76.9
000010	11	2.6	341	79.5
000011	8	1.9	349	81.4
000012	12	2.8	361	84.1
000013	3	0.7	364	84.8
000014	4	0.9	368	85.8
000015	12	2.8	380	88.6
000016	3	0.7	383	89.3
000017	5	1.2	388	90.4
000018	4	0.9	392	91.4
000019	1	0.2	393	91.6
000020	5	1.2	398	92.8
000021	2	0.5	400	93.2
000022	2	0.5	402	93.7
000023	1	0.2	403	93.9
000025	2	0.5	405	94.4
000026	1	0.2	406	94.6
000027	1	0.2	407	94.9
000030	4	0.9	411	95.8
000033	1	0.2	412	96.0
000035	3	0.7	415	96.7
000040	3	0.7	418	97.4
000050	3	0.7	421	98.1
000051	1	0.2	422	98.4
000060	1	0.2	423	98.6
000150	1	0.2	424	98.8
000200	1	0.2	425	99.1

001500	1	0.2	426	99.3
090006	1	0.2	427	99.5
140013	1	0.2	428	99.8
3	1	0.2	429	100.0

11. Of these pumps, how many are/is this pump: (READ LIST)

- a. Less than 20 horsepower .... (NUMBER OF PUMPS) \_\_\_\_\_ or (% of total) \_\_\_\_\_
- b. 20 HP to 75 horsepower .... (NUMBER OF PUMPS) \_\_\_\_\_ or (% of total) \_\_\_\_\_
- c. 76 HP to 200 horsepower .. (NUMBER OF PUMPS) \_\_\_\_\_ or (% of total) \_\_\_\_\_
- d. Over 200 horsepower..... (NUMBER OF PUMPS) \_\_\_\_\_ or (% of total) \_\_\_\_\_
- (TOTAL SHOULD ADD TO NUMBER IN Q10) \_\_\_\_\_ or (100%) \_\_\_\_\_

Q11	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	340	99.7	340	99.7
2	1	0.3	341	100.0

Frequency Missing = 88

Q11A	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	7	1.8	7	1.8
000000	120	31.0	127	32.8
000001	96	24.8	223	57.6
000002	53	13.7	276	71.3
000003	33	8.5	309	79.8
000004	17	4.4	326	84.2
000005	17	4.4	343	88.6
000006	11	2.8	354	91.5
000007	4	1.0	358	92.5
000008	8	2.1	366	94.6
000010	5	1.3	371	95.9
000011	2	0.5	373	96.4
000014	2	0.5	375	96.9
000015	5	1.3	380	98.2
000018	1	0.3	381	98.4
000019	1	0.3	382	98.7
000020	2	0.5	384	99.2
000048	1	0.3	385	99.5
000050	1	0.3	386	99.7
000100	1	0.3	387	100.0

Frequency Missing = 42

Q11B	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	7	1.8	7	1.8
000000	72	18.8	79	20.6
000001	95	24.8	174	45.4
000002	55	14.4	229	59.8



000003	29	7.6	258	67.4
000004	27	7.0	285	74.4
000005	15	3.9	300	78.3
000006	16	4.2	316	82.5
000007	11	2.9	327	85.4
000008	2	0.5	329	85.9
000009	5	1.3	334	87.2
000010	7	1.8	341	89.0
000011	3	0.8	344	89.8
000012	7	1.8	351	91.6
000013	3	0.8	354	92.4
000014	3	0.8	357	93.2
000015	6	1.6	363	94.8
000016	2	0.5	365	95.3
000017	1	0.3	366	95.6
000018	1	0.3	367	95.8
000020	4	1.0	371	96.9
000025	1	0.3	372	97.1
000029	1	0.3	373	97.4
000030	2	0.5	375	97.9
000032	1	0.3	376	98.2
000035	1	0.3	377	98.4
000040	1	0.3	378	98.7
000049	1	0.3	379	99.0
000075	1	0.3	380	99.2
000140	1	0.3	381	99.5
000200	1	0.3	382	99.7
10	1	0.3	383	100.0

Frequency Missing = 46

Q11C	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	7	2.0	7	2.0
000000	230	65.5	237	67.5
000001	29	8.3	266	75.8
000002	21	6.0	287	81.8
000003	14	4.0	301	85.8
000004	10	2.8	311	88.6
000005	7	2.0	318	90.6
000006	4	1.1	322	91.7
000007	6	1.7	328	93.4
000008	3	0.9	331	94.3
000009	3	0.9	334	95.2
000010	7	2.0	341	97.2
000011	1	0.3	342	97.4
000012	1	0.3	343	97.7
000015	1	0.3	344	98.0
000016	1	0.3	345	98.3
000020	1	0.3	346	98.6
000025	1	0.3	347	98.9
000040	1	0.3	348	99.1
000050	1	0.3	349	99.4
000072	1	0.3	350	99.7
030000	1	0.3	351	100.0

Frequency Missing = 78

Q11D	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	7	2.0	7	2.0
000000	325	93.4	332	95.4
000001	6	1.7	338	97.1
000002	1	0.3	339	97.4
000003	3	0.9	342	98.3
000004	2	0.6	344	98.9
000005	2	0.6	346	99.4
000017	1	0.3	347	99.7
001200	1	0.3	348	100.0

Frequency Missing = 81

12. What is your estimate of the average age of the pumps?

\_\_\_\_\_ (Average # of years) **OR RECORD RANGE:** From \_\_\_\_\_ to \_\_\_\_\_ years old

Q12	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	20	4.7	20	4.7
1	296	69.0	316	73.7
2	113	26.3	429	100.0

Q12A	Frequency	Percent	Cumulative Frequency	Cumulative Percent
01	4	1.4	4	1.4
02	7	2.4	11	3.7
03	13	4.4	24	8.1
04	4	1.4	28	9.5
05	19	6.4	47	15.9
06	4	1.4	51	17.2
07	7	2.4	58	19.6
08	11	3.7	69	23.3
09	2	0.7	71	24.0
10	44	14.9	115	38.9
12	14	4.7	129	43.6
13	1	0.3	130	43.9
14	2	0.7	132	44.6
15	36	12.2	168	56.8
16	1	0.3	169	57.1
17	3	1.0	172	58.1
18	2	0.7	174	58.8
19	1	0.3	175	59.1
20	56	18.9	231	78.0
21	2	0.7	233	78.7
22	2	0.7	235	79.4
23	1	0.3	236	79.7
24	1	0.3	237	80.1
25	17	5.7	254	85.8
26	2	0.7	256	86.5
27	1	0.3	257	86.8
30	19	6.4	276	93.2
33	1	0.3	277	93.6

35	2	0.7	279	94.3
37	1	0.3	280	94.6
40	7	2.4	287	97.0
45	1	0.3	288	97.3
48	1	0.3	289	97.6
5	1	0.3	290	98.0
50	2	0.7	292	98.6
54	1	0.3	293	99.0
58	1	0.3	294	99.3
60	2	0.7	296	100.0

Frequency Missing = 133

Q12B	Frequency	Percent	Cumulative Frequency	Cumulative Percent
00	2	1.8	2	1.8
01	23	20.4	25	22.1
02	13	11.5	38	33.6
03	5	4.4	43	38.1
04	4	3.5	47	41.6
05	11	9.7	58	51.3
06	4	3.5	62	54.9
07	2	1.8	64	56.6
08	3	2.7	67	59.3
10	17	15.0	84	74.3
11	1	0.9	85	75.2
15	10	8.8	95	84.1
18	3	2.7	98	86.7
20	4	3.5	102	90.3
25	3	2.7	105	92.9
30	5	4.4	110	97.3
35	1	0.9	111	98.2
40	2	1.8	113	100.0

Frequency Missing = 316

Q12C	Frequency	Percent	Cumulative Frequency	Cumulative Percent
03	2	1.8	2	1.8
04	1	0.9	3	2.7
05	4	3.5	7	6.2
08	4	3.5	11	9.7
10	14	12.4	25	22.1
12	4	3.5	29	25.7
13	1	0.9	30	26.5
15	13	11.5	43	38.1
19	1	0.9	44	38.9
20	31	27.4	75	66.4
25	6	5.3	81	71.7
30	8	7.1	89	78.8
33	1	0.9	90	79.6
34	1	0.9	91	80.5
35	2	1.8	93	82.3
40	10	8.8	103	91.2
50	9	8.0	112	99.1
70	1	0.9	113	100.0

Frequency Missing = 316

13. On average, how many months are the pumps used during the year? (READ LIST)

- Less than 3 months..... 1
- 3-6 months ..... 2
- 7-9 months ..... 3
- Year round ..... 4
- Don't know (DO NOT READ).....DK
- Refused (DO NOT READ) ..... REF

Q13	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	2	0.5	2	0.5
1	26	6.1	28	6.5
2	194	45.2	222	51.7
3	123	28.7	345	80.4
4	84	19.6	429	100.0

14. Approximately, what percentage of your total annual costs is spent in electricity bills?

\_\_\_\_\_ (Approximate %) OR RECORD RANGE: From \_\_\_\_\_ % to \_\_\_\_\_ %

Q14	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	126	29.4	126	29.4
1	281	65.5	407	94.9
2	22	5.1	429	100.0

Q14A	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	5	1.8	5	1.8
000	1	0.4	6	2.1
001	14	5.0	20	7.1
002	15	5.3	35	12.5
003	11	3.9	46	16.4
004	10	3.6	56	19.9
005	44	15.7	100	35.6
006	2	0.7	102	36.3
007	7	2.5	109	38.8
008	11	3.9	120	42.7
009	2	0.7	122	43.4
010	48	17.1	170	60.5
012	7	2.5	177	63.0
013	1	0.4	178	63.3
015	20	7.1	198	70.5
018	1	0.4	199	70.8
020	30	10.7	229	81.5
022	1	0.4	230	81.9
025	14	5.0	244	86.8
030	8	2.8	252	89.7
033	4	1.4	256	91.1
035	2	0.7	258	91.8

040	2	0.7	260	92.5
044	1	0.4	261	92.9
050	6	2.1	267	95.0
051	1	0.4	268	95.4
065	1	0.4	269	95.7
066	1	0.4	270	96.1
070	1	0.4	271	96.4
075	4	1.4	275	97.9
080	4	1.4	279	99.3
090	1	0.4	280	99.6
100	1	0.4	281	100.0

Frequency Missing = 148

Q14B	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	1	4.5	1	4.5
001	1	4.5	2	9.1
003	2	9.1	4	18.2
005	2	9.1	6	27.3
007	1	4.5	7	31.8
008	2	9.1	9	40.9
010	6	27.3	15	68.2
015	5	22.7	20	90.9
025	2	9.1	22	100.0

Frequency Missing = 407

Q14C	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	1	4.5	1	4.5
002	1	4.5	2	9.1
004	1	4.5	3	13.6
005	1	4.5	4	18.2
008	1	4.5	5	22.7
010	4	18.2	9	40.9
015	5	22.7	14	63.6
020	5	22.7	19	86.4
030	2	9.1	21	95.5
100	1	4.5	22	100.0

Frequency Missing = 407

15. How important is it for you to be sure that your pumps and irrigation systems make efficient use of electricity? Is it: **(READ LIST)**?

- Very important ..... 1
- Somewhat important ..... 2
- Not too important, or ..... 3
- Not at all important ..... 4
- Don't know (**DO NOT READ**).....DK
- Refused (**DO NOT READ**) ..... REF

Q15	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	1	0.2	1	0.2
1	342	79.7	343	80.0
2	72	16.8	415	96.7
3	14	3.3	429	100.0

16. Do you know that use of efficient technologies, products, system design, and services can affect your electricity bills?

- Yes ..... 1
- No ..... 2
- Don't know.....DK
- Refused ..... REF

Q16	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	7	1.6	7	1.6
1	405	94.4	412	96.0
2	17	4.0	429	100.0

17. How easy is it to get information about alternative ways of reducing energy use in pumps or irrigation systems? Would you say it is: (**READ LIST**)?

- Very easy..... 1
- Somewhat easy..... 2
- Not too easy, or..... 3
- Not at all easy..... 4
- Don't know (**DO NOT READ**).....DK
- Refused (**DO NOT READ**) ..... REF

Q17	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	25	5.8	25	5.8
-	2	0.5	27	6.3
1	132	30.8	159	37.1
2	184	42.9	343	80.0
3	51	11.9	394	91.8
4	35	8.2	429	100.0

18. How willing are you to spend time looking for information on ways to reduce energy use? Would you say you are: (**READ LIST**)?

- Very willing..... 1
- Somewhat willing..... 2
- Not too willing, or..... 3
- Not at all willing..... 4
- Don't know (**DO NOT READ**).....DK
- Refused (**DO NOT READ**) ..... REF

Q18	Frequency	Percent	Cumulative Frequency	Cumulative Percent
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&	12	2.8	12	2.8
1	162	37.8	174	40.6
2	210	49.0	384	89.5
3	32	7.5	416	97.0
4	13	3.0	429	100.0

19. How satisfied are you with the available information on alternative irrigation systems for your site?  
(READ LIST)

- Very satisfied..... 1
- Somewhat satisfied..... 2
- Not too satisfied, or..... 3
- Not at all satisfied..... 4
- Don't know (DO NOT READ).....DK
- Refused (DO NOT READ)..... REF

Q19	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	44	10.3	44	10.3
-	2	0.5	46	10.7
1	133	31.0	179	41.7
2	193	45.0	372	86.7
3	43	10.0	415	96.7
4	14	3.3	429	100.0

20. How easily do you think such information will be available in the future? (READ LIST)

- Very easy..... 1
- Somewhat easy..... 2
- Not too easy, or..... 3
- Not at all easy..... 4
- Don't know (DO NOT READ).....DK
- Refused (DO NOT READ)..... REF

Q20	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	102	23.8	102	23.8
-	1	0.2	103	24.0
1	144	33.6	247	57.6
2	149	34.7	396	92.3
3	25	5.8	421	98.1
4	8	1.9	429	100.0

21. How willing are you to pay for information regarding alternative ways of reducing energy use at the pump? (READ LIST)

- Very willing..... 1



- Somewhat willing ..... 2
- Not too willing, or ..... 3
- Not at all willing ..... 4
- Don't know (**DO NOT READ**).....DK
- Refused (**DO NOT READ**) ..... REF

Q21	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	25	5.8	25	5.8
1	41	9.6	66	15.4
2	137	31.9	203	47.3
3	103	24.0	306	71.3
4	123	28.7	429	100.0

22. How do you usually first learn about energy-efficiency options? Do you first learn: (**READ LIST**)?

- When you approach a vendor or contractor ..... 1
- When you approach PG&E ..... 2
- Through PG&E brochure in the mail or a bill insert ..... 3
- Through television/radio/newspaper ads ..... 4
- When a PG&E rep. contacts you ..... 5
- When a contractor or vendor contacts you ..... 6
- By word of mouth ..... 7
- Or is it family tradition/recommendation ..... 8
- Anything else? (**SPECIFY**) \_\_\_\_\_ ..... 9
- Don't know (**DO NOT READ**).....DK
- Refused (**DO NOT READ**) ..... REF

Q22	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	27	6.3	27	6.3
1	65	15.2	92	21.4
2	27	6.3	119	27.7
3	99	23.1	218	50.8
4	36	8.4	254	59.2
5	32	7.5	286	66.7
6	27	6.3	313	73.0
7	70	16.3	383	89.3
8	9	2.1	392	91.4
9	37	8.6	429	100.0

RESPONSES TO "OTHER" QUESTION : Q22	RESPONDANT ID
workshops****	30063
Farm Bureau publications***	30106
Trade publications****	30137

articles in periodicals****	30163
articles in farm magazines****	30193
all of the above****	30350
County Water resources agency.****	30352
when they give you credit on their programs.(p.g.e.) ****	30371
trade journals/orchard mags***	30410
trade mags****	30536
reading magazines****	30541
farm information publications- articles.****	30596
A LITTLE BIT OF EVERYTHING****	30611
has pump people in the corporation who advise them.****	30627
trade shows****	30635
County Agriculture Services****	30677
i look for the info on my own****	30692
trade journals***	30702
research it myself****	30798
university of cal. cooperative extension****	30802
trade magazines****	30871
newspaper or pamphlet article.****	30877
personal research.****	30882
techno fair.****	30885
none standout****	30892
Engineering company -****	30894
At the local university, they put that information out.****	31038
receive no information****	31107
AGRAC. PUBICATIONS****	31127
trades****	31133
articles in farm journals****	31248
BY MY OWN EXPERIMENTING****	31388
libraries****	31440
journals***	31451

experience***	31452
TECH. MANUALS****	31476
califonia farmer the magazine.****	31497

23. How familiar are you with PG&E's pump test or site survey programs? Would you say you are: **(READ LIST)**?

- Very familiar..... 1
- Somewhat familiar..... 2
- Not too familiar, or..... 3
- Not at all familiar..... 4
- Don't know (**DO NOT READ**).....DK
- Refused (**DO NOT READ**) ..... REF

Q23	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	1	0.2	1	0.2
1	191	44.5	192	44.8
2	129	30.1	321	74.8
3	43	10.0	364	84.8
4	65	15.2	429	100.0

24. How familiar are you with PG&E's rebate programs? Would you say you are: **(READ LIST)**?

- Very familiar..... 1
- Somewhat familiar..... 2
- Not too familiar, or..... 3
- Not at all familiar..... 4
- Don't know (**DO NOT READ**).....DK
- Refused (**DO NOT READ**) ..... REF

Q24	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	2	0.5	2	0.5
1	62	14.5	64	14.9
2	120	28.0	184	42.9
3	106	24.7	290	67.6
4	139	32.4	429	100.0

25. How many times has the PG&E service representative contacted you in the past four years? (**READ LIST**)

- Once..... 1
- Twice ..... 2
- Several times, or..... 3
- Never..... 4
- Don't know (**DO NOT READ**).....DK
- Refused (**DO NOT READ**) ..... REF

Q25	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	14	3.3	14	3.3
1	46	10.7	60	14.0
2	45	10.5	105	24.5
3	99	23.1	204	47.6
4	225	52.4	429	100.0

26. Typically, who decides to install energy-efficiency improvements? Is it the owner(s), partners, the farm manager, an agricultural engineer or consultant, a group process, or someone else? (**ENTER ALL THAT APPLY**)

- a. The owner(s)/landlords.....1
- b. A partner or partners .....2
- c. The farm manager.....3
- d. An agricultural engineer or a consultant.....4
- e. Is it a group decision process?.....5
- f. Anyone else? (**SPECIFY**) .....6

Q26A	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0	91	21.2	91	21.2
1	338	78.8	429	100.0

Q26B	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0	393	91.6	393	91.6
1	36	8.4	429	100.0

Q26C	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0	396	92.3	396	92.3
1	33	7.7	429	100.0

Q26D	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0	396	92.3	396	92.3
1	33	7.7	429	100.0

	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0	427	99.5	427	99.5
1	2	0.5	429	100.0
Q26E	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0	398	92.8	398	92.8
1	31	7.2	429	100.0
Q26F	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0	422	98.4	422	98.4
1	7	1.6	429	100.0
Q26G	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0	428	99.8	428	99.8
1	1	0.2	429	100.0
Q26H	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0	429	100.0	429	100.0

RESPONSES TO "OTHER" QUESTION : Q26	RESPONDANT ID
maintenance manager****	30043
farm hand****	30057
farm hand****	30057
farm hand****	30057
finance mgr.****	30071
Program Director****	30148
Board of Directors****	30352
farm management,then warden****	30897
myself a self employed farmer****	31275

27. Which of these financial methods do you typically use to evaluate energy-efficiency improvements?  
 (READ LIST; CIRCLE ONE RESPONSE)

- Simple payback ..... 1
- Lowest initial investment..... 2
- A more complex financial analysis..... 3
- Don't know (DO NOT READ).....DK
- Refused (DO NOT READ) ..... REF

Q27	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	78	18.2	78	18.2
-	2	0.5	80	18.6
1	195	45.5	275	64.1
2	64	14.9	339	79.0
3	90	21.0	429	100.0

28. How easy would it be for you to get financing for irrigation equipment changes or upgrades that cost \$800–\$1,000 per acre? (**READ LIST**)

- Very easy..... 1
- Somewhat easy..... 2
- Somewhat difficult, or ..... 3
- Very difficult ..... 4
- Not applicable (**DO NOT READ**) ..... 5
- Don't know (**DO NOT READ**).....DK
- Refused (**DO NOT READ**) ..... REF

Q28	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	29	6.8	29	6.8
1	83	19.3	112	26.1
2	124	28.9	236	55.0
3	87	20.3	323	75.3
4	62	14.5	385	89.7
5	44	10.3	429	100.0

29. How often have you not made necessary changes in the irrigation systems due to lack of financing? (**READ LIST**)

- Often ..... 1
- Sometimes..... 2
- Not too often, or ..... 3
- Never..... 4
- Don't know (**DON'T READ**).....DK
- Refused (**DON'T READ**) ..... REF

Q29	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	8	1.9	8	1.9
1	33	7.7	41	9.6
2	61	14.2	102	23.8
3	87	20.3	189	44.1
4	240	55.9	429	100.0

30. Suppose an irrigation system requires an improvement at your site and you had only two options. One option has low initial costs and less benefits and the other option has high initial cost and more benefits. Which option are you most likely to select: **(READ LIST)**

- Low initial costs with less benefits..... 1 (GO TO Q31)
- High initial cost with more benefits ..... 2 (GO TO Q32)
- Don't know (**DON'T READ**)..... DK (GO TO Q33)
- Refused (**DON'T READ**) ..... REF (GO TO Q33)

Q30	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	104	24.2	104	24.2
-	1	0.2	105	24.5
1	103	24.0	208	48.5
2	221	51.5	429	100.0

**IF LOW INITIAL COST (CODE 11), ASK:**

31. Why would you select this option? Was it because: **(READ LIST)?**

- |  | <u>YES</u> | <u>NO</u> | <u>DK</u> | <u>REF</u> |
|--|------------|-----------|-----------|------------|
| a. You do not have enough information about long term benefits.....1..... 2.....   |            |           | DK        | REF        |
| b. You're not sure if the performance of the system is worth the higher cost ..... | 1.....     | 2.....    | DK        | REF        |
| c. It depends on who has recommended the option.....1..... 2.....                  |            |           | DK        | REF        |
| d. Too many indirect costs are involved.....1..... 2.....                          |            |           | DK        | REF        |
| e. The possibility of high <u>unexpected</u> costs.....1..... 2.....               |            |           | DK        | REF        |
| f. Limited financing .....   | 1.....     | 2.....    | DK        | REF        |
| g. You have a habit of selecting low initial cost option .....                     | 1.....     | 2.....    | DK        | REF        |
| h. That is how all the investment decisions are made in your organization.....     | 1.....     | 2.....    | DK        | REF        |
| i. You have to wait too long for the benefits .....                                | 1.....     | 2.....    | DK        | REF        |
| j. Anything else? ( <b>SPECIFY</b> ) _____   |            |           | DK        | REF        |
| _____  | ....1..... | 2.....    | DK        | REF        |

**NOW GO TO Q33**

Q31A	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	3	2.9	3	2.9
1	45	43.7	48	46.6
2	55	53.4	103	100.0

Frequency Missing = 326

Q31B	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	6	5.8	6	5.8
1	68	66.0	74	71.8
2	29	28.2	103	100.0

Frequency Missing = 326

Q31C	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	4	3.9	4	3.9
1	43	41.7	47	45.6
2	56	54.4	103	100.0

Frequency Missing = 326

Q31D	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	8	7.8	8	7.8
1	62	60.2	70	68.0
2	33	32.0	103	100.0

Frequency Missing = 326

Q31E	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	8	7.8	8	7.8
1	67	65.0	75	72.8
2	28	27.2	103	100.0

Frequency Missing = 326

Q31F	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	6	5.8	6	5.8
1	63	61.2	69	67.0
2	34	33.0	103	100.0

Frequency Missing = 326

Q31G	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	6	5.8	6	5.8
1	56	54.4	62	60.2
2	41	39.8	103	100.0

Frequency Missing = 326

Q31H	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	9	8.7	9	8.7
1	51	49.5	60	58.3
2	43	41.7	103	100.0



Frequency Missing = 326

Q31I	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	8	7.8	8	7.8
1	61	59.2	69	67.0
2	34	33.0	103	100.0

Frequency Missing = 326

Q31J	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	4	3.9	4	3.9
1	14	13.6	18	17.5
2	85	82.5	103	100.0

Frequency Missing = 326

RESPONSES TO "OTHER" QUESTION : Q31	RESPONDANT ID
because we don't own the property or the equipment. ***	30111
water availability.****	30486
lease the land - does not own it.****	30492
alternate water source.****	30596
To save money****	30677
too many rules and regulations.if i have to shut mypumps off on ****	30697
sunday because the rate structures are so bad.	
perhaps thinking in long term weither i would have to wait to ****	30702
receive the benefits	
i've never needed it with my present pumpo system****	30766
do not own property****	30798
Don't know where the hidden costs are.****	30828
because of funds****	30962
Around here we have the disel pumps insted of electric ****	31105
because of my age probably.****	31248
too lengthy of a pay back.****	31401

**IF HIGH INITIAL COST (CODE 12), ASK:**

32. Why would you select this option? Was it because (**READ LIST**)?

- |   | <u>YES</u> | <u>NO</u> | <u>DK</u> | <u>REF</u> |
|---|------------|-----------|-----------|------------|
| a. The information and benefits are adequate and convincing .....                 | 1.....     | 2.....    | DK ...    | REF        |
| b. You are sure the performance is worth the higher cost .....                    | 1.....     | 2.....    | DK ...    | REF        |
| c. You trust the agency that recommended the system .....                         | 1.....     | 2.....    | DK ...    | REF        |
| d. You know there are no indirect costs involved .....                            | 1.....     | 2.....    | DK ...    | REF        |
| e. You know that there are no <u>unexpected</u> costs.....                        | 1.....     | 2.....    | DK ...    | REF        |
| f. You can spare the funds required for the change .....                          | 1.....     | 2.....    | DK ...    | REF        |
| g. Initial cost is evaluated in conjunction with the<br>long-term benefits.....   | 1.....     | 2.....    | DK ...    | REF        |
| h. That is how all the investment decisions are made<br>in your organization..... | 1.....     | 2.....    | DK ...    | REF        |
| i. Long-term benefits are more important.....                                     | 1.....     | 2.....    | DK ...    | REF        |
| j. Anything else? ( <b>SPECIFY</b> ) _____<br>_____                               | ....1..... | 2.....    | DK ...    | REF        |

**NOW GO TO Q33**

Q32A	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	9	4.1	9	4.1
1	178	80.5	187	84.6
2	34	15.4	221	100.0

Frequency Missing = 208

Q32B	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	7	3.2	7	3.2
1	195	88.2	202	91.4
2	19	8.6	221	100.0

Frequency Missing = 208

Q32C	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	13	5.9	13	5.9
1	147	66.5	160	72.4
2	61	27.6	221	100.0

Frequency Missing = 208

Q32D	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	28	12.7	28	12.7
1	125	56.6	153	69.2
2	68	30.8	221	100.0

Frequency Missing = 208

Q32E	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	17	7.7	17	7.7
1	140	63.3	157	71.0
2	64	29.0	221	100.0

Frequency Missing = 208

Q32F	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	15	6.8	15	6.8
1	156	70.6	171	77.4
2	50	22.6	221	100.0

Frequency Missing = 208

Q32G	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	7	3.2	7	3.2
1	206	93.2	213	96.4
2	8	3.6	221	100.0

Frequency Missing = 208

Q32H	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	8	3.6	8	3.6
1	175	79.2	183	82.8
2	38	17.2	221	100.0

Frequency Missing = 208

Q32I	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	5	2.3	5	2.3
1	206	93.2	211	95.5
2	10	4.5	221	100.0

Frequency Missing = 208

Q32J	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	4	1.8	4	1.8
1	21	9.5	25	11.3
2	196	88.7	221	100.0

Frequency Missing = 208

RESPONSES TO 'OTHER' Question : Q32	RESPNDANT ID
as long as you make a profit.****	30098

you get what you pay for.****	30101
Because its the best benefits to the owner.****	30106
there might be depreciation , and other pay backs./have to get a look at lease terms./cash flow/service of debt.//	30371
staying ahead of environmental regs****	30649
faster pumping would save money****	30824
wise****	30900
compliance with regulations concerning discharge.****	30927
when i can think of PG& E i can only think of it getting more expensive , because the cost would be more later. If technology enters into our power source i still think its going to getmore expensive, 10, 20, 30, 40 years from now, so the things that i can do now to reduce my power bill to be efficient withuse of power will help in the long run, but i still have to justify my expense , and sometimes its difficult to justify my expenseto get the benefits. some of those systems can improve your crops too.	31025
It might be something right the first time won't have to redo it Later.	31036
into sustainable ag and this goes along with it****	31059
common sense****	31122
yes, because i am not penny wise and tom foolish****	31123
Have to keep paying demand charges when youre not using something ****	31205
ease of maintenance****	31213
you can afford to select the higher cost option onceyou've **** satisfied the benefits for your payback.	31250
if in the long run it would save money over the years.// ****	31327
because maximizing use of water ressorces is extremely important. ****	31362
in the long run it becomes very cheap w/ inflation. ****	31497
Environmental responsibility****	31539

33. If you were considering options to increase the efficiency of electricity use by installing new equipment or repairing old equipment, how important would (ITEM) be in your decision?

	Very Important	Somewhat Important	Not too Important	Not at all Important	Don't Know	Refused
a. reliability of the equipment	1	2	3	4	DK	REF
b. potential energy savings	1	2	3	4	DK	REF
c. general health of the economy	1	2	3	4	DK	REF
d. current equipment's performance	1	2	3	4	DK	REF
e. initial cost	1	2	3	4	DK	REF
f. operating and maintenance costs	1	2	3	4	DK	REF

Q33A	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	5	1.2	5	1.2
1	382	89.0	387	90.2
2	35	8.2	422	98.4
3	2	0.5	424	98.8
4	5	1.2	429	100.0

Q33B	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	9	2.1	9	2.1
1	309	72.0	318	74.1
2	99	23.1	417	97.2
3	8	1.9	425	99.1
4	4	0.9	429	100.0

Q33C	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	15	3.5	15	3.5
1	157	36.6	172	40.1
2	144	33.6	316	73.7
3	65	15.2	381	88.8
4	48	11.2	429	100.0

Q33D	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	8	1.9	8	1.9
1	298	69.5	306	71.3

2	112	26.1	418	97.4
3	7	1.6	425	99.1
4	4	0.9	429	100.0
Q33E	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	9	2.1	9	2.1
-	1	0.2	10	2.3
1	250	58.3	260	60.6
2	146	34.0	406	94.6
3	18	4.2	424	98.8
4	5	1.2	429	100.0
Q33F	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	5	1.2	5	1.2
1	307	71.6	312	72.7
2	107	24.9	419	97.7
3	7	1.6	426	99.3
4	3	0.7	429	100.0

**REFER TO Q2. IF YES, AWARE OF BOWL AND IMPELLER PUMP REPAIR, ASK Q34-38.**

**IF NO, SKIP TO Q39.**

34. With respect to the repair of pumps, currently how certain are you about the claim that a pump repair would save energy? (READ LIST)

- Very certain..... 1
- Somewhat certain..... 2
- Not too certain, or..... 3
- Not at all certain..... 4
- Don't know (DO NOT READ).....DK
- Refused (DO NOT READ)..... REF

Q34	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	30	8.2	30	8.2
1	116	31.5	146	39.7
2	142	38.6	288	78.3
3	55	14.9	343	93.2
4	25	6.8	368	100.0

Frequency Missing = 61

35. How important is it for you to be certain about the energy savings claim before making the decision to repair a pump? (READ LIST)

- Very important..... 1
- Somewhat important..... 2

Not too important, or ..... 3  
 Not at all important ..... 4  
 Don't know (**DO NOT READ**).....DK  
 Refused (**DO NOT READ**) ..... REF

Q35	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	7	1.9	7	1.9
1	261	70.9	268	72.8
2	80	21.7	348	94.6
3	10	2.7	358	97.3
4	10	2.7	368	100.0

Frequency Missing = 61

36. In the future, how certain do you believe you will be about the claim that a pump repair would save energy? (**READ LIST**)

Very certain..... 1 (GO TO Q37)  
 Somewhat certain..... 2(GO TO Q37)  
 Not too certain, or..... 3(GO TO Q38)  
 Not at all certain ..... 4(GO TO Q38)  
 Don't know (**DO NOT READ**).....DK (GO TO Q45)  
 Refused (**DO NOT READ**) ..... REF (GO TO Q45)

Q36	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	55	14.9	55	14.9
1	135	36.7	190	51.6
2	144	39.1	334	90.8
3	23	6.3	357	97.0
4	11	3.0	368	100.0

Frequency Missing = 61

**IF VERY/SOMEWHAT CERTAIN, ASK:**

37. Would you be certain because of: (READ LIST; RECORD ONLY ONE)?

- Your previous experience with pump repairs ..... 1
- The experience of other growers ..... 2
- The person you talked to is knowledgeable ..... 3
- Something else? (SPECIFY) ..... 4
- Don't know (DO NOT READ) .....DK
- Refused (DO NOT READ)..... REF

**NOW GO TO Q45**

Q37	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	14	5.0	14	5.0
1	157	56.3	171	61.3
2	33	11.8	204	73.1
3	55	19.7	259	92.8
4	20	7.2	279	100.0

Frequency Missing = 150

Q37A	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	2	100.0	2	100.0

Frequency Missing = 427

RESPONSES TO 'OTHER' QUESTION : Q37	RESPONDANT ID
All of them****	30285
Experience with pumps****	30292
Age of the existing system****	30352
Depending on bowl design and efficiency of the pump****	30455
Efficiency testing****	30502
Pump efficiency test****	30507
When you can justify repairing a well****	30649
Good care of equip. makes it run better****	30824
all of them.****	30892
all of them combined****	30904
It's all of the ones listed****	31023
a little bit of all****	31047



I have an electrical background and used to sell electrical pump Panels.//	31064
it all depends on the situations****	31161
Combo of all those****	31335
More research by me****	31400
A DEALER****	31520

**IF NOT TOO/NOT AT ALL CERTAIN, ASK:**

38. Would you not be certain because of: (READ LIST; RECORD ONLY ONE)?

- Your previous experience with pump repairs ..... 1
- The experience of other growers ..... 2
- The person you talked to is not knowledgeable ..... 3
- Something else? (SPECIFY) ..... 4
- Don't know (DO NOT READ) .....DK
- Refused (DO NOT READ) ..... REF

**NOW GO TO Q45**

Q38	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	3	8.8	3	8.8
1	15	44.1	18	52.9
2	3	8.8	21	61.8
3	2	5.9	23	67.6
4	11	32.4	34	100.0

Frequency Missing = 395

Q38A	Frequency	Percent	Cumulative Frequency	Cumulative Percent
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Frequency Missing = 429

RESPONSES TO "OTHER" QUESTION : Q38	RESPONDANT ID
pge****	30094
it just doesnt do that much. Most of my crops need alot more ****	30250
water anyway.	
the water level decreasing****	30486
Unless they can prove it saves then I'll consider it. ****	30782

depends on the individual case****	30786
the current pump is new and the well,,,, so it is already very Efficient ****	30802
I often am told that I will save money and then therates Change--up!-- and I've saved nothing.// ****	30893
Haven't been focusing on it.****	30994
I just things until I actually see it working****	31032
I don't know all the facts for this question****	31149
i don't beleive a pump repair will increase efficiency ****	31451

**39. REFER TO Q3. IF YES TO (A) DRIP OR MICRO OR YES TO (B) SPRINKLER, ASK Q40-44**

40. With respect to micro irrigation systems, currently how certain are you about the overall predicted performance of this type of system? (READ LIST)

- Very certain..... 1
- Somewhat certain..... 2
- Not too certain, or..... 3
- Not at all certain..... 4
- Don't know (DO NOT READ).....DK
- Refused (DO NOT READ)..... REF

Q40	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	19	31.1	19	31.1
1	16	26.2	35	57.4
2	14	23.0	49	80.3
3	3	4.9	52	85.2
4	9	14.8	61	100.0

Frequency Missing = 368

41. How important is it for you to be certain about the overall predicted performance of a micro irrigation system before making the decision to install it? (READ LIST)

- Very important..... 1
- Somewhat important..... 2
- Not too important, or..... 3
- Not at all important..... 4
- Don't know (DO NOT READ).....DK
- Refused (DO NOT READ)..... REF

Q41	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	11	18.0	11	18.0
1	42	68.9	53	86.9
2	5	8.2	58	95.1
3	1	1.6	59	96.7
4	2	3.3	61	100.0

Frequency Missing = 368

42. In the future, how certain do you believe you will be about the predicted performance of a micro irrigation system? (READ LIST)

- Very certain..... 1(GO TO Q43)
- Somewhat certain..... 2(GO TO Q43)
- Not too certain, or..... 3(GO TO Q44)
- Not at all certain..... 4(GO TO Q44)
- Don't know (DO NOT READ).....DK (GO TO Q45)
- Refused (DO NOT READ)..... REF (GO TO Q45)

Q42	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	26	42.6	26	42.6
1	17	27.9	43	70.5
2	12	19.7	55	90.2
3	1	1.6	56	91.8
4	5	8.2	61	100.0

Frequency Missing = 368

**IF VERY/SOMEWHAT CERTAIN, ASK:**

43. Would you be certain because of: (READ LIST; RECORD ONLY ONE)?

- Your previous experience with micro irrigation..... 1
- The experience of other growers ..... 2
- The person you talked to is knowledgeable ..... 3
- Something else? (SPECIFY) \_\_\_\_\_..... 4
- Don't know (DO NOT READ) .....DK
- Refused (DO NOT READ)..... REF

**NOW GO TO Q45**

Q43	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	14	48.3	14	48.3
2	8	27.6	22	75.9
3	4	13.8	26	89.7
4	3	10.3	29	100.0

Frequency Missing = 400

Q43A	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	2	100.0	2	100.0

Frequency Missing = 427

RESPONSES TO QUESTION : Q43	RESPONDANT ID
improved technology getting there but not there yet.****	30390

**IF NOT TOO/NOT AT ALL CERTAIN, ASK:**

44. Would you not be certain because of: **(READ LIST; RECORD ONLY ONE)?**

- Your previous experience with the micro irrigation ..... 1
- The experience of other growers ..... 2
- The person you talked to is not knowledgeable ..... 3
- Something else? **(SPECIFY)** \_\_\_\_\_ ..... 4
- Don't know **(DO NOT READ)** .....DK
- Refused **(DO NOT READ)** ..... REF

**NOW GO TO Q45**

Q44	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	2	33.3	2	33.3
4	4	66.7	6	100.0

Frequency Missing = 423

Q44A	Frequency	Percent	Cumulative Frequency	Cumulative Percent
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Frequency Missing = 429

RESPONSES TO QUESTION : Q44	RESPONDANT ID
i'm not going to invest any more into they systems that i use ****	30410
uncertain about results and what would happen because of no experience. Micr ****	30417
would myt meetnal opeeion, j t what I thought of it, what the situation ls	31213
depend on the individual****	31281
comb of all those****	31335

45. If you were to consider options to save energy, you may want to learn about the advantages and predicted energy savings of the options. As you may know, you may get that information from PG&E, from pump dealers, from consultants, or from irrigation system designers.

46. How confident are you in the advantages and predicted energy savings if they were projected by PG&E? Would you be: (READ LIST)?

- Very confident..... 1(GO TO Q47)
- Somewhat confident..... 2(GO TO Q47)
- Not too confident, or..... 3(GO TO Q48)
- Not at all confident..... 4(GO TO Q48)
- Don't know (DO NOT READ).....DK (GO TO Q49)
- Refused (DO NOT READ)..... REF (GO TO Q49)

Q46	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	14	3.3	14	3.3
1	168	39.2	182	42.4
2	218	50.8	400	93.2
3	23	5.4	423	98.6
4	6	1.4	429	100.0

**IF VERY/SOMEWHAT CONFIDENT, ASK:**

47. Is your confidence based on: (READ LIST; RECORD ONLY ONE)?

- Your previous experience with PG&E..... 1
- The experience of other growers ..... 2
- The person you talked to is knowledgeable ..... 3
- The fact that you feel they are unbiased ..... 4
- Something else? (SPECIFY) ..... 5
- Don't know (DO NOT READ) .....DK
- Refused (DO NOT READ)..... REF

Q47	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	23	6.0	23	6.0
1	243	63.0	266	68.9
2	22	5.7	288	74.6
3	34	8.8	322	83.4
4	48	12.4	370	95.9
5	16	4.1	386	100.0

Frequency Missing = 43

Q47A	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	1	100.0	1	100.0

Frequency Missing = 428

RESPONSES TO 'OTHER' QUESTION: Q47OTH	RESPONDANT ID
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just my own opinion****	30993
No reason not to believe it.****	30994
They are a good company and they have have no reason to tell you something thats not true, its just a fact that it saves energy.	31038
my general suspicon of information****	31123
my personal opinion, just what I thought of it, what the situation is ****	31213
depend on the individual****	31281

**IF NOT TOO/NOT AT ALL CONFIDENT, ASK:**

48. Are you not confident because of: (READ LIST)

- Your previous experience with PG&E..... 1
- The experience of other growers ..... 2
- The person you talked to is not knowledgeable ..... 3
- The fact that you feel they are biased ..... 4
- Something else? (SPECIFY) ..... 5
- Don't know (DO NOT READ) .....DK
- Refused (DO NOT READ) ..... REF

Q48	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	17	58.6	17	58.6
2	1	3.4	18	62.1
3	4	13.8	22	75.9
4	3	10.3	25	86.2
5	4	13.8	29	100.0

Frequency Missing = 400

Q48A	Frequency	Percent	Cumulative Frequency	Cumulative Percent
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Frequency Missing = 429

RESPONSES TO 'OTHER' QUESTION: Q48	RESPONDANT ID
all of them****	30113
Demand charges vary too much are a big company and i just dont think that PG&E would try to defraud you. ****	30503
I WOULD TALK TO ALL THREE****	30611
the Engineer****	30894

is concerned about deregulation. Would have said very confident Before that. ****	30954
all of them****	30113
Demand charges vary too much****	30486
all of the above****	31326
Lack of experience****	31535

49. How confident are you in the advantages and predicted energy savings if they were projected by a company other than PG&E? Would you be: **(READ LIST)**?

- Very confident..... 1(GO TO Q50)
- Somewhat confident..... 2(GO TO Q50)
- Not too confident ..... 3(GO TO Q51)
- Not at all confident ..... 4(GO TO Q51)
- Don't know (**DO NOT READ**).....DK (GO TO Q52)
- Refused (**DO NOT READ**) ..... REF (GO TO Q52)

Q49	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	48	11.2	48	11.2
1	37	8.6	85	19.8
2	243	56.6	328	76.5
3	77	17.9	405	94.4
4	24	5.6	429	100.0



**IF VERY/SOMEWHAT CERTAIN, ASK:**

50. Is your confidence based on: (READ LIST; RECORD ONLY ONE)?

- Your previous experience with them/long-term relationship  
with them ..... 1
- The experience of other growers ..... 2
- The person you talked to is knowledgeable ..... 3
- The fact that you feel they are unbiased ..... 4
- Something else? (SPECIFY) \_\_\_\_\_ ..... 5
- Don't know (DO NOT READ) .....DK
- Refused (DO NOT READ)..... REF

Q50	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	21	7.5	21	7.5
1	125	44.6	146	52.1
2	59	21.1	205	73.2
3	31	11.1	236	84.3
4	25	8.9	261	93.2
5	19	6.8	280	100.0

Frequency Missing = 149

Q50A	Frequency	Percent	Cumulative Frequency	Cumulative Percent
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Frequency Missing = 429

RESPONSES TO 'OTHER' QUESTION : Q50	RESPONDANT ID
they don't control the rates and PGE still controlsthe rate ****	30087
all of those factors.****	30111
in meetings****	30260
looks at all of them.****	30285
a little bit of all of the above****	30443
i do a lot of business.****	30511
i can make my own judgement****	30649
depends on the case****	30786
im comfortable with pge****	30788
have their own in house engineer.****	30894
deregulation.****	30954
No experience with them.****	30994

everybody pretty much says the same thing, it doesntmatter what ****	31038
company, they all tell you that it saves energy andeveryone already knows that it does.	
thinks they are biased. In for a profit. ****	31067
The fact that I feel that they are not biased. ****	31105
never had an experience with them. ****	31248
all of the above****	31326
combination of all those****	31335

**IF NOT TOO/NOT AT ALL CERTAIN, ASK:**

51. Are you not confident because of: (READ LIST)?

- Your previous experience with them..... 1
- The experience of other growers ..... 2
- The person you talked to is not knowledgeable ..... 3
- The fact that you feel they are biased ..... 4
- Something else? (SPECIFY) ..... 5
- Don't know (DO NOT READ) .....DK
- Refused (DO NOT READ)..... REF

Q51	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	15	14.9	15	14.9
-	1	1.0	16	15.8
1	20	19.8	36	35.6
2	6	5.9	42	41.6
3	6	5.9	48	47.5
4	31	30.7	79	78.2
5	22	21.8	101	100.0

Frequency Missing = 328

Q51A	Frequency	Percent	Cumulative Frequency	Cumulative Percent
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Frequency Missing = 429

RESPONSES TO 'OTHER' QUESTION: Q51	RESPONDANT ID
I'm loyal in pge on repairs such as transformers inthe winters ****	30094
LACK OF INFO****	30282
biased, and lack of familiarity****	30625

this industry is so different from the normal mainstream ag that ****it alters the results.	30646
Unless you know the company****	30782
only having dealt with pg&e****	30799
lack of experience with them****	30808
not having experience with them****	30863
no other companies available****	30917
not knowlegable with company****	30948
i havent talked to any other people****	30962
I just rely on my pump man at pg&e****	31019
Because they are hired by PG&E, and they are probably biased anyway. ****	31028
lack of previous experience with them****	31036
all of the above****	31123
i have alot of confidence in pg&e****	31148
I would like to talk to the person weho is knowledgable ****	31188
if its not PG& E or another company that i know i would be very ****	31253
leery , because there is always someone out here selling something	
no previous experience****	31255
find facts for yourself****	31281
lack of experience with them****	31434
no experiece with any other supplier.****	31462
not knowing the people****	31464

52. Now suppose that in the future, PG&E did not offer any information about the advantages and predicted savings from these options. How confident would you be if they were projected by someone else in the future? (READ LIST)

- Very confident..... 1
- Somewhat confident..... 2
- Not too confident, or..... 3
- Not at all confident..... 4
- Don't know (DO NOT READ).....DK
- Refused (DO NOT READ) ..... REF

Q52	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	91	21.2	91	21.2
1	29	6.8	120	28.0
2	231	53.8	351	81.8
3	59	13.8	410	95.6
4	19	4.4	429	100.0

53. Before you decide to make any changes in the irrigation system, how important is it for you to double-check the recommendation made? (READ LIST)

- Very important ..... 1
- Somewhat important ..... 2
- Not too important, or ..... 3
- Not at all important ..... 4
- Don't know (DO NOT READ).....DK
- Refused (DO NOT READ) ..... REF

Q53	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	9	2.1	9	2.1
1	327	76.2	336	78.3
2	76	17.7	412	96.0
3	12	2.8	424	98.8
4	5	1.2	429	100.0

54. If you were to install a new micro irrigation system, currently how concerned would you be about possible unexpected costs of the irrigation system? (READ LIST)

- Very concerned ..... 1
- Somewhat concerned ..... 2
- Not too concerned, or ..... 3
- Not at all concerned ..... 4 →GO TO Q56
- Would never install micro irrigation system (DO NOT READ)
- (Specify why \_\_\_\_\_) 5 →GO TO Q58
- Don't know (DO NOT READ).....DK
- Refused (DO NOT READ) ..... REF } GO TO Q56

Q54	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	16	3.7	16	3.7
1	257	59.9	273	63.6
2	84	19.6	357	83.2
3	21	4.9	378	88.1
4	11	2.6	389	90.7
5	40	9.3	429	100.0

RESPONSES TO QUESTION : Q54WHY	RESPONDANT ID
because of the crops we grow,alfafa , oats and pasture. ****	30020
SELLING THE PROPERTY****	30054
not for citrus the soil would kill the trees too close to the Pump ****	30094
It wouldn't work for my nursery****	30133
we are an oil company****	30202
We have cheap water the way we have****	30214
i have never known it to work in my type of farmingoperation ****	30276
not applicable to what I'm growing. ****	30383
does not fit my needs****	30404
it's not a system i use****	30502
the cost of water is low enough that it would not justify the cost ****	30507
not a practical irrigation method****	30586
MIRCO DOES NOT APLLY TO PASTURE****	30611
will work on how we are set up****	30662
because i already paid the big bucks for my system****	30697
We been on 4 inches of water, and they just are forvineyards and stuff like that, not for rice. ****	30701
it's not feasible, we do everything on a large scale****	30735
just because i don't have info on it****	30793
doesn't fit in our type of business****	30824
It wouldn't be applicable for pastures. ****	30841
BECAUSE OF THE APPLICATIONS****	30844
i dont like them in orchards.****	30892
because you can't irrigate livestock pastures with them ****	30999
basically the micro system is chewed by animals****	31023
not with rice, no micro. Some talk of sprinkler, ldk, Maybe. ****	31036
i have no need for that****	31044
I don't need it all I need is a little water. ****	31086
I have no permanent crops****	31122
it doesn't work for me at the moment****	31161
Because it's a waste of money to install them. ****	31188

you have to have some orchard or vines, i dont havethat ****	31253
because it want work with corn****	31325
does not know what it is****	31342
I dont need the money and I am 80 years so why wouldl need the change. ****	31357
not for the crops that I have now****	31393
it's simply not a consideration****	31412
because it wouldn't work for us right now but that well it's not ****	31440
something we are thinging about	
alfalfa and corn can't do that****	31448

55. How likely are these concerns to affect your decision to install a micro irrigation system? (READ LIST)

- Very likely ..... 1
- Somewhat likely ..... 2
- Not too likely, or ..... 3
- Not at all likely ..... 4
- Don't know (DO NOT READ).....DK
- Refused (DO NOT READ) ..... REF

Q55	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	15	4.1	15	4.1
-	1	0.3	16	4.4
1	194	53.6	210	58.0
2	88	24.3	298	82.3
3	40	11.0	338	93.4
4	24	6.6	362	100.0

Frequency Missing = 67

56. In the future, if you were to install a new micro irrigation system, how concerned would you be about possible unexpected costs of the irrigation system? (READ LIST)

- Very concerned ..... 1
- Somewhat concerned ..... 2
- Not too concerned, or ..... 3
- Not at all concerned ..... 4
- Don't know (DO NOT READ).....DK
- Refused (DO NOT READ) ..... REF

Cumulative Cumulative

Q56	Frequency	Percent	Frequency	Percent
&	48	12.3	48	12.3
-	1	0.3	49	12.6
1	203	52.2	252	64.8
2	85	21.9	337	86.6
3	28	7.2	365	93.8
4	24	6.2	389	100.0

Frequency Missing = 40

57. Is your opinion based on: **(READ LIST; RECORD ONLY ONE)**

- Previous experience..... 1
- Experience of other growers ..... 2
- Confidence in the source of information of the irrigation system..... 3
- Something else? **(SPECIFY)** \_\_\_\_\_  
 \_\_\_\_\_ ..... 4
- Don't know **(DO NOT READ)**.....DK
- Refused **(DO NOT READ)** ..... REF

Q57	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	65	16.7	65	16.7
-	1	0.3	66	17.0
1	166	42.7	232	59.6
2	82	21.1	314	80.7
3	37	9.5	351	90.2
4	38	9.8	389	100.0

Frequency Missing = 40

Q57A	Frequency	Percent	Cumulative Frequency	Cumulative Percent
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Frequency Missing = 429

RESPONSES TO 'OTHER' QUESTION Q57	RESPONDANT ID
just what i have been told by others****	30073
lack of knowledge****	30087
had no knowledge of micro****	30098
don't know***	30101
micro systrems are not known in this area it's very new.//nfi ****	30135
Unfamiliarity with whom I'm dealing with.//****	30229
Knowing how to shop & the costs of things****	30350
I'm not experienced with Micro grower and I would have to invetigate	30365

so that i will know. ****	
dont know. something else might make me doubt it.// ****	30368
CAN'T USE BECAUSE OF FROST****	30415
i don't kow anything about micro sustems****	30442
they have micro systems have been around, they justdont break down. ****	30503
suitability for the crop. reliability.****	30596
my own experience****	30720
lack of knowledge****	30729
don't what this system is exactly****	30786
to install with unknown company****	30799
no knowledge of the system****	30843
all of the above and lack of my own knowledge.****	30904
Site specific -****	30961
well you never know, nothing is 100% sure, if there could be unexpected costs, i am going to be concerned. There could always be something unexpected that pops up and you have to watch out for that. ****	31038
lack of experience with micro-irrigation****	31052
all equally****	31067
common sense****	31107
my general suspicion of information provided by others ****	31123
we do our research on anything we purchase****	31144
we're just a small operation and we are retiring andnot doing that thing anymore ****	31171
it would be the fact that i'm already in a drip system,so i really wouldn't be considering it.****	31215
previous experience****	31226
basic econmics****	31250
all of the above****	31272
no experience with system****	31275
lack of understanding****	31287
just common sense ,to worry about unexpected costs.****	31327



MOST SALEMEN ALWAYS SAY IT'S GOOD AND IT'S NEVER AS GOOD AS THEY SAY IT IS. ****	31329
combination of all those****	31335
how about all three, micro systems require a lot of maintenance. ****	31462
no knowledge**	31492

58. How many bowl and impeller pump repairs have you had since January 1, 1994?

\_\_\_\_\_ (SPECIFY #) → if 0, go to Q61

Q58	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	16	3.7	16	3.7
000000	160	37.3	176	41.0
000001	94	21.9	270	62.9
000002	54	12.6	324	75.5
000003	32	7.5	356	83.0
000004	13	3.0	369	86.0
000005	15	3.5	384	89.5
000006	17	4.0	401	93.5
000007	6	1.4	407	94.9
000008	4	0.9	411	95.8
000010	2	0.5	413	96.3
000012	2	0.5	415	96.7
000013	1	0.2	416	97.0
000015	3	0.7	419	97.7
000016	1	0.2	420	97.9
000020	1	0.2	421	98.1
000024	1	0.2	422	98.4
000030	1	0.2	423	98.6
000040	1	0.2	424	98.8
000100	1	0.2	425	99.1
000200	1	0.2	426	99.3
100006	2	0.5	428	99.8
300001	1	0.2	429	100.0

59. How many pump repairs have you had since January 1, 1994 without getting a rebate from PG&E?

\_\_\_\_\_ (SPECIFY #)

Q59	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	30	11.2	30	11.2
000000	58	21.6	88	32.7
000001	62	23.0	150	55.8
000002	42	15.6	192	71.4
000003	25	9.3	217	80.7
000004	11	4.1	228	84.8

000005	10	3.7	238	88.5
000006	10	3.7	248	92.2
000007	3	1.1	251	93.3
000008	4	1.5	255	94.8
000010	4	1.5	259	96.3
000012	1	0.4	260	96.7
000013	1	0.4	261	97.0
000015	2	0.7	263	97.8
000020	1	0.4	264	98.1
000024	1	0.4	265	98.5
000025	1	0.4	266	98.9
000030	1	0.4	267	99.3
000075	1	0.4	268	99.6
000200	1	0.4	269	100.0

Frequency Missing = 160

60. How many of these were done in 1998?

\_\_\_\_\_ (SPECIFY #)

Q60	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	10	3.7	10	3.7
000000	169	62.8	179	66.5
000001	62	23.0	241	89.6
000002	11	4.1	252	93.7
000003	8	3.0	260	96.7
000004	4	1.5	264	98.1
000005	1	0.4	265	98.5
000010	2	0.7	267	99.3
02	1	0.4	268	99.6
1	1	0.4	269	100.0

Frequency Missing = 160

61. What are some of the main reasons why you repair a pump? (READ LIST; ENTER ALL THAT APPLY)

	YES	NO	DK	REF
a. The pump is broken .....	1.....	2.....	DK ...	REF
b. Poor performance of the pump.....	1.....	2.....	DK ...	REF
c. To increase the reliability of the pump.....	1.....	2.....	DK ...	REF
d. Previous experience of pump repairs.....	1.....	2.....	DK ...	REF
e. To reduce the electricity bills .....	1.....	2.....	DK ...	REF
f. Advice and/or rebate from PG&E.....	1.....	2.....	DK ...	REF
g. Advice from dealer/consultant.....	1.....	2.....	DK ...	REF
h. Anything else? (SPECIFY) _____	.....	.....	DK ...	REF

Q61A	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	8	1.9	8	1.9
1	372	86.7	380	88.6
2	49	11.4	429	100.0

Q61B	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	10	2.3	10	2.3
1	367	85.5	377	87.9
2	52	12.1	429	100.0

Q61C	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	17	4.0	17	4.0
1	271	63.2	288	67.1
2	141	32.9	429	100.0

Q61D	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	30	7.0	30	7.0
1	215	50.1	245	57.1
2	184	42.9	429	100.0

Q61E	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	21	4.9	21	4.9
1	271	63.2	292	68.1
2	137	31.9	429	100.0

Q61F	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	40	9.3	40	9.3
1	194	45.2	234	54.5
2	195	45.5	429	100.0

Q61G	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	28	6.5	28	6.5
1	201	46.9	229	53.4
2	200	46.6	429	100.0

Q61H	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	12	2.8	12	2.8
1	60	14.0	72	16.8
2	357	83.2	429	100.0

Q61I	Frequency	Percent	Cumulative Frequency	Cumulative Percent
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Frequency Missing = 429

RESPONSES TO 'OTHER' QUESTION: Q61	RESPONDANT ID
if its broken(the reason!)****	30034
to be more efficient****	30040
added value to the property****	30063
need and reliability , economic benefit.****	30071
bottom line money, return on investment-immediate return. ****	30111
to increase efficiency****	30112
pump test****	30201
Smoke coming out of the motor****	30229
when it gets half full its time to repair.****	30250
sometimes you may just want to pump more water, repair and enlarge at the same time.****	30371
efficiency****	30442
how long since the efficiency has slipped****	30450
they just get old and they break down, it just happens, they cant run forever. ****	30464
only based on my own experience.//****	30486
if you needed different pressure**** B341	30509
if the price of electricity went up.****	30596
pump test****	30601
nfi****	30611
switch from flood to drip.//****	30625
In house people - their recommendations.****	30627
if it is not working right you fix it.****	30636
makes noise****	30647
to save water and that's the main reason****	30649
general repairs****	30662
motor burnout and low water table****	30664
Because you go out to pump, and she's not pumping, you have to repair her. ****	30701
went underwater****	30724
discharge was lower than normal****	30729

changing irrigation system****	30755
save energy cost performance****	30788
age related****	30794
to increase water flow****	30823
advice from family.****	30828
IT JUST DIDN'T WORK***	30844
i really dont know****	30866
casing collapse or other similar problem****	30871
just if there is something wrong with it i repair. ****	30885
increase efficiency or take care of poor performance****	30900
adapt to diesel - considering that full time.****	30904
b/c of the efficiency of the well pumping enough water and the bowls being warn down. ***	30962
to increase the watder flow****	31019
if you do routine maintencne you get more from yourpump ****	31023
Because we ran out of water.****	31028
experience has taught us the appropriate level thata good pump should produce. ****	31036
reliability****	31059
if it was worn out****	31102
personal experience****	31122
the water table dropped and i had to put a bigger motor in and bowl and drill another well in another spot. ****	31135
For more efficieny***	31164
because it wasnt performing or working.****	31171
to get the most energy oyut of my pompe****	31188
personal experience****	31224
i know it from past experience, ive been here all mylife and involved in the last 35 years on my own ****	31253
THE LACK OF WATER PRODUCTION****	31288
routine maintenance****	31344
IF IT IS INEFFICIENT***	31388
lack of water.****	31395

just poor performance****	31407
poor performance****	31444
MAINLY TO IMPROVE THE EFFICIENCY***	31476

62. Did you convert any sprinkler systems to micro irrigation systems or install any new micro irrigation systems since January 1, 1994?

Yes ..... 1 GO TO Q63  
 No ..... 2 GO TO Q67  
 Don't know ..... DK GO TO Q67  
 Refused ..... REF GO TO Q67

Q62	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	2	0.5	2	0.5
1	100	23.3	102	23.8
2	327	76.2	429	100.0

63. If you received a rebate for micro irrigation system conversion from PG&E, did you also convert or install any new micro irrigation systems since January 1, 1994 without a rebate?

Yes ..... 1 GO TO Q64  
 No ..... 2 GO TO Q66  
 Not applicable ..... 3 GO TO Q67  
 Don't know ..... DK GO TO Q67  
 Refused ..... REF GO TO Q67

Q63	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	14	14.0	14	14.0
1	61	61.0	75	75.0
2	16	16.0	91	91.0
3	9	9.0	100	100.0

Frequency Missing = 329

**IF YES, ASK:**

64. How many acres did you convert or install without a rebate? \_\_\_\_\_ (# of acres)

Q64	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	2	3.3	2	3.3
000000	1	1.6	3	4.9

000001	2	3.3	5	8.2
000002	3	4.9	8	13.1
000004	2	3.3	10	16.4
000005	2	3.3	12	19.7
000006	2	3.3	14	23.0
000008	1	1.6	15	24.6
000010	1	1.6	16	26.2
000012	1	1.6	17	27.9
000015	1	1.6	18	29.5
000016	1	1.6	19	31.1
000020	2	3.3	21	34.4
000022	1	1.6	22	36.1
000024	1	1.6	23	37.7
000030	1	1.6	24	39.3
000040	2	3.3	26	42.6
000044	1	1.6	27	44.3
000045	3	4.9	30	49.2
000050	1	1.6	31	50.8
000060	2	3.3	33	54.1
000070	1	1.6	34	55.7
000080	4	6.6	38	62.3
000085	1	1.6	39	63.9
000090	1	1.6	40	65.6
000100	1	1.6	41	67.2
000150	1	1.6	42	68.9
000180	2	3.3	44	72.1
000200	5	8.2	49	80.3
000225	1	1.6	50	82.0
000300	1	1.6	51	83.6
000360	1	1.6	52	85.2
000400	2	3.3	54	88.5
000550	1	1.6	55	90.2
000600	1	1.6	56	91.8
000840	1	1.6	57	93.4
000900	1	1.6	58	95.1
001000	1	1.6	59	96.7
001200	1	1.6	60	98.4
2	1	1.6	61	100.0

Frequency Missing = 368

65. Of these, how many acres were installed in 1998? \_\_\_\_\_ (# of acres)

Q65	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	1	1.6	1	1.6
000000	27	44.3	28	45.9
000001	4	6.6	32	52.5
000002	1	1.6	33	54.1
000005	1	1.6	34	55.7
000009	1	1.6	35	57.4
000015	1	1.6	36	59.0
000016	1	1.6	37	60.7
000020	2	3.3	39	63.9
000025	1	1.6	40	65.6
000030	1	1.6	41	67.2

000035	1	1.6	42	68.9
000040	2	3.3	44	72.1
000044	1	1.6	45	73.8
000045	1	1.6	46	75.4
000048	1	1.6	47	77.0
000050	2	3.3	49	80.3
000060	1	1.6	50	82.0
000070	1	1.6	51	83.6
000080	2	3.3	53	86.9
000100	1	1.6	54	88.5
000160	1	1.6	55	90.2
000180	1	1.6	56	91.8
000220	1	1.6	57	93.4
000300	1	1.6	58	95.1
000550	1	1.6	59	96.7
000600	1	1.6	60	98.4
001000	1	1.6	61	100.0

Frequency Missing = 368



66. What are some of the main reasons you decided to install a micro irrigation system regardless of whether you received a rebate or not? (READ LIST; ENTER ALL THAT APPLY)

- |  | <u>YES</u> | <u>NO</u> | <u>DK</u> | <u>REF</u> |
|--|------------|-----------|-----------|------------|
| a. The old system was broken .....                           | 1.....     | 2.....    | DK ...    | REF        |
| b. Low performance of the old irrigation system.....         | 1.....     | 2.....    | DK ...    | REF        |
| c. To increase the reliability of the irrigation system..... | 1.....     | 2.....    | DK ...    | REF        |
| d. Previous experience with micro irrigation .....           | 1.....     | 2.....    | DK ...    | REF        |
| e. To reduce the electricity bills .....                     | 1.....     | 2.....    | DK ...    | REF        |
| f. To use water more efficiently .....                       | 1.....     | 2.....    | DK ...    | REF        |
| g. It was better for the crop.....                           | 1.....     | 2.....    | DK ...    | REF        |
| h. It saves on fertilizer costs .....                        | 1.....     | 2.....    | DK ...    | REF        |
| i. Advice and/or Rebate from PG&E.....                       | 1.....     | 2.....    | DK ...    | REF        |
| j. Advice from dealer/consultant.....                        | 1.....     | 2.....    | DK ...    | REF        |
| k. Anything else? (SPECIFY) _____                            | 1.....     | 2.....    | DK ...    | REF        |

Q66A	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	7	9.1	7	9.1
2	70	90.9	77	100.0

Frequency Missing = 352

Q66B	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	34	44.2	34	44.2
2	43	55.8	77	100.0

Frequency Missing = 352

Q66C	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	2	2.6	2	2.6
1	44	57.1	46	59.7
2	31	40.3	77	100.0

Frequency Missing = 352

Q66D	Frequency	Percent	Cumulative Frequency	Cumulative Percent
&	1	1.3	1	1.3
1	45	58.4	46	59.7
2	31	40.3	77	100.0

Frequency Missing = 352

Q66E	Frequency	Percent	Cumulative Frequency	Cumulative Percent

1	31	40.3	31	40.3
2	46	59.7	77	100.0

Frequency Missing = 352

Q66F	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	72	93.5	72	93.5
2	5	6.5	77	100.0

Frequency Missing = 352

Q66G	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	63	81.8	63	81.8
2	14	18.2	77	100.0

Frequency Missing = 352

Q66H	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	34	44.2	34	44.2
2	43	55.8	77	100.0

Frequency Missing = 352

Q66I	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	3	3.9	3	3.9
2	74	96.1	77	100.0

Frequency Missing = 352

Q66J	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	20	26.0	20	26.0
2	57	74.0	77	100.0

Frequency Missing = 352

Q66K	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	18	23.4	18	23.4
2	59	76.6	77	100.0

Frequency Missing = 352

RESPONSES TO 'OTHER' QUESTION: Q66	RESPONDANT ID
past experience****	30163
the quality is the main reason./****	30402

it reduces weeds.//****	30596
for better higher production****	30750
did not have level land****	30833
sicall we need something done about communication - we are dealing with recorders and i can't get in touch withreal people. ****	30098
The PG&E service never calls. The previous one visited all the time. ****	30146
your rates are way to high****	30187

67. Those are all my questions. On behalf of PG&E, I thank you very much for your time.

**NOTE: IF RESPONDENT REQUESTED CONTACT INFORMATION FOR PG&E, CHECK BOX AT BOTTOM OF CONTACT RECORD SHEET.**

**NOTE: IF RESPONDENT WANTED COMMENTS FORWARDED TO PG&E, ENTER THEM HERE:**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**RESPONDENT NAME:** \_\_\_\_\_

**SAMPLE ID NUMBER:** \_\_\_\_\_ **INTERVIEWER ID:** \_\_\_\_\_

**TIME ENDED:** \_\_\_\_\_ **DATE:** \_\_\_\_\_

COMMENTS	RESPONDANT ID
He did participate in the Sprinkler Mainline rebate program, but they never sent him the money back california ****	30250,31130
farm advisor/neighbors****	31140
it's for a new crop****	31213
it was the only practical way of doing it****	31217
to do do a more efficient job of irrigating****	31238
To make it easier for my son. he's taking over the farm in a year or	31273

so. ****	
Only to accomodate a larger operation****	31276
MY OWN STUDY****	31375
he said he has never ever had anyone from PG&E contact him ****	30069
Basically, we need something done about communication - we are dealing with recorders and i can't get in touch withreal people. ****	30098
The PG&E service never calls. The previous one visited all the time. ****	30146
your rates are way to high****	30187
He did participate in the Sprinkler Mainline rebateprogram, but they never sent him the money back, he never gort the rebate. He called them once about it 2 years ago, but nothing came from it. He doesnt have a lot of confidence in the rebate program because of that. He said the PG&E representative told him that they didnt recieve his rebate request.****	30250
the resp said we growers don't wan to deal with a computer when they call in with a problem about a power shortage we don't need to deal with a touch tone system we need a way to get past all that to get some direct help right away ****	30260
the power bills are going up and our prices are going down we can go on like we are going now our prices are going down and pgand eis going up we might have to look for alternatives ****	30286
Main electricity is milk production. Want info on rebates of Frequency drives. ****	30383
we paying the high demand charges and we don't use it we should go back to the six month plan where we only have to payfor it six months out of the year thats why we are going to gear heads where we we have f.i.d irrigation ****	30403

<p>i'm sure they are well aware of it but just over the line in Oregon my friends pay two thirds less for power than we do ****</p>	<p>30427</p>
<p>how can i get in contact with someone without having to punch numbers here and punch numbers there and then wait twenty minutes just to speak with someone and then lose the message and start all over again. this part is very frustrating to me. they need a local number that we can use so that we can actually speak to people. in an emergency we call nine one one but for emergencies for them you're just stuck. i wish they would figure this out and solve the problem. ****</p>	<p>30443</p>
<p>the farming is very difficult and it's hard to turn a profit if they could just lower the rates it would make it easier on us. they're too high. ****</p>	<p>30477</p>
<p>well it's their old equipment every time i go out to turn on my system something else blows up so i'm considering going to fuel they need to work on their equipment ****</p>	<p>30536</p>
<p>conserving water is the main thing the electricity seems to follow suit it's important to have a system that efficiently uses water so no water is wasted so there isn't any run off that's our biggest concern because if we are using the water someone else isn't... another concern when it comes to pump repair we have to figure out whether we can have a well pulled up because they will be down for a while it depends on the season and how much back up i'll have with my other pumps</p>	<p>30649</p>

<p>we have an average of outages in the year and they won't fix it.we have to much voltage and they blow up motors and they won't do anything.i'm switching to propane.the voltage variation is blowing up my motors and it doesn't work.we've been here fortwenty years.i do ahve a lot of diesel.</p>	<p>30663</p>
<p>pg&amp;e sent bill for 70,000 dollars for one pump.the bill is not correct because it is too high.i asked that it be corrected and the next month they sent similar bill.i wish pg&amp;e would devote time to their corrections of bills.</p>	<p>30664</p>
<p>they need to upgrade their system we have too many power outs they need to get rid of their stand by charge i pay 80 amonth whether i use my pump or not they need to get rid of that charge</p>	<p>30692</p>
<p>i think there rate structure stinks.on my pumps if iuse Electricity between nov.1 and april 1 they will charge me two thousand two hundred dollars.in this business you never know what the weather is like if you need water than you're out of luck.they can do a lot better.because of this i've been looking for a deidesl engine and just shutting this off only because of the rate structure.</p>	<p>30697</p>
<p>When the clock turns over to the year 2000, can they assure us that, we will still have power. ****</p>	<p>30719</p>
<p>pertaining to power we have to pay a high monthly demand charge to just to access to power even when it is not on. I amlooking into other alternatives to the electricity. the costs arehigh.</p>	<p>30812</p>

<p>they some twenty years ago they coned us into putting into bigger pumps.when we have colder nights everyone turns them on.once in a while you have a problem at night and you can't wait four and five hours for someone to come out.they don't have enough service people but uthey said this would be a good deal.they should increase their service people.some people have went to diesel because of this.they should inform the farmers before cutting of the top of trees when you have low power lines.</p>	<p>30869</p>
<p>relates to the time of use rates, cheapest use on weekends and difficult to cover with smaller pumps, made farmers work on weekends this did not happen to city users, Lumping the costs of agricultural use in with the small cities that are growing seems very unfair, break out the ag costs seperately. ****</p>	<p>30871</p>
<p>Would be a good idea for PG&amp;E to reduce their rates for standby pumps. The standby costs are phenomenal. It is a major reason that he is considering switching to diesel for his deep well. ****</p>	<p>30904</p>
<p>PG&amp;E has not let him know about any rebate programs.****</p>	<p>30952</p>
<p>PG&amp;E, if they are really concerned about efficiency, will first improve their delivery system. They have had 10 blackouts or power failures out here since September. You have to get the Electricity first before you can start trying to use it efficiently./ Also, recently they changed our rates (up of course) without giving us any prior notice.//</p>	<p>30955</p>

<p>we've had a lot of publicity over that were going to get lower pg&amp;e rates in the future but looking at the schedule when they send the bill in your energy charges on the bill area small portion of the bill, so they say we're going to see a ten percent saving but that's not gonna refer to the savings. I don't think people are gonna see rate reductions in our bills like they say we are.</p>	<p>30975</p>
<p>The closing of the central offices, have impaired the available information on the advantages, optional ways on how to reduce and save energy.</p>	<p>31028</p>
<p>the monthly charge even if we don't use it we pay \$90.00 a month off season and that is too much, just too much. ****</p>	<p>31034</p>
<p>He is worried and thinks that future information on rebates and programs from PG&amp;E maybe limited because he believes that PG&amp;E is getting out of energy production and getting more into energy distribution. He says that change will affect all of this.</p>	<p>31038</p>
<p>Resp wants information on how to get a Rebate for installing micro irrigation system...he's planning on doing that at this site...resp name Tom Valenta asked to be contacted within the next few days...if not ...contact 11-18-98...because he will be gone for one week...time to reach him is 7-730am...during the day leave message he can call PG&amp;E back...or eve after 5p....</p>	<p>31114</p>



<p>I think that they'd make alot of people happy if they'd just get rid of the demand charge for equipment when its notin use, it's just not fair having to pay for equipment that you're not using.</p>	<p>31205</p>
<p>i've had a lot of people who have called me with a lot of surveys And they always say they're going to send me a check or something.i Also have stock in pg&amp;e.we've dealt with pg&amp;e and we've always Been satisfied with the service and how everything has worked out.</p>	<p>31215</p>
<p>Well they've got a real problem in satisfying res and farmers the energy cost of their other projects beingtacted on to our bills and charging us with all these added cost and that the reson why we don't have trust anymore.... in visiting with other people we have to know why we have to pay these added on costs</p>	<p>31217</p>
<p>Resp said Qs 34,35,36,49,52,53 are the wrong questions. in reference to Q.49 &amp; 52...wording too general...it could be any company and that includes the good ones...dont wantto knock the good companies.in ref to Q.53. if you are knowledgeable you would have that info...too general...need too broad of ananswer...</p>	<p>31250</p>
<p>i think some of the questions were poorly witten, they don't apply to all growers.</p>	<p>31407</p>
<p>who wrote this survey and the queston are lousy****</p>	<p>31492</p>
<p>i wan't to review the the rate sheet with someone 931-9063 209 ****</p>	<p>31494</p>
<p>he wasn't given info about the rebate...****</p>	<p>31518</p>

***Appendix F***  
***Supply Side Market Actor Survey Instruments***

## ***Pump Dealer/Market Actor Survey***

### ***Company Profile***

1. What services and products does your company offer?
2. How many people are employed at your company?
3. How many years have you been in the business?

### ***Awareness Of and Involvement in the Program.***

4. What percentage of your company's activities (sales) involve PG&E energy efficiency programs?
5. Has your involvement increased or decreased over the years?
6. How has your involvement changed?
7. Why has your involvement changed?
8. By what means do your customers find out about new technologies?

### ***Their Opinions and Their Role in Customer Decision Making Process***

9. What role does you company play in irrigation system design and bowl/impeller pump repair?
10. Do you influence customers' choice of equipment/system design or do the customers generally tell you what they want?
11. What percentage of your customers request energy efficient equipment?

12. Do you know what has caused them to do so?

13. What is your opinion about why customers:

- perform bowl/impeller pump repairs?
- install low pressure sprinkler nozzles and micro drip irrigation?

14. What are the benefits of these (Micro, LPSN, repair) to the customer?

15. How often do you recommend energy efficient equipment alternatives? (Very often, Somewhat often, Not very often, Never)

***Market Bottlenecks***

16. What do you consider as the bottlenecks in the market for energy efficient equipment or services?

17. Are these bottlenecks new or have they existed for some time? How long? (if appropriate)

18. Do you think PG&E programs have affected any of these bottlenecks?

***Market Barriers***

19. How do you learn about new energy efficient products:

Satisfaction with delivery channel? (Very, Somewhat, Not Very, Not at all)

Difficulty obtaining information?

20. Does availability of the energy efficient equipment or services limit your ability to service your customers? (P/SA)

21. How do your customers learn about new energy efficient products:

Satisfaction? (scale if possible, very, somewhat, not very, not at all)

Difficulty obtaining?

22. Are you hesitant to recommend efficient technologies to your customers? (PU, HC)

If so why?

23. Are your customers hesitant to move to more efficient technologies?(PU, HC)

If so why?

24. Have any of your customers encountered unanticipated operation costs or problems that have made them unhappy with LPSN or micro irrigation? If so, has this experience affected other grower's tendency to move to these technologies? (HC)

25. What basis do your customers use to make their decisions on irrigation system improvements? (BR, OP/C, M/SI) (How do the customers decide?)

Bowl/impeller pump repair?

26. What are the most important factors that guide the customers' purchase decisions and choices.? (Open Opportunity)

27. How do your customers fund their purchases from your company? (ATF)

Level of difficulty obtaining financing? (Very, Somewhat, Not very, Not At All)

Source?

28. For customers who continually shy away from energy efficiency improvement, what are the most typical reasons? (Ir, Open Opportunity)

29. On a scale of one to ten, how important is energy efficiency to your customers?

***To Seek Knowledge about Comparison Point***

30. Are you involved in any pumping related activities outside PG&E's service territory?

**{If the person says none – end of survey}**

31. If so? What kind? Where? To what extent?

32. How would you compare the level of energy efficiency adoptions within PG&E's service territory with outside?

33. How would you compare customer attitudes on energy efficiency within PG&E's service territory with outside?

34. To what do you attribute differences (if any)?

## ***Irrigation Designer/Market Actor Survey***

### ***Company Profile***

1. What services and products does your company offer?
2. How would you characterize your customers? (i.e., big, small)
3. How many people are employed at your company?
4. How many years have you been in the business?

### ***Their Opinions and Their Role in Customer Decision Making Process***

5. What role does your company play in irrigation system design and bowl/impeller pump repair?
6. Do you influence customers' choice of equipment/system design or do the customers generally tell you what they want?
7. What types of equipment would you consider energy efficient?
8. What percentage of your customers request energy efficient equipment?
9. Do you know what has caused them to do so?
10. What is your opinion about why customers install low pressure sprinkler nozzles and micro drip irrigation?
11. How often do you recommend energy efficient equipment alternatives? (Very often, Somewhat often, Not very often, Never)

**Market Bottlenecks**

12. What do you consider as the bottlenecks in the market for energy efficient equipment or services?
13. Are these bottlenecks new or have they existed for some time? How long? (if appropriate)
14. Do you think PG&E programs have affected any of these bottlenecks?

**Market Barriers**

15. How do you learn about new energy efficient products:
  - Satisfaction with delivery channel? (Very, Somewhat, Not Very, Not at all)
  - Difficulty obtaining information?
16. Does availability of the energy efficient equipment or services limit your ability to service your customers? (P/SA)
17. How do your customers learn about new energy efficient products:
  - Satisfaction? (scale if possible, very, somewhat, not very, not at all)
  - Difficulty obtaining?
18. Are you hesitant to recommend efficient technologies to your customers? (PU, HC)
  - If so why?
19. Are your customers hesitant to move to more efficient technologies?(PU, HC)
  - If so why?
20. Have any of your customers encountered unanticipated operation costs or problems that have made them unhappy with LPSN or micro irrigation? If so, has this experience affected other grower's tendency to move to these technologies? (HC)
21. What basis do your customers use to make their decisions on irrigation system improvements? (BR, OP/C, M/SI) (How do the customers decide?)



22. What are the most important factors that guide the customers' purchase decisions and choices.? (Open Opportunity)
23. How do your customers fund their purchases from your company? (ATF)  
Level of difficulty? (Very, Somewhat, Not, Not At All)  
Source?
24. For customers who continually shy away from energy efficiency improvement, what are the most typical reasons? (Ir, Open Opportunity)
25. On a scale of one to ten, how important is energy efficiency to your customers? (10 is highest level of importance)

***To Seek Knowledge about Comparison Point***

26. Are you involved in any pumping related activities outside PG&E's service territory?

**{If the person says none – end of survey}**

27. If so? What kind? Where? To what extent?
28. How would you compare the level of energy efficiency adoptions within PG&E's service territory with outside?
29. How would you compare customer attitudes on energy efficiency within PG&E's service territory with outside?
30. To what do you attribute differences (if any)?

***Appendix G***  
***Supply Side Market Actor Survey Responses***

## ***Pump Dealer/Market Actor Survey***

### ***Company Profile***

1. What services and products does your company offer?

*Sell turbine pumps for booster and deep well, specify irrigation systems PD1*

*Installation and service of domestic and deep well pumps PD2*

*Pump sales, installation and service, use drillers, no LPSN or micro, also do pump tests.  
PD3*

*Furnish install and repair turbine pumps, both electrical and engine driven, supply electrical services associated with both. Don't supply micro or LSPN design or installation. PD4*

*Pumps of all kinds – generally irrigation, deep well, and low lip pumps PD5*

*Drip, micro, low-volume irrigation, Sprinkler systems Pumps with diesel, natural gas engines and electric motors, Pump repairs PD6*

*Water well drilling, Pump sales & repair, Pump tests, Mainly for municipalities, but also for industrial, Ag, and domestic markets PD7*

*Ag electrical and pump work, domestic pump work – mainly small Ag customers with 100 acres or less PD8*

2. How many people are employed at your company?

*26 PD1*

*7 PD2*

*8 PD3*

*14 PD4*

*42 PD5*

*About 50 PD6*

*60-70 PD7*

*6 PD8*

3. How many years have you been in the business?

*31 PD1*

*45 PD2*

*68 PD3*

*35 PD4*

*50 PD5*

*nine PD6*

*40-50 years PD7*

*Since 1968 for electrical and 1978 for pumps PD8*

***Awareness Of and Involvement in the Program.***

4. What percentage of your company's activities (sales) involve PG&E energy efficiency programs?

*4 years ago 4%, today 2%. PD1*

*None now. PD2*

*Not very much at all, less than 1% PD3*

*Minimal in the last 2 years, 7-10% before that. PD4*

*Not much – maybe 10% PD5*

*zero PD6*

*Back in '93-'95 was around 10% for Ag market PD7*

*Hardly any PD8*

5. Has your involvement increased or decreased over the years?

*Decreased. PG&E has cut way back on their programs. PD1*

*None then. PD2*

*decreased PD3*

*Decreased. PD4*

*It has stayed the same PD5*

*Customers tend to come to them with PG&E rebates PD5*

*Decreased PD6*

*Decreased PD7*

*NA PD8*

6. How has your involvement changed?

*Gone down. PD1*

*NA PD2*

*Still doing pump testing, no rebates. PD3*

*Decreased PD4*

*NA PD5*

*NA PD6*

*NA PD7*

*NA PD8*

7. Why has your involvement changed?

*PG&E has cut way back on their programs. PD1*

*NA PD2*

*Rebate program went away, used to do quite a few. 5% before. Do both domestic and ag wells. PD3*

*PG&E used to pay for down the hole work, it has been motors only in the last couple of years. The shift to engine driven pumps in the last couple of years has put a lot of used equipment on the market, so customers tend to buy that rather than new. PD4*

*NA PD5*

*Because there are no more PG&E programs PD6*

*Ag market has gone down, they aren't doing anything due to economy, only 5-10% of sales in last couple of years is with the Ag market PD7*

*Because there are no more PG&E programs PD7*

*NA PD8*

8. By what means do your customers find out about new technologies?

*They hear about them from us or from trade industry magazines, also from PG&E. Then they usually call us and ask what it is about. PD1*

*Word of mouth, from us. PD2*

*Through me. PD3*

*Universities (Fresno and Calpoly), most of the new growers are college educated so they tend to do their research, periodicals, pump dealers. PD4*

*Don't really know – they get information through the PG&E bill and then ask them about it – maybe newspaper or radio PD5*

***Their Opinions and Their Role in Customer Decision Making Process***

9. What role does your company play in irrigation system design and bowl/impeller pump repair?

*Designing, specify, install. We are a full service pump dealer. PD1*

*We do bowl and impeller repair, don't do irrigation design. Do pump testing on domestic only. Have PG&E do large pumps. PD2*

*They give him the specifications and he picks the design of the bowl that works the best. Don't do irrigation system design. PD3*

*Bowl and impeller repairs is about 70% of our work. We specify and verify the designs. The remainder is large pipeline design for large farms. PD4*

*75%-80% of their business is pumps and pump repairs PD5*

*Customers tend to come to them with a needed GPM (gallons per minute) and they design the bowl and motor to fit that need PD5*

*Does design, installation, and maintenance for both irrigation systems and pumps PD6*

*Does installation and maintenance for pumps – performs pump repairs PD7*

*They do pump repair – a lot of rebowling, but mainly for new acreage going in and change of crop irrigation system (i.e. from flood to drip) not for efficiency purposes PD8*

10. Do you influence customers' choice of equipment/system design or do the customers generally tell you what they want?

*The customers don't know [the technical details about] what they want. They rely on us. PD1*

*50/50 many know what they want, some ask PD2.*

*Specify the equipment, make recommendations. Will influence the decision on energy efficiency if they ask. PD3*

*Generally influence the design significantly. The customer knows generally what they want, but we specify the equipment to give it to them. PD4*

*They recommend and the customers tend to accept that recommendation PD5*

*Both – design to the needs of the customer PD6*

*They do operation analysis between fuels PD6*

*50/50 – Muni's specify what they want, Ag market is influenced by them PD7*

*The irrigation system companies provide them with the needed GPM and psi and they provide the pump and bowls to that spec PD8*

11. What percentage of your customers request energy efficient equipment?

*One water utility customer that represents about 2% of our business. PD1*

*None. PD2*

*A lot ask, then follow his recommendations and price PD3*

*1% at most PD4*

*10% - mainly water districts and large farms PD5*

*Their customers are developing new businesses often, not retrofitting – they design with the best equipment available PD6*

*No real answer to this question PD6*

*90% of the muni's (high efficiency motors) PD7*

*None PD8*

12. Do you know what has caused them to do so?

*Their engineers are sophisticated enough to appreciate the advantages. PD1*

*They expect us to give them the best we got. PD2*

*Saving energy. Don't know the source. Rebate drew attention. PD3*

*The ones who request energy efficiency are corporate farms where they have engineering staff who understand the advantages and who have the wherewithal to bear the added cost. PD4*

*They use the pumps continuously and it justifies the added 20%-25% cost for efficient motors. PD5*

*PG&E programs PD5*

*NA PD6*

*Less operating costs PD7*

*They don't care about operating costs PD8*

*Not educated about efficiency PD8*

13. What is your opinion about why customers:

- perform bowl/impeller pump repairs?

*To regain their previous water volume output. They repair it because they have a problem. PD1*

*To get more water, pump worn out, not getting the water they need. PD2*

*Wear or changing the system to higher volume or drip system. PD3*

*Two types : (1) Perform annual tests and repair pumps to optimize performance, and (2) call when it breaks PD4*

*Cost for power is less PD5*

*PG&E programs help PD5*

*The pump is broken PD6*

*The efficiency is low PD6*

*Most because production is down, a small percentage is preventive PD7*

*Change of irrigation systems PD8*

*20 years ago, rebowled due to inefficient pumps because of the dropping water table PD8*

- install low pressure sprinkler nozzles and micro drip irrigation?

*Cost savings, energy savings. PD1*

*No, don't know since we aren't in the line of business. PD2*

*More efficient irrigation system. PD3*



*Don't handle this kind of product, but supplying the appropriate water for the crop is the primary reason that the growers do anything to do with irrigation. PD4*

*Don't deal with directly, but the pumps for irrigation are - The cost for power is less – a more efficient use of water – to decrease cost per acre foot PD5*

*Energy conservation and water distribution PD6*

*NA PD7*

*NA PD8*

14. What are the benefits of these (Micro, LPSN, repair) to the customer?

*Pumps: get the flow rate back PD1*

*Micro: Water and power savings PD1*

*LPSN: Not popular there. They tried it a couple of years back and the growers didn't get the even coverage that they needed so they don't want it any more. PD1*

*Don't know. PD2*

*Cutting energy cost because they can go to TOU to cut costs. PD3*

*Repair: (1) Improves efficiency, reduces costs (2) prolongs useful life of equipment PD4*

*Cost – increase water – decrease cost per acre foot PD5*

*Repair - Low operating costs PD6*

*Repair - Less operating cost, increased water supply PD7*

*NA PD8*

15. How often do you recommend energy efficient equipment alternatives? (Very often, Somewhat often, Not very often, Never)

*Somewhat often PD1*

*Not very often PD2*

*Not very often. PD3*

*Not very often PD4*

*somewhat PD5*

*Always PD6*

*Somewhat often PD7*

*Never PD8*

**Market Bottlenecks**

16. What do you consider as the bottlenecks in the market for energy efficient equipment or services?

*Cost and availability. Availability mostly, it takes 3 to 4 weeks to get an energy efficient motor. PD1*

*No idea PD2*

*Availability, there are not very many manufacturers of premium efficiency motors. Availability. Doesn't seem to be any supplier competition. Product needs to be able to handle loads. We are told not to overload the motors energy efficient motors, but we can go to 115% reliably on standard efficiency motors. Giving the rebate to the wholesaler doesn't work. Thinks it should go to the customer. PD3*

*(1) education, (2) unawareness of what it is actually costing them. When they look at the added cost [of energy efficient motors] it puts them off premium efficiency motors. They cost 15-30% more than standard efficiency motors. PD4*

*Cost PD5*

*Don't see any – do it all the time PD6*

*Don't see any – do it all the time for muni's PD7*

*Ag market is not really concerned PD7*

*Not advised and don't care PD8*

17. Are these bottlenecks new or have they existed for some time? How long? (if appropriate)

*Have existed a long time. The situation is slowly getting better. It used to take 2 months to get an energy efficient motor. PD1*

*NA PD2*

*They have existed for quite a while. Cut back on rebates for servicing the pump. PG&E cut out time relays, time clocks, cut where I wouldn't have cut. PD3*

*Have existed a long time, depends somewhat on the economic environment in the Ag arena. PD4*

*Existed since the technologies come out PD5*

NA PD6

NA PD7

NA PD8

18. Do you think PG&E programs have affected any of these bottlenecks?

No. PD1

NA PD2

*When they were going the rebate program made the customers more aware and concerned about their pumps. Made them think about it before they had to. Made them more proactive. Got the dealers involve ahead of time. PD3*

*When PG&E paid a percentage of the repair they were more diligent about checking and repairing their pumps. When PG&E stopped they pretty much went back to their old ways. PD4*

*Yes – through helping with the cost PD5*

NA PD6

*Yes – 90% of the Ag market was affected when there were programs, but no longer calling since the incentives are gone. PD7*

*PG&E used to do pump tests – when the customers saw what they could save, they would sometimes do the pump repair, but they don't do pump tests anymore. Also, the water table is only 5-180 feet here and the operating costs are really low. The payback for the small customer is way too long to pay for a pump repair based on the projected savings. PD8*

### **Market Barriers**

19. How do you learn about new energy efficient products:

*My suppliers, they send material and from their salesmen. PD1*

*Manufacturers will promote them, also magazines, conventions. PD2*

*Through publications, through wholesalers. VSD, wholesalers puts on seminars PD3*

*From the vendors they buy from PD4*

*Suppliers and PG&E PD5*

*Manufacturer's personal reps, Trade shows PD6*

*The muni's use engineering firms to design and specify, then this company learns about the new products PD7*

*Don't – once in a while from PG&E – they used to do a breakfast for suppliers, but not any more PD8*

Satisfaction with delivery channel? (Very, Somewhat, Not Very, Not at all)

*Somewhat PD1*

*Very. PD2*

*Somewhat PD3*

*Somewhat, would always like more information. For us it is pretty straightforward, we only have two options, bowl impeller choices and motors. PD4*

*Somewhat satisfied PD5*

*Very PD6*

*Somewhat PD7*

*NA PD8*

Difficulty obtaining information?

*Ten years ago we used to get a lot of information from PG&E, Now nothing. PD1*

*No PD2*

*No PD3*

*No PD4*

*Not difficult PD5*

*NA PD6*

*NA PD7*

*NA PD8*

20. Does availability of the energy efficient equipment or services limit your ability to service your customers? (P/SA)

*No. PD1*

*Don't think so. PD2*

*Yes, in almost all areas. Not much competition. Turbine motors not available, especially vertical hollow shafts. PD3*

*Can be a factor, has been in the past. Can't get motors quick enough, it is better now PD4*

*Very little – it can take longer to get the equipment since not always stocked PD5*

*No PD6*

*No PD7*

*NA PD8*

21. How do your customers learn about new energy efficient products:

*From us and from trade magazines. PD1*

*Read in farm magazine. Advertising. That and talking to dealers. PD2*

*Through me. Ask around to other farmers. Assume that they talk to their constituents. PD3*

*Universities, periodicals, vendors. PD4*

*Don't know PD5*

*From them, through magazines and trade shows and competitors reps PD6*

*Muni's go look for it through their engineering firms PD7*

*Ag market uses pump repair shops like them and previously PG&E PD7*

*They don't – and they don't care PD8*

Satisfaction? (scale if possible, very, somewhat, not very, not at all)

*Very, as far as we can tell. PD1*

*Pretty satisfied. PD2*

*Don't know, seem satisfied. PD3*

*somewhat PD4*

*NA PD5*

*yes PD6*

*NA PD7*

NA PD8

Difficulty obtaining?

None. PD1

None. PD2

No, they get what they need. PD3

No PD4

NA PD5

NA PD6

NA PD7

NA PD8

22. Are you hesitant to recommend efficient technologies to your customers? (PU, HC)

Yes PD1

No PD2

Motors, yes. Other types, VSD depends, added expense means we do you have to justify the added cost. PD3

No PD4

Not to recommend, but give cost factor to be competitive PD5

No PD6

No – they are open it suggestions if ready to do something and is cost effective PD7

NA PD8

If so why?

They take a long time to get, delay. PD1

NA PD2

Added expense, less reliable. The customer must use the pump a lot to justify the added cost. If not as reliable, then customer will have problem. Want customer to be happy PD3

NA PD4

NA PD5

NA PD6

NA PD7

NA PD8

23. Are your customers hesitant to move to more efficient technologies?(PU, HC)

*Yes PD1*

*Not that I know of. If it saves money they will go for. PD2*

*No, because they trust us. PD3*

*No PD4*

*Yes due to cost PD5*

*No – they are good salesmen PD6*

NA PD7

NA PD8

If so why?

*Price and delay. PD1*

NA PD2

NA PD3

NA PD4

NA PD5

NA PD6

NA PD7

NA PD8

24. Have any of your customers encountered unanticipated operation costs or problems that have made them unhappy with LPSN or micro irrigation? If so, has this experience affected other grower's tendency to move to these technologies? (HC)

*Yes, tried LPSNs about 4 years ago and they didn't get the even application that they wanted, so they now shy away from them. PD1*

*Not in our line of business, so I don't know. PD2*

*There have been problems, but usually it is the design or installation that cause the problem. PD3*

*No PD4*

*NA PD5*

*No PD6*

*NA PD7*

*NA PD8*

25. What basis do your customers use to make their decisions on irrigation system improvements? (BR, OP/C, M/SI) (How do the customers decide?)

*Cost, efficiency, application uniformity PD1*

*If it will save money or improve efficiency of operation. Just judgement, will it pay off in the long range. PD2*

*Don't really know. PD3*

*We don't do this kind of work but it is generally to satisfy the uniformity of crop needs, PD4*

*NA PD5*

*Depends on the customer – some are more technically oriented PD6*

*Capitol investment, operating costs, service, comfort with supplier PD6*

*NA PD7*

*NA PD8*

*Bowl/impeller pump repair?*

*The information we give them, they rely on us. PD1*

*Just go ahead and do, do it when you have to. PD2*

*Don't really know. PD3*

*Generally capital cost, least expensive PD4*

*Notices that the cost per acre foot is increasing - a pump test by PG&E or by them shows the efficiency – notice the water dropping off PD5*



*Farmers tend to get their pumps tested every 2-3 years and at a certain point it becomes cost effective to get a pump repair PD5*

*Not getting enough water PD6*

*Ag - Their recommendation – not always based on pump test since the Ag market is currently running them until they can't get enough water and then fixing them. PD7*

*PG&E used to do pump tests, when they saw on paper the potential savings, they would do the work. Now they do pump repairs only when they don't get enough water for their crops. The cost to repair for the small customer is really high. PD8*

26. What are the most important factors that guide the customers' purchase decisions and choices.? (Open Opportunity)

*Cost, lack of knowledge, uncertainty about performance. PD1*

*Price and service. PD2*

*Dependability. If a system is going to work for them and they believe that the savings are going to be there, then they will do it. PD3*

*Crop needs and capital costs, some (generally the larger ones) consider operating costs PD4*

*Overall plant efficiency PD5*

*1. Service 2. Operating costs 3. Capitol cost PD6*

*Muni's use a competitive bid process PD7*

*Cost PD7*

*Don't know PD8*

27. How do your customers fund their purchases from your company? (ATF)

*Borrow from the bank PD1*

*Thirty day cash payment. Set up funds in their budgets for the large items. PD2*

*Don't know. PD3*

*Most have an operating budget, usually backed up by a line of credit. PD4*

*Don't know really – thinks that they put it in their budget PD5*

*Leasing or purchasing PD6*

*Don't know PD7*

*Don't know PD8*

Level of difficulty obtaining financing? (Very, Somewhat, Not very, Not At All)

*Not at all, the ones that can't borrow go under. PD1*

*Only one customer that I know of got a lease. PD2*

*NA PD3*

*Not very, if they do they probably shouldn't be making the purchase PD4*

*Don't know PD5*

*Don't know PD6*

*NA PD7*

*NA PD8*

Source?

*Bank PD1*

*Not as long as their credit is good. PD2*

*NA PD3*

*Generally a bank, may be on a lease to purchase. PD4*

*Either their budget or a financial institution PD5*

*Financial institution – banks generally PD6*

*NA PD7*

*NA PD8*

28. For customers who continually shy away from energy efficiency improvement, what are the most typical reasons? (Ir, Open Opportunity)

*Cost, lack of understanding. PD1*

*Don't know. PD2*

*I let them bring it up first. I don't promote unless they ask. So I don't get involve with EE unless they bring it up. PD3*

*Cost, but an irrigation system involves a lot of factors. PD4*

*cost PD5*

*None shy away PD6*

*Cost – this is mainly the small individual ag customer PD7*

*Don't really know, but probably because usage cost is cheap and don't really do anything to save it PD8*

29. On a scale of one to ten, how important is energy efficiency to your customers?

*One PD1*

*About an 8 PD2*

*They want the most from the energy that they spend. Say 9. But they have to compare with reliability and equipment availability. They often wait too late to make a decision on change then availability is a factor. PD3*

*3 where 10= important PD4*

*7.5 PD5*

*8 in most years, but this year they are worried about keeping afloat and interest in energy efficiency goes way down PD6*

*Muni – 9 to 10 PD7*

*Ag – 9 to 10 for the big guys which is who they generally work with PD7*

*1 PD8*

***To Seek Knowledge about Comparison Point***

30. Are you involved in any pumping related activities outside PG&E's service territory?

*Yes, SCE service territory PD1*

*No PD2*

*Sometimes SCE PD3*

*Some PD4*

*Yes PD5*

*yes PD6*

*Yes PD7*

No PD8

**{If the person says none – end of survey}**

31. If so? What kind? Where? To what extent?

*SCE service territory, some. Mostly PG&E. PD1*

*NA PD2*

*Same kind, SCE service territory. PD3*

*Same type of work, SCE service territory PD4*

*Projects a couple times a year with the US Wildlife up in Oregon and Washington where they put in pumps for structures – don't deal with the local utilities PD5*

*Lots of natural gas pumps in SCE and SoCal Gas territories PD6*

*Same type of work within SCE and LAWDP areas (Orange County and LA County) – do about 10-15% of their work there PD7*

32. How would you compare the level of energy efficiency adoptions within PG&E's service territory with outside?

*Similar. PD1*

*NA PD2*

*Hard to say. PD3*

*Same PD4*

*Can't really compare it PD5*

*No difference PD6*

*No difference PD7*

33. How would you compare customer attitudes on energy efficiency within PG&E's service territory with outside?

*No difference. PD1*

*NA PD2*

*All the same PD3*

*Same PD4*

*They request energy efficient motors but that is because of who it is (the federal government) not due to where they are PD5*

*All hate PG&E PD6*

*No difference PD7*

34. To what do you attribute differences (if any)?

*NA PD1*

*NA PD2*

*NA PD3*

*NA PD4*

*NA PD5*

*Service is so horrible and PG&E has cut back on good people PD6*

*NA PD7*

## ***Irrigation Designer/Market Actor Survey***

### ***Company Profile***

1. What services and products does your company offer?

*Civil engineering and land surveying to irrigation districts, Ag water agencies, munis, developers – on farm engineering for irrigation – energy consulting to any large energy user such as irrigation districts, large farms, C/I – pump testing ID1*

*Pump & irrigation contracts – design, sell, and service ID2*

*Irrigation supplies for homeowner & ag customer ID3*

*Full service for irrigation systems – design, parts, and service ID4*

*Ag irrigation system design and installation ID5*

*Housing, commercial building, Ag irrigation design and pump repair ID6*

*Full range of agricultural irrigation products, do booster pump repair ID7*

*Irrigation Consulting, we design irrigation systems and supply training. ID8*

2. How would you characterize your customers? (i.e., big, small)

*Large ID1*

*Large and small ID2*

*Ag – big farms ID3*

*Wide range of big and small Ag customers ID4*

*Full range from small to up to thousands of acres ID5*

*Medium ID6*

*Full range, most medium sized. ID7*

*Very small and very large, nothing in between. ID8*

3. How many people are employed at your company?

*50 ID1*

*28 ID2*

10 ID3

15 ID4

23 ID5

8 ID6

3 ID7

2 ID8

4. How many years have you been in the business?

*Since 1968 ID1*

*47 years ID2*

*4 under new ownership, company there since 1967 ID3*

*Since 1990 ID4*

*18 ID5*

*6 ID6*

*6 ID7*

*20 ID8*

***Their Opinions and Their Role in Customer Decision Making Process***

5. What role does you company play in irrigation system design and bowl/impeller pump repair?

*Some irrigation design, not a lot, most go straight to the dealer – mostly design for irrigation districts, pump stations for developments ID1*

*Do it all ID2*

*Design systems and sell the equipment ID3*

*Design systems, sell equipment, service the system ID4*

*No pump repair, main role is design and system set up, the pump repair is left up pump companies, we supply and install all irrigation system components. ID5*

*Do full design, subcontract installation, sell the materials. Do pump sales and repairs. Pump testing ID6*

*No pump repair. Do irrigation design, supply and install equipment ID7*

*No repair, consult, look at irrigation system, evaluate systems, comment on pump wear, make recommendations. On irrigation systems we design the whole thing. Don't actually sell products. ID8*

6. Do you influence customers' choice of equipment/system design or do the customers generally tell you what they want?

*They influence the customer – some want more advice than others ID1*

*They influence the customer ID2*

*They design for the job required ID3*

*They influence the customer ID4*

*75% of the influence is ours ID5*

*We help them design it, they ask us most of the time. We do design and they have a few requirements. ID6*

*50% we influence, 50% know what they want. ID7*

*High level of influence ID8*

7. What types of equipment would you consider energy efficient?

*Site specific for irrigation – surface irrigation can be best, but depends on soil, topography ID1*

*Variable speed/frequency drives, LPSN ID2*

*Nothing – new motors ID3*

*Drip irrigation ID4*

*Components, sizing of pipes, valves can influence by reducing pressure loss, primarily micro irrigation, so dripper and micro-sprayers, filtration system. ID5*

*Micro irrigation systems (drip and microsprinkler) ID6*

*Booster pumps that have high efficiency motors, drip irrigation. ID7*

*Micro irrigation systems, VFDs, energy alternatives (gas, diesel) ID8*

8. What percentage of your customers request energy efficient equipment?

*Design work – less than half ID1*

*Majority ID2*



*None ID3*

*Few – less than 10% ID4*

*90% are sensitive to it, this is indicated by type of equipment they request ID5*

*50% ID6*

*0-1% ID7*

*0% ID8*

9. Do you know what has caused them to do so?

*PG&E promoting energy efficiency over the years ID1*

*They are interested in operating costs ID2*

*NA ID3*

*NA ID4*

*Cost savings reflected in energy savings, better production resulting from better irrigation. ID5*

*No, not real sure. ID6*

*Getting more conscious of every dollar they spend. They can save money this way. ID7*

*NA ID8*

10. What is your opinion about why customers install low pressure sprinkler nozzles and micro drip irrigation?

*LPSN – strictly to save energy ID1*

*Micro – done for crop and other reasons (more precise control of chemicals, water savings, soil type, topography) ID1*

*Lower cost systems to operate ID2*

*Water conservation, pumping costs, better crop production – less chemicals ID3*

*Primary reason is to grow a better crop, increase production ID4*

*More uniform irrigation, results in water savings and crop improvement (important). ID5*

*Cost savings, reduce weed growth. ID6*

*For micros, it is because the trees get too big. With micros installed they can run them off peak for several days to meet needs. This saves money. ID7*

*We deal with grapes, growing performance is the most important, overall system costs also important. Typically pumping from deep wells, so the energy cost savings on a difference of 20psi is not crucial. ID8*

11. How often do you recommend energy efficient equipment alternatives? (Very often, Somewhat often, Not very often , Never)

*Very often ID1*

*Somewhat often ID2*

*Very seldom ID3*

*Very often ID4*

*Very often, we feel that it is our basic recommendation. ID5*

*Somewhat often. ID6*

*Not very often ID7*

*Very often. ID8*

### ***Market Bottlenecks***

12. What do you consider as the bottlenecks in the market for energy efficient equipment or services?

*Fear on customers part that will not get what's advertised ID1*

*Cost – initial ID1*

*Education on EE of the end user ID1*

*Don't see anything specific ID2*

*PG&E service (bad) and pricing (high) ID3*

*Capitol costs ID4*

*Initial cost, ID5*

*Financing, don't see the benefits. We can tell them but they don't necessarily believe it. ID6*

*Don't know ID7*

*Don't see any. In VFD's it is long payback. ID8*

13. Are these bottlenecks new or have they existed for some time? How long? (if appropriate)

*Not new – deregulation has increased confusion and uncertainty on energy prices – some postponing decisions on equipment because may not have the payback expected. ID1*

*NA ID2*

*Gotten worse in the past 5 years ID3*

*Existed forever ID4*

*Long time. ID5*

*A long time. ID6*

*NA ID7*

*Long time ID8*

14. Do you think PG&E programs have affected any of these bottlenecks?

*Yes – pretty effective in education, customers like rebates ID1*

*NA ID2*

*Yes – for the worse – no more service reps and no on-site visits ID3*

*Some effect, but not large ID4*

*In the past yes. The programs are not available now so they aren't affecting them. Growers that understood what the programs could do for them were affected by them. ID5*

*Don't know. ID6*

*NA no experience with PG&E programs. ID7*

*Don't know. ID8*

### **Market Barriers**

15. How do you learn about new energy efficient products:

*Contact with utilities, trade shows, direct mailers ID1*

*Suppliers, manufacturers ID2*

*Manufacturers ID3*

*Manufacturers ID4*

*Attend trade shows, manufacturers that are developing them, seminars by universities ID5*

*From the vendors. ID6*

*From manufacturers, sales flyers, magazines. ID7*

*Trade shows, publications. ID8*

Satisfaction with delivery channel? (Very, Somewhat, Not Very, Not at all)

*Somewhat ID1*

*Very ID2*

*Somewhat ID3*

*Very ID4*

*Somewhat ID5*

*Somewhat. ID6*

*Somewhat ID7*

*Very ID8*

Difficulty obtaining information?

*Not getting it, but becoming aware early on of new technology ID1*

*Generally not ID2*

*No – takes a little time and have to know where to find it ID3*

*Not really ID4*

*No, can generally get it through contacts that I have developed over the 35 years I have been in the business. Networking is important. ID5*

*Some things yes, some no. ID6*

*Yes, may have to look a bit ID7*

*No. ID8*

16. Does availability of the energy efficient equipment or services limit your ability to service your customers? (P/SA)

*No ID1*

*No ID2*

*No ID3*

*No ID4*

*No, equipment is generally available, may need to which to something similar, but can generally get what I need. ID5*

*No. ID6*

*No ID7*

*No. ID8*

17. How do your customers learn about new energy efficient products:

*Trade shows, utility reps, consultants ID1*

*Their company advertises, mailings, has retail store ID2*

*Trade shows ID3*

*Through media such as Ag magazines or trade shows and from neighbors ID4*

*Through us, technical publications, local equipment shows ID5*

*They ask us. ID6*

*Through PG&E flyers in Electrical bill or magazine articles. ID7*

*Trade shows, publications and from consultants. ID8*

Satisfaction? (scale if possible, very, somewhat, not very, not at all)

*Somewhat ID1*

*Yes ID2*

*Don't know ID3*

*Not very ID4*

*Somewhat ID5*

*Don't know ID6*

*Somewhat. ID7*

*Somewhat. ID8*

*Difficulty obtaining?*

*Yes, thinks they do because they may not have the time to find it out ID1*

*Not aware of any ID2*

*Don't know ID3*

*Yes ID4*

*Yes, first they have to know it is there, then they have to search it out. ID5*

*Don't think so. ID6*

*No ID7*

*Don't believe so. ID8*

18. Are you hesitant to recommend efficient technologies to your customers? (PU, HC)

*No ID1*

*No ID2*

*No – if I'm aware of it and know about it ID3*

*No ID4*

*No, we are hesitant not to recommend energy efficient equipment. ID5*

*No. ID6*

*Not really, if it will save them money ID7*

*No ID8*

*If so why?*

*NA ID1*

*NA ID2*

*NA ID3*

*NA ID4*

NA ID5

NA ID6

NA ID7

NA ID8

19. Are your customers hesitant to move to more efficient technologies?(PU, HC)

*Quite often ID1*

*Yes – evaluate cost/benefit analysis ID2*

*Don't think so ID3*

*In general, not if cost effective ID4*

*Yes ID5*

*Yes. ID6*

*Some are. ID7*

*No. ID8*

*If so why?*

*Initial cost is higher ID1*

*Change is a hard sell ID1*

*Cost ID2*

*NA ID3*

*NA ID4*

*Because it costs more, have some concern about performance. Uncertain about the cost benefit. ID5*

*Uncertain that it will work like we say it will. ID6*

*They are sure of what they have and know, they are not sure of what they don't know ID7*

*They aren't because they look at a cost basis/payback so they know what they are getting into. ID8*

20. Have any of your customers encountered unanticipated operation costs or problems that have made them unhappy with LPSN or micro irrigation? If so, has this experience affected other grower's tendency to move to these technologies? (HC)

*Yes on LPSN when they first came out – uniformity was bad, new generation is better ID1*

*Micro – not trouble free, but gives good service ID1*

*Yes it affects others tendencies ID1*

*Micro – more maintenance is required and may have played a role ID2*

*No ID3*

*Yes – systems need to run for long time, this is a change in the behavior needed and the system is more difficult to manage – but the crop results override the difficulty. No don't believe that the experience affects other growers tendency to move to the technologies. ID4*

*Yes, there have been some cases. Customers didn't anticipate the degree of management required. They now need to control flow as opposed to when they used flood irrigation. Most systems are manual, only about 5% are automated. ID5*

*Yes, but this is generally where they have tried to cut corners to save money. ID6*

*Not that I am aware of. ID7*

*No. ID8*

21. What basis do your customers use to make their decisions on irrigation system improvements? (BR, OP/C, M/SI) (How do the customers decide?)

*Their customer rely on cost/benefit analysis done by them ID1*

*Smaller customers rely on neighbors and past successes – use the USDA farm extension ID1*

*Irrigation efficiency, even application rates ID2*

*How much money they made the year before ID3*

*Economic return (potential for crop to produce more), cost of equipment, and potential cost savings ID4*

*The biggest is discussing it with their neighbors. Financial institutions that they are working with encourage them to do a financial analysis. ID5*

*Don't know. ID6*

*What kind of year they have had financially. If they are finding that what they are doing is inefficient, then they will try to change it. ID7*



*Cost of production and return on investment. ID8*

22. What are the most important factors that guide the customers' purchase decisions and choices.? (Open Opportunity)

*Cost/benefit ID1*

*Recommendations from them ID2*

*Money and availability of water, cost of water and pumping is high and people are moving to micro jet and drip when they can afford it ID3*

*Economic return ID4*

*Cost, first cost is biggest. Most don't reckon with operating costs until they are into it. Not so true with larger growers. Also adaptability to their crops. ID5*

*Don't know. ID6*

*Their self knowledge or what we recommend. ID7*

*Return on Investment. ID8*

23. How do your customers fund their purchases from your company? (ATF)

*Don't buy equipment from them ID1*

*Larger - loans ID2*

*Crop loans ID3*

*Within their own resources or banking relationship – 10-15% third party leasing ID4*

*75% out of cash flow. 5% lease purchase, 25% bank financing. ID5*

*Mostly credit. ID6*

*3-4 % lease, rest out of cash flow. If they finance, it is usually financed as part of a package of other farm improvements. ID7*

*For new developments, the go to Banks or Ag Credit. ID8*

Level of difficulty? (Very, Somewhat, Not, Not At All)

*NA ID1*

*Same as a regular business ID2*

*Don't think any difficulty ID3*

*Not at all ID4*

*Not very difficult to get financing. ID5*

*Not very difficult. ID6*

*Not very difficult. ID7*

*None, if it is based on return on investment, the lending organization understands that. ID8*

Source?

*NA ID1*

*Bank ID2*

*Banks ID3*

*Banks ID4*

*Banks ID5*

*We supply some, some from banks. ID6*

*Bank ID7*

*Banks and Farm Credit ID8*

24. For customers who continually shy away from energy efficiency improvement, what are the most typical reasons? (Ir, Open Opportunity)

*Initial cost – fear of failure – fear of change ID1*

*Don't want to make the investment ID2*

*Don't see any who shy away ID3*

*Capitol costs ID4*

*Initial cost ID5*

*Initial cost, and they are uncertain that they will get the payback. ID6*

*Not familiar with it, uncertain about performance, don't understand cost savings over time ID7*

*Cost, ROI too long. ID8*

25. On a scale of one to ten, how important is energy efficiency to your customers? (10 is highest level of importance)

3 ID1

8 ID2

10 ID3

3 ID4

7-8 for the more successful farmers, for old style farmers 3-2 ID5

6. ID6

3 ID7

3 ID8

***To Seek Knowledge about Comparison Point***

26. Are you involved in any pumping related activities outside PG&E's service territory?

yes ID1

no ID2

no ID3

yes ID4

Yes in SCE service territory ID5

No. ID6

No ID7

No ID8

**{If the person says none – end of survey}**

27. If so? What kind? Where? To what extent?

SCE territory and Turlock & Modesto irrigation districts ID1

Similar to PG&E service territory ID1

SCE territory, northern Stanislaus county ID4

SCE, About 50/50 ID5

28. How would you compare the level of energy efficiency adoptions within PG&E's service territory with outside?

*Higher inside than out ID1*

*No difference ID4*

*SCE seems to be a little greater. I don't know why. ID5*

29. How would you compare customer attitudes on energy efficiency within PG&E's service territory with outside?

*A little higher ID1*

*More concerned within PG&E service territory ID4*

*No difference. ID5*

30. To what do you attribute differences (if any)?

*Long history of PG&E & reps promoting EE ID1*

*Cost of power is higher in PG&E service territory ID4*

*Appendix H*  
*Data Sources and Uses Chart*

**Telephone Survey of Customers**

Q #	Question Summary	Use	Further Explanation
	<b>Screening</b>	-	
1	Pump Use in 3yrs	-	Necessary to have an opinion about covered equipment.
2	Awareness of a pump repair	-	Found some in past who didn't
3	Whether Drip or Sprinkler	-	screen for Micro questions
-	<b>Organizational Characteristics</b>	-	
4	Type of Business	E	
5	Ownership	E	
6	Management type	E	
7	Size of the business	E	
8	Length of time at location	E	
	<b>Intensity of use</b>	-	
9	Type of crop	E	
10	Number of Pumps	E	
11	Capacity of the pumps	E	
12	Age of the pumps	E	
13	Duration of pump use	E	
14	Electricity cost as % of total revenue	E	
	<b>Attitude</b>	-	
15	Importance of efficient use of electricity	E	
16	Awareness of efficiency effects on electric bills	E	
17	Ease of getting information	MB1	Information Search Costs
18	Willingness to seek info	E	
19	Satisfaction with information	E	
20	Ease of getting info in future	MB1f	Future Information Search Costs
21	Willingness to pay for info	E	
22	First Source of Information	E	
23	Familiarity with PG&E' AEMS program	E	
24	Familiarity with PG&E' AEEI program	E	
25	Number of Contacts	E	
	<b>Decision Making</b>	-	
26	Who makes decisions	E	
27	Investment Eval. Method	E	
28	Ability to spare funds for changes	MB	Access to financing
29	Unavailability of funds	E	
30	Low initial vs high initial costs	E	
31	Why low initial choice	E	
32	Why high initial choice	E	
33a	Imp. of reliability of equip	E	
33b	Imp of potential energy savings	E	
33c	Imp of Hlth of Econmy	E	
33d	Imp of performance of current equip	E	
33e	Imp.of initial cost when making decision	E	
33f	Imp.of equip maintenance in the decision	E	

Q #	Question Summary	Use	Further Explanation
	<b>Performance Uncertainty</b>	-	
34	Certainty about savings from pump repair	MB2	Pump retrofit Perform. Uncert.
35	Imp. of certainty	E	
36	Certainty about savings in future	MB2f	Future Pump retrofit Perform. Uncert.
37	Reasons if certain	E	
38	Reasons if uncertain	E	
39	Place holder	-	
40	Certainty about performance of Micro	MB2	Micro retrofit Perform. Uncert.
41	Imp of certainty	E	
42	Performance certainty of micro in future	MB2f	Future Micro retrofit Perform. Uncert.
43	Reasons if certain	E	
44	Reasons if uncertain	E	
	<b>Asymmetric Information</b>	-	
45	Statement to read	-	
46	Confidence in PG&E as a source of info.	MB3	Asymmentric Information
47	Reasons if confident	E	
48	Reasons if not confident	E	
49	Confidence in non-PG&E as a source of info.	MB3	Asymmentric Information
50	Reasons if confident	E	
51	Reasons if not confident	E	
52	Futr Conf. If no PG&E?	MB3f	Future Asymmentric Information
53	Imp of reconfirmation of recommendation	E	
	<b>Hidden Costs</b>		
54	Concern about unexpected costs	MB4	Hidden Costs
55	Concerns stopping from implementation	E	
56	Future concern about unexpected costs	MB4f	Future Hidden Costs
57	Why concerned/not concerned	E	
	<b>Explanatory Variables</b>	-	
58	Pump repairs in 4 years	Action Model	If nonexposed
59	If eei-pump part., then # pumps reprd w/o rebate?	Action Model	
60	Pump repairs in 1998	Sustainability	
61	Reasons for repair?	E	
62	Micro in 4 years	Action Model	If nonexposed
63	If eei-micro part., then # acres without a rebate?	Action Model	
64	How many acres?	Sustainability	
65	Micro in 1998	Action Model	
66	Why decided Micro?	E	
67	Thanks	-	

***Pump Dealer and Irrigation System Designers***

Uses	Pump Dealer	Irrigation System Designer
<u>Company profile</u>		
Services	Q1	Q1
Characterize the clients		Q2
Size of the Company	Q2	Q3
Length of time in business	Q3	Q4
<u>Program Awareness and involvement</u>		
% of Sales	Q4	-
Change in involvement	Q5	-
How and why the involvement changed	Q6, q7	-
Sources of information for customers	Q8	-
Role of the Company in the decision process	Q10	Q5, Q6
<u>Supply and Demand Constraints</u>		
Their definition of energy efficient equipment		Q7
Demand for energy efficiency technologies/practices	Q11	Q8
The reasons for the demand	Q12, q13	Q9, q10
Their opinion about benefits of energy efficient equipment	Q14	
How often do they recommend these?	Q15	Q11
<u>Market Barriers</u>		
<u>First market Barriers Analyzed</u>		
Information and search costs	Q19	Q16
Hidden Costs	Q24	Q21
Performance Uncertainties	Q22.Q23	Q19, Q20
Their opinion about the bottlenecks	Q16, Q17	Q12, Q13
PG&E's effects on them	Q18	Q14
Product/Service Unavailability	Q20	Q17
Their opinion about Customers' Sources of information	Q21	Q18
Organizational Practices	Q25	Q22
Any Other Market Barriers	Q26, Q28	Q23, Q25
Access to Financing	Q27	Q24
Importance of energy efficiency for customers	Q29	Q26
<u>Comparison Point</u>		
If any	Q30	Q27
Nature of Services outside PG&E	Q31, Q32	Q28, Q29
Comparison of Attitudes	Q33, Q34	Q30, Q31



***Appendix I***  
***Comparison of Modeling Results***

As a part of this study, three types of choice models were estimated. Since the results of logit and probit models are very similar, for simplicity, logit model results are selected. The most appropriate of the logit and ordered logit model is selected and reported in Section 5. The purpose of this Appendix is to present the results of each type of models for each of the four market barrier.

**Exposure Model**

Explanatory Variables	Parameter Estimates	
	Logit Model Selected Model	Probit Model
<b>Intercept</b>	-1.21 (1.9)	-1.01 (3.5)
<b>Dummy=1 if the largest source of revenue of the business is from vegetable and field crops, packing plant, orchard.</b>	0.75 (8.4)	0.4 (7.9)
<b>The extent (not at all, not too, somewhat, very) to which customers are willing to spend time looking for information on ways to reduce energy use.</b>	0.36 (4.1)	0.20 (3.7)
<b>Importance of savings (not at all, not too, somewhat, very) when considering options for repair or replacement of old equipment.</b>	0.37 (2.7)	0.2 (2.6)
<b>Number of times PG&amp;E representative contacted the customer.</b>	0.56 (18.2)	0.29 (19.3)
<b>Dummy=1 if annual electricity consumption is less than 31,820kWh</b>	-0.39 (2.2)	-0.22 (2.2)
<b>Dummy=1 if location of the business is Sacramento Valley</b>	0.64 (3.9)	0.25 (1.8)
<b>Number of observations</b>	429	429
<b>Number of exposed customers</b>	340	340
<b>Number of non-exposed</b>	89	89
<b>Percentage of probabilities correctly predicted (Concordant)</b>	72.5%	72.5%
<b>-2(LLR-LLU)</b>	50.1	49.0

**Market Barrier 1: Information and Search Costs**

Explanatory Variables	Parameter Estimates		
	Ordered Logit Model Selected Model	Logit Model	Probit Model
<b>Intercept_1: Intercept for response level 4</b>	-3.48 (26.8)	-0.7 (0.9)	-0.47 (0.99)
<b>Intercept_2: Intercept for response level 3 and 4</b>	-1.10 (2.8)	-	-
<b>Intercept_3: Intercept for response level 2, 3, 4</b>	0.06 (0.1)	-	-
<b>Dummy=1 if customers are aware of the effect of using efficient technologies, products, system design, and services on electricity bills.</b>	1.19 (6.4)	1.06 (4.0)	0.66 (4.1)
<b>Dummy=1 if customers learn about the energy efficiency options by approaching a vendor or contractor or PG&amp;E.</b>	0.26 (1.5)	0.56 (3.9)	0.33 (4.2)
<b>Dummy=1 if customers consider the technical aspect of their equipment as a reason to believe the savings claim from pump repair/irrigation system.</b>	-0.85 (2.6)	-1.05 (3.2)	-0.63 (3.1)
<b>Dummy=1 if customers' confidence in the savings predicted by agencies other than PG&amp;E depends upon other growers.</b>	-0.65 (6.8)	-0.66 (4.88)	-0.39 (4.8)
<b>Dummy=1 if annual electricity consumption in 1996 is less than or equal to 108,000 kWh and greater than 31,820 kWh.</b>	-0.24 (1.5)	-0.5 (4.24)	-0.3 (4.1)
<b>Dummy=1 if the largest source of revenue of the business is from live stock or dairy farm.</b>	-0.35 (1.8)	-0.39 (1.6)	-0.24 (1.7)
<b>Predicted probability of exposure.</b>	1.7 (6.4)	1.45 (2.8)	0.91 (2.9)
<b>Number of observations</b>	429	429	429
<b>Percentage of probabilities correctly predicted (Concordant)</b>	61.4%	66.3%	66.5%
<b>-2(LLR-LLU)</b>	30.0	28.2	28.4
<b>Chi square with 14 Degrees of Freedom</b>	16.8	-	-
<b>P Value</b>	0.26	-	-

Calculated market effects using exposure and information and search cost barrier model Results.

<b>Information Search Cost</b>	<b>Results</b>	<b>Results</b>	<b>Results</b>
	<b>Logit</b>	<b>Probit</b>	<b>Ordered Logit</b>
<b>Overall Effect</b>	0.6512	0.6528	0.6636
<b>Effect Attributable to the programs</b>	0.2276	0.2322	0.3088
<b>Overall Ratio</b>	34.95	35.57	46.53
<b>Overall Effect of EMS Program</b>	0.648	0.6495	0.6607
<b>Effect Attributable to EMS Program</b>	0.227	0.2315	0.3074
<b>EMS Ratio</b>	35.03	35.64	46.53
<b>Overall Effect of EEI Program</b>	0.0032	0.0033	0.0029
<b>Effect Attributable to EEI Program</b>	0.0006	0.0007	0.0014
<b>EEI Ratio</b>	18.75	21.21	48.28

**Market Barrier 2: Asymmetric Information**

Explanatory Variables	Parameter Estimates		
	Logit Model Selected Model	Probit Model	Ordered Logit
Intercept	1.13 (2.1)	0.71 (2.1)	0.89 (1.5)
Intercept2	-	-	2.9 (15.5)
Dummy=1 if customer has experience with agencies other than PG&E or/and have long term relationship with them.	1.13 (21.5)	0.69 (21.9)	1.3 (31.0)
Dummy=1 if perceive agencies other than PG&E are unbiased.	1.24 (7.3)	0.76 (7.5)	1.3 (9.3)
Dummy=1 if customers use complex financial methods to evaluate energy-efficiency improvements.	0.60 (4.6)	0.36 (4.6)	0.68 (6.7)
Dummy=1 if perceive PG&E is unbiased.	-0.88 (5.3)	-0.53 (5.4)	-0.54 (2.9)
Willingness to pay (not at all, not too, somewhat, very)for information regarding alternative ways of reducing energy use at the pump.	-0.25 (4.4)	-0.16 (4.6)	-0.16 (2.3)
Importance of general health of the economy (not at all, not too, somewhat, very) when considering options for repair or replacement of old equipment	-0.22 (3.8)	-0.13 (3.8)	-0.18 (3.1)
Predicted probability of exposure.	-0.8 (0.8)	-0.52 (0.8)	-1.05 (0.9)
Number of observations	362	362	362
Percentage of probabilities correctly predicted (Concordant)	69.5%	69.5%	68.1%
-2(LLR-LLU)	42.0	44.4	53.6
Chi square with 14 Degrees of Freedom	-	-	15.1
P Value	-	-	0.0001

Since the program effects are not significantly different from zero, the effects are not calculated.

**Implementation Model**

Explanatory Variables	Parameter Estimates	
	Logit Model	Probit Model
Intercept	1.26 (1.0)	0.72 (0.99)
Dummy=1 if the reason for pump repair/micro irrigation system is broken equipment or poor performance.	1.4 (3.9)	0.83 (3.9)
Number of times (often, sometimes, not too often, never) customer did not make changes in the irrigation systems due to lack of financing	-0.22 (3.2)	-0.13 (3.1)
Importance of (not at all, not too, somewhat, very) potential energy savings when considering options to increase the efficiency of electricity use by installing new equipment or repairing old equipment.	-0.59 (6.6)	-0.35 (6.9)
The extent (not at all, not too, somewhat, very) to which customers are willing to spend time looking for information on ways to reduce energy use.	0.30 (3.3)	0.18 (3.5)
Number of times PG&E service representative contacted the customer in past four years.	0.31 (8.8)	0.18 (9.3)
Dummy=1 if customer consider his business operated by a company.	1.61 (8.0)	0.96 (9.6)
Dummy=1 if customer categorizes his business as medium compared to other similar businesses.	0.57 (5.7)	0.34 (5.8)
Dummy=1 if customer first learned about energy-efficiency options by approaching a vendor, contractor or PG&E.	0.62 (5.1)	0.37 (5.4)
Dummy=1 if property is owned by the customer.	-0.67 (4.0)	-0.39 (4.3)
Dummy=1 if annual electricity consumption in 1996 is less than or equal to 31,820 kWh.	-0.39 (2.7)	-0.24 (2.8)
Number of observations	429	429
Number of customers who implemented an efficient technology.	285	285
Number of non-exposed	144	144
Percentage of probabilities correctly predicted (Concordant)	74%	74%
-2(LLR-LLU)	70.1	81.1

**Market Barrier 3: Performance Uncertainty**

Explanatory Variables	Parameter Estimates		
	Ordered Logit Model Selected Model	Logit Model	Probit Model
Intercept 1	-3.57 (14.1)	-1.8 (2.7)	-1.06 (2.6)
Intercept 2	-1.59 (2.9)	-	-
Intercept 3	-0.35 (0.1)	-	-
Dummy=1 if customers understand the technical aspect of their equipment and consider it as a reason to believe the savings claim from pump repair/irrigation system.	-1.38 (7.1)	-1.35 (5.5)	-0.82 (5.3)
Importance of (not at all, not too, somewhat, very) reliability of the equipment when considering options to increase the efficiency of electricity use by installing new equipment or repairing old equipment.	0.31 (2.1)	0.38 (2.5)	0.24 (2.5)
Importance of (not at all, not too, somewhat, very) general health of the economy when considering options to increase the efficiency of electricity use by installing new equipment or repairing old equipment.	0.30 (10.1)	0.22 (3.7)	0.13 (3.7)
Dummy=1 if annual electricity consumption in 1996 is less than or equal to 108,000 kWh and greater than 31,820 kWh.	-0.49 (5.7)	-0.25 (0.95)	-0.15 (1.03)
Dummy=1 if the largest source of revenue in the business is from ornamental nursery, indoor crops, or vineyard/winery.	0.24 (1.6)	0.39 (1.5)	0.22 (1.5)
Predicted probability of implementation.	1.04 (4.5)	1.07 (3.14)	0.63 (3.04)
Number of observations	395	395	395
Percentage of probabilities correctly predicted (Concordant)	62%	62.2%	62.2%
-2(LLR-LLU)	27.7	16.3	16.3
Chi square with 14 Degrees of Freedom	10.5	-	-
P Value	0.57	-	-

Calculated market effects using implementation and performance uncertainty barrier model results.

Performance Uncertainty	Results		
	Logit	Probit	Ordered Logit
<b>Overall Effect</b>	0.5403	0.541	0.5484
<b>Effect Attributable to the programs</b>	0.1422	0.1416	0.1729
<b>Overall Ratio</b>	26.32	26.17	31.53
<b>Overall Effect of EMS Program</b>	0.5365	0.5372	0.5449
<b>Effect Attributable to EMS Program</b>	0.1412	0.1406	0.1717
<b>EMS Ratio</b>	26.32	26.17	31.51
<b>Overall Effect of EEI Program</b>	0.0038	0.0038	0.0035
<b>Effect Attributable to EEI Program</b>	0.001	0.001	0.0012
<b>EEI Ratio</b>	26.32	26.32	34.29



**Market Barrier 4: Hidden Costs**

Explanatory Variables	Parameter Estimates		
	Logit Model-- Selected Model	Probit Model	Ordered Logit Model
Intercept	1.84 (1.6)	1.09 (1.7)	-0.73 (0.41)
Intercept2	-	-	0.19 (0.02)
Intercept3	-	-	1.8 (2.6)
Dummy=1 if customer's opinion about unexpected costs is based on experience of other growers.	-1.77 (7.7)	-0.94 (9.2)	-0.6 (4.4)
Dummy=1 if customers first learn about energy-efficiency options when PG&E, contractor, or vendor contacts them or by word of mouth.	0.62 (3.4)	0.33 (3.1)	0.23 (0.96)
Importance of (not at all, not too, somewhat, very) reliability of the equipment when considering options to increase the efficiency of electricity use by installing new equipment or repairing old equipment.	-0.91 (8.1)	-0.53 (7.9)	-0.46 (3.4)
Importance of (not at all, not too, somewhat, very) the general health of the economy when considering options to increase the efficiency of electricity use by installing new equipment or repairing old equipment.	-0.36 (5.0)	-0.19 (4.9)	-0.26 (5.5)
Dummy=1 if customer grows annual crops.	-0.90 (4.8)	-0.41 (3.7)	-0.85 (11.2)
Dummy=1 if the largest source of revenue of the business is from live stock or dairy farm.	-0.95 (2.5)	-0.49 (2.5)	-0.74 (4.5)
Dummy=1 if annual electricity consumption in 1996 is less than or equal to 108,000 kWh and greater than 31,820 kWh.	0.95 (7.4)	0.54 (7.7)	0.37 (2.4)
Probability of participation.	1.4 (2.4)	0.68 (1.9)	1.18 (3.96)
Number of observations	381	381	381
Percentage of probabilities correctly predicted (Concordant)	76%	76.3%	65.1%
-2(LLR-LLU)	39.7	39.3	35.6
Chi square with 14 Degrees of Freedom	-	-	71.9
P Value	-	-	0.0001

Calculated market effects using implementation and hidden cost barrier model results.

Hidden Costs	Results		
	Logit	Probit	Ordered Logit
<b>Overall Effect</b>	0.1429	0.1382	0.1402
<b>Effect Attributable to the programs</b>	0.0959	0.0869	0.0882
<b>Overall Ratio</b>	67.11	62.88	62.91
<b>Overall Effect of EMS Program</b>	0.1414	0.1366	0.1396
<b>Effect Attributable to EMS Program</b>	0.0952	0.0862	0.0878
<b>EMS Ratio</b>	67.33	63.1	62.89
<b>Overall Effect of EEI Program</b>	0.0015	0.0016	0.0006
<b>Effect Attributable to EEI Program</b>	0.0007	0.0007	0.0004
<b>EEI Ratio</b>	46.67	43.75	66.67

As can be seen from the results (i.e., calculated market effects), the difference between probit model results and logit model results are not significantly different from each other.