September 23, 2003

Energy Efficiency Proposals c/o Julia Cordell
California Public Utilities Commission
Energy Division – NGEERA Branch
505 Van Ness Avenue
San Francisco, CA 94102

Subject: Proposal in response to CPUC RFP
2004 – 2005 Energy Efficiency Programs
Docket 03-08-067
For Southern California Edison Territory

Automata, Inc. is pleased to submit one unbound and three taped copies of our Monitoring Soil Moisture to Control/Reduce Energy Use and Shift Load proposal. This proposal is designed to demonstrate how practical and economical existing technology can be used to improve energy efficiency through monitoring and controlling irrigation. We would like to note that this project is not a stand alone proposal. We have submitted two proposals, one for using growers served by PG&E and growers with SCE. To maximize this proposal, it must be done together. One cannot be done without utilizing the other. PG&E's proposal includes some of the overhead costs associated with this proposal. This proposal has also been sent via email.

Contractual or technical questions pertaining to this proposal can be addressed to Mr. Boyd Wilson or Mr. Lenny Feuer. Both contact personnel will be authorized to negotiate contract terms. We can be reached at:

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Nevada City, CA 95959
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Lenny@automata-inc.com

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3821 Crowell Road #234
Turlock, CA 95382
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boyd.wilson@charter.net

Thank you for the opportunity to submit this proposal, and we look forward to working with the California Public Utilities Commission.

_____
Lenny Feuer, President
Automata, Inc.

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Section I. Program Overview

A. Program Concept

Agricultural pumping requires a large quantity of energy to pump water to crops in California each year. By applying our technology, growers are able to monitor the moisture requirements of their crops and control irrigation pumping. The water application is minimized, and the timing of the application of the water becomes more flexible. This reduces "over watering", and in turn, reduces leaching of energy-intensive fertilizer into the ground and wasting it. In cases where water is delivered under pressure, our technology allows using the energy available in pressurized pipe to augment pumping energy instead of wasting the energy (if the existing pump system allows). The results of this energy efficiency project will use Automata's technology to reduce total kilowatt-hours and shift loads to off-peak hours.

Energy Efficiency Benefits:

- Less pumping energy is required as a result of reduced water application.
- Pumping energy is further reduced by utilizing energy in water that is being delivered under pressure.
- On-peak pumping is reduced further by shifting more of the pumping to mid-peak and off-peak hours.

Other Benefits from Energy Efficiency Monitoring and Control:

- Energy consumption is reduced by decreasing application of petroleum-based energy-intensive chemical fertilizer and pesticide.
- Reduced on-farm mileage due to automation.
- Congestion is reduced on the grid (including some congestion-impacted areas designated by the CAISO).
- Water resources are saved.
- Air pollution is reduced.
- Ground water pollution is reduced by reducing fertilizer leaching.
- Environmental pollution is reduced by decreasing application of energy intensive chemical fertilizer and pesticide.

B. Program Rationale

This program is timely for a number of reasons:

- Available energy resources are decreasing and grid capacity is constrained in supplying on-peak power to many congested areas.
- Water is becoming a scarce resource.
- Our environment is taxed by air pollution, ground water pollution, and destruction of fish habitats.
- Thus, these environmental issues affect the quality of our food.

The primary purpose of this program is to help to reduce energy consumption because growers can measure the moisture requirements of their crop and therefore use less electricity to pump water. Automata's equipment also helps control pumping times and can help growers shift irrigation to off-peak hours, thereby saving money for the growers

and helping to ease congestion on the grid during on-peak hours. In addition to energy efficiency issues, there are numerous other benefits for monitoring and controlling the irrigation process.

C. Program Objectives

The first objective is to demonstrate how practical and economical existing technology can be when properly applied for improved energy efficiency. Data acquisition and analysis of this project will direct us to make hardware and software enhancements during the course of the project to further improve energy efficiency. Additionally, these pilot projects will train a number of growers so they can continue to use and expand the technology. Finally a good demonstration program will educate a larger segment of growers of the direct and indirect economics of applied technology and therefore broaden the use.

Section II. Program Process

A. Program Implementation

We will coordinate with the Utility Distribution Company (UDC) so their account representative in each agricultural area will know about our program and can mention this program to their customers. In addition, we will meet to coordinate and share information with the statewide irrigation programs at Fresno State University, Center for Irrigation Technology, Cal Poly San Luis Obispo and UC Davis.

Our proposed program is different from other energy efficiency programs because most of the other programs have focused on improving the efficiency of agricultural pumping by installing variable frequency drives (VFD) to match pumping speeds with pumping requirements. Our program does share the common goal of helping growers to monitor their energy use during irrigation and to shift irrigation to off-peak hours whenever possible. Our program goes one-step further by optimizing irrigation in the field/orchard initially using our patented "AQUA-TEL-TDR" Soil Moisture Sensor that:

- Optimizes the "right" amount of water at the "right" time.
- Reduces error through automatic remote monitoring.
- Avoids laborious soil sampling and reduces on-farm mileage.
- Minimizes water usage and fertilizer waste.
- Reduces water runoff, thus saving material and cleanup costs.
- Minimizes energy use.
- Saves power costs by shifting demand to off-peak hours.

This program will supply background data and produce experienced operators so that plant stress monitoring methods developed by Automata and others will become feasible. Because most plant stress monitoring techniques and analysis is quite complex we do not propose using it initially. Plant stress monitoring becomes more important when implementing deficit irrigation.

By monitoring and controlling pumping activity with Automata's DATA⇌LYNX ® Telemetry Equipment and the Power Measurement® Meter, we are able to save energy by pumping only what is needed and thereby shift pumping to off-peak hours. Some

programs encourage off-peak pumping, but they do not have a method to measure the ET and moisture requirements of the crops like Automata's complete systems.

B. Marketing Plan

Up to this time, Automata, Inc. has been marketing its irrigation monitoring and control equipment primarily for the purpose of optimizing water use. However, the purpose of this proposal is to focus on the energy efficiency aspects of Automata's equipment to:

1) Save energy by reducing unnecessary pumping.
2) Shift use to off-peak hours.
3) Optimize water for irrigation.
4) Optimize pesticide use.

Three additional positive benefits will result in these proposed pilot programs:

1) Reduction of congestion in the California grid (including congested zones).
2) Reduction of wasted water from "over-irrigation".
3) Reduction in air pollution during peak hours as energy use shifts to off-peak hours.

Automata's marketing plan has several methods to reach growers in California. Automata will develop a product sheet (in Spanish and English) describing the energy efficiency benefits of our system and this will be done in the same format as our other marketing materials that can be found on our website: www.automata-inc.com. This energy efficient product sheet will be produced in color as well as black & white. It will be available in handout form and located on our website. Since it will be in Adobe PDF format, this energy efficiency program can easily be emailed to interested growers along with a cover letter. Printing costs are going to be nominal and will not be included in this proposal. However, the production cost is included and will be added to our budget.

These product sheets will be distributed at various meetings, including

- Water Districts
- Irrigation Districts
- County Farm Bureau meetings
- Association of California Water Agencies (ACWA)
- California Special Districts Association
- Farm Equipment and Product Shows
- Market Research of Growers in the Agricultural Areas

In addition we will:

- Make presentations to grower groups. We then, will visit and provide a plan on how the system would be installed and operated to those growers that show an interest in this program.
- We will advertise in County Farm Bureau Newspapers on a monthly basis. The cost for ¼ page is about $85.00 per month per county (please refer to the budget).
- We will exhibit at the Association of California Water Agencies (ACWA) Northern California show in May.
- Exhibit at the large World Agricultural Expo in Tulare in February.
- Organize Field Days on Farms.

- Publicize the fact that "other benefits "listed in section IA result directly in reduced input costs for the grower.
- Reporting results in Automata's Quarterly Newsletter which reaches 4,000+ members of the agricultural, environmental and water industry professionals.
- All materials will be made available in Spanish as well as English, so that all growers can be well educated in the pilot programs.

C. Customer Enrollment

Once a potential customer has shown interest in a pilot program, then we will personally meet with the customer to explain the program in more detail. We plan to establish 6 Southern California Edison pilot programs each covering one block (about 20 acres). These customers will be located in the San Joaquin Valley. Customers will be required to participate in the program by investing 25% percent of their own funds towards the cost of implementing the program into their fields. At the time of the customer's enrollment, we will cover the following:

- Purpose and requirements of the program.
- Investment requirement of the grower and the incentives by the CPUC.
- Time table for delivery and installation of the system.
- Installation and operation of the Automata system.
- Customer support issues and availability.
- Reporting requirements for this program.
- Seek their permission to show the pilot program to other growers.
- Offer a guided tour of existing installations.
- Point out that all benefits mentioned result in reduced input costs for the grower.

We will display the data from each pilot program over the Automata web server program "IFPNET.COM" so each grower, EM&V contractor, UDC Rep, and CPUC staff has open access to the data on a near real-time basis.

D. Materials

Customers will be given the opportunity to take part in this program through marketing avenues such as trade shows, etc. We will meet with the grower to establish the qualifications and to see if their farm will benefit with energy efficient irrigation monitoring and control systems. After determining if the grower qualifies, we will set up a delivery time and place. There will be one Base Station, one Weather Station, one Pump Station and two Soil Moisture Field Stations. All field stations are capable of control (pumps, valves, etc.). The Base Station will be connected to the office computer and all software necessary will be installed. The Base Station will run on AC power. The Field Stations will be solar powered. Each Station will require a 20' tower. The tower will need to be anchored in cement for stability. The stations will then be mounted on the towers using the hardware that is included. The Weather, Pump and Monitoring stations will communicate with the Base Station via Spread Spectrum Radio. Please refer to the materials described under Section VIII – C. Discussion of budget line item details.

E. Payment of Incentives

Automata, Inc. would like to make this program affordable to everyone involved. We believe that the grower should share in one quarter of the on-farm equipment and installation cost of the pilot program on their farm to be sure we have a committed user. Therefore, we propose an incentive program as follows:

25% Grower Portion
66% CPUC Incentive
5% Automata Incentive of Automata's Products
5% Automata Dealer's (Wilson) Incentive of Automata's Products
100% Total

Note: Total is not exactly 100% because Automata and the Wilson contribution are 5% of Automata's Products only.

F. Staff and Subcontractor Responsibilities

The major staffing structure will be furnished by Automata, Inc. The following is a list of staff that will be working with this program along with their cost and responsibilities:

Steve Jagerhorn	Software Developer	Steve plans to be spending 25% of his time with this program and will be responsible for developing and troubleshooting all software needs.
Boyd Wilson	Certified Energy Consultant and Dealer of Automata's Equipment	Boyd will be spending 200 hours of paid time on this program. In addition, Boyd will be responsible for marketing and sales involved with this program as a dealer.
Ron Brase	Agronomist	The Agronomist will be spending 5% of his time with this program.
TBD	1 Temporary Full Time Installer/Operator	Will be responsible for installing all phases of equipment and operating the system after installation. This will take 100% of his/her time.
TBD	1 Temporary Full Time Assistant Installer	Will assist the installer with any help needed. This will take 100% of his/her time.
Lenny Feuer	President, Chief Engineer	Lenny's responsibilities will be to monitor the primary contact for program implementations. This will

		take 20% of his time.
Mary Ann Townsend	Accounts Payable and Receivable	Mary Ann will be responsible for all bookkeeping pertaining to finances. This will take about 15% of her time.
Jim Foley	Northern California Sales Representative	Jim Foley will be responsible for assisting in obtaining contacts. He will be spending about 10% of his time on this program.

G. Work Plan and Timeline for Program Implementation

For the first year of this program Automata, Inc. would like to focus on the area covered by Southern California Edison. We plan to introduce the program to farmers at the World Ag Expo in Tulare, CA on February 10-12, 2004. Beginning in February 2004 through March of 2004 we hope to begin meeting with farmers to determine qualifications and any financing that needs to be addressed. We hope to have all 6 pilot programs installed and running by the end of April 2004 and begin monitoring the energy efficiency that this program is intended to address. Below is the timeline that we plan to closely adhere to in the future:

January 2004 Prepare Marketing Materials	**February** Introduce the Program at the World Ag Expo in Tulare, CA	**March** Begin meeting with farmers to determine qualifications
April Begin Installation of equipment and train farmers	**May – December 2005** Monitor energy efficiency and show that by using an efficient irrigation system, both energy and resources will be limited to only the necessary amount needed.	

We will monitor the energy use and compare it to the historical energy use of the grower for the same crop on the same acreage (keeping the variables as constant as possible). We will also monitor how much of their load can be shifted to off-peak hours. The growers will save money on reduced energy use, and shifting loads from on-peak tariffs.

APT suggests:

- Pump metering enclosures will be installed 8 weeks after release of purchase order on a staggered basis such that no more than 5 pump metering enclosures are installed per week. This would result in an eight week lead time for the first five enclosures, and then five pump metering enclosures would be installed per week for five weeks.
- Communications and commissioning of the 6 pump meters would be performed within six weeks of completion of installation of the last five enclosures.
- Four weeks of baseline data would be collected on all loads before enacting new control algorithms.

- New control algorithms would be enacted over five weeks, with five new pumps added to the control algorithms each week.
- Four weeks of post implementation data would be collected to prove the viability of the program goals.
- Energy savings assumptions – 35 HP motor, 15% energy saving, shifting from 12 hours on-peak to 8 hours off-peak plus 4 hours on-peak.

Section III. Customer Description

A. Customer Description

The customers are growers located in the San Joaquin or Salinas Valley. It is the grower that decides when and how much to irrigate their crops. They work closely with their water district or irrigation district to release water. The source of water could either be ground water self-provided from their wells or water provided from their water agency. This requires a tremendous amount of energy to operate large electric motors and pump water up from depths of 200 to 400 feet. In addition, there is the energy that is required for pumping surface water located along canals or tributaries. We propose that each pilot project will cover one agricultural block (about 20 acres). We will emphasize growers who are comfortable using computers.

B. Customer (Grower) Eligibility

1. The grower should be willing to pay 25% of the pilot project cost.
2. The grower should have a block of about 20 acres that is the same crop type as the year 2003 for row crops (2002 data for orchards and citrus groves).
3. The grower should have utility bills or access to utility bill information from their UDC to show power use for the same acreage, and be willing to switch to a time-of-use (TOU) rate if not already on a TOU rate schedule).
4. The grower should be willing to show other growers in the area their pilot program operation upon request with reasonable notification.
5. The grower should be willing to allow their project data to be posted on Automata's Web Server.
6. The growers might be willing to post a sign at the site that identifies it as a California Energy Saving Site (Optional on grower's part).

Technical requirements:

a. The grower needs to have a computer with at least Windows 98 or newer and be dedicated to the purpose of this pilot program.
b. Line of site for communications purposes.
c. Hole dug for the installation of the 20' tower required for each station.

C. Customer Complaint Resolution

Automata, Inc. has implemented a 2-year warranty on all products sold by Automata. If there are any problems with the hardware or software, it will be covered under the warranty for 2 years after purchase. However, there are complaints that might need to be addressed and below is a guideline on how we intend to reach a solution:

1) Step one - meeting between the grower and the dealer to address issues.

2) Step two- if the issue has not reached mutual satisfaction, then the issue is escalated to the President of Automata, and he contacts the grower.
3) Step three- if a mutually satisfactory conclusion is not reached, then Automata and the Grower will sit down with a mediator and attempt to reach an agreement.
4) If the mediation process is exhausted, then Automata, Inc. will remove its equipment at its own expense and pay the grower up to $1000 for their participation (from Automata's account).

D. Geographic Area

We will work with growers in the San Joaquin Valley. These agricultural areas that are served by Southern California Edison (SCE) in SP-15 zone. Growers in Kern, Kings and Tulare counties are in SCE (although some counties receive service from both UDC's). Please note that some of these counties are in high grid-congestion areas as designated by the CAISO.

Section IV. Measure and Activity Descriptions

A. Energy Savings Assumptions

This project will reduce energy (kWh) required to move water for irrigation by better controlling the moisture content in the crops being irrigated. This more consistent control will result in a net decrease in water consumption, and therefore a net decrease in energy required to pump that water. In addition, this program will shift energy consumption for irrigation from expensive on-peak hours to lower cost off-peak hours by controlling the irrigation pumps. The required volume of water for irrigation will be moved during off-peak hours to take advantage of the financial benefits.
This project will also reduce the amount of water consumed by crops through better control of moisture content. We will further reduce energy consumption by minimizing use of energy intensive chemical fertilizer and pesticides.

B. Deviations in Standard Cost-effectiveness Values

Applied Power Technology's (APT) assumptions for a Return on Investment (ROI) calculation are as follows for each of the 6 pilot project sites:

- Each pump will be individually metered at the pump itself. Each pump will require three current transformers (CTs) to monitor the current in each phase.
- Each meter will be mounted in a weather- tight enclosure located at the pump itself.
- A local qualified electrician will perform the enclosure mounting and wiring.
- Each meter will communicate information (and make control actions) back to the field station located at the pump. Ultimately the energy meter data will go to a centralized server through a suitable communications system provided by Automata, Inc.
- No more than 10 meters will be installed between the 6 pilot project sites.

- Monitored data will be collected and analyzed by a central PC server provided and commissioned by APT.
- ION Enterprise software will be used to provide energy consumption and load profile reports.
- Project administrative time for APT will be limited to an allowance of 40 hours total for all 6 pilot project sites.
- Software development time for APT will be limited to an allowance of 80 hours total for all 6 pilot project sites.
- Communication infrastructure between all 6 pilot projects sites either already exists or will be provided by others, and is not included in the APT's scope of work.

Required travel costs will be billed direct to the project and are not included in this estimate. An allowance for travel can be provided as required.

C. Rebate Amounts

We propose rebate amounts as follows:

- Contribution by Automata, Inc. 5% of the Automata equipment cost.
- Automata will contribute to 5% of the web monitoring fees.
- Contribution by Automata Dealer (Boyd Wilson) 5% of the Automata equipment cost
- Contribution by CPUC for the amount of 65% of the equipment costs and 75% of the installation labor.
- Contribution by the grower of 25% of the equipment costs and 25% of the installation cost.

D. Activities Descriptions

Automata, Inc. is a member of many agricultural organizations and will use our affiliation to expand the number of growers we can reach. There are many activities planned throughout the year that will allow us to inform the grower of this pilot program. Some examples:

- World Ag Expo in Tulare
- Stockton Ag Show in Stockton, CA
- Irrigation Association Conference
- Western Growers Association Conferences
- Etc.

Refer to time line in Section II – G.

Section V. Goals

Brief Overview

The growers will save money on reduced energy use, demand charges, and shifting loads from on-peak tariffs. Our goals are to implement the pilot programs for monitoring and controlling the power. We will quantify:

1) A 25% energy reduction, measured in kWh and KW.
2) At least a 15% shift from shift from on-peak hours to mid-peak or off-peak hours, measured in total on-peak hours shifted to mid-peak or off-peak hours.

If the grower is currently irrigating 12 hours from 6 AM to 6 PM, we propose a shift in 6 PM to 6 AM (resulting in no on-peak hours and only 4 partial-peak hours plus 8 off-peak hours).

The total savings depends on the crop type, soil type, weather conditions, evapotranspiration rate (ET), and other variables unique to each growing area.

Other Objective Measures for Evaluation Program Progress

Based on a 35 HP motor, the 15% energy savings plus the shifting from 12 hours on-peak to 8 hours off-peak + 4 hours on-peak = an annual savings of $10,158/year per pilot program. Total cost per installation is $25,169.

Pay back period for the entire system = $25,169 / $10,158 = 2.4 years.

Section VI. Program Evaluation, Measurement and Verification (EM&V)

Proposed Program Evaluation Approach

APT's proposed evaluation would be to record a baseline energy consumption and load profile for all loads in the pilot project areas along with the volume of water moved and resultant moisture levels. This data would be graphed and costs assigned based on market rates.

After analysis and design of simple irrigation pump control algorithms, a new measurement of the energy consumption and load profile for all loads, along with the volume of water moved and resultant moisture levels would be recorded. This data would be graphed and costs assigned based on market rates.

The intent of this project would be to demonstrate that simple controls implemented on the demand side would (a) reduce the amount of energy required to move water; (b) shift the energy consumption to non-peak hours to take advantage of lower energy prices; (c) reduce the amount of water moved to irrigate crops; and (d) provide more consistent moisture content control of the crops irrigated.

List of two potential EM&V contractors

We have contacted the following EM&V contractors and they expressed an interest in this project:

kW Engineering,
Mr. Jim Kelsey, P.E., 360 17th Street, Suite 100, Oakland, CA 94612, Tel. 510.834.6420

Quantum Consulting,
Ms. Eileen Parker and Mr. Kris Bradley, 2030 Addison St. #410, Berkeley, CA 94704, Tel. 510-540-7200

Section VII. Qualifications

A. Primary Implementer

Automata, Inc. is the primary implementer with this proposal. Lenny Feuer is President and Chief Engineer of Automata, Inc., with additional support from Mary Ann Townsend and Marsha Morris (all direct employees).

Automata, Inc. has been supplying complete systems solutions including telemetry, software, and sensors since 1975. Automata manufactures the DATA ⇌ LYNX® SCADA system sensors and software used in a wide variety of light industrial and agricultural applications. We offer hard wire, satellite, narrow band radio, spread spectrum radio, telephone, and fiber optic communications to suit a wide range of environments. These award-winning products are proven management tools in canal automation, agriculture, bioremediation, flood warning, irrigation, pump and well water supply systems. This is our company's twenty-eighth year of business in research, development, and manufacturing.

Forty-five Automata weather stations have been installed in area orchards to collect precise weather data every 15 minutes. Data collected include: temperature, humidity, precipitation, leaf wetness, wind speed and direction, soil moisture, solar radiation, and barometric pressure. Using Automata's radio telemetry, this data is being transmitted to a central server and from there is posted onto an interactive website. Growers are able to use this website to manage their orchards and calculate degree day-models. This allows orchard managers to more accurately time pesticide sprays and use new generation pesticides targeting only the pest, and not beneficial organisms as well. Funding for The Dalles IFP Network has been provided by: Bonneville Power Administration, Oregon Watershed Enhancement Board, Oregon Department of Environmental Quality, Northern Wasco County PUD, Wasco County Fruit and Produce League, UP Northwest and several.

"I used IFP net this spring to determine my spray schedule and saved 2 entire applications, reducing the risk of water pollution."
-Dan Ericksen, orchardist &
Wasco County Judge (taken from the one-year progress report, The Dalles, 2003)

B. Subcontractors

Applied Power Technology (APT) will supply the metering and control equipment as well as engineering services. APT is lead by Rich Celio, PE; Andy Taylor, PE, and Mark Andresen.

Boyd Wilson, MBA, CEP, is the Automata Dealer and APT Representative and he will be the primary contact in developing the customers for the pilot programs in the San Joaquin and Salinas Valleys.

Jim Foley is the Automata's Northern California Sales Representative. He will assist in identifying the contacts and providing sales support.

C. Resumes or Description of Experience

Lenny Feuer, President and Chief Engineer at Automata, Inc. Nevada City, CA
Under the leadership of Lenny Feuer Automata has contributed to the fields of Flood Warning, Agriculture, water distribution, and environmental monitoring. Automata's first significant product was the ALERT flood warning system which has now become a national standard in the USA. More recently agricultural products addressing integrated pest management, frost warning, efficient irrigation, and disease prediction are in use. In water distribution PLUG AND PLAY AUTOMATED CANAL CONTROL SYSTEM has been developed. Part of the strategy applied involves integration of private enterprise, research organizations, academia, and more importantly the end users.

Business:

Address	104 New Mohawk Road, Suite A Nevada City, CA USA 95959
Phone	(530) 478-5882 Ext 216 FAX (530) 478-5881
Email	lenny@automata-inc.com

Education:

Graduate work at California State University, Los Angeles
BSEE, University of California at Berkeley

Professional Experience:

1975 to present: Founder (1975) and Chief Engineer of Automata, Inc. Design, develop, manufacture and sale of microcomputer-based equipment such as remote control and remote monitoring systems for the agricultural, environmental, industrial, water, and weather communities. Has overseen all of Automata's equipment projects.

1973 – 1975: Senior Research and Development Engineer for Robertshaw Controls Company in Anaheim, California. Developed and designed several digital to analog and analog to digital interface modules for process control applications.

1966 – 1973: Senior Research Engineer for NCR-Electronic Data Processing Division. Developed an approach to data management involving the major causes of computing inefficiencies; designed a special purpose, firmware, sort processor; developed basic micro-programming control concepts; developed a test procedure and instrumentation for rod memory elements.

Honors and Awards:

- Feuer, Lenny and Automata, Inc. 1995. HORIZON Soil Moisture Based Irrigation Controller. Recipient of Agricultural Engineering's AE50 award for one of the fifty best agricultural innovations of the year.
- Feuer, Lenny and Automata, Inc. 1990. ET-NOW Electronic Atmometer. Recipient of Agricultural Engineering's AE50 award for one of the fifty best agricultural innovations of the year.
- Feuer, Lenny and Automata, Inc. 1990. ET-NOW Electronic Atmometer. Recipient of Agricultural Engineering's AE50 award for one of the fifty best agricultural innovations of the year.
- Feuer, Lenny and Automata, Inc. 1989. BUGCOUNT Electronic Insect Counter. Recipient of Agricultural Engineering's AE50 award for one of the fifty best agricultural innovations of the year.
- Feuer, Lenny and Automata, Inc.1988. Analog Infrared Data Telemetry Link. Recipient of Agricultural Engineering's AE50 award for one of the fifty best agricultural innovations of the year.

- Feuer, Lenny and Automata, Inc. 1985. Infrared Telemetry System for monitoring and controlling field conditions in remote locations. Recipient of Agricultural Engineering's AE50 award for one of the fifty best agricultural innovations of the year.

Patents and Trademark

- Feuer, Lenny. 1995. Patent No. 5,445,178 on AQUA-TEL Soil Moisture Sensor, developed by Lenny Feuer
- Feuer, Lenny and Automata, Inc. 1988. DATALYNX® Remote Control and Remote Monitoring Data Acquisition and Control Field Stations and Base Station for use in agricultural and industrial applications, in class 9. Trademark Registration No. 1,525,001.

Membership in Professional Societies

Air and Waste Management Association
American Water Works Association
California Chamber of Commerce
California Rural Water Association
California Special Districts Association
Napa Valley Grape Growers Association
Nevada County Economic Resource Council
Nevada Water Resources Association
Sonoma County Grape Growers Association
Sonoma Valley Vintners and Growers Alliance
The Irrigation Association
U.S. Committee on Irrigation and Drainage
Western Growers Association

Papers

- Clemmens, A J.; Strand, R.J.; Feuer, L. 2002. Application of Canal Automation in Central Arizona. Presented at CSCID Second International Conference on Irrigation and Drainage.

- Clemmens, A.J.; Feuer, L; Strand, R.J. 1998. Plug and Play Canal Automation: Is it Possible? Presented at Water Resources Engineering 98 Conference; American Society of Civil Engineers; August 3-7, 1998; Memphis, Tennessee.

- Feuer, Lenny. 1992. Real Time Total System Approach to Irrigation. Presented at 16th European Regional Conference of International Commission on Irrigation and Drainage: Budapest, Hungary.

- Feuer, L. 1989. A Resource Management Telemetry System. ASAE Paper No. 892658, American Society of Agricultural Engineers; St. Joseph, Michigan. Presented at The American Society of Agricultural Engineers' 1989 International Winter Meeting; New Orleans, Louisiana.

- Feuer, L. 1989. New Developments in Infrared Telemetry. ASAE Paper No. 893563, American Society of Agricultural Engineers; St. Joseph, Michigan. Presented at The American Society of Agricultural Engineers' 1989 International Winter Meeting; New Orleans, Louisiana.

- Feuer, Lenny 1986. Infrared Telemetry for Agricultural Applications. Proceedings of Agri-Mation 2, ASAE; St. Joseph, Michigan.

Mary Ann Townsend, Office Manager/Marketing Director at Automata, Inc. Nevada City, CA

Ms. Townsend has more than 25 years of administrative and program management. This includes general business and agricultural experience both in the public and private sector.

Business:

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Education:

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California State University at Sacramento

Professional Experience:

1975 to present: Automata, Inc. Nevada City, California – Corporate Agent (since 1981), and Office Manager (part time 1975-1980 and full time since 1980). Oversee marketing (including advertising, dealer training, exhibiting, literature, newsletters, press releases, seminars, and users' group meetings) and sales (including quotes and order processing). Manage accounting (including payables, receivables, and financial reports) and office work.

1984-1985: Agricultural Biologist for the Nevada County Agricultural Commissioner's Office; Grass Valley, California. Developed, maintained, and kept records of quarantine insect trapping along with insect and plant identification.

1982-1983: Agricultural Inspector for California State Department of Food and Agriculture; Sacramento, California.

1981: Biologist Technician for the U.S. Forest Service.

1975-1976: Executive Secretary for Sierra Economic Development District; Nevada City, California.

1969-1973: Research Department Secretary for NCR; San Diego, CA

Steve Jagerhorn, Software Developer at Automata, Inc. Nevada City, CA

Mr. Jagerhorn has 20 years of extensive experience in software programming. This includes Visual Basic, SQL, HTML, C++, Fortran, Pascal, Assembly Language, Microsoft Windows Operating Systems (95, 98, NT, ME, 2000, XP), Microsoft Office Applications (Word, Excel, Access, Power Point, and Outlook), Networking, and Administration.

Business:

Address	104 New Mohawk Road, Suite A Nevada City, CA USA 95959
Phone	(530) 478-5882 Ext. 219 FAX (530) 478-5881
Email	steve@automata-inc.com

Education:

1990 – 1991	Student of California Polytechnic State University
1990	Graduate of Cuesta Community College; San Luis Obispo, California
1984	Graduate of Marysville High School; Marysville, California

Professional Experience:

7.5 years	Software Engineer with Automata, Inc. Current responsibilities include programming HMI/SCADA software, technical support for customers, technical writing/editing for manuals and reports, network administration, computer maintenance and purchasing, web design, and internal communications engineering.
8 years	Computer Specialist/Consultant, self employed as Real Solutions
3 years	Commercial Electrician

Ronald J. Brase, President, California AgQuest Consulting, Inc., Fresno, CA

Managing company of 10 persons providing technical advising services for all major crops produced through irrigated agriculture in California. Areas of expertise include irrigation water management, plant nutrition management, and pest management requiring the integrated application of engineering, agronomy, soil science, and entomology. Ranch water/ energy use budgets developed and maintained for farming operations. Studies performed involving crop injury/assessment, crop feasibility, land use development, and wastewater management. Primary areas of work include the San Joaquin Valley and counties along the central coast of California.

1/76 to 12/79

Sr. Water Mgt. Specialist, Hazra Ag Services, Fresno, CA(Currently J.M. Lord, Inc.)

Provided irrigation scheduling and fertility management services for commercial crops in California. Supervised and provided training for other individuals. Position required a fundamental understanding of soil-plant-water inter-relationships as a basis for evaluating lands for agricultural suitability and resolving problems in agricultural lands.

6/66 to 12/75

Supervisor Information Systems, General Electric Co., Schenectady, N.Y.

Developed, implemented, and maintained computerized information systems in the electric utility industry. Scope of activities included extensive development of database management systems, supervision of technicians and training of computer system users.

Education

Postgraduate courses in Agricultural Production, California State University Fresno, Fresno, CA

Postgraduate courses in Industrial Administration, Union College, Schenectady, NY

Bachelor of Science, Mechanical Engineering, California State University Fresno, Fresno, CA

Certifications

Certified Crop Advisor (# 6864) by American Society of Agronomy and California Dept. of Food & Agriculture

Certified Pest Control Applicator (#PA10-80663) by the California Dept. of Pesticide Regulation

Society Affiliations, Organizations & Committees

A member of the American Society of Agricultural Engineers, American Society of Enology & Viticulture, California Irrigation Institute, California State University, Plant Science Department, and Advisory Committee.

President of the San Joaquin Valley Viticulture Technical Group. Vice President of the American Society of Agronomy, California Chapter and Past Chairman of Irrigation Association, Agricultural Irrigation Committee and California Department of Water Resources, Advisory Committee. Past Board member of the California State University, Center for Irrigation Technology and Technical Advisor of the Central California Winegrowers.

Litigation Experience

Year	Plaintiff / Defendant	Description
1987	D. Gardner vs. K. Karins	Resolution of lease dispute concerning vineyard development and water resources.
1991	F & L Farm Company vs. City of Lindsay, Lindsay Olive Growers, et al	Effects of nitrate leaching to ground water quality for agricultural land.
1991	Sonoma Valley County Sanitation Dist. vs. Community Realty Company	Land condemnation proceeding concerning suitability of land for vineyard development.
1994	Rain & Hail Insurance vs. Michael Hat Farming	Estimate grape crop injury due to rain.
1995	S. Meisner vs. T. Lee Estate	Assess monetary value of vineyard farm management activities.
2000	R. S. Natt vs. Coulture Pruning	Yield assessment of severe pruning of walnut orchard.
1996-2002	Sumner Peck, et al vs. US Bureau of Reclamation et al	Assessment of crop damages owing to shallow ground water conditions.
2003	J & K Farms vs. Peelman Realty et al	Production levels of Thompson Seedless grapevines as a function of age.

Applied Power Technologies (APT)

APT is committed to increasing business productivity by optimizing the value of the customer's electrical system. APT provides complete solutions, services and products to help customers manage critical electrical systems efficiently and productively. APT's services include metering and cost allocation, power- quality, and advanced monitoring systems, and consulting on energy system optimization. Energy efficiency requirements in the electric power industry create a vital need for information that can lead to intelligent decisions. In addition, electric power reliability and quality problems have become one of the largest contributors to plant downtime and productivity problems for advanced manufacturing and for any business relying on computer control or data processing. Whether the problems are related to energy consumption patterns or electromagnetic compatibility, APT makes sure you get the information you need to make informed decisions. APT has

implemented and managed energy efficiency projects with: Stanford University, Silicon Valley Power (City of Santa Clara), San Francisco State University, NASA Ames Research Ctr., Sun Microsystems, Oracle Corp., Applied Materials, Intel, University of California, State of California Office of energy Assessment, and others.

Richard C. Celio, PE: Mr. Celio is a registered professional electrical engineer in the State of California. He is a member of IEEE, AIPE and AEE and is the Chairman of the Silicon Valley Chapter of the IEEE Power Engineering Society. He has over 15 years experience in helping industrial/commercial customers solve difficult electrical systems problems. He graduated from San Jose State University with a BSME. He performed graduate work and taught as lecturer for one year. With Pacific Gas & Electric he worked with large industrial/commercial customers inspecting electrical systems, evaluating control strategies and design changes to optimize efficiency. In 1986 he was instrumental in developing PG&E's Power Quality Enhancement Service. In September 1988, Mr. Celio became Basic Measuring Instrument's Education Manager responsible for program development and training in power quality. In February 1992 he joined CRS Sirrine Engineers (now Jacobs Engineering), and as manager of the San Jose Office for Energy Systems Planning and Analysis, he was responsible for engineering studies, research projects, consulting work, and instruction. In 1994, Mr. Celio started Applied Power Technologies to help utilities and industries reduce electrically related losses and improve energy efficiency..

Mark Andresen has over 15 years experience in the fields of AC power, grounding, and power quality. He has over 8 years experience with power line harmonics, and has worked in the energy management field. Prior to joining Applied Power Technologies Mr. Andresen was founder and President of Integrated Power Analysis, a consulting firm in the power quality industry. Mr. Andresen has worked for Basic Measuring Instruments (BMI), a leading supplier of power measurement and monitoring equipment. During his 5 years at BMI, he held positions as Education Manager, Senior Applications Engineer, and Product Manager for energy measurement products. Before joining BMI Mr. Andresen was a power-quality contract consultant, the Western Region Application Engineer for Oneac Corp., an R&D engineer for Hewlett-Packard, and a design engineer for the Army Corps of Engineers. Mr. Andresen earned his BSEE from Virginia Tech, and he is a member of IEEE. He was a chapter chairman for the IEEE standard 1159 - "Monitoring Electric Power Quality", and is listed in Who's Who in Science and Engineering, Who's Who in Finance and Industry, and Who's Who in the West.

Andrew "Andy" E Taylor, **PE**. has over 15 years experience in electrical power systems. He holds a bachelor's degree in electrical engineering from the University of Idaho, and a master's degree in manufacturing systems engineering from Stanford University. Andy has been a registered professional electrical engineer since 1994.

Andy comes to Applied Power Technologies from Intel Corporation, where he spent the last eight years in various positions in facilities and manufacturing. He chaired Intel's virtual factory joint engineering team (JET), and most recently was the strategic planning manager for Intel Mask Operations. Prior to Intel, Andy worked as a consulting electrical engineer for Quasar Engineering in Belmont, CA and for ABB Impell in San Ramon, CA. Back in Boise, Idaho Andy worked for the electric utility Idaho Power Company.

Andy is a seasoned professional skilled in both facilities management and manufacturing systems improvement. Andy is flexible and creative problem solver, and a great addition to the Applied Power Technologies team.

Boyd Wilson, MBA, CEP has 25 years of experience in a combination of the energy utility business and agribusiness/food industry. The scope of his experience includes energy procurement, service and product development, economic analysis, project management, data analysis, and assisting clients with government agencies and regulations. He has developed several new products and services, including "Green Valley Energy"®, small hydroelectric project certified by the California Energy Commission. Other services include web-based products including the "Energy Assistant"® product that provides load control for utility customers and information services such as "Energy Budget"® and "Utility Alerts"® to save purchased power costs for public utilities. Mr. Wilson serves on the Power Purchasing Workgroup with the U.S. Department of Energy, Western Area Power Administration. He is one of the co-founders of the CVP Water and Power Pool JPA that provides supplemental energy for a group of municipal water agencies. He is a project manager for the Demand Reserve Program for under the California Power Authority. He has provided testimony to the California Public Utility Commission on behalf of clients. He was the Vice President of a division of a Fortune 500 food company (SupHerb Farms, div. of McCormick Schilling Spices). Wilson was President/CEO of Chosen Foods, a licensed food processor with 50 employees in peak season. His years in the agribusiness and the food processing industry have provided experience in cost reduction and more energy-efficient use of natural gas and electrical energy. He earned his BA from the University of Oregon and his MBA from San Francisco State University. He holds his Certified Energy Procurement (CEP) from the Association of Energy Engineers.

EDUCATION

Masters of Business Administration
(MBA, graduated with Honors)
San Francisco State University, California

B.A. – Business Administration
University of Oregon, Eugene

Certified Energy Procurement (CEP) by the
Association of Energy Engineers

PROFESSIONAL HISTORY

Robertson-Bryan, Inc., Senior Energy Consultant
Elk Grove, CA

Main Street Networks
Senior Product Manager for Utility Services
Morgan Hill, CA

Turlock Irrigation District, Energy Resources Administration
Product Development Manager
Turlock, CA

Chosen Foods, LLC
President/CEO
Turlock, CA

SupHerb Farms, div. of McCormick-Schilling Co.
Vice President, Director Sales & Marketing
Turlock, CA

Consultant to Food and Packaging Industry
Brentwood, CA

REPRESENTATIVE PROJECT
ENERGY / UTILITY INDUSTRY

EXPERIENCE
Energy Procurement. Assisted clients with their RFP for energy procurement contracts. Handled negations with the power providers and achieved competitive rates and terms for the municipal utility.

Energy Analysis for Financial Audit. Performed energy analysis work and audit of energy transactions for one of California's largest public agencies.

Project Manager. Assisted clients with Meter Service Providers (MSP), Meter Data Management Agent (MDMA), Energy Service Providers (ESP) and Scheduling Coordinators to evaluate economic feasibility and secure new services.
Senior Product Manager. Lead a team of Silicon Valley software developers and electrical engineers to develop Web-based products including the "Energy Assistant" product that provides load control for utility customers and information services such as "Energy Budget" and "Utility Alerts" to save purchased power costs for public utilities. Also helped develop Online Energy Service and worked on the software development team. This allows C&I customer to use a new meter pulse electrical component to read their energy consumption over the Internet.
Manager in Energy Resources Administration of Municipal Utility. Responsible for starting-up the Product Development Department, including Green Valley Energy® program, the first small hydroelectric power plants certified by the CEC. Developed and launched new products and services to increase revenue for Turlock Irrigation District. Responsible for managing 13 team members of the Direct Access Project for a municipal utility in California. Directed work of subordinates in the area of: long-term power purchase contracts analysis and municipal utility rate design. Included water releases for hydroelectric power plants with other stakeholder interests for irrigation requirements, river levels to meet fish flow requirements, flood control, and other environmental requirements.
Testimony to CPUC. Testified to the California Public Utility Commission (CPUC) to represent a client concerning Direct Access issues on pending legislation.
Serves on the Power Purchase Workgroup of the U.S. Department of Energy's Western Area Power Administration (WAPA).
MANAGERIAL EXPERIENCE IN THE FOOD INDUSTRY
Served as President/CEO of Chosen Foods, LLC. Responsible for product development, general management, and administration for this food manufacturer. Responsible for sales, marketing and purchasing for this food manufacturer, which had 50 employees. Responsible for reducing natural gas and electric energy costs.

SupHerb Farms. Started-up the foodservice business unit for this division of McCormick Schilling Spices, a Fortune 500 company. Managed product development

and new business development. Set up corporate contracts with the largest national and regional key accounts. Responsible for developing and managing the business in the U.S and Canada.

Consultant to Food and Packaging Industry. Worked as the U.S. consultant to Nihon Can Pack, a large Japanese food-packaging manufacturer. Purpose was to develop strategic relationships and joint venture agreements with U.S. companies. Also included feasibilities to build or acquire U.S. facilities.

Section VIII. Budget

Summary Budget Table for Southern California Edison Territory

Brief Description	Per Pilot Site	For a total of 6 pilot sites	% of Total Program Budget
Hardware			
1 Base Station, 1 Weather Station, 1 Pump Station and 2 Monitoring Stations.(refer to detail table below)	$20,146	$120,875	38%
Estimated unit costs for each metered pump (multiply by 6 pumps for entire project cost):	$2,640	$15,840	5%
Installation Labor	$2,384.33	$14,306	4%
Total Hardware Costs		**$151,021**	**47%**
Administrative Costs			
Labor		$36,158	11%
Travel/Conference/Training		$81,071	25%
Total Administrative Costs		**$117,229**	**36%**
Marketing / Advertising / Outreach Costs			
Advertising		$5,712	2%
Translating Brochures into Spanish		$320	Less than 1%
Labor		$7,200	2%
Web Server Software (Automata)		$8,400	3%
Total Marketing / Advertising / Outreach Costs		**$21,632**	**7%**
Evaluation, Measurement and Verification Costs			
Labor		$12,614	4%
Benefits		$710	less than 1%
Travel / Conference / Training		$403	less than 1%
Overhead and General and Administrative Costs		$4,742	1%
Profit		$1,267	Less than 1%
Estimated costs for the central monitoring PC server (APT)		$10,400	3%
Total Evaluation, Measurement, and Verification Costs		**$30,136**	**9%**
Other Budget Items		**$1709**	**1%**
Budget Grand Total (Southern California Edison)		**$321,727**	

Information Program Element
The first line item in the budget summary is required for on-farm use to receive the benefits demonstrated by this project. This is not set aside for information decimation. A portion of the budget is available to make the information readily available to growers, project administrators, financers, etc who are monitoring the project. The cost is mostly used for putting the information on the web site. About 9% of the budget is set aside for an information program element. Automata, Inc. has included our Web Server Software and would like to note that this software is not essential in the farm operation; it is used for the purpose of project supervision. This software allows any interested party as well as the grower to view the information from the Internet.

Discussion of budget line item details

Weather Station Site #1

	Description	Cost
Dual MINI	Dual Mini Field Station with Spread Spectrum Radio. Includes: Loop Antenna 8 analog inputs 4 digital inputs 4 controls	$1999.00
AMC Chassis	Gives capability of manually overriding the computer control and gives a visual ON/OFF indicator.	$213.00
Latching Solenoid Drive	Low Power Consumption	$312.00
Rain Gauge	8.8” tipping bucket rain gauge with 25’ of cable.	$250.00
2-AQUA-TEL TDR	Soil moisture sensor with 10’ cable.	$198.00
AD592-Air	Air temperature sensor with 25’ cable	$50.00
H50	Relative Humidity Sensor	$295.00
SUNBLOCK	Radiation Shield	$133.00
LI-200SZ=3S	Solar Radiation Sensor	$449.00
200WSD	Wind speed and direction sensor.	$457.00
WIND-COMP	Computes wind speed and wind run from frequency sensor.	$130.00
SOLCHGR-12-1200	Solar Panel, 1200mA with 15’ cable. Deep cycle battery included.	$425.00
Tower	2” pipe 20’ long	$80.00
Total cost for each Weather Station		**$4,991.00**

Pump Station Site #2

Dual MINI	Dual Mini Field Station with Spread Spectrum Radio. Includes: Loop Antenna 8 analog inputs 4 digital inputs 8 controls monitor kWh	$2399.00
AMC Chassis	Gives capability of manually overriding the computer control and gives a visual ON/OFF indicator.	$284.00
REL280-4A-4	Relay Board + four 24-280VAC 4 amp relays	$194.00
Vortflow	Insertion type Vortex Flow Meter with display	$930.00
FLOW-COMP	Computes flow rate and totalized flow from a frequency flow meter.	$130.00
2 - STI-psi	Stainless Steel Pressure transducer.	$390.00
AC-CHGR-12-360	AC Battery Charger, 360mA	$45.00
2-AQUA-TEL TDR	Soil moisture sensor with 10' cable.	$198.00
Tower	2" pipe 20' long	$80.00
Total for each Pump Station		**$4,650.00**

MINI Field Station Site 3 & 4

2-MINI Field Stations	MINI Field Station with Spread Spectrum. Includes: Loop Antenna 4 analog inputs 4 digital inputs 4 controls	$2398.00
2-AMC Chassis	Gives capability of manually overriding the computer control and gives a visual ON/OFF indicator.	$426.00
2-Latching Solenoid Drive	Low Power Consumption	$624.00
2-AQUA-TEL TDR	Soil moisture sensor with 10' cable.	$594.00
2-SOLCHGR-12-1200	Solar Panel, 1200mA with 15' cable. Deep cycle battery	$850.00

	included.	
Total for each set of Monitoring Stations		**$4,892.00**

Equipment/Software that will be needed in excess of above units:

Cable	Sensor cable 1000’	$1500.00
Web Server	Software	$21,000.00
Total		**$22,500.00**

Base Station

Base Station	MINI Base Station with Spread Spectrum Radio. Includes: Loop Antenna Battery 15’ cable	$750.00
AC-CHGR-12-360	AC Battery Charger, 360mA	$45.00
Antenna	OMNI	$237.00
Field Commander	Automatically controls an irrigation system and collects data for irrigation scheduling and other purposes.	$1800.00
Extended Controls Software	A situational, modular addition for us in Field Commander Software.	$250.00
Evapotranspiration Software	Computes ET for irrigation scheduling based on solar radiation, air temperature, humidity and wind speed.	$99.00
Pager Software	Dials pager on high and low level alarms and reports failures.	$200.00
Laplink	Commercially available technical support software.	$225.00
3-Way Port Expander		$80.00
Device Server	Internet Embedded Controller	$426.80
Total for Base Station		**$4,112.80**

Equipment provided by Applied Power Technologies (APT)

Item Description	**Qty**	**Unit Price**	**Ext Price**
ION 7330 meter with communications and four digital inputs and four digital outputs	1	$1200	$1200

Three Current Transformers (CTs) rated between 50A and 400A	3	$30	$90
Weather-tight enclosure located at the pump site	1	$750	$750
APT commissioning labor hours for each enclosure before shipment	2	$150	$300
Field Installation labor hours for each meter enclosure and CTs at pump site *	4	$75	$300
Total			**$2,640.00**

* Note that the field installation labor costs are not included in APT's summarized cost of this project. If required, these labor hours can be rolled up under APT assuming a reasonable labor rate markup.

Estimated costs for the central monitoring PC server:

Item Description	**Qty**	**Unit Price**	**Ext Price**
APT purchased and provided central monitoring PC server	1	$3500	$3500
ION Enterprise software licensed for up to 15 monitored devices	1	$4500	$4500
APT software development labor allowance – total for all 15 pilot sites	80	$150	$12000
APT project management and administrative support	40	$150	$6000
Total			**$26,000.00**

This cost would be spread across all 6 meters in the 6 pilot project sites on a per unit basis.

Conclusion

In conclusion, Automata, Inc. and its subcontractors are uniquely experience to provide the technology to monitor the moisture requirements for agriculture. By providing only the moisture that is required to irrigate crops, growers will save on energy for pumping water. In addition, this equipment provides the ability to control irrigation times, therefore shifting the load to mid-peak and off-peak hours. The purpose of these pilot programs is to educate the growers to the benefits of using this technology to help control their energy and water use.

Appendix – Energy Saving Calculations

Based on a 35 HP motor, the 15% energy savings plus the shifting from 12 hours on-peak to 8 hours off-peak + 4 hours on-peak = an annual savings of $10,158/year per pilot program. Total cost per installation is $25,169.

Pay back period for the entire system = $25,169 / $10,158 = 2.4 years.

SCE TERRITORY SAVINGS (SP-15)

Assumptions: Operating 6 AM to 6 PM = 12 Hours On-Peak

	Motor Size (HP)	Demand (KW)	Energy (KWhr)	Energy Savings	Example of Rates	On-Peak Energy $	Off-Peak Energy $	TOTAL Energy $	Savings Energy $
	15	11.175	26820	4023	AG-5A,D	0.27408	0.08396	$ 7,351	$ 1,103
	25	18.625	44700	6705	AG-5A,D	0.27408	0.08396	$ 12,251	$ 1,838
used this	35	26.075	62580	9387	AG-5A,D	0.27408	0.08396	$ 17,152	$ 2,573
	45	33.525	80460	12069	AG-5B,C,E,F	0.17247	0.07041	$ 13,877	$ 2,082
	55	40.975	98340	14751	AG-5B,C,E,F	0.17247	0.07041	$ 16,961	$ 2,544
	65	48.425	116220	17433	AG-5B,C,E,F	0.17247	0.07041	$ 20,044	$ 3,007
	75	55.875	134100	20115	AG-5B,C,E,F	0.17247	0.07041	$ 23,128	$ 3,469
	85	63.325	151980	22797	AG-5B,C,E,F	0.17247	0.07041	$ 26,212	$ 3,932
	95	70.775	169860	25479	AG-5B,C,E,F	0.17247	0.07041	$ 29,296	$ 4,394
	105	78.225	187740	28161	AG-5B,C,E,F	0.17247	0.07041	$ 32,380	$ 4,857
								annual	annual

* assumed 12 hrs per day for 200 days

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Assumptions Shift operations to 6PM to 6AM (8 hours Off-peak and 4 hours on-peak)	Motor Size (HP)	Demand (KW)	Energy (KWhr)	Energy Savings	Rates	On-Peak Energy $	Off-Peak Energy $	TOTAL Energy $	Savings Energy $	Savings Shifting $	Total Savings Energy + Shifting $
	15	11.175	26820	4023	AG-5A,D	0.27408	0.08396	3,527	529	3,824	4,353
	25	18.625	44700	6705	AG-5A,D	0.27408	0.08396	5,878	882	6,374	7,255
used this	35	26.075	62580	9387	AG-5A,D	0.27408	0.08396	8,229	1,234	8,923	10,158
	45	33.525	80460	12069	AG-5B,C,E,F	0.17247	0.07041	7,718	1,158	6,159	7,317
	55	40.975	98340	14751	AG-5B,C,E,F	0.17247	0.07041	9,433	1,415	7,527	8,942
	65	48.425	116220	17433	AG-5B,C,E,F	0.17247	0.07041	11,148	1,672	8,896	10,568
	75	55.875	134100	20115	AG-5B,C,E,F	0.17247	0.07041	12,864	1,930	10,265	12,194
	85	63.325	151980	22797	AG-5B,C,E,F	0.17247	0.07041	14,579	2,187	11,633	13,820
	95	70.775	169860	25479	AG-5B,C,E,F	0.17247	0.07041	16,294	2,444	13,002	15,446
	105	78.225	187740	28161	AG-5B,C,E,F	0.17247	0.07041	18,009 annual	2,701 annual	14,371 annual	17,072 annual

* assumed 12 hrs per day for 200 days

Annual Summary for this Proposal		KWH	KWH	
	6			
35 HP	**Installations**	**375,480**	**56,322**	**$ 60,945**