

**2010-11 Grant Proposal Solicitation  
Air Quality Improvement Program (AQIP)  
Final Report**

**Advanced Technology Demonstration Project:  
Cordless Zero-Emission Commercial  
Lawn and Garden Equipment**

**Mobile Source Control Division  
California Air Resources Board  
March 26, 2013**

**Mojave Desert Air Quality Management District  
14306 Park Avenue  
Victorville, CA 92392**

## Project Summary

Name of Applicant: Mojave Desert Air Quality Management District (MDAQMD)

Project Director/Principal Investigator: Alan J. DeSalvio

Project Title: Can Green Take the Heat?: *Evaluating the Use of Cordless Zero-Emission Commercial Lawn and Garden Equipment in the Extreme Climate of the Mojave Desert*

Objectives of the Project: The Mojave Desert region is classified as an “Extreme Climate” with hot and windy components. The objective of our project was to determine whether these climate extremes would significantly impact the operation of zero-emission commercial lawn and garden equipment within the MDAQMD. **Conclusion: Emphasis was shifted to concentrate on the Heat component of our extreme weather. We felt it was too difficult, out in the field, to accurately measure the impact of wind on the products being tested.**

Description of the Project: The MDAQMD partnered with local professional landscapers (i.e. government agencies) to test various types of lawn and garden equipment. Landscapers documented the operation of this equipment under the following conditions: extreme heat (90° and above). **Conclusion: As stated above, we determined that accurately measuring the wind would be too difficult in the testing field. After discussion with equipment providers, we learned that the impact of the heat was their primary interest in this project.**

Methods to be employed: Equipment was distributed to participating agency personnel, along with Evaluation Survey. Survey was to be completed weekly and returned to MDAQMD one time for every one month period to document performance of equipment in field. Factors evaluated were to include daily temperature(s), wind factor, length of daily use and length of daily charge, type of plant material equipment used on, ease of use, maintenance and problems/solutions. **Conclusion: Once the form was developed, it became clear that completing the form weekly was too onerous for the field personnel. Therefore, in conjunction with ARB and our demonstration partners, we determined that the survey forms would be taken for the first week of each of the test months (July, August and September.) July was moved to the second week due to the shortened holiday work week. Wind Factor was removed from the criteria.**

Potential Benefits and Outcomes: Testing the equipment in the MDAQMD provided a benefit to the equipment partner that does not exist in other parts of California. The extreme climate of the MDAQMD cannot be duplicated in other APCD's. This test allowed the manufacturer to receive performance data that cannot be replicated in California, but may be applicable to other parts of the country and/or other countries. Knowing how the equipment performs in our climate provides the manufacturer with knowledge that can be useful elsewhere. **Conclusion: Review of the Survey Forms completed does, as suspected, indicate that the heat has a significant impact on**

the performance of the equipment. The majority of temperatures reported on the Survey Forms were above 90° and often over 100°. Temperatures of this extreme occur occasionally in other air pollution control districts within California, but are not found in other areas of California on a daily basis. After sharing our initial findings with them, ARB Staff asked that we speak with other APCDs preparing to conduct their AQIP Projects and share our outcomes with them for use in developing their own test processes.

Major Participants: MDAQMD and City of Victorville, CA Public Works Department Landscape Maintenance Districts and Parks Operations (CITY) was selected for the initial phase of project. Other agencies were to be added at later phases as additional cordless zero-emission equipment becomes available and the use of the equipment is at capacity within the City of Victorville staff. **Conclusion: Once we met with the technology partners, it became clear that they had proprietary concerns that would prevent us from testing two different brands of equipment with the same technology demonstrator. Therefore, MDAQMD Staff contacted the Hesperia Parks and Recreation Department and they agreed to join our project. The City of Victorville Public Works Department tested Stanley, Black and Decker (SBD) equipment and Hesperia Parks tested Stihl (STIHL) equipment. Both agencies tested the MTD Riding Mower.**

Requested Funding Amount: \$15,000

District Match: \$20,000 Total - \$15,000 Cash and \$5,000 In-Kind Funds

## **Project Narrative**

Name of Applicant: Mojave Desert Air Quality Management District (MDAQMD)

Project Title: Can Green Take the Heat?: *Evaluating the Use of Cordless Zero-Emission Commercial Lawn and Garden Equipment in the Extreme Climate of the Mojave Desert*

Industry Partner: City of Victorville, CA Public Works Department Landscape Maintenance Districts and Parks Operations

Technology Demonstrator: To Be Identified. MDAQMD feels confident that a technology demonstrator can be found, based upon our successful implementation of our residential LGER Program.

Requested Funding Amount: \$15,000

### **Narrative:**

#### **Relevance to the Solicitation Objective and Potential Emission Reduction Benefits**

The Mojave Desert region is classified as an “Extreme Climate” (Köppen-Geiger Climate ID) with hot and windy components. Köppen-Geiger defines our area as *BWh: a dry desert with annual average temperature of greater than 64.4 degrees F*. The objective of our project was to determine whether these climate extremes would significantly impact the operation of zero-emission commercial lawn and garden equipment within the MDAQMD. When developing and deploying advanced technologies to meet California’s longer-term, post 2020 air quality goals, it is necessary to test the equipment in all areas of the state, due to the diversity of climates within. Staff believed that the Mojave Desert portion of the MDAQMD jurisdiction provides the only area within the State where the test equipment can be tested for extreme heat and wind conditions. MDAQMD is non-attainment for PM10 and PM 2.5. Staff believed that the winds which accompany the high heat of the desert could result in abrasive particulate matter (dust) which may impact the operation of the equipment. Batteries, by their operational design, use outside air to cool. Staff surmised that the extreme temperature of the ambient air used to cool the batteries during operation may cause the batteries to malfunction and overheat. **Conclusion: Heat had a significant impact on the length of time that the battery held the charge, often reducing the time by 50% or more from the manufacturer’s recommendation. As outlined above, wind was not studied in this test.**

Funding the MDAQMD demonstration project will meet the goals of the ARB to fund an emerging strategy that has the potential to provide real and surplus cost effective emission reductions. The MDAQMD already participates in the Carl Moyer program and the LGER Program. Our District is not eligible for Prop 1B funding. Therefore, District participation in this AQIP program will add to our arsenal of current programs

already designed to provide real and surplus cost effective emission reductions in criteria and toxic air pollutants. As a District of non-attainment for several pollutants, the MDAQMD welcomes this opportunity to demonstrate equipment which may accelerate implementation of new cleaner technologies in the cordless zero-emission commercial lawn and garden equipment sector. **Conclusion: The equipment tested was not capable of meeting the tasks required for use in a commercial setting. Demonstrators reported problems with the length of time the battery would hold a charge and the frequency with which they were required to change batteries because of this. There was a significant negative impact on their work schedule from the use of the equipment. At one point, workers with the City of Victorville were threatening to stop using the SBD equipment due to its poor performance. Demonstrators indicated that the equipment was not heavy duty enough to perform the tasks required in a commercial landscape setting. The only positive reported was the quiet operating sound and the fact that the equipment weighed less than the traditional powered equipment they normally used.**

Cordless zero-emission commercial lawn and garden equipment is not readily available in today's marketplace. Our demonstration project involved testing of zero-emission cordless equipment by professional landscapers employed by the City of Victorville, CA and the Hesperia, CA Parks Department. These staff members use gasoline powered equipment on a daily basis to perform landscape maintenance in median strips, parks, along sidewalks and in other common areas of the community. MDAQMD replaced the gas-powered equipment currently being used with cordless zero-emission equipment for the duration of the demonstration period, thereby providing immediate reductions of criteria pollutant and greenhouse gas emissions. At the end of the test period, demonstrators were given the equipment for their continued use. With a positive testing result MDAQMD was hopeful that, in the future, the demonstrators will choose to replace all of their gas-powered lawn and garden equipment with cordless zero-emission technology. **Conclusion: We determined that "commercial" equipment would be that equipment that was capable of performing for extended periods of time for a project that would be above and beyond what would be used in a residential setting. Zero-emission cordless equipment to meet this specification (as manufactured) does not exist in today's marketplace. Therefore, we tested the only equipment available: zero-emission cordless equipment designed for residential use. This equipment was used on a daily basis which temporarily reduced the amount of pollution by replacing the normally operated gas powered equipment. At the end of the project, the equipment was fully depreciated by the MDAQMD and given to the demonstrators in September 2012. At this point, several of the pieces of the SBD equipment were no longer operable. The majority of the STIHL equipment is operable. In speaking with the field supervisors for both demonstrators, MDAQMD Staff learned that their plans are to mothball the cordless equipment and only use it when their gas powered equipment is not available. Note: While the AQIP was initially supposed to be conducted over a two year period, our testing needed to occur during the hot summer months. Therefore, with ARB approval, the summer of 2012 was selected in order to meet AQIP Program deadlines. Due to the poor performance**

**of the tested equipment, it is very clear that the equipment would not have lasted for an extended test period.**

Commercial small off-road engines (SORE) (i.e. lawn and garden equipment) represent only 10% of the population and yet contribute 70% of SORE emissions. Reducing the number of small off-road engines through the use of innovative technology will help California achieve its air quality goals by significantly reducing criteria pollutant and greenhouse gas emissions. Funding an in-use demonstration program will allow operators to gain hands-on experience without an expensive risk. Buying down the current price of the equipment will accelerate sales of this new technology by offsetting some of the higher costs associated with bringing new technologies to the marketplace.

The estimated cost effectiveness of the technology in dollars per ton of criteria pollutant reduced is \$19,384, using the current Carl Moyer Program cost effectiveness methodology. Please See Potential Emission Reduction Benefits Sheet Attached.

**Conclusion: Even when provided the equipment free of charge, technology demonstrators in this project have indicated that they will return to the original gas powered equipment they previously used. Performance issues with the equipment prevent the demonstrators from meeting their work schedule when using the zero-emission cordless equipment used in this project.**

Match Funding and Financial Capabilities: The MDAQMD has requested funding in the amount of \$15,000 from ARB. On May 23, 2011, the Governing Board of the MDAQMD approved a District Match of \$20,000 Total: \$15,000 Cash and \$5,000 In-Kind Funds in the form of Administrative Support Services. The Board Resolution was in place prior to the June 22, 2011 deadline in the grant requirements. The MDAQMD Match exceeds the 50% requirement for this Grant Solicitation. No grant funding will be dependent on any other solicitation.

Additionally, the City of Victorville has committed its personnel to safely operate and maintain this equipment on a regular basis in order to test the equipment on a year round basis. The equipment operators and their supervisors have also pledged to complete the weekly evaluations of the equipment and to return those evaluations once each month.

**Please See Attached Budget.**

**Please See Letter of Commitment from Industry Partner – City of Victorville, CA**

#### Project Objective and Work Plan

The residential LGER Program conducted by the MDAQMD has been very successful in bringing cordless zero-emission equipment to the residents of our area. In 2010, the program distributed 100 mowers. In 2011, the MDAQMD conducted a direct exchange event where 335 mowers were distributed. The significant increase in the size of the program demonstrates that there is an interest in cordless zero-emission lawn and

garden equipment within the District and that District staff is capable of securing a manufacturer to partner with us in projects similar to the demonstration project under consideration. Due to the short time frame associated with the release and deadline for the AQIP Demonstration Grant, District Staff has been unable to identify a technology demonstrator for our project. Based upon our past success with our residential Lawn and Garden Equipment Program, MDAQMD is confident of our ability to engage a technology demonstrator for this project in a timely manner. **Conclusion: MDAQMD was unable to locate a vendor of commercial zero-emission cordless electric equipment for this project and we do not believe such (commercial) equipment exists. As stated above, we used residential grade equipment which proved unable to perform in a commercial setting.**

#### Specific Goals

- Evaluate performance of equipment in field.
- Evaluate effects of heat on equipment.
- Evaluate effects of wind on equipment.
- Evaluate ease of operation, maintenance required and ability to retain charge.

#### Tasks

Phase 1: Apply for and receive grant. Sign agreement and return Board resolution. **Completed.**

Phase 2: Research Technology Demonstrator. Select Technology Demonstrator. Prepare MOU with industry partner, City of Victorville, CA.

*NOTE: Demonstration of Equipment will be conducted in 3 Phases in order to allow technology demonstrator the time needed to develop equipment. As equipment becomes available it will be added to project schedule.*

**Conclusion: Added Hesperia Parks Department due to proprietary concerns of equipment vendors. MOUs signed with both partners.**

Phase 3: Order Equipment for First Stage of Demonstration. Instruct operators and begin using equipment in field. The collection of the first data will begin. Six months after initial start, an interim report will be given to ARB.

**Initial report completed and submitted with first Request for Disbursement in August 2012.**

Phase 4: Order Equipment for Second Stage of Demonstration. Instruct operators and begin using equipment in field. The collection of the second data will begin. Six months after initial start, an interim report will be given to ARB. **All equipment was ordered at beginning of project, therefore eliminating this phase.**

Phase 5: Order Equipment for Third Stage of Demonstration. Instruct operators and begin using equipment in field. The collection of the third data will begin. Six months

after initial start, an interim report will be given to ARB. **All equipment was ordered at beginning of project, therefore eliminating this phase.**

Phase 6: The compilation of the entire project data will begin. Three months after collection of the final data, a final report will be given to ARB. **Final Report delayed 30 days for equipment usage download by SBD.**

Quantitative Milestones

	Start Date	Scheduled Completion Date	Actual Completion Date	Interim Report to ARB
Apply for Grant	4/11/2011	5/11/2011	5/11/2011	
Grantee Selected	5/11/2011	5/27/2011		
Signed Agreement/Resolution Returned	5/27/2011	6/22/2011		
Research Technology Demonstrator	7/1/2011	8/1/2011		
Select Technology Demonstrator	8/10/2011	8/30/2011		
MOU w/ Victorville	5/27/2011	6/22/2011		
Order 1st Equipment:Train	9/6/2011	9/20/2011		
1st Data Collection Begins	10/01/11	3/30/2012		5/12/2011
Order 2nd Equipment:Train	2/1/2012	2/28/2012		
2nd Data Collection Begins	3/1/2012	3/30/2013		11/1/2012
Order 3rd Equipment:Train	9/1/2012	3/30/2013		
3rd Data Collection Begins	10/1/2012	3/30/2013		5/1/2013
Final Report to ARB	4/1/2013	6/1/2013		

**This project was conducted over three months during the summer of 2012. Draft Final Report was available in November 2012. Final report was delayed until March 2013 to allow SBD to download their equipment usage data from the demonstration equipment.**

Test Sites, Data Collected and Test Methods

The Test Site will include the Public Works and Parks Operations and Maintenance Facilities for the City of Victorville, CA. Data will be collected by CITY employees using a weekly evaluation form which they will complete. The forms will be sent to the MDAQMD on a monthly basis for analysis. The Test Method will be actual field use following manufacturer’s recommendations and instructions.

If needed during the course of testing, MDAQMD will enlist additional area municipalities to implement the testing on a scale equivalent to the funding requested. The number of municipal participants will be based upon the number of pieces of equipment to be tested. The goal of the MDAQMD will be to ensure that all equipment is being tested on a daily basis in order to fully evaluate the equipment performance and attain the maximum amount of emissions reductions possible.

**The Hesperia Parks Department also participated in this project. Both demonstration partners completed the same survey forms and returned them to the MDAQMD as scheduled.**

### Budget and Source of Funding

Equipment Purchase of \$15,000 will be funded by AQIP Demonstration Grant Funds with 50% (\$15,000) matching funds from MDAQMD for total equipment funds of \$30,000. MDAQMD will provide in-kind funds in the form of administrative support, totally an additional \$5,000.

CITY will provide staff time as need to perform field testing and preventive maintenance; and prepare and submit evaluation forms.

### Technology and Innovation

Zero-emission lawn and garden equipment has advanced considerably since the days when use of that equipment often involved the limitations of the electric extension cord available. Today, cordless zero-emission *residential* lawn and garden equipment is readily available and more widely used than previously. Commercial cordless zero-emission lawn and garden equipment however, is not widely available.

Whereas residential equipment has limited use, perhaps mowing the lawn and leaf blowing once each week; commercial equipment endures much heavier usage, sometimes eight hours per day. In order to make commercial equipment viable, manufacturers have had to become technology innovators. The use of multiple technologies with one piece of equipment, for example: Husqvarna's combination battery/solar powered mower, is just one way that manufacturers are addressing the need for zero-emission commercial equipment.

Limited battery life (per charge) has been an issue that has limited the introduction of commercial cordless equipment. Most equipment is handheld by the operator. Therefore, increasing the size of batteries makes operating equipment impractical due to weight. Batteries become hot during operation, they become hotter under an increased and continual load. Sometimes, fans are used to cool batteries, however, the addition of a fan to zero-emission commercial equipment will add to the weight. Most equipment then, relies upon the circulation of outside air to cool the battery and allow it to continue to operate effectively. The demonstration project proposed by the MDAQMD would test whether the extreme ambient air temperature of our area would impede the proper operation of the commercial battery. District Staff is hopeful that improved battery technology combined with the use of renewable energy (solar) has created viable commercial zero-emission equipment which will operate effectively when tested in extreme climate areas such as ours. Demonstration projects such as ours can assist manufacturers in pushing commercial equipment closer to the marketplace.

Legislative actions in California continue to push manufacturers toward finding a viable solution to the demand for "green" technology in the commercial cordless zero-emission field. As California is a major marketplace for lawn and garden equipment, the economics of pursuing green technology motivates manufacturers to innovate.

The MDAQMD firmly believes that as these innovations in battery technology for commercial equipment evolve, it will be of critical importance that the equipment be field tested in an “extreme climate” such as ours.

**Conclusion: As hypothesized above, “limited battery life” was a major issue in this test. It was very apparent from the start that the actual time that the battery operated was much less than the suggested battery operating time listed by both manufacturers, SBD and STIHL. When MTD Mowers (riding mower) was added to the test in July 2012, the mower battery life proved to be the same as the manufacturer promised. The problem with the MTD Mower however was the practicality of using it in a commercial setting, for ex.: the mower would need to be ridden (or towed) to various parks for mowing. The time and distance that it took to get the mower to more than one location used so much battery life that there was not enough left to complete the mowing. Towing the mower defeats the purpose of having a zero-emission cordless mower.**

**It is our belief that, while manufacturers are being pushed toward finding a viable solution to the demand for green technology in the field of zero-emission cordless commercial lawn and garden equipment, there currently exists no such equipment. Staff firmly believes that any effort to mandate the use of zero emission cordless commercial lawn and garden equipment will be futile. Without the technology to support the use of such equipment in the commercial field, introducing a mandate would be detrimental to those who are voluntarily attempting to reduce their use of gasoline powered equipment.**

#### Potential for Market Penetration and Commercialization of the Technology

The target market for this project would be communities located within the MDAQMD, a District which is classified as having “extreme climate” conditions. The targeted industries within the MDAQMD would include commercial and professional landscapers and landscape maintenance personnel.

For purposes of a control group, the CITY was selected to test the equipment because MDAQMD staff felt that their personnel could be relied upon to:

- safely operate the equipment to the manufacturer’s specifications
- perform regular maintenance on the equipment
- retain the equipment for the duration of the project
- accurately record and report their evaluation of the equipment

While the Mojave Desert setting of the MDAQMD is classified as an “extreme climate,” it is not the only area to have this designation. A similar climate to that of the MDAQMD test area can also be found in certain portions of Texas, Arizona, New Mexico and the Greater Southwestern United States, as well as parts of Oklahoma. Once the test equipment has met the rigors of the MDAQMD, it would be safe to say that it could be operated anywhere where temperatures are more extreme.

**Conclusion: City and Parks staff met all requirements placed on them for the course of this project and they are to be commended for staying the course even after the equipment proved unable to meet their operational requirements. As MDAQMD Staff suggested, this equipment, when operated in other parts of the country with similar climate as our District would have the same result, unfortunately, this result is not good or as hoped for initially.**

#### Environmental Justice

In the proposed project, CITY personnel will operate the test equipment in the landscape medians and other common greenspaces surrounding local housing tracts. These tracts are most likely to be ones designed to attract young families and/or seniors for their livability (maintained greenspaces, close proximity to services).

In this project, the professional landscapers testing the equipment will operate their zero-emissions equipment in close proximity to housing without adversely impacting at risk populations (children/elderly.) Demonstrating the ease with which this equipment can be operated will encourage landscape professionals working in the area to try the equipment and get rid of their old, polluting equipment. Maintaining median strips and parks in areas with a high population of seniors and children will demonstrate that this equipment is viable for use in caring for residential landscaping. During the demonstration project, actual emissions in environmental justice areas will be reduced for a period up to two years.

**Conclusion: Use of this equipment resulted in emission reduction for a period of 3 months. Emissions and noise pollution in residential areas, as well as parks were reduced, however, the operational failure of this equipment results in it's discontinued use, with a return to the use of gas powered equipment with associated emissions and noise.**

#### Project Team Capabilities and Degree of Industry Collaboration

The MDAQMD has a dedicated grant staff experienced in implementing and administering this and similar programs. Such programs include the Mobile Emission Reduction Program, Lower Emissions School Bus Replacement Program, and the successful implementation of 12 rounds of the Carl Moyer Program. The District's Moyer Program was audited by CARB in 2009 and results of the audit were positive. MDAQMD staff has successfully met the stringent criteria of the Carl Moyer Program and Staff feels fully qualified to tackle the AQIP guidelines and hence, implement and administer a strong LGER program which meets all State requirements. Qualifications of key personnel are outlined below:

Alan J. DeSalvio: Supervising Air Quality Engineer. Mr. DeSalvio has 20 years experience administering air quality programs for the MDAQMD. He has extensive experience in quantifying emissions reductions.

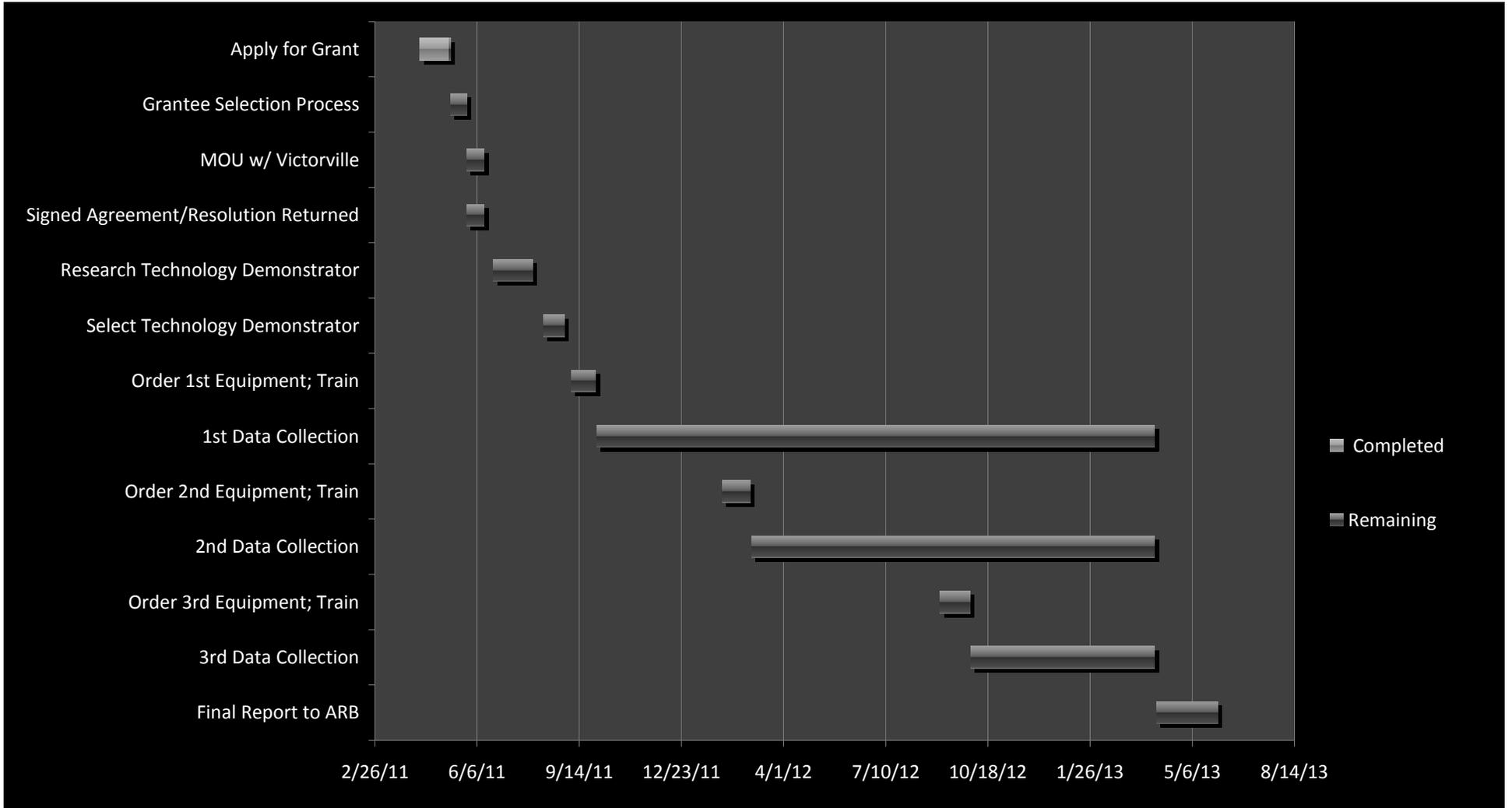
Holly Noel: Air Quality Specialist/Grants Programs Coordinator. Ms. Noel has a Master of Public Administration degree and approximately 15 years experience in program

administration. She implemented a large community based water conservation demonstration program for the Mesa Consolidated Water District (Costa Mesa) and currently coordinates the MDAQMD LGER, AB 2766 and Carl Moyer Programs. She has extensive community outreach and public affairs experience. Ms. Noel will be responsible for day to day operations of the project.

City of Victorville, CA Public Works Department Landscape Maintenance Districts and Parks Operations (CITY): Personnel include professional landscape and maintenance personnel, engineers and public administrators. The CITY has successfully participated in several MDAQMD Carl Moyer Projects. A senior staffer with the CITY will coordinate their participation in the program.

**Hesperia Parks Department, Hesperia, CA: Personnel include professional landscape and maintenance personnel, and public administrators. A senior staffer with the PARKS coordinated their participation in the program.**

**Table 1 - Timeline for Completion**



**PROPOSED BUDGET**

<u>DIRECT LABOR</u>	<u>HOURS</u>	<u>RATE</u>	<u>TOTAL</u>	<u>IN-KIND</u>	<u>MATCH</u>
(AJD) SAQE	4	@	\$76.73	\$306.92	\$
(HN) AQS/Grants	90	@	\$44.32	\$3944.48	\$
(SK) Adm Svcs Mgr	4	@	\$66.55	\$266.20	
(MP) Fiscal Analys	4	@	\$37.35	\$149.40	\$
(MZ) IS Speclst	2	@	\$40.52	\$81.04	\$
(VR) CRE Mgr	4	@	\$59.24	\$236.96	\$
			<b>TOTAL \$</b>	<b>\$4985</b>	

PARTNER(S)/SUBCONTRACTOR(S) COST ITEMIZED

INDIRECT COSTS (OVERHEAD AND FRINGE BENEFITS)

Overhead Rate	N/A	\$
Fringe Benefits	N/A	\$
		<b>TOTAL \$</b>

DIRECT COSTS (EXCEPT LABOR)

Travel Costs	N/A	\$
Equipment and Supplies (Itemized)	\$15,000	\$
Other Direct Costs (Itemized)	N/A	\$

TOTAL COSTS

TOTAL EQUIPMENT FUNDS REQUESTED

\$15,000

TOTAL ADMINISTRATIVE FUNDS REQUESTED\*

\$None

ONE TO ONE MATCH

<b>SOURCE</b>	<b>MDAQMD AQIP DEMO 2011 Project</b>	<b>AMOUNT</b>	<b>\$15,000</b>
In-Kind Contribution: MDAQMD, Admin Costs 2011 LGER Project			

**AQIP Demonstration Project Cost Effectiveness - MDAQMD**

Equip	Predicted		Monthly					Emission Factors (gm/kW-hr)			Baseline Em (lbs/month)		Replace Em (lbs/month)		Weighted Surplus (lbs/mo)
	Unit Cost	Engine Type	hp	kW	# of Equip	Activity	Load	HC+NOx	PM10	HC+NOx	PM10	HC+NOx	PM10		
Ride Mower	2500	4-stroke gas	20	27	2	30	0.36	10	0	12.8	0.0	0	0	12.8	
Push Mower	1000	4-stroke gas	4	5.4	2	30	0.36	10	0	2.6	0.0	0	0	2.6	
Leaf Blower	500	2-stroke gas	2	2.7	3	30	0.5	50	2	13.3	0.5	0	0	23.9	
Trimmer	500	2-stroke gas	1.5	2	3	15	0.5	50	2	5.0	0.2	0	0	9.0	

Phases	Cost \$	Use Duration months	Weighted Reductions tons
First Batch	10,000	17	0.41
Second Batch	10,000	12	0.29
Third Batch	10,000	5	0.12
	Actual Cost: 30,000		Annual Average: 0.41
	Incremental Cost: 15,000		
	Annualized Cost (2 year project): 7,950		
	Weighted Cost-Effectiveness (\$/ton): 19,384		

**CONCLUSION: SBD and STIHL equipment was purchased at beginning of project. MTD Riding Mower was purchased at the beginning of July 2012. Due to delivery difficulties with the MTD mower, it was not used during June or July in the City of Victorville.**

Equip	Predicted		Monthly					Emission Factors (gm/kW-hr)			Baseline Em (lbs/month)		Replace Em (lbs/month)	
	Unit Cost	Engine Type	hp	kW	# of Equip	Activity	Load	HC+NOx	PM10	HC+NOx	PM10	HC+NOx	PM10	
Ride Mower	2500	4-stroke gas	20	27	2	30	0.36	10	0	12.8	0.0	0	0	
Push Mower	1000	4-stroke gas	4	5.4	2	30	0.36	10	0	2.6	0.0	0	0	
Leaf Blower	500	2-stroke gas	2	2.7	3	30	0.5	50	2	13.3	0.5	0	0	
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AQIP APPLICATION

AND

AWARD

May 10, 2011

Ms. Grace Garcia  
Air Resources Board  
Mobile Source Control Division  
1001 I Street, P.O. Box 2815  
Sacramento, CA 95812

Re: Submission of 2010-11 Grant Proposal Solicitation – AQIP  
Advanced Technology Demonstration Project: Cordless Zero-Emission Commercial Lawn  
and Garden Equipment  
Application Package for the Mojave Desert Air Quality Management District

Dear Ms. Garcia:

Please find enclosed our application package for the 2010-11 Advanced Technology Demonstration Project: Cordless Zero-Emission Commercial Lawn and Garden Equipment as delineated in your Air Quality Improvement Program's grant proposal solicitation.

Pursuant to the requirements of the Grant Proposal Solicitation, we have enclosed four signed original sets of the application, one digital copy of the application, in PDF format on the enclosed CD. For the demonstration project we are requesting \$15,000 from AQIP and matching \$15,000. The entire \$30,000 will provide demonstration equipment. MDAQMD will contribute an additional \$5,000 in-kind toward administrative costs, thereby exceeding the required 50% match.

If you have any questions, please feel free to contact me at any time.

Sincerely,

Holly Noel  
Air Quality Specialist  
Grants Program Coordinator  
Mojave Desert Air Quality Management District  
(760) 245-1661 x1854  
[hnoel@mdaqmd.ca.gov](mailto:hnoel@mdaqmd.ca.gov)

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Air Quality Improvement Program (AQIP)**

**Advanced Technology Demonstration Project:  
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**Application Package for  
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Description of the Project: The MDAQMD will partner with local professional landscapers (i.e. government agencies) to test various types of lawn and garden equipment. Landscapers will document the operation of this equipment under the following conditions: extreme heat (90° and above) and wind (gusts of 30mph and above).

Methods to be employed: Equipment will be distributed to participating agency personnel, along with Evaluation Survey. Survey will need to be completed weekly and returned to MDAQMD one time for every one month period to document performance of equipment in field. Factors evaluated will include daily temperature(s), wind factor, length of daily use, length of daily charge, type of plant material equipment used on, ease of use, maintenance and problems/solutions.

Potential Benefits and Outcomes: Testing the equipment in the MDAQMD will provide a benefit to the equipment partner that does not exist in other parts of California. The extreme climate of the MDAQMD cannot be duplicated in other APCD's. This test allows the manufacturer to receive performance data that cannot be replicated in California, but may be applicable to other parts of the country and/or other countries. Knowing how the equipment performs in our climate will give the manufacturer learning that can be useful elsewhere.

Major Participants: MDAQMD and City of Victorville, CA Public Works Department Landscape Maintenance Districts and Parks Operations (CITY) for initial phase of project. Other agencies may be added at later phases as additional cordless zero-emission equipment becomes available and the use of the equipment is at capacity within the City of Victorville staff.

Requested Funding Amount: \$15,000

District Match: \$20,000 Total - \$15,000 Cash and \$5,000 In-Kind Funds

## **Project Narrative**

Name of Applicant: Mojave Desert Air Quality Management District (MDAQMD)

Project Title: Can Green Take the Heat?: *Evaluating the Use of Cordless Zero-Emission Commercial Lawn and Garden Equipment in the Extreme Climate of the Mojave Desert*

Industry Partner: City of Victorville, CA Public Works Department Landscape Maintenance Districts and Parks Operations

Technology Demonstrator: To Be Identified. MDAQMD feels confident that a technology demonstrator can be found, based upon our successful implementation of our residential LGER Program.

Requested Funding Amount: \$15,000

### **Narrative:**

#### Relevance to the Solicitation Objective and Potential Emission Reduction Benefits

The Mojave Desert region is classified as an “Extreme Climate” (Köppen-Geiger Climate ID) with hot and windy components. Köppen-Geiger defines our area as *BWh: a dry desert with annual average temperature of greater than 64.4 degrees F*. The objective of our project is to determine whether these climate extremes will significantly impact the operation of zero-emission commercial lawn and garden equipment within the MDAQMD. When developing and deploying advanced technologies to meet California’s longer-term, post 2020 air quality goals, it is necessary to test the equipment in all areas of the state, due to the diversity of climates within. Staff believes that the Mojave Desert portion of the MDAQMD jurisdiction provides the only area within the State where the test equipment can be tested for extreme heat and wind conditions. MDAQMD is non-attainment for PM10 and PM 2.5. Staff believes that the winds which accompany the high heat of the desert could result in abrasive particulate matter (dust) which may impact the operation of the equipment. Batteries, by their operational design, use outside air to cool. Staff surmises that the extreme temperature of the ambient air used to cool the batteries during operation may cause the batteries to malfunction and overheat.

Funding the MDAQMD demonstration project will meet the goals of the ARB to fund an emerging strategy that has the potential to provide real and surplus cost effective emission reductions. The MDAQMD already participates in the Carl Moyer program and the LGER Program. Our District is not eligible for Prop 1B funding. Therefore, District participation in this AQIP program will add to our arsenal of current programs already designed to provide real and surplus cost effective emission reductions in criteria and toxic air pollutants. As a District of non-attainment for several pollutants, the

MDAQMD welcomes this opportunity to demonstrate equipment which may accelerate implementation of new cleaner technologies in the cordless zero-emission commercial lawn and garden equipment sector.

Cordless zero-emission commercial lawn and garden equipment is not readily available in today's marketplace. Our demonstration project would involve testing of zero-emission cordless equipment by professional landscapers employed by the City of Victorville, CA. These CITY staff members use gasoline powered equipment on a daily basis to perform landscape maintenance in median strips, parks, along sidewalks and in other common areas of the community. MDAQMD will replace the gas-powered equipment currently being used with cordless zero-emission equipment for the duration of the two year demonstration period, thereby providing immediate reductions of criteria pollutant and greenhouse gas emissions. At the end of the test period, CITY will be offered an opportunity to purchase the test equipment at a greatly reduced cost. With a positive testing result MDAQMD is hopeful that, in the future, the CITY will choose to replace all of their gas-powered lawn and garden equipment with cordless zero-emission technology. If needed during the course of testing, MDAQMD will enlist additional area municipalities to implement the testing on a scale equivalent to the funding requested.

Commercial small off-road engines (SORE) (i.e. lawn and garden equipment) represent only 10% of the population and yet contribute 70% of SORE emissions. Reducing the number of small off-road engines through the use of innovative technology will help California achieve its air quality goals by significantly reducing criteria pollutant and greenhouse gas emissions. Funding an in-use demonstration program will allow operators to gain hands-on experience without an expensive risk. Buying down the current price of the equipment will accelerate sales of this new technology by offsetting some of the higher costs associated with bringing new technologies to the marketplace.

The estimated cost effectiveness of the technology in dollars per ton of criteria pollutant reduced is \$19,384, using the current Carl Moyer Program cost effectiveness methodology. Please See Potential Emission Reduction Benefits Sheet Attached.

Match Funding and Financial Capabilities: The MDAQMD has requested funding in the amount of \$15,000 from ARB. On May 23, 2011, the Governing Board of the MDAQMD is expected to approve a District Match of \$20,000 Total: \$15,000 Cash and \$5,000 In-Kind Funds in the form of Administrative Support Services. The Board Resolution will be in place prior to the June 22, 2011 deadline in the grant requirements. The MDAQMD Match exceeds the 50% requirement for this Grant Solicitation. No grant funding will be dependent on any other solicitation.

Additionally, the City of Victorville has committed its personnel to safely operate and maintain this equipment on a regular basis in order to test the equipment on a year round basis. The equipment operators and their supervisors have also pledged to

complete the weekly evaluations of the equipment and to return those evaluations once each month.

**Please See Attached Budget.**

**Please See Letter of Commitment from Industry Partner – City of Victorville, CA**

### Project Objective and Work Plan

The residential LGER Program conducted by the MDAQMD has been very successful in bringing cordless zero-emission equipment to the residents of our area. In 2010, the program distributed 100 mowers. In 2011, the MDAQMD conducted a direct exchange event where 335 mowers were distributed. The significant increase in the size of the program demonstrates that there is an interest in cordless zero-emission lawn and garden equipment within the District and that District staff is capable of securing a manufacturer to partner with us in projects similar to the demonstration project under consideration. Due to the short time frame associated with the release and deadline for the AQIP Demonstration Grant, District Staff has been unable to identify a technology demonstrator for our project. Based upon our past success with our residential Lawn and Garden Equipment Program, MDAQMD is confident of our ability to engage a technology demonstrator for this project in a timely manner.

### Specific Goals

- Evaluate performance of equipment in field.
- Evaluate effects of heat on equipment.
- Evaluate effects of wind on equipment.
- Evaluate ease of operation, maintenance required and ability to retain charge.

### Tasks

Phase 1: Apply for and receive grant. Sign agreement and return Board resolution

Phase 2: Research Technology Demonstrator. Select Technology Demonstrator.  
Prepare MOU with industry partner, City of Victorville, CA.

*NOTE: Demonstration of Equipment will be conducted in 3 Phases in order to allow technology demonstrator the time needed to develop equipment. As equipment becomes available it will be added to project schedule.*

Phase 3: Order Equipment for First Stage of Demonstration. Instruct operators and begin using equipment in field. The collection of the first data will begin. Six months after initial start, an interim report will be given to ARB.

Phase 4: Order Equipment for Second Stage of Demonstration. Instruct operators and begin using equipment in field. The collection of the second data will begin. Six months after initial start, an interim report will be given to ARB.

Phase 5: Order Equipment for Third Stage of Demonstration. Instruct operators and begin using equipment in field. The collection of the third data will begin. Six months after initial start, an interim report will be given to ARB.

Phase 6: The compilation of the entire project data will begin. Three months after collection of the final data, a final report will be given to ARB.

### Quantitative Milestones

	Start Date	Scheduled Completion Date	Actual Completion Date	Interim Report to ARB
Apply for Grant	4/11/2011	5/11/2011	5/11/2011	
Grantee Selected	5/11/2011	5/27/2011		
Signed Agreement/Resolution Returned	5/27/2011	6/22/2011		
Research Technology Demonstrator	7/1/2011	8/1/2011		
Select Technology Demonstrator	8/10/2011	8/30/2011		
MOU w/ Victorville	5/27/2011	6/22/2011		
Order 1st Equipment:Train	9/6/2011	9/20/2011		
1st Data Collection Begins	10/01/11	3/30/2012		5/12/2011
Order 2nd Equipment:Train	2/1/2012	2/28/2012		
2nd Data Collection Begins	3/1/2012	3/30/2013		11/1/2012
Order 3rd Equipment:Train	9/1/2012	3/30/2013		
3rd Data Collection Begins	10/1/2012	3/30/2013		5/1/2013
Final Report to ARB	4/1/2013	6/1/2013		

### Test Sites, Data Collected and Test Methods

The Test Site will include the Public Works and Parks Operations and Maintenance Facilities for the City of Victorville, CA. Data will be collected by CITY employees using a weekly evaluation form which they will complete. The forms will be sent to the MDAQMD on a monthly basis for analysis. The Test Method will be actual field use following manufacturer's recommendations and instructions.

If needed during the course of testing, MDAQMD will enlist additional area municipalities to implement the testing on a scale equivalent to the funding requested. The number of municipal participants will be based upon the number of pieces of equipment to be tested. The goal of the MDAQMD will be to ensure that all equipment is being tested on a daily basis in order to fully evaluate the equipment performance and attain the maximum amount of emissions reductions possible.

### Budget and Source of Funding

Equipment Purchase of \$15,000 will be funded by AQIP Demonstration Grant Funds with 50% (\$15,000) matching funds from MDAQMD for total equipment funds of \$30,000. MDAQMD will provide in-kind funds in the form of administrative support, totally an additional \$5,000.

CITY will provide staff time as need to perform field testing and preventive maintenance; and prepare and submit evaluation forms.

### Technology and Innovation

Zero-emission lawn and garden equipment has advanced considerably since the days when use of that equipment often involved the limitations of the electric extension cord available. Today, cordless zero-emission *residential* lawn and garden equipment is readily available and more widely used than previously. Commercial cordless zero-emission lawn and garden equipment however, is not widely available.

Whereas residential equipment has limited use, perhaps mowing the lawn and leaf blowing once each week; commercial equipment endures much heavier usage, sometimes eight hours per day. In order to make commercial equipment viable, manufacturers have had to become technology innovators. The use of multiple technologies with one piece of equipment, for example: Husqvarna's combination battery/solar powered mower, is just one way that manufacturers are addressing the need for zero-emission commercial equipment.

Limited battery life (per charge) has been an issue that has limited the introduction of commercial cordless equipment. Most equipment is handheld by the operator. Therefore, increasing the size of batteries makes operating equipment impractical due to weight. Batteries become hot during operation, they become hotter under an increased and continual load. Sometimes, fans are used to cool batteries, however, the addition of a fan to zero-emission commercial equipment will add to the weight. Most equipment then, relies upon the circulation of outside air to cool the battery and allow it to continue to operate effectively. The demonstration project proposed by the MDAQMD would test whether the extreme ambient air temperature of our area would impede the proper operation of the commercial battery. District Staff is hopeful that improved battery technology combined with the use of renewable energy (solar) has created viable commercial zero-emission equipment which will operate effectively when tested in extreme climate areas such as ours. Demonstration projects such as ours can assist manufacturers in pushing commercial equipment closer to the marketplace.

Legislative actions in California continue to push manufacturers toward finding a viable solution to the demand for "green" technology in the commercial cordless zero-emission field. As California is a major marketplace for lawn and garden equipment, the economics of pursuing green technology motivates manufacturers to innovate.

The MDAQMD firmly believes that as these innovations in battery technology for commercial equipment evolve, it will be of critical importance that the equipment be field tested in an "extreme climate" such as ours.

### Potential for Market Penetration and Commercialization of the Technology

The target market for this project would be communities located within the MDAQMD, a District which is classified as having "extreme climate" conditions. The targeted industries within the MDAQMD would include commercial and professional landscapers and landscape maintenance personnel.

For purposes of a control group, the CITY was selected to test the equipment because MDAQMD staff felt that their personnel could be relied upon to:

- safely operate the equipment to the manufacturer's specifications
- perform regular maintenance on the equipment
- retain the equipment for the duration of the project
- accurately record and report their evaluation of the equipment

While the Mojave Desert setting of the MDAQMD is classified as an "extreme climate," it is not the only area to have this designation. A similar climate to that of the MDAQMD test area can also be found in certain portions of Texas, Arizona, New Mexico and the Greater Southwestern United States, as well as parts of Oklahoma. Once the test equipment has met the rigors of the MDAQMD, it would be safe to say that it could be operated anywhere where temperatures are more extreme.

### Environmental Justice

In the proposed project, CITY personnel will operate the test equipment in the landscape medians and other common greenspaces surrounding local housing tracts. These tracts are most likely to be ones designed to attract young families and/or seniors for their livability (maintained greenspaces, close proximity to services).

In this project, the professional landscapers testing the equipment will operate their zero-emissions equipment in close proximity to housing without adversely impacting at risk populations (children/elderly.) Demonstrating the ease with which this equipment can be operated will encourage landscape professionals working in the area to try the equipment and get rid of their old, polluting equipment. Maintaining median strips and parks in areas with a high population of seniors and children will demonstrate that this equipment is viable for use in caring for residential landscaping. During the demonstration project, actual emissions in environmental justice areas will be reduced for a period up to two years.

### Project Team Capabilities and Degree of Industry Collaboration

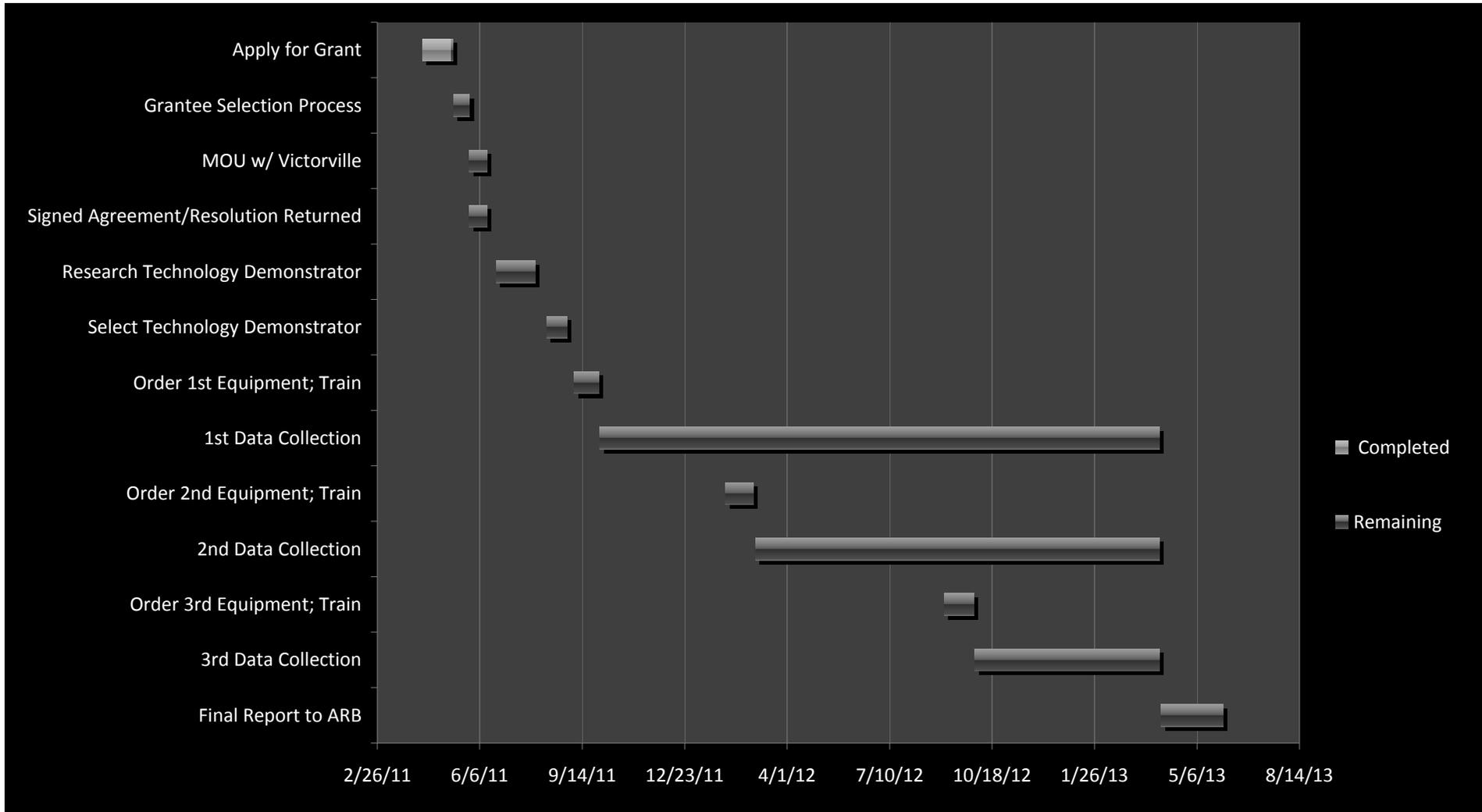
The MDAQMD has a dedicated grant staff experienced in implementing and administering this and similar programs. Such programs include the Mobile Emission Reduction Program, Lower Emissions School Bus Replacement Program, and the successful implementation of 12 rounds of the Carl Moyer Program. The District's Moyer Program was audited by CARB in 2009 and results of the audit were positive. MDAQMD staff has successfully met the stringent criteria of the Carl Moyer Program and Staff feels fully qualified to tackle the AQIP guidelines and hence, implement and administer a strong LGER program which meets all State requirements. Qualifications of key personnel are outlined below:

Alan J. DeSalvio: Supervising Air Quality Engineer. Mr. DeSalvio has 20 years experience administering air quality programs for the MDAQMD. He has extensive experience in quantifying emissions reductions.

Holly Noel: Air Quality Specialist/Grants Programs Coordinator. Ms. Noel has a Master of Public Administration degree and approximately 15 years experience in program administration. She implemented a large community based water conservation demonstration program for the Mesa Consolidated Water District (Costa Mesa) and currently coordinates the MDAQMD LGER, AB 2766 and Carl Moyer Programs. She has extensive community outreach and public affairs experience. Ms. Noel will be responsible for day to day operations of the project.

City of Victorville, CA Public Works Department Landscape Maintenance Districts and Parks Operations (CITY): Personnel include professional landscape and maintenance personnel, engineers and public administrators. The CITY has successfully participated in several MDAQMD Carl Moyer Projects. A senior staffer with the CITY will coordinate their participation in the program.

**Table 2 - Timeline for Completion**



**PROPOSED BUDGET**

<u>DIRECT LABOR</u>	<u>HOURS</u>	<u>RATE</u>	<u>TOTAL</u>	<u>IN-KIND</u>	<u>MATCH</u>
(AJD) SAQE	4	@	\$76.73	\$306.92	\$
(HN) AQS/Grants	90	@	\$44.32	\$3944.48	\$
(SK) Adm Svcs Mgr	4	@	\$66.55	\$266.20	
(MP) Fiscal Analys	4	@	\$37.35	\$149.40	\$
(MZ) IS Speclst	2	@	\$40.52	\$81.04	\$
(VR) CRE Mgr	4	@	\$59.24	\$236.96	\$
			<b>TOTAL \$</b>	<b>\$4985</b>	

PARTNER(S)/SUBCONTRACTOR(S) COST ITEMIZED

INDIRECT COSTS (OVERHEAD AND FRINGE BENEFITS)

Overhead Rate	N/A	\$
Fringe Benefits	N/A	\$
		<b>TOTAL \$</b>

DIRECT COSTS (EXCEPT LABOR)

Travel Costs	N/A	\$
Equipment and Supplies (Itemized)	\$15,000	\$
Other Direct Costs (Itemized)	N/A	\$

TOTAL COSTS

TOTAL EQUIPMENT FUNDS REQUESTED

\$15,000

TOTAL ADMINISTRATIVE FUNDS REQUESTED\*

\$None

ONE TO ONE MATCH

<b>SOURCE</b>	<b>MDAQMD AQIP DEMO 2011 Project</b>	<b>AMOUNT</b>	<b>\$15,000</b>
In-Kind Contribution: MDAQMD, Admin Costs 2011 LGER Project			

**AQIP Demonstration Project Cost Effectiveness - MDAQMD**

Equip	Predicted Unit Cost	Engine Type	hp	kW	# of Equip	Monthly Activity	Load	Emission Factors (gm/kW-hr)		Baseline Em (lbs/month)		Replace Em (lbs/month)		Weighted Surplus (lbs/mo)
								HC+NOx	PM10	HC+NOx	PM10	HC+NOx	PM10	
Ride Mower	2500	4-stroke gas	20	27	2	30	0.36	10	0	12.8	0.0	0	0	12.8
Push Mower	1000	4-stroke gas	4	5.4	2	30	0.36	10	0	2.6	0.0	0	0	2.6
Leaf Blower	500	2-stroke gas	2	2.7	3	30	0.5	50	2	13.3	0.5	0	0	23.9
Trimmer	500	2-stroke gas	1.5	2	3	15	0.5	50	2	5.0	0.2	0	0	9.0

Phases	Cost \$	Use Duration months	Weighted Reductions tons
First Batch	10,000	17	0.41
Second Batch	10,000	12	0.29
Third Batch	10,000	5	0.12
	Actual Cost: 30,000		Annual Average: 0.41
	Incremental Cost: 15000		
	Annualized Cost (2 year project): 7950		
	Weighted Cost-Effectiveness (\$/ton): 19384		



Governing Board  
Approval

And

MOUs

1 MEMORANDUM OF AGREEMENT BETWEEN  
2 MOJAVE DESERT AIR QUALITY MANAGEMENT DISTRICT AND  
3 THE CITY OF VICTORVILLE PUBLIC WORKS DEPARTMENT,  
4 VICTORVILLE, CALIFORNIA

5 This agreement is made and entered into by and between the Mojave Desert Air Quality Management  
6 District (MDAQMD) and the City of Victorville Public Works Department (VICTORVILLE), Victorville,  
7 California in regards to the *Can Green Take the Heat Advanced Technology Demonstration Project* and is  
8 effective as of January 17, 2012.

9 **WHEREAS**, the MDAQMD has received a grant from ARB regarding real world testing of zero  
10 emission cordless commercial lawn and garden equipment and

11 **WHEREAS**, data collected from such testing will be reported back to ARB to assist in the  
12 development of future similar type equipment; and

13 **WHEREAS**, VICTORVILLE is located within the jurisdiction of the MDAQMD and has Public  
14 Works staff and large landscape areas which would provide a broad base of such data; and

15 **WHEREAS**, the MDAQMD and its equipment vendor partner has the capability to provide zero  
16 emission cordless lawn and garden equipment for VICTORVILLE to test obtain such data; and

17 **NOW, THEREFORE**, in consideration of the mutual covenants and obligations, and under the  
18 conditions set forth in this agreement, MDAQMD and VICTORVILLE agree as follows:

19 **COVENANTS AND OBLIGATIONS**

20 1. MDAQMD will provide, through its vendor partner, VICTORVILLE with zero emission cordless  
21 electric commercial lawn and garden equipment to use to perform landscape maintenance tasks as  
22 required by the Public Works Department. Said equipment will only be operated by VICTORVILLE  
23 personnel in accordance with accepted operating and safety practices and procedures.

24 2. The City of Victorville will allow the usage of the equipment to be monitored by MDAQMD and  
25 its vendor partner and provide usage data to MDAQMD. Monitoring may include but is not limited to  
26 monitoring devices, in-field observation and completion of forms.

27 3. Upon commencement of this agreement MDAQMD and its vendor partner will provide the City of  
28 Victorville with equipment to be tested, monitoring devices and training as needed to properly gain data.

4. VICTORVILLE agrees to properly and securely store equipment to be tested for the duration of

- 1 the agreement.
- 2 5. VICTORVILLE agrees to replace, at its own cost, any equipment to be tested if such is lost or  
3 stolen.
- 4 6. MDAQMD and its vendor partner agree to replace equipment to be tested if such equipment  
5 breaks under normal usage and operation.
- 6 7. Upon completion or termination of the agreement, VICTORVILLE will be offered the option to  
7 purchase the equipment to be tested at a reduced cost.
- 8 8. This agreement shall become effective as of January 17, 2012 and shall remain in effect for a term  
9 of two (2) years under the same terms and conditions unless earlier terminated, extended or modified as  
10 provided herein.
- 11 9. This agreement may require that VICTORVILLE sign a non-disclosure agreement with the vendor  
12 partner involved in the project for particular equipment which may be in "research and development"  
13 status or for data derived from particular equipment.
- 14 10. This agreement may be amended or terminated only by the written agreement of the parties hereto.  
15 Either party may terminate this agreement by giving thirty (30) days written notice to the other at the  
16 address set forth below:
- 17
- |                                     |                         |
|-------------------------------------|-------------------------|
| 18 <u>MDAQMD</u>                    | VICTORVILLE             |
| Jean Bracy                          | Joe Flores              |
| Director of Administrative Services | Manager                 |
| MDAQMd                              | Public Works Department |
| 14306 Park Ave                      | City of Victorville     |
| 20 Victorville, CA 92392-2310       | 14343 Civic Dr.         |
|                                     | Victorville, CA 92392   |
- 21
- 22
- 23 11. The City of Victorville and MDAQMD shall indemnify, defend, save and hold harmless each  
24 other against any and all liabilities, claims, demands, damages, suits, and causes of action arising out of or  
25 connected with the performance by VICTORVILLE or MDAQMD of any of its duties, obligations or  
26 functions in connection with the performance of this agreement.
- 27 12. This agreement may be executed via facsimile and in two or more counterparts, each of which  
28 shall be deemed an original, but all of which shall be considered one and the same instrument.

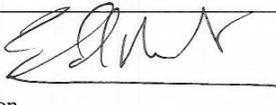
1 13. The provisions and terms of this agreement shall be interpreted in accordance with the laws of the  
2 State of California.

3 In witness whereof, the authorized representatives for the MDAQMD and the City of Victorville have  
4 caused this agreement to be executed on the date(s) indicated below

5 Date: 1/19/2012

Date: 2/27/12

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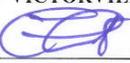


7 Joe Flores  
8 Public Works Manager  
9 City of Victorville  
10 14343 Civic Dr.  
11 Victorville, CA 92392

Eldon Heaston  
Executive Director  
Mojave Desert Air  
Quality Management District

11 Approved as to Legal Form:  
12 Date: 1/12/12

13   
14 Karen K. Nowak  
15 District Counsel

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18 CITY OF VICTORVILLE  
19 By:   
20 Chuck Buquet, Risk Manager

By:   
Andre de Bortnowsky, City Attorney

21 Dated: 1/19/12  
22

Dated: 1/31/12

23  
24  
25  
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27  
28

1 MEMORANDUM OF AGREEMENT BETWEEN  
2 MOJAVE DESERT AIR QUALITY MANAGEMENT DISTRICT AND  
3 THE HESPERIA RECREATION AND PARK DISTRICT,  
4 HESPERIA, CALIFORNIA

5 This agreement is made and entered into by and between the Mojave Desert Air Quality Management  
6 District (MDAQMD) and the Hesperia Recreation and Park District (HESPERIA PARKS), Hesperia,  
7 California in regards to the *Can Green Take the Heat Advanced Technology Demonstration Project* and is  
8 effective as of February 15, 2012.

9 **WHEREAS**, the MDAQMD has received a grant from ARB regarding real world testing of zero  
10 emission cordless commercial lawn and garden equipment and

11 **WHEREAS**, data collected from such testing will be reported back to ARB to assist in the  
12 development of future similar type equipment; and

13 **WHEREAS**, HESPERIA PARKS is located within the jurisdiction of the MDAQMD and has  
14 district staff and large landscape areas which would provide a broad base of such data; and

15 **WHEREAS**, the MDAQMD and its equipment vendor partner has the capability to provide zero  
16 emission cordless lawn and garden equipment for HESPERIA PARKS to test obtain such data; and

17 **NOW, THEREFORE**, in consideration of the mutual covenants and obligations, and under the  
18 conditions set forth in this agreement, MDAQMD and HESPERIA PARKS agree as follows:

19 **COVENANTS AND OBLIGATIONS**

- 20 1. MDAQMD will provide, through its vendor partner, zero emission cordless electric commercial  
21 lawn and garden equipment for HESPERIA PARKS to use to perform landscape maintenance tasks as  
22 required by the District. Said equipment will only be operated by HESPERIA PARKS personnel in  
23 accordance with accepted operating and safety practices and procedures.
- 24 2. HESPERIA PARKS will allow the usage of the equipment to be monitored by MDAQMD and its  
25 vendor partner and provide usage data to MDAQMD. Monitoring may include but is not limited to  
26 monitoring devices, in-field observation and completion of forms.
- 27 3. Upon commencement of this agreement MDAQMD and its vendor partner will provide  
28 HESPERIA PARKS with equipment to be tested, monitoring devices and training as needed to properly  
gain data.

- 1 4. HESPERIA PARKS agrees to properly and securely store equipment to be tested for the duration  
2 of the agreement.
- 3 5. HESPERIA PARKS agrees to replace, at its own cost, any equipment to be tested if such is lost or  
4 stolen.
- 5 6. MDAQMD and its vendor partner agree to replace equipment to be tested if such equipment  
6 breaks under normal usage and operation.
- 7 7. Upon completion or termination of the agreement, HESPERIA PARKS will be offered the option  
8 to purchase the equipment to be tested at a reduced cost.
- 9 8. This agreement shall become effective as of February 15, 2012 and shall remain in effect for a  
10 term of two (2) years under the same terms and conditions unless earlier terminated, extended or  
11 modified as provided herein.
- 12 9. This agreement may require that HESPERIA PARKS sign a non-disclosure agreement with the  
13 vendor partner involved in the project for particular equipment which may be in "research and  
14 development" status or for data derived from particular equipment.
- 15 10. This agreement may be amended or terminated only by the written agreement of the parties hereto.  
16 Either party may terminate this agreement by giving thirty (30) days written notice to the other at the  
17 address set forth below:
- 18
- |                                     |                                       |
|-------------------------------------|---------------------------------------|
| 19 <u>MDAQMD</u>                    | HESPERIA                              |
| Jean Bracy                          | Lindsay Woods                         |
| Director of Administrative Services | General Manager                       |
| MDAQMD                              | Hesperia Recreation and Park District |
| 14306 Park Ave                      | P.O. Box 401055                       |
| 21 Victorville, CA 92392-2310       | Hesperia, CA 92340                    |
- 22
- 23 11. HESPERIA PARKS and MDAQMD shall indemnify, defend, save and hold harmless each other  
24 against any and all liabilities, claims, demands, damages, suits, and causes of action arising out of or  
25 connected with the performance by HESPERIA PARKS or MDAQMD of any of its duties, obligations or  
26 functions in connection with the performance of this agreement.
- 27 12. This agreement may be executed via facsimile and in two or more counterparts, each of which  
28 shall be deemed an original, but all of which shall be considered one and the same instrument.

1 13. The provisions and terms of this agreement shall be interpreted in accordance with the laws of the  
2 State of California.

3 In witness whereof, the authorized representatives for the MDAQMD and HESPERIA PARKS have  
4 caused this agreement to be executed on the date(s) indicated below

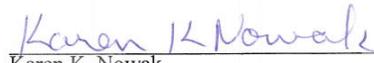
5 Date: 2/16/12

Date: 2/27/12

6   
7 Lindsay Woods  
8 General Manager  
9 Hesperia Recreation and Park District

  
Eldon Heaston  
Executive Director  
Mojave Desert Air  
Quality Management District

10  
11 Approved as to Legal Form:  
12 Date: 2/9/2012

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14 Karen K. Nowak  
15 District Counsel

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## AGREEMENT REGARDING TREATMENT OF TRADE SECRET DATA

This agreement is between Mojave Desert Air Quality Management District (MDAQMD) located at 14306 Park Avenue Victorville CA, 92392-2310, and Stanley Black & Decker, Inc. of 1000 Stanley Drive, New Britain, CT 06053, United States of America ("SBD"), collectively referred to as the parties.

### RECITALS

WHEREAS, MDAQMD has agreed to field test battery powered outdoor tools supplied by SBD, and collect and provide SBD with data relating to their use (Project); and

WHEREAS, the Project is expected to result in a variety of data, which is considered to be Confidential Information; and

WHEREAS, the parties wish to protect any such data which is Trade Secret to the full extent of the law;

NOW THEREFORE, in consideration of the mutual covenants and conditions listed below, the Parties agree as follows:

### TERMS AND CONDITIONS

#### 1. Definitions -

- (a) "DISCLOSER and RECIPIENT" - The terms "Discloser" and "Recipient" refer respectively to the party disclosing or receiving a specific item of Confidential Information. For purposes of this Agreement, SBD shall be considered the Discloser and MDAQMD shall be considered the Recipient of the information MDAQMD gathers as a result of field testing work done in accordance with the Project.
- (b) "CONFIDENTIAL INFORMATION" - as used herein, means any non-public information, including but not limited to, Trade Secret information as defined pursuant to Section 6276.44 of the California Government Code, or Article 11 of Chapter 4 of Division 8 of the California Evidence Code (commencing with Section 1060) or as defined in Section 3426.1 of the California Civil Code. Such information shall include but not be limited to information, know-how, technical data, test results, user opinions, lab notes, reports, engineering, research, intellectual property and business information (including drawings, models, components, and marketing information or plans) disclosed, generated as part of this agreement or otherwise obtained by observation or analysis by either party, provided that such information is:

- (1) clearly designated, labeled or marked as "Confidential" prior to or at the time it is provided by the Discloser; or
  - (2) Recipient knows or should know to be confidential in nature; or
  - (3) the Discloser within thirty (30) days after such disclosure, delivers to the Recipient a written document or documents describing such information as confidential; or
  - (4) the results of field testing, including any data, reports or other information regardless of whether the information is disclosed to the other party.
- (c) The term CONFIDENTIAL INFORMATION shall exclude information which:
- (1) is known or possessed by Recipient at the time of its disclosure to Recipient,
  - (2) is publicly known at the time of disclosure to Recipient,
  - (3) is subsequently received by Recipient from a third party without restriction on disclosure,
  - (4) is or subsequently becomes publicly known without violation of this agreement,
  - (5) is lawfully available under the California Public Records Act (California Government Code Section 6250 et. seq.) The California Open Meetings Laws (California Government Code Section 54950 et. seq.) or is otherwise required to be disclosed by State or Federal law or by any order of a judicial, legislative or administrative governmental authority (e.g. subpoena, court order, civil/criminal discovery).
  - (6) is required to be disclosed to the California Air Resources Board by the MDAQMD as a condition of receiving the monetary grant which provides funds for the field test. Such information shall be limited to basic information on date and duration of use of the equipment generally correlated with the ambient air temperature and generic performance data (e.g. functioning/non-functioning status when use is terminated)
3. Confidentiality Obligation – MDAQMD shall hold in confidence all CONFIDENTIAL INFORMATION, and shall treat the CONFIDENTIAL INFORMATION in the same manner as other proprietary information disclosed to MDAQMD pursuant to law (and shall not publish, disseminate, disclose, use or otherwise commercially exploit (except for a use consistent with the Project) the CONFIDENTIAL INFORMATION without the prior consent of SBD.

4. Copies - Recipient may reproduce or copy the Confidential Information, in whole or in part, for use solely in connection with the Project and consistent with the obligations set forth herein.
5. Ownership; No License - All right, title and interest in and to the Confidential Information will remain the property of the Discloser. Neither this Agreement nor the disclosure of Confidential Information hereunder will be construed as granting any right or license respecting any Confidential Information except for the specific rights expressly granted under this Agreement. All Confidential Information disclosed hereunder is provided by Discloser on an "as is" basis without representation or warranty of any kind. For purposes of clarity, any information or data resulting from the field testing shall be owned by SBD.
6. Injunctive Relief - The Parties acknowledge that any remedy at law for the breach or threatened breach of the provisions of this Agreement may be inadequate to fully and properly protect the Discloser and, therefore, the Parties agree that the Discloser may be entitled to seek injunctive relief without the posting of a bond to prevent a breach of this Agreement and to secure the enforcement of this Agreement in addition to other available remedies for such breach or threatened breach.
7. Term of Agreement - The term of this Agreement is 2 years beginning on the Effective Date. The obligations of Recipient regarding disclosure and use of CONFIDENTIAL INFORMATION shall terminate 4 years from the Effective Date.
8. Termination; Confidential Information Disposition - On Discloser's written request, Recipient shall promptly return to the Discloser any and all Confidential Information delivered in tangible form to Recipient, including all copies or extracts thereof, or provide notice to Discloser certifying in writing that all Confidential Information (including without limitation all copies, abstracts, notes, summaries, and the like) has in fact been destroyed. Notwithstanding the foregoing, the Recipient may retain one copy of Confidential Information for its legal archives, provided that such Confidential Information shall remain subject to the provisions of this Agreement unless and until the Confidential Information is returned to the Discloser.
9. Independent Relationship. Nothing in this Agreement obligates either Party to enter into any business transaction or to make any payments. This Agreement shall not be construed to create an association, partnership, joint venture, or relation of principal and agent between the Parties within the meaning of any federal, state or local law. No license under any Party's trademark, patent or copyright right is being granted herein.
10. Successors and Assigns - This Agreement shall be binding on and inure to the benefit of the Parties, their parents, affiliates, subsidiaries, entities in common control with, in control of, or controlled by the Parties, all personnel thereof, and the Parties' respective successors-in-interest or assigns; provided, however, that neither Party may assign any right or delegate any duty under this Agreement without the prior written consent of the other party.

11. Lawsuits and Indemnity – SBD agrees to indemnify and hold harmless MDAQMD, its agents officers and employees, from any claim, action or proceeding against MDAQMD, its agents, officers or employees to attack, set aside, void or annul a claim of confidentiality made pursuant to applicable laws by the MDAQMD as a result of this agreement. SBD shall have the right but not the duty to defend the MDAQMD in any litigation against the MDAQMD which could result in any indemnity obligation under this paragraph subject to MDAQMD's right to also participate in such defense. If SBD chooses to exercise such right, SBD shall have the right to choose counsel to jointly represent MDAQMD and SBD. MDAQMD consents to such joint representation. MDAQMD shall cooperate in the defense provided by SBD. Whether SBD so elects to defend MDAQMD, or not, neither Party shall enter into any settlement of the Litigation without the other Party's consent.

Nothing contained herein shall prohibit the MDAQMD, in its sole discretion, from participating in the defense of any litigation over and above representation provided by SBD. If the MDAQMD defends itself or participates in such defense, it shall do so in good faith and shall bear its own cost. MDAQMD's participation in its own defense shall not affect SBD's obligations under the paragraph above. Whether MDAQMD defends itself against litigation or elects to participate in the joint defense of said litigation after SBD has exercised its right to assume the defense, the parties agree that MDAQMD and SBD shall cooperate in the defense and that neither party shall settle such action without the express consent of each party.

MDAQMD shall notify SBD within ten (10) MDAQMD business days of its receipt of any demand, claim, action, proceeding, or litigation in which the MDAQMD may be entitled to indemnification by SBD pursuant to this Agreement.

12. Governing Law - This Agreement shall be construed and interpreted, and its performance shall be governed, by the laws of the State of California, without reference to conflict of law principles. The Parties agree to submit to the exclusive personal jurisdiction of the courts of the State of California.

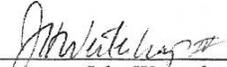
13. Compliance with Law - The Parties agree to abide by all federal and state laws and regulations applicable to the access and use of the Confidential Information, including applicable laws regarding (a) trade secrets, (b) the export of such information to certain foreign countries or disclosure to certain foreign nationals, which may be prohibited, (c) personal health information, (d) California Public Records Act, and (e) California Brown Act.

14. Severability - If any part of a provision of this Agreement is found illegal or unenforceable, it will be enforced to the maximum extent permissible, and the legality and enforceability of the remainder of that provision and all other provisions of this Agreement will not be affected.

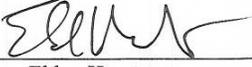
15. Entire Agreement; Amendments - This Agreement is the complete and exclusive agreement between the Parties with respect to the subject matter hereof, superseding and replacing all prior agreements, communications, and understandings (written and oral) regarding

its subject matter. This Agreement may be modified, or any rights under it waived, only by a written document executed by both Parties. The Parties may sign facsimile copies of the Agreement, each of which will be deemed an original.

STANLEY BLACK & DECKER, INC.

  
\_\_\_\_\_  
BY: John Weetenkamp  
TITLE: Director of Marketing  
DATE: 2/7/12

MDAQMD

  
\_\_\_\_\_  
BY: Eldon Heaston  
TITLE: Executive Director/APCO  
DATE: 2/8/12

# Financial Documents

- Disbursement Requests
- Status Report
- Invoices
- Internal MDAQMD Documents



DATE: 6/14/2012  
 INVOICE NUMBER: Mojave Demo  
 P.O. NUMBER:

**BILL TO:**  
 Mojave Desert AQMD  
 14308 Park Avenue  
 Victorville, CA 92392

**REMIT TO:**  
 BLACK & DECKER (U.S.), INC.  
 701 E. JOPPA ROAD TW655  
 TOWSON, MD 21286

ATTN: Halp Noel

ATTN: MENDY JOHNSON

DESCRIPTION	Item	Units Sold	Rebate Amount	\$ AMOUNT
19" Self Propelled Cordless Mower with Lith-out Battery	SPCM1936	4	\$ 374.40	\$1,497.60
36v Cordless Front Tire Tiller	CTL36	2	\$ 339.99	\$679.98
24" 36V High Performance Cordless Hedge Trimmer	LHT2436	11	\$ 127.49	\$1,402.39
13" 36V Lithium High Performance Cordless String Trimmer	LSST136	12	\$ 144.49	\$1,733.88
20V Lithium Cordless Sweeper	LSW20	11	\$ 99.00	\$1,089.00
20V Lithium Cordless Chain Saw	LCS120	4	\$ 105.56	\$422.24
20V Lithium Cordless Lopper	LPP120	5	\$ 123.50	\$617.50
Battery and Charger for all 36v Mowers & Tillers	RB-3612	6	\$ 104.28	\$625.68
3- Pack of AP-100's in Dispensable Master Carton	AP-100-3ZP	24	\$ 13.27	\$318.48
20V Charger	L2AFC	8	\$ 30.00	\$240.00
20V Lithium Ion Battery - 1.5 AH	LBXR20	8	\$ 40.95	\$327.60
36V Lithium Ion Battery - 1.5 AH	LBXR36	20	\$ 72.00	\$1,440.00
Timer Installed		49	\$ 25.00	\$1,225.00

TOTAL AMOUNT DUE: **\$11,619.35**

INVOICE DUE AND PAYABLE: 15-Jul-12

**Air Quality Improvement Program  
 GRANT DISBURSEMENT REQUEST FORM  
 Fiscal Year 2010-2011**

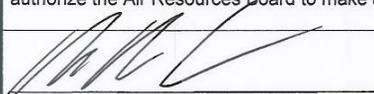
<b>Amount of Funds Requested for this Disbursement</b>	
1. Project Name: Can Green Take the Heat? Advanced Technology Demonstration Project	
2. Business Name: Mojave Desert Air Quality Management District	3. Grant number: G10-AQIP-16
4. Contact Person: Holly Noel	

	Original Grant	Total of Previous Disbursements	This Request	Remaining Balance
<b>Project Funds</b>	<b>\$ 15,000</b>	<b>\$0</b>	<b>\$10,489.39</b>	<b>\$4510.61</b>
<b>Admin. Funds</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>
<b>Total</b>	<b>\$15,000</b>	<b>\$0</b>	<b>\$10489.39</b>	<b>\$4510.61</b>

Documentation attached for justification of disbursement of:

Administrative Funds
  Project Funds

Attachments: Two Invoices from Hesperia Outdoor Power and Status Report #1

<b>Certification</b>
I certify that the information contained in this grant disbursement request and all attachments is correct and complete and is in accordance with the grant agreement. In addition, I hereby authorize the Air Resources Board to make any inquiries to confirm this information.
 _____ Signature of Authorized Official
Name:
Alan J. De Salvio
Title:
Supervising Engineer
Date:
5-12-2012



## INTEROFFICE MEMO

**DATE:** May 12, 2012                      **PHONE:** x1885  
**FROM:** Holly Noel, Air Quality Specialist/Grants Program Coordinator  
**FOR:** Alan J. De Salvio, Supervising Engineer  
**TO:** Donna Vickers

**SUBJECT:** MD# 0511 – 07 Green Heat Project

This grant is a 50% match with ARB providing \$15,000 and MDAQMD providing \$15,000 in Project Funds and \$5,000 in Administrative Funds.

Please pay the attached 2 invoices to Hesperia Outdoor Power in the total amount of \$10,489.39.

This money is to be reimbursed to us from ARB. We have processed Disbursement paperwork to ARB (attached) for the entire amount of \$10,489.39 per their request and are awaiting their payment.

Thank you!

*okay to pay  
AMS  
5/10/12*

HESPERIA OUTDOOR POWER EQUIP  
 17494 MAIN ST.  
 HESPERIA, CA 92345  
 (760) 947-4673

Date.....: 05-08-12 17:20:00  
 Invoice #...: 017282, Page 1  
 Customer #..: 2451661  
 Salesperson.: SM  
 P.O. #.....:

BILL TO: 2451661  
 MDAQMD  
 14306 PARK AVE  
 VICTORVILLE, CA 92392  
 (760) 245-1661

SHIP TO:  
 MDAQMD  
 14306 PARK AVE  
 VICTORVILLE, CA 92392

- INVOICE -  
 TERMS: 30 Days Net, from Statement Date

QTY	QTY	PRICE	NET	TOTAL	T/S	
SLD	B/O				X/O	
STI 8863201	APRON CHAPS-32"/SEVE	1	0	99.99	0.00	0.00 T
STI 36700050064	71pm3 64e chain loop	1	0	23.49	0.00	0.00 T
STI 48504305502	AL300 FAST CHARGER	15	0	93.99	75.19	1127.85 T
STI 48504900100	battery belt w/bag,+	1	0	159.99	0.00	0.00 T
STI 48504900301	harness for battery	1	0	26.99	0.00	0.00 T
STI HSA65	CORDLESS HEDGETRIM. S/N 432350339	1	0	299.95	239.96	239.96 T
STI HSA65	CORDLESS HEDGETRIM. S/N 432350340	1	0	299.95	239.96	239.96 T
STI HSA65	CORDLESS HEDGETRIM. S/N 432350341	1	0	299.95	239.96	239.96 T
STI FSA85	FSA85 CORDLESS TRIM S/N 43214429	1	0	299.95	239.96	239.96 T
STI FSA85	FSA85 CORDLESS TRIM S/N 432814421	1	0	299.95	239.96	239.96 T
STI FSA85	FSA85 CORDLESS TRIM S/N 432814424	1	0	299.95	239.96	239.96 T
STI FSA85	FSA85 CORDLESS TRIM S/N 432814427	1	0	299.95	239.96	239.96 T
STI FSA85	FSA85 CORDLESS TRIM S/N 432814428	1	0	299.95	239.96	239.96 T
STI FSA85	FSA85 CORDLESS TRIM S/N 432814432	1	0	299.95	239.96	239.96 T
STI BGA85	cordless blw S/N 433049154	1	0	299.95	239.96	239.96 T
STI BGA85	cordless blw S/N 432981335	1	0	299.95	239.96	239.96 T
STI BGA85	cordless blw S/N 433049155	1	0	299.95	239.96	239.96 T
STI 56057713206	1/8" round file box	1	0	8.99	0.00	0.00 T
STI MSA160	CORDLESS C/S S/N 432936789	1	0	349.95	279.96	279.96 T

HESPERIA OUTDOOR POWER EQUIP  
 17494 MAIN ST.  
 HESPERIA, CA 92345  
 (760) 947-4673

Date.....: 05-08-12 17:20:00  
 Invoice #...: 017282, Page 2  
 Customer #...: 2451661  
 Salesperson.: SM  
 P.O. #.....:

BILL TO: 2451661  
 MDAQMD  
 14306 PARK AVE  
 VICTORVILLE, CA 92392  
 (760) 245-1661

SHIP TO:  
 MDAQMD  
 14306 PARK AVE  
 VICTORVILLE, CA 92392

- INVOICE -

TERMS: 30 Days Net, from Statement Date

QTY	QTY	PRICE	NET	TOTAL	T/S
SLD	B/O				X/O
1	0	269.99	165.99	165.99	T
STI 48504006505 AP160 BATTERY PACK S/N 982000749					
1	0	269.99	165.99	165.99	T
STI 48504006505 AP160 BATTERY PACK S/N 982000750					
1	0	269.99	165.99	165.99	T
STI 48504006505 AP160 BATTERY PACK S/N 982000751					
1	0	269.99	165.99	165.99	T
STI 48504006505 AP160 BATTERY PACK S/N 982000752					
1	0	269.99	165.99	165.99	T
STI 48504006505 AP160 BATTERY PACK S/N 982000753					
1	0	269.99	165.99	165.99	T
STI 48504006505 AP160 BATTERY PACK S/N 982000754					
1	0	269.99	165.99	165.99	T
STI 48504006505 AP160 BATTERY PACK S/N 982000755					
1	0	269.99	165.99	165.99	T
STI 48504006505 AP160 BATTERY PACK S/N 982000756					
1	0	269.99	165.99	165.99	T
STI 48504006505 AP160 BATTERY PACK S/N 982000757					
1	0	269.99	165.99	165.99	T
STI 48504006505 AP160 BATTERY PACK S/N 982000758					
1	0	269.99	165.99	165.99	T
STI 48504006505 AP160 BATTERY PACK S/N 982000789					
1	0	269.99	165.99	165.99	T
STI 48504006505 AP160 BATTERY PACK S/N 982000790					
1	0	269.99	165.99	165.99	T
STI 48504006505 AP160 BATTERY PACK S/N 982000791					
1	0	269.99	165.99	165.99	T
STI 48504006505 AP160 BATTERY PACK S/N 982000792					
1	0	269.99	165.99	165.99	T
STI 48504006505 AP160 BATTERY PACK S/N 982000793					
1	0	269.99	165.99	165.99	T
STI 48504006505 AP160 BATTERY PACK S/N 982000794					
1	0	269.99	165.99	165.99	T
STI 48504006505 AP160 BATTERY PACK S/N 982000795					

HESPERIA OUTDOOR POWER EQUIP  
 17494 MAIN ST.  
 HESPERIA, CA 92345  
 (760) 947-4673

Date.....: 05-08-12 17:20:00  
 Invoice #...: 017282, Page 3  
 Customer #..: 2451661  
 Salesperson.: SM  
 P.O. #.....:

BILL TO: 2451661  
 MDAQMD  
 14306 PARK AVE  
 VICTORVILLE, CA 92392  
 (760) 245-1661

SHIP TO:  
 MDAQMD  
 14306 PARK AVE  
 VICTORVILLE, CA 92392

- INVOICE -  
 TERMS: 30 Days Net, from Statement Date

QTY	QTY	PRICE	NET	TOTAL	T	S
SLD	B/O				X	O
1	0	269.99	165.99	165.99	T	
STI 48504006505 AP160 BATTERY PACK S/N 982000796						
1	0	269.99	165.99	165.99	T	
STI 48504006505 AP160 BATTERY PACK S/N 982000797						
1	0	269.99	165.99	165.99	T	
STI 48504006505 AP160 BATTERY PACK S/N 982000798						
1	0	269.99	165.99	165.99	T	
STI 48504006505 AP160 BATTERY PACK S/N 982001439						
1	0	269.99	165.99	165.99	T	
STI 48504006505 AP160 BATTERY PACK S/N 982001440						
1	0	269.99	165.99	165.99	T	
STI 48504006505 AP160 BATTERY PACK S/N 982001441						
1	0	269.99	165.99	165.99	T	
STI 48504006505 AP160 BATTERY PACK S/N 982001442						
1	0	269.99	165.99	165.99	T	
STI 48504006505 AP160 BATTERY PACK S/N 982001443						
1	0	269.99	165.99	165.99	T	
STI 48504006505 AP160 BATTERY PACK S/N 982001444						
1	0	269.99	165.99	165.99	T	
STI 48504006505 AP160 BATTERY PACK S/N 982001445						
1	0	269.99	165.99	165.99	T	
STI 48504006505 AP160 BATTERY PACK S/N 982001446						
1	0	269.99	165.99	165.99	T	
STI 48504006505 AP160 BATTERY PACK S/N 982001447						
1	0	269.99	165.99	165.99	T	
STI 48504006505 AP160 BATTERY PACK S/N 982001448						

PHONE: 760-947-4673. FAX: 760-947-7400. 17494 MAIN ST., HESPERIA CA 92345  
 THANK YOU FOR YOUR PURCHASE, AND HAVE A GREAT DAY!!! HOPEMOWER@GMAIL.COM

HESPERIA OUTDOOR POWER EQUIP  
17494 MAIN ST.  
HESPERIA, CA 92345  
(760) 947-4673

Date.....: 05-08-12 17:20:00  
Invoice #...: 017282, Page 4  
Customer #...: 2451661  
Salesperson.: SM  
P.O. #.....:

BILL TO: 2451661  
MDAQMD  
14306 PARK AVE  
VICTORVILLE, CA 92392  
(760) 245-1661

SHIP TO:  
MDAQMD  
14306 PARK AVE  
VICTORVILLE, CA 92392

- INVOICE -  
TERMS: 30 Days Net, from Statement Date

IFR	PART/MODEL #	DESCRIPTION	QTY SLD	QTY B/O	PRICE	NET	TOTAL	T S  X O
							SUBTOTAL	9506.99
							TAX	736.79
							INVOICE TOTAL	10243.78
							=====	
							AMOUNT PAID	0.00
							BALANCE DUE	10243.78

RECEIVED BY: \_\_\_\_\_

HESPERIA OUTDOOR POWER EQUIP  
 17494 MAIN ST.  
 HESPERIA, CA 92345  
 (760) 947-4673

Date.....: 05-08-12 17:21:33  
 Invoice #...: 017283, Page 1  
 Customer #..: 2451661  
 Salesperson.: SM  
 P.O. #.....:

BILL TO: 2451661  
 MDAQMD  
 14306 PARK AVE  
 VICTORVILLE, CA 92392  
 (760) 245-1661

SHIP TO:  
 MDAQMD  
 14306 PARK AVE  
 VICTORVILLE, CA 92392

- INVOICE -  
 TERMS: 30 Days Net, from Statement Date

QTY	QTY	PRICE	NET	TOTAL	T	S
SLD	B/O				X	O
6	0	37.99	37.99	227.94	T	

PHONE: 760-947-4673. FAX: 760-947-7400. 17494 MAIN ST., HESPERIA CA 92345  
 THANK YOU FOR YOUR PURCHASE, AND HAVE A GREAT DAY!!! HOPEMOWER@GMAIL.COM

SUBTOTAL 227.94  
 TAX 17.67  
 INVOICE TOTAL 245.61  
 =====  
 AMOUNT PAID 0.00  
 BALANCE DUE 245.61

RECEIVED BY: \_\_\_\_\_

Form **W-9**  
(Rev. December 2011)  
Department of the Treasury  
Internal Revenue Service

### Request for Taxpayer Identification Number and Certification

Give Form to the  
requester. Do not  
send to the IRS.

Name (as shown on your income tax return) Hesperia Outdoor Power Equipment

Business name/disregarded entity name, if different from above

Check appropriate box for federal tax classification:  
 Individual sole proprietor     Corporation     S Corporation     Partnership     Trust/estate  
 Limited liability company. Enter the tax classification (C=C corporation, S=S corporation, P=partnership) >     Exempt payee  
 Other (see instructions) >

Address (number, street, and apt. or suite no.)  
17000 Main St

City, state, and ZIP code  
Hesperia CA 92345

Requester's name and address (optional)

List account number(s) here (optional)

**Part I Taxpayer Identification Number (TIN)**

Enter your TIN in the appropriate box. The TIN provided must match the name given on the "Name" line to avoid backup withholding. For individuals, this is your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the Part I instructions on page 3. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN* on page 3.

Note: If the account is in more than one name, see the chart on page 4 for guidelines on whose number to enter.

Social security number  
[ ] - [ ] - [ ]

Employer identification number  
26-2100030

**Part II Certification**

Under penalties of perjury, I certify that:

- The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me), and
- I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding, and
- I am a U.S. citizen or other U.S. person (defined below).

**Certification instructions.** You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the certification, but you must provide your correct TIN. See the instructions on page 4.

Sign Here    Signature of U.S. person > [Signature]    Date > 5-9-2012

**General Instructions**

Section references are to the Internal Revenue Code unless otherwise noted.

**Purpose of Form**

A person who is required to file an information return with the IRS must obtain your correct taxpayer identification number (TIN) to report, for example, income paid to you, real estate transactions, mortgage interest you paid, acquisition or abandonment of secured property, cancellation of debt, or contributions you made to an IRA.

Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN to the person requesting it (the requester) and, when applicable, to:

- Certify that the TIN you are giving is correct (or you are waiting for a number to be issued).
- Certify that you are not subject to backup withholding, or
- Claim exemption from backup withholding if you are a U.S. exempt payee. If applicable, you are also certifying that as a U.S. person, your allocable share of any partnership income from a U.S. trade or business is not subject to the withholding tax on foreign partners' share of effectively connected income.

Note: If a requester gives you a form other than Form W-9 to request your TIN, you must use the requester's form if it is substantially similar to this Form W-9.

**Definition of a U.S. person.** For federal tax purposes, you are considered a U.S. person if you are:

- An individual who is a U.S. citizen or U.S. resident alien.
- A partnership, corporation, company, or association created or organized in the United States or under the laws of the United States.
- An estate (other than a foreign estate), or
- A domestic trust (as defined in Regulations section 301.7701-7).

**Special rules for partnerships.** Partnerships that conduct a trade or business in the United States are generally required to pay a withholding tax on any foreign partners' share of income from such business. Further, in certain cases where a Form W-9 has not been received, a partnership is required to presume that a partner is a foreign person, and pay the withholding tax. Therefore, if you are a U.S. person that is a partner in a partnership conducting a trade or business in the United States, provide Form W-9 to the partnership to establish your U.S. status and avoid withholding on your share of partnership income.

**Air Quality Improvement Program (AQIP)  
Advanced Technology Demonstration Project:**

**Can Green Take the Heat?  
Evaluating the Use of Cordless Zero-Emission  
Commercial Lawn and Garden Equipment  
in the Extreme Climate of the Mojave Desert**

**Mobile Source Control Division  
California Air Resources Board**

**Status Report #1  
Mojave Desert Air Quality Management District  
14306 Park Avenue  
Victorville, CA 92392**

## **Project Summary**

Major Participants: MDAQMD and City of Victorville, CA Public Works Department Landscape Maintenance Districts and Parks Operations and the Hesperia (CA) Parks District for initial phase of project.

Technology Demonstrator: Since receiving the Grant Award, MDAQMD has secured Stihl Corporation (STIHL), Stanley, Black and Decker, Inc. (SBD) and MTD Products (MTD) as technology demonstrators for this project

### Specific Goals

- Evaluate performance of equipment in field.
- Evaluate effects of heat on equipment.
- Evaluate ease of operation, maintenance required and ability to retain charge.

### **Status Report #1**

Update on Project - MDAQMD is pleased to report that the following tasks have been completed in compliance with our Grant Agreement:

Milestone 1: Received grant (6/01/11). Signed agreement and returned Board resolution (6/13/11).

Milestone 2: Researched and selected Technology Demonstrator (7/2011). Prepared MOA with industry partner City of Victorville, CA and Hesperia (CA) Parks District (Jan. & Feb. 2012)

*NOTE: While Demonstration of Equipment was originally envisioned to be conducted in 3 Phases in order to allow technology demonstrators the time needed to develop equipment, it was determined that all equipment to be tested could be employed at the beginning of the test.*

Milestone 3: Ordered Equipment for First Stage of Demonstration (March and April 2012). Instructed operators (Hesperia 5/8/12) (Victorville – TBD). Originally our field test was scheduled to begin May 14, 2012; however, the start date has been moved to May 21, 2012 with the approval of ARB. This delay was due to several factors: equipment delivery delay from SBD; weather not warm enough, training not available due to equipment delay. Because all of the test equipment is being rolled out during the first phase of the test, we do not believe there should be a delay in the final report to ARB.

**Please find attached Disbursement Request Form and Invoice(s) from Hesperia Outdoor Power for \$10,489.39 total.**

**Air Quality Improvement Program  
GRANT DISBURSEMENT REQUEST FORM  
Fiscal Year 2010-2011**

**Amount of Funds Requested for this Disbursement**

1. Project Name: Can Green Take the Heat? Advanced Technology Demonstration Project

2. Business Name:  
Mojave Desert Air Quality Management District

3. Grant number:  
G10-AQIP-16

4. Contact Person:  
Holly Noel

	Original Grant	Total of Previous Disbursements	This Request	Remaining Balance
<b>Project Funds</b>	<b>\$ 15,000</b>	<b>\$10,489.39</b>	<b>\$4510.61</b>	<b>\$0</b>
<b>Admin. Funds</b>	<b>\$</b>	<b>\$</b>	<b>\$</b>	<b>\$</b>
<b>Total</b>	<b>\$15,000</b>	<b>\$10,489.39</b>	<b>\$4510.61</b>	<b>\$0</b>

Documentation attached for justification of disbursement of:

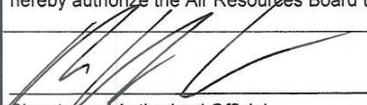
Administrative Funds

Project Funds

Attachments: Invoice from MTD Products

**Certification**

I certify that the information contained in this Grant Disbursement Request Form and all attachments is correct and complete and is in accordance with the Grant Agreement. In addition, I hereby authorize the Air Resources Board to make any inquiries to confirm this information.

  
Signature of Authorized Official  
Name:

Alan J. De Salvio  
Title:  
Supervising Engineer

Date:  
8-15-2012

# INVOICE

**REMIT TO:**  
MTD PRODUCTS COMPANY  
P.O. BOX 73411-N  
CLEVELAND OH 44193  
DUNS 00-419-6515

**MAIL TO:**  
MTD PRODUCTS COMPANY  
P.O. BOX 368022  
CLEVELAND OH 44136  
PHONE (330) 225-2600



**INVOICE NO.**  
CO 1779731

**INVOICE DATE**  
06/21/12

**PO NUMBER**  
MOJAVE DESERT AQMD

**BILL TO:**

Ms. Holly Noel  
Mojave Desert AQMD  
Air Quality Specialist  
Grants Program Coordinator  
14306 Park Avenue  
Victorville, CA 92392

**SHIP TO:**

MR. JUSTIN FOSTER OR JAMES FRALEY  
CITY OF VICTORVILLE, CALIFORNIA  
PUBLIC WORKS: FLEET MAINTENANCE DIVISION  
14177 MC ART ROAD  
VICTORVILLE, CA 92392

**DUE DATE:**  
7/20/2012

**SHIPPING INFORMATION:**

MR. JUSTIN FOSTER OR JAMES FRALEY 760-955-5284

**COMMENTS:**

DESCRIPTION/SKU # MODEL NUMBER	QUANTITY	UNIT PRICE	EXTENDED PRICE
17SVCEDS999	1	\$4,000.00	\$4,000.00

SALES TAX \$310.00

**TOTAL INVOICE \$4,310.00**

# INVOICE

**REMIT TO:**  
MTD PRODUCTS COMPANY  
P.O. BOX 73411-N  
CLEVELAND OH 44193  
DUNS 00-419-6515

**MAIL TO:**  
MTD PRODUCTS COMPANY  
P.O. BOX 368022  
CLEVELAND OH 44136  
PHONE (330) 225-2600



**INVOICE NO.**  
CO 1779354

**INVOICE DATE**  
06/21/12

**PO NUMBER**  
MOJAVE DESERT AQMD

**BILL TO:**  
Ms. Holly Noel  
Mojave Desert AQMD  
Air Quality Specialist  
Grants Program Coordinator  
14306 Park Avenue  
Victorville, CA 92392

**SHIP TO:**  
HESPERIA GOLF COURSE  
17970 Bangor Ave  
Hesperia, CA 92345-6933

**DUE DATE:**  
7/20/2012

**SHIPPING INFORMATION:**  
CONTACT BRAD COOK central delivery contact 760 550 4468 OR HECTOR AMBRIZ TO MEET AT TIME OF DELIVERY

**COMMENTS:**  
P: (760) 244-9301  
F: (760) 244-9238  
<http://www.hesperiajgolf.com>

DESCRIPTION/SKU # MODEL NUMBER	QUANTITY	UNIT PRICE	EXTENDED PRICE
17SVCEDS999	1	\$4,000.00	\$4,000.00

SALES TAX \$310.00

**TOTAL INVOICE \$4,310.00**



## INTEROFFICE MEMO

**DATE:** August 15, 2012 **PHONE:** 1885  
**FROM:** Holly Noel  
**TO:** Alan J De Salvio **cc:**

**SUBJECT: Green Heat Project MD#0511-07 Payment to Black and Decker**

Please approve payment of the attached Invoice from Black and Decker for \$11,619.35.

This request will complete the Green Heat Project MD#0511 payment requirements for this program.

This is Grant #: G10-AQIP-16.

There will be no Disbursement Request from ARB for these funds. This fulfills the majority of our 50% (plus \$5,000 administration) match for this program.

Thank you.

*okay to pay*  
*ANJ*  
*8/15/2012*

*Sent to Donna Hakers*  
*8-15-12*  
*AJ*

# Data Collection for City of Victorville Demonstration Partner

- Equipment Key
- Project User Survey



PUBLIC WORKS DEPARTMENT, FLEET EQUIPMENT LISTING

Item Description	Item Number	Volts	Model Number	Parks Dept.	Landscape Maint.
<b>Hedge Trimmers</b>					
24 Inch	1A	20	LHT2436		
24 Inch	2A	20	LHT2436		
24 Inch	3A	20	LHT2436		
24 Inch	4A	20	LHT2436		
24 Inch	5A	20	LHT2436		
24 Inch	6A	20	LHT2436		
24 Inch	7A	20	LHT2436		
24 Inch	8A	20	LHT2436		
24 Inch	9A	20	LHT2436		
24 Inch	10A	20	LHT2436		
24 Inch	11A	20	LHT2436		
<b>String Trimmers</b>					
	1B	36	LST136		
	2B	36	LST136		
	3B	36	LST136		
	4B	36	LST136		
	5B	36	LST136		
	6B	36	LST136		
	7B	36	LST136		
	8B	36	LST136		
	9B	36	LST136		
	10B	36	LST136		
	11B	36	LST136		
	12B	36	LST136		
<b>Chain Saw</b>					
	1C	20	LCS120		
	2C	20	LCS120		
	3C	20	LCS120		
	4C	20	LCS120		
	5C	20	LCS120		
<b>Pruning Saw</b>					
	1D	20			

PUBLIC WORKS DEPARTMENT, FLEET EQUIPMENT LISTING

Item Description	Item Number	Volts	Model Number	Parks Dept.	Landscape Maint.
	2D	20			
	3D	20			
	4D	20			
	5D	20			
<b>Rotor Tiller (Large)</b>					
	1E	36	CLT36		
	2E	36	CLT36		
<b>Leaf Blower</b>					
	1F	20			
	2F	20			
	3F	20			
	4F	20			
	5F	20			
	6F	20			
	7F	20			
	9F	20			
	10F	20			
	11F	20			
	12F	20			
<b>Lawn Mower</b>					
	1G	36	SPCM1936		
	2G	36	SPCM1936		
	3G	36	SPCM1936		
	4G	36	SPCM1936		
<b>Battery/Bad Batteries *</b>					
	AA	36			
	AB	36			
	AC	36			
	AD	36			
	AE	36			
	AF	36			
	AG	36			
	AH	36			

PUBLIC WORKS DEPARTMENT, FLEET EQUIPMENT LISTING

Item Description Battery/Bad Batteries *	Item Number	Volts	Model Number	Parks Dept.	Landscape Maint.
	AI	36			
	AJ	36			
	AK	36			
	AL	36			
	AM	36			
	AN	36			
	AO	36			
	AP	36			
	AQ	36			
	AR	36			
	AS	36			
	AT	36			
	AU	36			
	AV	36			
	AW	36			
	AX	36			
	AY	36			
	AZ	36			
	AAA	36			
	AAB*	36			
	AAC	36			
	AAD	36			
	AAE	36			
	AAF	36			
	AAG	36			
	AAH	36			
	AAI*	36			
	AAJ	36			
	AAK	36			
	AAL*	36			
	AAM	36			
	AAN*	36			
	AAO	36			

PUBLIC WORKS DEPARTMENT, FLEET EQUIPMENT LISTING

Item Description	Item Number	Volts	Model Number	Parks Dept.	Landscape Maint.
Battery	AAP	36			
	AAQ	36			
	BA	20			
	BB	20			
	BC	20			
	BD	20			
	BE	20			
	BF	20			
	BG	20			
	BH	20			
	BI	20			
	BJ	20			
	BK	20			
	BL	20			
	BM	20			
	BN	20			
	BO	20			
	BP	20			
	BQ	20			
	BR	20			
BS	20				
BT	20				
BU	20				
BV	20				
BW	20				
BX	20				
BY	20				
BZ	20				
BBA	20				
BBB	20				
BBC	20				
BBD	20				

PUBLIC WORKS DEPARTMENT, FLEET EQUIPMENT LISTING

Item Description	Item Number	Volts	Model Number	Parks Dept.	Landscape Maint.
	BBE	20			
	BBF	20			
	BBG	20			
	BBH	20			
<b>Battery (Large)</b>	CA	36			
	CB	36			
	CC	36			
	CD	36			
	CK	36			
	CF	36			
	CG	36			
	CH	36			
	CI	36			
	CJ	36			
	CK	36			
	CL	36			

Green Heat Demo Project User Survey

Organization/Crew:

Date: 6-4-12

Equipment Number	Battery I.D.	Area Worked vegetation, bushes, concrete, etc.	Vegetation Condition wet, moist or dry	Vegetation Characteristics thick grass, tall grass, dense bush, etc.	Type of Terrain uphill, downhill, uneven	Time of Day morning, afternoon or evening	Outdoor Temperature from thermometer	Equipment Surface Temperature hot, warm or cool	Individual Battery Run Time per battery in minutes	Grade Equipment Performance: B (for Better than usual gas powered equipment), S (for Same or similar) or W (for worse than)			
										Ease of Use	Durability	Weight	Overall
COV #16	COV #CK	grass	moist	tall grass	even	morning	70	warm	35 minutes	B	B	B	B
COV #5F	BD #1	concrete	dry		even	morning	70	warm	5 min	W	W	B	W
COV #4A	AF #8	bushes	dry	bush	uneven	morning	72	warm	12 min	B	S	B	B
COV #2B	AN #2 A+#4 AW #2	grass	moist	tall grass	uneven	morning	77	warm	07 min 06 min	B	S	B	S







































# Data Collection for Hesperia Parks Demonstration Partner

- Equipment Key
- Project User Survey

Green Heat Demo Project User Survey

Equipment Number	Organization/Crew: LAMP	Battery I.D.	Area Worked vegetation, bushes, concrete, etc.	Vegetation Condition wet, moist or dry	Vegetation Characteristics thick grass, tall grass, dense bush, etc.	Type of Terrain uphill, downhill, uneven	Time of Day morning, afternoon or evening	Outdoor Temperature from thermometer	Equipment Surface Temperature hot, warm or cool	Individual Battery Run Time per battery in minutes	Grade Equipment Performance: B (for Better than usual gas powered equipment), S (for Same or similar) or W (for worse than)		
											Ease of Use	Durability	Weight
14	CC	CC	Vegetation	dry	tall grass	even	midday	78	warm	40	S	S	S
14	DP	DP	Vegetation	dry	tall grass	uphill	morning	86	warm	48	S	S	S
15	DD	DD	veg.	dry	tall grass	even	morning	84	warm	46	S	S	S
15	CC	CC	veg	dry	tall grass	even	morning	93	warm	42	S	S	S
15	H	H	veg	dry	tall grass	even	midday	96	warm	36	S	S	S
14	H	H	veg	dry	grass	even	morning	98	warm	56	S	S	S
14	DD	DD	veg	dry	grass	even	morning	99	warm	42	S	S	S

## STIHL POWER EQUIPMENT

1. String Trimmer/432814421/FSA85
  2. Hedge Trimmer/432350341/HSA65
  3. Blower/433049156/BGA85
  4. String Trimmer/432814427/FSA85
  5. Hedge Trimmer/432350340/HSA65
  6. Blower/433049160/BGA85
  7. String Trimmer/432814424/FSA85
  8. String Trimmer/432814429/FSA85
  9. Hedge Trimmer/432350339/HSA65
  10. Blower/433049154/BGA85
  11. Blower/433049155/BGA85
  12. Chain Saw/432936815/MSA160c
  13. Walk Behind Mower/432972228/RMA370
  14. String Trimmer/432814428/FSA85
  15. String Trimmer/432814432/FSA85
- A. 982001439
  - B. 982001440
  - C. 982001441
  - D. 982001442
  - E. 982001443
  - F. 982001444
  - G. 982001445
  - H. 982001446
  - I. 982001447
  - J. 982001448
  - K. 982000789
  - L. 982000790
  - M. 982000791
  - N. 982000792
  - O. 982000793
  - P. 982000794
  - Q. 982000795
  - R. 982000749
  - S. 982000749
  - T. 982000750
  - U. 982000749
  - V. 982000750
  - W. 982000751

X. 982000752  
Y. 982000753  
Z. 982000754  
AA. 982000755  
BB. 982000756  
CC. 982000757  
DD. 982000758

Green Heat Demo Project User Survey

HRPD  
Date: 6/14 to 6/19/12

Organization/Crew:	Equipment Number	Battery I.D.	Area Worked vegetation, bushes, concrete, etc.	Vegetation Condition wet, moist or dry	Vegetation Characteristics thick grass, tall grass, dense bush, etc.	Type of Terrain uphill, downhill, uneven	Time of Day morning, afternoon, or evening	Outdoor Temperature from thermometer	Equipment Surface Temperature hot, warm or cool	Individual Battery Run Time per battery in minutes	Grade Equipment Performance: B (for Better than usual gas powered equipment), S (for Same or similar) or W (for worse than)		
											Ease of Use	Durability	Weight
	8	V	SAND BUNKERS	MOIST	TALL GRASS	UNEVEN	AFTERNOON	90°	WARM	31 min	B	S	B
	8	Y	SAND BUNKERS	MOIST	TALL GRASS	UNEVEN	AFTERNOON	87°	WARM	28 min	B	S	B
	10	Z	CONCRETE	DRY		EVEN	MORNING	70°	COOL	27 min	B	B	B
	10	U	CONCRETE	DRY	Pine Needles	EVEN	MORNING	62°	COOL	13 min	W	S	B
	8	Y	Flag	moist	thick grass	EVEN	AFTERNOON	95°	hot	28 min	B	B	B

Green Heat Demo Project User Survey

Equipment Number	Organization/Crew	Battery I.D.	Area Worked vegetation, bushes, concrete, etc.	Vegetation Condition wet, moist or dry	Vegetation Characteristics thick grass, tall grass, dense bush, etc.	Type of Terrain uphill, downhill, uneven	Time of Day morning, afternoon or evening	Outdoor Temperature from thermometer	Equipment Surface Temperature hot, warm or cool	Individual Battery Run Time per battery in minutes	Ease of Use	Durability	Weight	Overall
13		U	Grass	wet	tallgrass	DOWN	MORNING	79°	WARM	35min	B	W	B	B
7		R	Grass	wet	tallgrass	Even	MORNING	79°	WARM	1	B	W	B	S
11		Q	Concrete	wet	tallgrass	Even	MORNING	79°	WARM	40min	W	W	W	W
7		X	Grass	moist	tallgrass	Even	MORNING	44°	WARM	35min	B	W	B	S
7		K	Grass	moist	tallgrass	Even	MORNING	70°	WARM	35min	B	W	B	S
7		P	Grass	moist	Tallgrass	Even	Midday	78°	WARM	35	B	W	B	S
11		P	concrete	DRY	Low	Flat	Midday	76°	WARM	90	B	W	B	S
7		R	Grass	moist	Tallgrass	Even	Midday	76°	WARM	35	W	W	W	W
9		K	Grass	DRY	SHRUBS	Even	Afternoon	92°	WARM	20	B	W	B	B
7		K	North field	DRY	Tall grass	Even	Evening	71°	COOL	25	B	W	B	B

Organization/Crew: HRPD Lime Street  
Date: 6/3/2012 - 6/8/2012

3  
4  
5  
6  
7

Green Heat Demo Project User Survey

WEEK of  
Date: 6-1-12

Organization/Crew: HRPD / HCP CREW	Equipment Number	Battery I.D.	Area Worked vegetation, bushes, concrete, etc.	Vegetation Condition wet, moist or dry	Vegetation Characteristics thick grass, tall grass, dense bush, etc.	Type of Terrain uphill, downhill, uneven	Time of Day morning, afternoon, or evening	Outdoor Temperature from thermometer	Equipment Surface Temperature hot, warm or cool	Individual Battery Run Time per battery in minutes	Grade Equipment Performance: B (for Better than usual gas powered equipment), S (for Same or similar) or W (for worse than)		
											Ease of Use	Durability	Weight
	5	I	BUSHES	DRY	BUSH	EVEN	MORNING	85°	cool	38.1	S	S	S
	5	J	Bushes	DRY	BUSH	EVEN	MORNING	89°	cool	40.5	S	S	S
	6	E	Concrete	DRY	Surface	uneven	Afternoon	92°	cool	13.7	W	B	W
	6	F	Concrete	Dry	Surface	uneven	Afternoon	95°	Warm	14.1	W	B	W
	6	E	Concrete	Dry	N/A	Even	Afternoon	77°	cool	9.8	W	B	W
	6	F	Concrete	Dry	N/A	even	Afternoon	77°	warm	6.0	W	B	W
	6	G	Concrete	Dry	N/A	Even	Morning	74°	cool	13.9	W	B	W
	5	F	BUSHES	DRY	BUSH	EVEN	MORNING	68°	cool	82.9	B	S	B



Green Heat Demo Project User Survey

Equipment Number	Organization/Crew	Battery I.D.	Area Worked vegetation, bushes, concrete, etc.	Vegetation Condition wet, moist or dry	Vegetation Characteristics thick grass, tall grass, dense bush, etc.	Type of Terrain uphill, downhill, uneven	Time of Day morning, afternoon, or evening	Outdoor Temperature from thermometer	Equipment Surface Temperature hot, warm or cool	Individual Battery Run Time per battery in minutes	Grade Equipment Performance: B (for Better than usual gas powered equipment), S (for Same or similar) or W (for worse than)			
											Ease of Use	Durability	Weight	Overall
14	ADA	DD	carcets, grass	moist	thick grass	level	morning	80	hot	45min	W	W	W	W
14	ADA	AA	grass	dry	thick grass	level	Afternoon	98	hot	20min	S	W	B	W
14	ADA	DD	grass	dry	thick grass	level	morning	75	warm	60min	S	S	S	S
14	ADA	CC	grass	dry	thick grass	level	morning	75	warm	20min	S	S	S	S
15	ADA	AA	grass	dry	grass	level	morning	78	warm	40min	S	S	S	S
15	ADA	BB	grass	dry	grass	level	Afternoon	80	warm	35min	S	S	S	S
14	ADA	DD	grass	wet	grass	level	morning	80	warm	35	W	W	W	W
14	ADA	AA	grass	wet	grass	level	morning	84	warm	40	W	W	W	W

10/1

11/1

12/1

Green Heat Demo Project User Survey

Organization/Crew:		Date: 6-4-12											
Equipment Number	Battery I.D.	Area Worked vegetation, bushes, concrete, etc.	Vegetation Condition wet, moist or dry	Vegetation Characteristics thick grass, tall grass, dense bush, etc.	Type of Terrain uphill, downhill, uneven	Time of Day morning, afternoon or evening	Outdoor Temperature from thermometer	Equipment Surface Temperature hot, warm or cool	Individual Battery Run Time in minutes per battery	Ease of Use	Durability	Weight	Overall
Grade Equipment Performance: B (for Better than usual gas powered equipment), S (for Same or similar) or W (for worse than)													
COV #16	COV #CK	grass	moist	tall grass	even	morning	70	warm	35 minutes	B	B	B	B
COV #5F	BD #1	concrete	dry		even bush	morning	70	warm	5 min	W	W	B	W
COV #4A	AF #8	bushes	dry	bush	uneven	morning	72	warm	12 min	B	S	B	B
COV #2B	AN #2 A+#4 AU #2	grass	moist	tall grass	even bush	morning afternoon	77	warm	08 min 07 min 06 min	B	S	B	S





Green Heat Demo Project User Survey

Equipment Number	Organization/Crew	Battery I.D.	Area Worked vegetation, bushes, concrete, etc.	Vegetation Condition wet, moist or dry	Vegetation Characteristics thick grass, tall grass, dense bush, etc.	Type of Terrain uphill, downhill, uneven	Time of Day morning, afternoon or evening	Outdoor Temperature from thermometer	Equipment Surface Temperature hot, warm or cool	Individual Battery Run Time per battery in minutes	Grade Equipment Performance: B (for Better than usual gas powered equipment), S (for Same or similar) or W (for worse than)			
											Ease of Use	Durability	Weight	Overall
19		92	vegetation	dry	thick grass	level	E	95	W	30	B	S	B	W
7B		AQ	"	d	"	"	M	75	W	5	S	W	B	W
9B		A0	"	d	"	"	M	80	W	15	S	S	B	W
19		CD	"	d	"	"	E	99	W	10	B	W	B	W
4B		AI	"	d	"	"	M	80	W	25	S	W	B	W
8B		AR	"	wet	"	"	M	98	W	30	S	W	B	W
5B		AAP	"	.W	"	"	E	95	W	10	S	W	B	W

Date: 6-1-12

Organization/Crew: MOW CREW



Green Heat Demo Project User Survey

Organization/Crew: <i>Parks Crew Crew</i>		Date: <i>6-6-12</i>											
Equipment Number	Battery I.D.	Area Worked vegetation, bushes, concrete, etc.	Vegetation Condition wet, moist or dry	Vegetation Characteristics thick grass, tall grass, dense bush, etc.	Type of Terrain uphill, downhill, uneven	Time of Day morning, afternoon or evening	Outdoor Temperature from thermometer	Equipment Surface Temperature hot, warm or cool	Individual Battery Run Time per battery in minutes	Ease of Use	Durability	Weight	Overall
<i>TG1</i>	<i>COV#5</i>	<i>Turf grass</i>	<i>D</i>	<i>TG1</i>	<i>U</i>	<i>M</i>	<i>77</i>	<i>W</i>	<i>40 min</i>	<i>S</i>	<i>S</i>	<i>B</i>	<i>S</i>
<i>COV#3</i>	<i>COV#4</i>	<i>Turf grass</i>	<i>M</i>	<i>TG1</i>	<i>U</i>	<i>A</i>	<i>79</i>	<i>W</i>	<i>45 min</i>	<i>S</i>	<i>S</i>	<i>B</i>	<i>S</i>
<i>COV#5</i>	<i>ARP</i>	<i>Turf grass</i>	<i>D</i>	<i>TG1</i>	<i>U</i>	<i>M</i>	<i>77</i>	<i>C</i>	<i>25 min</i>	<i>S</i>	<i>S</i>	<i>B</i>	<i>W</i>
	<i>AR3</i>	<i>Turf grass</i>	<i>M</i>	<i>TG1</i>	<i>U</i>	<i>A</i>	<i>79</i>	<i>C</i>	<i>25 min</i>	<i>S</i>	<i>S</i>	<i>B</i>	<i>W</i>

Green Heat Demo Project User Survey

Equipment Number	Organization/Crew	Battery I.D.	Area Worked vegetation, bushes, concrete, etc.	Vegetation Condition wet, moist or dry	Vegetation Characteristics thick grass, tall grass, dense bush, etc.	Type of Terrain uphill, downhill, uneven	Time of Day morning, afternoon or evening	Outdoor Temperature from thermometer	Equipment Surface Temperature hot, warm or cool	Individual Battery Run Time per battery in minutes	Grade Equipment Performance: B (for Better than usual gas powered equipment), S (for Same or similar) or W (for worse than)			
											Ease of Use	Durability	Weight	Overall
8B		AAA	GRASS EDGEING	MOIST	NORMAL	EVEN	M	77°	WARM	10M	SW	W	B	S
		AQ	GRASS	M	THICK	E	M	"	W	10M				
		AQ	GRASS	M	THICK	E	M	"	W					
			GRASS EDGEING	D	NORMAL	E	A	84°	W	5M				

Organization/Crew: PARKS (Mowden) Date: 06/06/12







Green Heat Demo Project User Survey

Organization/Crew: <i>new crew</i>		Date: <i>6-7-12</i>											
Equipment Number	Battery I.D.	Area Worked vegetation, bushes, concrete, etc.	Vegetation Condition wet, moist or dry	Vegetation Characteristics thick, grass, tall grass, dense bush, etc.	Type of Terrain uphill, downhill, uneven	Time of Day morning, afternoon or evening	Outdoor Temperature from thermometer	Equipment Surface Temperature hot, warm or cool	Individual Battery Run Time per battery in minutes	Ease of Use	Durability	Weight	Overall Grade Equipment Performance: B (for Better than usual gas powered equipment), S (for Same or similar) or W (for worse than)
<i>8B</i>	<i>AC</i>	<i>vegetation</i>	<i>dry</i>	<i>thin</i>	<i>even</i>	<i>M</i>	<i>87</i>	<i>W</i>	<i>30</i>	<i>B</i>	<i>W</i>	<i>B</i>	<i>W</i>
<i>8B</i>	<i>AI</i>	<i>"</i>	<i>"</i>	<i>"</i>	<i>"</i>	<i>"</i>	<i>"</i>	<i>"</i>	<i>22</i>	<i>B</i>	<i>W</i>	<i>B</i>	<i>W</i>
<i>9B</i>	<i>AP</i>	<i>"</i>	<i>"</i>	<i>"</i>	<i>"</i>	<i>A</i>	<i>90</i>	<i>"</i>	<i>25</i>	<i>B</i>	<i>W</i>	<i>B</i>	<i>W</i>
<i>9B</i>	<i>AR</i>	<i>"</i>	<i>"</i>	<i>"</i>	<i>"</i>	<i>A</i>	<i>90</i>	<i>"</i>	<i>25</i>	<i>B</i>	<i>W</i>	<i>B</i>	<i>W</i>







HRRD

Green Heat Demo Project User Survey

Organization/Crew: <u>LMX Street</u>		Date: <u>7/9-7/13</u>		Grade Equipment Performance: B (for Better than usual gas powered equipment), S (for Same or similar) or W (for worse than)									
Equipment Number	Battery I.D.	Area Worked vegetation, bushes, concrete, etc.	Vegetation Condition wet, moist or dry	Vegetation Characteristics thick grass, tall grass, dense bush, etc.	Type of Terrain uphill, downhill, uneven	Time of Day morning, afternoon, or evening	Outdoor Temperature from thermometer	Equipment Surface Temperature hot, warm or cool	Individual Battery Run Time per battery in minutes	Ease of Use	Durability	Weight	Overall
13	M	grass	moist	thick/tall	EVEN	morning	85°	warm	20	S	S	B	S
7	V	grass	moist	tall	EVEN	morning	89°	warm	10	S	S	B	B
11	K	concrete	dry	—	EVEN	morning	89°	warm	15	W	S	W	W
7	L	grass	moist	thick/tall	EVEN	morning	88°	warm	22	B	S	B	B
7	W	grass	moist	thick/tall	EVEN	morning	90°	warm	20	B	S	B	B
7	K	grass	moist	thick/tall	EVEN	morning	94°	warm	17	B	S	B	B
11	Q	concrete	dry	—	EVEN	morning	93°	warm	20	W	S	W	W
7	O	grass	moist	thick	EVEN	morning	80°	warm	17	B	S	B	B
7	P	grass	moist	thick	EVEN	morning	90°	warm	15	B	S	B	B
11	M	concrete	dry	—	EVEN	morning	91°	warm	22	W	S	W	W

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Black & Decker Product Trial –  
Victorville Public Works Department  
Feedback from Kate Piche, SBD Employee  
Product Download Completed at PW Yard in Victorville, CA

Trial Details & Feedback:

1. Products placed in May 2012 with installed timers which were removed and downloaded in January 2013. Almost all products returned for timer download.
  - a. Mowers and Tillers were returned without batteries.
2. Interviews conducted with Ed Sohm and Justin Foster after product download to add feedback to timer data. Observations and conclusions below largely supported by their feedback.
3. Many products unused or used for short time. Products were divided into two groups for use by either public works or parks department. Products with parks department had more use, but both groups gave feedback that more power was primary request with extended runtime as secondary request.
4. Feedback from both teams suggested time constraints were the biggest factor leading to reverting back to gas equipment due to amount of work. Faster speeds were requested on all tools with goal of faster task completion.
5. Runtime was an issue and extended runtime or additional battery packs would be required for future use. However, charging is still a concern during the middle of the day. Charging at the end of the day wasn't a problem. Teams indicated they would plug in all batteries at the end of the day to charge overnight.

Email from Kate Holly,

The runtime is in hours. The unit with the most use was a string trimmer with 2.6 hours of use, which translates to 2 hours and 36 minutes, or a total of 156 minutes. I've added a runtime column into the attached translating the runtime into minutes to give you a second data point for the very low use tools. Some of the tools that have less than a minute of use recorded were never actually used except to initiate the timers and ensure the unit was working during pack-in and teardown.

Switch cycles indicate the number of times the trigger was engaged. The more times the trigger was engaged shows the more starts and stops a crew member would have done in the course of using the tool. Sometimes that can show they are using it for more short quick bursts of trimming and saving the battery power in between (which is a key advantage of battery powered tools over gas powered equipment which need to keep the gas engine running the whole time during use even when not cutting). For the units with higher usage times, there are high switch cycles which implies that the users took advantage of this and preserved battery power in between applications.

I have corrected the years and attached an updated report. Thank you for catching that.

As far as the equipment that wasn't used, the biggest factor in the feedback was time and the nature of the labor for each group. Generally the public works department used their equipment less or not at all. One of the suggested factors was they were using contract labor and concerned about the added cost of any wasted time and defaulted to gas equipment. The Parks Department gave their tools more use and a better trial, but they said they typically had sentenced labor use the cordless tools because there was less concern about the cost of labor time there. Both groups referenced a big reduction in staff during the trial period as a big factor in defaulting back to gas equipment in order to handle the work load in less time.

Please let me know if you have any other questions I can answer.

Thank you,

**Kate Piche** Product Manager  
CDIY | Stanley Black & Decker, Inc.

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**StanleyBlack&Decker**

LHT2436	11	201148	H				broken guard, cracked on both sides and broke off, unit works, no timer data	broken guard
LPP120	1	201150	M				working, bad timer	
LPP120	2	201209	L				working, timer not wired properly	
LPP120	3	201210	M	0.02	1.45	46	working	
LPP120	4	201209	M				working	
LPP120	5	201209	M	0.06	3.80	16	working	
LST136	1	201148	M	0.10	6.05	42	n/a	
LST136	2	201148	H	1.05	62.70	197	Spool cap missing, can be moved into edge mode without button being depressed (head rotating freely)	
LST136	3	201148	M	1.17	70.35	348	n/a	
LST136	4	201148	L	0.00	0.25	11	Spool cap came off easily, indicator light on battery not working	
LST136	5	201148	L	0.28	17.03	15	n/a	
LST136	6	201146	H	2.60	155.82	433	Spool cap missing	
LST136	7	201148	H	0.30	17.88	56	n/a	
LST136	8	201148	H	1.59	95.13	447	chipped power select wheel	
LST136	9	201148	No				No use	
LST136	11	201148	H	0.50	30.10	40	Height adjust (lever lock) out of place (loosened)	
LST136	1210	201148	H	1.63	97.68	512	Cracked guard	
LST136	A	201148	H				n/a	
LSW20	1	201202	M	0.63	37.55	54	working	
LSW20	2	201152	M				no timer data	
LSW20	3	201152	M	0.03	1.63	2	working	
LSW20	4	201152	M	0.39	23.67	40	working	
LSW20	5	201152	M	0.08	4.93	6	working	
LSW20	6	201152	M	0.01	0.50	9	working	
LSW20	7	201152	M	2.18	131.03	200	working	
LSW20	8	201152	M	0.03	1.98	15	working	
LSW20	9	201152	M	2.27	136.47	217	working	
LSW20	10	201152	M	0.29	17.12	57	working	
LSW20	11	201152	L	0.24	14.28	4	working	
LSW20	A	201152	No				not working	
SPCM1936	1	201206	H				padding on handle torn, housing very faded	
SPCM1936	2	201206	H				padding on handle torn, housing very faded	
SPCM1936	3	201206	No				no use	
SPCM1936	4	201206	M					