

2016 State Water Efficiency and Enhancement Program

State Water Efficiency and Enhancement Program is funded by the "California Climate Investments" program



Request for Grant Applications

Released:
June 20, 2016

Grant Applications Due:
By 5:00 p.m. PDT on August 5, 2016
No late submissions accepted.



California Department of Food and Agriculture

1220 N Street, Room 120
Sacramento, CA 95814
(916) 657-3231
grants@cdfa.ca.gov

Table of Contents

Background and Purpose	1
Funding and Duration	1
Eligibility and Exclusions	1
Timeline	1
Project Types	2
Water Savings	2
Greenhouse Gas Emission Reductions	2
Other Management Practices	3
Program Requirements.....	3
Technical Assistance.....	4
Grant Application Process	4
How to Apply.....	4
Project Design.....	5
Water and Energy Use Documentation.....	5
Budget Worksheet.....	7
Allowable Costs.....	7
Unallowable Costs	8
Review and Evaluation Process	8
Additional Considerations	8
Assistance and Questions.....	10
Notification and Feedback	10
Disqualifications	11
Award Process	11
Appendix A: Grant Application Checklist	
Appendix B: FFAST Grant Application Questions	
Appendix C: Budget Worksheet	
Appendix D: ARB Quantification Methodology for SWEEP	
Appendix E: USDA NRCS Payment Schedule	

Background and Purpose

The California Department of Food and Agriculture (CDFA) is pleased to announce, in coordination with the State Water Resources Control Board (SWRCB) and the Department of Water Resources (DWR), a competitive grant application process for the 2016 State Water Efficiency and Enhancement Program (SWEEP) Round II.

The 2016 SWEEP funding arises from the Budget Act of 2015, SB 101, (Chapter 321, Statutes of 2015), which authorizes CDFA to “support greenhouse gas emission reductions through water and energy efficiency grants promoting water and energy savings.” SWEEP is funded through the Greenhouse Gas Reduction Fund referred to as the “California Climate Investment” program.

The program’s objective is to provide financial incentives for California agricultural operations to invest in water irrigation systems that reduce greenhouse gas (GHG) emissions and save water.

Funding and Duration

The 2016 SWEEP Round II will disperse up to \$18 million to California agricultural operations investing in irrigation systems that reduce GHG emissions and save water. The maximum grant award is \$200,000 with a recommended 50 percent match of the total project cost. The maximum grant duration is 12 months and grant funds cannot be expended before December 1, 2016 or after November 30, 2017. Therefore, project installation must be completed no later than November 30, 2017. CDFA reserves the right to offer an award different than the amount requested.

Eligibility and Exclusions

The irrigation project must be on a California agricultural operation.

- For the purpose of this program, an agricultural operation is defined as row, vineyard, field and tree crops, commercial nurseries, nursery stock production, and greenhouse operations.
- Academic institutions and governmental organizations are **not** eligible for funding.

An agricultural operation entity **cannot** receive a total cumulative SWEEP funding amount of more than \$600,000.

Projects **must** reduce GHG emissions **and** save water. Applicants must provide supporting documentation directly related to actual, on-farm water consumption and GHG emissions during the prior growing season to be eligible for funding.

SWEEP funding cannot be combined with United States Department of Agriculture (USDA), Natural Resource Conservation Service (NRCS) Environmental Quality Incentive Program (EQIP) financial assistance.

Timeline

The application period begins Monday, June 20, 2016. The deadline to submit a grant application is Friday, August 5, 2016 at 5 p.m. (PDT). **No exceptions will be granted for late submissions.**

CDFA will conduct four workshops on the 2016 SWEEP Round II grant solicitation process and program requirements. For CDFA grant application workshop schedule and locations, visit the SWEEP website at www.cdfa.ca.gov/go/SWEEP.

Invitation to submit Grant Applications	June 20, 2016
CDFG Grant Application Workshops	June 22 – June 29, 2016
Grant Applications Due	August 5, 2016 5:00 p.m. PDT
Announce and Award Funding	November 2016

(See [Technical Assistance Section](#) for details regarding technical assistance workshops available for assistance with development of and/or submission of a grant application.)

Project Types

CDFG has identified the following project types that address GHG emission reductions *and* water conservation. The project types are intended to guide prospective applicants to develop projects that achieve GHG emission reductions *and* water savings. Applicants should consider incorporating several projects types listed below in order for a proposed project to achieve both GHG emission reductions *and* water savings.

Water Savings

Weather, Soil or Plant Based Sensors for Irrigation Scheduling

Examples include soil moisture or plant sensors (NRCS Conservation Practice Standard 449) with electronic data output or electronic weather station linked to irrigation controller, for growers to ensure efficient irrigation scheduling. Use of evapotranspiration (ET) based irrigation scheduling, such as the California Irrigation Management Information System (CIMIS) on existing or proposed projects to optimize water efficiency for crops. Telemetry components that allow the electronic communication between technology devices are eligible for funding through SWEEP.

Micro-Irrigation or Drip Systems

Use of micro-irrigation or drip systems, including sub-surface drip systems. Should follow NRCS Conservation Practice Standard 441.

Greenhouse Gas Emission Reductions

Fuel Conversion

The conversion of a fossil fuel pumps to solar, wind, electric, or natural gas resulting in a reduction of GHG emissions. Renewable energy, including solar, installations that power irrigation systems are eligible for SWEEP funding.

Improved Energy Efficiency of Pumps

Examples include retrofitting or replacing pumps. NRCS Conservation Practice Standard 372 may apply.

Low Pressure Systems

Use of low pressure irrigation systems to reduce pumping and energy use. For example, the conversion of a high pressure sprinkler system to a low pressure micro-irrigation system or lower pressure sprinkler system. Should follow NRCS Conservation Practice Standards 441 or 442.

Variable Frequency Drives

Use of Variable Frequency Drives to reduce energy use and match pump flow to load requirements. Should follow NRCS Conservation Practice Standard 533.

Reduced Pumping

For example, improved irrigation scheduling may lead to reduced pump operation times.

Other Management Practices

CDFA supports innovative projects and understands there is variability in irrigation systems throughout California. For this reason, applicants may propose projects that do not fit into the above project types as long as water savings can be calculated *and* GHG reductions can be quantified using the [Air Resources Board \(ARB\)-approved Quantification Methodology \(Appendix D\)](#).

Program Requirements

An agricultural operation can only submit one grant application using a unique tax identification number. Note that if an agricultural operation does not have a unique tax identification number, that operation should only use the last four digits of their social security number (e.g., 000-00-1234) as their unique business identification number in their grant application.

An agricultural operation must use the operation's legal business name and associated tax identification number in their application. The business name provided in the application is the operation entity to which CDFA will extend a Grant Agreement if the project is selected for an award of funds. (See page 11 for details regarding the Award Process.)

Applications *cannot* build upon *any* previously funded SWEEP projects directly affecting the same Assessor's Parcel Numbers (APN). However, applicants are encouraged to apply for a new project with different APNs.

Applicants must include flow meters in their proposed project or demonstrate actual water use will be *measured* with existing flow meters. (See page 5 for more specifics on project design requirements.)

The California Air Resources Board (ARB) has developed a GHG calculation methodology for use in estimating proposed projects GHG reductions. This methodology includes a GHG Calculator Tool intended to assist applicants in determining GHG reductions from estimated on-farm energy savings as a result of project implementation.

Applicants are required to use and submit the ARB GHG Calculator Tool provided in Section B of the California Air Resources Quantification Methodology for SWEEP, which is available at: <http://www.arb.ca.gov/cc/capandtrade/auctionproceeds/quantification.htm>. In order to complete this calculator, applicants will need to attach a pump efficiency test for existing irrigation pumps impacted by the proposed project.

SWEEP grant funds cannot be used to:

- Expand existing agricultural operations (i.e., additional new acreage cannot be converted to farmland)
- Install new groundwater wells or increase well depth
- Test new technology or perform research

(See pages 7 – 8 for information on allowable and unallowable costs.)

If selected for an award, execution of the Grant Agreement is conditional upon applicants agreeing to the following program requirements:

- Project consultation conducted by a CDFA Environmental Scientist to confirm project site information and discuss implementation plans

- Post-project verification conducted by a CDFA Environmental Scientist, or in partnership with a local Resource Conservation District (RCD), to evaluate the project site and quantify GHG reductions and water savings
- All project-related water and energy use records must be made available to CDFA or its designees for three years following project implementation
- Expectation to use and maintain system for a minimum of 10 years

(See [page 11](#) for more details regarding project implementation requirements.)

Technical Assistance

CDFA strongly encourages applicants to obtain technical assistance from a professional irrigation specialist when developing their grant application. These specialists are key resources in calculating the potential GHG reductions and water savings of the project design. Therefore, the technical assistance of professional irrigation specialist will improve the accuracy of GHG reductions and water savings calculations resulting in a more competitive grant application.

In addition to CDFA's grant application workshops, technical assistance workshops will be hosted by California academic research institutions, RCDs or non-profit organizations that were awarded a 2016 SWEEP Technical Assistance Workshop grant. The Technical Assistance Workshops are an opportunity for SWEEP applicants to obtain assistance with the development of and/or submission of their SWEEP grant application. Applicants will have access to a computer and internet, and an irrigation expert will also be available to provide guidance on completing the required GHG reductions and water savings calculations and answer any technical questions. Access CDFA SWEEP website www.cdfa.ca.gov/go/sweep for more details regarding these technical assistance workshops.

Grant Application Process

How to Apply

CDFA continued its partnership with the State Water Resources Control Board (SWRCB) to host a web-based application submission process. Applicants will utilize the SWRCB's Financial Assistance Application Submittal Tool (FAAST). FAAST can be accessed through the SWRCB website at <http://faast.waterboards.ca.gov/>. Applicants must create a user account in FAAST in order to submit a grant application.

FAAST is organized into several tabs and includes a question and answer format. The Questionnaire tab in FAAST contains the grant application, which is a series of questions regarding the proposed project. Questions are answered in one or more of the four following formats: a drop down menu; a check box; a text box with predetermined character limitations; or as a document attachment. Responses to all questions must be submitted in the manner and format required by the application questionnaire in FAAST without exception.

The SWRCB website contains a Frequently Asked Questions section and a User's Manual for the FAAST system. After reading the information available on the website, applicants that have additional questions about the FAAST System should contact FAAST customer service at (866) 434-1083, Monday through Friday, 8:00 am to 5:00 pm or via email, faast_admin@waterboards.ca.gov.

In advance of completing the application questionnaire in FAAST, applicants are encouraged to gather all required information using [Appendix A: Grant Application Checklist](#) and [Appendix B: FAAST Grant Application Questions](#) to facilitate effective and timely submission of the grant application.

Applicants are required to submit the following attachments:

- Project design
- Completed [Budget Worksheet](#)
- Completed [USDA NRCS Irrigation Water Savings Calculator Workbook](#)
- Completed [ARB GHG Calculator Tool](#) provided in the ARB Quantification Methodology for SWEEP, including the following supporting documents related to inputs provided in the ARB GHG Calculator Tool
 - Baseline GHG emission documentation (e.g., fuel receipts or utility bills)
 - Pump efficiency tests and pump specification documents. *(Required by the ARB Quantification Methodology)*

Project Design

Applicants are required to submit a project design for the proposed irrigation system. The design must include a detailed schematic and locations of where equipment and infrastructure will be installed in the field.

Project designs must also include the following, as applicable:

- For new infrastructure, such as new irrigation piping, pumps, or sensors, include a detailed schematic and locations of the where that infrastructure will be installed on the field
- For improvements to existing infrastructure, include a schematic illustrating where the improvements will be made to the existing infrastructure
- Identify pertinent agronomic information, such as the crop and water distribution uniformity value of the irrigation system
- For use of ET based irrigation scheduling, show water deliveries can be made on a consistent basis to accommodate that scheduling
- Projects that include the installation of renewable energy, such as photovoltaic panels, must include the location, engineering and energy output specifications of the proposed installation

Water and Energy Use Documentation

Applicants are required to submit water and energy use supporting documentation to substantiate water savings and GHG reductions calculations provided in their application.

Grant Applications that do not attach the required types of water and energy use documentation cannot be funded.

Specific requirements pertaining to water and GHG documentation are specified below:

Water Use Documentation

Irrigation Water Savings Calculator (Microsoft Excel Workbook)

The USDA, NRCS Field Office Technical Guide – Irrigation Water Savings Calculator allows applicants to select specific variables directly related to current on-farm irrigation and proposed irrigation systems, and therefore, is sufficient documentation to demonstrate baseline water use and projected water savings estimates.

“Applicants are required to provide electronic documentation that is complete and sufficient to allow the calculations to be reviewed and replicated.”

[SWEEP Quantification Methodology](#)

For detailed instructions on completing the Irrigation Water Savings Calculator, refer to [Appendix C of the ARB GHG Quantification Methodology](#).

Applicants must complete and attach the [USDA NRCS Irrigation Water Savings Calculator](#) to their grant application. Applicants must complete the “input” tab of the calculator to estimate baseline water use and projected water savings after project installation. Note that the Irrigation Water Savings Calculator is also a required input to the ARB GHG Calculator Tool.

Greenhouse Gas Emission Documentation

To determine the impact of the proposed project on GHG emissions, applicants *must* follow the ARB-approved GHG Quantification Methodology ([Appendix D](#)). This methodology utilizes a GHG Calculator Tool developed by ARB to estimate GHG emission reductions from changes in fuel use.

The Quantification Methodology can also be found at:
<http://www.arb.ca.gov/cc/capandtrade/auctionproceeds/cdfasweepqm.pdf>.

ARB GHG Calculator Tool (Microsoft Excel workbook)

Applicants are required to complete and attach the [ARB GHG Calculator Tool](#) to their grant application. Applicants must use energy records from 2015, and other on-farm specifications (e.g., pump tests) to complete the calculator.

Supporting Documentation for GHG Calculations

Supporting documentation submitted along with the calculator must be sufficient to allow for CDEA or ARB to replicate the calculations. Applicants must provide an explanation of inputs used in the calculator in their application.

Applicants are required to attach the following supporting documentation:

- Utility bills, actual fuel receipts, and/or field operational logs covering at least six months of the peak pump energy use for the prior irrigation and growing season (2015), not to exceed a total of 12 months. (In situations where the project involves crop rotation, up to three years of supporting documents may be provided to substantiate a representative baseline of energy use from pumping.)
 - Documents must capture actual, not estimated, energy use data (e.g., gallons, kWh, etc.)
 - Documents must indicate a specific time period (e.g., months/dates) for the on-farm energy use. (For months with no on-farm energy use, indicate no usage for those months during the growing season.)
 - Field operational logs are defined as on-farm data compiled during a growing season and maintained as a common business practice by the agricultural operation to capture an actual time period (e.g., months and dates) of on-farm energy use values (e.g., gallons, kWh, etc.). Documents that provide estimates are *not* considered field operational logs.
- Pump and motor specifications
- Pump tests for existing pump(s)
- Completed [USDA NRCS Irrigation Water Savings Calculator](#)

Applicants will be required to describe how the baseline GHG calculation value is supported by the on-farm energy documentation attached to their grant application. A response must be provided in the grant application explaining how the GHG documentation directly relates to the irrigation system.

The projected GHG savings value must be based on the time period that correlates with the records submitted with the application.

Budget Worksheet (*Microsoft Excel workbook*)

Download the Budget Worksheet template from the [CDFA SWEEP website](#). Applicants are required to download and complete a Budget Worksheet by entering the amount of grant funds budgeted for each category and itemizing all allowable costs included in the grant request for the proposed project.

The Budget Worksheet must be attached in Microsoft Excel format and be consistent with the project design. (See [Appendix C](#)) Failure to submit the required Budget Worksheet or submission of an alternate template/file type may result in disqualification.

Applicants should use the USDA, NRCS payment schedules as a guide, to the extent feasible, to determine project costs. (See [Appendix E](#) for the USDA, NRCS Payment Schedules.)

Budget Cost Categories:

A. Supplies

Itemize the estimated cost of supplies by providing a description and quantity to be purchased. Supplies are items with an acquisition cost less than \$5,000 per unit that are used exclusively for the project (e.g., pipes, tubing).

B. Equipment

Itemize the estimated cost for any equipment by providing a description and quantity to be purchased. Equipment is an article of nonexpendable, tangible personal property, which equals or exceeds \$5,000 per unit (e.g., solar panels, irrigation pumps).

C. Labor

Labor costs **cannot** exceed 25% of the total SWEEP grant request. Labor costs in excess of 25% of the total SWEEP grant request must be covered by matching funds. Estimate the cost for any work on the project that will be performed by individuals associated with a contractor. Provide a brief description of services and the cost/hour necessary for installation (e.g., labor for electrician, concrete work).

D. Other

Itemize the estimated cost of any other allowable expenses not covered in the previous budget categories necessary for project implementation (e.g., permits, monthly or annual service charges).

Allowable Costs

Project costs must be itemized and clearly support installation of irrigation systems, including supplies, equipment, labor, and any other allowable cost necessary for project implementation.

Examples of allowable costs include:

- Installation of photovoltaic panels to power irrigation systems
- All components of micro-irrigation irrigation systems
- Sensor hardware and telemetry
- Software associated with sensors and weather stations
- Flow meters

Unallowable Costs

Unallowable costs, include, but are not limited to:

- Project design costs
- Costs associated with technical assistance
- Post-project service charges and maintenance costs associated with the irrigation system
- Non-labor costs (e.g., management) and fees associated with project oversight
- Labor costs in excess of 25% of the total SWEEP grant request
- Supplies and equipment costs not related to irrigation or water distribution systems
- Costs associated with drilling of new or expanding groundwater wells
- Irrigation training courses
- Soil management practices
- Pump efficiency test

Review and Evaluation Process

CDFA will conduct multiple levels of review during the grant application process:

1. The first level of review is an administrative review to determine whether application requirements were met, and if applicable, assess an applicant's past SWEEP grant performance.
2. The second level review is a technical review by a group of agricultural irrigation water system specialists and experts affiliated with the University of California and California State University systems. The technical reviewers will evaluate grant applications based on the overall expected success of the project, including the potential for the project to reduce GHG emissions *and* save water.
3. CDFA will select applications for funding based upon the score provided by the reviewer, the level of GHG reductions and water savings and several other additional considerations. CDFA's intent is to fund projects that can produce the highest degree of GHG emission reduction *and* water savings.

Additional Considerations

During the review process, the following additional considerations will be evaluated when selecting projects for an award of funds based on the number of additional criteria met:

- Completion of or commitment to complete Irrigation Training
- Location within a Critical Over-drafted Groundwater Basin
- Soil Management Practices
- Matching Funds
- New SWEEP Recipients

Irrigation Training

Irrigation training is a critical component to irrigation management and agricultural water conservation. CDFA strongly encourages applicants to participate in an irrigation training course to maximize the benefits of a well-designed and maintained irrigation system. During the review process, grant applications will receive additional consideration if the applicant has attended an irrigation training relevant to the SWEEP project within the last two years or commits to attend an irrigation training course during the course of the project term.

Applicants may consider training resources provided on the program website at www.cdfa.ca.gov/go/SWEEP. However, applicants may also select an alternative training course that best meets the needs of their operation. Applicants must identify the irrigation training course in their grant application.

If awarded, the irrigation training course will become part of the Grant Agreement between the agricultural operation and CDFA. Therefore, project completion will be conditional upon completing the required training course during the grant term. Recipients must provide evidence (i.e., certificate of completion) confirming attendance. CDFA encourages agricultural operations to consider both the agricultural operation’s manager and irrigator attend a training course; however, only one agricultural operation representative is required to attend.

Applicants that previously completed irrigation training must attach evidence (e.g., certificate of completion) to the grant application confirming attendance to receive the extra consideration during the review process.

Critically Over-drafted Groundwater Basins

Projects that demonstrate reduced groundwater pumping within critically over-drafted groundwater basins will receive extra consideration during the review process. Applicants must use the [DWR online map](#) to determine if their project falls within a critically over-drafted groundwater basin as identified by the DWR. A list of the basins, including the basin numbers, is identified in Table 1 below. If a proposed project reduces groundwater pumping within a critically over-drafted ground water basin, applicants must identify the basin name and corresponding number within the application.

Table 1

List of Critically Over-drafted Groundwater Basins (January 2016)	
Basin Number	Basin/Sub-basin Name
3-01	Soquel Valley
3-02	Pajaro Valley
3-04.01	180/400 Foot Aquifer
3-04.06	Paso Robles
3-08	Los Osos
3-13	Cuyama Valley
4-04.02	Oxnard
4-06	Pleasant Valley
5-22.01	Eastern San Joaquin
5-22.04	Merced
5-22.05	Chowchilla
5-22.06	Madera
5-22.07	Delta-Mendota
5-22.08	Kings
5-22.09	Westside
5-22.11	Kaweah
5-22.12	Tulare Lake
5-22.13	Tule
5-22.14	Kern County
6-54	Indian Wells Valley
7-24	Borrego Valley

Soil Management Practices that increase Water-Holding Capacity

Increasing soil organic matter has multiple benefits including increased water-holding capacity of the soil and carbon sequestration. These benefits are in line with the purpose of SWEEP, and therefore, projects that integrate one or more of the following soil management practices identified below will receive additional consideration providing the management practice(s) will not result in an increase in on-farm water demand or energy use.

- Cover cropping ([USDA NRCS Conservation Practice Standard 340](#))
- Mulching ([USDA NRCS Conservation Practice Standard 484](#))
- Compost application
- [Resource conserving crop rotation](#)

Any of the management practices that are indicated in the project application will become part of the grant agreement terms and incorporated into the scope of work. Awardees should follow applicable USDA NRCS Conservation Practice Standards when implementing these management practices.

Matching Funds

Matching funds are not required, but applicants are strongly encouraged to include a 50 percent match. Applications that include matching funds will receive additional consideration.

Matching funds are defined as a portion of project costs not borne by the SWEEP grant award, and can include cash and/or in-kind contributions. In-kind contributions include costs associated with labor involved with the installation of the project. Applicants choosing to use matching funds are encouraged to submit written documentation describing the source of matching funds with the grant application.

Assistance and Questions

CDFA cannot assist in the preparation of grant applications; however, general questions may be submitted to grants@cdfa.ca.gov. In order to ensure all potential applicants benefit from receiving all submitted questions and answers, CDFA will post Frequently Asked Questions (FAQ) on June 20, 2016 on the SWEEP website and an additional FAQ will be posted according to the following schedule:

Questions Received by:	Responses Posted by:
July 18, 2016 at 8:00 am PST	July 25, 2016 at 5:00 pm PST

In order to maintain the integrity of the competitive grant process, CDFA is unable to advise and/or provide applicants with any information regarding specific grant applications during the solicitation process.

Notification and Feedback

All applicants will be notified regarding the status of their grant application. Applicants not selected for funding will receive feedback on their grant application within 60 days after receiving notification.

Disqualifications

The following will result in the disqualification of a grant application:

- Incomplete grant applications: applications with one or more unanswered questions necessary for administrative or technical review
- Incomplete grant applications: applications with missing, blank, unreadable, corrupt, or otherwise unusable attachments
- Applications for more than the maximum award amount
- Applications with unallowable costs or activities not necessary to complete the project objectives

APPEAL RIGHTS: Any discretionary action taken by the Office of Grants Administration (OGA) may be appealed to CDFA's Office of Hearings and Appeals Office within ten (10) days of receiving a notice of disqualification from CDFA. The appeal must be in writing and signed by the responsible party named on the grant application or his/her authorized agent. It must state the grounds for the appeal and include any supporting documents and a copy of the OGA decision being challenged. The submissions must be sent to the California Department of Food and Agriculture, Office of Hearings and Appeals, 1220 N Street, 4th Floor, Sacramento, CA 95814 or emailed to CDFA.LegalOffice@cdfa.ca.gov. If submissions are not received within the time frame provided above, the appeal will be denied.

Award Process

Grant Agreement

CDFA will initiate the Grant Agreement process with applicants selected to receive a 2016 SWEEP Round II grant award. Applicants with projects selected for award of funds will receive a Grant Agreement package with specific instructions regarding award requirements including information on project implementation, verification, and payment process. In addition, a CDFA Environmental Scientist will contact each recipient to schedule a project consultation to confirm project site information and discuss implementation plans.

Project Implementation

Once a Grant Agreement is executed, the grant recipient can begin implementation of the project.

Recipients are responsible for the overall management of their awarded project to ensure all project activities, including labor associated with installation, are completed no later than November 30, 2017.

For projects involving utility interconnection, recipients must take the necessary steps to begin the interconnection process after execution of the Grant Agreement to ensure utility interconnection work is complete by this date.

Project implementation must occur on the APNs identified in the Grant Agreement scope of work. Failure to install a project on the APNs identified in the scope of work may result in all or any portion of the grant funding withheld or termination of the Grant Agreement.

CDFA may conduct a Critical Project Review upon reasonable notice at any time during the project term. The purpose is to determine whether deliverables are being met and evaluate project progress to ensure installation is complete within the grant term. Recipients may be required to submit financial records and project documentation to ensure SWEEP funds are used in compliance with the Grant Agreement terms and conditions.

Payment Process

CDFA will provide the grant recipient with the necessary grant award and invoicing documents. Grant recipients may be eligible to receive an advance payment up to 25 percent of the total grant award for project installation. The remaining funds will be allocated on a reimbursement basis through quarterly or monthly invoicing.

CDFA will withhold 10 percent from the total grant award until the verification requirement is complete to ensure grant recipients install their project as approved by CDFA. Invoicing and closeout of all project expenditures must be completed no later than February 28, 2018.

Project Verification

Following project implementation, a CDFA Environmental Scientist, or a local RCD in partnership with CDFA, will initiate the verification component. The verifier will visit the project site, and inspect the completed project to ensure design specifications were met and the system is working effectively. In addition, the verifier will take photographs to document project completion. The verification component must be completed no later than January 31, 2018.

Post-Project Completion Requirements

Execution of the Grant Agreement is conditional upon agreement to post-project completion requirements. Recipients are expected to maintain documentation related to the SWEEP funded project, including energy and water use documentation, to report actual benefits achieved for a period of three years after project completion. The purpose of this reporting is to demonstrate the long-term success of SWEEP awarded projects by documenting GHG emission reductions and water savings data.

After the project is operational, a CDFA Environmental Scientist will work with recipients to collect the necessary data and quantify GHG emission reductions and water savings.

Failure to work with CDFA or its designees to provide the necessary project-related documentation will be considered non-performance. In the event of non-performance, CDFA may take any action deemed necessary to recover all or any portion of the grant funding.

Appendix A: Grant Application Checklist

Application Components

- Completed FAAST Application**
 - Overview: **General Information**
 - Section I: **Previously Funded Project**
 - Section II: **Property Information**
 - Section III: **Current Irrigation System & Practice**
 - Section IV: **Project Types**
 - Section V: **Project Duration**
 - Section VI: **Proposed Irrigation System & Practice**
 - Section VII: **Water Calculations**
 - Section VIII: **GHG Calculations**
 - Section IX: **Additional Considerations** (*optional*)

Application Attachments

- Project Design**
- Budget Worksheet**
- USDA NRCS Irrigation Water Savings Calculations**
(https://efotg.sc.egov.usda.gov/references/public/CA/CA_irrigation_water_savings_10-6-14.xls)
- ARB GHG Calculator Tool**
(<http://www.arb.ca.gov/cc/capandtrade/auctionproceeds/cdfasweepcalc.xlsx>)
- GHG Baseline Documentation** (*e.g. utility bills, fuel receipts, field operational logs, etc. covering at least 6 months of the peak pump energy use for the prior irrigation season (2015)*)
- Pump Efficiency Test** (*must include pump & motor specifications*)

Optional Application Attachments (*only if applicable to project*)

- Matching Funds** (*optional*)
- All Other Supplemental Documents** (*e.g., irrigation training certificates*) (*optional*)



FINANCIAL ASSISTANCE

APPLICATION SUBMITTER

State Water Resources Control Board

[Help](#) | [Logout](#)

FAAST: Grant Application Questions Preview

This screen displays a "Preview of Application/Survey Questions" entered by the FFAST or RFP administrator. This Preview displays what the applicant /survey taker or reviewer would see while filling out the questionnaire or the review sheet. To filter questions by funding program, please select a funding program from drop-down. The page will refresh and questions specific to the selected funding program will be displayed.

Filter by Funding Program: All

SECTION I: PREVIOUSLY FUNDED PROJECT

1. Has your agriculture operation received a previously funded SWEEP project?

a. If yes, provide the SWEEP Agreement Number(s), award amount(s) and corresponding Assessor's Parcel Number(s) of where each of the project(s) were implemented.

Example: SWE10000, \$50,000, 000-000-0000

Answer: Select a Value

Answer:

Maximum of 500 characters.

SECTION II: PROPERTY INFORMATION

2. Indicate the total farm size (acres) of the applicant's agricultural operation.

Answer:

Please do not use comma (,) and enter a number between 0 and 99999999

3. Indicate the property location(s) of where the project will be implemented. Provide property information for each Assessor's Parcel Number (APN) that will be impacted by the proposed SWEEP project.

a. Assessor's Parcel Number(s)

IMPORTANT REMINDER: Be sure to use the APN format that is used by your county Assessor's Office.

Visit your county's Assessor's Office in person or the Assessor's Office webpage to look up or verify the APN(s).

Answer:

Maximum of 1000 characters.

b. Address or Nearest Cross Streets

Answer:

Maximum of 500 characters.

c. City, Zip Code

Answer:

Maximum of 500 characters.

d. County

Answer:

Maximum of 500 characters.

**e. List current crop(s) and corresponding acreage impacted.
(Example: Alfalfa: 80 acres)**

Answer:

Maximum of 500 characters.

4. Indicate if the property location(s) water source is surface water (i.e., water delivered to the property) or

groundwater pumped from on-farm wells.

Answer: Select a Value

SECTION III: CURRENT IRRIGATION SYSTEM & PRACTICE

The questions in Section III apply to the current irrigation and/or distribution system. The purpose of this section is to understand an applicant's current water use system.

5. Description of current water use system

Describe in detail the current water use system and associated energy sources. At a minimum, applicants should address the current crop, irrigation system type (e.g. flood irrigation, sprinkler, drip etc.), fuel source(s) and water source(s).

Answer:

Maximum of 1000 characters.

Is current water use measured either on farm (e.g. with a flow meter) or by the water supplier?

Answer: Select a Value

Answer:

Maximum of 500 characters.

SECTION IV: PROJECT TYPES

The questions in Section IV apply to the project types for which the applicant is applying for SWEEP funds.

6. Project Types

Address all applicable project types and provide an explanation for all types selected. Only indicate project types that are being incorporated as part of the project.

NOTE: Do not indicate a project type if it is already the current practice at the project site.

Water Conservation

a. Weather, Soil or Plant based sensors for irrigation scheduling

Examples include soil moisture or plant sensors (NRCS Conservation Practice Standard 449) with electronic data output or electronic weather station linked to irrigation controller, for growers to ensure efficient irrigation scheduling. Use of ET based irrigation scheduling, such as the California Irrigation Management Information System (CIMIS) on existing or proposed projects to optimize water efficiency for crops. Telemetry components that allow the electronic communication between technology devices are eligible.

If yes, provide a detailed explanation.

Answer: Select a Value

Answer:

Maximum of 1000 characters.

b. Micro-Irrigation or Drip Systems

Use of micro-irrigation or drip systems, including sub-surface drip systems. Should follow NRCS Conservation Practice Standard 441.

If yes, provide detailed explanation.

Answer: Select a Value

Answer:

Maximum of 1000 characters.

Greenhouse Gas Emission Reduction

c. Fuel Conversion

The conversion of a fossil fuel pumps to solar, wind, electric, or natural gas resulting in a reduction of carbon dioxide GHG emissions. Renewable energy, including solar, installations that power irrigation systems are eligible.

If yes, provide detailed explanation.

Answer: Select a Value

Answer:

Maximum of 1000 characters.

d. Improved Energy Efficiency

Examples include retrofitting or replacing pumps. NRCS Conservation Practice Standard 372 may apply.

If yes, provide detailed explanation.

Answer: Select a Value

Answer:

Maximum of 1000 characters.

e. Low Pressure Systems

Use of low pressure irrigation systems to reduce pumping and energy use. For example, the conversion of a high pressure sprinkler system to a low pressure micro-irrigation system or lower pressure sprinkler system. Should follow NRCS Conservation Practice Standards 441 or 442.

If yes, provide detailed explanation.

Answer: Select a Value

Answer:

Maximum of 1000 characters.

f. Variable Frequency Drives

Use of Variable Frequency Drives to reduce energy use and match pump flow to load requirements. Should follow NRCS Conservation Practice Standard 533.

If yes, provide detailed explanation.

Answer: Select a Value

Answer:

Maximum of 1000 characters.

g. Reduced Pumping

For example, improved irrigation scheduling may lead to reduced pump operation times.

If yes, provide detailed explanation.

Answer: Select a Value

Answer:

Maximum of 1000 characters.

h. Other Management Practices

For projects implementing any other management practices that will result in GHG reductions and water savings.

If yes, provide detailed explanation.

Reminder: GHG emission reductions must be calculated according to the ARB GHG Quantification Methodology and with the ARB Calculator Tool.

Answer: Select a Value

Answer:

Maximum of 1000 characters.

SECTION V: PROJECT DURATION

The maximum grant duration for a proposed project is 12 months. Grant funds cannot be expended before December 1, 2016 or after November 30, 2017.

7. Estimate the "Start Date" for the proposed project

Answer:



8. Estimate the "End Date" for the proposed project

Answer:



SECTION VI: PROPOSED IRRIGATION SYSTEM & PRACTICE

The questions in Section VI apply to the proposed water use system on the property. The purpose of this section is to estimate the potential water savings and reductions in greenhouse gas emissions.

9. Description of proposed water use system

Explain in detail the proposed water use system and associated energy sources. At a minimum, applicants should address the proposed crop, irrigation type, irrigation water management practices, fuel source(s) and water source(s).

Answer:

Maximum of 1000 characters.

10. All projects must allow for water to be measured after project implementation. Provide an explanation of how the proposed project will measure applied water after the project is installed.

REMINDER: If water is not currently measured by flow meters on-farm or by the water supplier, the agricultural operation must include flow meters within the project to allow water to be measured after project implementation.

Answer:

Maximum of 500 characters.

Before proceeding with the application, applicants must complete the USDA NRCS Irrigation Water Savings Calculator and the ARB GHG Calculator Tool. Upon completing the calculators, applicants will need to refer to the completed calculators to answer questions 11 through 13.

SECTION VII: WATER CALCULATIONS

Applicants must use the [USDA NRCS Irrigation Water Savings Calculator](#) to provide an estimate of current baseline water use and the estimated water savings due to the proposed project in question 11a and 11b below. Use the units of acre-inches per year per acre. Refer to instructions in Appendix C of the ARB Quantification Methodology.

11. a. What is the baseline water use from the USDA NRCS Irrigation Water Savings Calculator, located in cell C23 (acre-inches/acre)?

Answer:

Please do not use comma (,) and enter a number between 0 and 99999999

- b. What is the estimated water savings from the project, located in cell A28 of the USDA NRCS Irrigation Water Savings Calculator? (acre-inches/acre)?

Answer:

Please do not use comma (,) and enter a number between 0 and 99999999

- c. Are there any comments or clarifications regarding the baseline water use value or projected savings from the project?

Reminder: The completed USDA NRCS Irrigation Water Savings Calculator workbook must be attached.

If yes, provide your explanation.

Answer: Select a Value

Answer:

Maximum of 1000 characters.

SECTION VIII: GHG CALCULATIONS

Use the required ARB GHG Calculator Tool , which can be found [HERE](#), to quantify proposed project GHG reductions. The ARB GHG Calculator Tool should be used to respond to questions 12 a. through c.

Attach the entire completed Excel workbook, and attach all supporting documents that provide inputs to the calculator, including pump efficiency tests, pump and motor specifications, actual fuel invoices, electric bills, and field operational logs.

Use the completed ARB GHG Calculator Tool to respond to questions 12 a. through c.

12. Current baseline greenhouse gas emissions

- a. What is the *total* baseline fuel or electricity use for all the fields involved in the proposed SWEEP project? This information is located in cell B15 of the "Input" tabs of the workbook. Complete all that apply below.

i. Electricity (kwh/yr)

Answer:

Please do not use comma (,) and enter a number between 0 and 99999999

ii. Diesel (gallons/yr)

Answer:

Please do not use comma (,) and enter a number between 0 and 99999999

iii. Motor gasoline (gallons/yr)

Answer:

Please do not use comma (,) and enter a number between 0 and 99999999

iv. Biodiesel/renewable diesel (gallons/yr)

Answer:

Please do not use comma (,) and enter a number between 0 and 99999999

v. Natural gas (scf/yr)

Answer:

Please do not use comma (,) and enter a number between 0 and 99999999

vi. Solar (kwh/yr)

Answer:

Please do not use comma (,) and enter a number between 0 and 99999999

vii. Wind (kwh/yr)

Answer:

Please do not use comma (,) and enter a number between 0 and 99999999

viii. Other renewable (kwh/yr)

Answer:

Please do not use comma (,) and enter a number between 0 and 99999999

b. Explain how the supporting baseline GHG documents (such as fuel invoices, electricity bills, pump efficiency tests, etc.) were used to provide inputs to the ARB GHG Calculator Tool. In addition, identify specific references where within the supporting baseline GHG documentation the inputs can be found.

Answer:

Maximum of 1000 characters.

c. Are field operational logs used to calculate GHG reductions? If yes, explain how those logs were maintained and how data was collected on-farm.

Note: If field operational logs were used, the logs MUST be attached.

Answer: Select a Value

Answer:

Maximum of 500 characters.

13. Indicate the estimated greenhouse gas emission reductions from the project (Tonnes of CO2 equivalent/acre), located in cell B16 of the "Summary" tab of the ARB GHG Calculator Tool.

Answer:

Please do not use comma (,) and enter a number between 0 and 99999999

SECTION IX: ADDITIONAL CONSIDERATIONS

Section IX is not required, but the following will receive additional consideration.

14. Training

If awarded funding, will a representative from the agriculture operation agree to attend the training? If yes,

indicate the training course and the agriculture operation representative(s) planning to attend.

IMPORTANT REMINDER: If the answer is indicated as "Yes", irrigation training will become a term of the grant agreement if the project is awarded funding. This training will be at the cost of the agriculture operation.

Answer: Select a Value

Answer:

Maximum of 500 characters.

15.

Critically Over-drafted Groundwater Basin

Does the project location fall within a critically over-drafted groundwater basin as identified by the Department of Water Resources? If yes, click [HERE](#) to identify the basin name and corresponding number.

Answer: Select a Value

Answer:

Maximum of 500 characters.

16.

Soils Management Practices for Increasing Water-Holding Capacity

Indicate which, if any, of these management practices will be implemented with the goal of increasing soil organic matter and water-holding capacity of the soil.

IMPORTANT REMINDER: For practices selected, if awarded, those practices will become a term of the grant agreement. (Soil management practices are not eligible for SWEEP funding and therefore will be implemented the cost of the agricultural operation).

Select all that apply.

- a. Cover cropping
- b. Mulching
- c. Compost application
- d. Resource conserving crop rotation

Answer: a b c d

17.

Matching Funds(attachment):

If matching funds (cash) have been secured, attach matching funds documentation. Documentation should confirm the contribution source, type, and amount of contributions in support of the project.

Reminder: If applicable, attach matching funds (cash) documentation.

Answer: Select a Value

Appendix D

California Air Resources Board

Greenhouse Gas Quantification Methodology for the California Department of Food and Agriculture State Water Efficiency and Enhancement Program

Greenhouse Gas Reduction Fund FY 2015-16



March 15, 2016

Appendix D

Table of Contents

Section A. Introduction.....	1
Methodology Development.....	1
Tools.....	2
SWEEP Projects.....	2
GHG Emission Reductions Quantification Approach.....	3
Program Assistance.....	3
Section B. Quantification Methodology.....	4
Step 1: Identify the SWEEP Proposed Project Component(s).....	5
Step 2: Determine the Inputs Needed.....	6
Step 3: Estimate GHG Emission Reductions Using the ARB GHG Calculator Tool	7
Read Me Tab	7
Inputs Tab	7
Summary Tab.....	7
GHG Emission Reduction Calculations.....	8
Section C. Documentation	9
Section D. Reporting after Funding Award.....	10
Table 1. Project Components.....	5
Table 2. Required Calculator Inputs.....	6
Table 3. Quantification and Reporting By Project Phase.....	11
Appendix A. Example Project	
Appendix B. GHG Emission Reduction Calculations	
Appendix C. NRCS Tool Instructions	

Appendix D

Section A. Introduction

The California Air Resources Board (ARB) is responsible for providing the quantification methodology to estimate greenhouse gas (GHG) emission reductions from projects receiving monies from the Greenhouse Gas Reduction Fund (GGRF) for California Climate Investments. For the California Department of Food and Agriculture's (CDFA) State Water Efficiency and Enhancement Program (SWEEP), ARB staff developed this quantification methodology and the accompanying calculator tool for applicants to use to estimate the GHG emission reductions from each proposed project. ARB staff will periodically review each quantification methodology to evaluate its effectiveness and update methodologies to make them more robust, user-friendly, and appropriate to the projects being quantified.

This methodology uses calculations to estimate the reduction of on-farm energy use and associated reduction in GHG emissions based on proposed SWEEP project enhancements. These calculations are based on the current understanding of irrigation practices, irrigation system enhancements, fuel conversions, and GHG emission factors.

Methodology Development

ARB staff followed a set of principles to guide the development of the quantification methodology. These principles ensure that the methodology for SWEEP projects will:

- Apply at the project-level;
- Align with the project types proposed for funding;
- Provide uniform methodologies that can be applied statewide, and be accessible by all applicants;
- Support the analysis of GHG emission reductions from the proposed projects;
- Use existing and proven methods; and
- Use project-level data when available for estimated energy use reductions.

The methodology fits these objectives, and provides a uniform approach to quantify GHG emission reductions in metric tons of carbon dioxide equivalent (MTCO₂e).

ARB released a draft FY 2015-16 quantification methodology for public comment in February 2016. Public comments were considered in the development of this Quantification Methodology.

Appendix D

Tools

Applicants must use the ARB GHG Calculator tool, located at <http://www.arb.ca.gov/cc/capandtrade/auctionproceeds/quantification.htm>, to estimate the GHG emission reductions from their proposed SWEEP projects. GHG emission reductions used in this methodology are calculated as a result of on-farm enhancements that reduce groundwater pumping, improve pump system efficiency, or convert to less carbon-intensive energy sources used to operate pump system.

For projects that reduce water use that results in reduced pump demand, applicants will utilize the United States Department of Agriculture (USDA) National Resource Conservation Service (NRCS) Irrigation Water Savings Calculator tool to estimate water savings from proposed irrigation system enhancements. The water savings estimate determined by the NRCS Irrigation Water Savings Calculator tool is used as an input in the ARB GHG calculator tool.

The NRCS Irrigation Water Savings Calculator tool can be assessed here: http://efotg.sc.egov.usda.gov/references/public/CA/CA_irrigation_water_savings_9-08.xls. Instructions for applicants are included in Appendix C.

SWEEP Projects

GHG emission reductions for SWEEP projects are based on the following project types:

1. Pump and motor enhancement and/or replacement
2. Irrigation system enhancement
3. Fuel conversion

Per SWEEP Program Guidelines:

Eligible projects must:

- Reduce greenhouse gas emissions; and
- Reduce water use.

Applicants must provide supporting documentation directly related to actual on-farm water consumption and GHG emissions.

Note: Projects that reduce water consumption but do not reduce GHG emissions are not considered an eligible project.

Appendix D

GHG Emission Reductions Quantification Approach

The following metric will be used for ARB reporting purposes to assess the effectiveness of the project to reduce GHG emissions per dollar of GGRF funds will be reported by the applicant as:

$$\frac{\textit{Total Project GHG Reductions in Metric Tons of CO}_2\textit{e}}{\textit{Total GGRF Funds Requested (\$)}}$$

GGRF Funds Requested is the dollar amount requested through SWEEP. Section B describes the process for estimating the GHG emission reductions for proposed SWEEP projects in FY 2015-16. Additional documentation and reporting requirements are provided in sections C and D

The ARB calculator tool also determines GHG emission reductions per project acre. This metric is used by CDFA as a project selection criteria as outlined in CDFA's solicitation materials.

Program Assistance

CDFA staff, in conjunction with subject matter experts, will review the quantification portions of SWEEP project applications to ensure that the methods described in this document were properly applied to estimate the GHG emission reductions for the proposed project. Applicants should use the following resources for additional questions and comments:

- Questions on this quantification document should be sent to GGRFProgram@arb.ca.gov.
- For more information on ARB's efforts to support implementation of GGRF investments, see: www.arb.ca.gov/auctionproceeds.
- Questions not related to this quantification document but pertaining to SWEEP should be sent to grants@cdfa.ca.gov.

Appendix D

Section B. Quantification Methodology

This methodology estimates the GHG emission reductions of a proposed SWEEP project based on reduction in on-farm energy use as a result of pump and motor enhancements and replacement, reductions in pump demand from irrigation system enhancements, and the conversion to a less carbon intensive fuel or installation of on-site renewable energy generation. Applicants will use the ARB GHG calculator tool to estimate the total GHG emission reductions from the proposed project over the useful life, as defined in the methodology.

The following is a summary of the steps SWEEP applicants will follow to estimate and report the GHG emission reductions for a proposed project. Detailed instructions for each step are provided on subsequent pages. An example of a proposed SWEEP project quantification is included in Appendix A.

- Step 1 **Identify the SWEEP proposed project component(s):** The applicant must select at least one project component as identified in the 2016 SWEEP “Request for Grant Applications” (i.e., guidelines) or from Table 1 of this document. To achieve energy and water reductions, projects may require multiple project components.
- Step 2 **Determine the inputs needed:** The applicant will use Table 2 to determine the required project details needed for input into the calculator tool for the applicable project type selected in Step 1. Links for the ARB GHG calculator tool and USDA NRCS Irrigation Water Savings calculator are available in Section A. Introduction, Tools. Instructions for using the NRCS tool are included in Appendix C.
- Step 3 **Estimate GHG emission reductions (use ARB calculator tool):** The applicant will enter the project details into the ARB GHG calculator tool to calculate the GHG emission reductions over the useful life¹ using the inputs identified in Step 2.

¹ For purposes of SWEEP projects, the life of a proposed project (useful life) is defined as the number of years recipients are expected to use and maintain their system. The default useful life for these projects is 10 years.

Appendix D

Step 1: Identify the SWEEP Proposed Project Component(s)

Table 1 identifies the most common eligible project components expected to be funded under SWEEP. The applicant must identify at least one project component from this list that defines the proposed project. All projects must achieve energy use reductions and result in water use reductions. To achieve both objectives, projects may require multiple components. The project components identified will inform the sections of the ARB GHG calculator tool required to determine GHG emission reductions. Each calculation is for a single irrigated plot with a dedicated pump. For projects with additional pumps being upgraded or multiple plots, applicants must perform calculations on the additional Inputs Tabs for each pump or individual plot. The cumulative value is displayed as the Total GHG Emission Reductions in the Summary Tab. The irrigated acreage for each table should correspond to the acres served by that dedicated pump.

Table 1. Project Components

Pump and Motor Enhancements
Install a variable frequency drive (VFD) (booster pump or well pump)
Motor replacement or efficiency improvement
Pump replacement or efficiency improvement
Irrigation System Enhancements (for systems utilizing pumps)
Install or modify irrigation system that results in a reduction in system pressure
Install automated irrigation system, scheduling, soil moisture sensors, or other techniques to reduce water use that reduce pump demand
Fuel Conversions and Renewable Energy
Change fuel types to less carbon intensive fuel (in conjunction with water savings measures)
Install renewable energy on-site to offset fuel use

Appendix D

Step 2: Determine the Inputs Needed

Table 2 identifies the data inputs for the ARB GHG calculator tool to estimate the GHG emission reductions for proposed projects by project component.

Table 2. Required Calculator Inputs

All SWEEP Projects
Existing Conditions (prior to any project modification) <ul style="list-style-type: none"> • Irrigated Project Area (acres) • GGRF funds requested (\$) • Pump fuel amount or electricity use (gallons, therms, or kWh) • Fuel type
Pump and Motor Enhancements
Project Details (both pre-project values and post-project estimates) <ul style="list-style-type: none"> • Motor Rated Horsepower (hP) • Operational hours in a growing season; this parameter is only needed for pre-project scenario for determining baseline energy demand if energy use data is unavailable • Motor Efficiency (%) • Pump Efficiency (%) • System Pressure, in units of feet, determined from the following user inputs: <ul style="list-style-type: none"> ○ Pumping depth (ft) – this is groundwater depth for wells ○ Discharge pressure from pump (ft) ○ Friction losses (ft); if unknown, use a default of 10 ft for well pumps and 5 ft for booster pumps <p>Note: If pressures are known in units of pounds per square inch (psi), the calculator tool provides a mechanism for conversion to units of feet.</p> • If a VFD will be installed, specify type and VFD efficiency (%)
Irrigation System Enhancements (for systems utilizing pumps)
Project Details <ul style="list-style-type: none"> • Water savings, as estimated in USDA NRCS Irrigation Water Savings Calculator, is located in Cell A30 (%). If the project includes system repairs preventing leakage, these values should be captured in the USDA NRCS Irrigation Water Savings Calculator. Please refer to Appendix C for instructions on using the NRCS tool.
Fuel Conversions and Renewable Energy
Proposed Project Details <ul style="list-style-type: none"> • New fuel type if converting to a different fuel. • Capacity of renewable energy installations (kW). • If converting fuels, enter the change from the drop down menu in the ARB GHG calculator tool.

Appendix D

Step 3: Estimate GHG Emission Reductions Using the ARB GHG Calculator Tool

The applicant should download the calculator tool and enter project specific data to estimate GHG emission reductions. An overview of the calculator tool is provided below.

Read Me Tab

- On the Read Me Tab, enter the Project Name, Project ID from FFAST, and the contact information for person who can answer project specific questions from staff reviewers on the quantification calculations. This file must be submitted with other required documents. Please use the following file naming convention: “[FAAST ID]_[Project Name]” not to exceed 20 characters.

Project Name:	Smith Brothers Farm
Project ID - FFAST:	12-3456789
Contact Name:	John Smith
Contact Phone Number:	916-555-1234
Contact Email:	john@smithbros.com
Date Completed:	12/1/2015

Inputs Tab

- Headers in red indicate a field that requires input by the project applicant. For each project component section, please complete all relevant data. For example, if the project is not making changes to the pump or motor, the existing pump information will still be utilized in determining energy reductions from irrigation system enhancements. If applicants are implementing more than one project or their project impacts more than one pump or well site, the applicant should run the calculator tool for each pump or well site impacted. Definitions are provided in the definitions tab. Inputs must be substantiated in the documentation provided in accordance with Section C. Documentation.

Summary Tab

- The summary tab identifies the annual and useful life GHG emission reductions associated with SWEEP project enhancements. In addition, the total GGRF funds awarded, Total GHG emission reductions per acre, and the reporting metric of the project are summarized.

Appendix D

GHG Emission Reduction Calculations

All equations and calculations are included in the ARB GHG calculator tool as part of this quantification methodology; detailed documentation is included in Appendix B. In general, GHG emissions reductions are calculated using the following approaches:

Pump and Motor Enhancements
<i>GHG Emission Reductions = GHG Emissions of Old Pump – GHG Emissions of New Pump (Including VFD)</i>
Irrigation System Enhancements (for systems utilizing pumps)
<i>GHG Emission Reductions = GHG Emissions Reductions of Pump Operation for Reduction in Water Use</i>
Fuel Conversions and Renewable Energy
<i>GHG Emission Reductions = GHG Emissions of Displaced Fuel or GHG Emission Reductions from Less Carbon Intensive Fuel</i>

Appendix D

Section C. Documentation

Applicants must report the Net GHG Benefits over the useful life of the project and provide documentation of the calculations and inputs used. The Net GHG Benefits over the useful life are equal to the Total Project GHG Emission Reductions estimated in the ARB GHG calculator tool and found in the “GHG Calculations” Tab.

Applicants are required to provide electronic documentation that is complete and sufficient to allow the calculations to be reviewed and replicated. Paper copies of supporting materials must be available upon request by CDFA or ARB staff.

Documentation must include, at a minimum:

- Project application;
- Completed ARB GHG calculator tool file(s);
- Project description, including excerpts or specific references to the location in the main SWEEP application of the project information necessary to complete the applicable portions of the quantification methodology; and
- Project data support, including:
 - Calculator inputs determined in Step 2;
 - Documentation of the project data used to support ARB GHG calculator inputs (i.e., energy use, pump and motor specifications, and water savings estimates (USDA NRCS Irrigation Water Savings Calculator);
 - References to public documents that are the source of the project data.

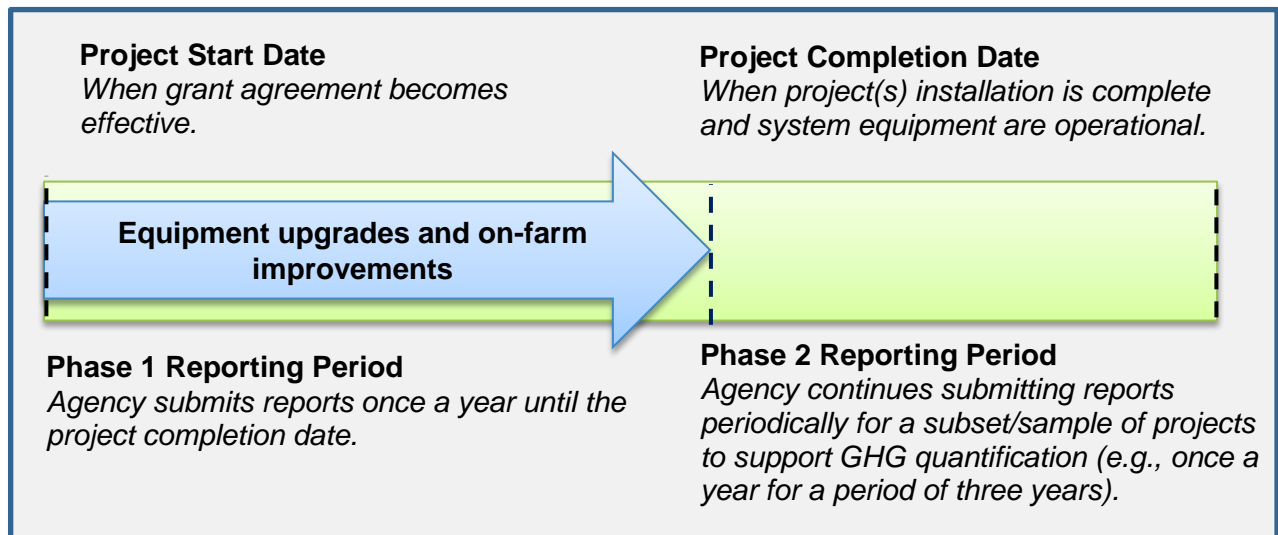
Appendix D

Section D. Reporting after Funding Award

Accountability and transparency are essential elements for all GGRF California Climate Investment projects. Each administering agency is required to track and report on the benefits of the California Climate Investments funded under their program(s) and each funding recipient has the obligation to provide the necessary data or access to data for their project to support reporting on project outcomes.

In 2015, ARB developed Funding Guidelines for Agencies Administering California Climate Investments (Funding Guidelines).² These Funding Guidelines describe the reporting requirements and set the minimum project-level reporting requirements for projects funded by CDFA. Volume III of the Funding Guidelines summarizes the major reporting components that CDFA must report to ARB. Because much of this data will be aggregated by CDFA staff, SWEEP funding recipients will need to provide project data to CDFA to support these reporting requirements.

Table 3 and the figure below show the project phases and when reporting is required.



² California Air Resources Board. Funding Guidelines for Agencies Administering California Climate Investments. December 21, 2015. <http://www.arb.ca.gov/cc/capandtrade/auctionproceeds/arb-funding-guidelines-for-ca-climate-investments.pdf>.

Appendix D

Table 3. Quantification and Reporting By Project Phase

	Timeframe	Quantification Methodology Section
Project Selection	Covers the period from solicitation to selection of projects and funding awards	All applicants use methods in this QM to estimate GHG reductions based on application data.
Phase 1	Covers the period from the beginning of the project until it becomes operational or the initial implementation is completed	Funded projects use methods in this QM, as needed, to update GHG estimates based on project changes.
Phase 2	Starts after Phase 1 is complete and a project becomes operational	GHG reductions achieved are quantified and reported for a subset of funded projects.

Phase 1 reporting is required for all SWEEP projects. CDFA will collect and submit data to ARB to satisfy Phase 1 reporting requirements. Recipients of SWEEP funding must report any changes that impact GHG emission reduction estimates (i.e., fuel or energy use) to CDFA prior to project completion.

Phase 2 reporting is required for only a subset of SWEEP projects and is intended to document actual project benefits achieved after the project becomes operational. Phase 2 data collection and reporting will not be required for every project. CDFA will be responsible for identifying the subset of individual projects that must complete Phase 2 reporting, identifying who will be responsible for collecting Phase 2 data, and for reporting the required information to ARB. ARB will work with CDFA to address “Phase 2” procedures, including but not limited to:

- The **timelines** for Phase 2 reporting, i.e., when does Phase 2 reporting begin, how long will Phase 2 reporting be needed.
- As applicable, **approaches for determining the subset of projects** that need Phase 2 reporting (i.e., how many **X** projects out of **Y** total projects are required to have Phase 2 reporting).
- **Methods for monitoring or measuring** the necessary data to quantify and document achieved GHG reductions and other select project benefits.
- **Data to be collected**, including data field needed to support quantification of GHG emission benefits.
- Reporting requirements for transmitting the data to ARB or CDFA for program transparency and use in reports.

Once the Phase 2 quantification method and data needs are determined, ARB will develop and post the final ARB approved Phase 2 methodology for use in Phase 2 reporting.

Appendix D

Appendix A. Example Project

The following example is a hypothetical SWEEP proposed project for the purpose of demonstrating how to use the ARB GHG Calculator tool to estimate the proposed project's GHG emission reductions.

A 100 acre farm in the Central Valley utilizes a high pressure solid set sprinkler system to irrigate vegetable crops. The farmer sources irrigation water primarily from an on-site groundwater well that employs an older, inefficient vertical turbine pump rated at 100 horsepower (hP) used in conjunction with a diesel motor. A pump test reported a pump test efficiency of 70%. The motor efficiency is listed by the manufacturer as 75%. Through CDFA's SWEEP grant program, the farmer proposes to convert the existing high pressure irrigation system to a low pressure micro-drip irrigation system. The farmer also proposes to replace the inefficient diesel motor/pump system with a new and more efficient electric motor/pump system rated at 80 hP with a VFD controller. In addition, the farmer proposes to install 20 kilowatt (kW) solar panels to provide renewable electricity to supplement a portion of the power to the electric pump system. Below are the steps that the applicant would perform to estimate the proposed project GHG emission reductions utilizing the ARB GHG calculator tool.

Step 1. Identify the SWEEP Proposed Project Type(s)

The first step is to identify applicable project components that will reduce both GHG emissions and water usage. CDFA has identified applicable project components in the SWEEP guidelines. In addition, Table 1 of this document provides a list of the most common eligible project components expected to be funded under SWEEP. The applicant must identify at least one project component from the list of applicable project components that defines the proposed project. All projects must both achieve energy use reductions to achieve GHG emission reductions and water use reductions. To achieve both objectives, many projects will include multiple components. The project components identified will inform the sections of the ARB GHG calculator tool required to determine GHG emission reductions. Each calculation is for a single irrigated plot with a dedicated pump. For projects with multiple plots, applicants must perform calculations for each individual plot and submit each run as well as a cumulative value for net GHG emission reductions.

In the above example, the project applicant identified irrigation system conversion that reduced system pressure and reduce water usage, motor/pump system replacement to improve system efficiency, VFD controller installation, and solar PV installation to provide renewable energy.

Steps 2 & 3. Determine the Inputs Needed and Estimate GHG Emission Reductions (using ARB Calculator Tool)

The applicant determines all of the required inputs from Table 2 for the ARB GHG calculator to estimate GHG emission reductions. The next step for the applicant is to review the "Read Me Tab" of the ARB calculator tool and to enter the project identifier

Appendix D

information. Below is an example of the required project identifier information that is entered by an applicant.

Project Name:	Smith Brothers Farm
Project ID - FAAST:	12-3456789
Contact Name:	John Smith
Contact Phone Number:	916-555-1234
Contact Email:	john@smithbros.com
Date Completed:	12/1/2015

Next, the applicant enters in the identified proposed project information for both pre-project and post-project cases into the ARB GHG calculator located in the “Inputs Tab”. The **red headers** under the “Input Data” column are project descriptors and indicate the fields (highlighted in yellow) that the applicant enters into the applicable pre-project and post-project columns. Below are sample inputs for the ARB GHG calculator from the example proposed project.

General Project Information

The “General Project Information” section is required for every applicant. Each project descriptor must have the associated project input.

General Project Information	
Input Data	Pre-Project
Irrigated Project Area (acres)	100
Funds requested (\$)	\$ 100,000
Pump fuel or electricity use (gallons, scf, kWh)	5,000
Fuel type	Diesel
Fuel Emissions Factor	0.013818137
Life of Project (yrs)	10

Pump and Motor Enhancement and Replacement

This section is required for proposed projects that incorporate improvements to the irrigation pump system. If pressures are not known in units of feet, please utilize the green “Pressure Conversion” tab to convert pressure into units of feet.

Pump and Motor Enhancement and Replacement - This Section required for all applicants		
Input Data	Pre-Project	Post-Project
Motor Rated Horsepower (hP)	100	80
Operational Hours (hr) (if Known) - If unknown, leave cell blank		
Motor Efficiency (%)	75%	85%
Pump Efficiency (%)	70%	85%
System Pressure (ft)	User may override system pressure if known	User may override system pressure if known.
Pumping depth (ft)	350	350
Discharge pressure (ft)	100	50
Friction losses (ft)	10	10
Are you installing a VFD?	N/A	VFD Well Pump
VFD Efficiency (%)		95%

Irrigation System Enhancement (for systems utilizing pumps)

This section is required for irrigation system modifications and improvements that result in water savings. Water savings results are determined from the USDA NRCS Irrigation Water Savings calculator as described in the CDFA SWEEP Guidelines, accessible http://efotg.sc.egov.usda.gov/references/public/CA/CA_irrigation_water_savings_9-

Appendix D

08.xls. The USDA NRCS Irrigation Water Savings estimate in Percentage (%) is the value used for this calculator. Estimated water savings from leakage repair is calculated as part of the NRSC tool. For instructions on the NRCS tool, please refer to Appendix C.

Irrigation System Enhancement (for systems utilizing pumps)		
Input Data	Pre-Project	Post-Project
Water savings (from NRCS) (%)	N/A	20%

Fuel Conversions and Renewable Energy

This section is required for pump system fuel conversions and renewable energy installations. Below are sample inputs (post-project) for the example SWEEP proposed project.

Fuel Conversions and Renewable Energy		
Input Data		Post-Project
Renewable energy capacity (kW)		20
New fuel type		Electricity
Fuel Emissions Factor		0.000378576
Fuel conversion		Diesel to Electricity
Conversion Factor		0.300992604

The applicant can select the “GHG Calculations” Tab to view the estimated project GHG emission reductions.

Submit Documentation

To complete the quantification process, the applicant must submit an electronic copy of the calculator (in .xls, .xlsm, or .xlsx) and all of the required documentation as noted in Section C. The summary documentation that provides the GHG emission reductions from the project can be found in the “Summary” tab of the calculator.

For this example, the Annual GHG Emission Reductions (MTCO₂e) is equal to the difference between GHG emissions pre-project and the GHG emissions post-project, accounting for the installation of on-site renewable energy. Total GHG Emission Reductions (MTCO₂e) is the annual reductions multiplied by the expected useful life of the installed equipment using a default value, as defined by CDFA, of 10 years. The applicant in this example would report the Net GHG Benefits over the Useful Life as 753.80 MTCO₂e.

The SWEEP Funds Requested (\$) is equal to the total GGRF funds requested. In this example, the amount is \$100,000. The total GHG emission reductions (MTCO₂e) per GGRF funds represent the benefits over Useful Life per dollar requested. For this example this value would be 0.0075 MTCO₂e per GGRF \$.

Appendix D

Results	GHG Emissions (MTCO ₂ e)	Description
GHG Benefits per Growing Season	75.25	Annual GHG Emission Reductions (MTCO ₂ e/yr)
Net GHG Benefits over Useful Life	752.46	Total GHG Emission Reductions (MTCO ₂ e)
GHG Benefits per Acre	7.52	Total GHG Emission Reductions (MTCO ₂ e) per Acre
Total GGRF Funds Requested (\$)	100,000.00	Total SWEEP funds requested
Total GHG Emission Reductions per Total GGRF Funds Requested (\$)	0.0075	Total Reductions per SWEEP funds requested

Appendix D

Appendix B. GHG Emission Reduction Calculations

Equations for Irrigation System Pressure Changes

(Eq. 1.a) Pre-Project Head (for use in Eq. 3.c and Eq. 4.a)

$$TDH_{pre\ project} = H_{pumping\ elevation\ pre\ project} + H_{discharge\ pressure\ pre\ project} + H_{friction\ loss\ pre\ project}$$

(Eq. 1.b) Post-Project Head (for use in Eq. 4.a)

$$TDH_{post\ project} = H_{pumping\ elevation\ post\ project} + H_{discharge\ pressure\ post\ project} + H_{friction\ loss\ post\ project}$$

Where:

- $TDH_{project}$ = total dynamic head or system pressure requirement (ft), pre and post project
- $H_{pumping\ elevation}$ = elevation head, the vertical distance which the water must be pumped (ft), pre and post project
- $H_{discharge\ pressure}$ = pressure head, is the maximum operating pressure of the water system converted from psi to feet of head (ft), pre and post project
- $H_{friction\ loss}$ = friction head loss, is the loss of pressure due to the flow of water through pipe and fittings (ft), pre and post project. Default friction losses are estimated at 10 ft.

Equations for Motor and Pump Efficiency Improvements

(Eq. 2.a) Pre-Project Efficiency (for use in Eq. 4.a)

$$\eta_{pre\ project} = \eta_{pump\ pre\ project} \times \eta_{motor\ pre\ project} \times \eta_{VFD\ pre\ project}$$

(Eq. 2.b) Post-Project Efficiency (for use in Eq. 4.a)

$$\eta_{post\ project} = \eta_{pump\ post\ project} \times \eta_{motor\ post\ project} \times \eta_{VFD\ post\ project}$$

(Eq. 3.a) GHG Emission from Existing Pump for Non-Electric Pumps

$$GHG_{pre\ project} = Fuel\ Use \times EF_{fuel\ pre\ project}$$

(Eq. 3.b) GHG Emission from Existing Pump for Electric Pumps with actual use data

$$GHG_{pre\ project} = Electricity\ Use \times EF_{electricity}$$

(Eq. 3.c) GHG Emission from Existing Pump for Electric Pumps (if actual use data is unavailable)

$$GHG_{pre\ project} = HP_{pre\ project} \times \eta_{pre\ project} \times Operational\ Hours_{pre\ project} \times 0.746 \times EF_{electricity}$$

Where:

- $\eta_{project}$ = overall pumping plant efficiency (%), pre and post project

Appendix D

- η_{pump} = pump efficiency (%), pre and post project
- η_{motor} = motor efficiency (%), pre and post project
- η_{VFD} = efficiency of variable frequency drive (%), pre and post project, if a VFD is not a part of the scenario, use a value of 1
- $\text{GHG}_{\text{pre project}}$ = GHG emissions from existing pump (MTCO₂e)
- Fuel use = pre project fuel use (gallons or scf)
- $\text{EF}_{\text{fuel pre project}}$ = Emission factor of pre project fuel (MTCO₂e per gallon or scf)
- Electricity use = pre project electricity use (kWh)
- $\text{EF}_{\text{electricity}}$ = emission factor from electricity (0.000306 MTCO₂e/kWh)³
- $\text{HP}_{\text{pre project}}$ = Pre project rated motor horsepower
- Operational Hours_{baseline} = baseline irrigation hours based on plant requirements, area, and flow rate (hrs)
- 0.746 = conversion from HP to kilowatts

Equations for GHG Emissions from Post Project Pump Demand and Fuel Conversions

(Eq. 4.a) GHG Emissions from Post Project Pump Demand

$$\text{GHG}_{\text{pump}} = \left((1 - \text{Water Savings}_{\text{NRCS}}) \times \frac{\text{TDH}_{\text{post project}}}{\text{TDH}_{\text{pre project}}} \times \frac{\eta_{\text{pre project}}}{\eta_{\text{post project}}} \times \text{GHG}_{\text{pre project}} \right)$$

(Eq. 4.b) GHG Emissions Adjustment for fuel conversions

$$\text{GHG}_{\text{pump,adj}} = \text{GHG}_{\text{pump}} \times \frac{\text{EER Adjusted Carbon Intensity}_{\text{New fuel}}}{\text{EER Adjusted Carbon Intensity}_{\text{Old fuel}}}$$

Where:

- GHG_{pump} = GHG emissions from pump changes (MTCO₂e)
- $\text{Water Savings}_{\text{NRCS}}$ = Water savings from USDA NRCS Irrigation Water Savings Calculator (%), as found in output Cell A30.
- $\text{GHG}_{\text{pump,adj}}$ = GHG emissions from pump changes accounting for fuel conversions (MTCO₂e)
- EER Adjusted Carbon Intensity = Energy Economy Ratio lifecycle emission factor for fuel with an adjustment to reflect for the relative efficiency of a specific fuel used in a motor (g/MJ)⁴

³ For the purposes of GGRF quantification methodologies, ARB developed a California grid electricity emission factor based on total in-state and imported electricity emissions (MTCO₂e) divided by total consumption in MWh. Emissions from ARB GHG inventory (2013), available online at: http://www.arb.ca.gov/cc/inventory/data/tables/ghg_inventory_by_sector_00-12_sum_2014-03-24.pdf. Consumption data from CEC Energy Almanac (2013), available online at: http://energyalmanac.ca.gov/electricity/electricity_generation.html

⁴ EER adjusted CI values. Source: California Air Resources Board, [CAGREET 1.8b versus 2.0 CI Comparison Table](#), April 1, 2015

Appendix D

Equations for GHG Emissions from VFD Installation and System Pressure Reductions

(Eq. 5.a) GHG Emission Reductions from VFD Installation (for Electric Pumps) with no changes in pressure demand from irrigation system changes

$$GHG_{VFD} = Energy\ Savings_{VFD} \times HP_{post\ project} \times EF_{electricity}$$

(Eq. 5.b) GHG Emission Reductions from VFD Installation (for Electric Pumps) accounting for reduced pressure demand from irrigation system changes

$$GHG_{VFD} = Energy\ Savings_{VFD} \times HP_{post\ project} \times (1 - Water\ Savings_{NRCS}) \times GWR \times \left(1 - \frac{TDH_{pre\ project} - TDH_{post\ project}}{TDH_{pre\ project}}\right) \times EF_{electricity}$$

Where:

- GHG_{VFD} = GHG emissions reductions from VFD installation (MTCO₂e)
- $Energy\ Savings_{VFD}$ = Energy savings for VFD installations (from DEER) (kWh/hp)
- $HP_{post\ project}$ = Post project rated motor horsepower

Equation for GHG Emissions Reductions from Installation of Renewable Energy

(Eq. 6) GHG Emission Reductions from pump (use $GHG_{pump,adj}$ if applicable)

$$GHG_{Renew} = Capacity \times Capacity\ Factor_{solar} \times 8,766 \times EF_{electricity}$$

Where:

- Capacity = Capacity of renewable energy installation (kW)
- Capacity Factor = Statewide average of renewable performance, 18⁵%
- 8,766 = Hours per year of renewable energy generation potential (hr)
- GHG_{Renew} = GHG emissions reductions from on-site renewable energy (MTCO₂e)

Equation for GHG Emissions Reductions from SWEEP Project Implementation

(Eq. 7) GHG Emission Reductions from pump (use $GHG_{pump,adj}$ if applicable)

$$GHG_{post\ project} = GHG_{pre\ project} - GHG_{pump} + GHG_{VFD} + GHG_{Renew}$$

Where:

- $GHG_{post\ project}$ = GHG emissions reductions from the SWEEP project improvements compared to the previous irrigation system (MTCO₂e)

⁵ CEC (2013). Cost-Effectiveness of Rooftop Photovoltaic Systems for Consideration in California's Building Energy Efficiency Standards. Available online at: <http://www.energy.ca.gov/2013publications/CEC-400-2013-005/CEC-400-2013-005-D.pdf>

Appendix D

Appendix C. NRCS Tool Instructions

USDA NRCS Irrigation Water Savings Calculator Instructions

The NRCS Irrigation Water Savings Calculator (NRCS Calculator) allows applicants to input specific information related to their current on-farm irrigation system to obtain baseline water use estimates. Similarly, applicants can input specific data related to proposed irrigation system enhancements to obtain projected water savings estimates. The NRCS Irrigation Water Savings Calculator can be accessed here: http://efotg.sc.egov.usda.gov/references/public/CA/CA_irrigation_water_savings_9-08.xls

The following instructions are included to assist the applicant with completing the NRCS Calculator (i.e., Microsoft Excel file) to obtain the annual water savings percentage to be used in ARB's GHG Calculator tool. If the project includes more than one irrigation practice, follow steps 1-11 to run the NRCS calculator tool for each unique practice. Instructions on how to combine multiple practices is included in Step 12.

1. Open the calculator tool through this link: http://efotg.sc.egov.usda.gov/references/public/CA/CA_irrigation_water_savings_9-08.xls
2. Enter project applicant name and date at the top of the NRCS Calculator.
3. Scroll down and enter in the project acreage, located at the bottom of the NRCS Calculator, affected by the proposed CDFA SWEEP project.
4. Select the predominant soil type affected by the proposed CDFA SWEEP project. If the applicant is unsure of the predominant soil type, applicants can determine the soil type as identified by the SoilWeb: <http://casoilresource.lawr.ucdavis.edu/gmap/>
5. Select the crop currently planted in the acreage affected by the proposed CDFA SWEEP project.
 - For double cropping, multiple crops, or crops grown in rotation: select one principle crop and run the NRCS Calculator only once. *Do not follow the instructions in the blue box in the NRCS Calculator tool.*
6. Select the appropriate baseline, township, and range of the proposed CDFA SWEEP project. Applicants can determine the township and range of their project by using the Land Survey Information System interactive map: <http://www.geocommunicator.gov/blmMap/MapLSIS.jsp>
7. Select the appropriate practice that captures the proposed irrigation system improvement and the baseline (i.e., current) on-farm irrigation practice used on the proposed project acreage. For example, if the current irrigation practice is surface irrigation and the project will replace leaking pipes, the applicant would select "SURFACE IRRIGATION (Replace a leaky pipeline with a pipeline)" from the "Practice" scroll box.

Appendix D

- Select the proposed irrigation water management (IWM) plan. If there is not an IWM plan used, or the applicant will not make changes to the existing IWM plan, select “No IWM plan” from the “Water Management” scroll box. Use the following definitions to determine the level of IWM for the project.

IWM Level	Tools Involved	Potential Water Savings
No IWM	no soil moisture equipment, no flow meter	None
Level 1	soil moisture equipment	5% water savings over no IWM
Level 2	soil moisture + flow meter	10% water savings over no IWM
Level 3	soil moisture + flow meter + volumetric management using soil/flow/ET information	15% water savings over no IWM

- Save the file as “project name_NRCS” as this file may be required for submission to CDFA. For projects with multiple irrigation practices, save each unique practice “project name_NRCS_practice”.

- Record the following values:

- “Estimated before practice water use” in ac-in/ac from cell C23
- “Estimated after practice water use” in ac-in/ac from cell C25
- “Annual Water Savings Estimate” in ac-in/ac from cell A28

These values may be required for use in the CDFA grant application to verify baseline and project water use.

The screenshot shows the NRCS calculator interface with the following fields and values:

- Predominant Soil:** Clay Loam
- Crop:** Alfalfa
- Baseline, Township, Range:** Humboldt, Mt. Diablo, San Bernardino
- Practice:** TRICKLE IRRIGATION (Replace under tree, solid set sprinkler or drip)
- Water Management:** No IWM plan
- Estimated before practice water use:** 31.3 Ac-in/ Ac (Step 10.a)
- Estimated after practice water use:** 29.4 Ac-in/ Ac (Step 10.b)
- Annual Water Savings Estimate:** 1.8 Ac-in/ Ac (Step 10.c)
- Water Savings Estimate:** 6% (Step 11)
- 0.16 In. Peak Daily ET**

- Record the annual water savings estimate percentage (%) located in cell A30. This percentage is the value to be input into the “Water savings (from NRCS) (%)” cell located in the ARB GHG Calculator, “Inputs” tab, cell C33.

- (Optional) For projects that include more than one irrigation practice in the same field in a given growing season, the NRCS calculator tool must be run for each unique practice. For each calculator run, multiply the annual water savings estimate percentage (%) from Step 11 by the number of acres which the practice will be used. Add each of these multiplied values and divide by total project acreage. The resulting value will be used in the ARB GHG calculator.

For example, for three unique practices used on a total 50 acres:

Practice	Acreage	Annual Water Savings Estimate (%)	Multiplied Value
Replacing surface pipe	20	4%	80
Replace surface irrigation with trickle	20	27%	540
Replace wheel lines on center pivots	10	9%	90
Reported Value (%) (Sum Divided by Total Acreage)			14.2

Appendix E: USDA NRCS Payment Schedule

Adapted from USDA NRCS EQIP FY FY15 EQIP Payment Rate Summary List Regular Rates. Found at:

<http://www.nrcs.usda.gov/wps/portal/nrcs/detail/ca/programs/financial/eqip/?cid=stelprdb1268409>

This table provides the rates for some likely SWEEP project components. Other Conservation Practice Standards may also apply and be eligible for SWEEP funding.

Practice Code	Practice Name	Component	Unit Type	Unit Cost
372	Combustion System Improvement	IC Engine Repower, <= 25 bhp	BHP	163.53
372	Combustion System Improvement	IC Engine Repower, >25 bhp	BHP	102.46
372	Combustion System Improvement	Electric Motor in-lieu of IC Engine, < 12 HP	Ea	736.45
372	Combustion System Improvement	Electric Motor in-lieu of IC Engine, 12-69 HP	Ea	3181.51
372	Combustion System Improvement	Electric Motor in-lieu of IC Engine, 70-124 HP	Ea	3993.56
372	Combustion System Improvement	Electric Motor in-lieu of IC Engine, 125-174 HP	Ea	7916.87
372	Combustion System Improvement	Electric Motor in-lieu of IC Engine, 175-224 HP	Ea	11992.74
372	Combustion System Improvement	Electric Motor in-lieu of IC Engine, 225-274 HP	Ea	14173.27
372	Combustion System Improvement	Electric Motor in-lieu of IC Engine, 400-499 HP	Ea	27454.2
372	Combustion System Improvement	Electric Motor in-lieu of IC Engine, >= 500 HP	Ea	34652.82
372	Combustion System Improvement	Mobile IC, 50-149 bhp	HP	268.23
372	Combustion System Improvement	Mobile IC, >= 150 bhp	HP	314.85

441	Irrigation System, Microirrigation	Vegetation Establishment	Ac	279.15
441	Irrigation System, Microirrigation	Orchard-vineyard, 10ac or less	Ac	1233.88
441	Irrigation System, Microirrigation	Orchard-vineyard, >10ac	Ac	682.53
441	Irrigation System, Microirrigation	Orchard-vineyard, durable tubing replace	Ac	348.48
441	Irrigation System, Microirrigation	Small Acreage	Ac	1633.18
441	Irrigation System, Microirrigation	Row Crop, Buried Manifold	Ac	826.84
441	Irrigation System, Microirrigation	Row Crop, Above Ground PE Manifold	Ac	505.36
441	Irrigation System, Microirrigation	Retrofit, Irrigation Automation	Ac	455.6
441	Irrigation System, Microirrigation	Filter replace	Ac	277.87
442	Sprinkler System	Center Pivot, < 600 Ft	LnFt	45.56
442	Sprinkler System	Center Pivot, > 600 Ft	LnFt	39.06
442	Sprinkler System	Linear Move System	LnFt	49.22
442	Sprinkler System	Wheel Line System	LnFt	9.64
442	Sprinkler System	Solid Set System	Ac	1247.92
442	Sprinkler System	Solid Set System Renovation	Ac	190.1
442	Sprinkler System	Handline system	LnFt	3.41
442	Sprinkler System	Traveling Gun System, 2" or less diameter Hose	Ea	10074.68
442	Sprinkler System	Traveling Gun System, >2" to 3" Hose	Ea	13068.08
442	Sprinkler System	Traveling Gun System, > 3" Hose	Ea	24131.35
442	Sprinkler System	Big Gun, Stationary	Ea	2587.62
442	Sprinkler System	Pod System	Ea	275.22
442	Sprinkler System	Renovation of Existing Overhead or Wheel line Sprinkler System	LnFt	4.22
442	Sprinkler System	Retrofit, Irrigation Automation	Ac	464.52

449	Irrigation Water Management	Basic IWM <30 acres	Ea	556.6
449	Irrigation Water Management	Basic IWM >= 30 acres	Ac	22.65
449	Irrigation Water Management	Intermediate IWM <30 acres	Ea	834.91
449	Irrigation Water Management	Intermediate IWM >= 30 acres	Ac	33.97
449	Irrigation Water Management	Advanced IWM <30 acres	Ea	1205.98
449	Irrigation Water Management	Advanced IWM >= 30 acres	Ac	46.83
449	Irrigation Water Management	IWM with Soil Moisture Sensors	Ea	985.18
449	Irrigation Water Management	IWM with Soil Moisture Sensors with Data Recorder	Ea	1309.66
449	Irrigation Water Management	IWM with Irrigation Evaluation	Ea	2754.78
449	Irrigation Water Management	IWM with Weather Station	Ea	2966.82
533	Pumping Plant	Electric-Powered Pump ≤ 3 Hp	HP	678.15
533	Pumping Plant	Electric-Powered Pump ≤ 3 HP with Pressure Tank	HP	901.92
533	Pumping Plant	Electric-Powered Pump >3 to 10 HP	HP	226.84
533	Pumping Plant	Electric-Powered Pump >10 to 40 HP	HP	208.32
533	Pumping Plant	Electric-Powered Pump >40 HP, Centrifugal	HP	134.4
533	Pumping Plant	Variable Frequency Drive only (no pump) ≤15Hp	Ea	1924.76
533	Pumping Plant	Variable Frequency Drive only (no pump) >15 Hp	HP	117.25
533	Pumping Plant	Internal Combustion-Powered Pump ≤ 7½ HP	HP	334.24
533	Pumping Plant	Internal Combustion-Powered Pump > 7½ to 75 HP	HP	333.44
533	Pumping Plant	Internal Combustion-Powered Pump > 75 HP	HP	201.79
533	Pumping Plant	Windmill-Powered Pump	Ft	507.69
533	Pumping Plant	Solar, <1 Hp	Ea	3539.88
533	Pumping Plant	Solar, 1-3 Hp	Ea	6698.01
533	Pumping Plant	Solar, >3 Hp	Ea	10875.56
533	Pumping Plant	Water Ram Pump	In	564.39
533	Pumping Plant	Livestock Nose Pump	Ea	627.27

533	Pumping Plant	Vertical Turbine Pump and drive, <100 Hp	HP	253.61
533	Pumping Plant	Vertical Turbine Pump and drive, >100 Hp	HP	183.05
533	Pumping Plant	Piston, manure	Ea	9874.2
533	Pumping Plant	Vertical manure pump, PTO	Ea	6790.73
533	Pumping Plant	Chopper manure pump	Ea	1028.72
533	Pumping Plant	Turbine, Pump Only	HP	98.19