

California Department of Food and Agriculture  
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Agricultural Operation	Project Description	Grant Award	County
Adam Agricultural Limited Partnership	Replacement of a 150 HP natural gas engine turbine with a 150 HP electric vertical shaft turbine run by a variable frequency drive. This new electric pump will be running entirely off of a newly installed solar PV system. This pump services 37.9 acres. Also included in the scope of this project design, is the replacement of an existing electric vertical shaft turbine that has a 30% OPE. This will be replaced with a new pump as well as a new premium efficiency motor. This new pump will be controlled by a variable frequency drive. In addition to these pump changes, weather and soil moisture monitoring will be installed on 65.58 acres.	\$150,000	Santa Barbara
Alborz Farms LLC	Incorporating the Hortau Irrigation Management System which includes soil moisture sensors and data management software which will allow real time monitoring via mobile devices or computer.	\$44,216	Kern
American Farms, LLC	The consolidation of two irrigation pumps into a single, more efficient pump. The irrigation system referenced in this document is responsible for providing water to 86.8 acres of land. Remove a 100 HP electric turbine pump, and a 200 HP diesel fueled booster pump. The replacement pump is 145 HP natural gas powered turbine. Additionally, soil moisture sensors will be added to the aforementioned 86.8 acres, thus reducing water usage.	\$150,000	Monterey
Andrew Castillo	The orchard is 10 acres of walnuts on loam soil with a solid set irrigation system. With the installation of soil moisture stations, inline pressure sensors, and flow meters throughout the orchard and pump stations and connecting these devices through telemetry it will ensure proper use and oversight of water.	\$11,430	Butte
Andrew Clark	Install solar system and variable frequency drive to get to a net zero energy use on existing ag pump. Also install electronic flow meter and moisture probe for more accurate monitoring and irrigation scheduling on varying soil types.	\$69,195	Fresno
Anthony Gentile	Adding Solar polar and converting from diesel to electric. Irrigation management using Telemetry with soil moisture, pressure sensors, pump monitoring, and new flow meters.	\$112,314	Butte
ARC Vineyards, LLC	The Hortau Irrigation Management system will be implemented to make more informed irrigation decisions. Four Hortau field monitoring stations will be installed in four irrigation blocks. These field monitoring stations will record and store soil moisture tension, system pressure and weather data. This data will be retrieved from the field automatically every 15 minutes. It will then be made available via any web enabled device.	\$32,365	Santa Barbara
Babe Farms	Install a remote farm management platform to monitor environmental conditions and the irrigation infrastructure at the farm, enabling efficient irrigation for repeatable management success. Utilize the Observant platform to enable monitoring of soil moisture, local evapotranspiration rates and weather, pump water filter pressure differential, remote pump control, in-line pressure, and capture flow meter data. The information will inform irrigation scheduling which can be monitored and controlled remotely.	\$24,155	Santa Barbara

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Baker Farming	Add Soil Moisture stations out in the fields to monitor irrigation efficiency by being able to view the data online that is relayed through a telemetry network. Convert solid set sprinkler system to drip. Add a flow meter to the discharge and pressure sensors before and after the filter. This would be connected to a telemetry network as well. Incorporation of CIMIS data with on-farm data. Installation of solar panels to power the pumps.	\$93,664	Butte
Baugher	In this 212 acres lot of almonds, install a soil moisture station as well as a pump flow monitoring station. In the soil moisture station, implementing a soil moisture probe to read the quality of the water in the ground. There will also be a radio tower that send the information being read from that probe. The pump will have a VFD flow meter installed to monitor the output. Install micro sprinklers in order to increase the effectiveness of the irrigation process.	\$150,000	Glenn
Beck Ag Operations, Inc	Installation of a 37.17 kW PV solar installation and weather and soil moisture monitoring hardware. The solar installation is projected to offset 86% of current electrical usage. Weather and soil moisture sensors and telemetry will be installed and data analyzed to inform irrigation scheduling.	\$150,000	San Luis Obispo
Becky Muxlow Farms	Installing real time remote field monitoring and water quality treatment equipment to help irrigate more efficiently. The sensors installed will be reading soil moisture from 6" to 40". The sensors will also read fertilizer applications, and soil temperature at various depths. Soil moisture sensors will be used to determine the appropriate interval between irrigation, depth of wetting, depth of extraction by roots and adequacy of wetting. These remote field monitoring units will include weather sensors to help irrigate based on ET and prevent unnecessary irrigation events. Soil temperature sensors will help to fertilize appropriately at the best temperatures. With the new solar system and the moisture sensors GHG emissions will be reduced and irrigation will be more efficient.	\$150,000	Kings
Ben Bertagna Farming	Add Soil Moisture stations out in the fields to monitor irrigation efficiency by being able to view the data online that is relayed through a telemetry network. Monitor pump efficiency by adding a flow meter to the discharge and pressure sensors before and after the filter. This would be connected to a telemetry network as well. Add solar units to all three pumps.	\$150,000	Butte
Bertagna Custom Farming, Inc.	Add Soil Moisture stations out in the fields to monitor irrigation efficiency by being able to view the data online that is relayed through a telemetry network. Monitor pump efficiency by adding a flow meter to the discharge and pressure sensors before and after the filter. This would be connected to a telemetry network as well.	\$32,760	Glenn
Bertagna Orchards, Inc.	On 110 acres of almonds, install soil moisture and water management tools. Convert to a low flow drip line system to help with water efficiency. The two soil moisture stations that will be installed are comprised of one soil moisture probe each as well as an adcon radio, a radio tower, radio solar panel and the necessary extension cables to provide power to the radio. Install flow meters on the two pumps.	\$150,000	Butte
Bidart Bros.	Incorporating the Hortau Irrigation Management System which includes soil moisture sensors and data management software which will allow real time monitoring via mobile devices or computers.	\$146,650	Kern

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Boparai Farms	Implement a Irrigation Management Program utilizing telemetry with soil moisture, flow meter, and pressure sensors throughout the various crops (raisin grapes, wine grapes and almonds).	\$112,468	Fresno
C AND E OTT FARMS LLC	Convert a flood irrigated parcel to double line drip. The crop will also be changing from alfalfa to walnuts which will result in less water usage. The row spacing will be 24' by 18' down the row with 18mm thick tape with a .5gph emitter every 24" This system will have a 92% distribution uniformity (DU) and is capable of meeting evapotranspiration (ET). Also to be installed will be a solution machine with gypsum silo and acid injection pump that will help with water infiltration reducing water use and pump run times. Finally the project will incorporate a soil moisture monitoring and weather data station in order to calculate crop demand based on ET data at the actual site.	\$150,000	San Joaquin
CH Farming Inc.	Switching to a combination style of drip and micro irrigation from flood irrigation will allow more direct controls of fertilization monitoring and watering methods. irrigation management would be based on moisture sensors.	\$94,513	Stanislaus
Charles E. Langel Orchards	Implementing a soil moisture station, and a pump flow meter. The soil moisture station will consist of one soil moisture probe to determine how well the water is penetrating the soil, an adcon radio and radio tower to report the information being read by the probe, and a solar panel with the required extensions to power the radio.	\$11,175	Butte
Charles F. Manhart	Add soil moisture stations in fields to monitor irrigation efficiency by viewing data online that is relayed through a telemetry network. Add flow meter before and after the filter which will also be connected to telemetry network.	\$54,300	Colusa
Cordi Family Farms	Convert an almond orchard from flooded irrigation to solid set sprinkle system and install a soil moisture sensor.	\$65,922	Sutter
DAMCO Investments	Install real time remote field monitoring and water quality treatment equipment/agents and Water Management System to help irrigate and manage water efficiently while saving green house gases. Remote Field monitoring sensors will be used to determined the appropriate interval between irrigation, depth of wetting, depth extraction by roots and adequacy of wetting. These sensors allow more precise irrigation according to ET and prevent unnecessary irrigation events. Gypsum machine will allow water amendments (with gypsum) and reduce the amount of standing water and evaporation. A Water Management system will be installed with a drip line irrigation system to replace the current flood system.	\$96,836	Tulare
Diamond West Farming Inc.	Implementation of Hortau's real time irrigation management system. Hortau's soil tensiometers will be installed with-in the effective root-zone to measure plant stress. The fully outfitted station will also monitor weather data along with system pressure. All data will be monitored and stored on the Hortau servers and made available to the grower via any web enabled device such as a smart phone or tablet.	\$148,232	San Luis Obispo

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DLP Ag Partnership, LP	Installation of weather and soil moisture monitoring hardware. Weather and soil moisture sensors and telemetry will be installed and data analyzed to inform irrigation scheduling at both properties. A new premium efficiency pumping station is to be installed. A VFD and a flowmeter will be installed at the project site.	\$149,904	San Luis Obispo
Doug Les Farms	Install real time remote field monitoring and water quality treatment equipment/agents and Water Management System to help irrigate and manage water efficiently while saving green house gases. Remote Field monitoring sensors will be used to determined the appropriate interval between irrigation, depth of wetting, depth extraction by roots and adequacy of wetting. These sensors allow more precise irriagation and according to ET and prevent unnecessary irrigation events. A Water Management system will be installed with a drip line irrigation system to replace the current flood system.	\$131,788	Tulare
Dougherty Brothers	Convert a furrow irrigation system to a new,low flow, sub-surface drip irrigation system on 150 acres of row crop. Replace a 145 HP diesel pump with a 60HP electric pump controlled with a VFD panel. The new system will include solar powered Smart Stations with soil water tension monitors and electronic data output, an electronic flow meter, and.22 GPM/100' drip tape. Evaoptranspiration will be monitored daily via emails from the Western Weather system.	\$134,906	Sutter
DP Farms	<p>Install a 60.1 KW AC solar system that will produce enough electricity to offset the energy use of a 75 horsepower centrifugal booster pump used for drip irrigation.</p> <p>Install new Netafim drip tape to increase irrigation system uniformity.</p> <p>Install a Pure Sense soil moisture monitoring system with a weather station that will be used to help schedule the frequency and duration of irrigation events.</p> <p>Install a Netafim NMC Pro Automation system that will monitor and control fertilizer injection into the irrigation system and electronically change water for the irrigation system based on a schedule created from soil moisture sensor readings.</p> <p>Install a 75HP variable frequency drive electric panel on the irrigation system booster pump to ensure the irrigation system operates at the designed pressure and conserves energy.33:33</p> <p>Install a magnetic flow meter on the drip system to record applied water in gallons per minute and total acre feet.</p>	\$150,000	Fresno
Farming M's, Inc.	The proposed project will install micro sprinklers on and new planting of 40 ac of almond trees in a field that was formally flood irrigated row crops. In addition the project will reduce irrigation usage by installing an ET based smart irrigation controller system, moisture sensors, flow meters, and a weather station. Install a variable frequency drive, solar panels to power electric the pump.	\$150,000	Tulare

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Freedom Farms	<p>Install a new drip irrigation system in three traditional rice fields in south Sutter. The scope of the project includes a new electric pumping plant with VFD, filters, underground pvc mainlines, pvc field laterals, re-useable polyethylene manifolds, drip tape, and the John Deere Field Connect soil moisture monitoring system and weather station. The project will save water and reduce greenhouse gas emissions in multiple ways, including:</p> <ol style="list-style-type: none"> <li>1) the reduction of gross applied water through new cropping patterns (shifting from flooded rice to drip irrigated tomatoes, for example)</li> <li>2) the elimination of four diesel booster pumps (currently used for sprinkler irrigation of row crops)</li> <li>3) reduced tractor passes to apply fertilizer. Fertilizers will be injected into the drip irrigation system</li> <li>4) the introduction of ET and soil moisture based irrigation scheduling.</li> </ol>	\$150,000	Sutter
G and N Creekside Farms Inc	<p>Add Soil Moisture stations out in the fields to monitor irrigation efficiency by being able to view the data online that is relayed through a telemetry network. Monitor pump efficiency by adding a flow meter to the discharge and pressure sensors before and after the filter. This would be connected to a telemetry network as well.</p>	\$38,650	Butte
Godinho Orchards	<p>The 41 acre property of almonds is applying for an upgrade in their irrigation water management level. Install 1 soil moisture station, equip the pump station with a flow meter and attach pressure sensors. The data will be relayed through a telemetry network allowing for accurate records and easy access to live data.</p>	\$10,923	Solano
Greene and Hemly	<p>Installing 16 Hortau stations for irrigation management. In addition, this advanced system eliminates fertilizer and nutrient leaching which in turn reduces the environmental impact of crop production. Ultimately the Hortau system allows the grower to monitor the trees stress and only irrigate when the trees need it.</p>	\$138,030	Sacramento
Henry Pruitt Anderson, III & Betty Jean Anderson	<p>The proposed project will remove 80 acres of flood irrigated row crops and install pistachios using a highly efficient point source drip irrigation system with a smart irrigation controller, moisture sensors, flow meters, and a weather station. In addition, the project will reduce GHGs by installing a variable frequency drive, solar panels to help power the pump.</p>	\$150,000	Tulare
Her Produce	<p>A diversified specialty vegetable operation will decrease water usage by converting from surface to drip irrigation and will decrease greenhouse gas emissions by increasing pump efficiency.</p>	\$45,674	Fresno
Hidden Oak Winery	<p>Install field monitoring station to help manage plant stress and irrigate to plant needs.</p>	\$7,692	San Luis Obispo
Holmes Ag Management	<p>80 Acre Water &amp; GHG improvements including using ET to help determine irrigation scheduling. This will be used in conjunction with soil moisture monitors, flow meters, and other factors to determine the correct schedule. Changing over a deep well diesel engine to an electric motor will drastically reduce GHGs. Increased water efficiency and using the VFD will result in less pumping of the booster pump thereby reducing GHGs.</p>	\$124,526	Tulare

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Holtermann Farms	Installing 11 Hortau stations to manage irrigation and plant stress on 1,050 acres.	\$95,004	Kern
Huerta Family Farms Inc.	Conversion of flood irrigated plums to drip irrigated. The proposed project will include soil moisture sensors to optimize irrigations and utilize ET based irrigation schedules. More efficient pumps will be designed and installed to supply adequate pressure to optimize the distribution uniformity of the proposed system.	\$150,000	Fresno
Innovative Produce Inc.	Consolidation of a 60 HP electric vertical shaft turbine and 50 HP electric booster pump combo, into a single 150 HP electric vertical shaft turbine controlled by a variable frequency drive. This pump will serve 105 acres. In addition to the consolidation, the scope of this project also involves the replacement of 375 HP diesel turbine pump with a 205 HP natural gas booster pump to reduce GHG on 54.98 Acres of row crops in Santa Maria. In addition, weather and soil moisture monitoring will be installed on 159.98 acres.	\$150,000	Santa Barbara
Iron Horse Ranches	Install a VFD on an existing pump and tie two pump stations together to be able to utilize the VFD on all acreage. Install solar panels on an existing structure to offset usage of these pumps located on the property.	\$150,000	Stanislaus
Isidro Hurtado	Replace moveable pipe sprinklers with double drip line. Install both a soil moisture station and a pump/flow meter station. The soil moisture station will consist of a soil moisture probe, an adcon radio, a radio tower, as well as a solar panel and all of the necessary extensions to power the radio. The pump station will include a new digital flow meter, two new pressure sensors, a radio, radio tower, its own solar powering station, as well as a VFD.	\$54,165	Butte
J & R Sanguinetti Farms Inc.	Install Hortau's advanced irrigation management to analyze how far the irrigation is penetrating into the soil and root zone to better manage water and nutrients.	\$117,760	San Joaquin
James Davidson	To install and enable more efficient irrigation practices, based on soil moisture, weather and pump controlling. This project seeks help with funding for 10,000 feet of drip tubing with .5gph emitters to ensure a more efficient irrigation process. Install a 10hp VFD panel at attach to the electric pump to replace the diesel pump. Install telemetry units along with weather sensors to enable correct soil and weather monitoring to in-turn, automatically enable the pump operation.	\$19,721	Butte
James Moore Farm	Install a new soil moisture and pump monitoring system on site. The soil station information in the field, combined with the flow meter and pressure data from the pump will help monitor irrigation practices and policies.	\$10,760	Butte
Jed Webster	Installation of a variable frequency drive as well as a new flow meter on new well. This well will serve 40 acres of 4th leaf almonds. The system allows for real time monitoring.	\$83,988	Madera



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Jennifer Tucker	Convert nine acres of almonds from single set, R-5 sprinklers to a new low pressure, dual line drip system and install one soil moisture station as well as a pump station. The soil moisture station will consist of one soil moisture probe, an adcon radio, a radio tower, as well as a solar panel and all of the necessary extensions to supply power to the radio. The pump station will include a new digital flow meter, two new pressure sensors, a radio, a radio tower and its own solar power system.	\$33,457	Butte
John D Weddington and Jan S Holcomb	Proposed changes will improve system uniformity (DU), reduce required pressure, improve pumping efficiency, recycle wasted filter flush water, eliminate use of irrigation season diesel pumping, and improve accuracy of irrigation scheduling. Water will be saved by a higher system DU, better timing of irrigation events and volumes, and recycling of filter flush water. GHG will be lowered by reducing energy inputs (electrical and diesel fuel). The following components will be upgraded: -New pressure compensating drip line (replaces standard drip line) -Low pressure design filter station (operates at 20 psi)-New VFD drive turbine pump (VFD maintains 20 psi during backflush) -New VFD submersible well pump 5hp (replaces 2hp and 7.5 hp pumps, and eliminates diesel pump during irrigation season)-Filter flush line installed to reservoir for recycling flush water -One additional soil moisture monitoring station and logger -Install flow meter on new 5hp VFD submersible well pump	\$65,288	Fresno
Karl te Velde Ranch, Inc.	Install high efficiency, low pressure micro sprinkler system on 125 acres of walnuts that are currently flood irrigated. A flow meter and moisture monitors will also be installed and data will be used to better manage irrigation scheduling.	\$150,000	Kings
Kaweah's Run Vineyard	Installation of weather and soil moisture monitoring hardware. Weather and soil moisture sensors and telemetry will be installed and data analyzed to inform irrigation scheduling. Automated controls will be installed to control existing irrigation pump and a flow meter will be installed to monitor flows from the well.	\$16,042	San Luis Obispo
Kemp Orchard	Install 2 soil moisture probes and one pump monitoring station on a 30 acre almond block, currently irrigated by micro-sprinkler. The soil moisture station will be able to display the irrigation events and pressure of the irrigation in real time through a telemetry network. This will improve the accuracy of the irrigation applied to reduce excess pump run-time. By reducing pump run-time there will be a reduction in the overall greenhouse gas emissions. The pump station will show the pressure and flow in real time. A Variable Frequency Drive will be installed to improve the efficiency of the pump along with the installation of additional solar panels.	\$52,176	Tehama
Ken Braunschmidt	On the 76 acre walnut orchard, install 8 soil moisture stations that measure the soil moisture and the in-line pressure. Along with equipping the current electric turbine pump with a flow meter and 2 pressure sensors. All of these monitoring devices will be connected through a telemetry network to allow for accurate record and easy access to live data.	\$47,793	Colusa
Knott Farms	Add Soil Moisture stations out in the fields to monitor irrigation efficiency by being able to view the data online that is relayed through a telemetry network. Monitor pump efficiency by adding a flow meter to the discharge and pressure sensors before and after the filter. This would be connected to a telemetry network as well.	\$11,175	Butte

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Leroy Del Don - Del Mar Farms Dos Palos	<p>Install a 75.1 KW AC solar system that will produce enough electricity to offset the energy use of a 100 horsepower booster pump used for drip irrigation.</p> <p>Install new Netafim drip tape to increase irrigation system uniformity.</p> <p>Install a Pure Sense soil moisture monitoring system with a weather station that will be used to help schedule the frequency and duration of irrigation events.</p> <p>Install a Netafim NMC Pro Automation system that will monitor and control fertilizer injection into the irrigation system and electronically change water for the irrigation system based on a schedule created from soil moisture sensor readings.</p> <p>Install a 100 HP variable frequency drive electric panel on the irrigation system booster pump to ensure the irrigation system operates at the designed pressure and conserves energy.</p> <p>Install a magnetic flow meter on the drip system to record applied water in gallons per minute and total acre feet.</p>	\$150,000	Merced
Martella Farm	<p>On 205 acres, install a smart irrigation controller system, moisture sensors, flow meters, and a weather station. In addition, the project will reduce GHGs by installing a variable frequency drive, solar panels to power the pump.</p>	\$113,200	Kings
MEK Group, Inc.	<p>The project will replace the 25 year old drip irrigation system with new drip lines and pressure compensating emitters to significantly reduce irrigation water use.</p> <p>Installation of a 20kw solar farm near a new well to further reduce GHG.</p>	\$74,479	Kern
Melissa Pruitt Farms	<p>Installation of 188 acres of subsurface drip irrigation with an electric booster pump to replace the existing flood irrigation system with a diesel booster pump. The conversion will also include the installation of the following:</p> <ol style="list-style-type: none"> <li>1) Pure Sense remote accessible in field soil moisture sensors &amp; in field weather station to help schedule irrigation events</li> <li>2) Variable frequency drive (vfd) electrical panel to ensure the system operates at the correct pressure and only uses the required electricity</li> <li>3) Netafim NMC Pro irrigation controller (automation) that will monitor and record the amount of water and fertilizer applied to the field and automatically change field valves based on the current irrigation program</li> <li>4) Seametrics magnetic flow meter to help monitor the irrigation system flow rate in gallons per minute and the total water applied to the field in acre feet</li> <li>5) Multiple pressure gauges to verify the system is operating as designed.</li> </ol>	\$150,000	Merced
Merrill Farms LLC	<p>The installation of 22 stations to be positioned in the most representative areas of their 1251 acres of rotational crops to improve irrigation management.</p>	\$149,576	Monterey
Michael G Jackson	<p>Installing high efficiency, low pressure double line drip irrigation system on 121 acres of stone fruit that is currently flood irrigated. A flow meter and moisture monitors will also be installed and data will be used to better manage irrigation scheduling.</p>	\$150,000	Fresno



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Mission Holdings	The removal of a 170 HP diesel engine, and consolidation of a turbine/booster pump combination into a single vertical shaft turbine pump. In addition, weather and soil moisture monitoring will be installed on 111 acres. A variable frequency drive will be installed to control the new vertical shaft turbine pump to reduce energy use and GHG emissions.	\$150,000	Monterey
Mission Ranches, LLC	Replacement of two 150 HP diesel booster pumps with a single 200 HP electric booster pump with VFD control. These booster pumps are responsible for irrigating 175.78 acres. Additionally, a solar PV system will be added to further reduce GHG emissions. Soil moisture sensing will also be applied to the 175.78 acres which will result in a reduction overall engine run hours.	\$150,000	Monterey
Myers Seed	Install five new soil moisture stations as well as two new pump stations. Each soil moisture station consists of one soil moisture probe, an adcon radio, a radio tower, as well as a solar panel and all of the necessary extensions to supply power to the radio. The pump stations will each include a digital flow meter, two new pressure sensors, a radio, radio tower, and it even has its own solar powering system. The grower will also be installing two new, more energy efficient diesel engines on his pumps.	\$93,096	Colusa
Naimi Ranch Inc	On 252 acres of almonds and walnuts, install an advanced irrigation management system from Hortau. This system will allow the farm to use less water and energy by incorporating soil moisture sensors and data management software. The Hortau system allows real time monitoring by mobile device or computer.	\$85,204	Merced
Navdip Badhesha	SDI system on 40 acres of grapes to replace flood irrigation system. The existing well pump and motor will be upgraded to a more efficient setup and run in conjunction with new drip system components, including the use of ET data based scheduling. The existing diesel gear-head will also be converted to an electrical setup through local PG&E services to substantially reduce emissions. In addition, a solar grid will be installed to help combat electrical costs and promote the usage of renewable energy.	\$150,000	Fresno
Nick Bertagna Farming	Add Soil Moisture stations out in the fields to monitor irrigation efficiency by being able to view the data online that is relayed through a telemetry network. Monitor pump efficiency by adding a flow meter to the discharge and pressure sensors before and after the filter. This would be connected to a telemetry network as well.	\$44,015	Butte
Nick Huerta	Converting flood irrigated farmground to a more efficient drip system. Water moisture sensors will be paired with the system to utilize an ET based irrigation schedule. New energy efficient pumps to reduce GHG emissions released are part of the project as well. The project will also implement IWM level 3 plans on properties currently without plans through the acquisition of soil moisture sensors and software.	\$50,223	Fresno
Old Colony Partnership	On 160 acres of almonds, install one soil moisture station as well as a digital pump flow meter. Install a new electric pumping station with a VFD to increase efficiency. The soil moisture station will include one soil moisture probe, and Adcon radio, a radio tower, the solar panel that supplies energy to the radio as well as the cables that deliver the energy to the radio. Install a solar array for the pump.	\$105,019	Tehama

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Opolo Wines, LP	The scope of the project application serves to add a 29.925 kW DC solar system to a pumping site that consists of a 10 HP submersible pump and a 30 HP electric booster pump. This solar system will reduce the amount of GHG produced. In addition to the solar installment, soil moisture sensors will be added to the 43.66 acres that this pump station serves.	\$150,000	San Luis Obispo
Orosi Premium Citrus, LLC	Install a micro-sprinkler irrigation system on 80 acres of citrus to reduce both water and energy useage as compared to the existing furrow irrigation. Additionally all three wells will be retrofited to improve pumping efficiency, and thus further lower energy useage. Soil moisture instrumentation will be installed to optimize water use. Finnally the micro sprinkler irrigation system will eliminate tne need for furrow irrigation tractor work and diesel fuel resulting in further Greenhouse Gas Emissions reduction.	\$140,140	Tulare
Paiva Farms	On 96 acres of almonds, install a pump monitoring system as well as 2 soil moisture stations to help with irrigation efficiency.	\$10,170	Butte
Patricia Diane Vineyard, LLC	Weather and soil moisture sensors and telemetry will be installed and data analyzed to inform irrigation scheduling. A flowmeter will be installed on an existing system to monitor flow rates during irrigation events.	\$20,610	San Luis Obispo
Pavo Real Vineyard LLC.	<p>Improve irrigation efficiency by implementing a Hortau advanced irrigation management system. The proposed Hortau Field Monitoring station will utilize 3 soil moisture sensors (tensiometers) to measure, record and report soil moisture tension. These sensors are placed at 3 depths (18", 24" and 36") and are offset so that both depth of infiltration and lateral movement of the water can be measured. This data is critical in order to effectively decide when to and how long to irrigate.</p> <p>The tensiometer reading is a physical measurement and thus is a direct measurement of plant stress with no required adjustment due to climate or soil type.</p>	\$14,697	Monterey
Porto Brothers	Cover 1,130.59 acres of almonds and pistachios with Hortau's advanced irrigation technology, using 17 stations on the property.	\$147,898	Fresno
R & J Sanguinetti	On 997 acres of tomatoes, walnuts and almonds, install a total of 17 Hortau stations throughout the ranches. This system will allow the farm to use less water and energy by incorporating soil moisture sensors and data management software.	\$143,584	San Joaquin
Rahul Family Farms, L.P.	Through the installation of soil moisture stations, irrigation events will be monitored to know when the soil is at a maximum moisture point. Incorporation of CIMIS data for better irrigation management.	\$66,465	Butte
Rapp Family 2001 Trust	The installation of 5 Hortau Smart Stations on 108 acres of almonds.	\$44,856	Merced

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Richard Kahn	Existing Pecan and Walnut orchard with diesel pump and flood irrigation to convert to high efficiency electric pump and drip irrigation system with soil and weather monitor. Project will improve efficiency of energy and water use as well as decrease air pollution. Costs of recovering the orchard health have been greatly increased by the need to drill a new well which is included in this project cost estimate as an in kind contribution.	\$103,627	Fresno
Richardson Family Irrv. Trust	Install 11 Hortau stations to properly manage 273 acres of citrus. This system will incorporate the use of soil sensimeters and data management software to allow real time monitoring.	\$94,927	Tulare
S&F Farms	This project design includes two Hortau stations to be placed in the most representative areas within the ranch. Hortau will also place a flowmeter monitoring station at each well location and pump station (2 sites).	\$22,023	Kern
Sami Jadallah	Install 2 soil moisture stations as well as one pump station. The soil moisture stations will each contain one soil moisture probe, one adcon radio, a radio tower as well as the the solar panel and the necessary extensions to supply energy to the radio. Install two pressure sensors, a VFD, as well as a flow meter on the pump stations all to help manage water usage and make it more efficient.	\$15,170.00	Tehama
Samuelson Farms	Installing drip irrigation systems, a VFD, soil moisture sensors/water management system, and adding & interconnecting mainlines to supply water efficiently.□The goal is to reducing operating expenses by reducing labor needs, travel, water applied, and energy required to operate systems. Monitoring soil moisture levels is critical to ensure irrigation water is applied to fill the root zone and no deeper. This will result in placement of nutrients near the tree root and reduce nitrogen and other fertilizers from being flushed into the lower water tables.	\$149,129	Fresno
Sarvjeet Panach	Upgrade from surface (flood) irrigation to a in-line drip system. The existing well and pump will be used, but all the drip system components will be new. Irrigation scheduling will be based upon a combination of ET data using CIMIS and pressure chamber readings.	\$125,541	Fresno
Sharyne Merritt	This project includes installing solar powered Rainbird ClimateMaster weather stations to monitor soil moisture, temperature, humidity, soil moisture, and wind speed all reported on-line through a cellular network. The project also includes installation of Bermad electronic valves with flow sensor that will allow for irrigation scheduling through wireless control of valves. The combination of site-specific weather information and remote controlled valves will provide more precise timing of irrigation, elimination of overwatering, and less pump use with accompanying energy savings and lower GHG. The project also includes application of 6 inches of mulch in areas of the orchard in which tree duff has not accumulated, in order to preserve moisture.	\$54,808	Santa Barbara

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Agricultural Operation	Project Description	Grant Award	County
Sierra Shadows Ranch LP	Install an advanced integrated microirrigation modular system that will function, applying many of today's digital technology features that provide benefits such as; 1) Cost/water efficient Variable frequency drive (VFD) control system for a 200hp well motor/pump ground water system 2) Distributed irrigation pipeline infrastructure throughout the East and West sections of the main ranch allowing for multiple ground water well sources to complement; add or subtract from current water, pressure rate requirements, while still expanding the orchard capabilities. New adjoining field parcels can be modularity added to the integrated irrigation structure. 3) Real-time monitoring of applied nutrients,soil/ET,insecticides, herbicides,etc.are Enhancement component updates to SSR irrigation system for the interfacing of sensors for optimizing water and fertilizer distribution via computer control for a real-time analysis of critical conditions.	\$24,548	Kern
Sipma Farms Inc.	The conversion of two diesel pump motors to natural gas motors. The installation of an ET based moisture monitoring system and the replacement of a solid set irrigation system with a micro irrigation system.	\$60,378	San Joaquin
Stephens Farm	Add Soil Moisture stations out in the fields to monitor irrigation efficiency by being able to view the data online that is relayed through a telemetry network. Monitor pump efficiency by adding a flow meter to the discharge and pressure sensors before and after the filter. This would be connected to a telemetry network as well.	\$11,175	Butte
Stone Ranch	Convert row crops to tomatoes and changing from flood irrigation to sub surface drip tape on 366 acres. The project will in addition remove a 200 HP diesel pump and install a 100 HP turbine electric well. A smart irrigation controller and soil moisture sensors will also be added to maximize the efficiency and decrease the water loss for the irrigation system. Solar panels will be installed to help offset the green house gasses emitted through the installation of the electric pump.	\$150,000	Kings
Stratford Ranch	Located on 293 acres of almonds, pomegranates and tomatoes.An irrigation smart controller and moisture sensors will be added to the existing drip/ micro yet irrigation to maximize the efficiency of the irrigation system. CIMIS will be used to established the initial baseline irrigation scheduling based on the previous years data for the region. As the moisture sensors are able to interpret that data and the onsite field conditions taking into account soil type, crop requirement, and irrigation emitter rate; the sensors will be programmed to act as the default mechanism for determining irrigation scheduling. A flow sensor will also be added to the system to determine and verify the exact amount of water that is being applied to the crop over the growing season.A variable frequency drive will be added to the project to match pump load to irrigation demand eliminating energy waste created from the electrical pump. Approximately 300 kWh of solar panels will be installed on the project resulting in approximately for 80% of the entire energy demand for the onsite farming operations.	\$150,000	Kings
Tanimura Brothers, LP	Incorporating soil moisture sensors and data management software provided by Hortau on 158 acres of rotational crops. The system allows real time monitoring by mobile device or phone.	\$86,682	Monterey

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Agricultural Operation	Project Description	Grant Award	County
Terranova Ranch, Inc.	Conversion from flood irrigation to low-pressure drip irrigation on existing walnut orchard. The project will incorporate Irrigation Water Management with Moisture Sensors.	\$50,366	Fresno
Tiffany Del Don	Installation of 201 acres of subsurface drip irrigation with an electric booster pump to replace the existing flood irrigation system with a diesel booster pump. The conversion will also include the installation of the following: 1) Pure Sense remote accessible in field soil moisture sensors & in field weather station to help schedule irrigation events 2) Variable frequency drive (vfd) electrical panel to ensure the system operates at the correct pressure and only uses the required electricity 3) Netafim NMC Pro irrigation controller (automation) that will monitor and record the amount of water and fertilizer applied to the field and automatically change field valves based on the current irrigation program 4) Seametrics magnetic flow meter to help monitor the irrigation system flow rate in gallons per minute and the total water applied to the field in acre feet 5) Multiple pressure gauges to verify the system is operating as designed.	\$150,000	Fresno
Travioli Family Farms	Install real time remote field monitoring, Flow Meters and water quality treatment equipment to help irrigate more efficiently while saving green house gases. Soil moisture sensors will be used to determine the appropriate interval between irrigation, depth of wetting, depth of extraction by roots and adequacy of wetting. These soil moisture sensors will allow more precise irrigation and according to ET. These remote field monitoring units will include weather sensors to help irrigate based on ET and prevent unnecessary irrigation events. Gypsum machines will allow the water to be amended (with gypsum) and reduce the amount of standing water and evaporation. Since Gypsum machines help the water infiltration, this will result in less pump time.	\$97,814	Tulare
Twin Oaks Vineyard LLC	Install six soil moisture stations and one pump monitoring station. The soil moisture station includes an Enviro-Pro Lite 120cm soil moisture probe, a in- line pressure sensor, and it connected through a telemetry network to allow for easy, real time data access and record. The pump station will be fitted with two McCrometer Flowmeter which will allow for an accurate flow rate display and better nutrient management through proportional injection. The pump station will have two pressure sensors before and after the filter. A well- transducer combined with a VFD will allow for accurate record and preservation of the water table. The pump station will also be linked to the telemetry system to allow for easy, real time data and record access.	\$70,753	Colusa
Watanabe Farms	Add Soil Moisture stations out in the fields to monitor irrigation efficiency by being able to view the data online that is relayed through a telemetry network. Monitor pump efficiency by adding a flow meter to the discharge and pressure sensors before and after the filter. This would be connected to a telemetry network as well.	\$11,175	Butte
West Coast Tomato Growers INC	Incorporate the the Hortau Irrigation Management System on 519 acres of tomatoes. This advanced system eliminates fertilizer and nutrient leaching which in turn reduces the environmental impact of the crop production. Ultimately the Hortau system allows the grower to monitor the plant stress and only irrigate when the plant needs it.	\$147,845	San Diego

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Agricultural Operation	Project Description	Grant Award	County
William Pruitt	Installation of 90 acres of subsurface drip irrigation with an electric booster pump to replace the existing flood irrigation system with a diesel booster pump. The conversion will also include the installation of the following: 1) Pure Sense remote accessible in field soil moisture sensors & in field weather station to help schedule irrigation events 2) Variable frequency drive (vfd) electrical panel to ensure the system operates at the correct pressure and only uses the required electricity 3) Netafim NMC Pro irrigation controller (automation) that will monitor and record the amount of water and fertilizer applied to the field and automatically change field valves based on the current irrigation program 4) Seametrics magnetic flow meter to help monitor the irrigation system flow rate in gallons per minute and the total water applied to the field in acre feet 5) Multiple pressure gauges to verify the system is operating as designed	\$150,000	Fresno
Wm. Bolthouse Farms, Inc.	The project will replace 142 acres (31.1 linear miles) of 3" diameter aluminum pipe with new 3" diameter Certa-Lok Yelomine PVC pipe and couplers. The savings of water will reduce electric motor run hours and thus reduce GHG emissions.	\$150,000	Kings
X Line Farms	Installation of weather and soil moisture monitoring hardware. A weather station and three soil moisture sensors and telemetry will be installed and data analyzed to inform irrigation scheduling.	\$24,945	San Luis Obispo