



DEPARTMENT OF PLANNING AND COMMUNITY DEVELOPMENT

1010 10TH Street, Suite 3400, Modesto, CA 95354
Planning Phone: (209) 525-6330 Fax: (209) 525-5911
Building Phone: (209) 525-6557 Fax: (209) 525-7759

CEQA Exempt Referral Staff Approval Permit

Date: April 28, 2020
To: Distribution List (See Attachment A)
From: Rachel Wyse, Senior Planner, Planning and Community Development
Subject: STAFF APPROVAL APPLICATION NO. PLN2020-0041 – AEMETIS SOLAR
Respond By: May 18, 2020
Public Hearing Date: Not Applicable

Under the California Environmental Quality Act of 1970, the project described herein is **exempt** from CEQA review (Section 15061(b)(3)); however, the Stanislaus County Department of Planning and Community Development is soliciting comments from responsible agencies to determine if specific conditions should be placed upon project approval. Therefore, please contact this office within **15 days** if you have any comments pertaining to the proposal. Comments made identifying potential impacts should be as specific as possible and should be based on supporting data (e.g., traffic counts, expected pollutant levels, etc.). Your comments should emphasize potential impacts in areas which your agency has expertise and/or jurisdictional responsibilities.

These comments will assist our Department to recommend for approval or denial and/or apply conditions of approval to the requested staff approval; therefore, please list any conditions that you wish to have included as well as any other comments you may have. Please return all comments and/or conditions as soon as possible or no later than the response date referenced above.

Thank you for your cooperation. Please call (209) 525-6330 if you have any questions.

Applicant: Andy Foster, Aemetis Advanced Fuels Keyes, Inc.
Project Location: 4209 Jessup Road, east of Faith Home Road, north of Keyes Road, in the Ceres area.
APN: 045-026-039
General Plan: Industrial & Planned Development
Community Plan: Industrial
Current Zoning: M (Industrial) & P-D (123) (Planned Development)

Project Description: Request to install a 1.56 megawatt (MW) photovoltaic array and 1.25 MW/2.5MWh battery energy storage system or “microgrid system” to offset the use of natural gas and electricity by generating it onsite to serve the development (see Microgrid Project Overview). The 10.95 acre site includes M (Industrial) zoning east of the main drive aisle and P-D (123) (Planned Development) zoning to the west. The arrays will be installed on an elevated structure over the site’s stormwater basin and over areas with vehicle traffic. The P-D (123) zoning district, an industrial planned development, became effective December, 1985 (Rezone 85-18).

Full document with attachments available for viewing at:
<http://www.stancounty.com/planning/pl/act-projects.shtm>



STAFF APPROVAL APPLICATION NO. PLN2020-0041 – AEMETIS SOLAR

Attachment A

Distribution List

X	CA ENERGY COMMISSION	X	SAN JOAQUIN VALLEY APCD
X	CA OPR STATE CLEARINGHOUSE	X	STAN CO BUILDING PERMITS DIVISION
X	CA RWQCB CENTRAL VALLEY REGION	X	STAN CO ERC
X	FIRE PROTECTION DIST: KEYES	X	STAN CO HAZARDOUS MATERIALS
X	IRRIGATION DIST: TURLOCK	X	STAN CO PUBLIC WORKS
X	MOSQUITO DIST: TURLOCK	X	STANISLAUS FIRE PREVENTION BUREAU
X	MUNICIPAL ADVISORY COUNCIL: KEYES	X	STANISLAUS LAFCO
X	PACIFIC GAS & ELECTRIC		

STANISLAUS COUNTY CEQA REFERRAL RESPONSE FORM

TO: Stanislaus County Planning & Community Development
1010 10th Street, Suite 3400
Modesto, CA 95354

FROM: _____

SUBJECT: STAFF APPROVAL APPLICATION NO. PLN2020-0041 – AEMETIS SOLAR

Based on this agency's particular field(s) of expertise, it is our position the above described project:

- _____ Will not have a significant effect on the environment.
_____ May have a significant effect on the environment.
_____ No Comments.

Listed below are specific impacts which support our determination (e.g., traffic general, carrying capacity, soil types, air quality, etc.) – (attach additional sheet if necessary)

- 1.
- 2.
- 3.
- 4.

Listed below are possible mitigation measures for the above-listed impacts: *PLEASE BE SURE TO INCLUDE WHEN THE MITIGATION OR CONDITION NEEDS TO BE IMPLEMENTED (PRIOR TO RECORDING A MAP, PRIOR TO ISSUANCE OF A BUILDING PERMIT, ETC.):*

- 1.
- 2.
- 3.
- 4.

In addition, our agency has the following comments (attach additional sheets if necessary).






Response prepared by:

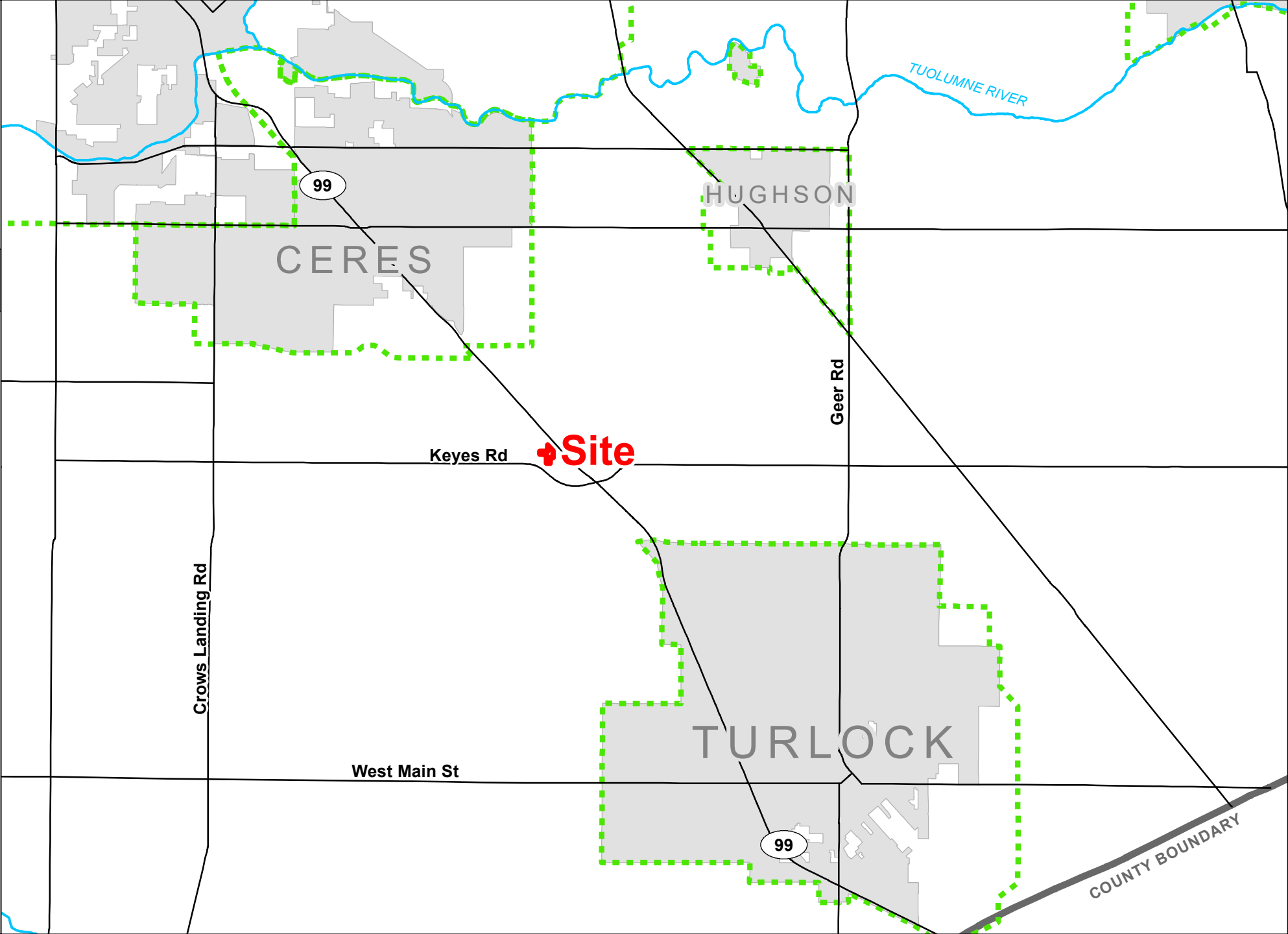
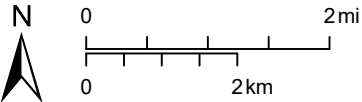
Name	Title	Date
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AEMETIS SOLAR
SAA
PLN2020-0041

AREA MAP

LEGEND

-  Project Site
-  Sphere of Influence
-  City
-  Road
-  River














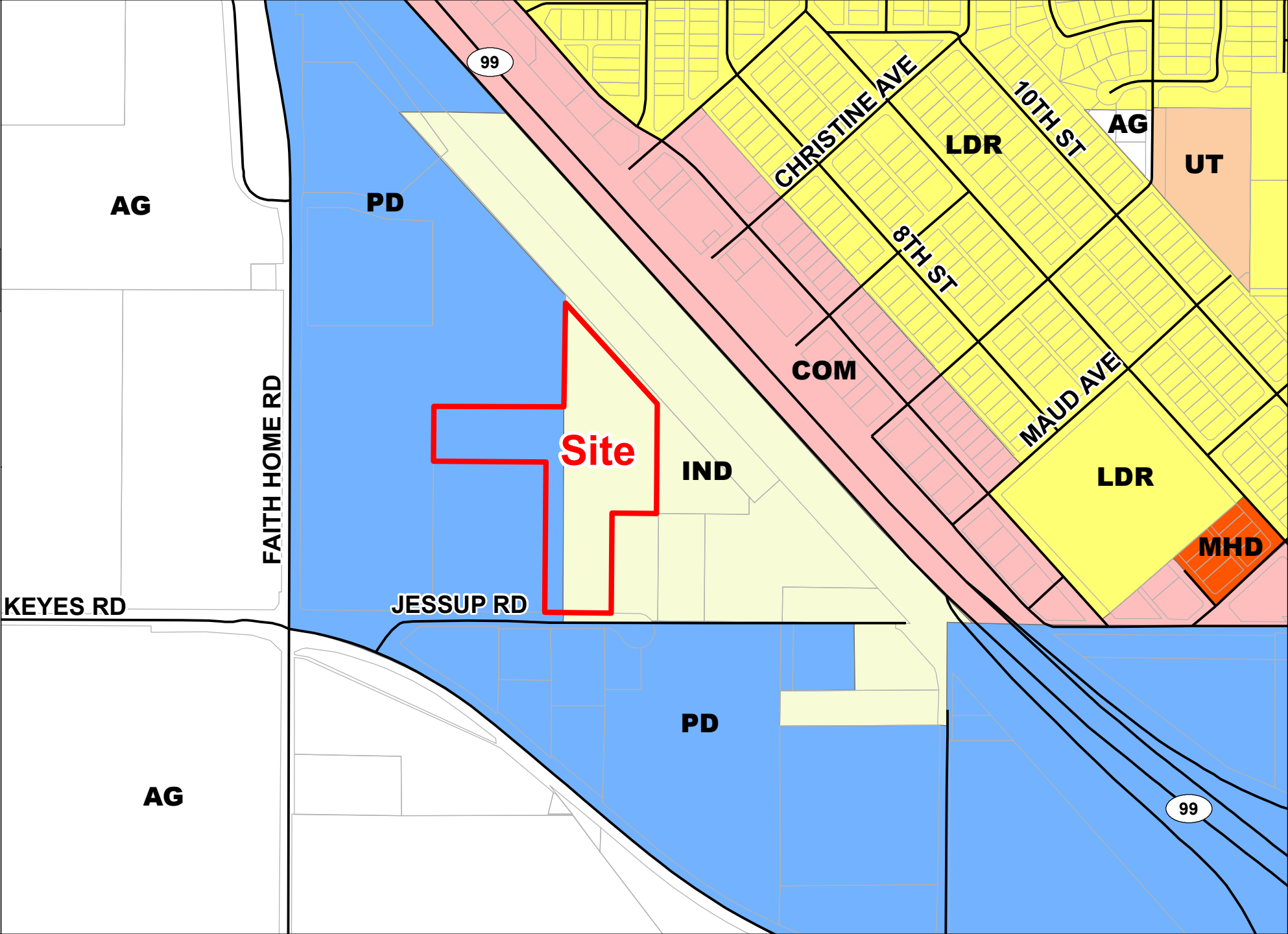
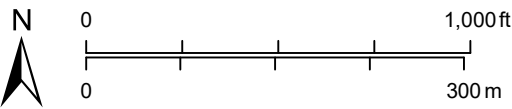
AEMETIS SOLAR

SAA
PLN2020-0041

GENERAL PLAN MAP

LEGEND










-  Project Site
 -  Sphere of Influence
 -  Parcel
 -  Road
- General Plan**
-  Agriculture
 -  Commercial
 -  Industrial
 -  Planned Development
 -  Low Density Residential
 -  Medium Density Residential
 -  Urban Transition

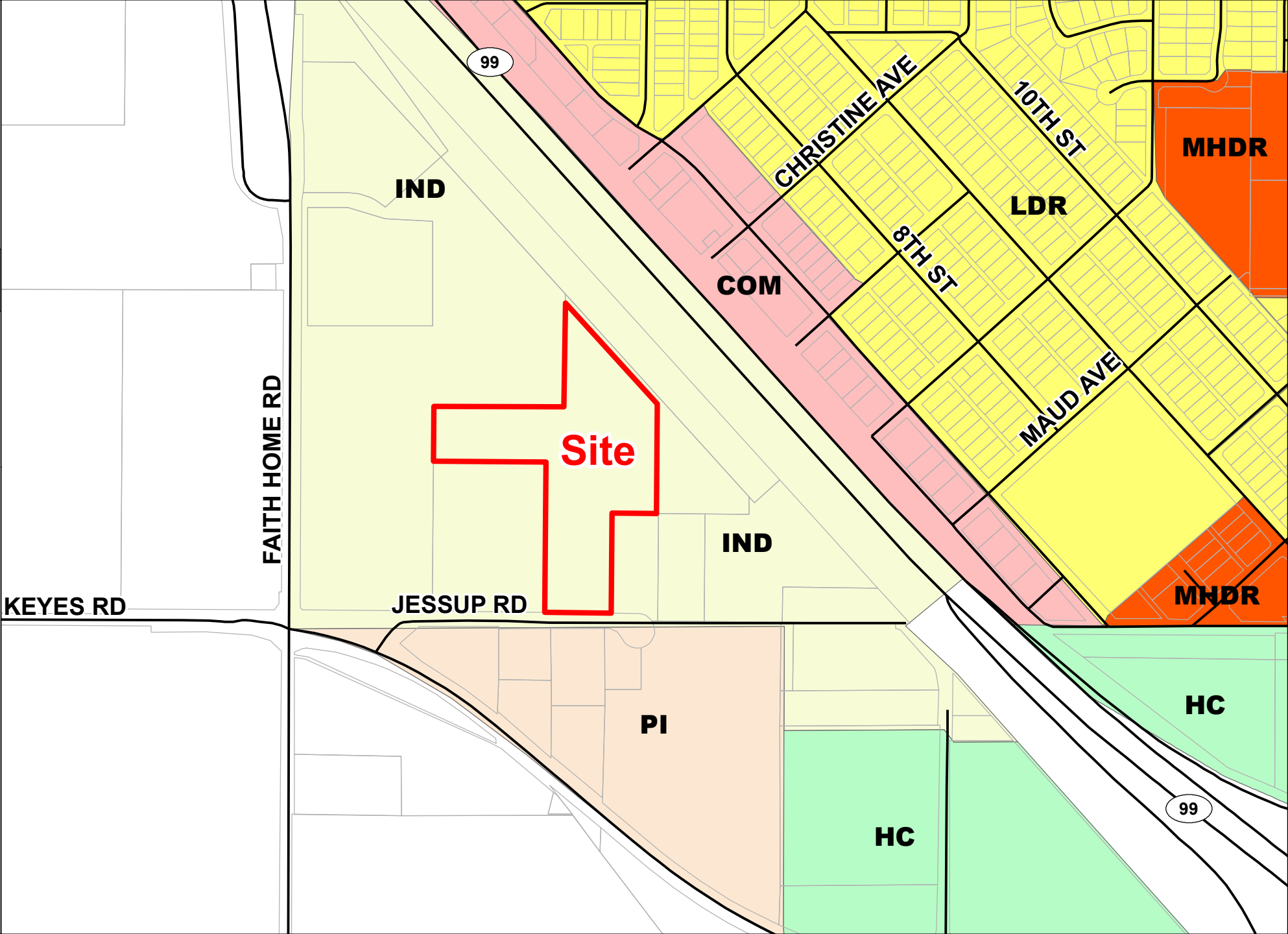
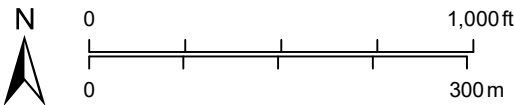


AEMETIS SOLAR
SAA
PLN2020-0041

COMMUNITY PLAN MAP

LEGEND

-  Project Site
-  Sphere of Influence
-  Parcel
-  Road
- Community Plan**
 -  Industrial
 -  Commercial
 -  Commercial - Highway
 -  Residential - Medium-High
 -  Residential - Low










AEMETIS SOLAR
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PLN2020-0041

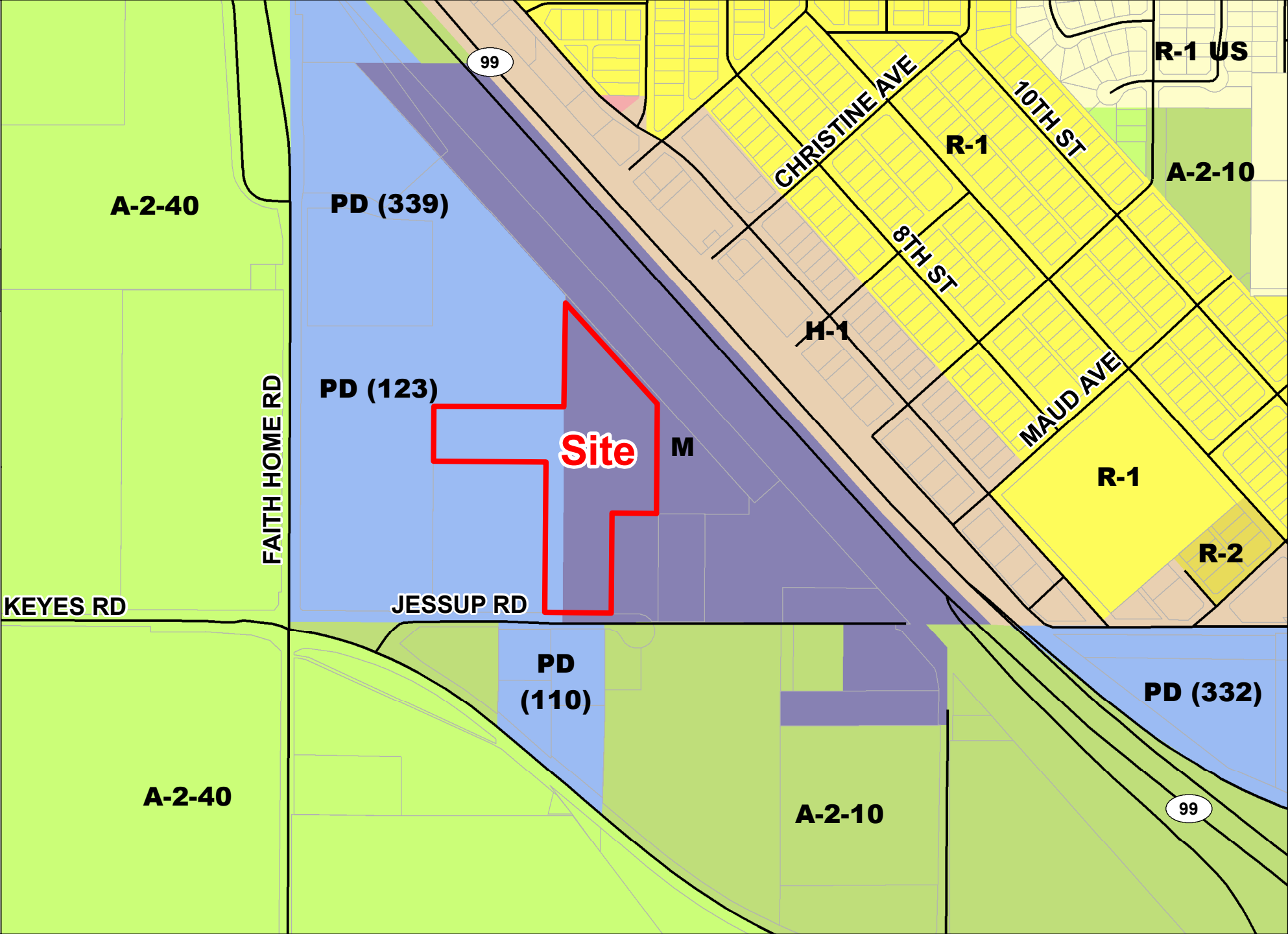
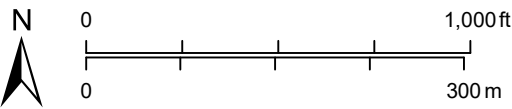
ZONING MAP

LEGEND

-  Project Site
-  Parcel
-  Road

Zoning Designation

-  General Agriculture 10 Acre
-  General Agriculture 40 Acre
-  Industrial
-  Planned Development
-  Highway Frontage
-  Single Family Residential
-  Single Family Residential



AEMETIS SOLAR

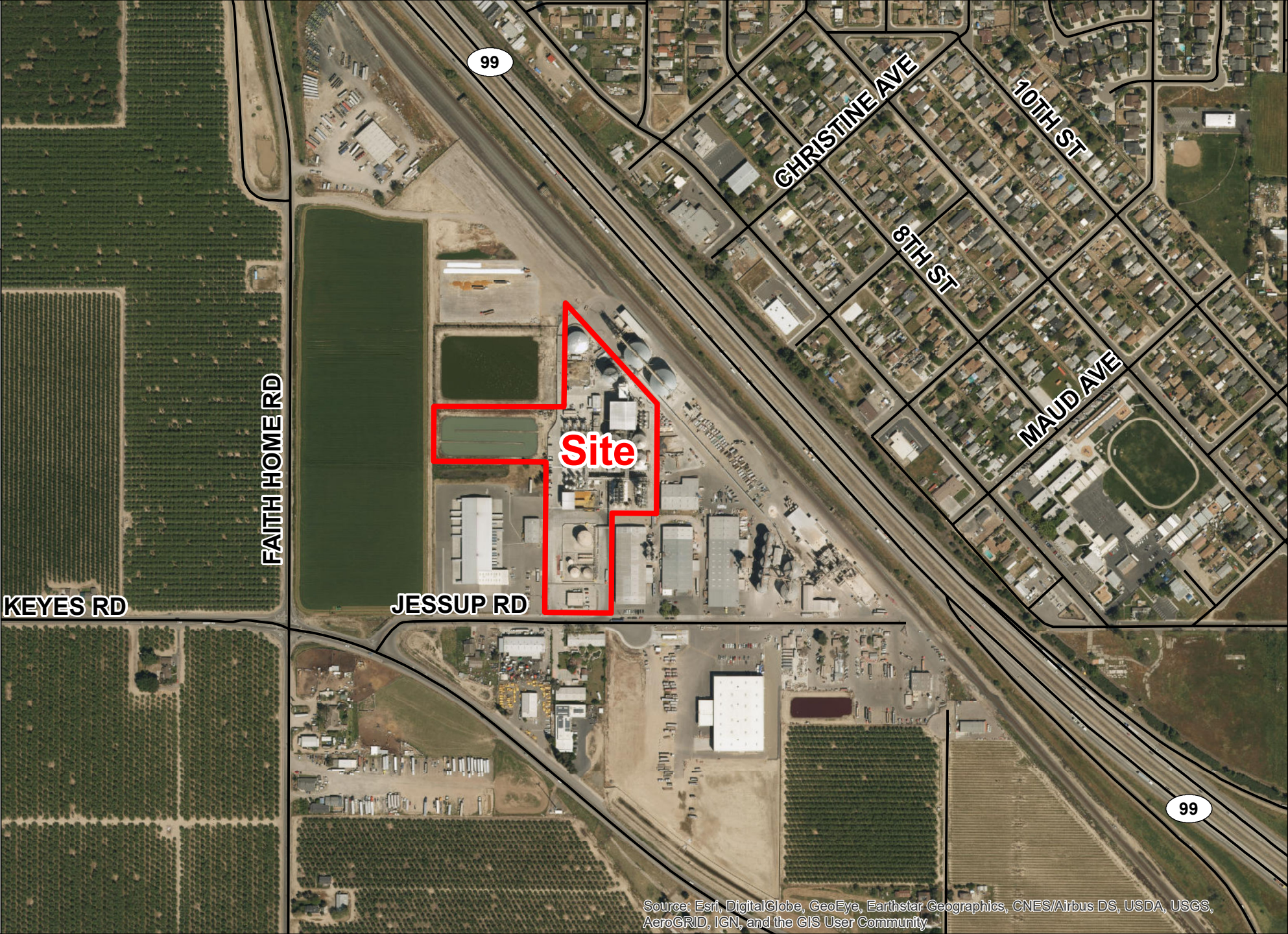
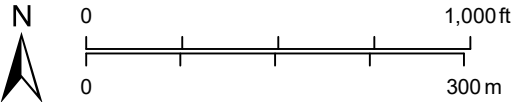
SAA

PLN2020-0041

2017 AERIAL AREA MAP

LEGEND

-  Project Site
-  Road





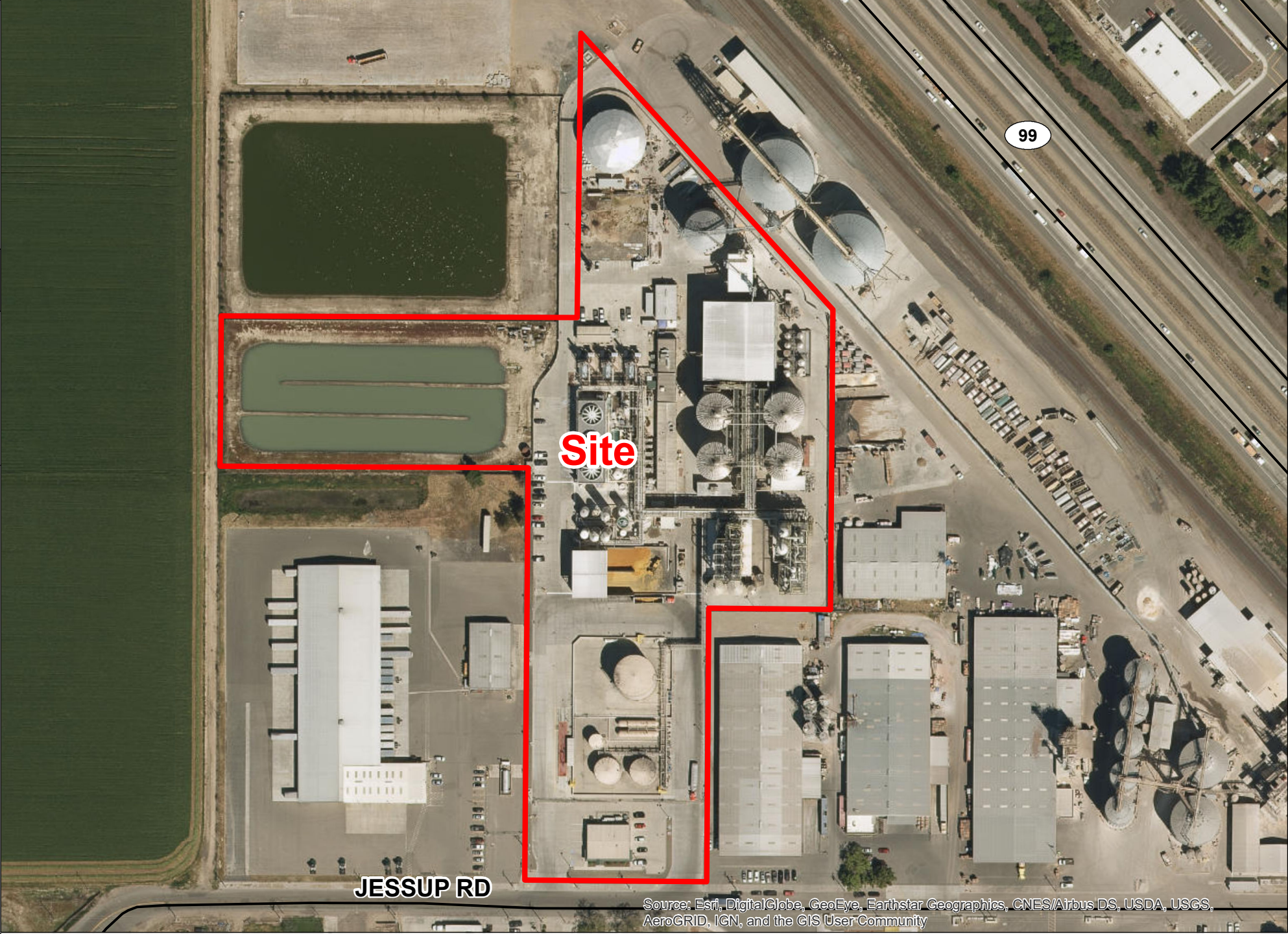
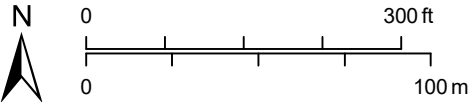
AEMETIS SOLAR

SAA
PLN2020-0041

2017 AERIAL SITE MAP

LEGEND

-  Project Site
-  Road



JESSUP RD

AEMETIS SOLAR

SAA
PLN2020-0041

ACREAGE MAP

LEGEND



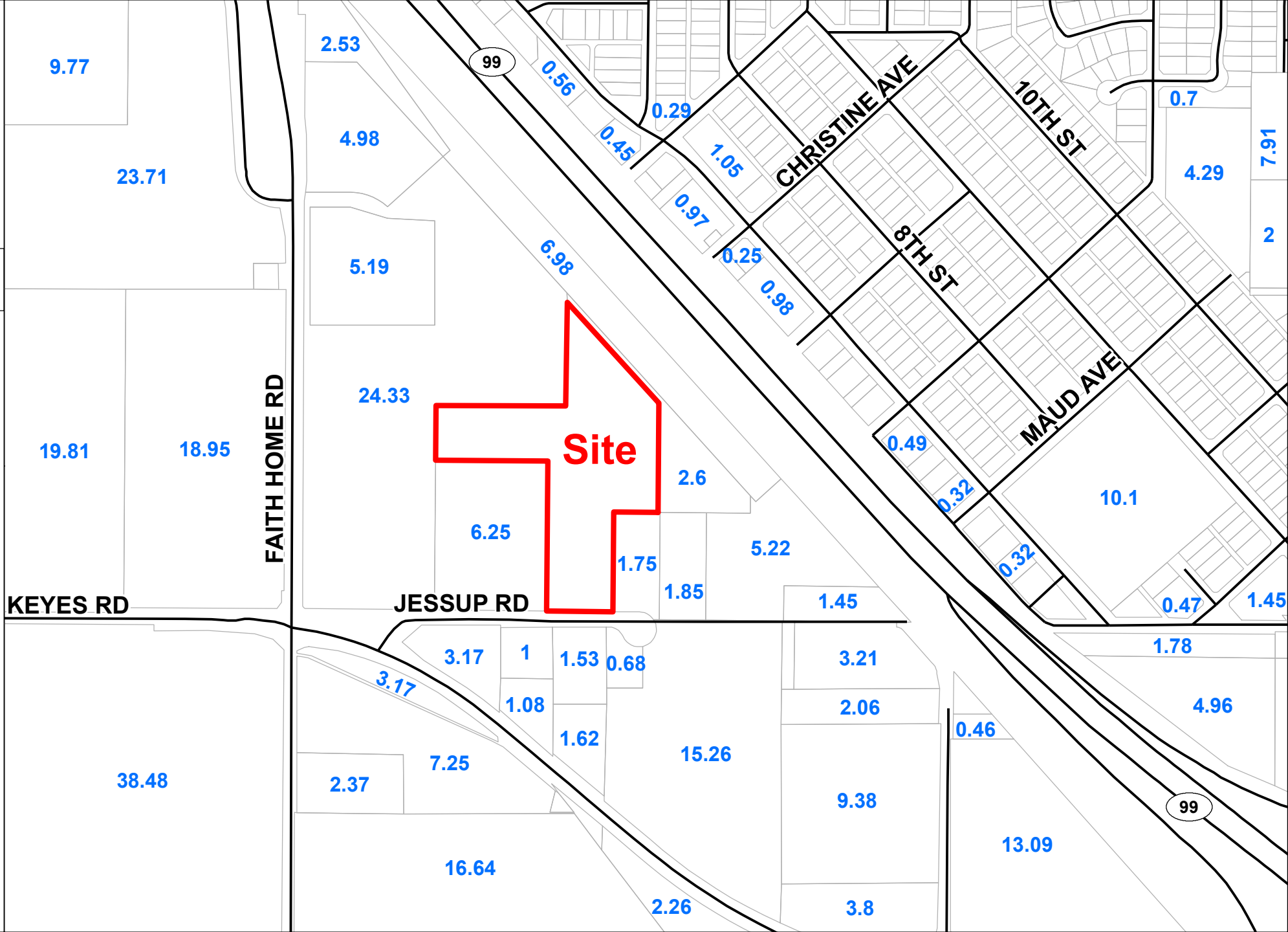
Project Site



Parcel/Acres



Road



0

1,000 ft

0

300 m

Microgrid Project Overview

Aemetis Advanced Fuels Keyes, Inc. (Aemetis) proposes to install a 1.56 MW photovoltaic (PV) array and 1.25 MW/2.5 MWh battery energy storage system to generate 3,234,460 kWh/year of renewable electricity. Aemetis operates an ethanol and animal feed production facility at the site at 4209 Jessup Road, Ceres, CA 95307 (parcel number 045-026-039). The microgrid system is designed to offset the use of natural gas in the site's existing boilers that are currently used to generate electricity onsite.

The PV array is proposed to be installed on an elevated structure in two areas:

1. Over the current stormwater basin
2. Over areas with vehicle traffic

Aerial maps are included in this document showing the parcel as shown on the Stanislaus County GIS parcel viewer, additional overlays of the proposed locations, and the map provided in the grant funding application to the California Energy Commission.

The proposed PV array will use 4,986 Trina 395W solar panels (TSM-DE15H(II)-395 – or comparable), as shown in Figure 1, for a total DC rating of 1,969,470 Watts. All DC power will be converted into useful grid electricity via 26 60-kW AC inverters (Chint-SCA60KTL-DO/US-A – or comparable), for a total of 1,560,000 AC Watts at 480V AC. Based on a solar production factor of 1,642.3 kWh per kW of nameplate capacity, the vendor estimated that the array will generate 3,234,460 kWh/year.



Figure 1. PV Solar Array
(Source: Trina Solar)

The battery system for the microgrid is a Schneider Electric 125kW/250kWh system comprising lithium-ion nickel manganese cobalt oxide (NMC) cells with a 15-20-year calendar life and ability to discharge 4,000 – 5,000 times over that lifetime (or comparable). As shown in Figure 2, the battery system consists of 17 battery modules, containing 714 lithium-ion NMC cells each. A battery protection/management

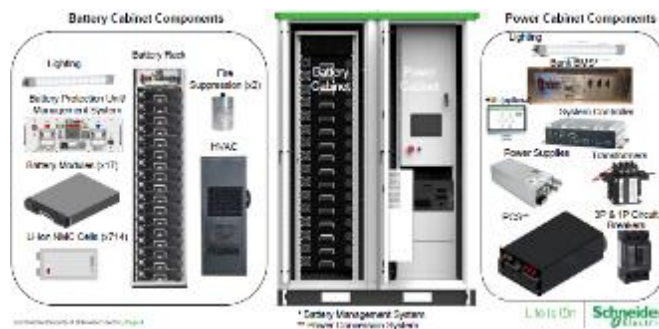


Figure 2. Battery Energy Storage System (BESS)
(Source: Schneider Electric)

system manages safe battery performance while a heating, ventilation, and air conditioning (HVAC) unit maintains operating temperatures. Fire suppression devices prevent combustion in the unlikely event that the battery management system and HVAC malfunction. The connected power cabinet contains transformers, breakers, and communications to send performance data from the battery to the microgrid controller.

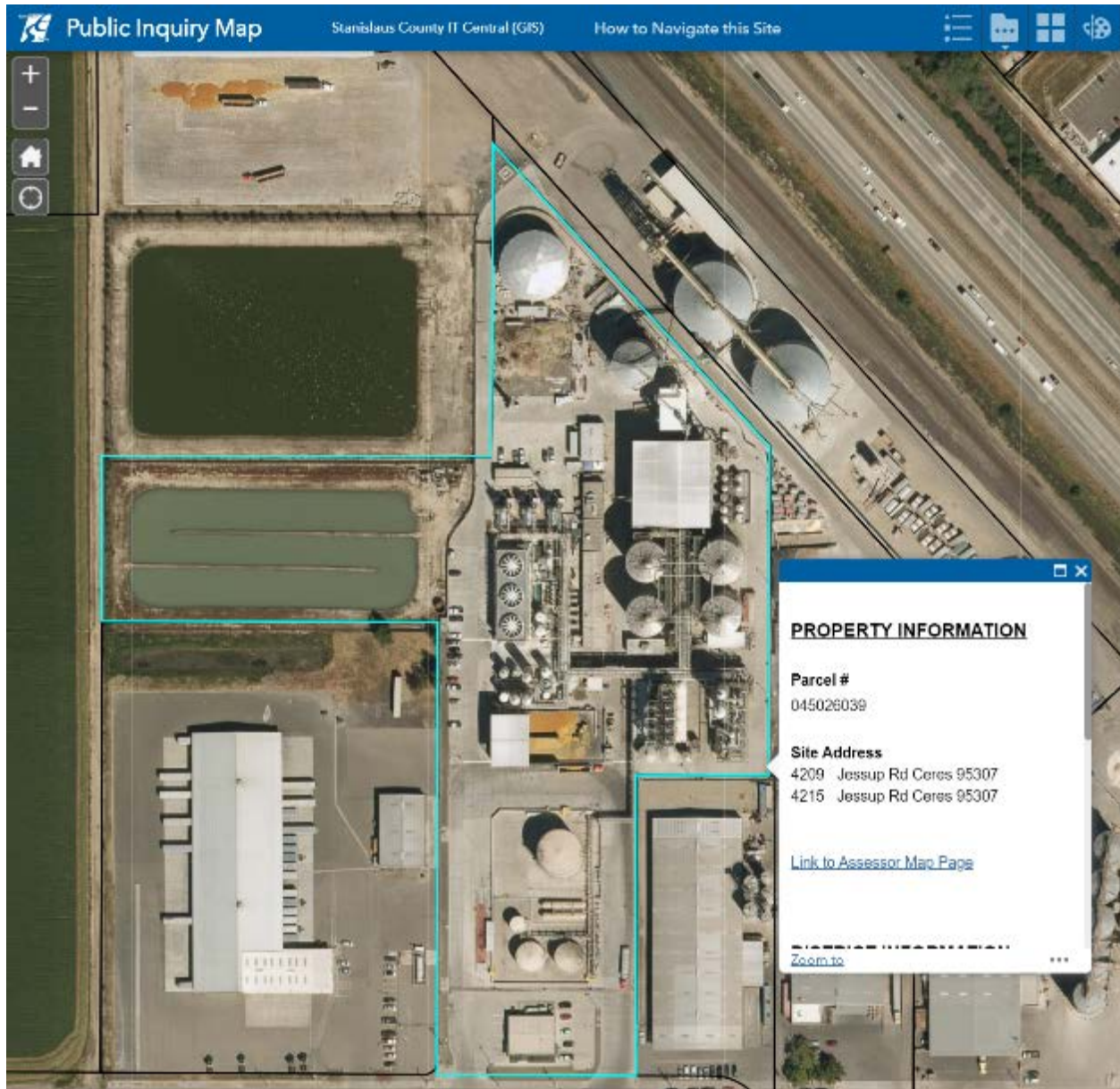
The proposed project will reduce operating costs by reducing the amount of onsite natural gas consumption, monetizing carbon reductions through the LCFS program, and by avoiding downtime at the food production plant. On average, over the last two years, the facility has had three sustained outages per year. Electricity service interruptions are

costly. For example, on January 31, 2018, the food production facility had a 12-hour outage. It took nine days to return to normal operating conditions.

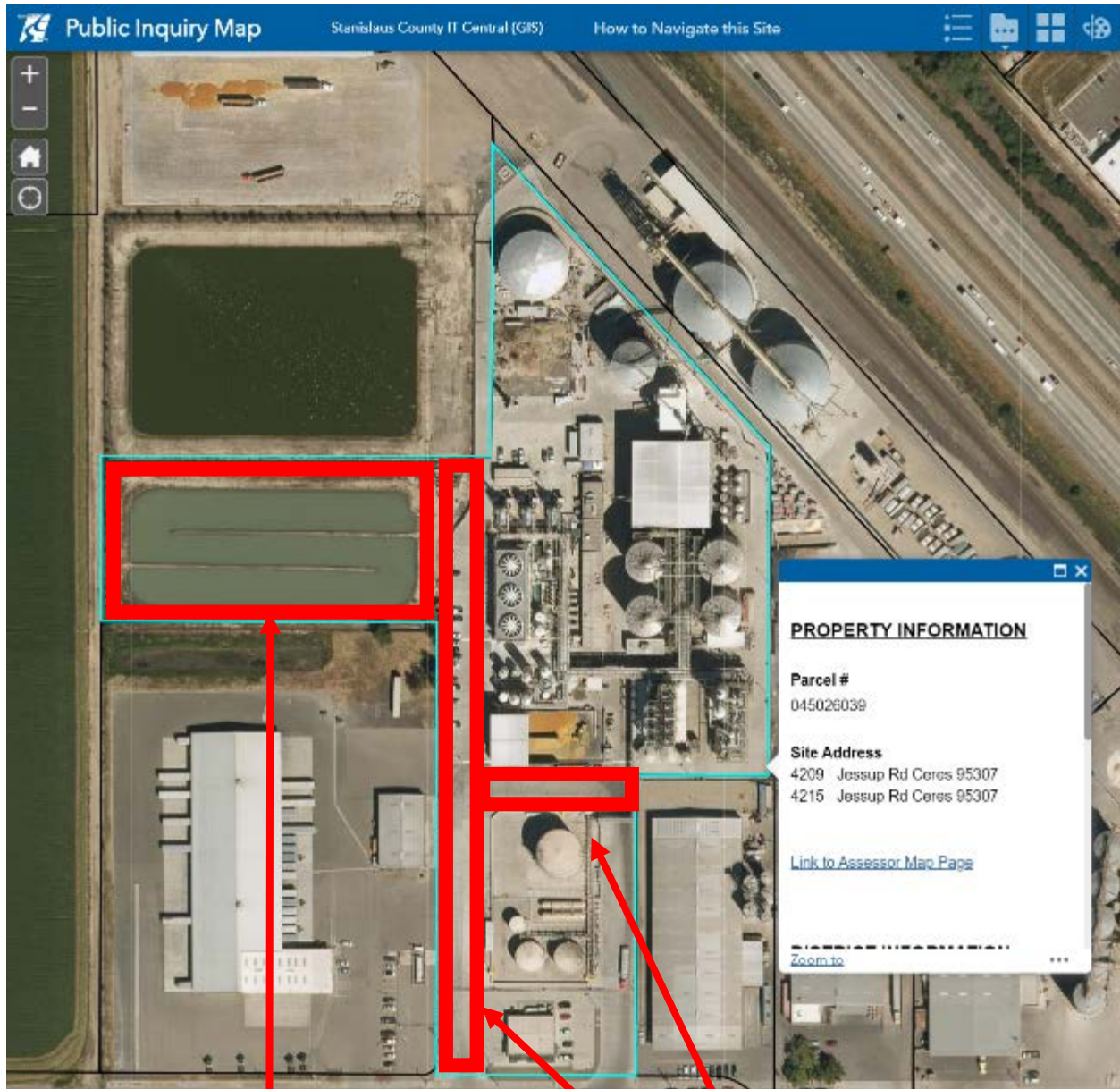
Aemetis applied for \$8 million in funding to support this \$9.6 million proposed project through the Food Production Incentive Program (FPIP) administered by the California Energy Commission (CEC). The grant narrative and the scope of work between Aemetis and the CEC detailing the work that will be done on the project is provided as an attachment to this submission.

Using the emission reduction calculator provided by the California Air Resources Board (CARB) as part of the CEC's FPIP application process, Aemetis estimates that the new equipment will reduce annual GHG emissions by 12%—equivalent to 7,831 MTCO₂e/year

Parcel Map from Stanislaus County GIS Viewer



Parcel Map with Framed Location of the Proposed Solar Array



Elevated above stormwater basin

Elevated above areas with vehicle traffic

Aerial Map from CEC Proposal



ATTACHMENT 2

Project Narrative Form

0.0 Introduction

Aemetis seeks \$8,000,000 from the California Energy Commission (CEC) to install emerging technology to reduce GHG emissions at its animal food production facility in Keyes, California (4209 Jessup Road, Ceres, California 95307).¹ Per the California Air Resources Board (CARB), the Keyes facility qualifies as a California cap-and-trade facility, reporting 2018 emissions of 78,140 metric tons of carbon-dioxide equivalents per year (MTCO₂e/year). In 2020, emissions will be reduced to a net 67,914 MTCO₂e/year when the replacement (currently underway) of an old, inefficient molecular sieve dehydration system (MSDH) with a new, efficient zeolite membrane dehydration system (ZMDH) is completed. In this baseline scenario, the plant converts 663,437 tons/year of corn feedstock into 448,000 tons/year of cow feed (wet distiller's grains or WDGs), 6,400 tons/year of distiller's corn oil (DCO), and alcohol. Aemetis distributes the WDGs to more than 70 local dairy farms located within 50 miles of the Keyes facility and transports the distiller's corn oil to a large nearby poultry producer for use as feed.



Figure 1. WDGs at the Keyes Facility.

The proposed project will reduce greenhouse gas (GHG) emissions and operating costs by installing an emerging technology—a grid-connected, island-able microgrid comprising a 1.56 MW photovoltaic (PV) array and 1.25MW/2.5MWh Battery Energy Storage System (BESS)—that will be integrated with an artificial intelligence (AI)-driven distributed control system (DCS).

The PV array will generate 3,234,460 kWh/year. In the baseline scenario, total electricity loads at the plant are 21,748,935 kWh/year, of which 9,601,836 kWh/year are generated onsite from an old inefficient steam turbine and 12,147,099 is purchased from the local utility, Turlock Irrigation District (TID). Onsite electricity is generated when steam from the boiler is run through a steam turbine to generate electricity. Output steam from the turbine is subsequently used for process heating. In the baseline scenario, the facility generates excess steam for process heating in order to maximize onsite electricity production. With the proposed zero-emission microgrid system, Aemetis will produce 3,234,460 kWh/year of additional onsite electricity generation, which will be used to displace this excess natural gas consumption. Displacing onsite natural gas with onsite zero-emission renewables reduces the carbon intensity of the food and fuel production facility, creating additional economic incentives through the Low Carbon Fuel Standard (LCFS). This additional LCFS incentive makes it more economical for Aemetis to choose to reduce onsite natural gas electricity generation than to reduce TID electricity procurement. Based on steam turbine specifications, the microgrid is expected to offset 147,476 MMBTU/year (1,474,755 therms/year) of natural gas demand for on-site electricity generation. Additionally, the microgrid will allow islanded operations during TID outages, protecting WDGs from spoiling and allowing biological processes to continue to operate.

Metric	2018	After ZMDH (Baseline)	After Microgrid (After Project)
Corn processed (TPY)	627,200	663,437	663,437
Total kWh/year load	21,748,935	21,748,935	21,748,935
Renewable Generation (kWh/year)	0	0	3,234,460
Therms/year consumed	14,494,811	11,856,409	10,381,653
MTCO ₂ e/year	78,140	67,914	60,083
WDG produced (TPY)	422,268	448,000	448,000
Distillers Oil produced (TPY)	6,200	6,400	6,400

¹ The use of Ceres in the mailing address is due to the U.S. Post Office's procedures for identifying sites.

ATTACHMENT 2

Project Narrative Form

Thus, the proposed project will reduce operating costs by reducing the amount of onsite natural gas consumption, monetizing carbon reductions through the LCFS program, and by avoiding downtime at the food production plant. On average, over the last two years, the facility has had three sustained outages per year. Electricity service interruptions are costly. For example, on January 31, 2018, the food production facility had a 12-hour outage. It took nine days to return to normal operating conditions. Aemetis estimated the outage lost the plant 800 tons of WDG and 42 tons of DCO production, as well as 94,109 gallons of ethanol. TID estimated the plant lost \$239,700 in revenues and \$914 in associated yeasts and enzymes used in food production. Moreover, the food facility spent \$5,980 on emergency generators. The outage caused a total of \$254,693 in losses. With 75% of the facility's electricity load covered by the PV + BESS microgrid during short power interruptions, the facility can avoid costly interruptions like this one.

The proposed investment of a PV + BESS microgrid with an Artificial Intelligence (AI)-driven DCS will provide reliable, low-carbon electricity for the Aemetis food production facility. The ZMDH project will be completed by the NOPA of this proposed 29-month \$9,552,566 project. The budget accounts for \$9,042,625 of equipment costs, \$267,813 monitoring and verification costs, and \$242,128 engineering and design costs. Aemetis is seeking \$8,000,000 of these costs. It is prepared to cover the remaining \$1,552,566 as well as \$4,053,888 of additional costs for installation, insurance, travel, and permitting. The proposed PV + BESS microgrid will generate 3,234,460 kWh/year that directly displace onsite natural gas consumption at the facility's boiler. This natural gas displacement reduces GHG emissions by 7,831 MTCO₂e/year. Note that no renewable energy generation is included in the CARB FPIP Benefits Calculator Tool, only natural gas savings, because the microgrid does not displace any grid power. Without CEC funding, Aemetis would forego the proposed project, losing the opportunity to significantly reduce GHG emissions and operating costs, and produce more transportation-grade ethanol at a lower carbon intensity. With CEC funding, Aemetis estimates that the new equipment will reduce annual GHG emissions by 12%—equivalent to 7,831 MTCO₂e/year and reduce the carbon intensity of its produced transportation-grade ethanol to 60.97 CO₂e/MJ.

Aemetis—with its exceptional track record of safe operations and a history of environmental compliance—is highly qualified to manage and complete the proposed \$9.6-million, shovel-ready project. Collectively, the Aemetis team has 200+ years and nearly \$3 billion of project execution experience. The team has completed numerous large projects, including a \$10-million renovation of its ethanol production systems, the construction of a \$25-million biodiesel facility, a \$5-million liquid CO₂ project with Linde Gas, and a \$5-million waste-to-ethanol facility. No other project team has a similar track record or is as ready to proceed without delay upon Notice of Proposed Award.

Of significant importance, Aemetis has designed the project to minimize the project's potential negative impact on the surrounding low-income and disadvantaged communities—which are characterized by high levels of pollution, particulate matter (PM_{2.5}), and unemployment—and to provide meaningful benefits to those areas and their residents. Key benefits will include reductions in on-site criteria air pollutant or toxic air contaminant emissions by reducing fossil fuel consumption, preferential hiring for residents of low-income and disadvantaged communities, support for 50 temporary jobs with an average compensation of \$80/hour with full benefits during construction, and the creation of three permanent full-time engineering jobs with an average compensation of \$168,750/year plus a generous benefits package. Aemetis will also administer a new scholarship program—funding 10 \$3,000 annual scholarships—aimed at local students studying STEM subjects, sustainability, or trades with direct application in the operation and maintenance of food production and other industrial facilities.

ATTACHMENT 2

Project Narrative Form

1.0 Tier 2 Technical Merit and Need

1.1 Technologies to be Implemented

Aemetis proposes technologies that will generate carbon-free electricity, displacing onsite natural gas electricity production, at the Keyes facility. The grid-connected, fully-islandable microgrid—comprising a 1.56 MW PV array and 1.25MW/2.5MWh BESS (Figure 2)—is estimated to generate and store 3,234,460 kWh/year, or 15% of the Keyes facility's electricity demand over the year and up to 75% during short power interruptions. The BESS will be charged by the PV array, thus ensuring the power produced and stored by the proposed microgrid is zero carbon. The PV and Storage systems will be connected to the existing Aemetis electrical network via a 480V switchboard, 3-MW pad-mounted transformer, and a 12-kV MetalClad circuit breaker. The PV array will be installed on pathways and parking lots and a 2.3-acre site immediately adjacent to the Keyes facility (Figure 3).

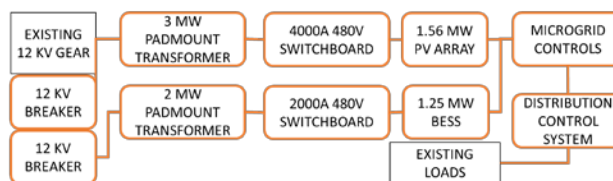


Figure 2. Proposed Solar + Storage Microgrid. Microgrid assets shown in orange.



Figure 3. Proposed Solar Area (blue).

The proposed microgrid will be managed by a microgrid controller that will monitor the power status of the PV array, BESS, and utility connection. Control software manages the microgrid's resources to optimize electric reliability by balancing critical loads and operations at the food production facility with available generation or storage. The controller reacts quickly, balancing supply and demand in milliseconds. During a utility outage, the microgrid controller will island the system from the grid and communicate the available power of the PV array and BESS to a Distributed Control System (DCS) so critical loads can be dispatched and curtailed to maintain food production. In island mode, the microgrid controller will continue sending BESS and PV power status to the DCS so that the Keyes facility can continue food production operations. Continuing food operations during utility outages will reduce annual operating costs. On average, over the last two years, the facility had three sustained outages per year. Electricity service interruptions are costly. In January 2018, the Keyes facility had a 12-hour outage, taking nine days to return to normal operating conditions. It lost production of 800 tons of WDG, 42 tons of DCO, and 94,109 gallons of transportation-grade ethanol. Thus, the plant lost \$239,700 in revenues and \$914 in associated yeasts and enzymes used in food production. Moreover, the food facility spent \$5,980 on emergency generators. The outage caused a total of \$254,693 in losses. The proposed microgrid will significantly improve resiliency and production levels at the Keyes facility by maintaining a reliable source of zero-carbon power because it covers 15% of the facility's electricity load over the year and up to 75% of the electricity load during short power interruptions. As described in Section 1.1.1 through Section 1.1.3, the proposed project will reduce GHG emissions by a net 7,831 MTCO₂e/year.

1.1.1 Photovoltaic (PV) Array

The proposed PV array will comprise 4,986 Trina 395W solar panels (TSM-DE15H(II)-395), as shown in Figure 4, for a total DC rating of 1,969,470 Watts. All DC power will be converted into useful grid electricity via 26 60-kW AC inverters (Chint-SCA60KTL-DO/US-A), for a total of

ATTACHMENT 2

Project Narrative Form

1,560,000 AC Watts at 480V AC. Based on a solar production factor of 1,642.3 kWh per kW of nameplate capacity, the vendor estimated that the array will generate 3,234,460 kWh/year.

The Keyes facility has a natural gas plant heat rate of 45,595 BTU/kWh. This low system efficiency is due to an old and relatively small steam turbine that is tuned to supply the plant's process heat as its primary purpose, with electricity as a secondary product. The PV array will offset 147,476 MMBTU/year (1,475,755 therms/year) of natural gas demand for on-site power generation, equivalent to 7,831 MTCO₂e/year. In total, the PV array reduces facility GHG emissions by 8,568 MTCO₂e/year.



Figure 4. PV Solar Array
(Source: Trina Solar)

1.1.2 Battery Energy Storage System (BESS)

The BESS chosen for the PV + BESS microgrid is a Schneider Electric 125kW/250kWh system comprising lithium-ion nickel manganese cobalt oxide (NMC) cells with a 15-20-year calendar life and ability to discharge 4,000 – 5,000 times over that lifetime. As shown in Figure 5, the BESS consists of 17 battery modules, containing 714 lithium-ion NMC cells each. A battery protection/management

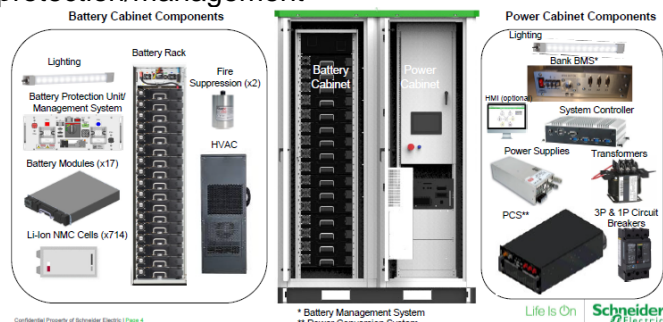


Figure 5. Battery Energy Storage System (BESS)
(Source: Schneider Electric)

system manages safe battery performance while a heating, ventilation, and air conditioning (HVAC) unit maintains operating temperatures. Fire suppression devices prevent combustion in the unlikely event that the battery management system and HVAC malfunction. The connected power cabinet contains transformers, breakers, and communications to send performance data from the BESS to the microgrid controller.

1.1.3 Distributed Control System (DCS)

An artificial intelligence (AI)-driven DCS is the heart of an automated facility. A DCS collects, manages, and unifies data from sensors, controls, and systems—including the microgrid controller for the proposed PV + BESS microgrid—across the plant. When the DCS is installed and integrated into the food production facility, the operations team will define and teach “use cases” to the AI-driven DCS. A use case defines critical loads to be maintained when grid electricity service is interrupted. The AI-driven DCS will manage plant operations accordingly as use cases arise, determining which loads to maintain and which to curtail. For example, when grid electricity service is interrupted, the DCS will dispatch and curtail specific unit operations to maintain desired operating levels. The proposed DCS will manage operations in real-time over fiber optic communications.

1.2 GHG Emissions Reduction

The proposed technologies enable 12% annual GHG emissions reduction (7,831 MTCO₂e). The proposed project also increases output of animal feed and transportation-grade ethanol. Aemetis estimates that the equipment upgrades will reduce the carbon intensity of produced ethanol from 67.03 gCO₂e/MJ to 60.97 gCO₂e/MJ. By replacing onsite natural gas electricity generation with carbon-free power generated by the solar PV, Aemetis is committing to greatly reducing GHG emissions associated with producing its products: animal feed and ethanol.

ATTACHMENT 2

Project Narrative Form

1.3 Technology Justification

The proposed project meets all the requirements for Tier 2 projects. First, the technology is commercially available and 100% will be purchased from California suppliers. Schneider Electric, the chosen microgrid vendor, has significant experience designing and deploying PV + BESS microgrids for industrial applications. The proposed project is based on Schneider Electric's EcoStruxure microgrid controller solution, which manages network, generation, and protection for stable and optimized microgrids throughout the U.S., Puerto Rico, Canada, and Europe. EcoStruxure is the platform that enables renewable microgrids for military, municipal, utility, campus, and manufacturing applications. Among these microgrids, Schneider Electric has designed and delivered a custom microgrid for an indoor vertical farming facility based on EcoStruxure, a rooftop PV array, natural gas generator, and Li-Ion BESS. The system has significantly reduced GHG emissions while providing 100% uptime for lighting, HVAC, and processing equipment. The installation of the proposed PV + BESS microgrid at the Keyes facility will reduce the carbon intensity of California animal feed and ethanol produced, supporting steps towards achieving the GHG reduction goals of AB 32 and SB 32.

The proposed technology, a PV + BESS microgrid for an industrial application, is:

- Cutting edge and emerging technology. As of 2018, microgrids accounted for only 2,694 MW of installed generation capacity worldwide². The U.S. has 761 MW of installed microgrid capacity; campus microgrids account for most installations (53%) and commercial/industrial installation are the minority (3%)³. Moreover, the majority of U.S. microgrids are fossil powered – 51% CHP, 12% natural gas, and 17% diesel. Solar PV accounts for 11% and energy storage accounts for 7% of microgrid generating capacity.²
- Technology not widely used in California. As of April 2017, 120 existing, developing, and proposed microgrids were expected to provide 650 MW of peak capacity in California.⁴ Although 40% of California microgrids use solar PV and 27% use energy storage⁵, the 650 MW microgrid capacity accounts for only 1.4% of projected peak CA demand (46,511 MW).⁶
- Not drop-in ready equipment. Drop-in ready equipment is pre-assembled, functional, and deliverable. The proposed microgrid is not drop-in ready. It requires site-specific design and engineering. Equipment will be designed to specification, based on the needs and site-specific conditions at the Keyes facility. All proposed equipment will be manufactured off-site, shipped to the Keyes facility, and then assembled and constructed on site.
- Proven elsewhere to reduce GHG emissions. Microgrids reduce carbon emissions from fossil-generated power because they support zero-carbon renewable resource-based power, such as a solar PV. GHG emissions are eliminated when energy storage stores excess generation from the solar array, as is the case in the proposed microgrid, to make zero-carbon power available when the sun isn't shining (i.e. night, a cloudy day).

2 Microgrid Knowledge. "What's Driving Microgrids toward a \$30.9B Market?" August 30, 2018.

3 NREL. "Phase I Microgrid Cost Study: Data Collection and Analysis of Microgrid Costs in the United States" NREL/TP-5D00-67821. October 2018.

4 Microgrid Knowledge. "California Microgrid Roadmap Effort Identifies 120 Microgrids in the State". April 28, 2017.

5 CEC. "Microgrid Analysis and Case Studies Report: California, North America, and Global Case Studies." CEC-500-2018-022. August 2018.

6 CAISO. "2019 Summer Loads & Resources Assessment" May 8, 2019.

ATTACHMENT 2 Project Narrative Form

2.0 Technical Approach

2.1 Scope of Work

Aemetis proposes a 29-month project with six tasks (Figure 6) beginning in March 2020 and ending in July 2022. In Task 1 – General Project Tasks, Aemetis will complete all required administrative tasks associated with the project. These tasks include meeting with the Energy Commission, reporting, invoicing, documenting match, and completion of permitting. In Task 2 – Project Engineering Design, Schneider Electric will design a PV + BESS microgrid. The design is site- and customer-specific, requiring upfront engineering design, engineering specification, and site layout planning for the Keyes facility. In Task 3 – Site Preparation and Procurement, Aemetis will specify and order all proposed equipment, prepare an Installation Timeline, secure all required permits, accept delivery of the equipment, and complete all other activities required before equipment installation can proceed. In Task 4 – Equipment Installation, Aemetis will install the proposed equipment according to the Installation Timeline, test it, and continue plant operations. In Task 5 – Measurement and Verification, Aemetis will develop pre-installation measurements/calculations of electricity consumption and GHG emissions; perform post-installation measurements; and analyze measurements and determine electricity consumption, reduction of grid-sourced electricity demand and GHG emissions that result directly from the project. In Task 6 – Technology/Knowledge Transfer Activities, Aemetis will make the knowledge gained, project results, and lessons learned available to the public and key decision makers.

Tasks	2020												2021												2022								
	Q1			Q2			Q3			Q4			Q1			Q2			Q3			Q4			Q1			Q2			Q3		
	J	F	M	A	M	J	J	A	S	O	N	D	J	M	J	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S
Task 1: General Project Tasks																																	
Task 2: Project Engineering Design																																	
Task 3: Site Prep. & Procurement																																	
Task 4: Equipment Installation																																	
Task 5: M & V																																	
Task 6: Technology Transfer																																	

Figure 6. Proposed Project Schedule for Keyes Facility

2.2 Critical Success Factors, Risks, and Potential Limitations

Although the proposed project presents very little risk, Aemetis is still, nonetheless, aware of potential risks and barriers that could delay project completion:

Factor	Risk	Mitigation Strategy
Scheduling	Low	Aemetis will schedule installation of most big-ticket items to coincide with scheduled maintenance downtime, which generally occur on weekends. Smaller items—such as some drive motors and pumps—that do not necessarily require plant shutdown will undergo installation on a more ad hoc basis, with all installations completed by Month 14.
Managing Feedstock in and WDG out	Low	The Keyes facility generally receives 1,750 tons per day (t/d) of feedstock. When the plant is offline, Aemetis cannot process this feedstock. To overcome this hurdle, Aemetis will maintain sufficient inventory of food product WDG to accommodate normal deliveries to customers during any potential shutdown. Aemetis typically carries six days of WDG inventory at all times, which is more than sufficient to ensure continuous delivery of animal feed.
Equipment Shakedown	Low	The installation of large equipment often requires a period post-installation for maintenance staff to fine-tune the equipment and fix minor issues that result from the installation process. Aemetis' team of experienced

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Factor	Risk	Mitigation Strategy
		engineers, welders, electricians, maintenance technicians, and fabricators possesses deep experience in all aspects of industrial equipment installation, startup, commissioning, operation, maintenance, and repair.
Electrical Infrastructure	Low	Aemetis anticipates upgrading the Keyes facility electrical infrastructure needed to support the microgrid. To ensure successful integration of the proposed equipment, Aemetis and Schneider Electric have identified and defined the new equipment necessary.
Funding	Low	Aemetis is seeking \$8 million for its \$13.6 million project (some of which is not shown on the budget as this estimate includes installation and permitting costs not eligible as reimbursable or match items). Aemetis expects to provide all match funding for the project. However, if necessary, Aemetis has the support of Third Eye Capital (refer to letter of support in Attachment 07) to cover the remainder of the project cost.
CEQA	Low	Aemetis has obtained a CEQA negative declaration from San Joaquin Valley Air Pollution Control District (District Project Number N1062063). Stanislaus County has also determined that this project can proceed based upon the facility's existing use permit (refer their letter documenting the CEQA status of the project in Attachment 05A).
Permitting	Low	Aemetis expects that only a building permit will be necessary to proceed with construction. They will only need to update existing permits, which will happen well within the proposed installation period.

2.3 Measurement & Verification (M&V) Plan

Momentum will perform the third-party M&V function on the project. Momentum worked with Aemetis to develop an energy and GHG baseline for the proposed project, based on operating conditions at the Keyes facility (Section 3). Post award, Momentum will work closely with Aemetis to develop an M&V Protocol for pre-installation measurement; procure all meters necessary for M&V activities and supply to Aemetis for installation; perform three months of pre-installation measurements (or calculations) based on the M&V protocol for pre-installation; develop M&V protocol for post-installation measurements; perform 12 months of post-installation measurements based on M&V protocol for post-installation; assist with analysis of post-installation electrical and natural gas consumption and GHG emissions; prepare M&V Findings Report that includes M&V protocol, pre- and post-install measurements (or calculations), analysis, and results performed in this task; and provide all key assumptions used to estimate projected benefits. All calculations of GHG emissions reductions in the post-award M&V process will be based statewide emission factors provided by CARB and CARB's Quantification Methodology. Aemetis accepts that the Energy Commission or its consultant reserves the right to conduct an audit to verify assumptions and estimates of energy savings and GHG emission reductions.

3.0 Impacts and Benefits

3.1 Assumptions and Calculations

Aemetis estimates its baseline energy consumption based on the expected energy efficiency gains to be achieved, over 2018 performance metrics (Figure 7), by completing its ZMDH installation before the NOPA for the proposed project. Aemetis' engineering team determined the energy efficiency gains for the ZMDH and proposed project. These calculations are reasonable for their timeframe, assumptions, and estimated benefits, as they are based on most recent operations. Renewable energy production is based on a solar production factor of 1,642.3 kWh per kW of PV nameplate rating and was estimated by the vendor. Natural gas use reductions are based on the heat rate of onsite electricity generation using the existing boiler efficiency (81.5%) and the existing turbine's conversion efficiency (40 lb steam/kW).

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Metric	2018	After ZMDH (Baseline)	After Microgrid (After Project)
Corn processed (TPY)	627,200	663,437	663,437
Total kWh/year load	21,748,935	21,748,935	21,748,935
Renewable Generation (kWh/year)	0	0	3,234,460
Therm/year consumed	14,494,811	11,856,409	10,381,654
MTCO ₂ e/year	78,140	67,914	60,083
WDG produced (TPY)	422,268	448,000	448,000
Distillers Oil produced (TPY)	6,200	6,400	6,400

Figure 7. Summary of Current, Baseline, and Projected Project Performance Metrics

Figure 7 shows annual electricity and natural gas consumption, associated GHG emissions, and food production levels in 2018, after the ZMDH is installed (baseline), and expected performance after the proposed project is completed. In 2018, the facility emitted 78,140 MTCO₂e. The ZMDH installation underway will reduce emissions to a new baseline for the project, 67,914 MTCO₂e/year. The proposed project will reduce emissions by another 7,831 MTCO₂e/year, or 12% from this new baseline, to 60,083 MTCO₂e/year.

Importantly, Aemetis did not enter 3,234,460 kWh/year into Cell U14 of the 'Inputs_General' worksheet in the CARB FPIP Benefits Calculator Tool. As Aemetis understands the calculator, any entry into that cell would represent displacement of grid electricity in favor of onsite renewable generation. This project is not expected to offset electricity from TID, but instead offset onsite natural gas electricity generation. To avoid double counting benefits, Aemetis only included the reduction in natural gas use in the boiler in the calculator.

Based on the CARB FPIP Benefits Calculator Tool, the project is expected to reduce GHG emissions by 7,831 MTCO₂e/year. Co-benefits of this project over the project's 20-year lifetime (Figure 7) are significant, including: \$21.5 million in energy and fuel cost savings; reduction of 29,495,100 therms of fossil natural gas; 365,636 lbs of NO_x emission reductions; 23,712 lbs of ROG emissions; and 21,977 lbs of PM_{2.5} emission reductions.

3.2 Cost-Benefit Ratio

Based on the CARB Benefits Calculator Tool, the project will reduce GHG emissions at the Keyes Facility by 7,831 MTCO₂e/year. Over its 20-year lifetime, this adds up to a 156,619 MTCO₂e reduction. For the \$8,000,000 of GGRF funds spent, this equates to \$47/MTCO₂e or 21,420 MTCO₂e per \$million.

3.3 Timeframe for Estimated Benefits

The project will be 29 months in length, from the start of construction to operations, M&V, and completing all required reporting. It is expected that the emissions benefits will begin in May 2021 and will accrue for the 20-year life of the project, resulting in a total GHG emissions reduction of 156,619 MTCO₂e.

4.0 Market Potential and Information Sharing

4.1 Industrial Sectors/Facilities

In California alone, there are 5,639 food and beverage processing facilities; nationwide, there are 35,457.⁷ The drop-in, commercially available equipment upgrades proposed for the Keyes facility are highly relevant to most of these facilities and, indeed, common to most industrial facilities

⁷ USDA, Economic Research Service, using data from U.S. Census Bureau, County Business Patterns. <https://www.ers.usda.gov/topics/food-markets-prices/processing-marketing/manufacturing.aspx>

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across the country. Operating costs and GHG emissions increase when producers do not have access to reliable, low-cost renewable power. If the food production facility is subject to a power outage, it is unable to operate at capacity. During a power outage the facility is not producing product for sale, and any perishable feedstock, products, and by-products may degrade and become unsaleable. If electricity prices increase, production costs increase as well. Therefore, installing and operating a reliable, low-cost renewable source of electricity will reduce food production costs. Investing in a renewable power source such as a PV + BESS microgrid is very expensive. Many industrial facilities choose to continue using outdated, inefficient, natural-gas-powered boilers in lieu of installing microgrids. Others continue to buy carbon-intensive, grid-sourced electricity. These approaches are well understood and do not require a custom design like a PV + BESS microgrid does. However, these traditional methods do not reduce facility GHG and criteria air pollutant emissions. Public incentives, however, reduce the financial risks associated with adopting PV + BESS microgrids and could encourage many food processors to accelerate this timeline.

4.2 Information Sharing

Aemetis is committed to sharing knowledge gained from the project with other businesses in the food production industry. Aemetis will develop Presentation Materials for an Energy Commission-sponsored conference on the proposed project. When directed, Aemetis will also participate in workshop symposium(s) sponsored by the Energy Commission and provide at least six high-quality digital photographs of pre- and post- technology installation at the project site.

5.0 Capped and Uncapped Facilities

The Aemetis Keyes facility is a CARB California cap-and-trade facility. In 2018, the plant emitted 78,140 MTCO₂e/year. In 2019, Aemetis' NAICS registration includes NAICS 311119 (other animal food manufacturing). Please refer to Aemetis NAICS Codes Documentation in Attachment 08B for detail.

6.0 Preference Points

6.1 Priority Populations

The facility meets the requirements of III.D.8 in the Solicitation Manual for priority populations. First, the Keyes facility is located at 4209 Jessup Road, Ceres CA 95307. According to CalEnviroScreen 3.0, the Keyes facility is located in a census tract that is in the 84th percentile for pollution. As shown in Figure 7, this census tract is surrounded by other disadvantaged communities that score in the 80-85% category of CalEnviroScreen 3.0, and is a low-income community as defined by AB 1550 and SB 535 (Figure 8).

The proposed project will meaningfully address a community need for the identified priority population. CalEnviroScreen 3.0 identifies several relevant factors that dramatically impact the census tract in question, including pollution burden (84); ozone (78); PM_{2.5} (93); pesticides (92); drinking water (100); cardiovascular rate (79); education (78); poverty (83); and unemployment (98). By replacing inefficient, older equipment at the Keyes facility with commercially available, leading-edge, efficient equipment, Aemetis will directly mitigate pollution burden, ozone, and PM_{2.5} emissions within the census tract and in surrounding tracts. Aemetis has conducted outreach to community organizations and residents and received a letter of support from Opportunity Stanislaus, a non-profit organization devoted to local workforce development. As a Silver member of Opportunity Stanislaus, Aemetis supports training programs to prepare local candidates for industry jobs. The licenses and credentials earned through Opportunity Stanislaus are applicable across manufacturing industries so Aemetis estimates its job development supports the local community beyond the lifespan of this project. The project will include

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preferential hiring for residents of disadvantaged and low-income communities, educational outreach to local high school and community college students, and a new scholarship program aimed at local students studying STEM subjects, sustainability, or trades with direct application in the operation and maintenance of food production and other industrial facilities.

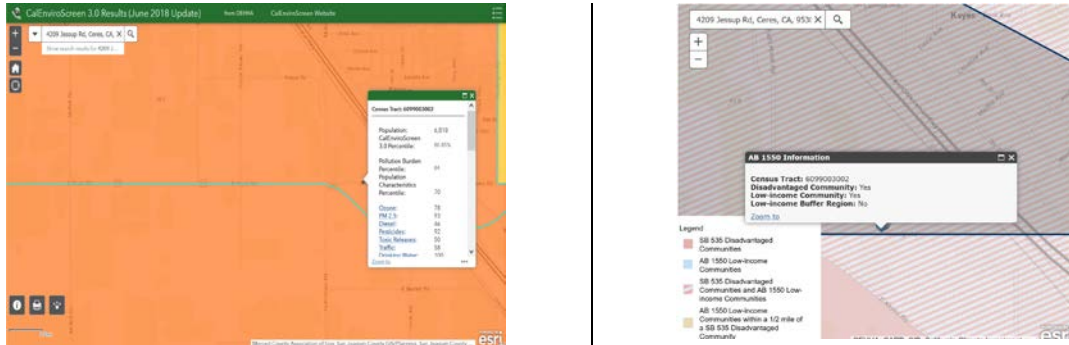


Figure 7. The Keyes facility is located in a SB 535 Disadvantaged Community and AB 1550 Low-income Community characterized by an 84th percentile pollution burden.

Aemetis will ensure that the proposed project provides several direct, meaningful, and assured benefits to priority populations by meeting the following benefit criteria:

- Reduces on-site criteria air pollutant or toxic air contaminant emissions through reduction of fossil fuel consumption via efficiency improvements or electrification;
- Reinvests energy or fuel costs savings that would otherwise be realized by the funding recipient into the same disadvantaged or low-income community, or to low-income households, to provide direct, meaningful, and assured benefits to residents. Aemetis will provide ten \$3,000 scholarships through Opportunity Stanislaus, an apprentice program with the local IBEW chapter, and a high school scholarship;
- Includes policies that are consistent with federal and state law and result in at least 25% of project work hours performed by residents of a disadvantaged or low-income community, or by residents of low-income households;
- Includes targeted recruitment, agreements, policies, or other approaches that are consistent with federal and state law and result in at least 10% of project work hours performed by residents of a disadvantaged or low-income community or by residents of low-income households, who are also participating in job training programs that lead to industry recognized credentials or certifications.

6.2 California-based Vendors

Aemetis seeks \$8,000,000 from the CEC. As shown in Attachment 04A, the estimated total cost of equipment from California-based vendors is \$9,042,625. Thus, 100% of the equipment purchased with these funds will come from California-based vendors. The major equipment vendors are:

- Valley Controls Inc., providing the DCS, is located at 583 E. Dinuba Ave., Reedley, CA 93654. This location is within a census tract designated as a disadvantaged community with CalEnviroScreen score in the 90th-95th percentile and an 81% pollution burden.
- Schneider Electric (Digital Energy branch), providing the PV + BESS microgrid, is located at 3030 Saturn St. Suite 100, Brea CA 92821.

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I. TASK ACRONYM/TERM LISTS

A. Task List

Task #	CPR¹	Task Name
1		General Project Tasks
2		Project Design
3	X	Site Preparation and Equipment Procurement
4		Equipment Installation
5		Measurement and Verification
6		Technology/Knowledge Transfer Activities

B. Acronym/Term List

Acronym/Term	Meaning
AB	Assembly Bill
BESS	Battery Energy Storage System
CAM	Commission Agreement Manager
CAO	Commission Agreement Officer
CPR	Critical Project Review
GHG	Greenhouse Gas
M&V	Measurement and Verification
MW	Megawatt
PV	Photovoltaic
SB	Senate Bill

II. PURPOSE OF AGREEMENT, PROBLEM/SOLUTION STATEMENT, AND GOALS AND OBJECTIVES

A. Purpose of Agreement

The purpose of this Agreement is to fund the design and purchase of an emerging microgrid technology that will help Aemetis reduce GHG emissions and operation costs at its animal food production facility in Keyes, California.

B. Problem/ Solution Statement

Problem

The margins for food production are quite tight and can be quite carbon intensive. Producers seek opportunities to reduce operating costs while reducing GHG emissions, to further the purposes of AB 32 and SB 32. In 2018, Aemetis reported 78,140 MTCO₂e of GHG emissions to the CARB cap-and-trade program. Operating costs and GHG emissions increase when producers do not have access to reliable, low-cost renewable power. If the food production facility is subject to a

¹ Please see subtask 1.3 in Part III of the Scope of Work (General Project Tasks) for a description of Critical Project Review (CPR) Meetings.

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power outage, it is unable to operate at capacity. During a power outage it is not producing product for sale, and any perishable feedstock, products, and by-products may degrade and become unsaleable. If electricity prices increase, production costs increase as well. Therefore, installing and operating a reliable, low-cost renewable source of electricity will reduce food production costs.

Investing in a renewable power source such as a PV + BESS microgrid is very expensive. Many industrial facilities choose a diesel-powered generator as a backup generator because this technology is well understood and does not require a custom design like a PV + BESS microgrid does. However, investing in a diesel-powered backup generator increases facility GHG emissions and may impact existing air permits, even though it reduces downtime during a power outage.

Solution

By using state funds to improve overall plant energy efficiency with the addition of an emerging renewable energy microgrid technology, Aemetis and food producers in general can reduce the financial risks associated with power outages and also install enough new renewable energy technology to reduce GHG emissions while reducing operational costs.

C. Goals and Objectives of the Agreement

Agreement Goals

The goals of this Agreement are to:

- Contribute to an overall reduction in California's food production costs.
- Reduce operating costs and GHG emissions associated with food production.
- Demonstrate the reliability and effectiveness of renewable energy technology at a California food processing plant.
- Continue progressing toward a low-carbon future.
- Benefit priority populations.

Agreement Objectives

The objectives of this Agreement are to:

- Design and install renewable energy technology, a PV + BESS microgrid, at the Keyes, California food production facility.
- Reduce GHG emissions by 8,568 MTCO₂e/year.
- Distribute \$30,000 in scholarships to students from low-income or disadvantaged communities.

III. TASK 1 GENERAL PROJECT TASKS

PRODUCTS

Subtask 1.1 Products

The goal of this subtask is to establish the requirements for submitting project products (e.g., reports, summaries, plans, and presentation materials). Unless otherwise specified by the Commission Agreement Manager (CAM), the Recipient must deliver products as required below by the dates listed in the **Project Schedule (Part V)**. Products that require a draft version are indicated by marking “**(draft and final)**” after the product name in the “Products” section of the

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task/subtask. If “(draft and final)” does not appear after the product name, only a final version of the product is required. With respect to due dates within this Scope of Work, “**days**” means working days.

The Recipient shall:

For products that require a draft version, including the Final Report Outline and Final Report

- Submit all draft products to the CAM for review and comment in accordance with the Project Schedule (Part V). The CAM will provide written comments to the Recipient on the draft product within 15 days of receipt, unless otherwise specified in the task/subtask for which the product is required.
- Consider incorporating all CAM comments into the final product. If the Recipient disagrees with any comment, provide a written response explaining why the comment was not incorporated into the final product.
- Submit the revised product and responses to comments within 10 days of notice by the CAM, unless the CAM specifies a longer time period, or approves a request for additional time.

For products that require a final version only

- Submit the product to the CAM for acceptance. The CAM may request minor revisions or explanations prior to acceptance.

For all products

- Submit all data and documents required as products in accordance with the following:

Instructions for Submitting Electronic Files and Developing Software:

○ **Electronic File Format**

- Submit all data and documents required as products under this Agreement in an electronic file format that is fully editable and compatible with the Energy Commission’s software and Microsoft (MS)-operating computing platforms, or with any other format approved by the CAM. Deliver an electronic copy of the full text of any Agreement data and documents in a format specified by the CAM, such as memory stick or CD-ROM.

The following describes the accepted formats for electronic data and documents provided to the Energy Commission as products under this Agreement, and establishes the software versions that will be required to review and approve all software products:

- Data sets will be in MS Access or MS Excel file format (version 2007 or later), or any other format approved by the CAM.
- Text documents will be in MS Word file format, version 2007 or later.
- Documents intended for public distribution will be in PDF file format.
- The Recipient must also provide the native Microsoft file format.
- Project management documents will be in Microsoft Project file format, version 2007 or later.

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○ **Software Application Development**

Use the following standard Application Architecture components in compatible versions for any software application development required by this Agreement (e.g., databases, models, modeling tools), unless the CAM approves other software applications such as open source programs:

- Microsoft ASP.NET framework (version 3.5 and up). Recommend 4.0.
- Microsoft Internet Information Services (IIS), (version 6 and up) Recommend 7.5.
- Visual Studio.NET (version 2008 and up). Recommend 2010.
- C# Programming Language with Presentation (UI), Business Object and Data Layers.
- SQL (Structured Query Language).
- Microsoft SQL Server 2008, Stored Procedures. Recommend 2008 R2.
- Microsoft SQL Reporting Services. Recommend 2008 R2.
- XML (external interfaces).

Any exceptions to the Electronic File Format requirements above must be approved in writing by the CAM. The CAM will consult with the Energy Commission's Information Technology Services Branch to determine whether the exceptions are allowable.

MEETINGS

Subtask 1.2 Kick-off Meeting

The goal of this subtask is to establish the lines of communication and procedures for implementing this Agreement.

The Recipient shall:

- Attend a "Kick-off" meeting with the CAM, the Commission Agreement Officer (CAO), and any other Energy Commission staff relevant to the Agreement. The Recipient will bring its Project Manager and any other individuals designated by the CAM to this meeting. The administrative and technical aspects of the Agreement will be discussed at the meeting. Prior to the meeting, the CAM will provide an agenda to all potential meeting participants. The meeting may take place in person or by electronic conferencing (e.g., WebEx), with approval of the CAM.

The administrative portion of the meeting will include discussion of the following:

- Terms and conditions of the Agreement;
- Administrative products (subtask 1.1);
- CPR meetings (subtask 1.3);
- Match fund documentation (subtask 1.6);
- Permit documentation (subtask 1.7);
- Subcontracts (subtask 1.8); and
- Any other relevant topics.

The technical portion of the meeting will include discussion of the following:

- The CAM's expectations for accomplishing tasks described in the Scope of Work;
- An updated Project Schedule;

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- Technical products (subtask 1.1);
 - Progress reports and invoices (subtask 1.5);
 - Final Report (subtask 1.6); and
 - Any other relevant topics.
- Provide an *Updated Project Schedule*, *List of Match Funds*, and *List of Permits*, as needed to reflect any changes in the documents.

The CAM shall:

- Designate the date and location of the meeting.
- Send the Recipient a *Kick-off Meeting Agenda*.

Recipient Products:

- Updated Project Schedule (*if applicable*)
- Updated List of Match Funds (*if applicable*)
- Updated List of Permits (*if applicable*)

CAM Product:

- Kick-off Meeting Agenda

Subtask 1.3 Critical Project Review (CPR) Meetings

The goal of this subtask is to determine if the project should continue to receive Energy Commission funding, and if so whether any modifications must be made to the tasks, products, schedule, or budget. CPR meetings provide the opportunity for frank discussions between the Energy Commission and the Recipient. As determined by the CAM, discussions may include project status, challenges, successes, final report preparation, and progress on technical transfer and production readiness activities (if applicable). Participants will include the CAM and the Recipient, and may include the CAO and any other individuals selected by the CAM to provide support to the Energy Commission.

CPR meetings generally take place at key, predetermined points in the Agreement, as determined by the CAM and as shown in the Task List on page 1 of this Exhibit. However, the CAM may schedule additional CPR meetings as necessary. The budget will be reallocated to cover the additional costs borne by the Recipient, but the overall Agreement amount will not increase. CPR meetings generally take place at the Energy Commission, but they may take place at another location, or may be conducted via electronic conferencing (e.g., WebEx) as determined by the CAM.

The Recipient shall:

- Prepare a *CPR Report* for each CPR meeting that: (1) discusses the progress of the Agreement toward achieving its goals and objectives; and (2) includes recommendations and conclusions regarding continued work on the project.
- Submit the CPR Report along with any other *Task Products* that correspond to the technical task for which the CPR meeting is required (i.e., if a CPR meeting is required for Task 2, submit the Task 2 products along with the CPR Report).
- Attend the CPR meeting.
- Present the CPR Report and any other required information at each CPR meeting.

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The CAM shall:

- Determine the location, date, and time of each CPR meeting with the Recipient's input.
- Send the Recipient a *CPR Agenda* and a *List of Expected CPR Participants* in advance of the CPR meeting. If applicable, the agenda will include a discussion of match funding and permits.
- Conduct and make a record of each CPR meeting. Provide the Recipient with a *Schedule for Providing a Progress Determination* on continuation of the project.
- Determine whether to continue the project, and if so whether modifications are needed to the tasks, schedule, products, or budget for the remainder of the Agreement. If the CAM concludes that satisfactory progress is not being made, this conclusion will be referred to the Deputy Director of the Energy Research and Development Division.
- Provide the Recipient with a *Progress Determination* on continuation of the project, in accordance with the schedule. The Progress Determination may include a requirement that the Recipient revise one or more products.

Recipient Products:

- CPR Report(s)
- Task Products (draft and/or final as specified in the task)

CAM Products:

- CPR Agenda
- List of Expected CPR Participants
- Schedule for Providing a Progress Determination
- Progress Determination

Subtask 1.4 Final Meeting

The goal of this subtask is to complete the closeout of this Agreement.

The Recipient shall:

- Meet with Energy Commission staff to present project findings, conclusions, and recommendations. The final meeting must be completed during the closeout of this Agreement. This meeting will be attended by the Recipient and CAM, at a minimum. The (meeting may occur in person or by electronic conferencing (e.g., WebEx), with approval of the CAM.

The technical and administrative aspects of Agreement closeout will be discussed at the meeting, which may be divided into two separate meetings at the CAM's discretion.

- The technical portion of the meeting will involve the presentation of findings, conclusions, and recommended next steps (if any) for the Agreement. The CAM will determine the appropriate meeting participants.
- The administrative portion of the meeting will involve a discussion with the CAM and the CAO of the following Agreement closeout items:
 - Disposition of any state-owned equipment.
 - Need to file a Uniform Commercial Code Financing Statement (Form UCC-1) regarding the Energy Commission's interest in patented technology.
 - The Energy Commission's request for specific "generated" data (not already provided in Agreement products).

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- Need to document the Recipient's disclosure of "subject inventions" developed under the Agreement.
- "Surviving" Agreement provisions such as repayment provisions and confidential products.
- Final invoicing and release of retention.
- Prepare a *Final Meeting Agreement Summary* that documents any agreement made between the Recipient and Commission staff during the meeting.
- Prepare a *Schedule for Completing Agreement Closeout Activities*.
- Provide *All Draft and Final Written Products* on a CD-ROM or USB memory stick, organized by the tasks in the Agreement.

Products:

- Final Meeting Agreement Summary (*if applicable*)
- Schedule for Completing Agreement Closeout Activities
- All Draft and Final Written Products

REPORTS AND INVOICES

Subtask 1.5 Progress Reports and Invoices

The goals of this subtask are to: (1) periodically verify that satisfactory and continued progress is made towards achieving the project objectives of this Agreement; and (2) ensure that invoices contain all required information and are submitted in the appropriate format.

The Recipient shall:

- Submit a quarterly *Progress Report* to the CAM. Each progress report must:
 - Summarize progress made on all Agreement activities as specified in the scope of work for the preceding month, including accomplishments, problems, milestones, products, schedule, fiscal status, and an assessment of the ability to complete the Agreement within the current budget and any anticipated cost overruns. See the Progress Report Format Attachment for the recommended specifications.
- Submit a quarterly *Invoice* that follows the instructions in the "Payment of Funds" section of the terms and conditions, including a financial report on Match Fund and in-state expenditures.

Products:

- Progress Reports
- Invoices

Subtask 1.6 Final Report

The goal of this subtask is to prepare a comprehensive Final Report that describes the original purpose, approach, results, and conclusions of the work performed under this Agreement. The CAM will review the Final Report according to the Project Schedule. When creating the Final Report, the Recipient must use the Style Manual provided by the CAM.

The Recipient shall:

- 1) Prepare a *Final Report* for this Agreement in accordance with the Style Manual, and Final Report Template provided by the CAM with the following considerations:
 - Ensure that the report includes the following items, in the following order:

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- Cover page (**required**)
- Credits page on the reverse side of cover with legal disclaimer (**required**)
- Acknowledgements page (optional)
- Table of Contents (**required**, followed by List of Figures and List of Tables, if needed)
- Executive summary (**required**) following the Executive Summary Template
- Include a summary table that includes the following information, but is not limited to (**required**):
 - Recipient name;
 - Project description;
 - Project location(s);
 - Census tract;
 - Dates: project selected and completed;
 - GGRF dollars allocated;
 - Leveraged and/or match funds;
 - Estimated/actual total project GHG emission reductions;
 - Estimated/actual energy saved (kWh, therms, or other fuels) for energy efficiency projects;
 - Estimated/actual energy generated (kWh or therm equivalents) for renewable energy projects;
 - Other benefits or results;
 - Other market sectors that can benefit from the project
 - Benefits to priority populations.
- Appendices - Include a copy of the M&V report for each demonstration site funded by the Energy Commission grant). (**required**)
 - Follow the Style Guide format requirements for headings, figures/tables, citations, and acronyms/abbreviations.
 - Ensure that the document omits subjective comments and opinions. However, recommendations in the conclusion of the report are allowed.
- Submit a draft of the report to the CAM for review and comment according to the project schedule. The CAM will provide written comments to the Recipient on the draft product within 15 days of receipt
- Consider incorporating all CAM comments into the Final Report. If the Recipient disagrees with any comment, provide a written response explaining why the comment was not incorporated into the final product
- Submit the revised Final Report and responses to comments within 10 days of notice by the CAM, unless the CAM specifies a longer time period or approves a request for additional time.
- Submit one bound copy of the *Final Report* to the CAM along with *Written Responses to Comments on the Draft Final Report*.

Products:

- Final Report (draft and final)

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- Written Responses to Comments on the Draft Final Report

CAM Product:

- Written Comments on the Draft Final Report

MATCH FUNDS, PERMITS, AND SUBCONTRACTS

Subtask 1.7 Match Funds

The goal of this subtask is to ensure that the Recipient obtains any match funds planned for this Agreement and applies them to the Agreement during the Agreement term.

While the costs to obtain and document match funds are not reimbursable under this Agreement, the Recipient may spend match funds for this task. The Recipient may only spend match funds during the Agreement term, either concurrently or prior to the use of Energy Commission funds. Match funds must be identified in writing, and the Recipient must obtain any associated commitments before incurring any costs for which the Recipient will request reimbursement.

The Recipient shall:

- Prepare a *Match Funds Status Letter* that documents the match funds committed to this Agreement. If no match funds were part of the proposal that led to the Energy Commission awarding this Agreement and none have been identified at the time this Agreement starts, then state this in the letter.

If match funds were a part of the proposal that led to the Energy Commission awarding this Agreement, then provide in the letter:

- A list of the match funds that identifies:
 - The amount of cash match funds, their source(s) (including a contact name, address, and telephone number), and the task(s) to which the match funds will be applied.
 - The amount of each in-kind contribution, a description of the contribution type (e.g., property, services), the documented market or book value, the source (including a contact name, address, and telephone number), and the task(s) to which the match funds will be applied. If the in-kind contribution is equipment or other tangible or real property, the Recipient must identify its owner and provide a contact name, address, telephone number, and the address where the property is located.
 - If different from the solicitation application, provide a letter of commitment from an authorized representative of each source of match funding that the funds or contributions have been secured.
- At the Kick-off meeting, discuss match funds and the impact on the project if they are significantly reduced or not obtained as committed. If applicable, match funds will be included as a line item in the progress reports and will be a topic at CPR meetings.
- Provide a *Supplemental Match Funds Notification Letter* to the CAM of receipt of additional match funds.
- Provide a *Match Funds Reduction Notification Letter* to the CAM if existing match funds are reduced during the course of the Agreement. Reduction of match funds may trigger a CPR meeting.

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Aemetis Advanced Fuels Keyes, Inc. (Aemetis)

Products:

- Match Funds Status Letter
- Supplemental Match Funds Notification Letter (*if applicable*)
- Match Funds Reduction Notification Letter (*if applicable*)

Subtask 1.8 Permits

The goal of this subtask is to obtain all permits required for work completed under this Agreement in advance of the date they are needed to keep the Agreement schedule on track. Permit costs and the expenses associated with obtaining permits are not reimbursable under this Agreement, with the exception of costs incurred by University of California recipients. Permits must be identified and obtained before the Recipient may incur any costs related to the use of the permit(s) for which the Recipient will request reimbursement.

The Recipient shall:

- Prepare a *Permit Status Letter* that documents the permits required to conduct this Agreement. If no permits are required at the start of this Agreement, then state this in the letter. If permits will be required during the course of the Agreement, provide in the letter:
 - A list of the permits that identifies: (1) the type of permit; and (2) the name, address, and telephone number of the permitting jurisdictions or lead agencies.
 - The schedule the Recipient will follow in applying for and obtaining the permits.

The list of permits and the schedule for obtaining them will be discussed at the Kick-off meeting (subtask 1.2), and a timetable for submitting the updated list, schedule, and copies of the permits will be developed. The impact on the project if the permits are not obtained in a timely fashion or are denied will also be discussed. If applicable, permits will be included as a line item in progress reports and will be a topic at CPR meetings.

- If during the course of the Agreement additional permits become necessary, then provide the CAM with an *Updated List of Permits* (including the appropriate information on each permit) and an *Updated Schedule for Acquiring Permits*.
- Send the CAM a *Copy of Each Approved Permit*.
- If during the course of the Agreement permits are not obtained on time or are denied, notify the CAM within 5 days. Either of these events may trigger a CPR meeting.

Products:

- Permit Status Letter
- Updated List of Permits (*if applicable*)
- Updated Schedule for Acquiring Permits (*if applicable*)
- Copy of Each Approved Permit (*if applicable*)

Subtask 1.9 Subcontracts

The goals of this subtask are to: (1) procure subcontracts required to carry out the tasks under this Agreement; and (2) ensure that the subcontracts are consistent with the terms and conditions of this Agreement.

The Recipient shall:

- Manage and coordinate subcontractor activities in accordance with the requirements of this Agreement.

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- Incorporate this Agreement by reference into each subcontract.
- Include any required Energy Commission flow-down provisions in each subcontract, in addition to a statement that the terms of this Agreement will prevail if they conflict with the subcontract terms.
- If required by the CAM, submit a draft of each *Subcontract* required to conduct the work under this Agreement.
- Submit a final copy of the executed subcontract.
- Notify and receive written approval from the CAM prior to adding any new subcontractors (see the discussion of subcontractor additions in the terms and conditions).

Products:

- Subcontracts (*draft if required by the CAM*)

IV. TECHNICAL TASKS

*Products that require a draft version are indicated by marking “(draft and final)” after the product name in the “Products” section of the task/subtask. If “(draft and final)” does not appear after the product name, only a final version of the product is required. **Subtask 1.1 (Products)** describes the procedure for submitting products to the CAM.*

TASK 2 PROJECT ENGINEERING DESIGN

The goal of this task is to design the necessary equipment and plan the equipment layout for the demonstration site. The piece(s) of equipment that need to be designed are a PV + BESS microgrid, which consists of the PV array, BESS, microgrid controller, metering of plant loads, and upgrades to the plant site and circuits to support the PV + BESS microgrid. The equipment will be installed at the Aemetis Keyes Facility, located at 4209 Jessup Road, Ceres, California 95307.

The Recipient shall:

- Identify critical loads and quantify total power (MW) required to maintain them during a power outage, determine necessary circuit upgrades, controls, and metering to manage these loads.
- Design the PV + BESS microgrid, including site integration with site preparation, electrical equipment, control systems, and structural components at the food production facility.
- Design the required site upgrades, including electrical systems, ground preparation, fencing, and integration with existing load controls.
- Provide a *Project Design Memo* that shall include, but not be limited to:
 - Summary of the steps taken to reach the final design and final layout;
 - Identification of barriers involved and discuss the steps taken to overcome those barriers;
 - Discussion of the final engineer design and equipment layout for each site.

Products:

- Project Design Memo (draft and final)

ATTACHMENT 3
Scope of Work Template
Aemetis Advanced Fuels Keyes, Inc. (Aemetis)

TASK 3 SITE PREPARATION AND EQUIPMENT PROCUREMENT

The goal of this task is to procure the necessary equipment and materials for installing a PV + BESS microgrid at the Keyes, California food production facility owned by Aemetis.

The Recipient shall:

- Procure equipment by:
 - Discussing equipment, electrical, and installation requirements with Schneider Electric and potential California-based vendors.
 - Finalizing equipment specification.
 - Preparing Equipment List. For each item, the letter shall provide the name of the item and make, model, size, capacity or other information as appropriate to the item. Items to include:
 - BESS
 - PV system
 - High voltage switchgear and breaker
 - Transformer
 - Low voltage switchboard
 - Microgrid controller
 - Metering and monitoring system
 - Issuing bid documents, reviewing responses, and selecting California-based vendors.
 - Placing equipment orders.
- Secure all permits needed for installation of all equipment, including:
 - Permit to construct from Stanislaus County.
- Prepare proposed locations at the site for installation of the new equipment. Steps include:
 - Preparing the Installation Timeline
 - Identifying drop sites for new equipment.
 - Accept delivery of new equipment at chosen site(s).
- Provide a *Site Preparation and Equipment Procurement Memo* that shall include, but not be limited to:
 - Summary of the steps to prepare the site(s);
 - Copy of the performance specifications for each equipment purchased by the grant.
 - Summary of the bids received and from whom;
 - Copies of all required permits needed for installation at each site;
 - Copies of the final procurement documents and purchase orders; and
 - Status of the planned installation including preliminary schedule for equipment delivery and installation for each site.

Products:

- Site Preparation and Equipment Procurement Memo

TASK 4 EQUIPMENT INSTALLATION

The goal of this task is to install and commission the equipment for this project, resume normal plant operations.

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Scope of Work Template
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The Recipient shall:

- Execute installation of the project as outlined in the Installation Timeline and Equipment List. Install each piece of equipment or group of equipment as follows:
 - Prepare drop sites as required
 - Shut down plant processes as required
 - Install new equipment
 - Install Measurement and Verification (M&V) meters and equipment
 - Conduct pre-startup safety review
 - Perform cold commissioning, which will include:
 - Completion and system check out
 - Confirmation of operational readiness
 - Perform hot commissioning, which will include:
 - Performance testing of new systems
 - Performance testing of integration with existing energy management and control systems
 - Performance test run of new system
 - Optimize system performance in response to testing in order to meet stated performance specification
- Provide an *Equipment Installation Memo* that shall include, but not be limited to:
 - Summary of the equipment installation requirements for each demonstration site;
 - Identification of barriers involved during installation and discuss the steps taken to overcome those barriers;
 - Discuss results of equipment start-up and commissioning at each site with respect to whether the equipment as installed meets the stated performance specifications.

Products:

- Equipment Installation Memo (draft and final)

TASK 5 MEASUREMENT AND VERIFICATION

The goal of this task is to report the benefits resulting from this project by performing measurement and verification (M&V) of greenhouse gas (GHG) and energy consumption reduction.

The Recipient shall:

- Enter into agreement with M&V subcontractor per Task 1.9 (if using outside vendor)
- Coordinate site visits with the M&V subcontractor at the demonstration site(s)
- Develop M&V protocol for ***pre-installation*** measurement (and calculation):
 - Electric, natural gas and/or other fossil fuel consumption and GHG emissions (use appropriate emissions factor from Attachment 8 of the grant solicitation) of the equipment/process/system(s)/sub-system(s) that are to be upgraded and/or replaced and/or modified.
 - Ensure installation of sub-metering equipment and data loggers for pre/post data analysis.
- Prepare and provide a detailed *M&V Plan* for each project demonstration site to include but not be limited to:
 - A description of the monitoring equipment and instrumentation which will be used.

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- A description of the key input parameters and output metrics which will be measured.
- A description of the M&V protocol and analysis methods to be employed.
- A description of the independent, third-party M&V services to be employed, if applicable.
- Perform three months (or shorter period as approved in writing by the CAM) of pre-installation measurements (and calculations) based on the M&V protocol for pre-installation.
- Prepare and provide a *Pre-Installation M&V Findings Report* for each demonstration site that includes M&V protocol, pre-install measurements (and calculations), analysis, and results performed in this task.
- Develop M&V protocol for **post-installation** measurements (and calculations) of:
 - Electric, natural gas and/or other fossil fuel consumption and GHG emissions (use appropriate emissions factor from Attachment 8 of the grant solicitation) of the equipment/process/system(s)/sub-system(s) that will be upgraded and/or replaced and/or modified
- Perform 12 months or two seasons, for seasonal facilities, (or shorter period as approved in writing by the CAM) of post-installation measurements based on M&V protocol for post-installation.
- Provide a summary of post-installation M&V progress in Progress Report(s) (see subtask 1.5) which shall include but not be limited to:
 - A narrative on operational highlights from the reporting period, including any stoppages in operation and why; and
 - A summary of M&V findings from the reporting period.
- Analyze post-installation electrical, natural gas and/or other fossil fuel consumption and GHG emissions.
- Prepare and provide a *Post-Installation M&V Findings Report* for each demonstration site that includes M&V protocol, pre and post install measurements (and calculations), analysis, and results performed in this task. Results should at a minimum report on the reduction of electricity, natural gas and/or other fossil fuel usage and reductions of GHG emissions that directly result from this project.
- Provide all key assumptions used to estimate and determine energy and GHG reductions (and additions, if applicable).
- Provide all key assumptions used to estimate projected benefits, including targeted market sector (e.g., population and geographic location), projected market penetration, baseline and projected energy use and cost, operating conditions, and emission reduction calculations.

Products:

- M&V Plan (draft and final)
- Pre-Installation M&V Findings Report (draft and final)
- Post-Installation M&V Findings Report(s) (draft and final)

TASK 6 TECHNOLOGY/KNOWLEDGE TRANSFER ACTIVITIES

The goal of this task is to make the knowledge gained, project results, and lessons learned available to the public and key decision makers.

ATTACHMENT 3

Scope of Work Template

Aemetis Advanced Fuels Keyes, Inc. (Aemetis)

The Recipient shall:

- When directed by the CAM, develop *Presentation Materials* for an Energy Commission-sponsored conference/workshop(s) on the project.
- When directed by the CAM, participate in workshops symposium(s) sponsored by the California Energy Commission.
- Provide at least (6) six *High Quality Digital Photographs* (minimum resolution of 1300x500 pixels in landscape ratio) of pre and post technology installation at the project site(s) or related project photographs.

Products:

- Presentation Materials (draft and final)
- High Quality Digital Photographs

V. PROJECT SCHEDULE

Please see the attached Excel spreadsheet, as well as the following project schedule table.

	2020												2021												2022											
	Q1			Q2			Q3			Q4			Q1			Q2			Q3			Q4			Q1			Q2			Q3					
Tasks	J	F	M	A	M	J	J	A	S	O	N	D	J	M	J	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S			
Task 1: General Project Tasks																																				
Task 2: Project Engineering Design																																				
Task 3: Site Prep. & Procurement																																				
Task 4: Equipment Installation																																				
Task 5: M & V																																				
Task 6: Technology Transfer																																				