The Monterey Regional Waste Management District (MRWMD) is an award-winning 63-year-old California Special District, covering 853 square miles, representing nine member agencies and providing services to local and regional customers. Its mission is “To turn waste into Resources in the most cost effective and environmentally sound manner to benefit the community.”

The MRWMD is an integrated waste management facility combining a Materials Recovery Facility, Household Hazardous Waste collection facility, landfill-gas-to-energy program, Last Chance Mercantile (LCM) reuse store, and public education and outreach. The MRWMD has been composting green waste for more than 20 years and was the first in the region to initiate a food scrap compost program in 2008. In January of 2012, MRWMD took another pioneering step forward in organics waste management by entering into an agreement with Zero Waste Energy (ZWE) to permit, construct and operate a Dry Fermentation “SmartFerm” Anaerobic Digestion (AD) composting system to manage food scraps.

1) PROJECT DESCRIPTION

System Design: 1st of its Kind, Dry Fermentation Anaerobic Digestion

As commissioned, the innovative SmartFerm AD project at the MRWMD was the 1st of its kind to be operational in California and only the 2nd dry fermentation AD project in the nation. This unique modular AD system is designed to convert 5,000 tons per year (tpy) of organic material into renewable biogas while generating 100 kW of renewable power and 4,400 tpy of pathogen free digestate compost feedstock. The beneficial outcomes of the project include a state-of-the-industry approach to managing food scrap organics, landfill diversion, renewable energy production, and emissions reduction. The MRWMD pilot project has proven the viability of the SmartFerm technology and serves as a replicable model for other small-scale applications from small communities, transfer stations, and college and corporate campuses. With the contract signed in April 2012, construction commenced in August 2012, and the pilot project was fully operational in March of 2013.

AD is the biological decomposition of organic matter with little or no oxygen. There are a variety of controlled systems where “wet” AD technology is currently utilized in the United States including wastewater treatment facilities and dairy manure digesters and co-digesters. “Dry” AD technology
has been utilized in Europe to process and treat the organic fraction of municipal solid waste to recover energy and to reduce the volume of solid waste that must be landfilled. With this in mind, MRWMD set out to utilize AD to prove the viability of using food scraps as a key ingredient in a dry AD compost system in the United States.

**System Merits, Innovative & Unique Aspects**

The MRWMD’s SmartFerm AD project is a model for the new generation of organics management strategies taking shape across the country. The project merits include:

- **Increased Organics Diversion**, demonstrates how CalRecycle’s strategic goal to reduce organic waste disposal in landfills by 50% by 2020 can be achieved.
- **Reduced Fugitive Methane Emissions** from landfills, a powerful greenhouse gas 20x more potent than CO2, in line with AB 32 Climate Change Scoping Plan.
- **Replicable Model for Small-Scale and Scalable Operations** throughout the state and nation, with several additional communities already following suit.
- **Model Public-Private Partnership** leverages resources, expertise and cost-sharing strategies to maximize results.
- **State-Of-The-Art Technology** allows for streamlined diversion of challenging wet food scrap organics, reducing the volume of organic waste being sent to landfill and conserving precious landfill capacity.
- **Integrated Power Generating Technology** harnesses the renewable energy from organics during the compost process, and put this energy to valuable use.
- **Generation of Excess Electrical Power** benefits neighboring wastewater treatment facility, as a model public-agency beneficial partnership.
- **In-Vessel System Design Aids in Odor Control**, reducing odor challenges often inherent to organics management.
- **Resulting Digestate is a Compost Feedstock** that yields high quality compost after windrow processing and curing.
- **Cost Effective** the first operational cost after one full year of system performance is $48/ton.
The ZWE/MRWMD partnership has demonstrated the mutual benefit of working cooperatively on an integrated approach to anaerobically digesting organics, inclusive of education, outreach, system performance, and community acceptance.

The Facility is currently operating as a 5-year pilot project and celebrated one full year of operation in March 2014. Technology piloted at MRWMD is already being replicated in other locations including a 90,000 tpy facility in San Jose, CA building on the implementation outcomes from MRWMD. Lessons learned are being incorporated into new project development at additional ZWE locations.

**A State-Of-The-Art System**

*SmartFerm* was developed in Germany and the technology is exclusively licensed to ZWE, a Lafayette, CA based developer of organic waste treatment projects utilizing dry AD technology. After the first year of operation, the system has operated on a blend of 70% food scraps and 30% ground green waste surpassing initial expectations that the system would run on a 50/50 mix.

The basic system design features four (4) steel fabricated and insulated digesters, each 12 feet in width, 12 feet in height and 40 feet in length. Each digester has a specially designed hatch that provides an air-tight seal to ensure anaerobic conditions are properly maintained during processing. The system features an 80,000 gallon below-grade concrete percolate tank, a mechanical-electrical container, containerized combined heat and power system, package bio-filter, a roof-mounted external biogas storage bladder and environmental control device.

In addition, there is a separate enclosed and negatively aerated receiving bay capable of staging sufficient feedstock for one digester. The purpose of the receiving bay is to prevent fugitive odors and provide vector control. The dimensions of the receiving bay are approximately each 12 feet in width, 14 feet in height and 40 feet in length.

At the core of the AD technology is a 21 day batch process that transforms organics into biogas and high quality digestate for composting. Incoming food scraps are tipped on the operations pad and blended with green waste mulch in a ratio of 70% food scrap to 30% green waste. After staging in a receiving building, the mixed organics are loaded into one of the four dry fermentation digesters and the hatch is closed and sealed, an in-floor aeration system blows air through the material to initiate aerobic decomposition. At the end of this 6-hour process, the material is biologically heated to a range that supports thermophilic anaerobic digestion.

“Anaerobic digestion offers the citizens of California multiple benefits. Its simple biological processes use our waste as resources to make renewable energy or low carbon biofuels along with a compost that can be used to restore the health of our precious agricultural soils. Anaerobic digesters can provide distributed energy, have a small footprint, and typically are enclosed, so they can be good neighbors in virtually any community setting. Because they produce electricity or fuel, they can help reduce our dependence on foreign sources of fossil fuel and significantly reduce greenhouse gas emissions that contribute to global warming. The development of a viable anaerobic digester infrastructure in California that uses our food waste and other urban organic wastes is one of CalRecycle’s highest priorities.”

~Margo Reid Brown, Acting Director California Department of Resources Recycling and Recovery (CalRecycle)
Following aeration of the material, anaerobic conditions are established and the heated liquid biological inoculant (percolate) from the below-grade storage tank is introduced to the material via an overhead sprinkling system. The percolate is maintained at a thermophilic temperature (maximum of 55 degrees Celsius) ensuring proper conditions are maintained in the digester for the rapid digestion of material and production of biogas. Biogas production begins within 6 to 12 hours of percolation and is pumped to the below-grade percolate tank for storage. Buffer storage of biogas is accommodated by an external roof-mounted gas bladder for “rich” and “lean” biogas.

The biogas produced is used in a 100 kW internal combustion engine (ICE) combined heat and power (CHP). Recovered heat from the AD Project CHP in the form of hot water is used to maintain thermophilic temperatures in the percolate tank. Electrical power is used to meet the parasitic loads of the system. Excess generation is sold to the neighboring utility Monterey Regional Water Pollution Control Agency (MRWPCA) under a Power Purchase Agreement. This energy sale builds on 30 plus years of MRWMD experience capturing landfill biogas to convert into renewable energy and distribution to the electrical grid, as one of the 1st such systems in North America.

Following the 21 day residency and shutdown procedure of the digester, the hatch is opened and a front-end wheel loader removes the sanitized digestate. The digestate is then placed into existing open windrow composting operations, run by Keith Day Company (KDC), to produce high quality compost for agricultural soil amendment applications.

**Design Protects Environmental Quality, Human Health & Resource Conservation**

The project meets all applicable state, local and federal compliance protocols for environmental and human health, environmental quality, and resource conservation. It further goes beyond compliance to provide additional environmental, economic and social benefits to the region.

**An Integrated Compost Program Responsive to Local Needs**

The MRWMD AD Project represents the natural evolution of local food scrap collection in the Monterey Bay Area. For five years prior to installation, MRWMD worked cooperatively with local business owners, special events, and haulers to establish and expand food scrap collection service and divert these organics from the landfill. According to the EPA, food scraps comprise the largest portion of the waste stream (21%), presently being sent to landfill in the United States with more than 36 million tons of waste generated in 2012 alone, and only five percent diverted from landfills and incinerators for composting. A local waste characterization study found that for the average Monterey Peninsula restaurant, this number can be as high as 46%, representing tremendous potential for diversion. Food scrap organics are a priority material targeted to meet the California 75% diversion goal, a goal the MRWMD Board has also adopted.

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1 [http://www.epa.gov/foodrecovery/](http://www.epa.gov/foodrecovery/)
2) Regulatory Compliance

First California Project Serves as a Model

The CalRecycle programmatic Environmental Impact Report for AD projects was instrumental in helping local planners understand this project and clear the way for local permitting.

An existing use permit for composting on District property was amended to include the AD project in addition to the traditional windrow composting operations.

Meeting Environmental Compliance

All appropriate permits are obtained. Permits and Facility Inspection Data are held on file at MRWMD. The innovative SmartFerm system is in compliance with local and state, regulations and has never received a notice of violation for its operation.

No Regulatory Citations

Following system start-up, one program improvement was implemented in cooperation with the Local Enforcement Agency (LEA) to contain digestate leachate. During the unloading of digesters and routine feedstock handling, several gallons of liquid leachate would sometimes seep from a digester and flow to a nearby storm drain. This amounted to a small volume of liquid not material, which should be conveyed from the storm drain to an adjacent detention basin. In response, with approval from the LEA, the MRWMD installed an underground storage tank with a diversion valve at the storm drain to allow any leachate to be captured in the tank. During rain events, the valve is opened to allow stormwater to flow directly to the detention basin. Leachate collected in the storage tank can then be pumped back to the percolate tank and reused in the system.

In addition, the MRWMD worked cooperatively with the LEA and ZWE to develop and implement Best Management Practices (BMPs) to minimize and/or avoid liquid seepage. The BMPs detail procedures for the swift handling and containment of incoming material and describe recommended actions to contain or absorb leachate in four areas: Tipping Floor, Receiving Bay Storage, Opening the Digester, and Temporary Bunker Storage of Digestate. These strategies have served to improve operational effectiveness at the facility and minimize liquid seepage to the storage tank.

Award Winning Agency, Supported By the Community

The MRWMD has received numerous awards and recognition including:

☆ **Best Solid Waste System in North America** (1998), Solid Waste Association of North America (SWANA)

☆ **Public/Private Economic Partnership “Green Award”** with Keith Day Company, Inc. for Food Scrap Compost Pilot Program (2010), Monterey County Business Council (MCBC)

“We did a commercial waste characterization study in summer 2012 of materials coming to our landfill. About 40 to 50 percent of the waste in the loads we audited were organics. Even though the District’s landfill has about 150 years of capacity and the District is well above the state-mandated 50 percent diversion, the District Board believes we need to continue on a pathway to more sustainable practices. It’s the right thing to do.”

~William Merry, General Manager of MRWMD
As evidenced in the attached Letters of Support, the system is well supported by the community, regulatory agencies, haulers, and environmental groups in the region. The program’s success relies on the contributions and support of a wide variety of community stakeholders and partners.

3) PROJECT PLANNING

An Effective Planning Process

The effectiveness of project planning is evidenced in the one year timeline to finalize the contract, begin construction and commence operations. The project benefited from the expert planning team led by ZWE. The effort included the ZWE engineering team along with a team from Germany where the system was fabricated along with the MRWMD operations staff. Working cooperatively, the system was designed, permitted, constructed, commissioned and brought on-line in record time. After a year of operations, it is clear that this rigorous and diligent planning process has achieved the desired outcomes.

An Effective Site and Facility Design

The Site Design Plan was provided by J.R. Miller and Associates; the Geotechnical Exploration Report was conducted by Golder Associates, Inc.; and the Authority to Construct / Permit to Operate Application was prepared for ZWE by Cornerstone Environmental Group, LLC. The site plan shown here depicts the proximity of the AD Facility within MRWMD’s existing compost operations and includes dimensions of the key facility layout components. By integrating the AD project adjacent to existing compost operations efficiency, including vehicle flow, transfer of materials and final processing was maximized.

Facility Design Yields Key Benefits

1. A minimal footprint of approximately 3,500 square feet is required.
2. Odors are mitigated by enclosing primary receiving and processing operations.
3. All organic waste receiving, processing and anaerobic digestion odors and off-gases are treated in a bio-filter.
4. The CHP system is installed in a sound-attenuate container reducing noise.
5. The initial thermophilic mode of operation produces sanitized digestate reducing the amount of time required for compost curing.
Process In Action—Construction Overview

Construction of the AD Facility and receiving bay required careful planning, site preparation and earthwork, including excavation and stockpiling soil for later use in the finished grading phase. Rough earthwork consisted of cutting or filling the site to produce overall site gradients and achieving an adequate sub-surface depth for the underground percolate tank. In general, surfaces were graded to drain to Regional Water Quality Control Board permitted stormwater retention/detention facilities. Development also required the construction of various supporting infrastructure including electrical switchgear and feeders and a new water line. Renewable biogas use required some surface preparation, excavation, trench shoring, pipeline installation, trench backfilling, and surface restoration, including load bearing concrete pads for the respective modular systems. No off-site improvements were planned nor required. This design strategy allowed for efficient on-site installation and maximized integrated with existing systems and processes within the full MRWMD Facility. *(The following photos illustrate the AD system construction and installation.)*

Project Timeline, Major Milestones:
- Board provides conceptual approval December, 2012
- Contract with ZWE signed April, 2012
- Pursuant to CEQA, the project was evaluated as a Pilot Research AD Composting Facility within the context of 2011 “Statewide AD Facilities EIR”
- Break ground August, 2012
- System operational March, 2013

Planning For Downtime

The facility design helps to minimize potential for downtown by utilizing four separate digester modules. This allows for batches of food scrap organics to be loaded into a digester approximately once every seven days. Should a single unit require maintenance, the other three units remain operational. In the event more significant maintenance or repairs are required, such as a engine failure, the system is equipped with an emergency flare, which allows operations to continue while maintaining emissions control. The planning and design process specifically included these considerations to maximize operational effectiveness and flexibility of the system.
Installation of the SmartFerm AD Composting System and Modules:

4) PERFORMANCE, ECONOMICS & COST-EFFECTIVENESS

Measuring Success

At the time of its commissioning in March 2013, this was the 1st dry fermentation AD project to become operational in California and only the 2nd facility in the US. Implemented as a pilot research and demonstration AD Facility, the project has an initial length of 5 years. As a demonstration project, the goal is to test the effectiveness of the Facility and determine whether the project should be expanded or enhanced in future years. Measures of success include:

- Environmental Compliance
- Tons and Ratio of Food Scraps and Green Waste Diverted from Landfill
- Digestate Data: Moisture Content; Organic Material Content
- Energy Production and Electricity Sales
- Operational Cost per Ton
- Public Acceptance

<table>
<thead>
<tr>
<th>SMARTFERM Process</th>
<th>Results</th>
</tr>
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<tbody>
<tr>
<td>Annual Volume</td>
<td>Up to 5,000 TPY</td>
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<tr>
<td>Digester Dimensions</td>
<td>40’ (L) x 12’ (W)</td>
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<tr>
<td>Digester</td>
<td>4</td>
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<tr>
<td>Residence Time</td>
<td>21 Days</td>
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<tr>
<td>Mode of Operation</td>
<td>Thermophilic (125-131°F)</td>
</tr>
<tr>
<td>Biogas Yield (CF/Ton)</td>
<td>3,000 - 3,200</td>
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<tr>
<td>Methane Content (%)</td>
<td>58 - 60</td>
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<tr>
<td>Electrical Output</td>
<td>100 kW</td>
</tr>
<tr>
<td>Finished Compost @ 40% Moisture Content</td>
<td>2,200 TPY</td>
</tr>
<tr>
<td>Total Diversion</td>
<td>+99%</td>
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This project presented an opportunity to implement a new technology to manage wet and sloppy food scrap organics in an enclosed system. While effective, windrow composting of these organics does not capture the CO2 emissions nor the energy value of the material. This project takes an operationally challenging material and places it inside a closed and controlled environment. Doing so dramatically reduces the CO2 emissions from decomposing organics and harvests the methane resulting from the anaerobic digestion process for the production of renewable electricity. Results from the first 12 months of operation are presented below. The system has achieved the anticipated operational objectives for system throughput and performance and is considered by the MRWMD and ZWE to be a complete success.

Waste Screening Procedure

Quality control with food scrap organics is essential. Before food scraps ever leave commercial properties and special events, MRWMD partner and local environmental nonprofit, The Offset Project (TOP) works with business and event staff to ensure participants are educated in proper source separation. TOP also performs spot checks of pre-sorted material for contaminants in periodic assessments and hands on separation of contaminants for many participating local events. Once the food scraps arrive at the AD Facility, loads are re-inspected by MRWMD staff and contaminants such as plastic and aluminum foil are removed.

Generator specific education and outreach based on contamination observed is provided to program participants through TOP, MRWMD and ZWE staff for continued improvement. Following digestion, the digestate is then composted in windrows for 60-90 days and the finished compost is then mechanically screened and sifted to remove any remaining contaminants. Routine testing of the finished compost shows the material is free of trace metals and pathogens.

Finished compost is sold by the truckload by KDC, the MRWMD’s contract compost processor and to the public at the scales and LCM.

Meeting & Exceeding Operational Performance Goals

In the first year of operations, the AD project has met expectations and is a proven success:

- **Full Environmental Compliance**, No Violations, Proactive BMPs Implemented
- **3,325 Tons** of Food Scraps and **1,425 Tons** of Green Waste **Diverted**
- **Demonstrated Ability** to run higher food scrap to green waste ratio (70/30) than expected, increases facility efficiency
- **Digester Capacity** is 60-65 tons, representing a 35-40% reduction in volume Digestate
- **Digestate Data Demonstrates** 64% moisture content, organic material content of 83%, 1.2 N, 0.21 P, and 0.31 K
- **No Pathogens** and No trace metals
- **Annual Operating Cost** per ton in line with initial estimates, presently at $48/ton, below current solid waste tipping fees of $51.75 per ton.
- **Public Awareness**: Developed **Organics to Energy** program branding with local hospitality industry, provided facility tours serving hundreds of visitors, and project case study presented at 5 industry conferences
2013 Food Scrap Tonnage Summary by Generator

<table>
<thead>
<tr>
<th>Origin</th>
<th>2013 Tons</th>
</tr>
</thead>
<tbody>
<tr>
<td>City of Salinas (Nov - Dec only)</td>
<td>54</td>
</tr>
<tr>
<td>City of Capitola</td>
<td>508</td>
</tr>
<tr>
<td>MRWMD Member Agencies</td>
<td>893</td>
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<tr>
<td>County of Santa Cruz</td>
<td>709</td>
</tr>
<tr>
<td>UC Santa Cruz</td>
<td>561</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2725</strong></td>
</tr>
</tbody>
</table>

*All food scrap material delivered to AD project at MRWMD.*

**Downtime Experience**

The system is designed to operate at a minimum 90 percent efficiency, with 5 percent of energy production consumed by parasitic load to run the system and the final 5 percent downtime reserved for routine maintenance.

The system did experience a failure of the seal holding the gas storage bladder in place during the first few months of operation. Despite this, the system was able to operate continuously by utilizing gas storage in the percolate tank. This required more operator time as the percolate tank has limited storage necessitating running the engine generator for shorter periods rather than continuously. A positive outcome of this setback was the system operator became fully experienced with many nuances of running the system and gained a great deal of system insight and knowledge. The faulty seal was subsequently replaced and it was learned the failure was caused due to the original factory seal not being installed correctly. The system has performed flawlessly since with no further storage bladder issues.

**Fostering Customer Service**

During the construction and development of the project the MRWMD kept a photo chronology on its Facebook page. This served to keep the local community and project stakeholders up-to-date on the project on a weekly and sometimes daily basis. The local hospitality industry has taken a great interest in both food scrap diversion and the success of the AD project. This is attributable to the industry’s desire to brand the Greater Monterey Peninsula as a sustainable destination and the public outreach and education conducted by the MRWMD and its non-profit partner, TOP. The hospitality industry formed their own “Monterey Regional Compost Coalition” which meets every other month to share success in food scrap diversion efforts. The Coalition was instrumental in encouraging local haulers to expand...
their food scrap collection programs and members have also visited the AD project on several occasions including timing their visits to see their own food scrap load delivered to observe contamination first-hand. Positive outcomes of the AD pilot project arise from the MRWMD’s mission-driven and proactive approach to ensuring that customers’ needs are met and that incoming material meets the strict AD system contamination guidelines.

Getting The Word Out

The MRWMD with ZWE hosted a community open house to celebrate the commissioning of the SmartFerm system in March of 2013. More than 150 people attended to hear representatives from ZWE, CalRecycle and the MRWMD speak about the project. This community engagement set the tone early on for informing the local community and generating excitement in the hospitality industry for the opportunity to be part of a state-of-the-art pilot project.

Operating Within Budget

The system has continuously operated within budget. The total capital cost, including design, engineering, construction and commissioning, was $2.9 million, a cost paid by ZWE. The MRWMD pays ZWE a tip fee of $23.50 per ton for green waste and $38 per ton for food scraps loaded into the digesters. In addition, the MRWMD staff performs load checks and contaminant removal on all incoming food scrap loads and assists with system maintenance such as pressure washing digesters. ZWE paid the cost of operator time, estimated at 20 hours per week for the first 8 months of operation with MRWMD assuming this cost, effective January 2014.

With the system operating at full capacity, the digester units have a rated capacity of 5,000 tpy annually. In the first full year of operation, the system processed 4,684 tons including 3,364 tons food scraps and 1,320 tons of green waste. Based on a food scrap tip fee of $38 per ton and a green waste tip fee of $23.50 per ton, processing of these materials has an associated cost of $159,838 annually. Additional staffing costs include the MRWMD operations at an estimated $32,070 per year and a part-time AD technician at $36,000 annually. Total annual costs for the system are $227,908 or $48 per ton. The current solid waste facility tip fee is $51.75. Electricity revenue generated from the project, retained by ZWE, is approximately $19.50 per ton at full capacity.
Recouping Facility Costs

The total capital cost, including design, engineering, construction and commissioning, was $2.9 million. The entire investment was made by the project developer ZWE. Leveraging this unique public-private partnership, no capital costs were incurred by the MRWMD. Based on initial investment, annual tip fees received from processed green waste and food scraps, as well as energy sale projections, it is estimated that the ZWE initial capital investment will be recouped within 11.5 years.

Reinvesting in Program Enhancement

As described below, the MRWMD invested in developing an “Organics to Energy” logo, website and branding campaign. Participating restaurants are using the program logo on their menus and websites to highlight their participation in the program for their customers.

5) Use of Effective & Efficient Equipment, Systems & Technologies

The state-of-the-art facility utilizes an effective enclosed in-vessel AD system and underground percolate/biogas storage tank, described in detail in the Project Description. Under the project, the food and other organic waste is loaded into the digesters. Anaerobic digestion of this waste by micro-organisms produces a biogas consisting of approximately 57% methane. The biogas is used in a CHP reciprocating engine to produce electricity and process hot water. An emergency backup enclosed flare is used to burn the biogas when the engine is down for maintenance. After the AD process is complete, the organic waste is then sent back to the MRWMD for composting. Given the CalRecycle strategic initiative to reduce the disposal of organics in landfills, all eyes in the State were on this first-of-its-kind in California project. The system performance during the first year of operation demonstrates success in 2013. The MRWMD was pleased to find that higher concentrations of food scraps can be utilized in the digester (70%) than initially projected (50%). Another testament to project success is evident in new SmartFerm projects now under construction in South San Francisco and Ventura County.

6) Worker Training, Health & Safety

The District provides initial and ongoing, comprehensive training to all employees. As required by 27 CCR 20610, training includes hazardous materials recognition and screening and heavy equipment operations, with emphasis on safety, health, environmental controls and emergency procedures. Training records are kept on-site and are available for regulatory agency review. There have been no accidents or incidents involving worker safety or health at the AD project.

Safety Procedures & Enforcement

District employees are provided with periodic refresher training regarding health and safety rules, emergency response procedures, first aid and CPR, hazardous waste identification, safe materials handling procedures, the use of appropriate personal protective equipment (PPE), and environmental controls. Ongoing, routine staff training includes classroom instruction and actual on-the-job training under the supervision of someone experienced in the various aspects of the skills being taught. Potential hazards and safety procedures are stressed. No employee is permitted to operate potentially
dangerous equipment or engage in potentially dangerous activities without appropriate training. Bi-monthly safety meetings are conducted in addition to any “as needed” safety meetings. The District Safety Committee, which meets quarterly (at a minimum) assures that all operations are in compliance with the District’s Injury and Illness Prevention Plan (IIPP). A safety task force comprised of senior administrative and operational managers meets periodically to review safety work orders, safety policies and procedures, and results of safety inspections.

7) **PUBLIC ACCEPTANCE, APPEARANCE AND AESTHETICS**

**Maintaining A Clean & Aesthetically Pleasing Facility**

The MRWMD maintenance program generally consists of two main elements: maintenance of equipment and maintenance of facility. AD Facility equipment is primarily limited to the single front-end wheel loader utilized in loading organics materials prior to digestion, and removal of digestate following the 21-day treatment period. MRWMD equipment is typically maintained and repaired on site by District personnel or maintenance contractors. In some instances, equipment may be sent off site for maintenance and/or repairs. General preventative maintenance activities include basic inspection and/or changes of equipment fluids, cleaning of equipment parts, and periodic diagnostics of equipment mechanics (including repair if findings so indicate).

Due the regular loading and unloading of each digester every 21 days, each vessel is inspected prior to reloading once per month. Any additional maintenance such as pressure washing walls and cleaning the overhead percolate sprinklers is performed. In addition, the MRWMD has adopted BMPs to manage incoming materials used as feedstock in the AD process. These BMPs provide for the swift handling and containment of materials, control of liquid seepage and help ensure the facility is maintained in a clean and aesthetically pleasing manner. Instructions are provided for tipping floor areas, receiving bay storage, opening the digester and temporary bunker storage of digestate. These practices further serve as vector and odor control, in addition to providing aesthetic benefits.
Public Relations & Public Education

Working in cooperation with the local hospitality industry, the MRWMD developed an “Organics to Energy” program logo and branding to highlight this project locally. The MRWMD retained a graphic design consultant and worked cooperatively with the business “Compost Coalition” to develop the graphic look and feel of the logo everyone was pleased with. In addition, a window decal was created for participating restaurants to display, which shows their participation in the program. Several restaurants are now displaying this logo on their menus and websites as well. This branding effort has served to help raise awareness of the program locally and help the community make the connection between “organics”, “energy”, and “compost” in this state-of-the-art project. This branding campaign also served to engage the hospitality industry in the identity of the program and increased personal investment and sense of ownership.

Public education efforts have included hundreds of earned media articles nationwide generated from the project open house launch and included articles in Biocycle and MSW Management Magazine. Social media has also been utilized throughout the planning and implementation process, with an active Facebook page documenting the project as well as a Tumblr blog. In the first 12 months of operation hundreds of visitors have toured the facility and the operational and financial performance of the system has been presented at 5 industry conferences, including SWANA’s 2014 Road to Zero Waste.

TOP has also worked to recruit new participants, often using case studies that showcase individual program success. In addition, the District has launched an Organics to Energy website, www.organicstoenergy.org, to educate the public on the AD system, and provide potential participants with information on how to join, local case studies and additional support resources.

Facility As a Good Neighbor

The AD Facility has implemented several mechanisms as a good neighbor including: frequent tours, odor control measures, vector control measures and direct partnership with neighboring wastewater treatment facility to provide renewable power generated by the facility.

Preconditioning Odor Control Measures Include:
1. Sealed containers during the storage and digestion process located inside of a negative-pressure building where all building and process air exhaust is directed through a biofilter for oxidation.
2. Use of thermophilic process to “sanitize” the waste, reducing the number of pathogens available during composting.
3. Use of a biofilter for additional control of volatile organic compounds (VOCs) and ammonia before exhausting to the air.

Additionally the facility has adopted refined BMPs to facilitate the swift transfer of materials, control odor and vectors and maintain an aesthetically pleasing work space.
SUMMARY

In line with the mission of MRWMD, this innovative 1st in the state, 2nd in the nation SmartFerm dry fermentation AD facility is meeting and exceeding expectations, providing a valuable enhancement to the MRWMD long-standing integrated composting systems while improving opportunities for waste diversion, emission reductions, landfill capacity preservation, renewable energy generation, odor control and soil amendment production. The system is a model public-private partnership and provides a replicable technology demonstration for small-scale and scalable applications throughout the state and the nation in the years to come.

ATTACHMENTS

The Project is broadly supported by the community. Letters of Support are presented from:

1. Zero Waste Energy—Builder, Financer, Operator & Lead Partner
2. Monterey Regional Water Pollution Control Agency—Neighboring Agency & Renewable Energy Sale Partner
3. The Offset Project—Local Non-Profit & Education/Outreach Partner
4. Waste Management—Participating Hauler & Program Partner
5. Passionfish—Local Restaurant & Program Participant Partner

Thank you!

On behalf of MRWMD, we appreciate your time and attention in reviewing this proposal.
April 24, 2014

Solid Waste Association of North America (SWANA)
1100 Wayne Avenue, Suite 650
Silver Spring, MD 20910
Attn: Recycling & Special Waste Technical Division

RE: 2014 SWANA Excellence Award—Composting Systems:
Monterey Regional Waste Management District

Dear Awards Evaluation Committee Members,

Zero Waste Energy (ZWE) is pleased to submit this letter of support for the Monterey Regional Waste Management District (MRWMD) Excellence Award in the Composting Systems category.

ZWE is a development company engaged in deploying organic waste processing technology throughout the Americas and Asia. In 2012, we partnered with MRWMD in the design and installation of the state-of-the-art SMARTFerm Dry Anaerobic Digestion (AD) system for the District on a site in Marina, California. This was the first dry AD system to be installed in California and only the second of its kind in the nation. In this innovative public-private partnership, ZWE is proud to have served as the owner, builder and financier, and we continue to serve as primary operator in collaboration with ongoing operational support by MRWMD.

MRWMD’s SMARTFerm AD Plant is converting 5,000 tons per year (TPY) of organic material into renewable biogas capable of generating 100 kW of renewable power and up to 4,400 TPY of pathogen-free digestate for composting. This is a pioneering program for managing the challenge of food scrap organics and serves as a model for the waste-to-energy industry, offering these benefits:

- **Increases organics diversion** from landfills, helping to meet CalRecycle’s goal to reduce organic waste disposal in the landfill by 50% by 2020
- **Reduces fugitive methane emissions** from landfills, a powerful greenhouse gas 20 times more potent than CO₂, in line with the State AB 32 Climate Change Scoping Plan

- **Generates high quality compost**, by blending digestate with bulking organics materials in open windrows for final maturation, curing, screening, blending and preparation for bulk soil amendment
- **Utilizes biogas** to generate 100 kW of renewable energy
- **Helps to power a neighboring Wastewater Treatment Facility** in support of the Monterey Regional Water Pollution Control Agency’s strategic goals
- **Creates a replicable model for small-scale and scalable operations** throughout California and the nation, with several additional communities already following suit

Lessons learned from this initial project application with MRWMD subsequently have been applied at larger scale ZWE installations throughout the state, paving the way for improved organics management in California in the years to come. Our public-private partnership model has demonstrated the mutual benefits of an integrated approach to organics processing, including education, outreach, system performance, and community acceptance. We are pleased to see this project advance to divert waste from landfills, reduce greenhouse gas emissions, and generate valuable renewable energy for our community.

On behalf of Zero Waste Energy, we encourage you to consider MRWMD as your selection for this award.

Sincerely,

Dirk B. Dudgeon
Senior Vice President
April 16, 2014

The Solid Waste Association of North America (SWANA)
1100 Wayne Avenue Suite 650
Silver Spring, MD 20910
Attn: Recycling & Special Waste Technical Division

RE: 2014 SWANA Excellence Award—Composting Systems:
Monterey Regional Waste Management District

Dear Awards Evaluation Committee Members,

We are pleased to submit this Letter of Support for the Monterey Regional Waste Management District (MRWMD) Excellence Award in the Composting Systems category.

Launched in 2013, and building on decades of organics management, MRWMD’s state-of-the-art small-scale dry fermentation anaerobic digester (AD), is the 1st of its kind to be installed in California and only the 2nd dry fermentation AD in the nation. Converting 5,000 tons per year (TPY) of organic material into renewable biogas capable of generating 100 kW of renewable power and up to 4,400 TPy of pathogen free digestate, the MRWMD’s SmartFerm AD Plant is a pioneering strategy for managing organics with many benefits for our local and global community:

- Increased organics diversion from landfills, helping to meet CalRecycle’s goal to reduce organic waste disposal in the landfill by 50% by 2020
- Reduced fugitive methane emissions from landfills, a powerful greenhouse gas
- 20x more potent than CO2, in line with AB 32 Climate Change Scoping Plan
- Generation of high quality compost, by blending digestate with bulking organics materials in open windrows for final maturation, curing, screening, blending and preparation for bulk soil amendment
- Generation of renewable biogas capable of generating 100 kW of energy

Sincerely,

Keith Israel
General Manager
April 16, 2014

The Solid Waste Association of North America (SWANA)
1100 Wayne Avenue Suite 650
Silver Spring, MD 20910
Attn: Recycling & Special Waste Technical Division

RE: 2014 SWANA Excellence Award—Composting Systems:
Monterey Regional Waste Management District

Dear Awards Evaluation Committee Members,

We are pleased to submit this Letter of Support for the Monterey Regional Waste Management District (MRWMD) Excellence Award in the Composting Systems category. Launched in 2013, and building on decades of organics management, MRWMD’s state-of-the-art small-scale dry fermentation anaerobic digester (AD) is the 3rd of its kind to be installed in California and only the 2nd dry fermentation AD in the nation. Converting 5,000 tons per year (TPY) of organic material into renewable biogas capable of generating 100 kW of renewable power and up to 4,400 TPY of pathogen-free digestate, the MRWMD’s SmartFarm AD Plant is a pioneering strategy for managing organics with many benefits for our local and global community:

✓ Increased organics diversion from landfills, helping to meet CalRecycle’s goal to reduce organic waste disposal in the landfill by 50% by 2020
✓ Reduced fugitive methane emissions from landfills, a powerful greenhouse gas 20x more potent than CO2, in line with AB 32 Climate Change Scoping Plan
✓ Generation of high quality compost, by blending digestate with bulking organics materials in open windrows for final maturation, curing, screening, blending and preparation for bulk soil amendment
✓ Generation of renewable biogas capable of generating 100 KW of energy
✓ Unique partnership helps powers neighboring Wastewater Treatment Facility in line with Monterey Regional Water Pollution Control Agency’s strategic goals

✓ Creating a replicable model for small-scale and scalable operations throughout the state and nation, with several additional communities already following suit

As a local environmental nonprofit, The Offset Project is dedicated to reducing greenhouse gas emissions through education and grassroots initiatives. In line with our mission, we are pleased to partner with MRWMD in implementing their food waste diversion program by providing assistance, education and outreach to participating special events and local business partners through our role supporting the MRWMD with public education and contamination prevention. From the earliest days of pilot food waste collection in 2008 working with partners like the Big Sur International Marathon, to our ongoing efforts with the Monterey Bay Composting Coalition, it is thrilling to support this effort as it is taken to a new level, moving our community forward to divert waste from landfills, reduce greenhouse gas emission, and generate valuable renewable energy for our community. Projects like these, are paving the way for improved organics management in California in the years to come.

On behalf of The Offset Project urge you to consider MRWMD for this award.

Sincerely,

Kristin Cushman, Executive Director

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The Offset Project, inc. is a California 501(c)(3) corporation
April 16, 2014

The Solid Waste Association of North America (SWANA)
1100 Wayne Avenue Suite 650
Silver Spring, MD 20910

Attn: Recycling & Special Waste Technical Division

RE: 2014 SWANA Excellence Award—Composting Systems:
Monterey Regional Waste Management District

Dear Awards Evaluation Committee Members,

We are pleased to submit this Letter of Support for the Monterey Regional Waste Management District (MRWMD) Excellence Award in the Composting Systems category.

Launched in 2013, and building on decades of organics management, MRWMD’s state-of-the-art small-scale dry fermentation anaerobic digester (AD), is the 1st of its kind to be installed in California and only the 2nd dry fermentation AD in the nation. Converting 5,000 tons per year (TPY) of organic material into renewable biogas capable of generating 100 kW of renewable power and up to 4,400 TYP of pathogen free digestate, the MRWMD’s SmartFerm AD Plant is a pioneering strategy for managing organics with many benefits for our local and global community:

- Increased organics diversion from landfills, helping to meet CalRecycle’s goal to reduce organic waste disposal in the landfill by 50% by 2020
- Reduced fugitive methane emissions from landfills, a powerful greenhouse gas 20x more potent than CO2, in line with AB 32 Climate Change Scoping Plan
- Generation of high quality compost, by blending digestate with bulking organics materials in open windrows for final maturation, curing, screening, blending and preparation for bulk soil amendment
- Generation of renewable biogas capable of generating 100 kW of energy
- Unique partnership help powers neighboring Wastewater Treatment Facility in line with Monterey Peninsula Water Pollution Control Agency’s strategic goals

Creating a replicable model for small-scale and scalable operations throughout the state and nation, with several additional communities already following suit

In line with our agency’s mission to develop new waste solutions that can help communities and organizations achieve their green goals, including zero waste, we are pleased to see projects like this one move forward within our community to divert waste from landfills, reduce greenhouse gas emissions, and generate valuable renewable energy for our community. Projects like these, are paving the way for improved organics management in California in the years to come. The success of our organics collection program on the Monterey Peninsula would not be possible without MRWMD’s participation in the Monterey Peninsula Resource Recovery Coalition or without the Anaerobic Digester.

On behalf of Waste Management Carmel Marina Corporation we urge you to consider MRWMD for this award.

Sincerely,

Felipe Melchor
District Manager
Waste Management
Carmel-Marina Corporation
April 16, 2014

The Solid Waste Association of North America (SWANA)
1100 Wayne Avenue Suite 650
Silver Spring, MD 20910

Attn: Recycling & Special Waste Technical Division

RE: 2014 SWANA Excellence Award—Composting Systems:
Monterey Regional Waste Management District

Dear Awards Evaluation Committee Members,

We are pleased to submit this Letter of Support for the Monterey Regional Waste Management District (MRWMD) Excellence Award in the Composting Systems category.

Launched in 2013, and building on decades of organics management, MRWMD’s state-of-the-art small-scale dry fermentation anaerobic digester (AD), is the 1st of its kind to be installed in California and only the 2nd dry fermentation AD in the nation. Converting 5,000 tons per year (TPY) of organic material into renewable biogas capable of generating 100 kW of renewable power and up to 4,400 TPY of pathogen free digestate, the MRWMD’s SmartPerm AD Plant is a pioneering strategy for managing organics with many benefits for our local and global community:

✓ **Increased organics diversion from landfills**, helping to meet CalRecycle’s goal to reduce organic waste disposal in the landfill by 50% by 2020
✓ **Reduced fugitive methane emissions** from landfills, a powerful greenhouse gas 20x more potent than CO2, in line with AB 32 Climate Change Scoping Plan
✓ **Generation of high quality compost**, by blending digestate with bulking organics materials in open windrows for final maturation, curing, screening, blending and preparation for bulk soil amendment
✓ **Generation of renewable biogas** capable of generating 100 kW of energy
✓ **Unique partnership help powers neighboring** Wastewater Treatment Facility in line with Monterey Peninsula Water Pollution Control Agency’s strategic goals
✓ **Creating a replicable model for small-scale and scalable operations** throughout the state and nation, with several additional communities already following suit

In line with our agency’s mission to reduce the footprint of our waste and limit the use of natural resources, we are pleased to see projects like this one move forward within our community to divert waste from landfills, reduce greenhouse gas emission, and generate valuable renewable energy for our community. Projects like these, are paving the way for improved organics management in California in the years to come.

On behalf of Passionfish, we urge you to consider MRWMD for this award.

Sincerely,

Cindy Walter
Vice President