

PROPOSED ANAEROBIC DIGESTION PLANT (ADP)

4388 Santa Fe Road, San Luis Obispo, CA 93401 Δ DRC2015-00122

• FREQUENTLY ASKED QUESTIONS •

PROJECT DESCRIPTION: The proposed anaerobic digestion plant would process organic waste – green and food waste within the Waste Connection service area including: San Simeon, Cambria, Cayucos, Morro Bay, Los Osos, San Luis Obispo, Avila Beach, Pismo Beach, Arroyo Grande, Oceano, Grover Beach, and Nipomo. The project consists of the remodel of an existing 13,128 square foot building, construction of a new 36,000 square foot building, and a new office trailer. The ADP consists of a digester, presswater tank, biofilter, and a combined heat and power unit with an enclosed flare. The ADP process will create compost, compost tea, and biogas that will fuel the plant and provide electricity in coordination with Pacific Gas & Electric.

QUESTION	RESPONSE
1. Who is Hitachi Zosen Inova and what do they do?	<p>HZI is a global market leader in energy from waste that utilizes the Kompogas – a dry anaerobic digestion technology. HZI employs 500 staff in Switzerland, Great Britain, Germany, and in the United States. HZI’s office in the US is in Norcross, Georgia. HZI has a dedicated staff involved in research & development, bio-technology, and operations & maintenance. See www.hz-inova.com</p> <p>While this technology is the first of its kind in the United States, HZI has a proven record with 75 ADPs throughout the world, some in existence for over 20 years.</p>
2. What is the difference between “dry” and “wet” anaerobic digestion?	<p>Both methods turn organic waste into useful biogas and by products. The main difference between the two methods relates to the form of the solid waste. Dry ADs handle waste, as it is, using a simple mechanical sorting and with digestion taking place in its solid form. Wet AD requires that the waste be turned into a homogenous pulp that can be pumped, while being processed. There are distinct advantages that dry ADs have over wet ADs – the feedstock can be any kind of solid organic waste (e.g., green and food waste), flexibility in processing capacity, higher tolerance to impurities, less odor, and the end products of compost, compost tea, and biogas vs. a wet ADPs sludge, compost tea and biogas.</p>
3. Are there other “dry” ADPs in California?	<p>Yes! See the attached chart noting five (5) ADPs in California and related details.</p>
4. Who permits and monitors the ADP?	<ul style="list-style-type: none"> The County of San Luis Obispo is responsible for preparing the environmental determination, issuing the Conditional Use Permit, and monitoring to ensure compliance with the mitigation measures and conditions of approval.

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	<ul style="list-style-type: none"> • The Department of Resources Recycling and Recovery (“CalRecycle”) is the Enforcement Agency for the County and is responsible for providing regulatory oversight of solid waste handling activities, such as ADP facilities, including permitting and inspections. They also reviewed the draft Mitigated Negative Declaration. • The SLO County Air Pollution Control District is responsible for review of the environmental documentation, applications, and issuing Authority to Construct permits that would include the flare and the combined heat and power (CHP) unit. The capacity of the ADP and, specifically the PF 1800 digester, is 33,000 tons per year based upon the following items: <ul style="list-style-type: none"> ▪ The efficiency of the specific digester. ▪ Waste Connections current green waste service area and projections to include food waste, and accounting for population growth over a 20-year period. ▪ The County’s Conditional Use Permit is based upon the noted limitations. ▪ The CalRecycle permit is based upon a limitation of <100 tons per day.
<p>5. What is the capacity of the ADP and how was that determined?</p>	
<p>6. Will there be additional truck trips associated with the ADP?</p>	<p>Waste Connections currently has nine (9) green waste trucks. Two (2) new commercial food waste trucks will be added to the fleet. There will be two new commercial green waste truck drivers and 3- 4 new HZI employees. Two additional trips include trucks that would be picking up finished products – compost and compost tea on a weekly± basis. Given these additions, there will be a total of 36 new daily trips.</p> <p>For reference, the City of San Luis Obispo <i>Transportation Impact Study Guidelines</i> require a traffic study to be performed when a project would generate over 100 peak hour vehicle trips. The project is generating 36 new daily trips that would typically occur outside of the typical weekday 7:00 – 9:00 a.m. and 4:00 – 6:00 p.m. peak periods.</p>
<p>7. What technical safeguards are in place to control odor?</p>	<p>HZI’s proposed ADP incorporates the following features to prevent and control odor:</p> <ul style="list-style-type: none"> ■ Closed System: The processes are totally enclosed in buildings (the reception hall and compost maturation/aerobic stabilization building) or within enclosed equipment or storage facilities (digester, digestate tank). ■ Advanced Doors: Automatic fast operating roll-up doors allow trucks to enter and exit the facility and close immediately upon safe entry or exit. It is anticipated that the doors will be open approximately one (1) minute/entry and/or exit of each truck for a total of approximately 15 - 20 minutes per day. ■ Ventilation/Air Pressure: All the working areas inside the buildings are connected to the exhaust air system that exits through the biofilter. The reception/pre-treatment hall and maturation hall are kept in slight negative pressure, so that inside air won’t escape from the buildings. The combination of ventilation and slight

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	<p>negative pressure act together to ensure that all air is collected in the exhaust air system.</p> <ul style="list-style-type: none">  Humidification: Exhaust air is humidified before it reaches the biofilter, which ensures optimal biofilter function.  Biofilter: Exhaust air is treated in the biofilter, which consists of root wood. Odors in the exhaust air are removed by microbes that live on the root wood. Root wood is changed approximately every 5 years to ensure maximum surface area of the root wood and to minimize root wood compaction.  Odor Impact Minimization Plan: The Plan provides operational information to on-site personnel, includes a monitoring and reporting program, and details the response methodology, should an odor event occur.
<p>8. What is “negative pressure” and what is its function?</p>	<p>Negative pressure is part and parcel to the project’s ventilation system. The ventilation system is designed for an air exchange ratio in each building a minimum of three (3) times per hour. In addition, areas with high odor sources (e.g., the reception hall) will have an area-specific ventilation duct to increase ventilation capacity.</p> <p>Negative pressure allows air to flow into the building, but not escape from it. This is achieved by using a higher ventilation fan capacity (30% greater) than the air flow into the building. The same principal is used in hospitals to prevent cross-contamination. The ventilation system is under constant surveillance by the control system, which is alarmed to alert personnel should a fan not be functioning properly.</p>
<p>9. What are quick close doors and how do they operate?</p>	<p>Quick close doors are high speed roll up doors which open in approximately 6 seconds and close in approximately 8 seconds. These doors are specifically manufactured for safety and security purposes and, in the case of the ADP, severely limits the time the doors to the reception area are open.</p> <p>When the door is open, outside air will flow through the door into the building due to the large opening and back pressure. This is like opening a window in your kitchen when the exhaust fan is on full power – one can feel the “negative pressure”, as the window opens much more easily.</p>
<p>10. Will there be an issue with birds or fruit flies?</p>	<p>Birds and vectors are attracted by untreated organic waste and often observed at open windrow compost facilities. All feedstock for the ADP is deposited in an enclosed building/reception area and processed within approximately 24 hours. Vector populations (flies, rodents, etc.) are kept under control with implementation of best management practices (BMPs) such as enclosing waste storage areas, routine cleaning, insect traps, rodent control services, and chemical treatment, as required. Compliance is enforced via the Lead Enforcement Agency (i.e., CalRecycle) and the SLO County Public Health Services/Environmental Health Services Department.</p>

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	<p>The Federal Aviation Administration (FAA) regulates not only airports, but uses within the Airport Land Use Plan (ALUP). The project was reviewed by the local Airport Land Use Commission and was found to be in conformance with the ALUP. Birds can create hazards due to the project’s proximity to the SLO County Regional Airport. As organic waste, will be deposited and processed in an enclosed building, birds are not anticipated to frequent the project site. Regardless, an application must be lodged with the FAA and a “Not a Hazard to Air Navigation” determination issued for both construction and permanent structure phases of the project.</p>
<p>11. What is the flare and how does it operate?</p>	<p>The flare is intended to operate only during the following times: 1) initial commissioning (start-up) of the facility for less than 90 days; and 2) when the combined heat and power (CHP) unit or upstream equipment are, in a rare occasion, not operational or, during routine maintenance. In this case, biogas is directed to the flare and it is automatically ignited by the pilot flame. When no gas is redirected to the flare it will automatically shut off. The flare is totally enclosed and is reviewed, approved, and permitted by the SLO Air Pollution Control District.</p>
<p>12. Does the ADP burn gas and, if so, what are the emissions?</p>	<p>The combined heat and power (CHP) unit is an engine, regulated by the SLO Air Pollution Control District. It operates using biogas created from the ADP. The biogas is combusted in the engine, while air pollutants (e.g., NOx, CO and VOC) emissions are reduced by a catalyst.</p>
<p>13. What is a biofilter and how does it function?</p>	<p>Biofiltration is an innovative air pollution control technology used in many industrial and commercial applications. A biofilter’s main function is to bring microorganisms into contact with pollutants contained in the air stream. A biofilter is a four-sided box that contains a filter material – root wood which is the substrate for the microorganisms. The microorganisms live in a thin layer of moisture, the “biofilm”, which surrounds the shredded pieces of root wood.</p> <p>The waste air is diffused in the biofilter and adsorbed onto the biofilm. This gives the microorganisms the opportunity to degrade odorous compounds. The biofilter efficiency is greater than 90% for odor and volatile organic compounds.</p> <p>Biofiltration is a slow composting process and the root wood will decompose over time. It will be replaced as soon as the measurable back pressure is too high. The typical lifetime of root wood in the biofilter is approximately 5 years.</p>
<p>14. Regarding noise, how was the 41 dB number calculated?</p>	<p>This number is the Leq measured 100 feet away from a similar ADP in Ottenbach, Switzerland. The measurements were taken at the end of the structure where materials are received. While the Ottenbach structure is approximately half the size of the</p>

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	proposed plant, doubling of the Ottenbach structure would increase the noise level from 41 dB to 44 dB, still well below the County’s established limit for sensitive receptors.
15. Does wind impact noise dispersion?	Wind does affect noise dispersion. Where there is wind, noise will increase at downwind locations and levels will decrease upwind. The difference is marginal at 100 feet. At greater distance the effect become more apparent. However, the increase related to the wind is offset by distance attenuation. ¹
16. Given the proposed ADP’s proximity to the airport, what is the ambient noise level?	The ambient noise level, as represented by the Ldn metric is 75 dB at the location of the ADP. This location, at the end of Runway 29, is one of the noisiest places in the County. If the sound from the ADP is computed for 24 hours and added to the current Ldn, the overall level is increased by .009 decibels, to and Ldn of 75.009.

Attachment - Table - Anaerobic Digestion Plants in California

¹ M.C. Berengier, B. Bauvreau, Blanc-Benon, D. Jus: Outdoor Sound Propagation: A Short Review on Analytical and Numerical Approaches, ACTA Acustica United with Acustica; Vol 89, pp 980-991, 2003

ANAEROBIC DIGESTION PLANTS IN CALIFORNIA

24 OCTOBER 2016

Location/ Project	Address	Owner	Environmental Document	Processing Type	Status
Monterey/ Marina MRWMD Waste to Energy	14201 Del Monte Boulevard Marina, CA 93933 8,000 feet to residential neighborhood	Zero Waste Energy (ZWE) partnered with Monterey Regional Waste Management District (MRWMD)	MND for existing recycling operations (renewal of use permit) with addition of anaerobic plant (pilot program)	DRY. 5,000 tons organic material/ year First US based anaerobic digestion SMARTFERM plant.	Operating (since 2013)
San Jose Zero Waste Energy Development	685 Los Esteros Rd, San Jose, CA 95134 4,000 feet to residential neighborhood and church.	Zero Waste Energy Development Company (GreenWaste Recovery, Zero Waste Energy, and Zanker Road Resource Management)	MND for 270,000 ton per year dry fermentation AD facility. (3) 60,000 SF buildings, incidental office space, biofilters, outdoor space for aerated curing piles, screening and stockpiling finished materials, 6 power and 3 emergency generators on an approximately 41 gross acre site.	DRY. One of the largest dry AD plants in the world.	Operating (since 2013)
S. San Francisco Blue Line Zero Waste Energy (South San Francisco Scavenger Company)	500 E Jamie Ct, South San Francisco, CA 94080 Directly adjacent to Genentech corporate campus	Blue Line Transfer Inc. and South San Francisco Scavenger Co., Zero Waste Energy	MND for 10,000 tons per year (tpy) of food waste and green waste into biogas (gaseous product generated by the degradation of organic matter under anaerobic conditions) that would be cleaned and converted into biogenic compressed natural	DRY. 11,200 tons organic material/ year SMARTFERM plant.	Operating (Since 2015)

			gas (CNG); 56,000 diesel equivalent gallons (dge) per year of CNG.		
American Canyon City of Napa Material Recovery Facility	802 Levitin Way, American Canyon, Napa, CA Directly adjacent to Airport and Southern Pacific Railroad tracks	Napa Recycling and Waste Services	MND for renewal of use permit of recycling and waste services and introduction of new technologies and equipment (Anaerobic Digestion, Biomass Gasification Unit, and Solar Panels)	DRY. Use approved, details of components not available.	Entitlement only, approved 2014.
Perris CR&R Material Recovery and Transfer Station (Green Energy)	1706 Goetz Road, Perris, CA 92570 Residential neighborhoods ±700 feet from AD facility.	CR&R Incorporated	MND for major modification to use permit 83,600 tons/year initial phase to 335,000 ton/year at capacity anaerobic digester and supporting equipment including biofilter and a Renewable Natural Gas (RNG) fueling facility,	DRY. Up to 150 tons per day of organic municipal waste into biogas and compostable material. Eisenmann Corporation system.	Construction nearing completion
San Luis Obispo Anaerobic Digestion Plant	4388 Old Santa Fe Road, CA 93401 ±1500 feet to residence; adjacent to airport.	HZI Kompogas®	MND for Anaerobic Digestion Plant and supporting equipment. 33,000 tons/ year	DRY. HZI Kompogas® system	Pending Board of Supervisors Decision

NOTE: Only the Perris CR&R project is like the HZI Komogas project. The other facilities are “garage” type facilities. (i.e., composting takes place within a “building(s)” versus within an enclosed vessel). The disadvantages of the garage-type digester is that gas-tightness of the opening is difficult to achieve and inoculation is needed for every new batch, thus reducing capacity for fresh feedstock



A. AEROBIZATION TUNNELS



B. PRESS ROOM



C. CRANE & DOSING FEEDER



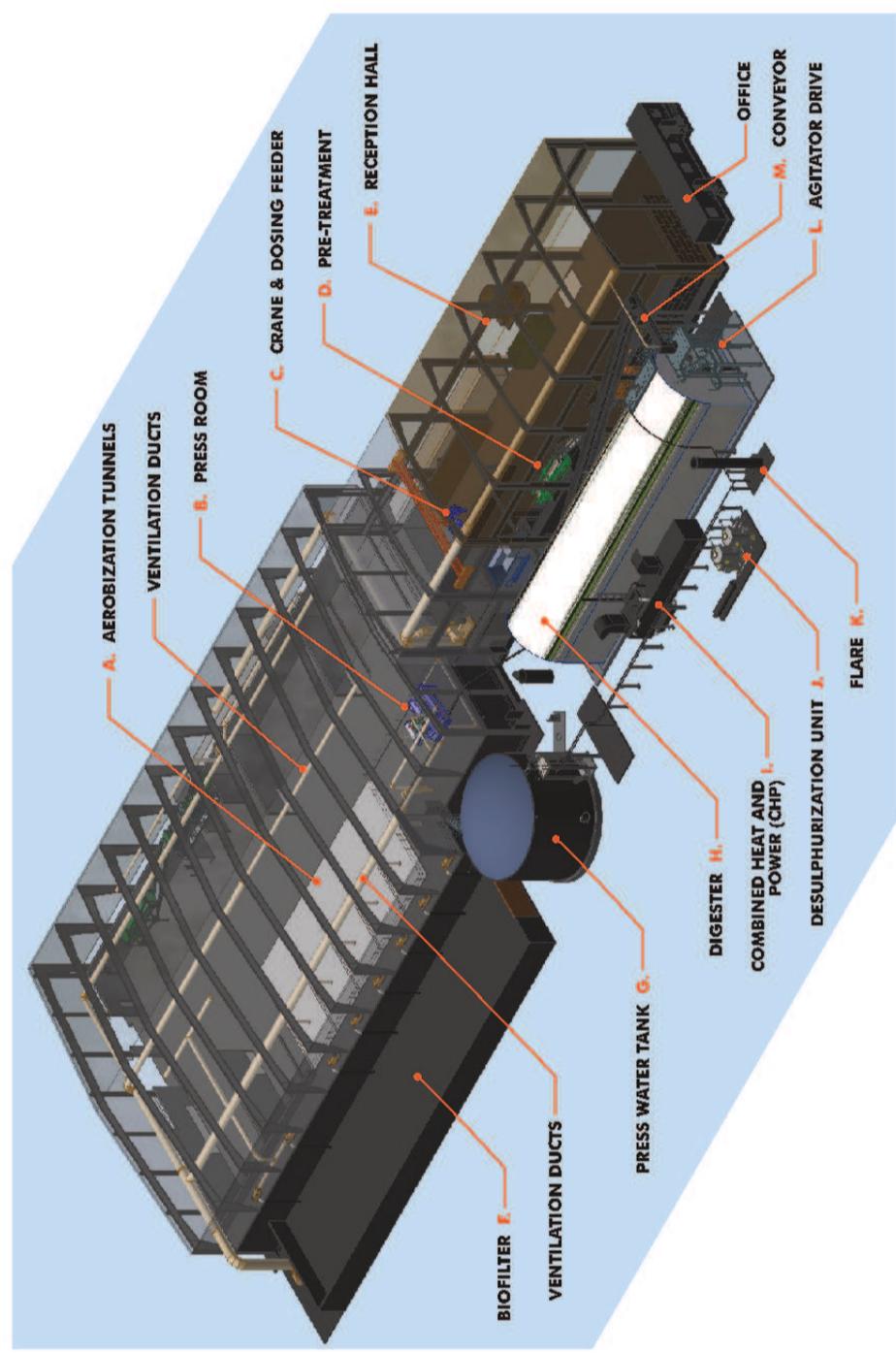
D. PRE-TREATMENT & INTERMEDIATE STORAGE



E. RECEPTION HALL (IN EXISTING BUILDING)



F. BIOFILTER



G. PRESSWATER TANK



H. DIGESTER



I. COMBINED HEAT AND POWER (CHP)



J. DESULPHURIZATION UNIT

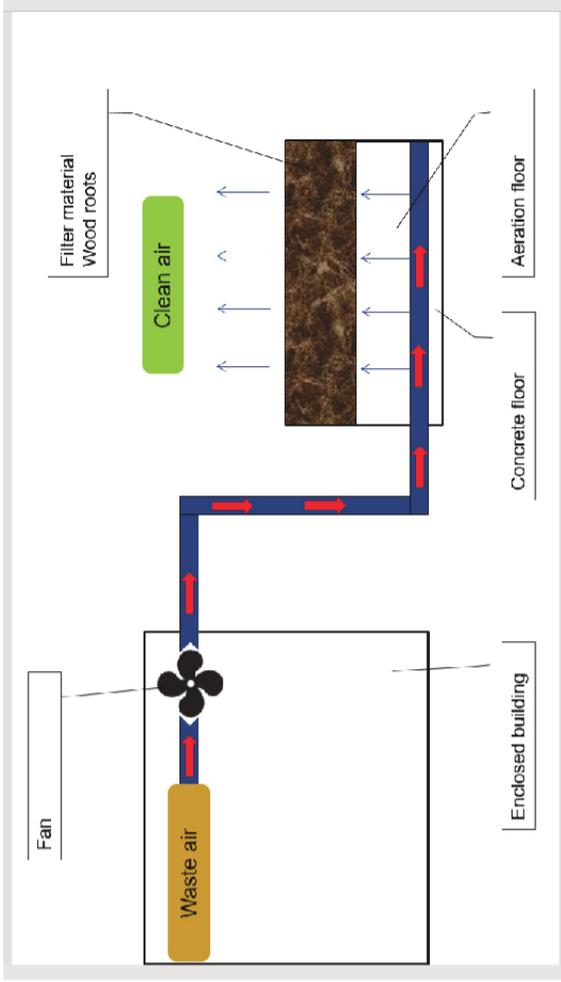


K. FLARE



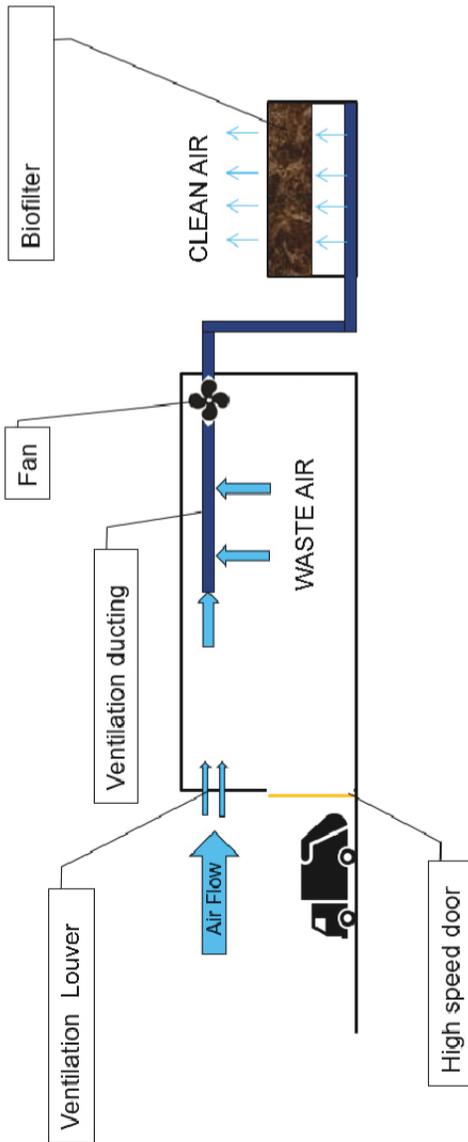
L. AGITATOR DRIVE

M. CONVEYOR



BIOFILTER SYSTEM

- The main function is to bring microorganisms into contact with odorous components contained in an air stream.
- The box that makes up this biofilter contains a filter material, which is the breeding ground for the microorganisms.
- The microorganisms live in a thin layer of moisture, the "biofilm", which surrounds the particles that make up the filter media.
- The waste air is diffused into the biofilter and the odorous air stream slowly moves through the bio-filter and the odorous components are absorbed into the filter media.
- Biofiltration is a slow composting process and the root wood will decompose over time. It will be replaced as soon the measurable back pressure is too high. The lifetime is approx. 5 years.
- Biofilter efficiency: >90% odor and VOC reduction
- No chemical usage
- Also in operation in e.g. waste water treatment plants, agriculture production or food processing plants



NEGATIVE PRESSURE VENTILATION SYSTEM

- Air change ratio in enclosed building min. 3 times per hour
- High odorous sources have a specific ventilation duct
- The negative pressure allows air to flow into the building but not escape from it
- When a door is opened, air from outside will flow through the door instead through the ventilation louvers
- High speed roll up doors keep time of open doors minimal
- Surveillance by the control system



1. STANDARD VENTILATION OPERATION

2. TRUCK ENTERING

3. MATERIAL UNLOADING

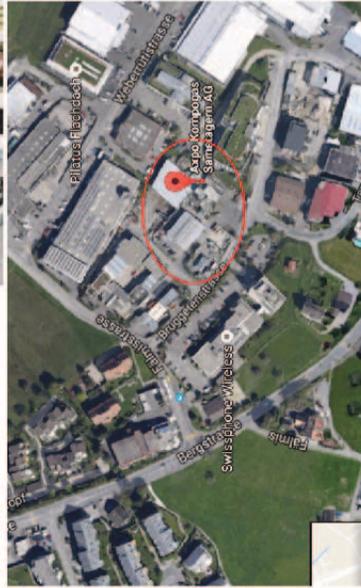
4. TRUCK EXITING

NEGATIVE PRESSURE VENTILATION SYSTEM - TRUCK DELIVERY SEQUENCE

Axpo Komogas Samstagern AG

Located in Samstagern, Switzerland (rural area)

- Year of construction: 1995
- No. of Digesters: 1
- Throughput: 11,000 tons/yr
- Distance to Neighbors: ~300 ft

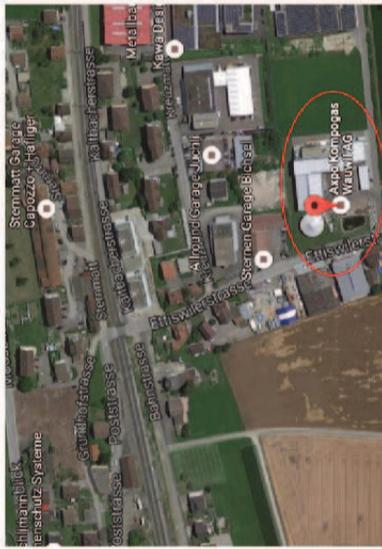


Picture © by Google

Axpo Komogas Wauwil AG

Located in Wauwil, Switzerland (rural area)

- Year of construction: 2011
- No. of Digesters: 1
- Throughput: 22,000 tons/yr
- Distance to Neighbors: ~300 ft



Picture © by Google

Axpo Komogas Winterthur AG

Located in Winterthur, Switzerland

- Year of construction: 2014
- No. of Digesters: 1
- Throughput: 28,000 tons/yr
- Distance to Neighbors: ~1,400 ft



Picture © by Google

Rijsenhout

Located in Rijsenhout, the Netherlands

- Year of construction: 2010
- No. of Digesters: 1
- Throughput: 48,000 tons/yr
- Distance to Neighbors: ~450 ft



Picture © by Google

Wiedag Recycling and Disposal

Located in Ostwil am See, Switzerland (rural area)

- Year of construction: 2001
- No. of Digesters: 1
- Throughput: 18,500 tons/yr
- Distance to Neighbors: ~300 ft



Picture © by Google

Axpo Komogas Oensingen AG

Located in Oensingen, Switzerland

- Year of construction: 2008
- No. of Digesters: 1
- Throughput: 20,000 tons/yr
- Distance to Neighbors: ~2,000 ft

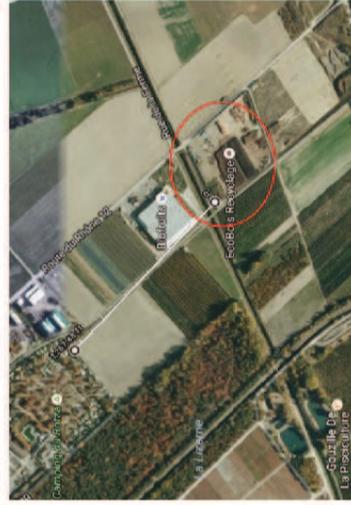


Picture © by Google

Vétroz

Located in Vétroz, Switzerland

- Year of construction: 2014
- No. of Digesters: 1
- Throughput: 22,000 tons/yr
- Distance to Neighbors: ~1,300 ft



Picture © by Google

San Luis Obispo

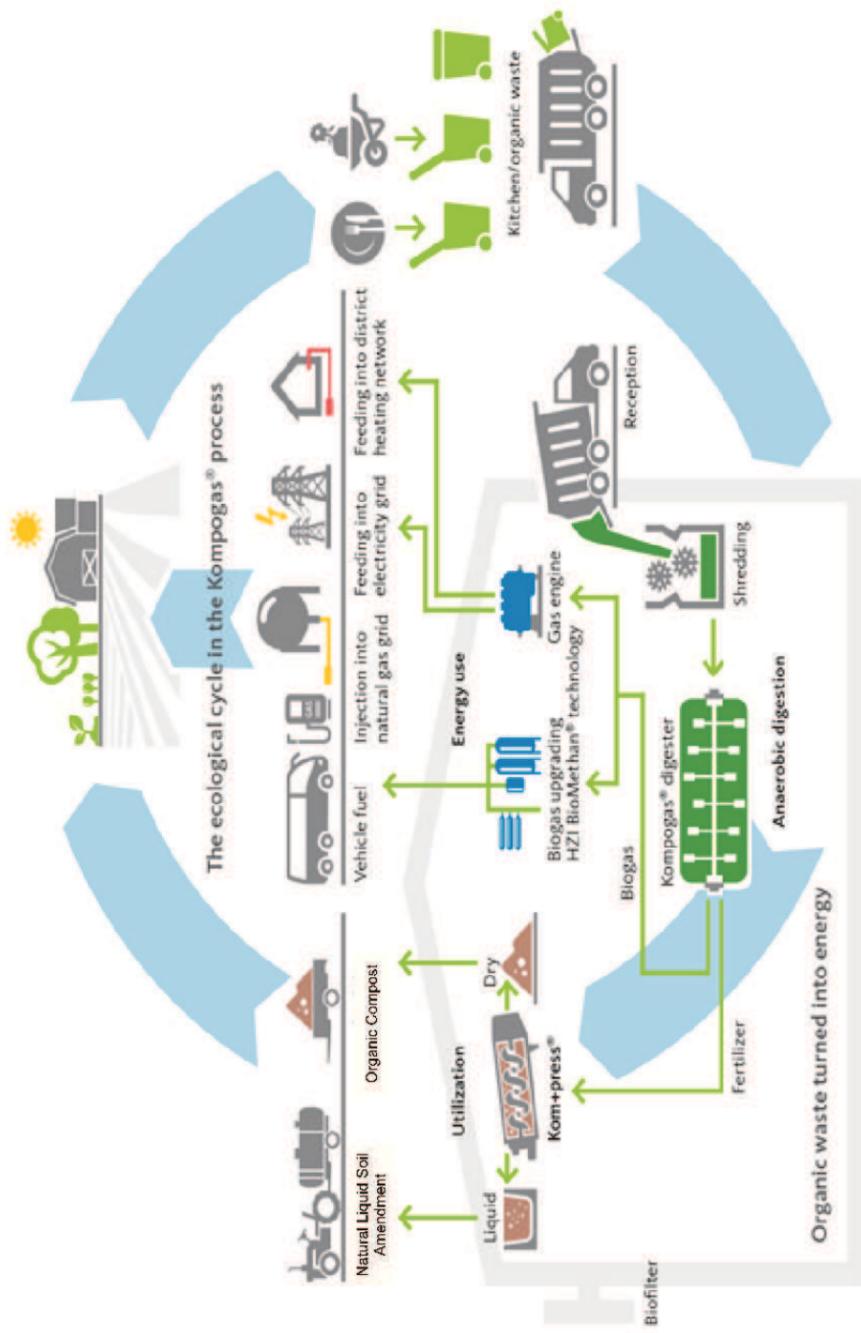
Located in San Luis Obispo, United States of America

- Year of construction: 1st quarter, 2018
- No. of Digesters: 1
- Throughput: 30,000 tons/yr
- Distance to Neighbors: 1,800 ft



Picture © by Google

SUSTAINABLE WASTE MANAGEMENT



WASTE CONNECTIONS, INC.

Hitachi Zosen
INOVA



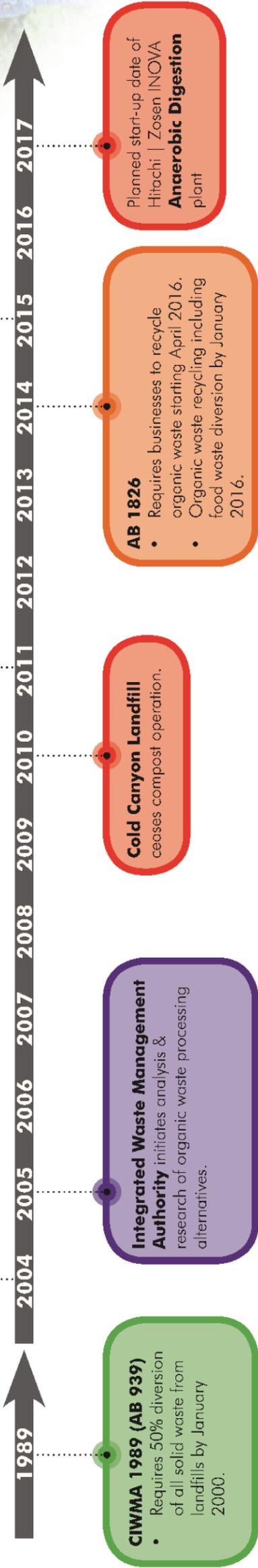
PROJECT LOCATION



PROJECT DATA

GENERAL PROJECT DATA	Land Owner	Waste Connections
	Location	San Luis Obispo, CA
	Start-up date	2017 (planned)
	Objective	Green and Food Waste Management. Renewable Energy Production.
ANAEROBIC DIGESTION PLANT DATA	Design, Builder, Operator	Hitachi Zosen Inova U.S.A. LLC
	Annual Capacity	Up to 27,500 tons per year
	Feedstock	Source segregated organic waste from residential and commercial yard/food waste collection.
	Digester Type	Komogas PFI800
	Electricity	Up to 5.3 million kWh per year
	Compost	Up to 14,000 tons per year
PLANT PRODUCTS	Liquid Fertilizer	Up to 1.6 million gallons per year

TIMELINE



THE RELATIONSHIP



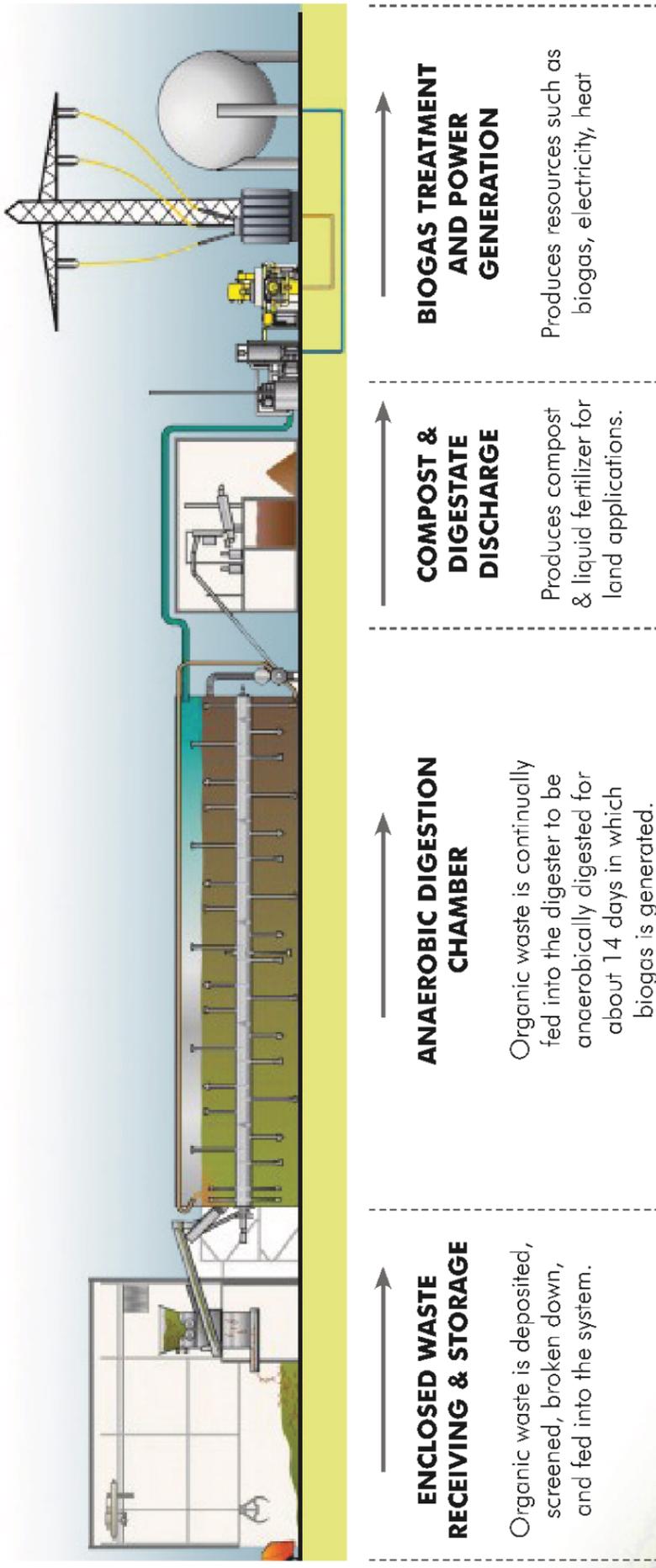
WASTE CONNECTIONS, INC.



- **Property owner/existing building lessor**
- **“Project-ready” site**
- **Organic collection infrastructure**
- **Consolidation of franchises for economy of scale**
- **Protected and lowest consumer rate possible**
- **Design-permit, finance, build and operate**
- **State-of-the-art technology with 75 Kompogas AD plants in 10 countries**
- **20-year commitment to SLO**

ANAEROBIC DIGESTION PROCESS

Section through processing plant



THE BUSINESS SIDE OF THE ORGANIC WASTE STREAM IN SAN LUIS OBISPO COUNTY

City/County/Community Service District

- Control/generate organics
- Obligations under AB 1826
- Existing franchise with Waste Connections at very low rates with restricted profit.

Integrated Waste Management Authority (IWMA)*

Compliance for AB 1826 for lowest possible price

Waste Connections

- Existing organics collection infrastructure
- Existing franchise agreement
- Centrally located permitted site
- Capital equipment contributions (\$3-4 million)
 - Property
 - Existing building
- Operation and Maintenance
 - Minimal lease amount
 - Free residuals disposal
- Minimal capital and operations & maintenance costs for customers
- Secure partial market for Compressed Natural Gas (CNG) sales
- Continued lowest rates for customers
- Annual rate audits

Hitachi Zosen INOVA

- Proven technology for organics conversion
- Facility design
- Facility permitting
- Facility construction
- Facility operations & maintenance
- 100% financing
- Energy (electric and/or fuel)
- Compost and compost tea (digestate)
- Fixed processing costs

Fuel for trucks

Guaranteed 20-year supply of organics

*IWMA is an interagency task force that focuses on garbage, recycling, household hazardous waste and other refuse issues in San Luis Obispo County. Based upon mandatory commercial recycling and organic diversion programs (e.g., AB 1862), the IWMA will be providing assistance (educational, etc.) to businesses to comply with the California mandates.