

BIOCYCLE

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ADVANCING COMPOSTING, ORGANICS RECYCLING & RENEWABLE ENERGY

COMMUNITY SUSTAINABILITY

Village of Wildpoldsried, Germany invests in renewable energy to raise revenues to pay for municipal infrastructure.

WHY COMPOSTERS NEED BIOPLASTICS
COMMERCIAL WASTE DIVERSION • DIGESTER DEVELOPERS TARGET MIXED ORGANICS
EXPOSURE RISKS TO TRACE ORGANIC CHEMICALS • CASE FOR BIOCHAR

CREATING INFRASTRUCTURE FOR COMMERCIAL WASTE DIVERSION



Architect's rendering of ZWED's 100,000 sq. ft. facility that will house the tip floor and sorting area, mixing hall, dry fermentation digesters and composting tunnels.

The City Council in San Jose, California, approves final agreements to initially divert an estimated 75,000 to 90,000 tons/year of preprocessed or source separated organics to anaerobic digestion and composting.

Part II

Nora Goldstein

ON June 21, the San Jose (CA) City Council authorized City staff to negotiate and execute agreements with Zero Waste Energy Development Company (ZWED) and Allied Waste Services of North America (Allied) to provide collection and processing of the city's commercial waste through 15-year contracts. "We are negotiating the final details of both contracts," says Michele Young, Organics Manager for the city's Environmental Services Department (ESD). "The City Council's authorization approved ESD's ability to execute the contracts as long as the contracts haven't changed materially. We've taken this opportunity over the last two months to fine-tune the agreements so they will function optimally."

As covered in Part I ("New Frontier For Commercial Waste In San Jose," May 2011), the City of San Jose is shifting from an open franchise system for its commercial waste management to an exclusive franchise system. Two Requests for Proposals were issued in 2010, one for organics processing and the other for commercial solid waste and recyclable material collection and

processing. ZWED was awarded the organics processing contract, while Allied was awarded the collection and recycling contract. The current recycling rate in the commercial sector is 22 percent. The new contracts are expected to bring the commercial diversion rate up to 80 percent by 2014, which is 5 percent higher than the city's goal of 75 percent diversion by 2013.

The official start date for the new collection and materials processing services is July 1, 2012. Allied has begun its outreach to commercial accounts, ordered new collection vehicles that will operate on compressed natural gas (CNG) and is expanding processing capacity at its materials recovery facility (MRF). ZWED is obtaining the necessary permits required to build its new dry fermentation anaerobic digestion and composting facility; construction is expected to start this fall and it will be the first commercial facility of its kind in the United States.

ORGANICS CONTRACTOR

ZWED is a partnership between GreenWaste Recovery, Inc. (GreenWaste) and Zanker Road Resource Management Ltd. (Zanker). ZWED is the owner/operator of the ZWED anaer-

obic digestion facility and Zanker, a partner of ZWED, is the owner/operator of Z-Best Composting Facility. ZWED's organics processing facility will be sited on approximately 40 acres of a city-owned former landfill site, adjacent to the San Jose/Santa Clara Water Pollution Control Plant and directly between two existing processing operations owned and operated by Zanker. Execution of the lease for the site, known as Nine Par, was approved by City Council at the June 21 meeting and will be executed in August, concurrent with the organics processing agreement.

ZWED conducted extensive studies and environmental review of the site and the project to comply with the California Environmental Quality Act (CEQA). The City of San Jose, as lead agency under CEQA, adopted a mitigated negative declaration that states the ZWED facility "will not cause any unmitigated significant impacts based on the findings of the comprehensive Initial Study completed and provides the environmental clearance required to obtain permits." The mitigated negative declaration was accepted by the San Jose City Council, as well as the Santa Clara City Council. ZWED needs to receive a solid waste facility permit for its operation.

When built out, ZWED's anaerobic digestion (AD) and composting facility will have the capacity to process up to 270,000 tons/year of organic waste. The first phase, which will be ready in the summer of 2012, will be designed to process 75,000 to 90,000 tons/year or approximately 290 tons/day. All processing will take place in an approximately 100,000 square foot enclosed building that houses a receiving area for feedstock material delivery and storage, a large hall for staging, mixing and moving materials, 16 digesters, an engine room with two combined heat and power units (2G Cenergy), and eight in-vessel composting tunnels. The entire building will be equipped with an air circulation and control system, with exhaust air treated through a biofilter. ZWED is installing Kompoferm dry fermentation digesters manufactured by Eggersmann Anlagenbau. Zero Waste Energy, LLC is the licensee of the technology in the U.S., and is supplying the system to ZWED. The IVC Plus in-vessel composting technology is also a proprietary and licensed system from Eggersmann.

CONTAMINANT LEVELS AND TIP FEES

The final contracts negotiated with ZWED and Allied established four levels of contamination in the "Organic Material Delivered by the Commercial Collection Franchisee (CCF)." The tipping fee rises according to the level of

contamination in the "organics stream" loads delivered. Prohibited materials, including sludge, oversized lumber, and hazardous wastes such as biohazardous materials, electronics, and vehicle parts, are not allowed in any of the four streams.

Contamination levels (by weight) are divided as follows: Level 1 — no more than 5 percent; Level 2 — greater than 5 percent and no more than 10 percent; Level 3 — greater than 10 percent and no more than 20 percent; and Level 4 — greater than 20 percent and no more than 30 percent. Beginning January 1,



2013, ZWED is required to achieve a diversion standard of not less than 90 percent for Organic Stream 1, 85 percent for Organic Stream 2, 75 percent for Organic Stream 3, and 65 percent for Organic Stream 4 per calendar year. Although contamination levels are defined by weight, the classification of material by organic stream entering the processing facility will be based on a visual assessment that is periodically calibrated to confirm the relative volume of materials.

ZWED retains the right to reject any incoming load determined to contain more than 30 percent contamination, any load containing more than 30 percent paper and/or fiber materials, and any load containing more than 0.25 percent glass. Upon receipt of one of these loads, ZWED will notify Allied that it intends to classify the load as "rejected," and will either charge Allied a reloading fee and require the load be

picked up for further processing to meet the Organics Streams' specifications or, depending on the level and type of contamination, ZWED may offer Allied the option to have ZWED process the load. ZWED would then have the option to process the rejected load at its AD facility or transfer the load for processing at Z-Best by either transferring it to the GreenWaste MRF for transfer to Z-Best or direct hauling the load to Z-Best. Allied would be charged the current rate for Organic Stream 4 and a reloading fee if the load was transferred to Z-Best.

Z-Best Composting is a sister company of ZWED that operates a mixed organics windrow facility. The site has the capacity to process organics from San Jose if needed during the start-up period of the digester.

After the collection or transfer vehicle is weighed, the scale house operator will categorize the load using material codes in the scale system to ensure the correct Organic Stream is entered. Upon unloading material in the tipping area, loads will be visually inspected by ZWED's trained load check personnel in the presence of the Allied driver. If an Organic Stream has a higher or lower contamination level than originally attributed to that load at the scale house, the load checker will communicate with the scale house operator to correct the gate tag to specify the correct Organic Stream, ensuring the proper categories are allocated and Al-

lied is charged correctly.

During the first year of operation, ZWED has invited Allied to have a full-time employee participate in the load check program to ensure both parties are in agreement on the load classification process which includes the translation of a volume-based visual assessment to a contamination rate and then an organic stream classification to use for invoicing purposes. ZWED will provide Allied ongoing feedback so a determination can be made by Allied on whether the collection accounts are routed correctly. Allied is required to deliver materials to ZWED that meet the Organic Streams specifications, so feedback from ZWED will allow Allied to adapt routes based on the organic materials collected and ensure loads that need to be preprocessed are directed to Allied's processing facility before being transferred to ZWED or loads that can be direct hauled to ZWED are direct hauled.



The size and quality of the material entering ZWED's AD facility will determine whether it will be loaded directly into the digesters, processed and then loaded into the digesters or bypass the digesters altogether and be placed directly into the composting tunnels for processing. "The biggest unknown in moving from the nonexclusive franchise system to an exclusive franchise is uncertainty about the quantity and quality of materials that actually exist in San Jose's commercial sector," says Emily Hanson of ZWED. "Waste composition studies of the whole commercial sector waste stream have been conducted, but those are only snapshots and they do not represent enhanced collection programs that will be offered by Allied. If Allied's clean collection programs and wet material processing can achieve the same results as similar programs that have been designed and implemented by ZWED member company GreenWaste, we expect a large percentage of the organic materials collected to be loaded directly into digesters without the need for additional preprocessing by ZWED."

Because of multiple unknowns, including number of accounts to be serviced, material types to be collected and their tonnages, contingencies have been built into both contractors' agreements for the first six months of program operations. For example, Allied has a waiver for meeting the diversion requirement in the first six months while the material is being tested, and ZWED has greater flexibility to utilize its Z-Best composting facility during the six-month start-up period than for the remainder of its contract. Z-Best has the capacity to process the total tonnage from San Jose's commercial organics streams without modifications or expansion and guarantees that contingency processing capacity will be available at Z-Best if needed starting on July 1, 2012.

During lengthy negotiations with the contractors and ESD, it was agreed that the highest use for the commercial stream materials is recycling, followed by digestion and composting. The goal, says Hanson, is to keep the paper fraction clean during collection so it can be recycled, versus having it become soiled during collection — making it a compostable material versus an organic material to be processed by the digesters. "We have a restriction on the percent by weight of the paper accepted in each load because paper has little to no BTU value and would occupy valuable space in the digesters," she explains. "Restrictions are also designed to incentivize Allied to focus on clean col-



Allied operates a materials recovery facility for single stream residential and commercial recyclables at its Newby Island Resource Recovery Park. The company is installing a wet processing line to sort loads that do not meet the Organics Stream specifications.

lection. If incoming loads have higher than 30 percent by weight paper and/or fiber content, they will be considered rejected loads and if Allied does not exercise their option to pick up and further process the material to meet the Organics Streams specifications, then ZWED has the flexibility to bypass the digesters and direct those loads to the composting section of our facility.”

Allied’s plan is to create collection routes for materials that are high in organics and low in contamination, e.g., restaurants and grocery stores. Those collection vehicles can go directly to ZWED’s facility. Routes collecting materials with a high level of organics but also a higher level of contamination will be delivered to Allied’s Newby Island Resource Recovery Park (Newby) in San Jose. The 340-plus acre site includes a large materials recovery and recyclables processing facility (commercial and residential), a composting facility for yard trimmings and food waste that has close to 1,000 tons/day of peak capacity and a landfill. “Our objective is to source material that is adequate for ZWED to receive directly,” says Gil Chesó, General Manager of Allied of Santa Clara County. “However, we will have cutting edge processing technology with the capacity to recover food and food-contaminated paper from the commercial materials collected and deliver that to ZWED after preprocessing on our sort lines.”

ORGANICS PROCESSING

Loads that are delivered to the ZWED facility and require removal of

contaminants will be processed via a combination and sequence of manual and mechanized equipment designed and adapted to the organic streams being delivered. While the processing equipment may change, the goal of additional processing is to gain access to materials, separate them by size and type and reduce the size to ensure proper digestion occurs.

Front-end loaders will fill each digester until it is loaded to its capacity of approximately 220 tons for each batch. Once filled, the anaerobic digestion process is initiated and continues for up to 21 days. After digestion, material is moved into the composting tunnels and may be mixed with wood chips (or other suitable bulking material) prior to placement in the composting tunnel to maintain proper moisture and allow effective airflow. The composting tunnels have an aerated bed. Material remains in the composting tunnels for up to 21 days, after which the compost will be moved outside for curing in large aerated static piles for up to four weeks. After curing, compost will be screened and stockpiled for sale as soil amendments. Overs from the screening operation may be reused as a bulking material in the digestion and composting process, or as mulch or hog fuel. Biogas will be combusted in the CHP units, with electricity used at the ZWED and Zanker facilities on site, or sent to the PG&E electrical grid through a power purchase agreement to be negotiated with the utility.

COMMERCIAL COLLECTION AND RECYCLING

Allied’s contract with the City of San Jose encompasses “the collection, processing, transfer, and disposal of solid waste, mixed waste, source separated recyclables and recyclable material from commercial premises; and the collection, preprocessing and transfer of organic material to the organic pro-

cessing contractor.” Allied’s processing portion of the contract (not including the organics collected and brought to ZWED) covers an estimated 220,000 to 250,000 tons/year of commercial recyclables and waste. There are about 9,500 commercial customers in the city.

Allied will preprocess materials containing more than 20 percent contamination prior to delivery to ZWED. Beginning January 1, 2013, Allied must divert, from its disposal facility, “a minimum of 75 percent by weight of the total weight of material collected from commercial premises,” states the agreement negotiated with ESD. “Beginning January 1, 2014, franchisee shall divert from the disposal facility a minimum of 80 percent by weight of the total combined weight of material collected from commercial premises.”

Allied is working with ESD to determine the top three to five customer outreach and education messages, define goals for technical assistance, design program services, develop web-based systems, and observe and provide feedback on customer communications. “We will be going to business associations and sponsoring events in conjunction with the San Jose Chamber of Commerce to start working with their members who are our customers,” says Chesó. “Our outreach and public education will increase starting in October.”

On the infrastructure side, Allied will install a CNG fueling station at Newby Island, establish routing and mapping, hire and train drivers and upgrade its materials processing lines. “We will be converting our fleets to CNG and will consider adding fueling stations to expand the reach of our fleet,” he adds. “Our waste and recycling trucks can provide a critical public health service while they are managing the waste streams.”

Allied and its consultant, Cascadia Consulting, are evaluating the number

of and types of collection bins to offer to commercial customers. "There are certain businesses such as offices that will need only one bin because most of their waste will be dry recyclables," explains Cheso. "We will ask those customers to put their 'wet' materials inside a clear plastic bag so they will be easier to see and easier to pull out for processing. Businesses that create higher volumes of wet or food-based materials would have more than one bin in most cases. A lot is still to be determined as we start outreach with our customers."

Allied and Cascadia are referring to the two bin separation as the "One-Bin Plus" option. In the beginning, Cheso expects that more loads from the One-Bin Plus collection will go to Newby Island for sorting instead of directly to ZWED. "But the goal is to educate all 'Plus' customers so that there can be more direct haul to ZWED with minimal residuals — and definitely no glass!"

In the event that Allied determines through waste and material characterizations and route audits that excessive glass (>0.25 percent/load) is found after customer education is performed, and the glass cannot be removed by preprocessing, ESD has allowed Allied to apply a graduated glass contamination surcharge directly to commercial waste customers, beginning at 10 percent of the monthly service charge. That surcharge can be increased in 10 percent increments by 10 percent, but no more than a total of 50 percent, for each successive quarter that it continues.

Loads collected by Allied that do not meet the Organic Stream specifications will be preprocessed at Newby. The wet organic processing consists of a front-end system for cleaning/removal of contaminants to meet the specifications. The difference in management of the dry and wet material streams will be the level of effort required on the front end to remove the varying levels of contaminants. The wet processing line is a subset of the dry processing line and is accessible from the dry line. There also will be a direct infeed.

All materials loaded on the wet processing line will pass through a bag breaker; contents are dropped back on the incline belt. Further, any wet recyclables-rich bags on the dry processing lines will be identified by sorters and redirected to the wet line. By breaking bags on the wet line instead of the dry line, devaluation of high value paper fiber to compost is minimized. Any dry recyclables, other than glass, are transferred to the dry line via a dedicated conveyor which deposits the material prior to the dry line presort.

Allied has to remit the organic processing fee portion of the customer rates to the city, which will be paying

ZWED directly for organics processing. Allied retains all revenues, including California Redemption/Refund Value ("CRV") and beverage container processing fees, from the sale of material recovered through the processing of commercial sector materials collected under the agreement with ESD. All residue resulting from the processing of materials collected under Allied's agreement, as well as the residue from ZWED processed under agreement, will be disposed of at Newby. No materials are allowed to be

direct hauled for disposal without written approval from the city.

The scale and scope of the City of San Jose's new commercial waste collection program — especially its goal of 80 percent diversion by 2014 — in and of itself warrants in-depth coverage. But the fact that this program includes the first large-scale dry fermentation digester for organics from the municipal solid waste stream in the United States makes all the players involved pioneers in raising the bar on organics recycling. ■

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