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# **Food Waste Co-Digestion at Los Angeles County Sanitation Districts (CA)**

## Business Case Analysis Case Study

## Glossary

CNG	Compressed natural gas
EBS®	Engineered BioSlurry (Waste Management)
ISO	Independent system operator
LCFS	Low Carbon Fuel Standard
LWDS	Liquid waste disposal station
kW, MW	Kilowatt, megawatt
mgd	Million gallons per day
MRF	Material recovery facility
O&M	Operations and maintenance
RINs	Renewable Identification Numbers (U.S. Renewable Fuel Standard)
RNG	Renewable natural gas
scfm	Standard cubic feet per minute
SRF	Slurry receiving facility
tpd	Tons per day
WRRF	Water resource recovery facility

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Cover photo is an aerial view of the Joint Water Pollution Control Plant, LACSD, courtesy of LACSD. Cover design by Evan Odoms.

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# Joint Water Pollution Control Plant (JWPCP) Los Angeles County Sanitation Districts (LACSD), California

## About the Utility

- Service area: covers 820 square miles, including 78 cities and unincorporated areas (covering about half the population of Los Angeles County)
- Wastewater facilities include: 10 wastewater treatment plants, 1 pollution control plant that discharges to the ocean
- Solid waste facilities include: 2 operating sanitary landfills, 4 closed landfills, 3 materials recovery facility/transfer stations
- Operating since: 1928
- Employees: 1,675
- Governance: governing board with members from the 24 independent special districts in LACSD, working cooperatively under a joint administration agreement

## About the WRRF

- Location: Carson, CA
- Size: 400 mgd permitted; average daily flow is 280 mgd
- Wastewater customers served: ~3.5 million
- Employees: 360
- Anaerobic digesters: 24 3.7-mg mesophilic digesters
- Food waste feedstock sources: slurried food scraps from LACSD's Puente Hills Material Recovery Facility (MRF) and eight other suppliers
- Food waste as share of total feedstocks: demonstration project and design for full implementation: 9% by liquid volume, 30% by solid weight (for Waste Management demonstration project, 1 digester accepted food waste; in full implementation, 5 digesters will accept food waste)
- Feedstock preprocessing: food scrap slurry providers preprocess food scraps in their facilities; at JWPCP, the slurries directly enter storage tanks before being fed to the digesters
- Electricity: the utility purchases electricity through the Districts' Direct Access program at \$114/MWh, and sells electricity on the spot market to the California Independent System Operator (ISO) grid via an interconnection agreement with Southern California Edison
- Biogas end use: Phase I (current): onsite electricity and heat generation (three 9.9-MW turbines) for internal use, and for electricity sales to the grid; and compressed natural gas (CNG) production for onsite vehicle fuel station; Phase II (future): renewable natural gas (RNG) for pipeline injection or additional electricity production
- Energy neutrality: before full co-digestion program implementation: 95-100%; following implementation: ~130%
- Biosolids management: in 2020, 70% of biosolids to land application and composting (including Class A sites in California, 4-5 Class A EQ composting sites in California, 2 of which are LACSD-owned, and 1 Class B land application site in Arizona); 30% to landfill for disposal

## Drivers and Goals

- Drivers: California Global Warming Solutions Act AB 32; California Mandatory Commercial Organics Recycling Law AB 1826; California Mandatory Commercial Recycling Law AB 341; CA Low

Carbon Fuel Standard; US Renewable Fuel Standard; South Coast Air Quality Management District 1191 Vehicle Fleet Rules; future enforcement of Short-Lived Climate Pollutants SB 1383

- Goals: provide food scrap diversion option for local haulers, convert waste into renewable energy and soil amendments

## Summary

Los Angeles County Sanitation Districts (LACSD), a regional agency that operates under a Joint Administration Agreement with 24 special districts in the county, oversees wastewater treatment as well as solid waste disposal and recycling. (In the solid waste arena, the agency is responsible for solid waste disposal and recycling facilities; the local governments and the LA County Department of Public Works are responsible for solid waste collections.) The utility's mission statement includes converting waste into resources: it has been creating electricity from biogas since the 1940s and reclaiming water for re-use since the 1960s. LACSD's flagship wastewater resource recovery facility (WRRF), the Joint Water Pollution Control Plant (JWPCP), is one of the largest in the United States, processing an average of 280 mgd. LACSD's Energy Recovery Engineering Section in its Solid Waste Management Department formed in the 1990s. Initially focused on promoting energy efficiency and energy recovery from landfill gas to generate electricity, the section activities have expanded to include energy recovery from co-digestion.

The extensive set of California state policies supporting greenhouse gas mitigation, renewable energy development, and food waste diversion has spurred investments to enable co-digestion at JWPCP and to expand energy production from the resulting biogas. To provide haulers in the county with an affordable option for food scrap diversion and to increase renewable energy production, LACSD's Energy Recovery team has led the utility's effort over the last decade to explore the potential of co-digestion at the plant. A sequence of studies culminated in a 4-year demonstration project (2014-2018) with Waste Management's Engineered BioSlurry (EBS®) feedstock, produced from its patented CORE® process. The agency also has been evaluating a range of options for creating value from the biogas.

Following the success of the demonstration project, LACSD recently initiated a very large-scale co-digestion program, and Phase I of an energy strategy for the additional biogas. LACSD is developing a diversified set of sources for food scrap slurries from private sector suppliers, as well as from its own food scrap preprocessing facility installed at its Puente Hills Materials Recovery Facility in 2018.

In February 2019, the utility paused the food waste receiving station to re-evaluate options to reduce costs and to allow market demand to develop further. In 2020, it installed the first of two redesigned slurry receiving facilities, sized to accept 166 tons per day (tpd) of food scrap slurry – enough for 2 digesters. A second slurry receiving facility with capacity to receive 249 tpd – enough for 3 digesters – is in construction, expected to begin operating by summer 2021. In addition to its 415 tpd digester capacity, JWPCP can feed 200 tpd of food waste at its headworks. In the week ending Feb. 13, 2021, JWPCP received 221 tpd of slurry from diverted food scraps, and deliveries were gradually shifting from the headworks to the new receiving facility to enter the digester directly. LACSD expects a slow increase in food scrap feedstocks leading up to full enforcement of generator recycling requirements in 2024.

In Phase I of its energy strategy, the WRRF is producing more than enough electricity to meet plant needs most of the time and sells the excess on the spot market; it is also producing CNG for direct sales at the public fueling station on JWPCP property and for use by the utility vehicle fleet. LACSD is still evaluating options for Phase II of the energy project, including pipeline injection of biomethane and production of additional electricity to sell to the grid.

## Project 1: Experimentation with Organic Feedstocks

California's ambitious solid waste diversion goals set out in AB 341 prompted LACSD to conduct a feasibility study of co-digestion in 2011. The study found that co-digestion was technically feasible, allowed under the current regulations, and could help LA County – as well as local cities and private haulers – meet pending diversion requirements, but it cautioned that further information was needed to project the economics of the project.

### Feedstock Strategy

#### **Bench Scale Study with Waste Management**

At the same time that LACSD was looking into co-digestion, Waste Management (WM) was developing its food scraps management technology. In 2012, JWPCP conducted a bench scale study of co-digestion using WM's EBS® as a feedstock. No negative impacts on digester operations were observed. In the bench scale study, LACSD was able to characterize the slurry and quantify the biogas production potential from the added food waste. Further, they developed their specifications for food scrap feedstocks and determined a target feed rate for co-digestion.

#### **Demonstration Project with Waste Management**

Building from the bench scale studies, JWPCP began a four-year demonstration project with WM to assess whether co-digestion at a large scale could provide a viable and economically feasible option for landfill diversion for commercial establishments in local communities. The goal was to provide an affordable disposal option for organic waste, so that small- to medium-size hauling companies could remain competitive in the organic waste disposal market.

At their Organics Recycling Facility in the City of Orange, approximately 30 miles from the Carson plant, WM takes in commercial food scrap collections, expired produce and prepackaged food products, and off-spec and expired soda products, and then removes packaging and other contaminants and grinds them into smaller pieces and blends them to form a slurry. Starting in 2014, WM began delivering 20,000 gallons of EBS® per day to the JWPCP. During the demonstration project, the plant fed slurry to only one of its 24 digesters, with four digesters serving as controls. Over time, WM increased the amount of slurry hauled to the plant up to 100,000 gallons (83 tons) per day, which has the potential to produce an additional 800 kW of electricity.

In January 2018, WM and LACSD ended the demonstration project and signed an interim agreement to increase food waste deliveries, in anticipation of signing a long-term agreement that would start after the LACSD installed a new slurry receiving station.

#### **Other Private Hauler Food Scrap Deliveries**

During this period, JWPCP was also testing slurries from other private suppliers at its digesters. All food waste slurries are entering the plant through the headworks until a new slurry receiving station is built.

### Project Impacts and Risk Management

#### **Operational Impacts**

##### ***Receiving Station and Digester Impacts***

The co-digestion demonstration project had no significant negative impacts on digester performance. The plant staff members have observed increased debris, which will have to be removed during digester cleaning. To control odors, the plant pumps the food waste from WM tanker trucks into closed, sealed storage tanks and has installed activated carbon canisters.

The demonstration project also highlighted the need to streamline the offloading process and the need to plan for increased traffic with the expansion of the co-digestion program.

### ***Regulatory Compliance***

The co-digestion demonstration project had no impact on regulatory compliance with air and water permits. Because the facility is in a non-attainment area for ozone, particulate matter (PM<sub>10</sub>), and fine particulate matter (PM<sub>2.5</sub>), the facility routinely conducts source monitoring to ensure compliance.

### ***Biogas Impacts***

With the addition of 83 tpd of EBS® to one digester, biogas production was estimated to increase sufficiently to yield an additional 800 kW in annual electricity generation.

### ***Biosolids Impacts***

No impact was detected in plant-wide biosolids production. (However, the impact of co-digestion in one digester out of 24 would be hard to detect given natural variations.)

### **Financial Impacts**

#### ***Costs***

Participation in the demonstration was self-funded by WM and JWPCP. JWPCP spent \$2 million on installing a food scrap slurry receiving station, operating the system, conducting laboratory analysis, and conducting research and other engineering analysis. (For reference, JWPCP's FY2017 operating expenses were around \$250 million.) WM covered costs associated with procurement of the temporary receiving station and distribution piping, as well as for receiving station operations and maintenance (O&M), which mainly involved replacing the pumps periodically.

JWPCP costs for receiving station O&M and for managing the additional biosolids during the demonstration project were estimated to be around \$17 per ton of food scraps delivered at 14% total solids (TS). In addition, \$250,000 was spent on disposal costs for the undigested food waste inerts.

#### ***Revenues***

In the demonstration project, LACSD charged WM \$10 per ton of food slurry in tipping fees, which partially covered the additional operating costs of the demonstration project associated with accepting food waste. The plant, with a maximum design capacity of approximately 35 MW of electricity, typically generated during this period about 20 MW of power for onsite uses, including electricity and heat for the digesters. The plant goal is to continuously export at least 200 kW in order to minimize the risk of utility grid disruptions that could knock the plant offline and impair operations. Because power plant biogas output varies with digester gas availability, at times natural gas is purchased for co-firing with digester gas in order to maintain the target level of export. The WRRF sells to the California ISO grid via an interconnection agreement with Southern California Edison. It sells to third parties on the unscheduled market due to unpredictable fluctuations in biogas production.

The additional biogas from the demonstration produced 800 kW of electricity, which represents an additional \$260,000 per year in revenue.

## **Project 2: Full Implementation of Co-Digestion and Energy Program**

Given the success of the Waste Management demonstration project and increased feedstock availability due to the 2014 commercial organics recycling mandate (AB 1826), LACSD has begun implementing a full-scale co-digestion project. The two key elements are what will ultimately be a very large-scale co-digestion program (with capacity up to 615 tpd of food waste feedstocks), and two phases of energy investments to create value from the additional biogas. In Phase I, the utility is allocating the first tranche of additional biogas to producing renewable vehicle fuel. The utility is still evaluating options for Phase II, including pipeline injection of renewable natural gas or increased generation of electricity to sell to the grid.

Considerations include the future dynamics of the feedstock supply as enforcement of California’s SB 1383 is activated, and of energy market prices and subsidies for renewable vehicle fuels.

As part of its project to expand co-digestion at JWPCP and to implement Phase I of its Energy Program, the utility planned a number of capital investments:

- construction of a food waste receiving station, including food waste receiving and storage tanks and associated pipelines and connections to existing digesters;
- construction of biogas pipelines within JWPCP to convey additional digester gas to the flares and to the on-site power generation facility;
- construction of a biogas conditioning system for production of RNG for vehicle fuel at the CNG fueling station at JWPCP;
- construction of new backup flares to destroy additional biogas generated by food waste; and
- expansion of the capacity at the CNG fueling station, with two additional islands and new driveways.

In February 2019, the utility paused the item with the largest initial cost estimate, the food waste receiving station, to re-evaluate options to reduce costs and to allow market demand to develop further. In 2020, it installed the first of two redesigned slurry receiving facilities (SRFs), sized to accept 166 tpd of food scrap slurry – enough for 2 digesters. A second SRF with capacity to receive 249 tpd – enough for 3 digesters – is in construction, and is expected to begin operating in summer 2021.



**Figure 1. JWPCP’s first slurry receiving station has two offloading stations, each with two storage tanks.**  
Source: LACSD.

Construction of the biogas pipelines and conditioning system has been completed, and design of the backup flares is in process. A request for proposals will be issued for the expansion of the CNG fueling station in February 2021.

The other critical investment made for the project is a new preprocessing facility at LACSD’s Puente Hills Materials Recovery Facility (MRF) where LACSD can create food scrap slurries in-house. The facility opened for food scrap deliveries in April 2018.

## Feedstock Strategy

### Managing Risks

The plan is to phase in over time the expansion of food waste feedstocks from 83 tpd during the demonstration project to 615 tpd, and of co-digestion in one digester during the demonstration project to five digesters. In order to process the associated increase in feedstocks, LACSD is adding two new SRFs that can accommodate a total of 415 tpd of food slurry. It also will increase loadings at the plant's liquid waste disposal station (LWDS) by an additional 200 wet tpd of waste from food and beverage manufacturing and fats, oils, and grease from restaurants and commercial establishments.

No physical improvements are required to accommodate the expanded deliveries of liquid wastes. The new food scrap slurry receiving stations include an odor control system to remove odors vacated from the head space of the food waste slurry storage tanks. Maintenance for the new food scrap SRF will be done by treatment plant personnel.

### Sourcing Food Scrap Feedstocks

The feedstock strategy is for a diversified set of private solid waste firms, as well as in-house production at the Puente Hills MRF, to supply the WRRF with food waste slurry derived from pre- and post-consumer commercial food waste.

LACSD currently has one-year contracts, with no quantity minimums, with 8 providers who deliver a variety of food scrap slurry feedstocks. They test every load for pH and conductivity, and they will collect samples from random loads to send to the laboratory to test for other parameters, including total suspended solids (TSS) and total volatile solids (TVS).

The plant is currently in "testing mode" for co-digestion of new feedstocks with the new equipment. Deliveries are gradually being shifted from entering the headworks through the LWDS, to entering the digester directly from the new SRF. The quantity of slurry delivered and the share entering through the SRF are highly variable from week to week. In the week ending Feb. 13, 2021, JWPCP received 221 tpd of slurry from diverted food scraps, of which 6% entered the digester directly through the SRF.

In 2021, LACSD is planning to negotiate multi-year contracts with put-or-pay provisions, specifications for quality parameters and testing requirements, and a tipping fee that is tiered based on quantity supplied and quality. The tip fees will be set in order to cover the costs of feedstock operations and maintenance costs, testing, biosolids management costs, and capital recovery.

To complement private sources, LACSD has developed in-house capacity to create food scrap slurries at its Puente Hills MRF. Mark McDannel, Manager of the Energy Recovery Section, explained that — in addition to diversifying supply sources — another motivation for this investment is to ensure that small- and medium-size haulers have a reasonably priced recycling option for their source-separated food scrap collections. He observed that large solid waste companies either have developed, or are contemplating plans to develop, their own preprocessing capability.

The Puente Hills MRF charges haulers a tipping fee of \$70/ton to deliver food scraps, substantially in excess of landfill fees in the area of around \$35-40/ton. To provide incentives to generators and haulers to recycle their food scraps, the LA County Department of Public Works, a separate agency that is responsible for collections in the unincorporated areas of the County, provides rebates of \$60/ton to haulers of food waste diverted from commercial business in its service area. For haulers to be eligible to receive the rebate incentive, the food scraps must be delivered to the Puente Hills MRF and meet acceptable contamination requirements.



After a short ramp-up period following the opening of the preprocessing facility in April 2018, the Puente Hills MRF has received a steady supply of about 30 tpd of source-separated food scraps collected by independent haulers. At full implementation, the facility aims to have supply to fill its capacity of 165 tpd of diverted food scraps.

### ***Preprocessing Food Scraps at the Puente Hills MRF***

For preprocessing the source-separated food scraps, Puente Hills MRF purchased a Doda Bioseparator Facility. The first stage of preprocessing is to remove contaminants on the MRF floor. Next, the food waste is loaded into the Doda feed-in hopper and forced through a 15-mm screen. Inerts are rejected to a nearby waste hopper for disposal. Reclaimed water dilutes the food waste slurry into a pumpable solution, approximately the consistency of cooked oatmeal. The slurry then passes through the Doda secondary separator using an 8-mm screen, where the material is further cleaned and “polished” of inerts. The food waste slurry is pumped into one of three storage tanks and then loaded into 5,000-gallon tanker trucks for delivery to the JWPCP. The WRRF has not experienced contamination issues with the Puente Hills MRF slurry.



**Figure 2.** In the Doda food scrap processing facility at the Puente Hills MRF, food scraps enter the Doda equipment (right); after preprocessing, the slurry is stored in storage tanks (left) until it is pumped to the digesters. Source: LACSD.

## **Financial Impacts**

### ***Investment Costs***

LACSD has incurred \$3.0 million in investment costs for the food scrap processing facility at the Puente Hills MRF, and \$3.2 million for the two slurry receiving facilities.

### ***Operating Revenue and Costs***

Puente Hills MRF is charging tip fees of \$70/ton for an estimated \$630,000 per year in tip fees at the current rate of delivery of food scraps (30 tpd). This fee covers processing equipment O&M and

contributes to capital recovery. The WRRF is currently charging all haulers a tip fee rate of \$28 per ton to bring slurries to the plant. The tip fee is priced to cover the operating costs of the JWPCP slurry receiving station and engineering, lab, and administrative expenses, and to contribute toward capital recovery. At the current rate of deliveries, estimated annual tip fees are about \$1,500,000.

## Energy Strategy

The renewable biomethane produced in Phase I is being sold to the public at the fueling station on JWPCP property and is used to fuel LACSD's fleet vehicles, which helps LACSD's compliance with South Coast Air Quality Management District 1191 fleet rules. These rules require public agencies to lower emissions from vehicle fleets and convert to alternative fuel use. In addition, the fueling station is open to the public 24/7, and is used by taxis, local buses, and individuals.



**Figure 3. LACSD CNG fueling station, located on JWPCP property, is open to the public. Source: LACSD.**

In Phase II, full implementation of co-digestion with 615 tpd of food waste is projected to increase biogas by 1,440 cubic feet per minute (cfm), from the JWPCP baseline (no co-digestion) level of 5000 cfm. Approximately 400 standard cubic feet per minute (scfm) has been allocated to the Phase I energy project, producing CNG vehicle fuel for sale. LACSD is still evaluating options for a future Phase II using the additional 1,040 cfm. Options include variations on a pipeline injection project, using the SoCalGas pipeline under the adjacent roadway, and variations on generating electricity for sale under California's Bioenergy Market Adjusting Tariff (BioMAT).

Factors they will be monitoring over time to inform the decision include the future availability of food waste as enforcement of the recycling mandate is activated, and the future values of Renewable Identification Numbers (RINs) and Low Carbon Fuel Standard (LCFS) subsidies, as more renewable vehicle fuel enters the market, as well as the impact of California's long-term commitment to an all-electric vehicle (EV) fleet on renewable fuel market demand. The economics for vehicle fuel are highly sensitive to variations in the price of RINs and LCFS credits, which multiply many times the recent sales price of around \$3/MMBTU for natural gas. A critical factor is whether or not the project would qualify for the more remunerative D3 RINs by allocating biogas from non-co-digesting digesters to the vehicle fuel uses.

In the week ending Feb. 13, 2021, JWPCP received 221 tpd of slurry from diverted food scraps; with 6% of the slurry entering through the headworks, the plant produced 298 scfm. Following installation of the first SRF, the plant is in a testing phase in which deliveries are gradually being shifted from entering the plant through the headworks to entering the digesters directly through the new SRF. Utility modeling estimates that 40% of the gas-producing potential is lost by using the LWDS, so after the second slurry receiving station is installed and both are fully operational, 221 tpd of food waste co-digestion would produce an estimated 476 scfm of biogas.

### **Financial Impacts**

Installation of the biogas conditioning and conveyance equipment for Phase I of the energy project cost \$5.0 million. LACSD projects that Phase I production of 400 scfm of biogas will produce 2,000 gasoline gallon equivalents (GGE) per day of CNG fuel, which at current market conditions would generate \$1.5 million in annual revenues including royalties on RINS and LCFS.

### **Combined Project Financial Analysis**

Energy improvements at LACSD are typically initiated by the Energy Recovery Team, not the individual facilities implementing them. The decision criteria for approval include that the project does not reduce the quality of wastewater treatment and that the payback period is 5-10 years, with shorter periods expected for projects with more uncertain estimates of net revenues. According to LACSD staff, as long as LACSD projects do not lose money and can ensure adherence to regulatory requirements, the District's board is generally open to new projects (Mark McDannel, interview with authors, March 19, 2018).

The total cost for the elements that have been installed or are in the construction phase is estimated to be \$16.5m. This total includes the preprocessing station at Puente Hills MRF (\$3.0m), the two new slurry stations at JWPCP (\$3.2m), the biogas conditioning and biogas pipeline equipment at JWPCP (\$5.0 m), and the construction of backup flares (\$5.3m). (This total does not include the future costs for expanding the fueling station.)

Partial offsets include a \$2.5 million grant from the California Energy Commission toward the biogas conditioning equipment, a \$4 million grant from CalRecycle toward the slurry receiving facilities and biogas pipeline, and a \$1.1 million tax exclusion credit from the California Alternative Energy and Advanced Transportation Financing Authority (CAEAFTA). Consequently, the net cost to LACSD of these project elements is anticipated to be \$10.0 million.

The investment will be financed internally through Solid Waste Department funds.

## **Lessons Learned**

### **Creating Value**

The large food waste co-digestion project that LACSD has initiated at JWPCP reflects the utility's long-standing focus on sustainability – recovering resources from waste to achieve environmental, community, and financial benefits. The incorporation of food scraps in co-digestion is facilitated by the utility's joint responsibility for solid waste and wastewater management.

Given its very large scale, the co-digestion program has surfaced a number of private solid waste firms that represent entrants in the market to supply a new product – food scrap slurries – suited to co-digestion feedstock through long-term contracts. It also has highlighted another new trend: public sector entrants into food scrap preprocessing.

## Managing Risks

### Stakeholder Risks

The project is designed to serve the utility's solid waste stakeholders, while using wastewater infrastructure and keeping wastewater treatment rates unchanged. Enabling the solid waste haulers to meet their new regulatory requirements for food scrap diversion has been an important motivation for including food scraps. No rate increase for either wastewater or non-food solid waste will occur due to this project.

LACSD also consults closely with neighbors of its facilities, through citizens' advisory councils.

### Operational Risks

The JWPCP plant staff initially were concerned about operational risks that could compromise their primary mission of ensuring water quality. To investigate the potential risks, the utility conducted a preliminary study, a pilot, and then a demonstration project with preprocessed food scrap slurry as digester feedstock to evaluate operational risks and benefits of co-digestion and to identify best practices/challenges and solutions. The conclusion was that the operational risks are all manageable. Based on the lessons learned during the trial periods, the plant staff has adopted an approach of making co-digestion work.

The specialized staff of the utility's Energy Efficiency and Energy Recovery sections, located in the Solid Waste Department, brought its long energy experience, including recovering biogas from landfills, to the planning to address operational risks associated with the energy component of the project.

### Financial Risks

Strategies to mitigate financial risk include establishing an extended timeframe for testing out the concepts and financing investments with internal funds.

## Replicability

The LACSD strategies to create value benefit from California's relatively high energy prices as well as the strong regulatory structure and generous subsidies for renewable energy and food waste diversion activities. The state policies promoting recycling of food scraps have supported the inclusion of food scraps as digester feedstocks, which occurs infrequently in states without aggressive policies.

JWPCP is one of the largest WRRFs in the country. The large scale of the plant makes possible the very large scale of the co-digestion and energy production operations, which allows JWPCP to realize a variety of positive factors: economies of scale; redundancy, which is important for efficiency; specialized staff focusing on energy efficiency and renewable energy; and the capacity both to finance investments and to manage new energy and food scrap preprocessing facilities in-house.

LACSD is also one of the relatively few utilities that combine solid waste and wastewater under one general manager and board of directors. Mark McDannel, Manager of the Energy Recovery Section, believes that having the two combined in one organization provides a substantial advantage, because co-digestion of food scraps requires collaboration between the wastewater and solid waste sectors. The JWPCP wastewater treatment plant carries out the co-digestion. The LACSD Solid Waste and Recycling Department has brought to the initiative a focus on providing a service to solid waste haulers in the area, and on maintaining low solid waste collection fees for LA County residents in independent districts while implementing the high-cost organics diversion mandate. In addition, the Solid Waste Department leverages its solid waste experience to develop the food scrap feedstock strategy and conduct the negotiations with feedstock haulers; it also designs the energy projects, leveraging the expertise its Energy Recovery Section developed with earlier projects recovering biogas from solid waste landfills.

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Figure 4. Truck unloading food scraps on tipping floor at Puente Hills MRF. Source: LACSD.



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