

## STAFF REPORT

**DATE:** July 17, 2019

**TO:** Utility Rate Advisory Commission

**FROM:** Richard Tsai, Environmental Resources Manager  
Jennifer Gilbert, Conservation Coordinator

**SUBJECT:** Organics Processing Facility Feasibility Analysis

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### **Recommendations**

1. Receive the final Organics Processing Facility Feasibility Analysis and presentation from staff.
2. Based on Commission discussion, consider providing a recommendation to City Council on the next steps.

### **Background and Analysis Summary**

The city contracted with Clements Environmental Corporation (Clements) in June 2017 to conduct an analysis of final destination options for handling organic materials collected from the City of Davis and rank available technologies. The overall goal of the study is to determine the most environmentally sound solution to divert organic waste, while minimizing the cost to City ratepayers. The study examines the environmental, political, technical and economic impacts and features of each option.

The draft Executive Summary of the analysis was presented to the Natural Resources Commission (NRC) at their February 26, 2018 meeting. The commission provided recommended revisions, comments and feedback, which were then provided to Clements. The full draft of the analysis was sent to the NRC Zero Waste Subcommittee mid-March 2018 for review. The Utility Rate Advisory Commission (URAC) also reviewed the Executive Summary of the analysis at their March 21, 2018 meeting.

Edits and comments received from both the NRC and the URAC indicated a desire for more in-depth analysis on several items, including the recent Yolo County organics projects, Recology's organics facilities, and a more in-depth greenhouse gas (GHG) analysis. Based on this feedback, the City decided to expand the scope of work for the analysis to include these items. City Staff returned to the NRC in April 2018 to receive clarification and direction on the type of GHG analysis to be utilized as part of the expanded scope.

Clements submitted an updated draft to the City in December 2018. After receiving comments and edits from the City, Clements delivered the final analysis to the City in May 2019. This final analysis is provided in Attachment 1.

The NRC's comments, edits and questions on the first draft of the analysis are included in Attachment 2 along with how they were addressed in the final analysis. A few items were not addressed in the final analysis, as they were not within the original nor the expanded scope of work.

The NRC reviewed the final report on June 24, 2019 and appointed a commission member to attend the July 2019 URAC meeting to bring outstanding questions from the NRC and continue the discussion on the results and methods of the analysis. The NRC's zero waste subcommittee also reviewed the WARM model input file and provided comments, included as Attachment 4. Staff asked Clements to revise the WARM model based on NRC's zero waste subcommittee input and a revised WARM tech memo is included as Attachment 5. At the June 24, 2019 NRC meeting, it was also suggested that option #5 Recology JPO be removed from consideration due to the hauling distance required for disposal.

This analysis is only the first step in the process to aid in the determination of the long-term plan for handling the City's organics; it is not intended to provide all the data that the City would need to move forward with one of the options discussed. However, it does provide recommendations for narrowing the scope of the next steps in reviewing the long-term strategy specifically for the City's organics processing.

Clements provided an analysis on five different organics facility options that may be available to the City:

1. Utilizing the Yolo County Central Landfill (YCCL) organics facility (currently in the process of being built)
2. Building an organics facility at the Old City Landfill
3. Building an organics facility at the City's Wastewater Treatment Plant (WWTP)
4. Working with UCD to build an organics facility near the UCD Anaerobic Digestion Plant
5. Utilizing one of Recology Davis organics facilities

## **Results**

Table 1.1 provides a summary of the five options and shows each option's technology type, costs, and potential revenues. The processing capacity for options 3 and 4 shown in Table 1.1 are based on the available organics data from both the City of Davis and UC Davis. Alternative feedstock scenarios (i.e., City-only feedstock, four times City feedstock, feedstock without C&D) are assessed in the financial proforma in Appendix E of the analysis. Capital costs include site preparation and purchasing necessary equipment such as material handling equipment (e.g., trommel screen, tub grinder) and technology-specific equipment (i.e. covered aerated static piles (CASP) or anaerobic digestion (AD) systems). The annual operating costs are the combined estimated direct labor and equipment expenditures required.

**Table 1.1 City Alternative Projects Summary<sup>1</sup>**

PROJECT	TECH	TYPE	CAPITAL COST (millions)	OPERATING COSTS / YEAR	PRODUCTS GENERATED	PRODUCT REVENUE / YEAR <sup>2</sup>	NET \$ / TON
1) YCCL	Anaerobic Composter Cells	N/A	N/A	N/A	Power Production + Compost	\$0	\$63.00 <sup>3</sup>
2) Old City Landfill	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3) City WWTP	A) Stand-Alone Composting	Covered Static Pile (12-inch compost cover)	\$0.98	\$576,449	Compost	\$339,682	\$19.69
	B) Stand-Alone Composting	CASP (membrane cover)	\$4.26	\$491,560	Compost	\$339,682	\$46.06
	C) AD + Composting	Discontinuous (AD-D) + Covered Static Pile	\$6.60	\$951,353	Power Production + Compost	\$514,932	\$77.66
	D) AD + Composting	Continuous (AD-C) + CASP	\$13.72	\$1,064,998	CNG Fuel + Compost	\$918,049	\$123.03
4) UC Davis <sup>4,5</sup>	E) Stand-Alone Composting	Covered Static Pile	\$0.98	\$576,449	Compost	\$339,682	\$19.69
	F) Stand-Alone Composting	CASP	\$4.26	\$491,560	Compost	\$339,682	\$46.06
5) Recology JPO	Composting	Aerated Static Piles (ASP)	N/A	N/A	Compost	\$0	\$80.00 <sup>6</sup>

<sup>1</sup>Total tons per day (TPD) is based on the available organics from both City of Davis and UC Davis and assumes 22 working day per month (264 days per year).

Alternative feedstock quantities (i.e., City-only feedstock, four times City feedstock, feedstock without C&D) are assessed in the financial proformas in *Appendix E*.

<sup>2</sup>Annual revenue to City for product sales.

<sup>3</sup>Tip fee was provided by Yolo County Central Landfill (YCCL); YCCL developed this estimated tip fee late 2016, and at the time of this report has yet to provide an updated tip fee.

<sup>4</sup>Assumes a City-operated composting project on UC Davis property

<sup>5</sup>Proforma does not include potential lease payments for use of UC Davis land

<sup>6</sup>Average of typical Recology JPO organics tip fees, not a City-negotiated price.

The study found that the City’s organic wastes are mostly fibrous yard materials, with only 5-10% of food waste. This makes the City’s organics wastes incompatible with UCD’s current anaerobic digester, which can only handle liquids and source-separated food wastes. High-solids digester that could handle the City’s organics materials would not see the same kind of energy production as would come from a liquid digester, as food wastes produce more energy than yard materials.

Table 7.5, below, shows the net costs per ton comparison for each option, with a breakdown of the City organics only.

**Table 7.5 Additional Project Scenarios Net Cost per Ton Comparison**

PROJECT	TECH	CITY + UCD; with C&D; ORIGINAL PROFORMA	CITY + UCD; NO C&D	CITY ORGANICS ONLY	FOUR TIMES CITY ORGANICS
<b>TONS PER DAY Options A, B, E, F (Stand-Alone composting)</b>		96.5	95	48	192
<b>TONS PER DAY Options C &amp; D (AD with composting)</b>		<u>AD</u> 53.5 <u>Composting</u> 83	<u>AD</u> 53 <u>Composting</u> 82.75	<u>AD</u> 48 <u>Composting</u> 36	<u>AD</u> 192 <u>Composting</u> 144
City WWTP (\$/ton)	A) Static Pile Composting	\$19.69	\$20.22	\$31.10	\$12.06
	B) CASP Composting	\$46.06	\$47.02	\$70.80	\$37.78
	C) AD-D + Static Pile Composting	\$77.66	\$79.31	\$144.90	\$95.83 <sup>1</sup>
	D) AD-C + CASP	\$123.03	\$125.85	\$226.04	\$106.62 <sup>1</sup>
UC Davis <sup>2,3</sup> (\$/ton)	E) Static Pile Composting	\$19.69	\$20.22	N/A	\$12.06
	F) CASP	\$46.06	\$47.02	N/A	\$37.78

<sup>1</sup>Although this option has more feedstock going to the AD system than the "City + UCD" options, it does not include some UC Davis material that would be sent directly to the composting operation. The economy of scale for this option is evident by comparing it with the "City Organics Only" proforma.

<sup>2</sup>This assumes a City-operated composting project on UC Davis property.

<sup>3</sup>These proforma do not include potential lease payments for use of UC Davis land.

Reviewing the analyses as conducted, Clements recommends the following next steps, structured by the City's area of focus:

1. If the City were focusing on options to process organic wastes from Davis only, it is recommended the City pursue building a City-operated static pile composting facility at the City's Wastewater Treatment Plant (WWTP).  
**OR**
2. If greater air emission control is required by YSAQMD, or desired by the City, and the higher cost associated with the technology is not a deterrent, it is recommended the City pursue building a City-operated CASP composting facility at the City's WWTP.  
**OR**
3. If the City can get a guarantee of organics from UC Davis, it is recommended that the City pursue building a City-operated CASP composting facility at the City's WWTP or at a site on the UC Davis campus.  
**AND**

4. If other organics are available, once composting is established and particularly if significant amounts of food waste are received in the future, consider the addition of AD to augment the existing composting.

**AND**

5. Were the City able to attract organics from the region and increase the project capacity from 25,000 tons per year to 50,000 tons per year, favorable economics of scale could be achieved for both composting and AD alternatives.

**Trends of Organics Processing Costs - Ratepayer Impacts**

The costs associated with disposal of the City’s organic waste are derived from the fees at the Yolo County Landfill, and are pass-through expenses for Recology. Each July, the amount charged to the City is updated based on the landfill adjustments.

A summary of the last five years of Yolo County landfill disposal fees for yard materials and yard materials mixed with food scraps is included in the table below, using only 2018 tonnage for the purposes of comparison:

	Effective Date						
	7/1/2014	7/1/2015	7/27/2016	7/1/2017	1/11/2017	7/1/2018	7/1/2019
<b>Yard Materials</b>	\$32.00	\$36.00	\$39.00	\$54.00	\$52.00	\$54.00	\$56.00
<i>Tonnage collected in 2018*</i>	4,798.6	4,798.6	4,798.6	4,798.6	4,798.6	4,798.6	4,798.6
<i>Landfill tipping fee</i>	\$153,554.88	\$172,749.24	\$187,145.01	\$259,123.86	\$249,526.68	\$259,123.86	\$268,721.04
<b>Food scraps and yard materials**</b>	N/A	N/A	\$52.00	\$54.00	\$52.00	\$62.00	\$64.00
<i>Average tonnage collected per month**</i>	7,411.8	7,411.8	7,411.8	7,411.8	7,411.8	7,411.8	7,411.8
<i>Average monthly landfill tipping fee</i>	N/A	N/A	\$385,413.08	\$400,236.66	\$385,413.08	\$459,530.98	\$474,354.56
<b>Total landfill tipping fees for organics</b>	<b>\$153,554.88</b>	<b>\$172,749.24</b>	<b>\$572,558.09</b>	<b>\$659,360.52</b>	<b>\$634,939.76</b>	<b>\$718,654.84</b>	<b>\$743,075.60</b>

\*Tonnage from yard material piles and street sweeping

\*\*Tonnage from organics and food scrap carts

The table below uses the 2018 tonnage to calculate potential tipping fee costs of the presented Options A through F from Clement:

			City + UCD		City Only	
			Per Ton	Yearly Cost*	Per Ton	Yearly Cost*
<b>Wastewater Treatment Plant</b>	<b>Option A</b>	Static Pile Composting	\$19.69	\$240,422.38	\$31.10	\$379,742.82
	<b>Option B</b>	CAASP Composting	\$46.06	\$562,410.10	\$70.80	\$864,494.90
	<b>Option C</b>	AD-D+ Static Pile Composting	\$77.66	\$948,258.11	\$144.90	\$1,769,284.06
	<b>Option D</b>	AD-C + CASP	\$123.03	\$1,502,243.05	\$226.04	\$2,760,034.30
<b>UC Davis</b>	<b>Option E</b>	Static Pile Composting	\$19.69	\$240,422.38	N/A	N/A
	<b>Option F</b>	CASP	\$46.06	\$562,410.10	N/A	N/A

\*assumes 2018 tonnage

**Next Steps**

Should the City decide to pursue a more in-depth study to build an organics facility, it would take a number of years before one is built and ready to accept materials for processing. In the interim, the City would still need a facility to process the existing organics that are collected by Recology Davis. New State regulations that are being drafted as part of the AB 1383 Short-Lived Climate Pollutants Regulations will require cities to provide CalRecycle with proof (in the form or contracts, agreements or letters of commitment) that an organics processing facility has the capacity for, and will accept, the organics collected from their jurisdiction. As such, it is in the City’s best interest to consider a short-term agreement with either the Yolo landfill or Recology to utilize their organics facilities.

The NRC will have a discussion on the study in July, and staff plans to present the feasibility study to the City Council in September 2019. The URAC is being asked to consider a recommendation on the following two items:

1. That the city should negotiate a short-term agreement (10 years or less) with Yolo County Landfill to formalize the near-term disposition of the City’s organic waste; and
2. To consider which option, of the options suggested by Clements, the URAC recommends pursuing for the next steps of this examination of the long-term plan for the City’s organic wastes, and the overall Solid Waste program.

**Attachments**

1. Organics Processing Facility Feasibility Analysis
2. Comments received by the NRC on the Draft Feasibility Analysis
3. Facility Permitting Technical Memo
4. Zero Waste Subcommittee WARM Model Comments
5. Revised WARM Technical Memo