TECHNICAL MEMORANDUM

To: SSIP PMC Program Team

From: Mary Fong, PMC Task Leader

Subject: Technical Memorandum No. 4 – Review of Other Biosolids Programs

Date: July 23, 2013

BACKGROUND

San Francisco is in the process of upgrading its biosolids processing facilities at the Southeast Water Pollution Control Plant (SEP) and Oceanside Water Pollution Control Plant (OSP) to produce a Class A Exceptional Quality (EQ) biosolids product. Before committing to a specific biosolids treatment technology, the San Francisco Public Utilities Commission (SFPUC) authorized a study to identify viable end-use markets available for biosolids in this region. Accordingly, a survey of agencies in the Bay Area and Southern California was conducted. Questions included in the survey addressed a broad array of issues, including, but not limited to the following:

- The type and classification of biosolids products;
- Beneficial use or disposition options currently used;
- Potential beneficial use or disposition options for the future;
- Quantity of biosolids produced; and
- Amount and type of High Strength Waste (HSW) accepted.

This technical memorandum (TM) summarizes findings from the study, which was conducted from March through May 2013.

ACQUISTION OF INFORMATION AND DATA

Survey questions were developed and reviewed by SFPUC representatives. After initial review and revisions, the questions were entered into Survey Monkey, an on-line survey portal. The survey was then completed on-line by SFPUC personnel, who provided feedback for survey improvements. The survey was revised to address these suggestions before being sent to the agencies of interest.

A total of 17 agencies were shortlisted for the survey, including 12 agencies from the Bay Area and five agencies from the Southern California region. Table 1 below lists all the agencies that were included in

the survey. Once the electronic survey mailing-list was approved, recipients of the survey were called and notified that they would be receiving an e-mail with a link to complete the biosolids survey.

Table 1
List of Agencies

Bay Area
Central Marin Sanitation Agency (CMSA)
Delta Diablo Sanitation District (DDSD)
Dublin-San Ramon Services District (DSRSD)
East Bay Municipal Utility District (EBMUD)
Fairfield-Suisun Sewer District (FSSD)
The City of Millbrae (Millbrae)
North San Mateo County Sanitation District (North San Mateo)
Novato S.D. Novato WWTP (Novato)
Sacramento Regional County Sanitation District (SRCSD)
The City of Santa Rosa (Santa Rosa)
South San Francisco
Union Sanitary District (USD)
Southern California
City of Los Angeles (City of LA)
The City of Encina (Encina)
Inland Empire Utilities Agency (IEUA)
Orange County Sanitation District (OCSD)
Ventura Water Reclamation Facility (Ventura)

Each agency was sent an e-mail that included background information about the survey and the link to complete it. Once each agency submitted the survey electronically, all answers were thoroughly reviewed for potential inconsistencies. Follow-up telephone calls or e-mails were made to agencies that did not respond within the first week of receiving the survey request and to agencies whose responses needed further clarifications.

The survey consisted of a total of 36 questions. Feedback for each question was compiled into tables after complete survey responses were received from all 17 agencies. A few of these tables are included in this TM and remaining are included in Attachment 1. Table 2 below lists all the tables included in this TM. Bay Area agency results were summarized separately from the Southern California agency responses to reveal and compare regional biosolids management trends.

Table 2
List of Tables

SURVEY RESULTS

Annual Biosolids Production

The most recent annual biosolids production data (2011) was obtained for each surveyed agency from the Environmental Protection Agency (EPA) Region 9 biosolids coordinator, reflecting data submitted by each agency in its annual biosolids report. According to the EPA Region 9 biosolids report, San Francisco and the surveyed agencies produced a total of 226,539 dry metric tons of biosolids in 2011. Future biosolids production projections were calculated based on this report and population change projections. Population projections came from the 2005 Association of Bay Area Governments (ABAG) population projection report and the May 2012 Department of Finance Report. According to these projections, biosolids production is expected to increase by almost 57,000 dry metric tons between now and the year 2040 (Table 1A, Attachment 1).

To confirm these projections, each agency was asked if they had conducted any studies with results that contradict the presented data. Four of the 17 agencies had completed biosolids projection studies. Of these four, three agencies conducted studies that yielded higher projections than the data presented. The reported biosolids projections can be found in Table 1B of Attachment 1.

Current Biosolids Quality

Bay Area

Bay Area agencies currently generate biosolids in the form of dewatered Class B cake, compost, liquid biosolids product and dried pellets. Class B cake is the dominant biosolids product in the Bay Area. As shown in Table 3 and Figure 1 below, nine of the 12 Bay Area agencies produce dewatered Class B cake. Out of these nine agencies, only Santa Rosa produces Class A compost from 30% of its Class B cake production. The solids content of the produced compost was reported as 62%. The remaining eight agencies produce Class B cake exclusively. The reported solids content in the Class B cake produced by these agencies ranges from 15 to 27% total solids (TS), as shown in Table 3 below. Reported percent solids by Bay Area agencies are included in Table 1A of Attachment 2. Three Bay Area agencies (DDSRD, Novato and SRCSD) produce liquid biosolids products exclusively; these have a TS range of 1 to 3% and are mostly land applied on-site. Following mesophilic digestion, DSRSD stores its liquid biosolids six (6) facultative sludge lagoons for a minimum of 4 to 5 years. The biosolids are further allowed to "rest" (Resting is defined as stopping the addition of new digested sludge) for 6 months before injecting them beneath the surface of a dedicated land disposal site to ensure Class A standards are met. SRCSD has a dedicated on-site land disposal which is used to dispose 80% of its liquid biosolids product.

Southern California

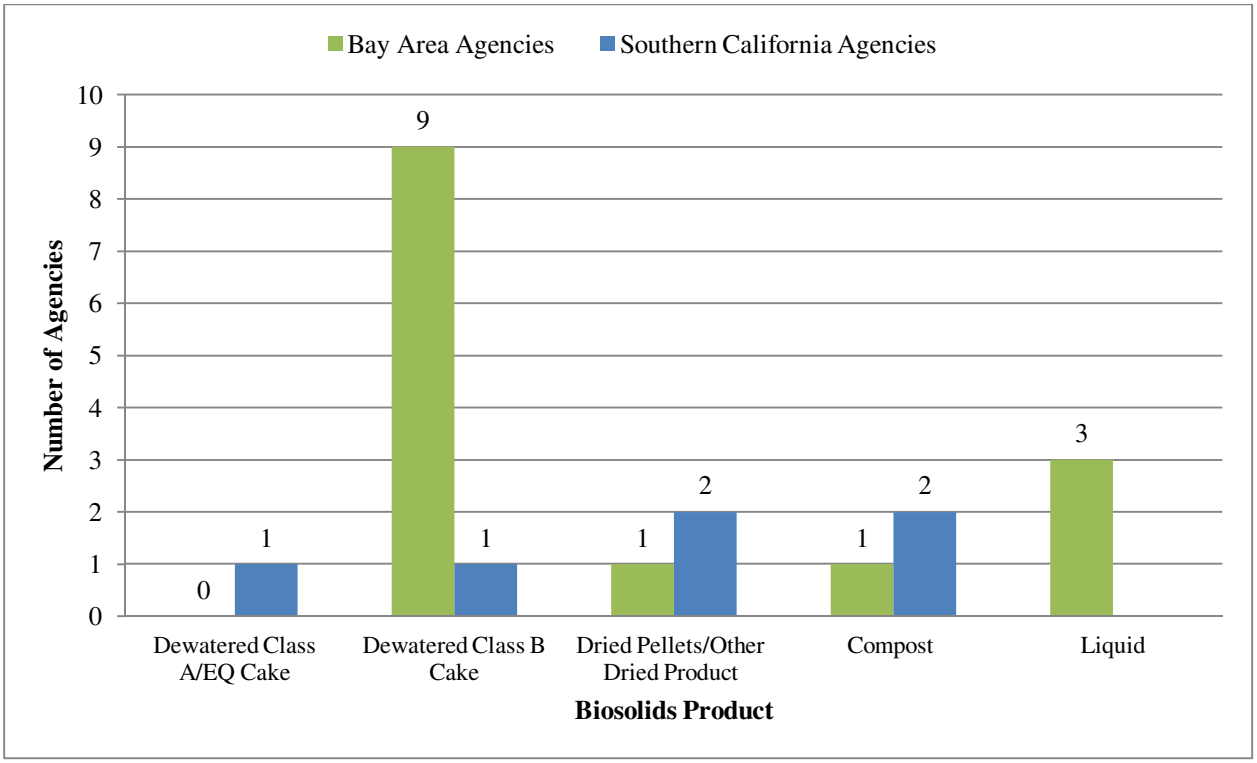
Biosolids products currently generated by the five surveyed Southern California Agencies include dewatered Class A/EQ cake, dewatered Class B cake, dried product, and compost. OCSD produces about 60% Class B biosolids cake and 40% compost. IEUA produces 100% compost at an adjacent facility co-owned by IEUA and LACSD. City of LA produces Class A/EQ biosolids, with a reported TS content of 28%. Encina produces a dried product at 92% TS content, while Ventura produces a dried product at 85% TS content (Tables 2A and 2B, Attachment 1 and Table 1B, Attachment 2).

Table 3
Biosolids Product Quality for Bay Area Agencies in 2012

Agency	Dewatered Class A/EQ Cake	Dewatered Class B Cake	Dried Pellets / Other Dried Product	Compost	Liquid		% TS Content
	%*	%*	%*	%*	%*	Description	
Central Marin Sanitation Agency		100					27
Delta Diablo Sanitation District		100					25
Dublin-San Ramon Services District					100	Land apply liquid on-site	3
East Bay Municipal Utility District		100					25
Fairfield-Suisun Sewer District		100					No Response
Millbrae		100					21
North San Mateo		100					24
Novato S.D. Novato WWTP					100	Land apply liquid on-site	3
Sacramento Regional County Sanitation District			20 (Class A pellets produced at a biosolids recycling facility adjacent to the site.)		80	~80% on-site land disposition;	1.5
Santa Rosa		70		30			15
South San Francisco		100					16
Union Sanitary District		100					24
Total Number of Agencies	0	9	0	1	3		

* % refers to % of total production of biosolids for each type of biosolids product generated.

Figure 1
Biosolids Product Quality for Bay Area Agencies in 2012



Anticipated Biosolids Quality in Year 2020

Bay Area

As can be seen in Table 4, overall product quality in the Bay Area will remain consistent for most agencies between now and the year 2020. Seven of the 12 Bay Area agencies reported that they will continue to exclusively produce dewatered Class B cake through 2020. Only EBMUD, which currently produces Class B cake, reported that they plan to upgrade their facility to produce dewatered Class A/EQ cake by the year 2020. Novato reported that they will continue to land apply 100% of their liquid biosolids, and DSRSD reported that they plan on producing a Class A/EQ cake with 10% of their biosolids while continuing to land apply the remaining 90% of their liquid biosolids. Two agencies (SRCSD and Santa Rosa) reported that their processing plans are currently under evaluation; any change in their biosolids quality in 2020 is unknown at this time.

Southern California

The surveyed Southern California agencies reported that they do not foresee a change in their biosolids product between now and the year 2020 (Table 3A, Attachment 1).

Table 4
Anticipated Biosolids Product Quality for Bay Area Agencies in 2020

Agency	Dewatered Class A/EQ Cake	Dewatered Class B Cake	Dried Product	Compost	Other	
	%	%	%	%	%	Description
Central Marin Sanitation Agency		100				
Delta Diablo Sanitation District		100				
Dublin-San Ramon Services District	10				90	Land apply liquid on-site
East Bay Municipal Utility District	100					
Fairfield-Suisun Sewer District		100				
Millbrae		100				
North San Mateo		100				
Novato S.D. Novato WWTP					100	Land apply liquid on-site
Sacramento Regional County Sanitation District	*Currently under evaluation*					
Santa Rosa	*Currently under evaluation*					
South San Francisco		100				
Union Sanitary District		100				
Total Number of Agencies	2	7	0	0	2	

Current Class B Cake Use

Bay Area

As can be seen in Figure 2 below, Bay Area agencies reported land application to be the dominant end use for dewatered Class B cake. Seven of the nine agencies that produce Class B cake land apply a portion (34 to 95%) of their produced biosolids. DDSD employs almost all of the produced biosolids (~95%) for land application, followed closely by North San Mateo, which uses 87% of its biosolids for land application. Five out of the nine Bay Area agencies use their Class B biosolids cake beneficially as alternative daily cover (ADC) at landfills; FSSD is the only agency that uses all of the biosolids produced as ADC. Only South San Francisco landfills all of its biosolids; Millbrae and DDSD send a negligible percentage (less than 10%) of their biosolids to landfills for non-ADC disposal. Table 5 below presents the current break-down of Class B biosolids cake for end-use or disposition by Bay Area agencies.

Figure 2
End-Uses Methods for Class B Cake for Surveyed Agencies in 2012

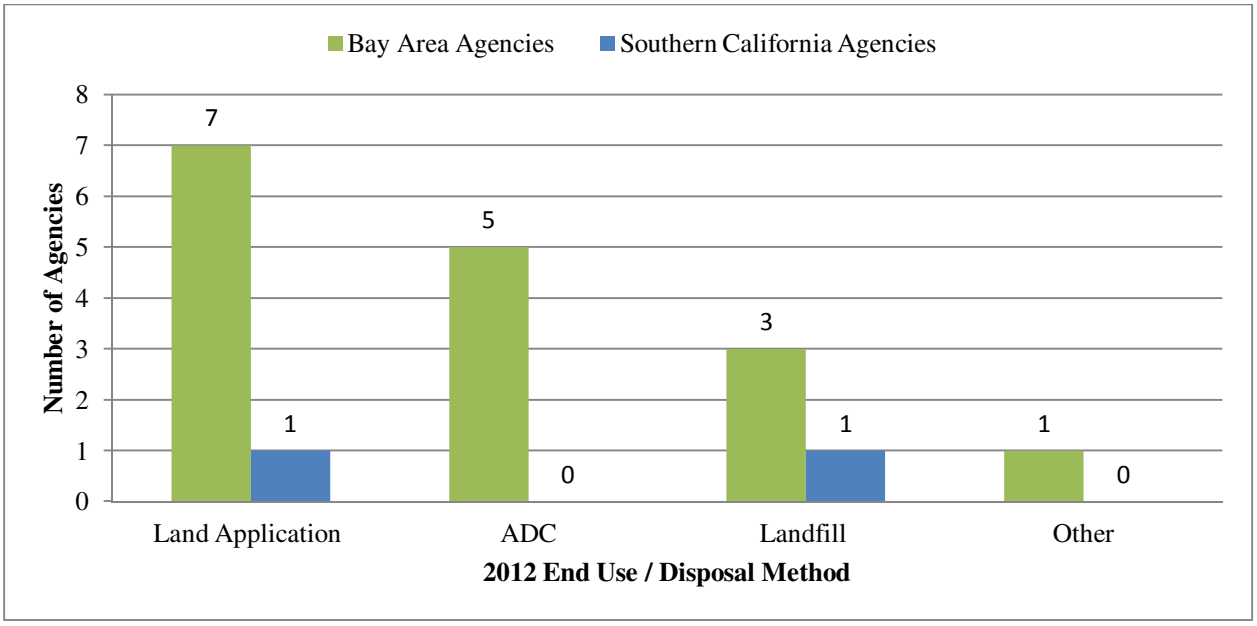


Table 5
Current End-Uses/Disposition of Class B Cake for Bay Area Agencies

Agency	Land Application (%)	ADC (%)	Landfill (%)
Central Marin Sanitation Agency	38	62	
Delta Diablo Sanitation District	95		1
East Bay Municipal Utility District	34	66	
Fairfield-Suisun Sewer District		100	

Agency	Land Application (%)	ADC (%)	Landfill (%)
Millbrae	60	30	10
North San Mateo	87	3	
Santa Rosa	70		
South San Francisco			100
Union Sanitary District	75		
Number of Agencies	7	5	3

Southern California

Only one Southern California agency - OCSD produces Class B biosolids cake (Table 2A, Attachment 1). IEUA produces 100% compost at an adjacent compost facility that the agency jointly owns and operates with Sanitation Districts of Los Angeles County (LACSD). OCSD produces about 40% compost at an on-site composting facility. In addition to composting, OCSD land applies almost half of its biosolids, and about 10% is sent to landfills (Table 2B, Attachment 1).

Future Class B Cake Use

As described above, nine Bay Area agencies currently produce Class B cake. Out of these nine agencies, only EBMUD has indicated it will be upgrading its biosolids product to Class A/EQ quality by the year 2020. Santa Rosa is also in the process of reviewing its future biosolids production/end use; hence, end-use of its biosolids product is not known at this time. The remaining seven agencies reported that their Class B end-use in 2020 will be similar to that being practiced now. Table 6 below lists the anticipated end-use for Class B Cake by Bay Area agencies in year 2020. Figure 3 presents the overall end-use methods anticipated by both Bay Area and Southern California agencies.

In 2006, the SFPUC joined 15 other Bay Area wastewater agencies to pursue a regional biosolids processing facility as part of the Bay Area Biosolids to Energy (BAB2E) program, based on a regional approach that had been explored in earlier Bay Area Clean Water Agencies (BACWA) studies. As can be seen in Table 6, four Bay Area agencies have indicated participation in the BAB2E program (Offsite Bioenergy Production).

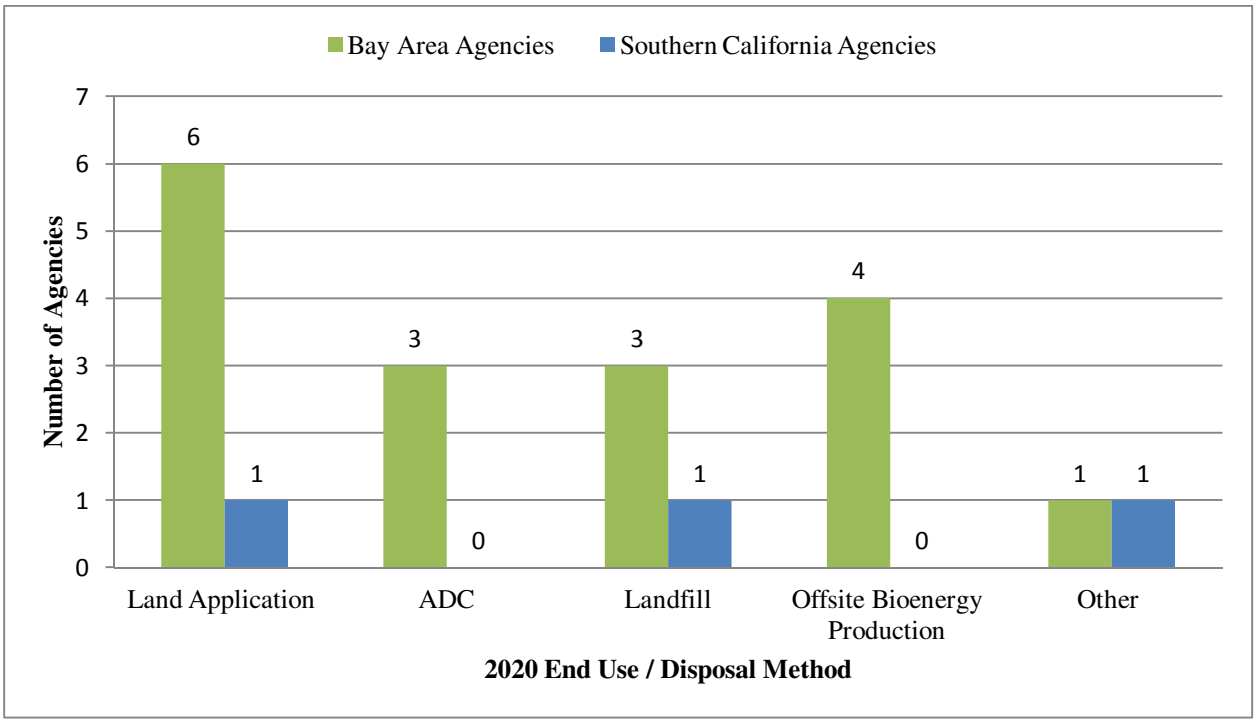
Table 6
Anticipated End-Uses of Class B Cake for Bay Area Agencies

Agency	Land Application (%)	ADC (%)	Landfill (%)	Offsite Bioenergy Production (%)
Central Marin Sanitation Agency	40	35		25
Delta Diablo Sanitation District	79		1	20
Fairfield-Suisun Sewer District		100		
Millbrae	60	30	10	

Agency	Land Application (%)	ADC (%)	Landfill (%)	Offsite Bioenergy Production (%)
North San Mateo	80			20
Santa Rosa[1]				
South San Francisco			100	
Union Sanitary District	90			10
Number of Agencies	5	3	3	4

[1]Santa Rosa is currently reviewing future biosolids production and end use.

Figure 3
Class B Cake End-Uses Methods Anticipated for Surveyed Agencies in 2020



Current Class A/EQ Cake Use

Only the City of LA currently produces Class A/EQ cake. Of this cake, 77% is land applied, 15% is used for offsite bioenergy production through deep well injection and methane extraction, and the remaining 8% is processed into compost locally at the Echo Park compost facility.

Future Class A/EQ Cake Use

EBMUD is the only Bay Area agency that is planning to upgrade 100% of its biosolids product to Class A/EQ, out of which 50% will be directed to land application. End-use plans for the remaining 50% are uncertain at this time. DSRSD has plans to contribute about 10% of its biosolids product to the BAB2E program. For participation in BAB2E, DDSRD plans to use centrifuges to dewater 10% of the biosolids stream to 20 to 30% TS before sending it to the regional facility for energy recovery. Table 7 below shows the anticipated end-use for agencies that have indicated an upgrade to production of Class A/EQ Cake in year 2020.

Table 7
Anticipated End-Uses of Class A/EQ Cake for Bay Area Agencies in Year 2020

Bay Area Agencies			
Agency	**Land Application (%)**	**Offsite Bioenergy Production (%)**	**Other (%)**
Dublin-San Ramon Services District		100	
East Bay Municipal Utility District	50		50

Dried Products Use

Encina will continue to produce dried pellets in year 2020. However, they have plans to exit the off-site bioenergy production market and solely rely on agriculture (60% anticipated end-use) and the landscape market (40% anticipated end-use) for their dried pelletized biosolids product. Ventura intends to continue production of dried biosolids into 2020. However, present and anticipated end-use of their dried product is unknown at this time. Out of the 12 Bay Area agencies, none reported production of dried pellets by 2020. Two Bay Area agencies – SRCSD and Santa Rosa – have indicated that their biosolids product quality anticipated in 2020 is currently under evaluation and therefore is unknown at this time.

Method for Ensuring Current Market

Bay Area

As shown in Table 8, six of the 12 Bay Area agencies rely on marketing their biosolids product through contracts with private sector companies such as Synagro. Santa Rosa is the only surveyed Bay Area agency that relies on its agency staff to market directly to end users. The remaining four agencies use other methods such as contracting with landfills for beneficial use or landfilling. For example, FSSD has a contract with the Potrero Hills landfill for 100% beneficial use of their biosolids as ADC.

Table 8
Method for Ensuring Current Market for Bay Area Agencies

Bay Area Agencies			
Agency	**Land Applier (i.e., Synagro)**	**Market Directly to Specific End Users (i.e., Reliance on agency staff, BAB2E)**	**Other**
Central Marin Sanitation Agency	X		
Delta Diablo Sanitation District	X		
Dublin-San Ramon Services District			X
East Bay Municipal Utility District	X		
Fairfield-Suisun Sewer District			X
Millbrae	X		
North San Mateo	X		
Novato S.D. Novato WWTP			X
Sacramento Regional County Sanitation District			X
Santa Rosa		X - Reliance on city staff	
South San Francisco			X
Union Sanitary District	X		X

Southern California

Three out of the five surveyed Southern California agencies (Encina, IEUA and Ventura) reported direct marketing to specific end users such as fertilizer companies and soil amendment companies. The other two agencies (City of LA and OCSD) rely on contracts with private sector land appliers (Table 2C, Attachment 1).

Method for Ensuring Market in 2020

All agencies in both the Bay Area and Southern California reported that they will use methods similar to current practices to market their biosolids products in 2020. As mentioned above, EBMUD is the only Bay Area agency that plans to upgrade to a Class A/EQ quality biosolids product. It has indicated that 50% of its Class A/EQ product will be used beneficially for land application through contracts with private sector land application firms. Information was not received about the remaining 50%. Table 9 below lists the methods the surveyed Bay Area agencies anticipate using to ensure markets in 2020. For information regarding Southern California agencies methods of ensuring markets in year 2020, refer to Table 3B of Attachment 1.

Table 9
Anticipated Methods for Ensuring Future Market for Bay Area Agencies

Bay Area Agencies			
Agency	**Land Applier (i.e., Synagro)**	**Market Directly to Specific End Users (i.e., Reliance on agency staff, BAB2E)**	**Other**
Central Marin Sanitation Agency	X		X
Delta Diablo Sanitation District	X		
Dublin-San Ramon Services District		X - BAB2E	
East Bay Municipal Utility District	X		X
Fairfield-Suisun Sewer District			X
Millbrae	X		
North San Mateo	X		
Novato S.D. Novato WWTP			X
Sacramento Regional County Sanitation District			X
Santa Rosa		X - Reliance on city staff	
South San Francisco			X
Union Sanitary District	X		

Costs

Bay Area

In the Bay Area, landfilling was reported as the most expensive biosolids end use, costing an average of $43.33 per wet ton. The average reported rates for composting[1], land application of Class B cake, and ADC per wet ton are $42.00, $34.86, and $36.50, respectively (Table 2A, Attachment 2). The survey asked for total costs including hauling. When evaluating end uses on a dry ton basis, on-site disposition of liquid biosolids product is the most expensive option, followed by landfilling, costing $467.00 and $255.00 respectively. On a dry ton basis, ADC is the least costly end-use option, costing on average $148.00 per dry ton. Land application of Class B cake and composting costs $158.00 and $191.00, respectively on a dry ton basis. Refer to Attachment 2 for conversion calculations from $/wet tons to $/dry tons. Figure 4 and Figure 5 present costs for biosolids end-use for surveyed agencies in $/dry tons and $/wet tons, respectively.

[1] An extreme composting cost of $155.00 per wet ton for Santa Rosa was not included when averaging end-use prices to avoid bias. When the outlier is included, composting costs an average of $70.25.

Figure 4
Costs in $/Dry tons for Surveyed Agencies in 2012

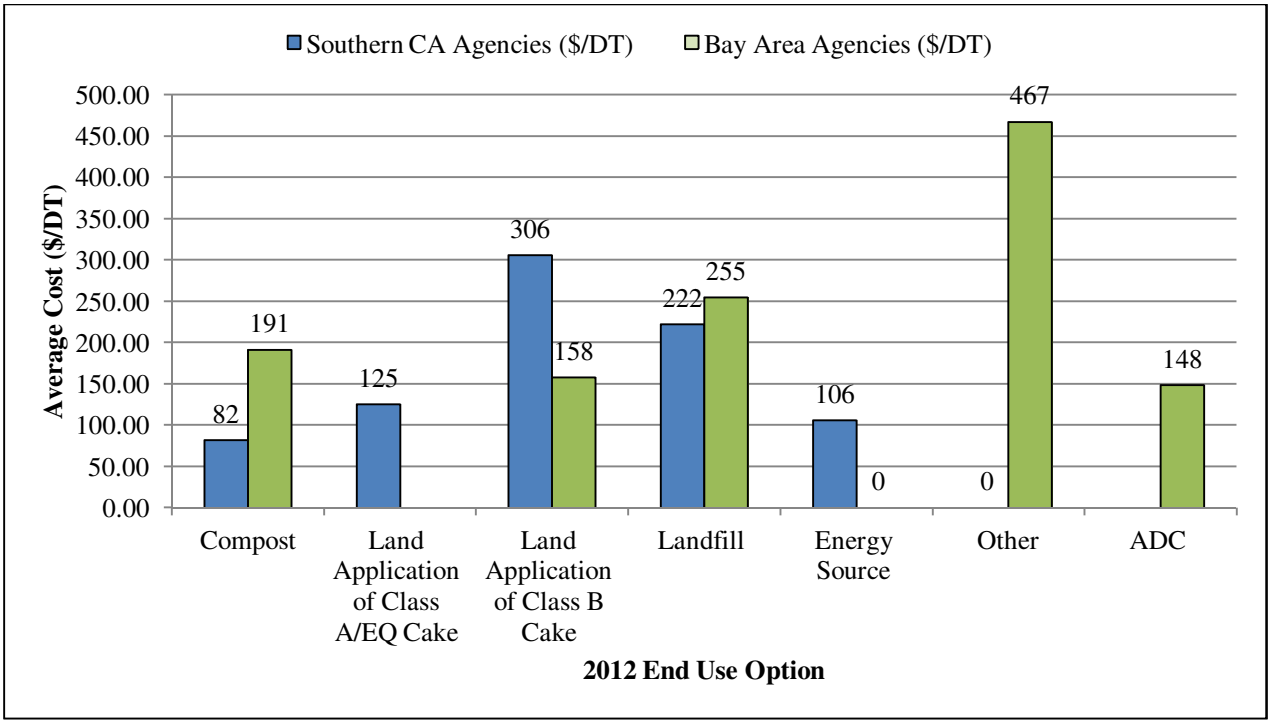
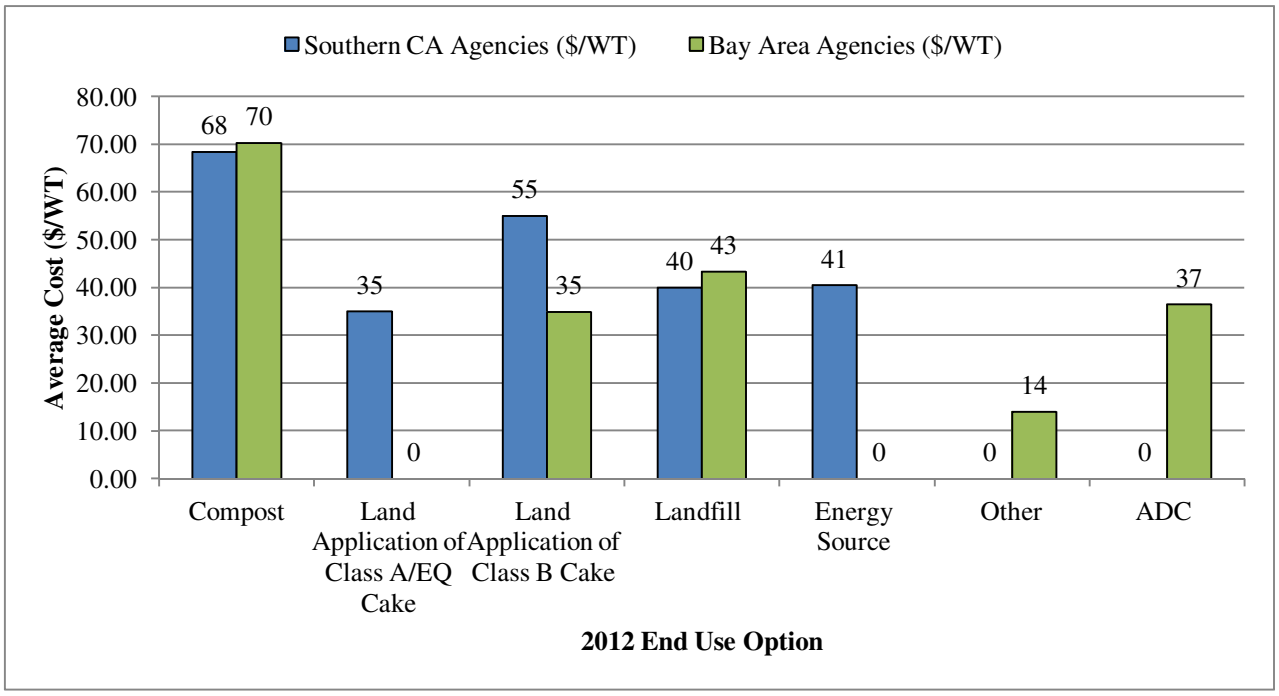


Figure 5
Costs in $/Wet tons for Surveyed Agencies in 2012



Southern California

Southern California agencies reported composting to be the most expensive end use for biosolids, costing an average of $68.33 per wet ton. On a wet ton basis, land application of Class A cake is the least expensive outlet for Southern California agencies ($35.00 per wet ton – this only represents the cost of hauling the material and does not include such costs as purchasing and running the farm). Land application of Class B cake, end use at an offsite energy producer (e.g., combusting pelletized biosolids at cement kilns), and landfilling cost $55.00, $40.50, and $40.00, respectively (Table 2B, Attachment 2). The survey asked for total costs including hauling. The longer hauling distances to land application sites in Southern California could account for why Southern California land application costs are higher than Bay Area costs.

Revenue

Bay Area

No Bay Area agencies reported revenue production from the sale of its biosolids or biosolids products.

Southern California

As seen in Table 10, Encina is the only Southern California agency that reported revenue generation from the sale of its dried pelletized biosolids product at about $17.00 per wet ton (at 92% TS). It should be noted that this is the actual cost (not net cost). In future, Encina plans to generate $50.00 per wet ton as they enter more exclusively into the nursery and golf course fertilizer market. Ventura is also considering marketing and generating revenue through future sales of its dried biosolids products.

Table 10
Revenue Generated by Sale of Biosolids

Southern California Agencies			
Agency	**Dried Pellets ($)**	**Other Dried Product ($)**	**Other ($)**
Encina	17+		
Ventura Water Reclamation Facility		0*	

*Just starting to market the product

Upgrades in 2040

Bay Area

Based on the survey, EBMUD is the only Bay Area agency that currently produces Class B cake and plans to upgrade to Class A/EQ product between now and 2020. Three additional agencies (CMSA, Santa Rosa and DDSD) have reported plans to upgrade to produce Class A/EQ product by 2040, as shown in Table 11.

Table 11
Anticipated Bay Area Agencies to Upgrade to Class A/EQ by 2040

Bay Area Agencies			
Agency	**Class B Cake**	**Class A/EQ Cake**	**Predicted Cost**
Central Marin Sanitation Agency		X	Not yet determined
Delta Diablo Sanitation District		X	$5,000,000
Dublin-San Ramon Services District	X		
East Bay Municipal Utility District[1]		X	190M $
Fairfield-Suisun Sewer District	X		
Millbrae	X		
North San Mateo	X		
Novato S.D. Novato WWTP	X		
Sacramento Regional County Sanitation District	X		
Santa Rosa		X	Not yet determined
South San Francisco	X		
Union Sanitary District	X		

[1]EBMUD plans to produce Class A/EQ Cake by 2020

Southern California

No Southern California agency reported plans to upgrade its products between now and 2020; however, OCSD does anticipate facility upgrades to produce Class A/EQ biosolids before 2040. Presently, OCSD produces Class B cake with 40% of it going to composting (Table 3C, Attachment 1).

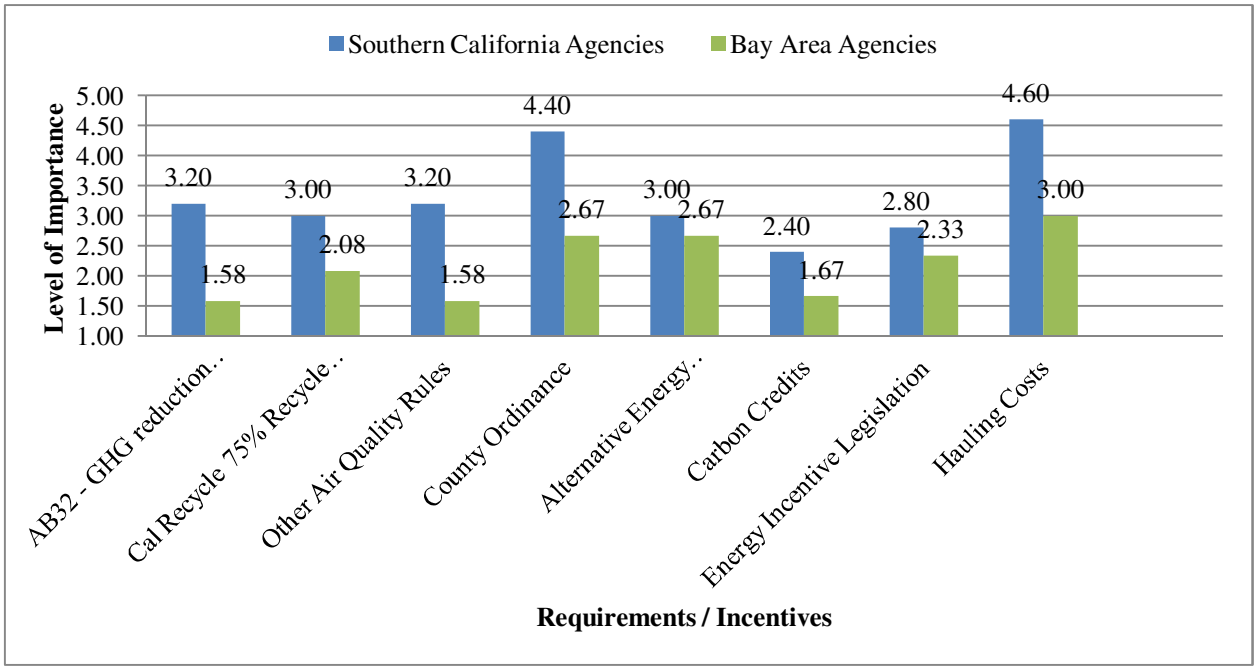
Requirement/Incentive Drivers

The following factors were identified as major drivers that may impact biosolids programs in both the Bay Area and Southern California regions:

- AB32 – Greenhouse gas (GHG) reduction requirements
- CalRecycle – 75% recycle goal
- Other air quality rules
- County ordinances
- Alternative energy production
- Carbon credits
- Energy incentive legislation
- Hauling costs

Each agency was asked to rank these factors on a scale of 1 to 5 by level of importance, with 5 being the most significant driver. Figure 6 below presents the different drivers impacting biosolids programs in both the Bay Area and Southern California regions.

Figure 6
Ranked Importance of Factors Driving Biosolids Programs for Surveyed Agencies



Bay Area

Notably, Bay Area agencies scored each requirement and incentive category lower than their Southern California counterparts. The Bay Area agencies reported hauling costs to be the most important factor driving the agencies' biosolids program scoring 3 out of 5. The second largest driver, county ordinances and alternative energy production, were ranked as average importance at 2.67 out of 5. Energy incentive legislation was ranked as the third largest driver, scoring 2.33 out of 5. GHG reduction and other air quality rules were ranked as the least important factors, averaging only 1.58 out of 5 (Table 4A, Attachment 1).

Southern California

Southern California agencies also reported hauling costs and county ordinances to be the most significant drivers to their biosolids programs. On average, these categories were ranked 1.60 and 1.73 points *higher* than the same categories ranked by the Bay Area agencies, perhaps indicating how the critical lack of sufficient local land application options has resulted in long distance hauling for Southern California agencies. For example, the City of LA hauls to Kern County, a roundtrip distance of about 230 miles. Similarly, OCSD hauls to Yuma County in Arizona, a roundtrip distance of over 400 miles. Air quality rules were also reported to be factors driving Southern California biosolids programs, with AB 32 GHG reduction requirements and other air quality rules both ranking 3.20 out of 5. Perhaps this is a reflection

of the more restrictive air quality requirements in Southern California. Carbon credits received the lowest scores, averaging a score of 2.40 (Table 4B, Attachment 1).

Challenges

The following potential challenges were presented to both Bay Area and Southern California agencies for their evaluation as real challenges:

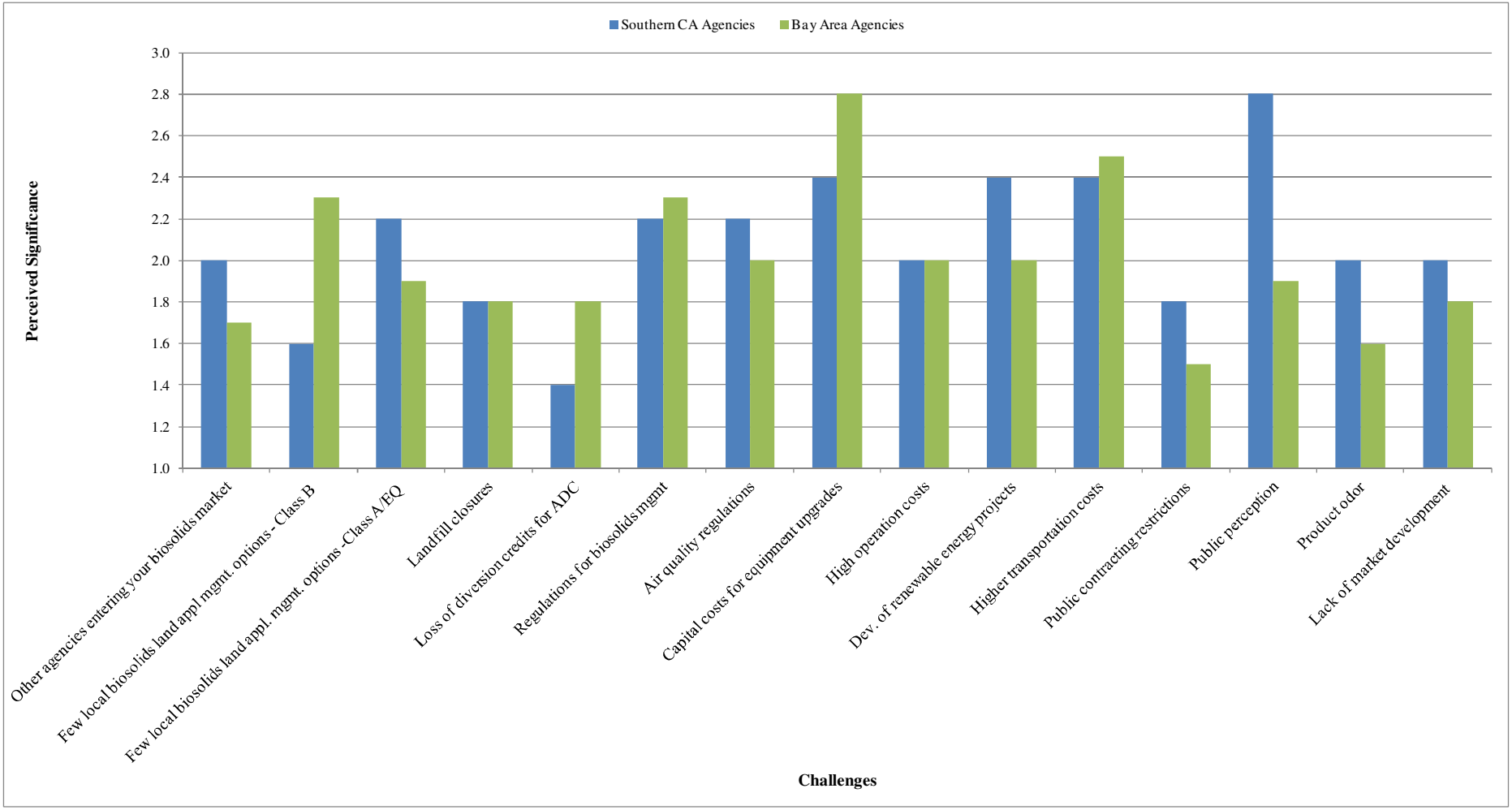
- Other agencies entering your biosolids market
- Few local biosolids land application options for Class B product
- Few local biosolids land application options for Class A/EQ product
- Landfill closures
- Loss of diversion credits for ADC
- Regulations for biosolids management
- Air quality regulations
- Capital costs for equipment upgrades
- High operation costs
- Development of renewable energy projects
- Higher transportation costs
- Public contracting restrictions
- Public perception
- Product odor
- Lack of market development

Agencies were asked to assign a rank to these potential challenges on a scale of 1 to 3, with 1 being the least perceived potential challenge and 3 being the most significant potential challenge. Figure 7 on the following page is a comparative chart showing the level of significance for each potential challenge for Bay Area and Southern California agencies.

Bay Area

Bay Area agencies reported capital costs for equipment upgrades to be the largest challenge impacting plans for their biosolids programs between now and 2020, scoring 2.8 out of 3. Higher transportation costs, lack of local biosolids management options for land application of Class B biosolids, and increasingly stringent state and federal regulations for biosolids management, are also considered significant challenges for Bay Area agencies, ranking 2.5, 2.3, and 2.3, respectively. Public contracting restrictions and product odor were judged as the least significant challenges to the future of the Bay Area agency biosolids programs, scoring 1.5 and 1.6, respectively (Table 5A, Attachment 1).

Figure 7
Ranked Potential Challenges for Biosolids Programs in the Future



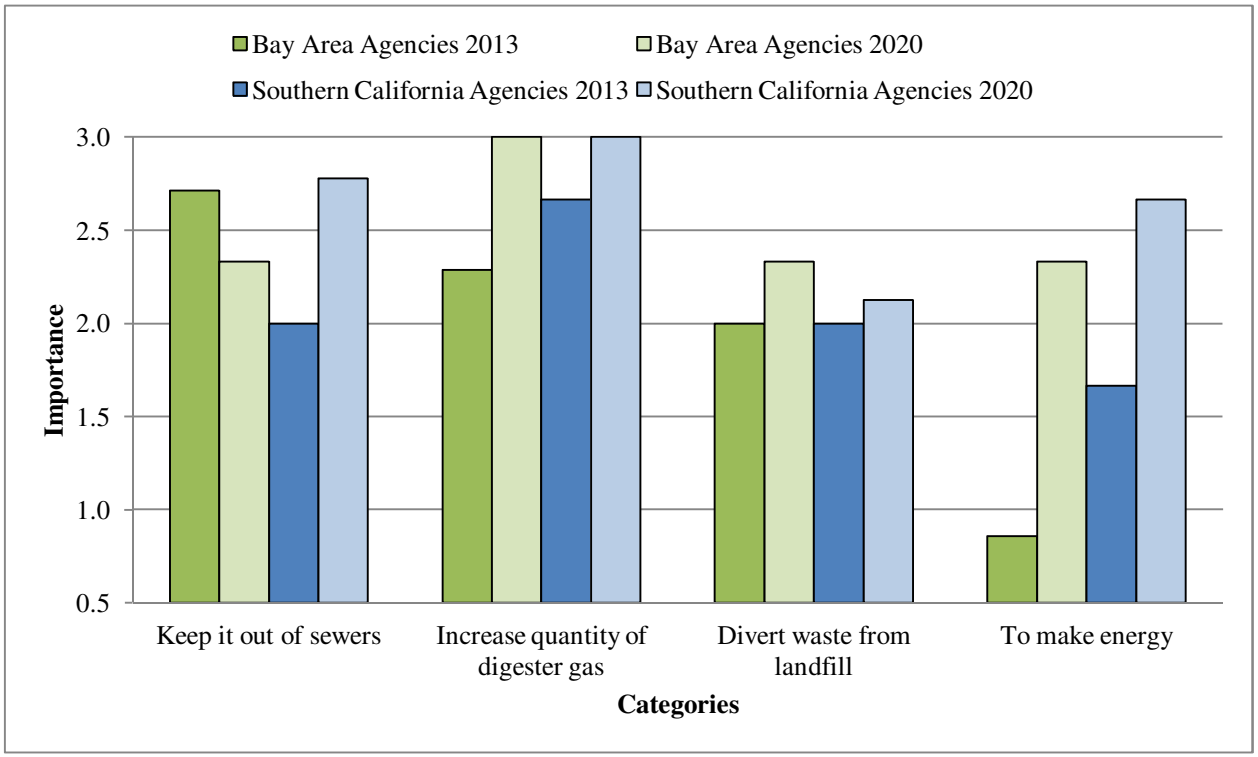
Southern California

Southern California agencies reported public perception to be the most significant challenge to the future of their biosolids program, earning a score of 2.8 out of 3. Other substantial challenges include capital costs for equipment upgrades, development of renewable energy projects, and higher transportation costs. Each of these factors received an average score of 2.4. Loss of diversion credits for ADC was not viewed as a challenge for Southern California agencies, scoring only 1.4 out of 3 (Table 5B, Attachment 1). This is not surprising because the survey reported none of the participating agencies send biosolids to ADC.

Fats/Oils/Grease (FOG) and Food/Organic Waste

Agencies were surveyed regarding co-digestion with FOG and Food/Organic Waste. Figure 8 illustrates four reasons for implementing FOG and/or Food/Organic Waste co-digestion, now and in the year 2020.

Figure 8
Ranked Importance for Co-Digesting FOG Currently and in 2020



FOG

Bay Area

Seven Bay Area agencies reported that they currently accept or very soon will be accepting FOG or other grease substances for co-digestion with biosolids. Two additional agencies plan to start accepting FOG by 2020. Of the agencies currently accepting a substance for co-digestion, two agencies (Millbrae and SRCSD) accept only FOG, two agencies (FSSD and Santa Rosa) accept only industrial waste, and two agencies (CMSA and EBMUD) accept both FOG and industrial waste. Table 12 presents the quantities

of FOG accepted now and anticipated to be accepted in 2020 for Bay Area agencies. As can be seen in Table 13, the primary discharge point for these substances is directly into anaerobic digestion. Only Santa Rosa receives FOG at the headworks.

Table 12
Quantities of FOG (gallons per month)

Bay Area Agencies			
Agency	**2012**	**2020**	**Beyond 2020**
CMSA [1]	0	250	250
DDSD	0	150	150
DSRSD	0	150	150
EBMUD	No response		
FSSD	226	226	226
Millbrae	90	225	275
North San Mateo	20	42	83
SRCSD	30	38	40
Santa Rosa	1655	No response	

[1]CMSA is in the final stages of upgrading its plant and foresees accepting FOG/industrial waste within the next few months.

Table 13
Discharge Points for Bay Area Agencies Accepting FOG/Industrial Waste

Bay Area Agencies				
			Discharge Point	
Agency	**FOG**	**Industrial Waste**	**Headworks**	**Directly in Anaerobic Digestion**
Central Marin Sanitation Agency	X	X		X
East Bay Municipal Utility District	X	X		X
Fairfield-Suisun Sewer District		X		X
Millbrae	X			X
Sacramento Regional County Sanitation District	X		*Not specified*	
Santa Rosa		X	X	

Southern California

Two of the five surveyed Southern California agencies (OCSD and City of LA) presently accept a grease substance at their facilities. While OCSD accepts a very negligible amount of FOG that is received directly into the headwords, City of LA accepts both FOG and industrial waste for co-digestion and

injects the waste directly into the digesters. Encina is planning to accept FOG by the year 2014 (Tables 6A and 6B, Attachment 1).

Reasons for Accepting FOG

As can be seen in Table 14 below, with a score of 2.7 out of 3, the primary reason Bay Area agencies reported accepting FOG and industrial waste currently is to keep this material out of the sewers. Additionally, increasing the quantity of digester gas was seen as a very important reason for five of the seven Bay Area agencies that currently accept FOG, gaining a total rank of 2.3 out of 3. Two agencies (DDSD and DSRSD) are currently not using FOG for co-digestion, but plan to accept it in the near future to increase the quantity of digester gas. Making other forms of energy (such as biodiesel) was reported to be a relatively minor reason for accepting this waste.

The reasons for accepting FOG today mirror those for 2020. The agencies reported increasing the quantity of digester gas to be the most important reason for accepting FOG and industrial waste. Table 15 below presents the anticipated reasons reported by Bay Area agencies that intend to accept FOG by year 2020.

Keeping the material out of sewers and diverting waste from landfills were also reported to be significant reasons for accepting this material by two of the three Southern California agencies, currently and in year 2020 (Tables 7A and 7B, Attachment 1).

Table 14
Reasons for Accepting FOG Currently by Bay Area Agencies

Bay Area Agencies (0 = least important, 3 = most important)					
Agency	**Keep FOG Out of Sewers**	**Increase Quantity of Digester Gas**	**Divert Waste from Landfill**	**Make Energy Form(s) Other than Biogas**	**Other[2]**
Central Marin Sanitation Agency	3	3	2	1	
East Bay Municipal Utility District	3	3	3	1	
Fairfield-Suisun Sewer District	2	3	1	1	
Millbrae	3	3	3	1	
North San Mateo[1]	3	0	3	0	3
Sacramento Regional County Sanitation District	2	3	1	1	
Santa Rosa	3	1	1	1	
Average	2.7	2.3	2.0	0.9	3.0

[1]North San Mateo currently accepts a grease substance but has not yet introduced it into the digesters

[2]Pollution prevention program and permit compliance

Table 15
Anticipated Reasons for Accepting FOG by Bay Area Agencies by 2020

Bay Area Agencies (0 = least important, 3 = most important)					
Agency	**Keep FOG Out of Sewers**	**Increase Quantity of Digester Gas**	**Divert Waste from Landfill**	**To Make Energy**	**Other[1]**
Central Marin Sanitation Agency	3	3	3	3	
Delta Diablo Sanitation District	3	3	2	2	
Dublin San Ramon	2	3	1	3	3
East Bay Municipal Utility District	3	3	3	3	
Fairfield-Suisun Sewer District	2	3	1	2	
Millbrae	3	3	3	3	
North San Mateo	3	3	3	3	
Sacramento Regional County Sanitation District	3	3	1	2	
Santa Rosa	3	3	*No Response*	3	
Average	2.78	3.00	2.13	2.67	

[1]Provide local disposition site for business

Food Waste / Organic Waste

Bay Area

Only three bay area agencies (CMSA, EBMUD and SRCSD) currently accept food or other organic waste for co-digestion. As shown in Table 16 and Table 17 below, similar to FOG and industrial waste, the primary reason for accepting this waste now and in 2020 is to increase the amount of biogas generated. Increasing biogas production and diverting organic waste from landfills were both reported to be moderately important reasons for accepting this waste. Agencies reported that increasing the nutrient value of biosolids is a minor reason for accepting this waste.

Table 16
Reasons for accepting Food/Organic Waste Currently by Bay Area Agencies

Bay Area Agencies (0 = least important, 3 = most important)				
Agency	**Have Additional Digestion Capacity**	**Increase Amount of Digester Gas**	**Divert Food or Organic Waste from Landfill**	**Increase Nutrient Value of Biosolids**
Central Marin Sanitation Agency	3	3	3	2
East Bay Municipal Utility District	3	3	3	2
Sacramento Regional County Sanitation District	2	3	1	1
Average	2.7	3.0	2.3	1.7

Table 17
Anticipated Reasons for accepting Food/Organic Waste by Bay Area Agencies in 2020

Bay Area Agencies (0 = least important, 3 = most important)				
Agency	**Have Additional Digestion Capacity**	**Increase Amount of Digester Gas**	**Divert Food or Organic Waste from Landfill**	**Increase Nutrient Value of Biosolids**
Central Marin Sanitation Agency	3	3	3	2
East Bay Municipal Utility District	3	3	3	2
Sacramento Regional County Sanitation District	1	3	1	1
Santa Rosa[1]	*	*	*	*
Average	2.3	3.0	2.3	1.7

[1]Biosolids Management Strategic Planning currently under progress.

Southern California

Only one agency in Southern California – City of LA – reported that it currently accepts food or other organic waste for co-digestion. Two additional agencies – Encina and OCSD – plan to accept food waste by year 2020. The primary reason for accepting this waste now and in 2020 is to increase the amount of biogas generated. Having additional capacity in digesters, increasing the nutrient value of biosolids, and diverting organic waste from landfills were each reported to be moderately important reasons for accepting this waste (Tables 8A and 8B, Attachment 1).

Operating Difficulties

Out of all surveyed agencies (Bay Area and Southern California), only EBMUD reported operating difficulties in accepting food waste and other HSW because of grit accumulation and equipment plugging, as shown in Table 18.

Table 18
Operating Difficulties in Accepting Food/Organic Waste

Southern California and Bay Area Agencies			
Agency	**No**	**Yes**	**Explanation**
Central Marin Sanitation Agency	X		
City of Los Angeles	X		
East Bay Municipal Utility District		X	Grit, equipment plugging
Sacramento	X		

Biosolids Master Plans

Bay Area

Only four of 12 Bay Area agencies (CMSA, DSRSD, EMBUD and SCRSD) reported that they have developed biosolids master plans, feasibility studies, or pilot studies for FOG or food waste. Three of these agencies will allow the SFPUC to obtain a copy of the aforementioned study (Table 9A, Attachment 1).

Southern California

Three of five Southern California agencies (Encina, IEUA and OCSD) reported that they have developed biosolids master plans, feasibility studies, or pilot studies for FOG or food waste. Each of these agencies has granted permission for the SFPUC to obtain a copy its study (Table 9B, Attachment 1).

Impacts of Recent Events on Biosolids End-use

Renewal of Solano County Land Application Ordinance

In 1995 Solano County adopted an ordinance to preserve land application of Class B biosolids, and in 2007, this ordinance was renewed. In 2012, Solano County revised their biosolids land application ordinance to include a date by which bay area agencies wishing to land apply Class B biosolids, convert biosolids-to-energy, or otherwise divert Class B biosolids away from land spreading.

Extension of San Luis Obispo Interim Ordinance

In March 2013, the San Luis Obispo County Board of Supervisors unanimously approved an extension of the existing interim biosolids ordinance until March 2017 as requested by County staff and supported by California Association of Sanitation Agencies (CASA). Even though this interim ordinance is restrictive, it excludes biosolids compost from its regulation. Although extension of this interim ordinance is not ideal, it is certainly the "better" option in lieu of other options that were under consideration, including making this interim ordinance permanent or funding an Environmental Impact Report (EIR) for a new permanent ordinance, which was likely to be even more restrictive. By extending the interim ordinance until 2017 the county is provided time to review the science and the issues, and consult with others, while drafting a new ordinance.

Court Ruling in Kern County

Measure E is a Kern County ballot measure approved by voters in 2006 that was designed to ban in unincorporated areas of the county the use of agricultural fertilizer made from biosolids. The City of Los Angeles and other filed suit in state court and in 2011 won a preliminary injunction to temporarily block Kern County from enforcing Measure E. Kern County appealed the ruling, but in February 2013 the state appellate court upheld the preliminary injunction pending resolution of the lawsuit. In upholding the injunction, the appellate panel stated "Measure E is likely to be held invalid because land application of biosolids, which undisputedly allows solid waste to be disposed of through recycling instead of in landfills or incinerators, is an activity the California Integrated Waste Management Act (CIWMA) seeks to promote and Measure E purports totally to ban." The Measure E legislation is currently under review by the California Supreme Court; however, the court will only be ruling on a tolling issue. Therefore, it may take up to another year before the lawsuit is settled.

Bay Area

Out of the 12 Bay Area agencies, 10 reported that the above-mentioned recent positive events indicate that land application of biosolids continues to be a viable market in California. Two agencies reported that its future biosolids plans have changed as a result of these recent actions (Table 11A, Attachment 1).

Southern California

A majority (four of five) of the surveyed Southern California agencies also reported that the recent events described above demonstrate that land application of biosolids is still a promising market in California. None of the agencies reported a change in their future biosolids plans as a result of these events (Tables 10B and 11B, Attachment 1).

ATTACHMENTS

Attachment 1 – Survey Results Tables

Attachment 2 –Calculations for Biosolids End-use/Disposition Costs

ATTACHMENT 1

SURVEY RESULTS TABLES

ATTACHMENT 2

CALCULATIONS FOR BIOSOLIDS END-USE / DISPOSITION COSTS