



**Better
Buildings[®]**
U.S. DEPARTMENT OF ENERGY

Waste Reduction Pilot Quarterly Call

Waste Reduction Pilot

31 total partners – 19 Industrial, 12 Buildings
2 newest partners: Sprint and Steelcase



Steelcase

Waste Pilot website:

<https://betterbuildingssolutioncenter.energy.gov/special-initiatives/waste-reduction-pilot>

3 presentations posted:

- Bristol-Myers Squibb
- Flowers Foods
- Volvo Trucks

Waste Reduction Pilot

Quarterly calls: What do we hope to get out of them?

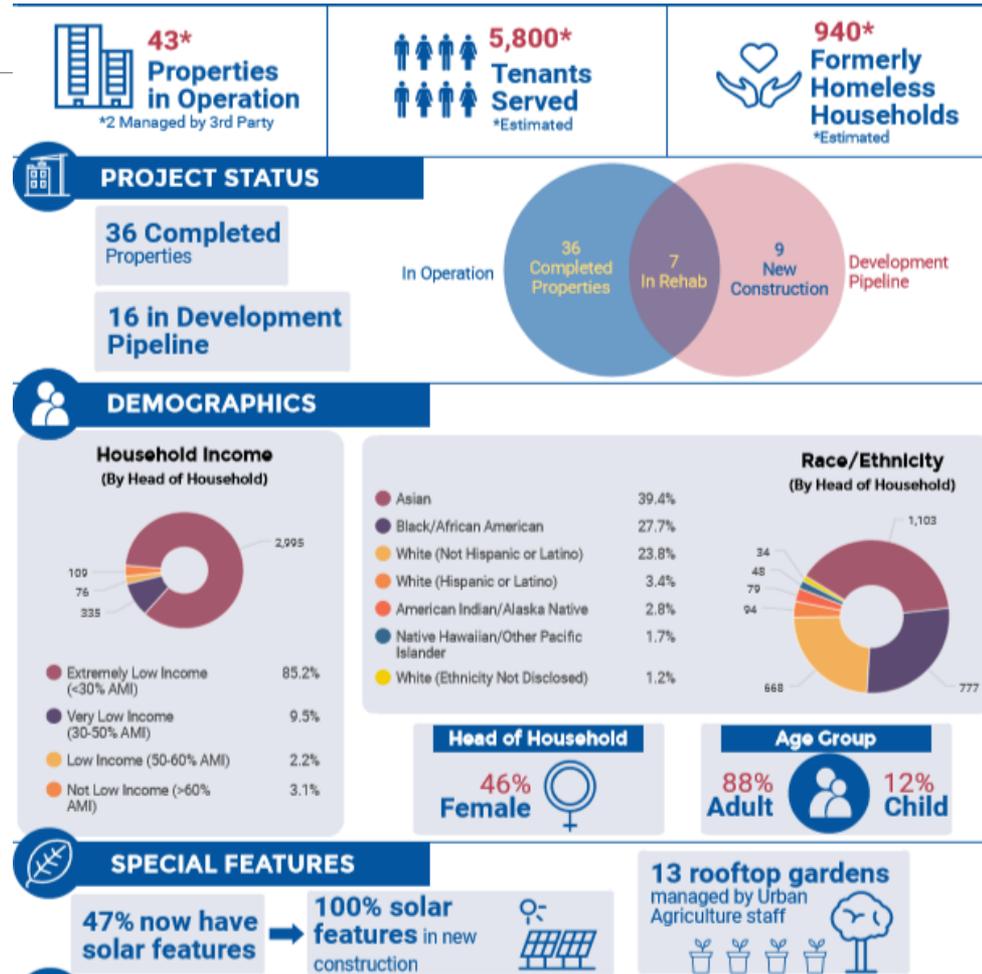
1. Spotlight Leadership – Share Best Practices
2. Present Valuable Resources
3. Provide a Forum to Share Challenges and Opportunities

Waste Management Approach

BBC WASTE PILOT WEBINAR, FEBRUARY 2020,
TENDERLOIN NEIGHBORHOOD DEVELOPMENT CORPORATION
(TNDC)



Our Story, Our Future



Why Manage Waste?



Cost – 2019 budget: \$1.4M vs. actual \$1.5M



Regulation - mandatory recycling and composting ordinance (No. 100-09)



Sustainability - climate change solution



Reputation

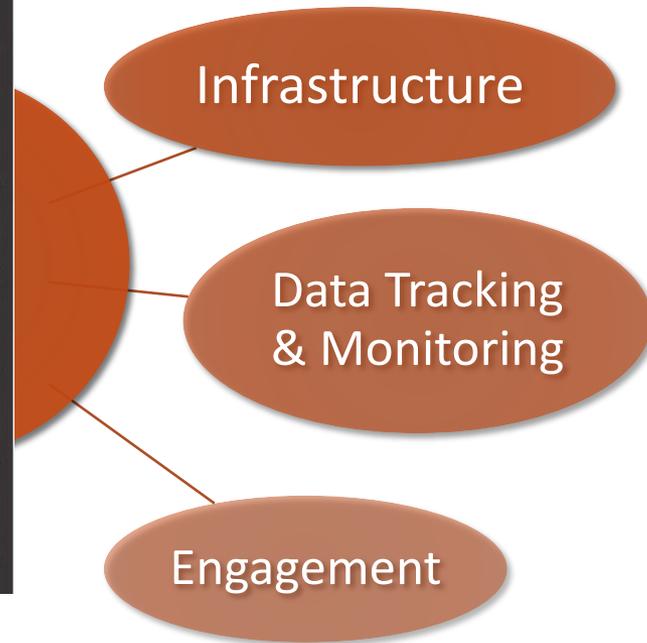


Visit [SFRecycles.org](https://www.sfrrecycles.org)

Waste Goal – Increase Diversion Rate to **60%** by 2028, with baseline of (34%) 2019.

3 Pronged Approach

RECYCLE 回收 REICLAR	COMPOST 堆肥 COMPOSTAR	LANDFILL 填埋區 BASURERO
Paper 紙 Papel	Food scraps 廚餘食物 Restos de comida	Shiny wrappers 光滑的食品塑料包裝 Envolturas brillantes de comida
Plastic 塑膠 Plástico	Paper towels & tissues 擦手紙和紙巾 Toallas y pañuelos de papel	Broken ceramics 破碎陶瓷器皿 Objetos de cerámica rotos
Glass 玻璃 Vidrio	Dirty paper containers 髒的紙盒 Recipientes sucios de papel	Rubber gloves 橡膠/乳膠手套 Guantes de caucho/látex
Metal 金屬 Metal	Compostable products 可有機分解的產品 Artículos compostables	Pouches 複合包裝袋 Paquetes de bebidas
Cartons 紙包飲品盒 Cartones	Plants 植物 Plantas	Polystyrene foam 聚苯乙烯泡沫/泡沫製品 Espuma de poliestireno



Infrastructure – Bins and Chutes

Old Buildings



Infrastructure – Bins and Chutes

New Buildings



Data Source

ANTONIA MANOR - TNDC
 180 TURK ST.
 SAN FRANCISCO CA 94102

Account Number: 010638312
Bill Date: 08/31/2019

Days of Service: -TW-F--

Billing Questions Call: 415-626-4000

Account Summary

Billing Number: 56891187
 Service From: 08/01/2019
 Service To: 08/31/2019
 Current Charges: 2648.22
Balance Due: 2648.22

Announcements

Monthly Rate: 2464.06

Bill Detail

Date	Description of Billing Charges	Amount
	PREVIOUS BALANCE	2463.06
08/05/2019	E-BILL PAY 001908022202212	-2463.06
08/31/2019	1-1YD TRASH CMPCTR-3dys/wk AUG	1419.72
08/31/2019	1-3-64GL RECYCLE-2dys/wk AUG	593.94
08/31/2019	1-3-64GL COMPOST-2dys/wk AUG	593.94
08/31/2019	1-LIFE LINE DISCOUN-1dy/wk AUG	-273.79
08/31/2019	BIN ACCESS CHARGE AUG	86.88
08/31/2019	BIN ACCESS CHARGE AUG	86.88
08/31/2019	BIN ACCESS CHARGE AUG	86.88
08/06/2019	CONTAMINATED 64 GAL COMPOST	30.86
08/06/2019	CONTAMINATED 64 GAL COMPOST	30.86
08/06/2019	CONTAMINATED 64 GAL COMPOST	30.86
08/13/2019	CONTAMINATED 64 GAL COMPOST	30.86
08/13/2019	CONTAMINATED 64 GAL COMPOST	30.86
08/13/2019	CONTAMINATED 64 GAL COMPOST	30.86
08/27/2019	CREDIT FOR E-PAYMENT 8/05/19	-1.00
	DIVERSION DISCOUNT AUG 05%	-130.39
	VOLUMETRIC DIVERSION RATE 30%	.00
	Balance Due	2648.22

Bill Anatomy

$$\text{Diversion Rate \%} = \frac{R+C}{R+C+T}$$

Diversion Discount, only if
 Diversion Rate is 25% or
 more.

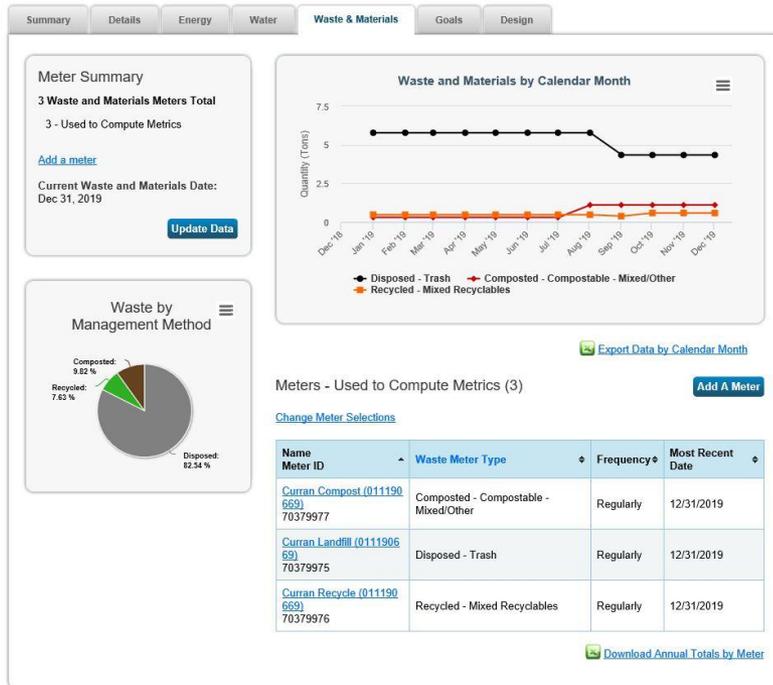
Data Tracking & Monitoring

Portfolio Analysis

	name	1036 Mission St	270 Turk	Cameo	Civic Center Reside	Clementina	Curran House	Dalt Hotel	Eddy & Taylor	Eddys	
	address	1036 Mission St	270 Turk	481 EDDY ST	44 MC ALLISTER ST	320/390 CLEMENTINA	145 TAYLOR ST	34 TURK ST	222 Taylor	939 Eddy (939 & 951	
	name on bill	1036 Mission St Assc	270 Turk GP, LLC	Cameo Apartments-T	Civic Center Reside	Clementina Towers A	Curran House TNDC,	Dalt Hotel TNDC, 34	Turk St	939 Eddy (939 & 951	
landfill	scheduled /wk	1-2 YD CMP- 2/wk	4- 96 gal-7/wk	5-64gal-2/wk	2-1YR CM-5/wk	2-2YD CM-2/wk	1-1.5 Y CMP-3/wk	7-96gal-3/wk	1-1.5 YR CMP- 4/wk	1-2YD-2/wk	
scheduled	unit(YR/gal)/mth	48 YR	10752 gal		120 YD	96 YD	54 Y		72YD	16 YD	
	gal/mth	9696	10752	2560	24240	24240	19392	10908	8064	14544	3232
	cost/month				2366.2 x2	1892.96x2		2511; 418.5			
	cost/month.total	1892.96	3005.04	527.2	4732.4	3785.92	2129.58	2929.5	2839.44	665.49	
	cost/gal	0.20	0.28	0.21	0.20	0.20	0.20	0.36	0.20	0.21	
extra	extra cost	655.50									
	contamination fee										
(total for ESPM)	total gal	9696	10752	2560	24240	19392	10908	8064	14544	3232	
	total cost	2548.46	3005.04	527.20	4732.40	3785.92	2129.58	2929.50	2839.44	665.49	
recycle	scheduled /wk	1-2 YD- 2/wk	6-96 gal- 6/wk	4-64gal-2/wk	9-96 gal-1/wk	5-96 gal-2/wk	9-96 gal-1/wk	3-96gal-1/wk	1-2YR- 4/wk	2-96gal-2/wk	
	unit(YR/gal)/mth	16 YD							32 YD		
	gal/mth	3232	13824	2048	3456	3840	3456	1152	6464	1536	
	cost/month				837; 418.5			418.5			
	cost/month.total	1063.28	3202.74	421.76	1255.5	1395.00	963.83	418.5	2126.56	316.32	
	cost/gal	0.33	0.23	0.21	0.36	0.36	0.28	0.36	0.33	0.21	
extra	extra cost						130.50				
	contamination fee	151.68									
(total for ESPM)	total gal	3232	13824	2048	3456	3840	3456	1152	6464	1536	
	total cost	1214.96	3202.74	421.76	1255.50	1395.00	1094.33	418.50	2126.56	316.32	
compost	scheduled /wk	2-64 gal-2/wk	2-64 gal-3/wk	1-64gal-1/wk	9-32-1/wk	4-64gal-2/wk	3-64 gal-1/wk; 8-32g;	1-64gal-1/wk	2-64 gal- 4/wk; 7-32g;	1-64gal-1/wk	
	unit(YR/gal)/mth						768;2048		2048; 1792		
	gal/mth	1024	1536	256	1152	2048	2816	256	3840	256	
	cost/month				311.52; 155.76		296.97; 623.04; 207.4		98.99 791.92; 623.04; 103.84		
	cost/month.total	395.96	316.32	52.72	467.28	791.92	1127.69	98.99	1518.8	52.72	
	cost/gal	0.39	0.21	0.21	0.41	0.39	0.40	0.39	0.40	0.21	
extra	extra cost										
	contamination fee	30.86							61.72		
(total for ESPM)	total gal	1024	1536	256	1152	2048	2816	256	3840	256	
	total cost	426.82	316.32	52.72	467.28	791.92	1127.69	98.99	1580.52	52.72	
extra	bins/cont./other	838.04					130.5		61.72		
together	total bill with all fees/disc.	3725.36	5290.76	1196.35	5938.99	6116.64	3871.34	3374.96	6075.2	1052.5	
	diversin rate	31%	59%	47%	16%	23%	37%	15%	41%	36%	
	diversion discount (%)	6%	34%	22%	-9%	-2%	12%	-10%	16%	11%	
(from the bill)	diversion discount (\$)	201.14	2218.19	220.37	0		541.53	0	1037.57	113.8	

Data Tracking & Monitoring

Energy Star Portfolio Manager



2019 Q4 Waste Variance Report

Clementina



Avg. Diversion for a Building Like Yours: 42%					Monthly Budget
	Contamination	Diversion	Contamination Fees	Monthly Bill	\$5,283
October 2019	No	38%	0	\$4,872	Within Budget
November 2019	No	<25%	0	\$6,156	-\$873
December 2019	Yes	<25%	61.72	\$12,335	-\$7,052

Engagement

Staff buy-in and engagement

What?	Who?	How?	URL
Resources for Composting, Recycling, and Landfill. 			
Service Issue [missed pick-up extra pick-up changing day of pick-up (but: <i>not the schedule</i>)]	site staff	customerservice@recologysf.com Phone no: 415-330-1300; 415-626-4000 Joanne Wu: jwu@recology.com	
Changes to service ONLY (increase/decrease bins' size/bins' number)	site staff to reach out to TND's Sustainability team and they will request changes (Magda)	mszymanska@tndc.org	
Lost/stolen bins 	site staff	customerservice@recologysf.com Joanne Wu: jwu@recology.com	
Access to trashrooms (keys)	site staff	Joanne Wu: jwu@recology.com	
Signs: Compost, Recycle, Landfill 	site staff	Joanne Wu: jwu@recology.com Freddy Coronado Barraza: alfredo.coronado.barraza@sfgov.org	Recology Sorting Guides Signage
Door Knocking Progr & Workshops 	site staff	Freddy Coronado Barraza: alfredo.coronado.barraza@sfgov.org Miguel Guerrero: douglas.guerrero@sfgov.org	
FREE Kitchen Pails for Compost for Residents 	site staff	customerservice@recologysf.com	Recology Apartment Resources
To Get Battery Buckets for YOUR Building 	site staff	customerservice@recologysf.com	Recology Apartment Resources
When Battery Bucket is full-call for pick-up 	site staff	415-330-1300	
FREE Bulky Items Pickup 	site staff	customerservice@recologysf.com 415-330-1300	Recology Bulky Item Pick-Up
power wash	Site staff	customerservice@recologysf.com • Cart - \$85 per cart • Container - \$218.62 • Compactor - \$325 (These prices may have gone up)	
compactor malfunctioning/defect	site staff	e-mail appropriate vendor; include FM (Art) and HD (if new building)	

Engagement

Resident engagement

External partners – Recology and SF Environment

Internal partners - tenant services and on-site staff



SF Environment
Our home. Our city. Our planet.
A Department of the City and County of San Francisco



Key Takeaways

Successes

- Waste as a priority
- Increased diversion and cost savings
- Increased knowledge and capacity
- Local leadership
- Waste tracking system

Challenges

- Infrastructure and costs
- Split incentives
- Population served
- Billing and metrics

Let's Manage Waste Together!!

Thank You!

Ruchi Shah, Senior Sustainability Manager
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Plastics Innovation Challenge

February 11, 20120

Melissa Klembara
Advanced Manufacturing Office
U.S. Department of Energy

Plastic baled for recycling. Photograph by Jenna Jambeck, University of Georgia



Department of Energy Launches Plastics Innovation Challenge

NOVEMBER 22, 2019

- **Collection:** Develop novel collection technologies to prevent plastics from entering the ocean.
- **Deconstruction:** Develop biological and chemical methods for deconstructing plastic waste, including from rivers and oceans, into useful chemical streams.
- **Upcycling:** Develop technologies to upcycle waste chemical streams into higher-value products, which reduces energy intensity and encourages further recycling.
- **Design for recyclability:** Develop new plastics that are recyclable-by-design and can be scaled for domestic manufacturability.
- **Commercialization:** Support a domestic plastics upcycling supply chain for US companies to scale and deploy new technologies in domestic and global markets

<https://www.energy.gov/eere/articles/department-energy-launches-plastics-innovation-challenge>

AMO and BETO related work

Funding Opportunities

- Notice of Intent (NOI) for Funding Opportunity (FOA) to Advance DOE's Plastic Innovation Challenge posted December 10, 2019
- Topic Areas:
 - Highly Recyclable or Biodegradable Bio-based plastics
 - Novel Methods for Deconstructing and Upcycling Existing Plastic Waste
 - BOTTLE Consortium Collaborations to Tackle Challenges in Plastic Waste
- EERE-Exchange.energy.gov

Workshops

- December 11-12, 2019 Plastics for a Circular Economy Workshop
- Presentations and report-outs will be posted
- <https://www.energy.gov/eere/bioenergy/events/plastics-circular-economy-workshop>
- Report forthcoming

Other AMO and BETO related work and updates

Launched BOTTLE National Lab Consortium

- www.BOTTLE.org ; bottle@nrel.gov
- NREL, LANL, ORNL, MIT, MSU, CSU
- Collaborations part of topic 3 in the Plastics NOI
- Initiated request for ideas from existing and new lab researchers to potentially join consortium (concepts due late March via EERE Exchange)

AMO and BETO – Upcoming Funding opportunities

- AMO/BETO FOA – BOTTLE: Bio-Optimized Technologies to keep Thermoplastics out of Landfills and the Environment (\$25M, \$15M from AMO).
- BETO/AMO SBIR – Novel Utilization Strategies for Ocean Plastic Waste (\$800k - \$400k from AMO).
- RFPs for REMADE and RAPID:
 - REMADE - up to \$11M of federal funds for R&D projects spread across multiple areas.
 - Check REMADE Roadmap for additional information about what they are targeting
 - <https://remadeinstitute.org/project-call-documentation>
 - RAPID – up to \$3M of federal funds for R&D projects spread across multiple areas, with plastic upcycling highlights as an area of interest.
 - <https://www.aiche.org/rapid/call-project-submission-fall-2019>

AMO & BETO - Upcoming/Recent Events

- BETO/AMO Workshop: Plastics for the Circular Economy
 - Golden, CO
 - Dec. 11-12
 - “AMO-centric” breakout topics on:
 - composites recycling
 - manufacturing challenges and opportunities for utilizing secondary polymer feedstocks
- Industry Roundtable on Plastics Innovation Challenge
 - Pittsburgh, PA
 - Late March 2020
 - Convening executive level folks from industry

Summary of BETO/AMO Funding Opportunities

- 2019 SBIR Phase 1 Release 2: Reimagining Plastic Degradation for Upcycling \$2.2M
- 2019 BETO FOA: Plastics in the Circular Carbon Economy ~\$10M
- 2020 BETO FOA: BOTTLE FOA ~\$20M (AMO + BETO)
- 2020 BETO/AMO SBIR Phase 1 - Novel Utilization Strategies for Ocean Plastic Waste \$1M (AMO + BETO)
- 2020 Launch Plastics Upcycling BOTTLE Consortium at National Labs \$2M in FY20, \$10M in out-years (AMO + BETO)
- 2020 NSF EFRI Solicitation on Engineering the Elimination of End of Life Plastics (with AMO) up to \$30M



**Better
Buildings®**
U.S. DEPARTMENT OF ENERGY

Waste Reduction Pilot Reporting Form

Ethan Rogers

ORISE Fellow

Reporting Form

- Provide a tool for participants to record performance data in a common format.
 - Instructions page
 - Reporting form
 - Table for baseline year data
 - Table for reporting year data
 - Calculates waste diversion rate
 - Fields to collect other information
 - Table for capturing performance of multiple sites (optional)
 - Energy Recovery worksheet (optional)
 - Waste Types
 - Example reporting form (hopefully useful)
- Better Buildings Partners may want to use EPA's Portfolio Manager instead

Reporting Form

Better Buildings, Better Plants Waste Pilot

Company Name:
 Company Contact Name:
 Company Contact Title:
 Address:
 Phone:
 E-mail Address:
 NAICs of Participating Facilities (max 3):

	Baseline Year	Reporting Year
Number of Participating Facilities*:	<input type="text"/>	<input type="text"/>
Number of Participating Facilities that are manufacturing plants:	<input type="text"/>	<input type="text"/>

Waste Tracking Units**:

use drop down n list

Waste Management Hierarchy



Baseline Year						
Waste Type (use drop down lists)	Reuse and Remanufacture	Recycling	Composting	Energy Recovery***	Treatment or Disposal	Total Waste
						0
						0
						0
						0
						0
						0
						0
Totals	0	0	0	0	0	0

Reporting Year						
Waste Type (use drop down list)	Reuse and Remanufacture	Recycling	Composting	Energy Recovery***	Treatment or Disposal	Total Waste
						0
						0
						0
						0
						0
						0
						0
						0
Totals	0	0	0	0	0	0

Waste Diversion Rate (%)	Baseline year	Reporting Year	Improvement
	#DIV/0!	#DIV/0!	#DIV/0!

Units for Waste Intensity Metric:			
Waste intensity metric (numeric value):	0	0	0

Reporting Form – drop down lists

Waste Tracking Units**:

Baseline Year	2017	
Waste Type	Reuse and Remanufacture	Recycling
Paperboard and cardboard	0	2000
Paper (mixed)		1000
Glass		500
Plastics (mixed)		1000
Metals (mixed)	100	4000
Food and compostables		0
Electronics, computers, printers		250
Totals	100	8750

Energy Recovery tab (optional)

Energy Recovery

Do you convert any of your waste to energy or a fuel or some other resource? If the answer is yes, please answer the following questions. If not, you do not need to fill out this tab.

Energy Recovery

How much waste was converted to energy (from Annual Form)

What units do you use to measure the volume of energy recovered? (Examples: kWh, MWh, Btus, MMBtus, Ccf, Mcf)

Was any energy recovery done off-site? If so, where?

Was any energy converted to energy on-site. If so, how was it converted to energy

Examples: Incinerator, biodigester, cogeneration, boiler, or cement kiln

What type of energy resources was your waste converted into?

Examples: Electricity, steam, hot water, biogas, fuel, other. List all that apply

Baseline Year	Reporting Year	Units
0	0	0

Cogeneration/Combined Heat & Power (CHP)

If consumed in a cogeneration/CHP system, was the waste consumed directly? (Y/N)

If not consumed directed, was the waste first converted to biogas or other fuel before combustion? If so, please identify the fuel.

How was the energy recovered? List all that apply.

Examples: Electricity, steam, hot water, fuel, other

Energy use on-site (if applicable)

How much electricity from waste-to-energy conversion was used onsite? (e.g.: kWh, MWh)

How much thermal energy from waste-to-energy conversion was used onsite? (e.g.:Btu, MMBtu, therms)

Waste Types

Waste Types

Depending on the facility type, waste categories may be more broad, such as "Trash" or "Mixed Recyclables", or may be specific to materials that are relevant to the organization, such as "Food and compostables" or "Chemicals". Pilot participants are not required to provide detailed categories for all waste, but are encouraged to do so if it is helpful for their waste tracking needs.

Pilot participants may select from the list of categories below, or choose others as needed. We have consolidated that list into a more manageable number of categories and subcategories for pilot participants' consideration.

- Appliances, metal cabinets and shelving
- Batteries
- Ceramics
- Construction and demolition debris
- Chemicals
- Electronics, computers, printers
- Fabrics and clothing
- Food and compostables
- Furniture
- Glass
- Hazardous wastes
- Light bulbs and fluorescent lights

Units

Pilot participants should identify one unit of measure to track the volume of waste(s) they are generating so that they can gauge progress towards their goal. Common units of measure are by weight (lbs, tons, kilograms) or by volume (cubic yards, square feet, gallons). Measurements by container (such as dumpster, carboy, bales) should be converted into either a weight or volumetric unit. Ideally, all waste streams are tracked by the same unit of measure so that overall progress is easily determined.

Units of Weight

- Pounds
- Tons
- Kilograms
- Metric tonnes

Units of Volume

- Cubic feet
- Cubic yards
- Cubic meters
- Gallons

Other

- Liters
- Other

Questions?



What's on your mind?

Biggest challenges you're facing?

New initiatives you're excited about?

Ways DOE can continue to support your efforts?

Reminder – BBBP Summit



2020 SUMMIT
JUNE 8-10 | ARLINGTON, VA



Thank you – See you again for the next
quarterly call in May