



**LOS ANGELES COUNTY  
SANITATION DISTRICTS**  
*Converting Waste Into Resources*

# FOOD WASTE PROGRAM UPDATE

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Solid Waste Energy Recovery

NOVEMBER 19, 2020



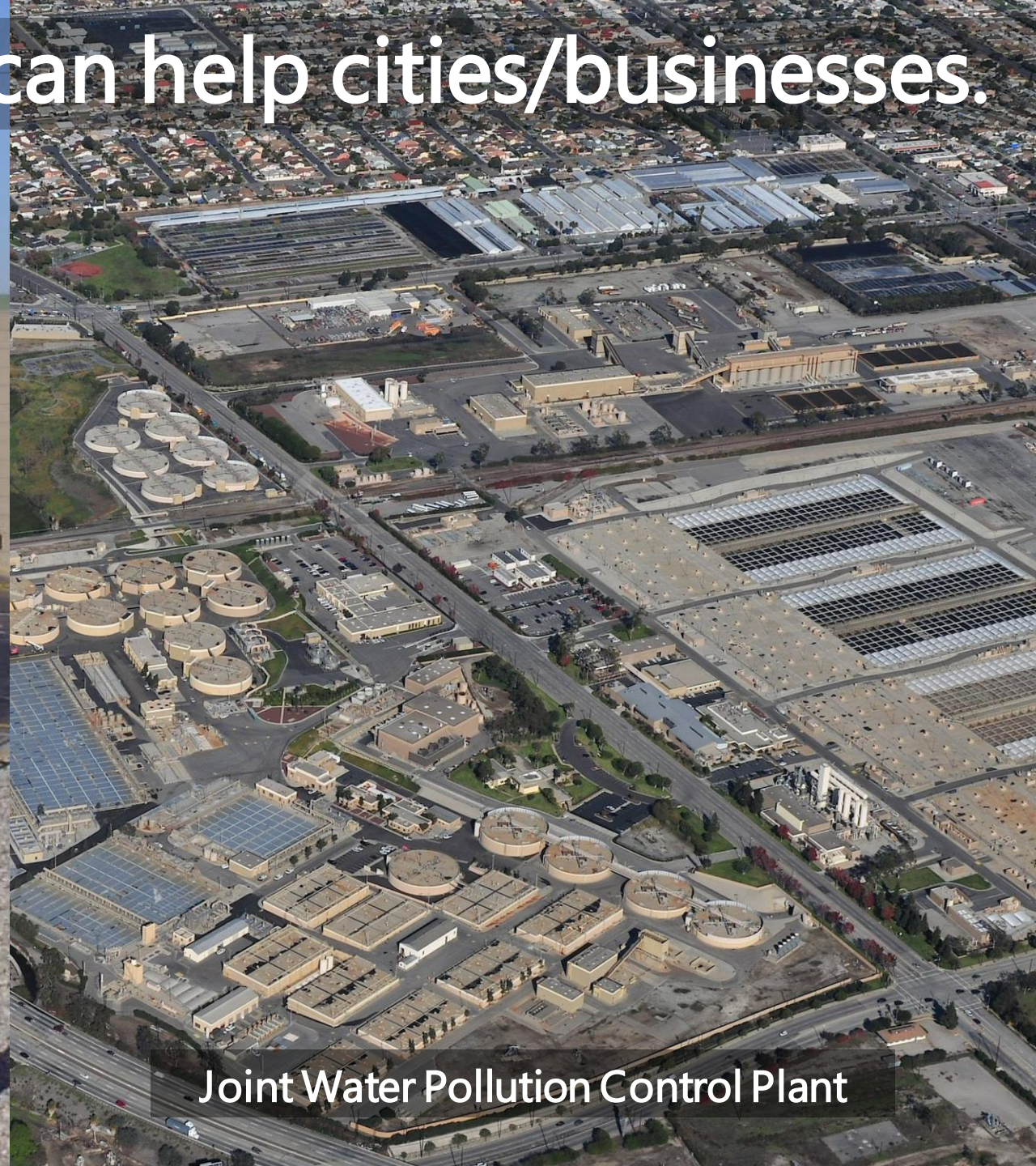
OUR SERVICE AREA



# Our food waste program can help cities/businesses.



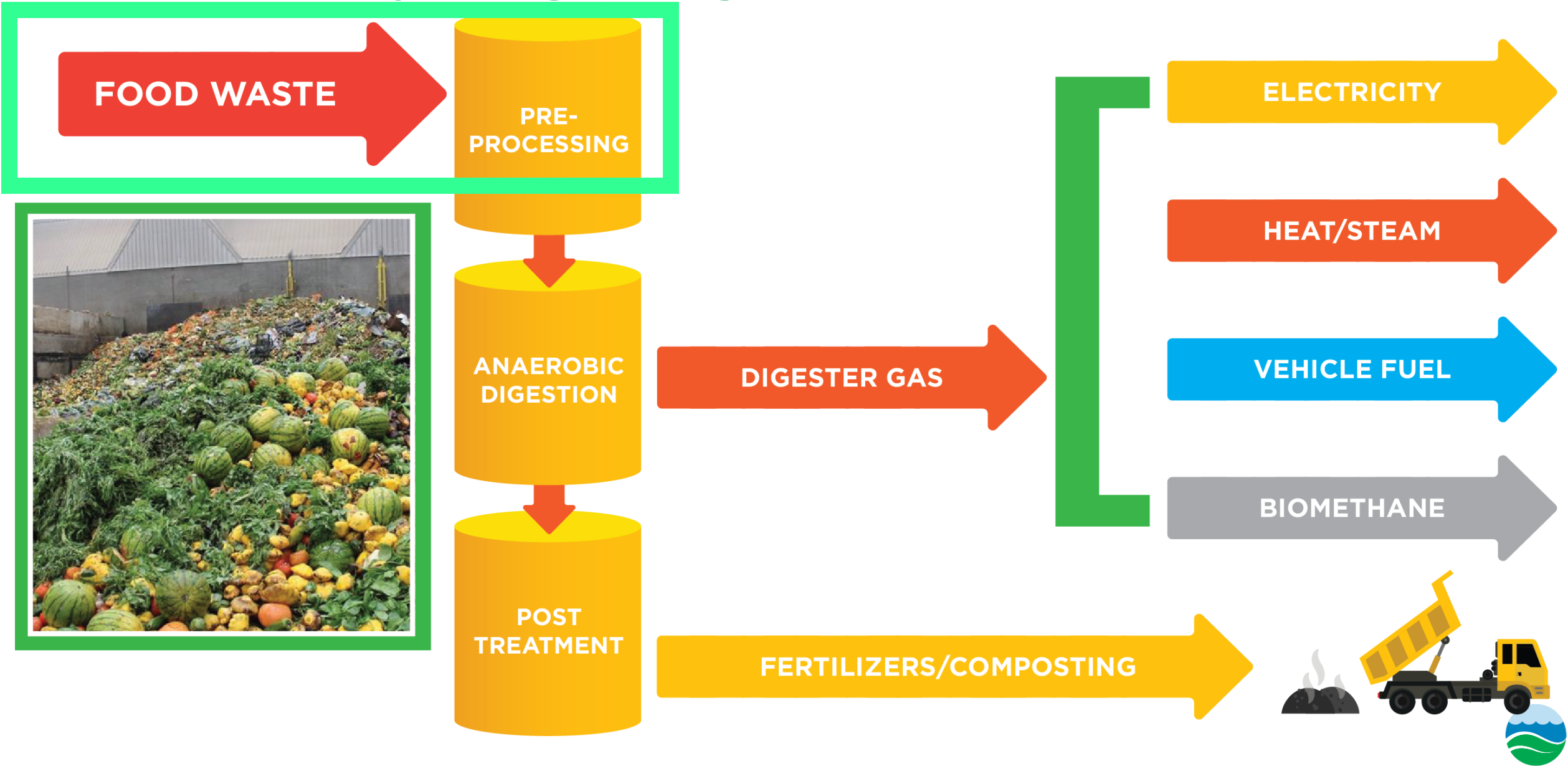
Puente Hills Materials Recovery Facility



Joint Water Pollution Control Plant



# Our recycling program has several steps.



30 tons/day of food waste is slurried at PHMRF.







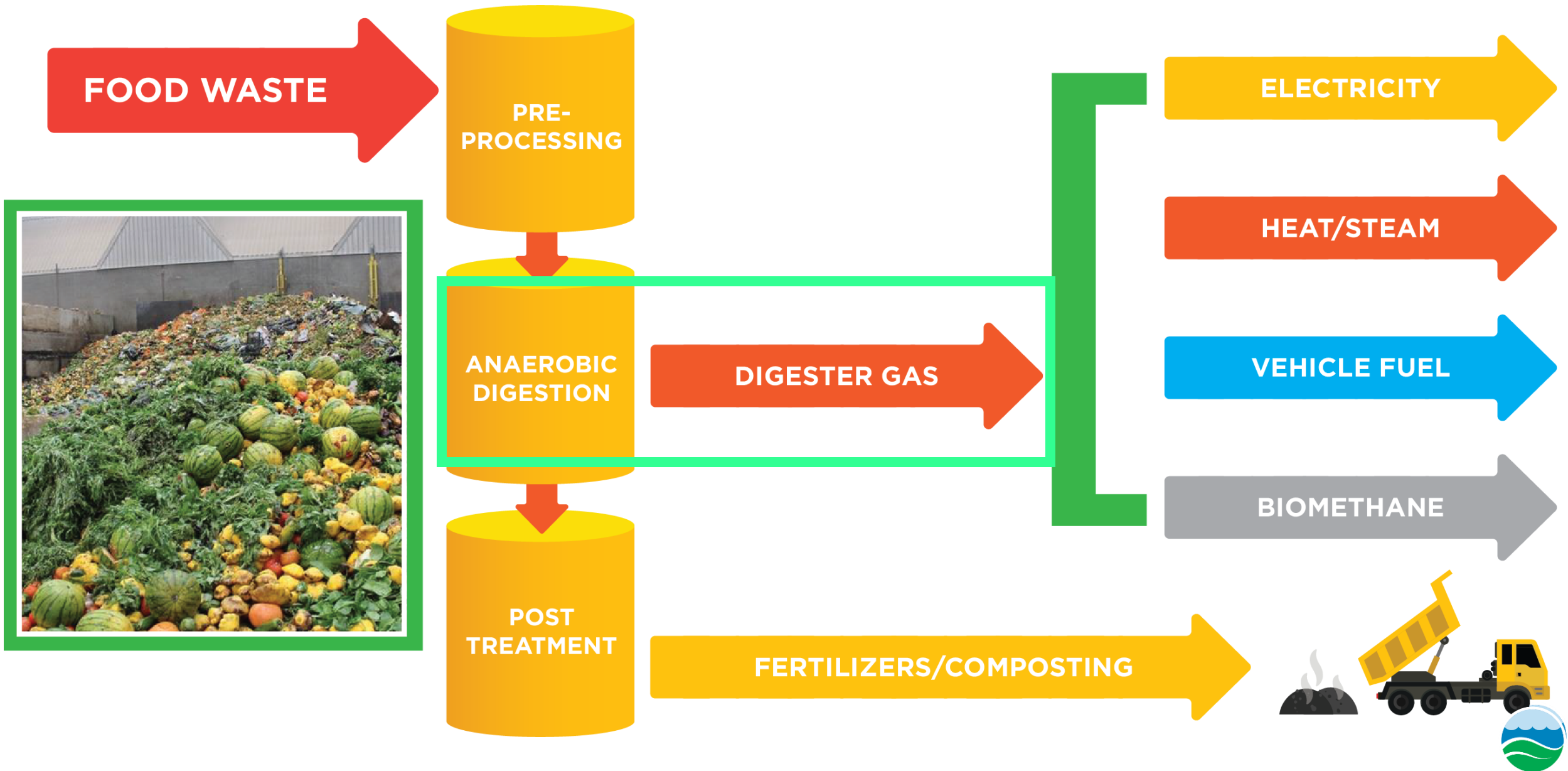
The slurry is pumped into tanker trucks.





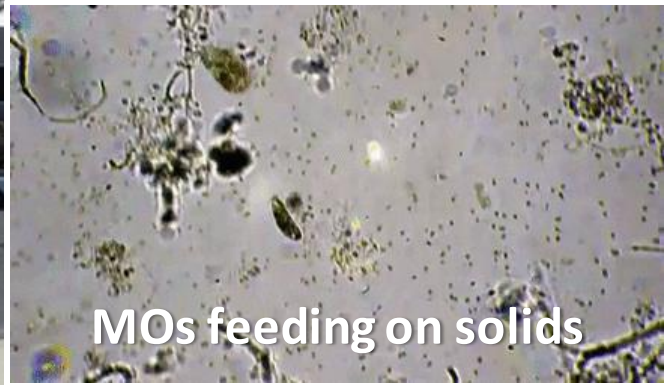
Slurried food waste is then delivered to JWPCP.







# Food waste and wastewater solids are digested.



MOs feeding on solids

24 Digesters  
Kept at 96 °F for 15-16 Days





Food waste and wastewater solids are digested.





Our power plant produces 20 MW of energy.



Renewable Energy

20 MW

Enough for 20,000 homes









The biogas is refined.





Renewable natural gas is stored.



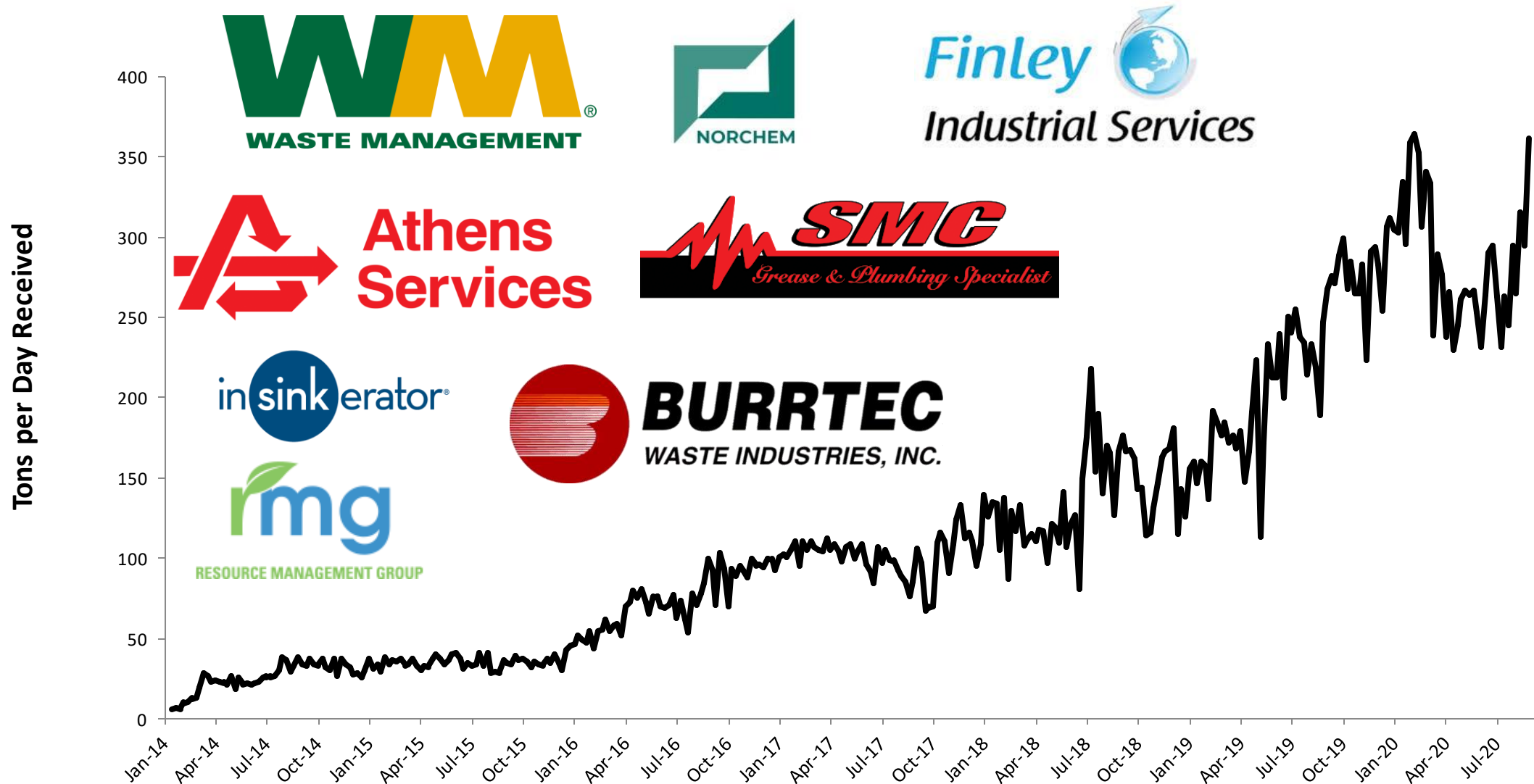


It will supply our existing fueling station.





# We're processing about 300 tons/day of slurry.





Our goal is 600 tons/day of food waste slurry.



Generation of electricity



Vehicle fuel



Injection into natural gas pipelines





# Phase 2 Energy Project

	A			B			C			D			E	F	G	H	I	J	
	Pipeline Injection Buyer X + CNG Fueling			Pipeline Injection Buyer Y + CNG Fueling			Pipeline Injection SoCalGas BCS Tariff			Pipeline Injection Vendor 1 BCS			Pipeline Injection Buyer X	BioMAT Tariff Fuel Cell 1	BioMat Tariff Microturbine 1	BioMat Tariff IC Engine	CNG Fueling BCS 2.0	SIPS Operation Vendor 2 BCS	
Energy Produced	RNG long term	RNG short term	Direct CNG	RNG long term	RNG short term	Direct CNG	Pipeline RNG			Pipeline RNG			Pipeline RNG	Electricity	Electricity	Electricity	Direct Vehicle CNG	RNG for Pumping	
Equipment Owned and Operated by	Owned by Districts Contract O&M			Owned by Districts Contract O&M			SoCalGas			Owned by Districts Contract O&M			Owned by Districts Contract O&M	Owned by Districts Contract O&M	Owned by Districts Contract O&M	Owned by Districts Contract O&M	Owned by Districts Contract O&M	Owned by Districts Contract O&M	Owned by Districts Contract O&M
Biogas Used	600	140 scfm	300	600	140 scfm	300	1,040 scfm			1,040 scfm			1,000 scfm	680 scfm	920 scfm	716 scfm	400 scfm	800 scfm	
Gas or Power Export Rate	180k mmBtu/yr	42k	2,100 GGE/d	180k mmBtu/yr	42k	2,100 GGE/d	312k mmBtu/yr			312k mmBtu/yr			300k mmBtu/yr	2,980 kW	2,680 kW	2,714 kW	2,571 GGE/day	147k mmBtu/yr avoided purchase	
Project Life	15 years			20 years			15 years			15 years			15 years	15 years	15 years	15 years	15 years	15 years	15 years
Capital Required	\$8.7 million			\$8.7 million			\$4.4 million			\$8.7 million			\$8.7 million	\$23.4 million	\$9.3 million	\$10.6 million	\$4.4 million	\$4.6 million	
Annual O&M incl. Cap Rec	\$1.4	to	\$1.8 million	\$1.2	to	\$1.8 million	\$3.1 million			\$1.4 million			\$1.4 to \$1.8 million	\$3.3 million	\$1.7 million	\$1.7 million	\$0.8 million	\$0.9 to \$1.2 million	
Gas or Power Sale Price	\$10	\$25	\$25 \$/mmBtu (each option)	\$10	\$25	\$25 \$/mmBtu (each option)	\$10	\$20	\$30 \$/mmBtu (\$ scenarios)	\$10	\$20	\$30 \$/mmBtu (\$ scenarios)	\$10.0 /mmBtu	\$127.7 /MWh	\$127.7 /MWh	\$127.7 /MWh	\$25.0 /mmBtu	\$5.7 /mmBtu escalate @5%	
Annual Income with Cap Rec	\$3.0	to	\$2.6 million	\$3.2	to	\$2.6 million	-\$1.2	\$0.7	\$2.5 million	\$0.5	\$2.4	\$4.2 million	\$1.6 to \$1.2 million	-\$0.13 million	\$1.19 million	\$1.11 million	\$1.62 million	-\$0.09 to \$0.5 million	
Total Income over Life, PV with Cap Rec	\$29.9 million			\$37.1 million			-\$12.4	\$7.0	\$26.4 million	\$5.0	\$24.4	\$43.8 million	\$15.6 million	-\$1.3 million	\$12.3 million	\$11.5 million	\$16.8 million	\$1.3 million	
Annual Income per unit Gas	\$9.7	to	\$8.2 \$/mmBtu	\$10.1	to	\$8.3 \$/mmBtu	-\$3.8	\$2.2	\$8.2 \$/mmBtu	\$1.5	\$7.5	\$13.5 \$/mmBtu	\$5.5 to \$4.0 \$/mmBtu	-\$0.7 /mmBtu	\$4.6 /mmBtu	\$5.7 /mmBtu	\$14.7 /mmBtu	-\$0.6 to \$3.3 \$/mmBtu	
Payback Period	2.3 years			2.4 years			n/a	4.0	1.5	6.6	2.7	1.7	3.7 years	11.0 years	4.5 years	5.0 years	2.2 years	8.1 years	





# Phase 2 Energy Project

Destination/Buyer	LT	ST	CNG	LT	ST	CNG	SIPS	LT	ST	SIPS	LT	ST
Raw Gas, scfm	600	140	300	600	440	0	500	540	0	500	0	540
CSD Price, \$/MMBtu	\$10	\$15	\$22	\$10	\$15	\$22	\$10	\$10	\$15	\$10	\$10	\$15
Annual Income after Cap. Rec.	\$2.8M			\$2.2M			\$1.5M			\$2.4M		
Total Income over Life, PV w/Cap. Rec.	\$29.9M			\$23.6M			\$16.7M			\$25.1M		
Annual Income, \$/MMBtu	\$9.7 - \$8.2			\$7.7 - \$6.3			\$5.6 - \$4.2			\$8.2 - \$6.8		
Simple Payback, years	2.3			2.8			3.5			2.7		

- Prices does not include transmission and other fees
- Assume LT price is unchanged from April 2020 offer and at these flows/vol.
- CSD Price is District share of all-in price (100% for LT, 60% for ST, 87% for CNG fueling); assume flat pricing over life







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# For more information:

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[www.lacsd.org/foodwaste](http://www.lacsd.org/foodwaste)



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