

# **Food Waste Update**

Sustainability/Energy Committee

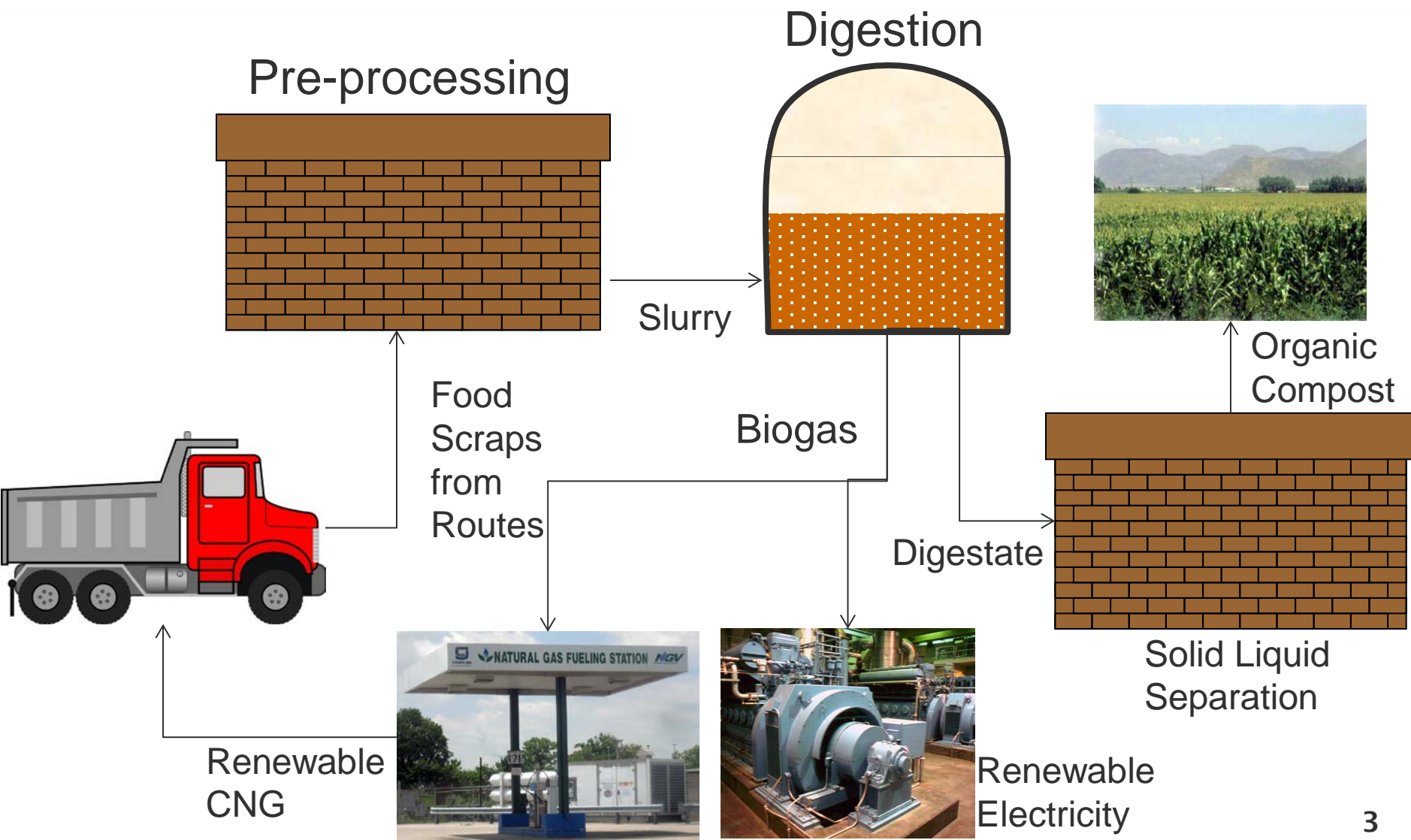
June 9, 2015

# Presentation Outline

- Background
- Food Waste Contracts
  - City of Oakland/  
Waste Management
  - Harvest Power
  - Recology
- Overall Food Waste Program
  - Opportunities
  - Infrastructure
  - Risks
  - O&M Role
- Next Steps



# Background Project Overview



# Food Waste Contracts



- City of Oakland/Waste Management
- Harvest Power
- Recology

# Food Waste Contracts



## Waste Management

# Waste Management

## WM Subcontract Status



- WM will deliver up to 50 tons per day straight from routes and additional material pre-processed
- WM and the District have agreed to key contract terms
  - Currently finalizing language
  - City staff will review/approve WM-EBMUD subcontract
- Contract effective date will be July 1, 2015
  - WM will manage material until District Preprocessing Facility is operational
- Expect to bring contract to Board for consideration on June 23



# Food Waste Contracts



Harvest Power

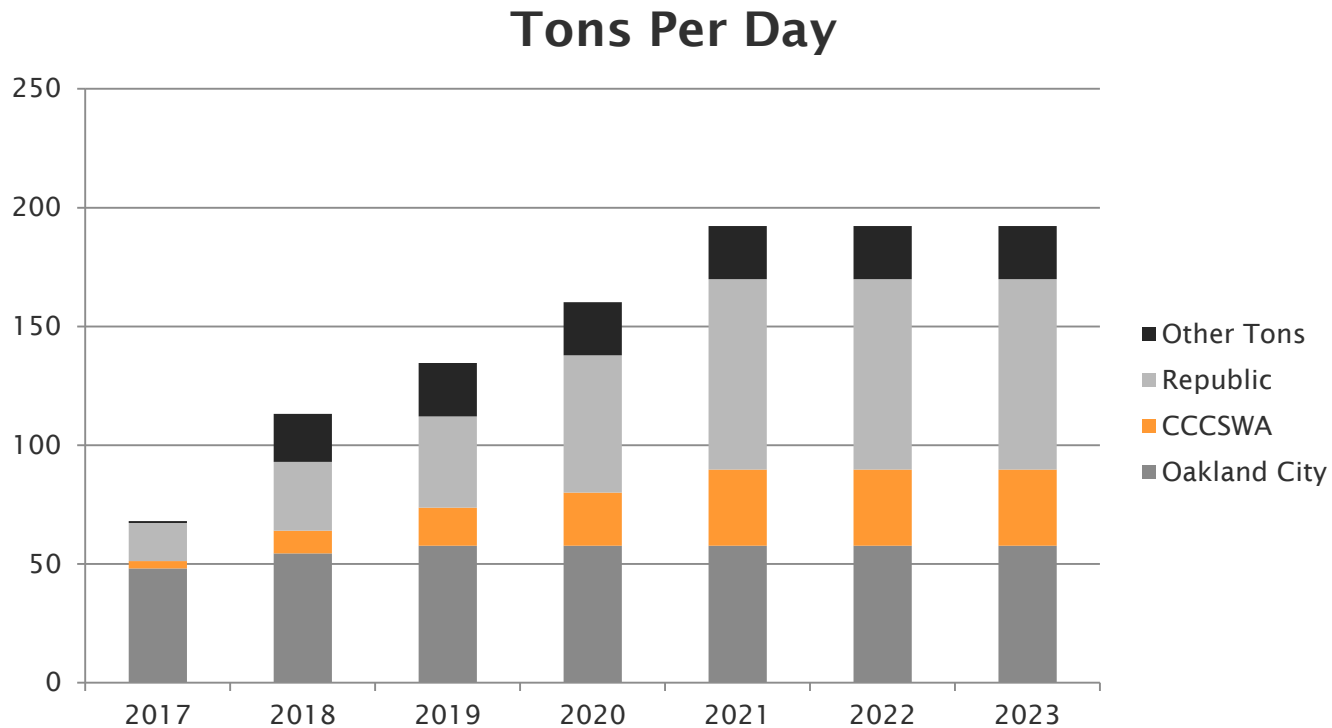
# Harvest Power Project Structure



- Energy Facility Financing Contract model
  - Statute allows District to procure design-build-operate services under certain conditions
  - Energy revenues offset District's capital investment
- Both parties contribute capital and share in revenue
  - Project elements are fully integrated
  - Tip fees are collected by District and shared with Harvest



# Harvest Power Feedstock Ramp Schedule



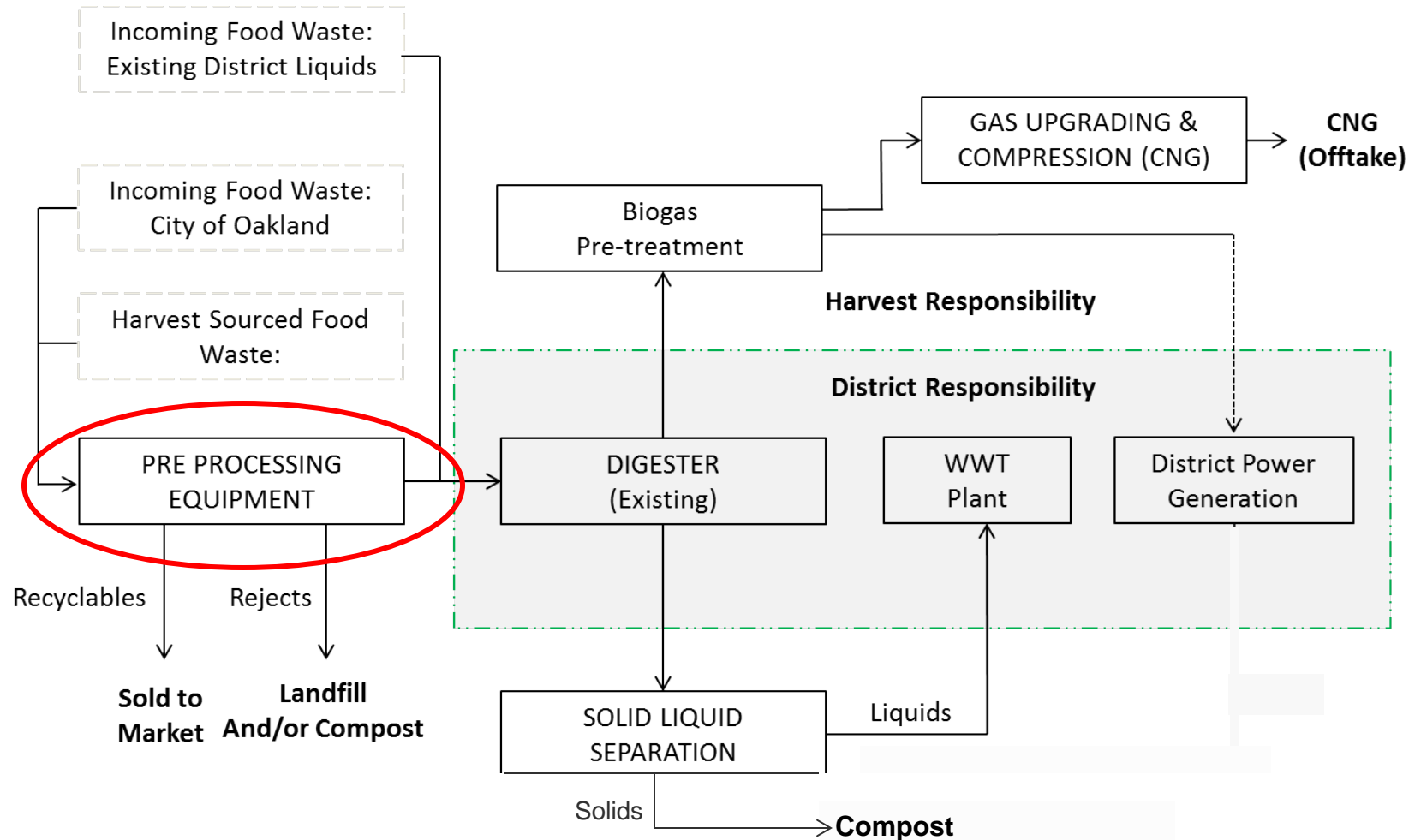
# Harvest Power Feedstock Availability



- Estimated quantities based on state and county waste characterization studies:

County	Tons per Year	Tons per Day
Alameda	91,612	294
Santa Clara (Sunnyvale)	23,858	76
Contra Costa	65,613	210
San Mateo	51,770	166
San Francisco	219,000	702
<b>Total</b>	<b>451,853</b>	<b>1448</b>

# Harvest Power Process Flow



# Harvest Power Pre-processing



Tipping Floor



"Separating  
and  
Squeezing  
Machine"



Bag Breaker and Screen



# Harvest Power Site Layout

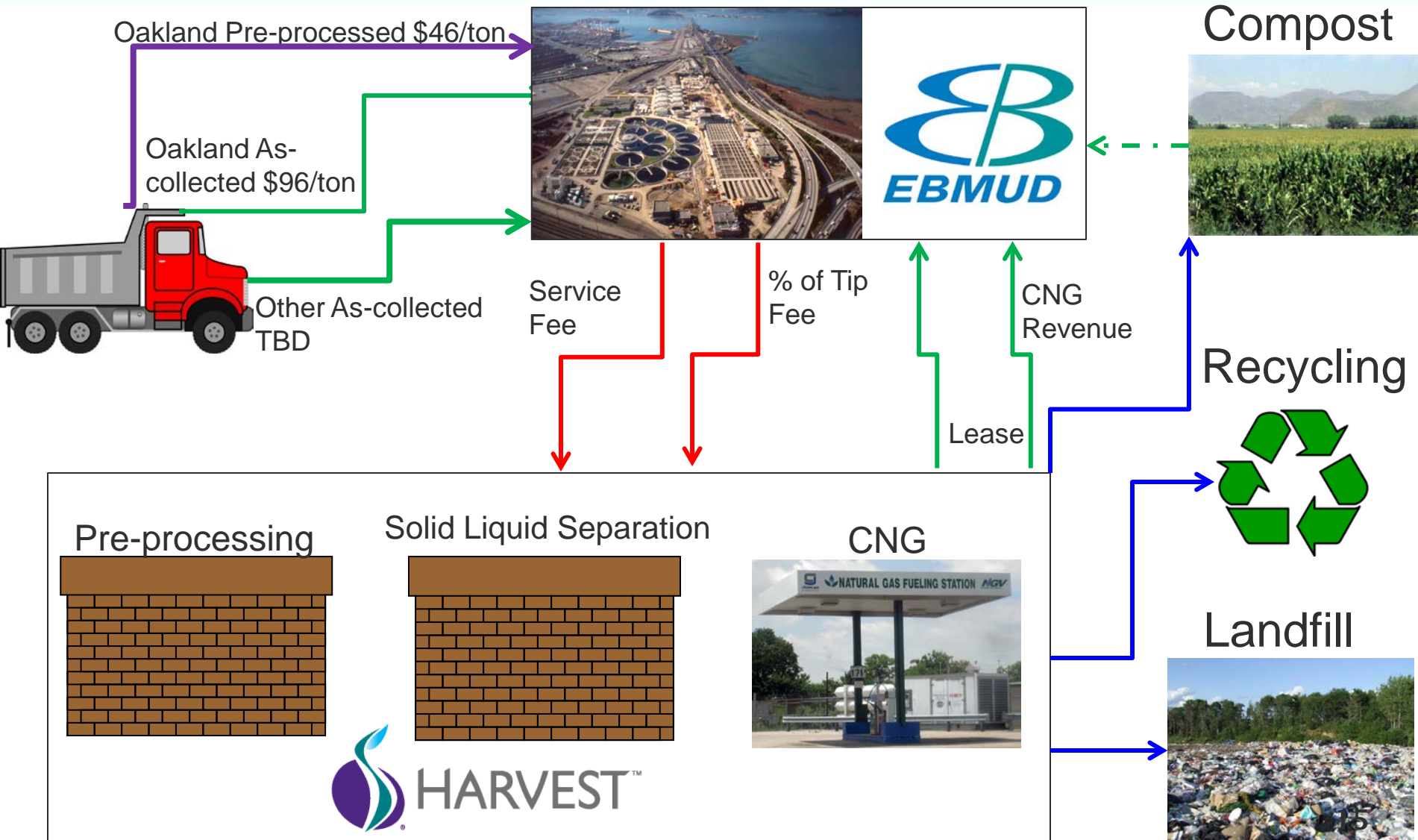




# Harvest Power Artist Representation

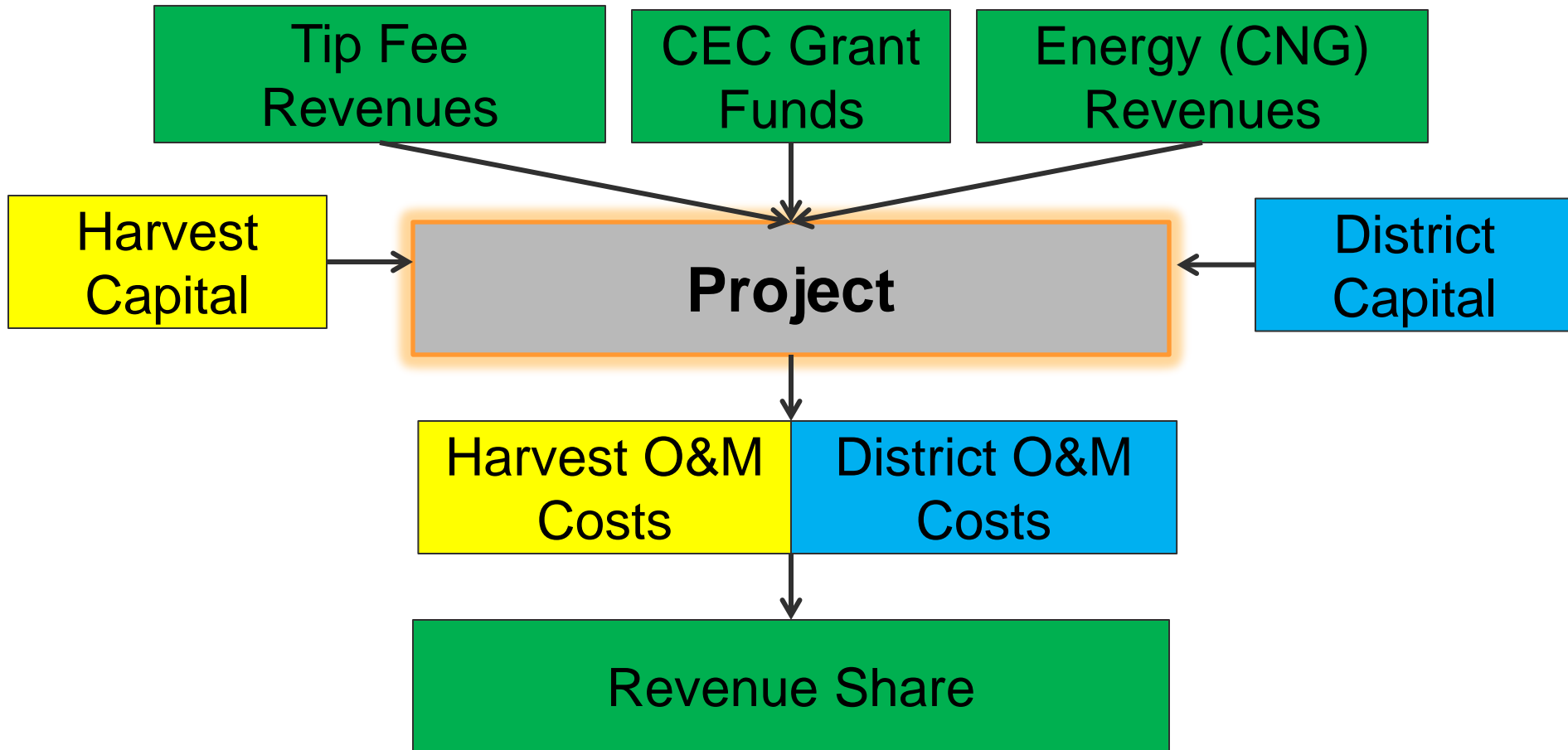


# Harvest Power Project Cash Flows





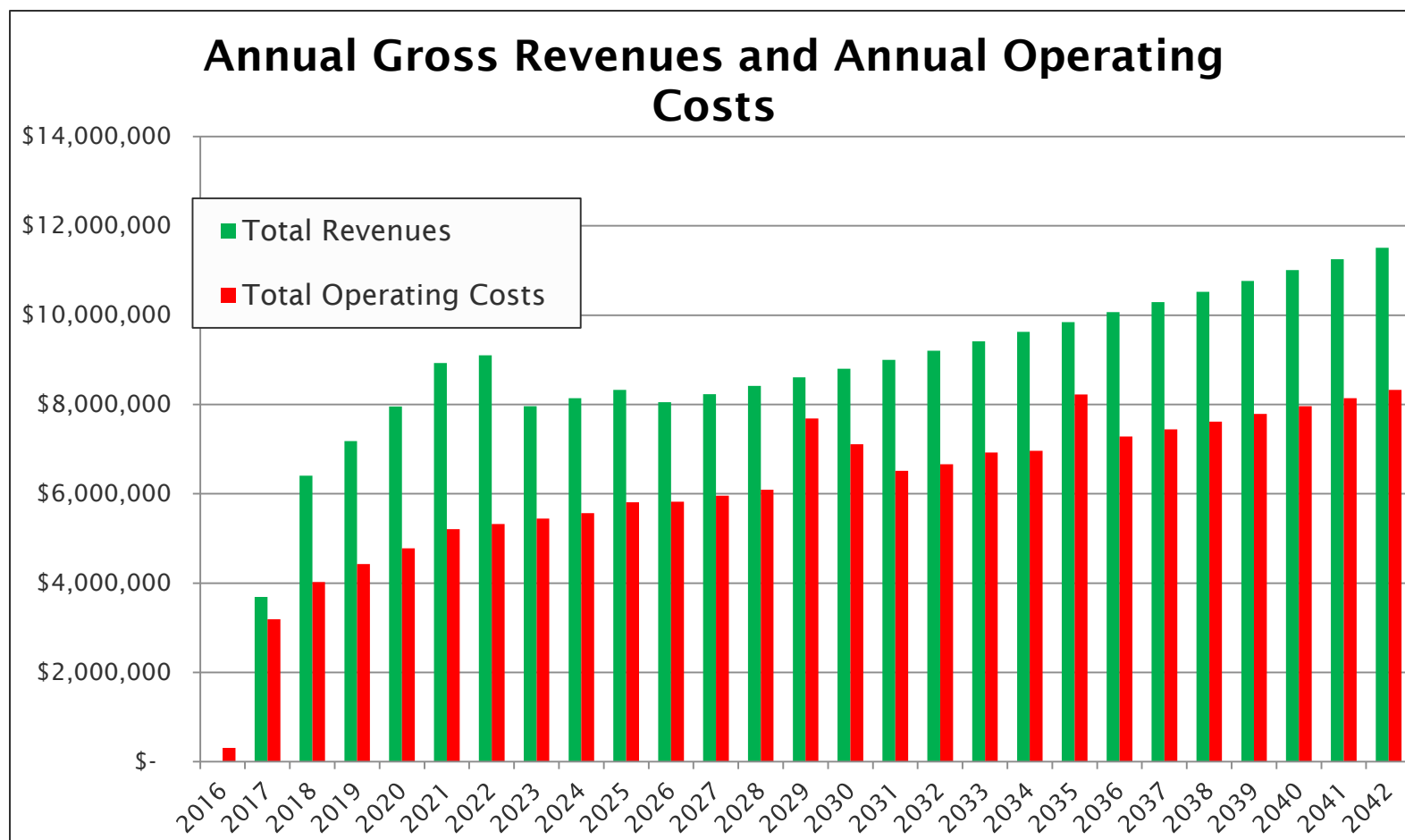
# Harvest Power Project Cash Flows



# Harvest Power Project Cash Flows



Total Capital Costs	\$21,000,000	Total Gross Revenue	\$ 232,000,000
		Total Operating Costs	\$ 123,000,000
			<u>\$ 109,000,000</u>



# Harvest Power Discounted Cash Flows



**Total Capital Costs**

**\$21,000,000**

**Total Gross Revenue (discounted)**

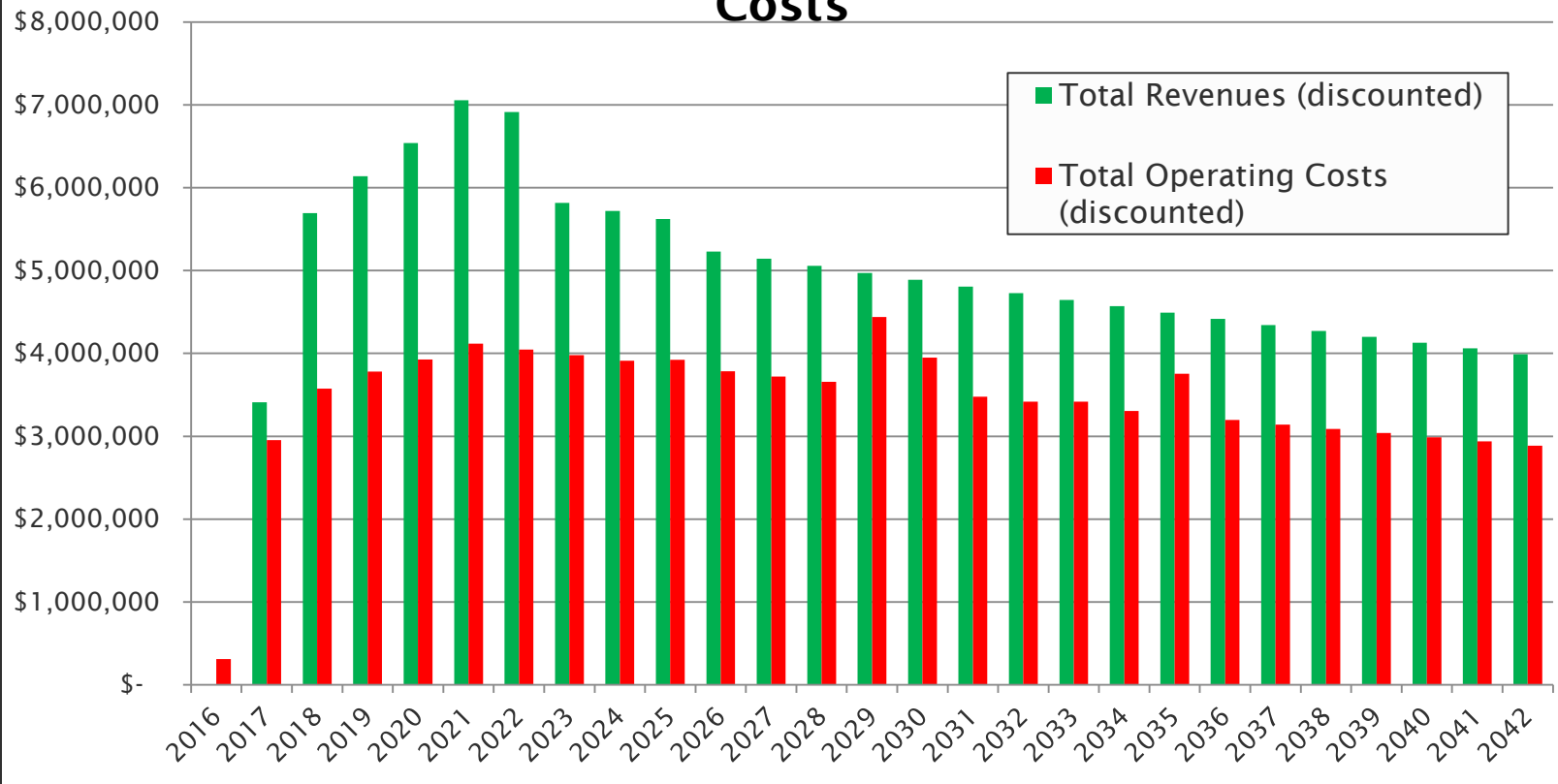
**\$ 131,000,000**

**Total Operating Costs (discounted)**

**\$ 93,000,000**

**\$ 38,000,000**

## Annual Gross Revenues and Annual Operating Costs





# Harvest Power Project Net Present Value



Scenario	Harvest Proposal		Revenue Share Approach	
	NPV	Capital Payback (yrs)	NPV	Capital Payback (yrs)
Base Case (190 tpd)	\$4.1M	18	\$12.5M	11
Worst Case (Oakland and CC only)	-\$23.4M	N/A	-\$2.2M	N/A
Reasonable Case (300 tpd)	\$24M	8	\$37.2M	5

# Food Waste Contracts



Recology

# Recology Project Overview



- In 2014, Recology was awarded a \$3M grant from CalRecycle for organics diversion and digestion at EBMUD
- Project would extract organics from San Francisco mixed solid waste
  - Process has two stages:
    - Extrusion Press at Recology in SF
    - Polisher at EBMUD WWTP
  - 70-100 tons/day with significant potential for expansion

# Recology Process Schematic



## Recology San Francisco

Bag Opener  $\Rightarrow$   
Screens  $\Rightarrow$  Press



Dry Fraction

Wet Fraction  $\Rightarrow$



Flotables



Hydrocyclone



Grit



Digesters



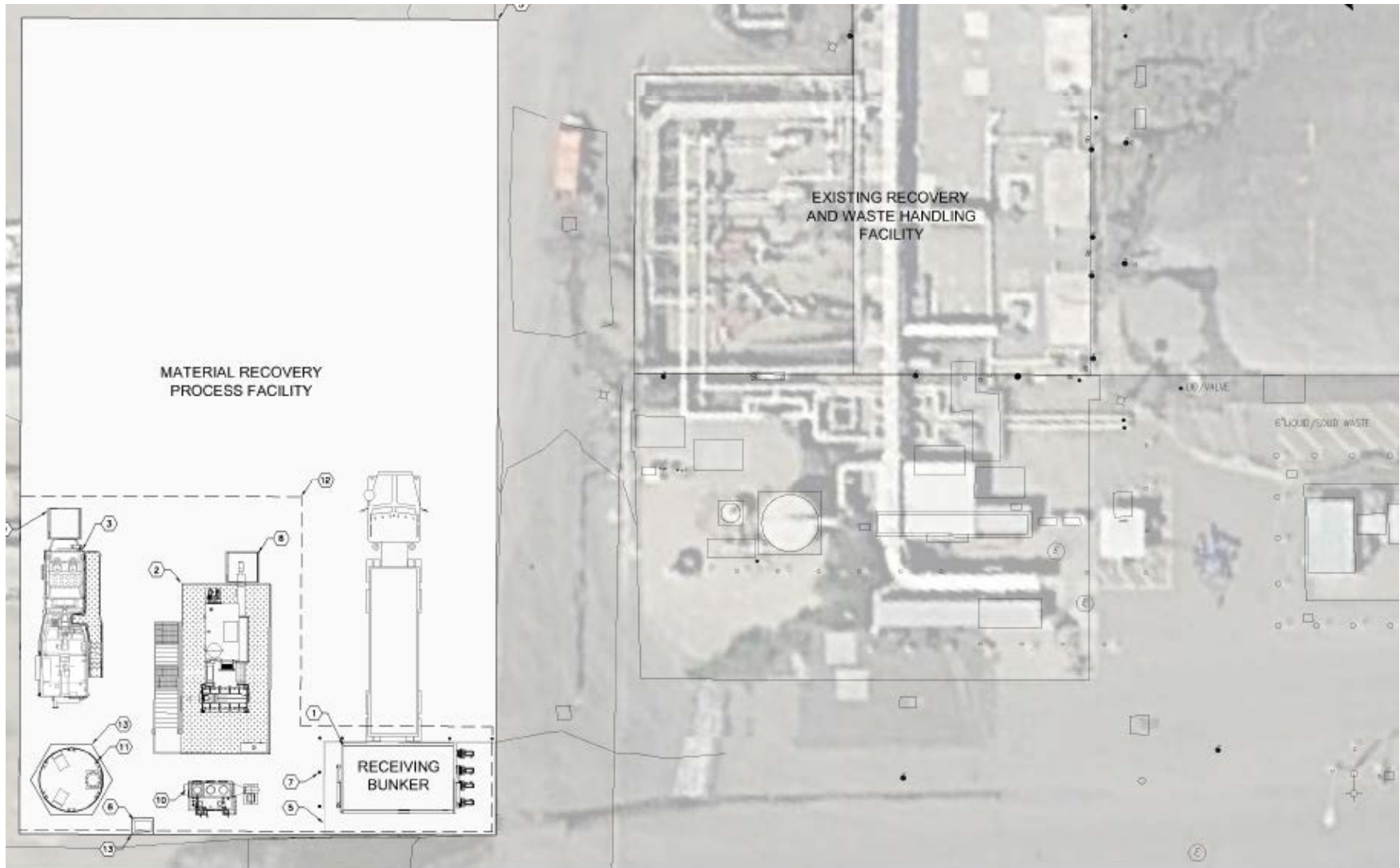
Digestate

## EBMUD MWWTP

Dynamic  
Cyclone



# Recology Project Layout



PLAN  
SCALE: 1/8"=1'-0"

# Recology

## Next Steps



- MOU to demonstrate project commitment to CalRecycle
  - Tip Fee
  - Term
  - Minimum quantities
- Contract negotiation
- Begin taking limited pressed material late 2015
- Install and commission polisher early 2016

# Overall Food Waste Program



- Opportunities
- Infrastructure
- Risks
- District O&M Role



# Overall Food Waste Program Opportunities



- Project Goals
  - Generate renewable energy
  - Provide a net benefit to ratepayers
- Food scraps are a local, sustainable source of high-strength waste that offsets losses of other waste streams
  - More food waste to become available in the near future
  - Composting capacity is limited, and District will have an early market advantage for anaerobic digestion
  - Oakland material serves as a base load for the program



# Food Waste Program Key Infrastructure Needs



- Identify available processing capacity and associated process upgrade needs
- Key Process Areas
  - Anaerobic Digestion: Sufficient existing capacity; utilize dedicated digestion to maximize value of digested material and meet project requirements
  - Solids Dewatering: Existing capacity and operational limitations; requires new dedicated dewatering capacity
  - Gas Management System: Limited capacity; requires CNG facility or expansion of District's Power Generation Station
- Develop phased-implementation plan to manage capital investments relative to program growth



# Food Waste Program Capital Improvements



Solid-Liquid Waste Receiving  
Station Logistics/Upgrades

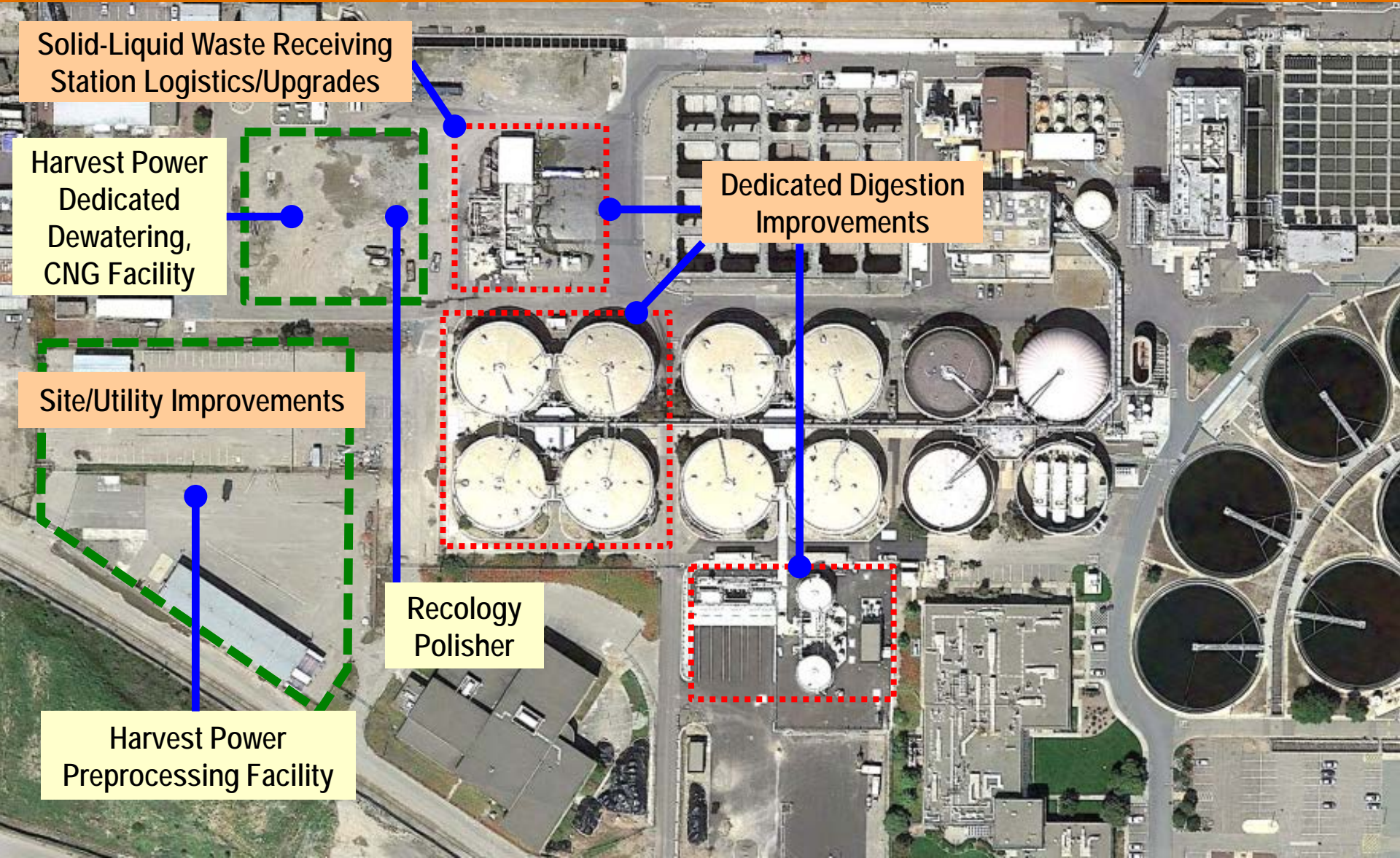
Harvest Power  
Dedicated  
Dewatering,  
CNG Facility

Site/Utility Improvements

Harvest Power  
Preprocessing Facility

Dedicated Digestion  
Improvements

Recology  
Polisher



# Food Waste Program District Capital Costs



- Harvest Power Project (Oakland Food Waste)
  - District Contribution to Preprocessing Facility \$11.4M
  - District share of \$5M Harvest CEC Grant (\$2.5M)
  - Site Improvements (Utilities, Access, Process Upgrades) \$3-4M
- Recology Project (Urban Organics)
  - Polishing Facility \$3-4M
  - District share of \$3M Recology CalRecycle Grant (\$1.2M)

\$13.7-15.7M
- Proposed FY16-20 CIP
  - Includes \$14M in FY16-FY18

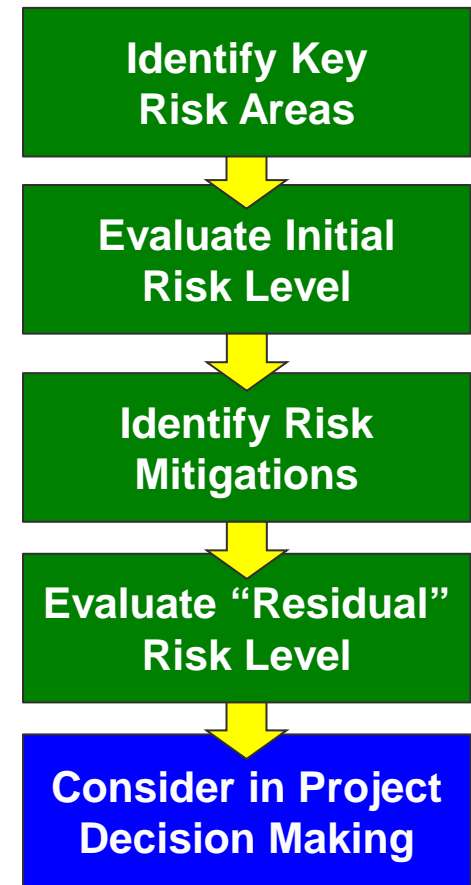
Note: These are preliminary capital costs and subject to change based on continuing contract negotiations.



# Food Waste Program Risk Management



- Key Risk Areas
  - Financial: Initial capital cost recovery, uncertainty regarding program growth
  - Technical: Use of emerging, innovative technologies; source quality issues
  - Regulatory: Solid waste permitting with public review process; community concerns regarding odors
  - Operational: Uncertain impacts; limited experience
- Identify mitigation measures to address initial risk and reduce overall “residual” risk to acceptable levels, where possible



# Risk Management Financial



Risk	Initial Risk Level	Mitigations	Residual Risk Level
<ul style="list-style-type: none"> <li>Projected feedstock growth does not materialize</li> </ul>	HIGH	<ul style="list-style-type: none"> <li>Long-term base contracts</li> <li>Harvest contract incentives for additional material</li> <li>District to assist in securing material</li> </ul>	MEDIUM
<ul style="list-style-type: none"> <li>Capital investment is not recovered or longer than expected payback period</li> </ul>	HIGH	<ul style="list-style-type: none"> <li>Both parties share capital risk</li> <li>Share grant funding</li> <li>Implement project in phases</li> <li>Require long-term contract obligations</li> </ul>	MEDIUM
<ul style="list-style-type: none"> <li>District is unable to meet required facility startup date (e.g., construction/permitting delays) and City does not approve extended schedule</li> </ul>	HIGH	<ul style="list-style-type: none"> <li>Contract with City has an allowance to request an extension of startup date</li> <li>Include Harvest contract incentives</li> <li>Start permitting process early</li> </ul>	HIGH

# Risk Management Technical



Risk	Initial Risk Level	Mitigations	Residual Risk Level
<ul style="list-style-type: none"><li>Preprocessing technology fails or is not cost-effective</li></ul>	HIGH	<ul style="list-style-type: none"><li>Require material to meet quality specifications</li><li>Harvest Power assumes technology risk and responsibility for making equipment modifications</li></ul>	LOW
<ul style="list-style-type: none"><li>Dewatering technology fails or is not cost-effective</li></ul>	HIGH	<ul style="list-style-type: none"><li>Harvest Power assumes technology risk and responsibility for making equipment modifications</li><li>Harvest Power assumes responsibility for digestate management</li></ul>	LOW

# Risk Management Regulatory



Risk	Initial Risk Level	Mitigations	Residual Risk Level
<ul style="list-style-type: none"> <li>Harvest and/or District are unable to secure a solid waste permit for preprocessing facility</li> </ul>	<b>MEDIUM</b>	<ul style="list-style-type: none"> <li>Start permitting process early and allow time to address any concerns from the public or local enforcement agency (LEA)</li> <li>Coordinate outreach efforts with Harvest</li> </ul>	<b>LOW</b>
<ul style="list-style-type: none"> <li>Solid waste permitting process requires additional project requirements</li> </ul>	<b>MEDIUM</b>	<ul style="list-style-type: none"> <li>Implement effective outreach efforts</li> <li>Build significant facility and operational controls into initial project phase</li> </ul>	<b>LOW</b>
<ul style="list-style-type: none"> <li>Facility odors cause off-site impacts</li> </ul>	<b>HIGH</b>	<ul style="list-style-type: none"> <li>Require building enclosure, odor control systems, operational controls</li> <li>Implement additional odor controls, as needed</li> </ul>	<div><b>MEDIUM</b></div> <div><b>LOW</b></div>
<ul style="list-style-type: none"> <li>Increased gas flaring with potential permit implications</li> </ul>	<b>MEDIUM</b>	<ul style="list-style-type: none"> <li>Require Harvest to construct CNG facilities to minimize flaring potential</li> </ul>	<b>LOW</b>

# Risk Management Operational



Risk	Initial Risk Level	Mitigations	Residual Risk Level
<ul style="list-style-type: none"> <li>Poor quality material with unforeseen or greater than expected process impacts/costs (e.g., high contamination, low gas value)</li> </ul>	<b>HIGH</b>	<ul style="list-style-type: none"> <li>Require material quality specifications for WM, Harvest, Recology</li> <li>Review WM customer lists</li> <li>Implement quality testing protocol</li> <li>District to provide support for targeted customer education</li> </ul>	<b>MEDIUM</b>
<ul style="list-style-type: none"> <li>District and/or its contractors are periodically unable to process mat'l</li> </ul>	<b>HIGH</b>	<ul style="list-style-type: none"> <li>WM is responsible for material during facility downtime</li> </ul>	<b>LOW</b>
<ul style="list-style-type: none"> <li>Inadequate solids dewatering capacity</li> </ul>	<b>HIGH</b>	<ul style="list-style-type: none"> <li>Require dedicated dewatering facility with phased expansion</li> </ul>	<b>LOW</b>
<ul style="list-style-type: none"> <li>Inability to operate facilities due to grit impacts</li> </ul>	<b>HIGH</b>	<ul style="list-style-type: none"> <li>Require Harvest to include a grit removal process and "buffer" tank</li> <li>Include digester cleaning costs and dedicated dewatering facility</li> </ul>	<b>LOW</b>
<ul style="list-style-type: none"> <li>Waste receiving, processing, and feeding logistics limit capacity</li> </ul>	<b>MEDIUM</b>	<ul style="list-style-type: none"> <li>Ensure District has adequate operational flexibility</li> </ul>	<b>LOW</b>

# Risk Management Summary



Significant Residual Risks	Residual Risk Level
<u>Financial</u> <ul style="list-style-type: none"><li>▪ Projected feedstock growth does not materialize</li><li>▪ Capital investment is not recovered or longer than expected payback period</li><li>▪ District is unable to meet required facility startup date and City does not approve extended schedule</li></ul>	<div>MEDIUM</div> <div>HIGH</div>
<u>Operational</u> <ul style="list-style-type: none"><li>▪ Poor quality material with unforeseen or greater than expected process impacts/costs</li></ul>	<div>MEDIUM</div>

# Food Waste Program District O&M Role



- Harvest Power to operate dewatering due to integration

Preprocessing



Grit  
Removal

Compost



Cake  
Dryness

Chemical Addition

Dewatering

Product  
Quality



# Food Waste Program

## District O&M Role (cont.)



- District to operate Recology polisher
- Considering operation of CNG
- 10-year check-in with Harvest Power to re-evaluate O&M roles

# Next Steps



- Continue contract negotiations with focus on maximizing benefits while minimizing risks to the District
- Continue to update the financial model to ensure there is sufficient net value to offset outstanding risks, as well as provide a financial benefit to the District's customers
- Provide future updates as contract negotiations progress toward conclusion
- Submit contracts for Board consideration
  - WM Subcontract for Oakland
  - Harvest Power
  - Recology