



**BOARD OF DIRECTORS
EAST BAY MUNICIPAL UTILITY DISTRICT**

375 - 11th Street, Oakland, CA 94607

Office of the Secretary: (510) 287-0440

Notice of Special Meeting

**Food Waste Workshop
Tuesday, March 22, 2016
9:30 a.m.
Training Resource Center
375 Eleventh Street
Oakland, California**

At the call of President Frank Mellon, the Board of Directors has scheduled a workshop on food waste for 9:30 a.m. on Tuesday, March 22, 2016, at 375 Eleventh Street, Training Resource Center, Oakland, California.

The Board will meet for a presentation on EBMUD's Food Waste Program. Staff will provide the Board with an overview and status update on current Food Waste Program efforts.

Dated: March 17, 2016

A handwritten signature in blue ink, reading 'Lynelle M. Lewis', is written over a horizontal line.

Lynelle M. Lewis
Secretary of the District



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AGENDA
Special Meeting

Food Waste Program Workshop
Tuesday, March 22, 2016
9:30 a.m.
Training Resource Center
375 Eleventh Street
Oakland, California

ROLL CALL:

PUBLIC COMMENT: The Board of Directors is limited by State law to providing a brief response, asking questions for clarification, or referring a matter to staff when responding to items that are not listed on the agenda.

DISCUSSION:

1. Staff presentation on EBMUD's Food Waste Program.

ADJOURNMENT:

Disability Notice

If you require a disability-related modification or accommodation to participate in an EBMUD public meeting please call the Office of the Secretary (510) 287-0404. We will make reasonable arrangements to ensure accessibility. Some special equipment arrangements may require 48 hours advance notice.

Document Availability

Materials related to an item on this Agenda that have been submitted to the EBMUD Board of Directors within 72 hours prior to this meeting are available for public inspection in EBMUD's Office of the Secretary at 375 11th Street, Oakland, California, during normal business hours.

EAST BAY MUNICIPAL UTILITY DISTRICT

DATE: March 17, 2016

MEMO TO: Board of Directors

THROUGH: Alexander R. Coate, General Manager *ARC*

FROM: Bennett K. Horenstein, Director of Wastewater *BKH*

SUBJECT: Food Waste Program Workshop

During the Food Waste Program Workshop on March 22, 2016, staff will provide the Board with an overview and status update on current Food Waste Program efforts and will describe in detail the proposed project with Harvest Power.

SUMMARY

The District continues to explore expanding its digestion of food waste for renewable energy production at the Main Wastewater Treatment Plant (MWWTP). Staff has been negotiating a contract with Harvest Power of Tulare, LLC (Harvest Power) to design, build, and operate the preprocessing facilities required to accept City of Oakland food waste delivered via the District's contract with Waste Management of Alameda County (WMAC), as well as digested food waste dewatering and renewable compressed natural gas facilities. Staff also continues to pursue other sources of food waste for the facility - including with the City of Berkeley. In addition, on October 13, 2015, the Board approved a contract with Recology to deliver urban organics derived from mixed solid waste in San Francisco.

Attachment

BKH:JTZ:jtz

Food Waste Program

Board Workshop

March 22, 2016

Agenda

- Background
- Food Waste Program Overview
- Harvest Power Project
- Design and Implementation
- Fiscal Impact
- Harvest Power Risk Summary
- Project Alternatives
- Summary and Next Steps



Harvest Power Project Overall Risk Factors



1. Aggressive Schedule
2. District as Subcontractor to Waste Management
3. Harvest Power Capacity and Viability
4. Approach to Risk and Liability Coverage
5. Reliance on Emerging Technology
6. Increased Capital Costs
7. Construction Site Constraints and Interface Issues
8. Feedstock Growth
9. Operating Cost Control
10. Potential Odor Issues

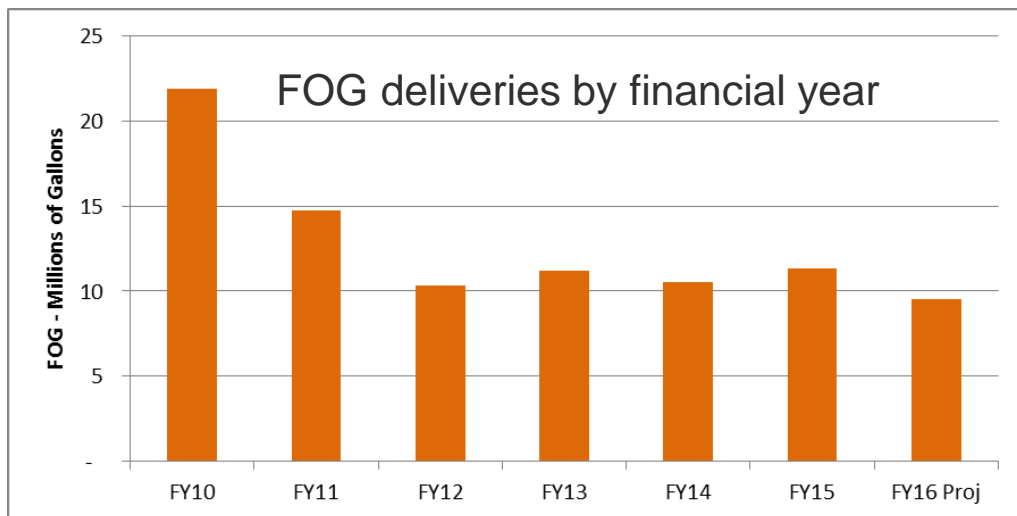
BACKGROUND AND FOOD WASTE PROGRAM OVERVIEW

Background

Why Food Waste?



- Local, sustainable source of organic material for digestion
- Offsets decreasing deliveries of liquid organic waste due to competition
 - Fats, Oils and Grease (FOG) deliveries decreasing
 - Lagunitas Brewery will soon discontinue deliveries
 - Santa Rosa marketing their plant as an alternative to EBMUD



- Began piloting food waste acceptance ~10 years ago
- Currently accept 7-10 tons per day from Central Contra Costa Solid Waste Authority
- More food waste to become available in the near future
 - 15% of what is currently landfilled in CA is food (6M+ tons per year)
 - AB 1826 requires businesses to separate and recycle organic waste and counties to develop plans
 - Interest from municipalities – SF, Berkeley
 - Interest from haulers / waste processors
- Composting capacity is limited, and siting new composting is increasingly difficult

Background R2 Capital Investments



2002

2004

2012

2017



Septage Receiving
Station

Solid-Liquid
Receiving Station

Turbine

Food Waste
Program



\$1M



\$7M



\$ 30M



\$40 - \$50M

Background

Oakland Source Separated Organics



- City of Oakland staff developed RFP for waste franchise (did not include renewable energy)
- District worked at all levels of City to make case for public agency partnership
- Ultimately, Oakland City Council directed that source separated organics be processed by District, via subcontract with WM
- Contract includes challenging schedule provisions
 - City currently considering District request to extend start date to December 31, 2017

Food Waste Program Overview

RFP and Selection



- In February 2015, District issued a request for proposals to provide food waste preprocessing and organics program development services
- Received two proposals – Harvest Power and Recology
 - Selected Harvest Power for commercial food waste preprocessing and associated facilities
 - Oakland creates base load of feedstock
 - Selected Recology for Urban Organics project

- Technical expertise with operational experience
- Project approach helps manage critical project schedule drivers
 - Requires timely equipment procurement
 - Integrated design/build schedule advantages
- Grant funding contribution to reduce initial capital requirements
 - Harvest brings a \$4.8 million grant from the California Energy Commission (CEC) for this project

Food Waste Program Overview

Organics Sources

Source Separated Organics

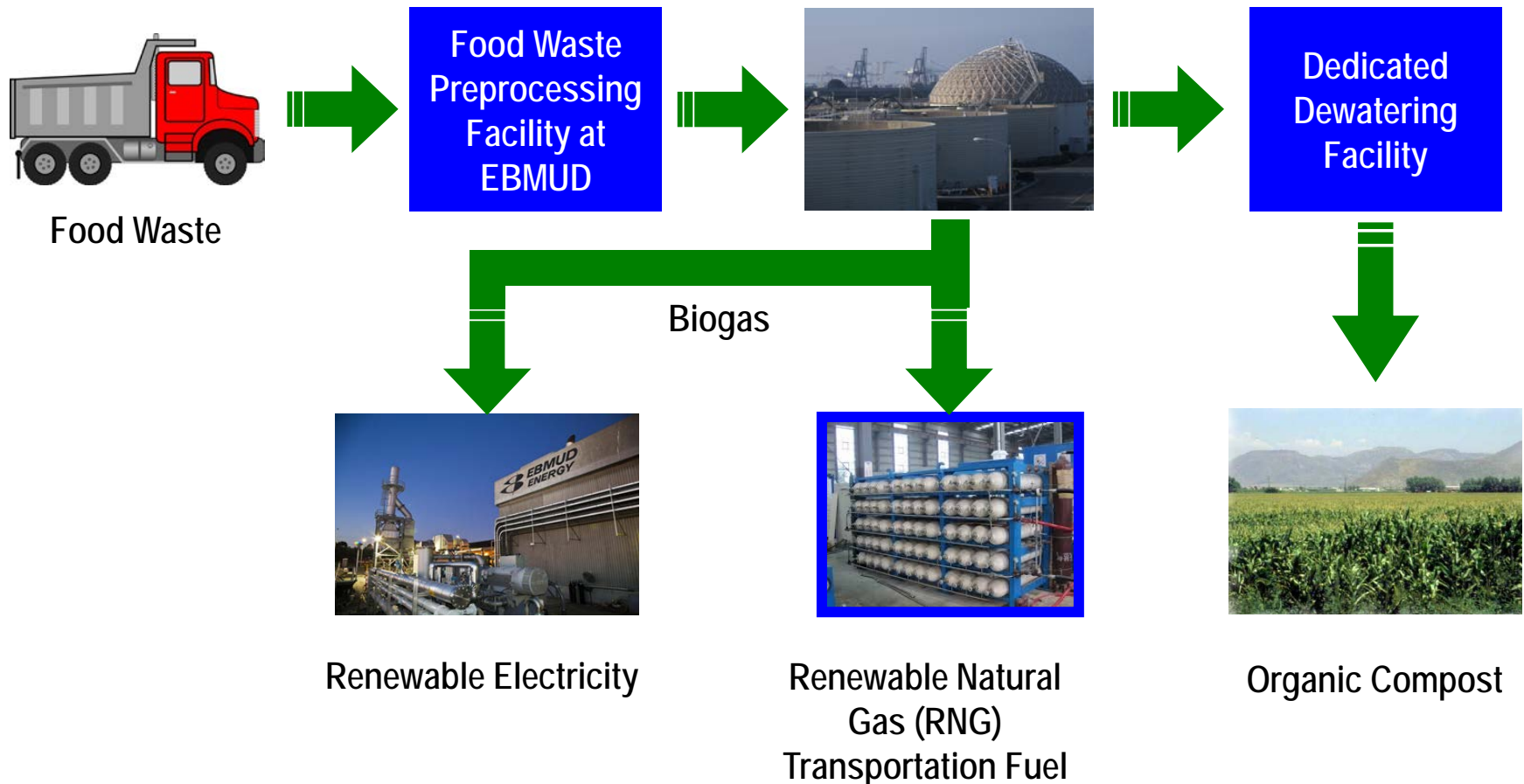


Mixed Solid Waste – Urban Organics



Food Waste Program Overview

Proposed Facilities



HARVEST POWER PROJECT

Harvest Power Project Company Background



- Who is Harvest Power ?
 - Venture-backed Start-up
 - Operate compost facilities, including in CA
 - Operate three food waste anaerobic digestion facilities (2 in Canada, 1 in FL)



Harvest Power Project Project Structure



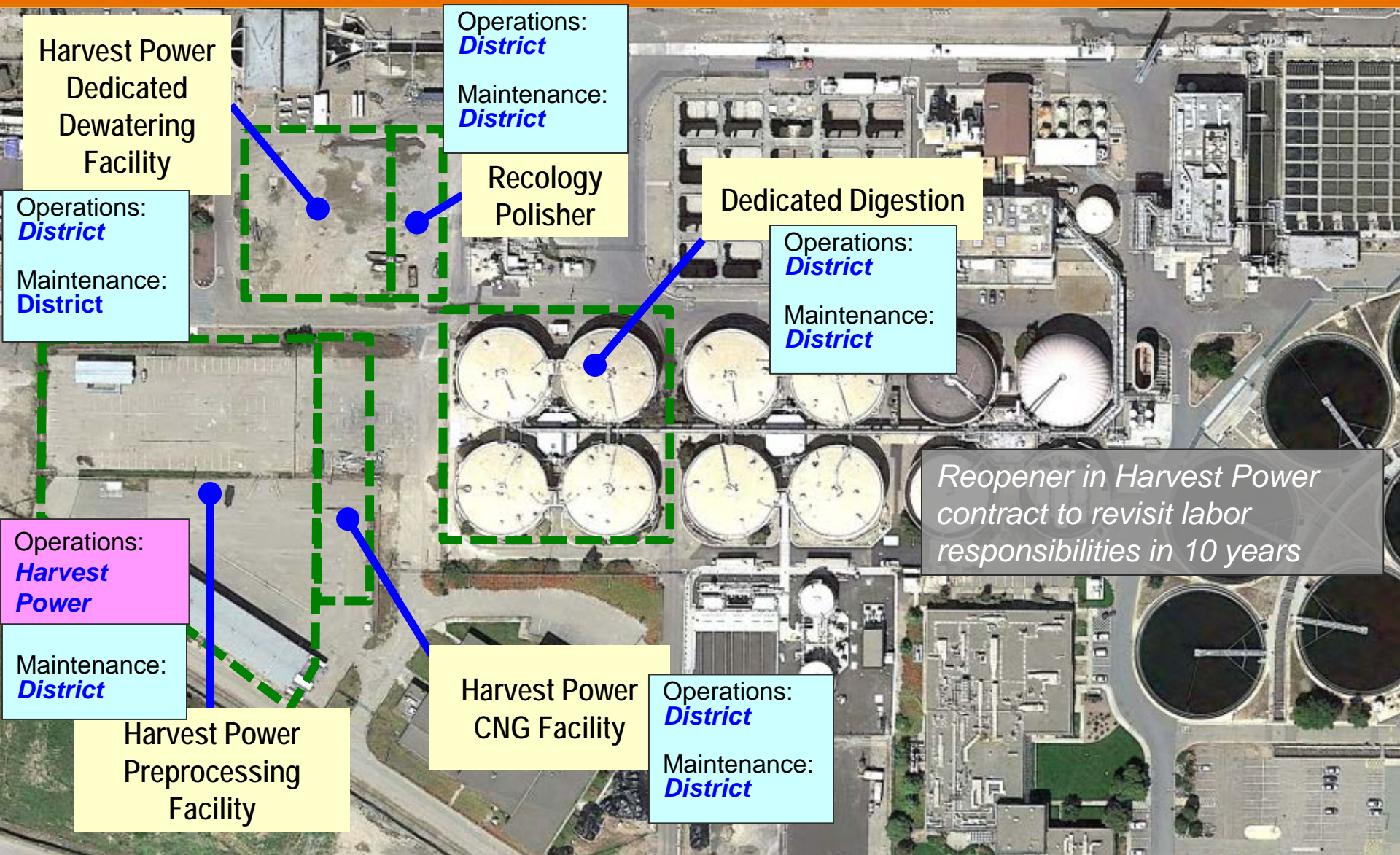
- Project has transitioned from public-private-partnership (P3) model to more of a design-build-operate (DBO) concept
 - District's lower cost of capital makes the project more economical
 - Harvest to design, build, operate, and market
 - Use of EBMUD labor for dewatering and Renewable Natural Gas (RNG) O&M
- Design-Build authority through use of Energy Services Contracting (ESCo) statute
 - Contract award requires Board to make a finding that energy revenue covers cost of project

Harvest Power Project Scope of Work



- Design, Construction, and Operation of Facilities
 - Food Waste Preprocessing
 - Dedicated Dewatering
 - Renewable Natural Gas for wholesale
 - Odor Control
- 190 tons/day in initial phase
 - Future phase build out to 380 tons/day
- Marketing and Procurement
 - Feedstock
 - RNG and Environmental Attributes
- Administration of CEC Grant

Harvest Power Project Facility O&M Approach

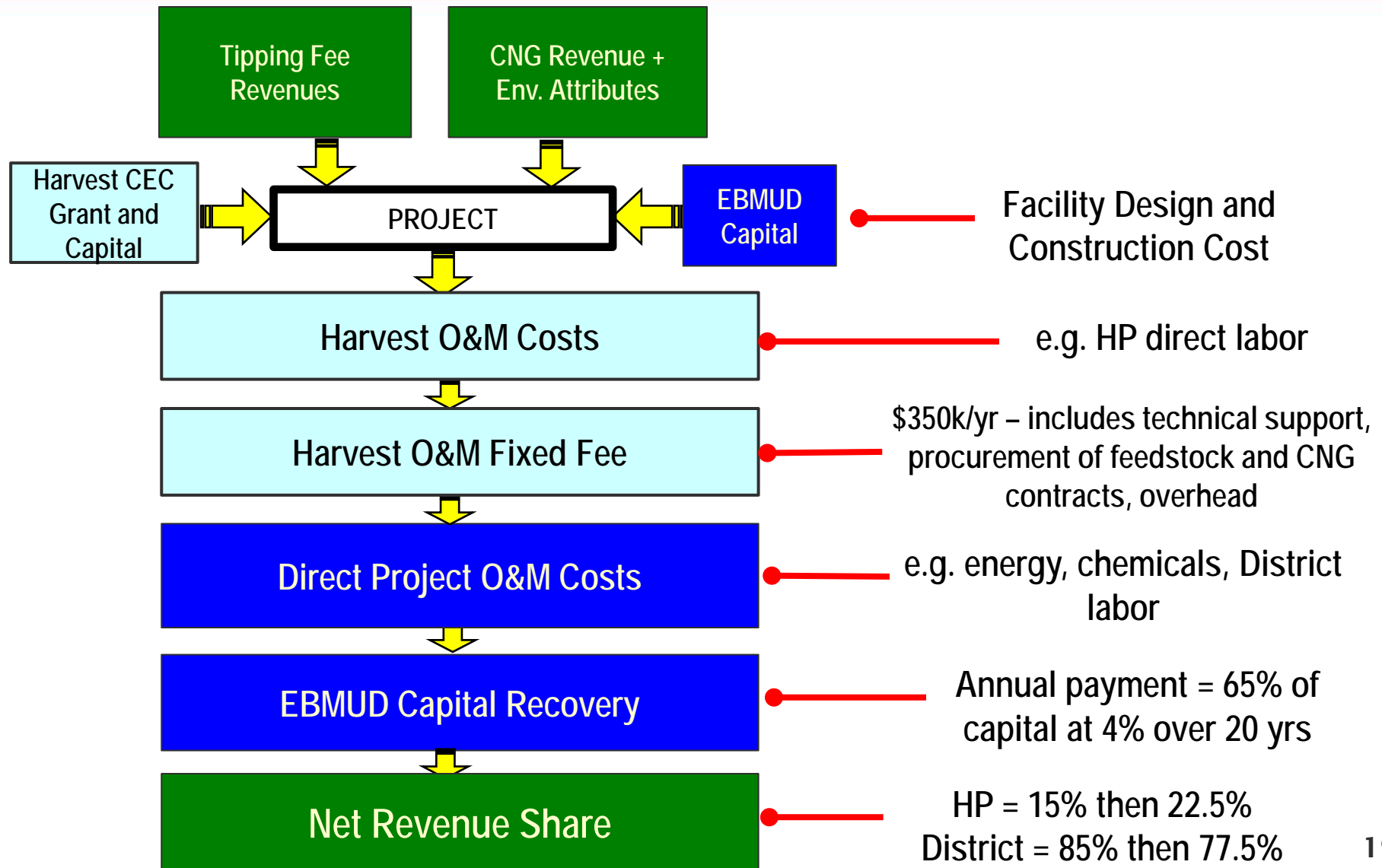


Harvest Power Project Status of Negotiations



- Time sensitivity
 - External schedule drivers (CEC and Oakland) are driving both the contract adoption schedule and the overall project delivery schedule
- Risk allocation remains key issue
 - Model is different from our typical approach to managing risk
 - Structure for project bonds under negotiation

Harvest Power Project Financial “Waterfall”



Harvest Power Project Financial Analysis



Harvest – Capital Assumptions

EBMUD site improvements	\$6,400,000
Estimated Harvest cost	\$36,900,000
Grant management fee	\$250,000
<u>CEC grant</u>	<u>-\$4,800,000</u>
Total	\$38,750,000

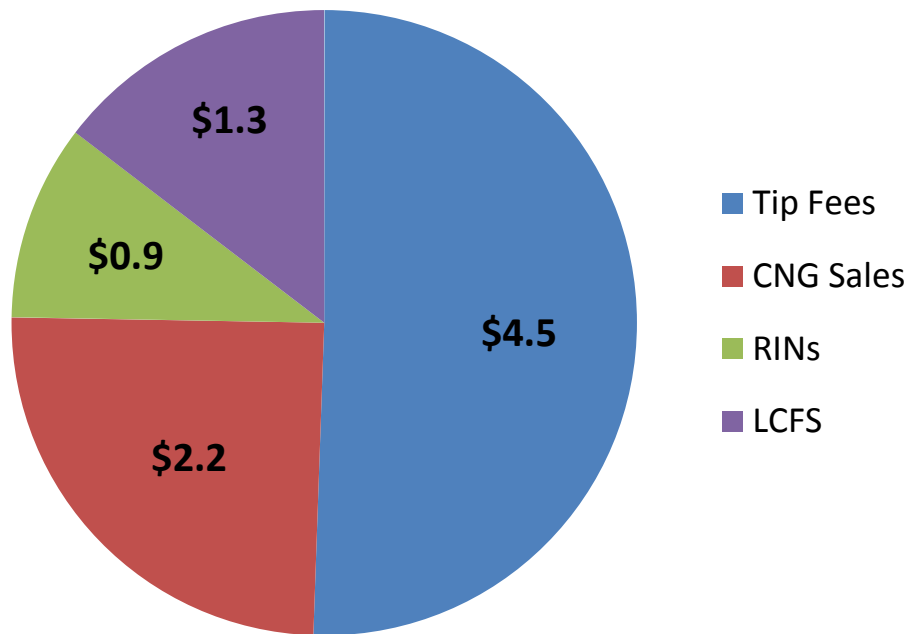
Alternative	Capital Investment	25-year NPV	20-year NPV	Discounted Payback
“Base Case”	\$38.7M	\$14.3M	\$5.6M	16 years
Schedule Delay*	\$43.5M	\$2.4M	-\$6.4M	24 years

* Assumes that Oakland contract is lost and that CEC grant does not come through.
192 TPD capacity not reached until year 10 of operations.

Harvest Power Project Revenue Sources



FY 2021* year projected gross revenue (\$M)



*FY 2021 is first year at top of feedstock ramp (192 TPD)

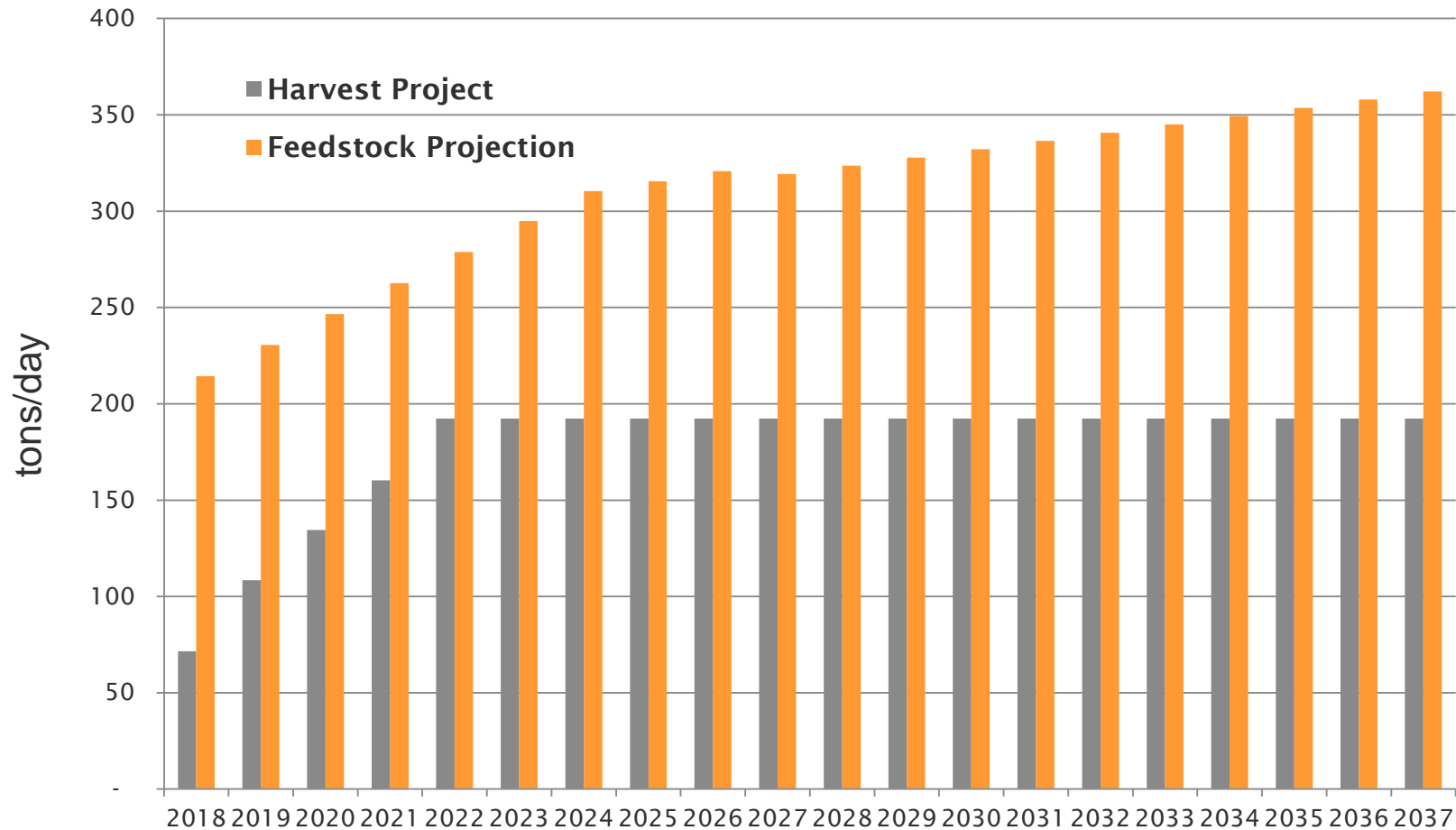
Harvest Power Project Sensitivity Analysis



Scenario	EBMUD 25 yr NPV	EBMUD 20 yr NPV
Baseline	\$14.3M	\$5.6M
Operating Costs up by 5%	\$11.3M	\$3.2M
Revenues down by 5%	\$8.2M	\$0.6M
Operating Costs up by 5% <i>and</i> Revenues down by 5%	\$5.2M	-\$1.8M
<i>Example Variables:</i>		
Cake dryness of 18% (vs 20%)	\$13.6M	\$5.0M
Reject rate 25% (vs 20%)	\$11.3M	\$3.2M
20% less LCFS revenue	\$12.7M	\$3.9M

LCFS = Low Carbon Fuel Standard

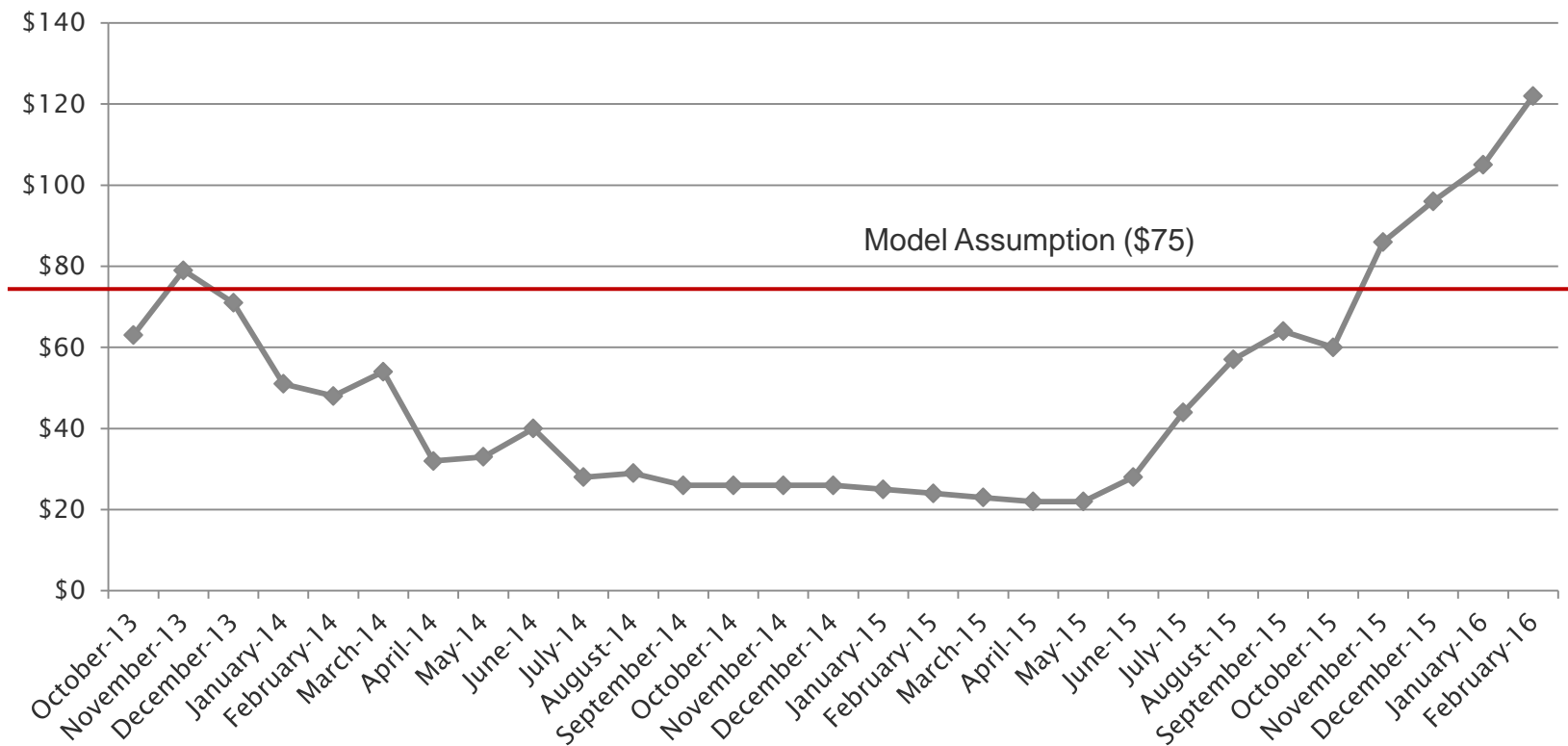
Harvest Power Project Feedstock Sourcing



Harvest Power Project Environmental Attributes



Monthly Average Low Carbon Fuel Standard (LCFS) Credit Price



DESIGN AND IMPLEMENTATION

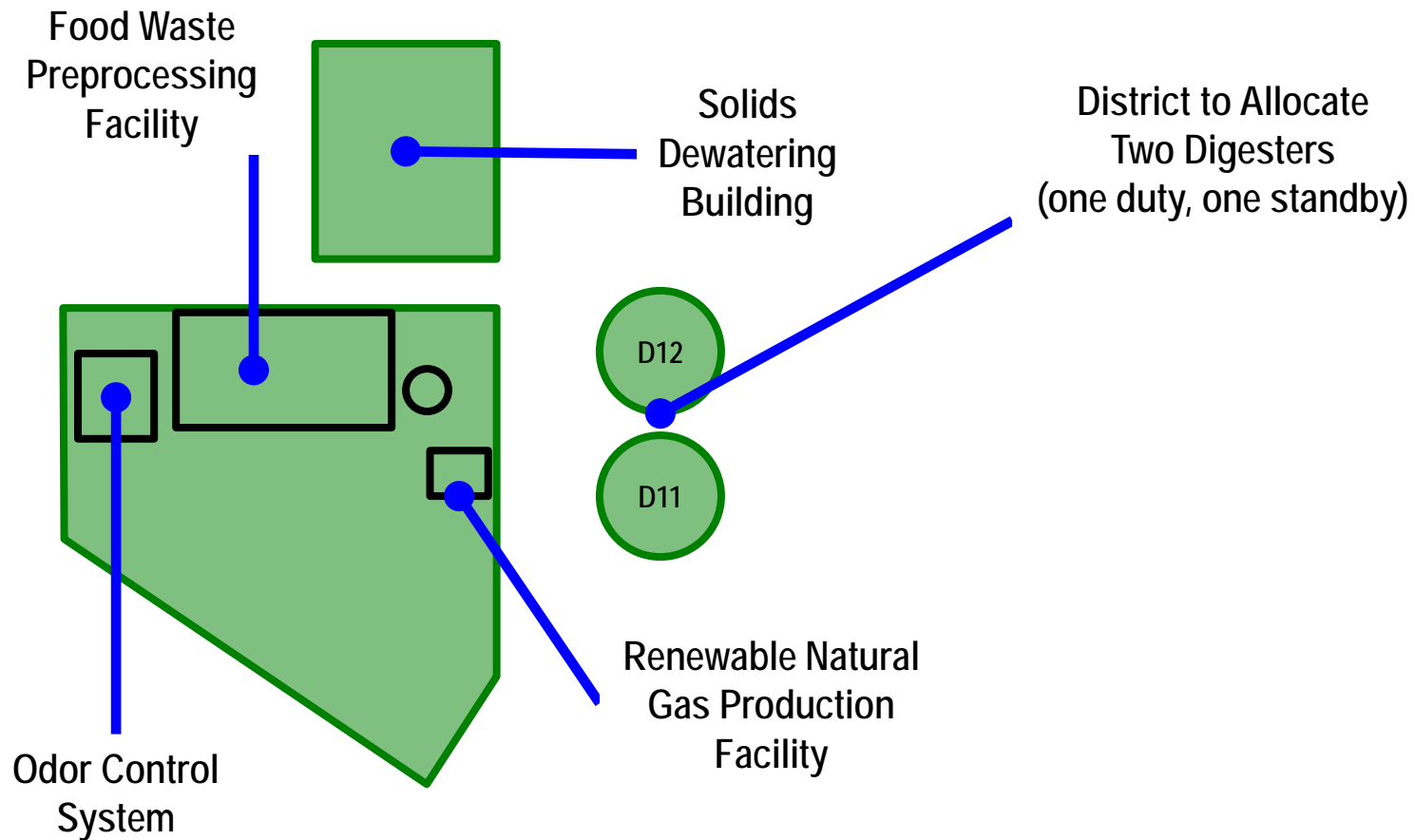
Design and Implementation

Key Infrastructure Elements

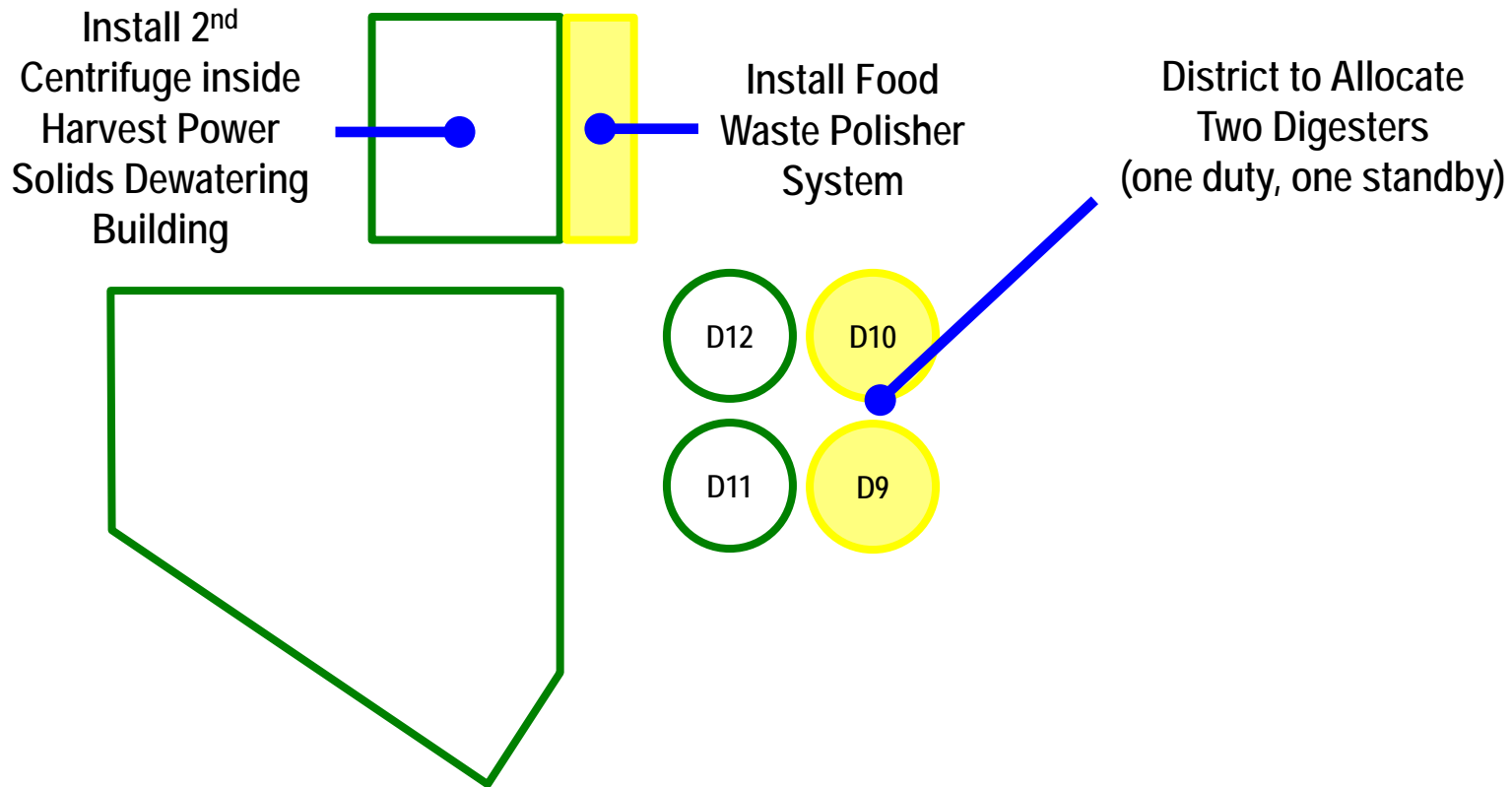


- Food Waste Preprocessing Building (190 tons per day)
 - Contaminant removal and size reduction via a bag breaker, trommel screen, Tornado system
- Solids Dewatering Building
 - New dewatering centrifuge and polymer feed system
- Renewable Natural Gas (RNG) Production Facility
 - CO₂ removal, gas compression, desulfurization system
 - Harvest Power is procuring critical path equipment ahead of full contract following Board approval on February 9, 2016
- Odor Control System
 - Chemical scrubber, biofilter, and activated carbon system

Design and Implementation Harvest Power Site Layout



Design and Implementation Recology Site Layout

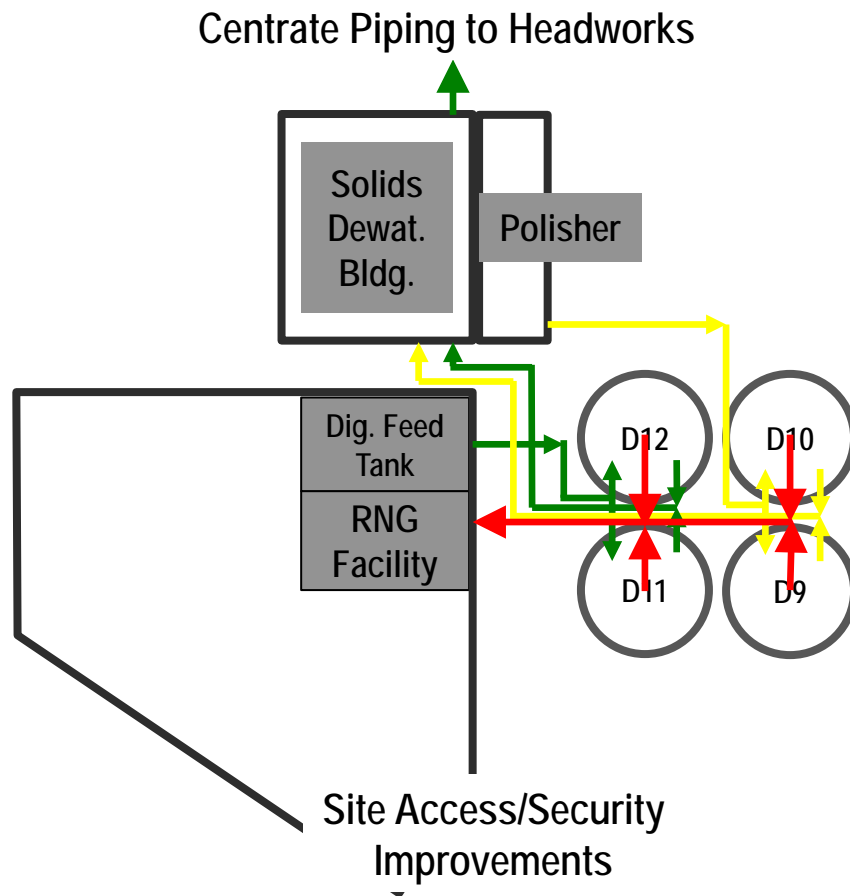


Design and Implementation Utilities and Site Improvements



- Staff has completed design of process piping, utility, and site improvements to support implementation of Harvest Power and Recology projects
 - Dedicated digestion feed and withdrawal piping
 - Digester gas piping and transfer system
 - Site (civil, access, security) and utility improvements
- Estimated total project cost = \$7.8M
- Board consideration of construction contract award (estimated at \$4.6 million) on April 12, 2016
- Aggressive construction completion schedule to meet \$4.8 million CEC grant requirements – RNG facility must be in service by early December 2016

Design and Implementation Utilities and Site Improvements Layout



Design and Implementation Harvest Power Challenges



- Significant increases in estimated Harvest capital cost
 - Initial cost estimate of \$21.5M has grown to \$37M as HP has developed the project design
- Significant construction scope and schedule demands
 - HP and District would need to construct over \$45 million in capital on a constrained project site in 12-16 months with complex process interconnection requirements
 - City of Oakland, CEC, permitting (building, air)
- Accelerated schedule provides for limited design review by District
- Level of District oversight, review, and approval during construction under Design-Build approach

Design and Implementation

Harvest Power Challenges (cont'd)



- HP is coordinating multiple subcontractors with pass-through of performance bonds to the District
 - Design Engineer
 - Building Architect
 - Preprocessing Technology Integrator
 - Dewatering Centrifuge Manufacturer
 - RNG Production Facility Manufacturer
 - Odor Control System Manufacturer
 - Construction Contractor
- As currently proposed, assignment and assumption of construction and performance-related risks between subcontractors/suppliers/Harvest Power is unclear
- Significant technology risk associated with food waste preprocessing equipment

Design and Implementation Preprocessing Technology Risk

- New processing technology (Tornado) with limited operating experience (no U.S. installations) in converting commercial organics to digestible material
 - Staff visited several existing site installations in Europe
- Key operating parameters drive project economics
 - Material throughput, reject fraction, and resiliency to varying feedstock contamination levels



Tipping Floor



Bag Breaker/Trommel Screen



Tornado System

Design and Implementation

Harvest Power Challenges (cont'd)



- Relatively high potential for change orders during construction (with likely disputes)
 - Multiple contractors working in close proximity
 - Interface with District facilities and District construction activities
 - HP has limited access to capital which may impact its capacity to continue construction work (or viability) if significant change orders occur

Design and Implementation Approach to Managing Risk



- HP to Meet Performance Guarantees and Standards
 - HP to meet Minimum Performance Standards for major equipment; District would not accept facility if standard is not met
 - HP to provide Performance Guarantees (beyond Minimum Performance Standards) for major equipment consistent with key joint financial analysis assumptions
 - Example:

Description	Minimum Performance Standard	Performance Guarantee
Total Preprocessing System Material Throughput	≥11.5 tons per hour of as-delivered material	≥14 tons per hour of as-delivered material
Dewatering Centrifuge Cake Dryness	≥18.0% total solids	≥20.0% total solids

Design and Implementation Approach to Managing Risk



- HP to Pay Liquidated Damages (LDs) for Performance Deficiencies and/or Schedule Delays
 - HP would have an “LD Cap” at 15% of the Total Design/Build Price (e.g., if the Total Design/Build Price = \$39M, the LD Cap = \$5.9M)
 - LDs provide a schedule incentive, as well as an incentive for HP to remedy equipment performance deficiencies during construction
 - District may need to make additional capital investment if LD Cap is exceeded
- District to Receive Additional Capital Recovery Payment in Project Waterfall
- Limited District Responsibility for Construction Change Orders
 - District would only be responsible for change orders related to unknown existing site conditions and direct District requests

FISCAL IMPACT

Fiscal Impact

Food Waste Program Cash Flow



Description	Est. Cash Flow (\$M)			
	FY16	FY17	FY18	Total
Harvest Power Project (no CEC grant)	6	25	6	37
Recology Project	0	5	1	6
Food Waste Utilities/Site Improvements	2	6	0	8
Total	8	36	7	51

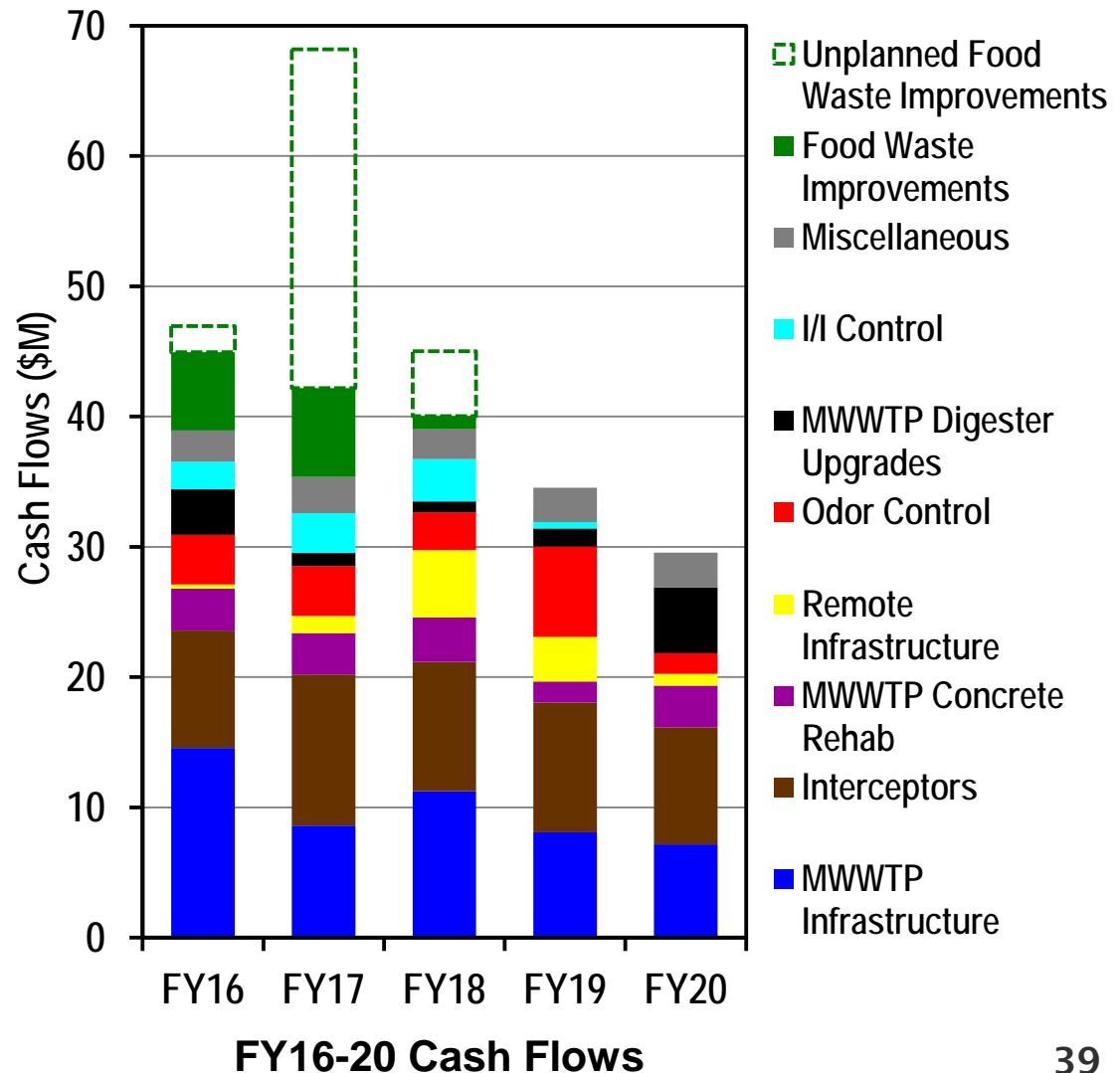
- Board-approved WW capital budget includes \$111M in cash flows from FY16-18; \$14M for food waste
- Current cash flow estimates total \$147M (+\$37M), including revised food waste program costs
- Recommended Funding Approach
 - Utilize Wastewater cash reserves (built up from Resource Recovery revenues)
 - Issue debt to fund non-food waste capital projects that were originally planned to be cash funded

Fiscal Impact

Wastewater Dept. Cash Flow



- Resulting WW cash reserves and debt coverage ratio maintain compliance with District policy targets
 - Cash reserves reduced ~\$10M from previous projection
 - Use of rate stabilization reserves will not be required
 - Debt coverage ratio remains strong (above target of 1.60)



HARVEST POWER RISK SUMMARY

Harvest Power Project

Overall Risk Factors



Risk Factors	Risk Level
1. Aggressive Schedule <ul style="list-style-type: none"> City of Oakland facility startup deadline, CEC grant deadline, permitting process Compressed design/construction with 12-16 month construction schedule 	HIGH
2. District as Subcontractor to Waste Management <ul style="list-style-type: none"> Potential as-delivered material quality concerns with limited remedies available to District Rigid District contract performance requirements with associated penalties 	MEDIUM
3. Harvest Power Capacity and Viability <ul style="list-style-type: none"> A startup venture-capital backed firm with an emerging business focus District concerns regarding near- and long-term viability if project economics shift 	MEDIUM
4. Limited District Risk and Liability Coverage <ul style="list-style-type: none"> Limits on Harvest Power's liability 	HIGH
5. Reliance on Emerging Technology <ul style="list-style-type: none"> Preprocessing facility utilizes a new technology Poor performance may inhibit ability to meet diversion goals (i.e., high reject rate) 	MEDIUM

Harvest Power Project

Overall Risk Factors (cont'd)



Risk Factors	Risk Level
6. High Capital Costs <ul style="list-style-type: none"> Limited financial capacity to cover future capital cost increases or additional expenditures that are likely to occur 	MEDIUM
7. Construction Site Constraints and Interface Issues <ul style="list-style-type: none"> Potential for high construction change orders due to schedule delays, site conditions Potential construction staging, site access limitations 	MEDIUM
8. Feedstock Growth <ul style="list-style-type: none"> Project financials rely on 190 tons per day; roughly 1/3 is currently under contract 	<div>MED</div> <div>LOW</div>
9. Operating Budget Control <ul style="list-style-type: none"> Project economics provide financial capacity to cover operating budget increases due to equipment or system performance issues, increased consumable costs, etc. 	MEDIUM
10. Potential Odor Issues <ul style="list-style-type: none"> Despite use of best available technologies and controls, the potential for off-site odors remains a key focus area 	<div>MED</div> <div>LOW</div>
OVERALL PROJECT RISK	<div>MED</div> <div>HIGH</div>

PROGRAM ALTERNATIVES

Program Alternatives



1. RNG Only

- Biogas is “scavenged” from engines
- Installation of one RNG skid

2. Recology + RNG

- Feedstock is “pressed” municipal solid waste
- Installation of polisher, dedication of two digesters, construction of dedicated dewatering facility, and one RNG skid

3. Integrated Program (Harvest + Recology + 2 RNG)

- Four digesters dedicated
- Two trains within dedicated dewatering
- Two RNG skids installed

Program Alternatives



4. Delayed Harvest/EBMUD Solo Food Waste

- Feedstock and facilities as in Harvest Power project
- Assumes loss of Oakland contract and CEC grant due to schedule delays

5. Delayed Integrated Program

- Feedstock and facilities as in Harvest Power project
- Assumes loss of Oakland contract and CEC grant due to schedule delays

Program Alternatives Financial Summary



	Capital	20-yr NPV	25-yr NPV	Discounted Payback
Harvest Power	\$39M	\$6M	\$14M	16 years
PROGRAM ALTERNATIVES				
1. RNG Only	\$8M	\$20M	\$22M	4 years
2. Recology + RNG	\$27M	\$4M	\$6M	14 years
3. Delayed Harvest/EBMUD Solo Food Waste	\$44M	-\$6M	\$2M	24 years
4. Integrated Program – Recology + Harvest Power	\$53M	\$24M	\$35M	10 years
5. Delayed Integrated Program	\$58M	\$15M	\$28M	14 years

SUMMARY AND NEXT STEPS

Summary



- Harvest Power Project presents an atypical set of risks
- Much of risk is driven by schedule and liability profile

Summary and Next Steps



- Harvest Power Project presents an atypical set of risks
 - Much of risk is driven by schedule and liability profile
-

- Feedback from Board
- Continue negotiations with Harvest Power
- Continue discussions with City of Oakland regarding time extension
- Begin Pilot Project with Recology
- April 12 Board Meeting
 - Harvest Power Contract Award
 - Utilities and Site Improvements Contract Award
 - Hearing on ESCo Finding

