

Update on Greenhouse Gas Emissions

May 26, 2015

Overview



- State GHG reduction goals
- Executive Order B-30-15
- District energy policy
- GHG emission reduction goal
- Next steps

State Reduction Goals

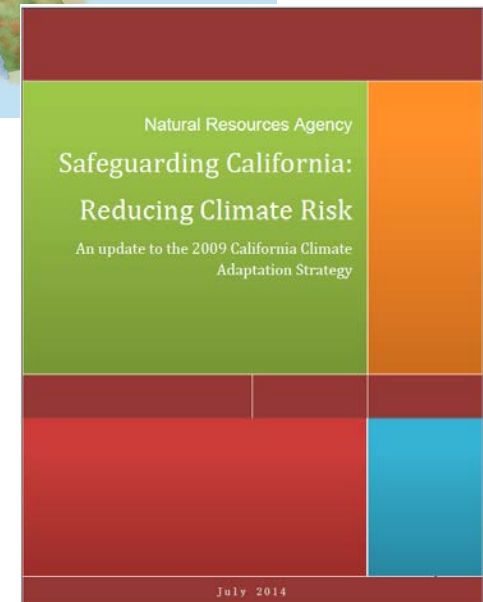
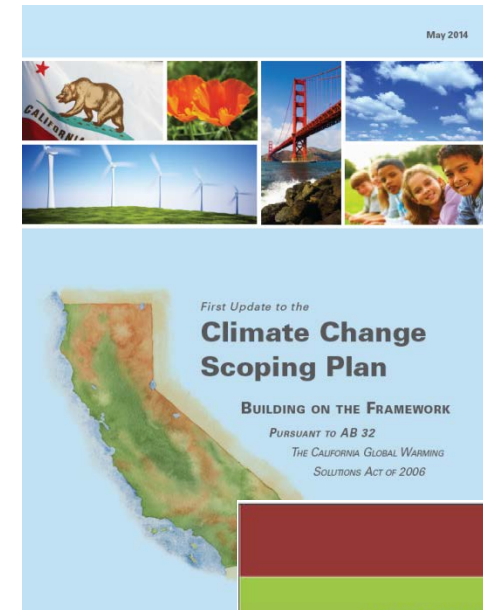


- 2005 Executive Order S-3-05
 - By 2010, reduce GHG emissions to 2000 levels
 - By 2020, reduce GHG emissions to 1990 levels
 - By 2050, reduce GHG emissions to 80% below 1990 levels
- 2015 Executive Order B-30-15
 - By 2030, reduce GHG emissions to 40% below 1990 levels

Executive Order B-30-15



- Interim GHG reduction goal
- Update the state's climate adaptation strategy every 3 years
- Prepare implementation plans for each sector by September 2015
- Report to the California Natural Resources Agency by June 2016 on the implementation



- Long-term GHG reduction scenario
 - Significant increase in energy efficiency and conservation
 - Switch away from fossil fuels
 - Lower carbon liquid and gaseous fuels (biofuels and biogas)
 - Low-carbon electricity (~50% renewables in 2030)
 - Reduce non-energy GHGs (e.g., methane)

District Energy Policy

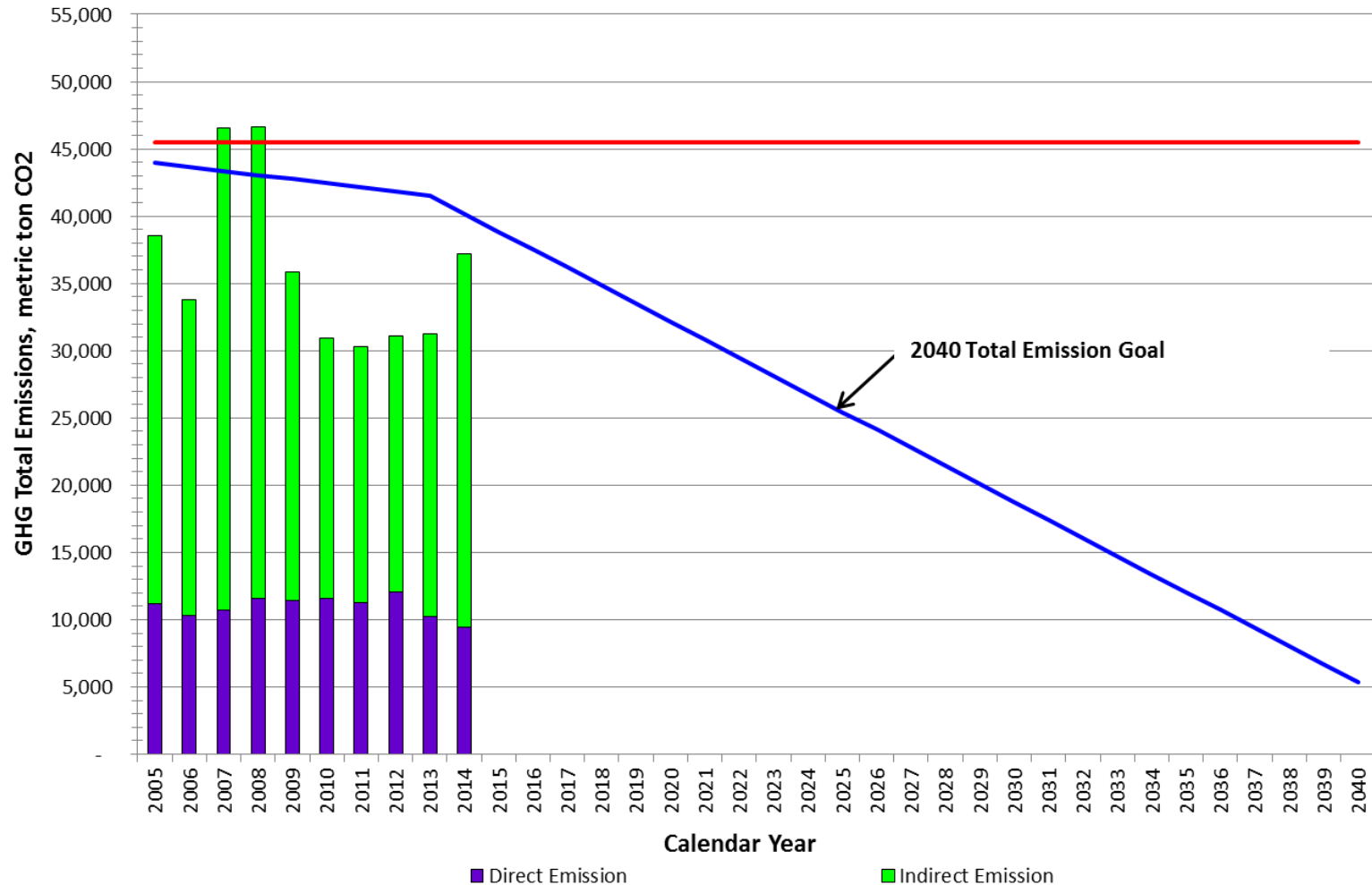


- Updated November 2013
- Comprehensive policy to address all energy sources
- Establish new GHG emission goals for 2040
 - Indirect Emissions: Carbon-free by 2040
 - Direct Emissions: 50% reduction by 2040 compared to 2000 emissions
- Least cost option to meet GHG reduction goals

GHG Emission Reduction Goal



Annual GHG Total Emission vs Goal



1990 vs 2000 Baseline



- Inventory GHGs based on the The Climate Registry protocols
- Estimates based on energy use and emissions factor
- Choose base year with earliest verifiable emissions data
- Why 1990 vs 2000?



The Climate Registry

State vs. District Goals



	Year			
	2020	2030	2040	2050
EBMUD	29%	59%	89%	-
State	0%	40%	-	80%

- EBMUD goals based on 2000 baseline
- State goals base on 1990 baseline
- California reduced emissions 6% between 1990 and 2000

Meeting District GHG Goal



- Direct Emissions
 - Reduce vehicle miles traveled and operating hours
 - Alternative energy sources for vehicles
 - CAFE standards
 - Carbon offsets
- Indirect Emissions
 - Energy conservation and efficiency
 - Energy source optimization
 - Renewable energy projects
 - Renewable Energy Certificates (RECs)
- TRECs currently the least cost and easiest to implement option

Renewable Energy Certificates (RECs)



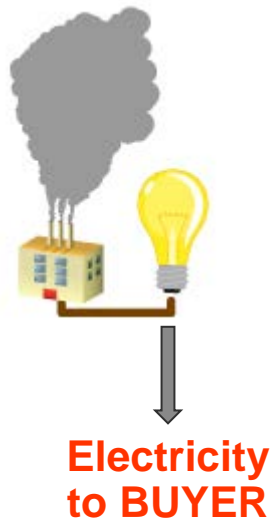
- REC is the environmental and renewable attributes of renewable electricity
- RECs also called “green tags”, “green credits”, “green tickets”, “renewable certificates”
- In the Western US, RECs are tracked using the Western Renewable Energy Generation Information System (WREGIS)
- A REC can be sold either “bundled” or “unbundled”

Renewable Energy Certificates (RECs)

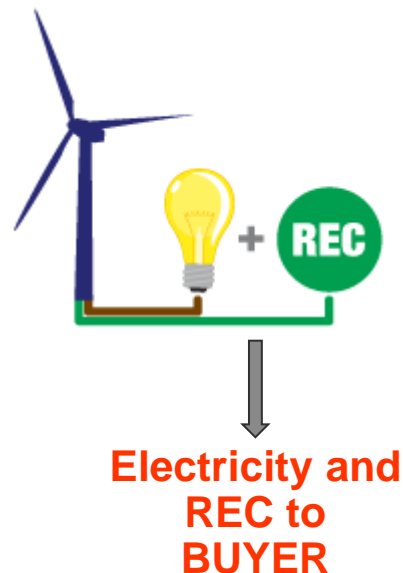


- 1 REC = 1 MWh
- Unbundled REC = Tradable REC
- Bundled RECs have a market value 20 to 40 times greater than TRECs

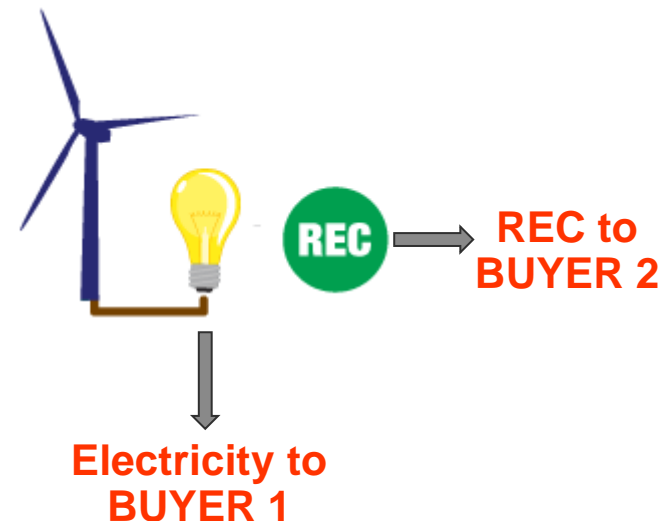
No REC



Bundled REC



Unbundled REC (TREC)



Freeport and GHG Emissions



- Freeport operation requires pumping and operation of the conventional WTPs
- Conventional WTPs more energy intensive
- Estimate CY2015 emissions 2,000 to 8,000 MT CO₂e above goal
- Current cost of TREC \$0.90 to \$1.10/MWh
- \$10,000 to \$50,000 to offset emissions



Next Steps



- Finalize 2014 GHG inventory
- Purchase TRECs to meet 2015 goal based on 2015 inventory

Questions?

Energy Strategy Update

May 26, 2105

Sustainability/Energy Committee

Overview



- Overview Net Energy Metering Tariff
- Photovoltaic projects
- Power and Water Resources Pooling Authority (PWRPA)
- Next steps

Net Energy Metering



- NEM
 - Net generation against consumption on site
 - Provides the best economic payback
 - Renewable generation credited at retail rates
- NEM-Aggregate
 - Tariff released in January 2014
 - Single generation project can apply credit to several accounts on the same, adjacent or contiguous properties

Changes in NEM Tariffs



- Current NEM or NEM-A tariffs available until
 - July 2017 or
 - NEM capacity exceeds 5% of utility peak load, estimated July 2016
- Existing NEM projects can remain on current NEM tariff structure for 20 total years
- New NEM tariffs after July 2017
 - Expected to be based on lower generation credit

PV Project Sites



- Significant electric load on site
- Area available 20+ years for PV system
- Preliminary economic evaluation

Project Site	Tariff	Credited Accounts
Camanche Dam site	NEM-A	10+
Oakport Site	NEM-A	4
North Richmond Reclamation Plant	NEM	1
Norris Res/Eden PP	NEM	1
Crockett Res/Rolph PP	NEM	1

RFP for PV Sites



- December 2014 issued an RFP
- Sent to 14 vendors
- Requesting PPA and direct purchase bids
- Mandatory site walk (8 participants)
- 5 participants submitted bids

Bids Received



Project Site	Tariff	Received Bids
Camanche Dam site	NEM-A	Yes
Oakport Site	NEM-A	Yes
North Richmond Reclamation Plant	NEM	Yes
Norris Res/Eden PP	NEM	Yes
Crockett Res/Rolph PP	NEM	No

Bid Evaluation



- NPV savings over 15-year term
- SunEdison's bids provided greatest value

Project Site	Size	NPV PPA	NPV Direct Purchase
Camanche Dam site	380 kW	\$2.340 M	\$1,990 M
Oakport Site			
Ground Mount	230 kW	\$630 K	\$460 K
Canopy System	230 kW	\$100 K	\$630 K
North Richmond Reclamation	380 kW	\$500 K	\$210 K
Norris Res/Eden PP	23 kW	\$190 K	\$140 K
TOTALS	1,013 kW	3.03 M	\$ 630 K

Camanche Dam Site



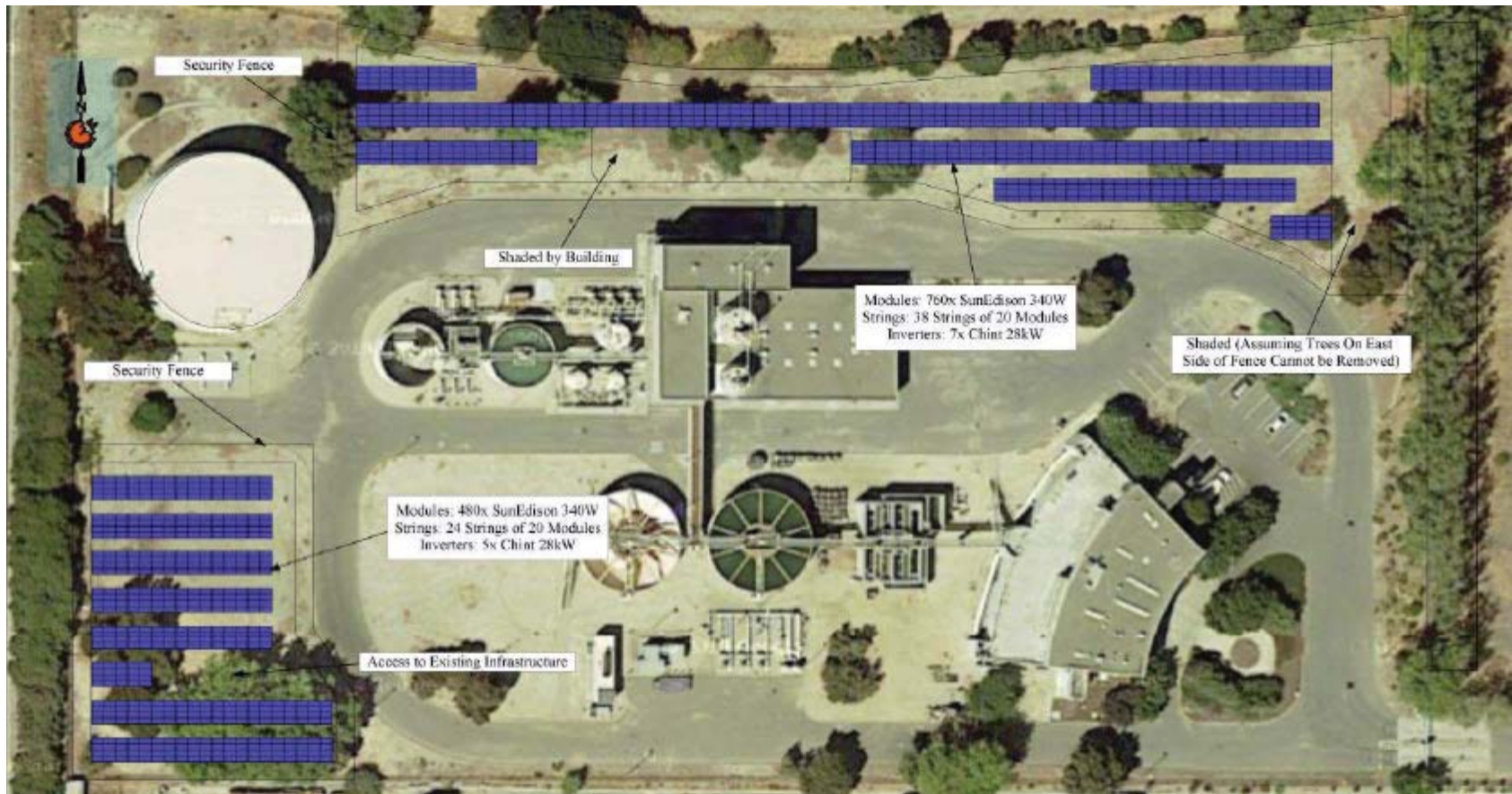
Oakport (canopy system)



Oakport (ground mount option)



North Richmond Reclamation



Norris Res / Eden PP



GHG Reduction



- Est. annual production 1,950 MWh
- Offset approximately 380 MT of CO₂
 - Based on PG&E's emissions factor
 - ~1.5% of CY 14 GHG indirect emissions
 - ~1.5% toward our 2040 zero emission goal

PV Next Steps



- Negotiate PPA's and the Direct Purchase Contract
- Complete CEQA
- Site Prep
- Board consideration, September 2015
- Project completion summer 2016

What is PWRPA



- Publicly-owned electric utility
- Joint Powers Authority established in 2004
- Participants
 - 8 Irrigation Districts
 - 7 Water Districts
- 9 to 23 percent lower cost than PG&E

2010 Settlement Agreement



- PG&E disputes PWRPA's right to exist
- 5-year Settlement Agreement
- Agree to disagree
- 15 megawatt cap for new PWRPA load
- Expires September 2015

PG&E Settlement Offer



- PG&E Offer
 - extend settlement 5 years to 2020
 - Additional 15 megawatts for new PWRPA load
 - Maintain all other terms
- PWRPA Board approved settlement
- Requires FERC approval (summer 2015)

Initial PWRPA Evaluation



Site	Estimated Saving/YR	Intervening Facility cost	Payback (years)
Castenada PP	\$130K	\$300K	2.3
Lafayette WTP	\$130K	\$330K	2.4
Orinda WTP	\$140K	\$340K	2.4
Claremont Center	\$130K	\$360K	2.7
San Ramon PP	\$120K	\$340K	2.8
USL WTP	\$90K	\$340K	3.6
Richmond RARE	\$70K	\$340K	5.0
Shasta Woods PP	\$40K	\$470K	11.3
Walnut Creek RWPP	\$110-210K	N/A	N/A
Diablo Vista	N/A	N/A	N/A
TOTAL	\$810K	\$2.4M	Ave 3.0 yrs.

December 2014 Submittal



- Submitted the seven favorable accounts for PWRPA service
 - Reserve remaining capacity for new load
- PG&E considered submittal incomplete
 - \$200,000 service initiation fee
 - Detail engineering drawings
 - Execution of PWRPA Agreements

PWRPA Next Steps



- Review approved Settlement Agreement
- Continue to evaluate the risks and benefits of PWRPA service

Food Waste Update

Sustainability/Energy Committee

May 26, 2015

Presentation Outline

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



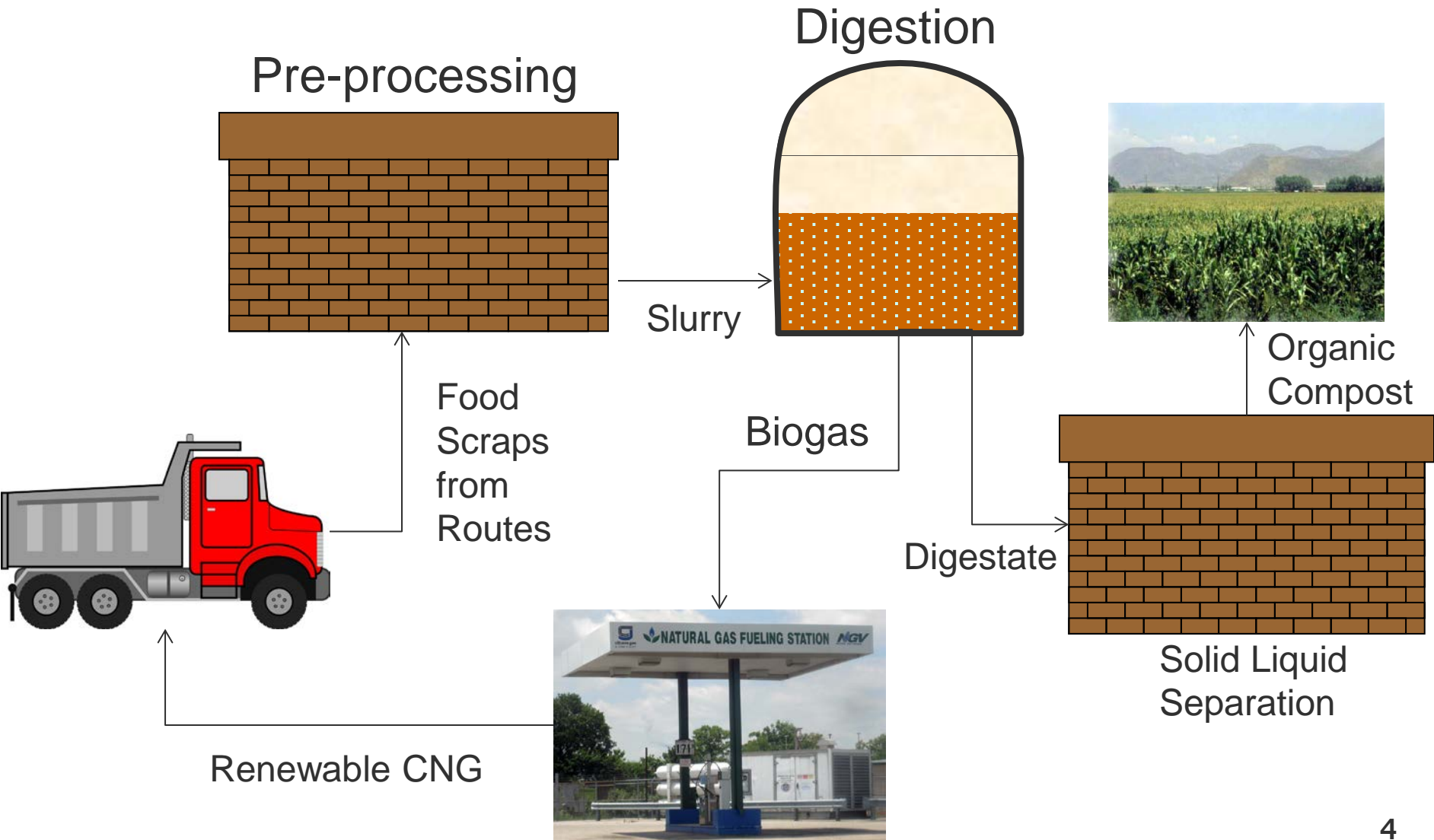
Background History



- Over ten years ago, the District began the Resource Recovery Program to utilize excess WWTP capacity
- Food waste has been identified as a local and sustainable source of organics
 - Piloting began in 2002



Background Project Overview



Background Project Status



- District released a RFP on Feb 20 to preprocess Oakland's food waste at the WWTP
 - **Harvest Power** selected for negotiation on integrated solution for Oakland and additional sources of food waste
 - **Recology** selected for negotiation on preprocessing of San Francisco "urban organics"
- Also evaluated option for District to implement project alone

- Schedule
- Experience/Expertise
- Material Sourcing
- Economics

➤ ***District alone option not feasible***

- Further consideration of District dewatering

Food Waste Contracts



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

Food Waste Contracts



Waste Management

Waste Management Background



- In September 2014, Oakland City Council awarded its Mixed Materials and Organics (MMO) franchise to Waste Management (WM) and directed commercial organics to the District
- Program is set up for District to be a subcontractor to WM
 - Prime MMO contract signed by City and WM in February
 - Many provisions of District subcontract with WM stem from the prime contract

Waste Management

WM Subcontract Status



- WM and the District have agreed to key contract terms
- Currently finalizing language
- City staff will review/approve WM-EBMUD subcontract

- All commercial food scraps collected in Oakland to be delivered to District
 - District staff will have ability to review WM decisions on which commercial organics customers will be directed to District vs. which stay with WM
 - Up to 50 tons/day will be delivered straight from routes at \$96/ton
 - WM will be responsible for complying with education and outreach requirements to limit contamination to 10%
 - District has option to augment outreach efforts

Waste Management

Material Quantity and Quality



- If quantities exceed 50 tons/day, WM has the option to pre-process and deliver at \$46/ton
 - Pre-processed material will be limited to 5% contamination
 - Material that does not to meet the 5% spec will be redirected to the pre-processing facility at \$96/ton
 - Process to verify quality through testing

Waste Management Residuals



- Contaminants removed from Oakland food scraps will be disposed of at WM's Altamont Landfill
 - Competitive gate rate established in City-WM contract
 - District/Pre-processor can select hauler

Waste Management Start-up Period



- WM contract with City begins July 1, 2015
 - District is not yet ready to accept material
 - District had planned to take responsibility for material and divert it to alternate facilities
- District and WM reached agreement that WM will be responsible for management of the material until the District commences operation of our pre-processing facility
- WM will also manage material during operational downtime

Waste Management Start-up Period (cont.)



- District to submit project status update to WM and City in January 2016
- If projection shows that District will not be ready for July 1, 2016, District required to submit a Remedial Plan defining an outside date for readiness
 - City has sole discretion to approve Remedial Plan
- Subcontract defines start-up period as July 1, 2015 until District commences operation or June 30, 2017, whichever is sooner

Food Waste Contracts



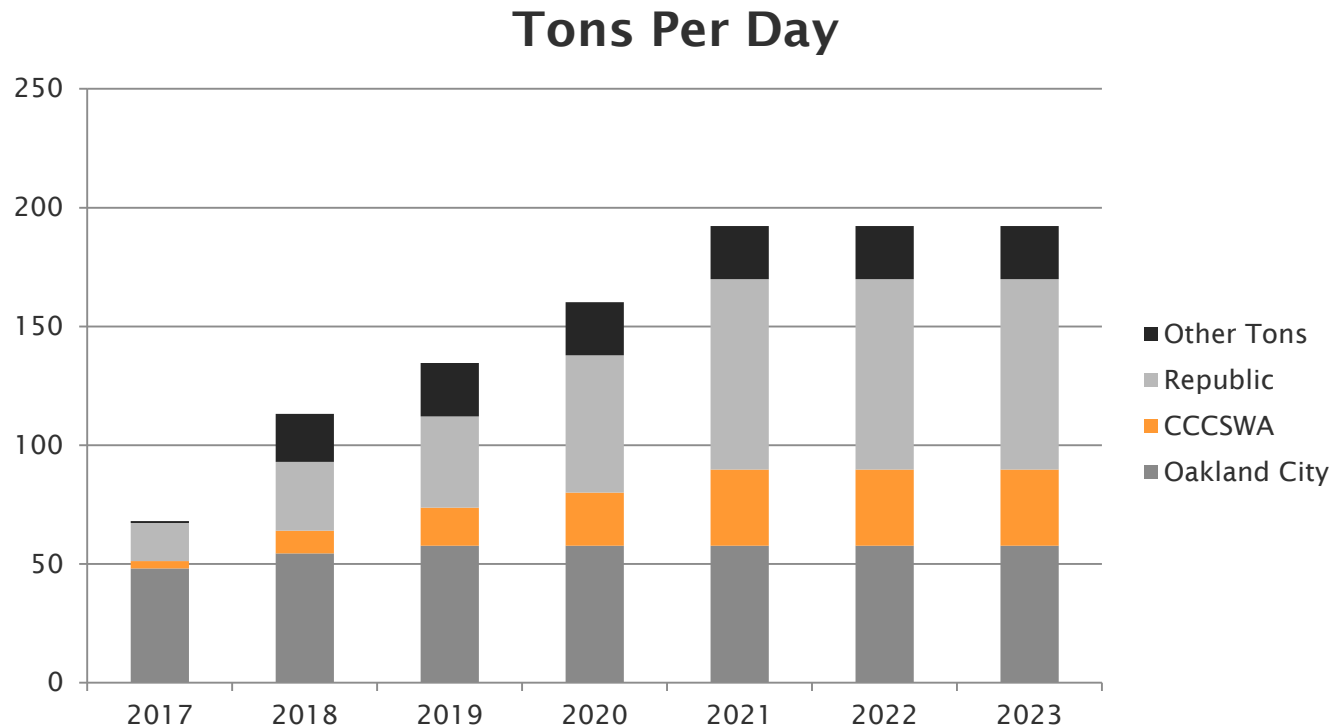
Harvest Power

Harvest Power Project Structure

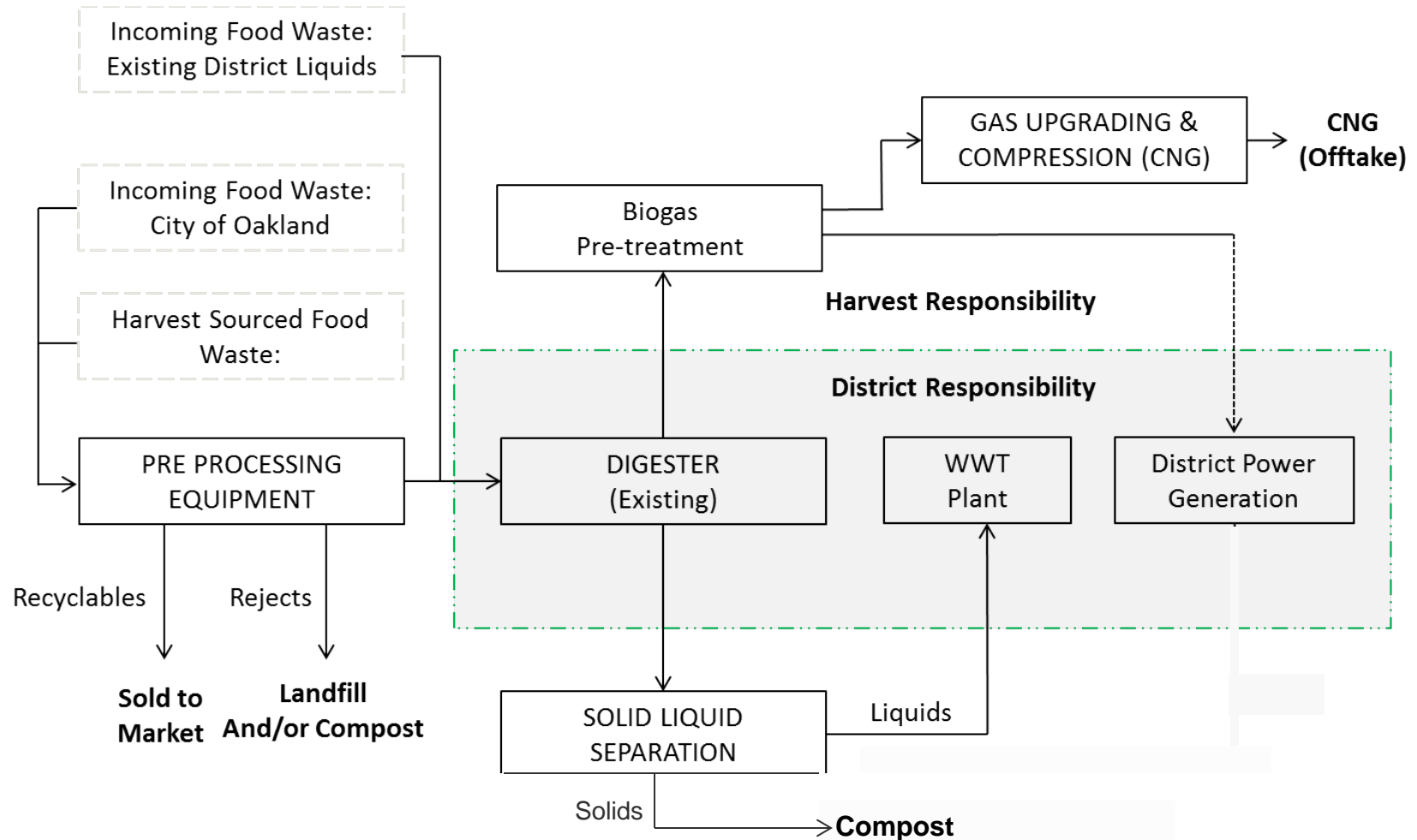


- Energy Facility Financing Contract model
 - Statute allows District to procure design-build-operate services under certain conditions
 - Energy revenues offset District's capital investment
- Both parties contribute capital and share in revenue
 - Project elements are fully integrated
 - Tip fees are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

Harvest Power Feedstock Ramp Schedule



Harvest Power Process Flow



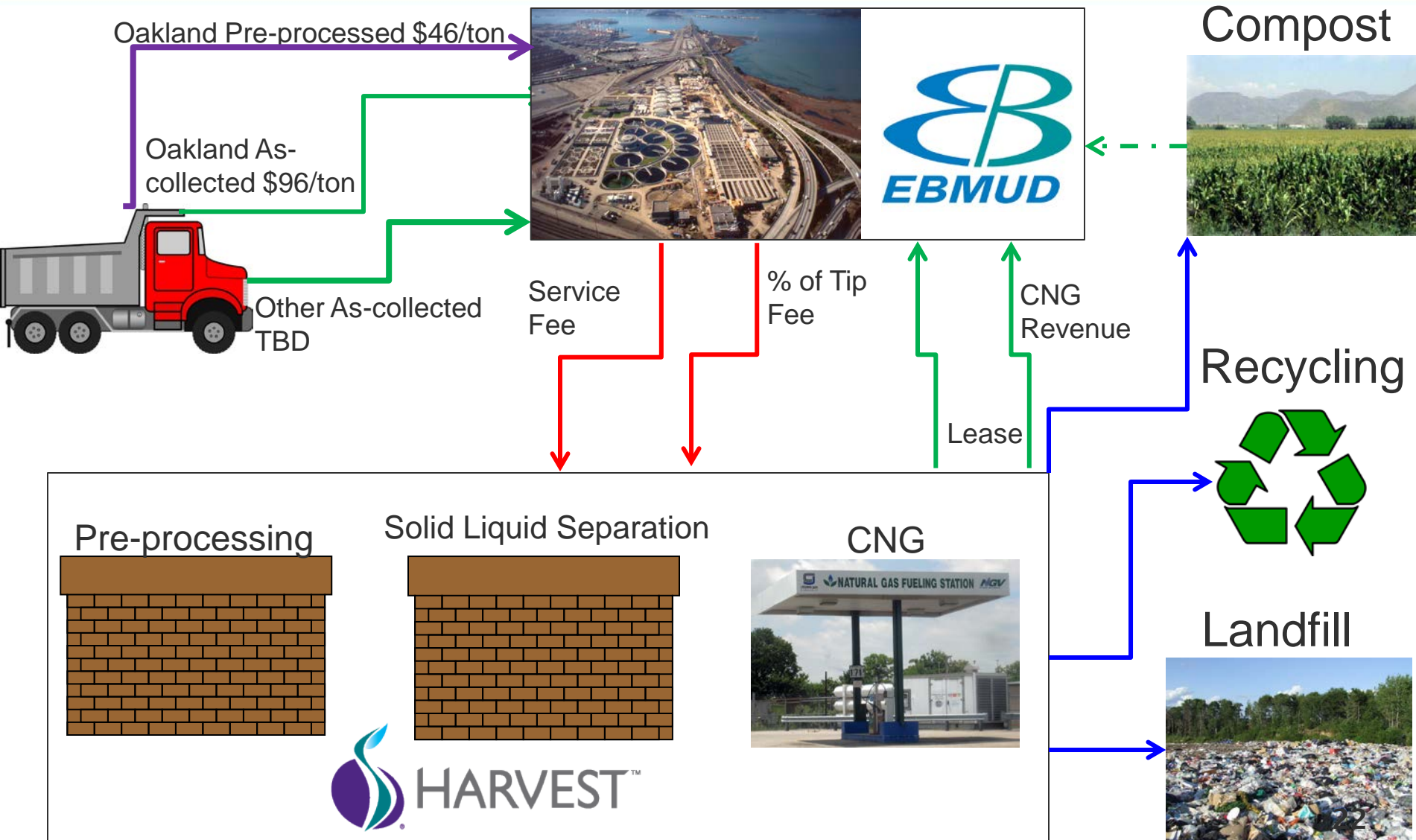
Harvest Power Solid Liquid Separation



- District operating not feasible due to project integration
 - Technology risk
 - Cost and consequences of inadequate pre-processing
 - Solids management –hauling cost and compost quality
- ***Cost tradeoffs***
 - Polymer
 - Cake dryness
 - Grit

- Access to material
- Revenue streams from energy, recycling, compost feedstock/fertilizer
- \$5 M CA Energy Commission grant
- Harvest interest to gain a foothold in northern CA

Harvest Power Project Cash Flows



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

Overall Food Waste Program



- Opportunities
- Infrastructure
- Risks



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

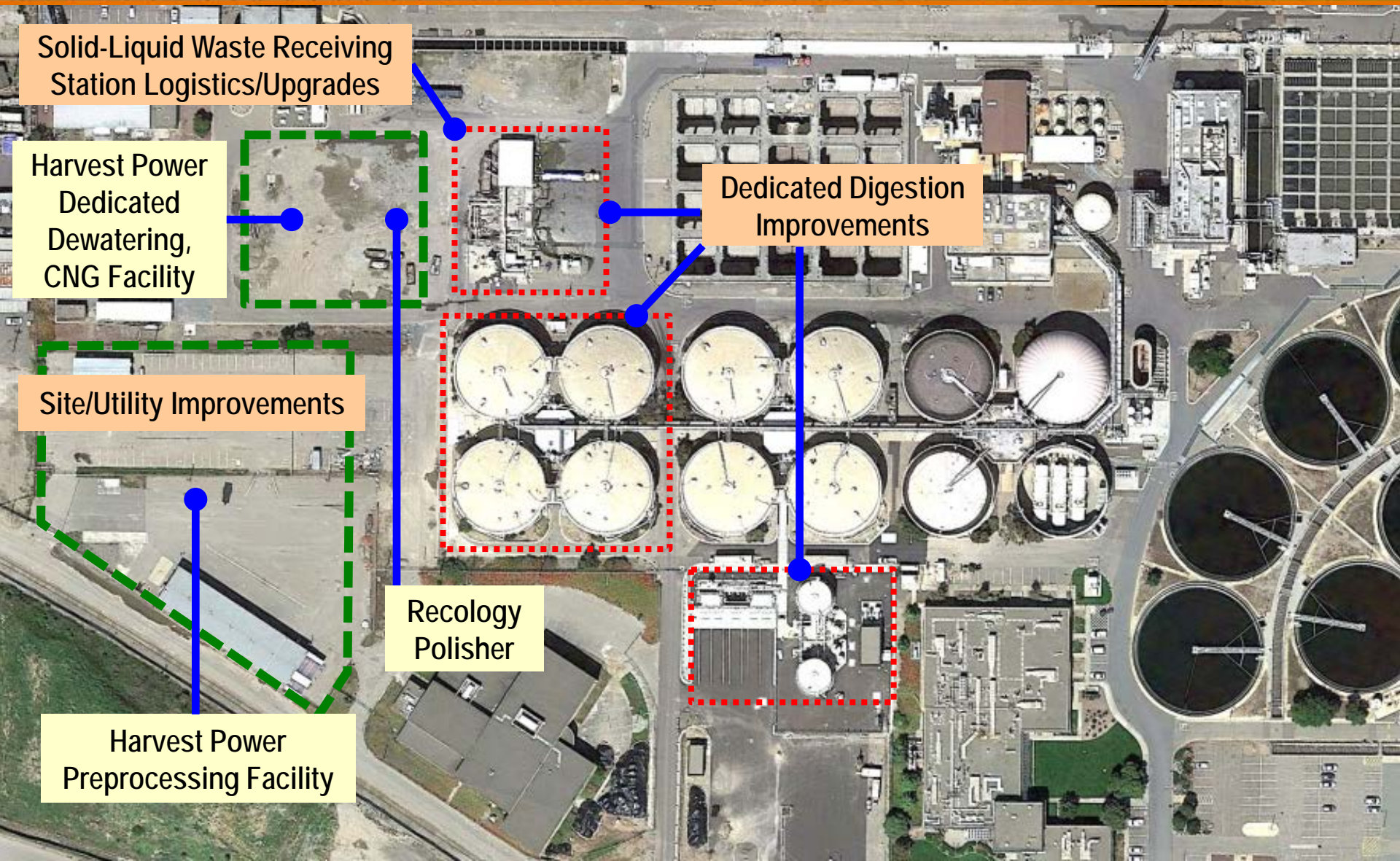
Harvest Power
Dedicated
Dewatering,
CNG Facility

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)

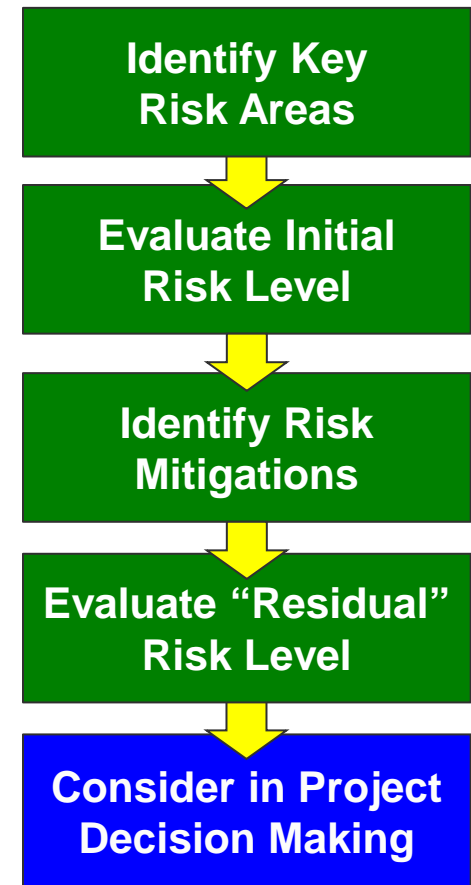
\$13.7-15.7M
- Proposed FY16-20 CIP
 - Includes \$14M in FY16-FY18

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

Risk Management

Technical



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

Risk Management Regulatory



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

Risk Management

Operational



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

Risk Management Summary



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

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