Public Works Agency

Ventura County Watershed Protection District

Ventura River Watershed Bio-Digester Feasibility Study

Ventura River Watershed Council

Thursday, July 11, 2013

E.P. Foster Library Topping Room

651 E. Main St., Ventura

AECOM

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Agenda and Presenters

- VCWPD PM - *Gerard Kapuscik*
- AECOM PM – *Ryan Gallagher, PE*
- Overview of Results
- Next Steps

What is the Purpose of the Study?

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In *cooperation* with Waste-to-Energy, VCRSD, and local stakeholders, the Ventura County Watershed Protection District (VCWPD) is conducting a *focused feasibility study* on the use of a bio-digester, other alternative technologies, and complimentary material handling processes designed to convert local organic wastes (including horse and cattle manure, green waste, and food waste) into energy and other useful byproducts in the Ventura River Watershed.

What was included in the Feasibility Study?

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5 stages of analysis:

- #1 – Feedstock Summary and Collection Methods *(Complete)*
- #2 – Technology and Site Analysis *(Complete)*
- #3 – Conceptual Site Plan, Environmental Review and Project Delivery *(Complete)*
- #4 – Implementation Plan *(Public Review Draft)*
- Final Feasibility Study

TM No.1 - Feedstock Summary & Collection Methods

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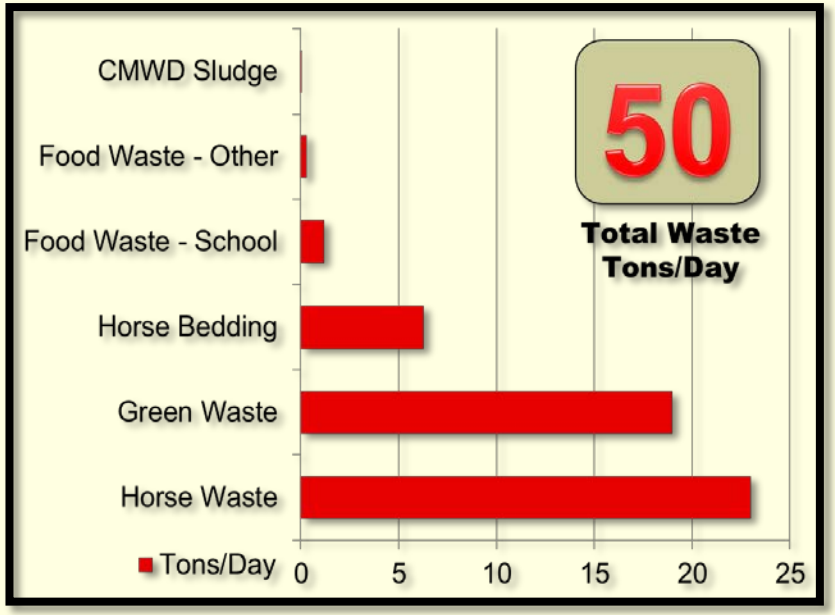
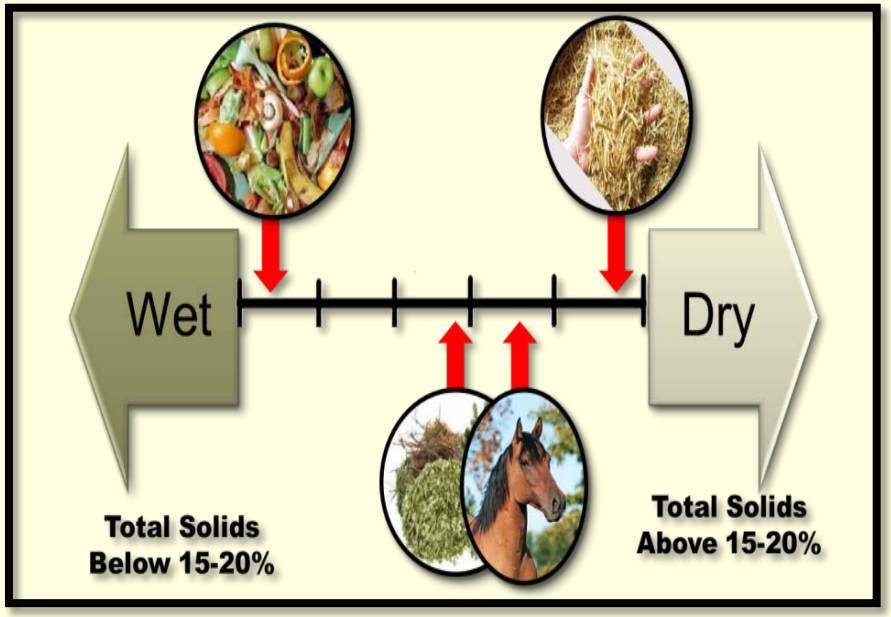
- Feedstock Data – Types & Characteristics





- Energy Potential => **1.86** Million kWh/yr
  = el. Energy for ~200 homes/yr
- Collection Methods

TM No.2 - *Technology* & Site Analysis

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- Technology Analysis

Start:
11 dry AD companies contacted

Analysis Tools
- Established Criteria
- Questionnaire
- Detailed Discussions

Result:
Three firms short-listed as most feasible

- Detailed Review of Short-listed Firms
  - Two firms with existing facilities
  - More food waste or process water needed
  - Green waste avoided due to wood; CMWD sludge not used; Straw bedding assumed; Food waste requires pre-treatment

TM No.2 - Technology & *Site Analysis*

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Criteria	Description
Site Access	Transportation arterial. Space for vehicle turning.
Feedstock Proximity	Locate in Ventura River Watershed
Adjacent Utilities	Dilution water, sewer and SCE or energy demand
Zoning	Industrial
Aesthetics	Industrial area or not clearly visible.
Environmental	Biological, Flood, Archaeological
O&M Requirements	Co-location

TM No. 3 - Conceptual Site Plan, Environmental Review and Project Delivery

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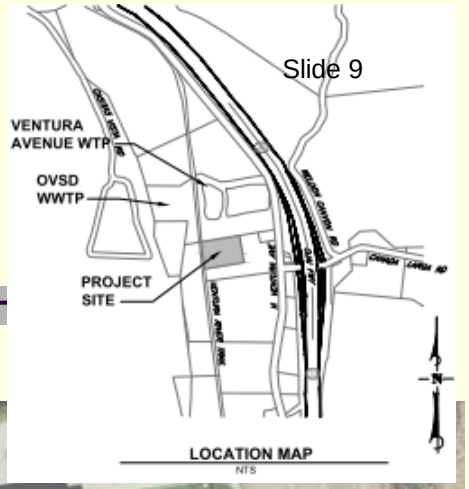
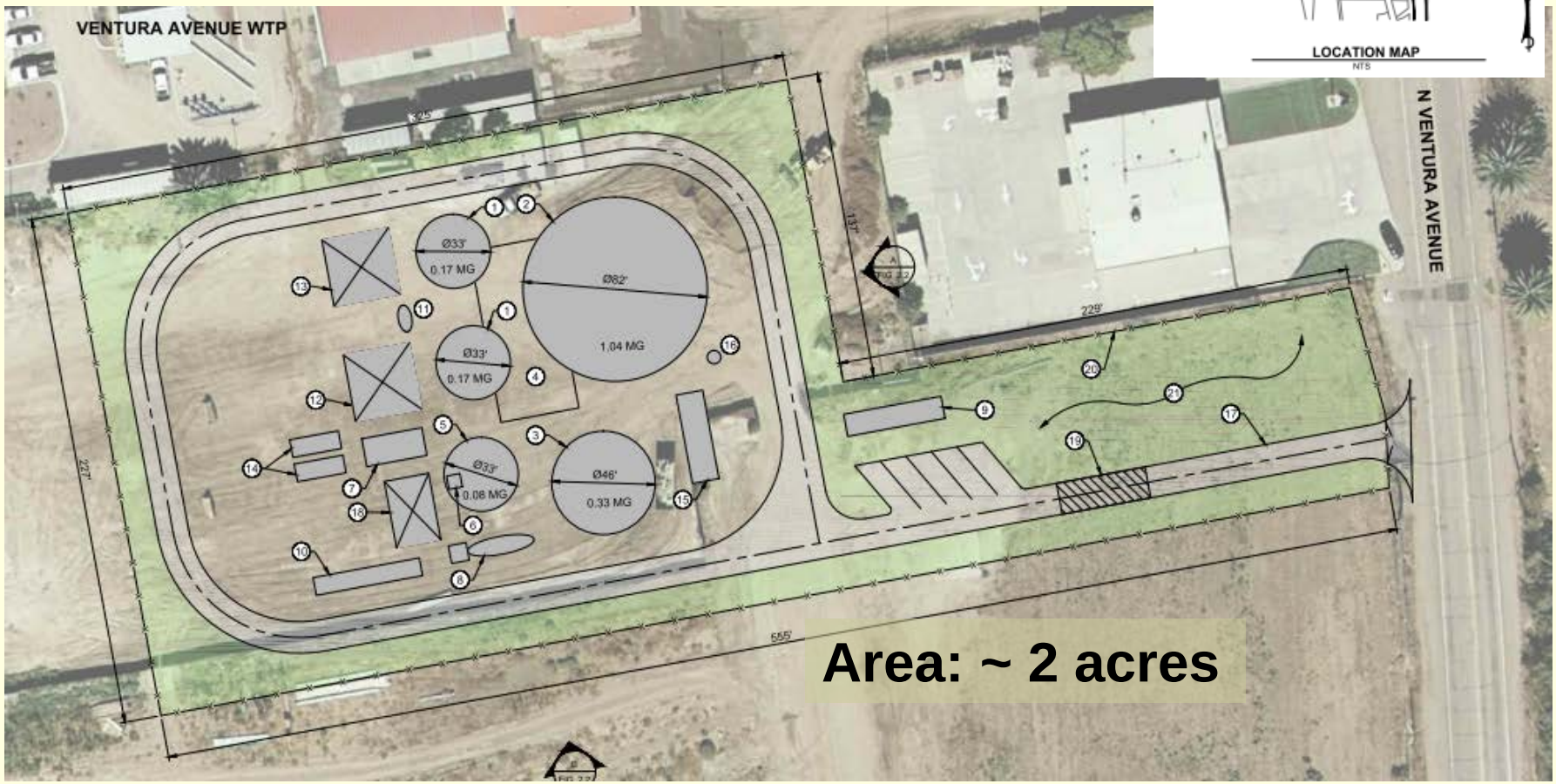
- Introduction – Background & Objective
  - Worked with Organic Services' as the Technology Provider for TM#3 Development
- Conceptual Site Plan
- Construction Costs
- Environmental Analysis
- Project Delivery Models

Conceptual Site Plan





Area: ~ 2 acres

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Probable Construction Cost Summary

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Description	Cost (in 1000')
Base Construction Subtotal (site work, tanks, equipment, etc.)	5,127
Contingency @ 25%	1,280
Bonds and Insurance @ 2%	100
Construction Subtotal	6,507
Engineering: Design and Construction @15%	1,000
Owner Engineering and Administration @ 5%	330
Environmental Permitting, Mitigation @ 5%	330
Land Acquisition (2 acres)	500
Total	**8,670**

Environmental Analysis Approach

Project Feasibility - Environmental Constraints

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- Preliminary California Environmental Quality Act (CEQA) Initial Study Checklist

=> Review of Related Environmental Documents

Project Feasibility - Environmental Constraints Findings [based on the current information available]

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Issue	Impact Potentially Significant if not Mitigated		Cumulative Impact
	Construction	Operation	
Air Quality (Emissions, Noise, Odors)	✓	✓	**TBD**
Biological Resources	✓		**TBD**
Archaeological Resources	✓		**TBD**
Water Quantity		✓	**TBD**

- Mitigated Negative Declaration or Environmental Impact Report would be required.
- No potentially significant impacts were identified that cannot be mitigated

Selected Project Delivery Models

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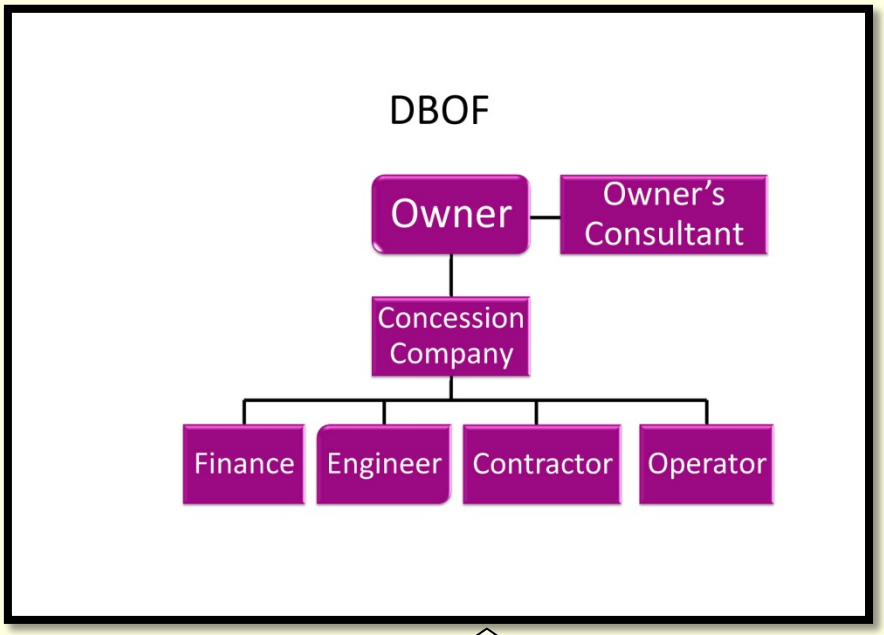
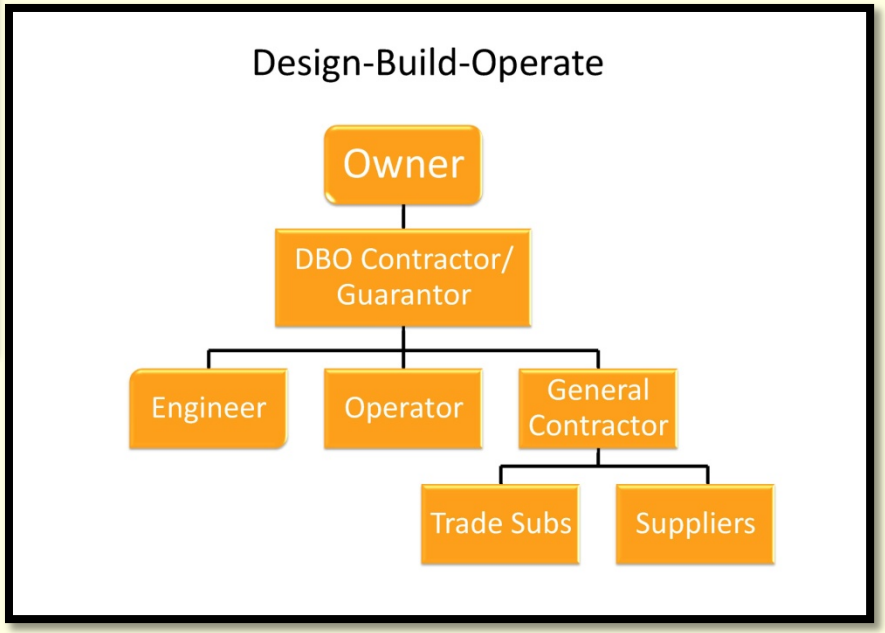


Private Ownership, Operation & Financing

Public-Private Partnership with Public Financing



Technical Memorandum No.4 Overview

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- Implementation Schedule
- Economic Analysis
- The Way Ahead

Schedule – 49 Months Overall

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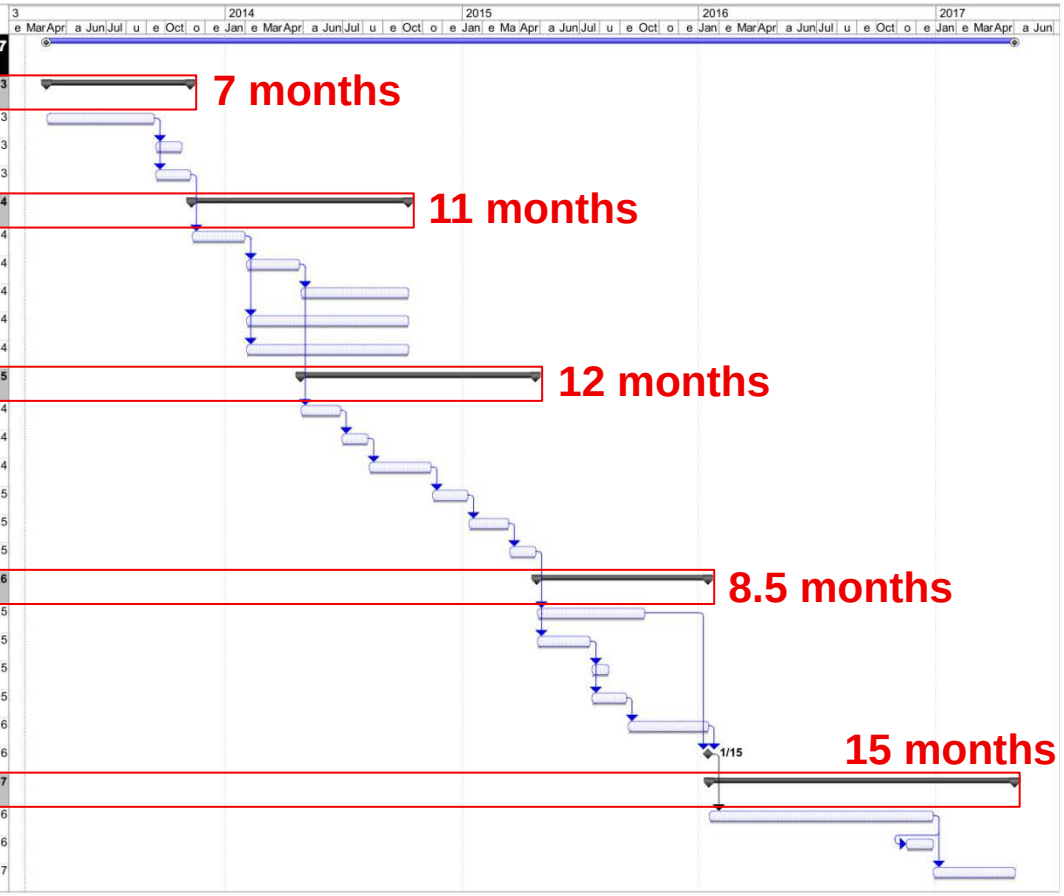
Task Name	Duration	Start	Finish
Overall Project Delivery	**1067 days**	**Mon 4/1/13**	**Tue 5/2/17**
OWNER FORMATION	**160 days**	**Mon 4/1/13**	**Fri 11/8/13**
Form Agency/ COOP/Governing Group	120 days	Mon 4/1/13	Fri 9/13/13
Select Owner's Representative / Program Manager	30 days	Mon 9/16/13	Fri 10/25/13
Identify Property Funding Source	40 days	Mon 9/16/13	Fri 11/8/13
PROJECT DEVELOPMENT	**240 days**	**Mon 11/11/13**	**Fri 10/10/14**
Secure Property Funding and Complete Due Diligence	60 days	Mon 11/11/13	Fri 1/31/14
Procure Property	60 days	Mon 2/3/14	Fri 4/25/14
Land Use Modification (If Required)	120 days	Mon 4/28/14	Fri 10/10/14
Formalize Partnership Contracts (Hauler, SCE, etc.)	180 days	Mon 2/3/14	Fri 10/10/14
Finalize Feedstock Supplier Agreement	180 days	Mon 2/3/14	Fri 10/10/14
ENVIRONMENTAL IMPACT REPORT (EIR)	**260 days**	**Mon 4/28/14**	**Fri 4/24/15**
Prepare Initial Study	45 days	Mon 4/28/14	Fri 6/27/14
Circulate Notice of Preparation	30 days	Mon 6/30/14	Fri 8/8/14
Prepare Administrative Draft EIR and Technical Studies	70 days	Mon 8/11/14	Fri 11/14/14
Circulate Public Draft EIR	40 days	Mon 11/17/14	Fri 1/9/15
Respond to Public Comments and Prepare Final EIR	45 days	Mon 1/12/15	Fri 3/13/15
Certification of Final EIR and Filing Notice of Determination	30 days	Mon 3/16/15	Fri 4/24/15
PROCUREMENT	**190 days**	**Mon 4/27/15**	**Fri 1/15/16**
Identify Project Funding Source (If Required)	120 days	Mon 4/27/15	Fri 10/9/15
Develop RFQ	60 days	Mon 4/27/15	Fri 7/17/15
Short List (3-5)	20 days	Mon 7/20/15	Fri 8/14/15
Develop RFP	40 days	Mon 7/20/15	Fri 9/11/15
Interview/Selection/ Negotiations	90 days	Mon 9/14/15	Fri 1/15/16
Notice to Proceed to DBOF Team	0 days	Fri 1/15/16	Fri 1/15/16
CONSTRUCTION	**337 days**	**Mon 1/18/16**	**Tue 5/2/17**
Construction	247 days	Mon 1/18/16	Tue 12/27/16
Begin Collection to Temporary Drop Off	30 days	Wed 11/16/16	Tue 12/27/16
Start-Up	90 days	Wed 12/28/16	Tue 5/2/17



Economic Analysis Alternative Scenarios

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- Financial performance of Alternatives is sensitive to financing costs and tipping fees.

Scenario	IRR	NPV
Alternative 1 - Private	0	-$9.9M
Alternative 2 – Public	-19.9%	-$5.4M
Alternative 2A – Public	11.7%	$6.0M

Increase in tipping fee from $22/ton (Alt, 2) to $35/ton (Alt. 2A)

- *Notes on project viability metrics:*
  - *NPV –NPV shows there is profit over and above the cost of funding*
  - *IRR – positive IRR in excess of (in this instance) threshold level return of 8% suggests the project is viable*

Alternative 2A: *Alternative 2 with Enhanced Tipping Fee and Improved Start-up*

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Capital Cost Assumptions

			Total $
Base Costs	Sub Total Base Costs	Σ	$ 5,127,000
CBI Costs	Contingency		$ 1,281,750
	Bonds & Insurance		$ 102,540
	Sub Total CBI	Σ	$ 1,384,290
Sub Total Construction		Σ	$ 6,511,290
EAEL Costs	Design and Construction		$ 976,694
	Administration		$ 325,565
	Environmental Permitting		$ 325,565
	Land Acquisition		$ 500,000
	Sub Total EAELA	Σ	$ 2,127,823
Total Capx		Σ	$ 8,639,113

Capital Financing Assumptions

	Alternative 1	Alternative 2a	Alternative 2b
Start Date	2014	2014	2014
Period (yrs)	30	30	30
Borrowing Rate	6.89%	4.00%	4.00%

O&M Assumptions

Inservice Date			2014
Base Throughput (tons)			10,700
Base O&M	Annual Fees		$ 23,000
	Repair and Maintenance		$ 100,000
	Personnel		$ 84,000
	Consumables		$ 120,000
	Leasing Machinery		$ 27,000
	Sum of O&M	Σ	$ 354,000
Base O&M Cost per Ton			$ 33.08
Escalation	O&M		3.50%

Tonnage Input Assumptions

	Alternative 1	Alternative 2a	Alternative 2b
Years 0 to 1	5,000	5,000	10,700
Years 1 to 2	10,700	10,700	10,700
Years 2 to 5	16,000	16,000	16,000
Years 5 to 30	21,000	21,000	21,000

Discount Factor

Factor	1.10%

Performance Metrics

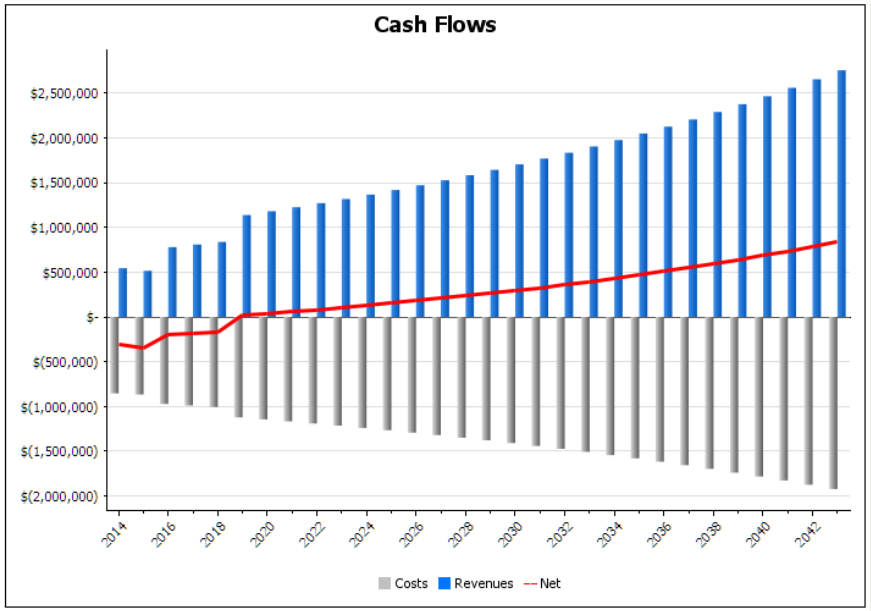
Net Present Value	$ 5,954,768
Internal Rate of Return	11.7%

Revenue Assumptions

		Alternative 1	Alternative 2a	Alternative 2b
Feedstock Input	Tipping Fee ($/ton)	$ 22	$ 22	$ 35
	Tipping Fee Escalation	3.50%	3.50%	3.50%
Electricity Output	Base ($/kwh)	$ 0.092740	$ 0.092740	$ 0.092740
	Base Rate Escalation	4.50%	4.50%	4.50%
	PTC ($/kwh)	$ 0.022000		
	PTC Term (yrs)	10		
	SGIP ($/kw)	500	500	500
	SGIP Term (yrs)	5	5	5

Kwh Output Assumptions

	Alternative 1	Alternative 2a	Alternative 2b
Years 0 to 1	607,000	607,000	1,214,000
Years 1 to 2	1,214,000	1,214,000	1,214,000
Years 2 to 5	1,682,000	1,682,000	1,682,000
Years 5 to 30	2,289,000	2,289,000	2,289,000



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Next Steps

- **Presentation to City of Ojai Planning Commission (July, 17, 2013)**
- **Presentation to the OVSD Board of Directors (July 2013)**
- **Publish Final Feasibility Study Report and Submit Study Report Deliverable to DWR for Grant Funding (August 2013)**
- **Potential Optional Additional Project Studies For Future Consideration:**
  - ***Market Analysis – Feedstock, Digestate, Carbon Credit***
  - ***Pilot testing/demonstration***
  - ***Comparative analysis of several TMDL solutions***

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For Additional Information

- **Biodigester Feasibility Study Info Website:**

  Final versions of all four technical memoranda, public workshop presentations and grant acceptance documents are available and accessible 24-7 on the District's website:

  - **WPD's: http://vcwatershed.org/new**

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Questions and Answers

Economic Analysis
Net Cash Flow Comparison

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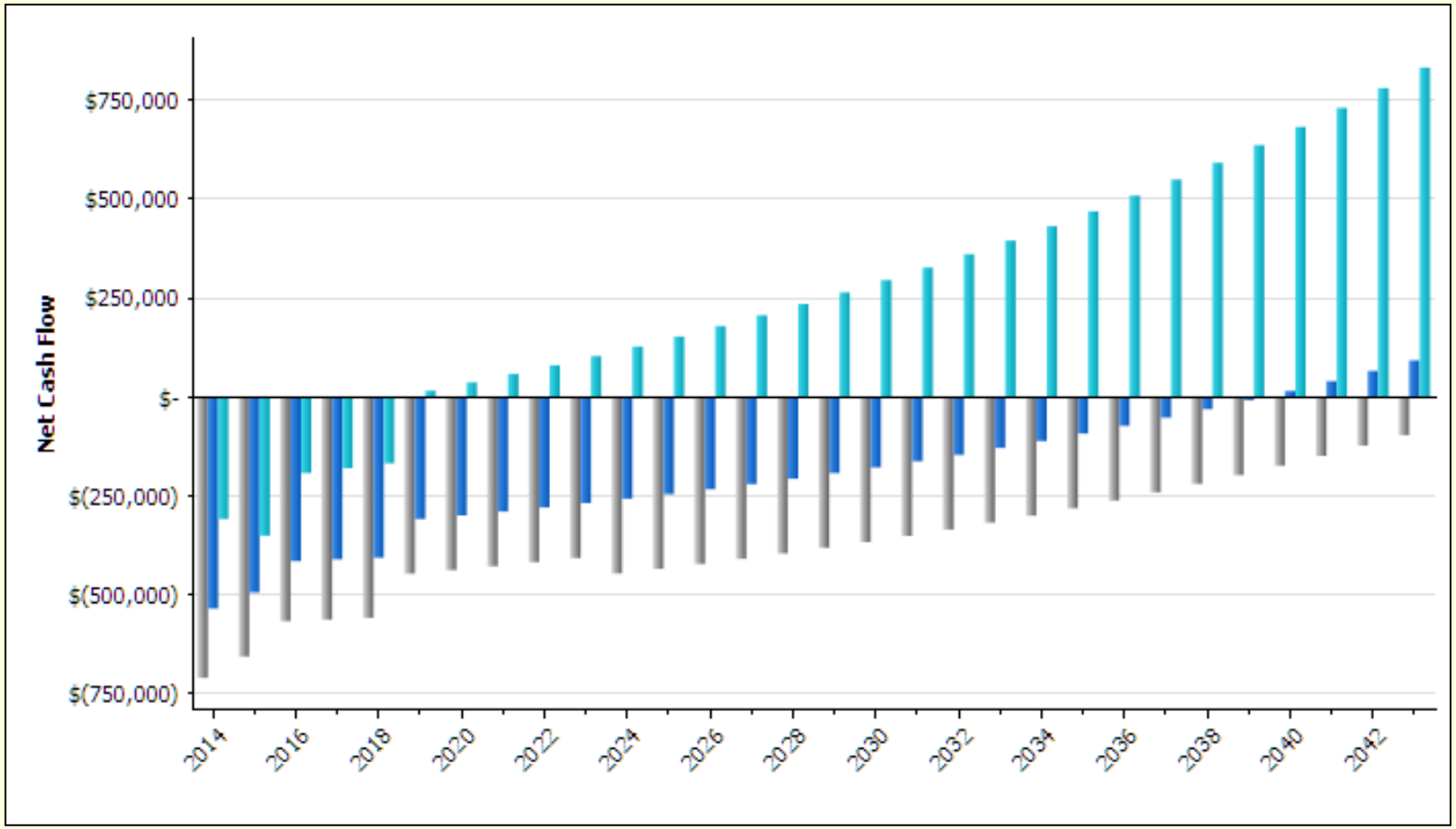

Water Use in Perspective

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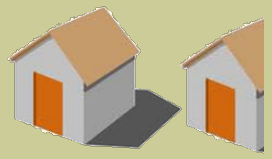
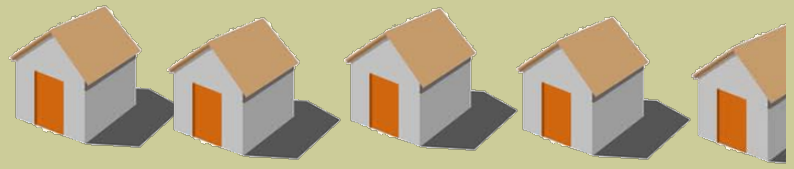
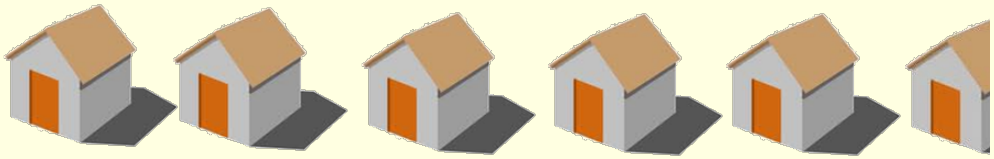
1 AF = average annual use for SF home



Low estimate = 1.6 AF/Yr



High estimate = 4.9 AF/Yr



Industrial
Zoning = 5.2 AF/Yr

Alternative 2: *Public Private Partnership*

with Public Ownership + Financing + Private Operation

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Capital Cost Assumptions

			Total $
Base Costs	Sub Total Base Costs	Σ	$ 5,127,000
CBI Costs	Contingency		$ 1,281,750
	Bonds & Insurance		$ 102,540
	Sub Total CBI	Σ	$ 1,384,290
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Capital Financing Assumptions

	Alternative 1	Alternative 2a	Alternative 2b
Start Date	2014	2014	2014
Period (yrs)	30	30	30
Borrowing Rate	6.89%	4.00%	4.00%

O&M Assumptions

Inservice Date			2014
Base Throughput (tons)			10,700
Base O&M	Annual Fees		$ 23,000
	Repair and Maintenance		$ 100,000
	Personnel		$ 84,000
	Consumables		$ 120,000
	Leasing Machinery		$ 27,000
	Sum of O&M	Σ	$ 354,000
Base O&M Cost per Ton			$ 33.08
Escalation	O&M		3.50%

Tonnage Input Assumptions

	Alternative 1	Alternative 2a	Alternative 2b
Years 0 to 1	5,000	5,000	10,700
Years 1 to 2	10,700	10,700	10,700
Years 2 to 5	16,000	16,000	16,000
Years 5 to 30	21,000	21,000	21,000

Discount Factor

Factor	1.10%

Performance Metrics

Net Present Value	$ (5,399,888)
Internal Rate of Return	-19.9%

Revenue Assumptions

		Alternative 1	Alternative 2a	Alternative 2b
Feedstock Input	Tipping Fee ($/ton)	$ 22	$ 22	$ 35
	Tipping Fee Escalation	3.50%	3.50%	3.50%
Electricity Output	Base ($/kwh)	$ 0.092740	$ 0.092740	$ 0.092740
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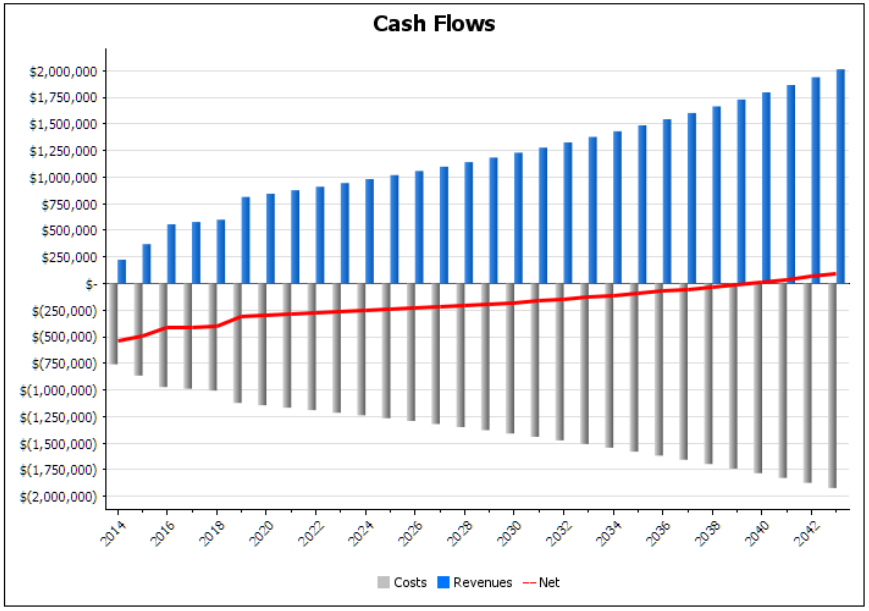

Alternative 1:

Private Ownership, Operation and Financing

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Capital Cost Assumptions

			Total $
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Years 2 to 5	16,000	16,000	16,000
Years 5 to 30	21,000	21,000	21,000

Discount Factor

Factor	1.10%

Performance Metrics

Net Present Value	$ (9,877,303)
Internal Rate of Return	

Revenue Assumptions

		Alternative 1	Alternative 2a	Alternative 2b
Feedstock Input	Tipping Fee ($/ton)	$ 22	$ 22	$ 35
	Tipping Fee Escalation	3.50%	3.50%	3.50%
Electricity Output	Base ($/kwh)	$ 0.092740	$ 0.092740	$ 0.092740
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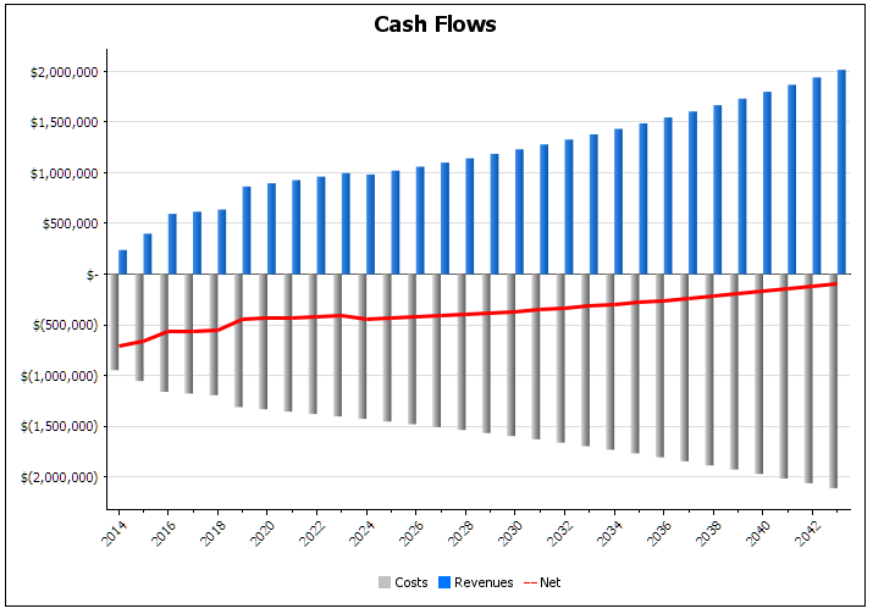

Economic Analysis Parameters/Assumptions Used

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- Capital Cost
- Rate of Return
- Private Financing
- Public Financing
- Discount Rate
- Feedstock Throughput
- Power Generation

Range of $22/ton to $35/ton

- Tipping Fee
- Operation & Maintenance (O&M)
- O&M Escalation
- Digestate/Fertilizer
- Power Purchase
- Incentives

Varies between 5,000 t/yr (yr 0-1) to 21,000 t/yr (yr 5-30)

Economic Analysis Background & Objective

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- Comparatively examine the economic viability of alternative project configurations

Alt 1 Private **VS** **Alt 2 Public**

Alt 2A Public

- Economic viability metrics:
  - Presence of positive net cash flow
  - A positive net present value (NPV)
  - A positive internal rate of return (IRR)