CALIFORNIA STATE UNIVERSITY, NORTHRIDGE

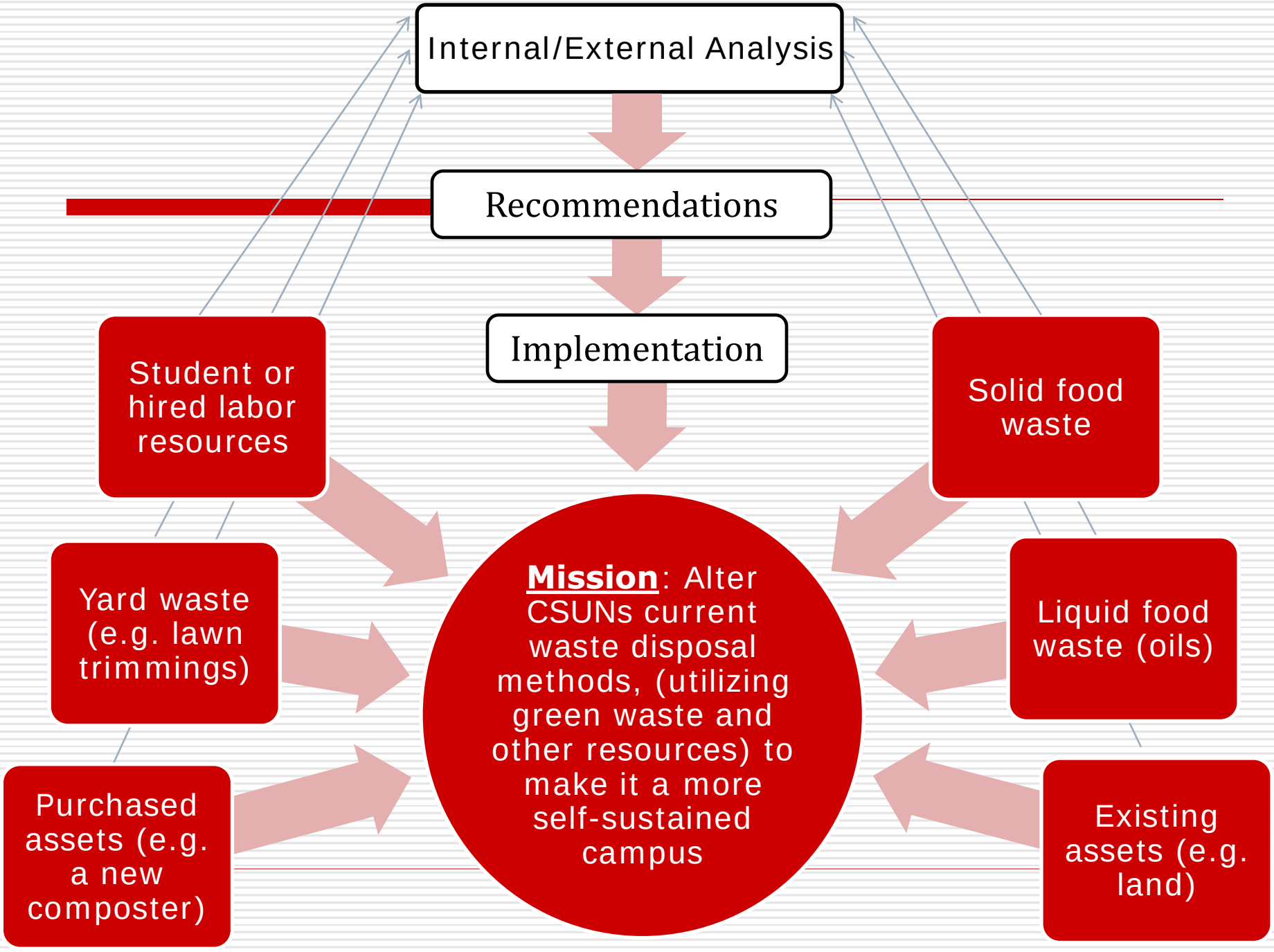
CSUN INSTITUTE FOR SUSTAINABILITY:
A Focus on Kitchen and Green Waste

Troy Dudley
Keith Geiger
Josh Massi
Elliott Richards

"That's enough on reducing our carbon footprint, Stevens. Wilson, any luck on finding a new planet?"

AGENDA

- Introduction to CSUN Institute for Sustainability and the project
- Industry Analysis
  - Industry Profile
  - External Analysis
  - Internal Analysis
- Marketing Strategy
- Key Strategic Issue
- Financial Analysis
- Recommendation & Implementation


Internal/External Analysis
Recommendations
Implementation
Student or hired labor resources
Yard waste (e.g. lawn trimmings)
Purchased assets (e.g. a new composter)
Solid food waste
Liquid food waste (oils)
Existing assets (e.g. land)
Mission: Alter CSUNs current waste disposal methods, (utilizing green waste and other resources) to make it a more self-sustained campus

WHAT IS THIS PROJECT ABOUT?

- Simply stated~

  (1) To improve CSUN's sustainability and reduce the environmental impact (includes the University, students, faculty, & staff)

  (2) Reduce the University's costs for waste disposal

WHAT IS THIS PROJECT ABOUT?

- Important facts:
  - CSUN currently pays $6,090 (Consolidated Disposal Services) and $36,112 (Allied Waste) per year for the removal of green and food waste, respectively
  - CSUN has already implemented some methods to improve sustainability
    - Food pulper
    - “Grasscycling”

CSUN INSTITUTE FOR SUSTAINABILITY

- Mission statement:

  "To promote, facilitate, and develop educational, research, and University and community programs related to sustainability…"

- Designed to educate and promote conservation and sustainability
  - Dedicated staff, promote events (Earth Day, LA River Cleanup Day)

INDUSTRY ANALYSIS

EXTERNAL AND INTERNAL ANALYSIS OF CSUN AND THE SUSTAINABILITY PROGRAM

INDUSTRY PROFILE

United States Department of Education's website declares there are 124 accredited 4-year universities offering bachelor's and/or advanced degrees with on-campus housing in California.

INDUSTRY PROFILE

- Accredited 4-year public universities.

- California State University
  - 412,000 students and 23 campuses

- University of California
  - 191,000 students and 10 campuses

INDUSTRY PROFILE

- Increasing awareness and sustainable trends.
  - U.S. corporations are increasing socially responsible practices.
  - California employment in the Energy sector grew 63 percent from 1995 to2008, the CSU is committed to providing a platform for the future leaders of the green economy.

INDUSTRY PROFILE

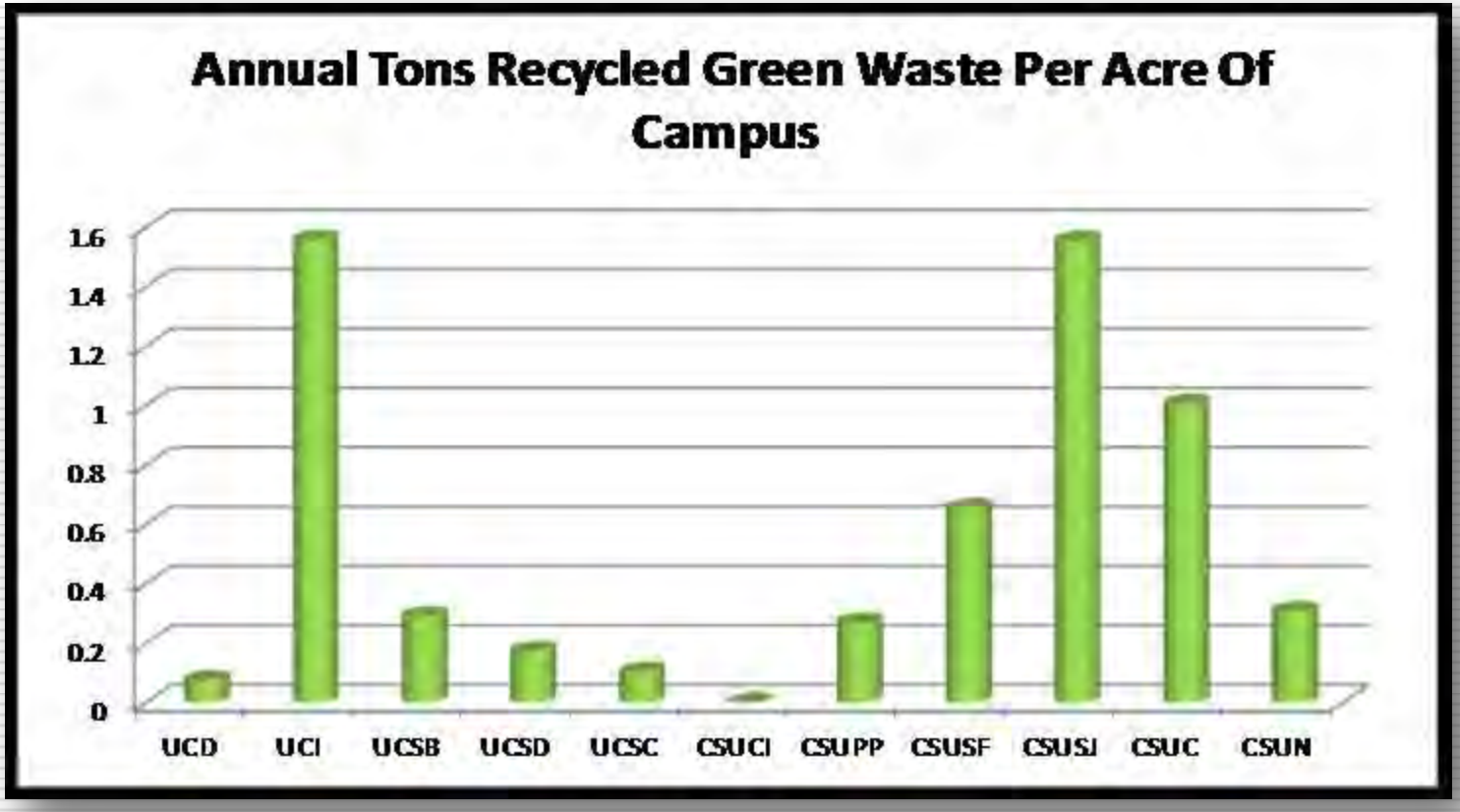
- University efforts are gaining national recognition.

  - For publication in its 2010 magazine and website Sierra Magazine published its rankings of the top 100 “coolest school’s” in the nation.

INDUSTRY PROFILE

- Green waste programs typically recycle grounds trimmings trough University landscape contractors.

INDUSTRY PROFILE



From data collected during site surveys interviews with campus staff compared to campus acreage data from www.calstate.edu and campus official websites.

INDUSTRY PROFILE

- In 2003, the UC Regents implemented the Policy on Sustainable Practices for all 10 campuses to adopt

  - The central objective of the policy was:

    By 2008, divert 50 percent of waste from landfill, by 2012 divert 75 percent of waste from landfill, and achieve "zero waste" by 2020.

INDUSTRY PROFILE

- Industry Cooperatives and Conferences are increasing in frequency and attendance.
  - 9th Annual UC/CSU/CCC Sustainability Conference 2010; which sold out and drew more than 1000 participants.

INDUSTRY PROFILE

- Another industry coalition is the Association for Advancement of Sustainability in Higher Education (AASHE).

AASHE's mission is to empower higher education to lead the sustainability transformation. We do this by providing resources, professional development, and a network of support to enable institutions of higher education to model and advance sustainability in everything they do, from governance and operations to education and research.

INDUSTRY PROFILE

- Notable and unique industry practices include:
  - 100% of UCI's green waste is composted totaling 2,147 tons per year. Rainbow transfer station works with UCI to bag the mulch and sell to 99cent retail stores
  - UCI purchased a fleet of Bio-diesel & alternative fuel vehicles to haul over 11,000 tons of solid waste per year.
  - UCSB implemented a trayless dining program which reduced food waste by 50%
  - UCSC lines dining hall trash cans with "bio-bags" to facilitate composting

INDUSTRY PROFILE

- Chico State and San Francisco State separate food waste which is professionally composted and sold to wineries in Napa and Sonoma, CA.
- Santa Monica City College purchased a vermiculture machine called Vermitech which utilizes worms to turn certain food waste into high-grade compost
- Stanford University collects food and compostable material separately from other garbage and uses serviceware (i.e. napkins, pizza boxes, etc).

SUSTAINABILITY OPPORTUNITIES

CSUN'S OPTIONS FOR IMPROVEMENT OF SUSTAINABILITY PRACTICES FOR FOOD AND GREEN WASTE

WHAT ARE THE INPUTS AND OUTPUTS?

Used Cooking Oil

Process: i.e. Vegawatt, Biofuel conversion, etc.

Energy: Electricity, Heat, Biofuel

Food Waste, Yard Waste

Process: i.e. In-Vessel Composter, 3rd Party Composter, etc.

Compost, Landfill Diversion

Inputs → Process → Outputs

THE ROCKET COMPOSTER

- Handles many types of organic waste
- Two weeks vs. several months
- Requires mix of 50% wood chips
- Comes in four different sizes
- Already in use at many European, U.S. campuses

THE VEGAWATT SYSTEM

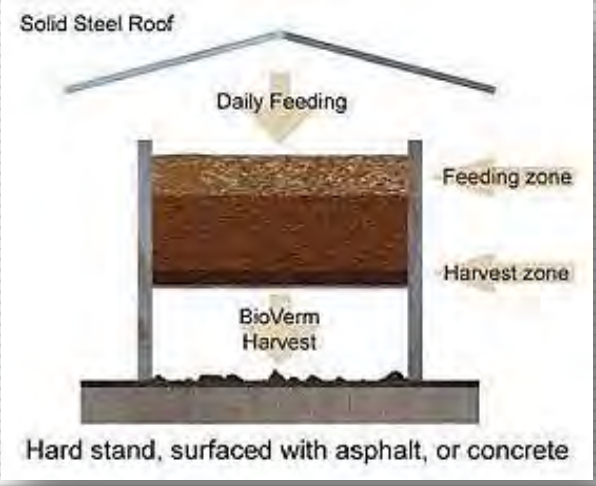
- Converts used fryer oil into electricity
- Six different sizes
- No emissions, cleaner than biodiesel
- Typically provides 10%-25% of a restaurant's electricity
- Hot water feed & return system

VERMICULTURE

- Composting using worms
- Can handle select types of organic waste
- Produces compost after 2.5-4 months
- Worms require particular environment
- Manual removal of compost

VERMITECH

- Proprietary large-scale vermiculture system
- Similar benefits, drawbacks of regular vermiculture
- Primary benefit: automated compost removal



COMPOST TEA

- Steep/soak compost in water and aerate
- Nutrients produce longer root systems for lawns, requiring less watering
- Compost must be created first, requires brewer and sprayers

OPEN WINDROW

- Long mound of organic waste
- Turned every few days by tractor pulled turner
- Aerates mixture, distributes heat & moisture generated by composting process
- 5-12 weeks to produce compost

WASTE PULPER

- Grinds up food waste, cardboard, paper & mixes with water
- Can reduce waste volume by 70%-85%
- Use with Rocket to double Rocket's processing capacity
- CSUN already owns one
- Temporarily out of use

THIRD-PARTY COMPOSTER

- Waste dumped into campus bins
- Collected by company such as Crown Disposal
- Crown brings all requested compost for free
- Composting done in Bakersfield

ADDITIONAL OPPORTUNITIES

- Grants
  - UC Irvine, UC Davis $200,000 each for their sustainability programs
  - CalRecycle (formerly CalGrant)
  - Expected state budget cuts could affect available grants
- Associated Student Association (ASA)
  - Ability to coordinate students for free to support sustainability projects
  - Cut costs, raise awareness for sustainability practices, inform students, faculty, staff of program's mission

THREATS

- Poorly functioning program, bad press
- Management must be on board and aware of additional responsibilities
- Future govt. regulations pertaining to conservation and waste management, CSUN must keep up

THREATS

- Reduction in budget & available grants
- Advancing “green” technology
- Replacing graduating students involved with the project
- Changes in restaurant waste production & staff availability due to seasonality

PEST ANALYSIS

POLITICAL

- Integrated Waste Management Act (1989)
  - 25% diversion of waste from landfills by 1995, 50% by 2000
  - Alternative Daily Covering (ADC) used as a way around this act.
- New bill will phase out recycling credit within 7 years
  - Charge state fee for green waste disposal as ADC
- Gov. programs promoting sustainability
  - UCI and UC Davis received $200,000 grants from Department of Conservation

PEST ANALYSIS

- **ECONOMIC**
  - CSUN's budget cuts and California's budget deficit
    - Governor Brown's new budget proposal cuts $500 million for California State Universities
    - $12.5 billion in cuts for gov. spending and programs
  - New federal budget passed in April 2011 cuts nearly $500 million for higher education

PEST ANALYSIS

- **SOCIO-CULTURAL**
  - Trend for campuses to become more sustainable
    - Long-Term Goal: 0% waste or 100% sustainable
    - 2010: 1,000+ university chancellors and presidents have dedicated their institutions toward sustainable futures
  - Growing number of youth activists for “green” movement
    - 2007: 570 schools participated in Campus Climate Change

PEST ANALYSIS

- **TECHNOLOGICAL**
  - Many advancements in composting and sustainability
    - Rocket, Vegawatt System, vermiculture, etc.
  - Technology continues to advance
    - Black Soldier flies larvae

STRENGTHS

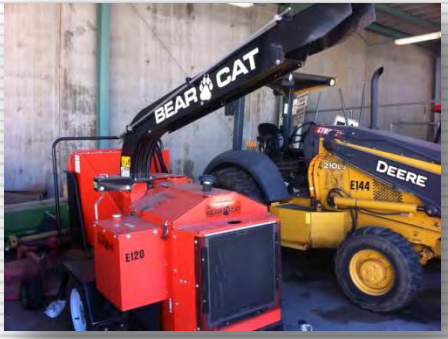
- Dedicated faculty and staff to the sustainability of CSUN
- Already using alternative methods to reduce waste
  - Utilizes the “grasscycling” method
    - Campus produces 0% grass clippings waste (except for short periods of heavy rain)
  - Performing Arts Center and Student Recreation Center received silver and gold LEED certifications for construction, respectively

STRENGTHS

- CSUN has invested in a fuel cell
  - Reduces heating and electricity costs
- Students participate in trash pick-ups

STRENGTHS

- CSUN owns:
  - A wood chipper



  - Fleet of transportation carts, street sweepers, etc.

WEAKNESSES

- Current costs for waste removal
- Budget size
- Lack of sustainability program compared to other universities
- Lack of space for large-scale composting projects
- Currently, CSUN gives away its fryer oil (for free) to Western Imperial

WEAKNESSES

- CSUN's current campus garden

WEAKNESSES

- Current location of chipped waste

MARKETING STRATEGY

KEY STRATEGIC ISSUES

- How will CSUN alter current green and food waste disposal methods to create a more self-sustaining campus.
  - Purchase equipment?
  - Culture change?
  - Justify investments?

FINANCIAL ANALYSIS

- Vegawatt
- Rocket Composter
- Vermitech
- Mighty Mike Windrow
- Third-Party Composter

VEGAWATT - INVESTMENT

- Vegawatt:$25,800
- Shipping and installation:$3,000
- Total investment: $28,800

Used Cooking Oil (WVO)

Process

Energy: Electricity, Heat

INPUT FOR VEGAWATT - WVO

FRYER OIL BY LOCATION (GALLONS)

	THE PUB	THE SIERRA CENTER	RESIDENT DINING FACILITY	THE CLUB	THE ARBOR	BURGER KING	TOTAL	
Dec-08	56	80	23	0	30	0	189	
Jan-09	9	30	0	10	90	80	219	
Feb-09	109	0	0	0	50	0	159	
Mar-09	0	0	0	0	0	0	0	
Apr-09	16	75	24	15	9	75	214	
May-09	0	0	0	0	0	0	0	
Jun-09	59	58	29	0	56	149	351	
Jul-09	0	0	0	0	0	0	0	
Aug-09	0	0	0	0	0	0	0	
Sep-09	75	100	75	0	75	200	525	
Oct-09	0	0	0	0	0	0	0	
Nov-09	154	66	174	0	148	148	690	Avg/Mo
	478	**409**	**325**	**25**	**458**	**652**	**2347**	**196**

Note: From B. Corrigan, Manager of Food Services

VEGAWATT INCOME STATEMENT

CSUN GREEN WASTE - VEGAWATT

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Approx value of Oil with Vegawatt[1] (see analysis)	2.79	2.79	2.79	2.79	2.79	2.79	2.79	2.79
Estimated gallons per year[2]	2,347.00	2,347.00	2,347.00	2,347.00	2,347.00	2,347.00	2,347.00	2,347.00
Savings Revenue $	6,548.13	6,548.13	6,548.13	6,548.13	6,548.13	6,548.13	6,548.13	6,548.13
Total Revenues $	**6,548.13**	**6,548.13**	**6,548.13**	**6,548.13**	**6,548.13**	**6,548.13**	**6,548.13**	**6,548.13**
AS Student Worker [3]	936.00	936.00	936.00	936.00	936.00	936.00	936.00	936.00
Total Usage Costs	**936.00**	**936.00**	**936.00**	**936.00**	**936.00**	**936.00**	**936.00**	**936.00**
Depreciation	4,118.40	7,056.00	5,040.00	3,600.00	2,563.20	2,563.20	2,563.20	1,296.00
Income Before Taxes $	1,493.73	(1,443.87)	572.13	2,012.13	3,048.93	3,048.93	3,048.93	4,316.13
Tax (No Tax)								
Net Income $	**1,493.73**	**(1,443.87)**	**572.13**	**2,012.13**	**3,048.93**	**3,048.93**	**3,048.93**	**4,316.13**

[1]Calculated by Vegawatt

[2]2009 Data from B. Corrigan

[3]Assumes (1) AS Student worker 2 days per week, 1 hour per day

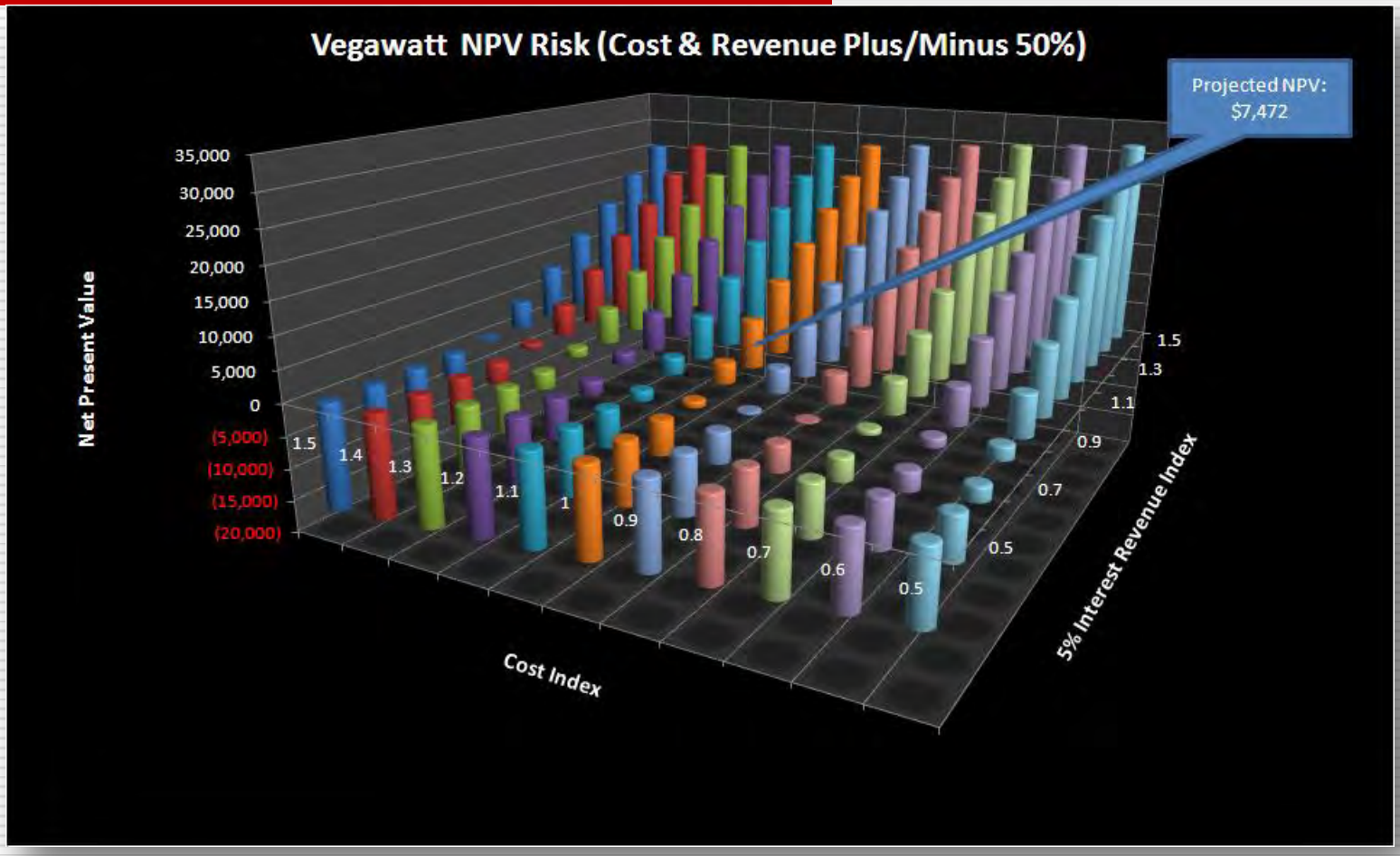
VEGAWATT CASH FLOW

CSUN GREEN WASTE - VEGAWATT CASH FLOW

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Revenues		6,548.13	6,548.13	6,548.13	6,548.13	6,548.13	6,548.13	6,548.13	6,548.13
Operating Costs		936.00	936.00	936.00	936.00	936.00	936.00	936.00	936.00
Operating Margin		5,612.13	5,612.13	5,612.13	5,612.13	5,612.13	5,612.13	5,612.13	5,612.13
Depreciation		4,118.40	7,056.00	5,040.00	3,600.00	2,563.20	2,563.20	2,563.20	1,296.00
Taxes		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Profit		1,493.73	(1,443.87)	572.13	2,012.13	3,048.93	3,048.93	3,048.93	4,316.13
OCF (add back depreciation)	0.00	5,612.13	5,612.13	5,612.13	5,612.13	5,612.13	5,612.13	5,612.13	5,612.13
Total CF from Investment	(28,800.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IATCF	**(28,800.00)**	**5,612.13**	**5,612.13**	**5,612.13**	**5,612.13**	**5,612.13**	**5,612.13**	**5,612.13**	**5,612.13**

Payback Period (Years)	**5.13**	
NPV Using 5% Cost of Capital	**$7,472**	Positive, Therefore Accept Project
IRR	**11.1%**	>5%, Therefore Accept Project
PV of Future Cash Flows	**$36,272.39**	
Profitability Index	**1.26**	>1, Therefore Accept Project

VEGAWATT NPV RISK



ROCKET A900 - INVESTMENT

- Rocket A900 Composter: $45,900
- Shipping costs $1,200
- Installation and training costs: $1,300
- 100 food waste collection bins: $2,000
- Tarp or wooden covering: $1,500

- Total investment: $51,900

CSUN's QUANTITY & REMOVAL COST OF GREEN WASTE

	2010 Green Waste Tonnage	Cost	Food Waste Yards*	Cost
Jan	11.34	$712.56	1093.33	$2,141.00
Feb	8.54	$505.11	1093.33	$3,873.00
Mar	8.97	$518.30	1093.33	$3,867.00
Apr	13.35	$774.23	261.33	$3,886.00
May	3.87	$240.28	261.33	$2,816.00
Jun	11.23	$830.74	261.33	$1,225.00
Jul	6.89	$366.70	1093.33	$1,226.99
Aug	5.55	$326.50	1093.33	$1,342.00
Sep	9.66	$449.80	1093.33	$3,919.00
Oct	9.73	$451.90	74.67	$3,926.00
Nov	4.76	$222.80	74.67	$3,945.00
Dec	15.04	$691.20	74.67	$2,094.00
Total	**108.93**	**$6,090.12**	**7568.00**	**$34,260.99**

THE ROCKET INCOME STATEMENT

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9
Compost Revenue ($)/cubic yard[1]	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
Estimated Quantity (Cubic yards)[1]	136.50	136.50	136.50	136.50	136.50	136.50	136.50	136.50	136.50
Compost Revenue $	1,365.00	1,365.00	1,365.00	1,365.00	1,365.00	1,365.00	1,365.00	1,365.00	1,365.00
Total Revenues $	**1,365.00**	**1,365.00**	**1,365.00**	**1,365.00**	**1,365.00**	**1,365.00**	**1,365.00**	**1,365.00**	**1,365.00**
Power Usage Costs $[2]	195.00	195.00	195.00	195.00	195.00	195.00	195.00	195.00	195.00
AS Student Worker $[3]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Savings on Waste Removal $[4]	(1,076.05)	(1,076.05)	(1,076.05)	(1,076.05)	(1,076.05)	(1,076.05)	(1,076.05)	(1,076.05)	(1,076.05)
Savings on Fertilizer Cost $[5]	(2,500.00)	(2,500.00)	(2,500.00)	(2,500.00)	(2,500.00)	(2,500.00)	(2,500.00)	(2,500.00)	(2,500.00)
Total Usage Costs $	**(3,381.05)**	**(3,381.05)**	**(3,381.05)**	**(3,381.05)**	**(3,381.05)**	**(3,381.05)**	**(3,381.05)**	**(3,381.05)**	**(3,381.05)**
Depreciation $	7,421.70	12,715.50	9,082.50	6,487.50	4,619.10	4,619.10	4,619.10	2,335.50	
Income Before Taxes $	(2,675.65)	(7,969.45)	(4,336.45)	(1,741.45)	126.95	126.95	126.95	2,410.55	4,746.05
Tax @38% $	(1,016.75)	(3,028.39)	(1,647.85)	(661.75)	48.24	48.24	48.24	916.01	1,803.50
Net Income $	**(1,658.90)**	**(4,941.06)**	**(2,688.60)**	**(1,079.70)**	**78.71**	**78.71**	**78.71**	**1,494.54**	**2,942.55**

[1]Rocket A900 is capable of producing 3.5 cubic yds of compost per week. Assuming CSUN can sell at $10 per cubic yd

[2]Assumes 12.5 cents/kWh X 30 kWh per week X 52 Weeks

[3]Assumes AS coordinates volunteers at no cost

[4]CSUN's Average cost per cubic yard of food & Yard waste removal 50/50 split is $7.85. The Rocket will reduce this by 137 cubic yards, so 137 X $7.85 = $1076

[5]Assumes Compost Tea will save 125 bags of fertilizer per year @ $20 per bag

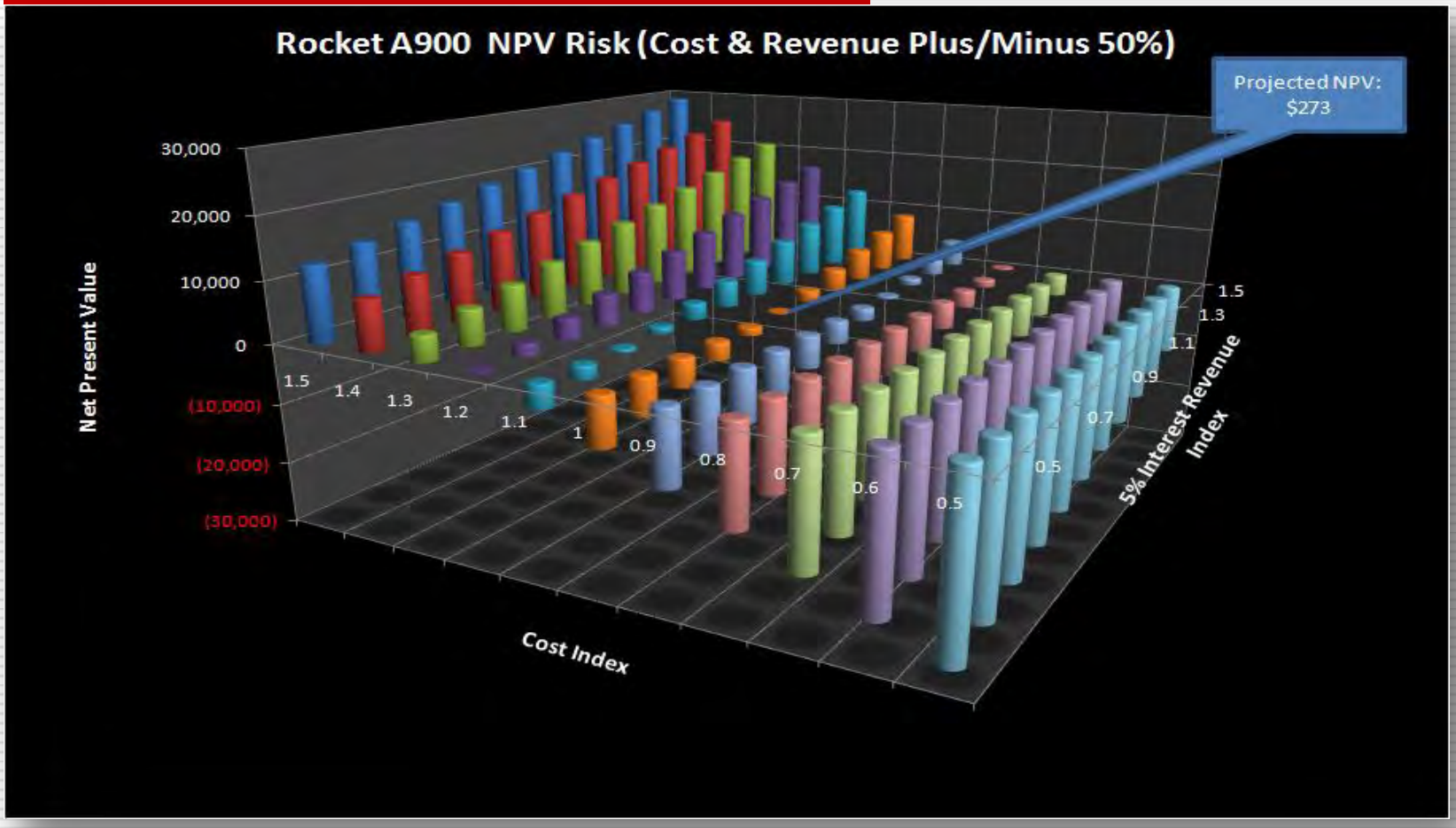
THE ROCKET CASH FLOW

CSUN GREEN WASTE - ROCKET A900 COMPOSTER

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9
Revenues		1,365.00	1,365.00	1,365.00	1,365.00	1,365.00	1,365.00	1,365.00	1,365.00	1,365.00
Operating Costs		(3,381.05)	(3,381.05)	(3,381.05)	(3,381.05)	(3,381.05)	(3,381.05)	(3,381.05)	(3,381.05)	(3,381.05)
Operating Margin		4,746.05	4,746.05	4,746.05	4,746.05	4,746.05	4,746.05	4,746.05	4,746.05	4,746.05
Depreciation		7,421.70	12,715.50	9,082.50	6,487.50	4,619.10	4,619.10	4,619.10	2,335.50	0.00
Taxes		(1,016.75)	(3,028.39)	(1,647.85)	(661.75)	48.24	48.24	48.24	916.01	1,803.50
Net Profit		(1,658.90)	(4,941.06)	(2,688.60)	(1,079.70)	78.71	78.71	78.71	1,494.54	2,942.55
OCF (add back depreciation)	0.00	5,762.80	7,774.44	6,393.90	5,407.80	4,697.81	4,697.81	4,697.81	3,830.04	2,942.55
Total CF from Investment	(51,900.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IATCF	**(51,900.00)**	**5,762.80**	**7,774.44**	**6,393.90**	**5,407.80**	**4,697.81**	**4,697.81**	**4,697.81**	**3,830.04**	**2,942.55**

Payback Period (Years)	**10.94**	
NPV Using 5% Cost of Capital	**273.09**	Positive, Accept
IRR	**5.1%**	>5%, Accept project
PV of Future Cash Flows	**$52,173.09**	
Profitability Index	**1.01**	>1, Accept

THE ROCKET A900 NPV RISK



VERMITECH - INVESTMENT

- Vermitech equipment: $50,000
- Awning and electrical hookup: $20,000
- Other installation & training costs: $10,000

- Total investment: $80,000

VERMITECH INCOME STATEMENT

CSUN GREEN WASTE - VERMITECH

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9
Compost Revenue ($)/cubic yard[1]	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
Estimated Quantity (Cubic yards)[1]	136.50	136.50	136.50	136.50	136.50	136.50	136.50	136.50	136.50
Compost Revenue $	1,365.00	1,365.00	1,365.00	1,365.00	1,365.00	1,365.00	1,365.00	1,365.00	1,365.00
Total Revenues $	**1,365.00**	**1,365.00**	**1,365.00**	**1,365.00**	**1,365.00**	**1,365.00**	**1,365.00**	**1,365.00**	**1,365.00**
Operating costs (Electricity, etc)	50,000.00	50,000.00	50,000.00	50,000.00	50,000.00	50,000.00	50,000.00	50,000.00	50,000.00
AS Student Worker $[2]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Savings on Waste Removal $[3]	(1,076.05)	(1,076.05)	(1,076.05)	(1,076.05)	(1,076.05)	(1,076.05)	(1,076.05)	(1,076.05)	(1,076.05)
Savings on Fertilizer Cost $[4]	(2,500.00)	(2,500.00)	(2,500.00)	(2,500.00)	(2,500.00)	(2,500.00)	(2,500.00)	(2,500.00)	(2,500.00)
Total Usage Costs $	**46,423.95**	**46,423.95**	**46,423.95**	**46,423.95**	**46,423.95**	**46,423.95**	**46,423.95**	**46,423.95**	**46,423.95**
Depreciation $	11,440.00	19,600.00	14,000.00	10,000.00	7,120.00	7,120.00	7,120.00	3,600.00	
Income Before Taxes $	(56,498.95)	(64,658.95)	(59,058.95)	(55,058.95)	(52,178.95)	(52,178.95)	(52,178.95)	(48,658.95)	(45,058.95)
Tax @38% $	(21,469.60)	(24,570.40)	(22,442.40)	(20,922.40)	(19,828.00)	(19,828.00)	(19,828.00)	(18,490.40)	(17,122.40)
Net Income $	**(35,029.35)**	**(40,088.55)**	**(36,616.55)**	**(34,136.55)**	**(32,350.95)**	**(32,350.95)**	**(32,350.95)**	**(30,168.55)**	**(27,936.55)**

[1]Assumes same production as Rocket A900: 3.5 cubic yds of compost per week. Also assumes CSUN can sell compost at $10 per cubic yd
[2]Best case scenario where student volunteers operate Vermitech
[3]Savings is calculated by proportion of partial removal cost to total removal cost
[4]Assumes higher savings on fertilizer than The Rocket because Vermitech produces higher grade compost

VERMITECH FINANCIAL INDICATORS

Payback Period (Years)	Cannot Compute
NPV Using 5% Cost of Capital	($392,017) Negative, Reject
IRR	Cannot Compute
PV of Future Cash Flows	($312,017) Negative, Reject
Profitability Index	-3.90 < 1, Reject

MIGHTY MIKE - INVESTMENT

- Mighty Mike Windrow: $18,385
- Sprayer attachment: $1,975
- Shipping: $550

- Total investment: $20,910

MIGHTY MIKE INCOME STATEMENT

CSUN GREEN WASTE - WINDROW

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9
*Compost Revenue ($)/cubic yard[1]	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
*Estimated Quantity (Cubic yards)[1]	136.50	136.50	136.50	136.50	136.50	136.50	136.50	136.50	136.50
Compost Revenue $	1,365.00	1,365.00	1,365.00	1,365.00	1,365.00	1,365.00	1,365.00	1,365.00	1,365.00
Total Revenues $	**1,365.00**	**1,365.00**	**1,365.00**	**1,365.00**	**1,365.00**	**1,365.00**	**1,365.00**	**1,365.00**	**1,365.00**
Operating costs (Fuel for Bobcat, etc)	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
AS Student Worker $[2]	702.00	702.00	702.00	702.00	702.00	702.00	702.00	702.00	702.00
Savings on Waste Removal $[3]	(6,090.12)	(6,090.12)	(6,090.12)	(6,090.12)	(6,090.12)	(6,090.12)	(6,090.12)	(6,090.12)	(6,090.12)
Savings on Fertilizer Cost $[4]	(500.00)	(500.00)	(500.00)	(500.00)	(500.00)	(500.00)	(500.00)	(500.00)	(500.00)
Total Usage Costs $	**(5,788.12)**	**(5,788.12)**	**(5,788.12)**	**(5,788.12)**	**(5,788.12)**	**(5,788.12)**	**(5,788.12)**	**(5,788.12)**	**(5,788.12)**
Depreciation $	2,627.63	4,501.88	3,215.63	2,296.88	1,635.38	1,635.38	1,635.38	826.88	
Income Before Taxes $	4,525.50	2,651.25	3,937.50	4,856.25	5,517.75	5,517.75	5,517.75	6,326.25	7,153.12
Tax @38% $	1,719.69	1,007.47	1,496.25	1,845.37	2,096.74	2,096.74	2,096.74	2,403.97	2,718.19
Net Income $	**2,805.81**	**1,643.77**	**2,441.25**	**3,010.87**	**3,421.00**	**3,421.00**	**3,421.00**	**3,922.27**	**4,434.93**

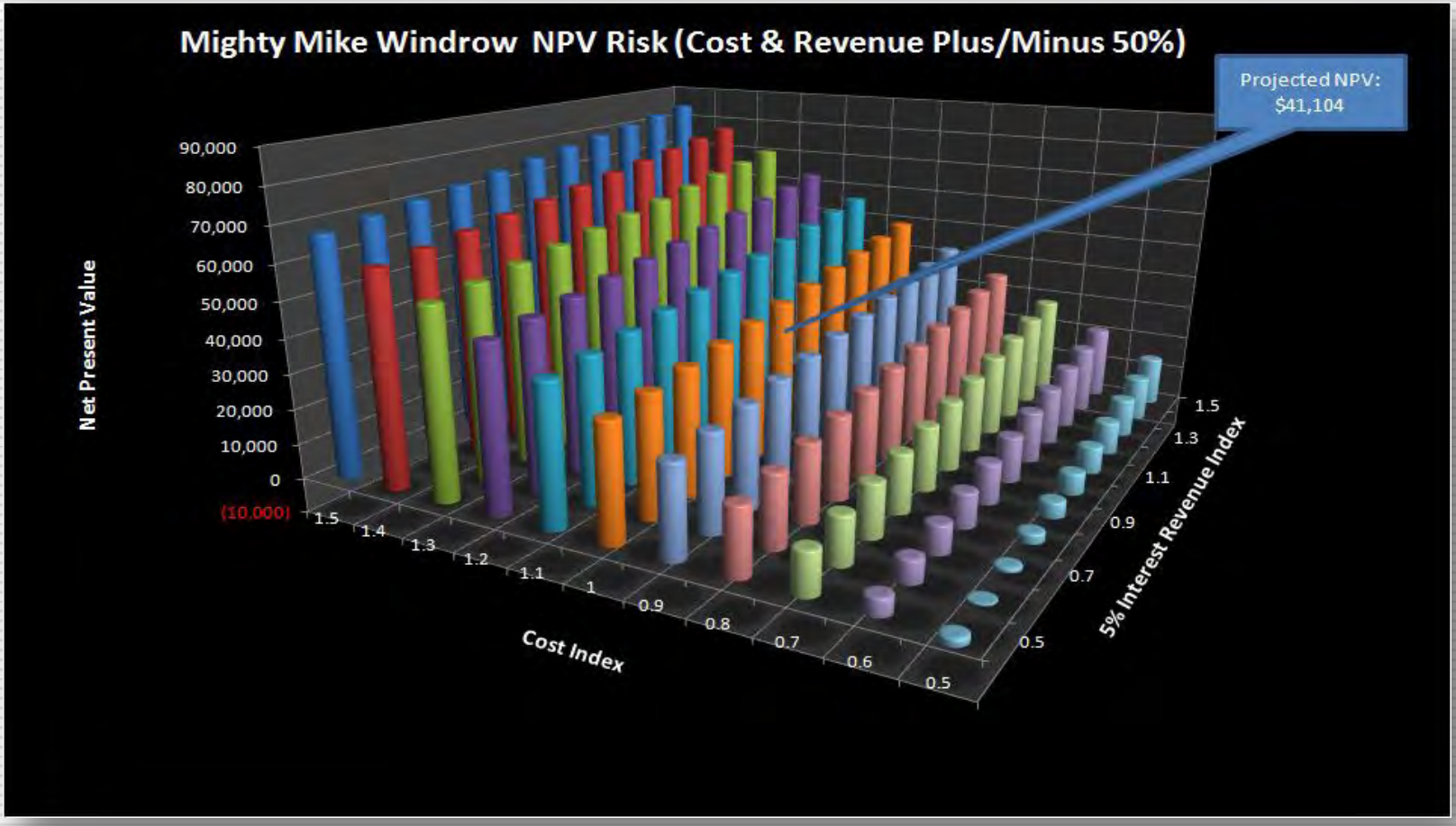
[1]Assuming CSUN can sell at $10 per cubic yd. Even though more cubic ft than Rocket will be produced, only 137 cubic yards are assumed to be sold

[2]Assumes 1 employee @ $9/hr, 1 day per week, 2 hrs per day, for 3/4 of the year

[3]Assumes ALL of CSUNs green waste can be used in Windrow

[4]Assumes Compost & Compost Tea will save 25 bags of fertilizer per year @ $20 per bag

MIGHTY MIKE NPV RISK



MIGHTY MIKE FINANCIAL INDICATORS

Payback Period (Years)	3.26	
NPV Using 5% Cost of Capital	41,103.81	Positive, Accept
IRR	28.9%	>5%, Accept project
PV of Future Cash Flows	$59,478.81	
Profitability Index	3.24	>1, Accept

Less conservative

More conservative

Cost of Capital	NPV
1.0%	$64,758
2.0%	$57,663
3.0%	$51,436
4.0%	$45,951
5.0%	$41,104
6.0%	$36,805
7.0%	$32,980
8.0%	$29,566
9.0%	$26,508
10.0%	$23,761

THIRD-PARTY COMPOSTING

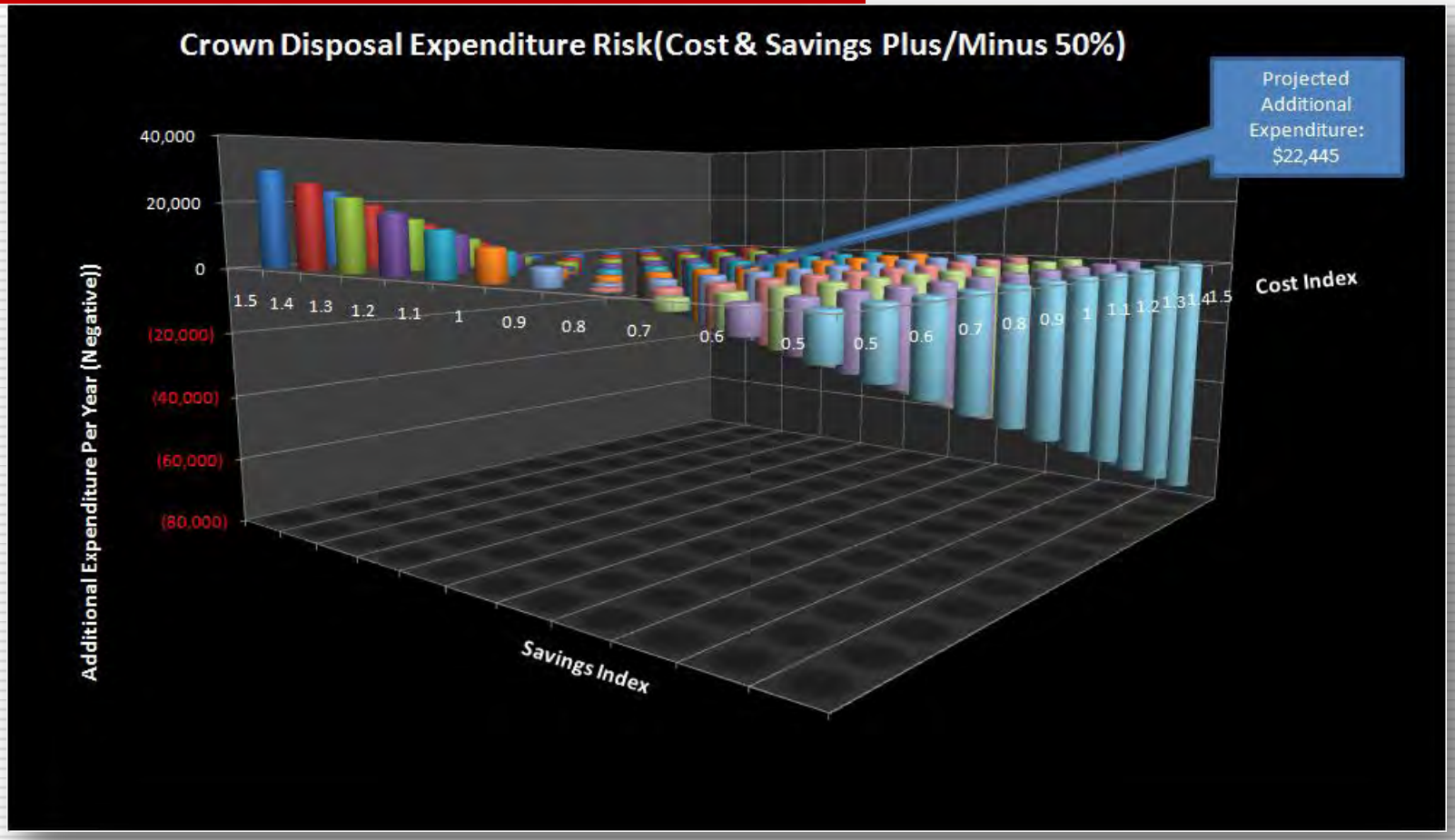
- No investment required
- Approximately 189 truckloads of food waste
- Approximately 22 truckloads of yard waste
- Each truck can haul up to 40 cubic yards
- Cost is $300 per truckload

CROWN DISPOSAL COSTS

CSUN GREEN WASTE - Crown Disposal

Costs		
Estimated truckloads per year of green waste (40 yard hauls)		21.79
Estimated truckloads per year of Food waste (40 yard hauls)		189.20
Total Hauls		**210.99**
Total Cost at $300 per Haul	**$**	**63,295.80**
Savings		
No longer use Consolidated for Green Waste	$	6,090.12
No longer use Allied for food waste	$	34,260.99
Fertilizer savings	$	500.00
Total Savings	**$**	**40,851.11**
Net expenditure		
Net additional expenditure per year	**$**	**(22,444.69)**

CROWN DISPOSAL EXPEDITURE RISK



FINANICAL SUMMARY – ALL OPTIONS

	Initial Investment	Payback Period	NPV	IRR	Operating Costs per Year[1]
Vegawatt	$28,800	5 years	$7,472	11%	$936
Rocket A900 In-Vessel Composter	$51,900	11 years	$273	5%	$195
Vermitech	$80,000	N/A	($392,017)	N/A	$50,000
Mighty Mike Windrow	$20,910	3 years	$41,104	29%	$802
Third Party Composter (Crown Disposal)	$0	N/A	N/A	N/A	$63,296

[1]Vegawatt & Mighty Mike assume student employees @$9/hr. Rocket & Vermitech assume AS volunteers at no cost

REMINDER OF THE PROJECT GOAL…

(1) To improve CSUN's sustainability and reduce the environmental impact (includes the University, students, faculty, & staff)

(2) Reduce the University's costs for waste disposal

Opportunity /Solution	Major Advantages (1 thru 10 rank)	Major Disadvantages (-1 thru -10 rank)	Recommendation / Score
Rocket A900 (In-Vessel System)	•Can take food and green waste (10) •Scalable, i.e. buy another if there is too much waste or use with pulper for higher output (8) •Compost can be used to save on fertilizer costs; compost tea can be made as complimentary product (5) •Unique technology that would set CSUN apart from most schools (10)	•Coordination & management required for operation (-10) •Initial expenditure of $48.4K (-5) •May still have to pay for some green waste removal until the flow of operation is perfected (-5)	•Score: 13 •Recommend. The A900 is not only a good solution to reducing green / food waste, but will also provide education to students that will lead to positive culture change
Vegawatt	•Can make profit with all of CSUNs oil (10) •Payback period of only 5 years; possibly sooner depending on oil output (7) •Produces electricity and heat (8) •Positive NPV with larger upside risk than downside risk (5) •Requires little operation expense (9)	•Initial expenditure of $25.8K (-3)	•Score: 36. •Recommend. Vegawatt is a must-have.
Vermitech	•Produces higher-grade compost (5) •Unique technology that would set CSUN apart from most schools (10)	•Very expensive to purchase and operate ($80K +) (-10) •Does not accept wide variety of food waste (-10)	•Score: -5 •Vermitech is not practical due to high costs and low functionality
Open Windrow	•Could handle all of CSUNs green waste (10) •Relatively inexpensive, Positive NPV (5)	•Cannot handle any food waste due to vermin problems (-10) •May produce strong odors (-8)	•Score: -3 •Do not recommend due to low functionality
Third party composting	•Least hassle – sorting , etc, is done at facility (10) •Third party will take all food and green waste (10) •Third party will supply CSUN with compost it makes (5)	•Will cost CSUN at least $22K more per year than its current waste arrangements (-8) •Carbon footprint impact from transportation trucks (-10) •This solution is not very hands-on (i.e. will not educate students like an on-site system would (-7)	•Score: 0 •Score of zero suggest this is neither a great opportunity or a bad one. Recommendation given to higher scoring option

RECOMMENDATIONS

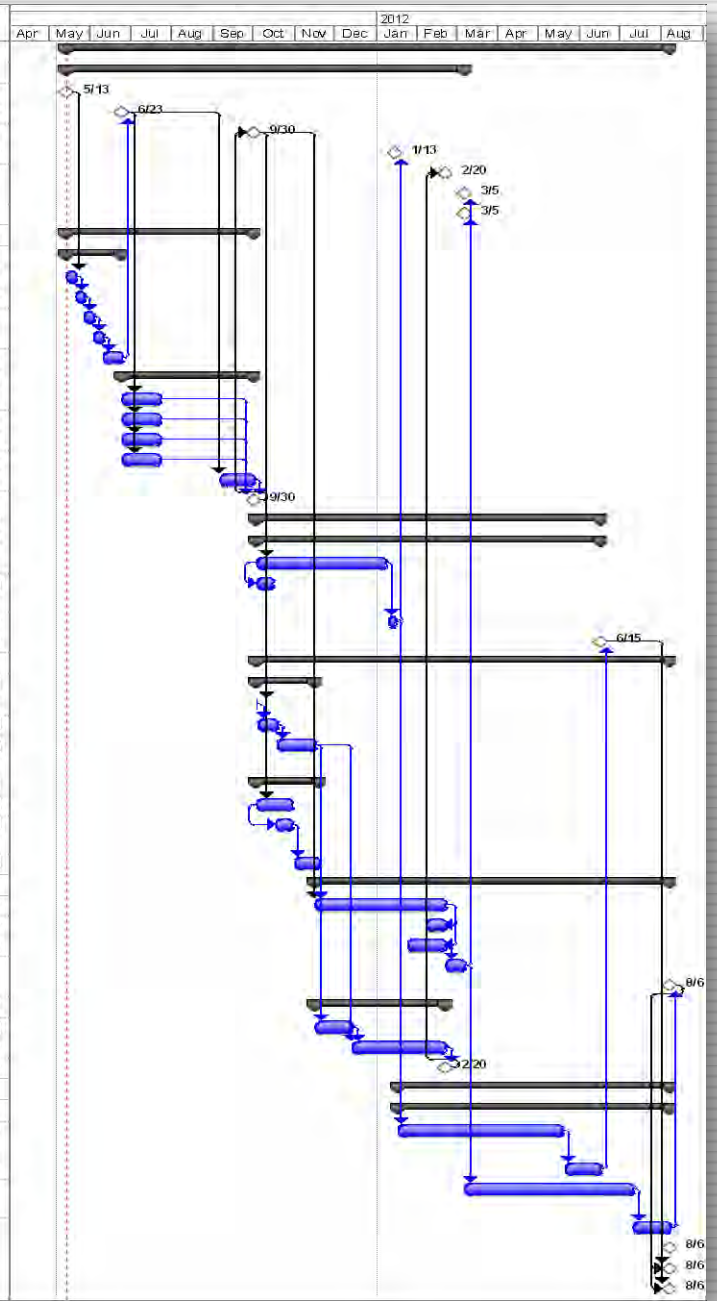
- The Vegawatt System
- The Rocket A900
- Remain focused on current activities
  - "Grasscycling"
  - Promoting sustainability programs throughout the University and school

IMPLEMENTATION PLAN

1. Memorandum of Understanding (MOU)
2. Attempt to obtain state, government, private grants
3. Insert prospective projects into CSUN's budget
4. Purchase Vegawatt
5. Detailed food and green waste audit
6. Marketing
7. Purchase Rocket A900
8. Appropriately staff operations
9. Implement supplemental options
10. Monitor progress, costs, etc.
11. Expand sustainability projects

GREEN PROJECT IMPLEMENTATION TIMELINE

ID	Task Name	% Complete	Duration	Start	Finish
1	**CSUN GREEN WASTE IMPLEMENTATION PLAN**	**0%**	**322 days**	**5/13/11**	**8/6/12**
2	**Key Milestones**	**0%**	**212 days**	**5/13/11**	**3/5/12**
3	Begin Project	0%	0 days	5/13/11	5/13/11
4	Obtain Signed MOU	0%	0 days	6/23/11	6/23/11
5	Obtain Funding	0%	0 days	9/30/11	9/30/11
6	Vegawatt Operational	0%	0 days	1/13/12	1/13/12
7	Staffing for Rocket A900 Complete	0%	0 days	2/20/12	2/20/12
8	Rocket A900 Operational	0%	0 days	3/5/12	3/5/12
9	Green Waste Implementation Complete	0%	0 days	3/5/12	3/5/12
10	**Management Activity**	**0%**	**101 days**	**5/13/11**	**9/30/11**
11	**Management Buy-In**	**0%**	**30 days**	**5/13/11**	**6/23/11**
12	Draft the Memorandum of Agreement	0%	5 days	5/13/11	5/19/11
13	Institution for Sustainability Sign-off	0%	5 days	5/20/11	5/26/11
14	PPM Sign-off	0%	5 days	5/27/11	6/2/11
15	AS Sign-off	0%	5 days	6/3/11	6/9/11
16	University President Sign-off	0%	10 days	6/10/11	6/23/11
17	**Obtain Grants / Sources of Funding**	**0%**	**71 days**	**6/24/11**	**9/30/11**
18	Federal	0%	20 days	6/24/11	7/21/11
19	State	0%	20 days	6/24/11	7/21/11
20	Other/Private	0%	20 days	6/24/11	7/21/11
21	Work Study Funding/Approval	0%	20 days	6/24/11	7/21/11
22	Insert Green Waste Project into CSUN Budget	0%	20 days	9/5/11	9/30/11
23	All Funding Avenues Explored	0%	0 days	9/30/11	9/30/11
24	**Vegawatt Activity**	**0%**	**185 days**	**10/3/11**	**6/15/12**
25	**Vegawatt Procurement and Installation**	**0%**	**185 days**	**10/3/11**	**6/15/12**
26	Place order (12-14 weeks ARO)	0%	70 days	10/3/11	1/6/12
27	Modify Current Job Descriptions (Food Services, PPM, or AS)	0%	10 days	10/3/11	10/14/11
28	Install Vegawatt	0%	5 days	1/9/12	1/13/12
29	Implement Changes to Vegawatt Staffing, etc.	0%	0 days	6/15/12	6/15/12
30	**Rocket A900 Activity**	**0%**	**221 days**	**10/3/11**	**8/6/12**
31	**Detailed Food & Green Waste Audit**	**0%**	**31 days**	**10/3/11**	**11/14/11**
32	Contact Ecco Technologies	0%	1 day	10/3/11	10/3/11
33	Request for Quote - Detailed Waste Audit	0%	10 days	10/4/11	10/17/11
34	Review Results of Audit and Adjust Plan As Necessary	0%	20 days	10/18/11	11/14/11
35	**Marketing Campaign**	**0%**	**35 days**	**10/3/11**	**11/18/11**
36	AS Constructs Flyers and Other Promotional Material	0%	20 days	10/3/11	10/28/11
37	Purchase Pilot Food Waste Bins and Place them at Strategic Locations	0%	10 days	10/17/11	10/28/11
38	Monitor Food Waste	0%	15 days	10/31/11	11/18/11
39	**Rocket A900 Procurement and Installation**	**0%**	**190 days**	**11/15/11**	**8/6/12**
40	Place order (12-14 weeks ARO)	0%	70 days	11/15/11	2/20/12
41	Determine Final Location For Rocket	0%	10 days	2/7/12	2/20/12
42	Build Tarp, If Necessary	0%	20 days	1/24/12	2/20/12
43	Install Rocket	0%	10 days	2/21/12	3/5/12
44	Implement Changes to Vegawatt Staffing, etc.	0%	0 days	8/6/12	8/6/12
45	**Staffing for Composting Operations**	**0%**	**70 days**	**11/15/11**	**2/20/12**
46	Create Job Outline	0%	20 days	11/15/11	12/12/11
47	Place Requisition for Student work	0%	50 days	12/13/11	2/20/12
48	Hire if Necessary, Otherwise Modify Current Jobs	0%	0 days	2/20/12	2/20/12
49	**Misc. Activity**	**0%**	**146 days**	**1/16/12**	**8/6/12**
50	**Monitoring**	**0%**	**146 days**	**1/16/12**	**8/6/12**
51	Begin Monitoring electricity & heat savings, Oil consumption, etc	0%	90 days	1/16/12	5/18/12
52	Implement Changes to Staffing, etc.	0%	20 days	5/21/12	6/15/12
53	Begin Monitoring Quantities of waste, Compost output, etc.	0%	90 days	3/6/12	7/9/12
54	Implement Changes to Staffing, etc.	0%	20 days	7/10/12	8/6/12
55	**Implement Minor Options**	**0%**	**0 days**	**8/6/12**	**8/6/12**
56	Composte tea	0%	0 days	8/6/12	8/6/12
57	Vermiculture	0%	0 days	8/6/12	8/6/12



THANK YOU!

QUESTIONS AND DISCUSSION

BACKUP

COMPOST TEA (SMALL SCALE)

- Purchase supplies (about $25):
  - 1 – 5 gallon bucket
  - 1 gallon compost
  - 1 aquarium pump
  - 1 – 3 way aquarium gang valve
  - 4 gallons of water
  - 4 feet of aquarium hose
  - Unsulfured molasses

HOW TO MAKE COMPOST TEA

1. Cut off 3 sections of aquarium hose long enough to span from the gang valve hanging on the side of the bucket all the way to the bottom of the bucket (about 1 ft sections)
2. Cut one more section of hose that will span from the aquarium pump to the gang valve
3. Add compost, covering the 3 tube ends
4. Add water. Note that if you are using tap water, the chlorine may kill beneficial bacteria so run the pump and let the chlorine evaporate for an hour before adding water to compost
5. Add 1 ounce of the unsulfured molasses. This provides food to the microorganisms
6. Turn on the aquarium pump and leave the mixture for 2 or 3 days, stirring occasionally
7. Your compost tea is done. Apply to garden or grass areas using a trombone sprayer or equivalent