



EcologyAction

Innovation • Partnership • Community



The *.org Community Organizing Perspective

Fryer to Fuel COLLECTION PROGRAM

The Fryer to Fuel (F2F) collection program is a FREE weekly service provided to restaurants throughout Santa Cruz County. The program was developed in collaboration with environmental agencies, food service industry and liquid waste haulers with funding from the United States EPA Urban Biofuels Initiative. Collection of used fryer oil for biodiesel production offers many benefits to the community including: improved water quality, reduced fossil fuel use, economic opportunity, and free grease disposal for restaurants.

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Recipe

• Dish: Locally-Produced, Sustainable Biodiesel

• Serves: B5, B20 or B50 for Local public fleets for a Population of 150,000 people

• Ingredients:

- Commercial biodiesel plant within 200 miles.
- At least 100,000 gallons of waste cooking oil/year generated by approximately 200 local restaurants (roughly).
- Liquid Waste Hauler(s) servicing local restaurants with vacuum truck(s) and bulk containers.
- Local Pretreatment or Environmental Compliance Inspectors regulating Fats, Oil, and Grease from restaurants (typically in a wastewater or sewer agency).
- Public Works, Waste Franchise, Commercial and/or School District Fleets using diesel.
- Economic Development, Planning, Environmental or Sustainability professionals within the public domain to motivate the program.



www.ecoact.org

- Ecology Action Started on Earth Day 1970
 - Recyclables Drop Off and Education
- Ecology Action today
 - 50 staff, 3 offices, \$9 Million annual budget
 - Sustainable Transportation, Climate Protection, Pollution Prevention, Zero Waste ,Energy Efficiency
- Pollution Prevention Program: Urban Biofuels Initiative, the Fryer to Fuel Program, a confluence of all of the Ecology Action hubs.

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Urban Waste to Biofuels Initiative

Use local fryer oil to produce biodiesel to fuel public fleets.



- EPA OSWER Grant
 - Olof Hansen, Waste Management Division
- Desired Outcomes
 - Reproducible in Communities of similar size and urbanization to Santa Cruz.
 - Reducing Air Pollutants by transforming an underutilized waste crop into high value, lower impact final product.
 - Establish closed loop biodiesel economy

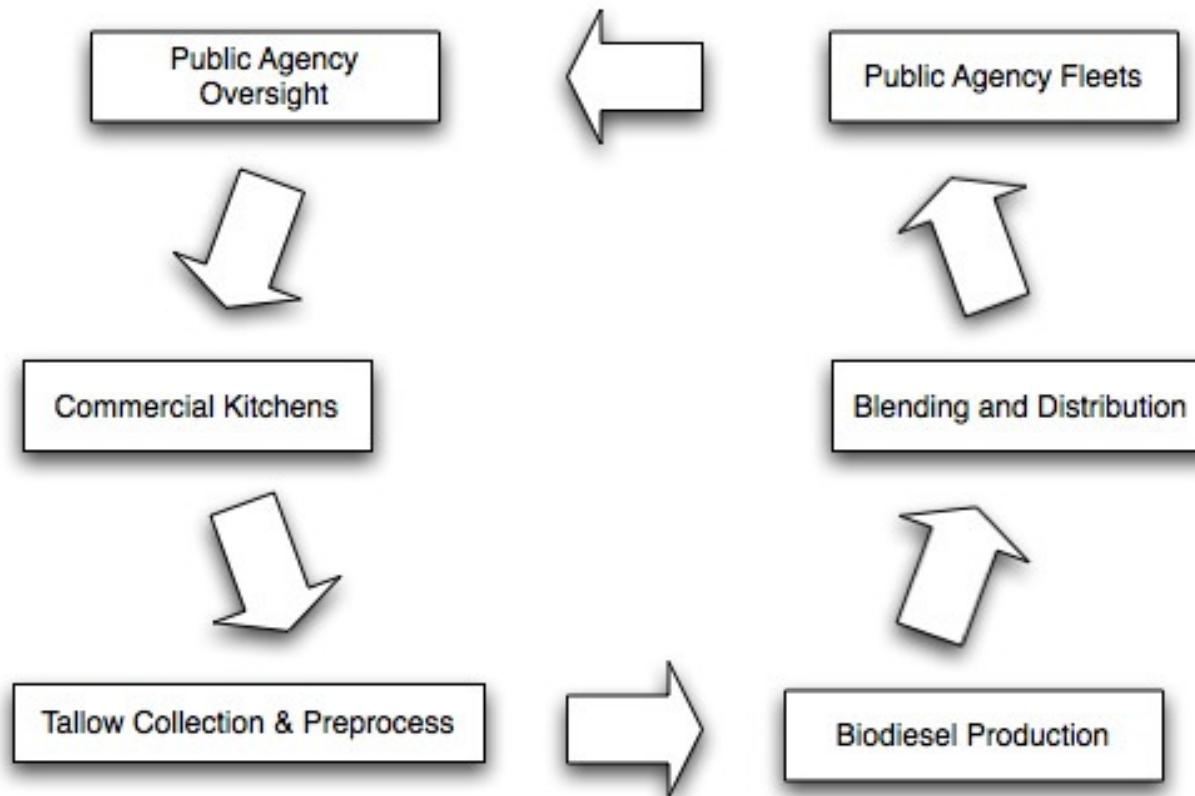


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Closed Loop

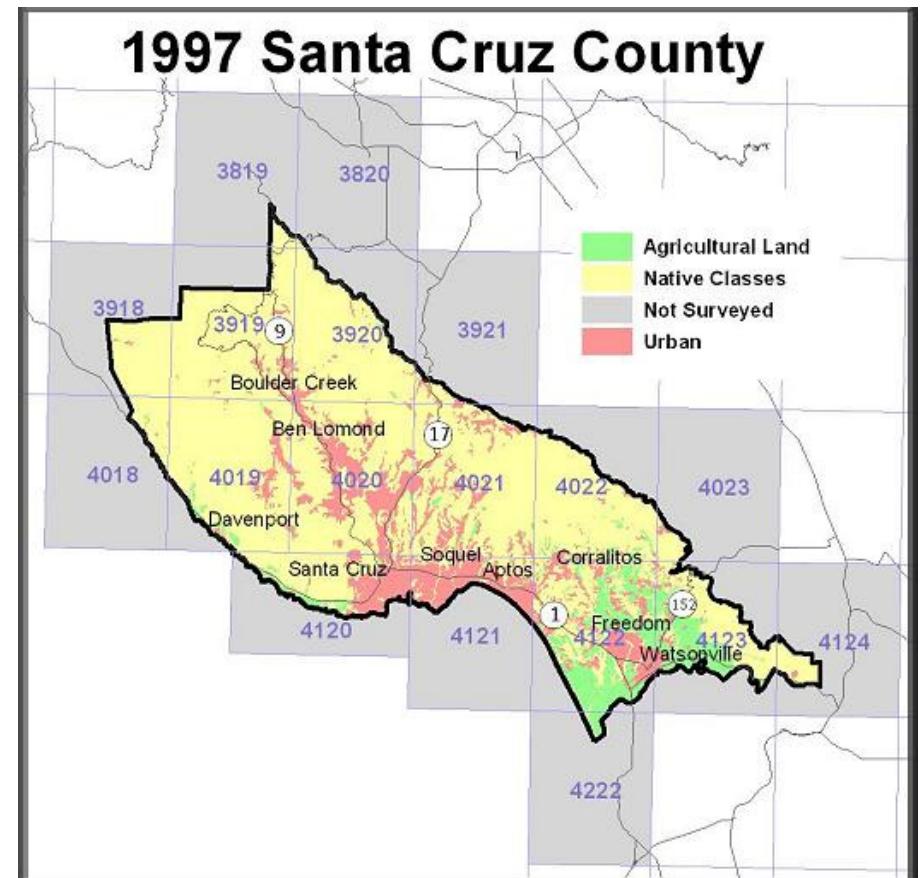


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Santa Cruz County

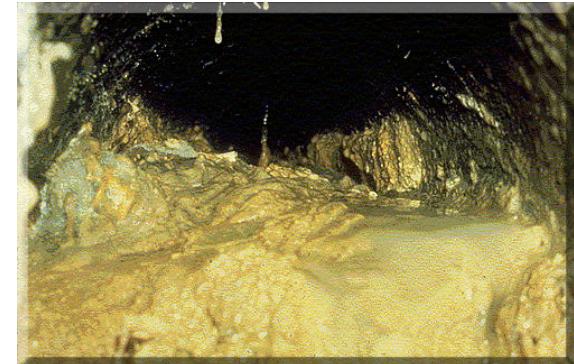
- A little bit of everything:
 - Rural/Agricultural
 - Downtown/Urban
 - Suburban Communities
 - University
 - Tourist/Beach Community





Fats, Oils and Grease

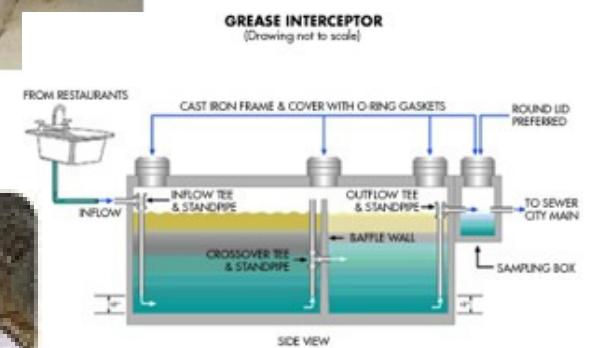
- Big problem for sanitary sewers and water quality
- Sanitary sewers clogged with grease leads to sanitary sewer overflows
- Beach closures, impaired water quality





Restaurant Grease 101

- Fryer Oil
- Interior Grease Trap
- Exterior Grease Interceptor



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Color Coding Grease

Types of Grease	FFA Content	Water Content	Derived From	Uses
Yellow Grease	>4%<15%	Very Low	WVO	Biodiesel feedstock
Brown Grease	>15%	>30%	Grease traps & interceptors	Cogeneration for sewage treatment plants.
White Grease	<4%	Extremely Low	Virgin oils, rarely from high quality WVO (canola or soy)	Biodiesel feedstock
Animal Fat	Typically >15%, but can be lower	High	Cooking meat	Protein enhancement for animal feed



Initial Lessons Learned

- Restaurant Survey- the average restaurant produces ~40 gallons/month of waste vegetable oil.
- Government unlikely to want to collect oil, make biodiesel, nor blend fuel on their property with their liability.
- For Santa Cruz, the best way to solve the problem was through a commercial solution

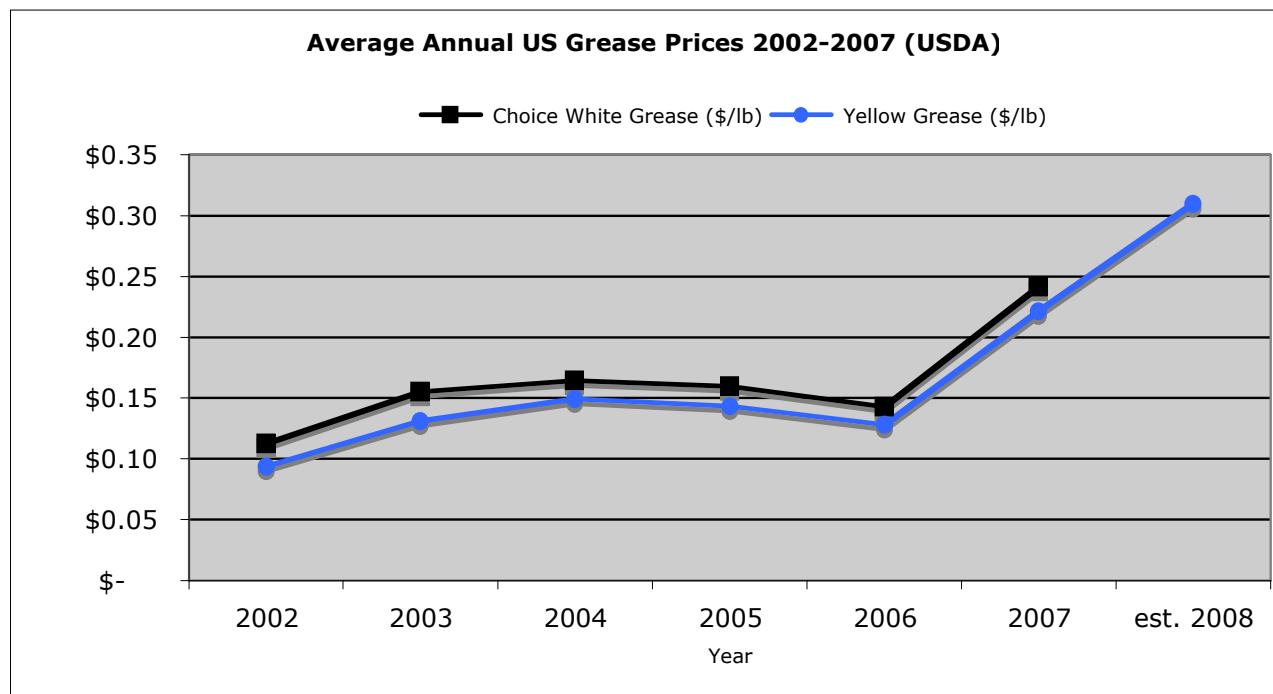


Commercial Solution

- Improving public-private relations through partnership
- Build off of existing infrastructure
- Obtain pilot test data with minimal financial commitment.
- Reduced financial impacts to restaurants, liquid waste haulers, and biodiesel producers.



Serendipity in Market Development



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Model

Fryer to consolidated bin to Salinas Tallow for rendering to BioEASI for processing into biodiesel to Coast Oil for blending and distribution to Public fleets



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EAS Inc.

- Waste Feedstock 100,000 lbs/week
- Permits, consistency, quality, reliability, commercial Scale Quantities
- Local- supports local renderers and farmers, local economies
- Use only one unit of energy for every 4.5 units of biodiesel they generate (solar & biodiesel power)
- Richard Gillis

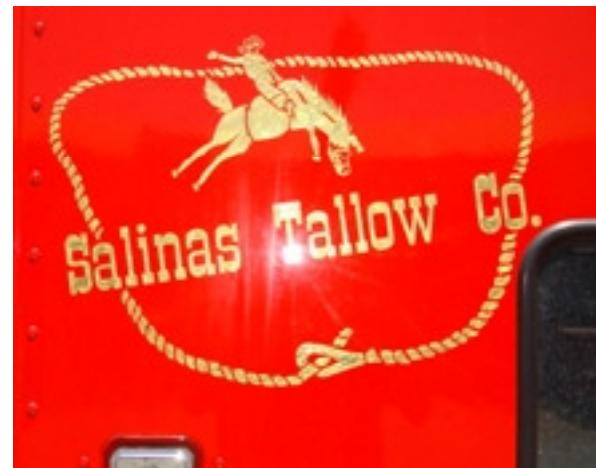


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Salinas Tallow

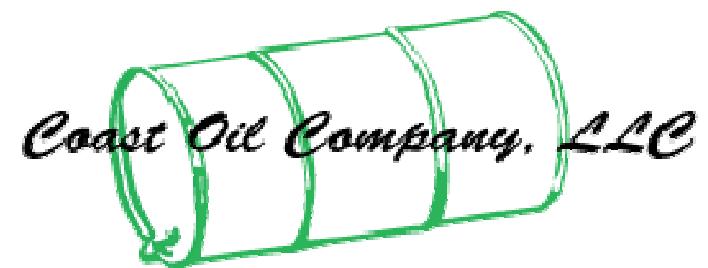
- Third generation family-owned business
- Phil and Bill Ottone
- Customer service based
- Needed help with quality of waste vegetable oil
- Better quality=less treatment





Coast Oil

- Main vendor of fuel for public fleets
- Blend B100 to B50, B20 or B5
- Distribute to local public fleets
- Wet Fueling





Program Partners

Fryer to Fuel Partners on Earth Day.

From left to right: Mary Arman, Public Works Operations Manager for the City of Santa Cruz, Bill Ottone, owner of Salinas Tallow, Phil Ottone, Manager of Salinas Tallow, Kevin Larson, Southern Territory Manager for Coast Oil, Vinicio Vides and Richard Gillis, owners of Energy Alternative Solutions, Inc. (EASi), and Olof Hansen, Environmental Protection Specialist and Fryer to Fuel Grant Manager for the U.S. EPA, Tom Huetteman, Deputy Assistant Regional Manager, US EPA.





Tallow Collection Problems

- Tallow Quality
 - Water < 0.5%
 - Free Fatty Acids < 7%
 - Time+Water+Heat+solids = bad specs
- Fryer Fuel Only
 - Trap Grease
 - Pan Grease





Consolidated Storage

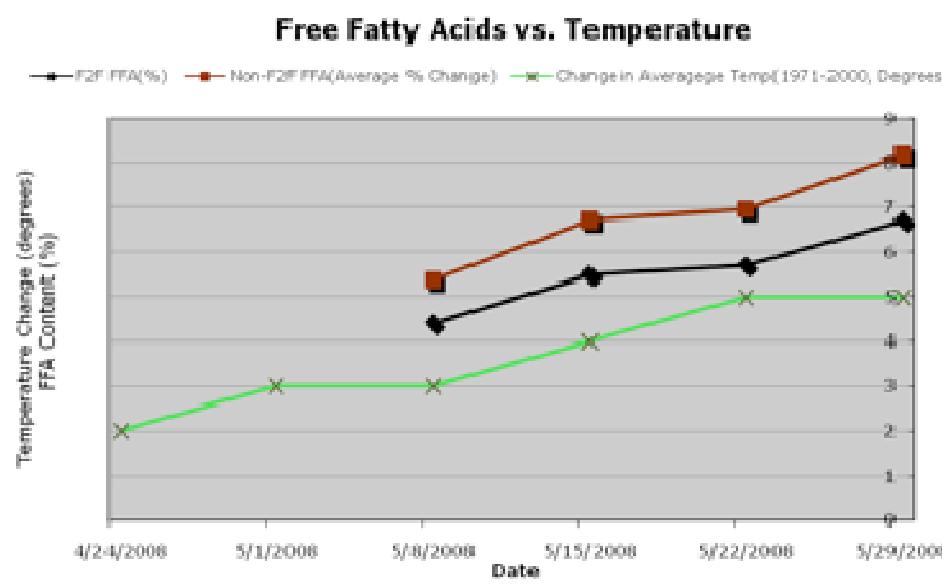
- Storing in original containers not good for oil quality or water quality
- Old bulk containers too high, lids hard to keep closed, oil stolen (Wendy's story)
- Grate easily clogged, creating overflows





Solution to Storage: Heat+Solids+Time is Not Your Friend

- Correlation between temperature and Free Fatty Acid
- Placement of bin in shaded area





Solutions for Storage

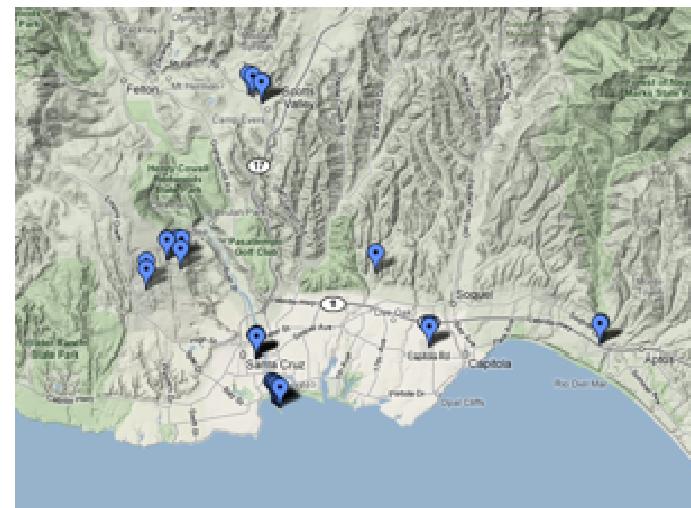
- New bulk bins by the Ottone Cousins (Salinas Tallow)
 - Lower down, easier to pour in
 - Closed, locking lid
 - V-shaped grate
- Provided Transfer Containers
- Provided Separate Brown Grease Storage (for meat, trap grease, pan grease)





Eliminate Bad Spec Oil

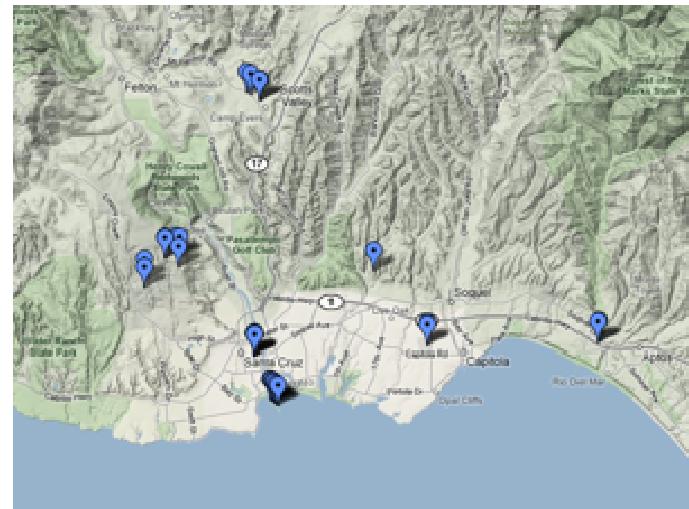
- Segregated trap/pan grease from fryer oil
- Trained Restaurant Staff.
- Fryer to Fuel BMPs
- More frequent collection
- Consolidated collection points, Dedicated Route
 - Grocery store strip malls
 - Downtown
 - Wharf
 - Shopping Mall
 - University Food Services





Broker Consolidated Collection with Businesses

- Started with Property Managers
- Then worked with Restaurants
- Hardest part was convincing restaurants to share a container
- Free pickups helped alleviate concerns



All 31 Participating Restaurants, in Clustered Collection Points in the Santa Cruz Area
(source: Google Maps)

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Best Management Practices

- Added Fryer to Fuel outreach to restaurant BMPs



BEST ENVIRONMENTAL
MANAGEMENT
PRACTICES

For

FOOD SERVICE
FACILITIES

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Benefits to Restaurants

- Window decals
- Publicity
- Free tallow service (previously \$)
- Free transfer containers
- Improved storage areas
- Free training for restaurant staff
- Green Business Program





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Improved Storage Areas



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Fryer to Fuel Documents

- F2F Agreement
- Wall Posters for restaurants
- Plaques for Lids on Consolidated Bins
- Fryer to Fuel BMPs
- Biodiesel Proposal for Public Fleets

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Quantitative Results

- 31 commercial kitchens producing the highest volumes of waste grease enrolled.
- Over 8 weeks collected 9,947 gallons (76,590 lbs)
- Fuel blended to produce ~31,830 gallons of B20.

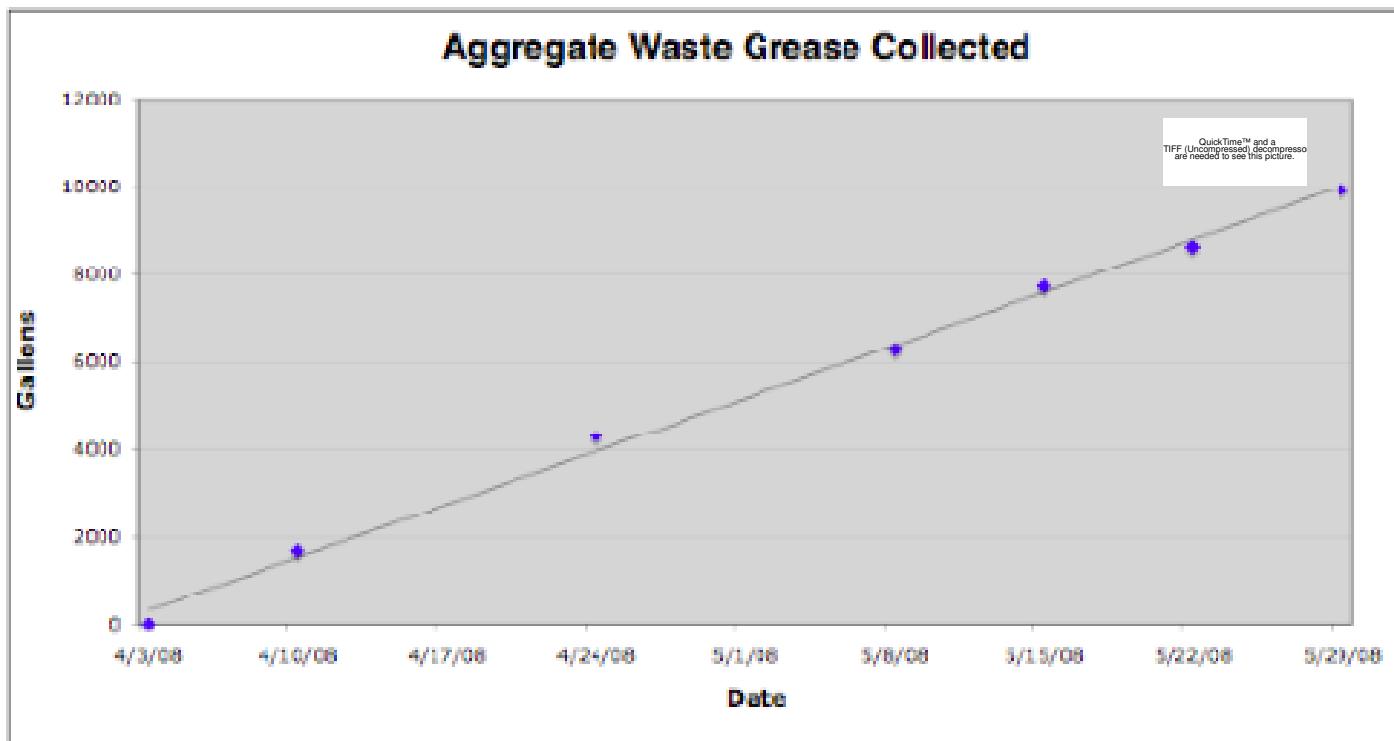


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Collection over 8 weeks



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Grease Quality Results

- Spot samples showed Free Fatty Acid percent below 7%
- Moisture below 0.4 %
- Yield exceeded expectations at only 15% loss after pre-treatment.
- Typical yield loss 35-40%

Quality Element	Fryer to Fuel	Non Fryer to Fuel
FFA (%)	6.7	8.2
Moisture (%)	0.4	Unavailable
Yield (%)	85	60



Typical Emissions Reductions

www.epa.gov/otaq/models/analysis/biodsl/p02001.pdf

Emission Type	B100	B20
Total Unburned Hydrocarbons	-67%	-20
Carbon Monoxide	-48%	-12%
Particulate Matter	-47%	-12%
NOx	+10%	+ or -2%



F2F Emissions Reductions

- 31,830 gallons of B20 fuel over 8 weeks.
- 40.76 pounds of particulate matter.
- 53.41 pounds of hydrocarbons.
- 452.52 pounds of carbon monoxide (CO).
- 94.93 pounds of nitrous oxides (Nox)
- 102,626 pounds of carbon dioxide.

* National Biodiesel Board's calculator found at www.biodiesel.org/tools



Carrying Capacity

- Estimated 250,000 gallons per year of waste grease in Santa Cruz County or 750,000 in tri-County region.
- Could yield 2,700,000 gallons of B20.
- Salinas Tallow could increase yield, recover more grease (currently only recovering half of estimated potential).
- EASI plant is scaling up and will open new plant.





Program Setbacks

- \$1/gallon biodiesel tax credit was not renewed in 2010, bill to extend the credit was killed in the senate recently.
- BioEASI plant closed for 3 months (back up and running now). The City of Santa Cruz picked the lowest bid for biodiesel, not locally produced.
- Salinas Tallow is sending their waste cooking oil out of the area.



Needs

- \$1/gallon biodiesel tax credit
- More restaurant training and pretreatment of waste cooking oil to have better quality feedstock
- More innovative grown feedstock- algae or jatropha.
- Renewed commitment to sustainable, community-based biodiesel.
- Funding