



Bioplastics From Food Waste

**Onsite Energy Generation and
Sustainability Conference**

February 28, 2014

Back2Earth Technologies



So, what's the problem?



BioPlastics Start with Digested Food Waste



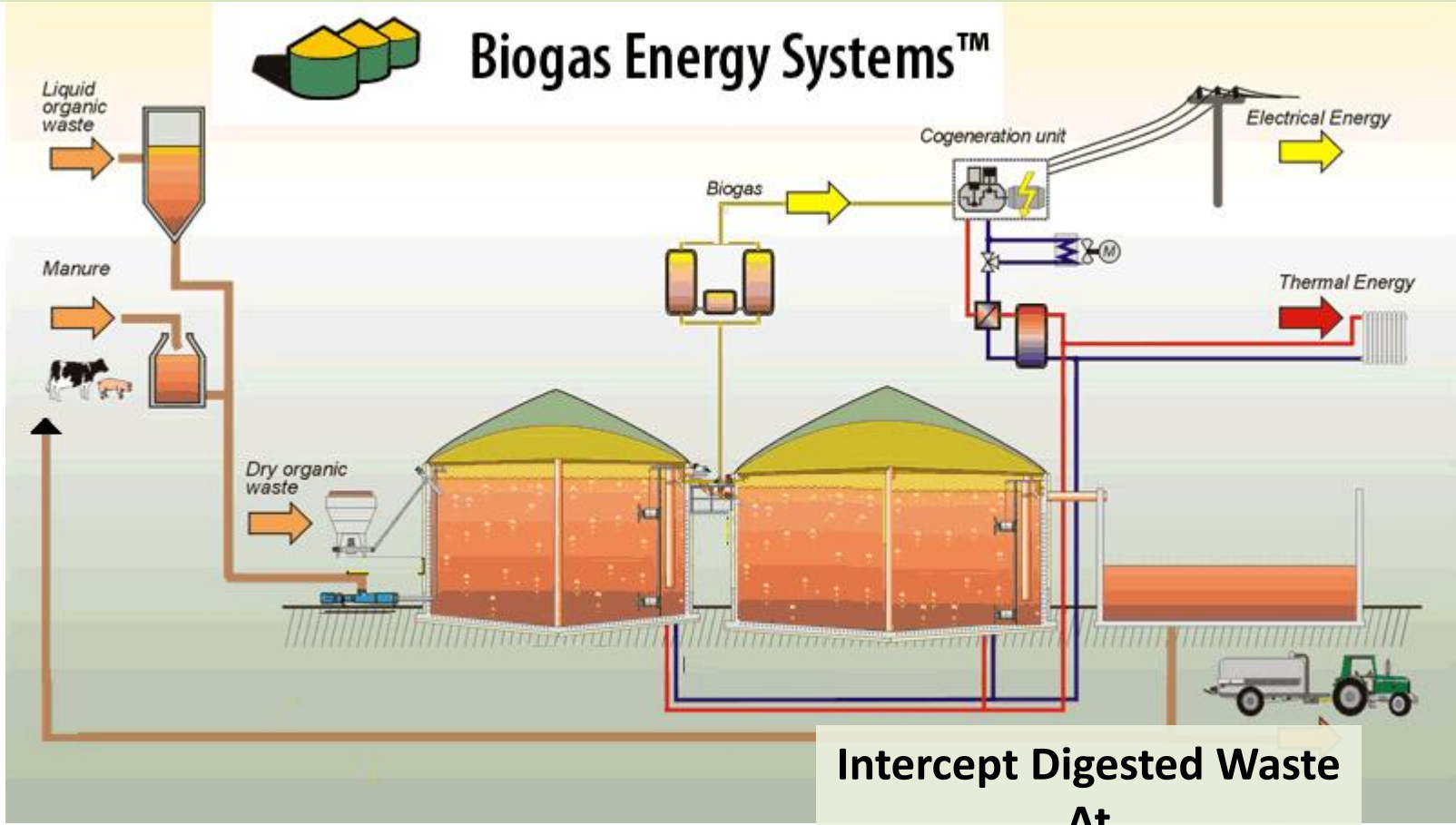
North State Rendering
Chico, CA



Biogas Energy Systems™

Back2Earth Technologies, LLC

40% to BioPlastics



Zero Waste

Which Food Waste Inputs are Acceptable?



FATS, OILS, GREASE (FOG)
(FAST-FOOD OUTLETS)

TOMATO WASTE

FRUIT WASTE

OLIVE OIL PROCESSING

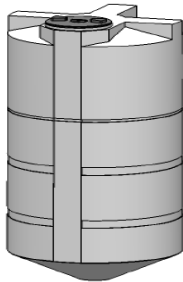
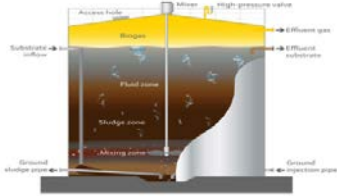
RENDERING WASTE

CITRUS RINDS

SLAUGHTER HOUSE WASTE



Digester



Bio-Plastic Resins



Compost & Water

A Specific Bio-based Plastic



- PHA (Poly Hydroxy Alkanoate)
- What products are made from PHA-type resins?





Bio Plastics from Food Waste

Pallets



PHA Films



Compostable Containers



Old Style Polypropylene

New PHA Plantable Pot



PP



PHA/DDGS 90/10

Applications



Containers



Forks



Straps

Interior Trim from PHA Resin



PHA Superior Performance Compostable Bio-Plastics



Strength
Malleability
Elongation
Dart Strength
Ink Acceptance
Heat Resistance
Barrier
Uses Existing
Converter Equipment



**Plantable
Nursery Pots**

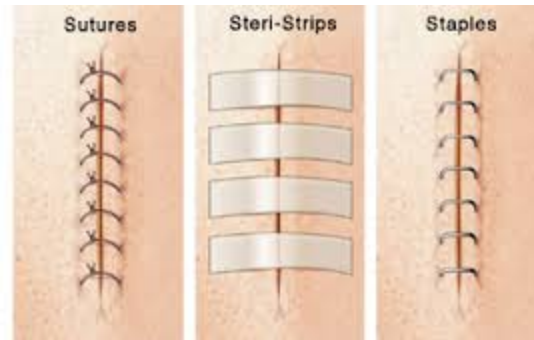
Zero Waste

Surgical Sutures that Dissolve in the Body



Zero Waste

Medical Applications Self-Dissolving



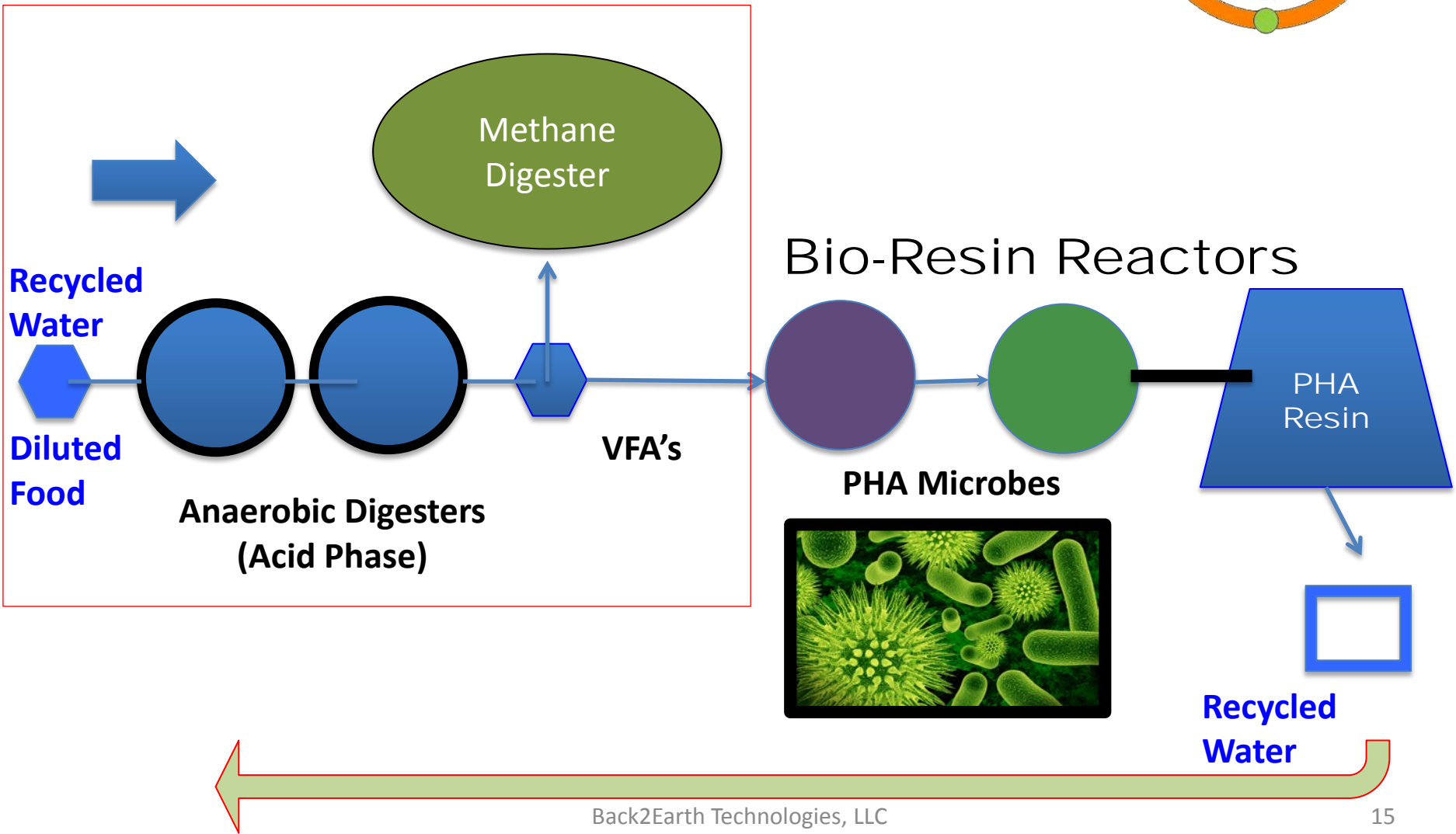
Zero Waste

End-of-Life Issues



90 Days

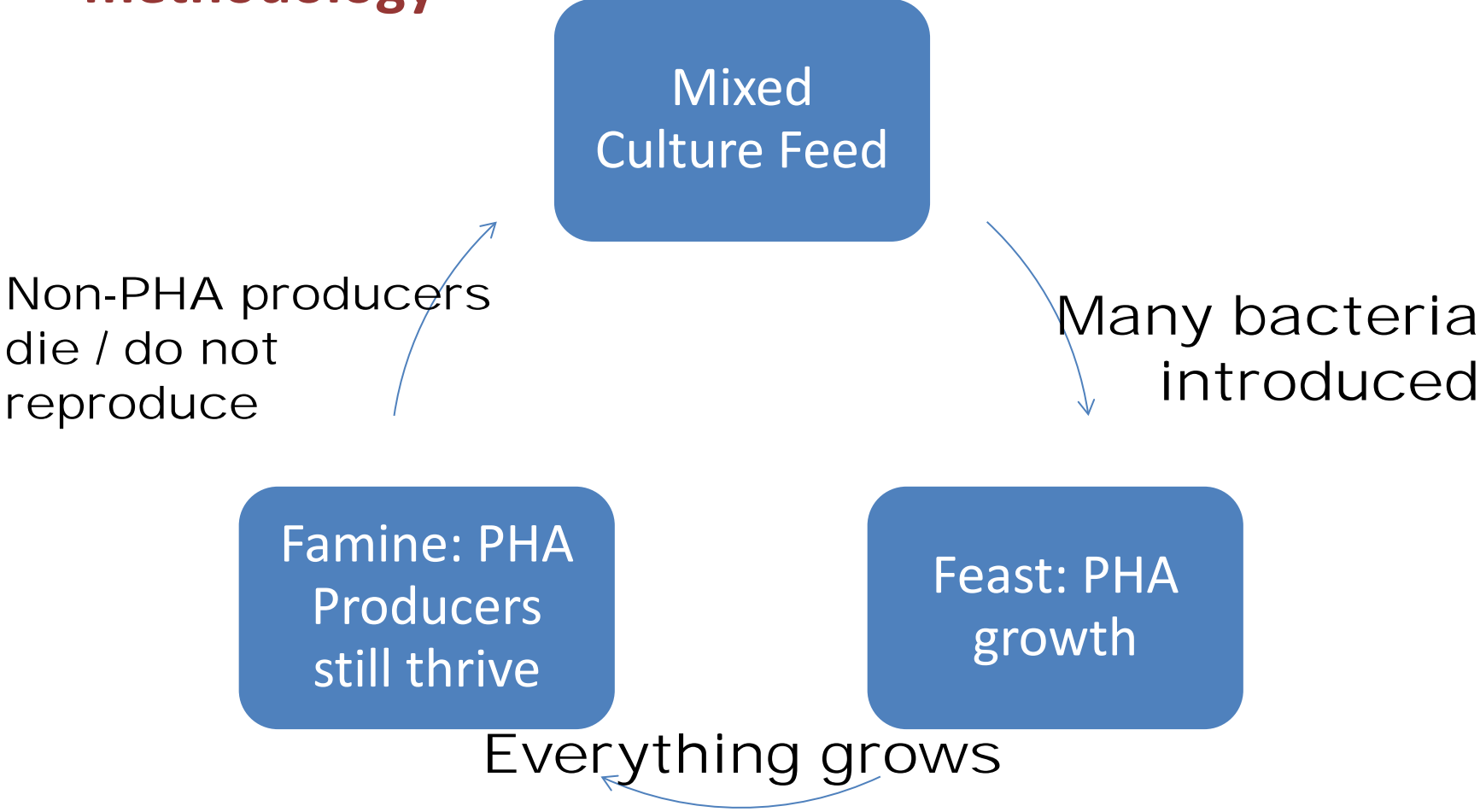
Process Flow



Zero Waste

Feast Famine Cycle...

use of micro-organisms and a patented methodology





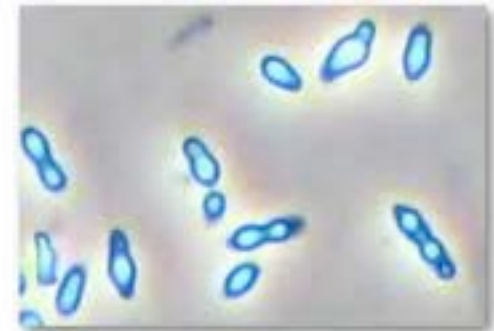
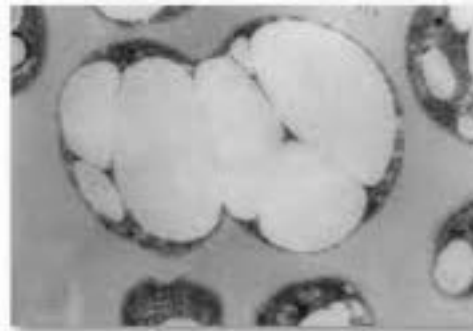
Fatty Acids & Microbes

Microbes Feast on
Volatile Fatty Acids

Fatty Acids a Result
of Digestion



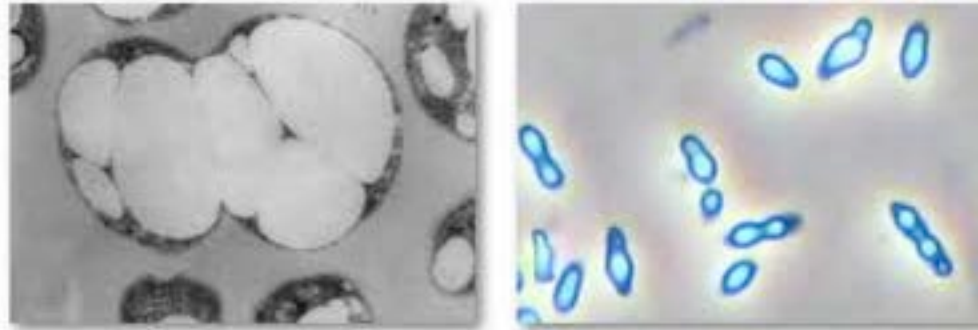
Microbes



Microbes act as Energy Storage Molecules

Zero Waste

PHA Resin In Energy Storage Molecules



Project Support

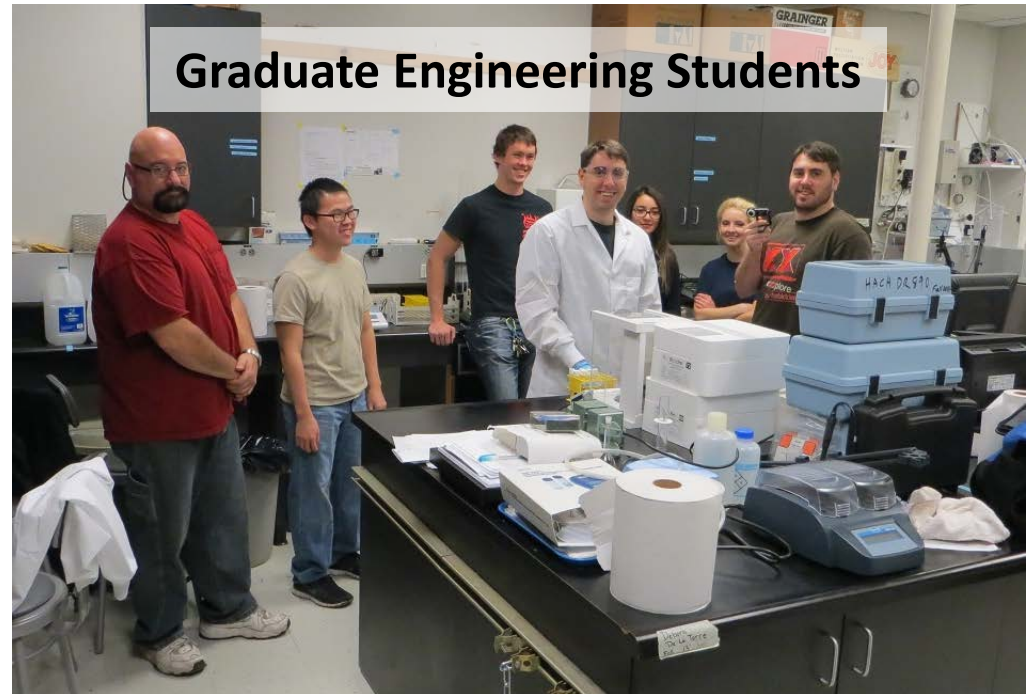


Fresno State and Agriculture Research Institute

- Partial Funding provided by Agriculture Research Institute (ARI)
- Support also Lyles Center for Innovation and Entrepreneurship
- Financial Support from Bill Smittcamp, President



Lyles College Engineering Lab



Zero Waste

Laboratory at Wawona Frozen Foods





Bio-Based Benefits

Compostable Trash Bags



- **Competitive Plastics**
- **Degradation**
- **Food Waste Solution**
- **Off-Gassing Reduction**
- **Processor Cost Savings**
- **Financial Support For Water Treatment**

Environmental Engineering Makes This Possible



Summary

- **Water, Plastic, Food Waste & Energy Are Intertwined**
- **Food Processors Are Part of The Solution**
- **Convert Waste to Bioplastics**
- **Reclaim Water at End of Process**





What About Reclaiming Water ?



**BioFiltro
BIDA
System**

