Waste Systems Technology

Presents:

Organic Waste or Waste Not

Organic Waste Stream

- What Is It?
  - Green/Yard Waste
  - Pre and Post Consumer Food Waste
- Where Is It?
  - Commercial and Residential Sector
- Who's Is It?
  - Owned by the Hauler at the point of Disposal
- Who's Problem Is It?
  - The Municipality, Point of Generation

Ten Most Prevalent Material Types in the California Landfill System

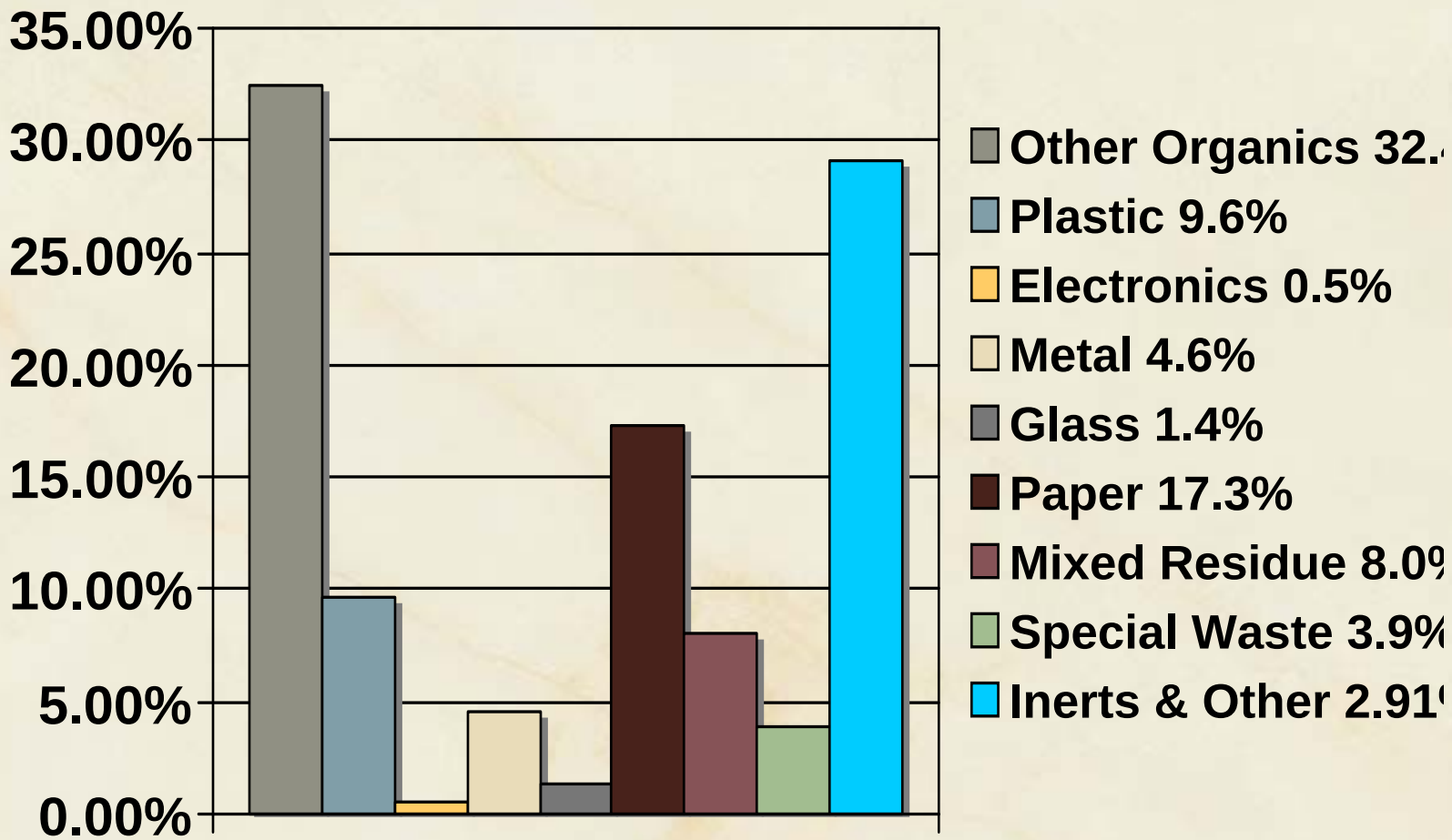
Material Type	Est. Pct
Food	15.5%
Lumber	14.5%
Remainder/Composite Paper	5.5%
Remainder/Composite Organics	5.2%
Uncoated Corrugated Cardboard	4.8%
Leaves and Grass	3.8%
Construction and Demolition	3.6%
Other Miscellaneous Paper	3.5%
Bulky Items	3.5%
Remainder/Composite Metal	3.2%

Organics = 52%

2008 Statewide Waste Characterization

Overview of California's Disposed Waste, 2008

(Prepared for CIWMB)



Alternative Technology ???

- Alternative Technology Has a nice sound to it - But what is it an Alternative to?
  - Landfilling?
  - Incineration/Combustion?
  - Composting?
  - Land Application?
- What is our Goal when invoking the word “Alternative”?
  - Alternative Energy?
  - Extending the Life of the Landfill
  - Clean Burning Vehicles?
- How do we define, Alternative Technology?

Long Haul Transfer & Disposal?

Long Term Solution?

- Fuel Prices
- Landfill Prices up 200%-300%
- Traffic Congestion
- Pollution and Air Quality Concerns
- Rail capacity Concerns
- Massive Fossil Fuel consumption
- Odor Concerns with Organic Materials
- No Diversion
- Increased Costs across the board

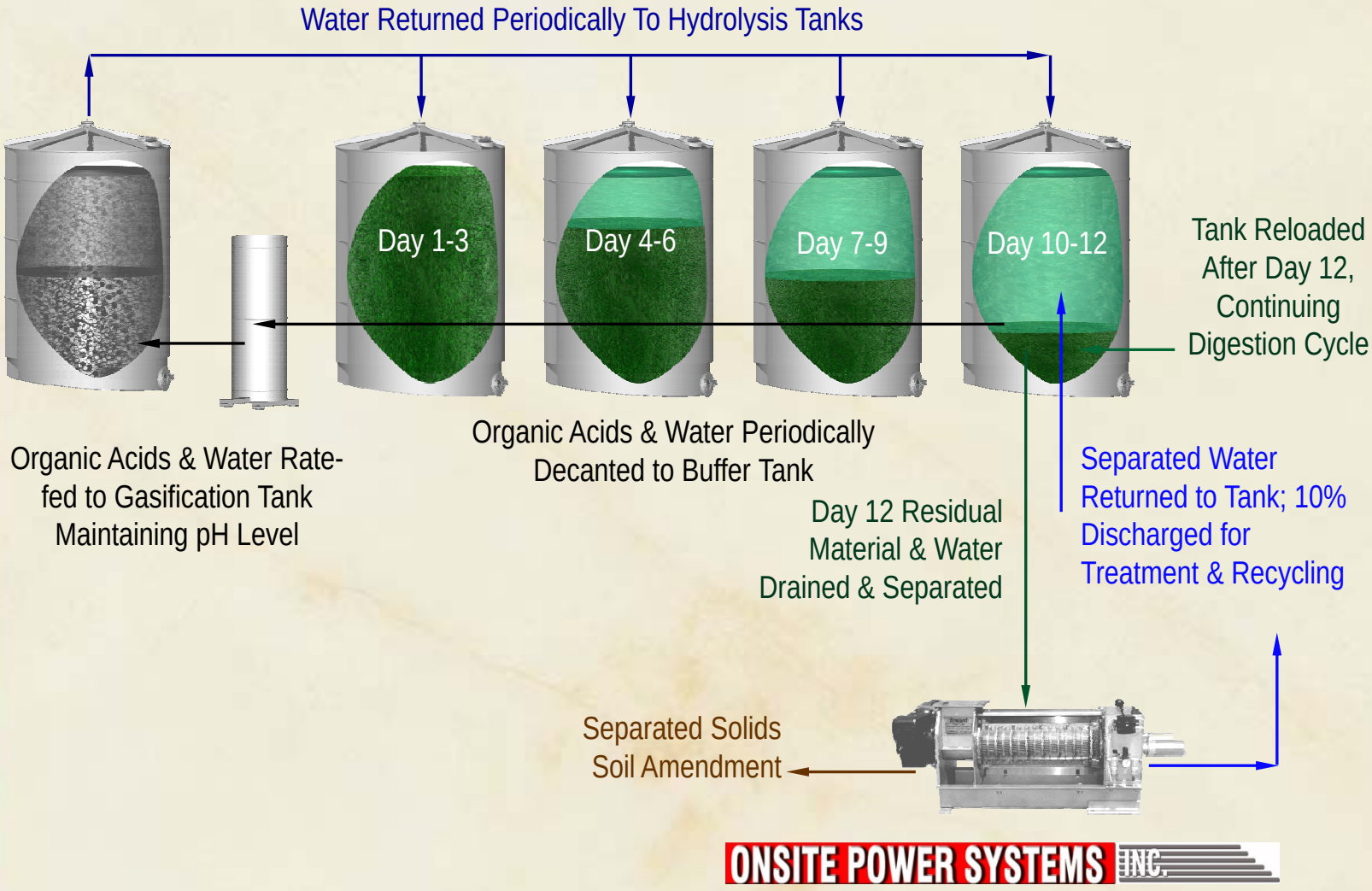
Organic Conversion Technologies

Conversion of organic materials for energy can proceed along three main pathways—

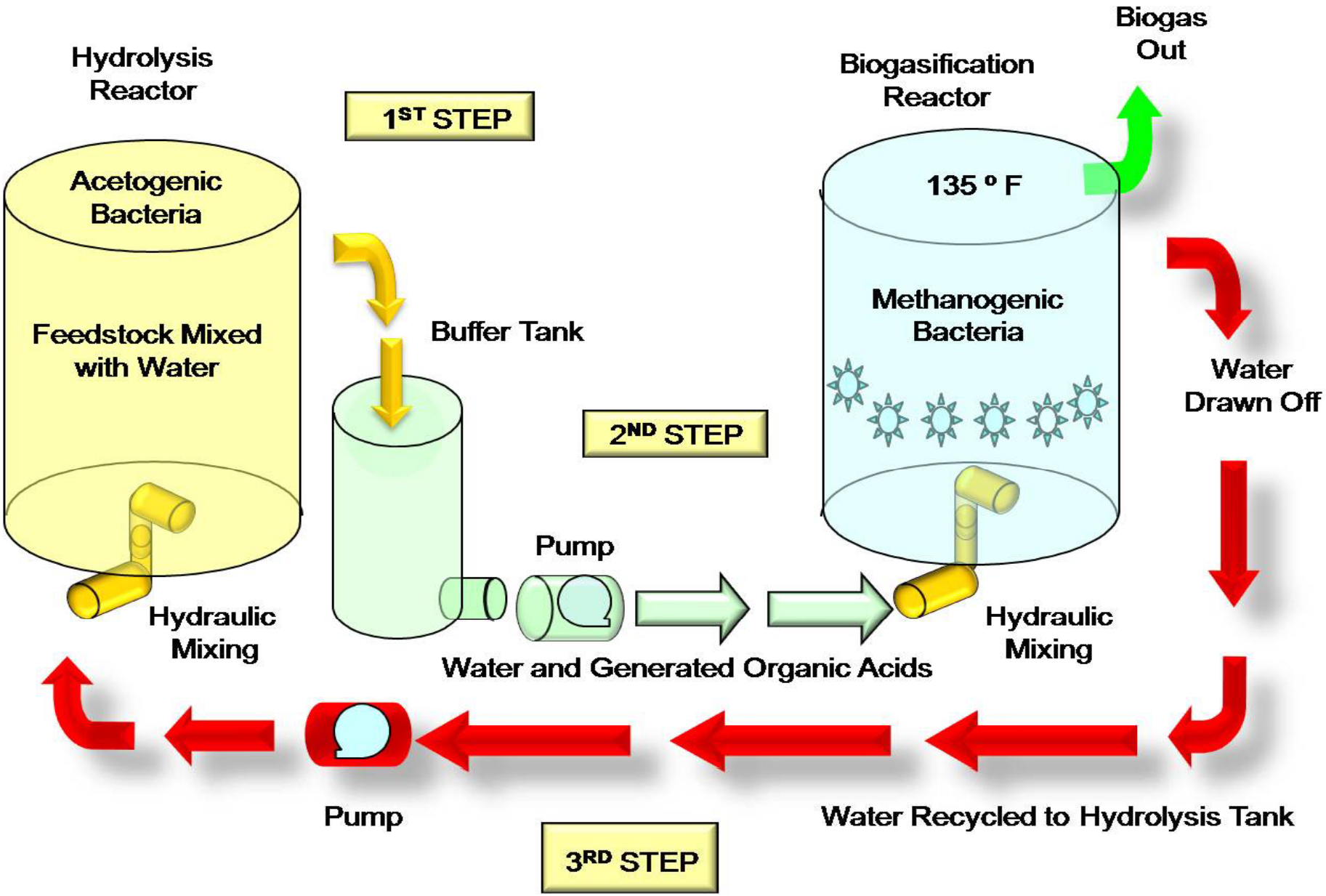
- Thermo-chemical - Higher Temperature and Faster Conversion rates. Best suited for lower moisture feed stocks. (Gasification and Pyrolysis)
- Biochemical - Lower Temperature and Lower Conversion Rates. Well suited for higher moisture feed stocks. (Composting and Anaerobic Digestion)
- Physicochemical - Associated with the transformation of fresh or used vegetable oils, animal fats, greases, and other suitable feed stocks into liquid fuels and Bio-diesel.

UC Davis Onsite Power Systems
Advanced Phased Solids

Mixed Green & Food Waste Process With 12 Day Retention Time



Anaerobic Phased Solids Digester System

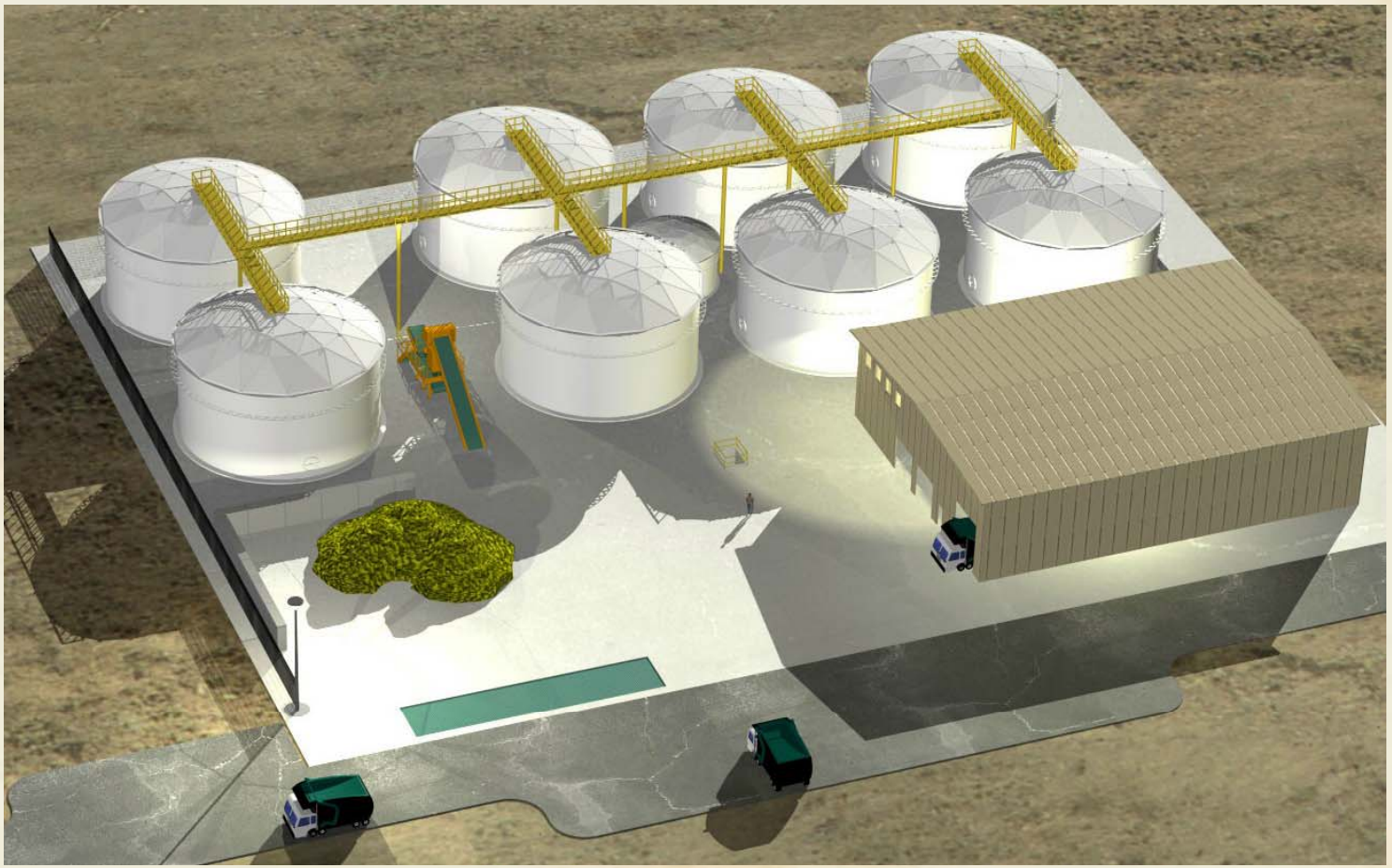


University of California Davis
Site Development

An advanced and technically validated approach to the problem of handling a wide variety of organic materials

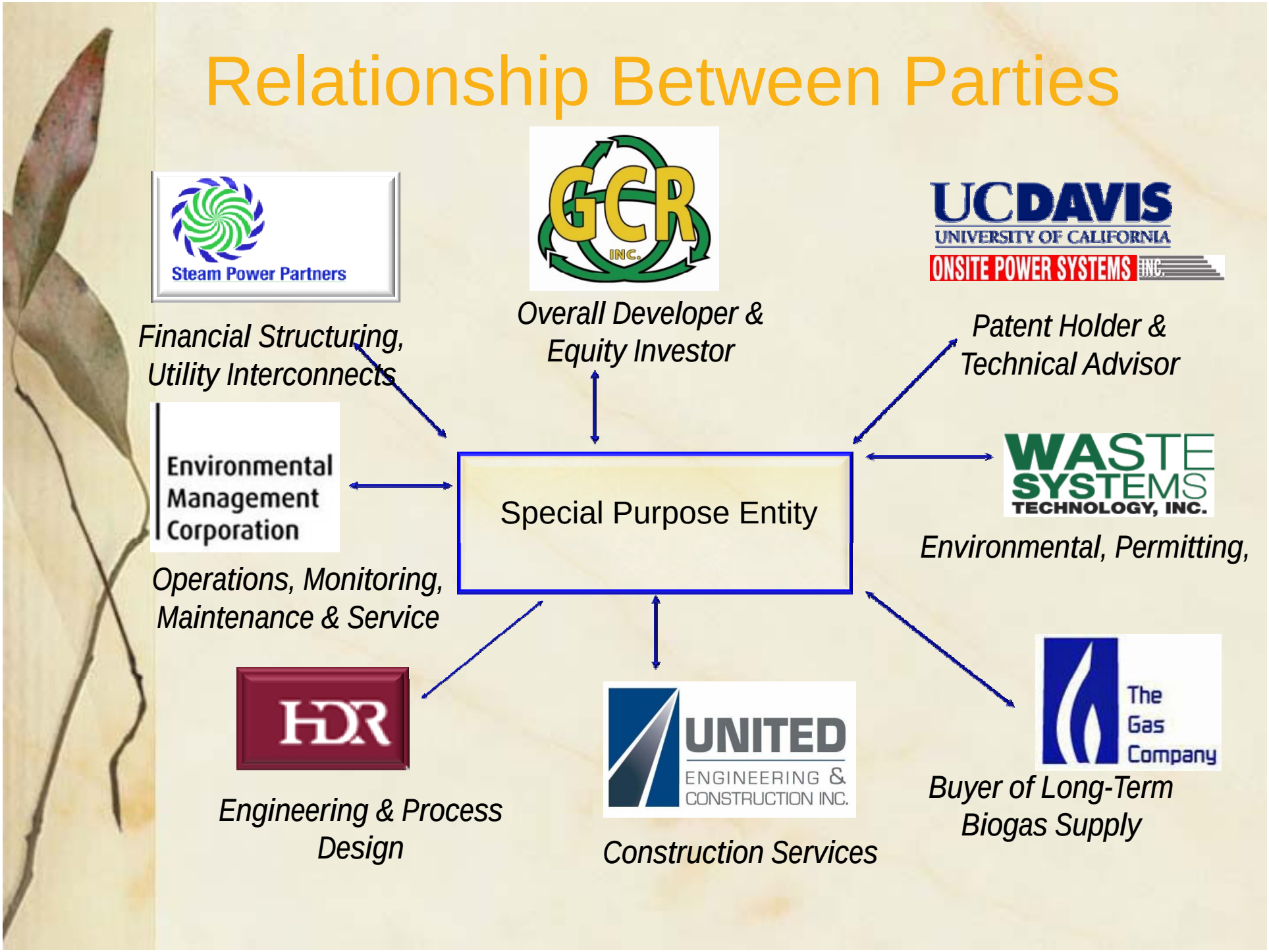
ONSITE POWER SYSTEMS INC.

Preliminary Site Design "GCR"



ONSITE POWER SYSTEMS INC.

Relationship Between Parties



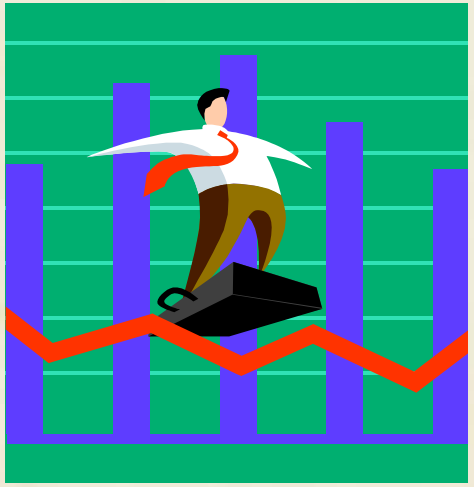
Byproducts of Anaerobic Digestion

- **Heat** (Facility Energy)
- **Methane Gas** (Natural Gas)
- **Water** (Purple Pipe)
- **5%-15% Solids** (Soil Amendments)

CNG

Economics

- For years inexpensive landfill rates have competed with the economic viability of alternative disposal technologies. That has changed
- Inexpensive fossil fuels have competed with the economic viability of alternative fuels. That has changed
- Some technologies such as Anaerobic Digestion are now financially viable and even competitive to composting and landfilling.



Grand Central Recycling & Transfer Station, Inc. (City of Industry)