Solving fuel shortage, waste reduction and handling and economic development challenges in Virginia
Introduction of Waste-based Ethanol Production Facility

Virginia Recycling Association
May 6, 2009
Agenda

• Welcome
• Concept Introduction
• Ethanol Plant Feasibility
• Plant Technology and Layout
• Local Requirements
• Open Discussion
• Adjourn
Concept Introduction

• Recycling grew into waste stream handling
• Investigated various waste stream reduction technologies
• Recyclables are up to 20% of waste stream
  — More had to be done
• Waste-to-ethanol technologies reduce stream up to 95%
• No local benefit from waste hauling
Searching for Solutions
Greater Incentives

- Federal Grants for non-corn-based ethanol
- Lower CO$_2$ emissions
Alternative Fuels

Fuel from Plants
Renewed Interest
Fuel Sources

• Materials containing
  – Carbon
  – Hydrogen
  – Oxygen

• Sources
  – Household wastes
  – Commercial and Industrial Wastes
  – Agricultural trimmings
  – Wastewater treatment sludge, septic tank wastes
Federal Incentives

• Reduce reliance on corn
• 36 billion gallons of biofuel by 2022
• More than half from non-food sources
GeneSyst International, Inc.

A New Beginning
In Waste Treatment
Technology Development

James A. Titmas
Inventor
Ethanol Plant Feasibility

- Technology developed, patented, reviewed and accepted
  - LOS ALAMOS
  - ORNL
  - MSU
Delivered Materials

Recyclables
- Plastics
- Glass
- Metals
- Aggregate & Soil

Primary
- Ethanol
- Butanol
- Cleaned Water
- CO₂

Secondary
- Lime
- Yeast
- Furfural
- Misc.
Partial List of Raw Materials

- FOOD WASTES
- RESTAURANT WASTES
- MAGAZINE PAPER
- OFFICE PAPER
- NEWS PRINT
- CARDBOARD
- CROP STOVER
- CROP CHAFF
- SCRAP WOOD
- LANDSCAPING DEBRIS
- ROAD SWEEPINGS
- HARBOR SKIMMINGS
- YARD WASTES
- SEWER SCREENINGS
- SEPTIC TANK WASTES
- DILUTE WWTP SLUDGE
- CROP PROCESSING
- GARDEN WASTES
- PULP AND PAPER WASTES
- TREE CLEARING WASTES
- COTTON CLOTH
- FEED LOT MAURE
- FIBRE BOARD
- SPENT GRAIN LIQUOR
- GRAIN ETHANOL WASTES
- EXPIRED FOOD AND DRINK
A new beginning in waste treatment
Laboratory Simulation
Product Enhancement Training (PET) Facility

- Training laboratory
- Gravity Pressure Vessel
- Confirming “JAR” tests
- Meet customer product requirements
Local/Site Requirements

• Construction ready site
  – Initial minimum 50 acres
  – Future expansion of 50 acres
• Clear roadway access
  • Domestic infrastructure
  • Standard industrial electricity
  • Fiber optic IT capability
Local/Site Requirements

Continued

- Rail siding
  - Capable of mechanized loading and unloading
Financial Requirements

• Phase 1 – Financing and Staff
• Phase 2 - Preliminary permitting, site prep & engineering
• Phase 3 - Construction & Operation
Positive Environmental Impact

• Methane emissions reduced up to 95%
• Permits Required
  – Air Quality
  – Waste transfer station
  – Materials recovery facility (MRF)
• No perpetual cost
Projected Performance

- **Intake** – Capable of 500-to-1500 tons/day MSW
  - Includes up to 10% wastewater treatment sludge
  - Includes biodegradable materials and feed lot waste
  - Includes up to 20% recyclable material

- **Output** – Flexible and adjusted to market requirements
  - 40,000-to-60,000 gallons/day ethanol
  - 9,000 gallons of marketable water/day
  - Furfural, yeast, liquid CO₂, urea, lime, acetic acid (variable)
  - Virtually no discharged process emissions

- **No smokestacks**
Local Benefits

• Employment
  – Construction up to 350 workers
    • >$50 million payroll
  – Plant operations
    • Up to 100 workers
    • >$5 million payroll
• Training and facility
Summary of Benefits

• Up to 100 Permanent jobs
• Increased local revenue
  – Production
  – Captured tipping fees
• Reduced landfill requirements and cost
• Reduced wastewater treatment cost
• Local production of required fuels, chemicals
• Environmentally friendly
Open Discussion
Thank You

Reclaimed Resources Inc.