

# YAVAPAI APACHE NATION BIOMASS FEASIBILITY STUDY



# OVERVIEW

YAN Demographics

Biomass Study Team

YAN Biomass Study Background

Project Rationale & Outline

Project Progress

Future

Q&A



# YAN DEMOGRAPHICS

- YAN Population = 1800 Enrolled Members
- YAN Geography = 650 Acres in 5 Locations
- Projected location of a Biomass Facility
  - Located in Verde Valley of Central Arizona
  - Middle Verde (On reservation)
  - Drake (30 Miles from the Reservation)



# YAN BIOMASS STUDY TEAM

- YAN Energy Director– Tracy Tudor
- YAN Program Consultant – Mark Randall
- YAN Utility Consultant – Leonard Gold
- YAN Technology Consultant – Al Dozier



# YAN BIOMASS BACKGROUND

- YAN Energy Program 1999 resource assessment
- YAN has 41 kW of Solar Generation
- YAN is negotiating with local utility for procurement of Reservation electrical utilities
- YAN views Biomass as an opportunity for economic development
- 2001 DOE FEMP Pre-feasibility Study indicated biomass could be economic



# Project Rationale

- Pyrolytic Steam Reforming Gasification

 <i>Gasification vs. Incineration</i>	
Gasification	Incineration
➤ Oxygen free gasification; converts feedstock to Syn Gas and benign ash	➤ Thermal destruction with direct flame & excess oxygen, Heat & CO <sub>2</sub>
➤ No air flow (extremely low NOX)	➤ High air flow (high NOX)
➤ <i>No toxic emissions (no Furans or Dioxins)</i>	➤ Generates <u>Furans and Dioxins</u>
➤ 94-98% reduction in volume and weight of carbon in Feedstock	➤ Maximum 85% to 90% reduction
➤ Creates high quality Syn Gas (450 to 900 BTU/SCF) that is storable	➤ Heat is only usable form of Energy and can not be stored
➤ Secondary air pollution control devices rarely required	➤ Secondary air pollution control device <u>always required</u>

# Gasifier Technology

- Can process any carbonaceous material
- Supplies its own purified process water
- Produces “Syn-gas”
- BTU Energy can be from 350-900 BTU/SCF
- Process Residue is a benign Ash



# Wide Range of Gasifiable Materials

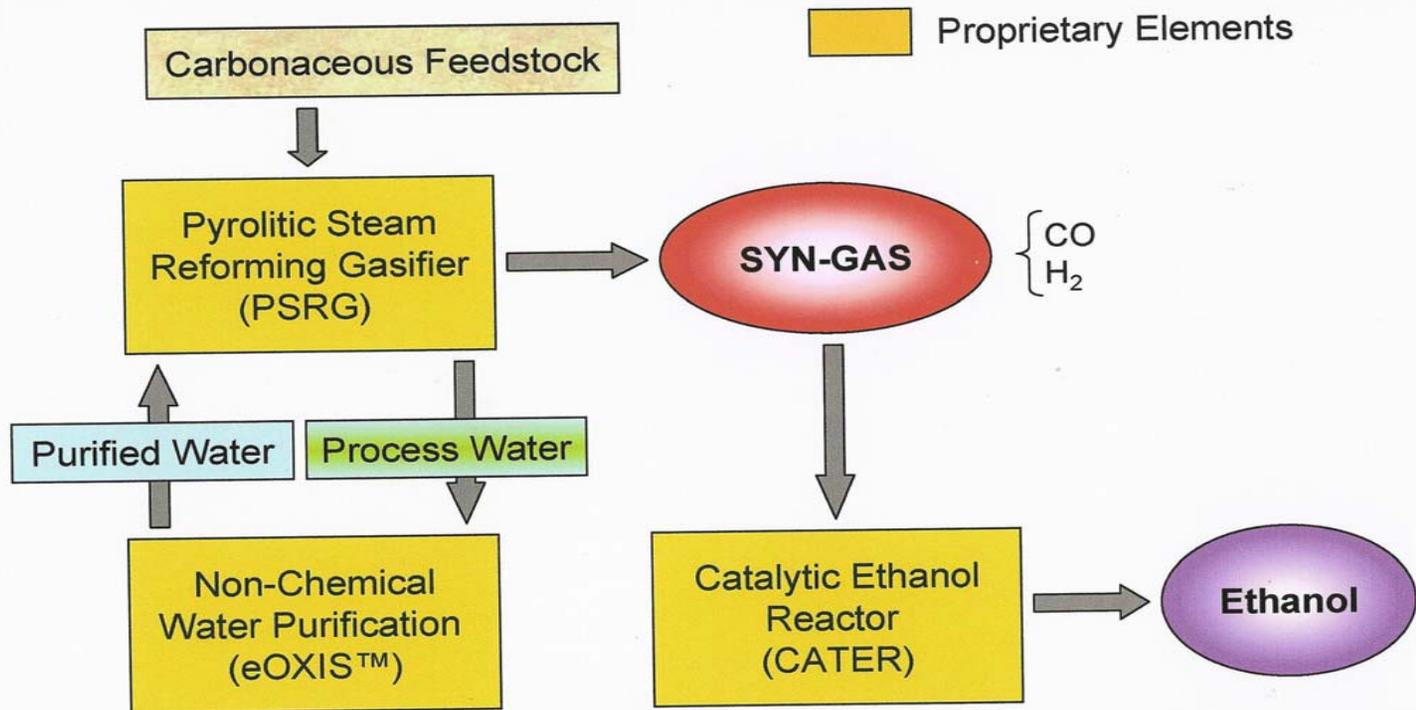
- Forest Trimmings - Wood
- Agricultural Residues
- Animal Manures
- Human Biosolids
- Municipal Solid Wastes
- Carbonaceous Fossil Fuels



# Gasifier Process



*Proprietary Technology*



# Denver Test Facility



## *Pilot Testing Facility*



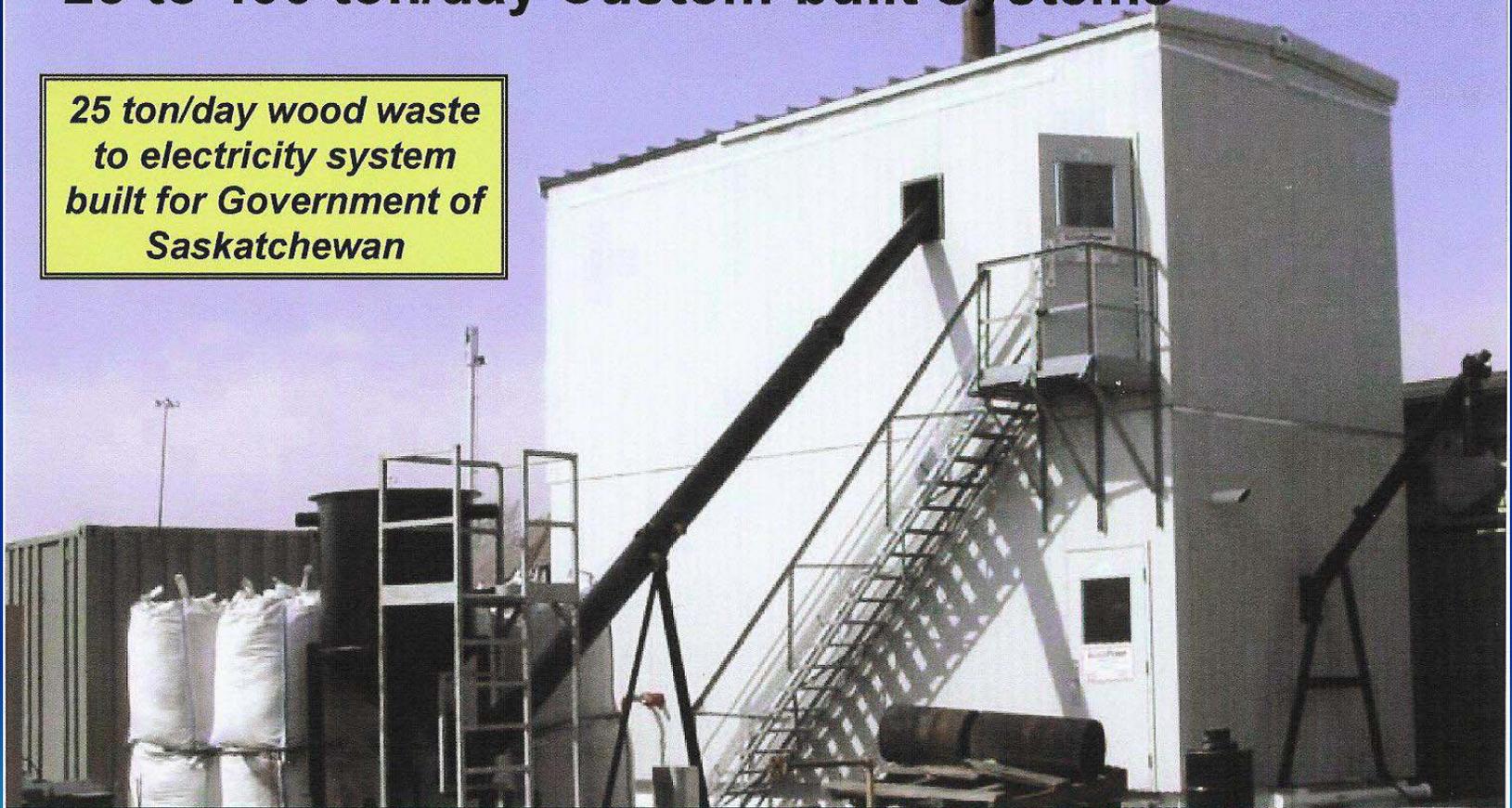
Rice Straw



Pilot testing facility allows short-term design testing of feedstock to optimize process design

## **25 to 400 ton/day Custom-built Systems**

***25 ton/day wood waste  
to electricity system  
built for Government of  
Saskatchewan***



# Project Outline

- Resource Availability Assessment
- Technology Review and Best Fit Analysis
- Preliminary Design and Cost Analysis
- Financing and Incentives
- Utility Interface
- Manpower Availability
- Business Plan
- Tribal Council Approval



# BIOMASS STUDY PROGRESS

- Completed Fuel Availability Assessment
  - Forest Material
    - National Forests - 3 within 100 mile radius
    - USFS is preparing treatment plans
    - 300 Tons per day needed for economics of scale
    - 2006, Forest material will be available
    - Studying Transportation options
  - Sewage Sludge
    - Completed quantity and energy content study
  - Biofuel Crops
    - Studying suitability



# Results to Date

- Human biosolids could provide up to 40%
  - Gasifier could be a solution to local biosolids disposal problems
  - Forest material availability and processes not yet established.
  - Transportation of forest material has marginal economics.
  - Relocation of plant improves economics of gas production and diminishes economics of power production
  - Local resources such as energy crops and MSW need study
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# FUTURE

- Continue to explore other potential waste-streams

-- MSW



-- Human Waste Sludge



-- Horse/Cattle Manure



-- Local lumber mills



# SUMMARY

- Feasibility Study is On-track
- Technology Validation is On-track
- Arizona RPS will be a factor in economics
- Multiple feedstocks will be necessary
- Project has potential to address a variety of waste disposal issues for the Verde

Valley



# Questions

