

The Science and Engineering for a Biobased Industry and Economy

S-1007

Project Participants

- 57 Scientists Representing:
 - 29 Land Grant University Agricultural Experiment Stations
 - 2 National Laboratories
 - 2 Private Enterprise Companies
- 4 Federal Agency Administrative Liaisons
- 1 Administrative Advisor

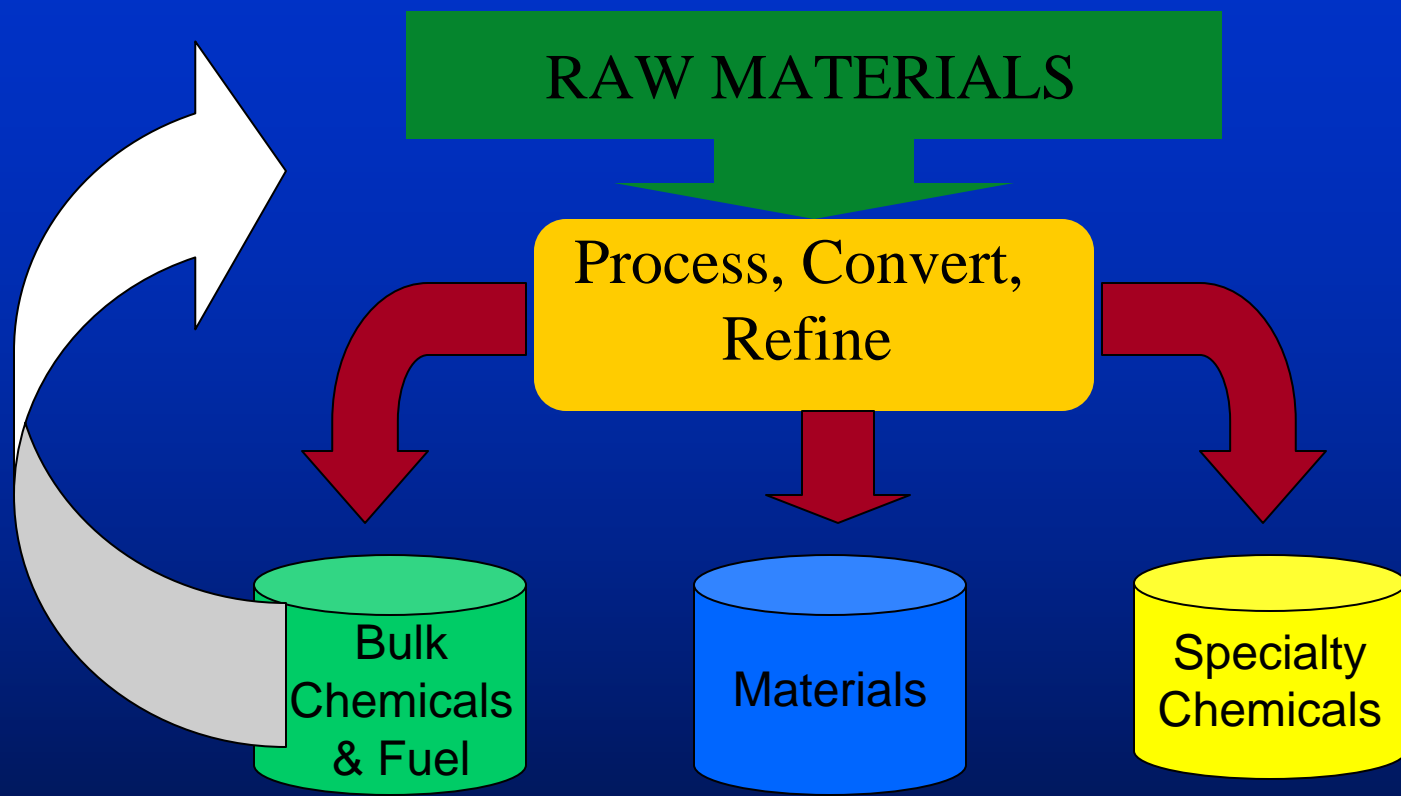
RAW MATERIALS

Process, Convert,
Refine

Bulk
Chemicals
& Fuel

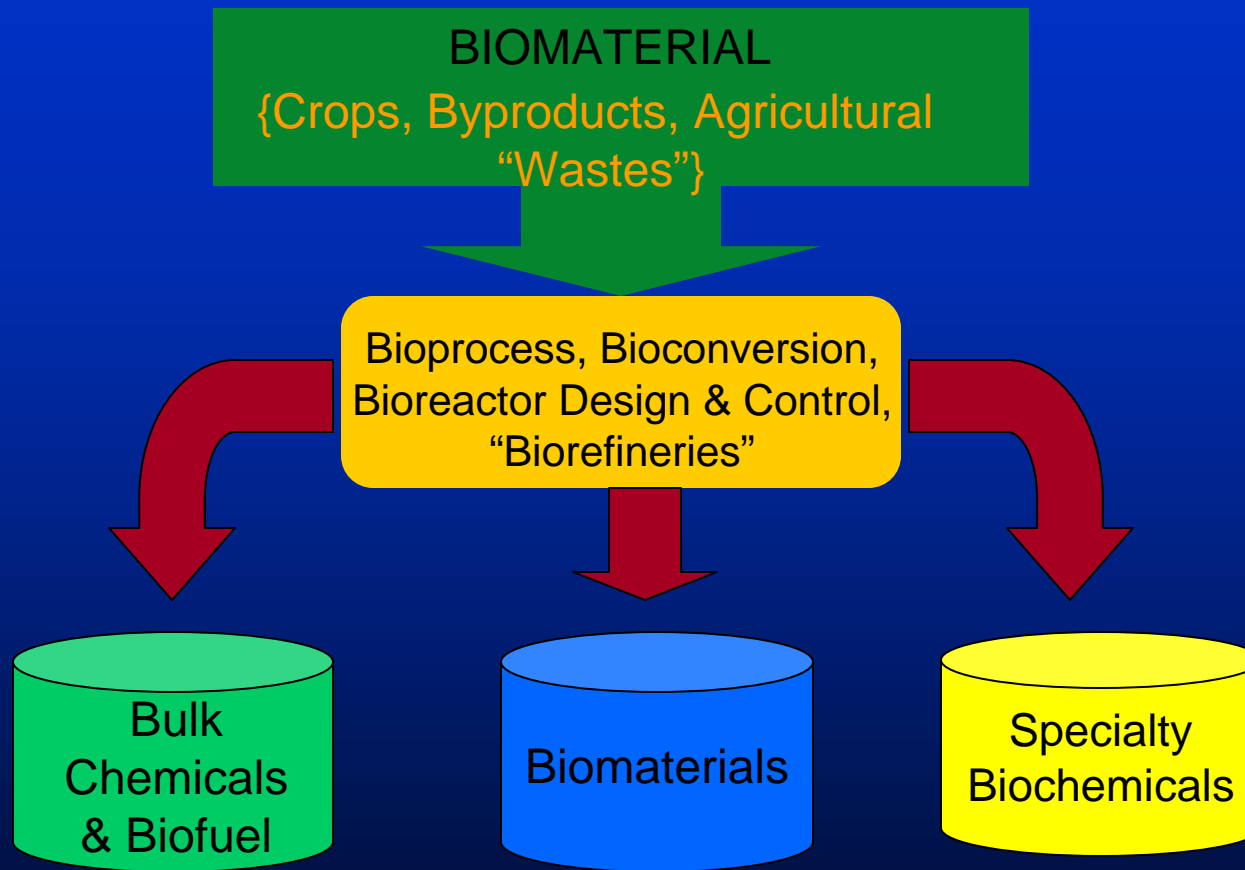
Materials

Specialty
Chemicals



S-1007

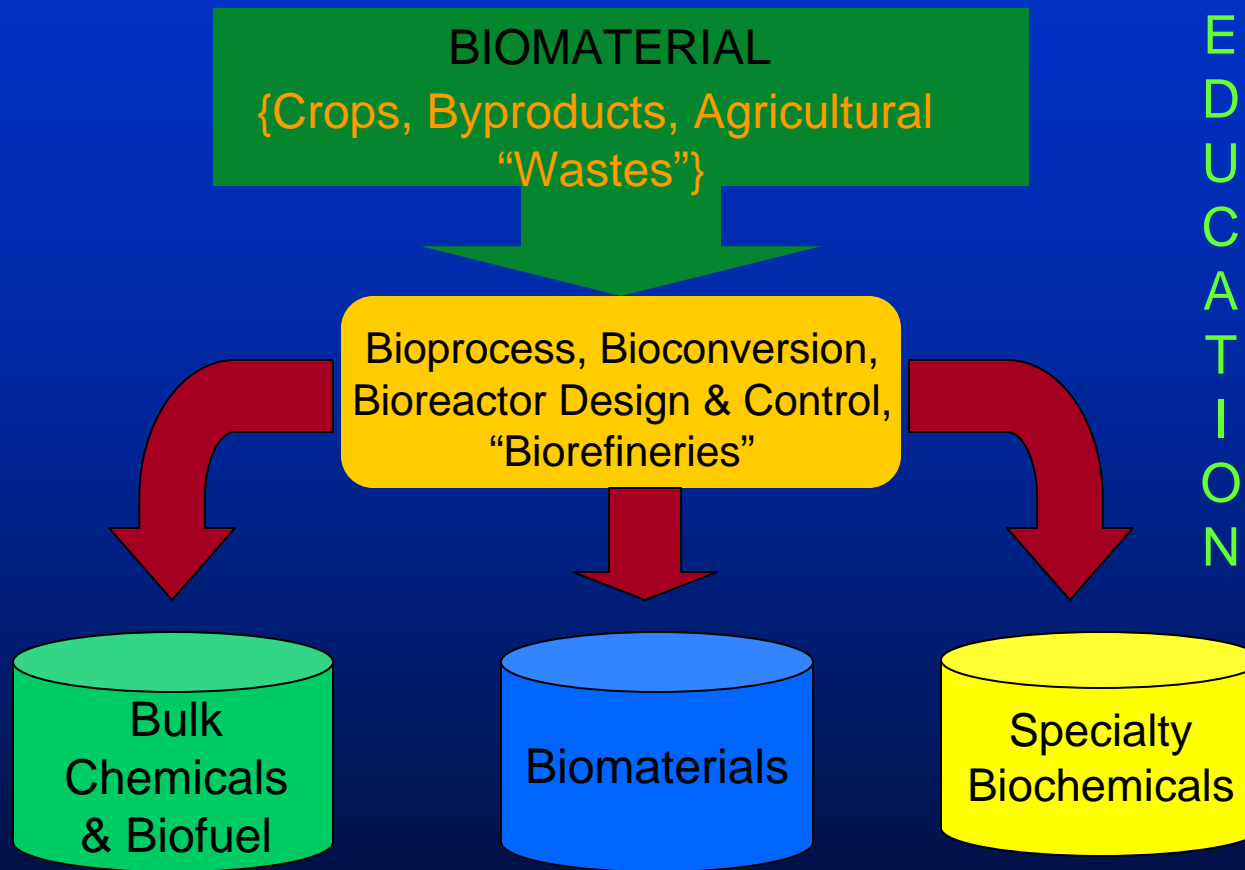
The Science and Engineering for a Biobased Industry and Economy



S-1007

The Science and Engineering for a Biobased Industry and Economy

E
N
V
I
R
O
N
M
E
N
T



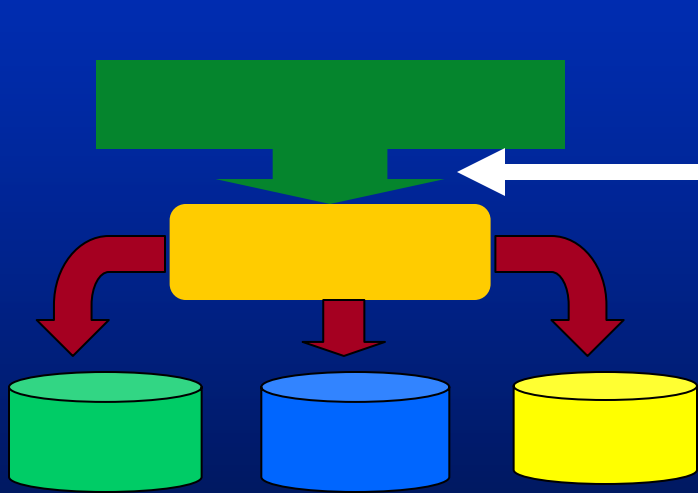
E
D
U
C
A
T
I
O
N

E
C
O
N
O
M
I
C
S

S-1007

OBJECTIVES

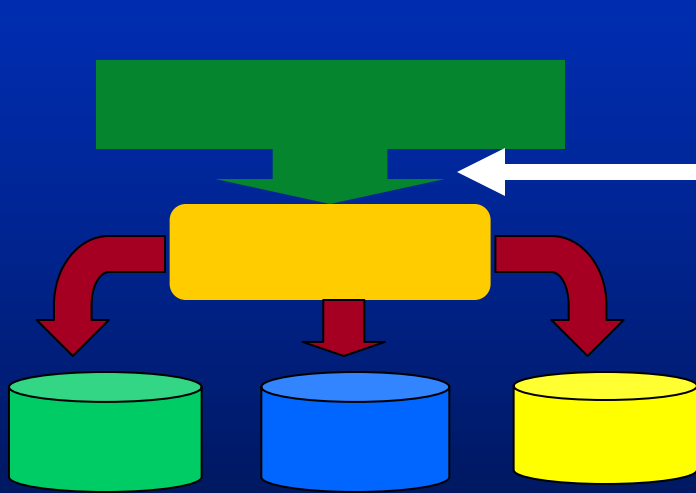
1. Reduce the cost of harvesting, handling, storing and transporting biomass - -



S-1007

OBJECTIVES

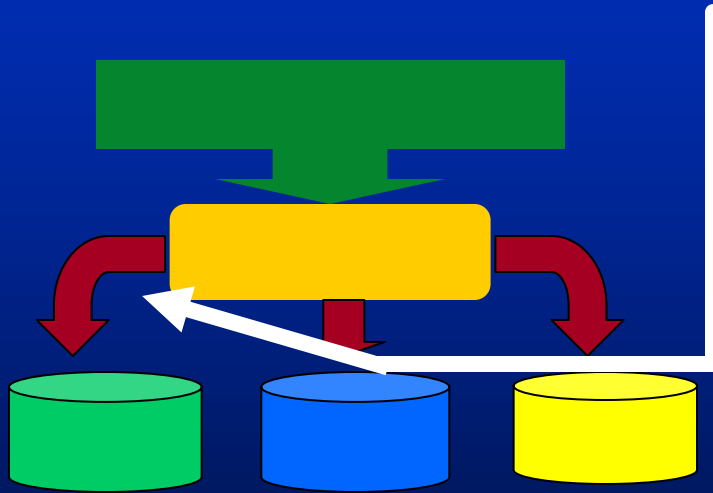
1. Reduce the cost of harvesting, handling, storing and transporting biomass increasing the competitiveness of biomass as a feedstock for fuels, materials and chemicals



S-1007

OBJECTIVES

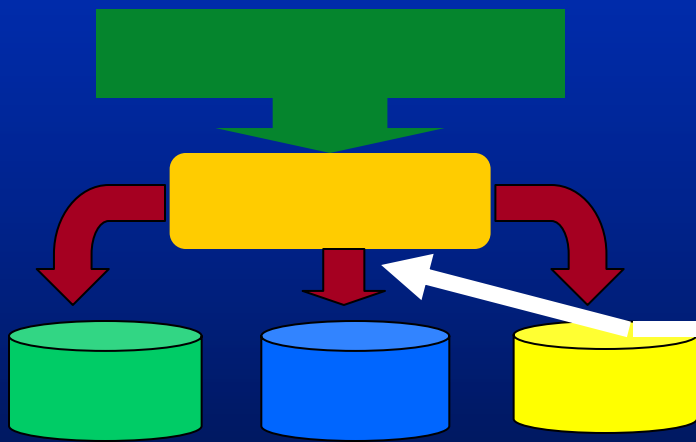
2. Expand the scientific knowledge leading to significant economic improvements in biofuel production processes.



S-1007

OBJECTIVES

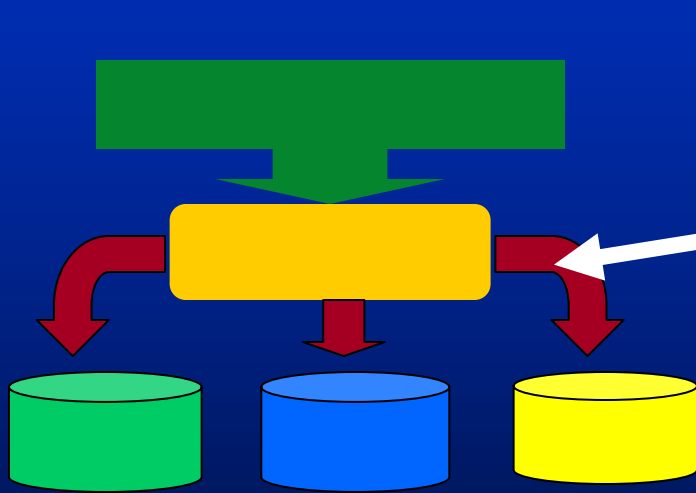
3. Develop, evaluate, and optimize integrated processes to convert biomass resources into biomaterials with commercial applications



S-1007

OBJECTIVES

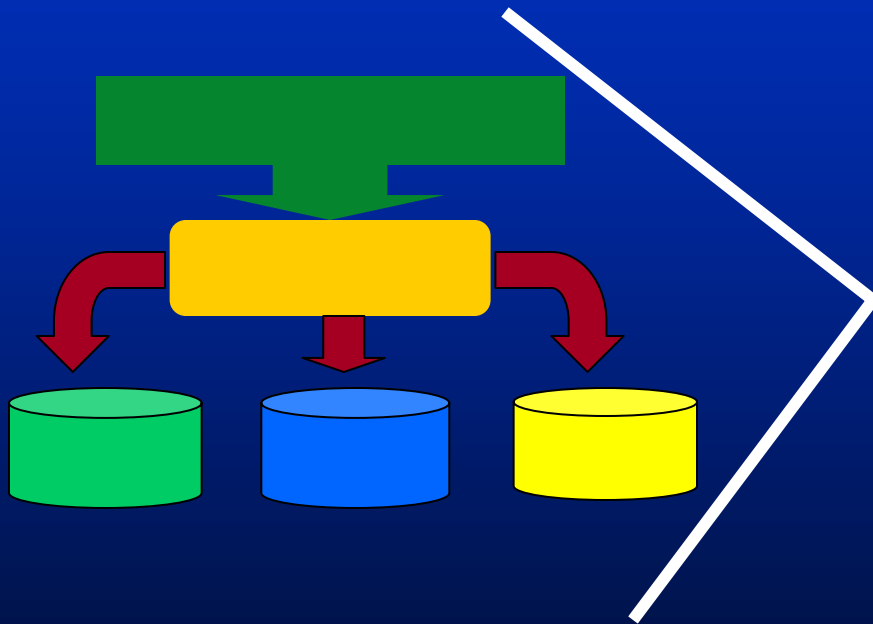
4. Expand the scientific knowledge for development of processes and systems for economical production of biobased speciality chemicals from agricultural feedstocks and residues



S-1007

OBJECTIVES

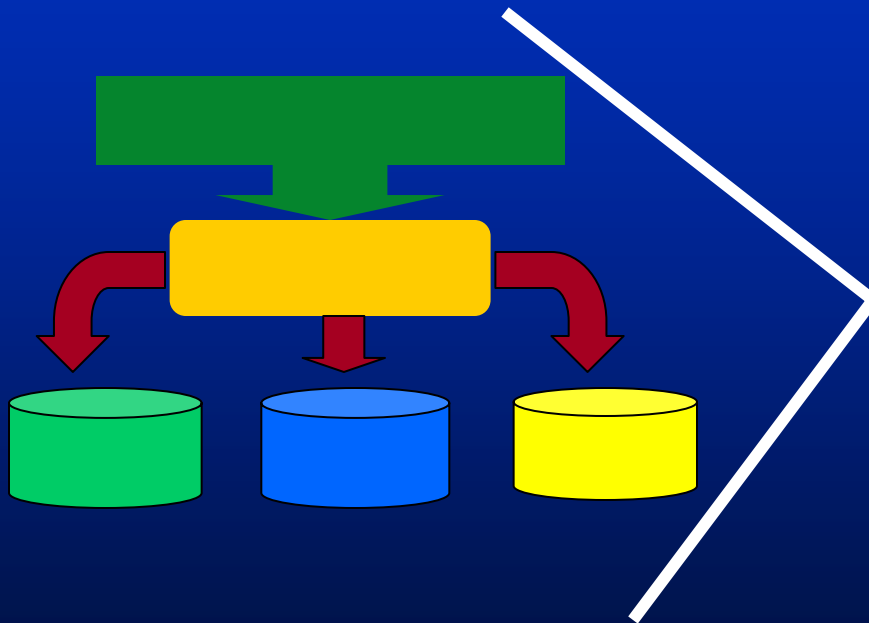
5. Identify needed educational materials,



S-1007

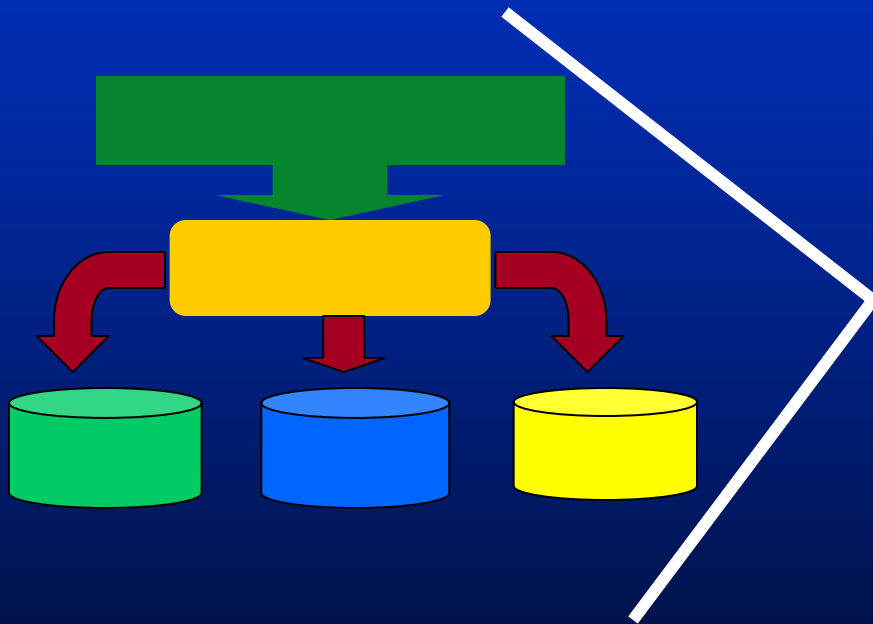
OBJECTIVES

5. Identify needed educational materials, developing those materials in distance based delivery methods



S-1007

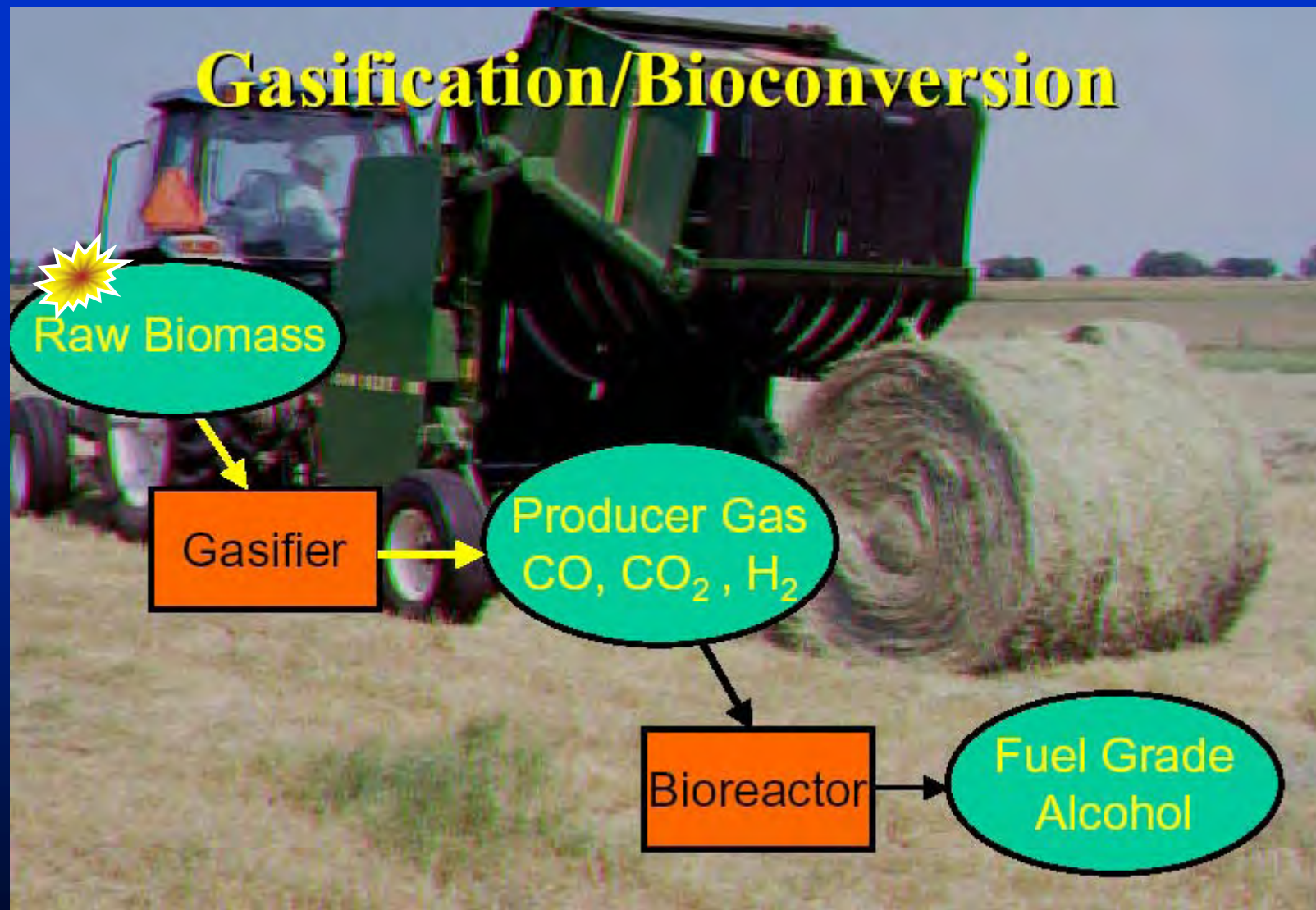
OBJECTIVES



5. Identify needed educational materials, developing those materials in distance based delivery methods and developing a trained work force to support a biobased products industry

Example Project Emphasis
Lead By
S-1007 Representatives From
Oklahoma
GRASSohol

Gasification/Bioconversion



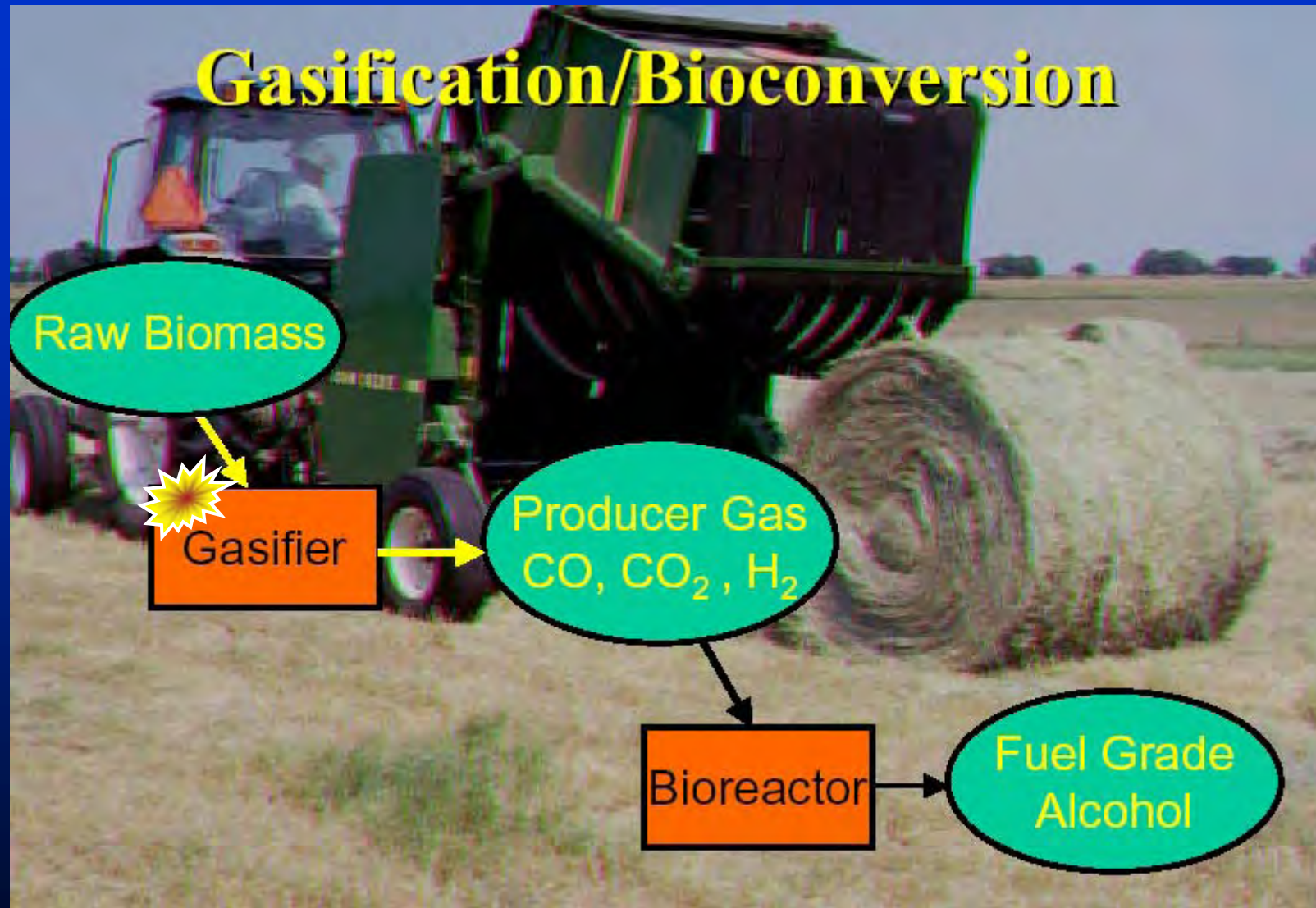
Switchgrass



Composition %					
C	H	N	O	Ash	Moisture
44.9	5.71	0.88	48.51	2.83	13



Gasification/Bioconversion



Gas Composition

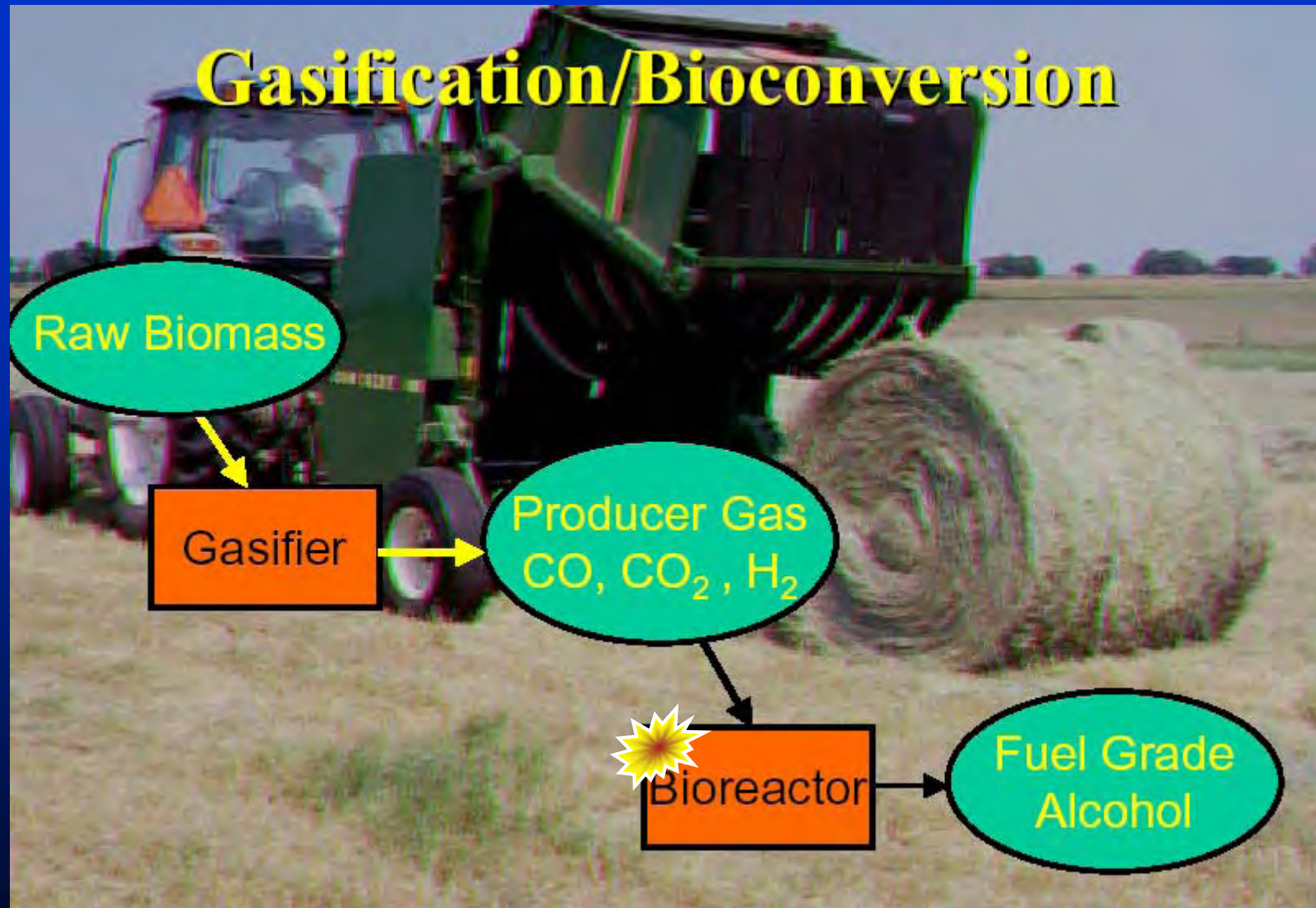
CO: 15 - 20%

CO₂: 10 - 20%

H₂: 5 - 10%

CH₄: 3 - 10%

Gasification/Bioconversion



BIOREACTOR

{Unique Organism}

P7 (*Clostridium carboxidovorans*)



- Isolated in anaerobic dairy lagoon
- Gram-positive, motile, rod-shaped bacterium
- Anaerobic
- Autotrophic (grows on CO/CO₂ as carbon source)
- Novel

BIOREACTOR

P7 (*Clostridium carboxidovorans*)

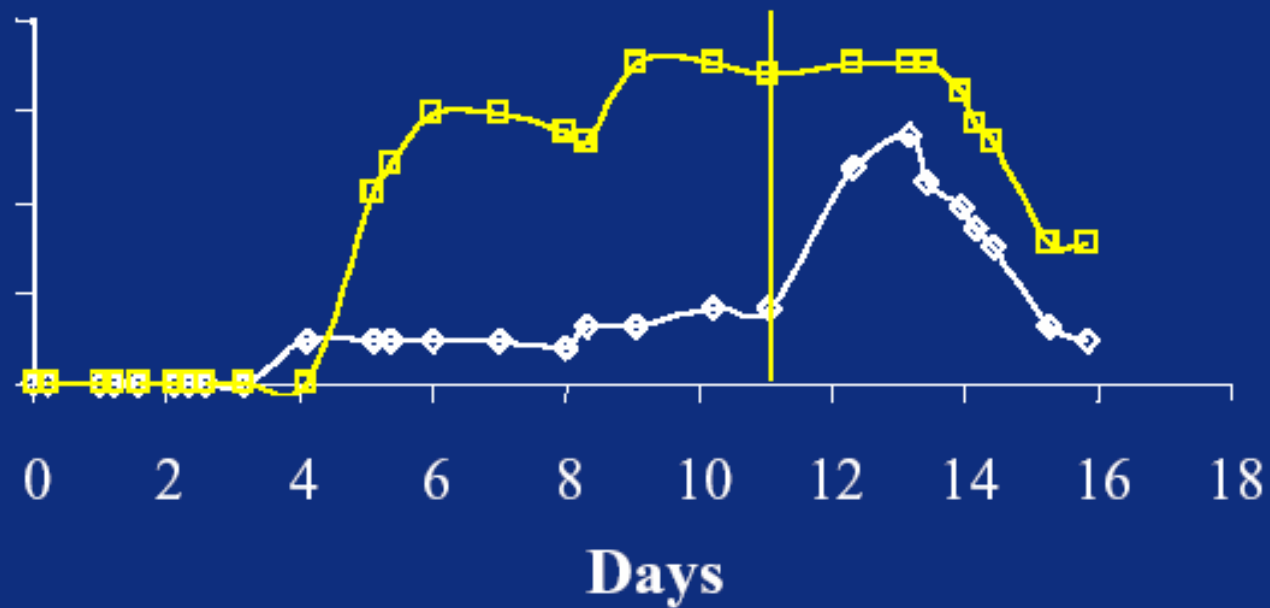


- Isolated in anaerobic dairy lagoon
- Gram-positive, motile, rod-shaped bacterium
- Anaerobic
- Autotrophic (grows on CO/CO₂ as carbon source)
- Novel

- P7 Is A Strong Organism For Syngas Fermentations
 - Robust
 - Oxygen Tolerant
 - Stable

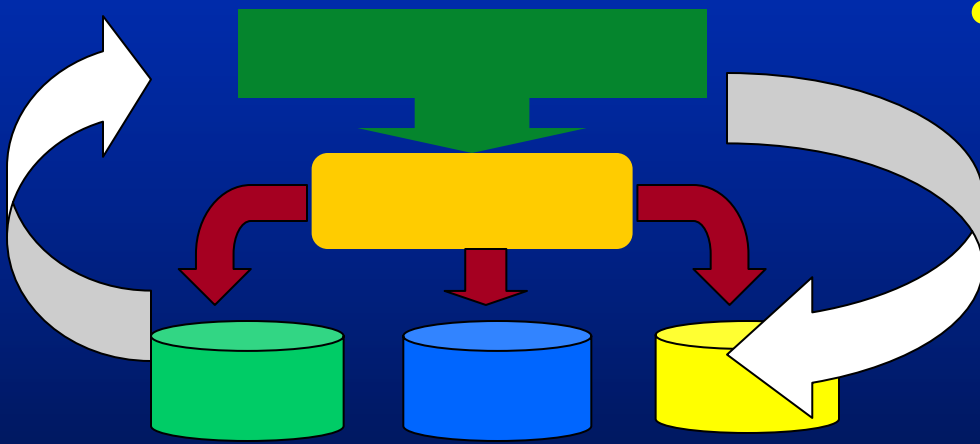
Product profiles

—◇— Ethanol —□— Butanol

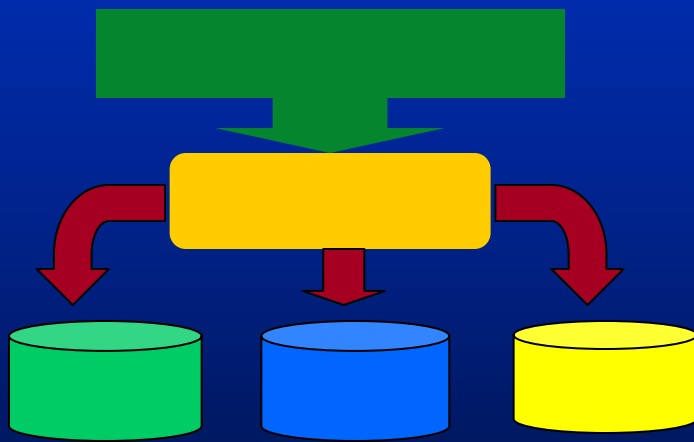


S-1007 BENEFITS

- Communications

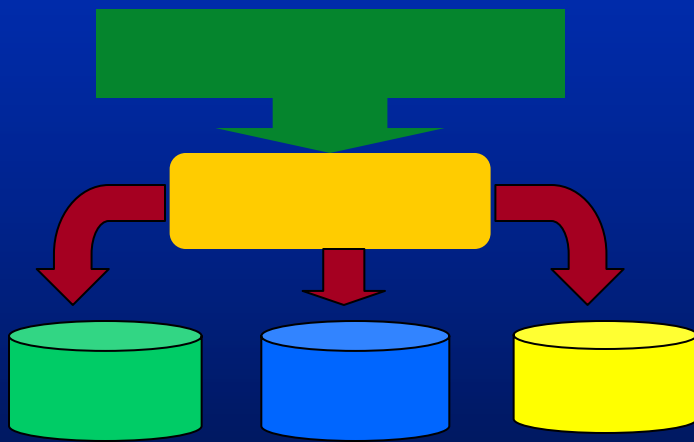


S-1007 BENEFITS



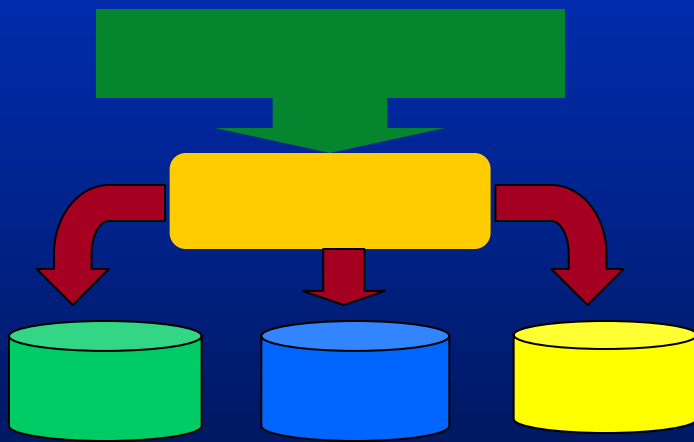
- Communications
- Collaboration
 - 12 collaborative proposals in 2005-2006
 - ~ 30 publications each year

S-1007 BENEFITS



- Communications
- Collaboration
- Resource for Biomass Expertise

S-1007 BENEFITS



- Communications
- Collaboration
- Resource for Biomass Expertise
 - Team Members Called On For Site Visit & Evaluation Of 27 USDA/DOE Biomass R&D Projects In FY 03 & 04

S-1007 Is In Its Fifth And Final Year

Development Of A Replacement Project Is Underway

New Project Will Continue In the
Same Vein As S-1007

Attendees At This Conference
Have Interests In Common
With Many S-1007
Participants

Check With Me If You Would Like
To Become A Participant As The
Replacement Project Is
Established

Dr. Roland Mote, Associate Dean

- Agricultural Experiment Station
- University of Tennessee
- 103 Morgan Hall
- 2621 Morgan Circle
- Knoxville, TN 37996

- cmote@utk.edu