WHITE TECHNOLOGY

Presentation for:

USDA & DOE

Biomass Research & Development
Technical Advisory Committee

CONVERTING SOLAR ENERGY TO BIOENERGY

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WHITE TECHNOLOGY

PROVIDING RENEWABLE ENERGY OPPORTUNITIES

CAPABILITIES

- LABORATORY PLANT PRODUCTION
- GREENHOUSE NURSERY PLANT PREPARATION
- FARM SERVICES
  - Permit
  - Soil Testing & Site Preparation
  - Planting
  - Crop Monitoring
  - Harvest Services
  - Transportation to Biomass Facility

WHITE TECHNOLOGY

UNIVERSITY OF SOUTH CAROLINA

Exclusive License

Patented Micropropagation Technology Process

Dr. Laszlo Marton

Dr. Mihaly Czako

- Trigger & Utilize Regenerative Nature of Plants
- Produce Millions of Plants for Large Scale Farming of Biomass
- Most Viable Alternative to Intensive Rhizome Planting

PROCESS

PLANT PRODUCTION LAB

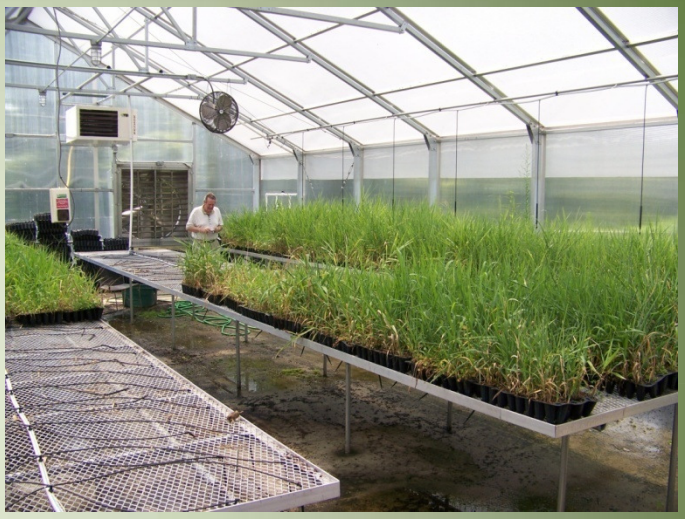
GROWTH CHAMBER

NURSERY

GREENHOUSE & PLANTING PROCESS

Greenhouse:

- Transfer from laboratory growth tube into greenhouse flat
- Controlled environment



Planting Process:

- Planting Giant Reed plantlets is similar to planting tomatoes
- Specialized planter and handling system
- Seven person planter crew
- Mechanical planting of Giant Reed plantlet
- Planting intervals set at 40” with a 30” row spacing

HARVESTING & TRANSPORTATION

- Commercial harvester “chopper” with silage head
- Variable cut product chopper control
- Cut material transferred into bulk trailer through discharge chute or baled.
- Round or rectangular bales for storage and/or transfer

THE IDEAL BIOENERGY CROP

- High yielding both in field volume and BTU
- C3 Photosynthetic pathway traits
- Tolerates a wide variety of ecological conditions
- Reduces emissions from planting, tillage and other crop applications – herbicide or pesticides
- Produces no viable seed, pollen or runners by which to spread

- Eliminates need for using land primarily used for food crops
- Carbon neutral when used as a biomass material
- Giant Reed serves as a carbon sink and phytoreactor breaking down soil pollutants

ENERGY CROP COMPARISON

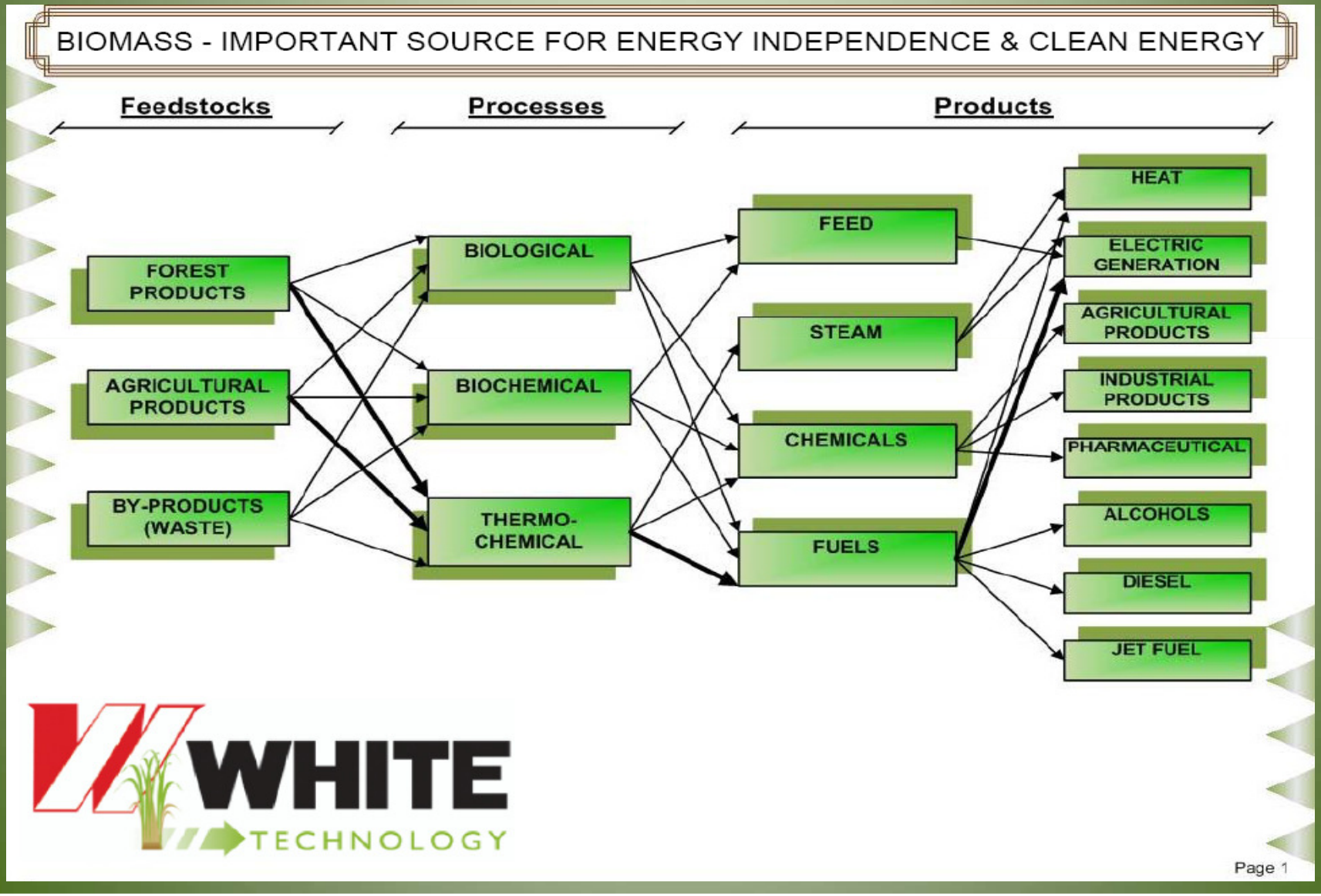
Giant Reed	Miscanthus	Energy Cane	Switch Grass
Sterile, Seedless Grass	Sterile, Non-viable Seed	No one Single Plant Version	Seed Producer, may spread
20-25 dry ton yield/yr	8-16 dry ton yield/yr	15-25 dry ton yield/yr	3-8 dry ton yield/yr
8000-8400 btu/lb	7300-7500 btu/lb	7000-7300 btu/lb	7000-7300 btu/lb
Low Fertilizer need	Low Fertilizer need		Large Fertilizer Need
No net CO2 emission	No net CO2 emission	0-25% CO2 emission	
Grows on Marginal Land	Grows on Marginal Land	Tropical & Sub Tropical Land	Grows in Most Soils
20-25 Year Crop	10-15 Year Crop	6-15 Year Crop	8-10 Year Crop
No Pollen Produced	Potentially Allergic	Potentially Allergic	Potentially Allergic
Endophyte Enhanced		Needs Insecticides	Large Herbicide Need
Higher Stress Tolerance			
Higher Field Persistence			
Low-Budget, Low Maintenance			

"High dry matter, carbon and cellulose yields per unit land area, from low input cropping systems are the major criteria for an economic biomass crop"—Evaluation of Giant Reed at Barmera, SA, South Australian R & D Institute, Adelaide, September 2007.

COMPETITIVE COST OF GIANT REED

Energy Fuel	BTU / LB	COST / DELIVERED TON / RANGE	COSTS PER MMBtu / RANGE
Giant Reed	8,000-8,400 / lb	$ 35- $45 / Bone Dry Ton	$ 2.08 - $2.81
Hogged Wood	8,000-8,400 / lb	$20 - $30 / 45% Wet Ton	$2.16 - $3.41
Coal	10,500 – 12,500 / lb	$75-$95/ton	$3.00 - $4.52
Natural Gas:		THERM	$5.00 - $10.00+

GIANT REED FOR ENERGY INDEPENDENCE & CLEAN ENERGY



CHALLENGES

- MASS PRODUCTION OF PLANTLETS
- TRANSPORT OF LOW DENSITY MATERIAL
- PERCEIVED INVASIVENESS
  - CURRENTLY CONSIDERED A NOXIOUS WEED :
  - TEXAS – CALIFORNIA – NEVADA

    (Source: USDA'S Natural Resources Conservation Service)
  - NO MANAGEMENT OF THE PLANTING BY MAN
- SUPPORT AT NATIONAL LEVEL

OPPORTUNITIES

- USDA & DOE SUPPORT ACTIVITIES TO ACHIEVE BENEFITS

- BIOENERGY FACILITIES WILL REQUIRE BIOMASS
  - Sustainable Source of new biomass that does not compete with food or existing industry
  - JOBS to produce, farm, harvest and deliver the biomass
  - JOBS to build the machinery and infrastructure

- AGRICULTURAL BIOMASS PROVIDES NEW INVESTMENT
  - Sustainable Source of Domestically Produced Clean Energy
  - JOBS in the USA
  - DOLLARS for Energy in the USA
  - MILLIONS OF NON-FOOD CROP ACREAGE AVAILABLE

- BCAP II – FARM SUBSIDY – RURAL DEVELOPMENT – NATIONAL POLICY (LONG TERM SUPPORT PROGRAMS)

- **ADOPT PROGRAMS TO PROMOTE & SUPPORT**