



Center for Renewable and
Alternative Fuel Technologies

Kentucky's Cellulosic Bio-fuels Project



Additional Partners



Program Objective

- Develop a commercial algal-oil Industry in Kentucky
 - ❖ Biomass primary nutrient
 - ❖ 50 mile radius from Winchester
 - ❖ 50 M gal algal-oil/year
 - ❖ Process to diesel in Irvine
- Replicate throughout Commonwealth
 - ❖ 6-8 Potential Facilities
 - ❖ Different Biomass Sources dependent on location



Winchester Industrial Park

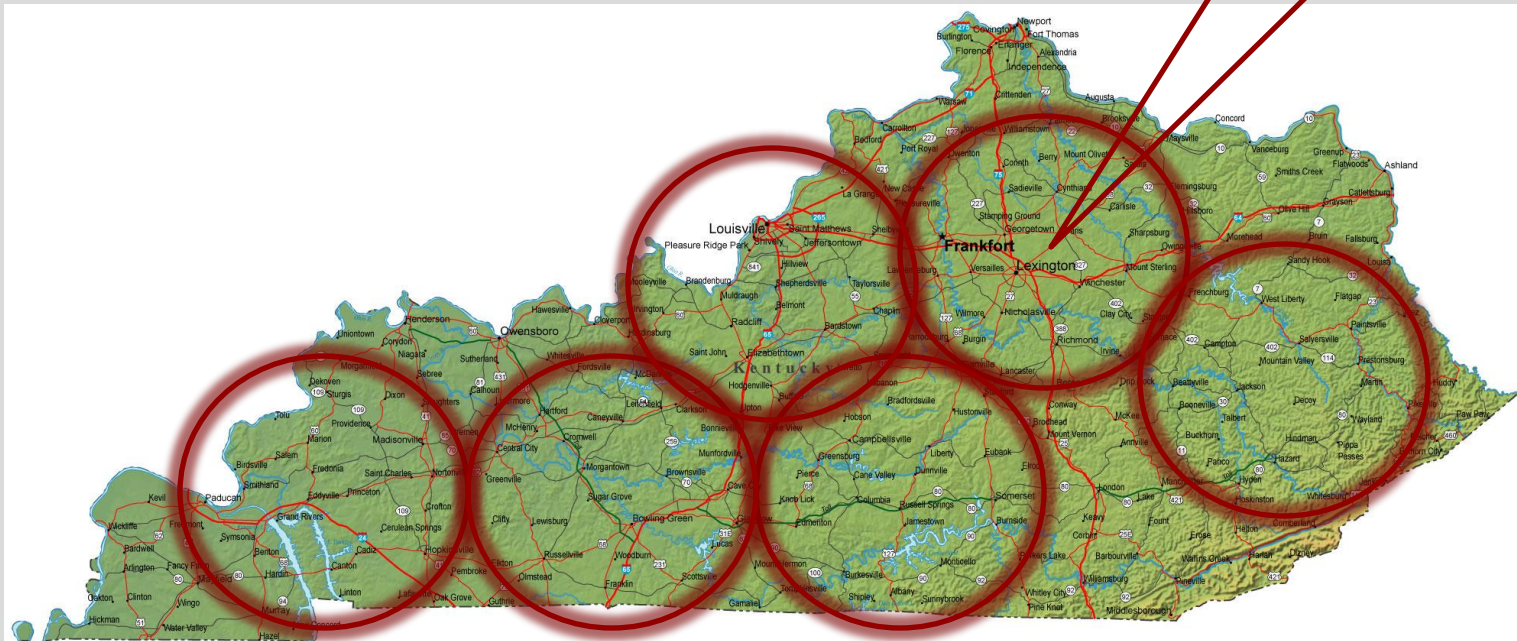


Potential Biofuels Pilot Plant



Kentucky Biofuels Opportunities

**Initial Plant in
Winchester**



**Biomass from a
50 mile radius**

**Each Plant Produces
50 M gal/year**

Years 1-5

Years 5-10

10 Years

Research & Development

- Phase I A, B, C
- Engineering
- Biomass
- Economics
- Saccharification
- Algae Growth
- Extraction
- Co-Products
- Environmental Impacts

Pilot Plant

- Phase II
- 2 M gal/year

Commercial Facility

- Phase III
- 50 M gal/year
- Private Investment

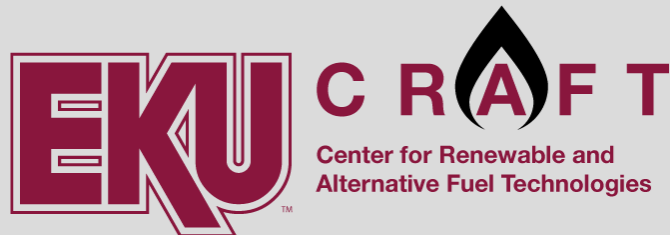
Research & Development Approved Projects Phase I-A

- Federal FY09 Appropriation through DLA
 - ❖ ECU – \$1.5 M
 - ❖ GA – \$2.1 M
 - ❖ 3 Years



Research & Development Approved Projects Phase I-A

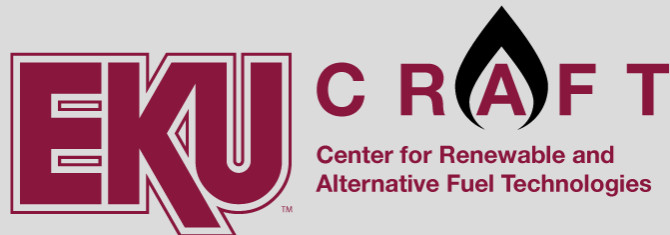
- State Funding to ECU
 - ❖ Appalachian Regional Commission
 - \$350 K
 - 2 Years
 - ❖ Ag Development Funds
 - \$220 K
 - 2 Years



Pending Projects

Phases I-B & C

- Federal Appropriation
 - ❖ \$2.4 M
 - ❖ Defense Appropriation – Dec. 2009
- DoD – Equipment Grant
 - ❖ ECU - \$446 K
 - ❖ March 2010 Notification



Current DLA Project

➤ General Atomics

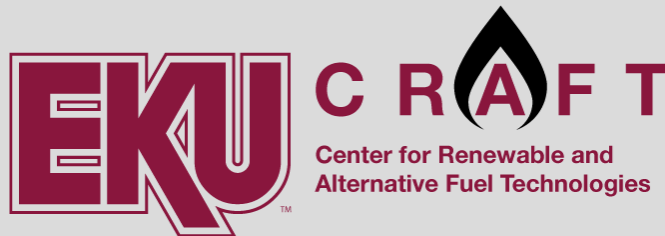
- ❖ Preliminary Engineering
- ❖ Pre-Conceptual and Conceptual Design
- ❖ Saccharification of Biomass
- ❖ Algae selection & growth
- ❖ Oil Extraction



Current DLA Project

➤ EKU

- ❖ Economic Analysis
- ❖ Biomass Survey
- ❖ Saccharification and Rapid Assay of Biomass
- ❖ Co-Product Utilization
- ❖ Environmental Impacts



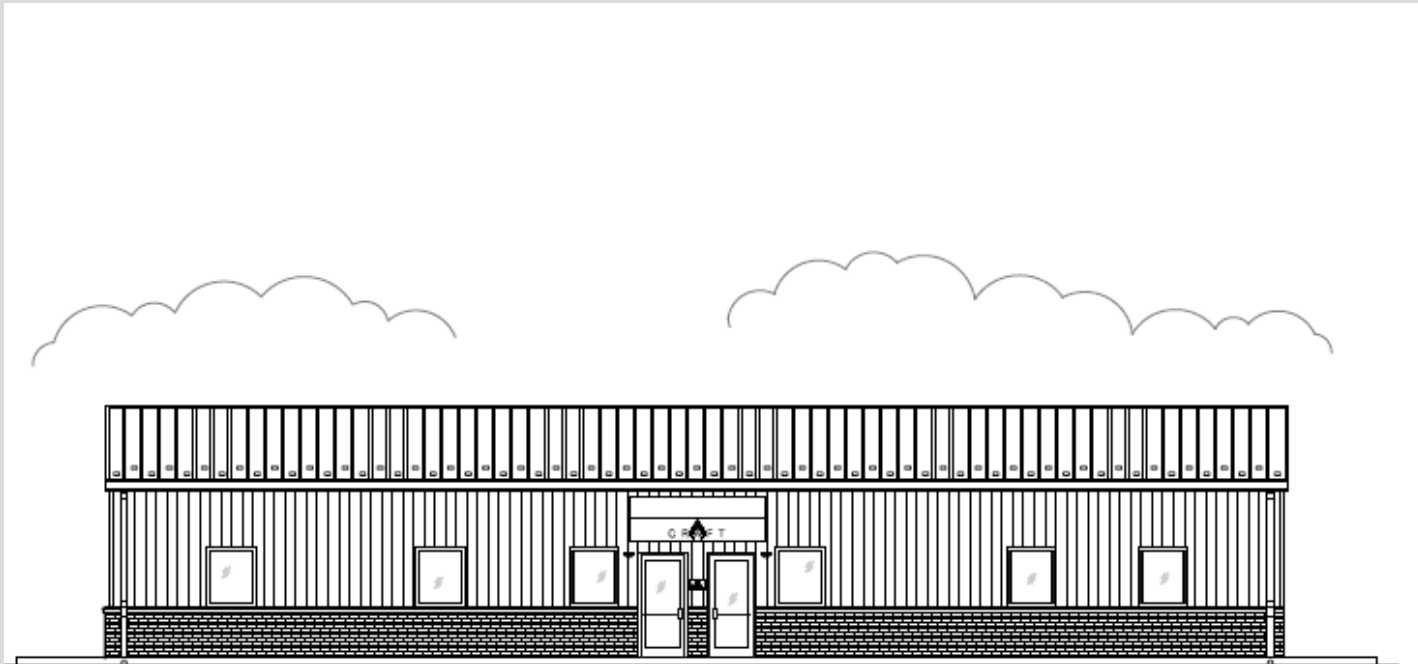
Initial EKV Research

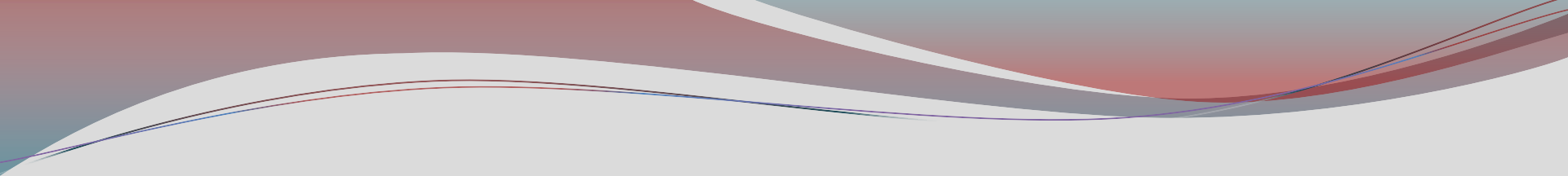
- Economic Analysis – Dr. Frank O’Connor
 - ❖ Economic Impact of Commercial Facility
 - ❖ 3 Reports that focus on Cost of Biomass Production
- Biomass Survey
 - ❖ Dr. Don Llewellyn
 - ❖ Gary Selby - undergraduate



CRAFT Research Building

July 1, 2010





“We will harness the sun and the winds and the soil to fuel our cars and run our factories. And we will transform our schools and colleges and universities to meet the demands of a new age.”

President Obama – 2009 Inaugural Address