

African Power Initiative

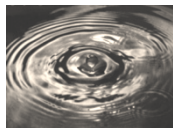
Combining the Energy of Human Hope With a New Greener Economy



**GREEN CHEMISTRY AND
SUSTAINABLE BIODIESEL
ENTERPRISE IN EAST AFRICA**

OUTLINE

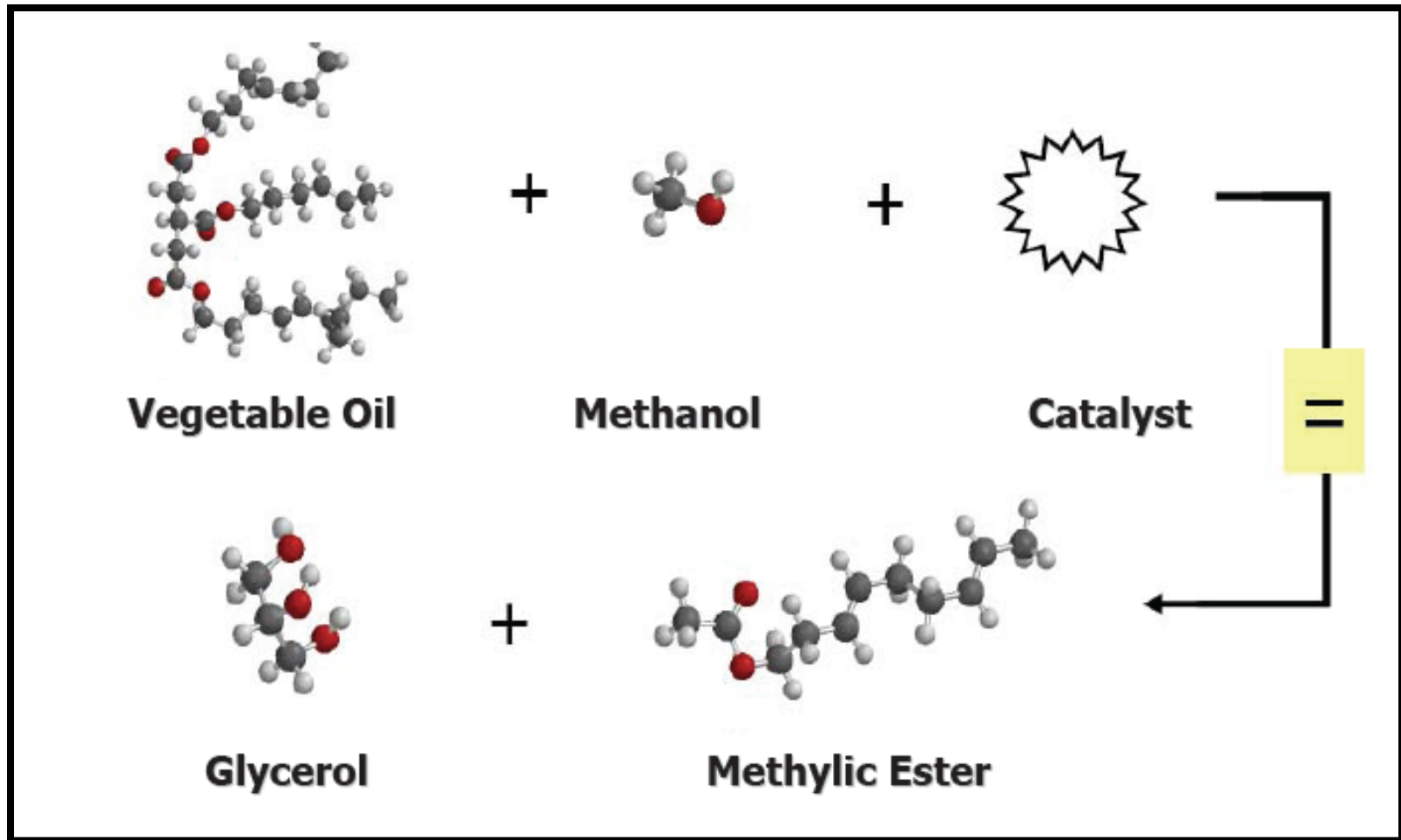
- Business strategy of African Power Initiative
- My role this summer, during start-up phase
- Biodiesel life-cycle considerations
- Future research



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BIODIESEL PRODUCTION OVERVIEW

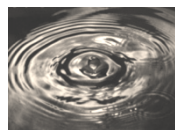


MISSION OF AFRICAN POWER INITIATIVE



By generating electric power and fuel through renewable sources, we contribute to sustainable development and the improvement of the human and environmental condition across Africa.

Initial Launch: Uganda

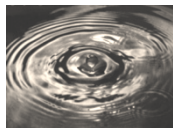


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RATIONALE

- Need secure fuel & electricity supply
- Low-cost:
 - Available arable land
 - Ample agricultural labor
- Mandates for biofuels
- Excess biomass is efficiently utilized
- Create jobs & economic development and support public health and education programs

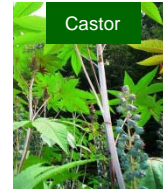


GEOGRAPHIC OVERVIEW:

Target Multiple East-African Countries With Diverse Non-Food Feedstock Crops



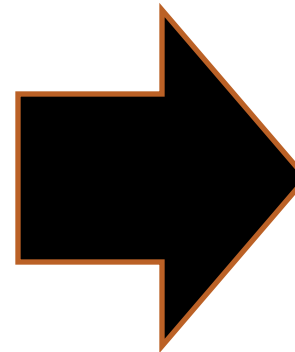
AFRICA



Castor



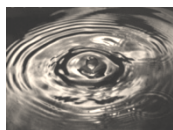
Jatropha



Candle Nut

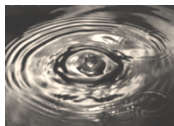


Simaruba



GEOGRAPHIC OVERVIEW:

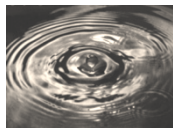
- Management and Industry in Kampala
- Initial plantation in Karamoja
- Agricultural Research in Kasese



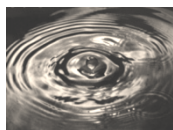
MAY TO AUGUST 2008: DREW'S RESPONSIBILITIES AT API



- Establish a research laboratory
- API's Environmental Impact Assessment
- Build a research team
- Life-Cycle Assessment to generate research ideas and questions



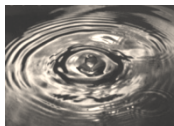
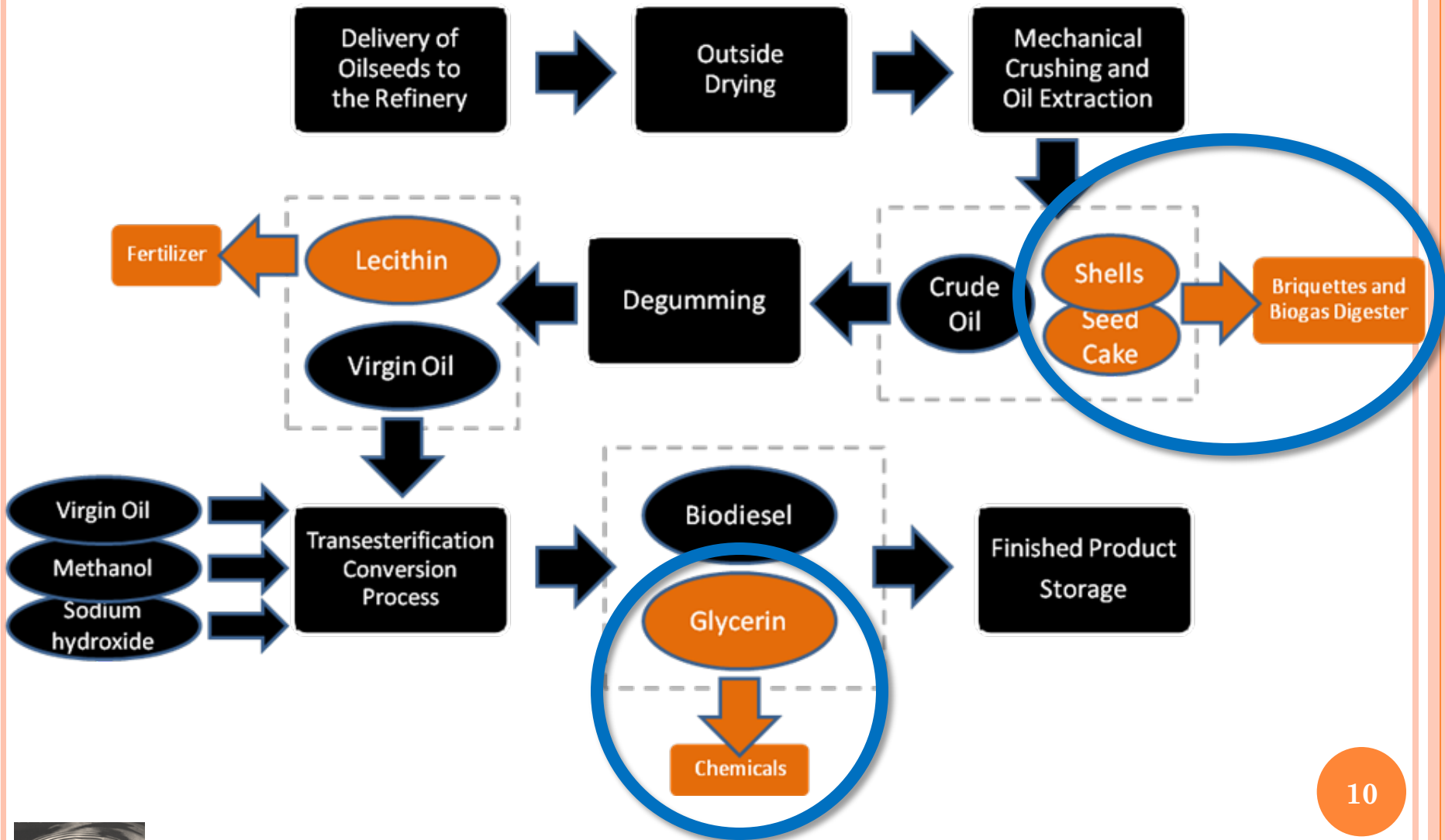
BUILDING API'S SCIENCE RESEARCH TEAM



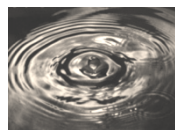
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BIODIESEL LIFE-CYCLE PROCESS FLOW



EFFECTIVE UTILIZATION OF BIOMASS

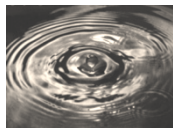


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BIOMASS → BRIQUETTES

- Inputs:
 - Shells or other agricultural residue with high lignin
 - “Binder,” such as molasses or banana peel
- Carbonize
 - powder [+ binder]
 - extrude → cut blocks
- Undercuts the value of lignin

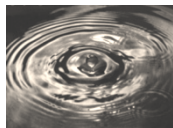


FUTURE RESEARCH

- API's launch in Dec.
- Senior Project:
Extract and Characterize
Technical Lignin from
Candlenut Shells

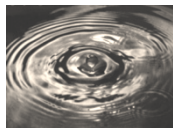
Prospective Applications to
Materials Industry

Toward an Integrated
Bio-Refinery



THANK YOU!

- Dr. Evan Beach and Professor Paul Anastas
- Alan S. Tetelman 1958 Fellowship and Class of 1964 Environmental Fellowship
- Saybrook College Mellon Research Grant
- Marcos Bitew and Catherine Nampijja
- Professor Steven Nyanzi
- API Research Team



QUESTIONS?

