



RENEWABLE ENERGY AND BUSINESS

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BIZTECH

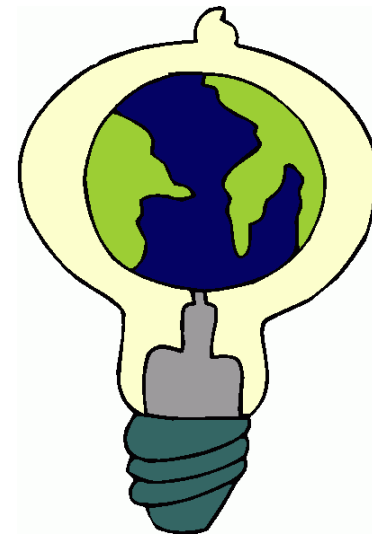
WHO AM I?

- Chemical Engineer with BS from Georgia Tech and MS from NC State University
- Enforcement officer in the NC Division of Air Quality
- Clean Transportation Program Coordinator at NC State Solar Center
- NOW - Director of the Renewable Energy Outreach (REO) program at the business incubator BizTech, Huntsville AL



WHAT IS A RENEWABLE ENERGY BUSINESS?

- A business who makes or helps develop an energy product that comes from a *renewable* source (not finite)
- Renewable Energy examples
 - Bio-fuels
 - Solar panels or solar heat collectors
 - Wind turbines
 - Hydroelectric
 - Hydrogen
 - Biomass



CURRENT ENERGY SOURCES

- Two main energy needs

- ELECTRICITY - for home and office that is coming from Coal, nuclear, natural gas
- TRANSPORTATION - that is coming from Petroleum based gas or diesel



PROBLEMS WITH CURRENT SOURCES

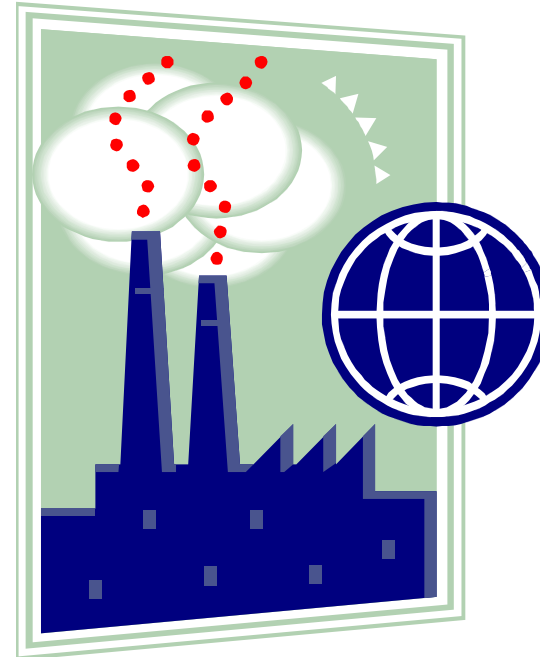
- Coal
 - Burning coal emits harmful pollutants such as NO_x , SO_x , CO_2 , VOC, toxins, and PM
 - Excavating coal is detrimental to the landscape
- Nuclear
 - Although clean burning, the residual waste is toxic and disposal is difficult
- Petroleum
 - Limited availability and foreign import
 - Harmful emissions such as CO_2 , PM, NO_x , CO, VOC

Ozone is created when sunlight is mixed with VOC and NO_x . Smog is a brown haze that is mainly made of ozone.



HOW OZONE HURTS

- Ground level ozone negative health effects
 - Asthma Attacks
 - Chest pain
 - Wheezing and coughing
 - Shortness of breath
 - Inflammation of lungs and airways
- **Huntsville and Birmingham will exceed new ozone standard**
- **1.4 million people in Alabama are already suffering with chronic diseases aggravated by ozone**



PARTICULATE MATTER POLLUTION

- “Fine particulate matter” consists of very small particles that come from a variety of natural and human-produced sources (PM_{10} $PM_{2.5}$)
- Multiple studies show direct correlation between exposure to particulates and increases in asthma attacks and hospitalization rates



PM monitor set up after Katrina

Jefferson county does not meet EPA standards for PM levels. Birmingham is 4th most polluted city in US in terms of PM



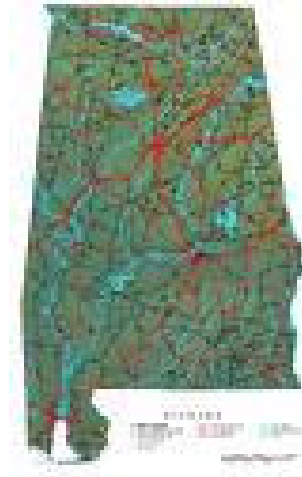
SMOG AND PM ISSUE IN BIRMINGHAM

- EPA used this picture in 1972 to showcase pollution issues and health concerns →
- Picture of Birmingham with Sloss Furnace (iron) in back ↓



ALABAMA AIR QUALITY ISSUES

1. Tightening of air quality standards
2. Lots of heavy industry and coal-fired utilities
3. Emissions from forest management and wood-burning
4. High vehicle miles per capita
5. **Topology in North Alabama**
6. Climatology: Stagnations



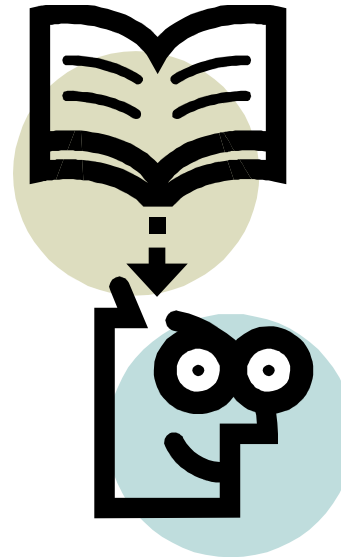
POSITIVE STEPS FORWARD

1. Reduce energy consumption
2. Reduce imports of foreign energy commodities
3. Create sustainable energy sources for both stationary and mobile uses that reduce air pollution
4. Encourage local Energy business growth and entrepreneurs



COMMON NEED

- Convenient source of useful information
- Outreach and education
- Readily available useable material
 - Website
 - Factsheets
 - Presentations
- Local consultation



ENTREPRENEURSHIP

- ◉ Jobs! 5-15% of U.S. firms create 60% of net new jobs.
- ◉ Innovation. Entrepreneurs account for more than half of all technological innovation.
- ◉ Prosperity. 1/3 of difference in national growth rates is due to entrepreneurship
- ◉ Presence. 11% of US adult population is trying to start a business



BUSINESS INCUBATORS

- BizTech is an incubator for the **Huntsville/Madison County area**



- BizTech's mission:
 - Increase the number of successful technology-based companies originating in, developing in, and relocating to Huntsville-Madison County, Alabama.
 - Give access to mentors, group experiences, training, shared space, professional assistance, and capital that will move them onto the fast track to success
 - www.biztech.org



BUSINESS INCUBATORS

- SEC - Shoals Entrepreneurial Center is an incubator for the Shoals Region (Florence)
- Offer a structured program to help your business succeed.
 - Help you develop your business plan
 - Conduct regular reviews
 - Connect with people who "have been there and done that."
 - Match you with the right professionals—accountants, attorneys, bankers, investors, educators, commercial realtors
 - www.shoalsec.com



THE INCUBATION ADVANTAGE

- BizTech and SEC can:
 - Put clients in touch with experienced entrepreneurs and advisors
 - Give an “instant office” setting that can be expanded and contracted
 - Facilitate a group experience in the incubator facility
 - Facilitate access to capital
 - Furnish in-house consulting
 - Control overhead
 - House collaborations with other start-up companies



INCUBATION ADVANTAGE

- ◉ In addition to services, incubators can create programs to address specific issues
- ◉ These initiatives are usually supported by grants (federal and state)
- ◉ Non-profit status of BizTech helps create collaborative atmosphere for initiatives
- ◉ **REO** is an example of one such program



WHAT IS REO?



- REO program is presently funded by:
 - Appalachian Region Council (ARC)
 - Workforce Innovation in Regional Development (WIRED) program from Dept of Labor
 - Alabama Dept of Economic and Community Affairs (ADECA)
- REO is established to provide education and outreach to potential and existing renewable energy businesses

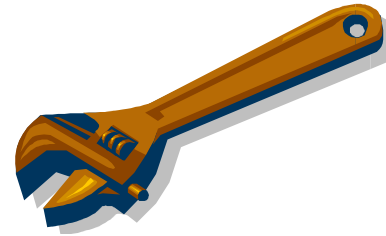


HOW DOES REO HELP?

- We look for Renewable Energy entrepreneurs
- Provide them basic information via REO website, factsheets, consultation, forums
- Inform them of our incubation services at BizTech or SEC
- Evaluate their business potential
- and when possible...Help them find investors to build their idea



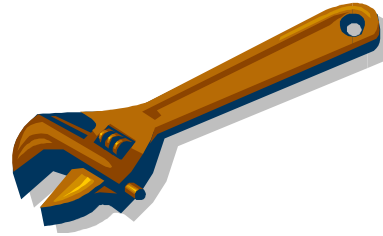
REO TOOLS



- Partner with organizations in the territory that have contact with businesses and/or individuals with an interest in renewables
 - Chambers of Commerce
 - Colleges and Universities
 - Council of Governments
 - TVA
 - USDA
 - NREL
 - Clean Energy Alliance (incubator group)



REO TOOLS



- Conduct informative seminars for those considering entering the industry at various locations in the project territory
 - 1st seminar in Florence - January 2009
 - 2nd seminar in Huntsville/Madison - March 2009
- One-on-one follow-up visits with seminar attendees identified as serious prospects
- Make outreach materials available such as brochures, factsheets, and presentations for conferences and others
- Web site (www.biztech.org/REO)



IDEAS THAT HAVE WORKED...

Ideas you can try.



RENEWABLE CONCEPTS

- Solar Energy
 - Photovoltaic
 - Solar Thermal
- Geothermal -Using Earth's natural heat
- Combined Heat and Power
- Hydrogen Technologies
 - Fuel Cells
 - Hydrogen hybrid fuels
- Biomass - electricity and fuel
 - Pyrolysis
 - Enzyme



COLLECTING METHANE

- Methane is an off-gas from decay of any organic material
- Some potential sources
 - Pig and Chicken farms
 - Waste water treatment
 - Landfills
- Methane is a greenhouse gas and harmful in the environment, but can be a great energy source, like natural gas
- City of Memphis is collecting 8 mega watts of methane gas from wastewater treatment facility



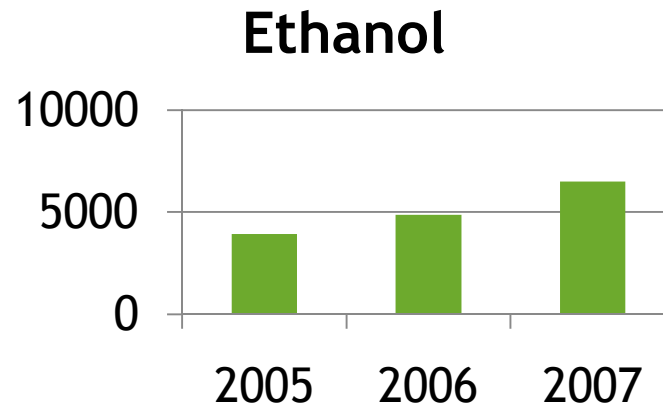
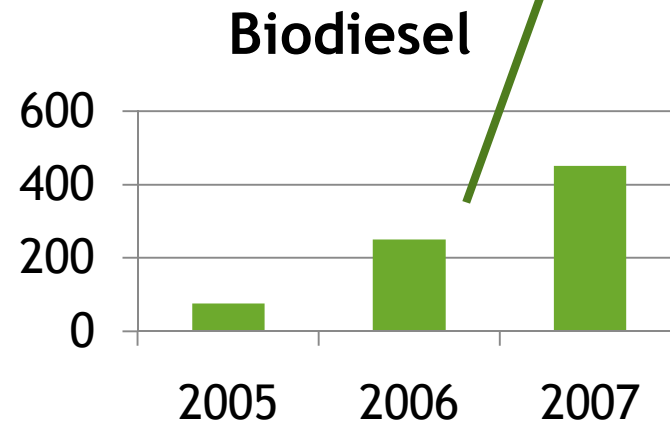
BIOFUEL SUCCESS

○ Biodiesel in US

- 75 million gallons (2005)
- 250 million gallons (2006)
- 450 million gallons (2007)

○ Ethanol in US

- 3,904 million gallons (2005)
- 4,855 million gallons (2006)
- 6,500 million gallons (2007)



CROPS TO MAKE BIODIESEL

- Rape (canola) -
- Linseed
- Field mustard
- Sunflower
- Safflower
- Castor oil
- Olive
- Peanut (groundnut)
- Algae
- Soy



Canola Field in Northern Alabama



CROPS TO MAKE ETHANOL OR ENERGY

- **Cereals** (grain for ethanol straw for solid fuel)
 - Barley
 - Wheat
 - Oat
 - Rye
- **Starch** (ethanol produced by fermentation)
 - Potato
 - Sugar beet
 - Jerusalem artichoke
 - Sugarcane

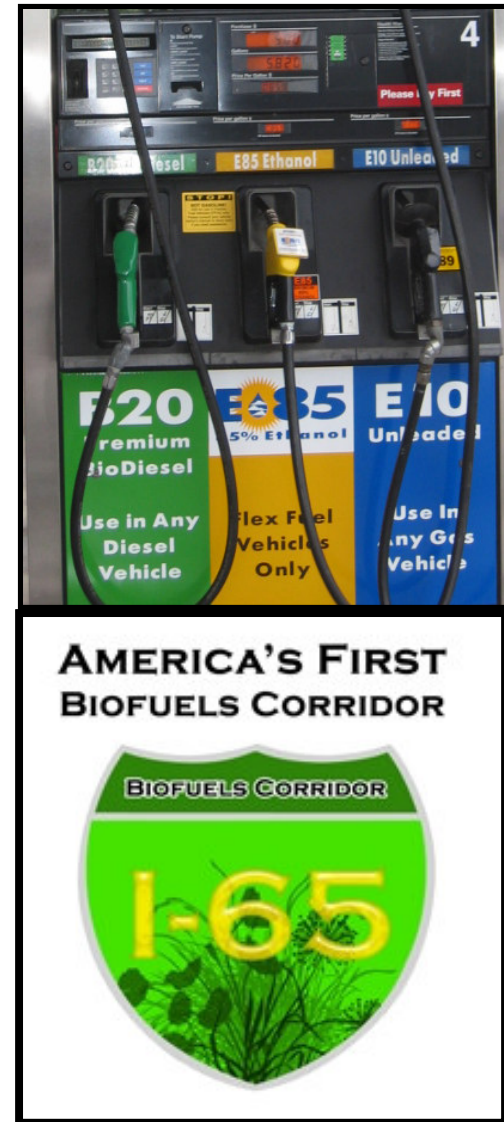


- **Grasses and others** (used whole to make methanol)
 - Switchgrass
 - Shorgum
 - Kenaf
 - Prickly pear
 - Whole crop maize
 - Hemp



BIOFUEL IN AL

- 14 Ethanol stations
- 32 Biodiesel stations
- ADECA and ACFC have grant to put 11 biofuel pumps on I-65
- Local Biodiesel manufacturers such as North Alabama Biodiesel



GOVERNMENT FUNDING...

America's Recovery and
Reinvestment Act (ARRA)



GRANTS.GOV

- List of current solicitation
- Search on www.grants.gov using
 - A. Agency that is posting grant
 - B. Key word from title
- Must be registered with grants.gov
- Must be eligible according to solicitation
- Ask the contact person (after reading the solicitation) any questions you have
- Look for partners to apply with



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