Opportunities in North Carolina for Producing Woody Biomass for Energy on Liability, Marginal, and Non-productive Lands

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The Push for Renewable Energy Continues Worldwide

- Most of the important development policy driven
Examples of Policies That Encourage Biomass for North Carolina

• Long-standing ethanol subsidies (U.S.)
• Renewable Fuels Standard of 2007 (U.S.)
• Interests of the US Military
• Senate Bill 3 from 2007 (the REPS) – (North Carolina)
• The Biofuels Center of NC
• 20-20-20* (EU)

In Response, Biomass Energy in North Carolina is Rapidly Developing

- Three private electricity (power) plants have converted to woody biomass
- New biomass power plants planned
- Various-scale CHP conversions completed or underway using woody biomass and agricultural residues
- Wood pellet plants being constructed or planned for EU power markets
- Cellulosic ethanol plant
Much Pushback to Some Aspects of Biomass in NC as Elsewhere

• Much publicized “food versus fuels” issue with corn ethanol

• Concerns about loss of ecosystem services due to over-gleaning forest biomass
  – Biomass Harvesting Guidelines (BHGs) being discussed as in many states

• Concerns about pressure to convert natural forests to managed plantations
Many Do Not Want to See This!
Where Can We Grow These Crops?

- “Liability Lands”
  - Contaminated sites
  - Lands receiving municipal waste treatment effluent or biosolids
  - Land fills
  - Highway right of ways
  - Airport properties
  - Power transmission line right of ways

- “Marginal” crop lands
  - Cleared agricultural lands that will not produce conventional crops profitably
Wastewater Land Application Facilities

- 0 - 50 Ha
- 51 - 100 Ha
- 101 - 200 Ha
- 944 Ha
Swine Lagoons NC Total (2003): ~ 4100
Neuse River Basin (2003): ~ 850
Note: Open Lagoons, Active/Non-Active
Phyto Sites (ex. Lindane was with Buried Here - Gamma-Hexachlorocyclohexane)
Highway Right of Ways in North Carolina
Most SRWCs in the Ground Today are Phytoremediation Projects?
PHYTOREMEDIATION
Using Nature to Clean Itself Up

From 1942 until 1991, the surrounding area was used as a landfill for chemical waste. The landfill consisted of multiple underground and aboveground storage tanks which were decommissioned and removed from the site. Evidence of a leak was discovered during the tank removal activities, resulting in impacts on subsurface soils and groundwater by petroleum hydrocarbons.

Phytoremediation was the selected method to control and contain contaminated groundwater migration and to remediate contamined soil and groundwater. Phytoremediation is an innovative and cost-effective technology for an agricultural and non-agricultural setting. The primary goal of phytoremediation is to remove, dehydrate, or stabilize environmental contamination on site and in area groundwater.

The use of phytoremediation was designed to remediate and, in some cases, remediate shallow groundwater plumes.

The plants can reach and extract groundwater, allowing groundwater flow patterns by preventing water uptake by the plants and reducing microbial activity in the root zone. The result of using the plants to be phytoremediated is a reduced soil concentration, herbicide control, and enhanced phytoremediation.

Both poplar and willow trees have been planted across the site to remediate subsurface soils and groundwater. The use of both poplar and willow trees within a phytoremediation plot can capture the favorable phytoremediation potential caused by each species.

The phytoremediation project is being performed in a combined effort with the United States Coast Guard, NCDENR, North Carolina Department of Transportation, and North Carolina State University.

[Logos for NCDENR, NC State University, and USGS]
However, In NC We May Be on the Verge of SRWCs for Energy
Cellulosic Transportation Fuels

- Is the technology that will be judged by “food vs. fuels”
- In the U.S. is the technology that will be most subsidized to facilitate development
- Not many other renewable alternatives

(slide borrowed from Alex Hobbs)
August Announcement in Eastern North Carolina

- Italian biofuels company announces new cellulosic ethanol plant to be constructed
- “The project, deemed ‘Project Alpha,’ plans to use dedicated non-food “energy grass” feedstock crops, which can be grown on low-value and marginal land…”

*ClintonNC.com (August 30, 2012)
Lots of Questions About Building an Industry on Non-Traditional Forest Feedstocks on Those Produced On Non-Food Lands

• How many parcels will be large enough to present an economic opportunity?
• Is there enough potential anywhere to support a biofuels plant without transporting feedstocks excessive distances?
• Will these lands have reasonable productivity?
• Will landowners be interested?
Some Voices of Negativity!

• “We need to grow wildflowers along our highways – people donate money.” (NC DOT)

• “Well, don’t forget. Marginal crop land is called ‘marginal’ for a reason! (NCSU Ag Prof)

• “All we care about is keeping the Division of Water Quality off our back.” (Municipal waste plant manager)
For more information

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• For woody biomass see:
  – http://www.ces.ncsu.edu/forestry/biomass.html