Agricultural/Renewable Contributions to US Electricity Usage

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Focus

Concern About The Viability of Biomass As a Generation Fuel
Biomass as a Heat Source

Consider Competing Sources & Uses
Also, Opportunity Cost – For Supplier & User
Material Characteristics

Low Energy Density a Liability
Bulk & Weight vs. Value
Energy Contents

Biomass: 8.25 Mbtu/Ton
Paper Pellets: 13.03 Mbtu/Ton
Bituminous Coal: 25 Mbtu/Ton
Von Thunen

The Originator of Spatial Economics

Lessons from The Isolated State
Von Thunen’s World

TOWN
Von Thunen’s World
Availability of Biomass

Today: 194 M dry Tons
(Corn Stover 75 M Tons)

Future: 500 to 1,000 M dry Tons
Availability Is Not the Issue!

Which Use Will Draw It?
For Heat, Competition Is With Coal Not Oil or Gas
Compare Spot Coal at $37 (high) With Biomass at $37 (low)

However, Biomass Is 1/3 the Energy
Biomass Supply Will Likely Be Drawn to Petrochemical Substitutes (High Value)
Experience of Direct Firing

Denmark – Straw
US – Switchgrass
US Direct Firing Issues

1. US Policy Is Universal – Biomass Is local
2. Low Bulk Density – Location & Transport
3. Biomass Is Not Homogeneously Distributed
4. Past Ag. Research Not Concerned With Fuel Use
5. Heat for Electricity Is low value – Biomass May Require High Value Product To Be Feasible
Distributed Power Option

Critical Logistics of the Grid
Value of Antaras’s Northeast Study
Burning Issues for Co-firing

Combustion, Chemicals, & Ash
Pollution Reduction Is Only Proportional
Logistics of Handling, Processing, & Firing Are Key
The Challenge

Bulk, Transportation, & Handling

Competition Is Coal

Co-firing Is Not Easy

The Supply Is Geography Limited

Electricity Is Cheap
To Overcome the Challenges

High Value Needed for Environmental Benefits
Cogeneration with High Value for Heat
Solve the Small Scale Issues
High Subsidies
High Power Price
High Cost for Clean Coal Technology