
Cycle 2 – Energy Research Grants (FY07/08)

Controls for Biomass Heating and Impact on Greenhouse Profitability

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ABSTRACT.

The overall goal of this project is to advance and assist Nebraska greenhouse and nursery production, by improving utilization of energy and environment moisture control, leading to higher profitability. We will investigate alternative biomass fuels for heating, as a supplement or replacement of propane and natural gas systems. We will also investigate improved heating and moisture control strategies. Nebraska has approximately 357 commercial growers and 2.5 million square feet under glass or other protection. However, 60-80 per cent of production costs are with energy input, the cost of which continues to rise. Greenhouse environmental control strategies for alternative biomass heating systems need to account for response time and feedback differences, when comparing biomass with traditional heating systems. The project will utilize collaborator greenhouses with existing biomass furnaces in Firth and O'Neil, Nebraska. The project will develop and test anticipative and adaptive environmental control algorithms. Leaf surface moisture control is needed for reducing crop disease potential. Greenhouses allow specialty crop production out of the natural season; with potential efficient use of resources, and increased yields per unit area. Nebraska also has 50 high school greenhouses and associated vocational agriculture programs, either currently in operation or being developed. Thus, the project will not only impact current commercial greenhouse operations, but serve as an educational tool for awareness of biomass energy issues.