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**NORTHEAST REGIONAL BIOMASS ENERGY PROGRAM
PROGRESS REPORT - 9TH YEAR
OCTOBER - DECEMBER 1991**

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INTRODUCTION

The Northeast Regional Biomass Program (NRBP) is entering its ninth year of operation. The management and the objectives have virtually remained unchanged and are stated as follows.

Management

The program conducted by NRBP has three basic features: 1) a state grant component that provides funds (with a 50 percent matching requirement) to each of the states in the region to strengthen and integrate the work of state agencies involved in biomass energy; 2) a series of technical reports and studies in areas that have been identified as being of critical importance to the development of biomass energy in the region; and 3) a continuous long range planning component with heavy private sector involvement that helps to identify activities necessary to spur greater development and use of biomass energy in the Northeast.

The state grant program provides states with an opportunity to strengthen and integrate the work of energy, forestry, air quality and other appropriate offices in promoting biomass energy use. Most state efforts to promote biomass energy have been fragmented among a wide range of agencies involved in various aspects of this energy source. The state grant projects require interagency cooperation and fall into several general categories: industrial conversion assistance; resource availability and use assessments; technical information development and dissemination; and conversion of state facilities.

The second element of the regional subprogram is a series of subcontracts for the production of reliable information and technical reports focusing on issues identified by the subprogram's Steering Committee and other experts in the region as being of particular importance to the development of biomass fuels in the region. These projects focus on a wide range of issues, including development and dissemination of technical, economic and environmental information of industrial wood energy use, assessment and mitigation of the environmental impacts of wood energy development, and economic analysis of biomass energy in the region. Profit, not-for-profit, university and other organization are eligible for these subcontracts, which are awarded on a competitive basis.

The active involvement of state officials in the formulating of topics for subcontracts helps to insure that the work produced under the technical subcontracts will be valuable to the state programs of the region. Cooperation between subcontractors and state officials will be built into the subcontract and grant agreements in areas such as information gathering and dissemination, workshops and publication preparation. In addition, other biomass energy experts (many from the private sector) will be actively involved in the program by serving on the Technical Advisory Committee or on the oversite committees that have been formulated for several of the subcontracts and grant programs.

Objectives

- Improve the effectiveness, coordination and planning capabilities of the state agencies in the region which have biomass-related responsibilities.
- Assess the availability of biomass energy resources.
- Provide reliable information to private companies, residential and commercial consumers, and public institutions about the potential and versatility of biomass energy sources.
- Better understand and mitigate the environmental impacts of increased biomass energy use without stifling the region's ability to take advantage of its most abundant indigenous energy source.
- Transfer the results of government-sponsored and private research and development to the private sector.
- Support region-specific and interregional studies of the critical impediments to further development of biomass energy resources.
- Coordinate the regional program with other federal, state and regional efforts to avoid duplication and maximize the effectiveness of NRBPs dollars.

A grant for the ninth year in the amount of \$775,000 was received from DOE. Funds were allocated as follows:

| | |
|------------------------|----------------|
| Operating | \$156,032 |
| Technical Subcontracts | 288,968 |
| State Grants | <u>330,000</u> |
| | \$775,000 |

RESEARCH HIGHLIGHTS

The Northeast Regional Biomass Steering Committee selected the following four projects for funding for the ninth year.

- Wood Waste Utilization Conference
- Performance Evaluation of Wood Systems in Commercial Facilities
- Wood Energy Market Utilization Training
- Update of the Facility Directory

Tellus Institute has completed the study entitled Regional Biomass Strategies and Their Potential to Mitigate the Accumulation of Greenhouse Gases in the Atmosphere. The final report is in preparation.

MANAGEMENT HIGHLIGHTS

Eight states responded to the CONEG Policy Research Center, Inc. request for proposals (CT, DE, NH, MA, ME, PA, RI and VT). New York and New Jersey proposals are in preparation while Maryland has formally declined.

The NRBP Steering Committee met in Cherry Hill, New Jersey October 21-22 to review the status of the program.

STATE GRANTS

Connecticut

The state of Connecticut has signed a contract with RPM Systems, Inc. to conduct a wood use survey of 800 known residential woodburners and a random sample of an additional 1000 homeowners.

The major effort for this coming year will be:

- Identification of barriers or disincentives to the introduction of alternative fuels to Connecticut's transportation sector.
- Identification of programs or incentives which can encourage a cleaner and more diversified mix of fuels in Connecticut's transportation sector and greater use of renewable fuels.
- Development of a mechanism for coordinating policies or programs concerning alternative fuels or vehicles across agency lines.

Delaware

The state of Delaware has received responses to their questionnaire from wood processors within the state (loggers, sawmill owners, furniture & cabinet makers, etc.). A directory will be published as well as entering the data into the U.S. Forest Service F.I.N.D. computer program.

Maine

The state of Maine recently published a study entitled "The Biomass Energy In Maine." The following are conclusions drawn from the study.

Woody biomass has emerged as a major component of the states energy supply. It is a role expected to expand in the future.

Wood fired power plants are successfully integrated into the electric utility system, providing reliable supplies of electricity. There doesn't seem to be any systems management problems for the utilities. Utility system operations, however, impact on the plants through dispatch practices that ultimately influence discharges of air pollutants,

and ripples through the fuel supply procurement network disrupting deliveries and production schedules.

Potentially negative impacts on the environment have been minimized or avoided through environmental regulation and economic realities. Wood fired power plants are performing for the most part within their air emission licenses. Ashes are safely being used as a soil amendment. Harvesting activities are regulated to protect soil and water resources. Research into the land application of wood ashes, and forest nutrient cycles is on-going. Surveys of harvesting and forest resource management practices is providing valuable information about biomass harvesting. And the economic realities of the market place assure proper utilization of forest products. On the whole, government has acted effectively in response to potential problems, while facilitating the development of the industry.

Maine is enjoying the relatively large economic benefits created by the development and operation of the biomass energy industry. The industry provide high paying, professional/technical level jobs. Annual expenditures for payroll, fuel, and goods and services ripples throughout economy supporting jobs and stimulating economic activity. On the down side, biomass based electricity is not the low cost power historically available in Maine. It remains to be seen if this source of power will turn out to be a good bargain over the life time of project contracts.

Several concerns persist -- will the necessary political and economic factors exist in the future to support growth and expansion of wood energy; the continuing availability of an economically priced fuel supply, that is produce consistent with sound forest management; the need for additional research on nutrient impacts, and appropriate forest management responses; and the impact of relatively more costly biomass electricity on rising electricity rates.

Maryland

The state of Maryland has formally withdrawn from participation in the Regional Biomass Program. This lack of participation was the result of reduction and reorganization of personnel within the Forestry Service.

Massachusetts

The Division of Energy Resources (DOER) program to demonstrate alternative fuels for transportation, which began earlier this year continues to broaden and make progress. Working through a steering committee made up of members of the Department's of Environmental Protection (DEP), Procurement and General Services (DPGS), and Public Works (DPW), three sets of vehicles have been or are in the process of being converted: two 4-cylinder sedans to propane, two six-cylinder sedans to compressed natural gas (CNG) and two light pick-up trucks to CNG.

The demonstration program is scheduled to continue for one year for each alternative fuel and for each type of vehicle. At the end of that time, an analysis will be carried out and a report issued evaluating the economics, environmental impact, safety,

"wear and tear," and infrastructural aspects of each new fuel demonstrated. It is anticipated, that recommendations will follow regarding future conversions and replacements of the 8,000 motor vehicle fleet owned and operated by the Commonwealth's executive branch.

DOER began working in the beginning of the fiscal year with the Division of Forestry and Parks (DFP) in the development of a brochure to serve as a consumer guide to woodstove operation and purchase. DFP had received a grant from the USDA Forest Service, with which to procure services for text and graphics preparation. Because of the recent new developments in cleaner burning woodstoves and the testing done in the field under CONEG/EPA/NYSERDA auspices, such a brochure is timely.

The program has since been expanded to include CONEG NRBP and NYSERDA as co-sponsors. Collectively, \$100,000 will be made available to fund both written and audio/visual programs. NYSERDA has agreed to serve as the umbrella organization in the solicitation of responses, and we are now awaiting a go-ahead from NYSERDA's Contracts group to issue an RFP.

New Hampshire

A recent survey completed by the state showed the number of New Hampshire households that use wood as a primary heat source declined slightly while those that use wood as a secondary/tertiary heat source increased in the 1990-91 heating season. The net result is an increase in the number of households burning wood according to the residential wood use survey conducted by Braiterman Associates under contract to the Governor's Energy Office (GEO).

The residential wood use survey is a state-wide telephone survey of 400 households conducted annually since the 1983-84 heating season. It is the only statewide survey that tracks residential heating fuel use with emphasis on wood burning. The survey is conducted with a grant by the U.S. Department of Energy through the Northeast Regional Biomass Program.

The 1990-91 survey results indicate little change from last year. Oil remains the fuel of choice in New Hampshire. Over 57% of the households surveyed indicated that oil is their primary fuel source. Wood remains the second most popular fuel at 11.7%. This is closely followed by natural gas at 10.7%, electricity at 9.4% and propane at 7.7%. Propane usage has been increasing in rural areas.

New Jersey

Jersey Central Power & Light Company (JCP&L), which generates electricity using everything from uranium and coal to oil and natural gas, is turning to a new source of fuel -- wood.

State regulators in October approved a 20-year contract between JCP&L and Tamal Energy Inc. for the purchase of electricity from a plant that will burn wood to generate 21 megawatts of power.

The plant, to be built in Tinton Falls in Monmouth County, will be the first wood-fired power plant in the state. According to the Board of Public Utilities (BPU), the Tamal plant will burn chips from tree stumps and other "clean" waste wood debris free of contamination from preservatives or mixed with other materials. The waste wood ordinarily would have been destined for landfills or other disposal facilities.

The plant will generate enough power to supply the needs of about 24,000 homes.

New York

The New York State Energy Research and Development Authority (NYSERDA) recently published its Annual Report 1990-91 and their multi-year RD and D plan for 1991-1996. The Authority manages a broad program of research designed to develop and apply efficient technologies to insure secure and economical future supplies of energy. The funding budget for 1991-1992 by category is as follows.

| | |
|--|--------------|
| Energy Efficiency and Economic Development | \$6,775 |
| Energy Resources and Environmental R&D | 5,775 |
| Industrial Efficiency and Applications | 3,100 |
| Building Energy Systems | 3,675 |
| Energy Resources | 2,900 |
| Municipal Waste | <u>2,875</u> |
| | \$25,100 |

Projects currently underway directly related to the NRBP are:

- **Wood-Waste-to-Chemicals Facility:** Constructs a commercial-scale facility to convert wood waste to energy-intensive materials and cogenerate electricity. Co-funder: Integrated Woodchem, Inc.
- **Characterization of Waste Wood Products:** Identifies major contaminants in waste wood and characterizes air emissions and ash features when waste wood is burned in a conventional wood energy system. Co-funders: Canadian Ministry of Energy, Mines & Resources; CONEG Policy Research Center, Inc.; U.S. EPA; Virginia Department of Minerals, Mining and Engineering.
- **Forest Ecosystems:** Performs experimental additions of nitrogen, sulfur and other chemical pollutants to selected sites in the Adirondacks to characterize the adverse effects to the forest ecosystem. Co-funders: ESEERCO, National Center for Air and Stream Improvement, SUNY College of Environmental Science and Forestry.
- **Alternate-Fuel Vehicle Demonstration Program:** Acquires 10 Ford methanol-powered full-size flexible-fuel vehicles for demonstration in fleets throughout New York State. Co-funders: Municipal fleets receiving vehicles.

Pennsylvania

The Pennsylvania NRBP Steering Committee member reported over the past year he has received 96 request for information from individuals interested in wood energy, recycling or composting. The information requests ranged from equipment manufacturers permitting, marketing assistance, source of wood fuel, heating values, efficiencies, wood fuel pellet producers, sources of financial assistance, project investment analysis, cogeneration and case studies of wood energy systems. Most of the requests are from within the state, however, there are a great many from outside the NRBP region.

Rhode Island

The Principle Investigator for Rhode Island has been changed to a Mr. William Chapman. Rhode Island has recently undertaken a study to determine markets from recycled construction and demolition wood waste. The study is expected to be completed in the summer of 1992. Rhode Island has also undertaken a project to study the options for the future disposal of sludge, garbage and yard waste and determine their applicability as a renewable energy source.

Vermont

Vermont has been involved in assisting the General Electric Research and Development Laboratory to secure wood chips suitable for use in a fixed bed gasifier/gas-turbine simulator. The fuel-in feed system for the gasifier currently being tested was designed to accommodate crushed coal which shares little in properties with wood chips as commonly available.

After several months of searching for a proper fuel, tests were conducted. The gasifier ran for 85 consecutive hours with no problems. The report of the tests is due to be published in February 1992.

TECHNICAL SUBCONTRACTS

Regional Biomass Strategies and their Potential to Mitigate the Accumulation of Greenhouse Gases in the Atmosphere

The contractor, Tellus Institute had previously submitted a report which provided (1) the projections of energy use by fuel for the eleven CONEG states, including biomass resources (firewood, MSW, landfill gas) and wood products (paper and pulp, construction); (2) an estimate of the carbon dioxide and methane emissions from all of these activities (including combustion and losses in extraction and distribution); and (3) project the stocks, annual growth, demands, and net annual growth (decline) on the forests, thereby obtaining carbon uptake (or additional releases) to combine with the combustion releases.

The contractor has currently developed energy-related greenhouse gas scenarios for quantitative background -- broad efficiency improvements over time, schematic full

cost dispatch (changing the dispatch order to reflect both direct and environmental costs, and perhaps more cogeneration).

- Explored the merits of alternative biomass options -- wood for electricity, wood for sectoral use, MSW and landfill energy options (and recycling), increased forest products, with expanded forest lands and stocks. Selectively compare to alternatives.
- Formulated and documented policy options analyses which included relevant interviews and other document reviews.

The final report has been reviewed and accepted by the Technical Advisory Committee. The report will be published in March 1992.

Wood Waste in the Waste Stream: Characterization and Emission Testing Protocol Development

NYSERDA has signed a contract with Environmental Risk Limited\ C.T. Donovan Associates for the amount of \$327,542 for Phase I. The Regional Programs will contribute \$102,000 towards this effort. CONEG will manage the contract for the region.

Since Waste Wood represents a significant portion of the solid waste stream currently being disposed of in landfills and in an increasing number of instances the clean fraction of the waste wood is being collected and combusted for power production. Environmental regulators are reluctant to allow the combustion of waste wood that is contaminated with paints, preservatives, resins, glues, etc. because of the general lack of knowledge regarding potential adverse environmental impacts. The goal of this project is to identify the major contaminants in waste wood and determine air emissions and ash characteristics when the material is combusted in a conventional wood energy system. This knowledge will then serve as the basis for selecting pollution control devices and/or recommending combustion systems operating parameters that minimize adverse impacts.

The project includes an extensive data collection task in eight states in the United States and one Canadian province. Based on the results of the data collection work, a series of laboratory investigations will be used to identify the chemical and physical properties of the contaminants. All information will be reviewed by a Technical Advisory Committee comprised of the sponsors and representatives of the regulatory community, industry trade associates and other interested parties.

The workplan for the project has been reviewed by the Technical Advisory Committee (TAC) and the NRBP Steering Committee. The status of the program will be reviewed again by the TAC in December 1991 and NRBP Steering Committee January 1992.

Evaluation of the Performance of Wood Chip Heating Systems in Institutional Buildings

The Northeast Regional Biomass Program issued a Request for Proposal in November for a field evaluation of direct combustion and gasification wood chip or

residue systems to determine fuel and capital costs, combustion efficiencies, O&M costs, and overall system performance over a period of at least one full heating system. These costs and benefits would be compared to those of comparably sized units fueled by electricity and oil--or in the case of retrofitted systems, of the pre- and post-conversion costs and benefits.

No less than six systems, at least one of which is wood gasification would undergo a performance analysis. The smallest system would be no smaller than 500,000 BTU's/hr; the largest, no more than 5 million BTU's/hr. The measurements would include the moisture content of the fuel, fuel weight, and energy output. By calibrating changes in the flow rate and temperature of incoming and outgoing water for hot water systems, researchers can determine efficiency in high-fire and standby modes.

At least one of the systems to be evaluated shall be in northern New England, and one should be located in Pennsylvania, New York, or New Jersey. Proposals are due January 10, 1992.

National Biomass Meeting and Woodwaste Conference

The Northeast Regional Biomass Program signed a contract with C.T. Donovan Associates to plan, organize and conduct the 1992 National Biomass Meeting and the Wood Waste Conference. The specific objectives of the conferences are to:

- conduct a national meeting of state biomass coordinators;
- characterize the physical and chemical contents of wood waste that could potentially be used for energy, and to identify non-wood materials that may cause wood waste to be unacceptable as a fuel source;
- identify and address a variety of technical issues affecting the use of wood waste for fuel, such as the ability of wood waste separation, processing, combustion, air emissions, and ash handling equipment to meet acceptable environmental standards; and
- review existing federal and state policies and regulations concerning the use of wood waste for fuel and address whether policy and regulatory trends are consistent with actual knowledge and data concerning wood waste combustion.

TECHNOLOGY TRANSFER

Prepared two articles for the Biologue magazine. Copies of the Biologue are attached.

Held a Regional Biomass Steering Committee meeting in Cherry Hill, New Jersey. List of attendees is attached.

LIST OF ATTENDEES
NRBP Steering Committee Meeting
Cherry Hill, New Jersey
October 21-22, 1991

| <u>NAME</u> | <u>ORGANIZATION</u> | <u>PHONE</u> |
|---------------------|--------------------------------|-------------------|
| Russ O'Connell | CONEG Policy Research Center | 202-624-8454 |
| Steve Morgan | Citizens Conservation Corp. | 617-423-7900 x470 |
| John Ferrel | Department of Energy | 202-586-6745 |
| Jeff Peterson | NYSERDA | 518-465-6251 x288 |
| Stu Slote | VT DPS | 802-828-2393 |
| Anne Stubbs | CONEG Policy Research Center | 202-624-8450 |
| Tony Pontello | U.S. DOE Philly Support Office | 215-597-3890 |
| Duane Day | U.S. DOE Boston Support Office | 617-565-9705 |
| Barri-Lynn Medeiros | NH GEO | 603-271-2711 |
| James Wall | DE Forestry | 302-739-4811 |
| Jim Connors | State of Maine | 207-624-6040 |
| Mike Voorhies | U.S. Department of Energy | 202-586-1480 |
| Allan Johanson | CT Office of Policy & Mgmt | 203-566-2800 |
| Eric Palola | C.T. Donovan Associates | 802-658-9385 |
| Christine Donovan | C.T. Donovan Associates | 802-658-9385 |
| Ed Lempicki | NJ Forestry Service | 609-292-2531 |
| Paul Szabara | PA Bureua of Forestry | 717-787-2105 |
| Bill Chapman | RI Governor's Energy Office | 401-277-3370 |
| Harry Lane | DOE/HQ, WDC | 202-586-9104 |
| Irving Sacks | MA Div of Energy Resources | 617-727-4732 |

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