



BIOMASS REPORT

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**Center for Biomass Energy Systems
Institute of Food and Agricultural Sciences
3038 McCarty Hall, University of Florida, Gainesville**

IFAS BIOMASS PROGRAM
DESCRIPTION AND PARTICIPATION PROCEDURES

with special emphasis on
The Co-Funded Program
with the
Gas Research Institute

July, 1982

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DESCRIPTION AND PARTICIPATION PROCEDURES

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Overview: The IFAS Biomass Program

The Institute of Food and Agricultural Sciences (IFAS), through its program planning process in 1978, identified energy problems as the highest priority facing Florida agriculture and other sectors of the Florida economy. In response to this identified need, IFAS formulated a legislative budget request for a broad-based program to address the energy situation. One of the thrust areas for this program was alternative energy sources. The total program was funded at a level of about three million dollars per year to support the several energy thrusts. These funds, allocated to the Departments and Centers, allowed program initiation or expansion during fiscal year 1979-80. Because of Florida's climate, land, and water resources and its energy utilization characteristics, biomass production, conversion and utilization emerged as a prominent component. To assure coordination of the emerging, substantial biomass effort within IFAS, the Center for Biomass Energy Systems was created. For liaison with other state and federal agencies, a Biomass Advisory Council, comprised of representatives from these agencies, was formed to provide guidance in program planning and development to the Director of the Center.

The administrative organization and technical management structure of the IFAS biomass program are shown in Table 1. The Dean for Research directs the biomass program as one component of the overall IFAS research effort. In the biomass area, the Dean for Research is assisted by a Technical Manager (Director of the Center for Biomass Energy Systems) and a Scientific Program Manager, who aid program development and project coordination through the faculty Research Working Groups and their Group Leaders (collectively called the Biomass Research Coordination Panel). These Working Groups are comprised of researchers with related interests who are participating or planning to participate in the IFAS biomass program. Activities of the Technical Manager, Scientific Program Manager, Research Working Groups and Group Leaders are more fully described later in this document. This process does not replace or conflict with the Department Chairman/Center Directors' day-to-day responsibility for project and personnel management in their units.

A list of all IFAS biomass projects in the current IFAS research program is located in Appendix I. The term "IFAS biomass project" refers to any biomass research project under investigation by IFAS personnel, regardless of funding sources (i.e., state, federal agency, private industry, etc.). Participation in the biomass component of the IFAS energy program follows long standing procedures detailed in the IFAS Internal Management Memoranda No. 61-6.23 relating to the project planning and development process. The format used for these projects is shown in Appendix II (AES Form 2122). Complete information is available in each unit leader's office set of Internal Management Memoranda for IFAS.

TABLE 1. IFAS BIOMASS PROGRAM: MANAGEMENT AND ADMINISTRATION

Program Level	Responsible IFAS Personnel	
Senior Management Overview	Vice President for Agricultural Affairs K. R. Tefertiller	
Program Direction	Dean for Research F. A. Wood	
Technical Management	Director, Center for Biomass Energy Systems W. H. Smith	
Scientific Program Management	Scientific Program Manager P. H. Smith	
Biomass Research Coordination Panel (Group Leaders)	<u>Research Working Group</u> Process Development - Bioconversion	<u>Leader(s)</u> R. Nordstedt
	Process Biology - Bioconversion	A. Bleiweis
	Root and Tuberos Crops, and Crop Residues	S. O'Hair R. Reddy
	Woody and Other Fibrous Crops	D. Rockwood S. Wang
	Systems Analysis and Data Management	W. Mishoe
	Marine and Freshwater Aquatic Plants	R. Reddy G. Bowes
	Grasses, Forage and Other Related Crops	G. Prine
	Environmental Protection and Pollution Abatement	D. Graetz

One source of IFAS biomass project support is the continuing state/federal funds that are allocated to the department or center of the researcher. On a yearly allocation basis, varying amounts of funding also are available through the internal grant program (Special Projects) of the IFAS Center for Biomass Energy Systems (CBES). Support from the Center is to allow faculty to pursue new, high-priority projects until the unit assumes support or extramural funds are procured. This should occur by the end of two years; longer support for a CBES Special Project should not be expected. Participation procedures and Requests for Proposals for Special Projects (Appendix III) are issued each year in April and funds are allocated on an IFAS fiscal year basis (July through June). In some cases, CBES Special Projects are selected for inclusion in the GRI/IFAS "Methane from Biomass and Waste" program under the designation, "IFAS co-funded projects" (details supplied elsewhere in this document).

Other sources of support are in the form of extramural funding as grants, contracts, or gifts. In most cases these are documented as CRIS projects and handled in the same way as regular state projects. It is important that these be numbered and reported in the usual way.

From the time of its initiation, the IFAS biomass program attracted considerable attention. Among those expressing interest in the program was the Gas Research Institute (GRI). This institute receives its resources from rate-payers for natural gas through the gas industry and manages a program of research relating to several facets of that industry. Biomass and its conversion to substitute natural gas is one thrust area in the Substitute Natural Gas Supply Research Division. Following several meetings to discuss research areas of mutual interest, a Participation Agreement between IFAS and GRI was developed. This agreement outlines institutional relationships in co-funding a research program whereby GRI matches IFAS funds committed to research in methane production from biomass and wastes. This agreement specifies that an annual program plan of work will be developed and jointly managed by IFAS and GRI. The work plan identifies specific projects, compatible objectives, performance tasks and levels of support. The remainder of the present document further describes the GRI/IFAS program and the procedures for faculty participation in this component of the total IFAS biomass effort.

I. The GRI/IFAS Program: Purpose and Scope

An important component of the IFAS biomass program relates to methane production. In 1981 the Gas Research Institute (GRI) and the Institute of Food and Agricultural Sciences (IFAS) initiated a program called "Methane from Biomass and Waste". This program is co-funded and jointly managed by both institutions through a Technical Management Team (TMT) composed of both IFAS and GRI

members. The objective of the program is to develop integrated processes, including production, harvesting, and conversion to methane, from decentralized renewable biomass resources with the goal of commercialization of methane production on a local or regional basis. A Participation Agreement between the two institutions defines policies and processes for the program.

The structure of the GRI/IFAS co-funded program is outlined in Table 2. In brief, the program is divided into eight biomass resource areas (woody plants, freshwater plants, grasses, root crops, halophytic plants, hydrocarbon plants, marine/coastal plants and wastes). Each resource area is divided into at least four research activities (species evaluation, biomass production, biomass conversion, and systems analysis across these three activities, later referred to as cross-component analysis). The biomass resources and conversion technologies will be developed sequentially at different intensities, since they are currently at different stages of research and development and since growth, materials handling, and conversion technologies depend on specific resource characteristics.

II. Programmatic Organization

The GRI/IFAS program is a composite of four major groups of projects:

1. IFAS Co-Funded Projects
IFAS-supported projects that are selected for program inclusion, contribute to the IFAS matching funds portion of the program, and receive no GRI funds. Support for these projects is by continuing state or federal funds, grants, contracts or gifts generated by IFAS.
2. GRI Co-Funded Projects
IFAS projects that are selected for program inclusion and receive GRI funding to supplement IFAS contributions.
3. Third Party Contracts (TPC's)
Projects that are proposed by parties other than IFAS and are selected for program inclusion and co-funding.
4. Cooperative Projects
IFAS in-house projects and non-IFAS, GRI-supported projects that are independently administered by either IFAS or GRI and contribute significant technical information to the program. These may provide direct or indirect support of the research program. Funds expended on these are not a part of the co-funding or matching contributions of IFAS and GRI.

TABLE 2. STRUCTURE OF THE GRI/IFAS METHANE FROM BIOMASS AND WASTE PROGRAM ^{a/}

BIOMASS RESOURCES							
WOODY (1.0)	FRESHWATER (2.0)	GRASSES (3.0)	ROOTS (4.0)	HALOPHYTES (5.0)	HYDROCARBON (6.0)	MARINE (7.0)	WASTE (8.0)
RESEARCH ACTIVITIES ^{b/}							
Species Evaluation (0.1)	Biomass Production (0.2)	Biomass Conversion (0.3)	Component Cross-Analyses (0.4)	Test Site Evaluation (Marine Only) (0.5)			
T A S K S							
0.1.1 Chemical Composition	0.2.1 Controlled Growth	0.3.1 Biological Gasifica- tion--Process Develop- ment	0.4.1 Data Base	0.5.1 Environmental			
0.1.2 Anaerobic Digestion	0.2.2 Genetic Improvement	0.3.2 Thermochemical Gasifica- tion--Process Develop- ment	0.4.2 Systems Analyses	0.5.2 Measurements			
0.1.3 Thermal Digestion	0.2.3 Field Production	0.3.3 Supporting Technologies: pretreatments, inocula, organism biology		0.5.3 Farm Site Selection			
0.1.4 Species Selection	0.2.4 Supporting Technologies-- harvesting, handling, etc.						

^{a/} Each project contributing to the program is classified according to this scheme. For example, project classed 2.3.1 indicates that the project addresses biological gasification processes for the conversion of freshwater plants to methane.

^{b/} When a research activity is not specific to biomass resource, a zero occupies the first digit. For example a project classified 0.4.1 indicates that a data base is being developed that will accommodate all resources.

Since IFAS receives energy program appropriations from the state legislature, biomass research projects have been initiated to carry out this commitment to the State of Florida. When these relate to the goals of the GRI/IFAS program, they are designated as IFAS co-funded projects. While these existing projects may not always receive portions of the GRI funds, they are important to the GRI/IFAS program because they help to meet the IFAS matching requirement in both information generated and funds expended. The IFAS funding match is accounted for at the overall program level--not on an individual project-for-project basis. The procedure is outlined below.

Matching Procedure

Estimates of faculty and technical support (career service) effort applicable to the research projects will be identified in the annual program plan. Actual matching effort will be certified on the University's Faculty and Staff Activity Certifications (Appendix V & VI). Salary and wage activity certifications are collected on an academic term schedule (August-December, January-April, and May-July); these will show FTE contribution to each project. Semester results will be acquired by the Director of the IFAS Center for Biomass Energy Systems and summarized on a calendar year basis for each IFAS Unit. The Director will also calculate semester matching in FTE terms (full-time equivalent) for each IFAS Unit and summarize matching FTE for the Program Year. FTE contribution and average unit support per FTE will be combined to arrive at the matching contribution. In this way, project leaders do not have to account for actual expenditures of O.E., O.P.S., and O.C.O. support funds. Because the match is determined by faculty and career service FTE contributions, it is extremely important that all contributions to the projects in the program are documented in this way.

III. Management and Administration

Through the Participation Agreement between the Gas Research Institute and IFAS, GRI will make funds available to IFAS research projects and/or third party (non-IFAS) contractors. Third Party Contracts will be awarded to projects that IFAS does not currently possess the capability to conduct or to involve important cooperators in the research. The IFAS Director of the Center for Biomass Energy Systems is designated as the overall Principal Investigator and will provide Technical Management for all IFAS projects included in the program, whether IFAS or partially GRI funded, in a way compatible with IFAS procedures. GRI program managers provide management for the Third Party Contracts. The IFAS Scientific Program Manager serves as an ex officio member of this IFAS/GRI Technical Management Team (TMT).

The administrative organization and technical management for the total IFAS biomass program were described earlier. The GRI/IFAS "Methane from Biomass and Waste" program, as one component of the total IFAS biomass effort, is administered and managed through the same structure (Table 1).

The Technical Manager (Director of the Center for Biomass Energy Systems), with assistance from the Scientific Program Manager and the Biomass Research Coordination Panel, is responsible for scheduling, programming, and assembling materials for periodic reviews by the GRI/IFAS Technical Management Team, GRI Project Advisors Panel, and others as appropriate. In addition, the Center provides administrative support to the Scientific Program Manager and Research Working Group Leaders for all activities associated with program coordination, management, and reporting to GRI. Faculty participation must be coordinated with departmental programs. Evaluation and day-to-day supervision are provided by the faculty member's Chairman or Center Director, and administrative services for research activities are provided by the faculty member's department or center in the usual way.

Each Research Working Group elects a Group Leader, who will call meetings at least quarterly to discuss research progress, problems, and future plans, and for in-house seminars. On a regular basis, the Group Leaders, who comprise the Biomass Research Coordination Panel, will meet with the Scientific Program Manager for reporting, identifying, and coordinating the program needs and opportunities.

The monthly Biomass Seminar Program, which was organized for presentation of reports by University of Florida faculty or guest speakers, is a responsibility of the Scientific Program Manager, who will plan the seminar, identify a faculty host for visiting speakers, and determine appropriate departmental co-sponsors.

IV. Participation in the GRI/IFAS Biomass Program

Submission

IFAS funded projects are developed in the usual way, as outlined in Internal Management Memorandum No. 61-6.23 (available from Department Chairman or Center Director), with funds received from the legislative appropriations for "Low Energy" or "Energy Efficient Technology" or with grants, contracts, or gifts generated by IFAS personnel.

Preproposals (see Appendix IV) for new projects may be submitted, when requested, for consideration for GRI funds. All preproposals are to be submitted to the Center for Biomass Energy Systems, 3038 McCarty Hall, University of Florida, Gainesville, Florida 32611.

Program Priorities

Current program priorities are outlined in Table 3. While these are the priorities, preproposals need not be limited to those alone; outstanding proposals that relate to any area of the program plan (Table 2) will be considered.

Preproposal Review/Program Development

Project reviews will be coordinated by the Technical Manager (Director of the Center for Biomass Energy Systems) with assistance from the Scientific Program Manager. As appropriate, the Biomass Research Coordination Panel will provide scientific and programmatic review comments. The Technical Manager will review and synthesize all comments and present a proposed IFAS plan of work to the Technical Management Team (TMT). This will be reviewed along with proposals for Third Party Contracts. The TMT, composed of IFAS' Director, Center for Biomass Energy Systems, GRI's Program Manager for Marine and Regional Biomass and IFAS' Scientific Program Manager (ex officio), will then present the annual plan of work and proposed budgets to the Program Directors --the IFAS Dean for Research and the GRI Assistant Director for Biomass and Waste Research. Leaders of proposed projects that are approved by the Program Directors will then be asked to prepare project statements in accordance with IFAS Internal Management Memorandum No. 61-6.23. In addition to these general requirements, all project statements will include a milestones chart (Appendix VII), a budget allocation by categories (Appendix VIII), a budget of projected expenditures by quarters (Appendix IX), and completed CRIS forms.

V. Reporting Requirements

Reports for both IFAS and GRI co-funded projects will be required as outlined below. Narrative reports will be submitted to the IFAS Director, Center for Biomass Energy Systems, who will forward them, as appropriate, to the IFAS Dean for Research or the GRI Program Managers.

1. Monthly financial reports, listing expenditures of GRI funds. These will be prepared by the IFAS Business Office and submitted to the GRI Business Office.
2. Quarterly narratives for all projects, with emphasis on progress and/or problems encountered. Each project leader will prepare a narrative report, by research task, and enter it into the Comprehensive Scientific Information Management System (CSIMS). These reports (Appendix X) are due on the 25th day of the months of March, June and September. Accompanying graphs, manuscripts, and other supporting documentation are to be submitted directly to the Center for Biomass Energy Systems until CSIMS modules are available for their transmittal.

TABLE 3. 1983 PROGRAM PRIORITIES
GRI/IFAS METHANE FROM BIOMASS AND WASTE PROGRAM

1. Genetic Manipulation
 - Higher plant improvement; propagation, yield and composition of convertible chemicals
 - Microbial conversions -- especially refractory organics
 2. Digestion Processes
 - Supplemental and mixed feedstocks
 3. New Biomass Species Evaluation
 4. Materials Handling
 - Harvesting, pretreatment and gasifier waste handling
-

3. Annual comprehensive reports, documenting progress with compiled data and relevant publications. This report is to be entered into CSIMS by December 15th.
4. Periodic presentations during site visits by the TMT, GRI Project Advisors, and/or IFAS Research Administrators or Research Working Groups will supplement the written reports. One of these presentations will be an annual project review.
5. All projects must be documented and reported in the CRIS system.

VI. Duration and Renewals

Projects covering research periods of up to three years may be submitted; however, continuation and funding will be determined on an annual basis.

VII. Program Credits and Cooperation

Equal credit will be given IFAS and GRI on published reports and other documents as well as oral presentations that result from both IFAS and GRI co-funded projects included in the program. Prepublication copies of manuscripts will be provided to the IFAS Director, Center for Biomass Energy Systems. The recommended credit statement is as follows:

"This paper (or presentation) reports results from a project that contributes to a cooperative program between the Institute of Food and Agricultural Sciences of the University of Florida and the Gas Research Institute, entitled "Methane from Biomass and Waste".

Faculty engaged in biomass crops production and waste capture research must provide materials to the Gasification Bioconversion Laboratory (See Protocol for Preparing Samples for Analysis in the IFAS Gasification Bioconversion Laboratories).

Faculty participating in this program will use the Comprehensive Scientific Information Management System (CSIMS) that was developed to aid them in compiling and analyzing data and in communicating reports, messages, and technical information. (See user manual).

VIII. Program Property

Title to each item of non-expendable property having an acquisition cost in excess of five hundred dollars (\$500.00) including materials, equipment, structures and test apparatus, which is purchased, constructed or produced with GRI funds (called "Program Property") will vest in IFAS upon delivery. IFAS users of the equipment will be responsible for the proper maintenance,

custody, storage and insurance of Program Property. The IFAS Business Office will maintain a list of all Program Property purchased; this list, as a minimum, will refer to the item description, acquisition date, acquisition cost, serial number and general location.

The TMT will annually review the Program Property List and recommend disposition of any Program Property that has either become obsolete or is no longer useful for its intended purposes. The annotated Program Property list will then be submitted to GRI's cognizant Contract Services Representative for final disposition. GRI will notify IFAS as soon as possible of the final disposition of selected Program Property.

Upon program completion, or in accordance with procedures described above, IFAS will deliver to GRI such documentation as shall be necessary to vest ownership of such Program Property in GRI. GRI will, at GRI's expense, arrange for the disposal of all listed Program Property. Such disposal will include, if mutually acceptable, sale to IFAS. GRI will at all times have the right to abandon in place any and all Program Property by written notice to IFAS, and thereafter GRI will have no further responsibility for the Program Property described in such written notices.

LIST OF APPENDICES

- I. Biomass Research Projects
- II. IFAS Project Statement Format
- III. Center for Biomass Energy Systems-Special Project Proposal Form
- IV. GRI/IFAS Preproposal Form
- V. University of Florida Faculty Activity Certification Form
- VI. University of Florida Non-Academic Activity Certification Form
- VII. GRI/IFAS Milestones Chart
- VIII. GRI Co-Funded Project: Budget
- IX. GRI Co-Funded Project: Quarterly Expenditure Projections
- X. Quarterly Project Report Form (GRI/IFAS and CBES)

BIOMASS RESEARCH PROJECTS

Thermal Gasification of Forest and Agricultural Residues for Heating and Engine Power Applications -- Shaw, Post, Eoff, and Arnold (Agricultural Engineering Department, School of Forest Resources and Conservation and Monticello Agricultural Research Center).

Production of Fermentable Feedstocks from Cellulosic Biomass using Innovative Acid Hydrolysis Technologies -- leGrand and Block (Agronomy and Chemical Engineering Departments).

Mosquito Production in Aquatic Biomass Production System -- O'Meara (Florida Medical Entomology Laboratory, Vero Beach).

Fuel Chipping and Continuous Feeding Systems for Downdraft Gasifiers -- Shaw, Post, and Eoff (Agricultural Engineering Department and School of Forest Resources and Conservation).

Integrated On-Farm Biofuels Demonstration -- Mullins (Botany Department).

Economic Feasibility of Producer Gas from Wood -- Kiker (Food and Resource Economics Department).

Coal Combustion Waste as a Soil Additive for Fuelwood Plantations -- Riekerk and Street (School of Forest Resources and Conservation and Soil Science Department).

Recovery and Utilization of Citrus Processing Waste for Methane -- Graumlich and Braddock (Lake Alfred Agricultural Research and Education Center).

Hydrocarbon Plants: A Preliminary Evaluation -- Dehgan (Ornamental Horticulture Department).

Gasification for Frost Protection -- Martsolf (Fruit Crops Department).

Tree and Grass Residues in Urban Areas as Biomass Feedstocks for Energy Production -- Sutton and Villate (Fort Lauderdale Agricultural Research and Education Center).

Utilization of Gasified Biomass Waste -- Regulski and Hoadley (Monticello Agricultural Research Center).

Biological Gasification of Biomass -- Screening -- Shiralipour, Smith, and leGrand (Microbiology and Cell Science and Agronomy Departments).

Thermochemical Gasification of Biomass -- Screening -- Eoff, Huffman, Wang, and Post (School of Forest Resources and Conservation).

Prediction of Fermentability of Biomass Resources -- Moore
(Animal Science Department).

Advancement of Thermochemical Gasification of Biomass to Methane
-- Lee (Chemical Engineering Department).

Improved Anaerobic Digestion of Biomass to Form Methane -- Smith
(Microbiology and Cell Science Department).

Cell Walls of Acetate-Fermenting Methanogenic Organisms --
Bleiweis (Microbiology and Cell Science Department).

Enzyme Treatment for Conversion of Polysaccharides in Biomass to
Methane -- Brown and Gritzali (Food Science and Human Nutrition
Department).

Biomass Production and Energetic Systems Analyses -- Mishoe and
Fluck (Agricultural Engineering Department).

Data Base Acquisition, Management, and Synthesis -- Portier,
Scheaffer and Hetrick (Statistics Department).

Process Engineering Analyses for Biomass Gasification -- Kirmse
(Chemical Engineering Department).

Screening Species for Woody Biomass Production -- Rockwood
(School of Forest Resources and Conservation).

Woody Biomass Production Pilot Tests -- Rockwood, Sullivan and
Dippon (School of Forest Resources and Conservation).

Moisture Reduction System to Prepare Woody Biomass for Thermal
Gasification -- Huffman, Post and Wang (School of Forest Re-
sources and Conservation).

Biomass Potential of Aquatic Macrophytes as Determined by Photo-
synthetic Processes -- Garrard and Bowes (Agronomy and Botany
Departments).

Growth Studies of Promising Aquatic Biomass Species in Nutrient
Enriched Water -- Reddy and Graetz (Sanford Agricultural Research
and Education Center and Soil Science Department).

Biomass Production of Plants in Sludge and Effluents -- Sutton,
Fitzpatrick and Batterson (Ft. Lauderdale Agricultural Research
and Education Center).

Harvesting of Microalgae Grown in Wastewater -- Lincoln (Agri-
cultural Engineering Department).

Native "weed" Species for Biomass Production --- Gilreath and
Csizinszky (Bradenton Agricultural Research and Education
Center).

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Sorghum and Other Crops for Year-Round Biomass Production in North Florida -- Dunavin and Brecke (Jay Agricultural Research Center).

Saw Palmetto Potential for Biomass Production -- Pitman and Kalmbacher (Ona Agricultural Research Center).

Evaluation of Brassica Crops as Biomass Feedstocks for Methane -- Strandberg and Reddy (Sanford Agricultural Research and Education Center).

Biomass Production by Taro -- Snyder, deLaPena and O'Hair (Belle Glade Agricultural Research and Education Center, University of Hawaii, Homestead Agricultural Research and Education Center).

Tissue Culture of Biomass Species -- Cantliffe (Vegetable Crops Department).

Induction of Genetic Markers in Marine Plants and Selection for Strains More Easily Convertible to Methane -- Preston (Microbiology and Cell Science Department).

Ultrastructural Analyses of Methanogenic and Plant Biomass Species -- Aldrich (Microbiology and Cell Science Department).

Methane Production from Biomass and Wastes with Low Solid Contents -- Nordstedt and Smith (Agricultural Engineering and Microbiology and Cell Science Departments).

Methane from Anaerobic Digestion of Biomass and Wastes -- Smith and LeGrand (Microbiology and Cell Science and Agronomy Departments).

Conversion of Cellulosic Biomass Constituents to Substrates for Fermentation to Fuels and Chemicals -- Brown (Food Science and Human Nutrition Department).

Bacterial Processes Relating to Cell Wall Properties -- Bleiweis (Microbiology and Cell Science Department).

Genetic Markers in Plant Improvement -- Preston (Microbiology and Cell Science Department).

Energy and Chemicals From Woody Species -- Rockwood, Riekerk, Sullivan, Huffman, Dippon, and Wang, (School of Forest Resources and Conservation).

Energy Production from Resin-Soaked Wood -- Huffman, Goddard, Wang, and Squillace (School of Forest Resources and Conservation).

Aquatic Plants for Biomass Production -- Sutton and Batterson (Ft. Lauderdale Agricultural Research and Education Center).

Biomass Production by Aquatic Macrophytes -- Garrard and Bowes (Agronomy and Botany Departments).

Aquatic Plant Biomass Production -- Reddy, Bagnall, Campbell, Nordstedt (Agricultural Engineering Department and Sanford Agricultural Research and Education Center).

Microalgae for Biomass Production and Treatment of Digester Effluent -- Lincoln and Nordstedt (Agricultural Engineering Department)

Biomass Production from Unconventional Forage Crops and Introduced Plant Species -- Prine (Agronomy Department).

Sorghum Biomass Production in North Florida -- Brecke, Dunavin, Stanley and Hensel (Jay Agricultural Research Center, Quincy Agricultural Research and Education Center, Hastings Agricultural Research Center).

Sugarcane and Sorghum Biomass Production (South Florida) -- Anderson and Shih (Belle Glade Agricultural Research and Education Center).

Evaluation of Grasses, Legumes and Other Crops for Biomass Production Under Various Management Practices -- Mislevy, Pitman, Kalmbacher and Overman (Ona Agricultural Research Center and Bradenton Agricultural Research and Education Center).

Utilization of Residual Fertilizer on Fallow Vegetable Lands in West Central Florida for Production of Biomass -- Csizinszky, Prevatt, Overman and Albregts (Bradenton Agricultural Research and Education Center and Dover Agricultural Research Center).

Root Crops Production from Biomass -- O'Hair, Shumaker, Csizinszky, Locascio, White, Forbes, Stanley, Rich, Snyder, Ozaki, Everett, Kalmbacher, Kretschmer and Albregts (Homestead Agricultural Research and Education Center, Hastings Agricultural Research Center, Bradenton Agricultural Research and Education Center, Vegetable Crops Department, Sanford Agricultural Research and Education Center, Quincy Agricultural Research and Education Center, Live Oak Agricultural Research Center, Belle Glade Agricultural Research and Education Center, Immokalee Agricultural Research Center, Ona Agricultural Research Center, Ft. Pierce Agricultural Research Center, and Dover Agricultural Research Center).

Operational Analyses Using an Experimental Test Unit (ETU) Methane Generator -- Nordstedt and Graetz (Agricultural Engineering and Soil Science Departments).

Methane Production from Vegetable Crop Residues -- Reddy, Graetz, Nordstedt, Smith, (Sanford Agricultural Research and Education Center, Departments of Soil Science, Agricultural Engineering and Microbiology and Cell Science).

Ecosystem Effects of Whole-Tree Harvesting for Fuel -- Riekerk (School of Forest Resources and Conservation).

Growth, Nutrition and Genetics of Marine Plants -- Ryther (School of Forest Resources and Conservation).

Near-shore Growth Studies of Sargassum -- Ryther (School of Forest Resources and Conservation).

Nitrogen Fixation in Sargassum Biomass Production Systems -- Shanmugam and Ingram (Microbiology and Cell Science Department).

Recycling Heat Treated Digester Effluent -- Graetz and Previc (Soil Science and Microbiology and Cell Science Departments).

Aquatic Biomass to Supplement Digesters Fed Animal Manure -- Bagnall, Reddy, and Smith (Agricultural Engineering Department, Sanford Agricultural Research and Education Center and Microbiology and Cell Science Department).

Florida Agricultural Experiment Stations

PROJECT STATEMENT

APPENDIX II
July 1982

Approved:

DATE Chairman or Center Director

Department:

Project Type:

Project Number:

Project Title:

Investigators:

Cooperators:

Location:

Duration:

Start Date:

Termination Date:

Objectives:

Note: Complete the following three headings on additional pages

Importance:

Previous Work and Present Outlook:

Method of Procedure:

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SPECIAL PROJECT PROPOSAL FY _____
Center for Biomass Energy Systems

- A. Project Title _____

- B. New Project Plan _____ Year 2 Project Continuation Plan _____
(check appropriately)
- C. Proposed Project is for (check appropriately)
Extension _____ Research _____ Resident Instruction _____
- D. Objective (ca. 50 words)
- E. Actual Tasks to be Performed to Accomplish Objective (up to 6
statements ca. one line each)
- F. Justification and Importance (ca. 500 words)
- G. Approach and Procedures (ca. 1500 words)
- H. Expected Results and their Application or Impact (ca. 500 words)
- I. Budget
O.E. _____ O.P.S. _____ O.C.O. _____
(provide justification if an O.C.O. item exceeds \$1,000)
- J. Approvals that signify that the funds requested are for this high
priority project of the unit/faculty member(s).

Unit Name

Faculty Member
signature

Unit Leader
signature

Unit Name

Faculty Member
signature

Unit Leader
signature

PREPROPOSAL FOR GRI/IFAS PROGRAM
Methane from Biomass and Waste

Project Title:

Project Leader(s):

Location or Unit Cooperating:

Objective:

Task to Be Performed (January 1 through December 31)

Justification, Expected Results, and Contribution to Program

Proposed Budget (January 1 through December 31)

IFAS Contribution FTE: Academic _____ Career Service _____

Total GRI Funds Requested:	Salary: Academic _____ Career Service _____
	Support: OE _____ OCO _____ OPS _____

\$ _____

Signatures _____ / _____
Project Leader(s) / Date Unit Leader(s) / Date

UNIVERSITY OF FLORIDA

REPORT OF FACULTY ACTIVITIES

PERIOD COVERED

REV. 7-75

(1) NAME	(2) LINE ITEM	(3) SOCIAL SECURITY NUMBER	(4) ACCOUNT NUMBER	(5) GROSS SALARY	(6) (7) THIS DEPT		(8) (9) (10) CLASSROOM TEACHING			(11) (12) (13) OTHER RESEARCH			(14) SPEAKING	(15) WRITING	(16) COUNSELING	(17) COMMITTEE	(18) OTHER	(19) LOAN OR BORROW			(20) (21) (22) LOAN OR BORROW			(23) (24) (25) LOAN OR BORROW			(26) (27) (28) LOAN OR BORROW					
					(6) FTE	(7) YEAR	(8) TEAM	(9) SIPPE	(10) TOTAL	(11) FTE	(12) YEAR	(13) ACTV						(14) FTE	(15) YEAR	(16) ACTV	(17) FTE	(18) YEAR	(19) ACTV	(20) (21) (22) LOAN OR BORROW			(23) (24) (25) LOAN OR BORROW			(26) (27) (28) LOAN OR BORROW		
																								(20) FTE	(21) YEAR	(22) DEPT NO	(23) FTE	(24) YEAR	(25) DEPT NO	(26) FTE	(27) YEAR	(28) DEPT NO

APPENDIX V
July 1982

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GRI CO-FUNDED PROJECT: BUDGET FOR GRI FUNDS

APPENDIX VIII
July 1982

Project Leader: _____

Project No.: _____

Project Title: _____

Account No.: _____

(office use only)

Categorical Budget

Time Period: _____ to _____
month/year month/year

- A. Salary (includes fringe, etc.) \$ _____
- B. Post-doctoral, graduate assistants, labor (OPS) _____
- C. Operating expense (OE) _____
- D. Equipment (OCO) _____

Total Direct Cost \$ _____

Indirect Cost (35% of A+B+C) \$ _____

Total Project Budget \$ _____

Budget Detail

A. Salary of Academic and Career Service Positions

<u>List Titles</u>	<u>Annual Salary</u>	<u>FTE</u>	<u>Fringe & Insurance</u>	<u>Budgeted Total</u>
_____	\$ _____	_____	\$ _____	\$ _____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

A. Subtotal Salary \$ _____

B. OPS Categories

	<u>FTE</u>	<u>Annual Rate</u>	<u>Budgeted Total</u> (includes W.C.)
Post-doctoral	_____	_____	_____
Graduate assistant	_____	_____	_____
	<u>No. of Hours</u>	<u>Hourly Rate</u>	
Unskilled labor	_____	_____	_____
Craftsman	_____	_____	_____
Technical	_____	_____	_____
Office & clerical	_____	_____	_____
Administrative and managerial	_____	_____	_____
Professional	_____	_____	_____

B. Subtotal OPS \$ _____

Personnel Subtotal (A+B) \$ _____

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C. Operating Expense

Career service State Personnel
Board assessment fee \$ _____

Travel (attach a list showing
destination, miles, mode of travel,
estimated cost for each trip) _____

Computer use _____

Publication/graphics/duplication _____

Material & supplies [attach a list
showing types (glassware, seeds, etc.)
suggested vendor, and estimated cost
for each type] _____

Subcontracts _____

Other incidental expenses _____

C. Subtotal OE \$ _____

D. Equipment

1. Itemization of equipment costing \$500 or more per item with paragraph justification for each item.

<u>Description</u>	<u>Catalog/ Model No.</u>	<u>Suggested Vendor</u>	<u>Estimated Price</u>
_____	_____	_____	\$ _____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Subtotal D-1 \$ _____

2. Equipment costing less than \$500 per item -- list examples and total budgeted for these items.

_____ Subtotal D-2 \$ _____

OCO Subtotal \$ _____
(D-1 + D-2)

Signature: Project Leader _____

Signature: Unit Leader _____

APPENDIX IX
July 1982

GRI CO-FUNDED PROJECT: QUARTERLY EXPENDITURE PROJECTIONS

PROJECT NUMBER _____ LEADER(S) _____

TITLE _____

BUDGET CATEGORY	QUARTER				PORTION TOTAL	DOLLAR TOTAL	^{1/}
	1	2	3	4			
	----- % of total -----						
SALARIES	_____ %+	_____ %+	_____ %+	_____ %+	%= 100% of \$	_____	
O.P.S.	_____ %+	_____ %+	_____ %+	_____ %+	%= 100% of	_____	
O.E.	_____ %+	_____ %+	_____ %+	_____ %+	%= 100% of	_____	
O.C.O.	_____ %+	_____ %+	_____ %+	_____ %+	%= 100% of	_____	

Total Project Budget \$ _____

^{1/} Direct costs only

QUARTERLY PROGRESS REPORT

PROJECT TITLE: _____

PROJECT NO. _____ PROJECT LEADERS _____

Task 1 to Task n 1/ QUARTER ENDING DATE _____

Project Leader's signature

Date

1/ Limit by tasks to one single-spaced page as described in CSIMS. Supporting tabular data, figures, and manuscripts/reprints are submitted separately.

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