



U.S. Department of Energy  
Energy Efficiency and Renewable Energy

*Office of the Biomass Program*

# First Annual Forum California Biomass Collaborative 8 January 2004

Federal Research Agenda for Biomass  
John Ferrell, Director  
National Biomass Coordination Office  
U.S. Department of Energy



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# Presentation Overview

- Biomass Legislative Drivers
- DOE-USDA Solicitation FY '02, '03, & '04
- DOE State Biomass Opportunities
- DOE California Investments
- DOE Office of Biomass Program Overview:
  - MYTP Research Focus



## Recent Congressional Directives:

- **Biomass Research and Development Act of 2000**
  - Biomass R&D Technical Advisory Committee
    - Vision for Bioenergy & Biobased Products in the US
    - Roadmap for Bioenergy & Biobased Products in the US
  - Biomass R&D Board
- **Farm Bill 2002, Title IX**
  - Federal Procurement of Biobased Products (Section 9002)
  - Renewable Energy Systems and Energy Efficiency Improvements (Section 9006)
  - Biomass Research and Development (Section 9008)
  - Continuation of the Bioenergy Program (Section 9010)
- **Healthy Forest Restoration Act of 2003, Title II**
- **Energy and Water Development Appropriations Committee**



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# Biomass R&D Board Members

## **David Garman, Co-Chair**

Assistant Secretary  
Energy Efficiency and Renewable Energy  
U.S. Department of Energy

## **Mark E. Rey, Co-Chair**

Under Secretary  
Natural Resources and Environment  
U.S. Department of Agriculture

## **Jean-Mari Peltier**

Counselor to the Administrator  
U.S. Environmental Protection Agency

## **Bruce Hamilton**

Director  
Bioengineering and Environmental  
Systems Division  
National Science Foundation

## **Jim Tate**

Science Advisor  
U.S. Department of Interior

## **Kathie Olsen**

Associate Director for Science  
Office of Science and Technology  
Policy

## **John Howard**

Federal Environmental Executive  
Office of Federal Environmental  
Executive



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# Farm Bill – Title IX Section 9002

- Model implementation program for Federal agencies to purchase biobased products
- The USDA has proposed guidelines for designating items made from biobased products that would be given Federal procurement preference.

## Objectives:

- Improve demand of biobased products
  - Spur development of rural communities.
  - Enhance the nations energy security
- The proposed rule is posted at <http://a257.g.akamaitech.net/7/257/2422/14mar20010800/edocket.access.gpo.gov>.



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# Section 9002 Guidelines

- Define the term “biobased product”
- Identify which biobased products qualify
- Prioritize items for designating as biobased
- Develop product categories, items, and propose minimum biobased content
- Require manufacturers to the use certain testing methods to validate environmental and health benefits and biobased content
- Propose cost-sharing for testing of products
- Request voluntary information from manufacturers and vendors on an Internet web site, such as availability, relative price, performance, and environmental and public health benefits
- Outline the use of a “USDA Certified Biobased Product” label for items with procurement preference



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# Farm Bill – Title IX Section 9006

## Renewable Energy Systems & Energy Efficiency Improvements

- Interagency Effort (USDA lead, DOE & EPA support)
- 5 yr, \$23M/yr for Renewable & Energy Efficiency Projects
- 50% for RE and 50% EE
- Wind, solar, biomass, geothermal, hydrogen, building and industrial efficiency
- Farmers, Ranchers, Rural Businesses eligible
- 25% Grant Program, \$100 M in total project value
- Non-R&D (Bricks and Mortar)

FY04 Total Project Value over **\$400 Million** (loans and grants)



# Section 9006 Process This Year

- Development of FY04 Section 9006 Grants and Loan Program
  - Draft of the Rules (underway)
  - Publish Rules for public comment Winter 2004
  - Late Spring early summer open for applications
  - July thru August – review of applications
  - September announcements of successful applicants
- Improve Quality of Applications
  - Toolkit for Applicants
    - Models
    - Guidelines





# Section 9006 What You Can Do...

- Get the word out to potential applicants on this potential source of project funding
  - Add as element of meetings, workshops, websites
  - Secure USDA state-level representation/participation (see state contacts via [http://www.rurdev.usda.gov/recd\\_map.html](http://www.rurdev.usda.gov/recd_map.html))
  - <http://www.rurdev.usda.gov/rbs/farbill/contacts.htm>
- Support development of more & better applications
  - Link to USDA Sec. 9006 technical info websites
  - <http://www.rurdev.usda.gov/rbs/farbill/resourc.htm>
- Use stakeholder and industry networks to support effort
  - Share draft Rulemaking, timelines, etc., when available (expected Winter 2004)
  - Will be posted at <http://www.rurdev.usda.gov/rd/farbill/9006resources.html>



# 2003 USDA - CA Rural Development Grant Recipients

## Some California Recipients:

- Cedar Mills Eco Farm (\$145,000)
  - Working capital grant to market organic produce produced in a greenhouse that uses bioenergy to heat the greenhouse products.
- Cal/West Seeds (\$100,030)
  - Purpose of project is to open emerging markets for a unique proprietary hybrid "BMR Hybrid Sudangrass" seed.
- Western United Dairymen (\$299,871)
  - The project will study the feasibility of developing a fuel market for renewable methane created on dairies.

**Total Value-Added Product Market Grant Recipients = \$4,174,507**



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# FY '02 Biomass Solicitation – DOE

## ***Biomass Research and Development for the Production of Fuels, Power, Chemicals and other Economical and Sustainable Products:***

- Advanced Biorefining of Distiller's Grain and Corn Stover Blends: (High Plains Corporation, Novozymes North America, Inc., VTT-Findland, National Renewable Energy Laboratory) - \$17.7 million, Total Project \$36.1 million
- A Second Generation Dry Mill Biorefinery (Broin and Associates, Inc, National Renewable Energy Laboratory) - \$5.5 million, Total Project \$12.1 million
- A New Biorefinery Platform Intermediate (Cargill, Codexis, Inc., Pacific Northwest National Laboratory) - \$6.1 million, Total Project \$12.2 million
- Making Industrial Bio-refining Happen (Cargill Dow, Iogen, Shell Global Solutions, CNH Global NV ) - \$26.0 million, Total Project \$52.0 million
- Integrated Corn-Based Bio Refinery (E.I. du Pont de Nemours & Co., Inc., Diversa, National Renewable Energy Laboratory) - \$18.2 million, Total Project \$37.2 million
- Separation of Corn Fiber and Conversion to Fuels and Chemicals Phase II: Pilot-scale Operation (National Corn Growers Association, Archer Daniels Midland, and Pacific Northwest National Laboratory) - \$2.4 million, Total Project \$4.9 million



- *Value Added Products from Hemicellulose Utilization in Dry Mill Ethanol Plants* - The Iowa Corn Promotion Board received the USDA's support for its plans to integrate enzymatic hydrolysis, fermentation, and aqueous phase catalysis to produce high-value components from hemicellulose.
- *Continuous Isosorbide Production from Sorbitol Using Solid Acid Catalysis* - For this project, the Iowa Corn Promotional Board will develop a process to convert sorbitol, from corn wet milling operations, to isosorbide.



1. Integration of Leading Biomass Pretreatment Technologies with Enzymatic Digestion and Hydrolyzate Fermentation Thermotolerant Biocatalyst for Biomass Conversion to Products, Trustees of Dartmouth College, \$1,882,866
2. Thermotolerant Biocatalyst for Biomass Conversion to Products Engineering, University of Florida (Gainesville, FL), \$1,437,620
3. Demonstration of the PureVision Biorefinery, Pure Vision Technology, Inc. (Ft. Lupton, CO), \$2,000,000
4. Platform Chemicals from an Oilseed Biorefinery, Cargill, Inc. (Minneapolis, MN), \$1,877,176



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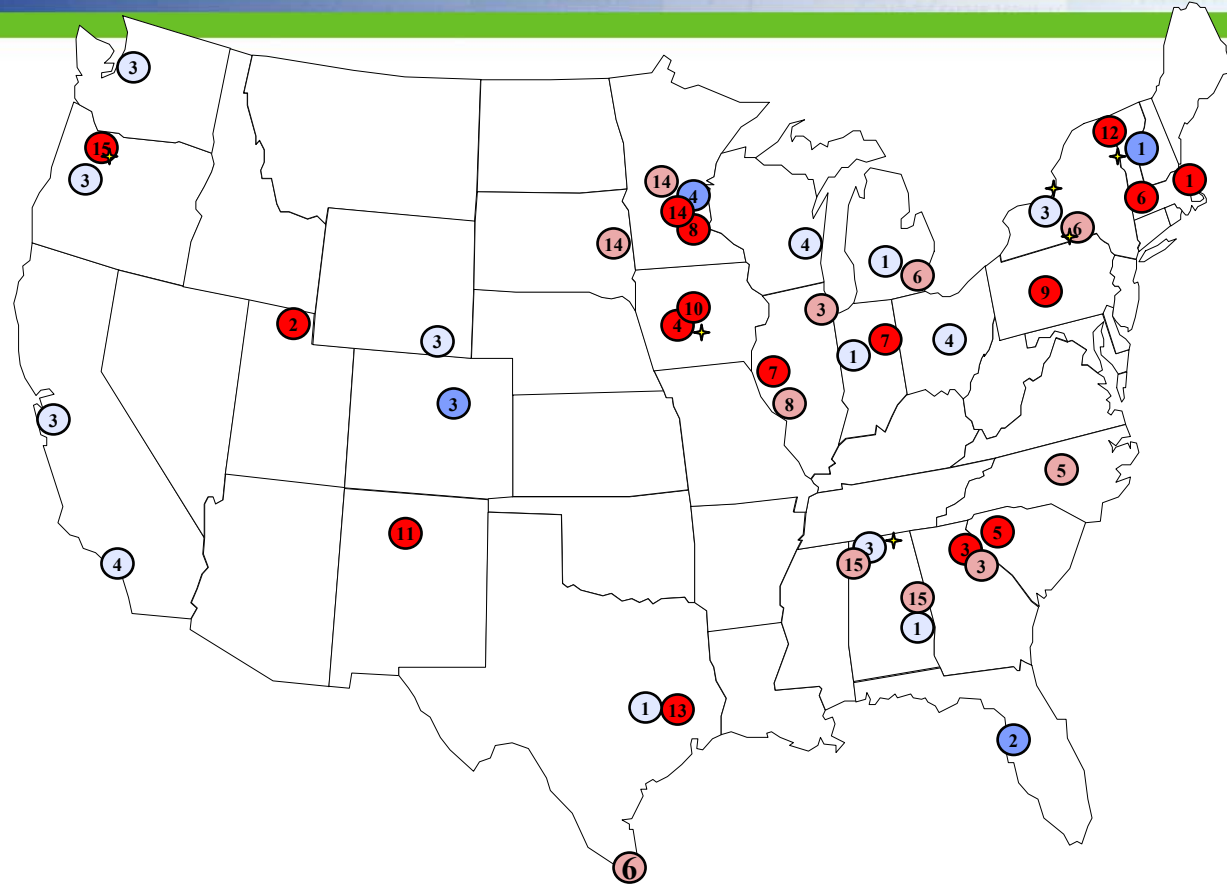
# FY03 USDA-DOE Biomass Joint Solicitation Projects by Location

## DOE's Projects

1. Trustees of Dartmouth (Hanover, NH)
2. University of Florida (Gainesville, FL)
3. Pure Vision Technology, Inc. (Ft. Lupton, CO)
4. Cargill, Inc. (Minneapolis, MN)

## USDA's Projects

1. Metabolix, Inc. (Cambridge, MA)
2. Utah State University (Logan, UT)
3. Earth Resources, Inc (Carnesville, GA)
4. West Central Cooperative (Ralston, IA)
5. Clemson University (Clemson, SC)
6. New Energy Solutions, Inc. (Pittsfield, MA)
7. Archer Daniels Midland Company (Quincy, IL & Decatur, IN)
8. Grain Value, LLC (St. Paul, MN)
9. Pennsylvania State University (University Park, PA)
10. Iowa State University (Ames, IA)
11. Local Energy (Tesuque, NM)
12. Vermont's Alternative Energy Corporation (Williston, VT)
13. Texas Agricultural Experiment Station (College Station, TX)
14. Sebesta, Blomberg, & Associates, Inc. (Roseville, MN)
15. T.R. Miles Technical Consultants, Inc. (Portland, OR)



	DOE Primary Contractor		USDA Primary Contractor
	DOE Subcontractor		USDA Subcontractor
+ Multiple contractors or subcontractors are located in this area.			



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# FY04 – Joint Solicitation

## Biomass Research and Development Initiative DE-PS36-GO94002

ISSUING OFFICE:  
U.S. DEPARTMENT OF ENERGY  
in Partnership with  
U.S. DEPARTMENT OF AGRICULTURE

ISSUE DATE:	December 22, 2003
REGISTRATION FORM DUE:	January 16, 2004
PRE-APPLICATION DUE:	January 30, 2004
FULL APPLICATION DUE :	March 26, 2004

- Information regarding this solicitation is available on the Department of Energy, Industry Interactive Procurement System (IIPS) website at: <http://e-center.doe.gov> or the Biomass Research and Development Initiative website at: <http://www.bioproducts-bioenergy.gov>.



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# FY04 – Joint Solicitation Technical Topic Areas

- **DOE-1:** Thermochemical Conversion – Syngas Cleanup & Conditioning and Pyrolytic Bio-Oils – Handling and Blending Characteristics
- **DOE-2:** Thermochemical Conversion – Fundamental Breakthrough Research
- **DOE-3:** Biomass – Petroleum Refinery Evaluations
- **DOE-4:** Thermochemical Gasification – Kraft Black Liquor Gasification
- **USDA-5:** Feedstock Development and Production
- **USDA-6:** Biobased Products – Environmental and Economic Performance
- **USDA-7:** Biomass Focused Forest Management Training
- **USDA-8:** Incentives





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# DOE-Biomass State FY 04 Opportunities

- Small Business Innovative Research (closed 1/6/04)
  - Sensors & Controls – Biomass Yield and Moisture Content
    - Phase I -- 9 months – up to \$100K
    - Phase II – 24 months – up to \$750K
    - Phase III – non-SBIR capital

<http://www.science.doe.gov/sbir/Solicitations>
- Inventions & Innovation
  - Technologies in early stage of development -- \$40K
  - Technologies approaching Prototype -- \$250K

<http://www.eere.energy.gov/inventions/index.html>
- State Energy Program (SEP) \$500K
  - Biomass Categories
    - Outreach and Information Transfer
    - State and local incentives
  - [http://www.eere.energy.gov/buildings/state\\_energy/](http://www.eere.energy.gov/buildings/state_energy/)



- US DOE National Biomass State and Regional Partnership (\$2 million FY 04)
  - Pacific -- DOE Seattle Regional Office with WGA
  - Western – Western Governor's Association
  - Great Lakes – Council of Great Lakes Governors
  - Southeast – Southern States Energy Board
  - Northeast – Coalition of Northeastern Governors
- Partnership Objectives
  - State support for Office of Biomass Programs & work closely with DOE Regional Offices
  - Facilitate closer communication
  - Provide leadership in addressing policy and technical issues
  - Partner with States



## BEFORE 2002

## NOW

**OTT**

**Biofuels**  
• *Ethanol*  
• *Renewable Diesel*

**OPT**

**Biopower**  
• Gasification, IGCC  
• Co-firing  
• Modular Power

**OTT/  
OPT**

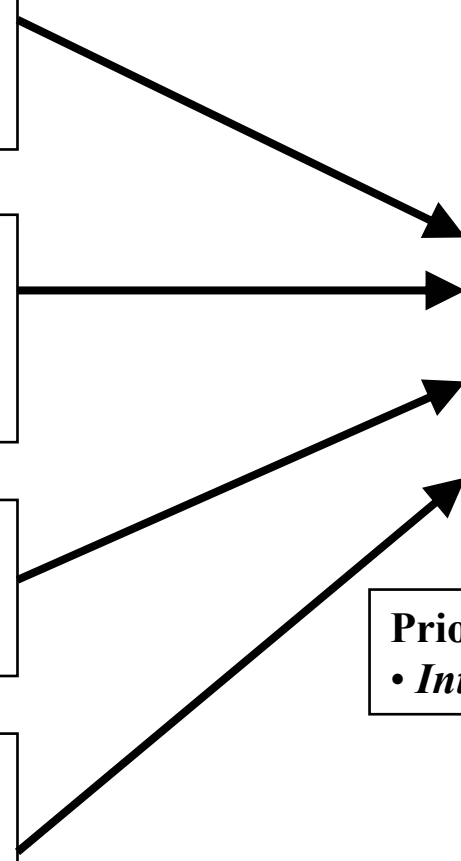
**Feedstock Development**  
• Residue Logistics  
• Energy Crops

**OIT**

**Industries of the Future**  
(energy efficiency, bioproducts)  
• Agriculture  
• Forestry (part)

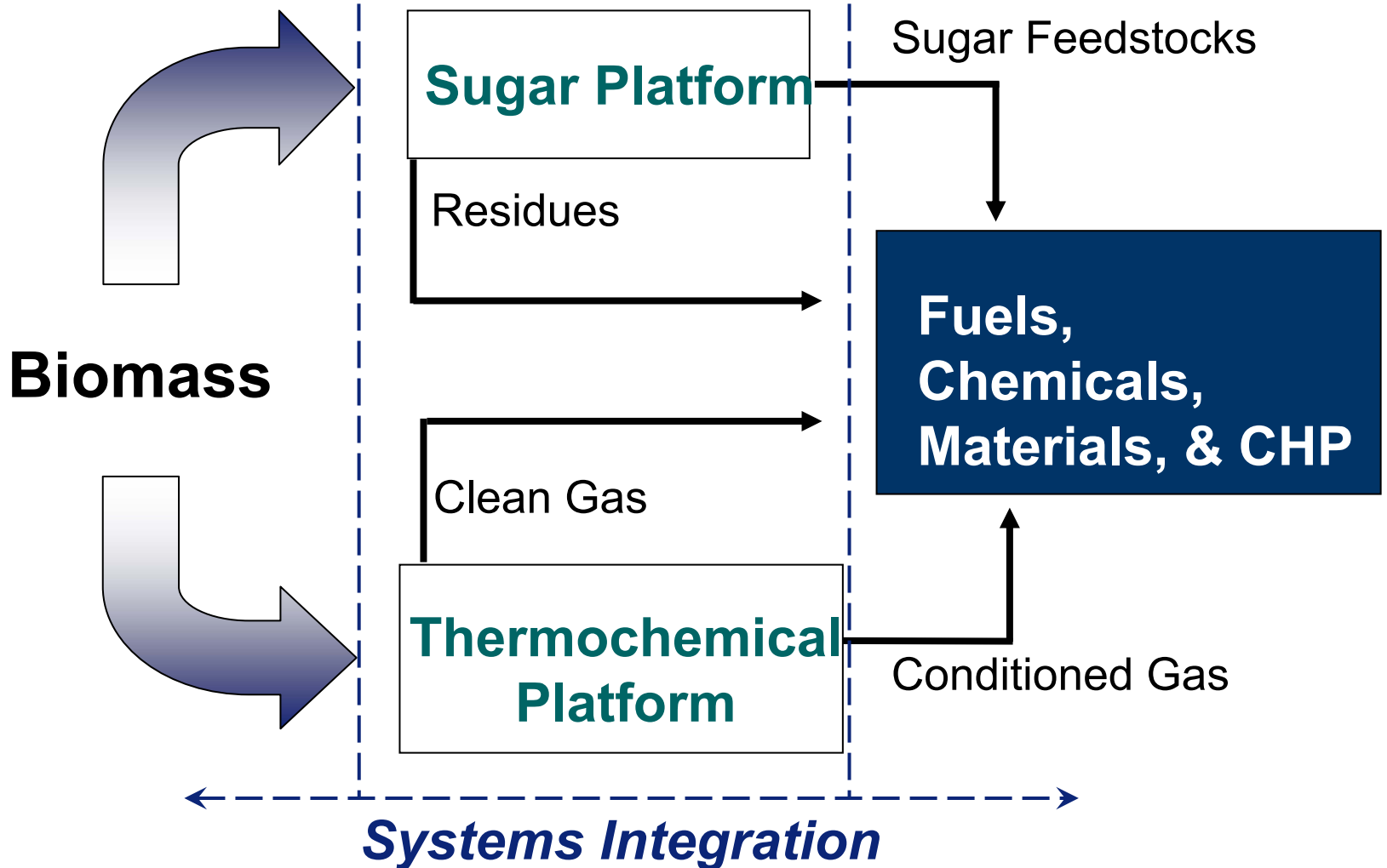
**Office of  
Biomass  
Program (OBP)**

**Priority:**  
• *Integrated Industrial Biorefinery*





## Advanced Biomass R&D

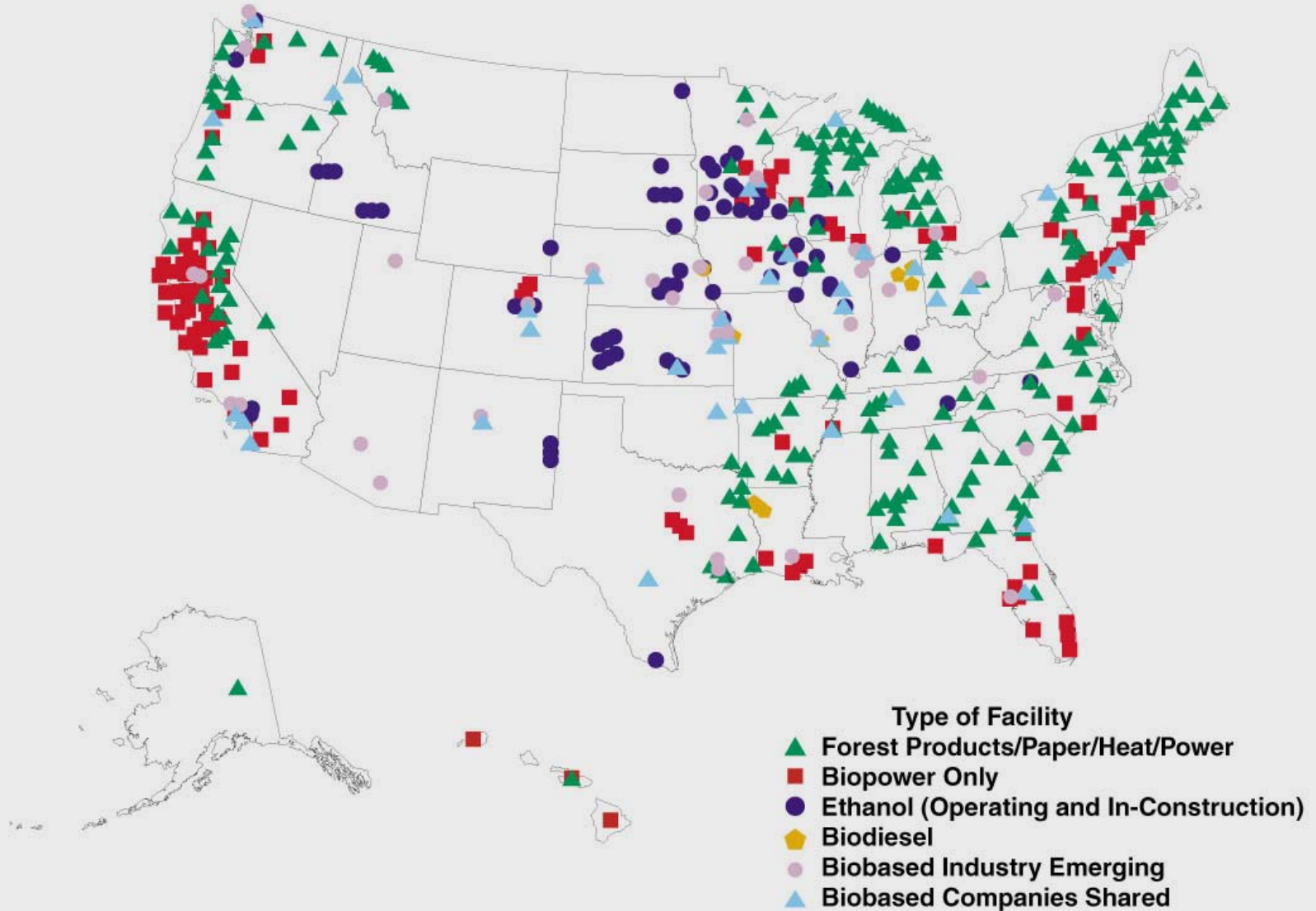




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# Existing Biomass Facilities

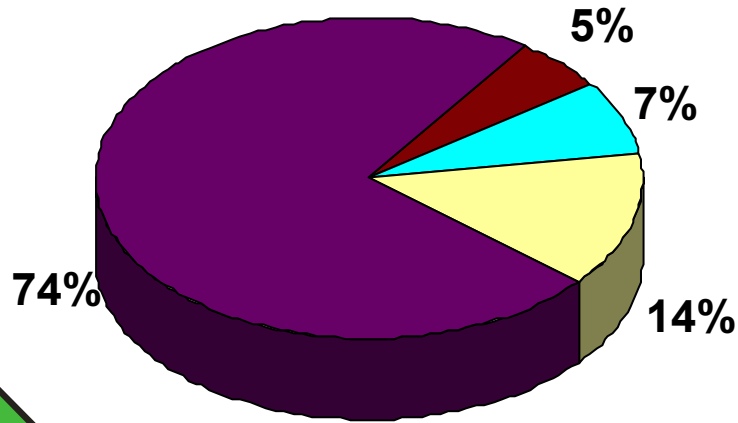




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# OBP Investments in California



- R&D
- Analysis & Consulting
- Ethanol Demonstrations
- Biopower Demonstrations

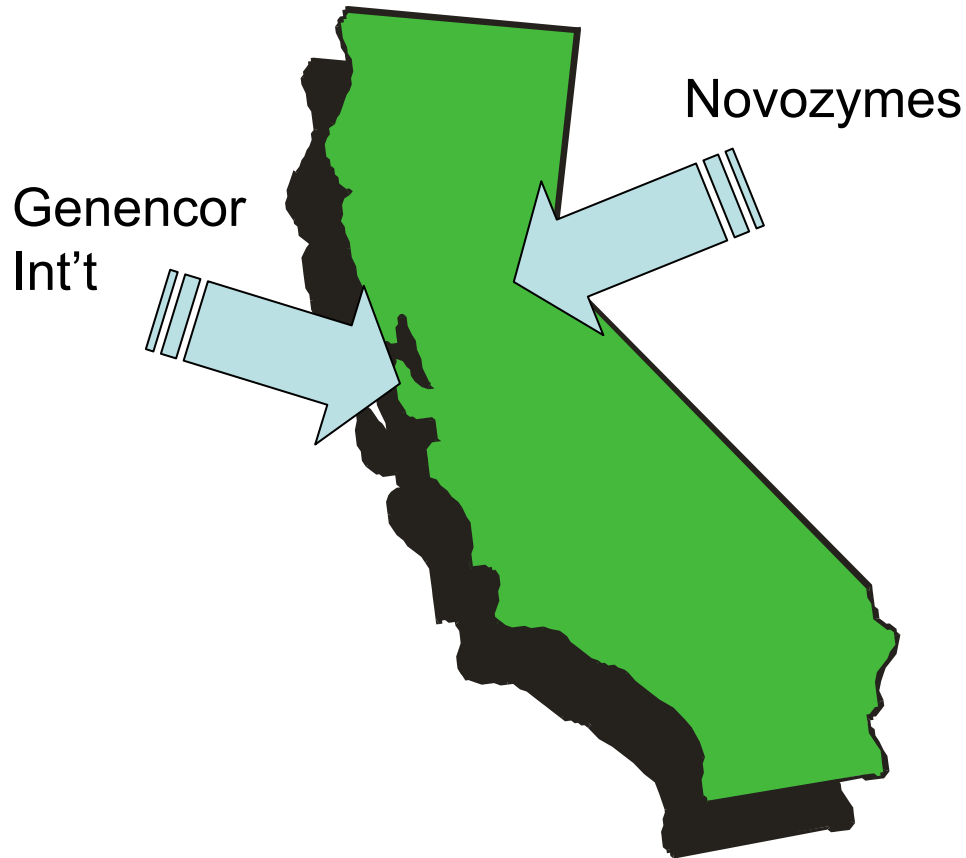


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# Enzyme R&D

\$20M+





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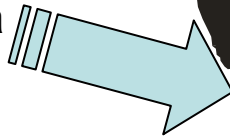
# Small Modular Biopower ('98 – '04)

CPC/Hoopa Reservation  
(w/ CEC)



CPC/Shasta  
(CEC & USDA)

Carbona  
Corp.



Flex Energy  
(w/ CEC)



CPC/San Barnadino  
(w/ USDA)





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For more information...

- Visit the Biomass Research and Development Initiative Internet web site at:
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- Contact:
  - John Ferrell, DOE Director
  - National Biomass Coordination Office
  - Office of Biomass Program
  - Energy Efficiency and Renewable Energy