

**BIOMASS RESOURCES FOR PRODUCING
RENEWABLE POWER AND FUELS
IN THE STATE OF NEW JERSEY
AND INCENTIVES TO PROMOTE THEIR DEVELOPMENT**

Report & Recommendations of the
Biomass Work Group

Co-Chairs

Gail Richardson, Energy Vision

David Specca, Rutgers EcoComplex

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Biomass Work Group

Graham Barker, Air & Gas Technologies
Jeffrey Beach, N.J. Department of Agriculture
Phil Cerria, South Jersey Energy Solutions
Edward A. Clerico, Natural Systems Utilities
Carol Coren, Rutgers Food Innovation Center
Rocco D'Antonio, Organic Diversion LLC
Chuck Feinberg, Chairman, Clean Cities N.J
Kenneth Frank, N.J. Department of Environmental Protection
Serpil Güran, Ph.D., Rutgers EcoComplex
Priscilla Hayes, Esq., Materials Management Consultant
Zane Helsel, Ph.D., N.J. Ag Experiment Station
Richard C. Kunze, The Ocean County Utilities Authority
Bryan Luftglass, Linde, Inc.
Dennis W. Palmer, P.E., Landis Sewerage Authority
Jerome K. Prevete, Pennoni Associates Inc.
Gail Richardson, Ph.D., Energy Vision; BWG Co-Chair
Gail Rosati, Organic Diversion LLC
Robert W. Simkins, Burlington County Resource Recovery
Gary Sondermeyer, Bayshore Recycling
David Specca, Rutgers EcoComplex; BWG Co-Chair
William E. Toffey, Effluential Synergies LLC
Joanna D. Underwood, Energy Vision
William E. Wells, New Jersey Natural Gas

The Task

State goal: 22.5% of electric power from renewable sources by 2021.

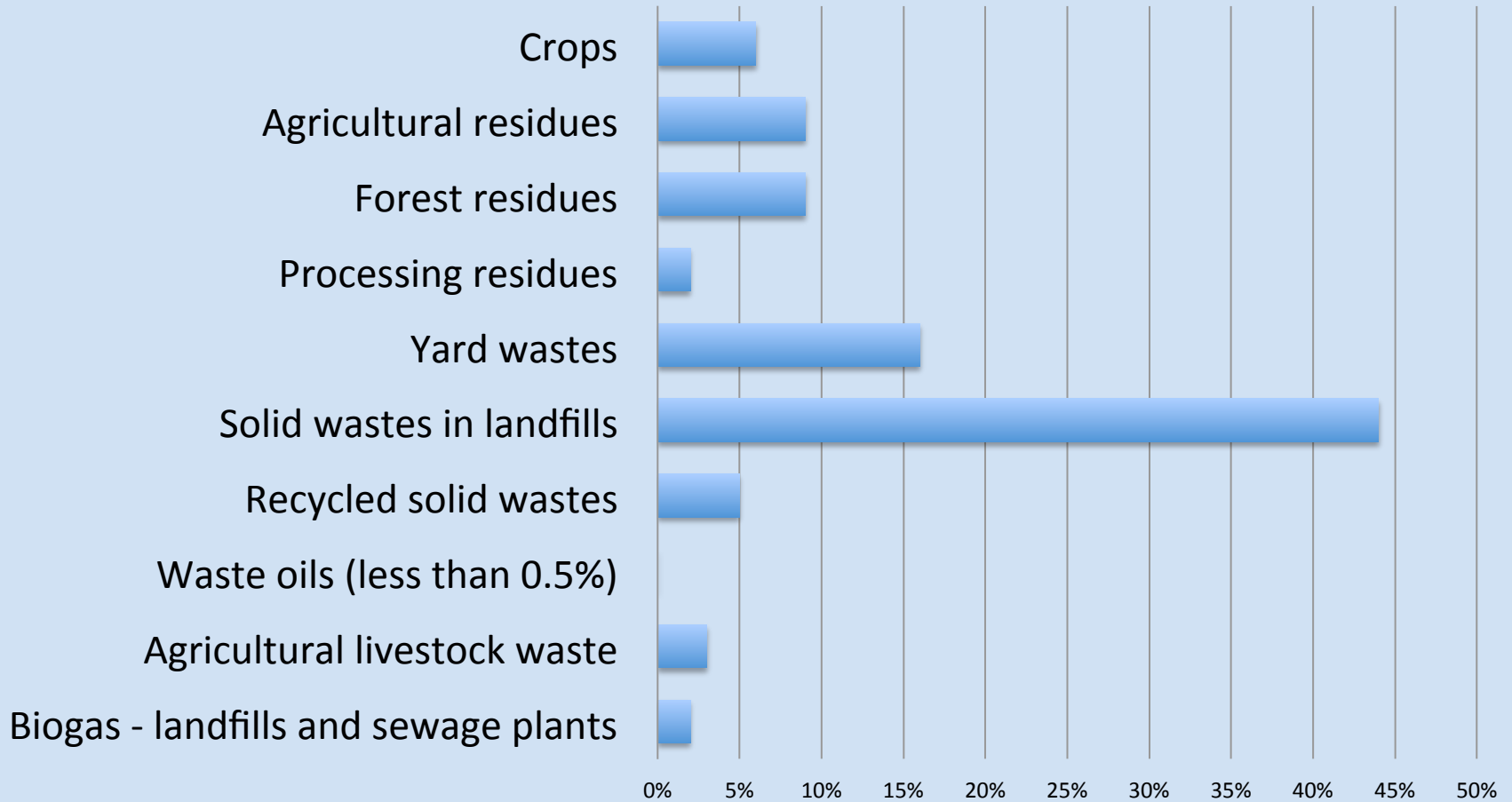
Lagging biomass sector: Current state-level incentives for producing renewable electricity are ineffective in stimulating investment in biomass-to-energy facilities.

***Central question:* What can the State do to incentivize the development of biomass resources for energy production?**

“Energy” in the 2011 Draft Energy Master Plan: Includes vehicle fuel for the first time. Among other measures to encourage the use of clean transportation fuels, promotes a shift to natural gas fuel for truck and bus fleets.

N.J. Biomass Resources

Potential Source of Up to 9% Electricity
OR 5% of Highway Fuel Consumption



Source: Assessment of Biomass Energy Potential in New Jersey, 2007

Commercial/Near-Commercial Technologies for Converting N.J. Biomass to Energy

Electric Power, Heat, and Vehicle Fuels

- *Anaerobic digestion*
 - *Gasification*
 - *Pyrolysis*

Electric Power and Heat

- *Direct combustion*

Ethanol Fuel

- *Cellulosic ethanol*
- *Dilute acid hydrolysis*

Biodiesel Fuel

- *Transesterification*

Key Challenge

Renewable biomass-to-energy industry in N.J. is limited to electric power generation at landfills

- Little on-the-ground experience with sustainable biomass-based pathways toward the State's renewable energy and clean fuels goals – that is, pathways with the lowest possible energy costs and no adverse environmental or society consequences.
- No adequate basis, yet, for designing incentives for biomass-based energy facilities.

Recommendations

MAJOR RECOMMENDATION

- ***Biomass to Power & Fuels Initiative***: Target State resources to facilitate public-private partnerships to build and operate biomass-to-power & fuels plants in two to three years.

OTHER RECOMMENDATIONS

- Facilitate and incentivize pilot and small-scale biomass-to-energy demonstrations.
- Commission studies of key economic aspects of ag and rural feedstocks.
- Commission studies to fill data gaps for urban and industrial feedstocks.

RNG WORK GROUP ANALYSIS

- Renewable natural gas is a sustainable biomass-based fuel with an unmatched combination of economic & environmental benefits.

Biomass to Power & Fuels Initiative

A State-driven program to facilitate the rapid development by private companies and public-private partnerships of commercial biomass-based energy facilities, having these objectives:

- 1) Contribute to the state's renewable energy and clean fuels goals
- 2) Serve as showcases of effective technologies and business models for producing power and fuels from biomass, and
- 3) Create the knowledge base needed to establish effective incentives to support the growth of the biomass-to-power & fuels industry in N.J.

Precedent: Transfer Station Initiative of 1987-88

Biomass to Power & Fuels Initiative

Components

1. State agency collaboration to target existing resources for BPFIs facilities
 - Resources already available through state and federal programs
 - State agency participation as project partners
 - Regulatory reform and speedy completion of regulatory review
2. RFP process to be carried out by the State
3. DECISIONS BASED ON: Selection criteria including number of facilities, host sites, eligible technologies, geographic distribution, energy products to be developed, and end-user markets. Weighted “outcome” criteria related to various economic, energy, job, and environmental objectives. The feasibility of providing project-specific State resources and the acceptability of a proposed project at the community level.

RNG Work Group Perspectives

1. RNG along with conventional natural gas is the only alternative fuel pathway today that can simultaneously a) break the oil dependence of trucks and buses; b) slash health-endangering urban air pollution; c) lower greenhouse gas emissions; and d) reduce fuel costs and price volatility.
2. RNG, when produced from biogas emissions of organic waste, is the least carbon-intensive fuel in the world and a fuel solution for trucks and buses. Expansion of natural gas fleets in N.J., as promoted by the Energy Master Plan, would create market incentives for RNG. One in four trucks and buses in N.J. could be fueled with RNG.
3. New Jersey is home to the largest concentration in the U.S. of high-tech companies that produce and market – nationally and internationally – advanced gas-separation technologies essential for producing RNG vehicle fuel from biogas. N.J. could build on this high-tech biomass technology sector to create a state-based RNG industry.

Agricultural and Other Rural Biomass Resources

What role can agriculturally derived fuels products play in the development of new fuel sources in N.J.?

Are there any regulatory or legislative barriers to the development of this fuel source?

Agricultural and Other Rural Feedstocks in N.J.

Agricultural & Other Rural Feedstocks	Net Usable Dry Tons 2007	% of Total
Crop Residues (1)	219,009	30%
<i>Corn stalks and cobs</i>	<i>108,582</i>	
<i>Wheat straw</i>	<i>37,666</i>	
<i>Rye straw</i>	<i>33,897</i>	
<i>Low grade hay (2)</i>	<i>38,864</i>	
Livestock Manures (3)	167,704	23%
Forestry Residues (4)	234,525	33%
Processing Residues	97,193	14%
TOTAL	718,431	100%

Findings – Farm and Rural Biomass

- Crops produced on N.J. farms have a much higher value for food and feed than as a bioenergy feedstock.
- Alternative uses for crop residues, including animal bedding, erosion control, soil nutrient and organic matter management may make them cost prohibitive as a bioenergy feedstock.
- Farmers do not usually pay disposal fees for organic waste disposal.
- Other incentives, such as the return of fertilizer and organic matter to the farm from bioenergy plants, may overcome these barriers.
- With nearly 2 million acres of state owned or managed land, there exists a large opportunity to produce sustainable energy crops and reduce the maintenance costs of State lands.

Recommendations – Farm and Rural

- Conduct a study to determine the economic availability of ag biomass, given its alternative uses.
- Investigate business models that will help to bring together ag and rural biomass in energy projects.
- Conduct a study to assess energy potential of sustainable forest residues.
- Determine the availability of State-owned and influenced lands for biomass production.
- Develop a framework for farmers to be able to grow and harvest bioenergy crops on State owned and influenced lands.

Urban Biomass Resources in N.J.

What other biomass opportunities exist in N.J.?

Urban Biomass Feedstocks in N.J.

“NON-AGRICULTURAL” BIOMASS FEEDSTOCKS	NET USABLE DRY TONS 2010	% OF TOTAL
Yard Waste	904,712	23%
<i>Brush/Tree Parts</i>	<i>278,765</i>	
<i>Grass Cuttings</i>	<i>49,003</i>	
<i>Leaves</i>	<i>289,354</i>	
<i>Stumps</i>	<i>287,590</i>	
Solid Waste - Landfilled	2,398,998	61%
<i>MSW net of waste paper & food</i>	<i>575,701</i>	
<i>Waste paper</i>	<i>1,111,156</i>	
<i>Food waste</i>	<i>227,440</i>	
<i>Construction & demolition</i>	<i>484,701</i>	
Recycled Materials	276,857	7%
<i>Food waste</i>	<i>59,702</i>	
<i>Wood scraps</i>	<i>60,945</i>	
<i>Magazines, junk mail, etc. (1)</i>	<i>156,210</i>	
Waste Oils	20,638	< 1%
<i>Used cooking oil</i>	<i>16,653</i>	
<i>Grease trap oil</i>	<i>3,985</i>	
Waste Biogas Emissions (2)	349,193	9%
<i>Wastewater treatment plants</i>	<i>21,987</i>	
<i>Landfills</i>	<i>327,206</i>	
TOTAL	3,950,398	100%

Findings - Urban Biomass

- Existing landfills and wastewater treatment plants could play a key role as locations for new clean bioenergy technologies.
- The amount of bioenergy produced from landfill gas could be much greater if 1) landfill gas power plants also recovered waste heat; 2) landfill gas from MSW that is currently being shipped out of state were made available for N.J. truck fuel; 3) landfill gas recovery rates from existing landfills were improved.
- Yard waste is another opportunity feedstock given that it is already being collected and there are few other uses for it.

Recommendations – Urban

- Expedite the planned DEP food waste study. Because of its potentially large amounts, food waste in N.J. could be an opportunity feedstock for biomass-based energy technologies.
- Conduct an inventory of industrial organic wastes as a potential major source of biomass feedstock.

Waste-to Energy “REC” Designation

Does the Biomass Work Group support pursuing changing the classification of waste-to-energy from a Class 2 to a Class 1 resource?

If so, do you have specific recommendations regarding how this should be done?

Waste-to Energy “REC” Designation: No Change Recommended

Based on a consideration of the economics of conventional RECs and of recent Legislative history, the Biomass Work Group found that an effort to modify the waste-to-energy REC definition would be ill advised and does not recommend it.

- A Class 1 definition for this sector wouldn't make any difference, in view of the bottoming out of regional REC markets.
- There appears to be little chance of changing the State-level policy position to retain waste-to-energy as a “Class 2” resource.
- There is value in exploring a market-based approach in the future, perhaps by creating a “Bio-REC” patterned after the SREC and OREC programs.

THANK YOU

Gail Richardson

VP for Programs

Energy Vision

718-222-5575

richardson@energy-vision.org



David Specca

Assistant Director

Rutgers EcoComplex

609-499-3600 x226

specca@aesop.rutgers.edu

