

The State of Institutional Woody Biomass Facilities in the United States



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This research was conducted by Katie Premo in fulfillment of an Independent Study Internship with the US Endowment for Forestry and Communities. The report was edited for publication by Carla Harper, www.West65Inc.com

Executive Summary

This report serves two purposes:

- 1- A summary of steps taken to ensure institutional woody biomass installations - a previously under-reported, albeit growing segment of the wood-to-energy sector - are properly documented through a standardized survey mechanism and placed within the www.Wood2Energy.org system (see below).
- 2- Showcase the wood-to-energy status of the fourteen Northeastern states within USFS Region 9.

The Woody Biomass Joint Venture- a partnership between the US Endowment for Forestry and Communities (Endowment) and USDA Forest Service (USFS) - is working to ensure reliable data on the use of wood for energy is publicly available.

While a number of public and private databases exist, the most exhaustive is www.Wood2Energy.org. Thanks to partners throughout the biomass industry as well as state and federal agencies, this publicly available database contains comprehensive information on the majority of users and processors of wood for energy (e.g., electric facilities, thermal installations, pellet mills) in the U.S. and Canada.

The University of Tennessee Center for Renewable Carbon created and currently houses the system with funding from the Endowment, USFS, American Forest and Paper Association, Forest Products Association of Canada and many other partners. Woody biomass is converted to energy primarily in the form of chips or pellets. The raw material is sourced from forest thinning and/or residue from the manufacture of products such as lumber and paper. Mature technologies, some of which are continuing to advance, efficiently produce energy for heating or electricity through various forms of combustion and gasification. As of January 2013, 297 operational and eight non-operational institutional woody biomass facilities have been identified. Schools account for 50 percent of the facilities. The Northeastern region of the U.S. hosts the most facilities due in large part to historical reliance on fuel oil. Vermont, Maine and Pennsylvania account for 36 percent of all institutional facilities nationally.

Table 1 - Institutional Types of Facilities Included in the Study

Schools
Government Facilities
College Campuses
Community Buildings
Medical Care Facilities
Correctional Facilities

Results - Institutional Woody Biomass Facility Research

This project sought to combine and update existing information on institutional wood-to-energy facilities for inclusion into the Wood2Energy system. The spreadsheet created for this report focused exclusively on institutional facilities using woody biomass to produce heat and/or electricity. Only the types of facilities listed in Table 1 were surveyed by combing key questions from numerous databases, including information on annual fossil fuel savings.

The emailed survey received a 17 percent response rate. Many facilities did not provide complete information, especially regarding fossil fuel savings/offsets. Phone contact enabled an eventual 60 percent response rate. As a result, approximately 110 facilities are categorized as incomplete. In the final analysis, 297 operational institutional facilities were verified and added to the Wood2Energy system. Eight facilities have been removed due to closure.

Chart 1: Location of Institutional Biomass Facilities in the United States

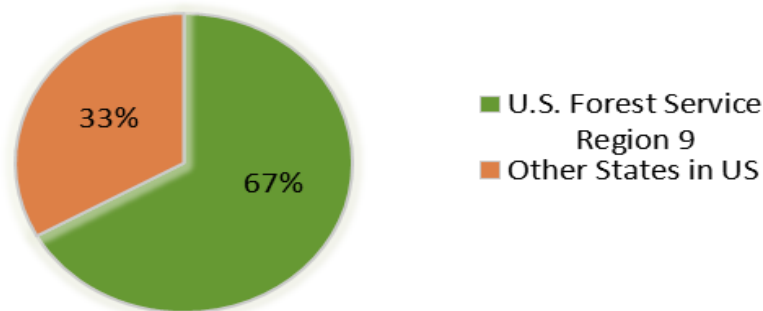


Chart 2: Woody Biomass Facilities in the United States by Type

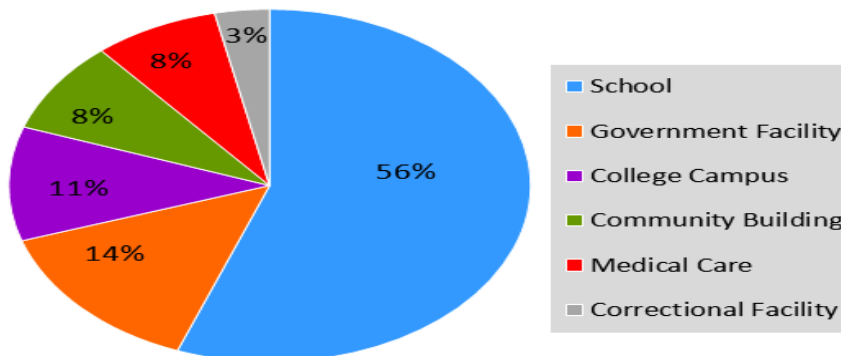


Table 2: Total Institutional by Type

School	165
Government Facility	42
College Campus	31
Community Building	25
Medical Care	23
Correctional Facility	10
Total	297

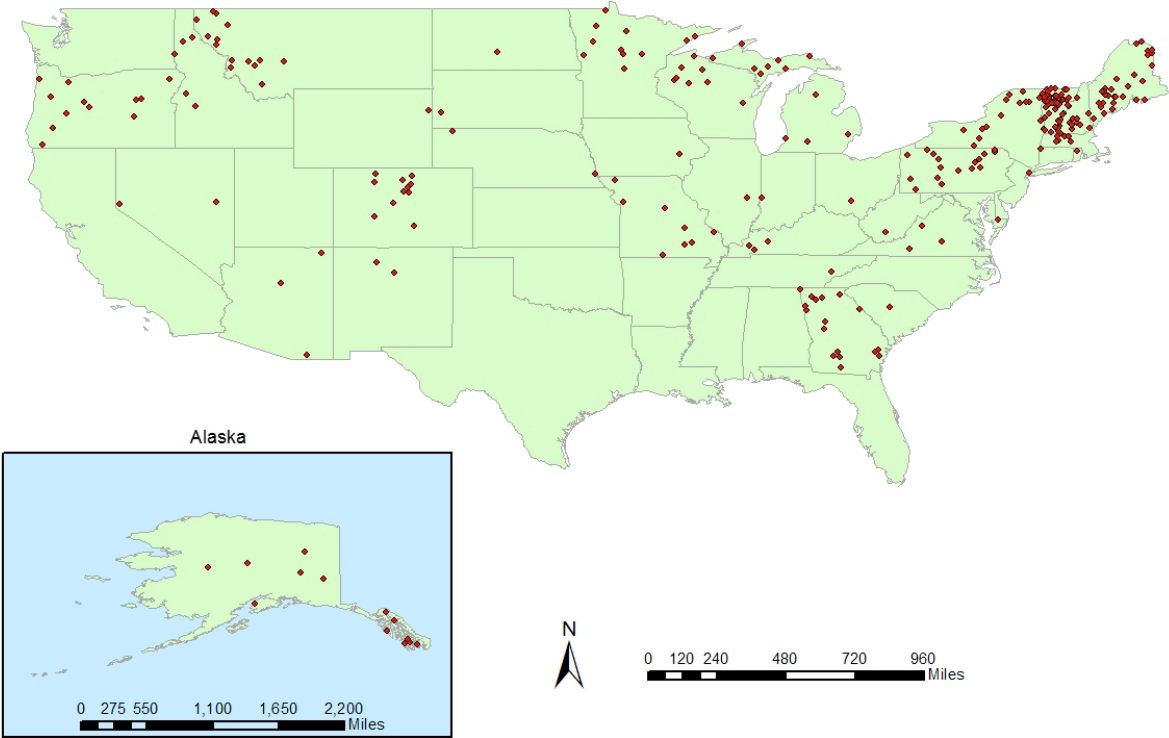
Table 3: Total Institutional Biomass Facilities by State

Alabama	0	Louisiana	0	Ohio	1
Alaska	16	Maine	35	Oklahoma	0
Arizona	3	Maryland	1	Oregon	15
Arkansas	0	Massachusetts	10	Pennsylvania	17
California	0	Michigan	10	Rhode Island	1
Colorado	11	Minnesota	10	South Carolina	0
Connecticut	1	Mississippi	0	South Dakota	1
Delaware	0	Missouri	8	Tennessee	1
Florida	0	Montana	14	Texas	0
Georgia	17	Nebraska	2	Utah	0
Hawaii	0	Nevada	1	Vermont	60
Idaho	5	New Hampshire	13	Virginia	3
Illinois	1	New Jersey	0	Washington	0
Indiana	1	New Mexico	2	West Virginia	1
Iowa	1	New York	15	Wisconsin	10
Kansas	0	North Carolina	0	Wyoming	1
Kentucky	3	North Dakota	2		

Table 4: Selections from the Institutional Biomass Facilities Database – Examples of Collected Data

	Tok School	Townsend Elementary School	Crotched Mountain Rehabilitation Center	Wyoming Honor Conservation Camp
Address	Jon Summar Drive Tok, AK 99780	201 North Spruce Street Townsend, MT 59644	1 Verney Drive Greenfield, NH 03047	40 Pippin Road Newcastle, WY 82701
Type of Facility	School	School	Medical Care	Correctional Facility
Year Operational	2011	2007	2006	2009
Square Footage	88000	58500	365000	10500
Biomass Energy System Manufacturer	Messersmith, Hurst	Solagen	Messersmith, Hurst	Central Boiler
Biomass Fuel Type	Woodchips	Wood Pellets	Woodchips	Cordwood
Size of System	0.005 MMBH	0.68 MMBH	12.0 MMBH	0.5 MMBH
Thermal Output	Steam	Hot water	Heat and hot water	Hot water
Backup Fuel	Fuel Oil	Fuel Oil and Propane	No. 2 oil/diesel	Propane
Annual Biomass Fuel Consumption	3,000 tons	200–300 tons	3,500 tons	20 cords
Combined Heat and Power (CHP)	Yes	No	No	Yes
New or Replacement	Replacement	Replacement	Replacement	Replacement
Fuel Replaced	Fuel Oil	Fuel Oil and Propane	Heating Oil	Propane
Project Cost	\$4,560,000	\$425,000	\$4,500,000	\$37,604
How Project was Funded	Grants	Grants, loans, CO2 offsets	Matching grant	Grant
Project Funder	AK State Renewable-Energy Grant, AK Legislature	Fuels for Schools, DNRC, USDA Rural Development Community Facilities Grant/Loan, The Climate Trust, local conservation district grant, school contribution	Regional Green-house Gas Initiative (RGGI)	Western Governors' Association
Estimated Annual Fossil Fuel Offset	53,000 gallons of fuel oil	12,600 gallons fuel oil, 1,692 gallons propane	25,000 gallons of oil	3,500 gallons of propane
Estimated Annual Fuel Savings	\$125,000	\$22,000	\$500,000	\$8,000

Institutional Woody Biomass Facility Locations in the United States



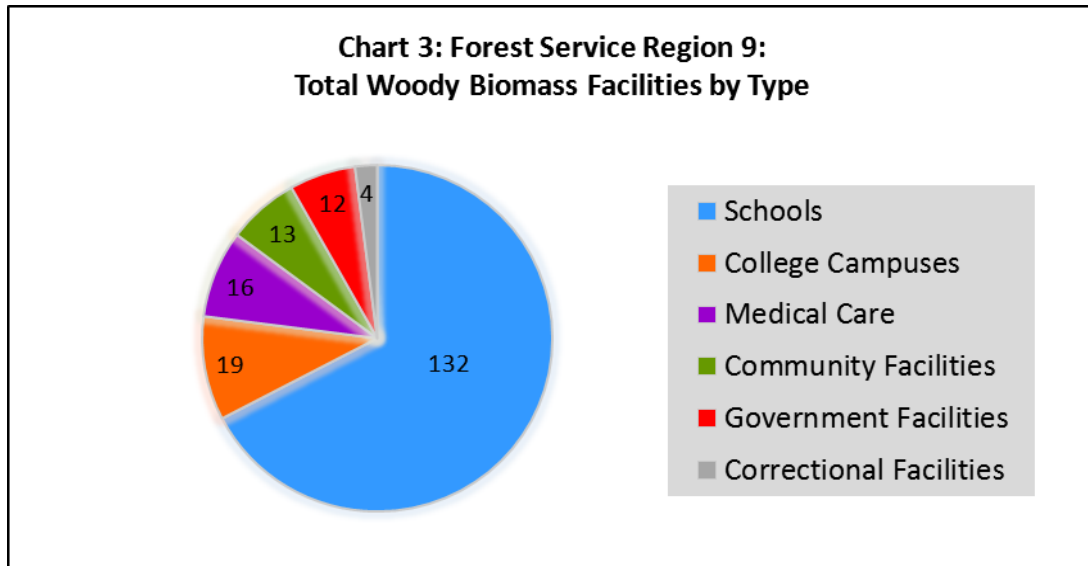
Thermal Woody Biomass Use Northeast Region

The Northeastern region hosts the highest concentration of institutional woody biomass facilities nationally. Many of the installations came on-line during a significant growth trend from 1980-2012. The Fuels for Schools program, along with initiatives in Vermont, encouraged many of the wood-to-energy school conversions in the Northeast. Fuels for Schools was Initiated by USFS State and Private Forestry and Montana’s Bitterroot Resource Conservation and Development (RC&D) Area to encourage the use of woody biomass for heat and power in public and private buildings. The American Recovery and Reinvestment Act (ARRA) supported a number of the new installations in the Northeast, primarily in Maine.

USFS Region 9 States

Connecticut	Maine	Missouri	Pennsylvania
Delaware	Maryland	New Hampshire	Rhode Island
Illinois	Massachusetts	New Jersey	Vermont
Indiana	Michigan	New York	West Virginia
Iowa	Minnesota	Ohio	Wisconsin

Schools represent nearly 70 percent of institutional woody biomass facility types in Forest Service Region 9.

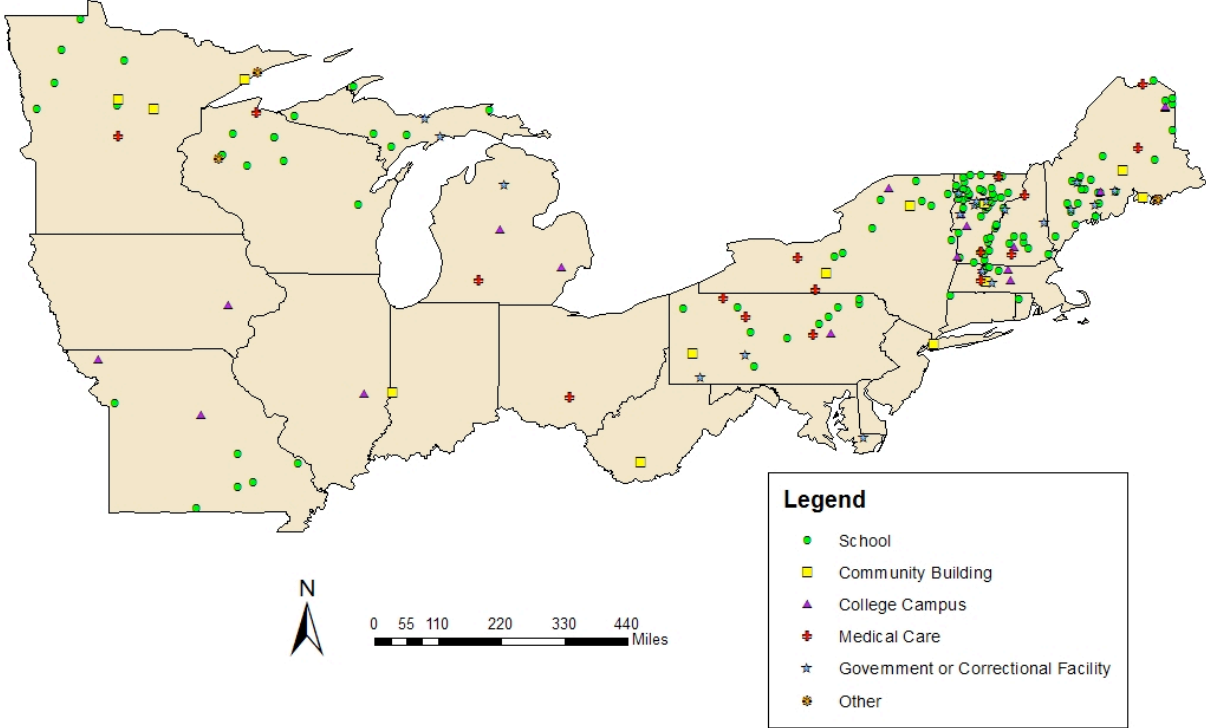


Vermont, Maine and Pennsylvania represent 57 percent of the biomass facilities in Region 9.

Table 5: Forest Service Region 9 – Total Institutional Woody Biomass Facilities by Type and State

State	Type of Woody Biomass Facility						Total Bio-mass Facilities by State
	School	Community Facility	Medical Care	College Campus	Correctional Facility	Government Facility	
Vermont	49	0	2	3	1	4	<u>59</u>
Maine	23	2	2	4	0	4	<u>36</u>
Pennsylvania	10	1	3	1	2	0	<u>17</u>
New York	9	3	2	1	0	0	<u>15</u>
New Hampshire	9	0	2	1	0	2	<u>14</u>
Massachusetts	3	1	1	3	0	2	<u>10</u>
Wisconsin	10	0	0	0	0	0	<u>10</u>
Minnesota	5	4	1	0	0	0	<u>10</u>
Michigan	6	0	2	2	0	0	<u>10</u>
Missouri	6	0	0	2	0	0	<u>8</u>
Connecticut	1	0	0	0	0	0	<u>1</u>
Iowa	0	0	0	1	0	0	<u>1</u>
Illinois	0	0	0	1	0	0	<u>1</u>
Ohio	0	0	1	0	0	0	<u>1</u>
Rhode Island	1	0	0	0	0	0	<u>1</u>
West Virginia	0	1	0	0	0	0	<u>1</u>
Maryland	0	0	0	0	1	0	<u>1</u>
Indiana	0	1	0	0	0	0	<u>1</u>
Delaware	0	0	0	0	0	0	<u>0</u>
New Jersey	0	0	0	0	0	0	<u>0</u>
Total Biomass Facilities							<u>197</u>

United States Forest Service Region 9 Industrial Woody Biomass Facilities



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