

**DIRECTORY OF WOOD MANUFACTURING  
INDUSTRY OF OHIO**

**Bibhakar S. Shakya**

**August 1997**

**The Public Utilities Commission of Ohio**

**Ohio Biomass Energy Program**

**DIRECTORY OF WOOD MANUFACTURING**  
**INDUSTRY OF OHIO**

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## ***Abstract***

This report provides information regarding the amount and type of wood residues available and their current uses in the state of Ohio. These are presented according to the size, wood input requirements, expenditure on energy, types and amount of wood residues generation, existing wood residue uses and disposal, and the current price index for wood residues sold.

This report also updates the database of Ohio Wood Manufacturers with current names, addresses, phone numbers, and other essential information in order to identify the potential source and demand points of wood residues. The database is given in the directory form for each of the industry categories: Dry Kiln, Saw Mill, Small Secondary Manufacturing Sector, and Large Secondary Manufacturing Sector. The report also includes the descriptive methodological tools used for the survey and other relevant information and data such as SIC codes of wood manufacturing industry and number of wood manufacturing companies per county in Ohio.

# Directory of Wood Manufacturing Industry in Ohio

*Bibhakar S. Shakya*

## INTRODUCTION

This report presents the updated directory of wood manufacturing industry in Ohio and other pertinent information on wood inputs, wood residues generation and their use. There are many sectors in the wood manufacturing Industry such as saw mill and secondary manufacturing sector. The following section discusses the classification of wood manufacturing industry and its sectors.

### 1.1 Wood Manufacturing Industry

Wood Manufacturing Industry is classified into two major categories based on the wood input supply. The output of a primary wood manufacturer becomes the input to a secondary wood manufacturer (Figure 1), or in other words, a primary wood manufacturer supplies wood input to a secondary wood manufacturer. The primary wood manufacturer includes Logging Contractor, Saw Mill, and Dry Kiln while the secondary wood manufacturer includes Millwork, Kitchen Cabinet, Boxes and Containers, Pallets and Skid, Furniture, and Fixtures. Figure 1 presents the wood supply linkages between primary and secondary wood manufacturers.

In Ohio, the wood manufacturing industry is an important industrial sector, with more than 300 sawmills/drykilns and more than 1,000 secondary wood manufacturing companies. The industry contributes \$7 billion per year to the state economy and generates over 70,000 jobs (Heiligmann *et. al.*, and ODNR). As part

of their production processes, these wood manufacturing industries also generate considerable amounts of wood residues, such as sawdust, chips, bark, solid wood trim and edging.

## 1.2 Wood Residues and Their Utilization

For the past several years, there have been increasing concern and interest regarding the recycling of wood residues. Wood residues can be used for different purposes: heat and energy, particle boards (reconstituted wood), animal bedding materials, landscaping material and compost (Figure 2). Various public and private enterprises are evaluating the issues regarding the amount of residues generated, their use and disposal, as well as creation of markets for these by-products. However, thorough information regarding these aspects of the industry is lacking for the efficient utilization of wood residues and substantial undertaking is necessary for their market development (Casana; Passewitz *et. al.*; and Warsco).

Several studies have indicated a general trend in the recycling of wood residues (Passewitz *et. al.*; and Widmann and Long), nonetheless, more research needs to be done to explore more efficient methods of their utilization (Casana; Passewitz *et. al.*; and Randall). There are few studies which indicate that wood manufacturers are giving away wood residues or paying \$10-\$11 per ton to have the wood residues removed. The land filling cost for wood residues is even higher (\$20 per ton) which includes the transportation and land filling fees. There are also cases where wood residues are disposed in the landfills (Passewitz *et. al.*; and

Randall). With the availability of appropriate information on wood residues in the state, such inefficient disposal may decrease and other more economic utilization of residues may increase due to the development of proper market infrastructures.

### **1.3 Organization of the Report**

This report is a compilation of the mail survey for their current addresses and also other related information on wood residues generation and use in Ohio.

Chapter I introduces the classification of wood manufacturing company and discusses generation and various uses of wood residues. The information of this report could be useful for the efficient and economic utilization of wood residues in the state and also be used to formulate appropriate policies to address issues regarding the recycling of wood residues.

Chapter II provides the overview of survey methodology and explains the survey population and their responses. In Chapter III, the survey results are presented. And Chapter IV is the directory of wood manufacturing company in Ohio. The more descriptive methodological tools and other relevant information and data are provided under Appendices.

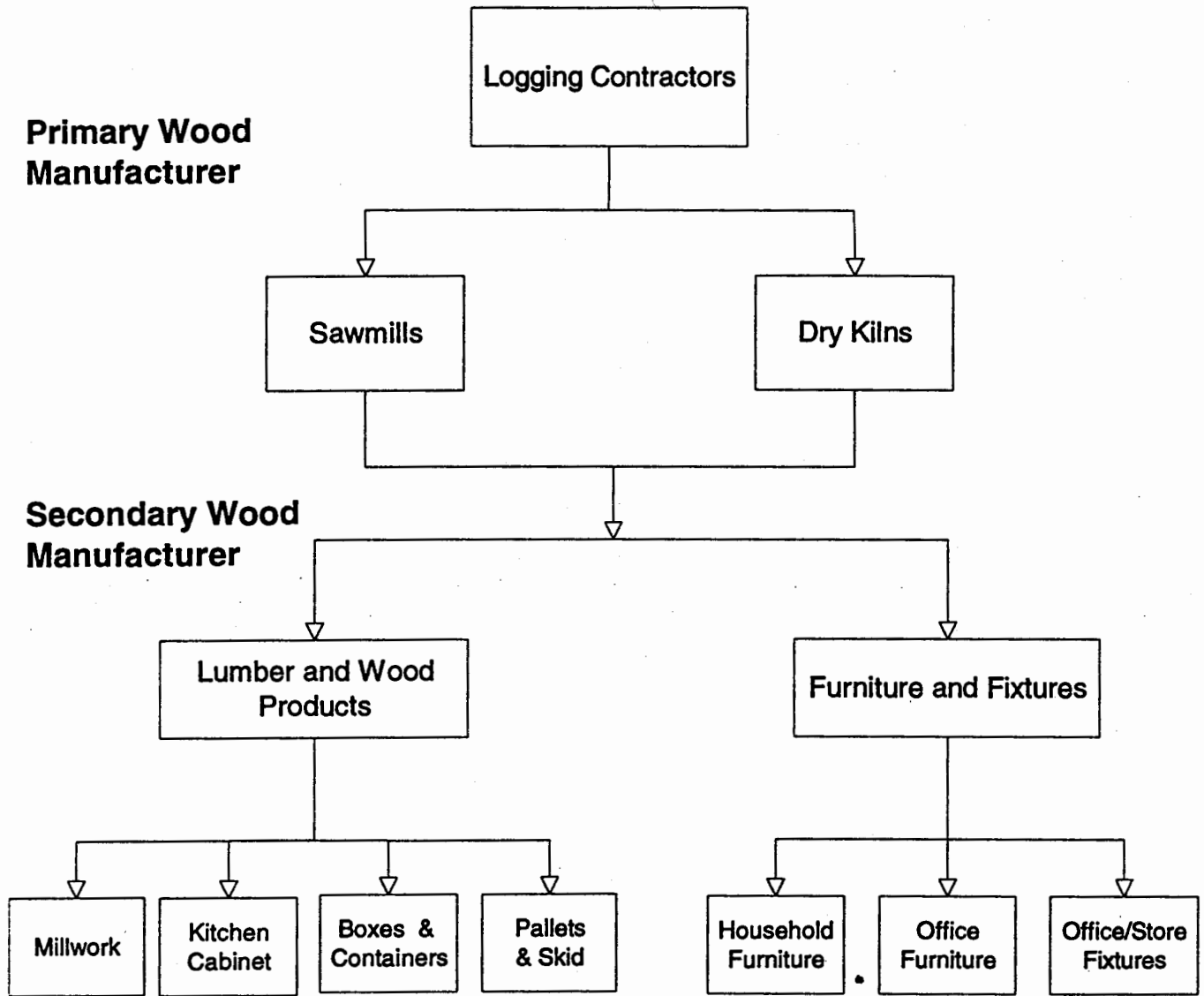


Figure 1. Classification of Wood Manufacturing Industry

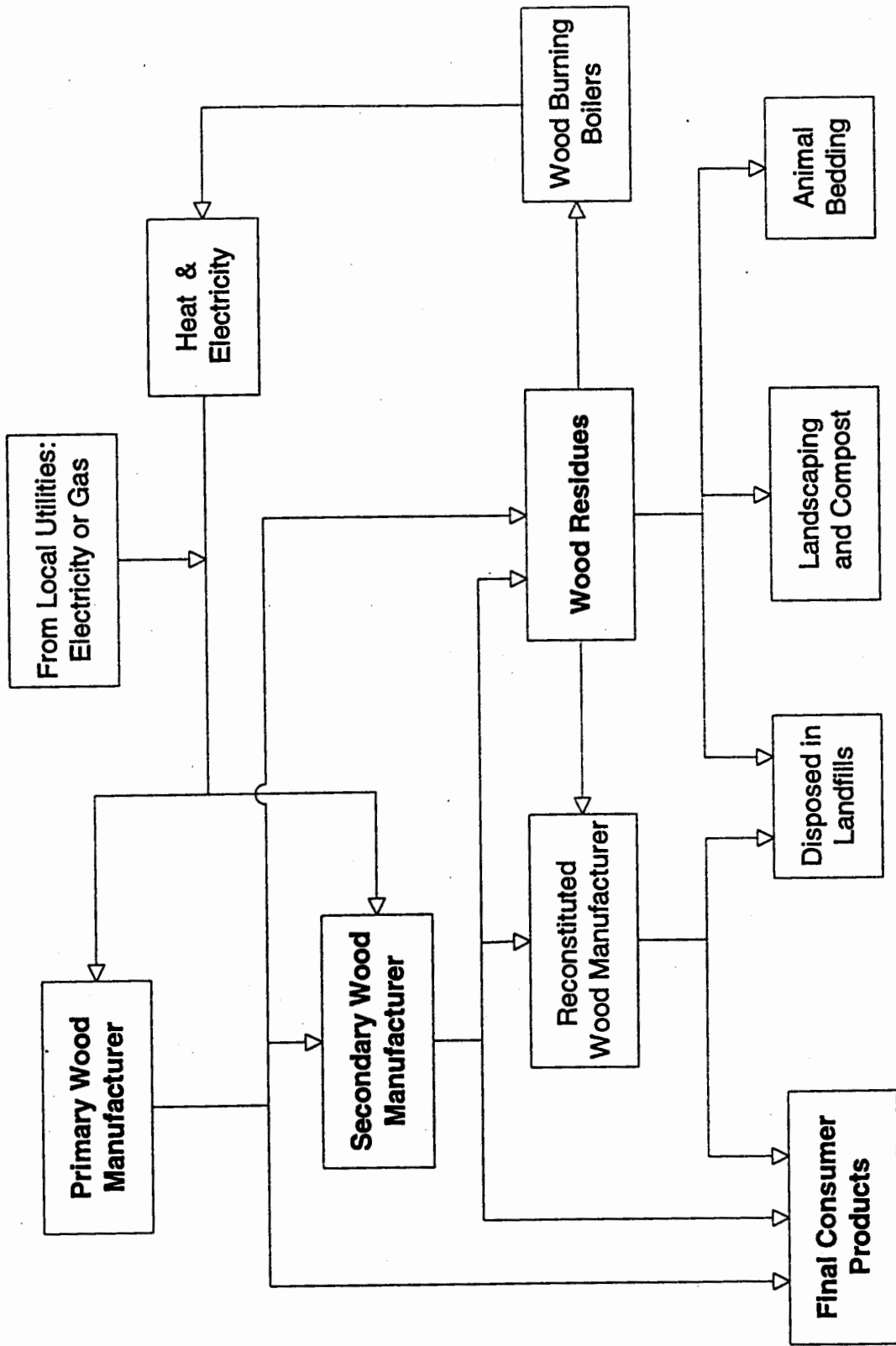


Figure 2. Generation and Use of Wood Residues

## METHODOLOGY

### 2.1 Introduction

There are several methods of survey for data collection such as mail survey, phone survey, field visit and interview. The choice of survey methods depends on the many important factors among which time and money are the critical ones. Therefore, on the basis of the survey budget, time needed to complete this project, number of survey population and also the amount of information to be collected, the mail survey was selected to use for this project to collect the data from the wood manufacturers of Ohio.

The survey form (questionnaire) was carefully designed to suit the purpose of the project, and was made as simple and precise as possible. The questionnaires were specifically designed one each for the two sectors: saw mill/dry kiln and secondary wood manufacturer. The main objective to develop two questionnaires was to make the survey form short and uncomplicated for each sector and was primarily based on the nature of those sectors and the type of wood input requirement. As discussed in the Chapter One of this report, the output from a sawmill/dry kiln is used as an input in the secondary wood manufacturer (see Figure 1).

There are eleven questions regarding general information of the company/firm, wood input, energy requirement, boiler establishment, and wood residues generation and their uses and disposal. The majority of the questions were similar for both surveys except the question regarding type and amount of wood input requirements. The survey included questions regarding the type of energy requirement and their costs. The annual expenditures (1993) on energy usage were also included in the survey. If the company has a boiler, it would indicate how much of its energy requirement is accomplished by the company's boiler.

In the survey, the information regarding wood burning boilers was particularly thought useful, as it would provide the current state of wood residues demand for energy production in the wood manufacturing companies. Companies who have wood burning boilers, most probably would recycle their wood residues for energy generation: heat, electricity, or both. Furthermore, it was also asked whether these companies would buy wood residues from other companies to run their boiler or not.

The survey's more detailed and most important sections were the format regarding the wood residues generation and their uses or disposal as the main objective of this project was to collect information on wood residues. The question categorized the amount and type of wood residues generated in a year (1993), their

uses or disposal, if sold, their price per unit, if land filled, their cost per unit, and any other end-use like given to farmers, recycled in company's boiler. Such information would also provide the details about the potential availability of wood residues in 1993 for boiler fuel or any other purposes. The two types of survey forms used in this study are given in the appendices.

## **2.2 Survey Population**

Most of the wood manufacturers in Ohio were included in this survey. The Ohio Department of Natural Resources, Division of Forestry provided the database of the wood manufacturers in Ohio. There were 238 saw mills, 57 dry kilns, 345 large secondary sectors, and 803 small secondary sectors. There many companies which run both saw mill and dry kiln. On the ODNR database, nineteen of such companies were listed in both categories. After sorting the list for duplicates, all the saw mills and dry kilns were included in the survey. However, in the secondary wood sector, few of the companies, based on the few important characteristics, were not included in this survey which is going to be discussed in the following paragraphs.

There are many types of secondary wood sectors. The Standard Industrial Classification (SIC) code of the wood manufacturing companies and their definitions are given in the appendices. Most of the secondary wood sectors were

surveyed for this study. However, the secondary wood manufacturing companies who produce little or no wood residues were excluded from this survey, as the main objective of the survey was to estimate wood residues available in the state.

The following secondary wood sectors (SIC code) were excluded in this study: wood preserving (2491); reconstituted wood products (2493); mattresses and bedsprings (2515); and public buildings and related furniture (2531). The companies which produce reconstituted wood products use saw dust and other type of wood residues as inputs in their production process and other excluded sectors produce either little or no recyclable wood residues. The final number wood manufacturing companies included in the survey population are given in Table 1 below.

**Table 1. The Number of Survey Population**

<b>Sectors</b>	<b>Number</b>
Saw Mills	238
Dry Kilns	46
Large Secondary	316
Small Secondary	772
<b>TOTAL:</b>	<b>1372</b>

## 2.3 Survey Responses

The survey forms were mailed to all the wood manufacturing companies with a cover letter and a postage-paid return envelope on June 1, 1994. The first reminder was sent to non-respondents on July 20, 1994 in the form of a postcard. The phone reminder was done in July and August to all big and medium size wood manufacturers. Then finally, the third reminder and survey form with a cover letter and postage-paid envelope were mailed on October 14, 1994. The total survey mail returned and the percentage of total responses is provided in Table 2 and the graphical analysis on a sector-wise percentage return survey is also presented on the following page.

**Table 2. Survey Response Percentage**

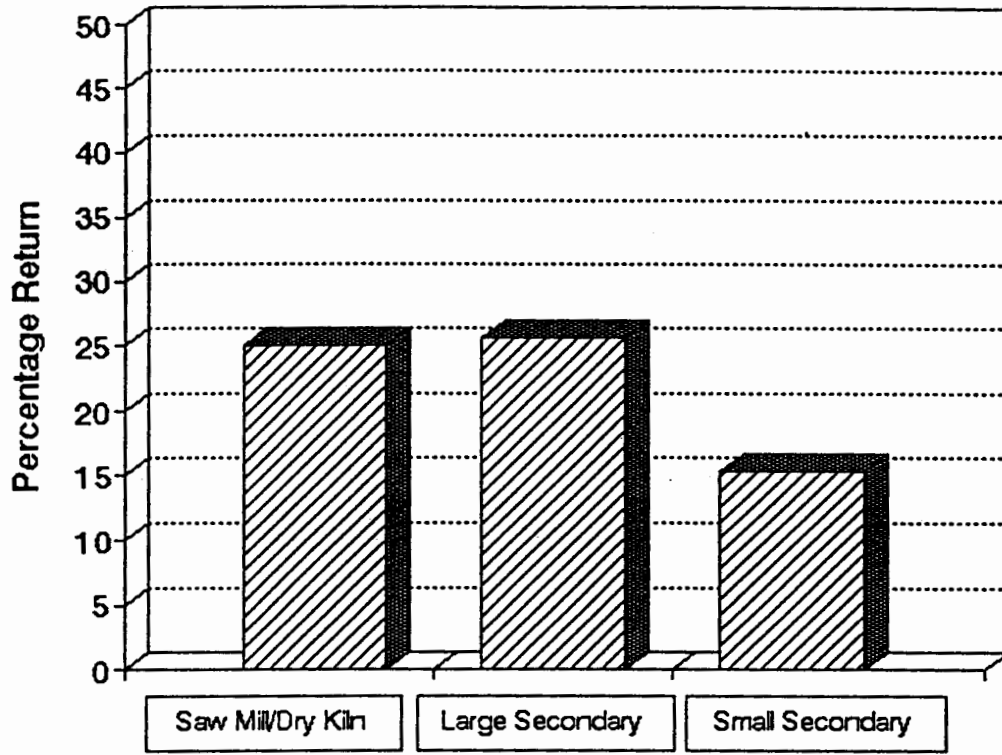
<b>Sectors</b>	<b>Total Number Surveyed</b>	<b>Number of Returns</b>	<b>Response Percentage</b>
Saw Mill	238	59	24.8
Dry Kiln	46	12	26.1
Large Secondary	316	81	25.6
Small Secondary	772	118	15.3
<b>Total/Average:</b>	<b>1372</b>	<b>270</b>	<b>19.7</b>

From this table, it is evident that the small secondary sector has the lowest response rate than other sectors. It was expected in the beginning of this study

because this sector includes manufacturers having less than five employees with no standard record keeping practice on generation and disposal of wood residues. Rest of the sectors have an average response rate of around 25 percent.

A statistical analysis is conducted to test whether the responses from this survey represent the whole survey population or not. The Chi-Squared test showed that the survey respondents in each of those sectors are not significantly different from the existing wood manufacturing companies at the level of 5 percent degrees of significance. Although, the data shows that the small secondary manufacturers have the lowest rate of survey responses, the study suggests that the survey respondents in each sector represent the actual existing wood manufacturers in respective sectors. Hence, the data of this survey represent the total population of wood manufacturers in Ohio.

Percentage of Return Surveys



## **SURVEY RESULTS**

The survey population included sawmills, dry kilns, large secondary wood sectors, and small secondary wood sectors. The size of the secondary wood sectors for this survey was based on the number of employees: those sectors with more than 20 employees were categorized under the large secondary wood sector, while those sectors employing less than 20 personnel were considered under the small secondary wood sector.

All the information received from the survey respondents is compiled and organized to build and update existing data on the wood manufacturing industries of Ohio. The data are sorted and aggregated using database software which are later summarized and tabulated into various categories. This database is capable of providing the representative information of these industries on size, wood input requirements, expenditure on energy, types and amount of wood residues generation, existing wood residue uses and disposal, and the current price index for wood residues sold. The results of the survey data are summarized in the following tables:

**Table 3. Employment and Wood Input Use of a Wood Manufacturer.**

Description	Saw/Dry	Lar-sec	Sm-sec
<b>Employment:</b>	21.40	70.30	8.78
<b>Wood Input:</b>			
Hard wood (bf)	5715796	3708523	709576
Soft wood (bf)	140507	2397627	149825
Dimension (bf)		15368	704
Particle board (sq ft)		2973272	33443
Veneer (sq ft)		536675	6771
Plywood (sq ft)		736329	24000
Others (sq ft)		192562	929

**Table 4. Average Annual Expenditure on Energy.**

Expenditure on Energy (in '000 \$)	Saw/Dry	Lar-sec	Sm-sec
Electricity	32.33	64.57	9.03
Natural Gas	6.89	16.91	1.50
Fuel Oil	6.17	0.85	0.38
Others		1.13	0.77
<b>TOTAL :</b>	45.39	83.46	11.68

Note: Saw/Dry = Saw Mill and Dry Kiln  
Lar-Sec = Large Secondary Sector  
Sm-Sec = Small Secondary Sector

**Table 5. The Average Wood Residues generated.**

<b>Wood Residues (ton)</b>	<b>Saw/Dry</b>	<b>Lar-sec</b>	<b>Sm-sec</b>
Saw dust	3029	27489	371
Chips	3974	52868	4
Bark	1974		
Ply- residues		7	3
Trimmings	137	474	44
Others	83	7802	133
<b>TOTAL:</b>	<b>9195</b>	<b>88630</b>	<b>555</b>

**Table 6. General trend of Wood Residues' Uses and Disposal**

<b>Uses of Wood Residues (in percentage)</b>	<b>Saw/Dry</b>	<b>Lar-sec</b>	<b>Sm-sec</b>
1. Given away	15.1	12.8	25.0
2. Sell	67.9	44.7	23.2
3. Internal uses	15.1	17.0	14.3
4. Land fill	1.9	25.5	37.5

**Table 7. Average Price of Wood Residues Sold (in \$ per ton)**

<b>Wood Residues</b>	<b>Saw/Dry</b>	<b>Lar-sec</b>	<b>Sm-sec</b>
1. Saw Dust	7.3	10.5	4.9
2. Chips	15.6	12.3	7.7
3. Bark	13.2		
4. Trimmings	9.4	9.5	5.0
5. Others	12.3	8.3	

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## **APPENDICES**

**A. Cover Letters for Survey Instrument**

**B. Survey Instruments**

**(1) Sawmills and Dry Kilns**

**(2) Secondary Wood Manufacturers**

**C. List of SIC codes of Wood Manufacturers**

**D. Glossary**

**E. Number of Wood Manufacturers Per County**

**F. Amount of Available Wood Residues Per County**

**APPENDIX A.**

**Cover Letters for Survey Instrument**



George V. Voinovich • Governor  
Frances S. Buchholzer • Director

Date: June 1, 1994

RE: Forest Industry Survey for Wood Residues

Dear Ohio Wood Manufacturers,

Over the past several years, there has been increasing concern and interest regarding the use of wood residues. Issues regarding the amount of wood residues generated, their disposal, as well as creation of markets are being studied.

As a result, a survey is being conducted by the Ohio Department of Natural Resources (ODNR) and the Public Utilities Commission of Ohio's Biomass Energy Program. The Ohio Forestry Association fully supports this survey.

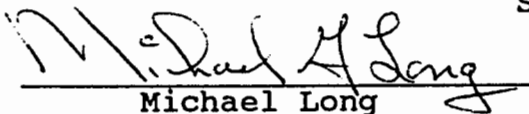
The main objective of this survey is to estimate the wood residues available in the State of Ohio in order to promote the more efficient and economical use of wood residues. In addition, the survey will be used by ODNR to update their existing database. The information we receive from you is extremely important for the compilation of accurate data.

The survey form has three pages and will only take about 15 minutes to complete. Please complete the survey by June 30 and return it in the enclosed self-addressed stamped envelope. If you have any questions regarding the survey, please call Bibhakar Shakya at (614) 292-9126.

We will publish the results of this survey and provide a FREE copy of the directory to all survey respondents. The published survey results will only contain summarized wood manufacturing data: Information about individual wood user companies will remain completely confidential!

We appreciate your support and prompt response.

Sincerely,

  
Michael Long

Wood Utilization & Marketing Forester  
Division of Forestry  
Ohio Department of Natural Resources

  
Ron Cornell

Executive Director  
Ohio Forestry Association

  
Bibhakar Shakya

Wood Manufacturing Directory Project  
Ohio Biomass Energy Program

Survey reminder # 3 in the form of post card.

---

Date: July 20, 1994

RE: Forest Industry Survey

Dear Ohio Wood Manufacturers:

You should have recently received a "Forest Industry Survey for Wood Residues" which was sent to all Ohio Wood Manufactures on June 1, 1994.

To date, we have not received your completed survey form. If you already returned the survey, please disregard this letter. If you have not, please take a couple of minutes to fill out the form and return it to us in the mail.

Thank you! If you have any questions, please call Bibhakar Shakya at (614) 292-9126.



George V. Voinovich • Governor  
Frances S. Buchholzer • Director

Date: October 14, 1994

RE: Forest Industry Survey for Wood Residues

Dear Ohio Wood Manufacturers:

On June 1, 1994, I sent a Forest Industry Survey for Wood Residues to you. In order to prepare an accurate analysis of the results of this survey, I need to receive survey responses from as many Ohio Wood Manufacturing Companies as possible. As of today, I have not received a survey form from your company.

If possible, I would like you to fill out and return the enclosed survey form by October 31, 1994. If you do not have the time, do not have accurate information needed to respond to the survey questions, or do not desire to fill out the form, please respond by fax (614/752-8353) or telephone (614/292-9126).

A copy of the published survey analysis will be provided to you later this year. The analysis will include summarized wood manufacturing data: Information about individual wood user companies will remain completely confidential!

This survey is being conducted by the Ohio Department of Natural Resources (ODNR) and the Public Utilities Commission of Ohio's Biomass Energy Program. The Ohio Forestry Association fully supports this survey.

The main objective of the survey is to determine the location and quantity of wood residues in the State of Ohio in order to promote the more efficient and economical use of wood residues.

Thank for your support and prompt response.

Sincerely,

Bibhakar Shakya  
Wood Manufacturing Directory Project  
Ohio Biomass Energy Program

**APPENDIX B.**

**Survey Instruments:**

**(1) Sawmills and Dry Kilns**

**(2) Secondary Wood Manufacturers**

**FOREST INDUSTRY SURVEY**  
(Saw Mill & Dry Kiln)

1. Company Name: \_\_\_\_\_.
2. Contact Person: \_\_\_\_\_ Title: \_\_\_\_\_.  
Telephone \_\_\_\_\_ Fax \_\_\_\_\_.
3. Type:        \_\_\_ Sawmill                    \_\_\_ Dry Kiln
4. Average Number of Employees: \_\_\_\_\_ .

**WOOD INPUT:**

5. Please indicate wood input use in 1993 as well as percentage yield of each raw material. Select whatever measurement unit (board feet or square feet) is most convenient for you.

Wood Input Type	Wood Input Amount		Percent Yield (output)
	----- bf	sq.ft.	
a. Hardwoods			
b. Softwoods			
c. Other, Please specify _____ _____			

(over)

**6. ENERGY CONSUMPTION IN 1993:**

SOURCE	TOTAL EXPENDITURE	ENERGY COST/UNIT
a. Electricity:	\$ _____	\$ ____ per ____
b. Natural Gas:	\$ _____	\$ ____ per ____
c. Fuel Oil:	\$ _____	\$ ____ per ____
d. Other (please specify _____):	\$ _____	\$ ____ per ____

**TOTAL ENERGY BILL IN 1993: \$ \_\_\_\_\_**

7. Do you have a wood burning boiler to generate heat and/or electricity in your company? \_\_\_\_\_ YES \_\_\_\_\_ NO

If answer is yes, approximately what percent of your heat and/or electricity requirement is supplied by the wood boiler?

Total Company's Energy Requirement	Supply from Wood boiler (%)
Electricity:	
Heat:	

**WOOD RESIDUES:**

8. Total amount of wood residues generated in 1993:

\_\_\_\_\_ Volume in tons

9. Types of Wood Residues and their uses in 1993:

Description	Saw-dust	Chips	Bark	Trimings Edging	Other: _____	TOTAL
a. Total tonnage Manufactured						
b. Tonnage Sold						
Price (\$/ton)						
c. Tonnage burned in Company's boiler						
Tonnage purchased for boiler						
Price paid (\$/ton)						
d. Tonnage Landfilled						
Landfill Charge (\$/ton)						
Labor & Transp. cost (\$/ton)						
e. Other uses, please Specify: _____						

10. What is total tonnage of wood residues potentially available now for boiler fuel or other purpose? \_\_\_\_\_ tons

11. Do you want a copy of the directory after the completion of this survey? (this survey will contain information about wood industries in aggregate form only) \_\_\_\_\_ Yes \_\_\_\_\_ No

**IMPORTANT NOTE:**

The information you provide in this survey will remain completely confidential.

**FOREST INDUSTRY SURVEY**  
**(Secondary Wood Industry)**

1. Company Name: \_\_\_\_\_.
2. Contact Person: \_\_\_\_\_ Title: \_\_\_\_\_  
 Telephone \_\_\_\_\_ Fax \_\_\_\_\_.
3. Major Products: \_\_\_\_\_.
4. Average Number of Employees: \_\_\_\_\_.

**WOOD INPUT:**

5. Please indicate wood input use in 1993 as well as percentage yield of each raw material. Select whatever measurement unit (board feet or square feet) is most convenient for you.

Wood Input Type	Wood Input Amount		Percent Yield (output)
	bf	sq.ft.	
a. Hardwood Lumber			
b. Softwood Lumber			
c. Dimension Parts			
d. Particle Board			
e. Veneer			
f. Plywood			
g. Other			

(over)

**6. ENERGY CONSUMPTION IN 1993:**

SOURCE	TOTAL EXPENDITURE	ENERGY COST/UNIT
a. Electricity:	\$ _____	\$ ____ per ____
b. Natural Gas:	\$ _____	\$ ____ per ____
c. Fuel Oil:	\$ _____	\$ ____ per ____
d. Other (please specify _____):	\$ _____	\$ ____ per ____
<b>TOTAL ENERGY BILL IN 1993: \$ _____</b>		

7. Do you have a wood burning boiler to generate heat and/or electricity in your company? \_\_\_\_\_ YES \_\_\_\_\_ NO

If answer is yes, approximately what percent of your heat and/or electricity requirement is supplied by the wood boiler?

Total Company's Energy Requirement	Supply from Wood boiler (%)
Electricity:	
Heat:	

**WOOD RESIDUES:**

8. Total amount of wood residues generated in 1993:

\_\_\_\_\_ Volume in tons

9. Types of Wood Residues and their uses in 1993:

Description	Saw-dust	Chips	Plywood residue	Trimings Edging	Other: _____	TOTAL
a. Total tonnage Manufactured						
b. Tonnage Sold						
Price (\$/ton)						
c. Tonnage burned in Company's boiler						
Tonnage purchased for boiler						
Price paid (\$/ton)						
d. Tonnage Landfilled						
Landfill Charge (\$/ton)						
Labor & Transp. cost (\$/ton)						
e. Other uses, please Specify: _____						

10. What is total tonnage of wood residues potentially available now for boiler fuel or other purpose? \_\_\_\_\_ tons
11. Do you want a copy of the directory after the completion of this survey? (this survey will contain information about wood industries in aggregate form only) \_\_\_\_\_ Yes \_\_\_\_\_ No

**IMPORTANT NOTE:**

The information you provide in this survey will remain completely confidential.

**APPENDIX C. LIST OF STANDARD INDUSTRIAL CLASSIFICATION  
(SIC) CODES OF WOOD MANUFACTURERS**

The wood manufacturers with the following SIC codes were surveyed for this project:

**SIC CODE                      LUMBER AND WOOD PRODUCTS INDUSTRIES**

2411	Saw and Planing Mills
2426	Hardwood Dimension & Flooring Mills
2431	Millwork
2434	Wood Kitchen Cabinets
2435	Hardwood Veneer & Plywood
2439	Structural Wood Members
2441	Wood Boxes
2448	Wood Pallets & Skids
2449	Wood Containers
2451	Mobile Homes
2452	Prefabricated Wood Buildings & Components
2499	Wood Products

**FURNITURE AND FIXTURES INDUSTRIES**

2511	Wood Household Furniture
2512	Wood Household Furniture, Upholstered
2519	Household Furniture
2521	Wood Office Furniture
2541	Wood, Office & Store Fixtures
2599	Furniture and Fixtures

## APPENDIX D. GLOSSARY

**Dry Kiln:** A dry kiln is a heated container or building in which cut lumber is dried and seasoned. Hardwood and softwood lumber, in most cases, is dried in a dry kiln before being sold as a product. The lumber is subjected to a series of timed temperature and humidity conditions, referred to as a kiln schedule, to allow the wood to dry without twisting, bowing, or splitting.

Most often lumber is dried in a conventional kiln in which the wood is dried in air that has been heated by steam coils or directly by the addition of combustion gases from a gas-, oil-, or wood residue-fired boiler. Moisture driven off by the heat is vented to the atmosphere. A dehumidification drier is another type of kiln that is a fairly new system primarily used for drying hardwoods. Moisture condensing on refrigerated coils is used to remove water contained in the wood. Other non-conventional drying methods such as vapor drying, radiofrequency, dielectric heating, and press drying, are primarily used experimentally and, in a few cases, are used commercially.

**Furniture and Fixture:** This category includes a large number of products such as household/office furniture, TV and radio cabinets, partitions, and fixtures. The production processes involve the machining and fabrication (fastening and gluing) of primary forest products (lumber, plywood, and board).

**Millwork:** Millwork is the manufacturing of various wooden parts and wooden kitchen cabinets. Generally, millwork includes moldings, doors, door frames, stair-work, blinds, window units, mantels, and similar materials.

**Particle board:** Particle board is composed of distinct particles of wood or other ligno-cellulosic materials that are bonded together with an organic binder. Other items used for particle board include chip board, flake board, silver board, shaving board, and woodwaste board.

**Prefabricated Wood Products:** These products include trusses, arches and wood buildings.

**Primary Wood Manufacturer:** Primary wood manufacturer includes Logging Contractor, Sawmill, and Dry Kiln.

**Secondary Wood Manufacturer:** Secondary wood manufacturer includes Millwork, Kitchen Cabinet, Boxes and Containers, Pallets and Skid, Funiturer, and Fixtures.

**Structural Wood Members:** Structural wood members are laminated or fabricated trusses, arches, and other structural members of lumber commonly used in building construction.

**Veneer/Plywood:** Veneer and plywood are made of both hardwood and softwood. While the hardwood products are used for decorative purposes, the softwood materials are used in structural applications.

**Wood Containers:** Wood containers include boxes, pallets, skids, and other types of containers.

## APPENDIX E. NUMBER OF WOOD MANUFACTURERS PER COUNTY

County	Sawmill/DK	LargeSec.Sect	SmallSec.Sect	Wood Boiler
1. Adams	7	1	1	1
2. Allen	2	3	12	1
3. Ashland	1	2	3	
4. Ashtabula	5	3	8	
5. Athens	1		1	
6. Auglaize	3	1	5	1
7. Belmont	1		3	
8. Brown	2	1	3	
9. Butler	1	7	13	
10. Carroll			2	
11. Champaign	1			
12. Clark		4	6	
13. Clermont	1	3	5	
14. Clinton	2	1	3	
15. Columbiana	3	5	10	
16. Coshocton	4		5	1
17. Crawford	1	2	4	
18. Cuyahoga	1	21	91	
19. Darke	1	3	6	
20. Defiance	2	1		
21. Delaware	3	4	9	
22. Erie	1	3	6	1
23. Fairfield	2	3	7	
24. Fayette	1	6	1	1
25. Franklin		13	48	
26. Fulton	3	7	4	7
27. Gallia	3			
28. Geauga	14	5	13	1

County	SawMill/ Dry Kiln	Large Sec. Sector	Small Sec. Sector	Wood Burn. Boiler
29. Greene	1	1	4	
30. Guernsey	2			
31. Hamilton	1	13	59	1
32. Hancock	2	2	5	
33. Hardin	2	1		
34. Harrison		1	3	
35. Henry	2		1	1
36. Highland	1	3	2	
37. Hocking	5	2	4	
38. Holmes	12	11	5	1
39. Huron	1	3	3	
40. Jackson	7	2	3	
41. Jefferson	3	2	2	1
42. Knox	3	3	3	
43. Lake		2	23	
44. Lawrence	3		2	
45. Licking	14	3	8	
46. Logan	1		2	
47. Lorain		1	23	
48. Lucas	1	6	24	
49. Madison	1	1	5	
50. Mahoning	5	9	21	
51. Marion		2	5	
52. Medina	2	6	6	
53. Meigs	2	1		
54. Mercer	2	2	4	
55. Miami	2	4	4	1
56. Monroe	4		2	
57. Montgomery		14	27	

County	Saw Mill/ Dry Kiln	Large Sec. Sector	Small Sec. Sector	Wood Burn. Boiler
58. Morgan	3	2	4	1
59. Morrow	3			
60. Muskingum	6	2	10	
61. Noble	4	2	2	
62. Ottawa	1	1	4	
63. Paulding			2	
64. Perry	5			
65. Pickaway	1		1	
66. Pike	13	2	3	1
67. Portage	3	1	14	
68. Preble	2	2	3	
69. Putnam	1	2	4	
70. Richland	7	1	8	
71. Ross	3		3	1
72. Sandusky	2		5	
73. Scioto	5		5	
74. Seneca		3	4	
75. Shelby	4	3	5	
76. Stark	3	12	23	1
77. Summit		6	23	
78. Trumbull	4	8	9	
79. Tuscarawas	9	12	15	1
80. Union	3	2	2	1

<b>County</b>	<b>Saw Mill/ Dry Kiln</b>	<b>Large Sec. Sector</b>	<b>Small Sec. Sector</b>	<b>Wood Burn. Boiler</b>
81. Van Wert		1	1	
82. Vinton	10	3	1	
83. Warren		3	5	
84. Washington	6	5	7	
85. Wayne	10	12	15	
86. Williams	2	4	4	1
87. Wood	2	4	5	
88. Wyandot			1	
<b>TOTAL:</b>	<b>257</b>	<b>287</b>	<b>706</b>	<b>26</b>

## APPENDIX F. AMOUNT OF AVAILABLE WOOD RESIDUES PER COUNTY IN 1993

County	Estimated Amount of Wood Residues (in '000 tons)
1. Adams	144.22
2. Allen	263.54
3. Ashland	170.56
4. Ashtabula	289.16
5. Athens	*
6. Auglaize	109.50
7. Belmont	*
8. Brown	99.56
9. Butler	575.26
10. Carroll	*
11. Champaign	*
12. Clark	322.92
13. Clermont	251.50
14. Clinton	99.56
15. Columbiana	432.00
16. Coshocton	38.50
17. Crawford	170.98
18. Cuyahoga	1729.42
19. Darke	251.92
20. Defiance	98.30
21. Delaware	351.48
22. Erie	251.92
23. Fairfield	261.44
24. Fayette	490.12
25. Franklin	1061.46
26. Fulton	589.68
27. Gallia	27.30
28. Geauga	533.36

County	Estimated Amount of Wood Residues (in '000 tons)
29. Greene	90.88
30. Guernsey	*
31. Hamilton	1075.181
32. Hancock	108.50
33. Hardin	98.30
34. Harrison	81.36
35. Henry	*
36. Highland	250.24
37. Hocking	207.38
38. Holmes	992.40
39. Huron	250.66
40. Jackson	225.16
41. Jefferson	188.34
42. Knox	268.86
43. Lake	169.86
44. Lawrence	28.14
45. Licking	371.66
46. Logan	*
47. Lorain	89.76
48. Lucas	499.78
49. Madison	91.30
50. Mahoning	775.22
51. Marion	162.3
52. Medina	501.32
53. Meigs	98.30
54. Mercer	180.08
55. Miami	339.02
56. Monroe	37.24
57. Montgomery	1132.74

<b>County</b>	<b>Estimated Amount of Wood Residues (in '000 tons)</b>
58. Morgan	189.18
59. Morrow	27.30
60. Muskingum	219.00
61. Noble	197.44
62. Ottawa	90.88
63. Paulding	*
64. Perry	45.50
65. Pickaway	*
66. Pike	279.76
67. Portage	113.28
68. Preble	179.66
69. Putnam	170.98
70. Richland	147.16
71. Ross	28.56
72. Sandusky	20.30
73. Scioto	47.60
74. Seneca	241.98
75. Shelby	278.80
76. Stark	998.26
77. Summit	490.26
78. Trumbull	680.98
79. Tuscarawas	1049.40
80. Union	188.34

<b>County</b>	<b>Estimated Amount of Wood Residues (in '000 tons)</b>
81. Van Wert	80.52
82. Vinton	331.72
83. Warren	242.40
84. Washington	458.04
85. Wayne	1058.50
86. Williams	340.28
87. Wood	340.70
88. Wyandot	*
<b>TOTAL:</b>	<b>25,623.90</b>

\* Data not disclosed because of sensitive nature (due to one or two companies in a county).