Wood Energy Handbook

A guide to using biomass for the production of energy in New Zealand
Wood Energy Handbook
A guide to using biomass for the production of energy

Contents

Introduction

1  Wood Energy in New Zealand
2  Solid biofuel classification guidelines
3  Contracting to deliver wood fuel to customers
4  Verifying the quality of solid biofuels
5  Specifying wood fuelled industrial and commercial heating systems
6  Tendering for wood energy equipment
7  Conversion of solid fuel boilers from coal to wood pellet firing
8  Safe operation of small scale heat plant
9  Wood energy sector quality framework
10  Wood energy information resources
11  Wood fuel drying
12  Cofiring wood and coal
13  Case studies
14  References
Introduction

New Zealand and Australia are both well served with the latest modern technology and equipment for the production of heat from wood fuel. There is a long history of the collection and burning of wood for heat. This is both in the residential and the commercial sectors. However, in the last decade the equipment available in both sectors has improved significantly with greater automation and improved control equipment. This is largely as a result of more stringent requirements on emissions to air and improvements in energy efficiency. Today a wide range of heat plant is available in a range of sizes and with technologies to suit different applications.

Investors in commercial scale wood energy plant are seeking heat at the lowest cost and also least risk production. The risk can come from the technology, fuel used, or from operational and maintenance failures. However, the risk is identifiable and manageable provided plant owners follow recognised quality assurance processes and best practice.

By pursuing best practice investors in heat plant can not only ensure that they have plant optimal to their needs but over the economic life of the plant they are likely to have hassle free plant operation and produce heat at least costs.

The size and model of equipment for commercial scale applications should be carefully scoped prior to purchase. The facility will require a capability for delivery and storage of wood chips or pellets fuel. Each fuel type has different transport and storage characteristics. These issues and securing a fuel supply are important aspects of the process of using wood fuel on a commercial scale. They should be assessed as part of assessing equipment selection.

Heat plant is always designed for specific grades and characteristic of fuel. For example, if using wet fuel then a fluid bed type combustor, however if the fuel is drier, then conventional combustor technology may suit. For conventional combustors there are however a range of types of fire grate. It’s essential to take the type of grate into account according to the fuel available e.g., an open weave reciprocating grate would be of little use for sawdust when a pin hole grate is likely to be more appropriate.

Potential investors in new heat plant should check out similar applications already in operation. Bioenergy Association has established a Bioenergy Facilities Directory www.bioenergyfacilities.org that lists facilities that have been installed in New Zealand, Australia and elsewhere by Association members. The Directory gives information on each project, its location and contact information on the designers and equipment suppliers.

The Bioenergy Association has developed a suite of Technical Guides, Information Sheets and published case studies which can assist facility owners, consultants and advisers to understand best practice. These documents have been collated into this Handbook for ease of storage and reference. More information is available on www.usewoodfuel.org.nz

The Technical Guides in this Handbook are constantly being updated as new best practice is identified. The format of the handbook is so that new versions of a Guide can easily replace older versions. Also additional Guides can be added as they become available.
Who is Bioenergy Association

The Bioenergy Association helps its members to develop and grow their bioenergy businesses, raises awareness of the benefits of bioenergy amongst markets and the public, and provides the latest information about the bioenergy sector, both in New Zealand and Australia. Details about the Bioenergy Association can be found in the website www.bioenergy.org.nz.

The Wood Energy Interest Group (WEIG) is the operational arm of the Bioenergy Association responsible for wood energy programmes, policies, best practice standards, advocacy and management of the UseWoodFuel website www.usewoodfuel.org.nz.

The WEIG supports members' wood energy business activities by undertaking advocacy for the use of wood energy, provides independent information on wood energy to the public and investors, and assists the Association establish and maintain best practice standards through a programme of information sessions, workshops and other events, the WEIG promotes the supply and use of quality wood fuel. Its members include leading providers of wood fuel and suppliers of heat plant technologies as well as asset owners who want to ensure there is a reliable supply of quality wood fuel for their facilities.

Membership of the Bioenergy Association is an indication of quality and best practice. Engage only Bioenergy Association registered advisers and buy only from Bioenergy Association equipment suppliers. Membership is an indication that they are up-to-date within the sector and are covered by the association's professional standards oversight.
**Preface**

This handbook has been prepared by collating together into a single source the Technical Guides and Information Sheets related to wood energy published by the Bioenergy Association. The collation provides the information necessary for those advising or making decisions on the use of wood fuel for the production of energy.

There are a number of other source books but these are either focused on promotion of bioenergy or are based on overseas data. This handbook has been prepared in order to bring together New Zealand and Australian relevant information and present it in a manner useful for advisers and decision makers.

The Technical Guides and Information Sheets have been prepared under the oversight of the Wood Energy Interest Group of the Bioenergy Association. The Interest Group includes significant members of the wood energy sector working in New Zealand and Australia. The documents have been prepared so that those working in the sector understand good practice. They are an outcome of industry discussion and collaboration and capture the collective technical knowledge of a range of leading bioenergy industry personnel.

The guides are provided in good faith as an addition to the ongoing body of knowledge relating to the wood energy sector in New Zealand and Australia. However, none of those involved with their preparation accept any liability either for the information contained herein, or its application.

As with all Bioenergy Association technical guidance documents, this handbook is a ‘living document’ and sections will be revised from time to time and reissued as new information comes to our attention. The handbook has been structured so that it can be added to and revised from time to time without disturbing other chapters. The website [www.usewoodfuel.org.nz](http://www.usewoodfuel.org.nz) will list the latest versions of each document.

The handbook has been developed as an output of the Wood Energy South Project managed by Venture Southland.

Users of the handbook are encouraged to advise the Executive Officer of the Bioenergy Association of New Zealand of gaps in the information, errors, and suggested improvements.

**Contact relating to the handbook should be made to;**

Executive Officer  
Bioenergy Association

Address:       P O Box 11595, Manners Street, Wellington 6142  
Email:         admin@bioenergy.org.nz  
Telephone:     +64 (0) 274 771 048
The preparation of this Handbook has been assisted by support from the following organisations:

- EECA BUSINESS
  - [www.eecabusiness.govt.nz](http://www.eecabusiness.govt.nz)

- Venture Southland

- AHIKA

- Azwood
  - [www.bioenergy.org.nz/azwood.co.nz](http://www.bioenergy.org.nz/azwood.co.nz)

- Beca AMEC Limited

- Canterbury Woodchip Supplies Limited

- C H FAUL and COMPANY LIMITED

- East Harbour Energy

- Fonterra Dairy for Life

- Gifford Consulting

- Living Energy

- Lumbr Renewable energy for business
  - [www.lumbr.co.nz](http://www.lumbr.co.nz)

- Lyttelton Engineering

- Nature’s Flame

- Pioneer Energy

- Polytechnik Biomass

- Peter Kernohan Solutions

- RCR Energy Biomass combustion and fragmentation for business
  - [www.rcrbiomass.com](http://www.rcrbiomass.com)

- SCION

- SparkEnergy
  - [www.sparkenergy.co.nz](http://www.sparkenergy.co.nz)

- Taymac

- Windsor

- WoodEnergy Australia Pty Ltd
The following Technical Guides and Information sheets available from admin@bioenergy.org.nz are to be inserted following each divider.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Information Sheet 40</td>
<td>Wood energy in New Zealand</td>
<td>coming soon</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Information Sheet 39</td>
<td>Wood energy information resources</td>
<td><a href="http://www.bioenergy.org.nz/resource/is39-wood-energy-information-resources">www.bioenergy.org.nz/resource/is39-wood-energy-information-resources</a></td>
<td>April 2017</td>
</tr>
</tbody>
</table>
Brian Cox  
Executive Officer Bioenergy Association  

Address:  
P O Box 11595  
Manners Street  
Wellington 6142  

Email:  
admin@bioenergy.org.nz  

Telephone:  +64 (0) 274 771 048