

Wood Energy Handbook



**A guide to using biomass for the
production of energy in New Zealand**



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A guide to using biomass for the production of energy

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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 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;

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The preparation of this Handbook has been assisted by support from the following organisations:



www.eecabusiness.govt.nz



www.bioenergy.org.nz/venture-southland



www.bioenergy.org.nz/ahika



www.azwood.co.nz



www.bioenergy.org.nz/becaamec



www.bioenergy.org.nz/canterbury-woodchip-supplies



www.bioenergy.org.nz/ch-faul



www.bioenergy.org.nz/east-harbour-energy



Dairy for life

www.bioenergy.org.nz/fonterra



GIFFORD
CONSULTING

www.bioenergy.org.nz/gifford-consulting



www.bioenergy.org.nz/living-energy



Renewable energy for business

www.lumbr.co.nz



www.bioenergy.org.nz/lyttelton-engineering



www.bioenergy.org.nz/natures-flame



www.bioenergy.org.nz/pioneer-energy



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www.bioenergy.org.nz/rcr-energy |
www.rcrbiomass.com



www.bioenergy.org.nz/scior



Biomass combustion and fragmentation for business

www.sparkenergy.co.nz



www.bioenergy.org.nz/taymac



www.bioenergy.org.nz/windsor



www.bioenergy.org.nz/woodenergy-australia

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

Divider No.	Document reference	Document title	Document website hyperlink	Document date
1	Information Sheet 40	Wood energy in New Zealand	coming soon	
2	Technical Guide 01	Solid Biofuel Classification Guidelines	www.bioenergy.org.nz/resource/tg01-solid-biofuel-classification-guidelines	January 2015
3	Technical Guide 06	Contracting to deliver quality wood fuel to customers	www.bioenergy.org.nz/resource/tg06-contracting-deliver-quality-wood-fuel-customers	January 2015
4	Technical Guide 05	Standard methods for verifying the quality of solid biofuels	www.bioenergy.org.nz/resource/tg05-verifying-solid-biofuel	January 2015
5	Technical Guide 10	Consultant specifier practice paper for wood fuelled industrial and commercial heating systems	www.bioenergy.org.nz/resource/tg10-specifier-practice-paper	December 2015
6	Technical Guide 04	Tender guidelines for the specification, supply and installation of wood energy plant	www.bioenergy.org.nz/resource/tg04-tender-guidelines-for-wood-energy-specification	December 2011
7	Technical Guide 02	Conversion of solid fuel boilers from coal to wood pellet firing	www.bioenergy.org.nz/resource/tg02-conversion-solid-fuel-boilers-from-coal-wood-pellet-firing	May 2010
8	Technical Guide 03	Guidance for the safe operation of small scale wood fuelled heat plant	www.bioenergy.org.nz/resource/tg03-wood-boiler-operators-guide	June 2015
9	Information Sheet 30	Ensuring quality wood energy plant	www.bioenergy.org.nz/resource/is30-ensuring-quality-wood-energy-plant	October 2015
10	Information Sheet 39	Wood energy information resources	www.bioenergy.org.nz/resource/is39-wood-energy-information-resources	April 2017
11	Information Sheet 12	Wood fuel drying	http://www.bioenergy.org.nz/resource/is12-woody-biomass-fuel-drying	October 2015
12	Information Sheet 09	Co-firing fact sheet	www.bioenergy.org.nz/resource/is09-co-firing-coal-with-wood	September 2016
13	Case Studies	540kW KOB Pryrot base load, wood chip boiler – Manufacturing Slinkskins	www.usewoodfuel.org.nz/resource/case-study-540kw-kob-pyrot-wood-chip-boiler-manufacturing-slinkskins	No date
		ETA Hack 220kW wood chip boiler – Donovan Primary School	www.usewoodfuel.org.nz/resource/case-study-eta-hack-220kw-wood-chip-boiler-donovan-primary-school	No date
		675kW Binder chip boiler – Splash Palace, Invercargill	www.usewoodfuel.org.nz/resource/case-study-675kw-binder-chip-boiler-splash-palace-invercargill	No date
		200kW Froling boiler – Takitimu School	www.usewoodfuel.org.nz/resource/case-study-froling-200kw-boiler-takitimu-school	No date
		200kW Froling boiler – Makarewa School	www.usewoodfuel.org.nz/resource/case-study-froling-200kw-boiler-makarewa-school	No date
		8MW Waiouru Army Base wood pellet fuelled heat plant	www.bioenergy.org.nz/resource/case-study-waiouru-army-wood-pellet-boiler	May 2017
14	Information Sheet 11	Bioenergy Association Publications	http://www.bioenergy.org.nz/resource/is11-bioenergy-association-publications	April 2017

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