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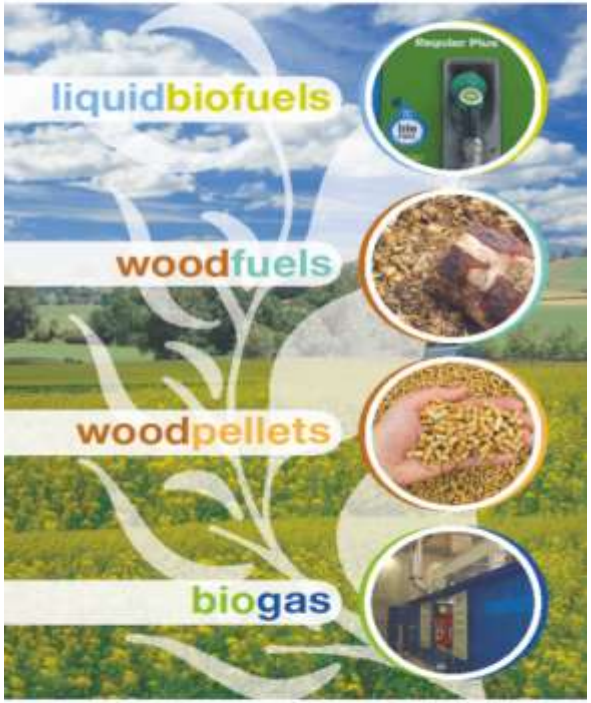

www.bioenergy.org.nz

Tools for Wood Fuel Supply: Managing Risks Quality Quantity & Cost

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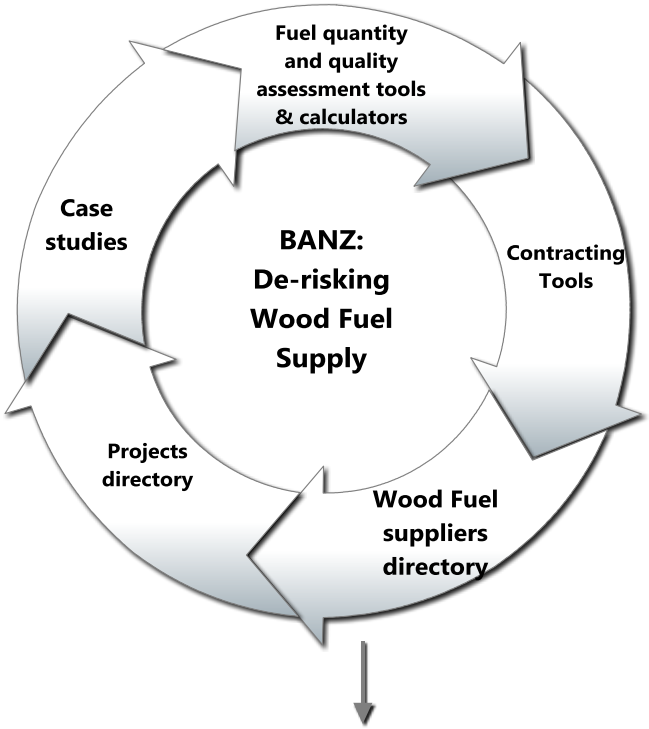
Reducing the Risks of Supplying Solid Biofuels & Reducing Costs

Risky Fuel Supply

- Niche bio-fuel suppliers
- Fuel supplied on a case by case basis
- Limited standardisation
- Relatively small biofuel suppliers
- Informal supply assessments
- No standard contracts
- No fuel quality accreditation scheme
- Uncertainty around supply and quality



Robust and Resilient Supply Market Providing "Fit-for-Purpose" Bio-fuels

- Cost effective supply of biofuels to end-users
- Standardised biofuels
- Lager scale suppliers supplying larger customers
- Reliable and consistent trade in bio-fuels across a range of sectors
- Customers receiving consistent and reliable supply of wood fuels

- Clear and unambiguous classification principals for solid bio-fuels
- Tools for efficient trading of fuels
- Improved understanding between sellers and buyers
- Tools for communicating with equipment suppliers
- Increased confidence for sellers and buyers
- Well defined wood fuel resources and tools to quantify these
- Predictable quality and consistency in pricing

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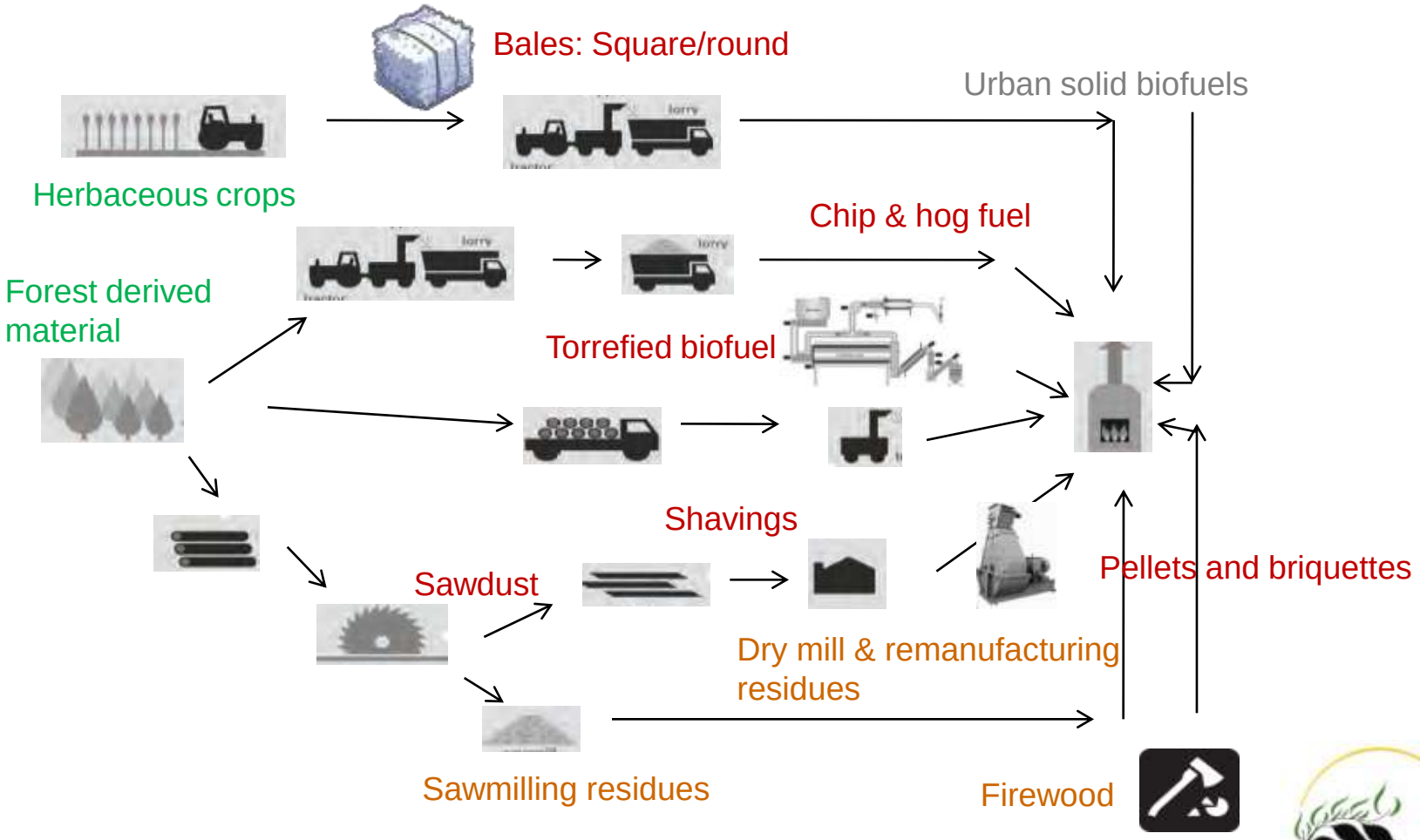
Overview

- Integrated package for de-risking the NZ wood fuel market
  - Specifying wood fuels
  - Assessing wood fuel quality (reducing costs of supply)
  - Assurance systems
  - Sample contract
  - Contracting wood fuel supply
- Directory of wood fuel suppliers
- Bioenergy projects directory
- Wood fuel supply tools
- Case studies
- Conclusions

Solid Biofuel Supply Chain: The System



Benefits of Re-Risking the Market

- Build confidence through the full supply chain – growers to energy users
- Improves competitiveness with existing fossil fuels
- Enhances quality and reliability for the end-user/customer
- Important tools to support business and making transactions
- Minimise the effort wood fuel customers put into assessing risks and “due diligence”

What Provides Market Assurance?
Widely Recognised & Respected Tools & Systems

- Perception of quality
  - Do they look as if they can provide what you need
- Demonstrated performance
  - Testing
  - Reporting
  - Communication
  - Track record for reliability of supply
- Product testing
  - Seem as an unnecessary overhead
  - Appropriate to the fuel type
  - Provide the test results
- Independent monitoring of performance
  - Just don't take my word for it
  - Self testing supported by external testing
- Independent auditing
  - Certification of processes
  - Accreditation

Illustration by Chris Gash

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Fuel Guidelines and Protocols

Benefits of Guidelines & Protocols

- Common language
- Demonstrate market understanding and leadership – fuel type and match with heat plant
- Creates competitive advantage through product differentiation
- Encourage market best practice
- Framework for regulatory compliance

BANZ Solid Biofuel Classification

- Consistently describe solid biofuels
- Revision of Guideline published 2010
- Based on EN14961-Part 1
- Focuses on NZ relevant fuels
- Markedly simplified

Types of Solid Biofuels

Fuel Type	Features	Example
Wood Chips (WC)	Chipped wood biomass in the form of pieces with defined particle size produced by mechanical treatment with sharp tools such as knives	
Hog Fuel (HF)	Fuel wood in pieces of varying size and shape produced by crushing with blunt tools such as rollers, hammers or flails	
Wood Pellets (WP)	Wood that has been pulverised and pelletised under heat and pressure to produce a cylindrical wood derived fuel of consistent size	

Types of Solid Biofuels

Fuel Type	Features	Example
Urban Wood Fuels (UWF)	Wood residues derived from urban activities including packaging materials, off-cuts, C&D residues, land clearing	
Compressed Firelogs and Briquettes (CFB)	Block of flammable matter used to start and or maintain a fire	
Torrefied Wood (TW)	Desiccated biomass with devolatilised carbohydrate	

Types of Solid Biofuels

Fuel Type	Features	Example
Herbaceous Wood Fuels (HWF)	Sourced from Miscanthus, Switchgrass, other grasses and straw – supplied as chips, hogged or pelletised fuels	
Firewood (FW)	Larger piece sizes of wood used for kindling or for sustaining combustion in domestic solid wood fire appliances	

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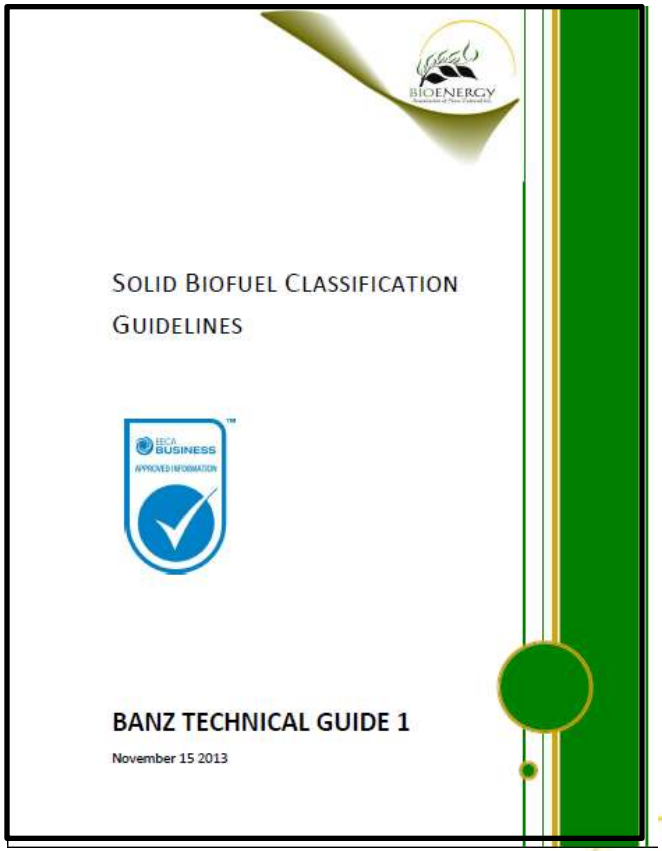
Solid Biofuel Classification Guidelines

- Focus on main tradable forms of solid biofuels
- Exists to make trading easier and less costly (simplifying process for specifying fuels)
- Herbaceous wood fuels – included
- Urban Wood Fuels is a new classification
  - Urban clean biofuel (untreated packaging)
  - Mixed grade chip (Treated sources)
- On BANZ website



Solid Biofuel Verification Methods

- Consistently agreed methods
- Sampling
- Testing methods
- Levels of testing
- Recommended laboratories/agencies for testing
- Leads to accredited fuel suppliers

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Solid Biofuel Verification Methods: Sampling

- Sampling is critical
- Needs to be representative
- Ensure that different particle size fractions are represented
- Take minimum of 3 samples (depends on stack size)
- Sample from upper, middle and lower part of the stack

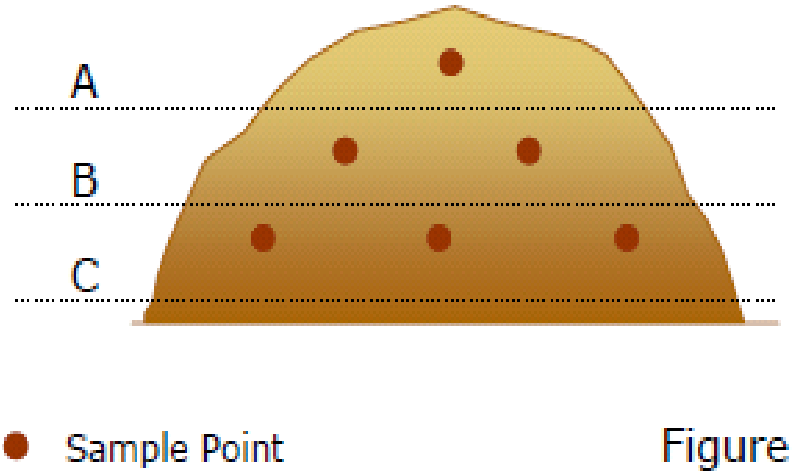

Figure 1

Particle Size

- Size reduction
  - Chipping
  - Hogging
  - Pelletising

- Screening
  - Particle size distribution
  - Chips
    - Main fraction
    - Fines
    - Coarse fraction

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BANZ Wood Fuel Supply Accreditation
Under Development

- Move to accredited fuel suppliers
  - Supplying “fit-for purpose’ fuels
  - Reliable supply
  - Self management
  - Independently assessed and reviewed
- Avoid the “fly-by-nighters”
- Builds on existing certification schemes
- Provides a low cost assurance
- Emphasis on dependable quality of fuel for markets not costly compliance

Overview of Accreditation Scheme

Application:
- Quality management system
- Training
- Product testing
- Customer references

Assessment and Approval:
- Evidence based
- Good documentation
- Product quality

Maintenance & auditing:
- Internal reviews
- Training
- Reporting of fuel quality
- Auditing

Agreed performance and reliability of wood fuel at an acceptable price

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Sample Contract
Under Development

- Type and quality of fuel
- Delivery of fuel
- Certainty of fuel supply
- Fuel quality verification
- Payment terms
- Disputes
- Variations
- Health & safety
- Other standard conditions

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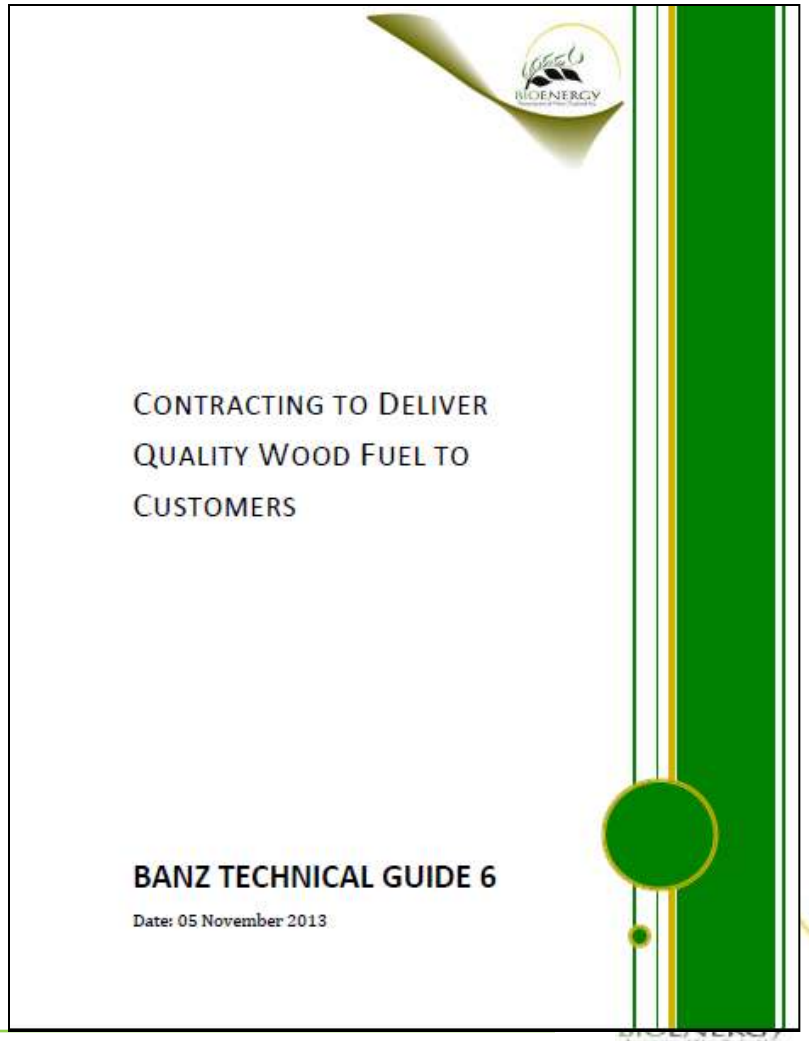
Solid Biofuel Technical Guide: Contracting

- Consolidated document to tie the classification of wood fuels and verification methods into an overarching document on contracting solid biofuels
- Covers
  - Terminology
  - Properties of fuels
  - Sampling and testing methods
  - Supply chain issues
  - Cost of biofuels
  - Contract conditions
  - Assurance scheme
  - Sample contract



Wood Fuel Suppliers: Directory

Usewoodfuels web site:

BANZ Members who supply fuel are listed below:

North Island, New Zealand		South Island, New Zealand		
Nature's Flame		Nature's Flame	Azwood	Spark Energy
Materials Processing		Otago Pellet Fires	City Firewood	Canterbury Woodchip Supplies
Living Energy		WENZ		

Note - there are several retailers of wood pellets nationwide - check the **Bioenergy Projects Directory** for 'fuel supplier'

Victoria, Australia
BB Truss and Timber Pty Ltd

http://www.usewoodfuel.org.nz/woodfuel_supply.html#findasupplier

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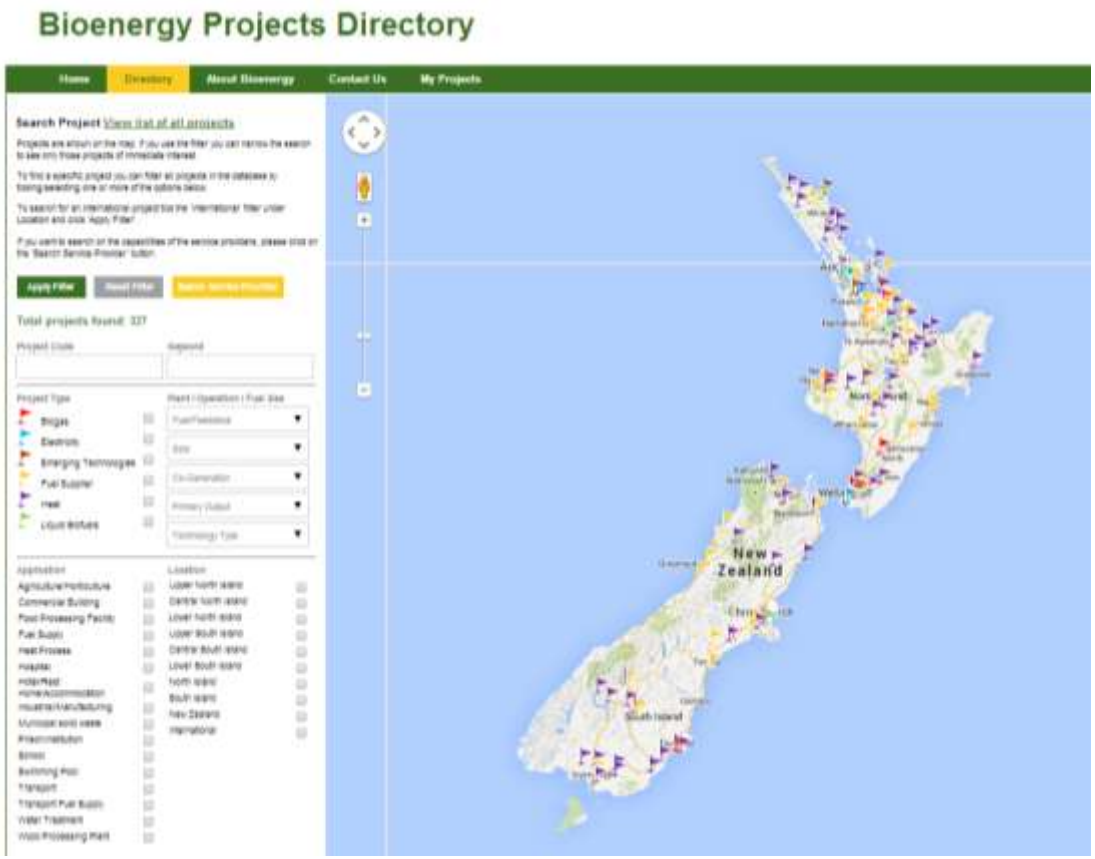
Bioenergy Projects Directory

Bioenergyprojects web site:



- Comprehensive listing
- Covers all forms of bioenergy projects
- Lists:
  - Application
  - Location
  - Project type
  - Provider
  - Fuel type, plant type

http://www.bioenergyprojects.org.nz/directory/

Wood Fuel Tools & Calculators

Usewoodfuel web site:

Tools and Calculators

The following tools have been developed to help get the best from wood fuel and to help with the decisions around the environmental and economic feasibility of committing to wood as a heating option.

Biomass calorific value calculator	Biomass boiler investment tool	Biomass cogeneration investment tool
Energy unit converter	Wet/dry basis converter	Cutover residue calculator
Residue transport cost calculator	CO2 emission calculator	Return on investment calculator
Supply curve tool	Wood waste valuation tool	Landing residue calculator
Biomass volume to mass converter	Residue recovery costing tool	On-site resource assessment tool
Wood Energy 101 – from Spark Energy (New Zealand)		

Source: EECA and Scion Calculators and Tools - Wood Energy Knowledge Centre

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http://www.usewoodfuel.org.nz/resources.html#tools-calculators

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Case Studies

Usewoodfuel web site:

Case Studies

Find out who's doing what with wood fuel in these featured Wood Fuel Case Studies or select from specific areas in the table below:

Accommodation	Rest-homes	Education * Institutions * Schools	Municipal facilities * Waste water treatment facilities * Military base * Swimming pools * Nurseries
Wood fuel technology	Wood processing		
Other applications	Contact us if you have any case studies to share, we welcome contributions and suggestions.		

The information associated with projects listed in the Bioenergy Projects Directory also include specific relevant case studies and presents a wealth of project information on wood fuel and wood pellets including examples of use, fuel suppliers and equipment suppliers.

http://www.usewoodfuel.org.nz/resources.html#casestudies

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Case Studies
Retirement & Care Facilities: Case Studies

- Little Sisters of the Poor and Hospital: Dunedin
- Ross Home & Hospital: Dunedin
- Titoki Healing Centre: Bay of Plenty
- Ashburn Clinic: Dunedin

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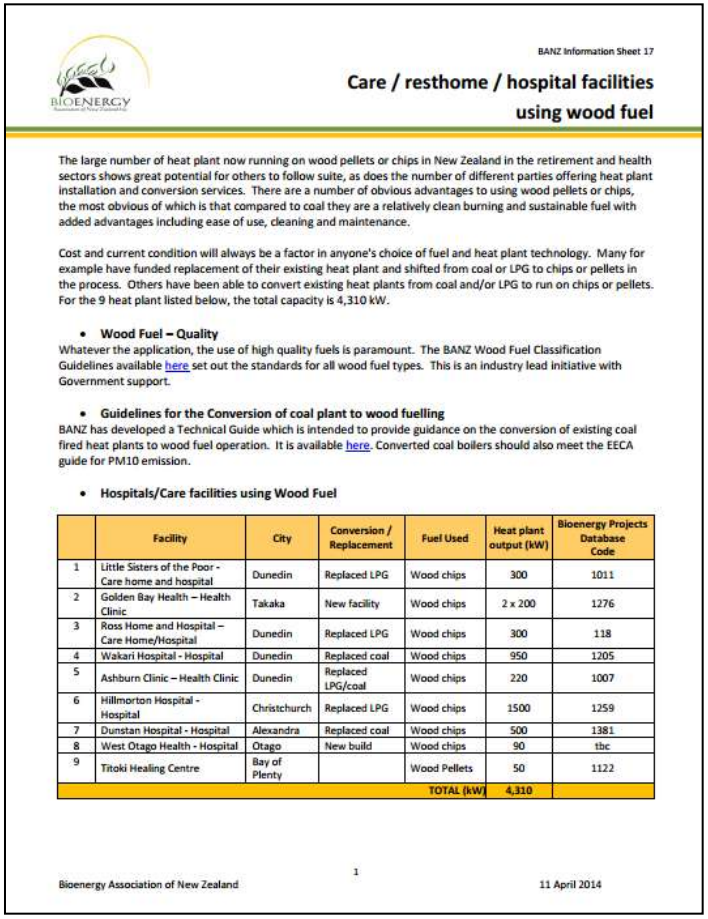
Case Studies
Retirement & Care Facilities: Case Studies



BANZ Information Sheet 17

Care / resthome / hospital facilities using wood fuel

The large number of heat plant now running on wood pellets or chips in New Zealand in the retirement and health sectors shows great potential for others to follow suite, as does the number of different parties offering heat plant installation and conversion services. There are a number of obvious advantages to using wood pellets or chips, the most obvious of which is that compared to coal they are a relatively clean burning and sustainable fuel with added advantages including ease of use, cleaning and maintenance.

Cost and current condition will always be a factor in anyone's choice of fuel and heat plant technology. Many for example have funded replacement of their existing heat plant and shifted from coal or LPG to chips or pellets in the process. Others have been able to convert existing heat plants from coal and/or LPG to run on chips or pellets. For the 9 heat plant listed below, the total capacity is 4,310 kW.

- **Wood Fuel – Quality**

Whatever the application, the use of high quality fuels is paramount. The BANZ Wood Fuel Classification Guidelines available here set out the standards for all wood fuel types. This is an industry lead initiative with Government support.

- **Guidelines for the Conversion of coal plant to wood fuelling**

BANZ has developed a Technical Guide which is intended to provide guidance on the conversion of existing coal fired heat plants to wood fuel operation. It is available here. Converted coal boilers should also meet the EECA guide for PM10 emission.

- **Hospitals/Care facilities using Wood Fuel**

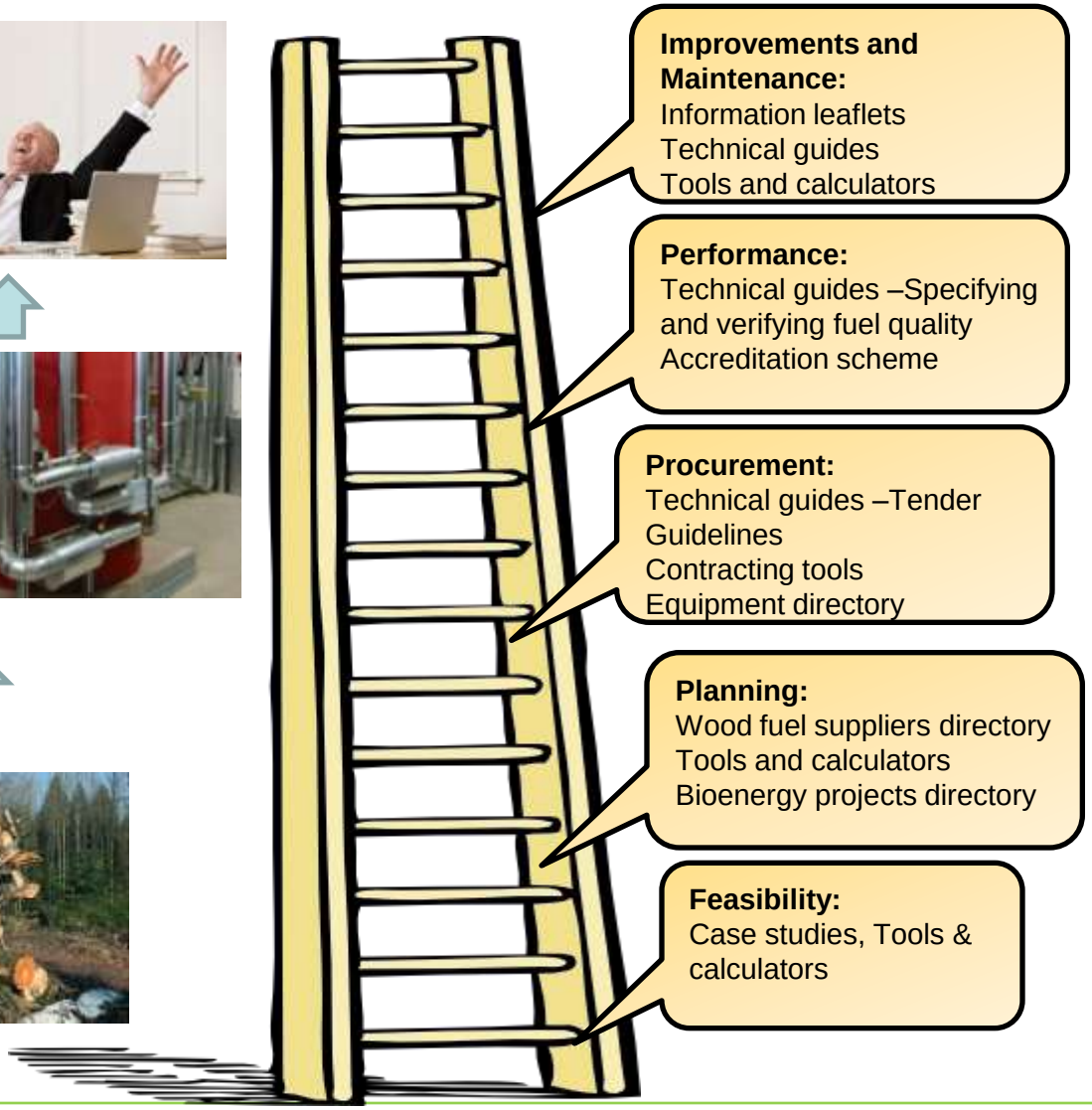
	Facility	City	Conversion / Replacement	Fuel Used	Heat plant output (kW)	Bioenergy Projects Database Code
1	Little Sisters of the Poor - Care home and hospital	Dunedin	Replaced LPG	Wood chips	300	1011
2	Golden Bay Health – Health Clinic	Takaka	New facility	Wood chips	2 x 200	1276
3	Ross Home and Hospital – Care Home/Hospital	Dunedin	Replaced LPG	Wood chips	300	118
4	Wakari Hospital - Hospital	Dunedin	Replaced coal	Wood chips	950	1205
5	Ashburn Clinic – Health Clinic	Dunedin	Replaced LPG/coal	Wood chips	220	1007
6	Hillmorton Hospital - Hospital	Christchurch	Replaced LPG	Wood chips	1500	1259
7	Dunstan Hospital - Hospital	Alexandra	Replaced coal	Wood chips	500	1381
8	West Otago Health - Hospital	Otago	New build	Wood chips	90	tbc
9	Titoki Healing Centre	Bay of Plenty		Wood Pellets	50	1122
				TOTAL (kW)	4,310	

Other Tools

- Equipment suppliers directory
- Training and education –
  - Continuing professional development
- Range of other technical guides
  - “Conversion of solid fuel boilers from coal to wood pellet firing”
  - Guidance document for wood pellet boiler operators
- Best practice boiler tuning procedure guidelines

Conclusions:

Summary of Tools



Improvements and Maintenance:
Information leaflets
Technical guides
Tools and calculators

Performance:
Technical guides –Specifying and verifying fuel quality
Accreditation scheme

Procurement:
Technical guides –Tender Guidelines
Contracting tools
Equipment directory

Planning:
Wood fuel suppliers directory
Tools and calculators
Bioenergy projects directory

Feasibility:
Case studies, Tools & calculators

Comprehensive suite of tools to assist the decision making right through the process

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Conclusions:

- De-risking the market
- Transforming the wood fuel market
- Agreement between the players
- Information and tools
- Improving competitiveness of wood fuels
- Perceptions & reality – wood fuels is mainstream
- Simpler to purchase and use than conventional fossil fuels
- Market best practice – open and transparent

It works off-shore so why not in New Zealand?