



# “Wood Pellets in New Zealand”

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Bioenergy Association of New  
Zealand (BANZ)

# BANZ – who we are

- Bioenergy Association of New Zealand  
[www.bioenergy.org.nz](http://www.bioenergy.org.nz)
- Key areas and Interest Groups
  - Wood Pellets – [www.woodpellets.org.nz](http://www.woodpellets.org.nz)
  - Wood Fuels – [www.woodenergy.org.nz](http://www.woodenergy.org.nz)
  - Liquid Biofuels – [www.liquidbiofuels.org.nz](http://www.liquidbiofuels.org.nz)
  - Biogas - [www.biogas.org.nz](http://www.biogas.org.nz)
- Activities occur around the Interest Groups
- Advocacy, standards, promotion, training

# What are wood pellets?

- Densified wood fuel typically made of shavings and/or sawdust
- Can be made from a wide range of feedstocks
- High density and low water content
- Consistent characteristics
- Low ash
- High calorific value
- = clean, renewable heat



1 tonne wood pellets = 3.36 barrels of oil = 20.5 GJ of gas

# A range of applications



# Wood pellets in NZ

- Made in New Zealand
  - For residential use
  - For commercial scale use
  - For export
- Growing in popularity as a clean green fuel
- Pellets available country wide
- Uses wood processing residue – higher value than combustion
- Increasing availability of wood pellet appliances and ability to convert existing boilers from coal to pellets

# Pellets vs Coal

Parameter	Coal	Wood Pellets
Volatiles matter on a dry ash free basis	~47%	~85%
	This is quite a difference.	
Air recommended for efficient combustion	Predominantly underfire air	Predominantly overfire (secondary) air
Calorific value (gross)	21-30 MJ/kg	19 MJ/kg
	Wood pellets have a lower energy density than coal. A greater volume needs to be stored and used to provide the same amount of heat.	
Bulk density	850 kg/m <sup>3</sup> <sup>(1)</sup>	650 kg/m <sup>3</sup>
Environmental benefits	Wood pellets are a renewable fuel made from wood residue. They are considered neutral with respect to greenhouse gas emissions. Compared to all fuel alternatives, wood pellets provide the greatest reduction in CO <sub>2</sub> emissions. Particulate emissions are also greatly reduced because wood pellet fuel inherently has very low moisture and ash content. <sup>2</sup>	
Ash	4-6%	0.5-0.8%
Sulphur	0.3 – 1.5%	negligible
Air required for Combustion	Wood pellets require more air for combustion compared to coal. This means that over fire or secondary air is therefore essential. Over fire air is critical to achieve efficient and clean burning. Air can be supplied in two ways: <ol style="list-style-type: none"> <li>1. By air damper from the main air fan, or</li> <li>2. By a secondary air fan.</li> </ol>	
Fuel Delivery	An auger has to run at a higher speed to ensure a greater rate of fuel delivery for wood pellets compared to coal. Having the capability of variable speeds on the feeding auger is highly recommended. Options include a variable speed drive (VSD) or a reduction gear box. If the auger is timed to come on and off, it's recommended that the interval time is 'seconds' rather than minutes'.	
Fuel Storage	Storage of the pellets is key. The main issue with the storage of pellets is ensuring that they are free from moisture. Pellets must stay dry.	

# High quality wood fuel

- **Low emissions** – pellet stove emissions are so low they can be burned in most areas even those with burning restrictions.
- **High Combustion** – near total combustion (around 98.5%); pellet stoves produce virtually no creosote.
- **Low waste ash production** - A 20kg bag of Wood Pellets produces around 100gms of ash.
- **High efficiency** - The efficiency rating can be as high as 94%, depending on the model and heat output required.
- **Easy to use** –flow like a liquid and can work as part of an automated feeding system; easy to ignite and to handle generally.

# Wood Pellets - a good option

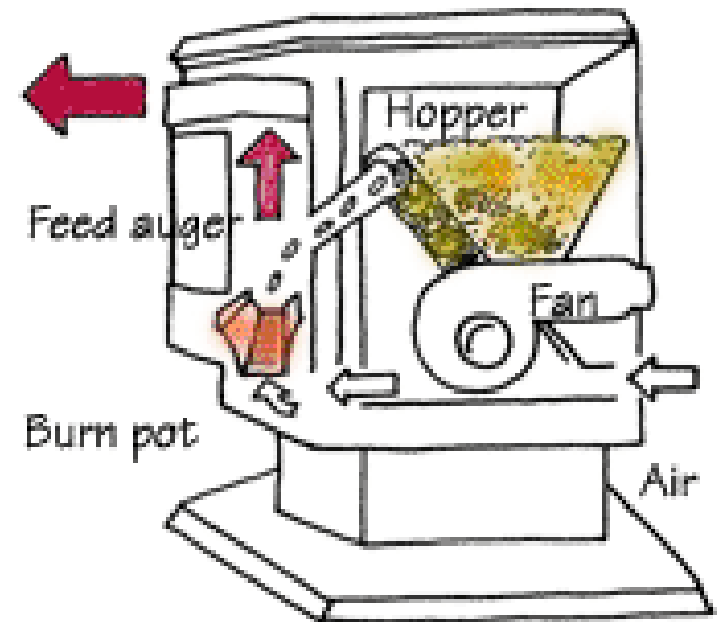
- **Easy installation** - minimal clearance is needed to install the burner/stove.
- **Easy to store** - One ton of wood pellets has the heat value of about 5 m<sup>3</sup> of firewood and stacks easily in one third of the space. This makes it possible to easily store fuel for the entire season.
- **Environmental advantages** – Sustainable source of fuel; CO<sub>2</sub> neutral both in combustion and storage. Wood pellets are a clean, environmentally friendly, natural, renewable fuel resource. Reduces waste destined for landfills and the cost of disposing waste ash is greatly reduced.
- **Continuous operation** – large hopper and the continuous burning stove.

# Residential Use

- ~ 10,000 pellet fires installed in residential applications (8,000 of these are in the Canterbury Region).
- pellets to heat a residential home – on average a little under 1-1.5 T/yr
  - growing market in the North Island (ave. Consumption = 0.75t/yr)
  - increasing number of fires in more modern homes (which are better insulated & require less heating)
  - holiday homes with low level of occupancy.
- Compliance issues with regard to use with wetback

# Residential – installation

- Pellets heaters are different from solid wood fires
  - installation,
  - fuel delivery,
  - air use,
  - access to working parts etc
  - Requirements for maintenance
- BANZ with Waiariki Polytech run installer courses – practical and theory
- BANZ developing installer accreditation scheme



# Pellets can be burned in larger boilers



# Pellets – Commercial Use (1)

- Circa 50 projects currently being supplied wood pellets by Natures Flame alone include:
  - Schools,
  - Universities,
  - Swimming pools,
  - Accommodation,
  - Day centre,
  - Prison,
  - Factory process heat,
  - Council biosolids drying facility (starting in June)
- Schools – of 46 schools running their heating on wood – 40 have opted for wood pellets.

(Details on the BANZ web-site

[http://www.bioenergy.org.nz/documents/publications/Wood\\_Pellets/School\\_Boilers-Conversions\\_and\\_Replacements\\_Feb2010.pdf](http://www.bioenergy.org.nz/documents/publications/Wood_Pellets/School_Boilers-Conversions_and_Replacements_Feb2010.pdf))

# Pellets – Commercial Use (2)

- New projects currently being progressed by Nature's Flame alone include:

➤ Schools and universities,	8
➤ Swimming pools,	4
➤ Accommodation,	4
➤ Dairy,	5
➤ Hospital,	14
➤ Prisons,	8
➤ Process heat,	5

# Schools



**Rotorua Girls High School**

**1 MW Boiler**



**Burn back safety**



**Lining the bunker**



**Eliminate ash disposal**



**VSD controls for auger and fan**

# Wood pellets replacing coal



Radford Yarn Technologies in Hornby  
Heat exchange to drier and washing facility

# Commercial – equipment supply

- There are a number of imported brands on the market to suit a range of needs, e.g.
- **HDG Compact** - Fuel: Wood Pellets Output: 25, 35, 50, 65, 80 kW
- **Large HDG Boilers** - 100/150/200 kW
- **Fu-wi wood pellet** boilers: 15kW, 22kW and 30kW
- **Woodpecker Wood Pellet Boilers** 15-50kW

There are currently six New Zealand based manufactures of wood pellet stoves/burners and boilers:

- McKenzie Heating Design (Dunedin),
- Parkwood Pellet Fires
- Taymac (Taylor Manufacturing Ltd) (Christchurch).
- Metalfab Industries (Auckland)
- Pioneer Manufacturing Ltd. (Taranaki)
- Eco Flame Ltd
- Fogarty Industries (Invercargill)

# Commercial – operation

- Reduced ash
- Cleaner operation
- Easier cleaning and maintenance
- Potential reduction in emissions (CO<sub>2</sub> & PM<sub>10</sub>)
- Sustainable fuel option
- Energy efficient

**“The new boiler cut electricity usage in half, slashed the energy bill by 25% and reduced the time needed to dry yarn by between three and six hours.” *Radford Yarn Technologies Christchurch***

# Commercial – Design & installation

- Consenting
- Conversion from coal
- Storage bins
- Continuous fuel delivery
- Enhanced air supply
- Safety
- Operator training

# Wood Pellet Producers in New Zealand

Who?	Location
"HotShottzz" (from Golden Strand Wood Fibre Products)	<i>Auckland</i>
The Green Lucifer Company	<i>West Auckland</i>
Pine Tree Pellets (from Wood Pellet Fuels)	<i>Huntly</i>
Inset Firelogs (NZ)	<i>Hastings</i>
Nature's Flame	<i>Christchurch, Rotorua and Taupo</i>
Firetime Pellets (from Aswood)	<i>Nelson</i>
Andrew McAlister	<i>Christchurch</i>
Starwood Ltd	<i>Timaru</i>
	<i>Dunedin</i>
Pomahaka Wood Pellets Ltd	<i>Tapanui (West Otago)</i>
Southern Wood Pellets	<i>Invercargill</i>

# Process residues -> revenue



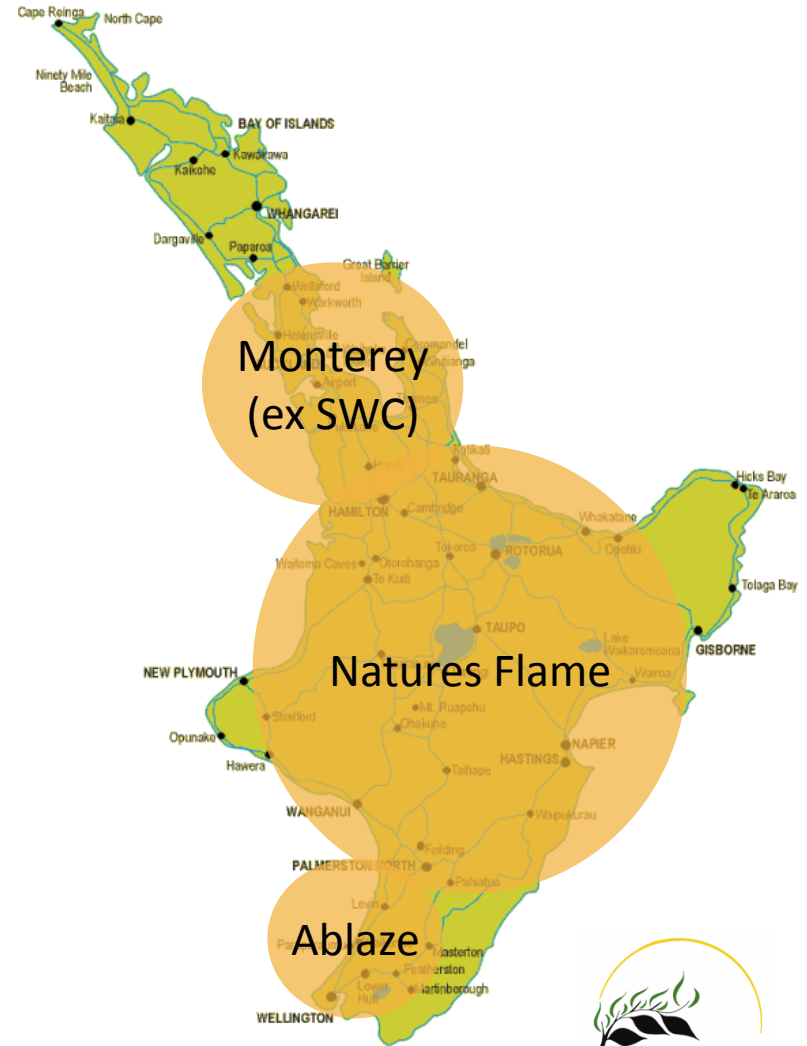
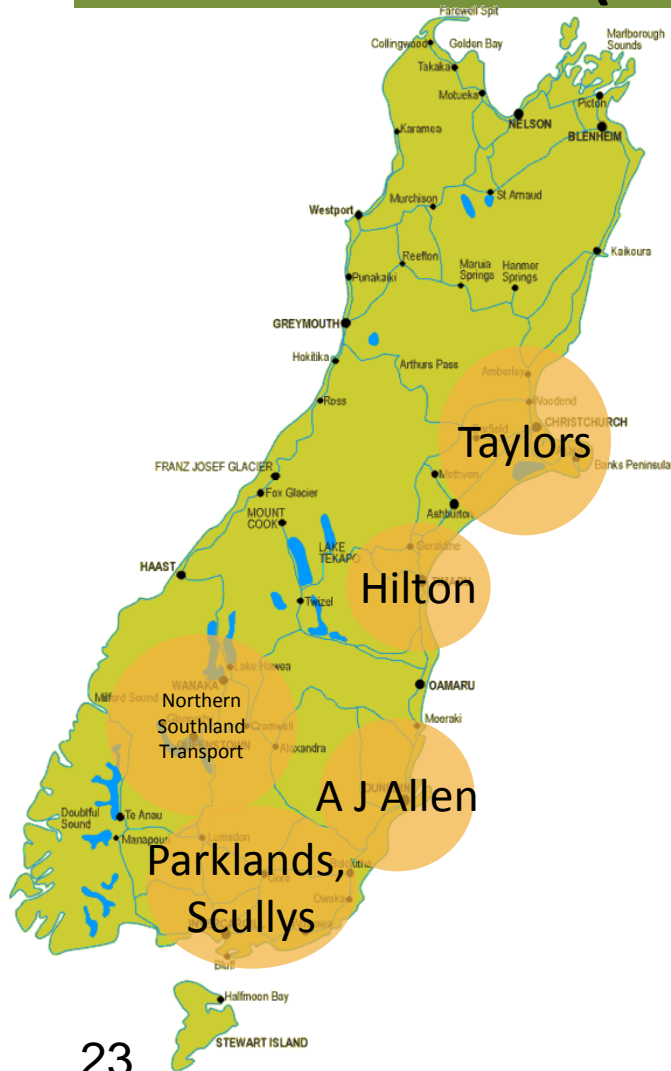
# Residential – pellet supply

- Pellets are available from:
  - service stations,
  - direct from the producer,
  - Placemakers and Mitre10,
  - other hardware stores and heating specialists.
- As the product becomes a more mainstream commodity the tendency is more towards retailers. (Natures Flame - 80% of their product is now sold through retail stores.)
- Natures Flame do bagged deliveries (15kg, or 1t) to any address in NZ

# Commercial – pellet supply

- Pellets are widely available in New Zealand.
- Bulk delivery
  - 12t and 28t loads available;
  - continued investment in delivery solutions in North and South islands.
- Depends on size of contract but up to ten years on volume and five years on price are sometimes available.
- Mechanised delivery

# Distribution and Delivery Example – (Nature's Flame)



# Pellet delivery in bulk



# Using Pellets – buyer beware

- Like any appliance, a pellet burner needs to be professionally installed and tested.
- All wood pellets are not created equal!
- Use quality pellets
- Good efficiency and emissions are possible when
  - The appliance is installed or converted properly
  - High quality wood pellet fuel is used
  - Appliance is properly maintained

# Wood Fuel Classification Guidelines

- Industry lead initiative
- To give the seller and the purchaser of wood fuel confidence re the description and quality of the wood fuel sought or supplied.
- Guidelines provide a common methodology for classifying, specifying and declaring the quality and properties of traded wood fuel in NZ.
- Available on the BANZ Web-site  
[http://www.bioenergy.org.nz/documents/Homepage/Forthcoming\\_Events/WoodFuelClassificationGuidelines\\_draft090928-version4.pdf](http://www.bioenergy.org.nz/documents/Homepage/Forthcoming_Events/WoodFuelClassificationGuidelines_draft090928-version4.pdf)
- The Guidelines cover the following forms of wood fuel:
  - Wood Chip
  - Hog Fuel
  - Wood Pellets
  - Brickettes
  - Construction and Demolition Timber
  - Firewood Logs
  - Firewood

# Pellets and air emission reduction

- **Delivering reduced emissions (CO<sub>2</sub> and PH<sub>10</sub>)**–
  - Quality fuel ensures good combustion
  - Correctly installed and tuned burners
- ***National Environmental Standards for Air Quality*** -  
All new enclosed wood fires to meet the National Environmental Standards.  
  
All wood burners installed after 1 September 2005 must have:
  - An emission of less than 1.5 grams of particles per kilogram of dry wood burnt and a
  - thermal efficiency of greater than 65%.

# Export potential

- Only renewable energy resource that can be exported
- Sell to meet other country climate change targets.
- Sustainably produced
- Easy to transport
- Currently being exported to Europe and Asia

# Big export future for Pellets



Natures Flame Taupo Plant with export focus