Bioenergy Association (BANZ) Conference

Successful Installation and Operation of Wood Fuelled Heat Plant

……a showcase of innovative technologies and fuel.

SCALABILITY & APPLICABILITY OF INDUSTRIAL SCALE HEAT PLANT

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9 May 2014

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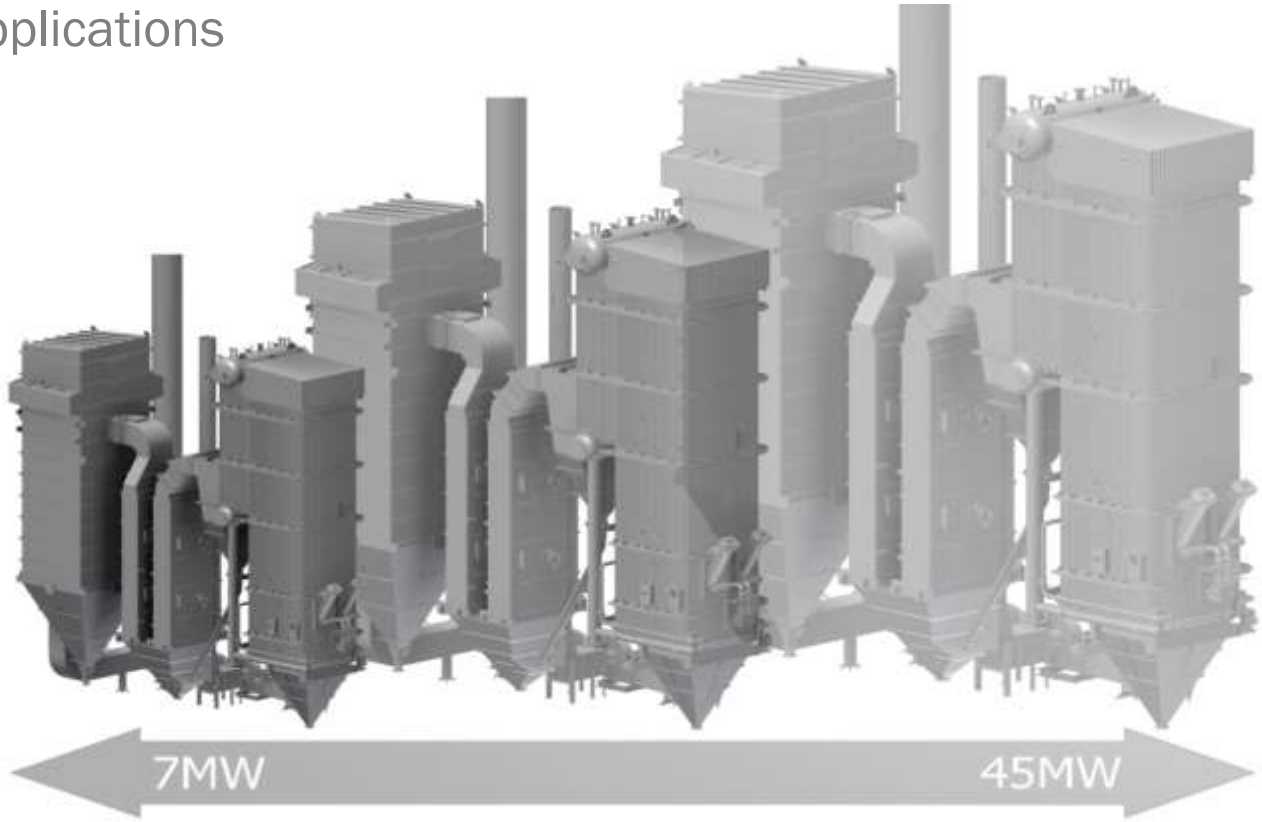
Scalability

Scalability can be defined as ‘able to be economically resized smaller or larger without losing quality’

Economic Solutions Available from 7 MW ~ 45 MW+

Biomass fired boilers, and in particular those using bubbling fluidised beds (BFB) were typically restricted to large installations but now this technology has been scaled down to suit a wide range of applications



Reference Sites – NZ Installed Examples

40 MW Bubbling Fluid Bed

8.5 MW Bubbling Fluid Bed

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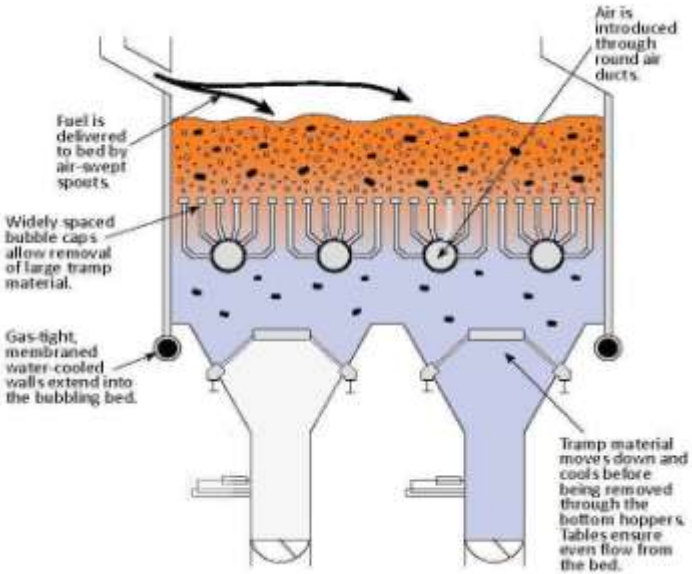
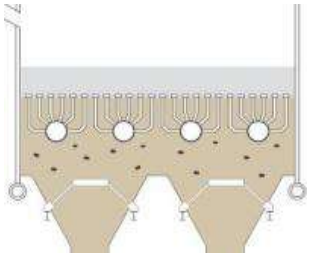
Fluid Bed Combustion for Steam Boilers, Water Heaters, & Thermal Oil Heaters

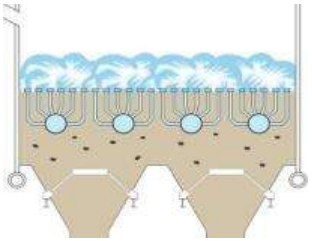


- High efficiency due to low excess air and better combustion
- Low NOx – approx. 30% lower than grate firing
- Low CO stack emissions
- Stable combustion that is less sensitive to fluctuating fuel composition than a grate fired system
  - Capable of handling fuels with high silica and pumice content. There are no moving parts subject to abrasion which is particularly relevant for central north island fuels

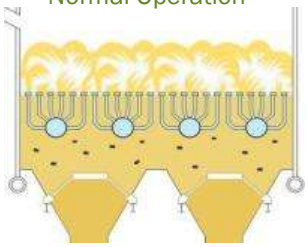
Not Operating
Bed Height ≈ 20”



Fluidized Bed With Air
Bed Height ≈ 32”



Heat Bed and add Fuel –
Normal Operation



Wood Waste Fuels , Multi Fuel Options with Mixing Capabilities

Able to burn:

- Woodchip
- Sawdust
- Bark
- Dry shavings
- Wood waste blended with other biomass fuels
- High moisture content fuels up to 67% while maintaining 100% output without supplementary firing.
- Process waste streams from other production processes such as coffee waste, animal processing sludges, etc.

Ease of Transport & Erection

9MW Coffee Waste Fired BFB Boiler – Nestlé UK
1 Piece Shipping & Erection

Efficient Site Erection

Modular fabrication of components leads to:

- Plug & play kitset approach
- Highly cost effective site erection
- Less disruption on green and brown field sites
- Reduced risks on site

Baghouse lift and install

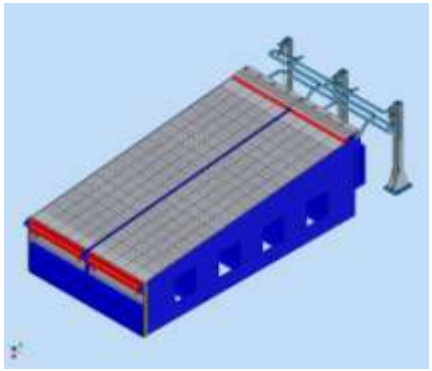
Applicability – Get the right tool for the job!

Don’t compromise on the important bits!

Typical Grate Firing Systems for Steam Boilers, Water Heaters, & Thermal Oil Heaters – Grate Options

Reciprocating Step Gate

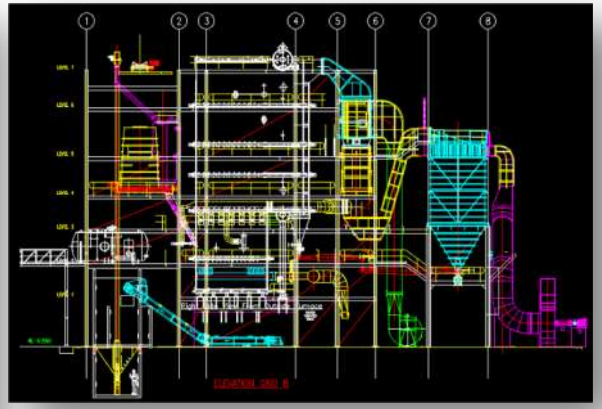
- Long proven technology
- Larger furnace volume and footprint / MW than other options
- Especially suited to larger fuel particles



Water Cooled Vibrating Grate

- Larger, heavier fuel particles are spread evenly on the grate forming a thin, fast-burning fuel bed
- The combination of suspension and the fast-burning bed makes it extremely responsive to load demand
- Water-cooled surface for long grate life, but tiles are individually replaceable
- Clinkering issues are rare. Pumice laden fuels can be tolerated

Reference Sites – Mixed Wood Waste Fuel



PAN PAC FOREST PRODUCTS LIMITED

Combustion System

- BFB

Thermal Capacity 41.7 MW

Steam flow	52.5 tph
Operating pressure	61.5 bar(a)
Steam Temperature	450°C
Feedwater Temperature	105°C

Fuel

Wood Waste	
Moisture Design	55%
Amount of fuel	23.1 tph

Temperatures

FEGT	948°C
Exit Air Heater	280°C
Exit Economiser	150°C
OFA Temperature	204°C
UFA temperature	196°C

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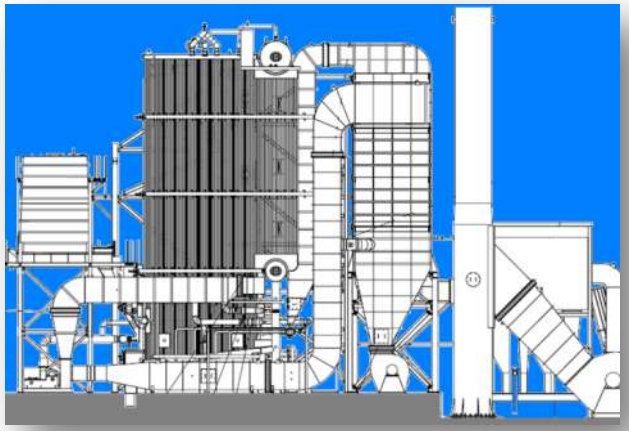
Reference Sites – Mixed Wood Waste Fuel



Tropik wood industries limited

Combustion System

- Spreader Stoker / Vibrating Grate

Thermal Capacity 26.9 MW

• Amount of steam	35.0 tph
• Operating pressure	45 bar(a)
• Steam Temperature	400°C
• Feedwater Temperature	105°C

Fuel

• Wood Waste and Saw Dust	
• Moisture Design	55%
• Amount of fuel	17.5 tph

Temperatures

• FEGT	827°C
• Exit Economiser	N/A
• Exit Air Heater	170°C
• OFA Temperature	299°C
• UFA temperature	299°C

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Reference Sites – Mixed Biomass, Extra High Moisture / Ash

Nestlé

Combustion System

- BFB

Thermal Capacity 16 MW

Steam flow	24.0 tph
Operating pressure	23 bar(a)
Steam Temperature (satd.)	220°C
Feedwater Temperature	105°C

Fuel

- Sawdust & Spent Coffee Grounds
- Moisture Design 55%
- Amount of fuel 7.6 tph

Temperatures

FEGT	806°C
Exit Economiser	238°C
Exit Air Heater	162°C
OFA Temperature	168°C
UFA temperature	165°C

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Reference Sites – Extra High Moisture / Ash

SILVER FERN FARMS

efi ENERGY FOR INDUSTRY

Combustion System

- BFB

Thermal Capacity 8.5 MW

Steam flow	12.7 tph
Operating pressure	16.5 bar(a)
Steam Temperature (satd.)	203°C
Feedwater Temperature	90°C

Fuel

Clarifier & DAF Solids, Sawdust	
Moisture Design	55%
Amount of fuel	5.2 tph

Temperatures

FEGT	767°C
Exit Economiser	261°C
Exit Air Heater	170°C
OFA Temperature	192°C
UFA temperature	188°C

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INVEST IN THE RIGHT TOOL FOR THE JOB!

Questions?