

# Energy Division

## Capability Presentation

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2019

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# Energy Division

- Design
- Manufacture
- Delivery
- Installation
- Commissioning
- Service
- Agency Products



## Core Business

### Technology

Babcock & Wilcox Boilers  
 Steampac™ Boilers  
 Vyncke Biomass Boilers  
 Windsor Energy Air Heaters  
 Weishaupt Burners  
 Dreizler Burners  
 Detroit Stoker  
 Emission Control Systems

### Services

Front End Engineering Design (FEED)  
 Plant and Equipment Design  
 Procurement  
 Manufacturing/Fabrication  
 Construction Management  
 Plant Refurbishment and Outage  
 Maintenance  
 Service  
 Whole of Life Support  
 Energy Plant Automation and Control

# Energy Division

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Windsor Energy NZ Head Office – Napier, New Zealand

- New Zealand business formerly known as Easteel dates back to 1952.
- Acquired By Windsor Engineering in 2019
- 30+ Engineers including in-house automation & electrical design
- Total office staff approx. 40 including sales, PM, engineering & finance
- Manufacturing facilities

# Energy Manufacturing

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- NZ workshop located in Wellington
- 2 x 5T gantry cranes; 8m under hook
- Cutting, rolling, welding, tube bending facilities
- 30+ trades staff



# Energy Division- Products



**STOKER FIRED BOILERS**



**FLUIDIZED BED BOILERS**



**THERMAL FLUID PLANTS**



**PACKAGED THERMAL FLUID**



**AIR HEATERS**

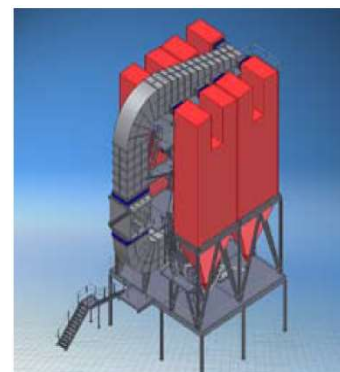
**LARGE GAS & OIL FIRED BOILERS**



**RCR STEAMPAC WT BOILERS**



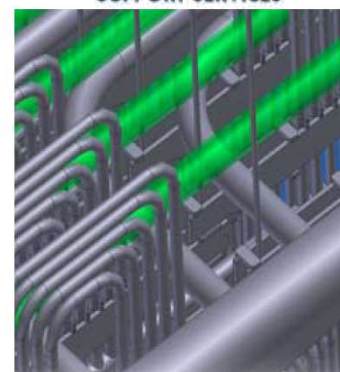
**AIR EMISSION CONTROL**



**BALANCE OF PLANT**



**WHOLE-OF-LIFE  
SUPPORT SERVICES**



# Energy Division - Product Lines

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## MAJOR PRODUCT LINES

Coal fired boiler plant – B&W Towerpak & DSC Roto Grate 10MW to 100MW+

Biomass Boiler – Vyncke Biomass, waste to energy, thermal oil boilers from 2MW to 10MW

- Vibrating Grate & Step Grate (Reciprocating Grate)

Biomass Boiler for high moisture content from 10MW +

- B&W Towerpak with BFB (Bubbling Fluid Bed) or Step Grate

Airheaters – Tubular Type – TT

- Range 20tph to 220tph up to 405°C

Airheaters Concentric Type - CT

- Range 5tph to 40tph up to 300°C

Steam Coil Airheaters – JT (John Thompson) design

- Fin tube design to heat clean process air for powder dryers

B&W FM Package Boiler - gas & oil fired from 20MW +

RCR Steampac Water Tube (WT) Package Boiler – gas, diesel & oil fired

- Standard Range 2.5MW | 4MW | 6MW | 8MW | 10MW | 15MW | 20MW

RCR Steampac Wet-Back (WB) Fire Tube Package Boiler – gas, diesel & oil fired

- Standard Range 4MW | 6MW | 7.6MW | 9.5MW

# Energy Division - Product Lines

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RCR Steampac Reverse Flame (RF) Fire Tube Package Boiler – gas, diesel & oil fired

- Standard Range 0.6MW | 1.2MW | 1.7MW | 2.3MW | 2.8MW | 3.6MW
- Majority of sales is handled by Windsor Engineering Service & Products divisions

Thermal Oil Heaters – INTEC Germany - gas, diesel, oil, coal & biomass fired

Sludge Dryer & Sludge Incinerator

Shell & Tube Heat Exchangers

Pug Mill Systems – Ash Handling

Sonic Horn/Sootblower

Accumulator / Deaerator Replacements

Economiser – Plain, Standard Fin & H-Fin Tube and Condensing Option

Geothermal Vessels

High Pressure Hot Water Boilers

Small HRSG

Various Emission Control technologies

# Our Technology Partners

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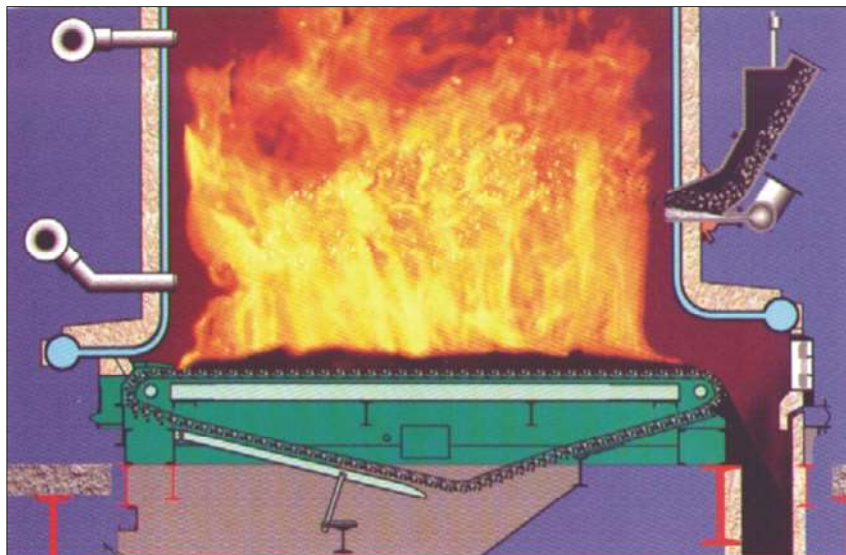
- Babcock & Wilcox Power Generation Group - Barberton, Ohio, USA
- Windsor Engineering is the exclusive licensee holder for Australia and New Zealand
- Applicable to B&W Towerpak™, FM™ package boilers and BFB technology
- Designs in-house using relevant B&W Design Manuals and software
- Vyncke – European designed biomass boiler systems, waste to energy and thermal oil



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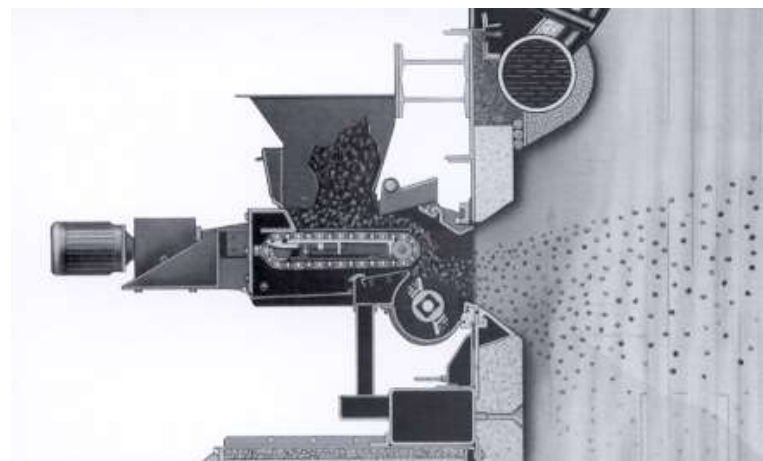
# TECHNOLOGY

# Traveling Grate



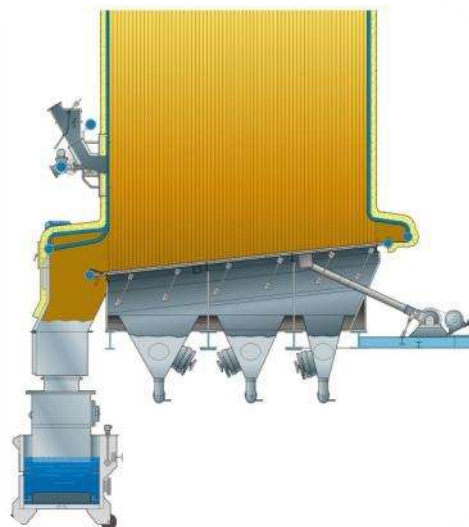
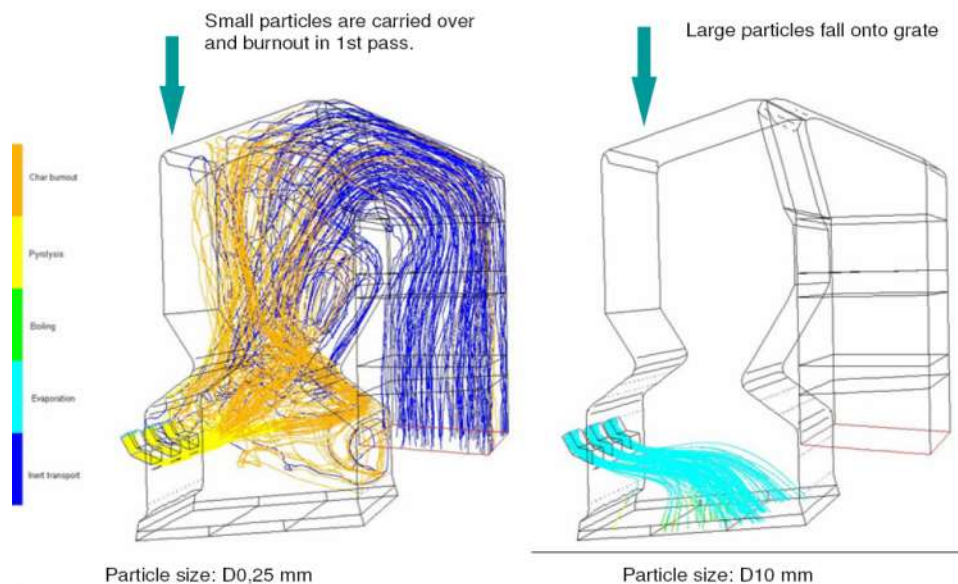
**RotoGrate® Stoker**

- Quick Response
- Fast rate of load change



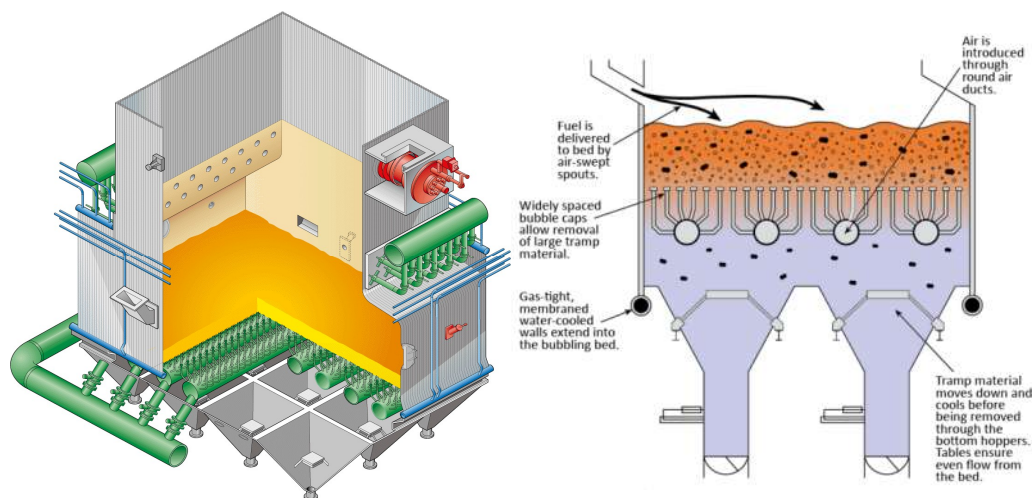
**UltraFeed® Feeders**

# Vibrating Grate



- The spreader firing principle is a widely accepted, proven and operator friendly means of burning biomass fuels
- Fuel is metered to a series of distribution devices which spread it uniformly over the grate surface
- Fine particles of fuel are rapidly burned in suspension assisted by carefully designed overfire air turbulence systems
- 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
- Minimal moving parts in furnace (one suspended grate platform) means very low wear and low maintenance cost
- Water-cooled surface for long grate life, but tiles are individually replaceable
- Clinkering issues are rare. Pumice laden fuels can be tolerated.

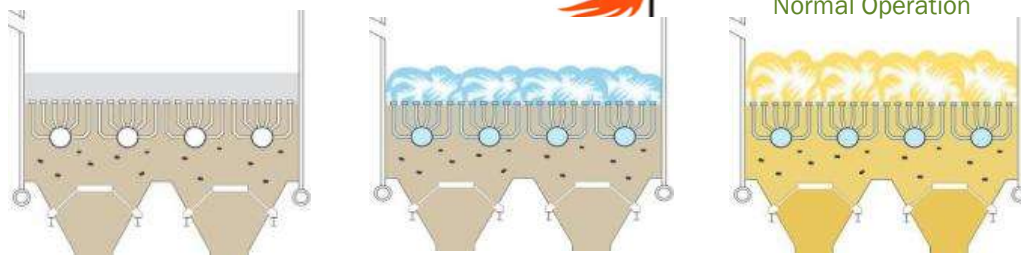
# Bubbling Fluidized Bed



Not Operating  
Bed Height  $\approx 20"$

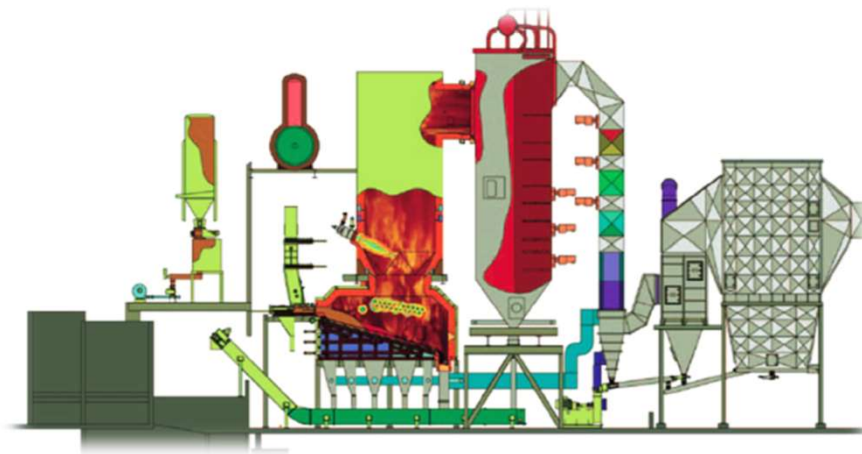
Fluidized Bed With Air  
Bed Height  $\approx 32"$

Heat Bed and add  
Fuel –  
Normal Operation

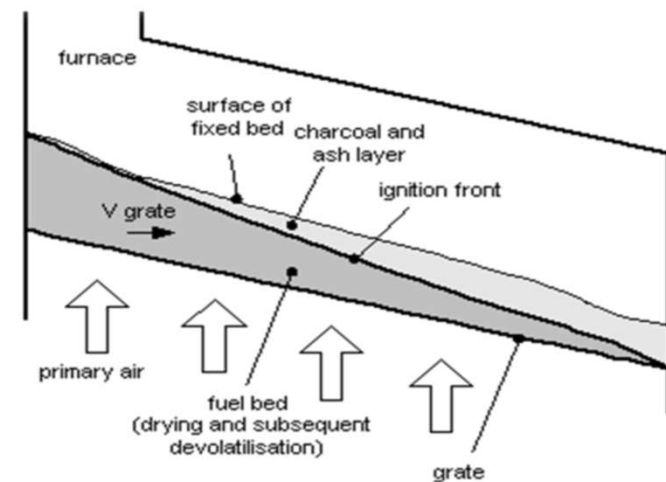


- BFB boilers are typically used when firing biomass at larger scale. RCR has perfected this technology at smaller scale typical in sawmills
- The fuel distribution is similar to spreader fired stoker technology where the fuel is spread into the furnace over the bed
- The bed is made up of sand with a series of high-pressure nozzles below which "fluidizes" the bed
- The fluidized sand bed heats and ignites the fuel to dry it and complete its combustion
- Higher moisture fuels in the range of 65% (wet basis) can be fired
- Not ideal for dry fuels or coal addition.

# Step Grate(Reciprocating Grate)

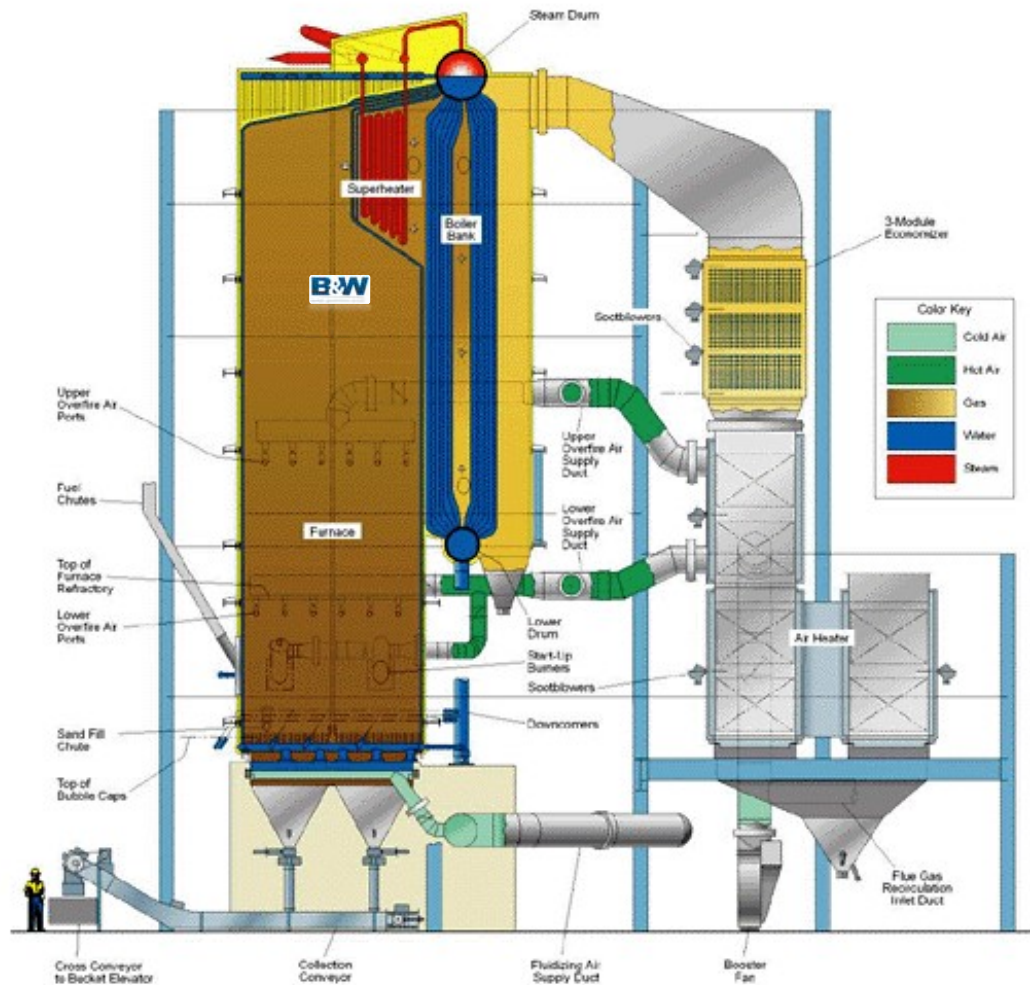


- Grates are either water or air-cooled
- First section typically “drying” zone
- Introduce fuel in large opening(s) at one end, accepts slightly larger fuel piece sizes
- Require large grate areas
- Good for steady constant loads, since the response time is slow
- Not ideal for applications where load swings readily occur
- High wear and “clinkering” problems associated with fuels of low ash fusion temperature (e.g. Pumice content).



# Towerpak Bottom Supported Boiler

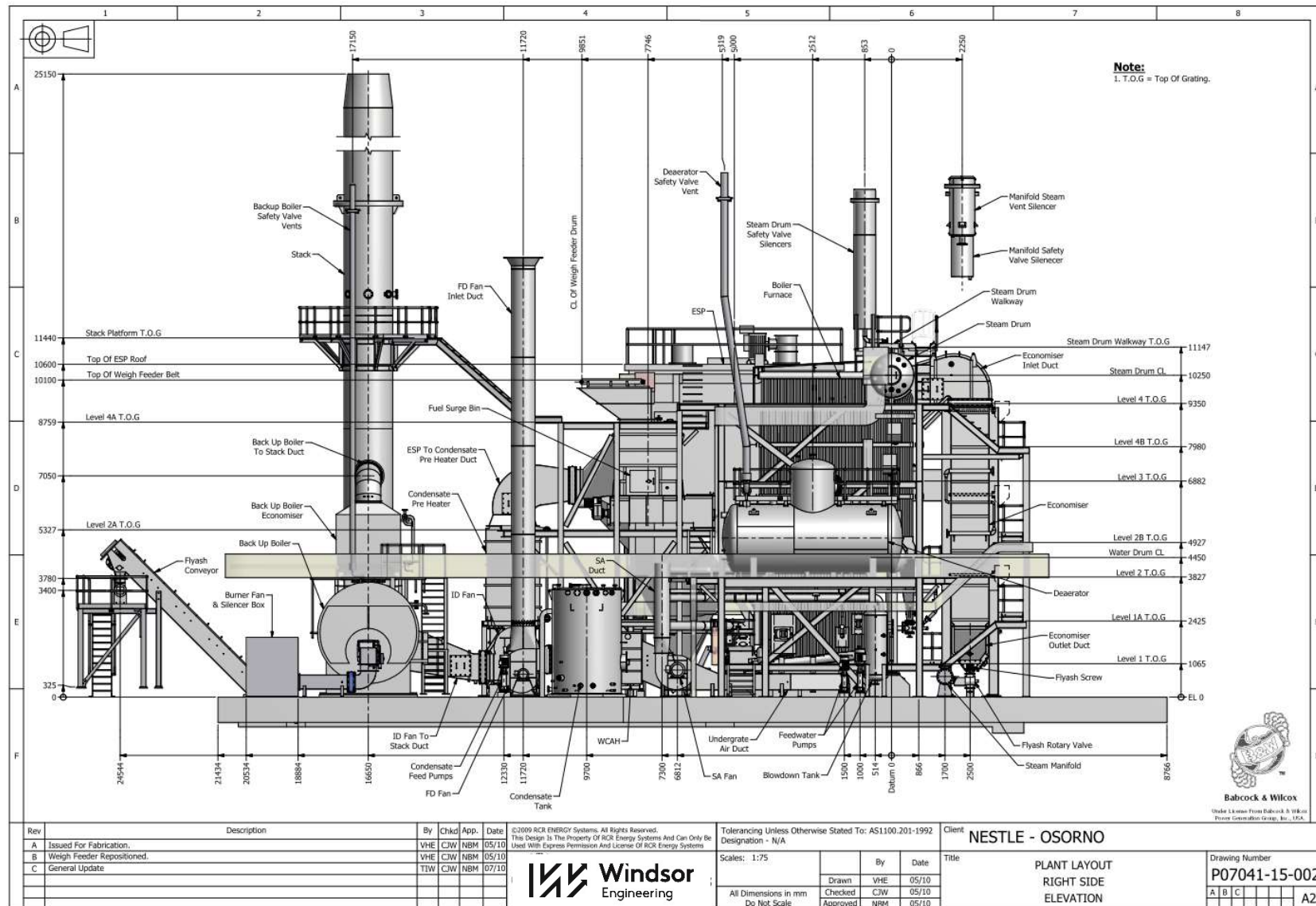
**BFB Bottom Supported**



- The two-drum generating bank is provided for low-pressure applications where a large amount of generating bank surface is required
- Higher pressure applications use a one-drum design
- Bottom supported so that boiler support steel requirements are minimized. Only platform support for access to the boiler and associated equipment is necessary.



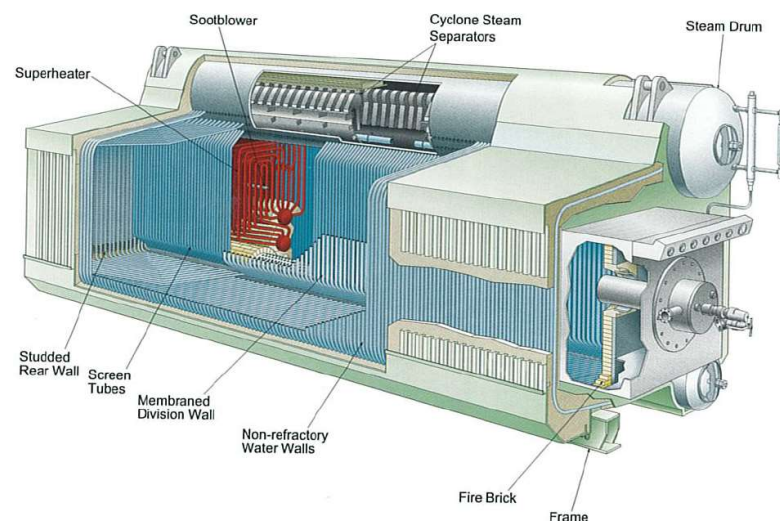
# Towerpak Boiler Plant



# Package Boilers



- FM unit, Range – 159 t/h, 72bar, 441 °C
- Gas, Oil or dual fuel fired
- Membrane wall construction
- Fully drainable superheater
- Extended surface economiser
- Low NOx burners



# Ash Handling System



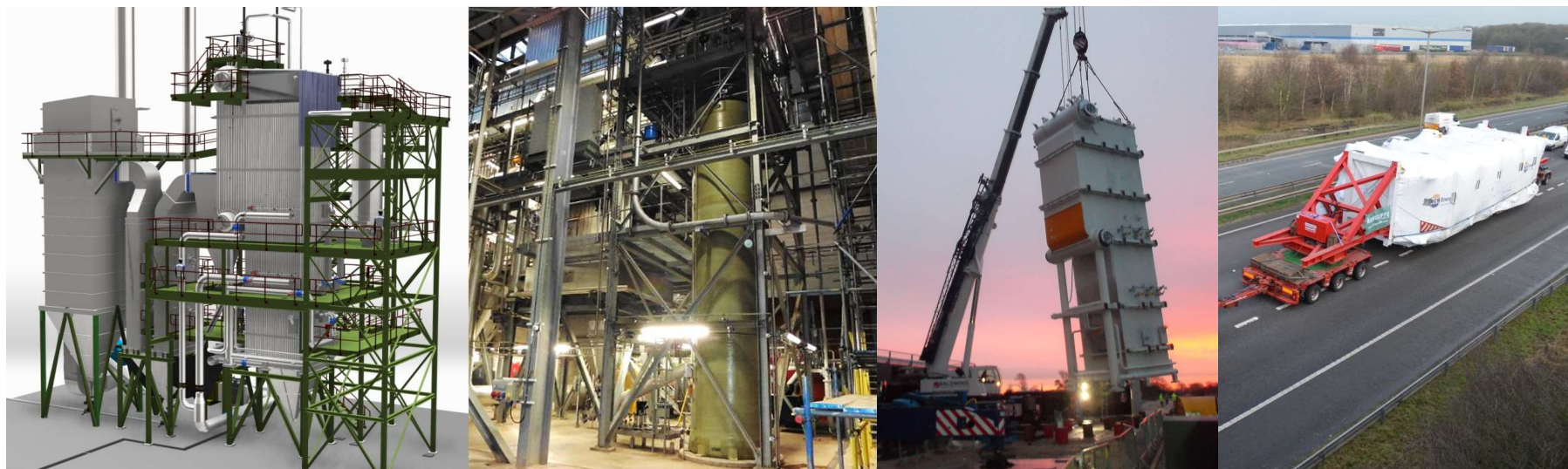
Pugmill



Dense Phase Pneumatic system to common 25 m<sup>3</sup> Storage Silo. Pickups at discharge of economiser and baghouse

# Key Projects

Example of completed BFB Boiler Fired on Coffee Grounds Plant



## Nestle UK Biomass Fired Steam Boiler Plant

<b>End Client</b>	Nestle
<b>Location</b>	United Kingdom – Tutbury - Staffordshire
<b>Description</b>	With the expansion of the coffee processing facility at Tutbury, UK, Nestle required additional process steam utilizing their coffee waste. a proven solution of a bubbling fluidized bed (BFB) boiler was elected due to its ability to incinerate high moisture biomass fuels in an efficient and environmentally friendly manner. To ensure that Health and Safety risks were minimised and to reduce the site installation costs, the Energy Division delivered the boiler pressure parts as a fully assembled unit.
<b>Scope of Work</b>	<p>Design and supply, erection supervision and site commissioning of a Babcock &amp; Wilcox Towerpak™ boiler and associated components to be fired predominantly on spent coffee grounds. The design is a bi-drum naturally circulating saturated steam boiler with bubbling fluid bed (BFB) combustion system, delivering 14tph of saturated steam at 23bar operating pressure. The boiler is designed and manufactured to European Standard EN 12952</p> <p>The boiler consumes 5.3tph of spent coffee grounds with a moisture of 51% to 65%. The emissions are controlled by means of a Pulsejet Baghouse and a Selective Non-Catalytic Reduction system (SNCR) for NOx reduction.</p>

# Key Projects

Example of completed Wood Biomass Boiler Plant – Vibrating Grate Technology



## Nestlé Wood Biomass Boiler Plant

Project: Nestlé Chile  
Location: Osorno, Chile  
Client: Nestlé

Nestlé is a world leading food company with nearly 500 factories distributed in 86 countries and 283,000 employees worldwide. Nestlé began operations in Chile in 1934, making condensed milk and went on to establish a number of milk processing plants in the south of the country in the region of Osorno.

Contract scope included design and supply of a complete boiler house containing boiler plant components,

supervision of erection, installation and commissioning on site.

We proposed a Babcock & Wilcox Towerpak® boiler fired on biomass featuring: Vibrating grate combustion system, very high efficiency boiler with economiser, recuperative air heater, condensate pre-heater for energy recovery, and 10 MW (15 t/h) back-up boiler fired on propane gas.

# Key Projects

Example of completed BFB Boiler Fired on Biomass Boiler Plant



## Nestlé BFB Boiler Fired on Biomass

Project: Gympie Project

Location: Gympie, QLD, Australia

Client: Nestlé Australia

16MW (24t/h) Bubbling  
Fluidised Bed Boiler

Nestlé's Gympie plant is one of Nestlé's largest facilities in Australia, where they manufacture instant coffee. The site employs approximately 200 people.

Nestlé approached the Energy team to replace their existing boiler on site. The boiler was proving unreliable due to its age and would not meet the steam demand of their growing plant.

The new boiler was not only required to produce steam but primarily to be able to incinerate high moisture coffee waste as fuel for the new boiler.

Contract scope included design and supply of a complete package of boiler plant components, including erection, installation and commissioning on site.

# Key Projects

Example of completed Gas & Diesel fired FM Boiler Plant



<b>End Client</b>	Fonterra Cooperative Group
<b>Location</b>	Lichfield New Zealand
<b>Description</b>	With the expansion of the milk processing plant at Lichfield, Fonterra required additional process steam for the second of the world's largest dairy spray dryer with a capacity of over 30t/hr of whole milk powder (equivalent to 4.4 million litres/day of milk). Contract scope for this project included a 52MW dual (gas & diesel) fired boiler capable of producing 71.5t/hr of saturated steam at 37bar. To ensure that Health and Safety risks were minimised and to reduce the site installation costs, RCR delivered the boiler pressure parts and main components as a fully assembled modules.
<b>Scope of Work</b>	Design and supply, erection supervision and site commissioning of a Babcock & Wilcox (B&W) FM® package boiler and associated components to be fired predominantly on natural gas. High Efficiency Energy Heat Recovery utilizing a high efficiency economizer, boiler blowdown heat recovery and deaerator vent heat recovery.

# Key Projects

Example of completed Recovery Boiler Rebuild



## CHH Tasman Recovery Boiler Rebuild

Project: CHH RB2

Location: Kawerau, New Zealand

Client: Carter Holt Harvey Tasman

In 2010-11, The Energy Divisions Australian and NZ operations jointly provided a scope of works that encompassed the demolition of the existing furnace and replacement of the boiler furnace and primary and secondary air and heater system.

This involved the installation of a 120 tonne gantry crane for the installation of new boiler pressure parts, including the furnace panels and hearth, and the removal and reinstallation of existing

parts, removal and reinstallation of the electrical and instrumentation equipment and replacement of the boiler piping systems.

We were responsible for site management and coordination of resources, worked closely with the client through the planning and delivery phases of the project, and applied extensive pre-planning and pre-shut modularisation of assemblies.

# Why Clients Trust the Energy Division

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- **Flexibility.** Ready and able to customize a solution so that you get what you want in the way most suited to your needs.
- **Lowest Risk.** The team have successfully managed numerous thermal energy plant projects of similar applications at equivalent scale and with time-critical deliveries.
- **We Deliver.** Safely, on time and meet or exceed performance guarantees
- **We Finish and Care.** Our attention to detail is second to none and the standard of finish, workmanship and training is a source of pride and identity to our people
- **Service.** We offer the most comprehensive care package available, including on-site maintenance and repairs, combustion tuning and optimization and remote automation troubleshooting

**E.I. Engineering Intelligence™. That's What We Do.**