Energy Solutions For Industry

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# What to Consider when Selecting your Heat Plant

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Living Energy Ltd

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# Topics

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1. Living Energy
2. Primary Design Fundamentals
3. Secondary / Other Factors to Consider
4. The Perfect Wood Boiler Solution

*94 slides = 12.766 seconds per slide*

# 1. Living Energy

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Established in 2003

Installed over 40,000kW of wood boiler capacity (25 boilers)

Installed boilers ranging from 100kW to 22,500kW

Partnered with Hargassner and Binder (Austrian) as well as Visdamax (NZ & Malaysian)

Wood Energy specialists : focus is on the area that is economic : **HEAT !!**



# A quick intro to “Wood Energy”

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- Boilers are highly developed products
  - Automated ignition
  - Automated fuel feed
  - Automated boiler tube cleaning
  - Auto ash removal
  - Auto response to load etc etc
- As convenient as fossil fuels….?

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# 2. Primary Design Fundamentals

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# Fundamental No. 1 : Investment Horizon

**Covered by Christian already**

***Competition for capital is a factor, normally requiring compromises***

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# Fundamental No. 2 : SIZING.....

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# a) Sizing the Boiler

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Wood Boilers…

- Cannot turn on and off as easily, or up and down
- Condensation occurs when cooling – try to avoid this
- Can only turn down to 20-30%
- Are expensive compared to gas or coal

**These are all good reasons to ensure the wood boiler is sized optimally**

Some examples of sizing ‘ratios’ :

| Site | Old boiler | Wood boiler |
|---|---|---|
| Thames High School | 600kW | 300kW |
| Golden Bay High / Pool | 700kW | 300kW |
| Westland High School | 900kW | 350kW |
| Dunstan High School | 1200kW | 650kW |
| Dunstan Hostel | 1000kW | 250kW |
| Little Sisters Hospital | 800kW | 300kW |

**Optimising the wood boiler size saves installation and operating costs. It also extends the life of the boiler.**

# Boiler Sizing

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# b) Sizing the Fuel Store

1. Aim for as much as possible - within the space and budget constraints
2. Factor in the distance to the fuel depot
3. Factor in the amount stored off site
4. Factor in the net amount recoverable

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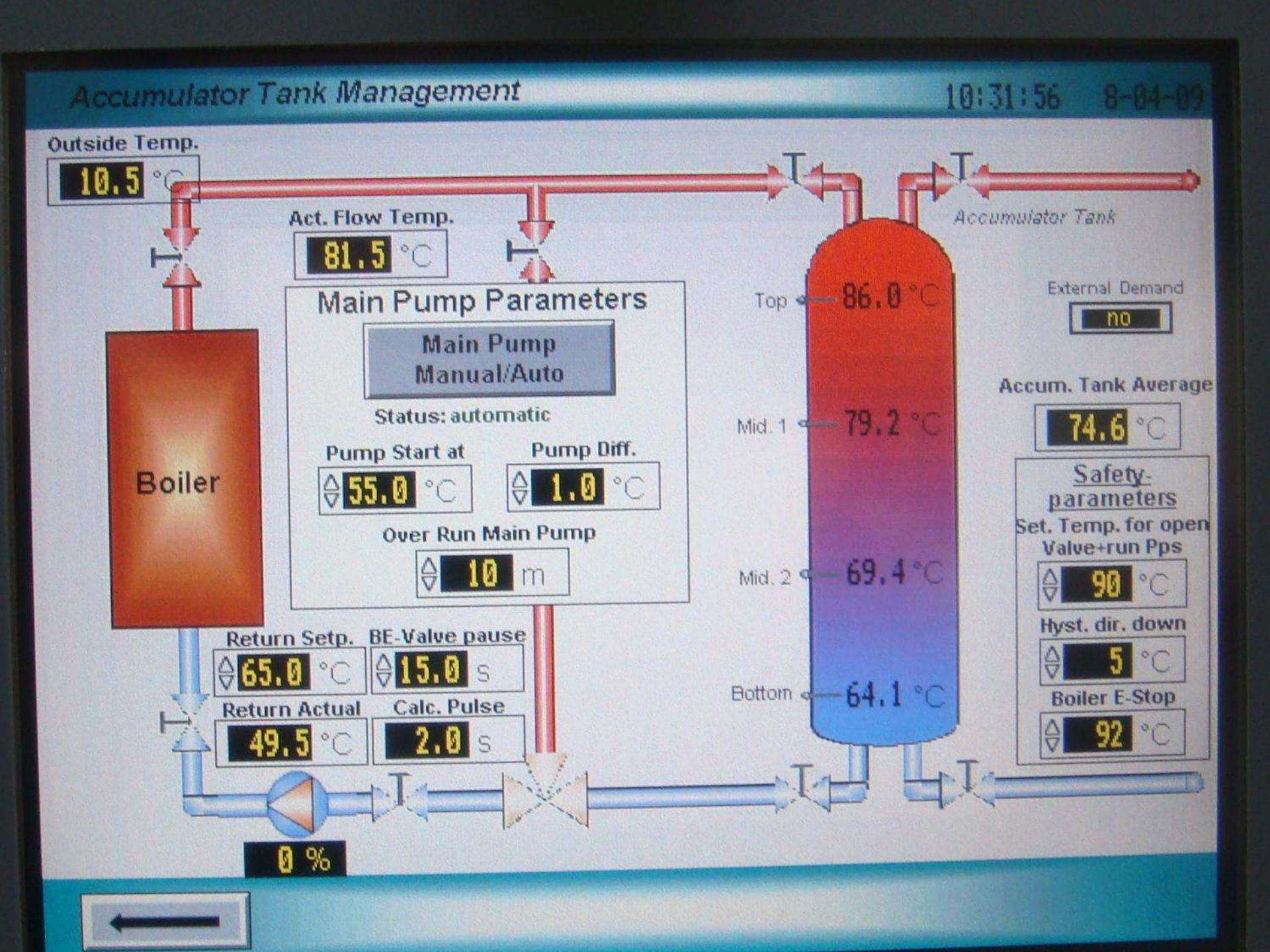
# c) Sizing the Energy Storage. Buffer tanks….

1. Improve efficiency
2. Improve response times
3. Increase boiler longevity
4. Increase peak output

**Aim for as much as possible - given space and budget constraints**


Accumulator Tank Management
10:31:56 8-04-09
Outside Temp.
10.5 °C
Act. Flow Temp.
81.5 °C
Accumulator Tank
Main Pump Parameters
Main Pump Manual/Auto
Status: automatic
Pump Start at
55.0 °C
Pump Diff.
1.0 °C
Over Run Main Pump
10 m
Boiler
Top 86.0 °C
Mid. 1 79.2 °C
Mid. 2 69.4 °C
Bottom 64.1 °C
External Demand
no
Accum. Tank Average
74.6 °C
Safety-parameters
Set. Temp. for open Valve+run Pps
90 °C
Hyst. dir. down
5 °C
Boiler E-Stop
92 °C
Return Setp.
65.0 °C
BE-Valve pause
15.0 s
Return Actual
49.5 °C
Calc. Pulse
2.0 s
0 %

# 1,300,000 litre Buffer Tank

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# OTHER PRIMARY DESIGN FUNDAMENTALS

a) Receiving the Fuel
b) Recovering the Fuel
c) Combusting the Fuel
d) Flue Gas Clean-Up

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# a) Getting the wood fuel into the fuel store


STAS


YT03 ZZS


SCANIA


TRAILERS
TRAILERS


PERICOLO!


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TRACTOR HIRE
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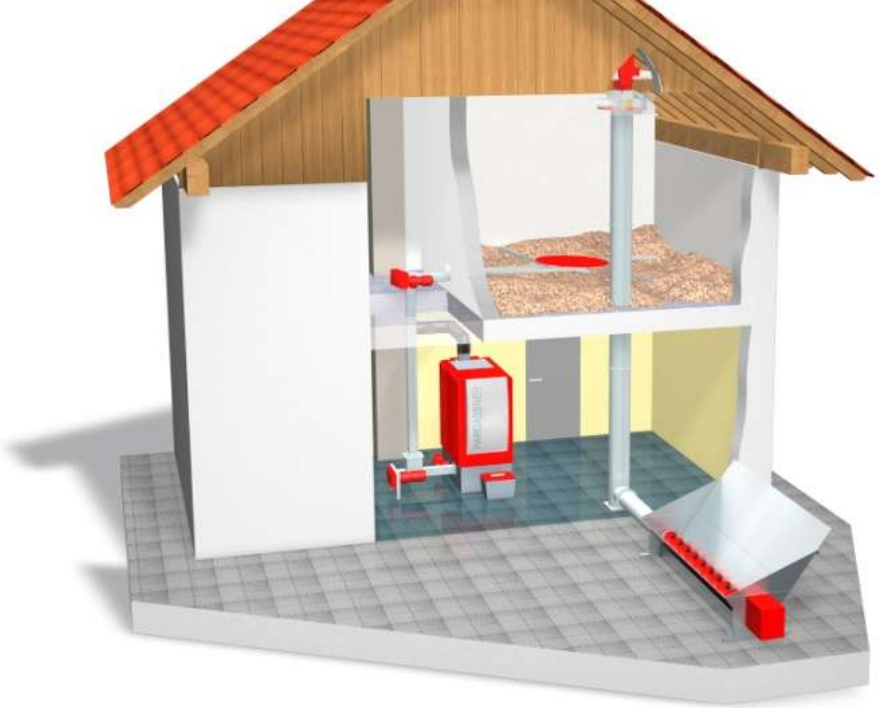
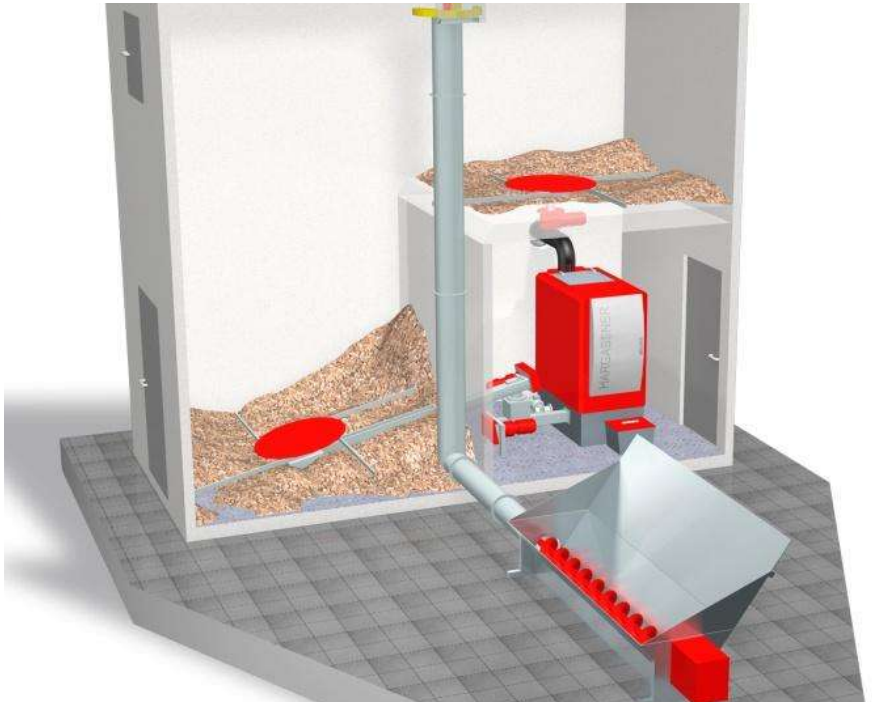
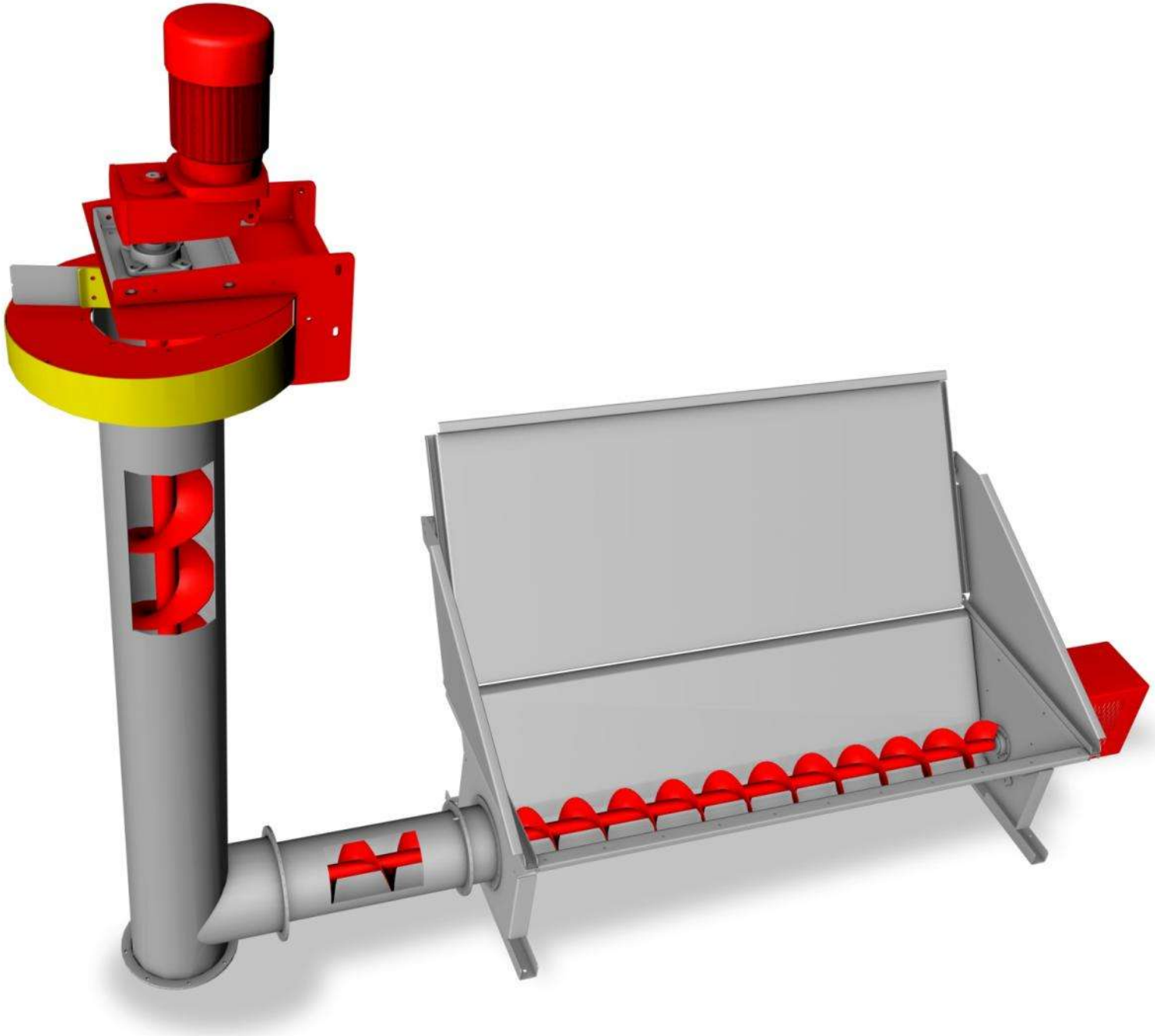
501155
WARMAX


Push bar to open


The truly renewable
fuel for your business
wenz
SEC WOODCHIP UNLOADER








SCANIA

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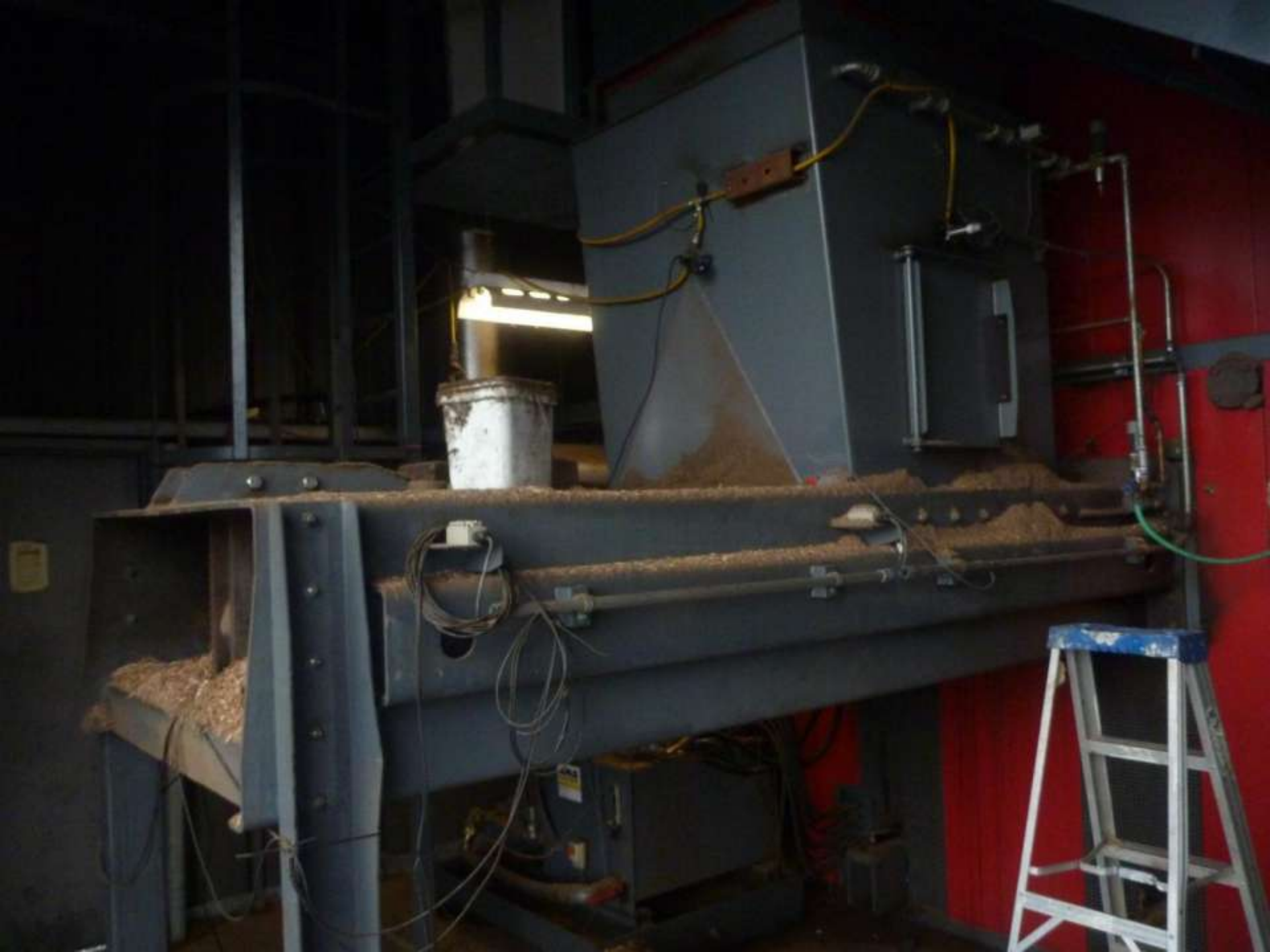
# b) Recovery / Extraction of the Wood Fuel from the Store


HARGASSNER



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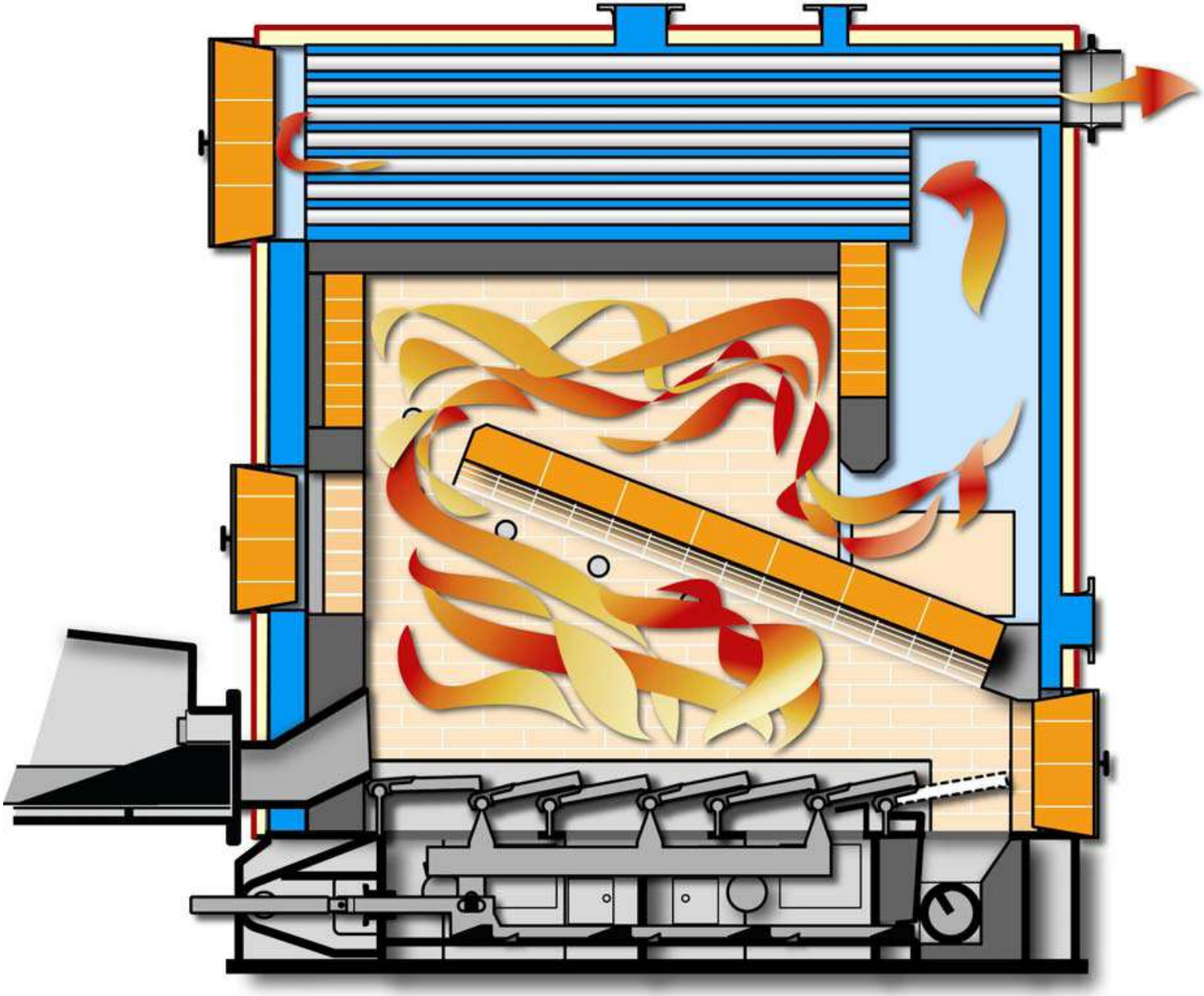
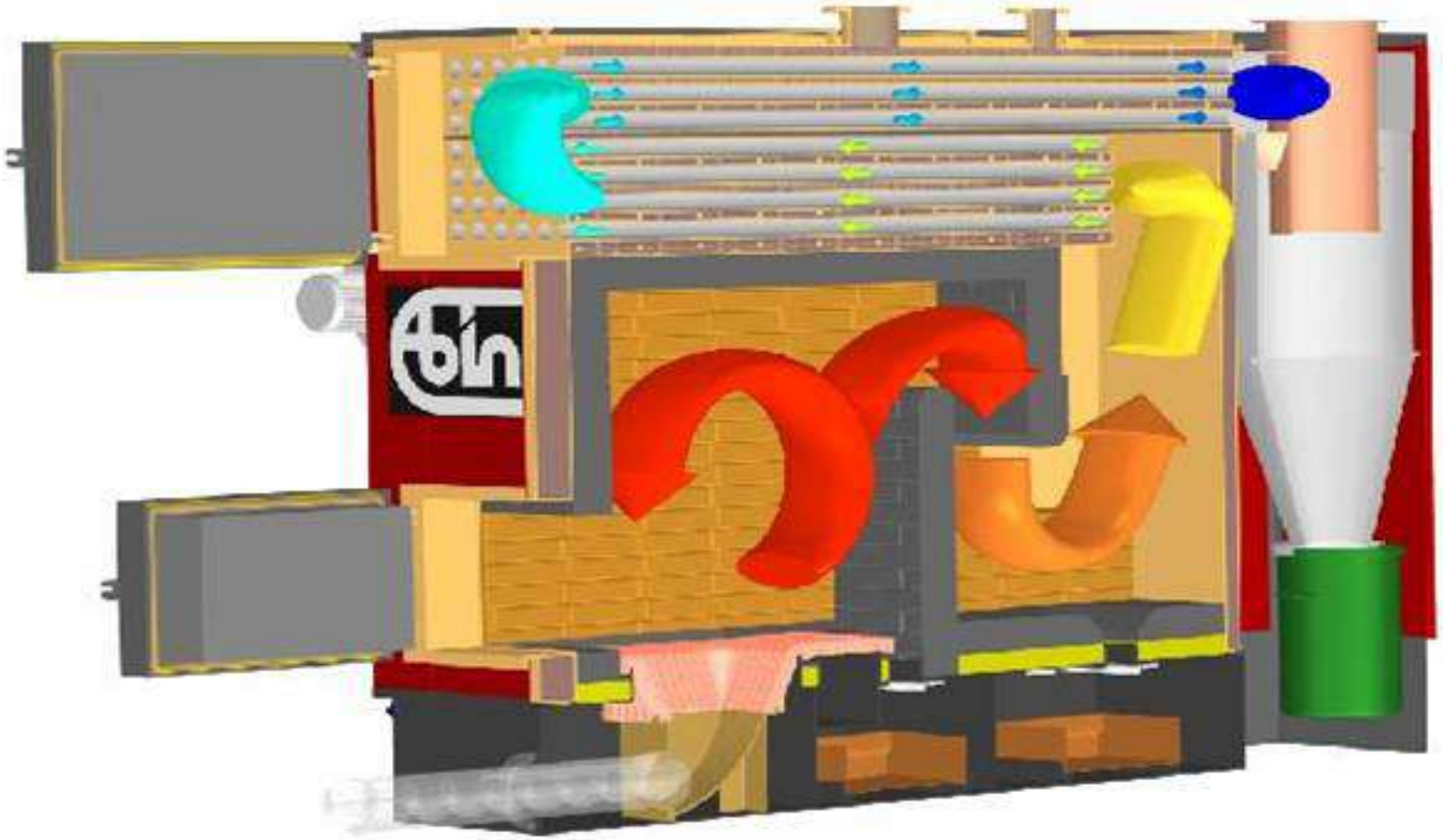
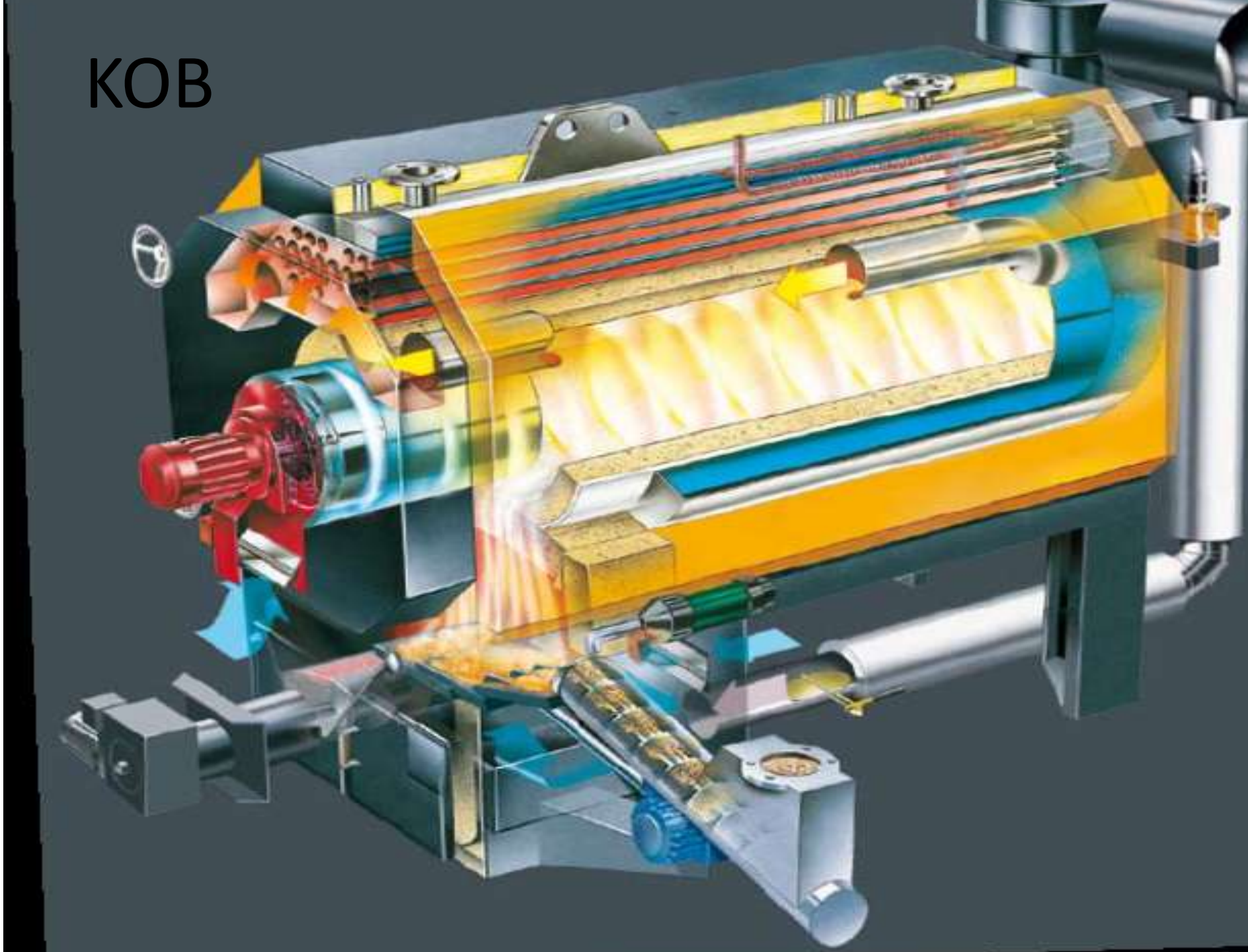
# c) Combusting the Wood Fuel





# КОВ



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# d) Flue gas Clean-Up (Emissions Control)


binder
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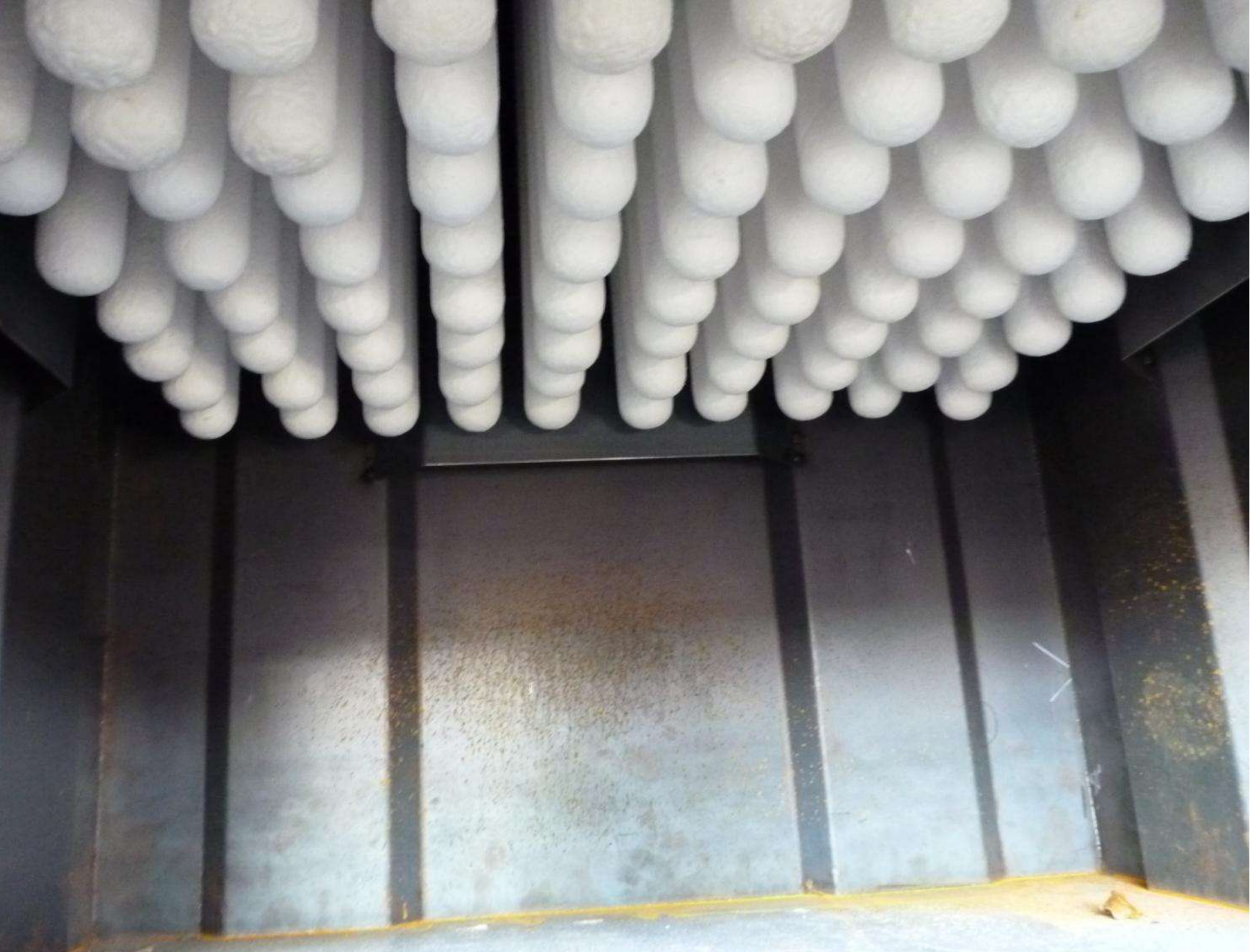

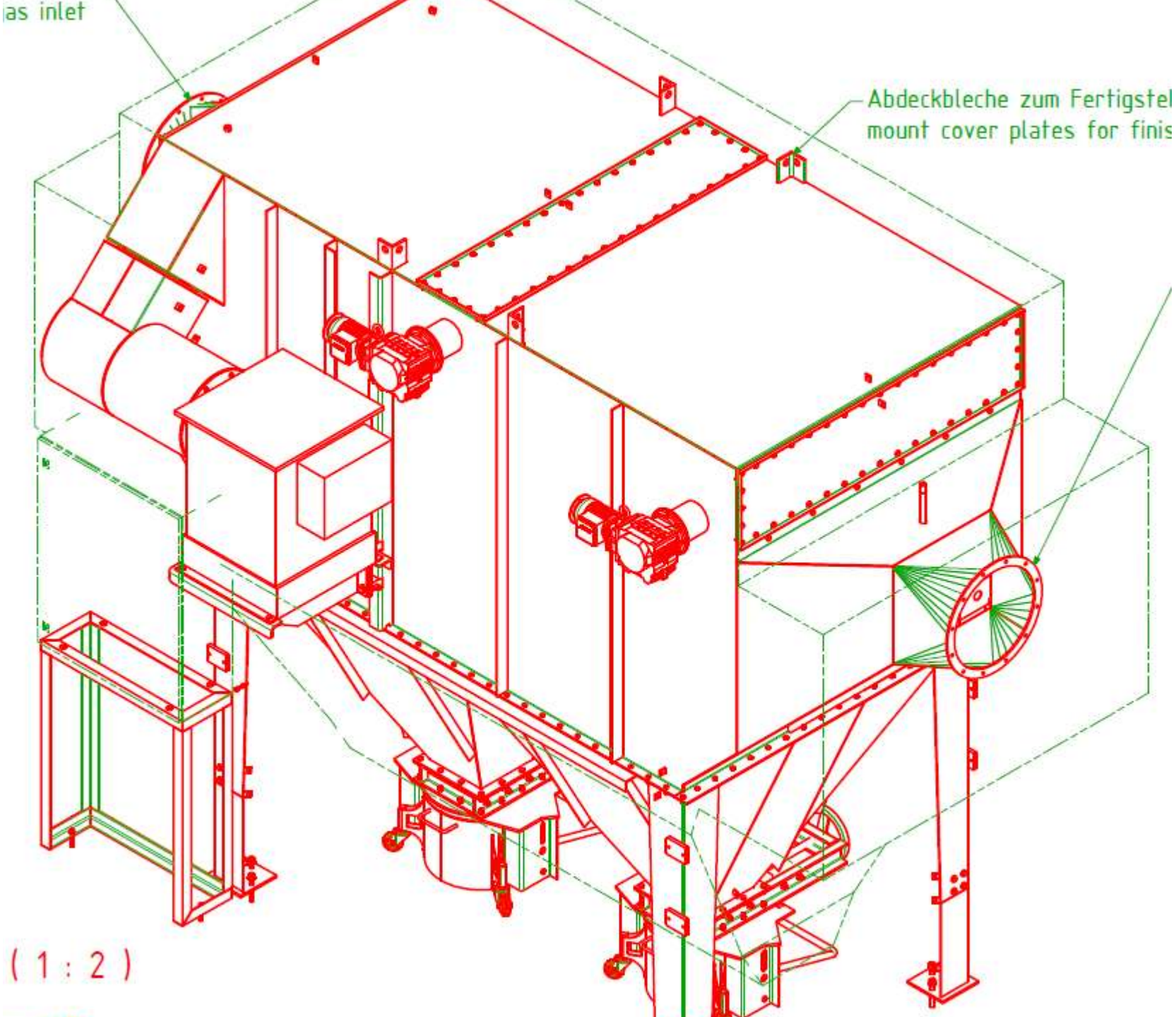
as inlet
Abdeckbleche zum Fertigstel
mount cover plates for finis
( 1 : 2 )

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# 4. Other Factors to Consider

1. Safety Features
2. Ignition
3. De-ashing and Tube cleaning
4. Longevity
5. Controls / Graphics packages
6. Efficiency
7. Redundancy
8. Supplier Expertise

# How to install it

# How to install it ?!

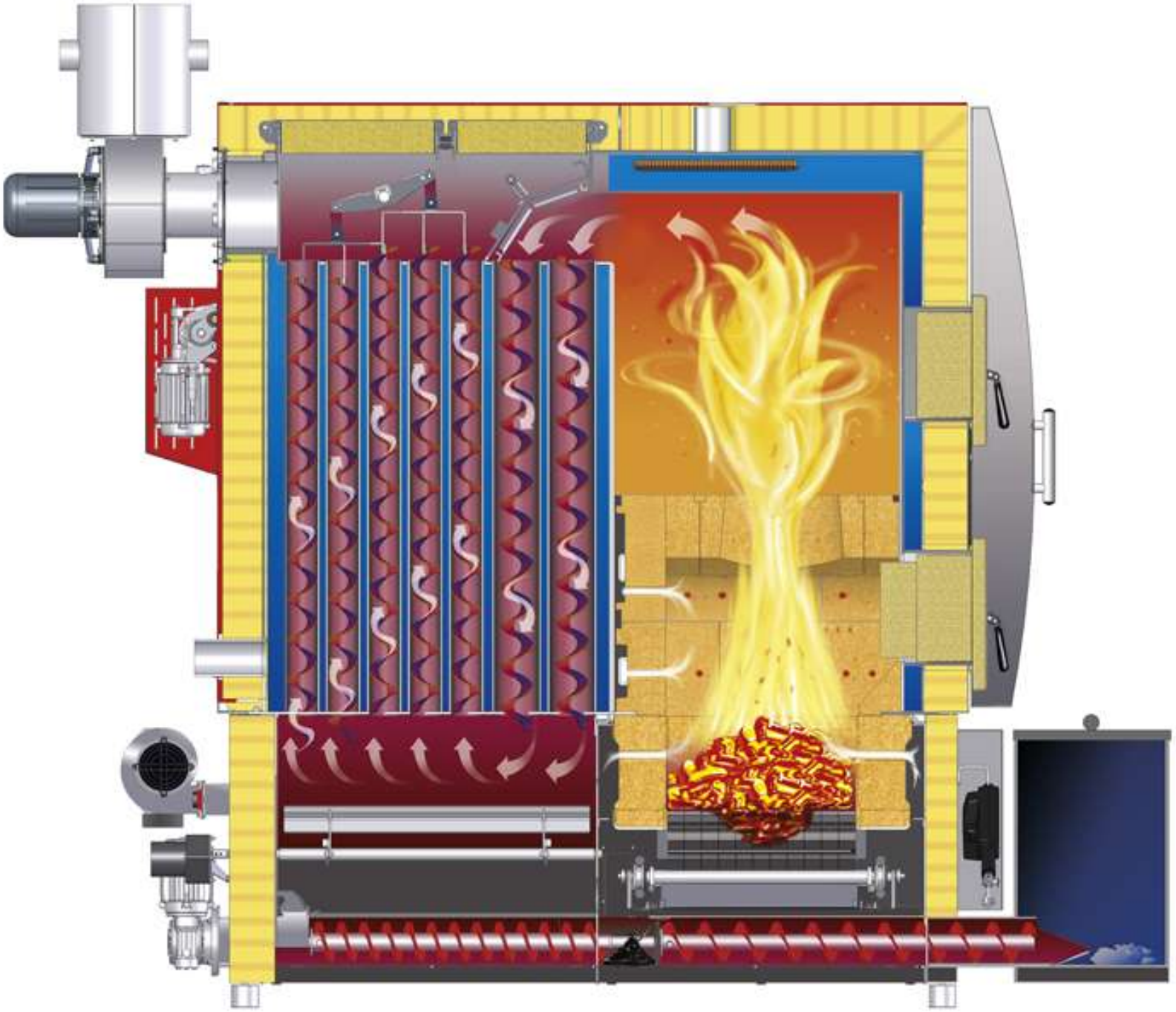
EGR

# Burn-back Protection

Automatic Ignition

# Different ash handling….


# Ash Removal




HARGASS
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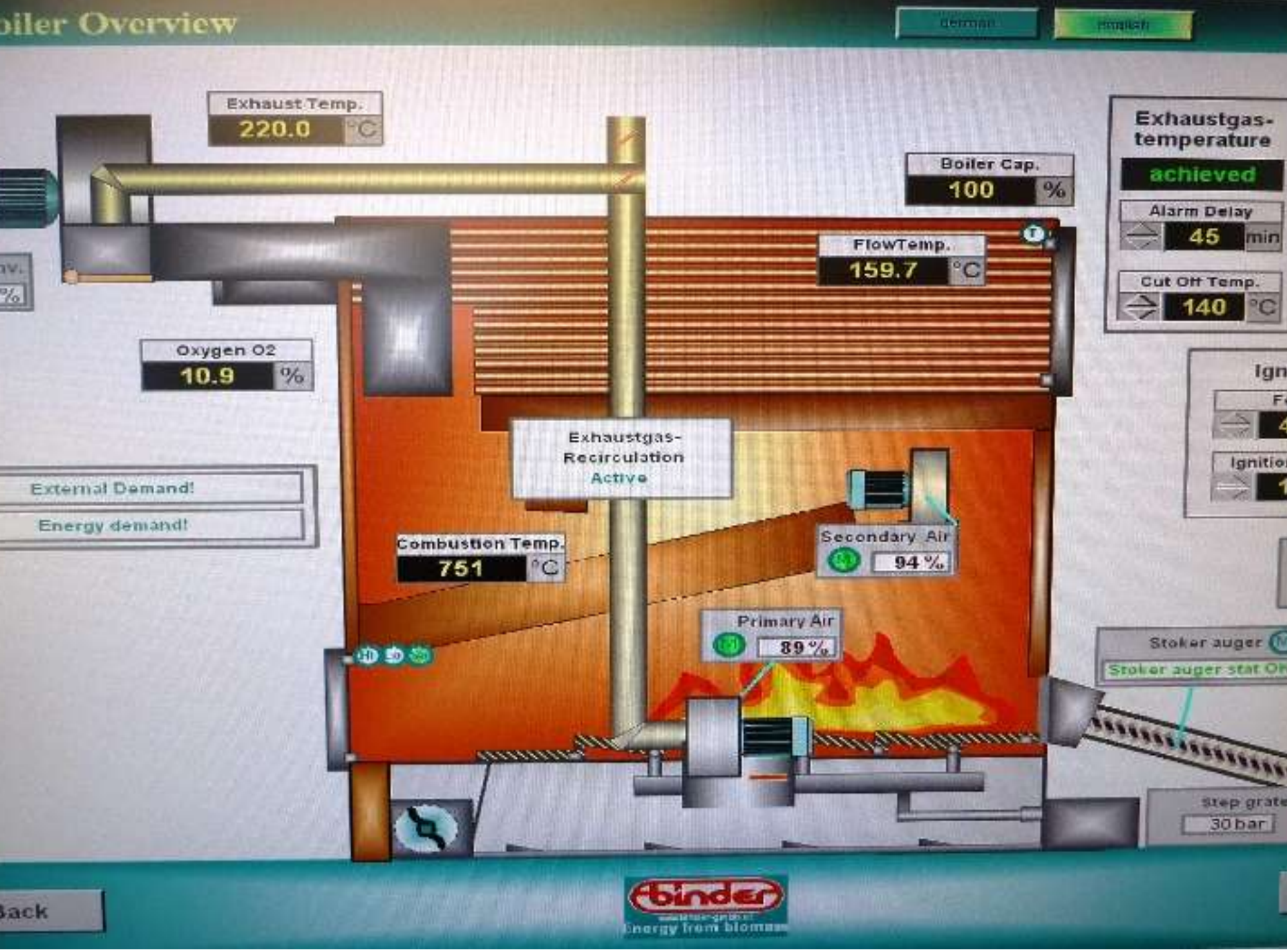
# Boiler Tube Wall Thickness


oiler Overview
German
English
Exhaust Temp.
220.0 °C
Boiler Cap.
100 %
Exhaustgas-temperature
achieved
Alarm Delay
45 min
Cut Off Temp.
140 °C
FlowTemp.
159.7 °C
Oxygen O2
10.9 %
Exhaustgas-Recirculation
Active
External Demand!
Energy demand!
Combustion Temp.
751 °C
Secondary Air
94 %
Primary Air
89 %
Stoker auger
Stoker auger stat
step grate
30 bar
Back
binder
Energy from biomass

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# 4. Other Factors to Consider

1. Safety Features
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5. Controls / Graphics packages
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# 5. Summary : The Perfect Wood Boiler Solution

1. Large, spacious, well ventilated boiler house
2. On-site fuel storage of a week of winter use
3. Large buffer tank capacity (if appropriate)
4. Walking floor fuel recovery system
5. Ram stoker system
6. Automatic ash removal, with drag chain or ram
7. Pre-heater and economiser
8. Fuel-flexible boiler(s) well suited to load, an d built to last
9. Flexible ignition system
10. Good back-up (100% or more)
11. With safety features, and the other bells and whistles

**Only in Europe - where policy is consistent and long term ?**

**Fossil fuels are abundant here - so NZ Budgets usually require compromise.**