

TOPICS

ENERGY EFFICIENCY OPPORTUNITIES in biomass energy systems



Visit us at booth 703

Friday, 13th April at 4 pm

## FRANCISCO RIPOLL

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EXPORT MANAGER AT SUGIMAT

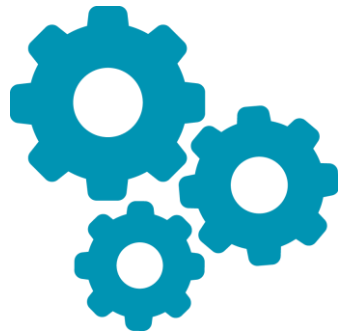
### BACKGROUND:

- **Industrial Engineer** specialized in Quality & Logistics at Polytechnic University of Valencia (Spain)
- **MBA Executive** at Cardenal Herrera CEU University in Valencia
- **Speaker** at conferences & seminars in Denmark, Spain, Ukraine, UK & the USA
- 10 years of experience in thermal energy sector



## ENGINEERING COMPANY FOR GENERATION & USE OF ENERGY

SUGIMAT offers **custom made solutions** in the industrial **boilers market**, with applications focused on power generation using **fossil fuels, biomass and other unconventional fuels**



**Since 1978**  
40 years of know-how



**3,000 References**  
Up to 27 countries



**Human capital**  
100 employees

## LABORATORY, ENGINEERING & FACTORY



FULL EQUIPPED LABORATORY FOR TESTING NEW FUELS



R&D DEPARTMENT WITH MORE THAN 20 ENGINEERS AT YOUR DISPOSAL



FACTORY WITH 215,000 SQ. FT IN VALENCIA (SPAIN)

## HEADQUARTER: SPAIN & 7 INTERNATIONAL OFFICES



Up to **8 offices worldwide** and more than **3,000 references** in **27 different countries**

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## POWER, BIOMASS & HEATING FLUID

### HEATERS

- Thermal oil
- HTF
- Hot water & overheated water
- Steam
- Hot gases generator
- Process furnace

### HEAT EXCHANGERS

- Hot water & overheater water exchanges
- Thermal oil exchangers
- Condensators
- Steam generators

### COMBUSTION SYSTEMS

- Fossil: Gas, diesel, fuel oil...
- Biomass
- Unconventional fuels

### ORC GENERATION PLANTS



WE ADAPT OUR STANDARD PRODUCTS  
TO THE NEEDS OF OUR CUSTOMERS

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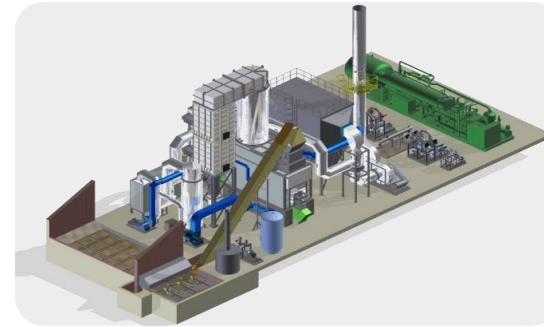
**POWER, BIOMASS & HEATING FLUID**



**PLYWOOD PLANT**  
Biomass/ thermal  
fluid



**CHEMICAL INDUSTRY**  
Natural gas /thermal fluid



**COGENERATION  
PELLET PLANT**  
Biomass /thermal fluid



**POPLAR PLANT**  
Fluidized bed/  
biomass thermal fluid



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POWER, BIOMASS & HEATING FLUID



**THERMOSOLAR PLANT**  
HTF heaters



**PELLET PLANT**  
Biomass hot water boiler



**TEXTIL**  
Fire tube steam  
boiler biomass



**WOOD BASED PANEL**  
Biomass thermal  
fluid hot gases

INTERNATIONAL BRANDS WE ALREADY WORK WITH

**FINSA**

**ALNIC**  
Feel the innovation

**kronospan**  
Wood, perfected

**GARNICA**  **PLYWOOD**

**THEBAULT**  
GRUPE

 **F A U S**

## TOPICS

**ENERGY EFFICIENCY OPPORTUNITIES** in biomass energy systems

- **COMBUSTION CONTROL**
- **THERMAL OIL HEATERS vs STEAM HEATERS**

**SECTORS**



**WOOD**



**DETERGENTS**



**FOOD**



**TANNING**



**METALLURGY**



**PAPER &  
PAPERBOARDS**



**FURNITURE**



**CHEMICAL**



**BITUMEN &  
ASPHALTS**



**CANNING**



**CORK**



**TEXTILE**



**PLASTICS**

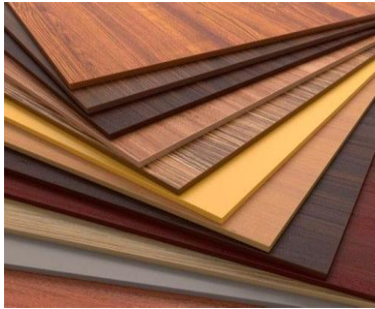


**RUBBER**



**CATERING**

## WHAT ARE THE NEEDS OF THE INDUSTRY THAT BURNS WASTE?



**PARTICLE  
LAMINATED  
BOARD**



**OSB**



**WOOD  
SECTOR**



**MDF**



**PLYWOOD**

## WHAT ARE THE NEEDS OF THE INDUSTRY THAT BURNS WASTE?

- More cost-effective plants
- More **efficient** plants
- **Safer** plants
- Less unscheduled stops (8000 h/year)
- Less human attention during production
- Equipment complying with Emissions Directive



WHAT ARE THE NEEDS OF THE INDUSTRY THAT BURNS  
WASTE?



COMBUSTION  
CONTROL

HEAT TRANSFER FLUID CHOICE  
DEPENDING ON THE  
PRODUCTION PROCESS

## TOPIC 1

**COMBUSTION CONTROL:** Computer vision adapted to combustion



## COMPUTER VISION DEMONSTRATION

READY ?

## COMBUSTION CONTROL

### CASE STUDY:

40 M BTU Power plant at 536 °F

- Thermal fluid
- Poplar barks
- Mechanical grates

**DIFFERENT STRESSES  
DURING WORKING TIME**

**CONSEQUENCES ON THE FURNACE**

Located: Samazan (France)



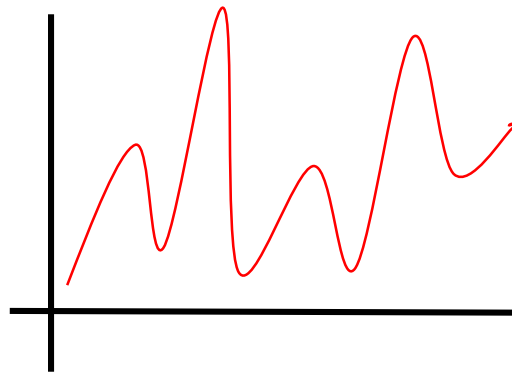
## COMBUSTION CONTROL

### STRESSES:

**CHANGES ON BIOMASS**  
Moisture, size, ashes,  
melting point of ashes



**CONSUMPTION  
PEAKS & OFF-  
PEAKS**



**WEATHER  
CHANGES**



# PUSHER GRATES

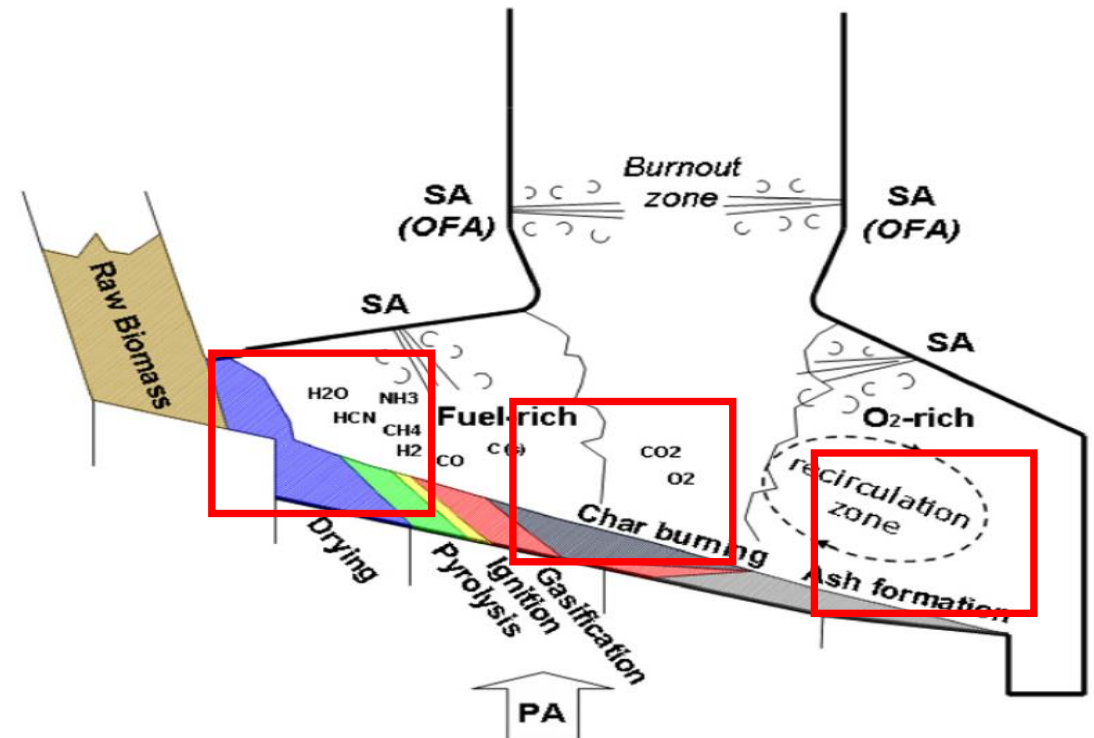
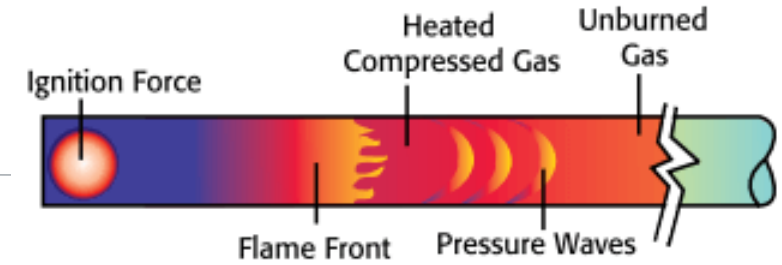


## COMBUSTION CONTROL

### CONSEQUENCES of EVENTUALITIES

- Unstable flame front
- **Inefficient combustion**
- Risk of unburned particles
- Flame-backs
- Emissions **above the limits**
- Assistance by a heater operator

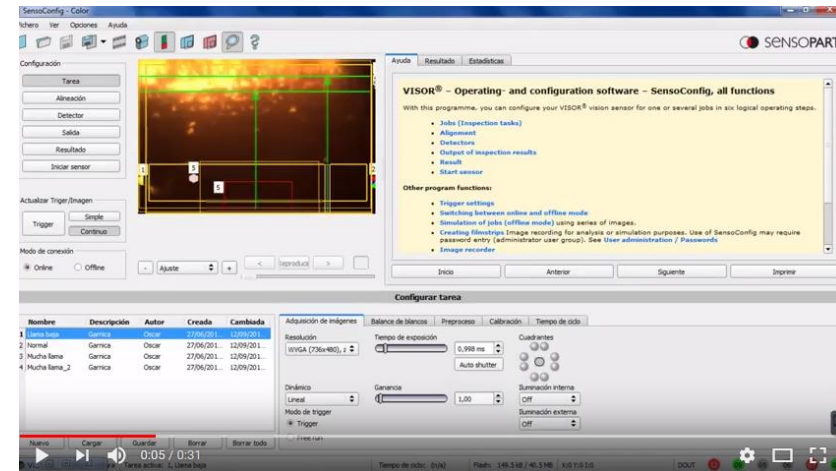
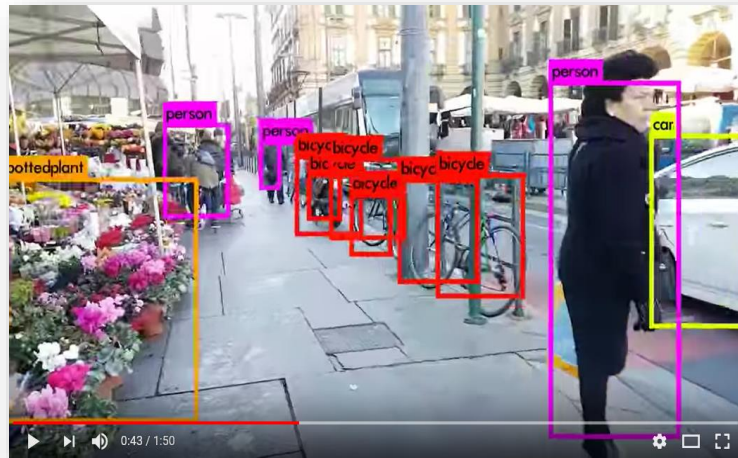
DESIGN. 30% WET  
 OPTION 1. 45% WET  
 OPTION 2. 15% WET



## WHAT IS THE TOOL?

### COMPUTER VISION ADAPTED TO COMBUSTION

- Real world processing



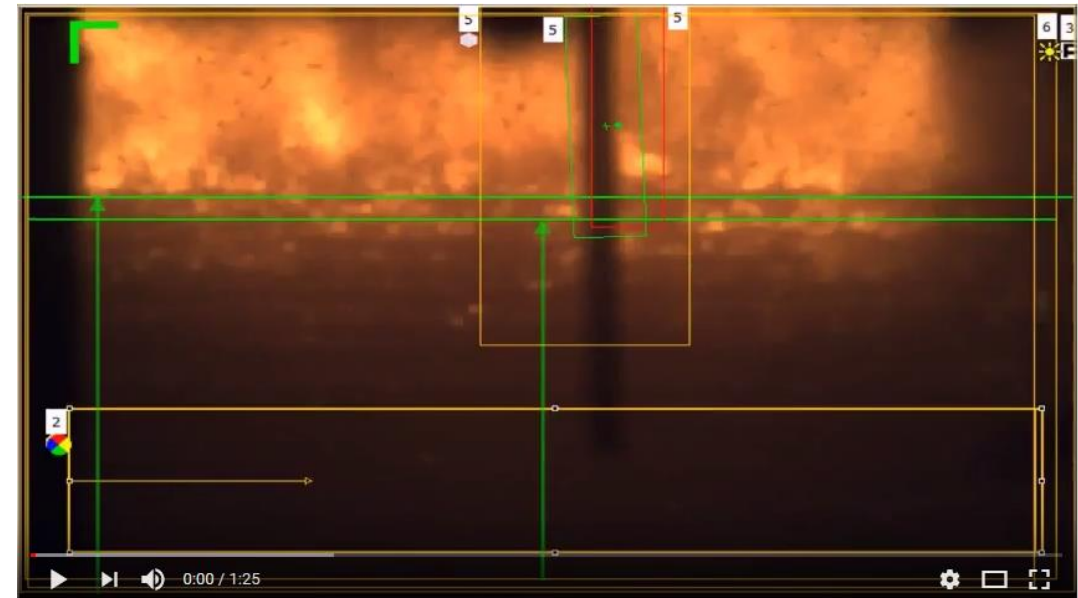
## COMPUTER VISION & FRONT FLAME CONTROL

Make decisions based on the information

SPEED REGULATION OF THE GRATES

PRECISE AIR  
INPUT TO THE  
COMBUSTION

REGULATED  
BIOMASS INPUT



FRONT FLAME CONTROL

## FRONT FLAME CONTROL

ACCURATE GRATE  
SPEED REGULATION

PRECISE AIR  
INPUT TO THE  
COMBUSTION

REGULATED  
BIOMASS INPUT

### CONSEQUENCES

- NO<sub>x</sub> reduction
- CO reduction
- Improvement of combustion **efficiency**
- Stability of the power supplied
- Protection of feeding system and embers zone



## COMBUSTION CONTROL

**SUGIMAT** has developed a **COMPUTER VISION SYSTEM** to get:

**SELF DRIVEN PLANTS**

**EFFICIENT INSTALLATIONS**

**SAFER PLANTS**

## TOPIC 2

**HEAT TRANSFER FLUID CHOICE** depending on the production process

## HEAT TRANSFER FLUID CHOICE DEPENDING ON THE PRODUCTION PROCESS CRITICAL TEMPERATURES

### 1950 – CHEMICAL SECTOR REACTORS

required temperatures 572 ° F

Steam boilers  
High pressure 90 Bar  
Very high costs  
Very big heater rooms



 **GERMAN COMPANY** developed thermal oil heaters to work at 572° F at atmospheric pressure

### CONSEQUENCES

Higher safety  
Reduced heater rooms  
Less maintenance costs  
Higher efficiency

### Other COUNTRIES



CHEMICAL

RUBBER

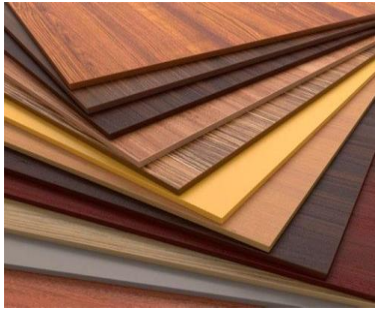
METALLURGY

WOOD

1964 – SPAIN



## WHAT ARE THE NEEDS OF THE INDUSTRY BURNING WASTES?



**PARTICLE  
LAMINATED  
BOARD**



**OSB**



**WOOD  
SECTOR**

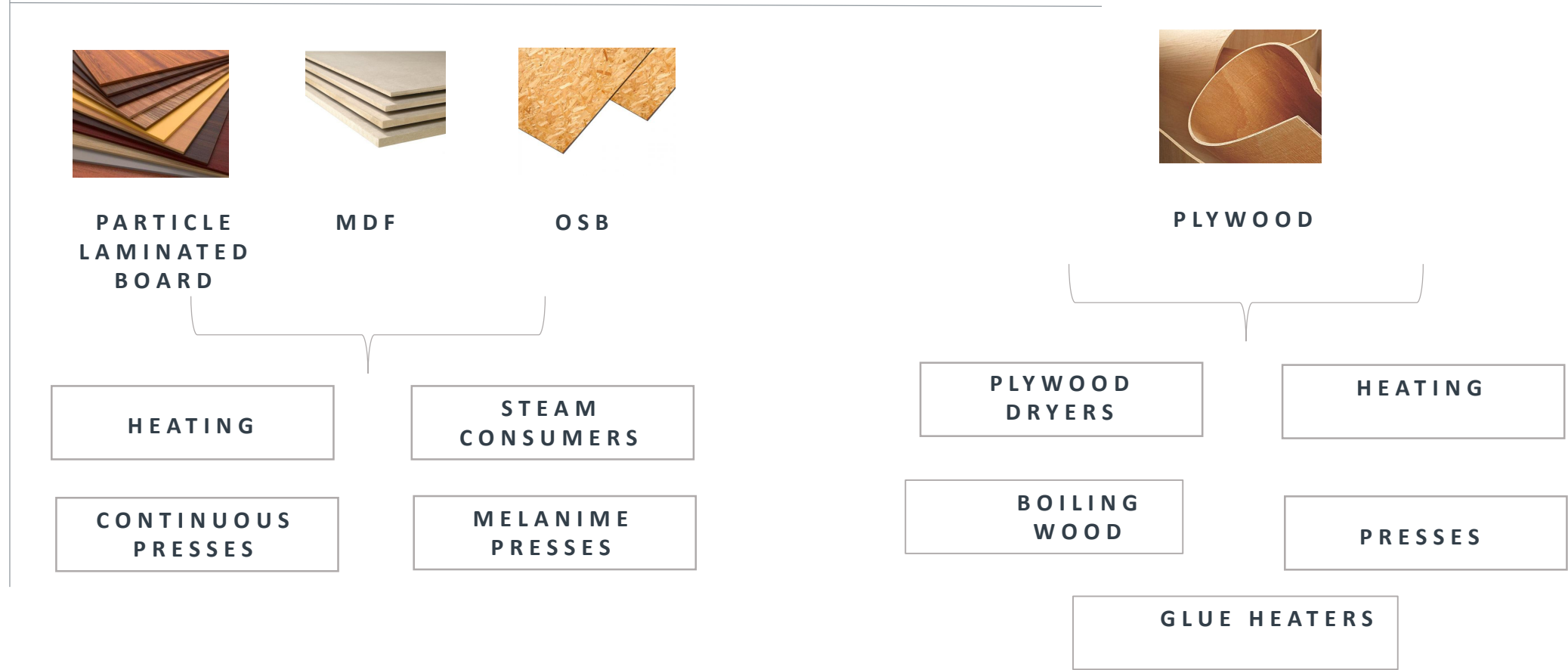


**MDF**



**PLYWOOD**

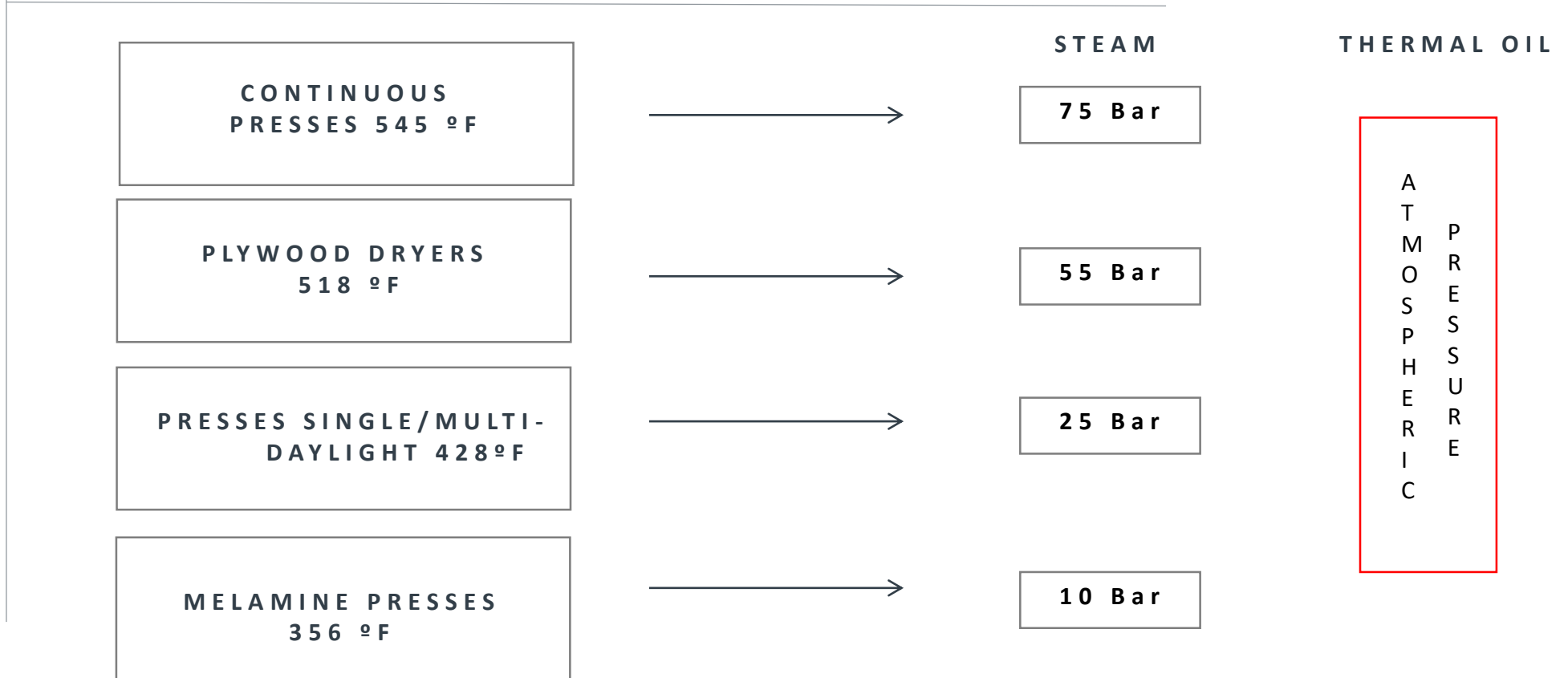
## SELECTION OF FLUID HEATER BASED ON THE PRODUCTION PROCESS



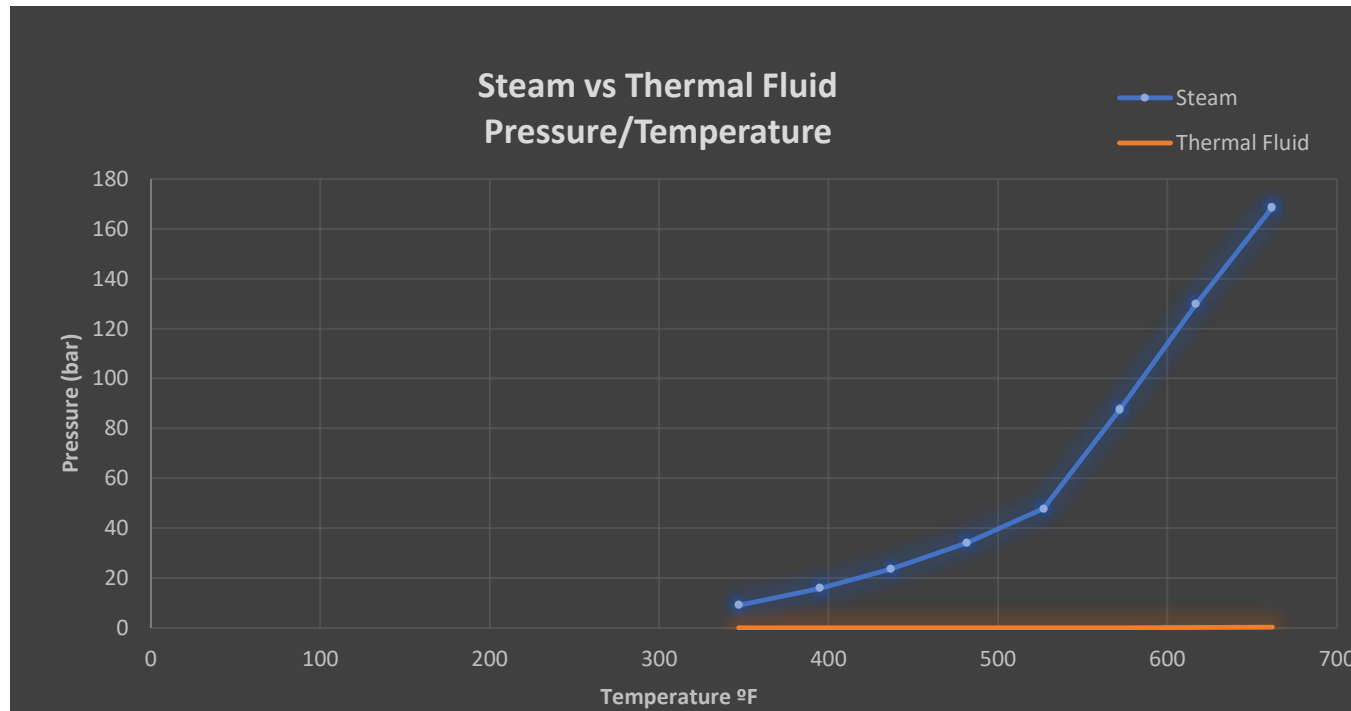
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## SELECTION OF FLUID HEATER BASED ON THE PRODUCTION PROCESS

CONCEPT	STEAM – HIGH PRESSURE	OIL- LOW PRESSURE
PERFORMANCE CONSUMERS	LIMITED TO THE HEATER'S PRESSURE	HIGH PERFORMANCE-HIGH TEMPERATURE
INVESTMENT - HEATER	ENORMOUS – LARGE THICKNESS TUBES	MODEST -REDUCED THICKNESS TUBES
INVESTMENT - CIVIL WORKS	HIGH – IT REQUIRES CIVIL WORKS WITH THICK WALLS OR RESPECTING A CONSIDERABLE DISTANCE	NOT REQUIRED -OUTDOORS
INVESTMENT - SAFETY	VERY EXPENSIVE -HIGH PRESSURE RISKS	LOW PRESSURE RISKS

## SELECTION OF FLUID HEATER BASED ON THE PRODUCTION PROCESS

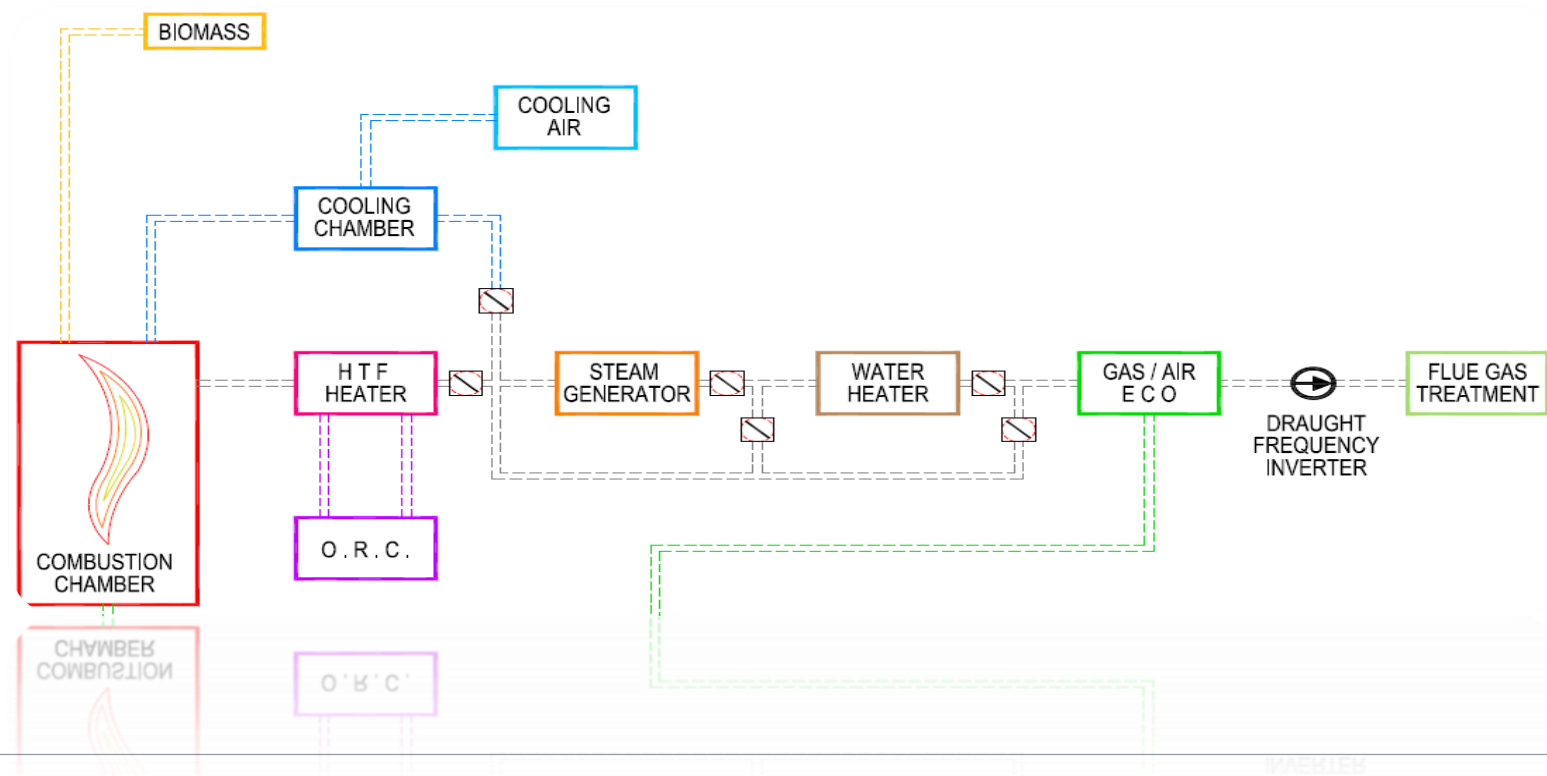
CONCEPT	STEAM – HIGH PRESSURE	OIL- LOW PRESSURE
STOP MAINTENANCE	FREEZING POINT 32°F	FREEZING POINT -40° F
HEATER MAINTENANCE	PIPE CHANGING IN FIRE TUBE HEATERS TO WITHSTAND THERMAL SHOCKS AND	ALMOST NON-EXISTENT
	VAPORIZATION ON THE SURFACE	
FAILURE MAINTENANCE	HIGH PROBABILITY OF LEAKAGES DUE TO BREAKS (COMMON)	LOW PROBABILITY OF LEAKAGES DUE TO BREAKS
FLUID QUALITY MAINTENANCE	HIGH COSTS IN QUALITY CONTROL TO PREVENT PROBLEMS DERIVED FROM LIME , ACIDITY, RUSTING AND TURBIDITY	ALMOST NON-EXISTENT
PUMP MAINTENANCE	LOTS OF PRESSURE IN SEALINGS – CONSTANT MAINTENANCE	LONGER LIFE SINCE CONSTANTLY LUBRICATED

## SELECTION OF FLUID HEATER BASED ON THE PRODUCTION PROCESS

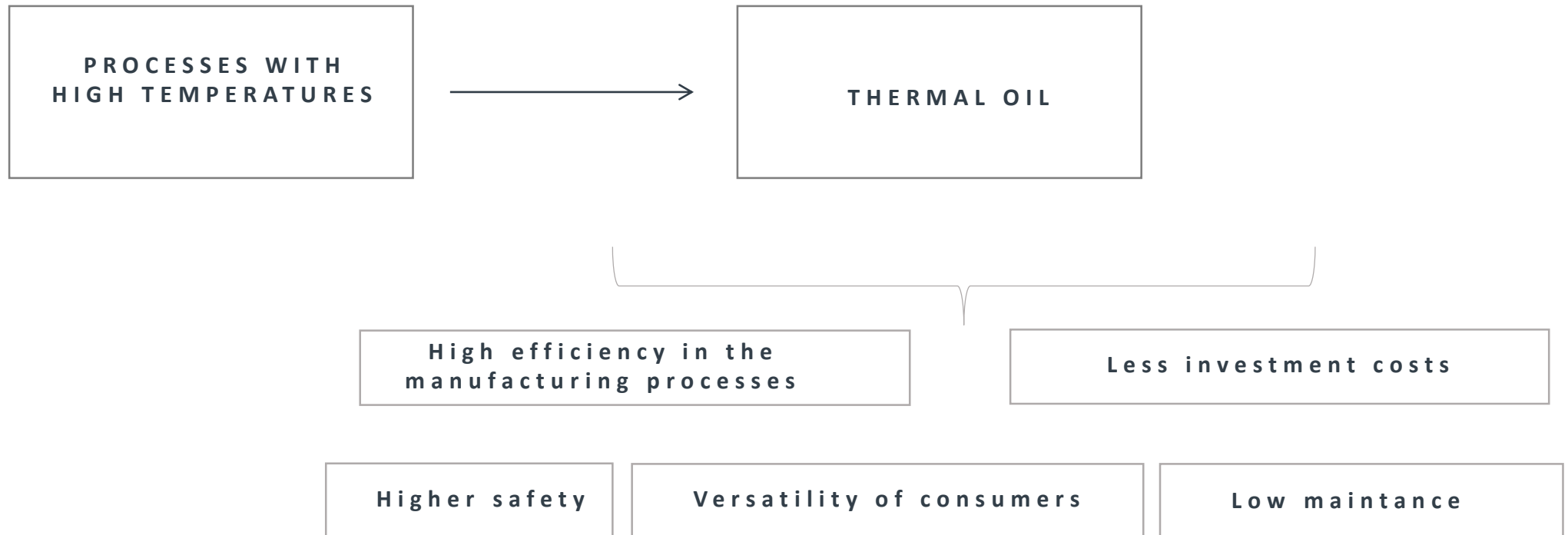
CONCEPT	STEAM – HIGH PRESSURE	OIL- LOW PRESSURE
SELF-CONSUMPTION	REDUCED (SINCE LESS QUANTITY OF LIQUID MASS)	HIGH (SINCE A HIGH QUANTITY OF FLUID HAS TO BE MOVED)
SAFETY	IN CASE OF LACK OF STEAM IN THE HEATER, IF WATER COMES IN AN EXPLOSION MAY OCCUR	LOW RISK OF EXPLOSION
AUTHORIZATIONS	EXTREMELY RESTRICTIVE	LESS RESTRICTIVE
OPERATION	-	BETTER REGULATION/FLEXIBILITY REGARDING TEMPERATURE

## SELECTION OF FLUID HEATER BASED ON THE PRODUCTION PROCESS

### VERSATILITY WITH THERMAL OIL



## SELECTION OF FLUID HEATER BASED ON THE PRODUCTION PROCESS



OUR ADDED VALUE

## CUSTOM MADE SOLUTIONS



COMBUSTION  
CONTROL



HEAT TRANSFER FLUID  
CHOICE DEPENDING ON THE  
PRODUCTION PROCESS

**THANK YOU VERY MUCH  
FOR YOUR ATTENTION**

**Francisco Ripoll**

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