bioliza
ESTRATEGIAS EN BIOENERGÍA

BIOMASS CHP SOLUTIONS TO DECARBONIZE AGRICULTURE

1MWE CHP GASIFYING BIOMASS FOR ON-FARM CONSUMPTION

1

Dr. José A. La Cal | Industrial Engineer | BIOLIZA Founding Partner

BIO COGEN 2030

bioliza

ESTRATEGIAS EN BIOENERGÍA

SUMMARY

- Presentation and BIOLIZA'S value proposal
- Gasification as a feasible technology
- Application to the olive oil sector
- 1 MWe CHP biomass gasification plant
- Conclusions

JOSÉ A. LA CAL, PHD

bioliza
ESTRATEGIAS EN BIOENERGÍA

Industrial Engineer. Universidad Politécnica de Madrid, October, 1994	Executive MBA. Escuela Superior de Gestión Comercial y Marketing, ESIC. October, 2011	Doctor by the Universidad de Jaén (Spain). Mars, 2013. Associate Professor from September, 2015	EOI Approved Professor for the areas of Energy and Renewable Energies since 2011	Bioenergy consultant in the Dominican Republic since 2019

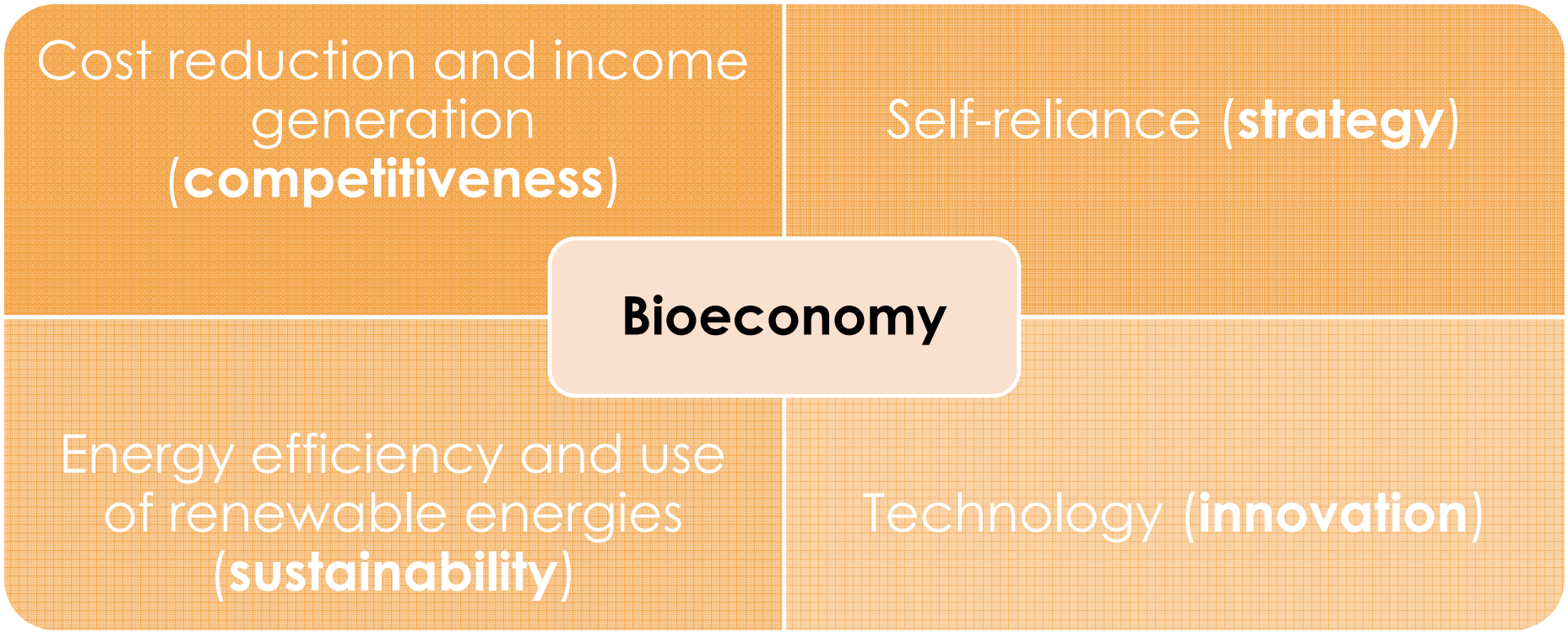
BIOLIZA

It is a Company Based on the Knowledge of the University of Jaén, established in 2014.

We offer solutions for the energy valorization of residual biomass through gasification technology

Our business lines are: Engineering, Consulting, Training and project development

VALUE PROPOSAL



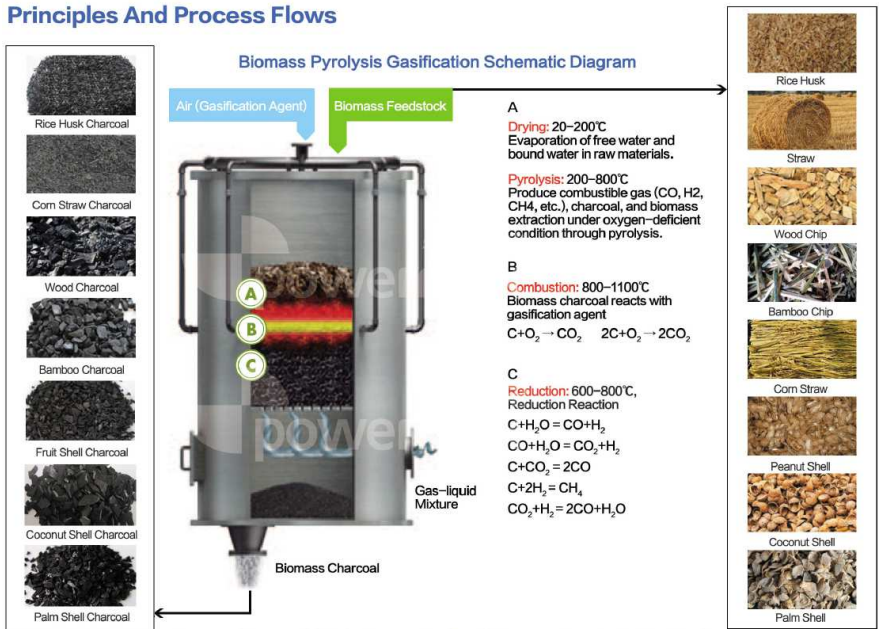
bioliza

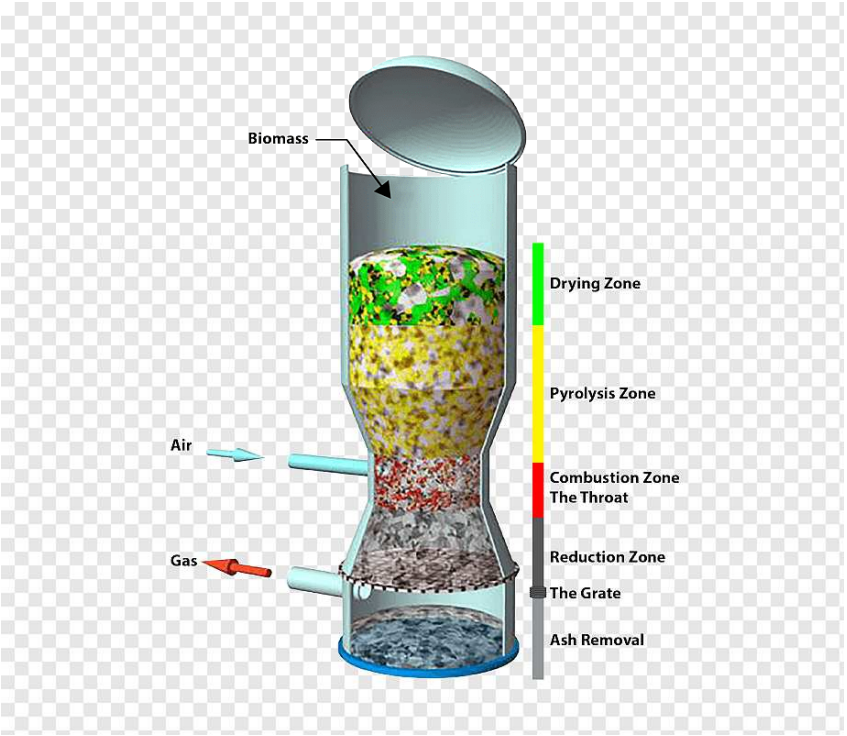
ESTRATEGIAS EN BIOENERGÍA

THE GASIFICATION AS TECNOLOGY

- What does it consist of?
- Biomass properties
- Syngas and biochar applications
- Advantages and disadvantages
- Competitiveness

HOW DOES IT WORK?





BIOMASS: PROPERTIES

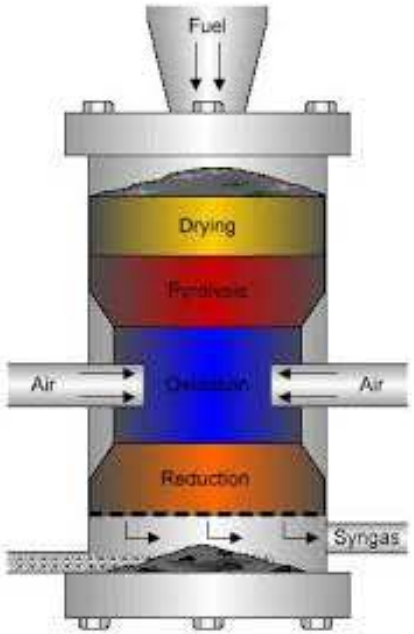
bioliza
ESTRATEGIAS EN BIOENERGÍA

- Humidity < 20%
- Size grain between 5 – 15 mm
- Bulk density > 450 kg/m^3
- Ash content < 5%

OUR TECHNOLOGY

bioliza
ESTRATEGIAS EN BIOENERGÍA

Downdraft



Advantages:

- Small power < 1 MW
- Simple construction
- Lower tar production
- Suitable for use of the syngas in set engines
- High efficiency in biomass conversion

THE SYNGAS

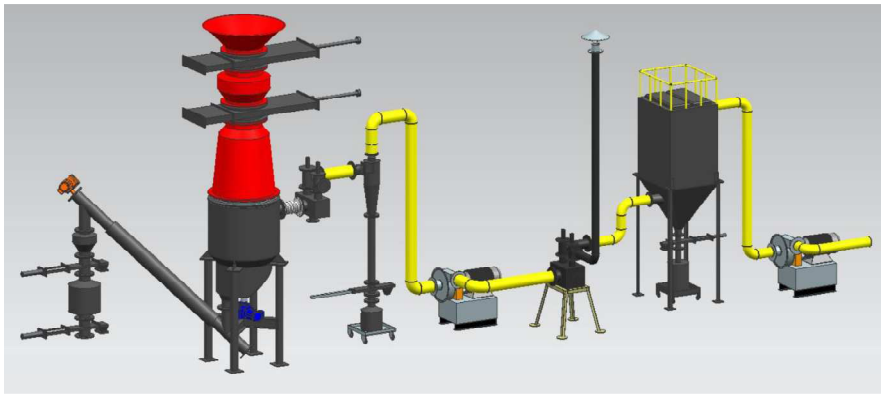
bioliza
ESTRATEGIAS EN BIOENERGÍA

Gas Parameters	Unit	SAMPLE 1	SAMPLE 2
H_2	%	19.28	19.81
O_2	%	0.0	0.0
N_2	%	45.91	48.67
CH_4	%	2.74	2.42
CO	%	15.09	15.59
CO_2	%	16.98	13.51
Calorific Value	(HHV) kcal/Nm^3	1336.11	1338.12
Average Calorific Value	(HHV) kcal/Nm^3	1337.11	

SYNGAS APPLICATIONS:

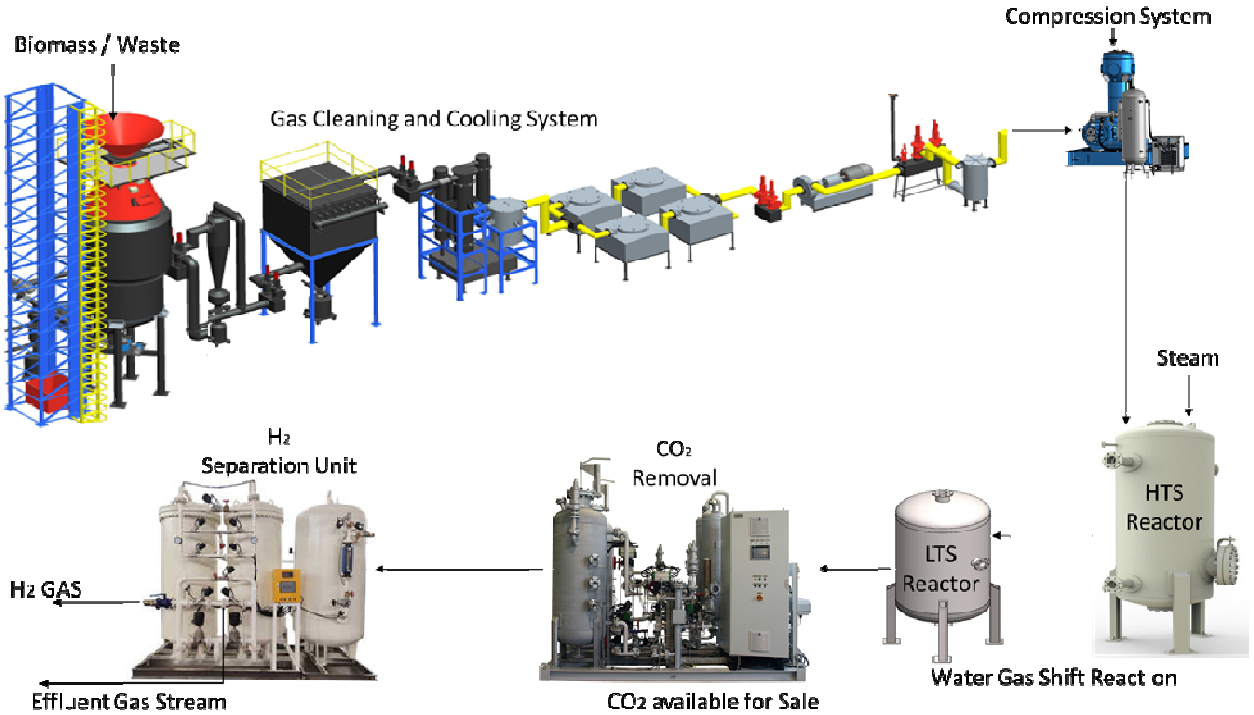
bioliza
ESTRATEGIAS EN BIOENERGÍA

Thermal energy for drying



Power

GREEN HYDROGEN



BIOCHAR

bioliza
ESTRATEGIAS EN BIOENERGÍA

Biochar from gasifier

Properties:

- (1 t Biochar = 3,0 t CO_2)
- Porous structure
- (1 t Biochar = 4 t waste)
- Water retention capacity
- Reduces soil acidity and improves aeration

BIOCHAR COMPOSITION

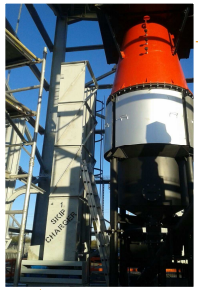
Type of biomass	Wet Olive Pomace Pellets Discharge
Moisture content on wet basis, %	38.38
Ash % on dry basis	26.49
Volatile % on dry basis	6.93
Fixed carbon, % on dry basis	66.58
Bulk density, kg/m3	675
Size (in mm)	05 to 20
Calorific Value, kcal/kg (HHV) (on dry basis)	5841
Ignition test	Burns easily
Flow ability test	Flows easily

GASIFICATION ADVANTAGES:

Wide range of biomass and waste

Versatility (EE, TE, steam, H2 green, ...)

Modularity



High energy efficiency (>65%)

bioliza
ESTRATEGIAS EN BIOENERGÍA

APPLICATION TO THE OLIVE OIL SECTOR IN SPAIN

- Circular economy
- Bioeconomy
- Self-production
- Costs reduction
- Sustainability
- Marketing

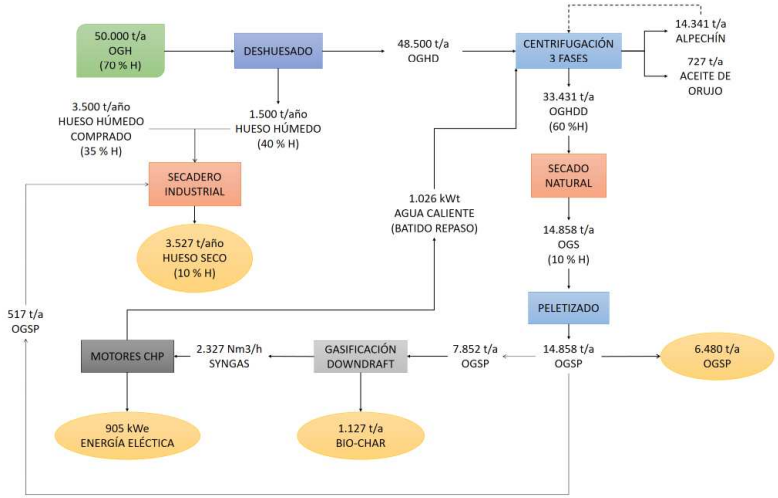
OUR PROJECT BASED ON OLIVE OIL INDUSTRY BIOMASS GASIFICATION

- Input: 7,500 t/a OGS
- Syngas power: 4,3 MWt
- Energy efficiency: 62,5 %
- Net electrical power: 0,8 MW
- Thermal power ≈ 2,4 MWt (hot water + exhaust pipes)
- Biochar production: 1,250 t/a

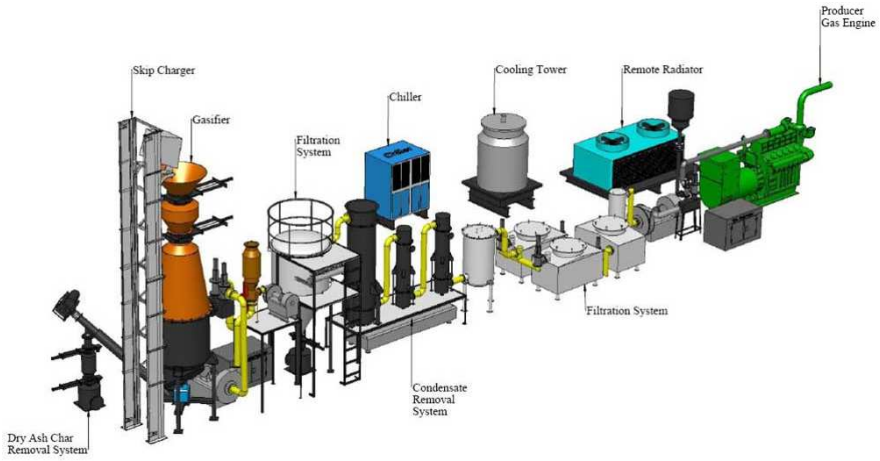
PILOT PROJECT

bioliza
ESTRATEGIAS EN BIOENERGÍA

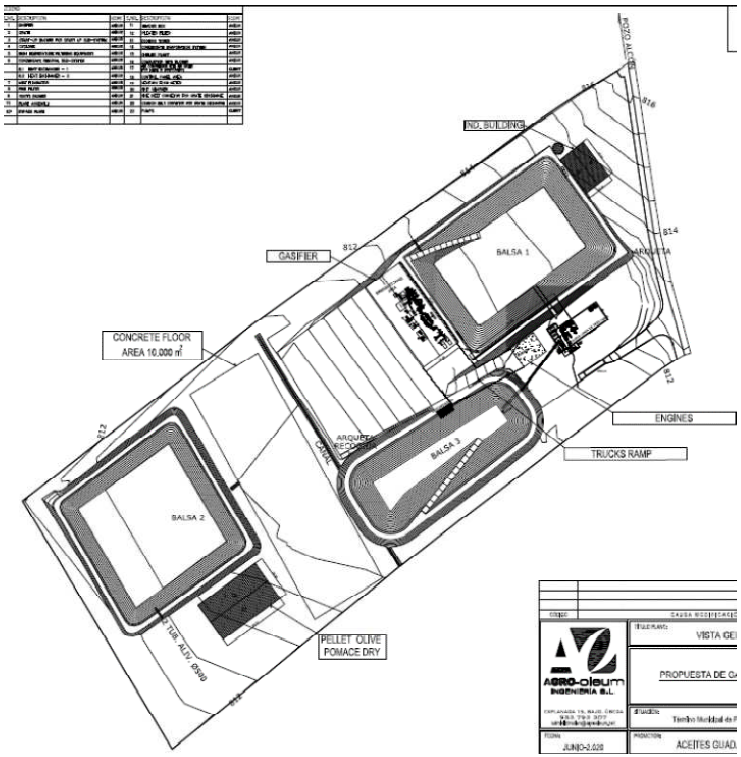
Mass balance

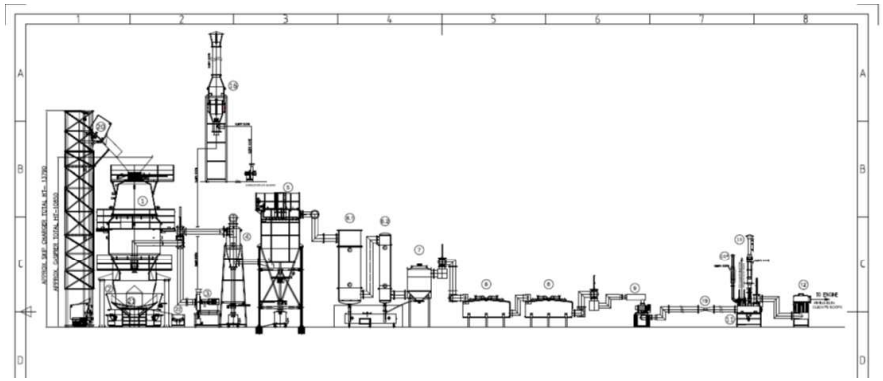


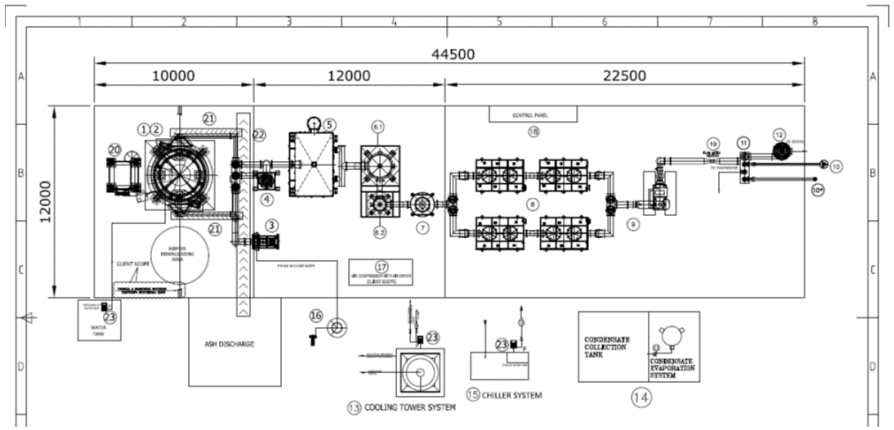
Layout



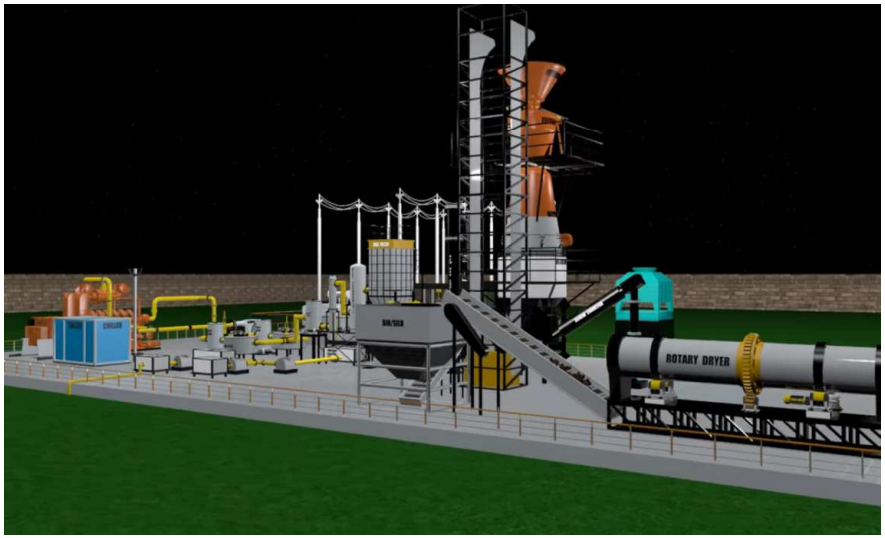
DRAWINGS


IND. BUILDING
GASIFIER
BALSA 1
BALSA 2
BALSA 3
CONCRETE FLOOR
AREA 10.000 m²
ENGINES
TRUCKS RAMP
PELLET OLIVE
POMACE DRY
AGRO-alsum
INGENIERIA S.L.
JUNIO-2.020
ACEITES GUAD.




44500
10000
12000
22500
12000
ASH DISCHARGE
13 COOLING TOWER SYSTEM
15 CHILLER SYSTEM
CONDENSATE COLLECTION TANK
CONDENSATE EVAPORATION SYSTEM
14

PLANT GENERAL VIEW



bioliza

ESTRATEGIAS EN BIOENERGÍA

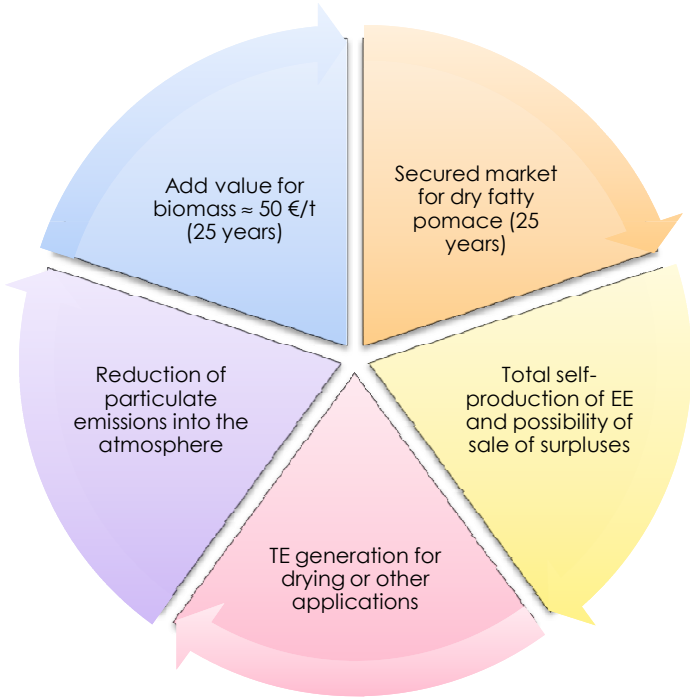
Biomass Energy_Dr. José A. La Cal

MAIN CONCLUSIONS:

- Versatile technology for a wide range of biomass and waste
- Possibility of using the syngas for renewable energy generation or for green H2
- Obtaining biochar as a by-product of the process
- Projects based on the new paradigms of the economy: circular, bioeconomy
- Alignment with the UN SDGs

ADD VALUE FOR THE RESIDUAL BIOMASS

bioliza
ESTRATEGIAS EN BIOENERGÍA



bioliza

ESTRATEGIAS EN BIOENERGÍA

THANKS FOR YOUR ATTENTION!

direccion@bioliza.es

T. 00 34 678 50 65 12

https://www.linkedin.com/in/joseantonioacal/

https://twitter.com/LaCal_BIOLIZA