



Pro EcoEnergia Ltd
Energy Consultants

Factors and their impact on the gasification installation efficiency

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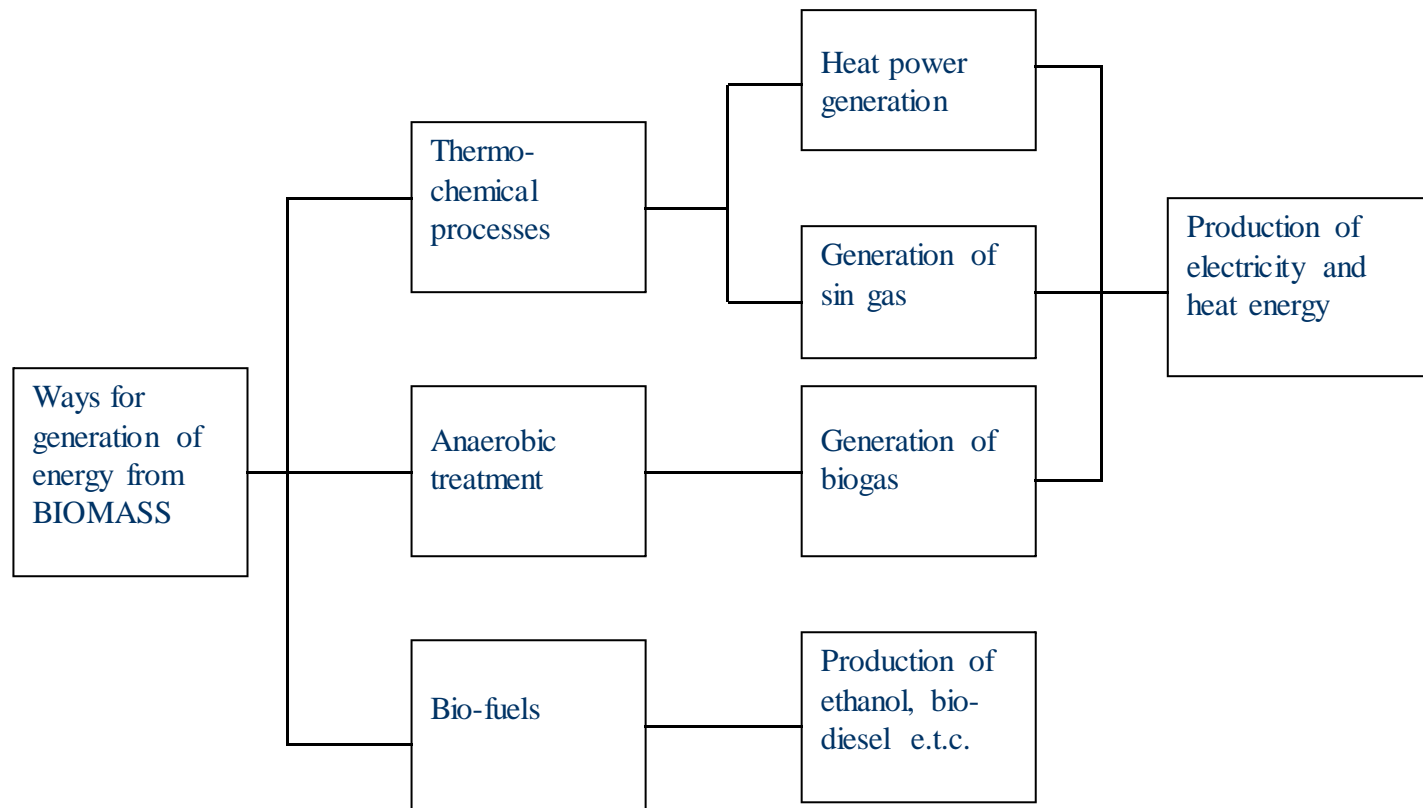
About the Company:

**Boiler Plant “Bansko” biomass turn-key project;
Measurement and analyses of energy recourses and possible production from
biomass, wind and solar**





General information for gasification





Main technologies

Comparison in case of 1000 kW_{el} and 7500h/a

Direct combustion: needs of 15 000 t/a, area of 500 m², heat production 4 000 kWt and investment of 3 800 €/kW

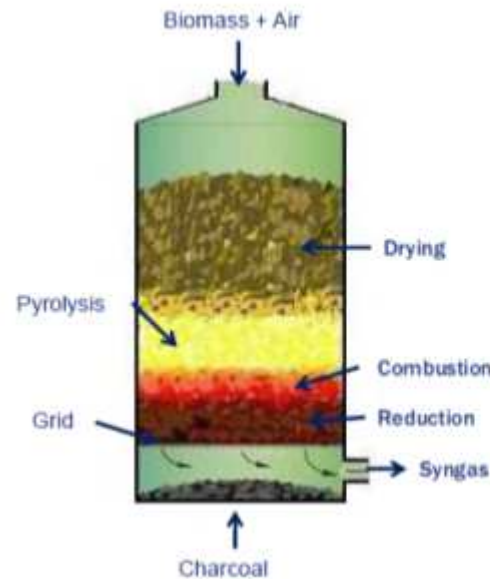
Gasification: needs of 8 000 t/a, area of 500 m², heat production 1 000 kWt and investment of 3000 €/kW

Fermentation: needs of 25 000 t/a, area of 2 000 m², heat production 1 000 kWt and investment of 2 500 €/kW



Critical technology elements

1. Biomass supply
2. Organization of fuel introduction
3. Singas cleaning
4. Heat consumption



Pyrolysis ($T = 300 \div 1000^{\circ} \text{C}$)
Evaporation of volatile components.
 $\text{C}_n\text{H}_m \rightarrow \text{CH}_4 + \text{C} + \text{H} + \text{Tars}$

COMBUSTION ($T = 1200 \div 1300^{\circ} \text{C}$)
Destruction of tars present in the pyrolysis gas. Conversion of solids into coal.
 $\text{C} + \text{H}_2\text{O} \rightarrow \text{H}_2 + \text{CO}$
 $\text{C} + \text{O}_2 \rightarrow \text{CO}_2$
 $2\text{C} + \text{O}_2 \rightarrow 2\text{CO}$

REDUCTION ($T = 600 \div 700^{\circ} \text{C}$)
Formation of Syngas
 $\text{CO} + \text{H}_2\text{O} \rightarrow \text{H}_2 + \text{CO}_2$
 $\text{C} + 2\text{H}_2\text{O} \rightarrow 2\text{H}_2 + \text{CO}_2$
 $\text{C} + \text{CO}_2 \rightarrow 2\text{CO}$



Important aspects in during the investment process

Environment Impact assessment

- Emissions
- General wastes
- Noise
- Fire protection
- Local regulations are prescriptive based rules
- New type of technology

Connection to the grid

- Problems with connection of RES
- Need to proof that the technology in “system friendly”



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Thank you for attentions!

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