

# BIOMASS (3)

*DIDACTIC MATERIALS*

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Virtual and Intensive Course  
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Erasmus+ 2010-1-PL01-AA210-G2-1122



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### 3. PRODUCTION OF BIOMASS

Wood chips are made from logs:



Fig. 24. Wood logs

[http://www.vedrana.lt/mediena\\_medienos\\_gaminiai/](http://www.vedrana.lt/mediena_medienos_gaminiai/)

Wood chips are made from sawmill waste:



Fig. 25. Wood boards

<https://www.medis.lt/skelbimas/perkame-zaliava-biokurui-30581>

Biomass (chips) from branches (trees) or shrubs:



Fig. 26. Wastes of branches and shrubs  
<https://forest.lt/go.php/lit/Dr.A.Tebera/>



From the biomass can be produced:

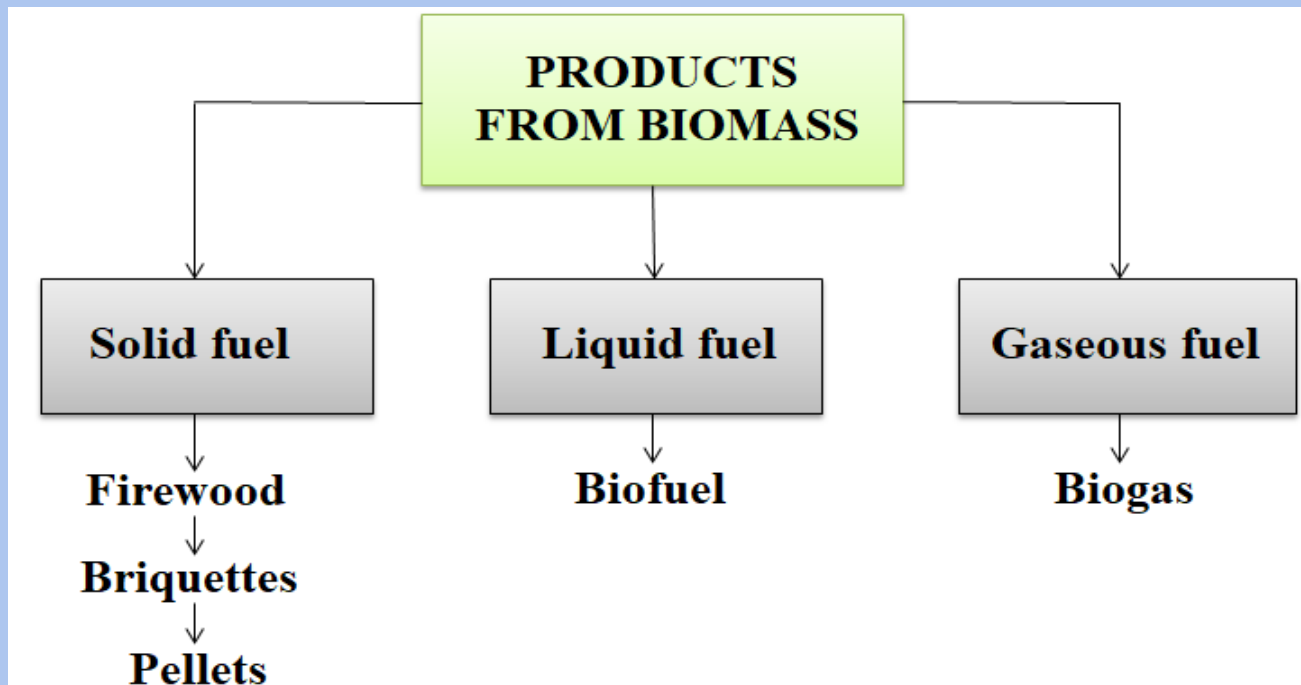


Fig. 27. Products from biomass

Pressed wood fuel is produced in form of briquettes (typical size of 30-100 mm) and pellets (6-12 mm) sizes.

Briquettes are suited for burning in furnaces and fireplaces, and pellets are more suited for automatic combustion devices.

For production of wood briquettes piston (Figure 14):

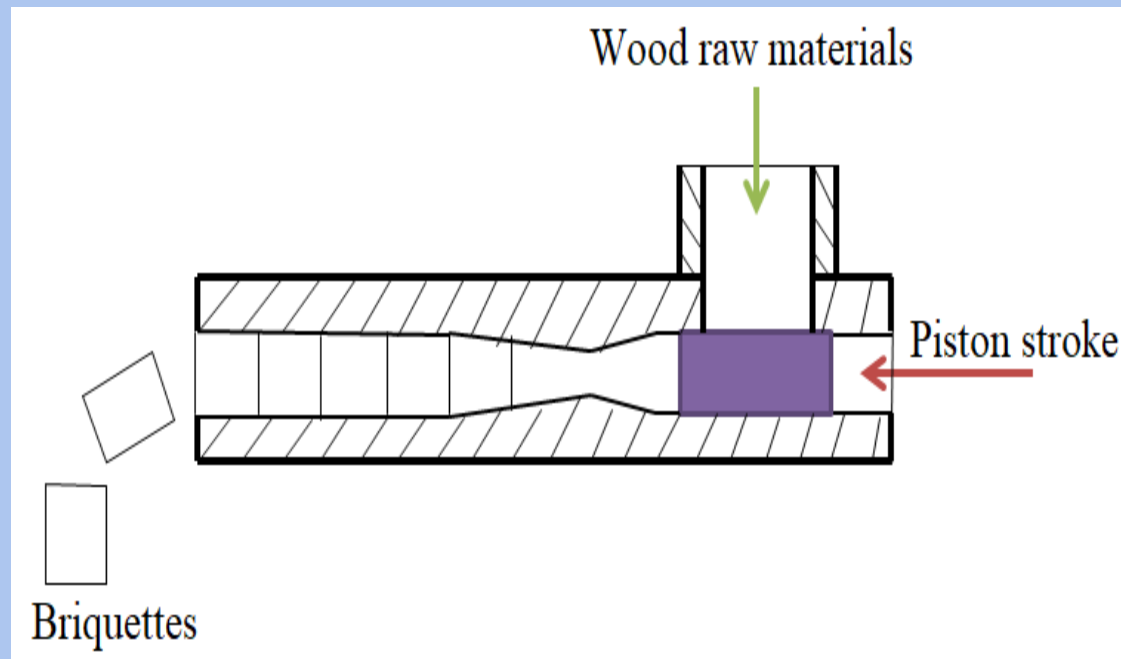


Fig. 28 . Scheme of piston press

Piston press operates in cycles – each time during the process a certain amount of raw material is extruded through the piston's cone-shaped nozzle.

In helical press (Figure 29) production of briquettes are ongoing continuously.

The final product can be cut into desired sized pieces.



Briquettes, produced by helical press, density is greater than produced by piston press.



Fig. 29. Scheme of helical press

## *Production of pellets.*

Pelletizers with cylindrical matrix are widely used in production of pellets. During pressing operation the temperature of the wood rises, lignin softens and under the influence of pressure rollers pushes materials through the openings of the conical matrix.



Fig.30. Wood pellets

<http://www.granula.lt/lt/granules-briketai.htm>

The sequence of pellet production:

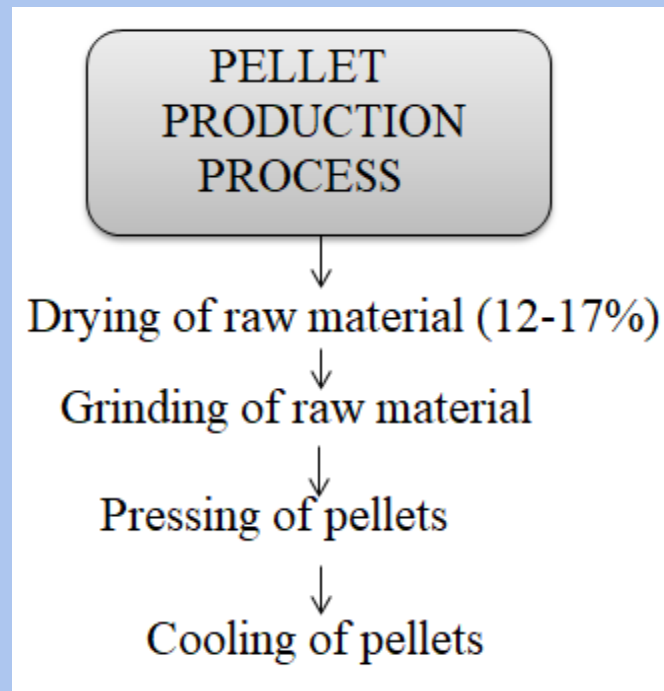


Fig. 31. Pellet production



*Matrixes for pellet presses.*

The most important part of *pellet press* – *matrix*.



Fig.32. Matrix

<http://www.dic-solid-coat.lt/en/industries/wood-furniture>



### *Operating principle:*

With the help of feeder chopped raw material is pushed in between rollers. Mass fallen between rotating matrix and pressing roller is strongly pressed through the openings of matrix. Adjustable blade brakes off the pellet according to the desired length. Hot pellets are carried to the refrigerator.

## Matrix technical data:

- Diameters of matrix openings – from 1.8 mm to 14 mm;
- Channel length – from 55mm to 104 mm.

Matrices are made of stainless steel or alloyed steel. Hardened in vacuum.



Fig. 33. Manufacturing of pellets

<http://www.woodpellet.lt/lt/naudinga-informacija/>

Packaging hopper is with a manual valve and balance. One bigbag can contain up to 1200 kg pellets.



Fig. 34. Equipment for pellet packing  
<http://www.factory.lt/lt/produkcija/granuliu-gamybos-iranga/pakavimo-iranga>





Fig. 35. Pre-packed pellets  
<http://www.silalesmediena.lt/>



Wood pellets – advantages with respect to conventional wood:

- economical than firewood;
- relatively low price comparites with obtained heat;
- high concentration of energy in a small volume;



The comparison of fuel according to its calorific capacity has the following equivalence circuit in accordance with the volume of:

*$1 \text{ m}^3 \text{ oil} = 6 \text{ m}^3 \text{ of wood chips} = 18 \text{ m}^3 \text{ of chips} = 3 \text{ m}^3 \text{ of wood pellets} = 4 \text{ m}^3 \text{ straw pellets} = 5 \text{ m}^3 \text{ straw briquettes.}$*

Portion of RES (renewable energy sources) in Lithuania in accordance with Directive 2009/28 / EC:

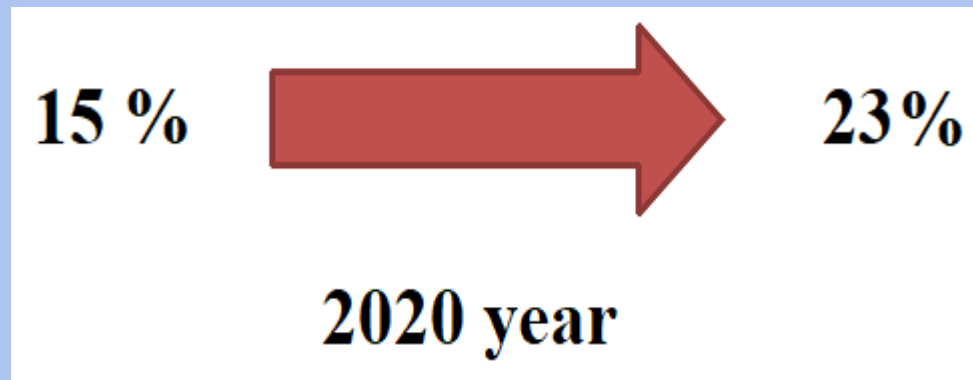


Fig. 36. Lithuania's commitments to the EU

In National Strategy for Development of RES stated:  
„ 49. Strategy vision – by providing exclusive priority to promote usage of renewable energy sources, to achieve, that in 2020 the renewable energy sources would become country's most important part of primary energy sources“.

## REFERENCES

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