

## **Kierunki techniczne (mechatronika, fizyka techniczna, inżynieria materiałowa)**

### **Bio-ethanol – the fuel of tomorrow from the residues of today.**

One of the greatest challenges for society In the 21<sup>st</sup> century is to meet the growing demand for energy for transportation, heating and industrial processes, and to provide raw material for the industry In a sustainable way.

An increasing concern for the security of the oil supply has been evidenced by increasing oil prices. More importantly, the future energy supply must be met with a simultaneous substantial reduction of greenhouse emissions. Actions towards this aim have been initiated. The European Commission plans to substitute progressively 20% of conventional fossil fuels with alternative fuels In the transport section by 2020. Liquid biofuels from renewable resources, particularly from lignocellulose materials, will have a substantial role In meeting this goal.

Ethanol has already been introduced on a large scale In Brazil, the US and some European countries, and we expect it to be one of the dominating renewable biofuels In the transport sector within the coming 20 years. Ethanol can be blended with petrol or used as neat alcohol In dedicated engines, taking advantage of the higher octane number and higher heat of vaporization: furthermore, it is an excellent fuel for future advanced flexi – fuel hybrid vehicles. Currently, ethanol for the fuel market is produced from sugar or starch. However, this raw material base, which also has to be used for animals feed and human needs, will not be sufficient to meet the increasing demand for fuel ethanol; and the reduction of greenhouse gases resulting from use of sugar or starch based ethanol is not as high as desirable. Both these factors call for the exploitation of lignocellulose feed stocks, such as agricultural and forest residues as well as dedicated crops, for the production of ethanol.

Although there are similarities between the lignocellulose and the starch process, the techno-economic challenges facing the former are large.

(From: Science Direct, Lund University, B.Hahn, M.Galbe )

#### **1. Brainstorm activity:**

A) Think of as many sources of energy as possible.

Which ones are : a) renewable b) non-renewable c) carbon based d) non-carbon based

B) Targets; discuss the following targets:

Cut CO<sub>2</sub> emission by .....? %

Reduce overall energy consumption by .....? %

Convert .....? % of transport fleet to biofuel

Meet .....? % of energy needs from renewables

## 2. Vocabulary;

The European Commission plans to substitute 20 % of conventional fuels with alternative fuels **by 2020**.

Here are some ways to set a **deadline**:

- a) Please finish this report **by** the end of May.
- b) **The deadline** for completing the research is the end of the month.
- c) We have to start this project **no later** than 10<sup>th</sup> October

**Rewrite these sentences using the words in brackets:**

- 1.They have to complete the project by the end of this week. (The deadline)
- 2.Please finalise the investigation by next Friday. (the last possible date is ..)
- 3.The deadline for switching to biofuels is next year. (will have to/no later than)
- 4. We'll have to finish this job no later than June 2<sup>nd</sup>. (by)

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