**Lecture question - Biofuels and Hydrogen Power**

What are advantages of biofuels?

Farm economics, jobs, cleaner exhaust, no net CO2, trade deficit, oil security

Why are biofuels referred to as carbon neutral?

No net CO2: they release CO2 but it comes from photosynthesis, and be captured by a plant and turned into glucose.

What are the current sources of ethanol?

Corn (Midwest) or sugar (Florida or Brazil).

What is the difference between E5 and E85?

E5 works in all cars, E85: about 100 stations. It has a lot more vegetables. E5 has 5% Ethanol while E85 has 85%. Most cars cannot handle that amount right now.

How is the difference in energy density between gasoline and ethanol?

1 Btu Ethanol output requires 0.75 Btu input

We produce about 4 billion of Ethanol compared to 140 billion for gasoline per year

What is the major problem of using E85 in a car that has not been modified to use E85?

The amount of oxygen is different, which will cause poor performance and likely cause engine component damage.

Is it possible to replace all gasoline needs in the US with ethanol? If not, why?

Entire USA corn production = 24 billion gallons Ethanol. The gasoline usage is 140 billion gal/year! We would also reduce our food and have nothing to eat!

What is biodiesel?

Vegetable oils converted to methyl esters. Comes from soybeans (USA) or canola.

How does a hydrogen fuel cell work?

Combination of hydrogen and oxygen converted into water to generate electricity.

What are the advantages of hydrogen fuel or all other fuels?

Quiet, odorless, pollution-free, plentiful electricity.