Go-Kart Design
The Challenge

Six Flags Amusement Park has asked you to design a Go-Kart (a small vehicle with an engine that kids can ride in). During your design phase, you must decide which fuel will power the Go-Kart. You are considering four fuels.

1. Gasoline, also known as octane, derived from petroleum
2. Gasoline, but derived instead from wood pellets
3. Natural gas, also known as methane
4. E85, which is mostly ethanol
Which fuel would be best?

You are considering four fuels. Here are the fuels and their chemical names.

1. Gasoline from petroleum (octane)
2. Gasoline from wood pellets (octane)
3. Natural gas (methane)
4. E85 (ethanol)

If the fuels all cost the same per gallon, which fuel would you choose to power the Go-Kart? Why? Please say what your reasons are and what you think is important.
How the fuels are available

It turns out that these fuels are available in different forms. Gasoline from petroleum and from wood pellets is available as a liquid. Natural gas is available as a gas. And E85 is available as a liquid.

<table>
<thead>
<tr>
<th></th>
<th>Gasoline from petroleum (octane)</th>
<th>Gasoline from wood pellets (octane)</th>
<th>Natural gas (methane)</th>
<th>E85 (ethanol)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liquid</td>
<td>Liquid</td>
<td>Gas</td>
<td>Liquid</td>
<td></td>
</tr>
</tbody>
</table>

Do you think this information is important in making a decision about which fuel is best? Does this information help you in your decision? Does it change your decision? Please explain your reasoning.
What the fuels are made of

It turns out that we know what these fuels are made from. Gasoline from petroleum and from wood pellets is made of carbon and hydrogen. Natural gas is also made of carbon and hydrogen. E85 is made of carbon, hydrogen and oxygen.

<table>
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<tr>
<th>Gasoline from petroleum (octane)</th>
<th>Gasoline from wood pellets (octane)</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Carbon</td>
<td>Carbon</td>
<td>Carbon</td>
<td>Carbon</td>
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<tr>
<td>Hydrogen</td>
<td>Hydrogen</td>
<td>Hydrogen</td>
<td>Hydrogen</td>
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</tbody>
</table>
<pre><code>                                       |                                    |                       | Oxygen        |
</code></pre>

Do you think this information is important in making a decision about which fuel is best? Does this information help you in your decision? Does it change your decision? Please explain your reasoning.
Particles that make up the fuels

It turns out that we know about how the particles are arranged in the fuels. Here are drawings of how the particles are connected.

Do you think this information is important in making a decision about which fuel is best? Does this information help you in your decision? Does it change your decision? Please explain your reasoning.
Pollution

When fuels are used in engines, they can cause pollution.

In terms of how these four fuels would affect the environment, which one of the fuels do you think would be better than the others to use? Please justify your answer and explain your reasoning.