2011

Applications of Hydrogen Power in Transportation

Michael Delia
Xinping St. Deng
Elise Laurent
Evan White

Follow this and additional works at: http://digitalcommons.wpi.edu/gps-posters

Part of the Architecture Commons, Arts and Humanities Commons, Business Commons, Education Commons, Engineering Commons, Life Sciences Commons, Medicine and Health Sciences Commons, and the Social and Behavioral Sciences Commons

Recommended Citation
Delia, Michael; Deng, Xinping St.; Laurent, Elise; and White, Evan, "Applications of Hydrogen Power in Transportation" (2011). Great Problems Seminar Posters (All Posters, All Years). 545.
http://digitalcommons.wpi.edu/gps-posters/545

This Text is brought to you for free and open access by the Great Problems Seminar at DigitalCommons@WPI. It has been accepted for inclusion in Great Problems Seminar Posters (All Posters, All Years) by an authorized administrator of DigitalCommons@WPI. For more information, please contact akgold@wpi.edu.
The dependence of the transportation industry on oil based fuels like gasoline and diesel is a major problem in today's world. Comparisons between hydrogen and gasoline cars based on total cost of ownership and carbon emissions were made to decide if a “Hydrogen Economy” was a practical alternative to the current oil economy. It was determined that hydrogen vehicles are a very practical solution to the world’s fuel needs in the years to come.

**Abstract**

- Hydrogen is reacted in a PEM (proton exchange membrane) fuel cell to produce electricity and water.
- By making the hydrogen with clean energy, it can be completely sustainable.
- When the hydrogen is stored in a compressed tank the vehicle has a range of 240 miles.

**Technology**

- Hydrogen is stored in composite tanks and reacted in a PEM fuel cell.
- PEM fuel cells are viable and sustainable means to power vehicles.
- The cost of fuel per mile of hydrogen powered cars (4-17 cents/mi) is comparable to or better than gasoline powered cars (16 cents/mi).
- The environmental impact from the use of these vehicles is far less than any gasoline car on the road today when clean energy sources like wind and solar are used to produce the hydrogen.

**Comparison Chart**

<table>
<thead>
<tr>
<th>Hydrogen</th>
<th>Battery</th>
<th>Gasoline</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pros</strong></td>
<td><strong>Cons</strong></td>
<td><strong>Pros</strong></td>
</tr>
</tbody>
</table>

**Survey Results**

- Storing compressed hydrogen in composite tanks and reacting it in a PEM fuel cell is a viable and sustainable means to powering vehicles.
- The cost of fuel per mile of hydrogen powered cars (4-17 cents/mi) is comparable to or better than gasoline powered cars (16 cents/mi).
- The environmental impact from the use of these vehicles is far less than any gasoline car on the road today when clean energy sources like wind and solar are used to produce the hydrogen.
- Urban areas that depend heavily on oil for transportation or have issues with vehicle pollution can benefit the most.

**Conclusion**

- In 1838, the fuel cell effect, which occurs when hydrogen and oxygen are combined to produce water and an electric current was discovered.
- Many major auto companies like Honda, BMW, GM, and others, have all developed concept cars that run on hydrogen.
- The Hydrogen Highway is a functioning system of hydrogen fueled cars and filling stations in California.

**References**