OVERVIEW OF MAZDA HYDROGEN VEHICLES

DOE HYDROGEN AND FUEL CELL TECHNICAL ADVISORY COMMITTEE (HTAC)
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MNAO Washington, D.C. Public and Government Affairs
EXTRACTING ENERGY FROM HYDROGEN

Electric Energy

Fuel Cell

Combustion Energy

Internal Combustion Engine

Ultimate Clean Vehicle
## COMPARISON OF FCV & HYDROGEN ENGINE VEHICLE

<table>
<thead>
<tr>
<th></th>
<th>FCV</th>
<th>H₂ Engine Vehicle</th>
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</thead>
<tbody>
<tr>
<td>CO₂</td>
<td>★★★★★★</td>
<td>★★★★★★</td>
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<tr>
<td>Emissions</td>
<td>★★★★★★</td>
<td>★★★★★</td>
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<tr>
<td>Energy Efficiency</td>
<td>★★★★★★</td>
<td>★★★★</td>
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<tr>
<td>Cost</td>
<td>★</td>
<td>★★★★★★</td>
</tr>
<tr>
<td>Reliability</td>
<td>★★★★</td>
<td>★★★★★★</td>
</tr>
<tr>
<td>Use of Gasoline</td>
<td>★</td>
<td>★★★★★★</td>
</tr>
</tbody>
</table>
WHY ROTARY?

Hydrogen is very combustible ➞ Abnormal combustion occurs

- Abnormal combustion doesn’t occur easily
- Abnormal combustion occurs more easily
DUAL-FUEL SYSTEM

Hydrogen Rotary Engine

Gasoline injector

Hydrogen injector

Fuel switch

H₂
HYDROGEN ENGINE VEHICLES
- Maximum power 80 kW
- H2 driving range 100 km (62 mi.)
- Dual-fuel system
HYNOR PROGRAM IN NORWAY - 2009

New Mazda RX-8 base model
- Left-hand drive
- Manual transmission
- Engine heater, etc.
MAZDA PREMACY HYDROGEN RE HYBRID

- Hydrogen driving range: 200 km (124 mi.)
- 40% more power: 110 kW
- 5 passengers, cargo space: 230 L
- Dual-fuel system

The first vehicle was leased in March 2009.
Hybrid System Structure

*Series Hybrid*

- Generator
- Inverter
- Motor
- Hydrogen engine
- Lithium-ion battery
MAZDA PREMACY HYDROGEN RE HYBRID

Hydrogen rotary engine
Hydrogen pipe
Gasoline pipe
Gasoline tank
Exhaust pipes
High-pressure hydrogen tank
Lithium-ion battery
High-voltage cable
Hybrid unit