High Octane Fuel Market Assessment

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High Octane Fuel Market Assessment

**Purpose:** Assess the feasibility, economics, and logistics of adopting HOF by drivers, vehicle makers, fuel retailers, and fuel producers

**Strategy:**
1. Identified benefits of High Octane Fuel (HOF) to key participants
2. Defined hurdles to HOF adoption
3. Proposed resolutions to hurdles
4. Grouped compatible/synergistic resolutions into 8 adoption scenarios
5. Modeled vehicle adoption rates for various scenarios
6. Modeled biofuel production and supply chain
Potential Benefits of HOF Adoption

• **Drivers**
  - Fuel cost savings: 8¢/gal (for E25) and 16¢/gal (E40)
    - EIA AEO 2014 projects savings of 18¢/gal (E25) and 36¢/gal (E40) in 2030
  - Reduced price volatility
  - Increased torque in performance applications
  - Energy security and environmental attributes

• **Vehicle manufacturers**
  - Greenhouse gas (GHG) reductions
  - Increased torque in performance applications

Source: Calculated from Clean Cities Price Reports by proportionally mixing E10 and E74
Potential Benefits of HOF, continued

• Fuel Retailers
  o HOF could fetch higher margins in less price-competitive market
  o HOF could differentiate stations in a uniform market
  o Cheaper fuel could result in 3% increase in trips to convenience store*

• Fuel Producers
  o Renewable Fuel Standard compliance
  o Economies of scale for cellulosic ethanol
  o Enable less expensive blendstocks
  o Facilitate additional gasoline export


Source: www.usatoday.com
## Hurdles and Resolutions to HOF Adoption

30 hurdles 94 potential resolutions identified, categorized, and discussed

<table>
<thead>
<tr>
<th>Tracking #</th>
<th>Hurdle</th>
<th>Type</th>
<th>Drivers</th>
<th>Vehicle Mfrs.</th>
<th>Fuel Retailers</th>
<th>Fuel Producers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Level 1 hurdles (most formidable hurdles—show-stoppers if not properly addressed)</td>
<td></td>
<td></td>
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<tr>
<td>1.1</td>
<td>Challenges building supply and demand in concert with one another</td>
<td>Logistical</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>1.2</td>
<td>Investments in ethanol face regulatory risk</td>
<td>Regulatory</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>1.3</td>
<td>Misfuelling legacy vehicles on HOF</td>
<td>Behavioral</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
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<tr>
<td>1.4</td>
<td>HOF is not currently a certification fuel, needs to be “readily available and used” first</td>
<td>Regulatory</td>
<td>X</td>
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<tr>
<td>1.5</td>
<td>Reid Vapor Pressure (RVP) of E25 (with current blendstock) would be too high, and therefore illegal</td>
<td>Regulatory</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
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<tr>
<td>1.6</td>
<td>HOF is not an EPA-registered fuel</td>
<td>Regulatory</td>
<td>X</td>
<td>X</td>
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<tr>
<td>1.7</td>
<td>Future CAFE calculation may not adequately reward HOFVs for improved efficiency</td>
<td>Regulatory</td>
<td>X</td>
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<tr>
<td>1.8</td>
<td>Cost of upgrading a retail station to offer HOF</td>
<td>Economic</td>
<td></td>
<td>X</td>
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<tr>
<td>1.9</td>
<td>Problem if HOF price exceeds that of regular gasoline</td>
<td>Economic</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
Vehicle Market Adoption Simulation

- All scenarios achieved a substantial percentage (43%–79%) of the light-duty vehicle stock by 2035
- More HOFVs are adopted if HOF is E40 (vs. E25) if they offer greater fuel cost savings and GHG benefit
- $2,500 purchase incentive boosted 2035 penetration 32% in consumer determined scenarios
- Designating certain vehicle models to be HOF-dedicated leads to higher adoption rates but early adoption speed depends on model production volumes
Fuel Supply Chain Simulation

Where are the bottlenecks?

• Fuel retailers’ investment in HOF equipment is limiting factor in most scenarios
  o Unless incentivized to invest, equipment cost is reduced, or if only compatible equipment is sold in advance. In which case:

• Construction rate of new biorefineries is limiting factor
  o Unless enough time passes to allow construction to catch up (circa 2025). In which case:

• HOF vehicle adoption is limiting factor
  o Only in scenarios where adequate retailer investment has been made and biorefinery construction has caught up with demand (post 2025)

• Feedstock availability and cost are not the limiting factors in any scenarios

Results show potential for significant HOF consumption in 2035 under the scenarios modeled
• 75 billion gallons of E40 (30 billion gallons of ethanol)
• Over 60% of 2035 LDV fuel market