E85 Deployment

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EIA Biofuels Workshop

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E85 Infrastructure

- Station locations, growth, vehicles, and pricing
- Regulations, codes, and standards
- Fueling equipment
- Links
Clean Cities supports local actions through public and private partnerships to deploy alternative and renewable fuels including E85.
E85 Retail Station Growth

Source: Alternative Fuels Data Center: http://www.afdc.energy.gov/data/tab/fuels-infrastructure/data_set/10332
Identifying Deployment Opportunities

Station Locator

Alternative Fueling Station Locator

Find alternative fueling stations near an address or ZIP code or along a route in the United States. Enter a state to see a station count.

Find Stations

Plan a Route

Go

Ethanol (E85)

more search options

2,596
ethanol stations
in the United States

Including private stations

Location details are subject to change. We recommend calling the stations to verify location, hours of operation, and access.

ABOUT THE DATA

Source: http://www.afdc.energy.gov/locator/stations/
Trip Planner

Alternative Fueling Station Locator

Find alternative fueling stations near an address or ZIP code or along a route in the United States. Enter a state to see a station count.

Find Stations

Washington, D.C. X
Charleston, SC X

Plan a Route

Ethanol (E85)

more search options

12
Ethanol stations along the route
Excluding private stations

Download spreadsheet of matching stations

Source: http://www.afdc.energy.gov/locator/stations/
I65 Corridor

• Several Clean Cities Coalitions and State Agencies combined to apply for a grant

• 21 E85 stations and 5 B20 Stations along 886 miles of interstate 60

• Partnered with DOE and retail fuel providers to fund the entire project
Incentives

• Federal
  o Tax credit up to 30% of the costs to install E85 infrastructure not to exceed $30,000. Expires 12/31/2013
  o USDA REAP program provides grants for blender pumps (which offer E85) up to 25% of project costs for communities with populations of 50,000 or less

• State
  o The following states offer E85 infrastructure financial incentives: AZ, AR, CA, CO, FL, IL, IA, KS, LA, MI, MN, NM, NY, NC, ND, OH, OR, PA, SC, TN, WI
  o Many states tax biofuels at lower rates than petroleum fuels

• Visit the following site to identify incentives in your area: http://www.afdc.energy.gov/laws/
FFV Growth

E85 FFVs Manufactured and in Use in the United States 1998-2009

<table>
<thead>
<tr>
<th>Year</th>
<th>Light-Duty E85 FFVs produced</th>
<th>Light-Duty E85 FFVs net annual increase*</th>
<th>Total fleet E85 FFVs in use</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998</td>
<td>216,165</td>
<td>144,000</td>
<td>144,000</td>
</tr>
<tr>
<td>1999</td>
<td>426,724</td>
<td>306,149</td>
<td>450,148</td>
</tr>
<tr>
<td>2000</td>
<td>600,832</td>
<td>456,947</td>
<td>907,096</td>
</tr>
<tr>
<td>2001</td>
<td>581,774</td>
<td>466,203</td>
<td>1,373,299</td>
</tr>
<tr>
<td>2002</td>
<td>834,976</td>
<td>700,719</td>
<td>2,074,018</td>
</tr>
<tr>
<td>2003</td>
<td>859,261</td>
<td>750,437</td>
<td>2,824,455</td>
</tr>
<tr>
<td>2004</td>
<td>674,678</td>
<td>609,437</td>
<td>3,433,892</td>
</tr>
<tr>
<td>2005</td>
<td>735,693</td>
<td>683,217</td>
<td>4,117,109</td>
</tr>
<tr>
<td>2006</td>
<td>1,011,399</td>
<td>960,287</td>
<td>5,077,396</td>
</tr>
<tr>
<td>2007</td>
<td>1,115,069</td>
<td>1,076,902</td>
<td>6,154,298</td>
</tr>
<tr>
<td>2008</td>
<td>1,175,345</td>
<td>1,149,389</td>
<td>7,303,687</td>
</tr>
<tr>
<td>2009</td>
<td>1,049,478</td>
<td>1,049,478</td>
<td>8,353,165</td>
</tr>
<tr>
<td>Total</td>
<td>9,281,394</td>
<td>8,353,165</td>
<td>8,353,165</td>
</tr>
</tbody>
</table>

Note: * Net increase is new FFVs manufactured discounted by the survival rate.

E85 Fleet Vehicles in Use

http://www.afdc.energy.gov/data/#tab/vehicles/data_set/10300
E85 Retail Prices

Comparison of Gas & E85 Prices

Source: Clean Cities Alternative Fuel Price Reports
# E85 Retail Prices

<table>
<thead>
<tr>
<th>Ethanol (E85) Information</th>
<th>Regular Gasoline Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reported by Clean Cities ($ per gal)</td>
<td>Reported by Clean Cities ($ per gal)</td>
</tr>
<tr>
<td>Average Price/Standard Deviation of Price</td>
<td>Average Price/Standard Deviation of Price</td>
</tr>
<tr>
<td>Number of Data Points</td>
<td>Number of Data Points</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Region</th>
<th>Average Price</th>
<th>Number of Data Points</th>
<th>Average Price</th>
<th>Number of Data Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>New England</td>
<td>$3.38 / 0.09</td>
<td>3</td>
<td>$3.65 / 0.15</td>
<td>38</td>
</tr>
<tr>
<td>Central Atlantic</td>
<td>$3.35 / 0.22</td>
<td>83</td>
<td>$3.56 / 0.21</td>
<td>70</td>
</tr>
<tr>
<td>Lower Atlantic</td>
<td>$3.24 / 0.20</td>
<td>64</td>
<td>$3.34 / 0.15</td>
<td>112</td>
</tr>
<tr>
<td>Midwest</td>
<td>$3.04 / 0.15</td>
<td>176</td>
<td>$3.19 / 0.15</td>
<td>208</td>
</tr>
<tr>
<td>Gulf Coast</td>
<td>$3.02 / 0.13</td>
<td>45</td>
<td>$3.11 / 0.10</td>
<td>64</td>
</tr>
<tr>
<td>Rocky Mountain</td>
<td>$3.11 / 0.21</td>
<td>60</td>
<td>$2.89 / 0.21</td>
<td>98</td>
</tr>
<tr>
<td>West Coast</td>
<td>$3.34 / 0.25</td>
<td>63</td>
<td>$3.54 / 0.28</td>
<td>122</td>
</tr>
<tr>
<td><strong>NATIONAL AVERAGE</strong></td>
<td><strong>$3.17 / 0.23</strong></td>
<td><strong>494</strong></td>
<td><strong>$3.29 / 0.30</strong></td>
<td><strong>712</strong></td>
</tr>
</tbody>
</table>

Source: Clean Cities Alternative Fuel Price Report January 2013
E85 Retail Prices

Source: Clean Cities Alternative Fuel Price Report January 2013
E85 Sales

• Most states track total ethanol sales; not E85 sales

• E85 sales are likely less than 1% of total ethanol sales

• Minnesota Department of Commerce E85 Data
Blender Pumps

• Provide FFV owners with more fuel choices
• Fuel is mixed from an E85 tank and an E10 tank to produce E20, E30 or similar
• Only FFVs can use fuels above E15
E15

• Approved for use in light duty trucks and vehicles 2001 and newer
• Only a few stations in midwest states are offering E15
• Not approved for use in motorcycles, boats, snowmobiles, small engines such as lawn mowers, leaf blowers, or similar
• There are several steps for retailers to provide E15 which can be found in the E15 Retailer Handbook: 
  http://ethanolrfa.3cdn.net/62e6e5d16c896ef941_tzm6vusyl.pdf
Regulations for Infrastructure

• **Local Authorities having Jurisdiction (AHJs)**
  - Fire marshals, state energy/environmental offices, weights & measures

• **Occupational Safety and Health Administration (OSHA)**
  - OSHA regulation 1910.106 (g)(3)(iv)(b)(1) requires dispensers, breakaways, and nozzles to be listed by a third-party for specific fuels.
  - OSHA 1910.106(b)(1)(iii)(a) covers steel tanks and requires sound engineering
Materials in Fueling Systems

Flow limiter (Al, steel)
Breakaway valve (nylon, HDPE, fluorocarbon, NBR, fluorosilicone)
Nozzle (Nylon, Al, fluorocarbon, Silicone rubber, NBR, fluorosilicone, HDPE)
Swivel (SS, fluorocarbon, NBR)
Hose (NBR)
Flexible connector (SS, fluorocarbon, NBR)
Emergency Shear Valve Protector (Iron, steel, brass, SS, Teflon, polyurethane)
Pump
Vapor
Liquid
Piping (nylon, PVDF, PPS, PK)
Extractor fitting (iron, polyurethane, Zn alloy)
Ball float vent valve (steel, SS)
Vapor Line Shear Valve (Iron, fluorocarbon, polyurethane)

Courtesy of Oakridge National Laboratory
UL Testing & Listed Equipment

- UL Subject 87A
- 15 week fuel exposure at 60°C
- Performance testing unique for each equipment type
- E85 UL listed equipment is available from multiple manufacturers
Status of Tanks

- **EPA Office of Underground Storage Tanks (OUST) Guidance - Compatibility Of UST Systems With Biofuel Blends**
  - Guidance was developed to cover blends above E10 and Biodiesel blends above 20%
  - Allows tank owners to meet 40 CFR Part 280
  - Compliance is achieved by
    - A letter from the equipment manufacturer with an affirmative statement of compatibility
    - Use of components certified by a nationally recognized independent testing laboratory

- **All tank manufacturers have provided letters stating compatibility with E85**
Useful Links

• Department of Energy Alternative Fuels Data Center:
  http://www.afdc.energy.gov/

• Renewable Fuels Association E85:
  http://ethanolrfa.3cdn.net/89258bdc8d0d998df2_8zm6y14xr.pdf

• EPA OUST Biofuels Guidance Document
  http://www.epa.gov/oust/altfuels/biofuelsguidance.htm

• Steel Tank Institute Letters Stating Compatibility:
  http://www.steeltank.com/Publications/E85BioDieselandAlternative
  Fuels/ManufacturerStatementsofCompatibility/tabid/468/Default.aspx

• Petroleum Equipment Institute Letters Stating Compatibility:
  http://www.pei.org/PublicationsResources/ComplianceFunding/UST
  ComponentCompatibilityLibrary/tabid/882/Default.aspx