

Alternative Fuels Data Center and API



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Project ID #TI059

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Overview

Timeline

Project start date: 1991

Project end date: Ongoing

Percent complete: N/A

Barriers

- Availability of alternative fuels and electric charging station infrastructure
- Availability of alternative fuel vehicles (AFVs) and electric drive vehicles
- Lack of technical experience with new fuels and vehicle technologies

Budget

Total project funding: \$965k (\$2.6M in Category)

NREL budget categories: *Technical and Problem Solving Assistance, Consumer Information and Outreach, Local Coalitions and Partnerships*

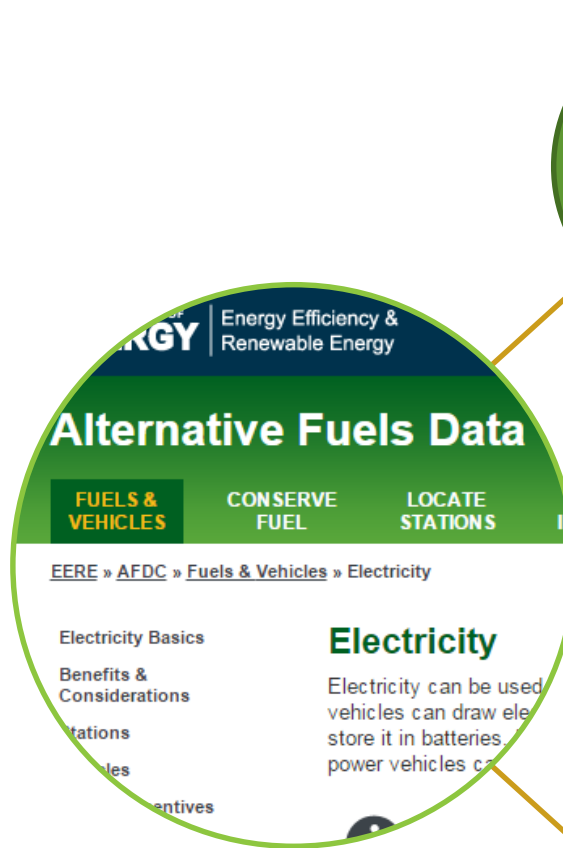
% of annual allocation for budget category: 37%

Team Members

- **Project leads:** DOE Clean Cities program, NREL
- **DOE programs:** BETO, FEMP, H&FC
- **Vehicle Technology Office:** Hybrid Electric Systems, Fuel Technologies and Deployment
- **Labs:** ORNL, ANL
- **Collaborations:** Industry, Clean Cities Coordinators, INL, DOE T2M, ICF

Relevance – Addressing Barriers

The Alternative Fuels Data Center (AFDC) is a clearinghouse for information that reduces the barriers to adopting alternative fuel technologies



Fuel Available

- Web Station Locator*
- iPhone Station Locator*
- Android Station Locator*
- APIs
- Widgets

Vehicles Available

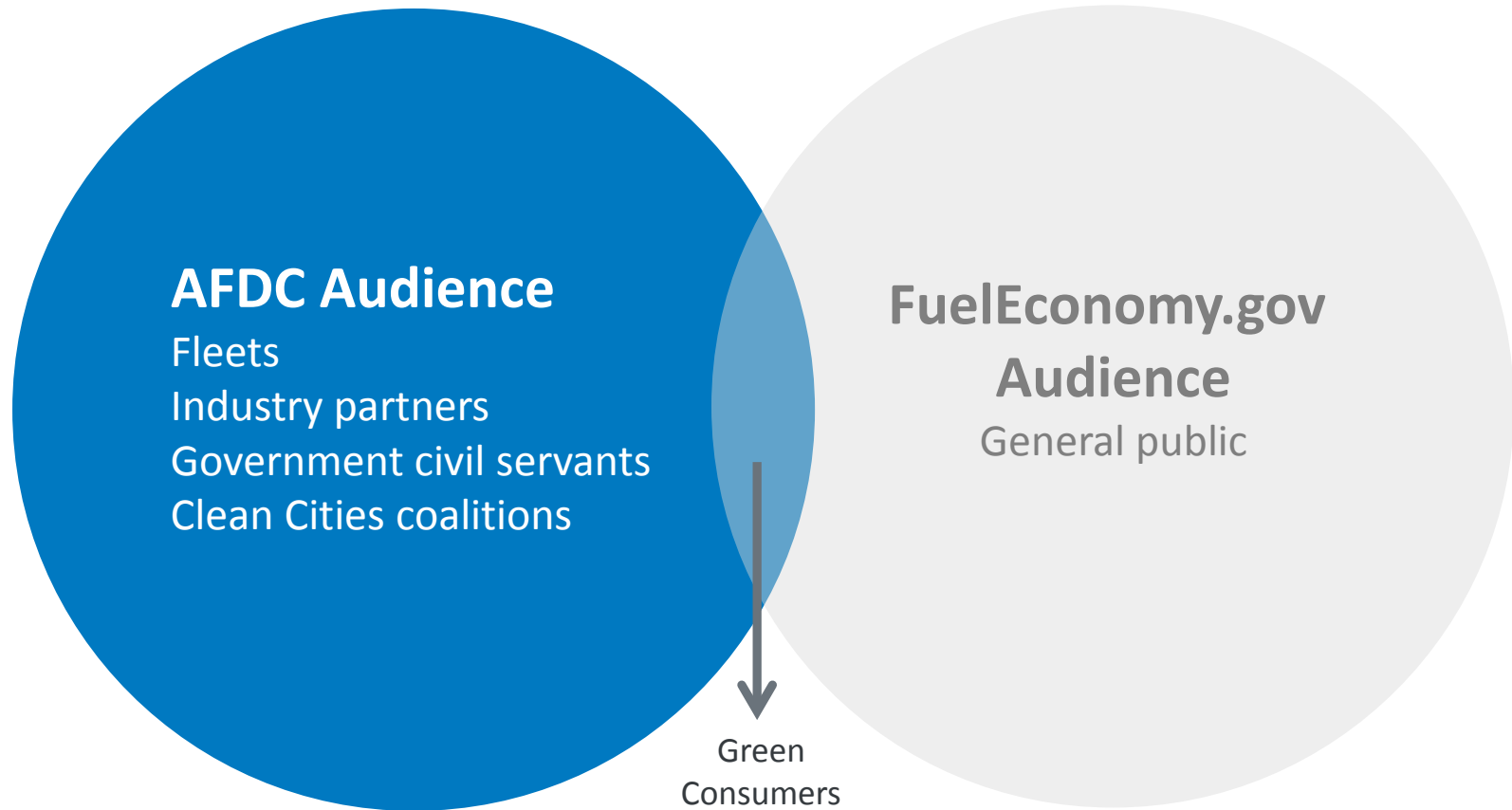
- FuelEconomy.gov*
- Alt Fuel Vehicle Search
- TransAtlas
- Laws and Incentives

Technical Expertise

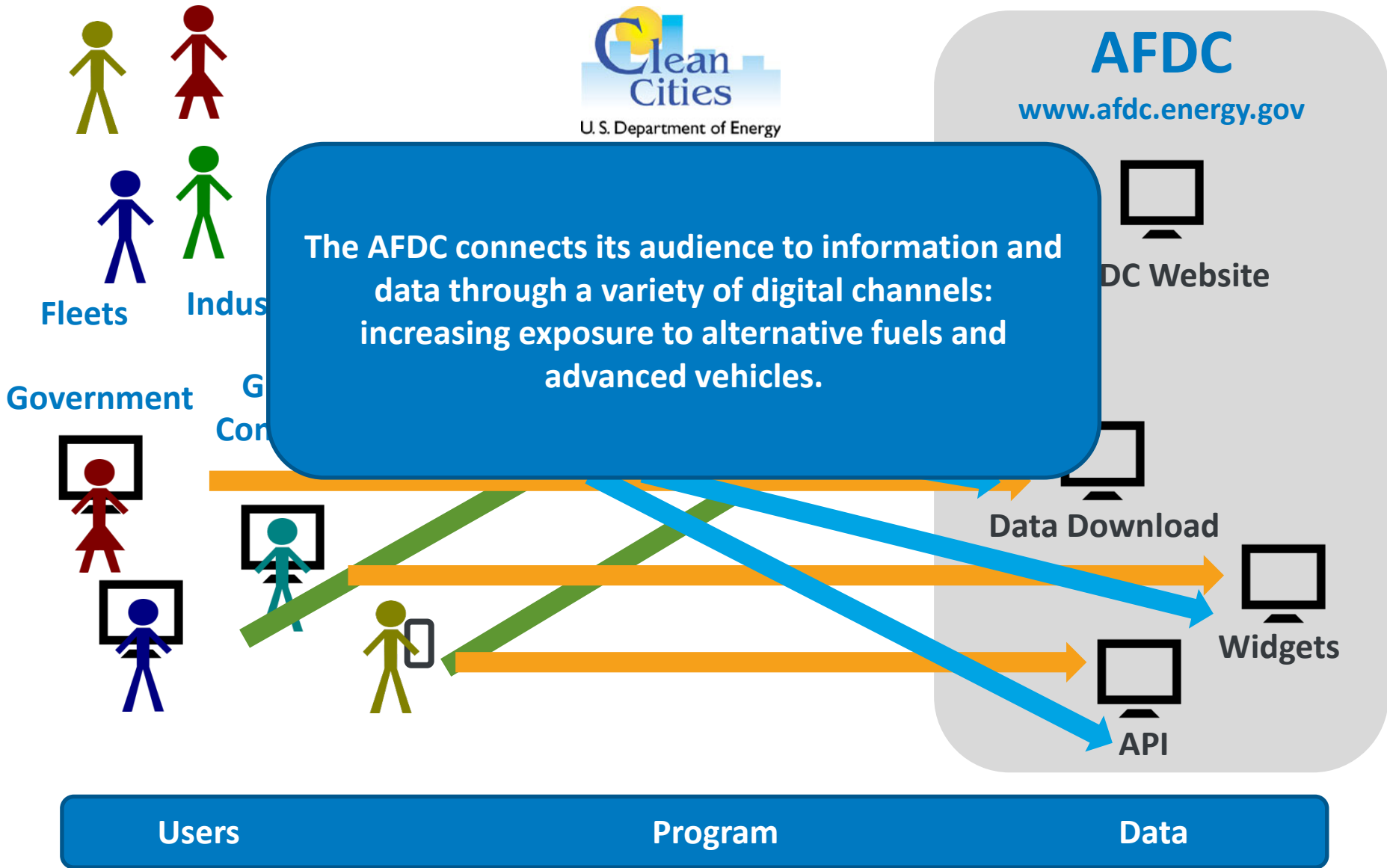
- Case Studies
- Publications
- AFLEET*
- PEV Scorecard
- VICE Model

*Discussed in other Clean Cities AMR presentations

Relevance - Audience



Relevance – The Role of the AFDC



Project Approach – Objective

AFDC Overall

Overall Objective: The AFDC provides information, data, and tools to help fleets and other transportation decision makers find ways to reduce petroleum consumption through the use of alternative and renewable fuels, advanced vehicles, and other fuel-saving measures. (afdc.energy.gov)

FY14 and FY15 Objectives:

- Increase impact through new data sharing techniques

Annual Objectives:

- Report measured impact through quarterly metrics reports
- Ensure data and content on site is accurate and current

AFDC APIs

Overall Objective: Provide data to developers, analysts, and partners via Application Programming Interfaces (APIs) (developer.nrel.gov and api.data.gov)

What is an API?

- Securely shares data using standard methods and data formats
- Allows the data owner to maintain ownership and control of the data
- Ensures the user always gets the most up to date data

FY14 and FY15 Objectives:

- Create API for laws and incentives data
- Enhance station data

Annual Objectives:

- Report measured impact through quarterly metrics reports
- Respond to user and partner needs

Project Approach – Users, Markets and Metrics

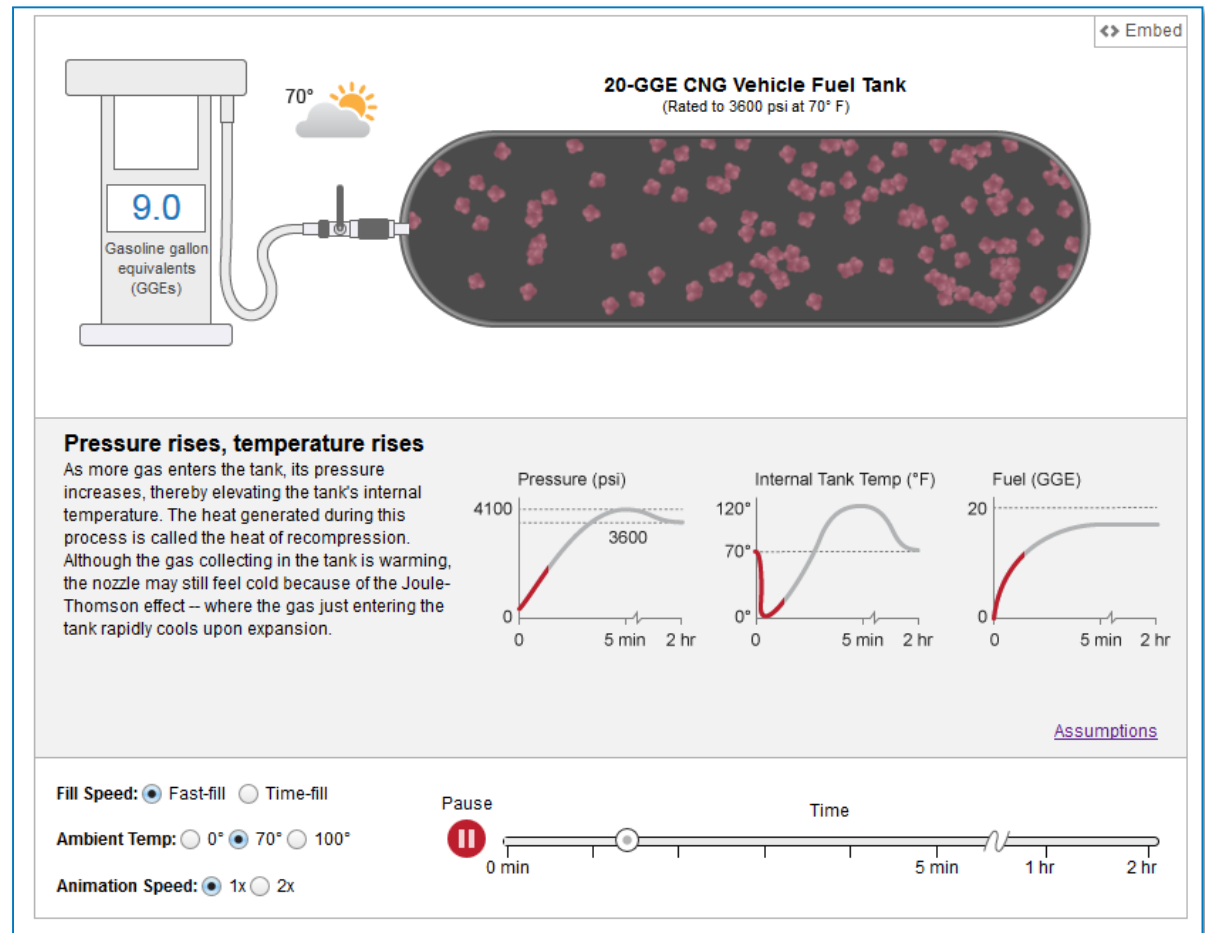
Gaseous Fuels vs. Liquid Fuels example

Driven by input from our market partners

Helps non-technical users understand how gaseous fuels work

3,800 people have viewed since September 2014 launch

Leveraged to create hydrogen tank visualization



Project Approach – Users and Collaboration

SLED Tool

The DOE Technology-to-Market Program (T2M) built the State & Local Energy Data (SLED) tool to help communities understand their energy markets. AFDC widgets and APIs were used to build the transportation section.

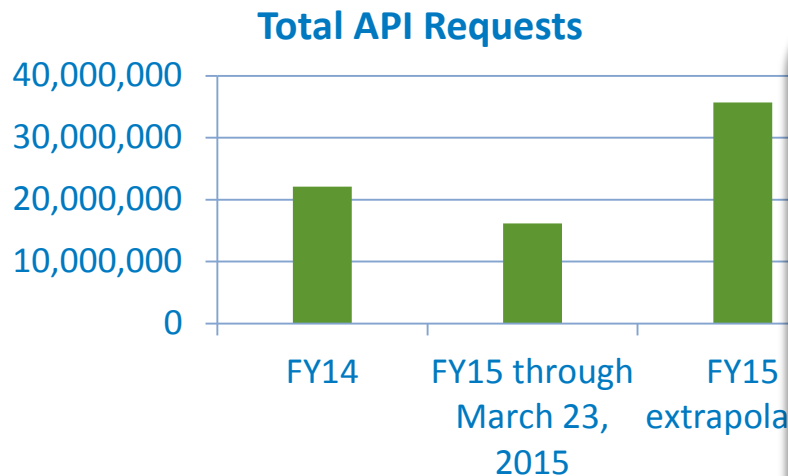
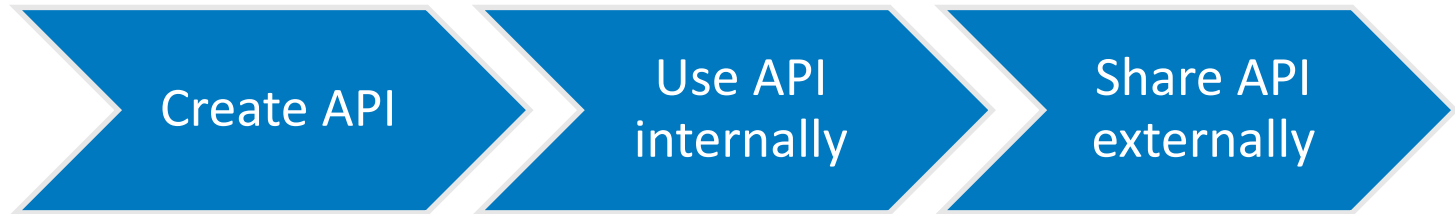
The screenshot shows the 'State & Local Energy Data' page for zip code 80121. The page is part of the U.S. Department of Energy's Energy Efficiency & Renewable Energy portal. A navigation menu on the left includes Electricity Generation, Energy Efficiency, Renewable Energy, **Transportation**, Community Planning, and Data Sources. The main content area is titled 'Transportation Summary for 80121' and includes a 'Share' button. Below the title is a paragraph explaining that the section provides details on transportation fuel sources and costs, along with available policies and incentives. A sub-section titled 'Transportation Fuel Sources and Costs' contains a table comparing regional and national average costs for various fuel types. A 'New Search' section at the bottom left features a search input field and buttons for 'Start Over' and 'Download PDF of this Page'. A note at the bottom explains that the data is based on regional groupings used by the Energy Information Administration (EIA) and cites the source as the U.S. Department of Energy, 2014.

Fuel Types	Regional Avg.	Nat'l Avg.
Gasoline	\$3.15/gallon	\$3.45/gallon
Diesel	\$3.90/gallon	\$3.91/gallon
Biodiesel (B20)	\$3.90/gallon	\$4.02/gallon
Biodiesel (B99-B100)	\$4.26/gallon	\$4.18/gallon
Ethanol (E85)	\$2.98/gallon	\$3.04/gallon
Natural Gas (CNG)	\$1.79/GGE	\$2.08/GGE
Propane	\$3.25/gallon	\$2.96/gallon
Electricity	No Data	\$0.12/kWh

<http://apps1.eere.energy.gov/sled/#/>

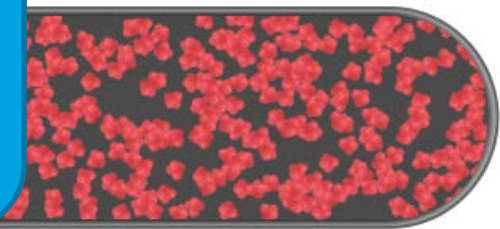
Project Approach – Users and Data Sharing

Data Stream



The AFDC provides data and applications for end users to enhance their own sites, analyses and tools.

CNG Vehicle Fuel Tank
(Rated to 3600 psi at 70° F)



Embed

Tool and Content Stream



Milestones

Month / Year	Milestone or Go/No-Go Decision	Description	Status
12/2013 FY14	Milestone	Provide a statistics report on the web activity for AFDC and Clean Cities websites.	Complete
12/2014 FY15	Go/No-Go	Determine if current Outreach and Information plan is effective and initiate necessary changes. Criteria – Collect feedback from CC stakeholders to determine continued usability of and need for information products.	Complete
12/2014 FY15	Milestone	Provide a statistics report on the web activity for AFDC and Clean Cities websites.	Complete

Project Accomplishments and Progress – FY14

Leading the Way at EERE

Clean Cities continues to lead the way for the Office of Energy Efficiency and Renewable Energy (EERE). EERE has over 140 websites and here's how the AFDC stacks up:

24% of FY14 pageviews are to the AFDC

11 of the top 25 EERE pages were AFDC pages

Top EERE Pages FY14

EERE Home Page

Solar Decathlon: Home Page

How Wind Turbines Work

AFDC: Station Locator

AFDC: Home Page

Solar Decathlon: Scores

EnergyPlus Energy Simulation Software

Building Energy Codes Program

AFDC: Electric Charging Station Locations

Status of State Energy Code Adoption

Solar Decathlon: Registration

AFDC: Alternative Fuels and Advanced Vehicles

AFDC: E85 Station Locations

How Does a Wind Turbine Work?

REScheck

Solar Decathlon: Teams

EnergyPlus Energy Simulation Software: Register

AFDC: Vehicle Cost Calculator

Steam Turbine Calculator

AFDC: Maps and Data

AFDC: State Laws and Incentives

AFDC: Biodiesel

AFDC: Natural Gas Station Locations

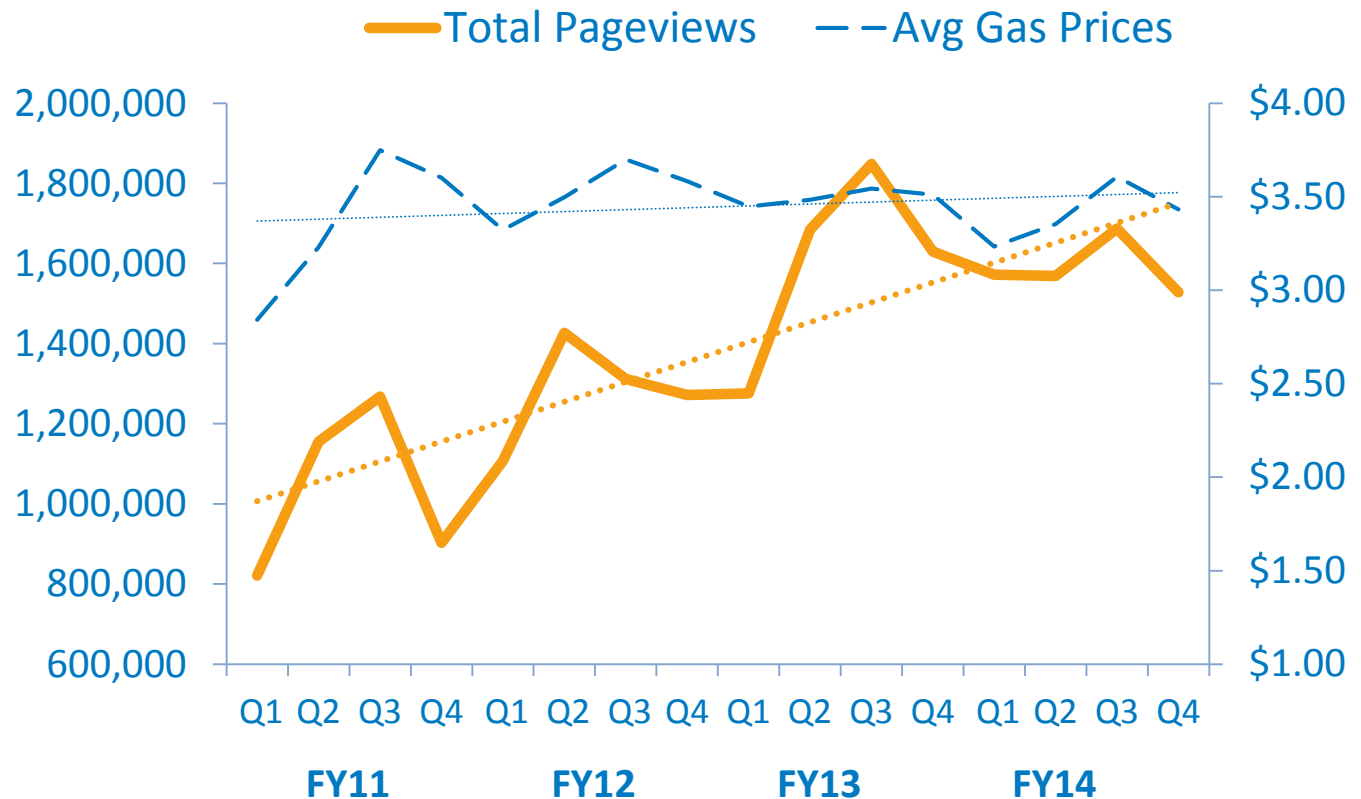
Energy Plus: Weather Data

AFDC: Laws and Incentives

Project Accomplishments – Continued Growth

The AFDC has seen continued growth over the past four years even as gas prices fluctuate.

In FY14, 1.4 million visitors viewed 6.4 million pages on the AFDC.



Visit Summary	FY14 Total
Pageviews	6,355,104
Sessions	1,808,478
Average Pages per Visitor	3.51

Project Accomplishments – Markets

Subset of Referrers Consistently in the Top 40 (2012-2014)

fueleconomy.gov

teslamotors.com

afdc.energy.gov

energy.gov

eere.energy.gov

automobiles.honda.com

content.bmwusa.com

edmunds.com

en.wikipedia.org

metroplugin.com

pge.com

nps.gov

smartusa.com

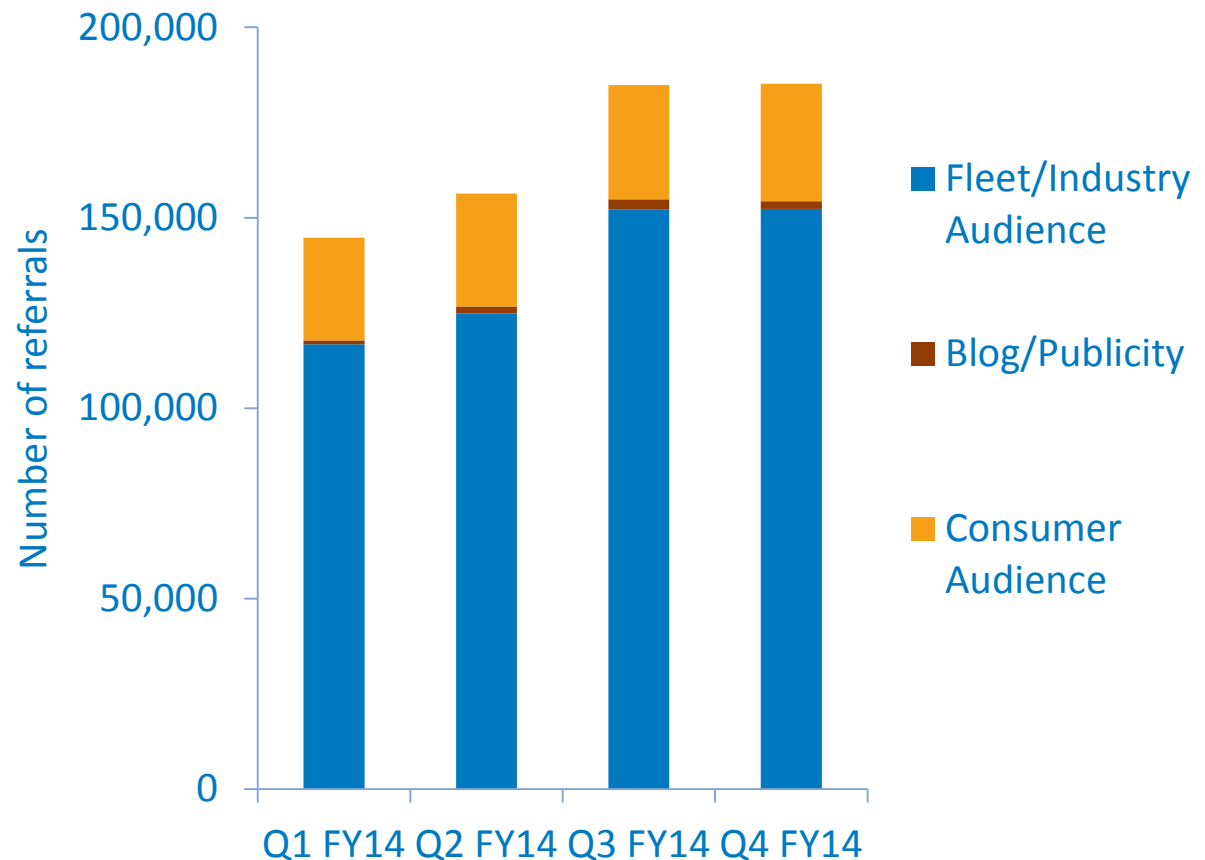
dsireusa.org

cngvc.org

ngvamerica.org

epa.gov

Measuring sites that send traffic to the AFDC helps find new partners and ensure we are providing value to our existing market partners



Project Accomplishments – API and Data Sharing

API - 422,661 requests in FY14

Fiat

Department of Labor

Recargo

Chevy

INL

EPA

Volkswagen

Illinois State DOT

General Electric

Widgets

Washington Post

Chevy

ABC News

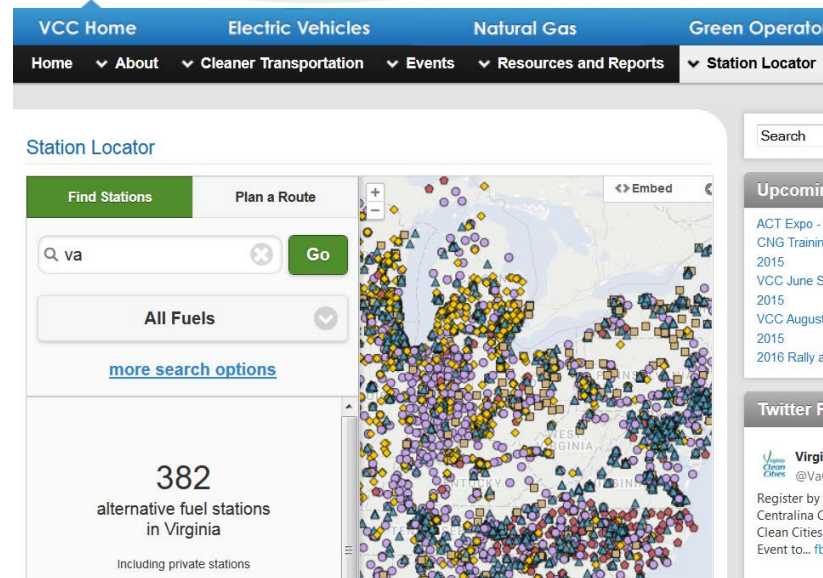
EERE

FuelEconomy.gov

Clean Cities Coalitions

City of Chicago

External API requests



Project Collaboration and Coordination – Tools

Tools

The Alternative Fuels Data Center offers a large collection of helpful tools. These calculators, interactive maps, and data searches can assist fleets, fuel providers, and other transportation decision makers in their efforts to reduce petroleum use.

Calculators

Vehicle Cost Calculator
Compare cost of ownership and emissions for most vehicle models. mobile

Petroleum Reduction Planning Tool
Create a plan for your fleet to reduce petroleum consumption and emissions.

CNG VICE Model 2.0
Evaluate ROI and payback period for natural gas vehicles and infrastructure.

AFLEET Tool
Calculate a fleet's petroleum use, cost of ownership, and air pollutant and GHG emissions.

JOBS Model
Estimate economic impacts of natural gas, hydrogen, or fuel cell infrastructure.

GREET Fleet Footprint Calculator
Calculate your fleet's petroleum use and greenhouse gas emissions footprint.

PEV Readiness Scorecard
Assess your community's readiness for the arrival of plug-in electric vehicles.

Interactive Maps

Alternative Fueling Station Locator
Locate alternative fueling stations and get maps and driving directions. mobile

TransAtlas
Analyze vehicle densities and locations of fueling stations and production facilities.

BioFuels Atlas
Compare feedstocks and analyze biofuel production by location.

Truck Stop Electrification Sites
Locate truck stops with electrification sites to reduce the need for idling. mobile

Coalition Locations
Find Clean Cities coalitions and contact information for coordinators.

Data Searches

Vehicle Search
Compare light-duty alternative fuel vehicles, electric vehicles, and hybrids.

Laws and Incentives Search
Search for laws and incentives related to alternative fuels and advanced vehicles.

Fuel Properties Comparison
Compare alternative fuel properties and characteristics.

Find a Car
Compare fuel efficiency, costs, carbon footprints, and emissions. mobile

State Information
Find state information about alternative fuels and advanced vehicles.

afdc.energy.gov/tools

NREL

ORNL

ANL

BETO

H&FC

FEMP

INL

Technology-to-Market Program

Alternative Fuel Market Expansion - FY15 plans

Significant Updates

- State Pages
- Webinar Database
- Data Download
- Station Locator
- Station Admin
- Clean Cities Template
- Search Functionality
- Publication Order Form
- Annual Report

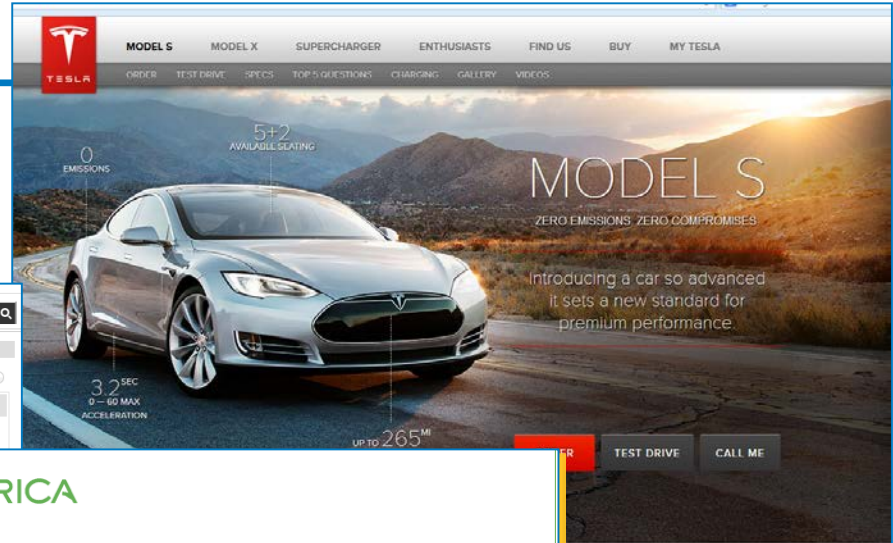
Leveraging Existing Assets

- Lemay Museum Apps
- Niche Market pages
- Fuel Properties
- Propane Widget
- Impact Metrics

Expansions

- Price Reporting Tool
- Station Android App
- Toolbox Login
- ARRA Conclusions

Alternative Fuel Market Expansion



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These 5 things need to happen before electric cars really go mainstream

Posted by Lydia DePillis on September 19, 2013 at 4:18 pm

In 1997, the world's first real consumer-oriented electric car -- the Prius -- debuted in Japan. Sixteen years and many new models later, electric cars have stayed stubbornly at about 2 percent of global sales for light vehicles, which Navigant Research projects will only grow to 3 percent by 2020. Tesla may be doing well, but their \$70,000 car won't reach the masses anytime soon. Chevrolet's Volt has had a rough ride, sales of Nissan's Leaf have disappointed, several battery companies have failed, and Israel's battery-swapping BetterPlace went under. Just this week, a car charging company that had received a \$99 million federal grant went bankrupt.

But the sector is far from dead. The past few weeks have seen something of a boom in rollouts of new electric cars: General Motors is developing a \$30,000 vehicle that can go 200 miles on a single charge, BMW is plans to launch the i3 this fall, and Volkswagen says it will bring an electric compact to the United States within two years. The all-electric Fiat just went on sale. Cadillac, Audi and Mercedes have prototypes as well. And overall sales have recently bumped:

U.S. PEV Sales by Model

Print Download

- BMW Active E
- Chevrolet Spark
- Chevrolet Volt
- Ford C-MAX Energi
- Ford Focus Electric
- Ford Fusion Energi
- Honda Accord
- Honda Fit EV
- Mitsubishi i-MiEV
- Nissan LEAF
- Prius Plug-in
- Smart ED
- Smart for Two EV
- Tesla Model S
- Toyota Prius
- Toyota RAV4

Source: hybridcars.com/market-dashboard.html

Notes: PEVs include plug-in HEVs, but do not include Neighborhood Electric Vehicles, Low Speed Electric Vehicles, or two-wheeled electric vehicles. Only full-sized vehicles sold in the U.S. and capable of 60mph are listed.

Publicity/Blog

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NGVAmerica is a national trade association dedicated to the development of a growing and sustainable American market for vehicles powered by natural gas or biomethane.

Advocating for the growing use of NGVs where they benefit most.

For the economy. For the environment. For health. For security. For America.

News	The transportation fuel of the future is here now.	Links
<p>NGV Industry Stakeholders' Survey Update</p> <p>Tax Credits for CNG and LNG Fuel and Fueling Equipment Extended</p> <p>CARB to Look at Aftermarket Conversion Rules</p> <p>Announcing a New Information Service for US LNG Fuel Production</p> <p>NGVAmerica Applauds the Inclusion of NGV Incentives in New EPA and NHTSA Rules</p>	<p>"Abundant, affordable, clean-burning natural gas presents a tremendous opportunity for America to realize an energy future using domestic resources to fuel our nation's transportation needs. To that end, we are committed to explore the aggregation of our annual state fleet vehicle procurements to provide an incentive to manufacture affordable, functional natural gas vehicles." Click to view</p> <p>—Governors Fallin, Hickenlooper, Mead, Corbett, Herbert, LePage, Martinez, Tomblin, Beshear, Perry, Kasich, Bryant, and Jindal in regard to an OEM request for information</p> <p><i>"If you're a business that needs to transport goods, I'm challenging you to replace your old fleet with a clean energy fleet that's not only good for your bottom line, but good for our economy, good for our country and good for our planet."</i></p> <p>—President Barack Obama, speaking at UPS in Maryland</p>	<p>NGV Forum: National news and dialogue for the NGV industry</p> <p>US LNG Fuel Production Plants: A Service of Zeus Intelligence</p> <p>Conferences and Events</p> <p>NGVAmerica Press Releases</p>

Fleet/Industry



Consumer

Summary

- AFDC is a market and user driven website
- In FY14 we accomplished
 - 1.4 million visitors viewing 6.4 million pages
 - Continued growth even as gas prices fluctuate
 - Enhancement of API and data download capabilities
 - Application sharing through widgets
- Effectiveness is measured quarterly and metrics drive change
- Collaboration with our key audiences expands the alternative fuel market
 - Fleets, Industry Partners, Government Civil Servants, Clean Cities Coalitions
- Leveraging assets developed by AFDC has supported
 - Industry Partners by providing data and applications
 - GSA to build api.data.gov
 - DOE programs including Hydrogen and Fuel Cell and Technology to Market to visualize data
 - DOE websites including Energy.gov, EERE, FuelEconomy.gov, FEMP

Technical Back-Up Slides

Project Accomplishment – User Feedback

I am truly impressed with the wealth of information and the fact so much of this information is truly up to date and accurate. This website shows that the team at AFDC take pride in their work and believe their mission to be important..and it is. This website and the AFDC is a valuable resource that allows my company to pursue its objective of providing the lowest carbon clean and compliant alternative fuel solutions to the US fleets. I feel confident that the information provided here is accurate and unbiased, which can not be said for the privately funded sites. Thanks again for your hard work and dedication.

*Dr. John Reed
CEO, North American Repower
March 7, 2014*

I want to congratulate whomever organized this website. It is well organized, easy to navigate, multiple links to help the visitor find what they are seeking, easy on the eyes, and contains a ton of great information.

Great job!

*Dean Wickstrom
(Just some guy from Minnesota)
January 31, 2014*

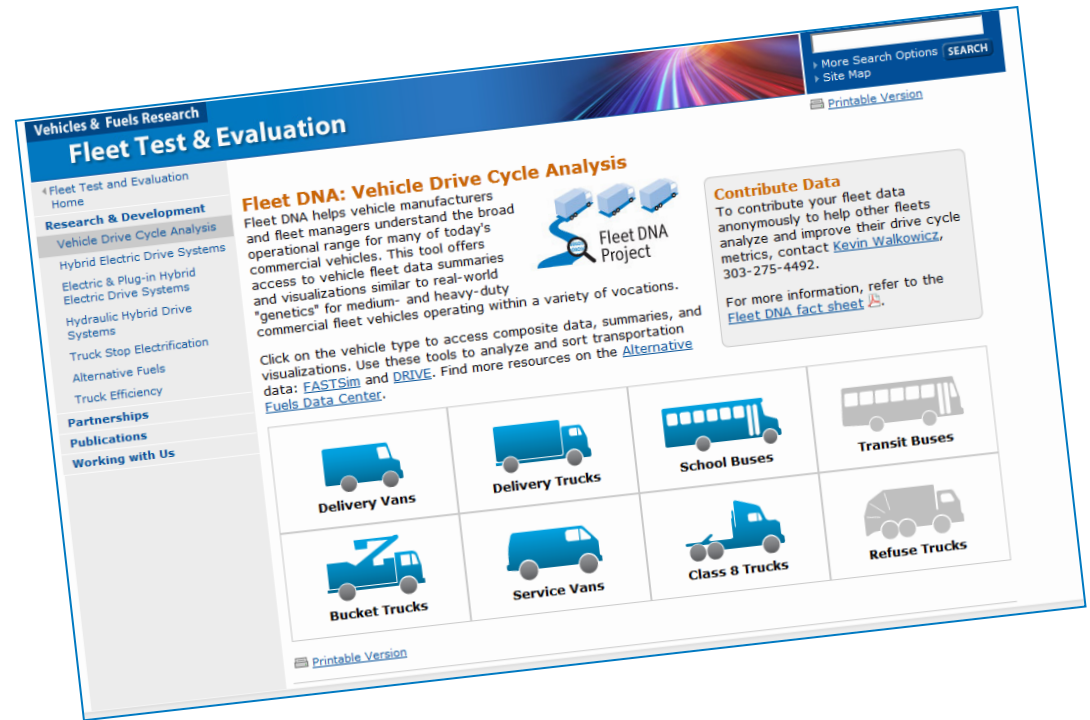
“I know you guys hear this all the time but the resources are incredible. Thank you.”

*Maggie Stritz-Calnin
Lansing Clean Cities
April 9, 2014*

Project Accomplishment – Collaboration with VTP

FleetDNA Tool

- Leverages AFDC Maps and Data to visualize drive cycle data for commercial vehicles
- Data will be used in the future to create qualitative and quantitative case studies about fleets using alternative fuels
- API created to access summarized drive cycle data



Project Accomplishment – Fuel Neutral

The AFDC provides quality content for all fuels and is a trusted resource regardless of the ebb and flow of fuel popularity.

AFDC Fuel Landing Page Quarterly Pageview Trends

