



... for a brighter future



U.S. Department
of Energy

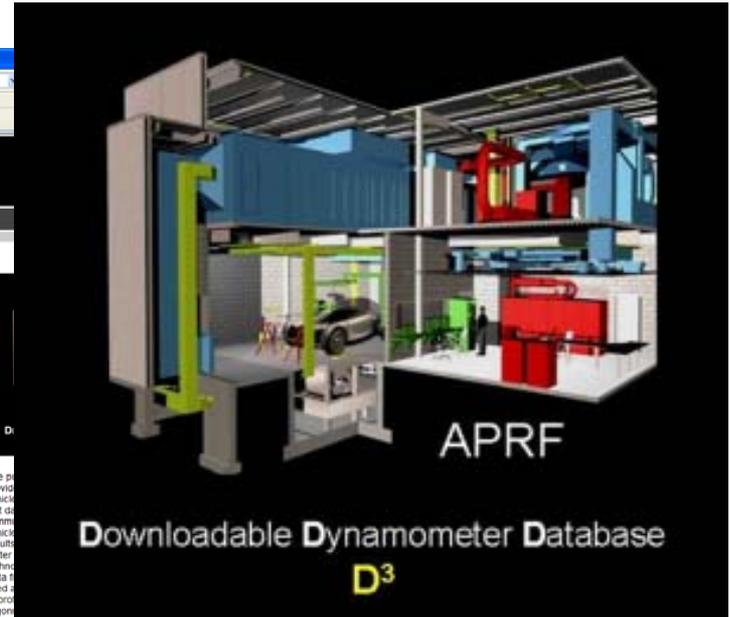
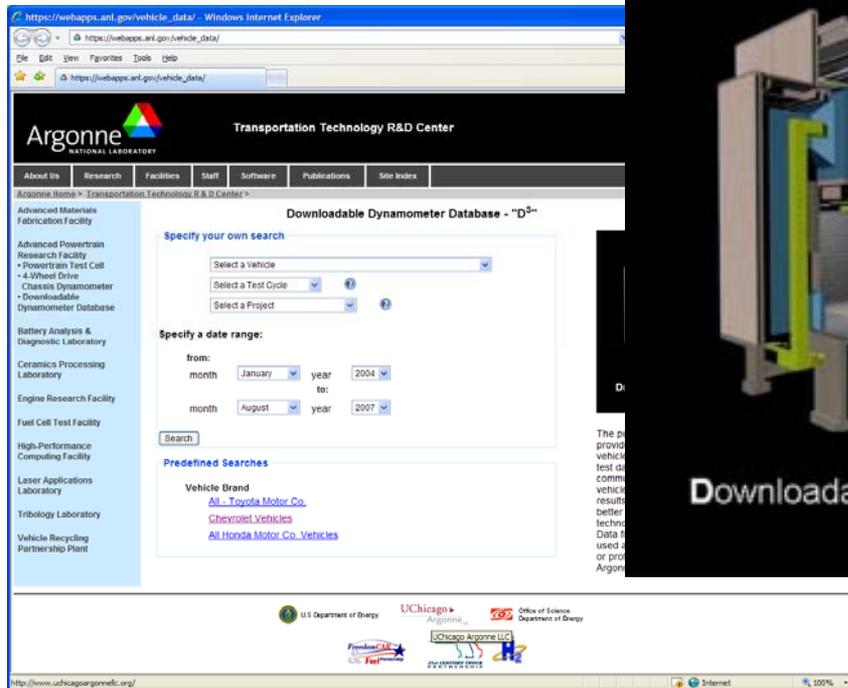
UChicago
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managed by UChicago Argonne, LLC

“D³” Website Database

Downloadable Dynamometer Database



Glenn Keller
Argonne Vehicle Systems Group
19 May 2009, DOE Vehicle Technologies Merit Review

Project ID: vssp_19_keller

This presentation does not contain any proprietary, confidential, or otherwise restricted information

OVERVIEW

Online Vehicle Testing Results Database

Timeline

Start – FY 2007
Ongoing Effort

Barriers

Time & resources
for updates and
maintenance

Budget

FY07: \$100 K
FY08: \$50 K
FY09: \$25 K

Partners

Idaho Nat'l Lab
AVTA Program

OBJECTIVE

Argonne's Downloadable Dynamometer Database is a online repository for vehicle dynamometer testing results.

- Users can search and download sets of raw data for individual analysis
- Serves as a data resource for universities, the public and researchers worldwide
- Website Address **https://webapps.anl.gov/vehicle_data/**
- The current interface is user-friendly and easy to find data which is organized either by vehicle or through use of a virtual project binder
- Users have the ability to search the entire database either by
 - vehicle,
 - project,
 - test cycle,
 - date of collection, or
 - a system of predefined searches.



Transportation Technology R&D Center

- About Us
- Research
- Facilities
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- Publications
- Site Index

Search TTRDC ... Search

Argonne Home > Transportation Technology R & D Center >

- Advanced Materials Fabrication Facility
- Advanced Powertrain Research Facility
 - Powertrain Test Cell
 - 4-Wheel Drive Chassis Dynamometer
 - Downloadable Dynamometer Database

- Battery Analysis & Diagnostic Laboratory
- Ceramics Processing Laboratory
- Engine Research Facility
- Fuel Cell Test Facility
- High-Performance Computing Facility
- Laser Applications Laboratory
- Tribology Laboratory
- Vehicle Recycling Partnership Plant

Downloadable Dynamometer Database - "D³"

[sign in](#)

Specify your own search

Select a Vehicle

Select a Test Cycle

Select a Project

Search by Vehicle

Search by Test Cycle

Search by Project

Specify a date range:

from:

month year

to:

month year

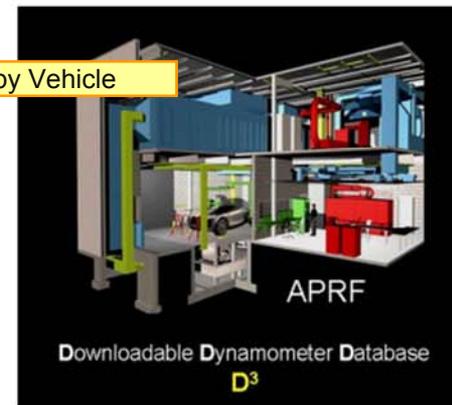
Search by Date

Search

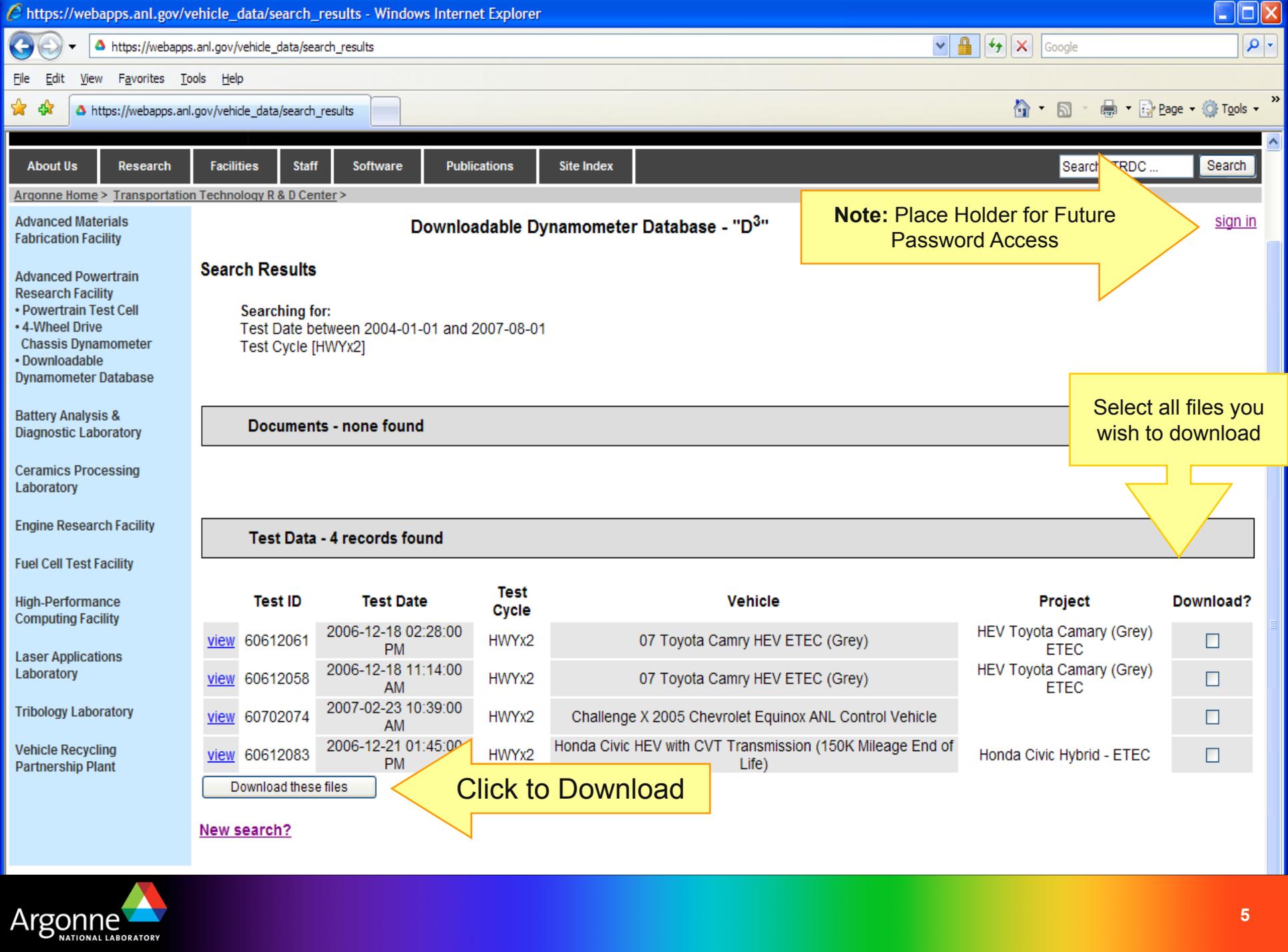
Predefined Searches

Predefined Searches

- Vehicle Brand
- [All - Toyota Motor Co.](#)
 - [Chevrolet Vehicles](#)
 - [All Honda Motor Co. Vehicles](#)



The purpose of this website is to provide advanced technology vehicle chassis dynamometer test data for the engineering community. Mostly comprised of vehicle benchmarking test results, it is intended for the better understanding of the technology and for education. Data from this website may not be used as a source for publication or profit without consent of Argonne National Laboratory.



- Advanced Materials Fabrication Facility
- Advanced Powertrain Research Facility
 - Powertrain Test Cell
 - 4-Wheel Drive
 - Chassis Dynamometer
 - Downloadable Dynamometer Database
- Battery Analysis & Diagnostic Laboratory
- Ceramics Processing Laboratory
- Engine Research Facility
- Fuel Cell Test Facility
- High-Performance Computing Facility
- Laser Applications Laboratory
- Tribology Laboratory
- Vehicle Recycling Partnership Plant

Downloadable Dynamometer Database - "D3"

Note: Place Holder for Future Password Access

[sign in](#)

Search Results

Searching for:
Test Date between 2004-01-01 and 2007-08-01
Test Cycle [HWYx2]

Documents - none found

Select all files you wish to download

Test Data - 4 records found

	Test ID	Test Date	Test Cycle	Vehicle	Project	Download?
view	60612061	2006-12-18 02:28:00 PM	HWYx2	07 Toyota Camry HEV ETEC (Grey)	HEV Toyota Camry (Grey) ETEC	<input type="checkbox"/>
view	60612058	2006-12-18 11:14:00 AM	HWYx2	07 Toyota Camry HEV ETEC (Grey)	HEV Toyota Camry (Grey) ETEC	<input type="checkbox"/>
view	60702074	2007-02-23 10:39:00 AM	HWYx2	Challenge X 2005 Chevrolet Equinox ANL Control Vehicle		<input type="checkbox"/>
view	60612083	2006-12-21 01:45:00 PM	HWYx2	Honda Civic HEV with CVT Transmission (150K Mileage End of Life)	Honda Civic Hybrid - ETEC	<input type="checkbox"/>

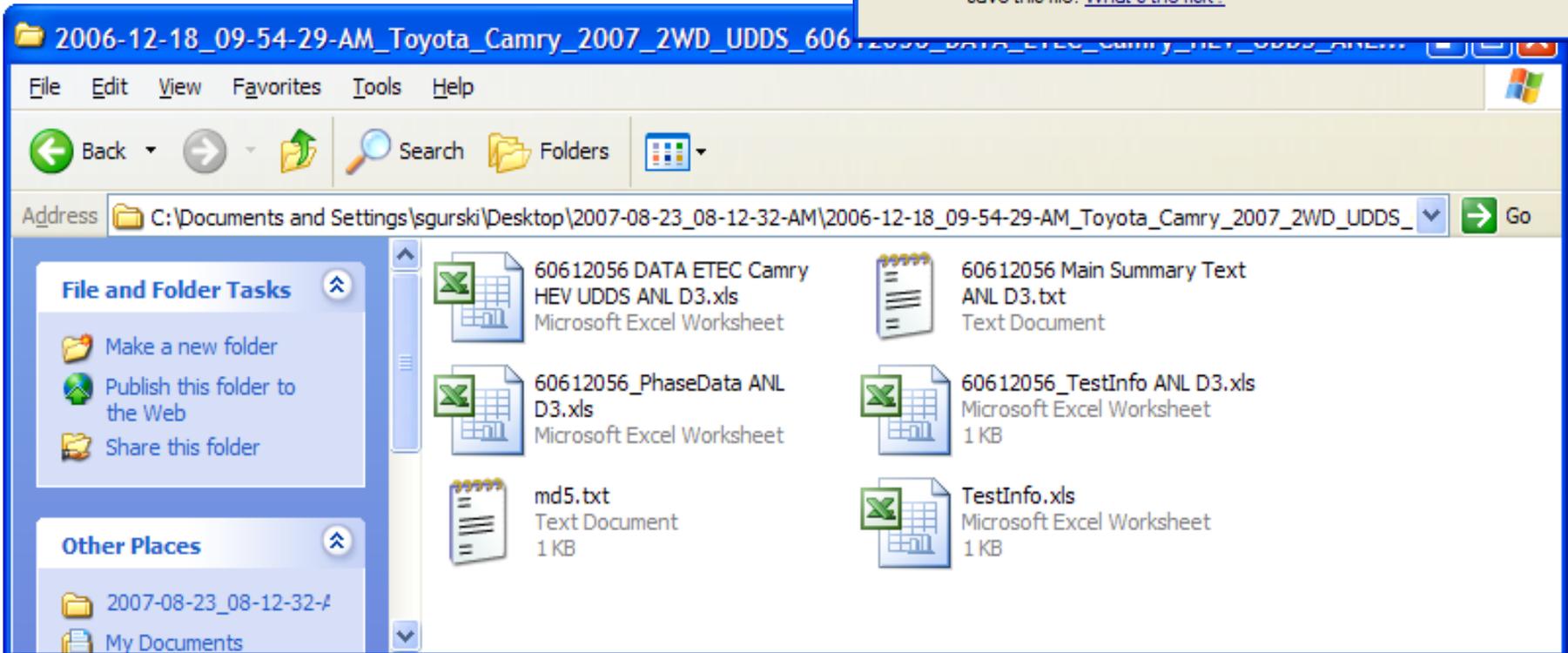
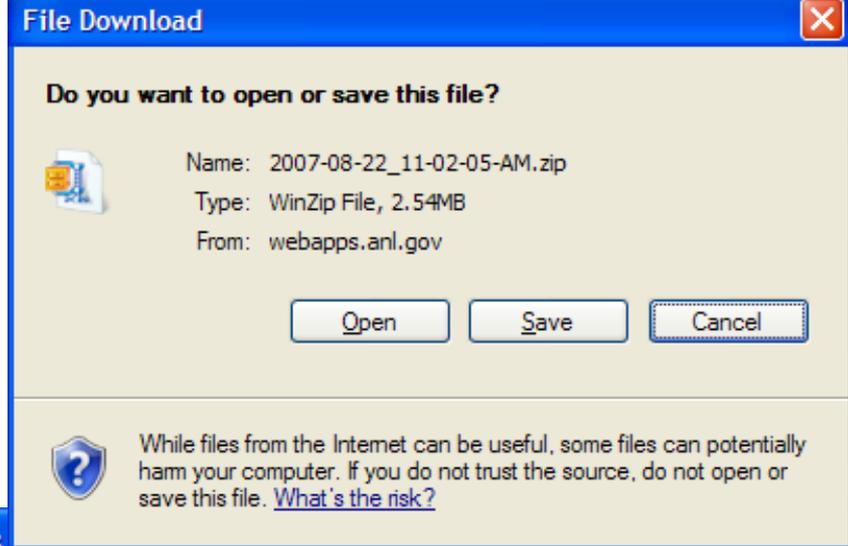
[Download these files](#)

Click to Download

[New search?](#)

Multiple data sets will be downloaded to a single .zip file containing the individual .zip files of the data sets.

Files are tab-delimited and easily opened in software programs such as Microsoft Excel or MatLab.



Type of information that is currently available for public download on the Argonne Online Vehicle Testing Database

- The D³ data is a subset of a much larger set of data. This larger and complete set of data will not be put on D³ public site.
- Each set of data is sanitized and checked for errors
- The data that is available for public download is:
 - General setup, test cell and environmental conditions
 - Bag fuel economy and emissions – No modal emissions data
 - Second-by-second data of:
 - *Drive Trace, Dynamometer, and Indicated Vehicle Velocity;*
 - *Dynamometer Tractive Force;*
 - *Battery Current, Voltage and Indicated State of Charge;*
 - *Engine Speed;*
 - *Modal Fuel Consumption (Measured from emissions bench or direct fuel scale)*

ACCOMPLISHMENTS

D³ is continually evolving based on the needs of the users and to provide additional functionality

- More Data and More Vehicles – As the database grows so can our ability to add search or organizational functions that can be utilized.
- Vehicle Summary Information Available – Summary information is now available on some of the vehicles in the database. More to be uploaded as available.

ACCOMPLISHMENTS

D³ is continually growing to include results from most recently tested vehicles

■ More Data and More Vehicles:

- 128 new test data folders uploaded to D³ since FY 08
- In total, D³ now contains 18 advanced vehicles with over 217 sets of data that can be searched and downloaded

■ Vehicles tested -- Includes PHEVs, Hybrids, and conventional vehicles.

- Latest vehicle test data added this past year:

Nissan Altima Hybrid

Electrovaya Escape PHEV

GM Tahoe Two-Mode Hybrid

Hymotion Prius version 2

Hymotion Escape PHEV

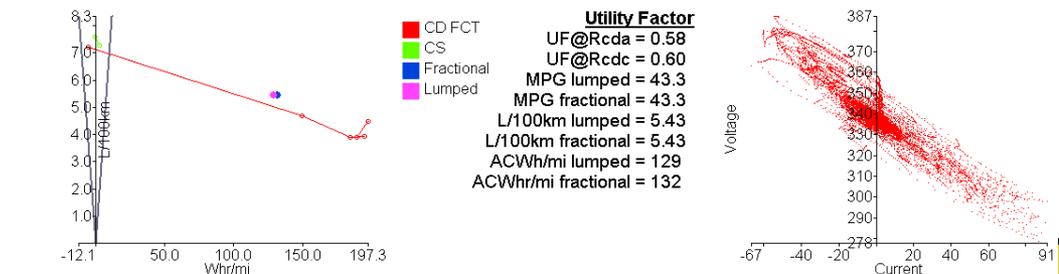
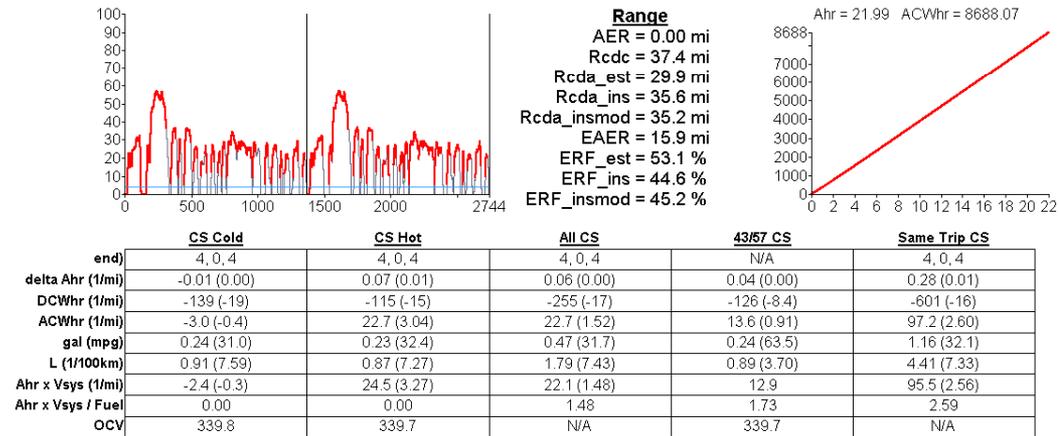
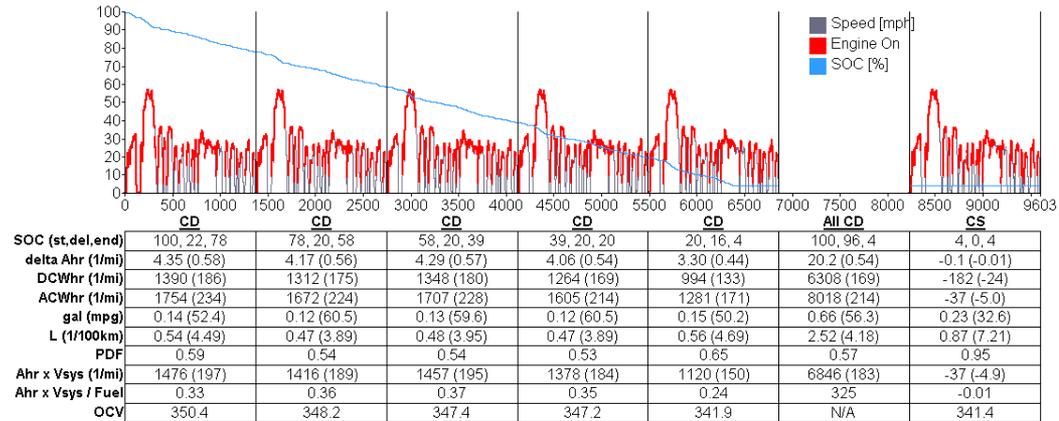
Plug-In Conversions Prius PHEV

HybridsPlus Escape PHEV

NEW D³ FEATURES THIS YEAR

- New this year is an one-page reporting tool that can automatically perform the critical PHEV calculations and plot the results.
- Several new performance parameters have been implemented that relate to energy consumption rates, various definitions of the depleting range, and calculating the equivalent electric vehicle range.
- The tool also utilizes the newly defined Utility Factors to apply proper in-use weighting of the final results.

Examples shown of new One-Page Summaries



Examples shown of new One-Page Summaries

ADVANCED POWERTRAIN RESEARCH FACILITY

Fast-Tracking Drivetrain Electrification



Plug-In Conversions Corp. Prius PHEV Conversion

Vehicle Description

Powertrain: 2005 Prius power-split
 Engine: 1.5L gasoline 4 cylinder
 Battery System: Battery Replacement

- Gold Peak NiMH Cells (30 Ah)
- NiMH battery replaces Prius NiMH battery
- Usable Capacity: 3.8 DC kWh
- Rated Capacity: 6.1 DC kWh
- Usable to Rated Battery Capacity: 62 %

PHEV system additional Net mass: 250 lbs
 Cost: \$12,500 (vehicle not included)

Dynamometer Testing Results

Emissions Attainment: SULEV
 Average UF Weighted Fuel Economy:

- 88.7 mpg* / 95.0 AC Wh/mi (UDDS)
- 85.2 mpg* / 100 AC Wh/mi (HWY)
- 49.8 mpg* / 95.3 AC Wh/mi (US06)
- 64.1 mpg* / 101 AC Wh/mi (LA92)

UDDS Charge Depletion Range: 24 mi
 UDDS Equivalent All Electric Range: 13.8 mi
 Roundtrip Electrical Energy Efficiency: 70 %
 Charger Efficiency: 78 %
 Charging Time: 5½ hours on 110VAC




Test Number	Cycle	Cold Hot	MPG*	Start SOC [%]	Whr/mile
60902089	UDDS	CS	129	83	148
60902090	UDDS	HS	170	67	147
60902091	UDDS	HS	185	50	150
60902092	UDDS	HS	74.8	33	32.3
60902093	UDDS	HS	67.0	21	2.5
60902094	UDDS	HS	66.4	21	1.0
60902099	Highway	CS	170	83	154
60902100	Highway	HS	65.1	32	2.5
60902101	Highway	HS	65.4	22	3.7
60902103	US06	CS	68.5	83	146

* Unadjusted Drive Cycle Fuel Economy [mpg]

FUTURE WORK

- Future plans include expanding the search capabilities so that users can extract summary information without downloading entire data sets. For example: “*Fuel Economy of all HEV’s on a UDDS drive cycle.*”
- Password Protected Full Dataset Access
Allow access to full data sets through password protected access provides ~ 100 signals rather than only a dozen available to the general public.

SUMMARY

The Argonne Downloadable Dynamometer Database (D³) is a simple and easy-to-use tool that enables the transfer of the latest advanced vehicle performance data for analysis and education. The D³ allows our industry, academic, and government partners access to high-quality vehicle chassis testing data on some of the latest vehicle technologies available.