Idaho National Laboratory

U.S. Department of Energy - Vehicle Technologies Program 2008 Annual Merit Review

Advanced Vehicle Testing Activity (AVTA) - PHEV Evaluations and Data Collection

Vehicle Systems Merit Review
Jim Francfort – INL AVTA Principle Investigator
Lee Slezak – DOE Sponsor

February 2008, Bethesda, Maryland

AVTA Participants

- The Idaho National Laboratory (INL) supports the ATVA's overall execution, collects and analyzes the data, and disseminates the testing results
- The Clarity Group (Phoenix, AZ) provides track and onroad testing and technical support, Don Karner is the PI for the Clarity Group (d.b.a. Electric Transportation Engineering Corporation - ETEC)
- National Energy Technology Laboratory manages the Clarity Group contract
- Argonne National Laboratory performs dynamometer vehicle testing for the AVTA
- Public and private fleet test partners provide vehicle mission diversity and provide leveraged funding
- FY08 budget is $9 million, with ~$675k spent to date ($7 million for PHEV Demonstration)

Historical Testing Accomplishments

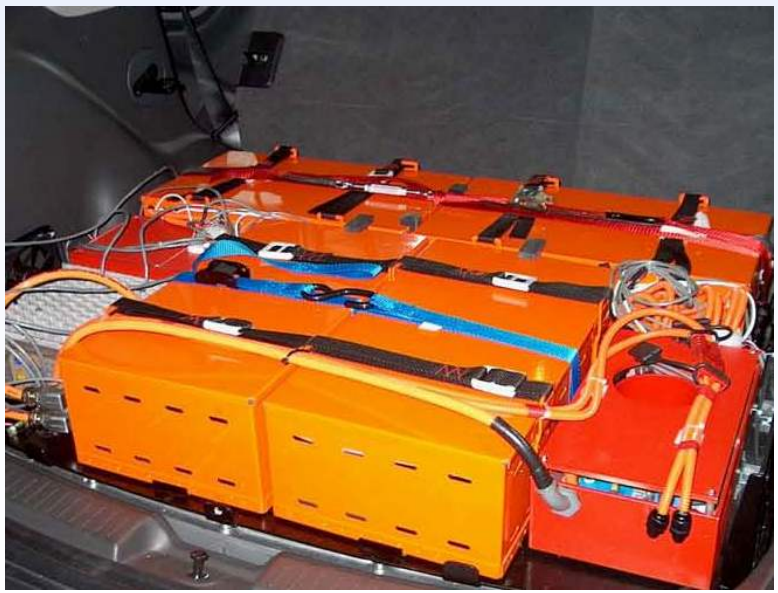
- Full-size electric vehicles (started early 1990's)
  - 40 EV models, 5+ million test miles
- Neighborhood electric vehicles (ongoing)
  - 15 NEV models, 200,000 test miles
- Urban electric vehicles
  - 3 models, 1 million test miles
- 100% Hydrogen and HCNG internal combustion engine (HICE) vehicles (ongoing)
  - 6 models, 400,000 test miles
- Hybrid electric vehicles (ongoing)
  - 13 HEV models, 3.5 million test miles
- Testing methods and procedures continue to evolve to match vehicle technology advancements

AVTA's PHEV Testing Objectives

- **Provide benchmark Plug-in Hybrid Electric Vehicle (PHEV) data to technology modelers, target setters, and research and development programs**
- **Assist early-adapter fleet managers in making informed vehicle purchase, deployment and operating decisions**
  - **Document the performance of PHEVs in test-track, dynamometer, accelerated, and real-world applications**
  - **Reduce the uncertainties about vehicle and battery performance and life**
  - **Document fuel (petroleum and electricity) use over various distances**
  - **Document charging infrastructure requirements, use, performance and costs**
  - **Document operator influence on charging times, patterns, and frequencies**

AVTA's PHEV Testing Objectives – cont'd

- Collect onboard vehicle operations data via data loggers
- Collect vehicle maintenance costs
- Document real-world PHEV life-cycle costs
- Continue to use established testing facilities and fleet-testing relationships to maximize knowledge and value to DOE



FY07 Testing Accomplishments

- Developed 400-page PHEV testing specifications and procedures document that incorporated comments from other national laboratories, industry and other stakeholders
- Obtained and benchmarked one PHEV from an OEM and two from PHEV conversions companies (only available) by performing:
  - Baseline performance track and laboratory tests
  - Initiated accelerated onroad tests
- Performed due diligence on PHEV models to determine suitability as test candidates

FY07 Testing Accomplishments - cont'd

- **Initiated cooperative testing agreements that provide access to non-DOE owned PHEVs operating in demonstration fleets. Partners include:**
  - **New York State Energy Research Development Agency (NYSERDA)**
  - **City of Seattle, King County, Port of Seattle, Puget Sound Clean Air Agency**
  - **Tacoma Power**
  - **National Rural Electric Cooperative Association**
  - **PHEV conversion companies**
    - **Hymotion**
    - **EnergyCS**

Baseline Performance Testing

- Initial track testing conducted near Phoenix
  - Testing includes coastdown (determination of dynamometer coefficients), acceleration, top speed, charging, & durability tests
- Five day dynamometer testing regime performed at Argonne
  - Testing includes at least 26 drive cycle tests
  - Charge depleting & sustaining test cycles
  - UDDS & HWFED cycles reported
  - Includes air conditioning (A/C) off & on cycles

RESS Baseline Performance Testing

- If vehicle option, conduct Rechargeable Energy Storage System (RESS) only testing with & without the air conditioning (A/C):
  - Day 1, RESS Only mode – A/C off
    - UDDS, UDDS, HWFEDS, HWFEDS
    - UDDS, UDDS, HWFEDS, HWFEDS
    - Repeat as able, than charge traction battery
  - Day 2, RESS Only mode – A/C on
    - UDDS, UDDS, HWFEDS, HWFEDS
    - UDDS, UDDS, HWFEDS, HWFEDS
    - Repeat as able

FY07 Testing Results

PHEVAMERICA

U.S. Department of Energy Advanced Vehicle Testing Activity

Base Vehicle Description
Make: Toyota
Model: Prius Year: 2006
VIN: JTDKB20U767508841
Number of Passengers: 5
Hybrid Configuration: Series/Parallel

Energy CS Plug-In Hybrid

VEHICLE SPECIFICATIONS

Weights
Design Curb Weight: 3160
Vehicle Test Weight: 3400 lbs
GVWR: 3795 lbs
GAWR F/R: 2335/2250
Distribution: 54.2%/45.8%
Payload: 635 lbs
Performance Goal: 400 lbs

Engine
Model: 1NZ-FXE
Output: 76 HP @ 5000 RPM
Configuration: 4 Cylinder In-line
Displacement: 1.5L
Fuel Tank Capacity: 11.9 gal
Fuel Types: Unleaded

Electric Drive System
Battery Manufacturer: Valence
Battery Type: Li-Ion
Number of Cells: 2376
Nominal Cell Voltage: 3.2V
Nominal System Voltage: 230.4V
Nominal Pack Capacity: 10 kWh
Measured Useable Capacity: 4.88 kWh

Charge System:
Input Voltages: 120V
Required Breaker Currents: 15-Amp
Charger Power Output: 1.2 kW
Charger Plug Type: NEMA 5-15
Estimated 80% Charge Time: 6.5 Hrs
Estimated 100% Charge Time: 8 Hrs

VEHICLE TEST RESULTS

Charge Depleting:
Acceleration 0-60 MPH
Time: 12.96 seconds
Acceleration 1/4 Mile
Time: 20.09 seconds
Maximum Speed: 75.7 MPH
Acceleration 1 Mile
Maximum Speed: 104.9 MPH
Charge Sustaining:
Acceleration 0-60 MPH
Time: 12.82 seconds
Acceleration 1/4 Mile
Time: 19.98 seconds
Maximum Speed: 75.7 MPH
Acceleration 1 Mile
Maximum Speed: 105.0 MPH

Brake Test @ 60 MPH
Distance Required: 126.8 ft

Fuel Economy with A/C Off[1]
Cold Start Charge Depleting[2]:
Fuel Economy: 108.2 MPG
A/C kWh Consumed[7]: .169 kWh/mi
Charge Depleting[3]:
Average Fuel Economy: 149.1 MPG
A/C kWh Consumed[7]: .153 kWh/mi
Charge Sustaining[4]:
Fuel Economy: 60 MPG

Fuel Economy with A/C On[1,5]
Cold Start Charge Depleting[2]:
Fuel Economy: 101.7 MPG
A/C kWh Consumed[7]: .201 kWh/mi
Charge Depleting[3]:
Average Fuel Economy:138.4 MPG
A/C kWh Consumed[7]: .194 kWh/mi
Charge Sustaining[4]:
Fuel Economy: 43 MPG

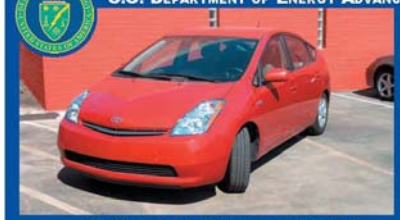
UDDS Fuel Economy[6]			HWFET Fuel Economy[6]		
Distance (miles)	Fuel Economy (mpg)	A/C Energy Consumed (kWh)[7]	Distance (miles)	Fuel Economy (mpg)	A/C Energy Consumed (kWh)[7]
10	118.0	1.83	10	106.6	1.77
20	137.6	3.65	20	116.4	3.45
40	124.7	5.52	40	99.9	5.46
60	105.9	5.65	60	86.7	5.84
80	94.7	5.65	80	79.5	5.93
100	89.18	5.65	100	75.2	5.93
200	77.9	5.65	200	66.6	5.93

TEST NOTES:
1. Cumulative fuel economy over EPA standard urban drive cycle.
2. Vehicle soaked at ambient temperature while off for a minimum of 12 hours prior to testing.
3. Average non-cold start charge depleting fuel economy
4. Value determined from average charge sustaining fuel economy tests with appropriate energy correction calculations.
5. A/C on coldest setting with full blower power.
6. Calculated cumulative fuel economy values, includes cold start.
7. A/C energy based on measured charge efficiency.

This vehicle meets all HEV America Minimum Requirements listed on back of this sheet
Values in red indicate the Performance Goal was not met. All Power and Energy Values are DC unless otherwise specified.

PHEVAMERICA

U.S. Department of Energy Advanced Vehicle Testing Activity



Base Vehicle Description
Make: Toyota
Model: Prius Year: 2007
VIN: JTDKB20U577558820
Number of Passengers: 5
Hybrid Configuration: Series/Parallel

Hymotion Plug-In Hybrid

VEHICLE SPECIFICATIONS

Weights
Design Curb Weight: 3037
Vehicle Test Weight: 3337 lbs
GVWR: 3795 lbs
GAWR F/R: 2335/2250
Distribution: 54.2%/45.8%
Payload: 758 lbs
Performance Goal: 400 lbs

Engine
Model: 1NZ-FXE
Output: 76 HP @ 5000 RPM
Configuration: 4 Cylinder In-line
Displacement: 1.5L
Fuel Tank Capacity: 11.9 gal
Fuel Types: Unleaded

Electric Drive System
Battery Manufacturer: A123
Battery Type: Li-Ion
Number of Cells: 616
Nominal Cell Voltage: 3.3V
Nominal System Voltage: 184.8V
Nominal Pack Capacity: 4.7 kWh
Measured Useable Capacity: 2.96 kWh

Charge System:
Input Voltages: 120V
Required Breaker Currents: 15-Amp
Charger Power Output: 1.2 kW
Charger Plug Type: NEMA 5-15
Estimated 80% Charge Time: 4.4 Hrs
Estimated 100% Charge Time: 5.5 Hrs

VEHICLE TEST RESULTS

Charge Depleting:
Acceleration 0-60 MPH
Time: 13.28 seconds
Acceleration 1/4 Mile
Time: 20.27 seconds
Maximum Speed: 74.34 MPH
Acceleration 1 Mile
Maximum Speed: 103.4 MPH
Charge Sustaining:
Acceleration 0-60 MPH
Time: 13.41 seconds
Acceleration 1/4 Mile
Time: 20.42 seconds
Maximum Speed: 74.82 MPH
Acceleration 1 Mile
Maximum Speed: 104.0 MPH

Brake Test @ 60 MPH
Distance Required: 153.0 ft

Fuel Economy with A/C Off[1]
Cold Start Charge Depleting[2]:
Fuel Economy: 146.72 MPG
A/C kWh Consumed[7]: .147 kWh/mi
Charge Depleting[3]:
Average Fuel Economy: 167.2 MPG
A/C kWh Consumed[7]: .148 kWh/mi
Charge Sustaining[4]:
Fuel Economy: 60.8 MPG

Fuel Economy with A/C On[1,5]
Cold Start Charge Depleting[2]:
Fuel Economy: 128.9 MPG
A/C kWh Consumed[7]: .199 kWh/mi
Charge Depleting[3]:
Average Fuel Economy: 153.2 MPG
A/C kWh Consumed[7]: .197 kWh/mi
Charge Sustaining[4]:
Fuel Economy: 46.5 MPG

UDDS Fuel Economy[6]			HWFET Fuel Economy[6]		
Distance (miles)	Fuel Economy (mpg)	A/C Energy Consumed (kWh)[7]	Distance (miles)	Fuel Economy (mpg)	A/C Energy Consumed (kWh)[7]
10	154.8	1.65	10	87.48	1.30
20	160.3	3.31	20	95.27	2.64
40	117.4	3.58	40	86.11	3.92
60	99.40	3.58	60	75.79	3.92
80	88.88	3.58	80	70.52	3.92
100	83.71	3.58	100	67.36	3.92
200	72.26	3.58	200	61.05	3.92

TEST NOTES:
1. Cumulative fuel economy over EPA standard urban drive cycle.
2. Vehicle soaked at ambient temperature while off for a minimum of 12 hours prior to testing.
3. Average non-cold start charge depleting fuel economy
4. Value determined from average charge sustaining fuel economy tests with appropriate energy correction calculations.
5. A/C on coldest setting with full blower power.
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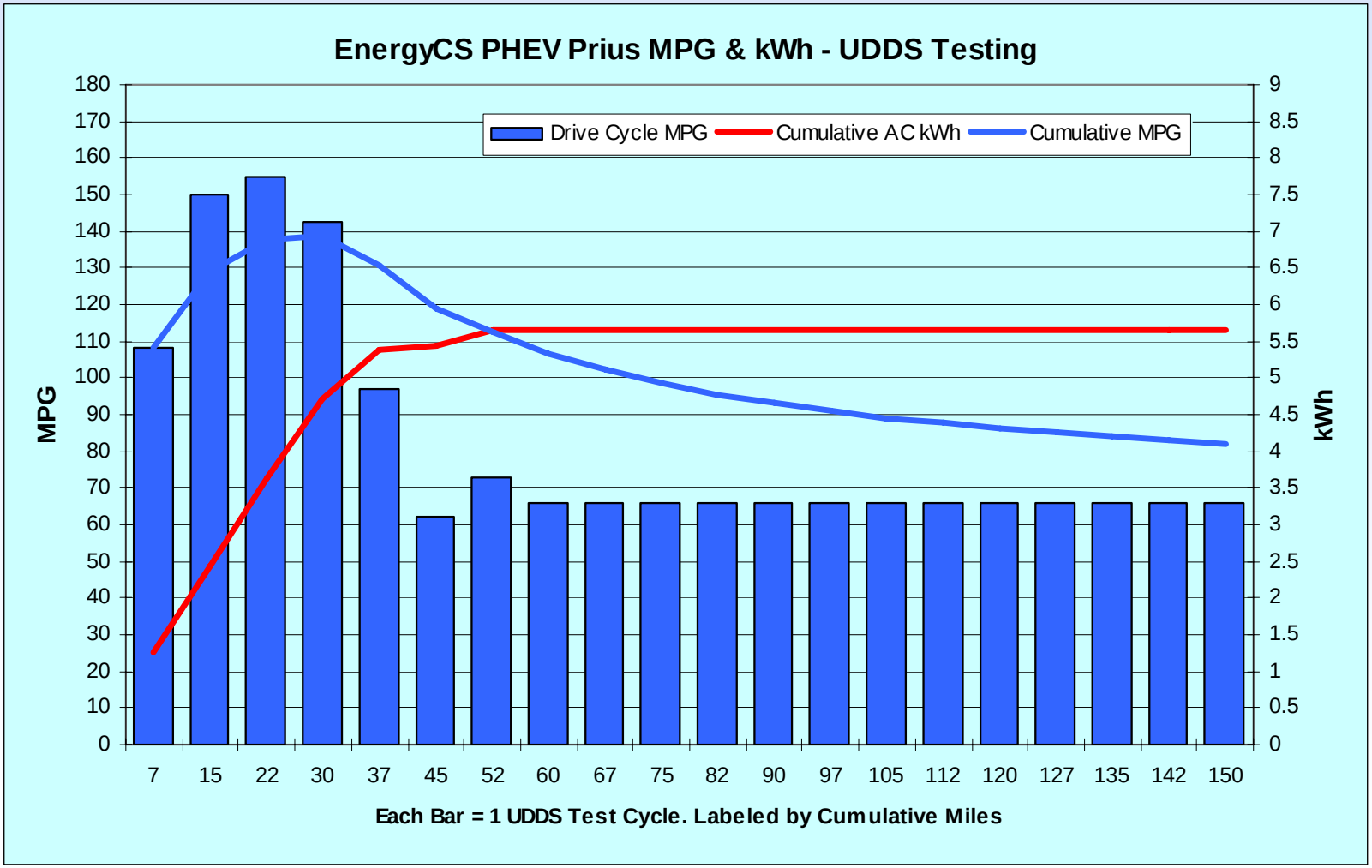
eTec · INL Idaho National Laboratory · U.S. Department of Energy

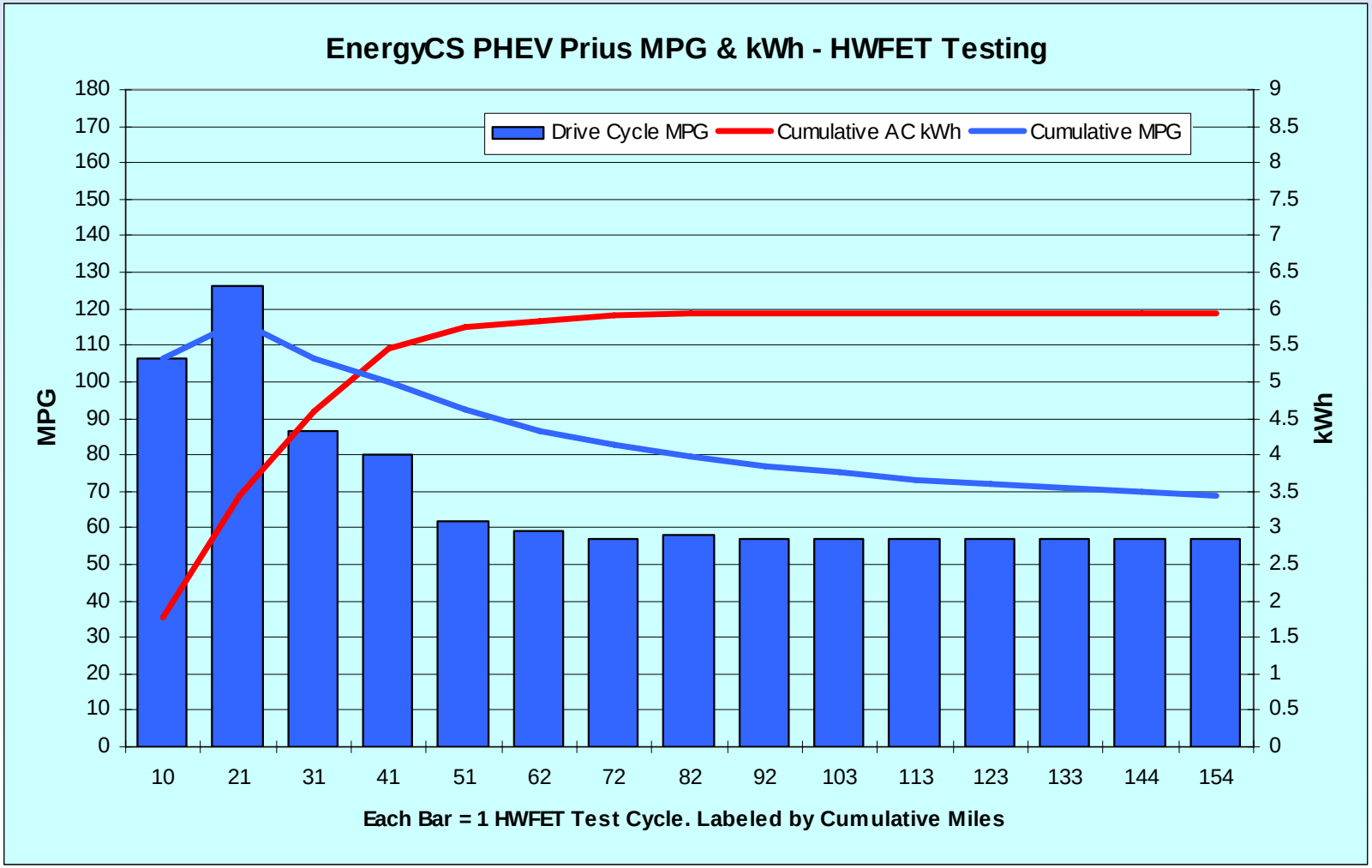
FY07 EnergyCS Prius – UDDS Fuel Use

- 9 kWh Valence lithium pack – AC kWh



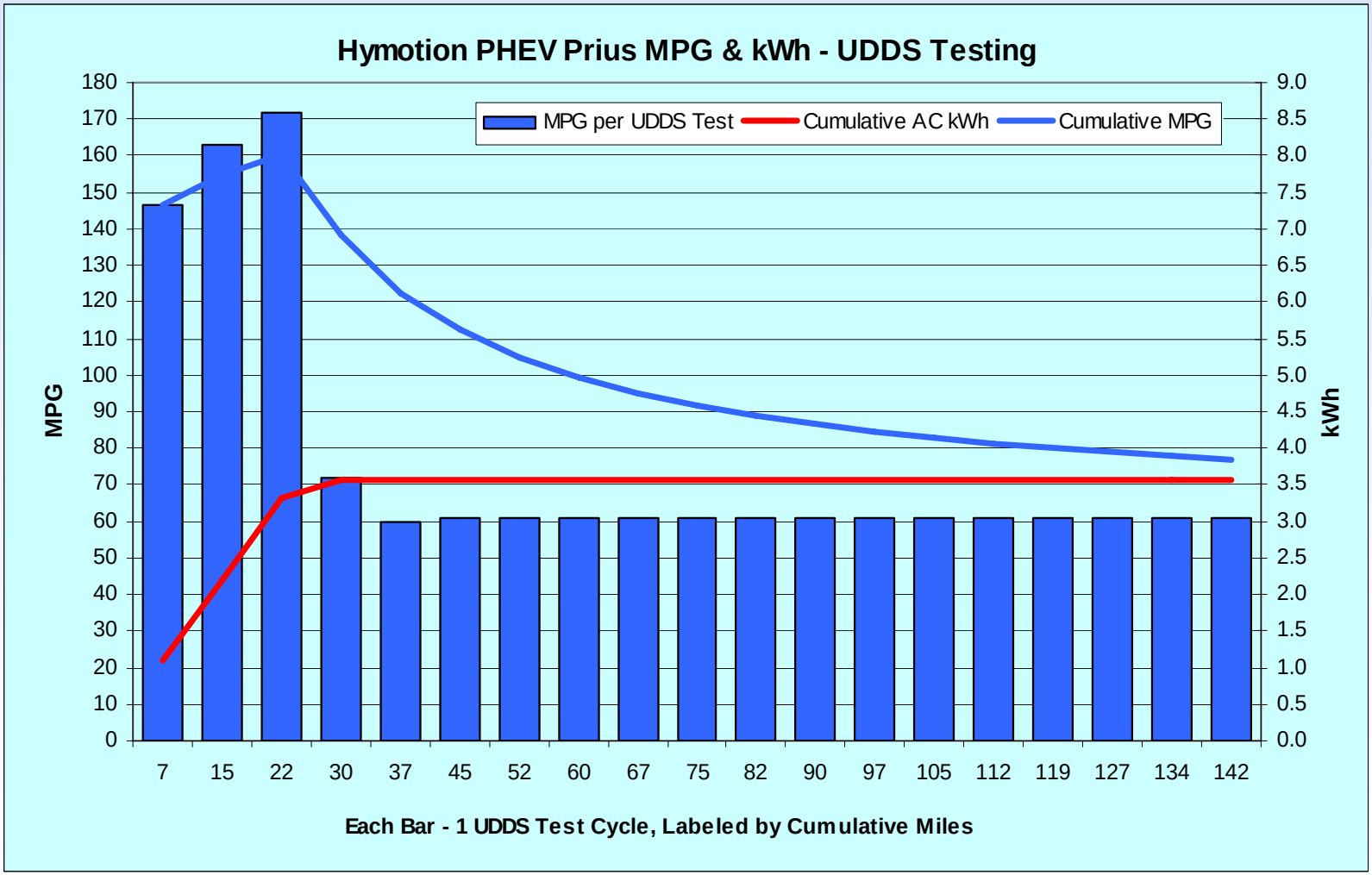
FY07 EnergyCS Prius – HWFET Fuel Use

- 9 kWh Valence lithium pack – AC kWh



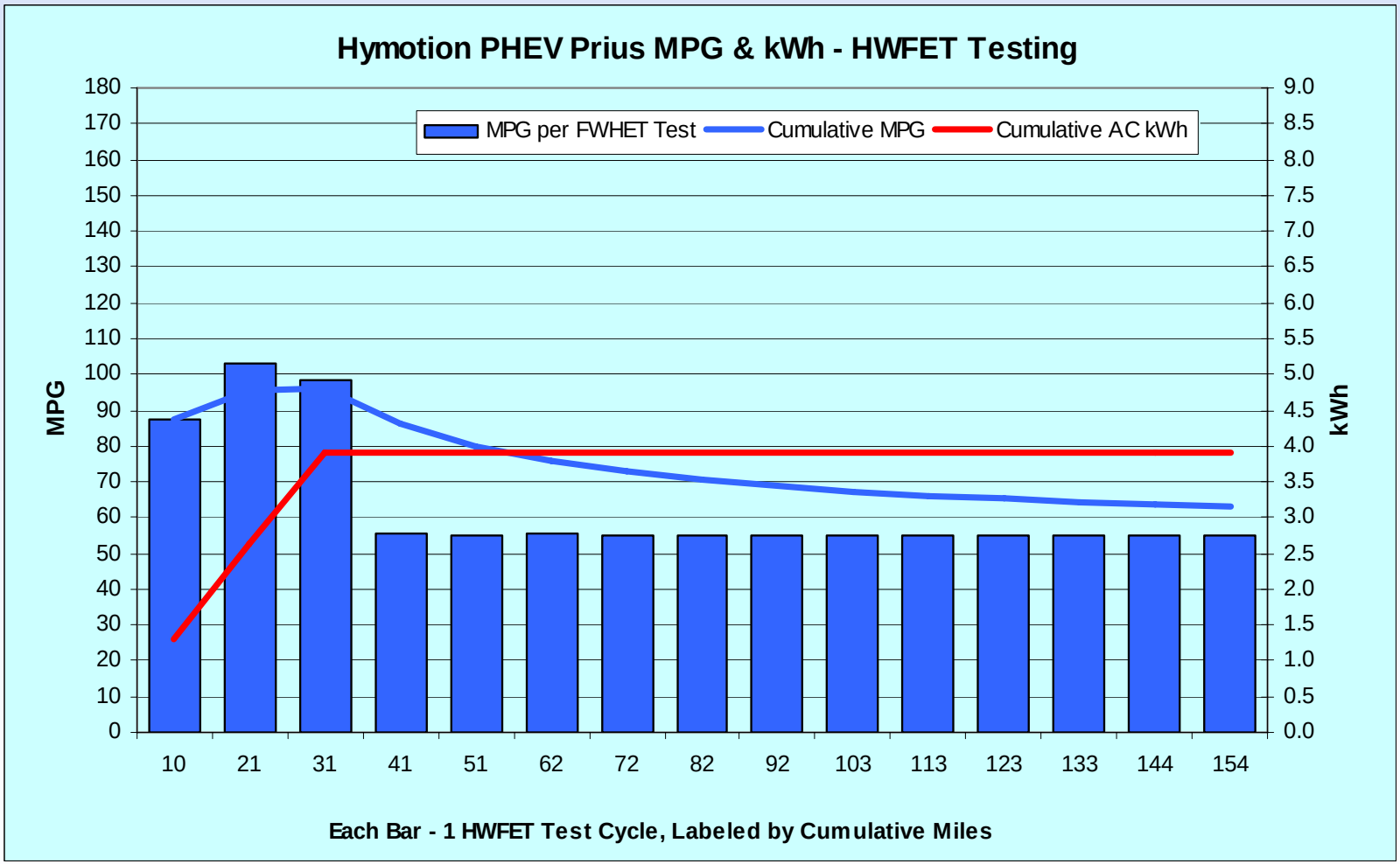
FY07 Hymotion Prius – UDDS Fuel Use

- **5 kWh A123 lithium & Prius packs – AC kWh**

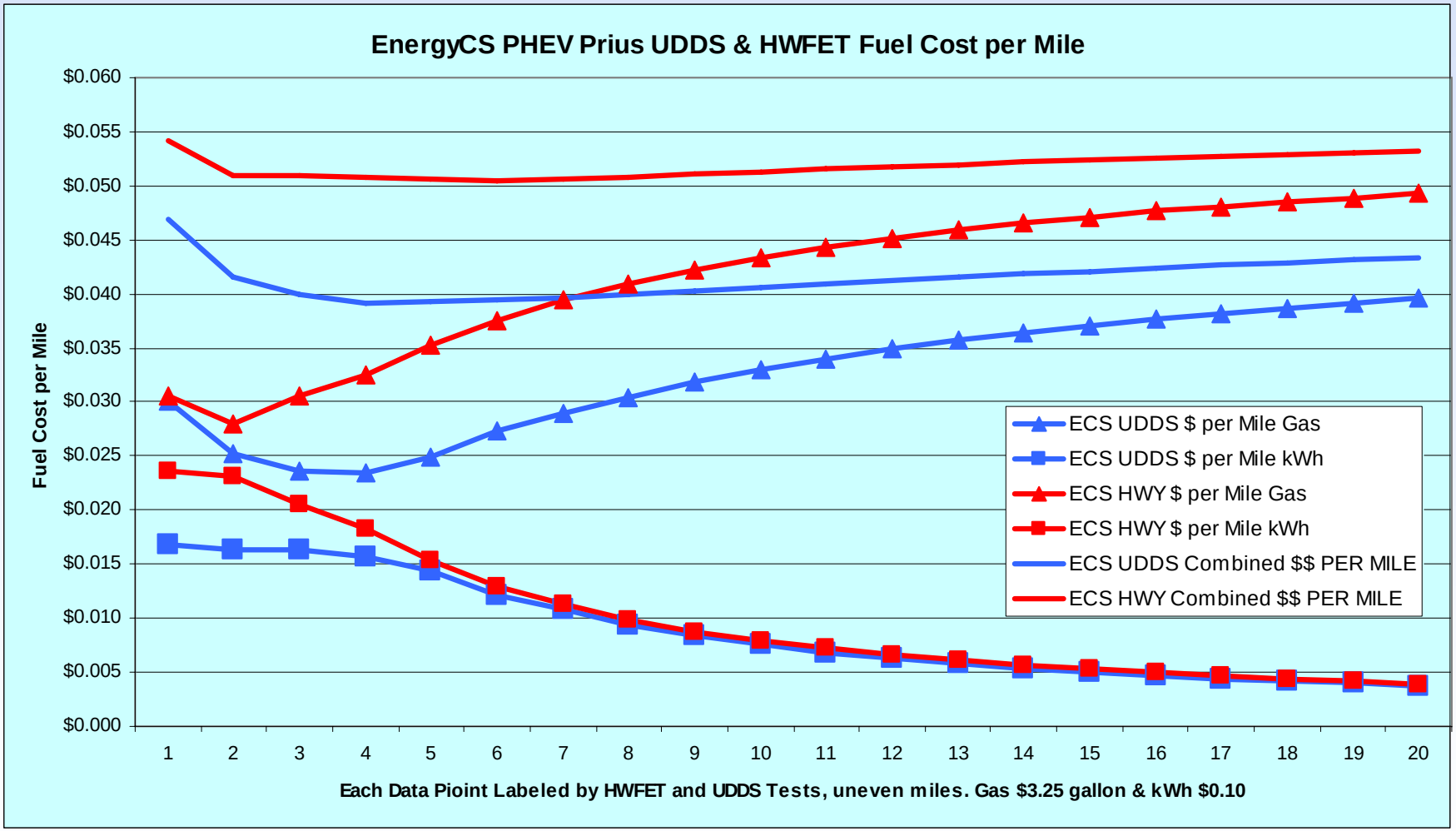


FY07 Hymotion Prius – HWFET Fuel Use

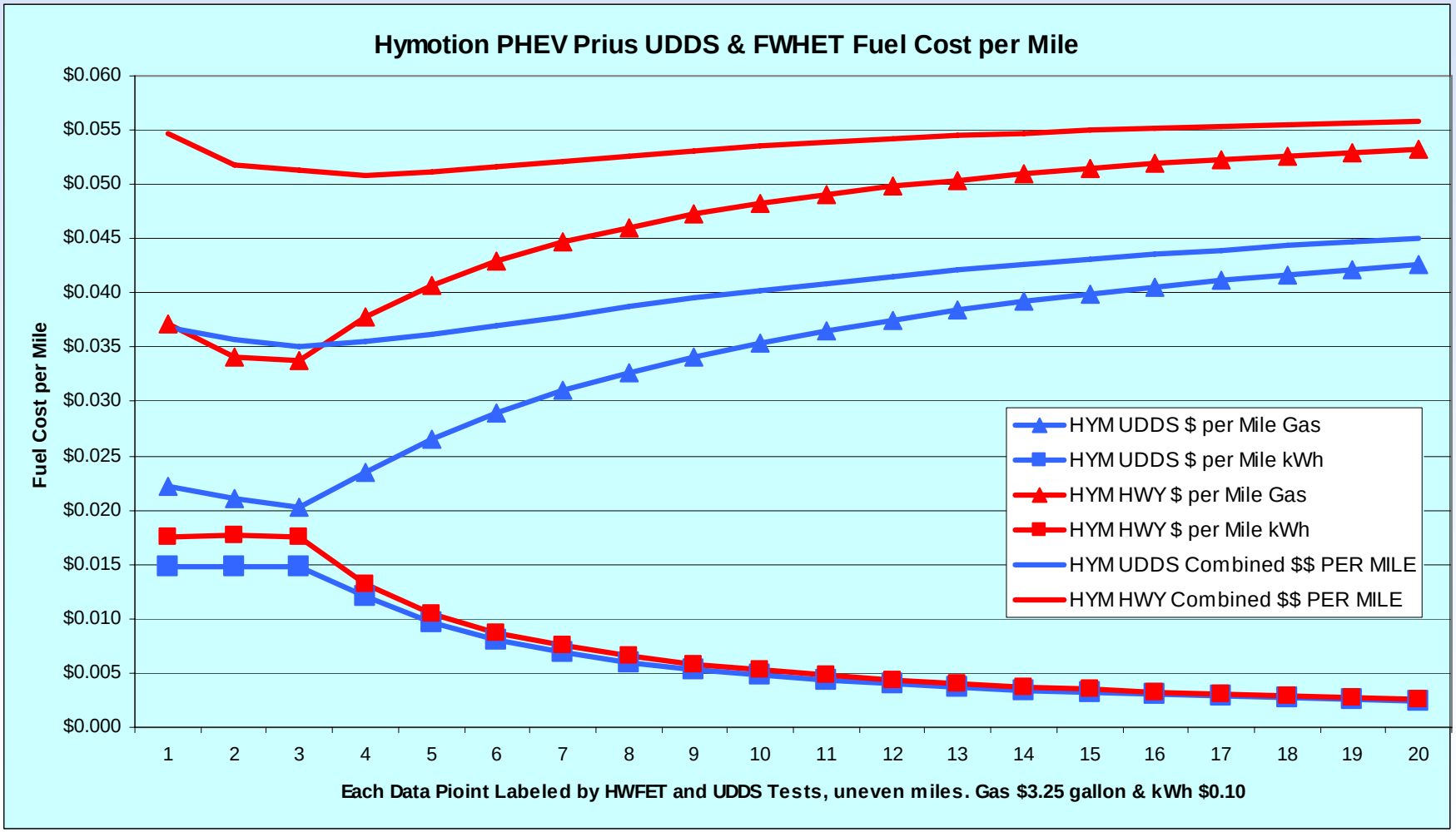
- **5 kWh A123 lithium & Prius packs – AC kWh**



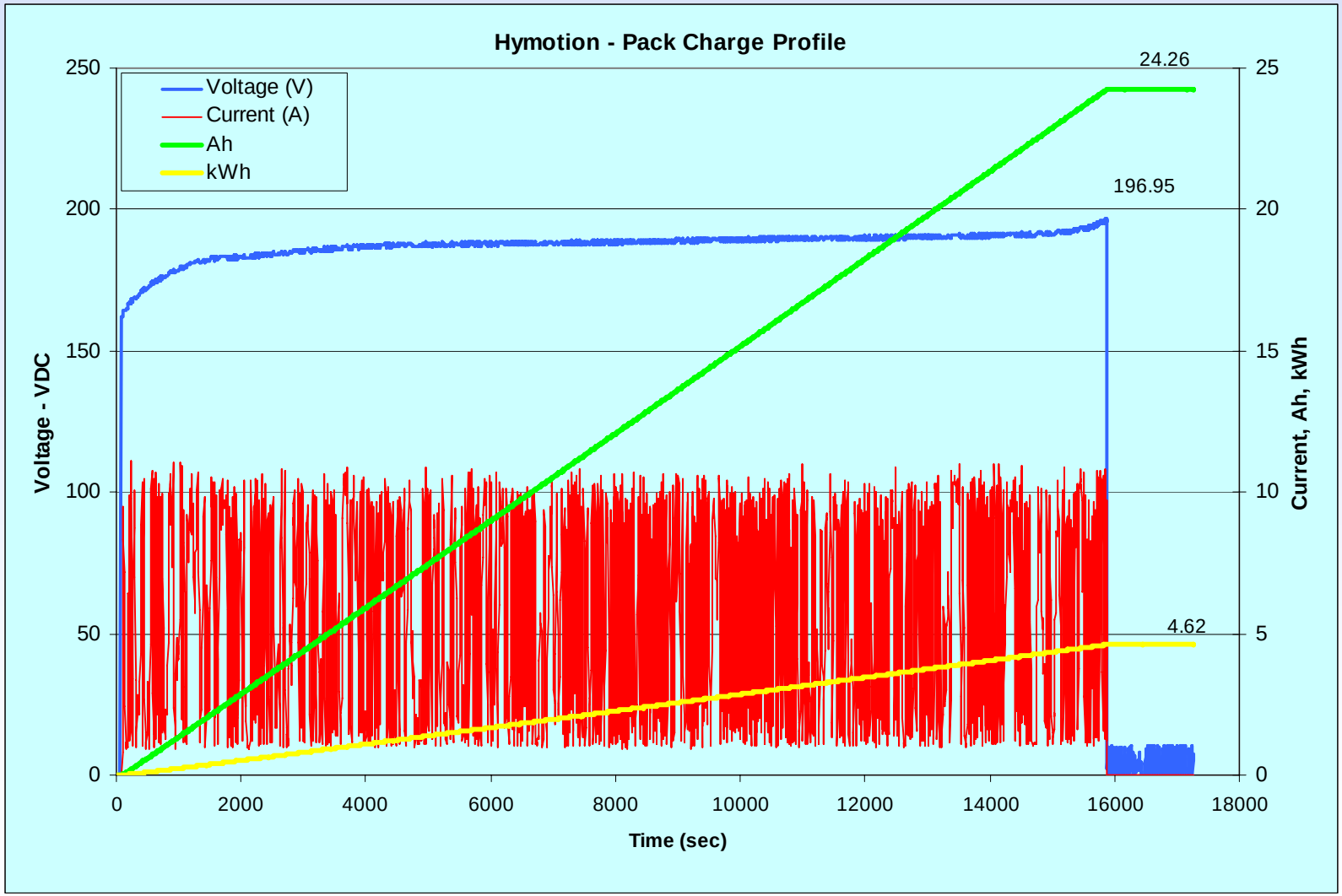
FY07 EnergyCS Prius – Fuel Costs



FY07 Hymotion Prius – Fuel Costs

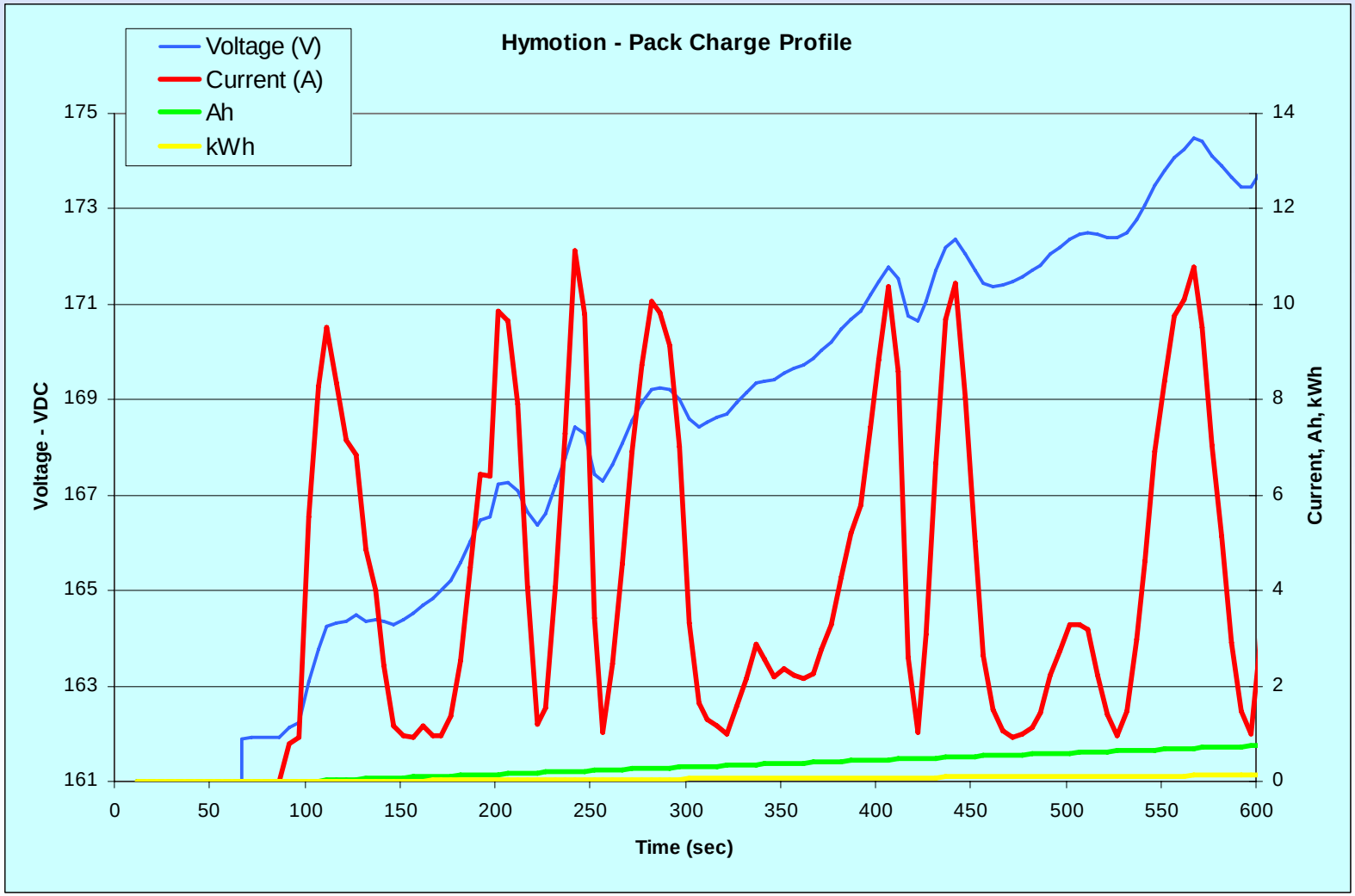


FY07 Hymotion Battery Charge Profile



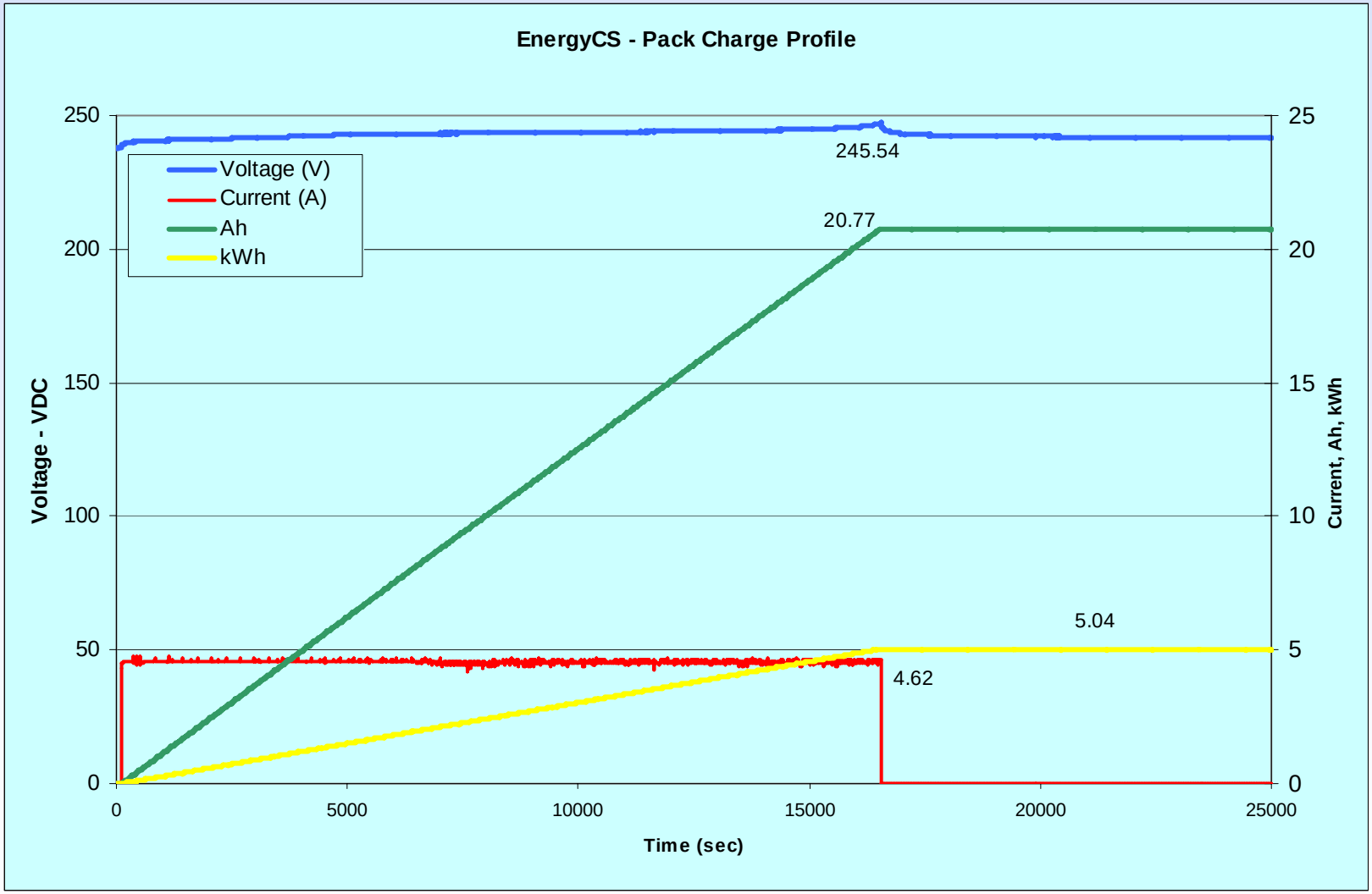
A123 Systems Lithium Ion Battery - DC kWh

FY07 Hymotion Cell Charge Profile



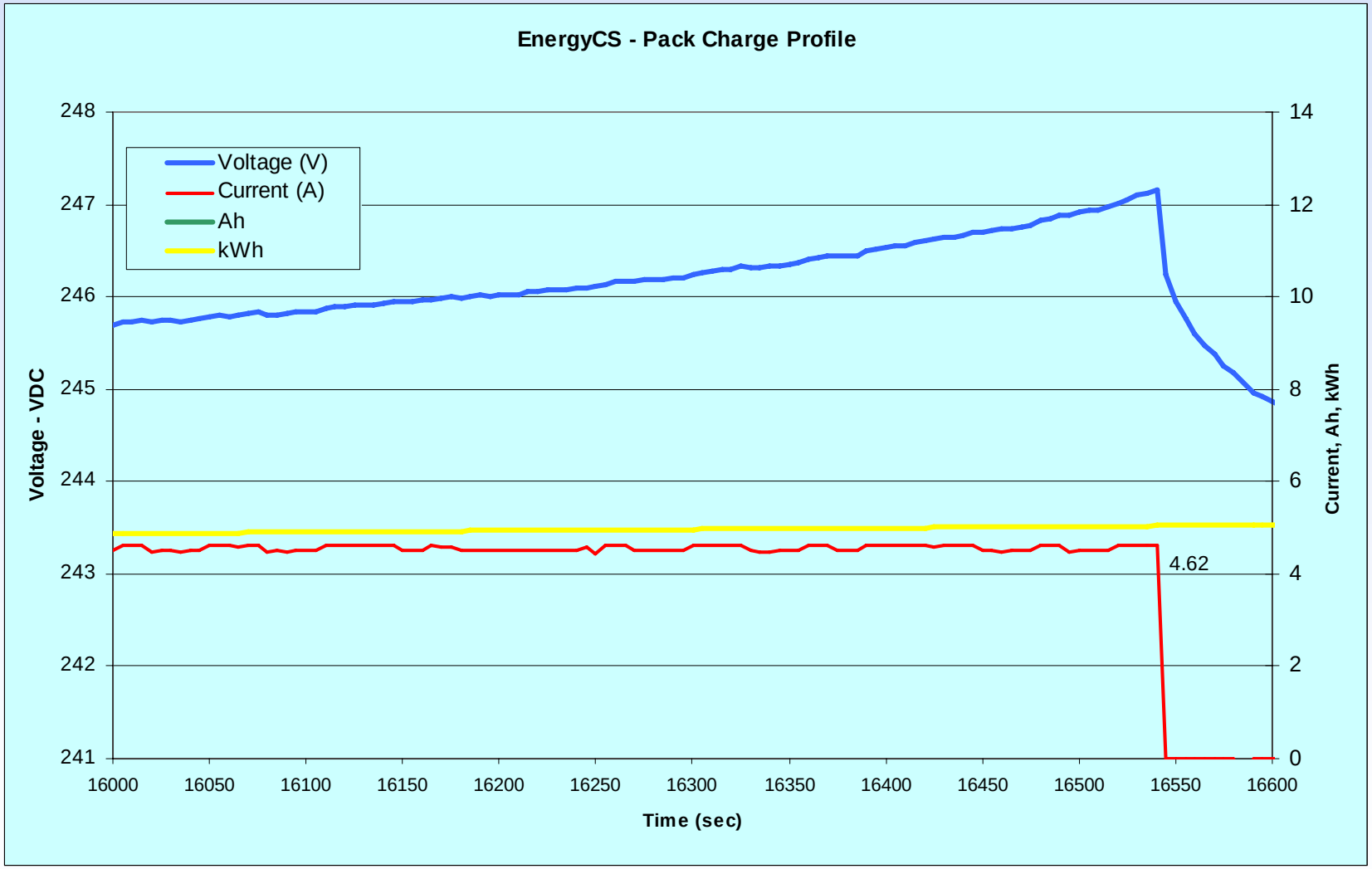
A123 Systems Lithium Ion Battery – DC kWh

FY07 EnergyCS Battery Charge Profile



Valence Lithium Ion Battery – DC kWh

FY07 EnergyCS Cell Charge Profile



Valence Lithium Ion Battery – DC kWh

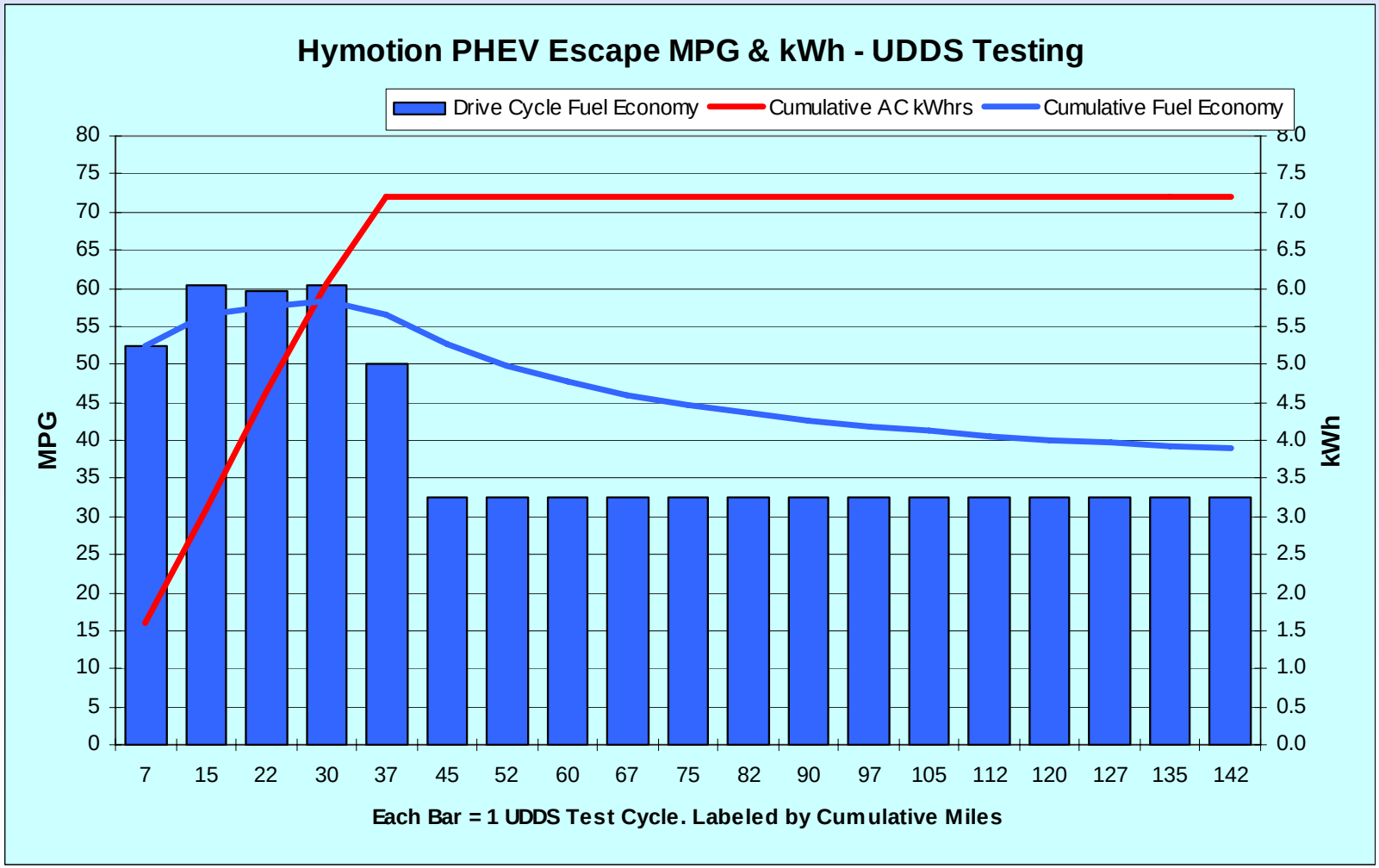
FY07 Kangoo Test Results

- **Renault Kangoo – Series PHEV with 9.6 kWh (usable) Saft NiCad pack & 650cc gasoline engine**

Test Cycle	AC kWh per Mile	Miles per Gallon
Battery Only - UDDS	0.268	
Battery Only - HWFET	0.155	
Battery Only @ Constant 45 mpg	0.271	
Battery & Gas Cold UDDS	0.144	42.3
Battery & Gas Hot UDDS	0.110	39.4
Battery & Gas Hot HWFET	0.042	40.9

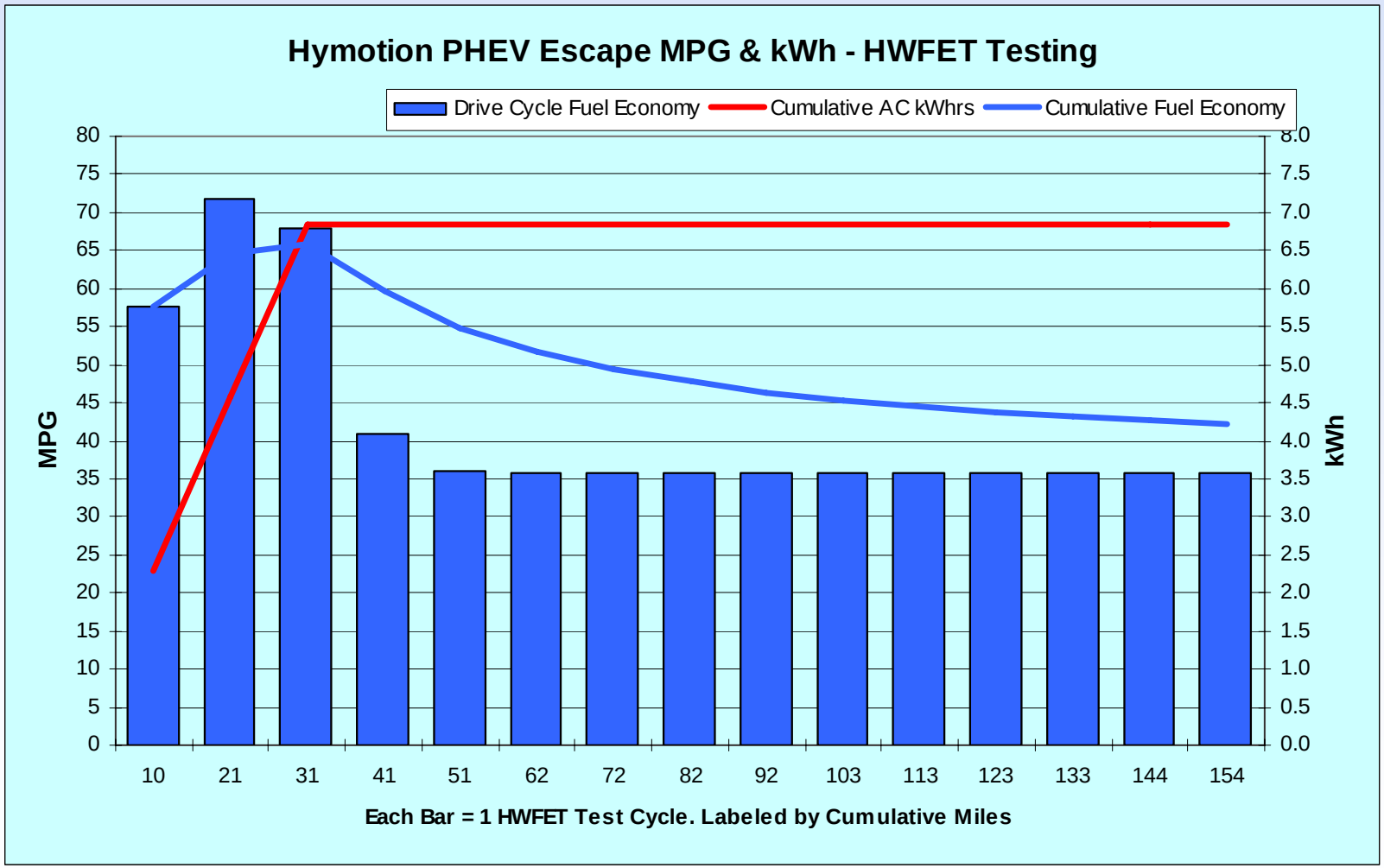
FY08 Hymotion Escape – UDDS Fuel Use

- **8.5 kWh A123 lithium & Prius packs – AC kWh**

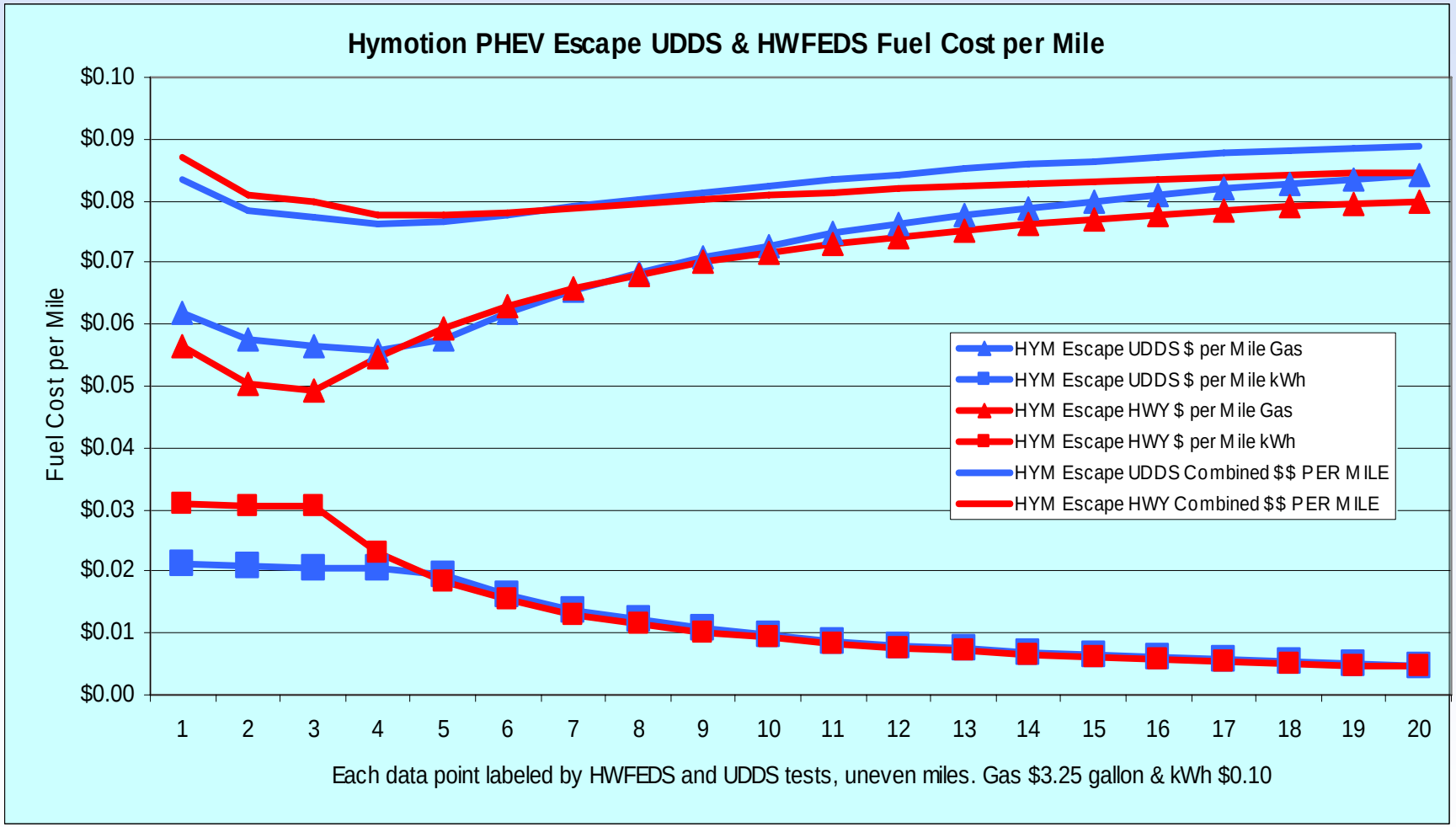


FY08 Hymotion Escape – HWFET Fuel Use

- **8.5 kWh A123 lithium & Prius packs – AC kWh**



FY08 Hymotion Escape – Fuel Costs



FY08 Accelerated Onroad Testing

- Uses dedicated drivers
- Predetermined and repeatable drive cycles
- Combinations of urban and highway loops
- 5,440 total onroad test miles per PHEV model
- 162 drive and charging cycles that include 1,344 hours of charging - can not be economically performed on a dynamometer
- Not as controlled as dynamometer, but compliments controlled dynamometer testing by allowing a broader view of fuel use over many more miles and charging events
- Test PHEV batteries at completion of accelerated testing and at 25k, 50k and ? miles

FY08 PHEV Accelerated Testing

- Accelerated testing in Phoenix over 5,440 miles
- GPS units track distance, average & maximum speeds

Cycle (mi)	Urban (10 mi)	Highway (10 mi)	Charge (hr)	Reps (N)	Total (mi)	Reps (%)	Miles (%)
10	1	0	4	60	600	37%	11%
20	1	1	8	30	600	19%	11%
40	4	0	12	15	600	9%	11%
40	2	2	12	15	600	9%	11%
40	0	4	12	15	600	9%	11%
60	2	4	12	10	600	6%	11%
80	2	6	12	8	640	5%	12%
100	2	8	12	6	600	4%	11%
200	2	18	12	3	600	2%	11%
Total	2,340	3,100	1,344	162	5,440		
Average	43%	57%	8.3	18			

FY08 EnergyCS Prius – Accelerated Testing

Cycle	Urban	Highway	Charge	Reps	Total	Electricity	Gasoline	
(mi)	(10 mi)	(10 mi)	(hr)	(N)	(mi)	kWh	Gals	MPG
10	1	0	4	60	600	115.58	4.78	125.6
20	1	1	8	30	600	86.21	7.95	77.9
40	4	0	12	5	200*	17.37	1.61	126.4
40	4	0	12	15	600	26.48	5.78	105.8
40	2	2	12	5	200*	29.00	1.42	145.1
40	0	4	12	5	200*	30.00	2.43	85.5
60	2	4	12	10	600	65.00	5.90	103.7
80	2	6	12	8	640	39.04	10.09	65.8
100	2	8	12	6	600	22.67	8.81	70.8
200	2	18	12	3	600	12.98	10.46	57.8
Total	1740	2500	984	132	4840	Weighted Average		81.7

*** Being rerun to 600 miles**

FY08 Hymotion Prius – Accelerated Testing

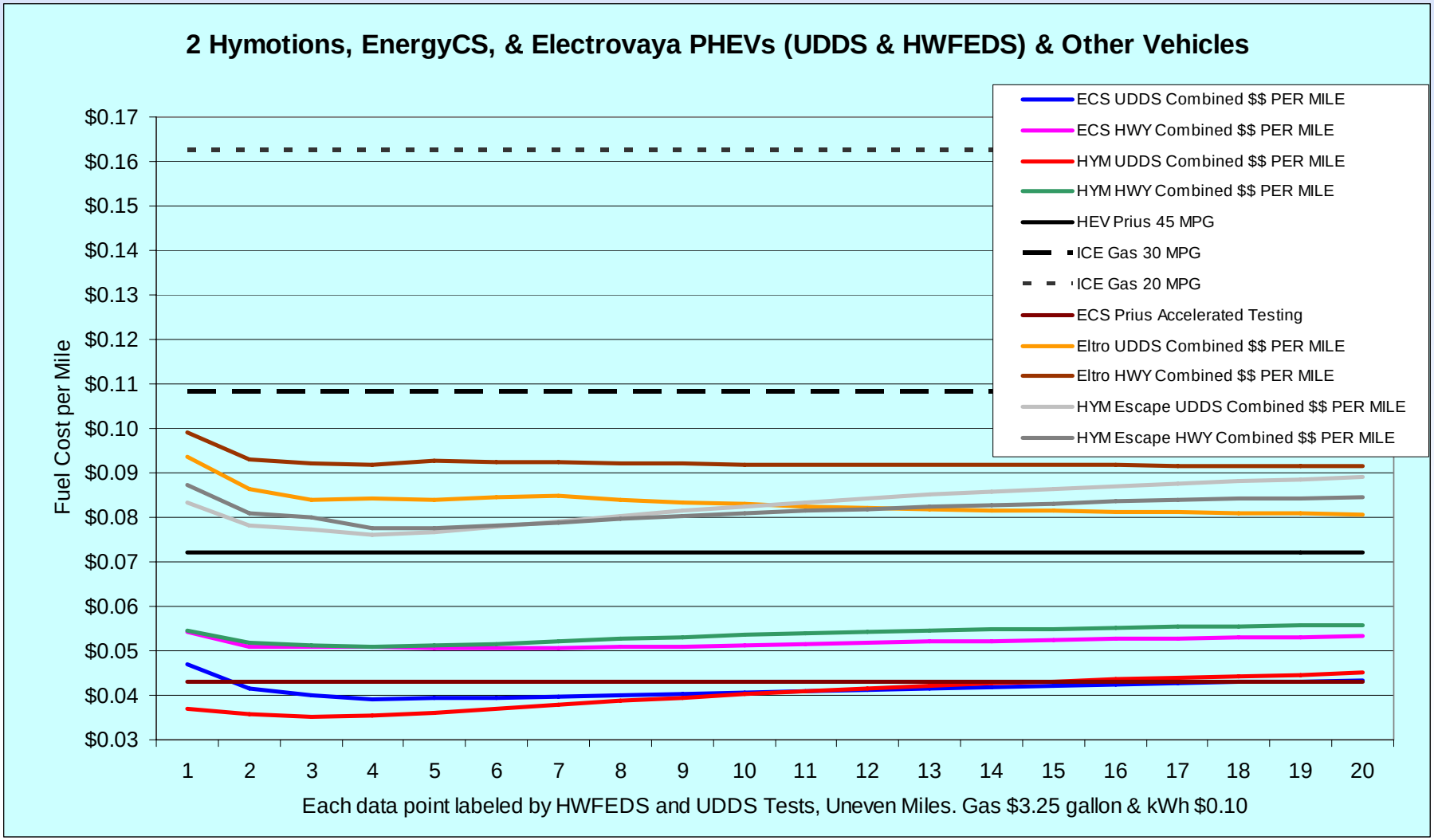
Cycle	Urban	Highway	Charge	Reps	Total	Electricity	Gasoline	
(mi)	(10 mi)	(10 mi)	(hr)	(N)	(mi)	kWh	Gals	MPG
10	1	0	4	60	600			
20	1	1	8	30	600	122.02	5.37	115.9
40	4	0	12	5	200*	29.84	1.87	108.9
40	2	2	12	5	600	87.22	5.78	106.8
40	0	4	12	5	600	79.82	8.54	73.1
60	2	4	12	10	600			
80	2	6	12	8	640	43.99	11.36	58.34
100	2	8	12	6	600	35.98	8.43	73.23
200	2	18	12	3	600	15.0	8.43	54.82
Total	1740	2500	984	132		Weighted Average		70.6

*** Being rerun to 600 miles**

FY08 Renault Kangoo – Accelerated Testing

Cycle	Urban	Highway	Charge	Reps	Total	Electricity		Gasoline	
(mi)	(10 mi)	(10 mi)	(hr)	(N)	(mi)	kWh	Mi/kWh	Gals	MPG
10	1	0	4	60	600	359.60	1.67	0	-
20	1	1	8	30	600	131.96	4.55	0	-
40	4	0	12	5	200	35.18	5.59	0	-
40	2	2	12	5	200	33.22	6.02	0	-
40	0	4	12	5	200	28.60	6.99	0	-
60	2	4	12	10	600				
80	2	6	12	8	640				
100	2	8	12	6	600				
200	2	18	12	3	600				
Total	1740	2500	984	132	4,240	Weighted Average			

FY07 / FY08 PHEV Fuel Costs per Mile



FY08 PHEV Onroad Demonstrations and Data Collection Activities

FY08 Hymotion Joint Data Collection

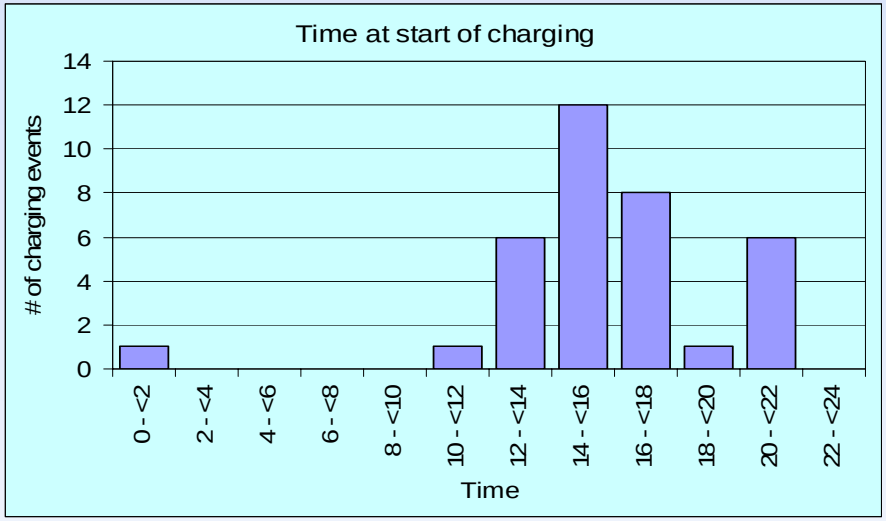
- Kvaser data loggers installed on 45 PHEVs in North America fleets, will include 100 vehicles by end of 2008
- Onboard data includes performance, fuel use, and charging and driving profiles (up to 45 parameters)
- Offboard data includes fuel use, maintenance and mission description
- Fleet testing agreement requires the INL to:
  - On a monthly basis, collect data from fleets via INL ftp site or regular mail
  - Perform AVTA, operating fleet, and Hymotion required data reduction and analysis
  - Report testing results monthly
- To date, 96% of 26 North American fleets with data loggers installed have agreed to participate

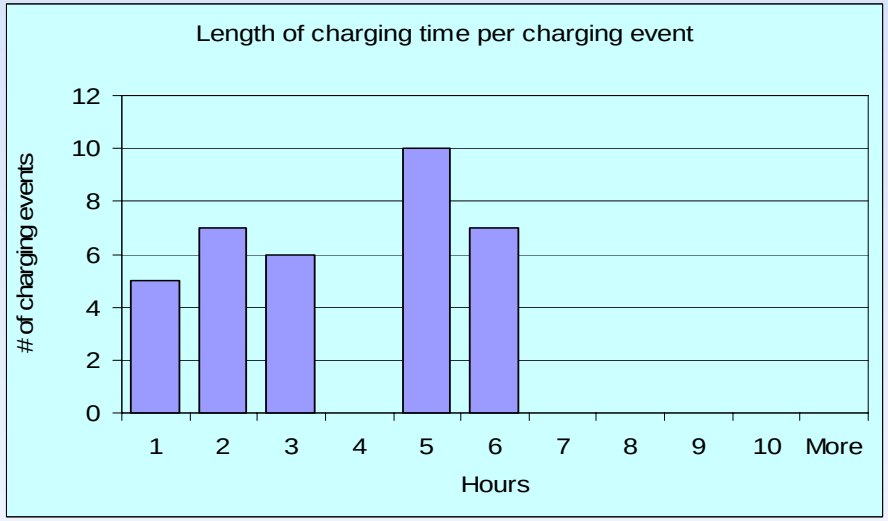
FY08 Hymotion Joint Data Collection – cont'd

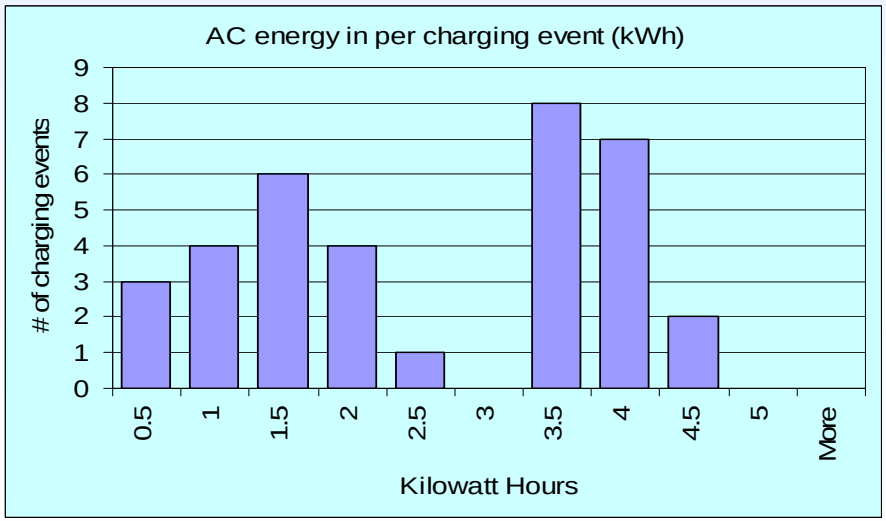
- Participates include electric utilities, water agencies, universities, county and provincial governments, and a private company in geographically diverse regions:
  - Northeast: Vermont, New Hampshire, New York
  - East / South East: Toronto, Virginia, South Carolina, North Carolina, Kentucky, Florida
  - North / Central: Wisconsin, North Dakota, Indiana, Manitoba
  - Southwest: Arizona, Texas
  - West Coast: California (5 fleets), Oregon
- New battery version available 1st half 2008, currently in crash testing; will maintain SULEV certification

FY08 Hymotion Prius Charging Profiles

- **3 months, 2212 miles, 35 charges (single PHEV)**

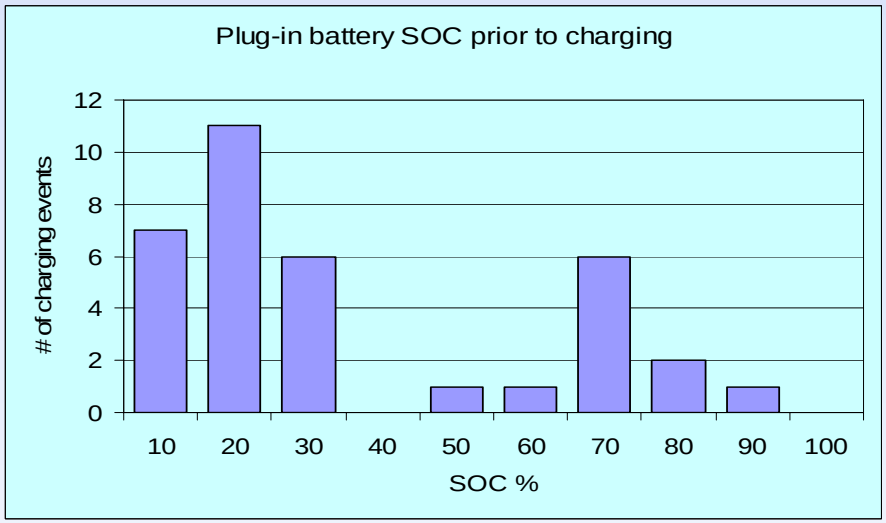


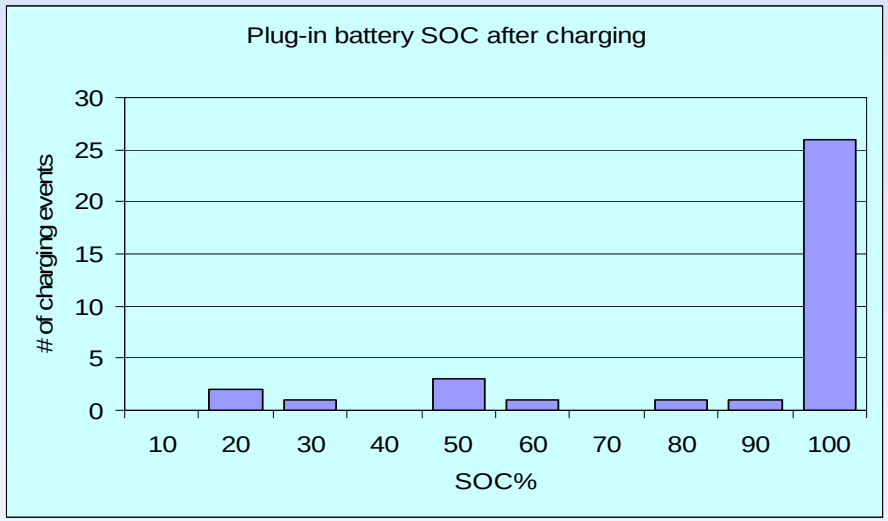


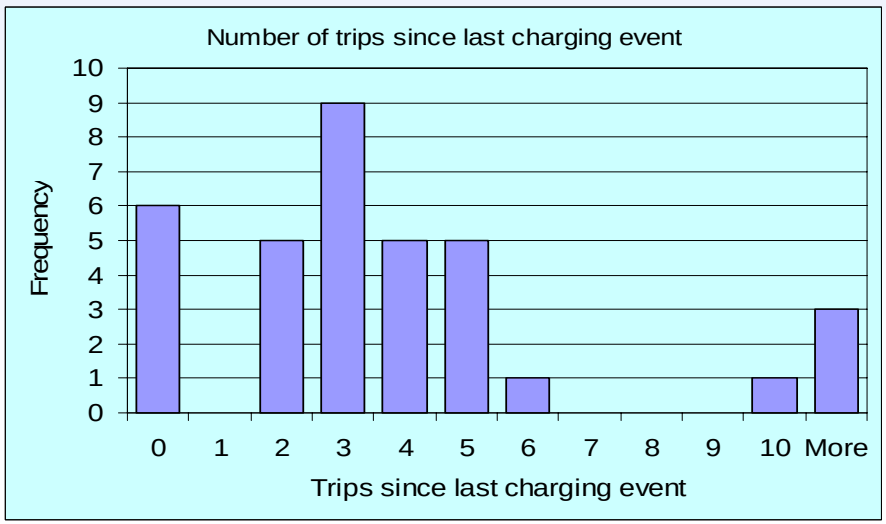


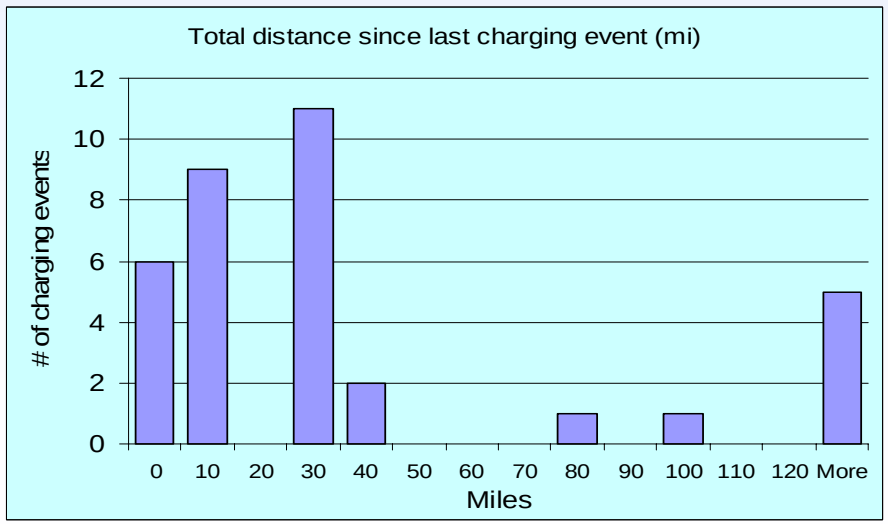
FY08 Hymotion Prius Charging Profiles

- **3 months, 2212 miles, 35 charges (single PHEV)**



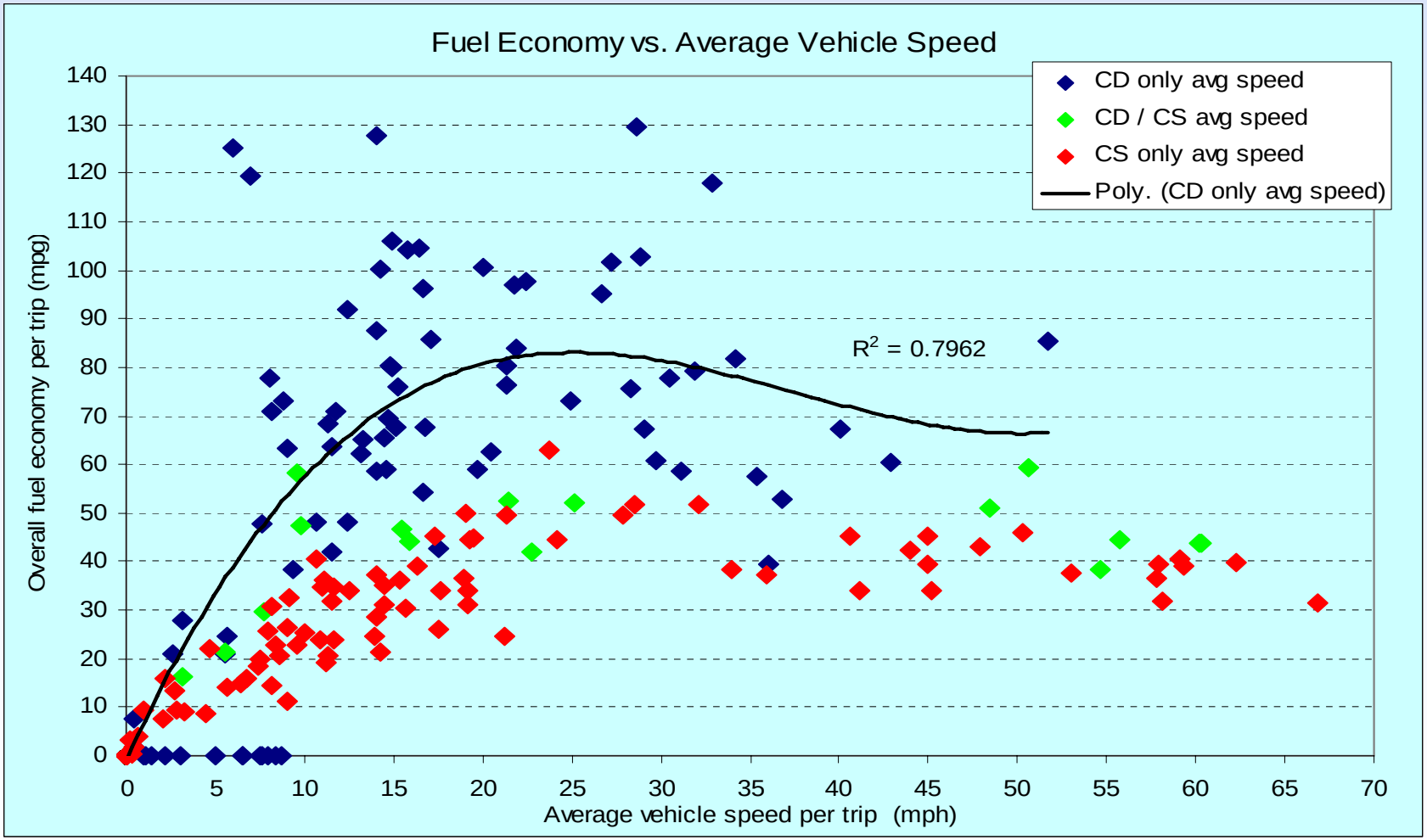






FY08 Hymotion Prius MPG Vs. Speed

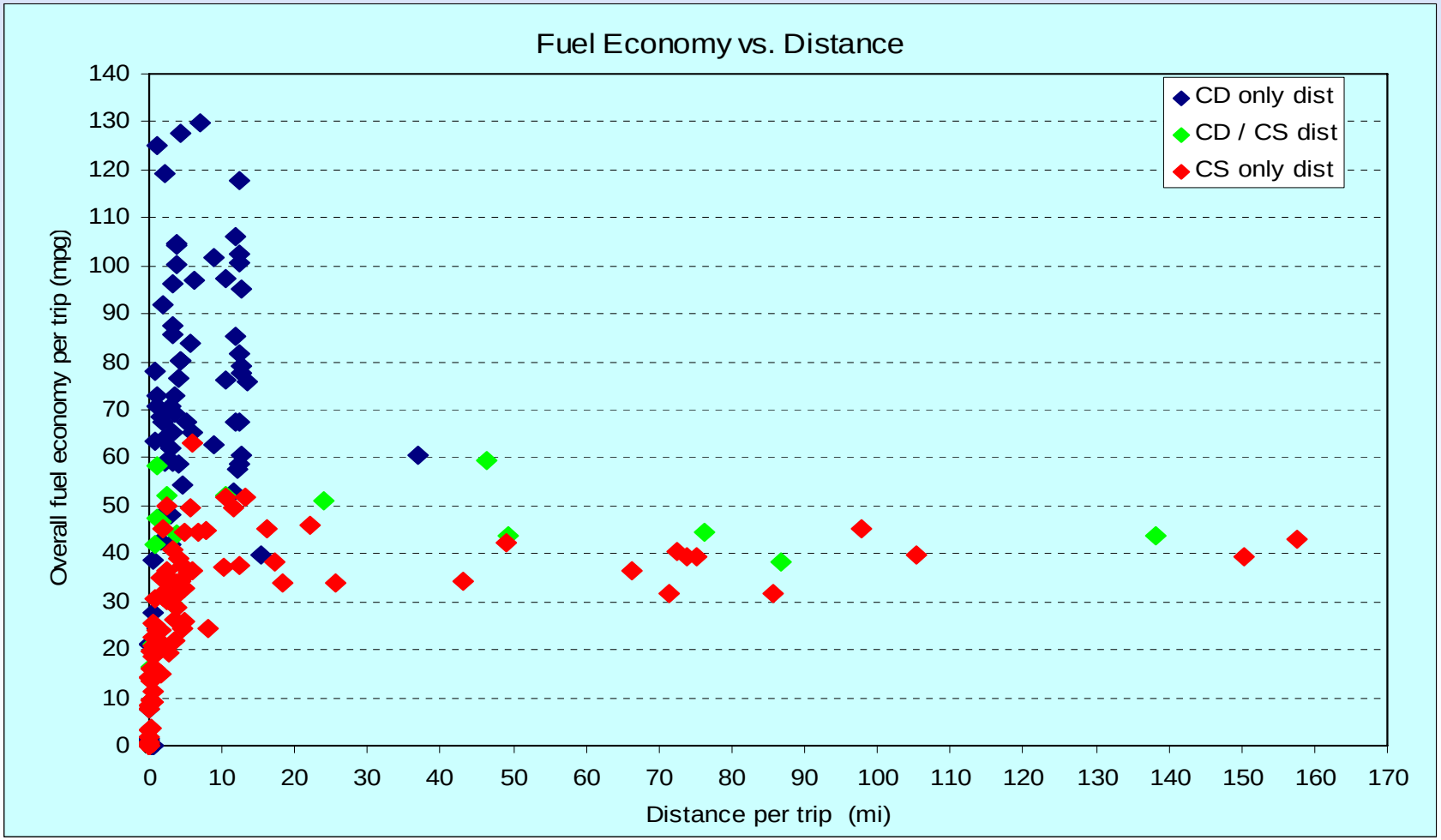
- **3 months, 2212 miles (single PHEV)**



CD – charge depleting, S - sustaining

FY08 Hymotion Prius MPG Vs. Trip Distance

- **3 months, 2212 miles (single PHEV)**

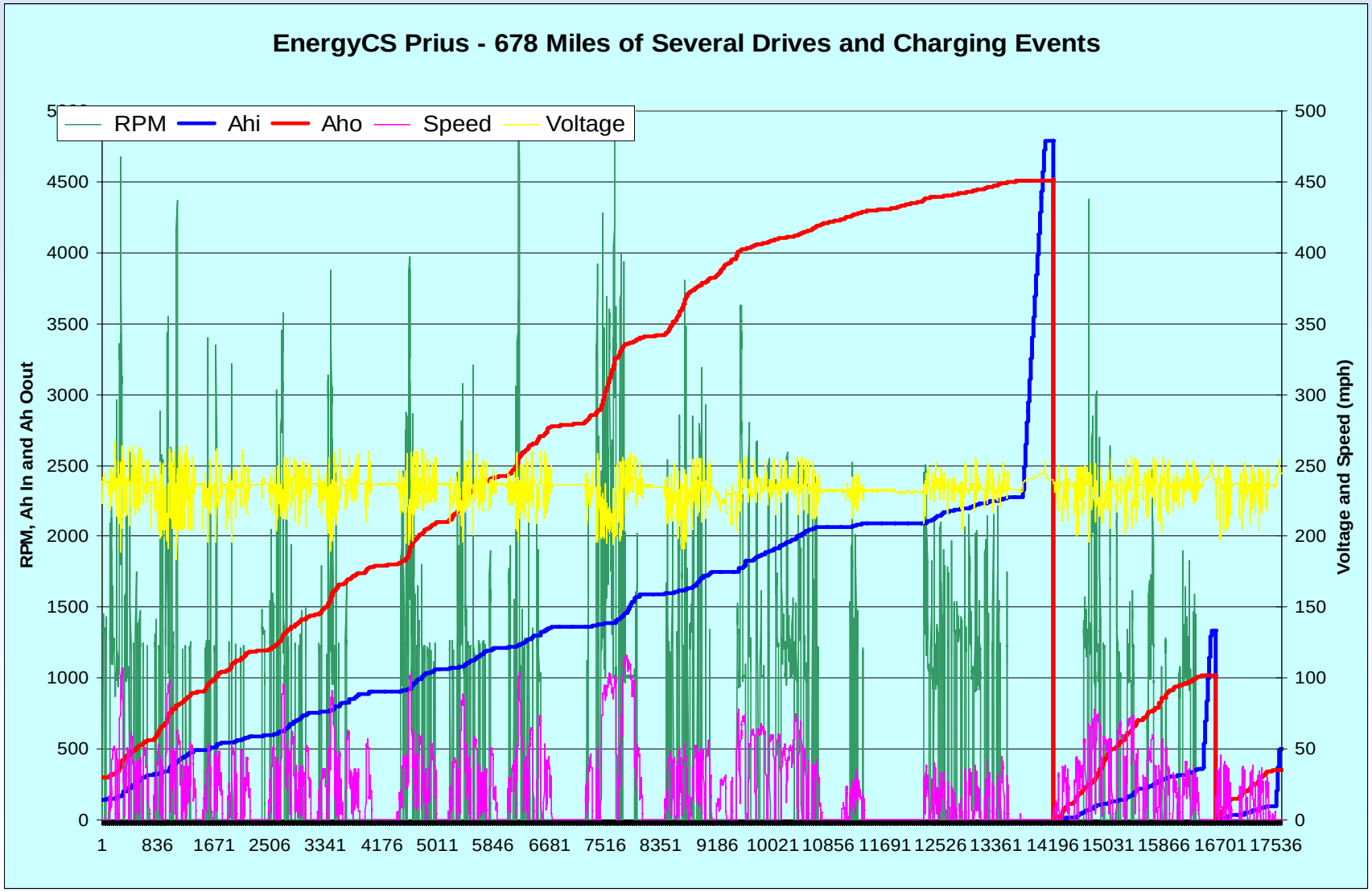


CD – charge depleting, S - sustaining

FY08 EnergyCS Joint Data Collection

- EnergyCS provided onboard data for seven vehicles operating in fleets in Canada, Arizona, and California
- Data collection methods are being modified to allow the collection of data via WiFi modems directly to INL servers
- Some reduction in battery performance due to software and pack balance problems
- AVTA / EnergyCS discussing replacement batteries

FY08 EnergyCS Onboard Data



FY07 / FY08 NYSERDA

- **The AVTA is testing all six of the New York State Energy Research and Development Agency's PHEV conversions. Models and test status:**

Model	Baseline Testing	Accelerated Testing	Delivery Status
EnergyCS Prius	Completed	Near completion	
Hymotion Prius	Completed	ongoing	
Hymotion Civic			Not yet delivered
Hymotion Escape	Started	After baseline	
Electovaya Escape	Problems	Starting	4 deliveries required
HybridsPlus Escape	Awaiting shipment		Delivered twice

- **Probable fleet testing of 30 PHEVs later CY08**

FY08 Seattle-Area Demonstration

- 13 Hymotion Prius PHEV demonstration with:
  - The City of Seattle (4)
  - King County (4)
  - Port of Seattle (2)
  - Puget Sound Clean Air Agency (3)

- 1 Green Car Company lead acid Prius at King County
- Fleets will operate PHEVs in various missions
- Using V2Green cellular data loggers and GPS units to collect onboard data (45 parameters)
- Obtain offboard fuel use, maintenance requirements, and mission descriptions from fleets
- Start April 2008
- Likely partner in charge demand study with Seattle City Light

FY08 Tacoma Power

- Tacoma Power obtained two lead acid battery Prius PHEVs from the Green Car Company
- One Hymotion Prius on order (April 2008)
- Conduct cooperative testing of vehicles and charging infrastructure
- Lead acid PHEVs are supposed to be the first PHEVs deployed with an all-electric range of 10 to 15 miles
- Testing will include charging and driving profiles as well as charging infrastructure analysis
- Using V2Green cellular data loggers and GPS units
- Started 1st quarter CY08
- AVTA considering baseline and accelerated testing of lead acid PHEV conversions

FY08 National Rural Electric Cooperative Association (NRECA)

- Total of seven Prius and Escape PHEVs from Hymotion, EnergyCS, and HybridsPlus will be / are operated by rural electric coop utilities
- Collect and process onboard data from the fleets, and provide individual vehicle and fleet operations data to NRECA and fleets
- Testing will include charging and driving profiles as well as charging infrastructure analysis

FY08 University of California Davis

- UCDavis will use 13 Hymotion Prius for public fleet demonstration
- Demonstration will include up to 100 drivers that are identified by AAA of California
- Each public driver will operate a vehicle for ~2 months
- V2Green cellular data loggers and GPS units will be used to track vehicle operations and performance, and charging practices and locations of the public
- AVTA will provide data collection, handling, analysis and dissemination support
- AVTA, UCDavis and AAA partnering to capture first study of public use of PHEVs
- Start ~April 2008

FY08 Washington State PHEV Demonstration

- Demonstrate 14 Hymotion Prius in coastal, desert, and island areas
- Testing partners include:
  - Port of Chelan (lead)
  - State of Washington
  - Five utilities
  - Three colleges
  - Port agencies, cities and counties
- Includes daily solar (photovoltaic array) charging of at least one PHEV
- Electricity costs as low as 2.5 cents/kWh (hydropower)
- Start early summer of 2008
- Use V2Green cellular data loggers and GPS units

FY08 Hawaii PHEV Demonstration

- Demonstrate six Hymotion Prius on Maui and Oahu
- Testing partners include:
  - State of Hawaii
  - University of Hawaii
  - Hawaiian Electric Company
  - Maui Electric Company
  - Maui County
  - U.S. Air Force
- Start late summer 2008
- Use V2Green cellular data loggers and GPS units

FY08 International Truck PHEV Bus Testing

- Conduct baseline performance testing of 40-foot PHEV school bus from International Truck with lithium pack
- Perform coastdown and dynamometer testing, likely use either or both the Manhattan driving cycle or the Orange County cycle
- With PHEV option on, 1st day of testing will include:
  - Cold start in charge deleting mode
  - Followed by hot starts in charge depleting modes
  - Followed by at least 2 charge-sustaining hot starts
  - In diesel engine only mode, 2nd day of testing will include 1 cold start, followed by several hot starts
- International completing internal testing

FY08 PHEV Technology Acceleration and Deployment Activity Financial Assistance

- DOE's Vehicle Technologies Program seeks to accelerate development of PHEVs that:
  - Substantially reduce petroleum consumption
  - Are fully compliant with FMVSS
  - Meet all relevant emissions regulations
  - Can be economically massed produced
  - Have (minimum) 10-mile cumulative UDDS electric range
- Round I proposals were due 2/13/08, Round II 4/30/06
- Each awardee required to demonstrate 80 PHEVs over 3 years
  - 10 PHEVs 1st year, 20 in 2nd year, 50 in 3rd year
- $7 million first year, total of $30 million over 3 years

Summary PHEV Testing Activities

- Continue testing current and upcoming PHEVs and PHEV batteries
- Continue to perform due diligence to identify suitable PHEV candidates for testing
- Identify and determine the value of partnering in additional PHEV demonstrations
- Perform controlled accessory load testing for PHEV modelers
- Coordinate PHEV and charging infrastructure testing with industry and other DOE entities
- Explore possible vehicle to grid testing opportunities
- Supply charging behavior patterns and demands to PHEV infrastructure modelers at Oak Ridge and Pacific Northwest National Laboratories

Summary PHEV Testing Activities – cont'd

- Provide PHEV cost data to other DOE labs and OEMs
- Continue AVTA's role as DOE's sole independent tester of whole-vehicle technologies in field applications. By late summer, PHEVs will be demonstrated in:
  - 37 fleets
  - 18 states and 2 provinces
- The AVTA will provide testing and data collection support for DOE's PHEV Technology Acceleration and Deployment Demonstration
- Provide PHEV testing results feedback to:
  - Domestic OEM industry, vehicle modelers and target setters, battery and other subsystem developers, DOE/Industry Technical Teams, and early fleet adaptors

Acknowledgement

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Vehicles and Systems Simulation and Testing Leader, Lee Slezak

Additional Information

http://avt.inl.gov
or
http://www1.eere.energy.gov/vehiclesandfuels/avta/

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