

# **21<sup>st</sup>. Century Automotive Challenge Competition Results**

**June 7, 2008**

## ***The Tour-to-the-Shore***

The course this year was almost the same as last year, a circuit running east from BCIT in Westampton, NJ, to Lakehurst, south to Oyster Creek and northwest back to the start. This year instead of backtracking from Batsto and going up through the heart of the pines at Chatsworth we continued west and went up Rtes. 206 and 541. It shortened the course to 143 miles and gave us a look at blueberries instead of cranberries.

The results are summarized in the accompanying spreadsheet.

Again the grand winner is a Honda Insight with the phenomenal mileage of 124.62 miles per gallon, or 1.21 gallons of fuel for the 143 mile trip plus a 2 mile allowance for fueling, comfortably beating last year's astonishing 75 mpg. I could not believe this, but I personally witnessed the fill up, and the fuel was indeed up to the top of the filler neck. Both the odometer and Nancy Hazard confirmed that Jack Martin, a new entrant from Appalachian College did in fact make the trip, so I guess it is true. There is no question that Jack was the overall winner, and no question that we have again proved our point that vehicles that you can buy today can solve our petroleum dependence and make a major contribution to reducing greenhouse gas emissions.

Again, even the lowest mileage vehicle, a 32 year old Mercedes 300D, got far better mileage than the US average of 19 mpg and won the diesel division for Ed. Kreibick.

The biodiesel division was won by Simon Hauger of West Philadelphia in a VW Jetta with the remarkable mileage of 66.83 mpg. Again I found this hard to credit, but I saw the fuel in the filler neck with my own eyes, and in fact the station spilled a half pint or so on the ground, so the true mileage is understated.

Among the Priuses (Priae?), Al Walker, the Hobbit took the prize at 68.97 mpg, with Kathleen Urban second and Nancy Hazard third. The adherence to the target time was not sensational overall, but Nancy Hazard and her driver Barbara took the prize with a total variance of 6 minutes, all accumulated on the new last leg. Up to that point they were perfect on each leg, a significant accomplishment in precision motoring.

## ***The Run-to-the-River***

This event for the newly popular concept of plug-in hybrids consisted of a morning run clockwise around the 24 mile course to Riverside, Delran and Beverly, followed by charging and an afternoon run counterclockwise around the same course simulating a 24 mile commute to work.

We had two entrants, yours truly with our modified (and almost antique) Chevy S-10, and EV Jerry Asher with a brand new plug-in conversion of a 2005 Prius. Jerry took the prize with a phenomenal 73.8 MPG and an estimated 8.1 miles on electric power only.

The S-10 did about ten miles of each leg on electric power, but only achieved 21.5 mpg overall. Part of this disappointing result was due to the fueling pump not shutting off automatically and spilling about a quart of gas on the ground. Correcting for this would give us about 24 mpg. At any rate it was better than the mileage on the same course without electric assist of 18.71 mpg. To get really accurate results we will need to use a fuel burette rather than filling the tank to measure fuel consumption. Nevertheless, it is a start at demonstrating what this new technology can contribute.

**21<sup>st</sup> Century Automotive Challenge  
Battery Powered Vehicle Division  
2008 Results**

**Grand Champion Over-All-Best Electric Vehicle**

EEVC member Alan Arrison  
VW Rabbit Pickup Truck

**Winner of the Efficiency Competition**

Considering mass of cargo and speed over 5 mile course  
EEVC member Alan Arrison  
VW Rabbit Pickup Truck

**Winner Acceleration Test**

Burlington County Electech Team  
The Olympian a converted 86 Ford Escort

**Winner Electric Vehicle Autocross**

Burlington County Electech Team  
The Olympian a converted 86 Ford Escort

**Winner Range Event**

Methacton High School  
Converted 3 wheeled British Sports Car called the Lomax

**Winner Braking Event**

Saint Mark's School  
Converted Ford 150 Pickup

**Over-all Placement**

1<sup>st</sup> Place VW Rabbit Pick up Truck  
2<sup>nd</sup> Place St. Mark's School  
3<sup>rd</sup> place Methacton High School  
4<sup>th</sup> Place The Burlington County Electechs

**21ST CENTURY AUTOMOTIVE CHALLENGE 2008**

**Autocross Event**

6/7/2008 19:22

Car #	Car Name	Time 1 (sec)	Time 2 (sec)	Time 3 (sec)	Cones	Best Time	With Penalty	Score	Rank	Notes
<b>ELECTRICS</b>										
14	Lorax	54.21	37.51	34.55	0	34.55	34.55	27.6	3	
56	StMarks	32.30			0	32.30	32.30	40.6	2	
"007"	RabbitPickup	OC	OC	30.81	2	30.81	40.81	-9	4	Actually 3 Ocs
16	ElecTecs/Cinn	29.77	34.65		0	29.77	29.77	55.2	1	
<b>HYBRIDS</b>										
Prius	UEK-881	OC	36.80	33.12	0	33.12	33.12	35.8	6	
Prius	Hobot	31.47(1)	30.15	29.72(2)	0	30.15	30.15	53.0	4	
Prius	EKZ-2248	29.50	27.35		0	27.35	27.35	69.1	3	
VW-TD	W Phill - Sedan	25.50	24.10		0	24.10	24.10	87.9	2	
InSite		31.25			0	31.25	31.25	46.6	5	
VW-TD	St Marks	26.47	23.73		0	23.73	23.73	90.0	1	

<b>AutoXBest</b>	22.0	<b>sec</b>	<b>AutoXMaxScore</b>	100.0	<b>Points</b>
<b>AutoXWorst</b>	35.0	<b>sec</b>	<b>AutoXMinScore</b>	25.0	<b>Points</b>
<b>AutoXValRange</b>	13.0	<b>sec</b>	<b>AutoXPointRange</b>	75.0	<b>Points</b>

**21ST CENTURY AUTOMOTIVE CHALLENGE 2008 RANGE EVENT**

6/7/2008 19:22

Car #	Car Name	Short Laps	Long Laps	Total Miles	Odo Total	Score
14	Lorax	8		44	48	97.0
56	StMarks	1		5.5	7.5	36.3
"007"	RabbitPickup	7		38.5	38.3	82.5
16	ElecTecs/Cinn	5		27.5	33	74.5

**RangeBest** 50.0 **Miles** **ShortLap** 5.5 **Miles**  
**RangeWorst** 0.0 **Miles** **LongLap** 24.3 **Miles**  
**RangeValRange** 50.0 **Miles**  
  
**RangeMaxScore** 100.0 **Points** *Range includes efficiency laps*  
**RangeMinScore** 25.0 **Points**  
**RangePointRange** 75.0 **Points**

**21ST CENTURY AUTOMOTIVE CHALLENGE 2008**

**Acceleration Event**

6/7/2008 19:22

Car #	Car Name	Time1 (sec)	Time2 (sec)	Time3 (sec)	Best Time	Calc MPH	Accel m/s2	Score	Rank
14	Lorax	5.16			<b>5.16</b>	13.2	<b>1.14</b>	<b>27.2</b>	<b>4</b>
56	StMarks	3.13			<b>3.13</b>	21.8	<b>3.11</b>	<b>56.7</b>	<b>3</b>
"007"	RabbitPickup	2.86	3.13		<b>2.86</b>	23.8	<b>3.73</b>	<b>65.9</b>	<b>2</b>
16	ElecTecs/Cinn	2.30	3.19	3.13	<b>2.30</b>	29.6	<b>5.76</b>	<b>96.4</b>	<b>1</b>

**AccelBest**            6.0    m/sec2            a=Vf^2/2x  
**AccelWorst**         1.0    m/sec2  
**AccelValRange**     5.0    m/sec2

**AccelMaxScore**    100.0    Points            **Accel Distance**    50.0    feet  
**AccelMinScore**    25.0    Points            **FtperMeter**        3.3    Feet  
**AccelPointRange**  75.0    Points            **MPH2MS**          0.4    factor

# 21ST CENTURY AUTOMOTIVE CHALLENGE 2008

## Braking Event

6/7/2008 19:22

Car #	Car Name	Time (sec)	Calc MPH	ODO MPH	MPH Value	Brake Distance Feet	Speed M/s	Distance Meters	Decel m/sec2	Score	Best Score	Rank
14	Lorax	1.93	14.3	20	14.3	13.3	6.4	4.0	5.06	7.2	7.2	3
56	StMarks	1.54	19.7	23	19.7	21.2	8.8	6.5	5.99	10.0	10.0	1
"007"	RabbitPickup	1.37	23.5	25	23.5	34.6	10.5	10.5	5.24	7.7	7.7	2
16	ElecTecs/Cinn	1.65	17.8	20	17.8	37.4	8.0	11.4	2.77	0.3	5.8	4
"007"	RabbitPickup	1.43	22.0	25	22.0	34.4	9.8	10.5	4.61	5.8		
56	StMarks	1.60	18.6	22	18.6	46.6	8.3	14.2	2.43	-1		
16	ElecTecs/Cinn	1.48	20.9	20	20.9	36.8	9.3	11.2	3.88	3.6		

<b>BrakeBest</b>	6.0	m/sec2	Accel=Vo^2/2X	<b>Max</b>	5.99	10.0
<b>BrakeWorst</b>	3.5	m/sec2		<b>Min</b>	2.43	-1
<b>BrakeValRange</b>	2.5	m/sec2				
<b>BrakeMaxScore</b>	10.0	Points	<b>Timed Dist</b>	30.0	feet	
<b>BrakeMinScore</b>	2.5	Points	<b>FeetPerMeter</b>	3.3	Feet	
<b>BrakePointRange</b>	7.5	Points	<b>MPH2M_S</b>	0.4	factor	
			<b>Toffset</b>	0.5	Secs	

**21st Century Automotive Challenge 2008**

**Electric Vehicle Event Summary**

6/7/2008 19:22

Car #	Car Name	600 Pts Max		Tech Test	Braking		Acceleration		AutoCross			Effic Mi/kWh		Effic Payload		Range	
		TOTAL SCORE	Position	90 pts max	10 pts max	100 pts max	100 pts max	100 pts max	100 pts max	100 pts max	100 pts max	100 pts max	100 pts max	100 pts max			
		Score	Decel m/sec <sup>2</sup>	Score	Accel m/s <sup>2</sup>	Score	Best Time	With Penalty	Score	Effic Wh/Mile	Effic Score	Payload Index Mi-Lb-MPH/Wh	Payload Score	Odo Total	Score		
14	Lorax	273	3		5.06	7.2	1.1	27.2	34.6	34.6	27.6	220.2	71.2	16.6	36.0	48.0	97.0
56	StMarks	290	2		5.99	10.0	3.1	56.7	32.3	32.3	40.6	209.6	78.1	41.1	76.8	7.5	36.3
"007"	RabbitPickup	383	1		5.24	7.7	3.7	65.9	30.8	40.8	-9	191.5	91.6	51.7	94.5	38.3	82.5
16	ElecTecs/Cinn	272	4		2.77	0.3	5.8	96.4	29.8	29.8	55.2	296.2	36.3	15.8	34.7	33.0	74.5

## 21St Century Automotive Challenge 2008 Results

<b>Tour-to-the-Shore</b>									
<b>Division</b>	<b>MPG</b>	<b>Time Variance Minutes</b>	<b>Rankings</b>					<b>Time</b>	
Entrant			<b>MPG Overall</b>	<b>Hybrid</b>	<b>Prius</b>	<b>Diesel</b>	<b>Biodiesel</b>		
<b>Diesel</b>									
Kreibick, Ed 1976 Mercedes 300 D	30.78	7+					1		
<b>Biodiesel</b>									
Moritz St. Mark's 2000 VW Jetta	45.32	24						2	
Hauger, S., W. Phila. VW Jetta	66.83	20	3					1	
<b>Hybrid</b>									
Martin, J. 2000 Honda Insight	124.62	13	1	1					
Natale, J 2006 Prius	51.04	11							
Urban, K. 2007 Prius	63.54	57			3	2			
Hazard, N Prius	58.8	6				3		1	
Hobbit 2004 Prius	68.97	25	2	2	1				
<b>Run-to-the-River (for Plug-in Hybrids)</b>									
Asher, J 2005 Prius (modified)	73.8	54	1						
Kydd, P. 1986 Chevy S-10 (modified)	21.5	0						1	

## 21ST CENTURY AUTOMOTIVE CHALLENGE 2008

6/19/08 9:25

## Efficiency Event

Index	Car #	Car Name	DeltaT Hours	DeltaT Minutes
1	14	Lorax	0.29	17.6
2	56	StMarks	0.45	27.0
3	"007"	RabbitPickup	0.24	14.5
4	16	ElecTecs/Cinn	0.28	16.6

Odo Start	Odo End	Odo Miles	Value Used	Vav	Iav
3395.0	3401.0	6.0	5.5	152.80	27.00
45908.9	45914.9	6.0	5.5	131.40	19.50
168205.1	168210.5	5.4	5.5	117.50	37.10
47809.5	47815.2	5.7	5.5	144.80	40.70

### Efficiency

Index	Car #	Car Name	Pav	Energy kWh	Effic Mi/kWh	Effic Wh/Mile	Effic Score	Rank
1	14	Lorax	4.13	1.21	<b>4.54</b>	<b>220.2</b>	<b>71.2</b>	<b>3</b>
2	56	StMarks	2.56	1.15	<b>4.77</b>	<b>209.6</b>	<b>78.1</b>	<b>2</b>
3	"007"	RabbitPickup	4.36	1.05	<b>5.22</b>	<b>191.5</b>	<b>91.6</b>	<b>1</b>
4	16	ElecTecs/Cinn	5.89	1.63	<b>3.38</b>	<b>296.2</b>	<b>36.3</b>	<b>4</b>

Vmax	Vmin
163.60	147.20
155.60	-31.20
124.00	106.00
152.00	133.20

### Efficiency

Index	Car #	Car Name	Payload Lbs	Calc MPH	Pay. Ind. All25MPH	Payload Index Mi-Lb-MPH/Wh	Payload Score	Rank
1	14	Lorax	195	18.7	22.1	<b>16.6</b>	<b>36.0</b>	<b>3</b>
2	56	StMarks	705	12.2	84.1	<b>41.1</b>	<b>76.8</b>	<b>2</b>
3	"007"	RabbitPickup	435	22.8	56.8	<b>51.7</b>	<b>94.5</b>	<b>1</b>
4	16	ElecTecs/Cinn	235	19.9	19.8	<b>15.8</b>	<b>34.7</b>	<b>4</b>

50# extra

178# extra

Imax	Imin
137.20	0.00
125.20	-310.40
160.40	-136.80
173.60	0.40

Higher is better"

<b>EfficBest</b>	5.5	<b>Mi/kWh</b>
<b>EfficWorst</b>	3.0	<b>Mi/kWh</b>
<b>EfficValRange</b>	2.5	<b>Mi/kWh</b>

<b>EfficMaxScore</b>	100.0	<b>Points</b>
<b>EfficMinScore</b>	25.0	<b>Points</b>
<b>EfficPointRange</b>	75.0	<b>Points</b>

Higher is better"

<b>PayloadBest</b>	55.0	<b>Index</b>
<b>PayloadWorst</b>	10.0	<b>Index</b>
<b>PayloadValRange</b>	45.0	<b>Index</b>

<b>PayloadMaxScore</b>	100.0	<b>Points</b>
<b>PayloadMinScore</b>	25.0	<b>Points</b>
<b>PayloadPointRange</b>	75.0	<b>Points</b>