

TANK TO WHEEL EFFICIENCY

Devin Serpa - AfterOil EV

The following shows the tank to wheel efficiency of various vehicle fuel and engine types.

ICE Internal Combustion Engine

	(cumulative)			
	100%	Fuel in 'tank' - gasoline		
-	62%	Engine losses due to heat		1
-	17%	Standby / Idle losses		1
-	6%	Driveline losses		1
=	15%	Tank to Wheel Efficiency		

REEV Range Extended Hybrid Electric Vehicle (Non plug-in portion)

	low	high		
	100%	to 100%	Fuel in 'tank' - gasoline	
x	38%	to 38%	Genset (adjusted from cumulative loss)	
x	85%	to 95%	Charge Controller	2
x	99%	to 99%	Battery charge / discharge efficiency	3
x	90%	to 99%	Voltage Controller (electronic throttle)	4
x	80%	to 88%	Electric motor uses power	5
x	94%	to 94%	Driveline (adjusted from cumulative loss)	
=	22%	to 29%	Tank to Wheel Efficiency	

HFC Hydrogen Fuel Cell

	low	high		
	100%	to 100%	Fuel in 'tank' - H2 (pressurized)	
x	53%	to 58%	PEM creates electricity from H2 gas	6
x	99%	to 99%	Battery charge / discharge efficiency	3
x	90%	to 99%	Voltage Controller (electronic throttle)	4
x	80%	to 88%	Electric motor uses power	5
x	94%	to 94%	Driveline (adjusted from cumulative loss)	
=	36%	to 47%	Tank to Wheel Efficiency	

BEV Battery Electric Vehicle

	low		high		
	100%	to	100%	Fuel in 'tank' - electricity	
x	99%	to	99%	Battery charge / discharge efficiency	3
x	90%	to	99%	Voltage Controller (electronic throttle)	4
x	80%	to	88%	Electric motor uses power	5
x	94%	to	94%	Driveline (adjusted from cumulative loss)	
=	67%	to	81%	Tank to Wheel Efficiency	

¹ <http://www.fueleconomy.gov/feg/atv.shtml>

² <http://www.zivanusa.com/NG5BatteryCharger.htm>

³ <http://www.metaefficient.com/deep-cycle-batteries/agm-absorbed-glass-mat-batteries.html>

⁴ <http://www.cafeelectric.com/>

⁵ http://www.adcmotors.com/public_site/products/#mf

⁶ http://www1.eere.energy.gov/hydrogenandfuelcells/fuelcells/pdfs/fc_comparison_chart.pdf