

# TANK TO WHEEL EFFICIENCY

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

## 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)	
=	<b>67%</b>	to	<b>81%</b>	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	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)	
=	<b>30%</b>	to	<b>45%</b>	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)	
=	<b>22%</b>	to	<b>29%</b>	Tank to Wheel Efficiency	

**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
=	<b>15%</b>	Tank to Wheel Efficiency	

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

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

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

<sup>4</sup> <http://www.cafeelectric.com/>

<sup>5</sup> [http://www.adcmotors.com/public\\_site/products/#mf](http://www.adcmotors.com/public_site/products/#mf)

<sup>6</sup> [http://www1.eere.energy.gov/hydrogenandfuelcells/fuelcells/pdfs/fc\\_comparison\\_chart.pdf](http://www1.eere.energy.gov/hydrogenandfuelcells/fuelcells/pdfs/fc_comparison_chart.pdf)