

# Electric and Flex-Fuel Vehicles Data Tables

**Table 1: Mass Energy Ratios for EV Batteries**

Battery	Volts	<b>Amp hours</b>	Wh (V X Ah)	<b>Battery mass (lbs)</b>	kWh (Wh ÷ 1000)	Lbs / kWh (Lbs ÷ kWh)
Lithium	12					
Lead	12					

**Table 2: EV Charging**

EV model	<b>kWh / 100 miles</b>
2014 Honda Fit	

**Table 3: Mass Needed per 100 Miles**

A	B	C	D
Energy	kWh / 100 miles (Table 2)	Lbs / kWh (Table 1)	Lbs / 100 miles (B X C)
Lithium			
Lead			

**Table 4: Battery Cost for 100 Mile Range**

A	<b>B</b>	C	D	E	F
Battery type	<b>Cost (\$)</b>	kWh (from Table 1)	Cost / kWh (Cost ÷ C)	kWh / 100 mi. (from Table 2)	Cost / 100 mi. (D X E)
Lithium					
Lead					

**Table 5: Land Needed for Ethanol Production** <sup>1,2,3</sup>

<b>Gasoline use/day in US bbls</b>	÷ 0.67 = gas to ethanol ratio	X 42 gal./bbl = ttl gal. needed	X 365 day/yr. = gal./ yr.	÷ 80 gal./ton = switchgr./ year	÷9.4 = ton/acre total acre/year	÷640 acres/mile = total square mi.

**Table 6: Combustion of Switchgrass** <sup>4,5,6,7</sup>

<b>Switchgr. kWh/ton</b>	÷2000 lb/ton =kWh/lb	X 0.95 = transmis. efficiency	X 0.81 = charg. efficiency	X 100 = kWh /100 lbs	X 3.45 mi./kWh = miles /100 lbs for electric Honda Fit

**Table 7: Fermentation of Switchgrass** <sup>7,2</sup>

<b>Gas-powered Honda Fit mpg</b>	÷ 0.67 = Gas to ethanol ratio	Switchgr. mi./100 lbs for ethanol Honda Fit X 0.040 gal./lb

## Electric and Flex-Fuel Vehicles Data Tables

**Table 8: Kilowatt Hours per Unit Fuel** <sup>8,9</sup>

Fuel used	Total kWh	Total fuel consumed	Original fuel unit	Unit conversion	kWh per converted unit	Converted unit
coal			per ton	2K lbs/ton		per lb
oil			per barrel	42 gal/bbl		per gal.
gas			per ft <sup>3</sup>	N/A		per ft <sup>3</sup>

**Table 9: Miles per Unit Fuel** <sup>5,6,7</sup>

Fuel used	kWh per converted unit	Transmission efficiency	Charging efficiency	Miles per kWh	Miles per unit fuel	Converted unit
coal		0.95	0.81	3.44		per lb
oil		0.95	0.81	3.44		per gal.
gas		0.95	0.81	3.44		per ft <sup>3</sup>

**Table 10: Effect of Supply on Oil Price** <sup>10</sup>

Mill. bbl. oil consumed by US per day	% increase in US consumption	Millions of barrels consumed by US per day	Price per bbl. (\$)	New price per bbl.
	10.00			

**Table 11: Effect of Oil Price on Economic Growth** <sup>11,12</sup>

Tax per barrel	% reduction in US GDP

### Literature Cited:

1. US Energy Information Administration FAQ's. <https://www.eia.gov/tools/faqs/faq.php?id=23&t=10>
2. US Department of Energy. Alternative Fuels Data Center. Accessed on June 17, 2023. <https://afdc.energy.gov/fuels/properties>
3. USDA. 2019. Switchgrass (*Panicum virgatum*) for Biofuel Production. Farm Energy. April 3, 2019. Accessed on March 30, 2024. <https://farm-energy.extension.org/switchgrass-panicum-virgatum-for-biofuel-production/> (based on 80 gallons ethanol per ton & 9.4 tons per acre per year)
4. Burn Test Proves Hopeful. Renewable Energy World. June 19, 2006. Accessed on Jun 17, 2023. <https://www.renewableenergyworld.com/baseload/switchgrass-burn-test-proves-hopeful-45188/> (based on 19,607,000 kWh per 15,647 tons of switchgrass)
5. US Energy Information Administration FAQ's. <https://www.eia.gov/tools/faqs/faq.php?id=105&t=3>
6. Batteries: What We Know About Them & How to Use Them. Home Power 1997, April/May, p 66.
7. Fuel Economy Guide. [www.fueleconomy.gov](http://www.fueleconomy.gov) (based on 100 miles / 29 kWh)
8. US Energy Information Administration. [https://www.eia.gov/totalenergy/data/monthly/pdf/sec7\\_5.pdf](https://www.eia.gov/totalenergy/data/monthly/pdf/sec7_5.pdf)
9. US Energy Information Administration. [https://www.eia.gov/totalenergy/data/monthly/pdf/sec7\\_9.pdf](https://www.eia.gov/totalenergy/data/monthly/pdf/sec7_9.pdf)
10. Rule of thumb (price drops \$4 for each million bbls) (obtained by request from the Energy Information Administration c.2011): [InfoCtr@eia.gov](mailto:InfoCtr@eia.gov)
11. A Simple Rule Of Thumb Regarding Oil And How It Impacts The Economy. *Business Insider*. February 24, 2011. Available online: <https://www.businessinsider.com/oil-impact-on-the-economy-2011-2> (adjusted for inflation)
12. CPI Inflation Calculator. <https://www.in2013dollars.com/us/inflation/2011?amount=1>