

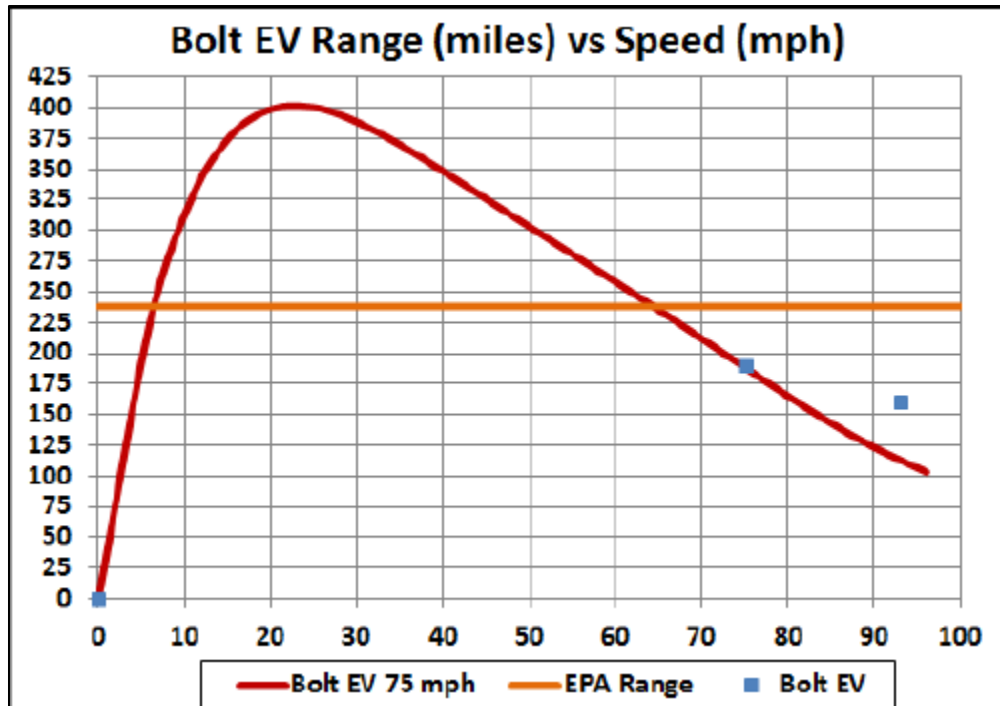
Chevy Bolt EV Range Update

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This is an update for the web page <http://www.roperld.com/Science/ChevyBoltRange.htm>. After completing that page information became available that the Chevy Bolt EV at constant top speed of 93 mph on the level can travel 160 miles. This does not agree with the curve in the original document for which this is an update. The range vs speed curve was:

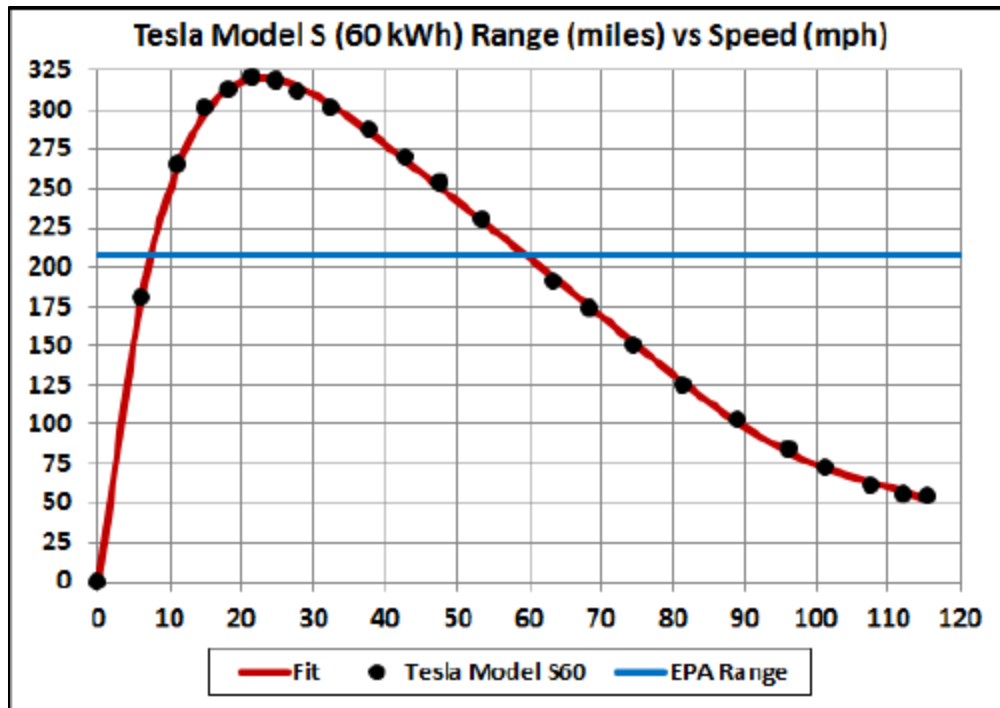


I thought that the peak at ~400 miles was too high.

This curve was calculated to match the mathematics of the range-speed curve for the Tesla Model S by requiring it to have the value 190 miles at 75 mph. The range value at 75 mph is a blue square.

Since that web page was created [another range value of 160 mph at constant speed of 93 mph was published](#); 93 mph is the top speed allowed for the Bolt EV. That value is indicated on the plot above by another blue square and is well above the red curve.

So, the author re-examined the mathematics of the range-vs-speed curve for the Bolt EV and realized that a product of a hyperbolic tangent and a decaying exponential would be a more efficient way to fit the data than a 6th-order polynomial as was used in the original document:

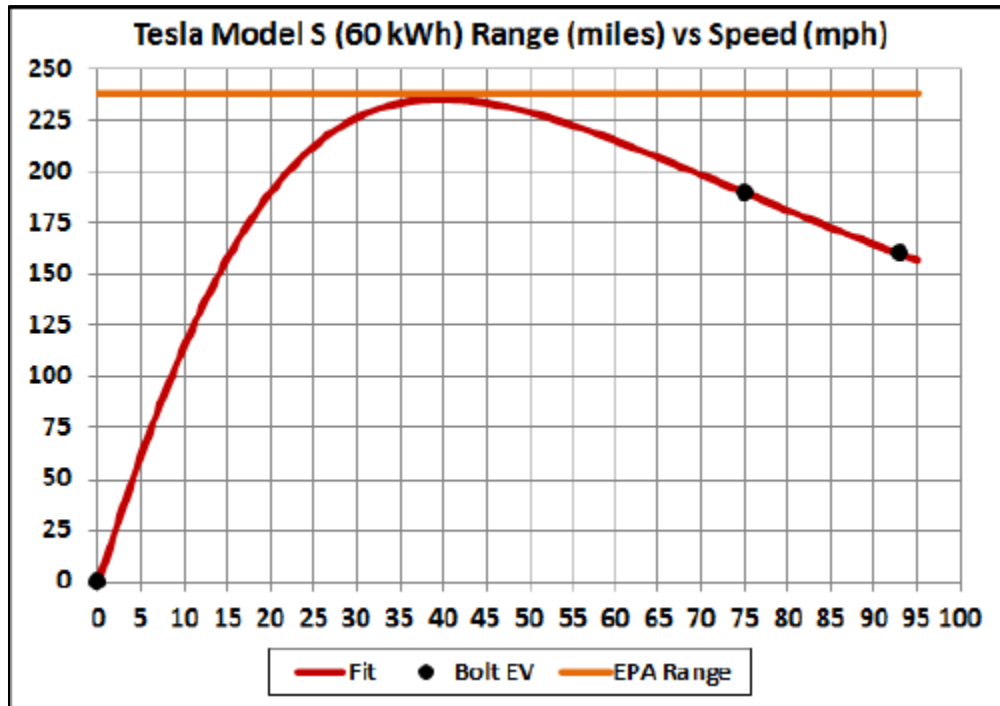


The red curve in this graph is the $670.5 \cdot \tanh(s/21.35 \text{ miles}) \cdot \exp(s/48.16)$ (s in mph) fit to the Tesla Model S range vs speed data.

Then I used those 3 parameters as a starting fit of the equation to the three data points for the Chevy Bolt EV

1. 0 miles @ 0 mph
2. 190 miles @ 75 mph
3. 160 miles @ 93 mph

The resulting exact fit is $415.9 \cdot \tanh(s/31.43 \text{ miles}) \cdot \exp(s/98.15)$, and the curve is:



The fit is exact because 3 parameters were used to fit 3 data points.

It is interesting that the 236-mph peak of this curve at 40 mph is very close to the EPA range of 238-mph. If this curve is correct, the EPA range is the maximum range for the Chevrolet Bolt EV.

It would be helpful to have more data points for other values for constants speeds, to see if they agree with this curve.

If I assume that the EPA range corresponds to the range at constant speed of 55 mph, the following range vs speed is:

