

# Energy Spreadsheet

Contributed by Greg Allen  
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We need your help. My friend Nick is working on a energy spreadsheet. In one of his earlier website post about ultracapacitors and EEstor a spreadsheet and model was included that contained a comparison of EEstor with Gasoline energy density. Unfortunately there was a serious error in the calculation. He created this model to help verfiy the numbers and approach. We would appreciate any feedback you have for Nick on this. From Nick G:

## Energy Efficiency Tool (Excel)

Liquid fuels such as gasoline and diesel combined with internal combustion engines have excellent attributes which make them difficult to replace as stores and forms of creating mechanical work. Internal combustion engines with liquid fuels have the following competitive attributes:

- High energy density and work delivery
- Cheap
- Easy to transport
- Relatively stable and safe in "normal environmental conditions"
- Cheap to store
- Relatively efficient
- Slow to degrade over time
- Minimal maintenance (no physical fuel storage replacement required) like some batteries which only last a limited number of cycles

For Ultracapacitors to offer a challenge to liquid hydrocarbon fuels, they need to match or exceed these attributes. The tool attached is a way of comparing various energy storage technologies on a cost and weight basis

We are looking for reviews or enhancements to the spreadsheet model. Feel free to create graphs, expand the data set or correct errors or assumptions as well as expand the presentation.

Ultracapacitors offer the opportunity for enhancing other aspects of energy from intermittent renewable such as sun and wind, micro-grids, power smoothing or even the physical transport of energy. We are interested in learning more about the needs or design constraints of various applications. The idea is that knowing where the finish line is for various markets and opportunities helps educate people about the opportunities ultra-capacitors have for revolutionizing energy.

The use of ultracapacitors in various markets could significantly alter markets by changing the required nature of electric grids, economies of scale for home generation, transport and distribution of electricity. It is important to know where these inflection points are in terms of specific energy storage density, cost etc. Help us out. How far are we from the age of the electric jet? Where is the finish line for the future?

We will use the inputs and updates to the spreadsheet to publish a few more articles about ultracapacitors and their transformative potential.

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