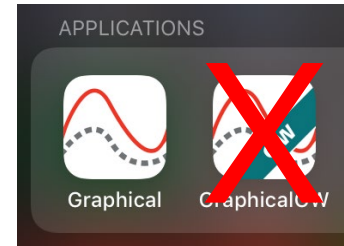


How to Use the Go Direct Energy Sensor ([Vernier GDX-NRG](https://www.vernier.com/downloads/graphical-analysis/))

Download software: www.vernier.com/downloads/graphical-analysis/

The software you use to connect to the sensor, called “Graphical Analysis,” is found at the link above. You can also find it in the app store on your phone. See the icons to the right – make sure you download the one without the green “GW banner” when downloading from the app store.

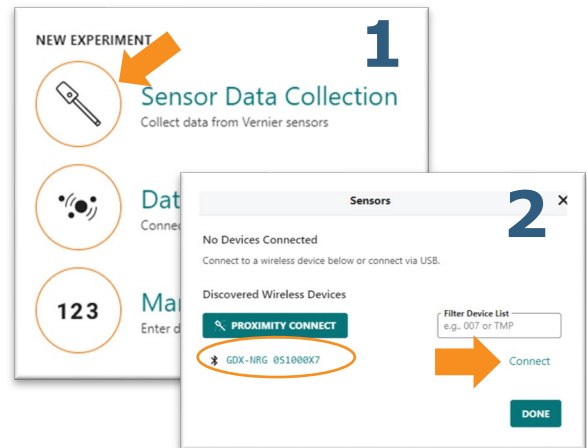


Quick overview on how to use the Energy Sensor

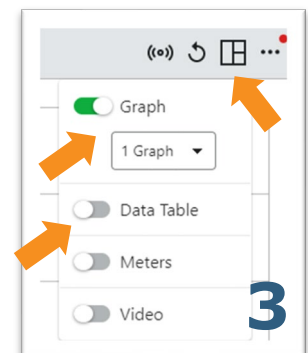
The software runs almost exactly the same, regardless of device (Android, ChromeOS, iOS & iPadOS, macOS, and Windows).

- Hold down on the power button on the front of the sensor for a couple seconds to turn it on (or to turn it off). There will be a light that flashes every couple seconds to let you know it’s on. You can connect by Bluetooth or using the included charging cable.
- Connect the wires from the sensor to the wires from the generator (red to red and black to black).
- On the side of the sensor, make sure the switch is on the “internal 30-ohm load” side.

- Once you open the program, click on “Sensor Data Collection” to connect to the energy sensor (see Image 1 to the right). If you’re already on the screen showing the chart or table, there’s also a button (🔍) in the lower right-hand corner of the window that you can click on to open up the “sensor connection” section. You should see the name of the sensor; click “Connect” and then “Done” (see Image 2 to the right).

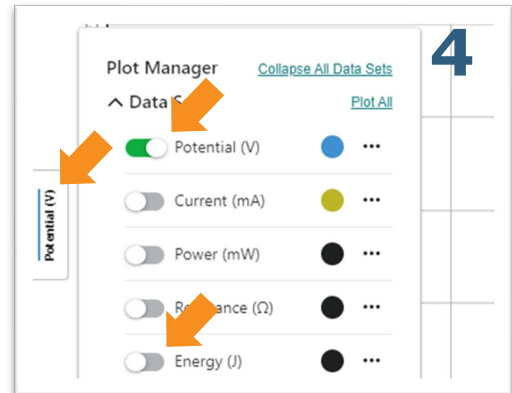


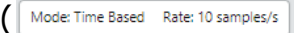
- It is easiest to see the exact Joule production by changing the screen to show one Graph and the “Data Table”, rather than the default view of two graphs. To do this, click on the window-looking button in the upper right (see Image 3 to the right).

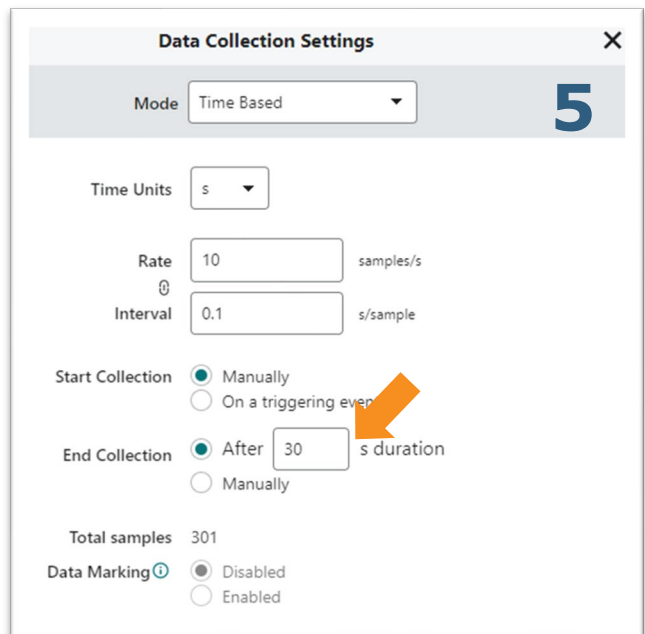


How to Use the Go Direct Energy Sensor (continued)

- The program automatically opens with the first graph set to "Potential (V)." We recommend you click on the left-hand axis title of the graph and then turn off "Potential (V)" and turn on "Energy (J)," as that's how we'll be measuring turbine performance at the KidWind Challenge (see Image 4 to the right).



- Once the turbine is spinning, click the "Collect" button at the top of the window to collect data for 30 seconds. If you want to change the data collection time period to match the 60 seconds that will be used for the competition, you can click on the "Mode/Rate" button in the lower left corner of the screen () and change the duration to 60 seconds (see Image 5 to the right).



- If you want to do multiple runs and make some adjustments to see what works best, you can click on the left-hand axis title and choose to show "Data Set 1," "Data Set 2," etc. Those can also be renamed. For example, you could change the title of your first run to be "3 blades," the next run to be "4 blades," etc. Unfortunately, the program does not display labels automatically.

NOTE: If Bluetooth keeps disconnecting, make sure the sensor is not still paired to someone else's computer or phone. If you have issues with Bluetooth working, please connect to the sensor using the included USB cable.