

**American Electric Power Challenge: Enhanced Energy Bridge Applications**

AEP currently offers the “Energy Bridge” to our customers with AMI Meters. This energy bridge receives data from the electric meter and sends this to an internet service. Customers are able to load an application on their smart phones which provides real time data and historical power usage.

The AEP MakeOHio2019 challenge involves using the data from a **hypothetical** “Enhanced Energy Bridge”. This device would provide significantly more data regarding the home’s power and other utility consumptions so as to allow for more creativity on the student projects. Additionally, this emulator will include inside/outside temperatures and specific appliance running status indications.

**Option 1:**

An Arduino set of code will be provided that will emulate the home. This code cycles through 24 hours at one minute intervals. Various appliances cycle on/off. Additionally, several conditions may be initiated with discrete inputs. Power, Gas and Water usages are totalized. Students will be able to add their monitoring code, modify the model, build inputs/outputs, or may develop their own model entirely.

**Option 2:**

A data set will be provided as a text file. An application can be developed to read the data and then develop monitoring, display and diagnostics. This may be more suitable for a RasPI type application.

**Option 3:**

A data set is available via the internet with a web request and JSON response. The data request and response formatting will be provided in the technical documents. This request/response can be integrated into an Arduino, RasPI, or similar type application. This data set has 900 records. Projects can cycle through this data.

Potential uses of the data can include:

- \*Display electric, water, natural gas usage.
- \*Alarm on high consumption of a utility. (Turn on LED’s, buzzer, send text messages)
- \*Automatic Open/Close blinds on sun light level. (Could activate a servo)
- \*Detect anomalous data patterns. (High water usage when no large water users active)
- \*Automatically close valve on water leak. (Could activate a servo)

Potential architectures could be:

- \*Single Arduino running a simulation and other code.
- \*Single RasPI running a simulation and other code.
- \*Arduino running a simulation and communicating to another arduino or PI via serial, I2C, etc.