**Team 1: PICA**

Our Senior Design group, team PICA (Power Information Collection Architecture), is comprised of four electrical and computer engineering students who all have a strong desire to serve, using our education and God-given abilities. One way we believe we can achieve this goal is through the development of a home power monitoring system capable of monitoring total and circuit-by-circuit power usage in a home.. Developing this technology gives us the opportunity to be good stewards of the resources God has given us by providing better information about power consumption. As good stewards of God’s Earth we want to help eliminate wasting the natural resources available to us, so by arming consumers with more accurate information about their consumption, we hope to see reductions in power consumption.

Traditionally, power companies estimate consumption based on discrete-time readings taken by a technician. Sending a technician out to each meter in an area is costly and inefficient in an internet-connected world. Additionally, a consumer cannot know exactly how much the power they consume costs until the end of a billing cycle, a problem we hope to alleviate with our PICA system. Several off the shelf solutions already exist to address some of these concerns in a residential or commercial setting, but with limited functionality or high-cost. Once we collect power usage data, our system aggregates and packages the data for presentation to both the consumer and utility provider.

Most homeowners are unaware of exactly how much power they are consuming hourly or daily, limited to monthly billing information Our system will have the ability to inform the homeowner of how much power they are consuming on a circuit-by-circuit level in hour-by-hour, day-by day, and month-by-month time increments.

Three sub-systems make up the full PICA system and include a main E-meter, a base station and smart breakers. The E-meter will replace the standard bubble meter, providing the power companies with their desired information in addition to providing information useful to the consumer. The base station provides a way to display the information to the consumer and optional controls for the breakers. The smart breakers include solid-state breakers and individual circuit monitoring, improving the functionality of standard breakers and giving consumers detailed information about their power consumption. Due to the different needs and desires of the power companies and consumers, the system is designed to be modular, making the system more marketable by allowing customers to buy only what is relevant to them.