



Company Information

Company Name	<i>Duke Energy</i>	Date Submitted	<i>11/14/2022</i>
Project Title	<i>Design of a Modular AMI Meter (DUKE_METER)</i>	Planned Starting Semester	<i>Spring 2023</i>

Senior Design Project Description

Personnel

Typical teams will have 4-6 students, with engineering disciplines assigned based on the anticipated Scope of the Project.

Please provide your estimate of staffing in the below table. The Senior Design Committee will adjust as appropriate based on scope and discipline skills.

Discipline	Number	Discipline	Number
Mechanical	2	Electrical	1
Computer	2	Systems	

Company and Project Overview:

Duke Energy is one of the largest electric power holding companies in the United States, providing electricity to 7.6 million retail customers in six states. Duke Energy has approximately 49,500 megawatts of electric generating capacity in six states in the Carolinas, the Midwest and Florida – and natural gas distribution services serving more than 1.6 million customers in Ohio, Kentucky, Tennessee, and the Carolinas.

As Duke Energy proceeds forward on the company’s Path to Net Zero Strategy (see more here: [Duke Energy Path to Net Zero](#)), additional insight and availability of customer energy usage data and control opportunities increase in importance. To facilitate this, a new type of “modular” Advanced Metering Infrastructure (AMI) electric meter should be considered.

Project Requirements:

Current AMI metering technology is somewhat basic in overall capability. The technology was designed years ago to meter usage at 15- or 30-minute intervals which is acceptable for billing



purposes but presents a barrier to introducing new products and capabilities to accelerate and support the Path to Net Zero.

A new “modular” AMI electric meter architecture should be considered and designed that would address the shortcomings found in current AMI electric meters. This new architecture should allow for increased granularity of data, “edge compute” capability, options to interface with Smart Home technology, etc. The architecture should also support multiple, possibly swappable/configurable options to securely communicate data between the meter and internal utility systems (such as cell, fiber, mesh, etc.) taking advantage of cloud-based technologies if possible. Also, the new meter should meet all necessary safety requirements and be compatible with current US meter form factor.

Expected Deliverables/Results:

- Full concept of operations describing/illustrating how the new “modular” AMI electric meter would operate/function for a utility
- Design with drawings and bills of material for a new “modular” AMI electric meter
- Proof of concept prototype of new “modular” AMI electric meter

Disposition of Deliverables at the End of the Project:

Students are graded based on their display and presentation of their team’s work product. It is mandatory that they exhibit at the Expo, so if the work product was tested at the supporter’s location, it must be returned to campus for the Expo. After the expo, the team and supporter should arrange the handover of the work product to the industry supporter. This handover must be concluded within 7 days of the Expo.

List here any specific skills, requirements, specific courses, knowledge needed or suggested (If none please state none):

- Interest in energy / utility transformation
- Interest in Smart Home technology