



**Company Information**

<b>Company Name</b>	<i>Siemens Energy Inc.</i>	<b>Date Submitted</b>	<i>05/26/2023</i>
<b>Project Title</b>	<i>Lean Re-engineering for Valve Service Shop (SIEMENS_LEAN)</i>	<b>Planned Starting Semester</b>	<i>Spring 2024</i>

**Senior Design Project Description**

**Personnel**

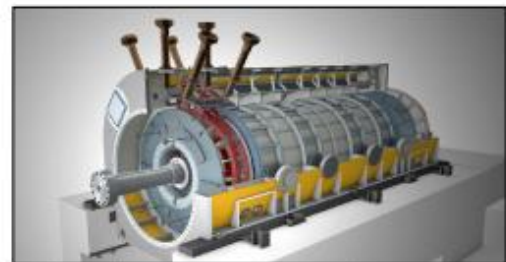
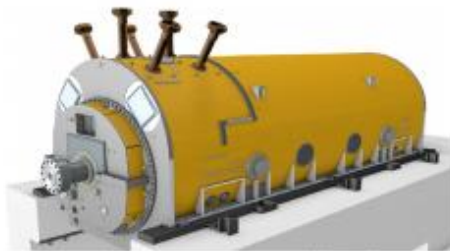
Typical teams will have 4-6 students, with engineering disciplines assigned based on the anticipated Scope of the Project.

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

<b>Discipline</b>	<b>Number</b>	<b>Discipline</b>	<b>Number</b>
Mechanical		Electrical	
Computer		Systems	5

**Company and Project Overview:**

The Siemens Charlotte Energy Hub is the company’s worldwide hub for 60 Hz power generating equipment. Opened in 1969, the facility has manufactured and serviced generators and steam turbines for the power generation market for decades.



In November 2011, the facility celebrated the opening of a new expansion, adding gas turbine production and service capabilities. The new Gas Turbine facility was designed based on LEAN manufacturing principles and certified for U.S. LEED Gold green building standards, making it the most advanced gas



turbine production plant in operation. The expansion represents a \$350 million total investment in Charlotte, adding 1,000 jobs. With its current workforce of 1,500 and more than one million square feet of space under roof, Siemens Energy in Charlotte has become the largest manufacturer in the city and the second largest among the 250+ Energy companies based in Charlotte. This project's objective is to re-design the valve servicing and repair operation to deliver process improvements using various System and Industrial Engineering methods.

### **Project Requirements:**

The goal of this project is to reduce the lead time for valve servicing and repairs, achieve faster turnaround times, streamline the process, eliminate waste, improve customer satisfaction, reduce costs, and increase overall efficiency.

- **Value Stream Mapping:** Begin by mapping out the entire process of valve servicing and repairs, from the moment a valve arrives at the shop to its final delivery back to the customer. Identify each step involved, including inspection, diagnosis, repairs, testing, and packaging.
- **Identify Bottlenecks and Waste:** Analyze the value stream map to identify any bottlenecks or areas of waste in the process. These could include excessive wait times, unnecessary transportation, redundant paperwork, or overproduction.
- **Standardize Work Procedures:** Develop standardized work procedures for each step of the valve servicing process. This ensures consistency and eliminates variations in how tasks are performed, leading to more efficient and reliable outcomes.
- **Implement Visual Management:** Introduce visual management techniques to provide clear and easily understandable visual cues for employees. This could include visual signals for identifying priority valves, clear labeling of workstations and tools, or visual boards to track progress and performance metrics.
- **Implement 5S:** Apply the 5S methodology to organize the workplace, tools, materials, reduce clutter, and optimize efficiency. Sort out unnecessary items, set in order the necessary tools and materials, shine, and clean the workspace, standardize the organization methods, and sustain the improvements over time.
- **Implement Kanban System:** Introduce a Kanban system to manage the flow of valves throughout the process. This visual signaling system can help regulate inventory levels, prevent overproduction, and ensure that work is pulled only when there is capacity to handle it.
- **Implement Continuous Flow:** Identify opportunities to create a continuous flow of work, minimizing wait times and batch processing. This could involve reconfiguring workstations, optimizing layouts, and cross-training employees to perform multiple tasks.
- **Implement Error-proofing (Poka-yoke):** Introduce error-proofing mechanisms to prevent defects and mistakes. This could include implementing quality checklists, using error-proofing devices to ensure correct valve assembly, or implementing automated testing processes.
- **Continuous Improvement:** Establish a culture of continuous improvement by encouraging employees to suggest and implement ideas for process enhancement. Regularly review performance metrics, solicit feedback from customers, and conduct regular Kaizen events to identify and implement further improvements.



**Expected Deliverables/Results:**

- Re-design process flow for the operation
- Standardized work procedures
- Implementation of visual management techniques
- 5S implemented
- Implementation of Kanban for material flow
- Poka-yoke implementation

**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):**

- Lean methodology knowledge.
- Data Analytics
- Decision and Risk Analysis (SEGR 3107)
- Lean Training and Coaching.
- Travel to Siemen's Charlotte location.