TRACK THE SUN

- Initially built in 2002, Team 116 had the purpose of redesigning this previous capstone project in order to track the sun's movement, boiling water and harnessing mechanical energy from the boiled water.
- Evaluation of the system involved polishing of reflective surfaces, integration of an electro-mechanical system to automatically track the sun's position to maximize boiling efficiency.
- The system is to be used at a local brewery supply in Philomath for boiling purposes, as it's been in operation for 20 years

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TRACK THE SUN

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REFLECTIVITY EFFICIENCY

An important topic for the project is the effectivity of the reflectivity of the surface that the sun will emit solar energy too. After testing and down selecting, restoring the surface was applied via applying vinyl car wrap material to the original panels. Major benefits to this option include low cost, predictable resilience, customizable coloring, minimal lead time, and simple installation.

POWER MANAGEMENT

- Power supply to the motor moving the dish will be applied through a 12 volt car battery along with a 30A manually resettable circuit breaker for safety precautions. A custom made orange battery holding case was designed and installed with a waterproofing coating along its surface.
- Original plans for the project consisted of a solar panel installed at the front of the structure for efficient solar light energy supply, selected in terms of weight and power capacity. However, a mechanical failure during winter break led to a battery supply proposal

MOTOR AND CODING

- A CIM Sport Gearbox and a CIM Motor were chosen as the planetary gear set and motor, respectively. These were chosen because they meet the calculated torque and speed requirements for the system. Additionally, three steel mounting plates and the PETG cover were manufactured. These components were assembled into a complete gearbox.
- In order for the system to properly track the sun it needed Four pieces of data, longitude, latitude, time, and rotational position. Using these pieces of data, the position of the sun could be calculated using equations provided by the National Oceanic and Atmospheric Administration (NOAA). All of this data would then be fed in from sensors such as an encoder and a GPS to an Atmel cortex based processor that would exercise closed loop control and track the sun throughout the day adjusting depending on the particular day of the year and the current time.