

Energy Group Report

The main goal of designing an RC car fueled by alternative energy sources was to generate interest and enthusiasm for those technologies. Originally, the design included a hybrid model that produced energy as it ran. Attached to the vehicle were a solar cell and a PEM cell. The two worked together to power the car's motor. Unfortunately, that model did not produce energy quickly enough to power the vehicle at a satisfactory rate. To remedy this issue, a 9V rechargeable battery was used to power the car, and a charging station fueled the battery. The charging station includes the original solar cell attached to the PEM cell. This arrangement of power sources serves as the current model for the RC car.

Our group was charged with the acquisition of a suitable solar cell as well as a hydrogen fuel cell in order to provide the means to solve our energy needs as efficiently as possible. We chose to utilize a proton exchange membrane (PEM) cell as a concise way to minimize the space required to make the model operable while maximizing the amount of energy we could produce within our budget restraints. Through experimentation with powering just the front two wheels without the burden of the rest of the car's chassis, we determined that the PEM cell connected with the solar cell simply could not outproduce the consumption of power; therefore, we deemed it necessary to find an alternative lest we put the audience to sleep as our car moved slower than a snail's pace. The first solution was to fully charge the PEM cell with the solar prior to moving the PEM cell solely on-board the car thus, while not able to perpetuate its movement, perhaps allowing for it to run for a longer and presumably faster duration.

This failed. The second solution was to acquire a rechargeable battery (9V) and have the solar cell and PEM cell act as a charging station instead of their original designation as the sole source of energy production and transfer. So far, this has worked out well, but not without drawbacks of its own. The charging process is rather slow and it has proven difficult to gauge how long the battery needs to charge. Also, the charging process needs near constant attention due to the need to continuously pump more water into the PEM cell in order to maintain steady levels of hydrogen production. Additionally, weather conditions can prove problematic as we rely on the solar cell to provide energy for the PEM cell to break down the water into hydrogen and oxygen.

Despite these inefficiencies, we are satisfied with the result, as we don't have access to higher quality materials due to budget and time restrictions, since the entire team consists of full-time college students with highly varied schedules.