

## **Solar**

A solar powered lawnmower satisfies the requirement of a non-source polluting energy source. The problem would be collecting enough sunlight to power an electric motor. The panel size required to power the electric motor, will be much larger than the necessary size of the lawnmower. Also as the panels grow larger, there is more weight added to the mower. The voltage of 24V, set by the commercial electric lawnmower, would be hard almost impossible, to reach with just photovoltaic cells. Thus a battery would be needed to maintain the charge. This adds even more weight and suggests that if solar power was desired it could come in the form of a separate charging station. Solar options would be better for reducing all pollution associated with the mower. However, since the goal of this project is mainly to reduce point source pollution it is beyond the scope and budget of our project to consider such an option.

## **Bio-Fuel**

Using a bio-diesel fuel doesn't satisfy the requirement of non-source polluting, but offers other advantages that made it an interesting option. Bio-diesel is made using 85% vegetable oil, which is a renewable energy resource. Emissions are much better than normal diesel fuel. Yet it still will produce emissions and will be much louder than the electric motor.

## **Fuel Cell**

Fuel cells are still in their infancy in terms of power sources. Improvements are constantly being made and mass production of fuel cells for power supply is not in motion. Because of this, fuel cells are still very expensive and hydrogen is not yet widely available to consumers. They would be able to provide the amount of power and mowing time that would be required to mow a good sized lawn, but fuel cells that need pure hydrogen would require a cumbersome tank to hold the fuel while those that are able to run on other gases such as methanol would create unwanted pollutants in the fuel reformer. When compared to the other energy sources being studied for this project, the disadvantages of powering a lawn mower with a fuel cell outweigh the benefits.

## **Battery**

In the last few decades, batteries have become part of every consumer's life. Batteries are simple and convenient power sources. When looking at using a battery to power a lawn mower, we see that a battery powered lawn mower will be light weight, have no need of a fuel storage tank, and produce no point source pollutants. Drawbacks to using battery power is whether or not a battery powered lawn mower will be able to provide the power and run time needed to mow a typical Maine lawn. Taking point source pollutants as our most heavily weighted criteria, we see that a battery powered lawn mower will be our best choice, and with recent advances in rechargeable batteries we believe we can create a system which will satisfy all the demands of a typical lawn mower.