

Calvin Biofuel Vehicle Project

Engineering 333, Calvin College
Professor Matthew Heun



Introduction

Waste vegetable oil (WVO) was chosen by the class as the best fuel source for the Calvin Biofuel Vehicle Project. The class then considered vehicle options and selected a lawnmower to be powered by WVO.

WVO Conversion



Greasecar WVO Conversion Kit

- Vehicle must be diesel
- Starts and stops on regular diesel
- Heats WVO to 160°F
- Operates best in warmer temperatures

Final Vehicle Selection



Toro GroundsMaster 4000-D Lawnmower

WVO Vehicle Options Evaluated

Campus Safety



Concerns over fuel warm up time and fuel system reliability in an emergency response situation ruled out this application.

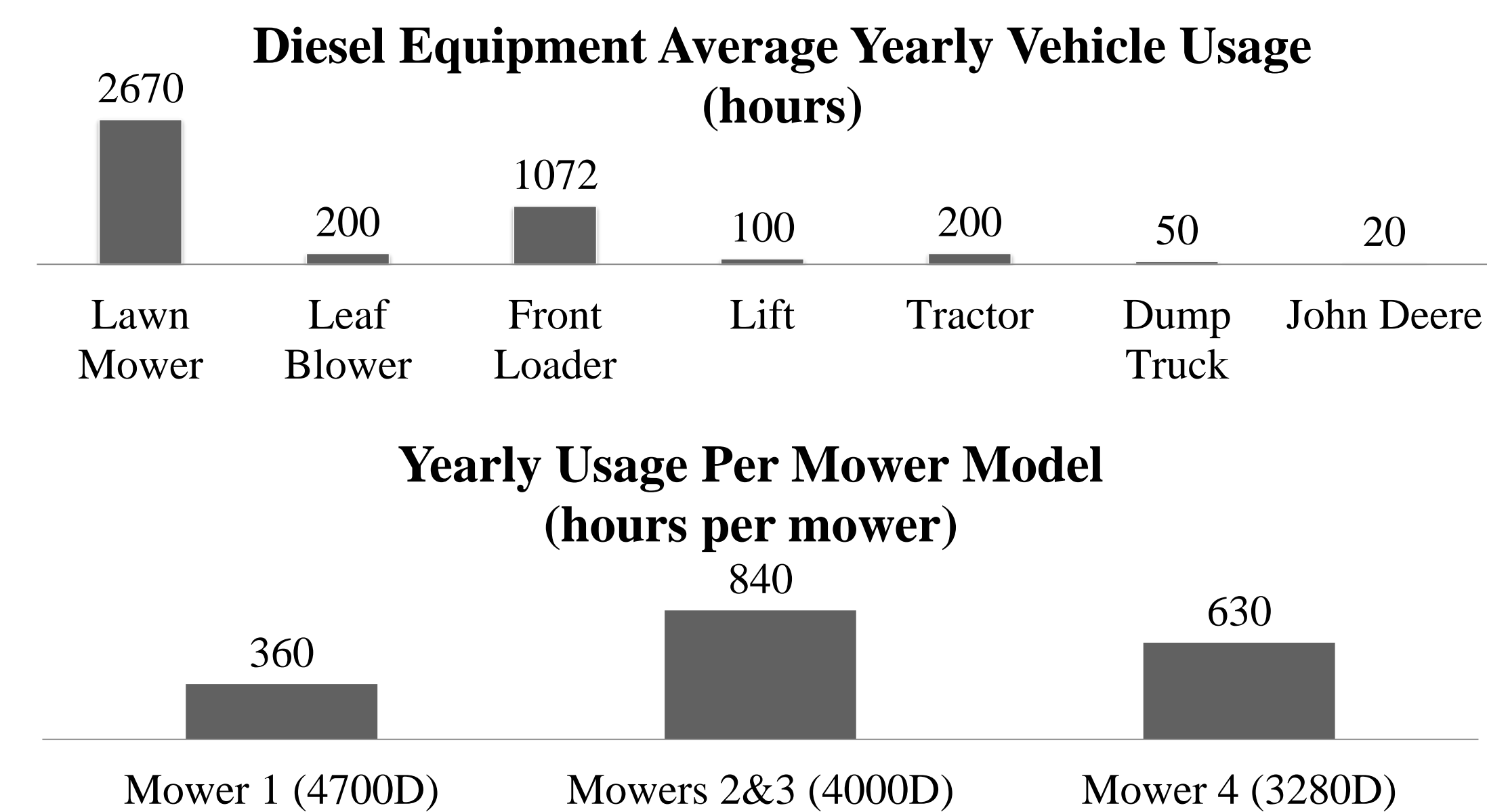
Transportation Van



Investigation revealed this alternative to be feasible. It was concluded that this would work well as a long term alternative, with additional fuel supply.

Physical Plant Maintenance Equipment

Data was collected to determine which diesel vehicles would be best for conversion.

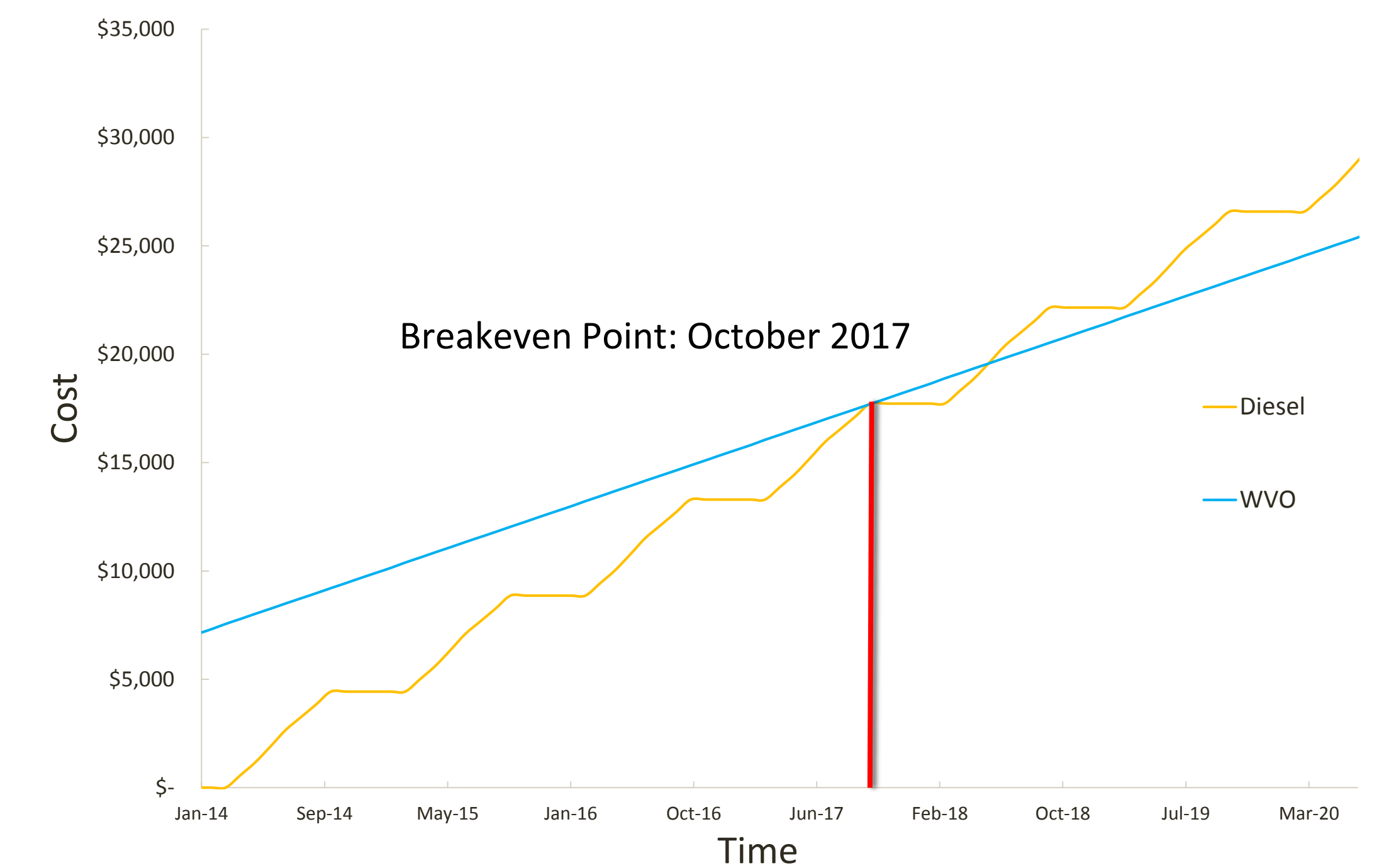


The 4000D lawnmower was selected because it is the most used and the conversion would not void the expired warranty.

Project Sustainability

Issue	Recommendation
Reliability	Maintenance schedule including fuel injector cleaner additive and frequent fuel filter changes
Labor	A Calvin student and physical plant worker to oversee fuel production
Integration with Education	Use project as resource for ENGR 101, seminars, and as example of teaching Christian stewardship
Securing More Oil for Future	Local restaurants have been contacted and are willing to donate additional oil

Feasibility



Conclusion

We recommend pursuing this project for both cost and educational benefits. This project will enhance both the environmental stewardship and faith seeking understanding philosophy of Calvin College. The project is also practically and economically feasible.

Acknowledgements

Prof. Matthew Heun – Engineering Department
Mr. Phil Beezhold – Physical Plant Director
Mr. David LaGrand – Local Biofuel Producer
Mr. Geffory Van Berkel – Physical Plant
Mr. Rick Balfor – Dining Services
Mr. Rich Husiman – Chemistry Department