

Transportation and Distribution of Future Energy: Biofuels

Eylem Asmatulu

Department of Industrial and Manufacturing Engineering, College of Engineering

Abstract: Biofuel is a natural resource and has a significant attraction worldwide for many applications, including transportation vehicles, house and industrial heating and electricity production in power stations. It is reported that this fuel can also reduce greenhouse gas emissions, increase US energy independency and provide an alternative energy to fossil fuels. The uncertainty of petroleum price and political instabilities makes biofuel more attractive and appealing for USA now. In order for biofuels to be a more viable replacement for petroleum based fuels, problems related to its transportation and distribution must be solved. The transportation and distribution options should be inexpensive, fast and sparsely spread through consumer demand points. In this paper, we review the current status of transportation (e.g., pipeline, railroad or ship) and distribution (e.g., truck) options for biofuels. The goal for follow on research will be to improve upon the current status through recommendations for refinery location and new transportation infrastructure. This will be accomplished via modeling, simulation and economical analysis.

1. Introduction

Comparing other fuels, biofuel is one of the cheapest fuels in the World, but transportation and distribution cost affects the overall price of biofuel. Also, transportation infrastructure needs to be enhanced for the biofuel and the U.S. transportation future. To date, there have not been sufficient studies about the effective transportation and distribution techniques for biofuel [1-3]. The purpose of this study is to define and develop the cost effective transportation and distribution techniques for the biofuel, and make it more compatible. Primarily, this idea will be used in the target states through the nationwide, and we will focus on this issue in the present project.

2. Methodology

Biofuel transportation starts at the farming fields and continues till the end users, including plant production field, gathering point, refinery, storage, retailer, etc. Because of that, the transportation and distribution is considerably important for the biofuel delivery. Wakeley et al. studies the similar works in the state of Iowa, and pointed out that there is no doubt of the fact that network of transportation and distribution system need to be optimized [1]. Building new infrastructures, such as pipeline and railroad are big portions of the transportation costs since it requires a large capital investment. Deciding this investment on the transportation and distribution mostly depends on petroleum price and building new infrastructures that require big funds and takes longer time.

We can reduce cost of new transportation infrastructure with simulation techniques and some inexpensive modification of current infrastructure. For instance, biofuel can be transported using the previously built pipeline systems (i.e., existing railroad, storage tanks, truck, and modified refueling station) if they are eligible and modifiable for this use. Sometimes existing transportation units need inexpensive modification but it is still cheaper than building new infrastructure. Another important issue is the location of biorefinery for the target states. Production plant (biorefinery) should be in the center of the transportation and distribution network as well as plant production field, storage areas, railroad, network of pipeline and trucking system because of the cost. Figure 1 shows that ethanol transportation by truck and railroad used efficiently in the USA [4].

According to Morrow et al. [2] railroad transportation is the cheapest for the biofuel transportation. Secondly, pipeline should be sparsely spread through distributors, so that we can use existing trucking system for refueling stations. These trucks may need little modification since the chemical structure of biofuel is different than others. Recently, Sokhansanj and his co-workers have explained the framework development of a dynamic

integrated biomass supply analysis and logistics model. In this model, they optimized and simulated the collection, storage, and transport operations for supplying agricultural biomass to a biorefinery [3]. In this study, we will use simulation techniques and economical analysis for balancing the distance of each chain and other parameters, such as farming cost, delivery time, maintenance, labor, etc. We will apply potential transportation and distribution options locally and nationally.

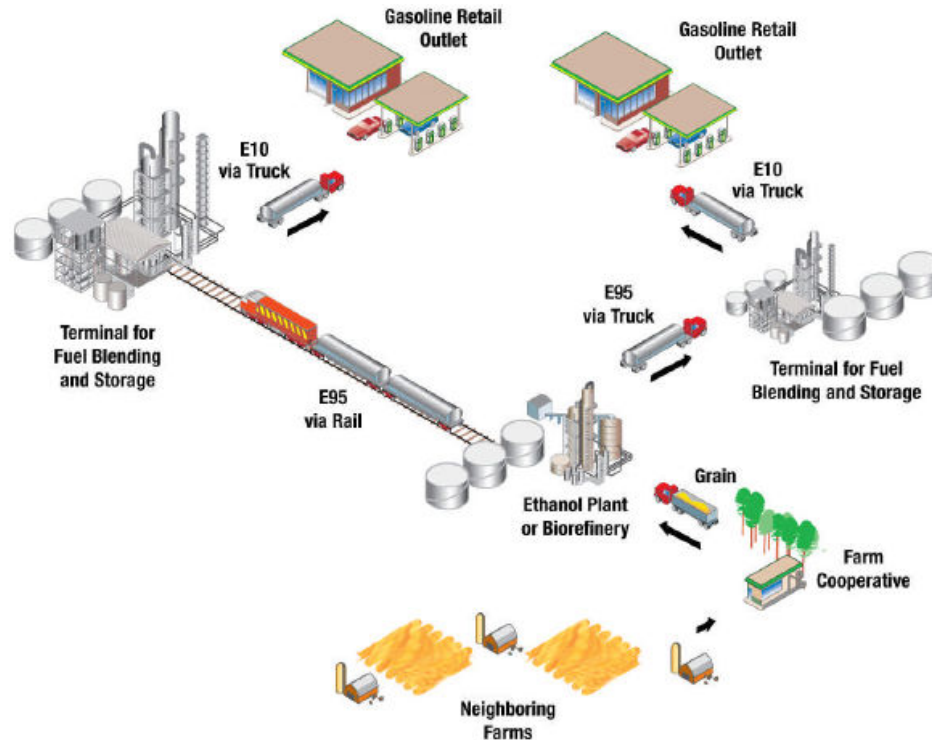


Figure 1: Rail and truck ethanol distribution system (Source: National Bioenergy Center, National Renewable Energy Laboratory; E95 is Fuel Ethanol).

3. Conclusions

In the present study, transportation and distribution cost are considered an important issue on the final price of the biofuels in the USA. Our suggestion is that we should use simulation and optimization techniques, and analyze each transportation step economically and effectively. The expected results should be utilized in all the transportation and distribution network of biofuel, so that we can reduce transportation and the overall cost of the biofuel. We assume that this project will bring several advantages through the target states in the nationwide.

4. Acknowledgements

The author gratefully acknowledges Dr. Twomey and Dr. Yildirim for their helpful discussions and feedback during the preparation of the paper.

References

- [1] Heather L. Wakaley, M.Griffin,C. Hendrickson and S.Matthew (2007) "Alternative Transportation Fuels"
- [2] Morrow, W. R., Griffin, W. M., and Matthews, H. S. (2006). "Modeling switchgrass derived cellulosic ethanol distribution in the United States." *Environmental Science & Technology*, 40(9), 2877-2886
- [3] Shahab Sokhansanj, Amit Kumar and Anthony F. Turhollow(2006) Development and implementation of integrated biomass supply analysis and logistics model (IBSAL).
- [4] <http://www.ams.usda.gov/tmd/TSB/EthanolTransportationBackgrounder09-17-07.pdf>.

Kansas Employers Compliance with Healthy People 2010 Initiatives Targeting Health Promotion in the Workplace

Jennifer Clark, PA-S*, Patricia Bunton, MS, PA-C

Department of Physician Assistant, College of Health Professions

Abstract. Introduction: The CDC and the Department of Health and Human Services has set a goal to increase the number of health promotion programs in the workplace as part of the Healthy People 2010 Initiative. Health promotion programs are designed to promote health in the workplace by targeting health risk reduction and actively preventing the onset of disease. The purpose of this study is to determine the number of Kansas employers currently offering a health promotion program, what types of services are offered, what barriers exist for employers who are not currently offering a program, and to compare the size of the company to these findings. **Methodology:** Five hundred companies were selected from the database Reference USA and were divided into 5 groups according to size. Surveys were sent to each employer and frequencies of answers were tabulated and compared to company size. **Results:** 154 surveys were returned for a 30.8% response rate. 60% of respondents stated that they offered a health promotion program. 73% of respondents employing more than 250 people offer a program and only 45% of companies employing less than 250 people offer a program. **Discussion:** According to survey respondents, larger companies in the state seem to be on target with the CDC's goal of at least 75% of employers offering a health promotion program, while smaller companies, those with less than 250 employees, lag behind.

1. Introduction

The healthcare system in the United States is moving into an era in which the importance of preventive medicine is increasingly significant. Americans are becoming more involved in their health care and aware of medical issues, which are due in part to extensive media coverage, plus the growing popularity of the internet. Successful strategies to reduce the prevalence of cardiovascular disease, cancer, diabetes, sexually transmitted diseases and number of other conditions involve reducing the risk for developing these diseases or conditions. Specifically, "health promotion programs are designed to promote health by reducing health risks and actively preventing the onset of disease [1]." Nearly 145 million people in the United States are employed, with the employment to population ratio being 63.1% [2]. Taking these figures into consideration, the workplace is an ideal place to introduce preventive health strategies to employees through worksite health promotion programs. These programs have been increasing in popularity since the concept was first introduced in the 1970's.

The growing trend toward providing preventive health services at the worksite can be attributed to the possibility that companies realize the many benefits from providing such services. Potential direct benefits for the company include the reduction of insurance and employee health related costs, absenteeism, employee turnover, work-related injuries and the increase of productivity in the workplace. Typical programs offer health promotion activities related to smoking cessation, exercise, and weight management, usually in the form of counseling for behavior modification, in-service meetings, and consultations. Screenings for hypertension and hypercholesterolemia are also utilized in order to diagnose and treat employees who are at risk. Other types of counseling services and activities offered are related to STD's/HIV, seatbelt use, home safety, alcohol and substance abuse, stress management and several others. More extensive screening tests are also used depending on company preference and resources.

Every ten years the CDC sets goals for the nation to attain in the next decade. The current goals are called the Healthy People 2010 Initiatives and one of the goals is to "increase the proportion of worksites that offer a comprehensive health promotion program to their employees [3]." The target goal is to have at least 75% of companies offering a comprehensive employee health promotion program by the end of this decade [3]. It has been 8 years since the last national survey on worksite health promotion; therefore, it is not known how many worksites currently offer a comprehensive health promotion program, including those in Kansas. The purpose of this study is to determine the number of Kansas employers currently offering a health promotion program,