



Longwood Gardens

Greenhouse Plastic Films EGR 7111 Life Cycle Assessment

Advisor: Bill Lorenz

Team: Sushmita Arjyal, Krystal Hamilton Case, David Soltesz



Project Overview

Overview

Use a Life Cycle Assessment (LCA) as a tool to investigate what greenhouse covering is least harmful to the environment while still maintaining performance and price.

Considerations

- Ability to withstand elements and use
- Financial cost over lifetime
- Maintenance
- Environmental impact over lifetime

Primary Options

- Polyethylene (AC/IR)
- Outstanding Durability
 - UV Block & Anti Dust
 - Easy Installation
- Ethylene Tetrafluoroethylene
- Self Cleaning
 - Recyclable
 - Extremely Stretchable

Analysis

Goal

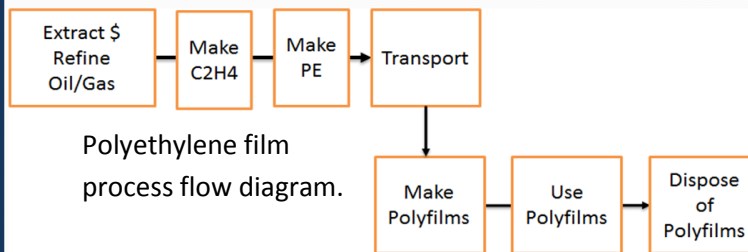
- Analyze the environmental effects of varying materials for use in production green houses.
- Develop a basic understanding of the level of impact of each potential solution from "cradle to grave".

Scope

-Three potential options; includes manufacturing, to use, to disposal.

Functional Unit

One production green house: 42'x100'



- Used SimaPro software to run simulations for all green house options for varying lengths of use.
- The software accounts for almost all life cycle impacts of each product.

Conclusions & Recommendation

Conclusions

- ETFE is most viable option
- Key advantages include durability, heating cost, and light transmissivity.

Recommendations

- Install ETFE on production greenhouse.
- Measure light transmission, heat transmission, and plant growth and use as metric.

Further Study

- Water consumption and chemical use for cleaning plastic.
- Use of bio based plastic instead of petro based.