

# AGPLASTIC SOLUTIONS

## AGRICULTURAL PLASTIC WASTE AND THE CIRCULAR ECONOMY

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### THE ENVIRONMENTAL PROBLEM AGRICULTURAL PLASTICS

Plastic technology revolutionized the agricultural industry by allowing farmers to achieve significant increases in crop yield. However, agricultural plastics contribute to roughly 2% of the world's total plastic production - **an estimated 12.5 million tons of agricultural plastics are produced globally each year** (UN FAO, 2022). Despite the benefits of agricultural plastics, there are significant environmental costs across all phases of the plastic life-cycle.



#### PRODUCTION PHASE

Drilling and extracting fossil fuels and manufacturing agricultural plastics produces significant GHG emissions as well as local water, land, and air pollution.



#### USE PHASE

On-farm use of agricultural plastics causes microplastic contamination and can leach and transport toxic chemicals in soil and water.



#### END-OF-LIFE PHASE

Disposal via landfilling, incineration, in-field burning, or tilling into the soil results in toxic leachate, air pollution, and soil degradation.

### FINDING SOLUTIONS THEORY OF CHANGE



#### POLICY CHANGES



#### CONSUMER EDUCATION



#### BUSINESS SOLUTIONS

While policy change or consumer education may provide avenues for reducing plastic use, demand, or improved disposal practices, AgPlastic Solutions believes that advanced recycling technologies provide a viable business opportunity for addressing the problems associated with the agricultural plastic waste-stream.

### BUSINESS SOLUTIONS

**The Challenge:** Use-phase solutions such as biodegradable plastic mulch products face regulatory barriers, technology challenges, and slow adoption rates by farmers. End-of-life solutions are challenging due to soil and chemical contamination of wastes preventing recycling using conventional recycling systems.

**AgPlastic Solutions mitigates the environmental impacts of agricultural plastics by capitalizing on this underutilized, hard-to-manage waste stream through the development of small-scale, modular advanced recycling systems that turn agricultural plastics into useful chemicals that can offset virgin fuel and plastic production.**

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### ADVANCED RECYCLING TECHNOLOGIES PYROLYSIS & GASIFICATION

AgPlastic Solutions partners with technology providers that are developing advanced recycling systems that utilize processes such as pyrolysis and gasification. These processes break down plastics at the molecular level and convert them into useful chemicals - such as fuels and plastic precursors that can be used to reduce virgin fuel and virgin plastics production.

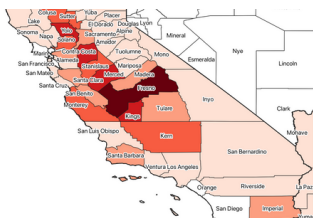
#### END-PRODUCTS

- **Commodity Fuels** - Gas and Diesel
- **Plastic Precursors** - Naphtha & Pyrolysis Oil
- **Syngas** - Hydrogen & Carbon Monoxide

A PEER-REVIEWED LIFE CYCLE ANALYSIS FOUND UP TO 14% GHG EMISSION REDUCTIONS RELATIVE TO VIRGIN FUEL PRODUCTION FROM A PYROLYSIS SYSTEM.

### SPATIAL ANALYTICS SITE ANALYSIS

AgPlastic Solutions conducted a spacial analysis to identify which areas of the country could be best served by advanced recycling projects. Using the following parameters, California was identified as having the most significant business opportunity as well as the potential to achieve the greatest environmental impact.



#### PARAMETERS

- Agricultural Plastic Waste Generation
- Average Tipping Fees
- Electricity and Fuel Prices
- Business Operations Costs

### VALUE PROPOSITION

### PROJECT DEVELOPERS

Emerging advanced recycling technology providers need help implementing these complex projects. As a project developer, AgPlastic Solutions brings together the necessary expertise and resources to get these projects up and running.

- **Feedstocks-** Source agricultural plastic waste streams from farmers and waste haulers
- **Technology Providers-** Coordinate with technology providers to site, scale, and manage projects
- **End Markets-** Identify buyers and end markets for recycled plastic end-products. For example, selling fuels to logistics heavy corporations with sustainability goals or plastic precursors to plastic resin manufacturers
- **Investors-** Secure funding from social impact investors or municipalities and achieve ROI from end-product sales

### SAMPLE PROJECT

### VENTURA COUNTY



#### FEEDSTOCK SUPPLIER

~2,200 tons of ag plastic/year  
+  
\$30-\$80 per ton tipping fee



#### TECHNOLOGY PROVIDER

\$3,750,000 capital investment  
+  
7.5 tons per day processing capacity



#### END-MARKET USERS

Ultra-low sulfur diesel sold to waste management company to fuel waste hauling



#### PROJECT INVESTORS

Initial investors such as Ventura County, a private equity firm, or waste hauling company

AgPlastic Solutions Project Development Fee will be 5-10% on top of total capital investment

## COMPETITIVE ADVANTAGE

### EXPERTISE AND RELATIONSHIPS

Expertise and relationship building within the industry are a critical component of specialized agricultural plastic waste management.

### TECHNOLOGY AGNOSTIC

Collaboration with a variety of technology providers allows for the application of the best available technology for each individual project.

### PROJECT DEVELOPMENT MODEL

As a project developer, AgPlastic Solutions manages the project complexities to get these systems in operation.

For more information visit this link:

<https://bren.ucsb.edu/projects/agplastic-solutions-waste-energy-and-plastic-circularity-agricultural-industry>



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