

Greenhouse Gas Emission Reduction and Cost from the United States Biofuels Mandate

Background/objective

The U.S. biofuel mandate may be the largest operating program to reduce greenhouse gas (GHG) emissions. However, only using historical costs per unit biofuel to calculate GHG abatement cost estimates biases these estimates upward. Here, researchers use an economic model that incorporates associated market effects, in addition to historical data, accounting for interactions within the crop sector to relate GHG abatement to implications for crop prices and land use.

Approach

- ❖ Developed relationship between renewable identification number (RIN) prices and abatement costs and applied method to historical data and economic simulations.
- ❖ Generated abatement cost curves based on historical and simulated RIN price data.

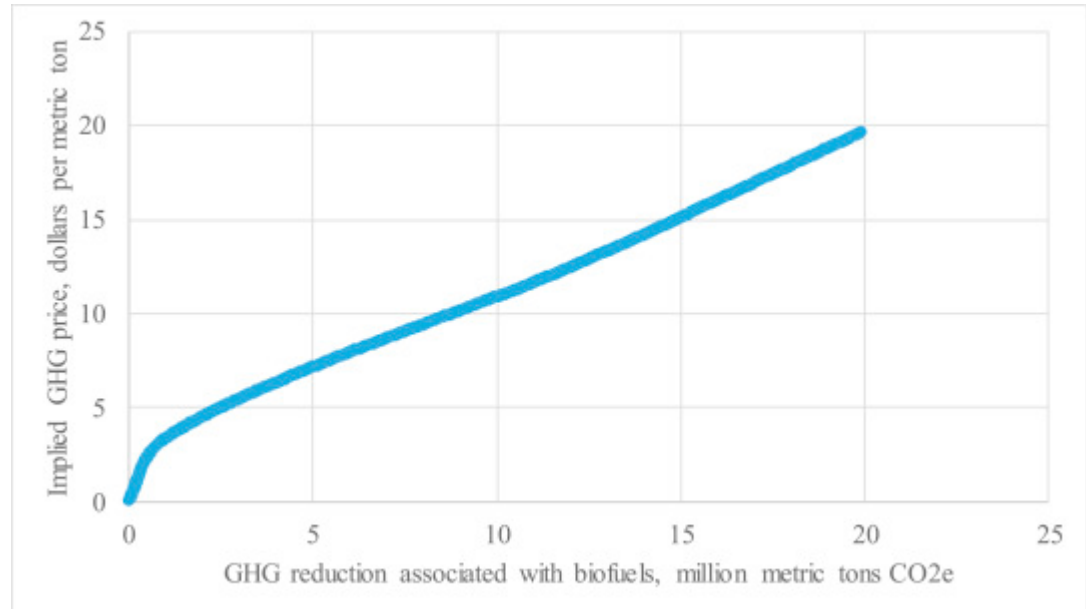
Results

- ❖ U.S. biofuel mandate causes up to 20 million tons CO₂ equivalent abatement for compliance costs equivalent to carbon prices up to \$20 per ton.
- ❖ There can be a trade-off between corn price increase and GHG reduction.
- ❖ Increase in total planted crop area is less important to GHG abatement than reallocation of land among crops.

Significance

The new method relates observed and simulated RIN prices to GHG abatement costs, providing information on how the RFS is currently functioning to reduce GHG emissions in the U.S. Additionally, this work provides insights on how land-use and biofuel cropping choices could influence GHG abatement.

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Estimated marginal GHG abatement cost curve associated with the RFS.