

# The Economic and Environmental Costs and Benefits of the Renewable Fuel Standard

## Objective

The renewable fuel standard (RFS) for biofuels from corn and cellulosic feedstocks impacts the environment in multiple ways. This analysis examines the environmental and economic trade-offs for corn-based and cellulosic biofuels over a suite of environmental effects and converts them to monetized environmental impacts which can be compared to the economic cost of extending the RFS for the 2016-2030 period.

## Approach

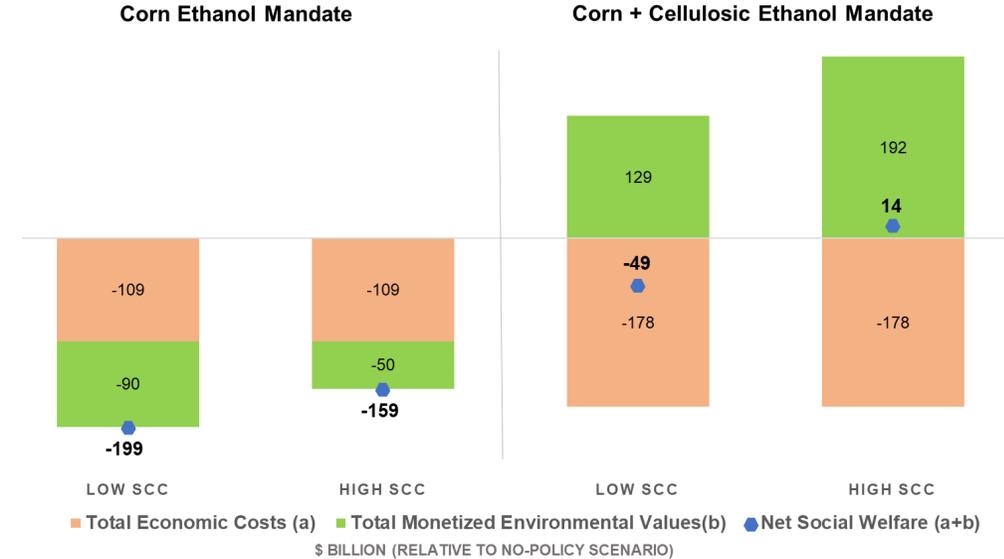
- ❖ Extended the BEPAM model to simulate the maximum discounted value of the net economic benefits to consumers and producers in the agricultural and transportation sectors over the 2016-2030 period.
- ❖ Quantified greenhouse gas (GHG) emissions and nitrogen (N)-leakage and monetized the changes in the value of these environmental impacts using the concepts of social cost of carbon (C) and of N.

## Results

- ❖ Maintaining the corn ethanol mandate (56 billion L-yr<sup>-1</sup> through 2030) leads to a discounted cumulative cost of \$199 billion for 2016-30 compared to the No-Policy scenario. This includes \$109 billion in economic costs and \$85 billion in net monetized environmental damages. The social value of N damage due to biofuel production substantially offsets the social benefits from GHG savings.
- ❖ Additional implementation of a cellulosic biofuel mandate for 60 billion L by 2030 would increase this economic cost by \$69 billion, partly offset by the monetized environmental benefits. The net change of social welfare would range from (-) \$49 billion with a low social cost of carbon to (+) \$43 billion with a high social cost of carbon for the 2016-30 period.

## Significance

Unlike corn ethanol, cellulosic biofuels can result in positive net benefits if GHG mitigation benefits have a high monetized value.



Estimated economic and environmental costs and benefits for corn ethanol mandate and corn + cellulosic ethanol mandate with low and high social cost of carbon (SCC).