

# Some Policies Relevant to Biofuels and Bioenergy

Chemistry 234

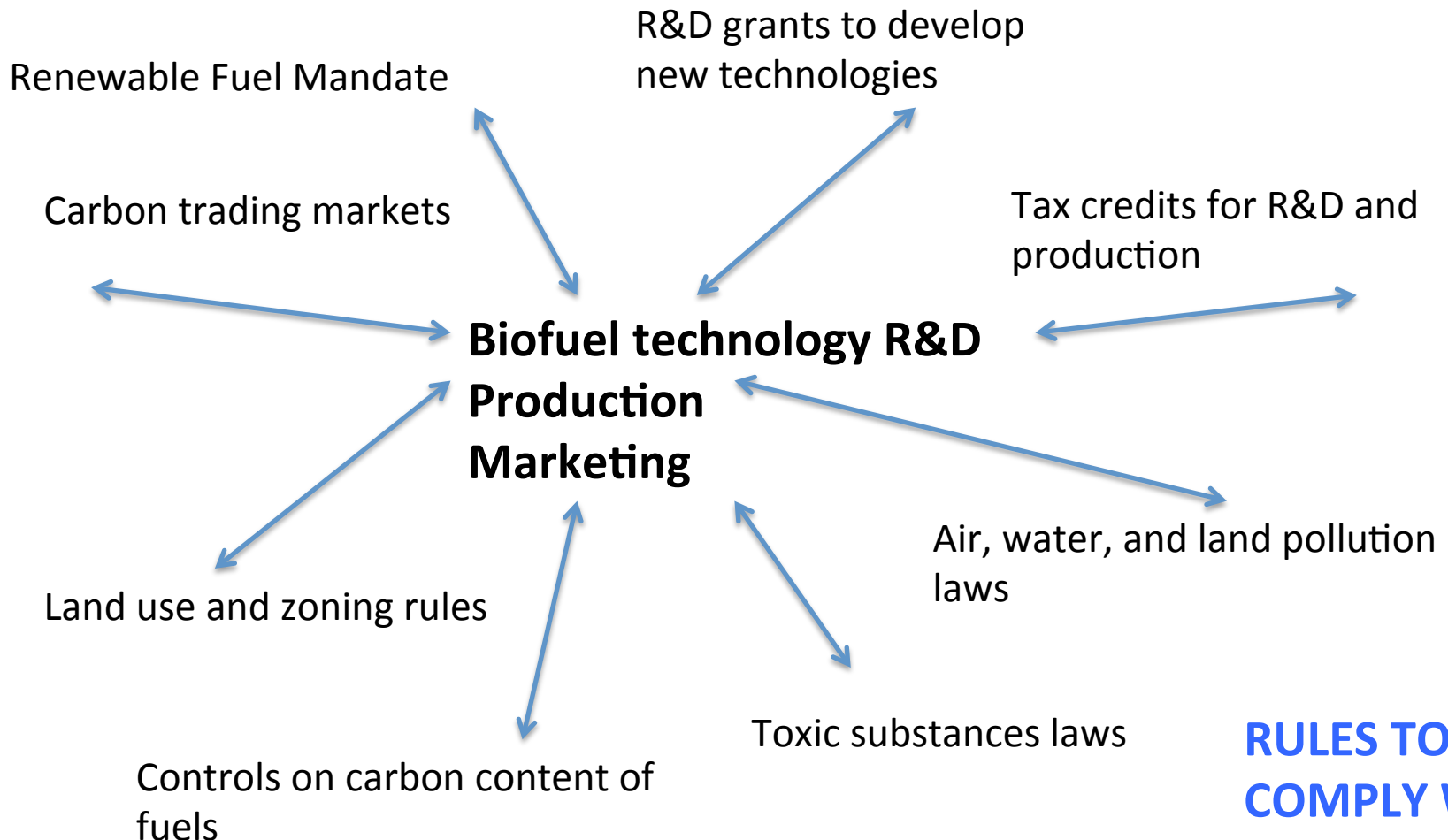
module on law and policy

Class 1



# The policy environment from a company's standpoint

## INCENTIVES



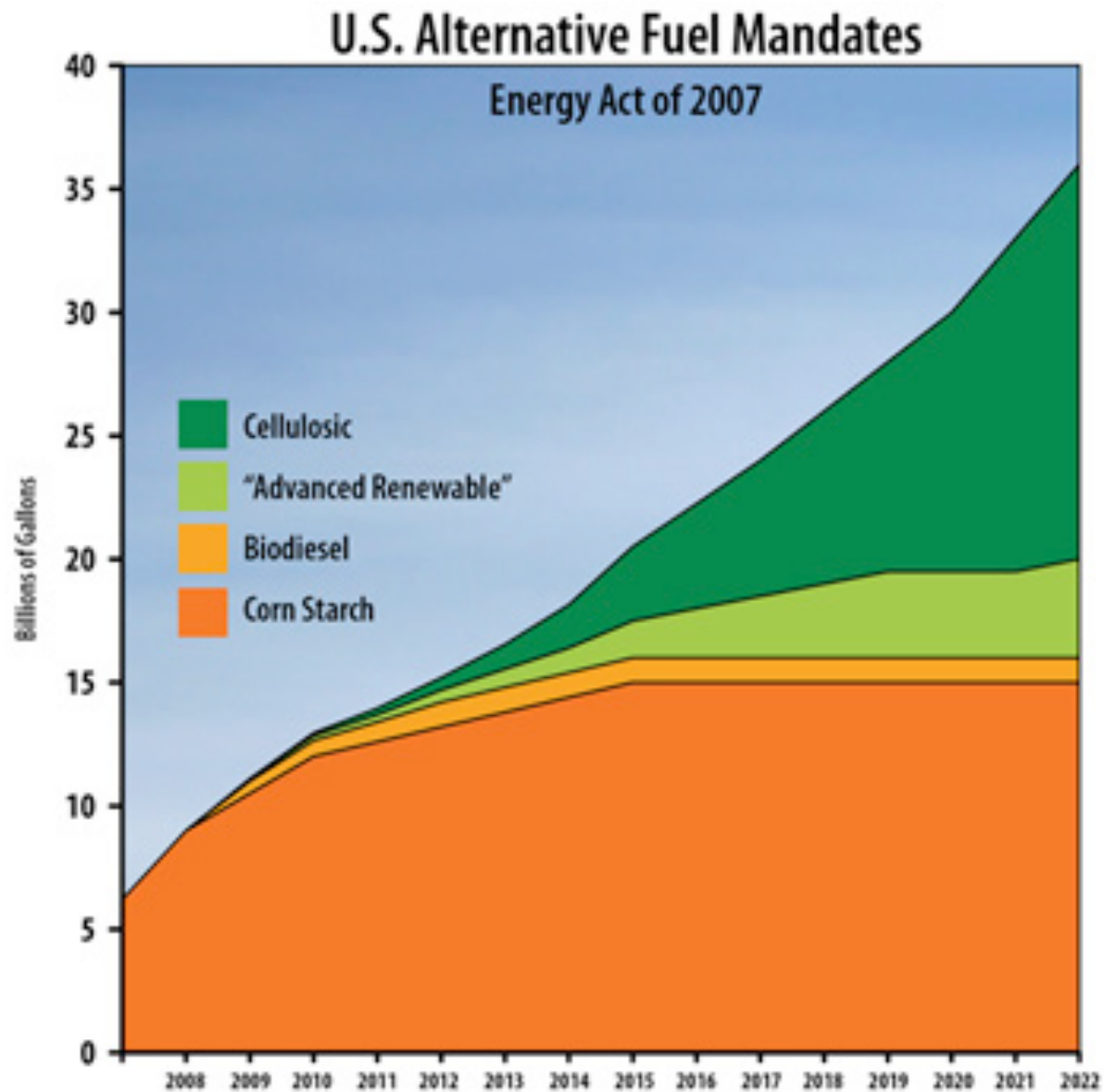
# Key policies

In sum, the key policies that you need to think about in your projects are:

- The **Renewable Fuels Standard** at the federal level.
- The **Low-Carbon Fuel Standard** at the California state level.
- The **Renewable Portfolio Standard** at the California state level.
- The **carbon trading markets** associated with California's climate change policies.

# The Renewable Fuel Standard

- In total, biofuel producers are supposed to supply a specified amount of biofuels in gallons produced/consumed each year, for blending into gasoline.
- First introduced by Congress in 2005 through the Energy Policy Act: 7.5 billion gallons by 2012.
- Expanded by Congress in 2007 through the Energy Independence and Security Act: 36 billion gallons by 2022.



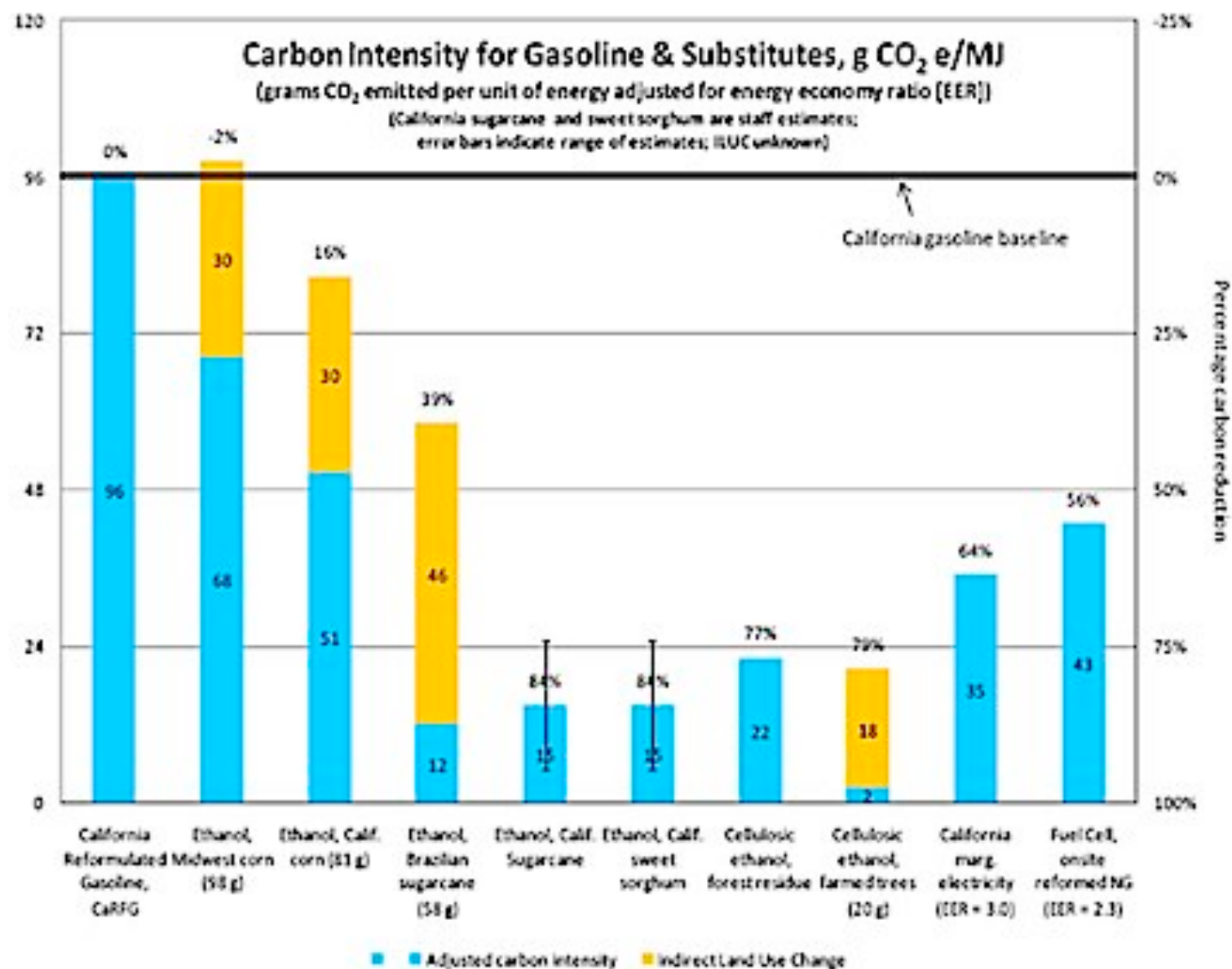
Renewable Fuels Association, 2013

# Implementing the RFS

- The US Environmental Protection Agency oversees the RFS.
- The RFS sets a threshold of GHG emission reductions for each category of fuel (e.g., 60% for cellulosic ethanol) but grandfathers in corn ethanol production as of 2007.
- The RFS applies to oil suppliers which must provide a volume of biofuels representing a % of their sales.
- Oil suppliers can sell their own biofuels or buy Renewable Identification Numbers from biofuel producers.
- EPA sets annually the volume targets for each fuel category, especially for cellulosic biofuels.
- EPA has the authority to waive a mandate if it is technically unfeasible or economically not viable.
- **FOR YOUR PROJECT: LOOK TO SEE IF YOUR TECHNOLOGY COMES INTO ONE OF THE FUEL CATEGORIES. IF NOT, YOU MAY BE ABLE TO APPLY FOR EPA APPROVAL UNDER THE NEW FUEL PATHWAY PROCEDURE.**

# The Low Carbon Fuel Standard

- A rule enacted to reduce carbon intensity in alternative transportation fuels as compared to gasoline, using life cycle assessment.
- California was the first state to introduce the LCFS through an executive order in 2007; the rule took full effect in 2011.
- A mix of traditional command-and-control and market trading tools.
- The California Air Resources Board sets a threshold of carbon intensity for gasoline; and conducts a LCA for all fuels, including production, distribution, and use, and including indirect and direct land use change effects.
- The emphasis is on assuring a net reduction in GHG emissions from fuels – 16 million tons yearly by 2020.
- This threshold is now set at 96 grams of CO<sub>2</sub>-eq per MJ of energy.





# Implementing the LFCS

- The focus is on fuel refiners, blenders, producers, and importers.
- Each company must meet a maximum level of GHG emissions each year, declining by 10% to the year 2022.
- Fuel suppliers can trade credits with each other: credits come from using fuels under the threshold while deficits come from using fuels exceeding the threshold.
- Fuel suppliers must have a net balance of credits and can make or buy their own biofuels, or can buy credits from other suppliers.

**FOR YOUR PROJECT, LOOK TO SEE IF YOUR TECHNOLOGY COMES WITHIN THE LFCS. IF IT DOES, CHECK WHETHER THE TECHNOLOGY EXCEEDS THE THRESHOLD. TO DO THIS, YOU NEED TO KNOW THE LIFE CYCLE EFFECTS OF YOUR TECHNOLOGY AND THE CARB WEBSITE CAN HELP.**

# The Renewable Portfolio Standard

- Essentially a regulation that promotes the increased production of energy from renewable sources such as biomass, wind, and solar energy.
- The RPS obliges electricity supply companies (or utilities) to produce a fraction of their energy from renewable sources.
- These utilities can earn or buy “renewable energy certificates” from biomass energy providers in the market.
- Over 30 US states now have versions of the RPS so your company may be able to target multiple markets.

# Implementing the RPS in California

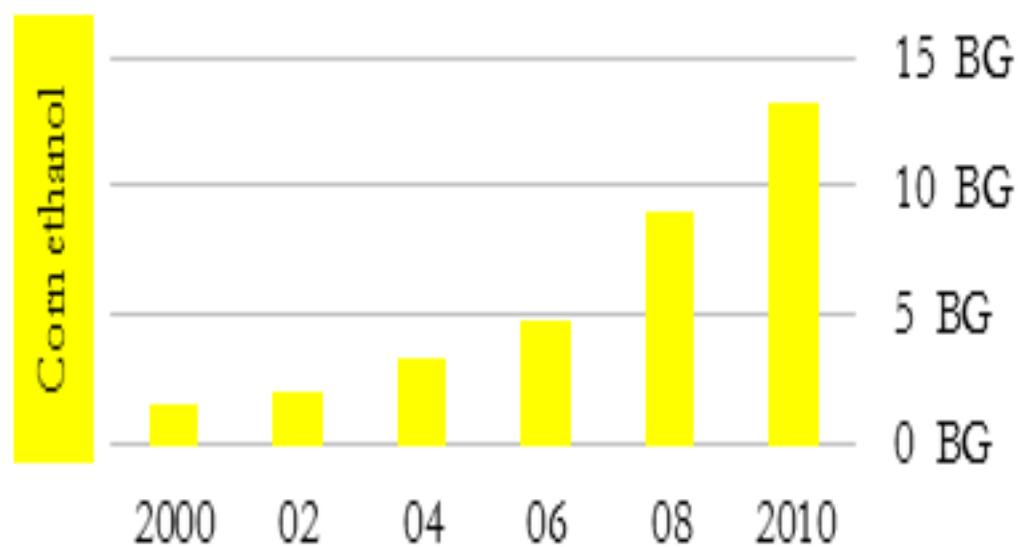
- The RPS was first introduced in 2002 and strengthened in 2006: the target was set at 20% by 2010.
- An executive order in 2008 increased this target to 33% by 2020.
- The California Public Utilities Commission oversees the program.
- To date, the program has largely worked (the Big 3 utilities now source 19.8% of their energy renewably) but it faces significant challenges in growing to 33% over the next 7 years.

**FOR YOUR PROJECT, LOOK TO SEE IF YOUR TECHNOLOGY FITS INTO THE RPS AND IF YOU CAN SELL CREDITS OR ENERGY TO THE ELECTRIC UTILITIES.**

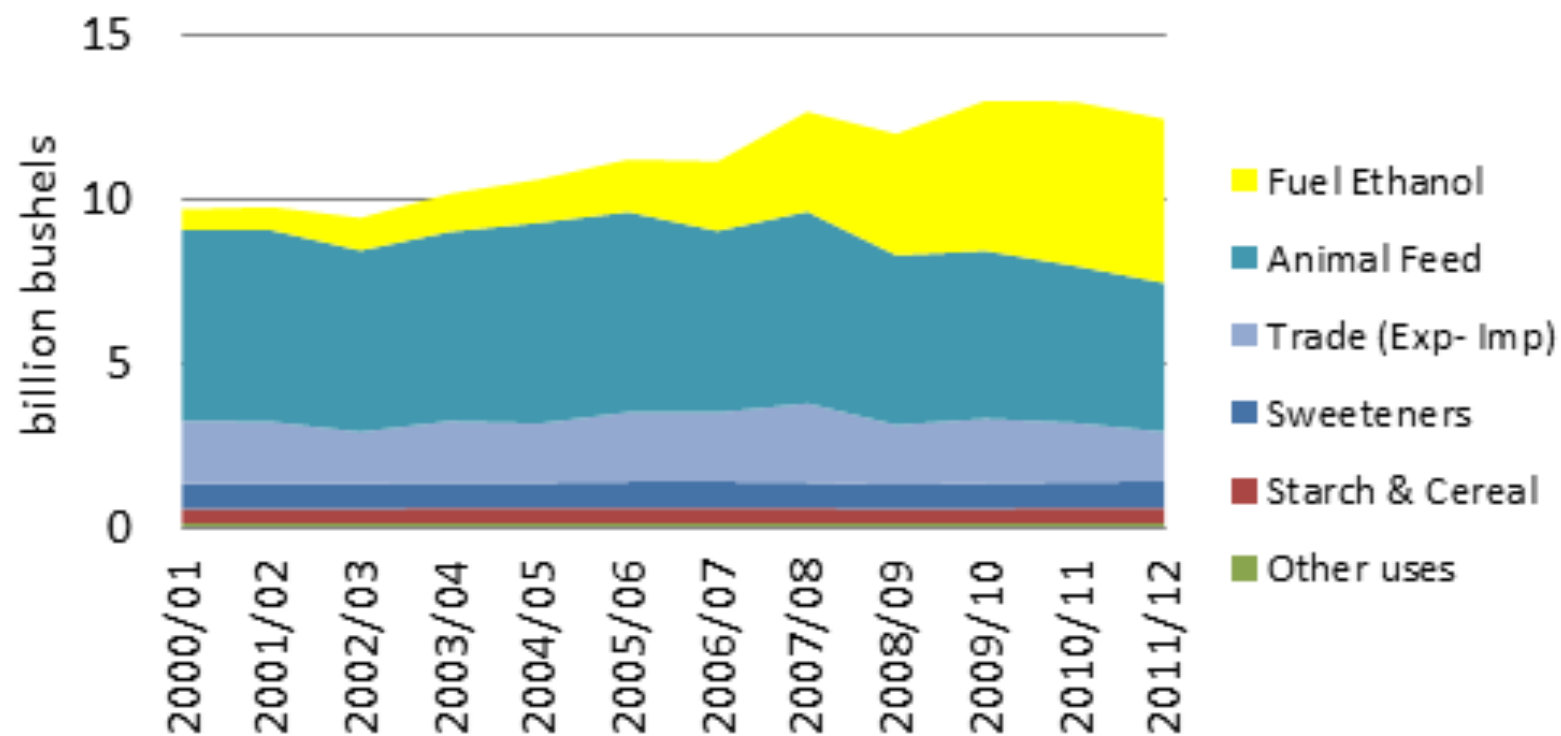
# An example of a policy-making challenge: the RFS's future

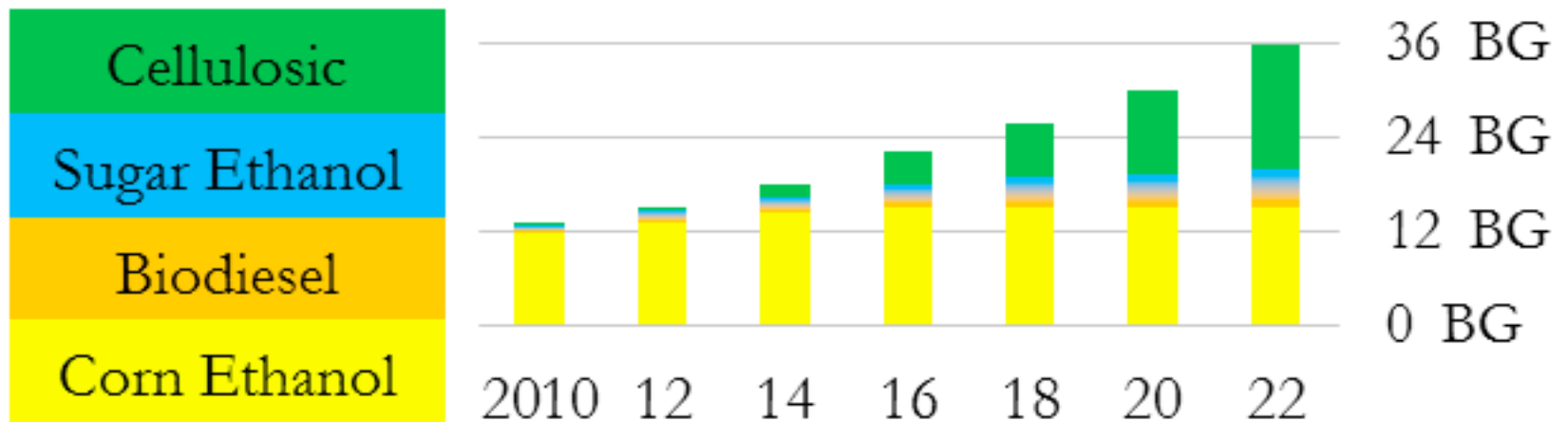
- Policy-makers have multiple motivations and goals
- There are often unintended or unforeseen social, ecological, and economic consequences flowing from a policy choice
- Policy-makers act according to “bounded rationality”: limited information, cognitive biases, varying risk perceptions

## US corn ethanol production

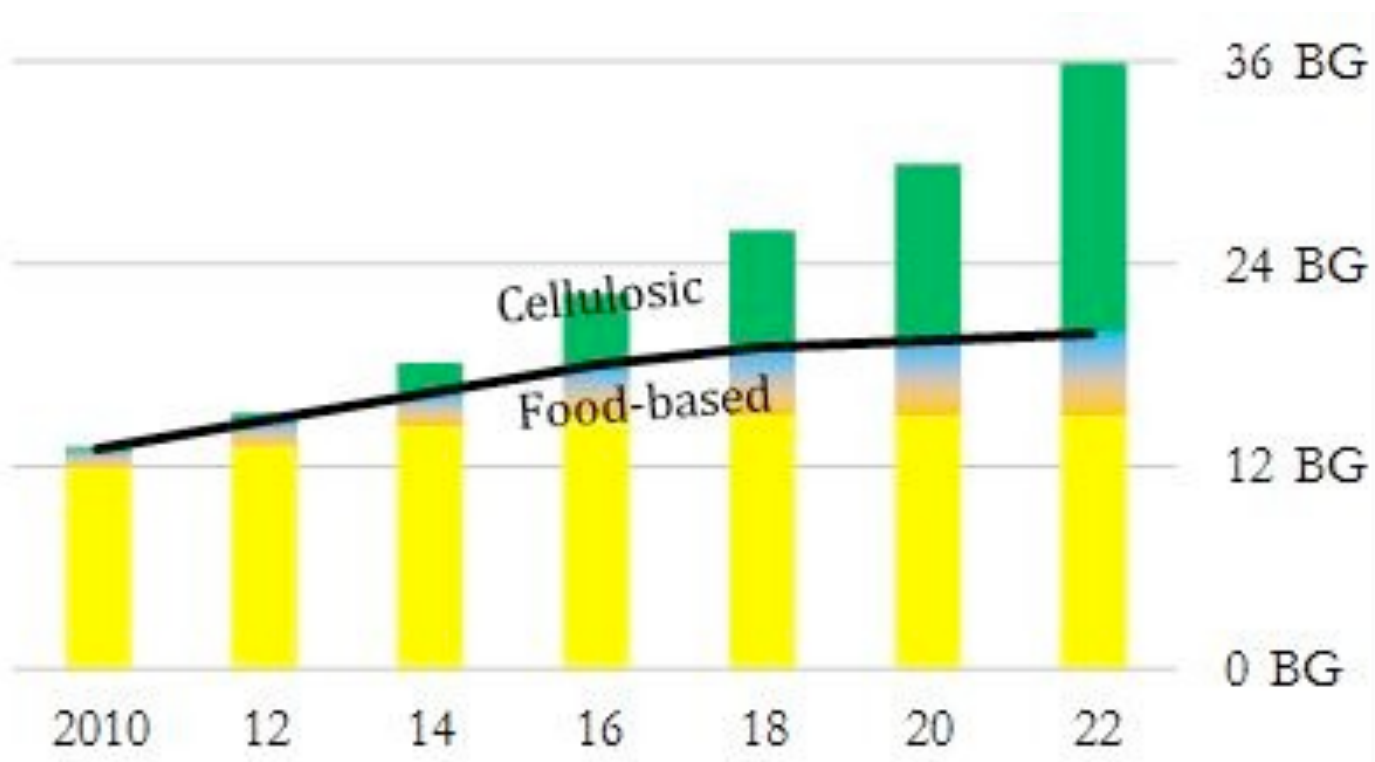


Uses of US corn (ERS data)





Renewable Fuels Standard mandates; BG = billions of gallons

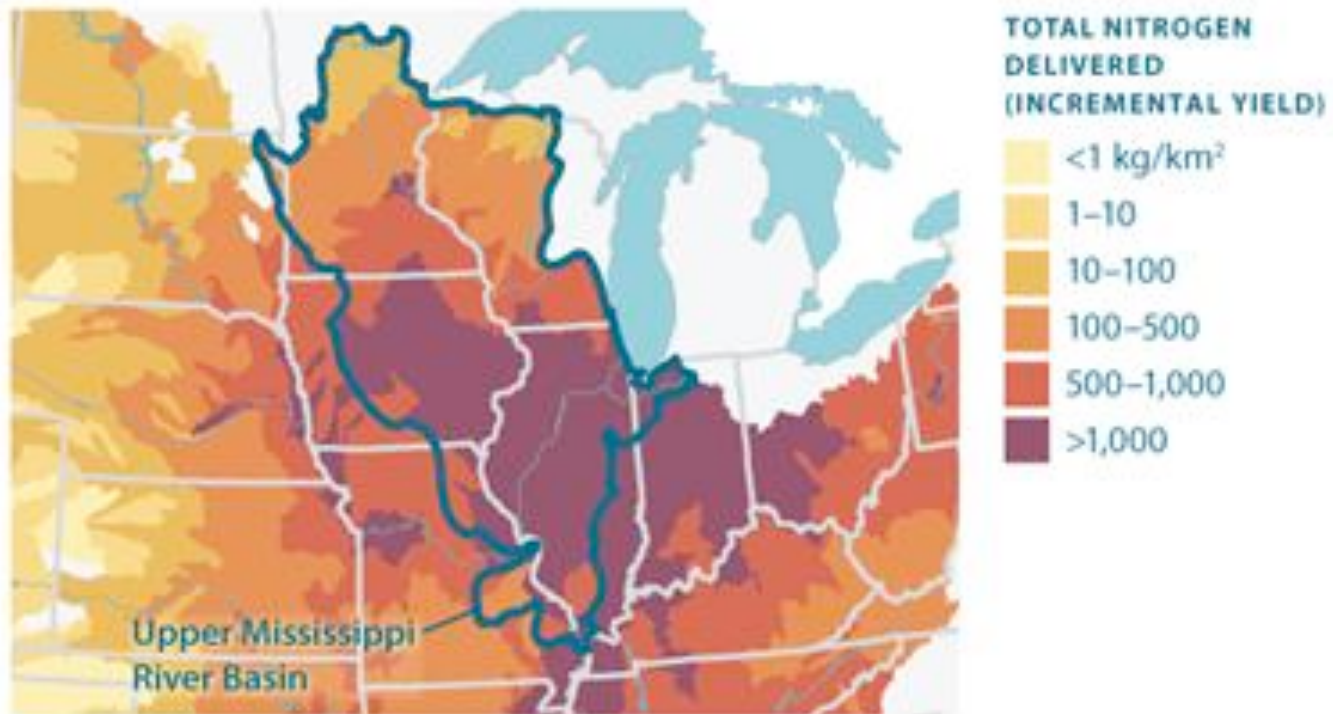


Renewable Fuels Standard mandates: Food-based vs. cellulosic biofuels; BG = billions of gallons

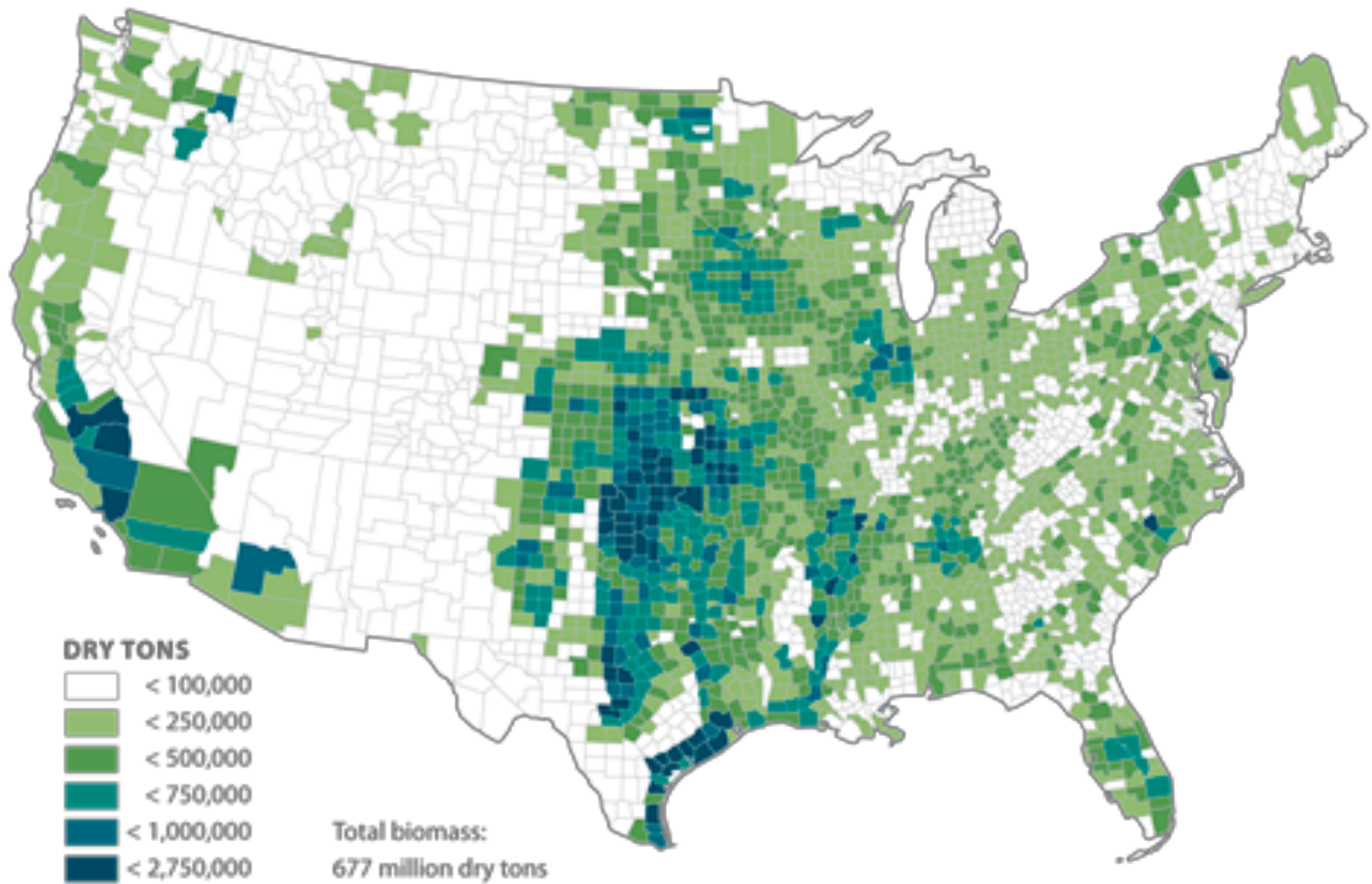




Data source: NASS

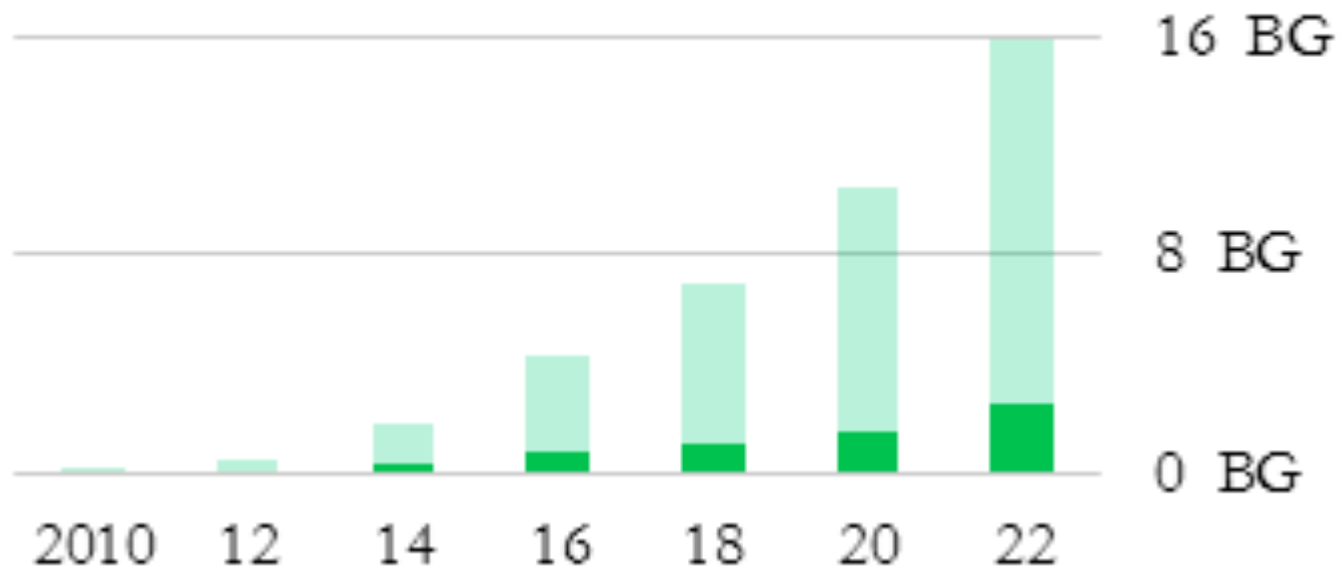


Data source: Alexander et al. 2008



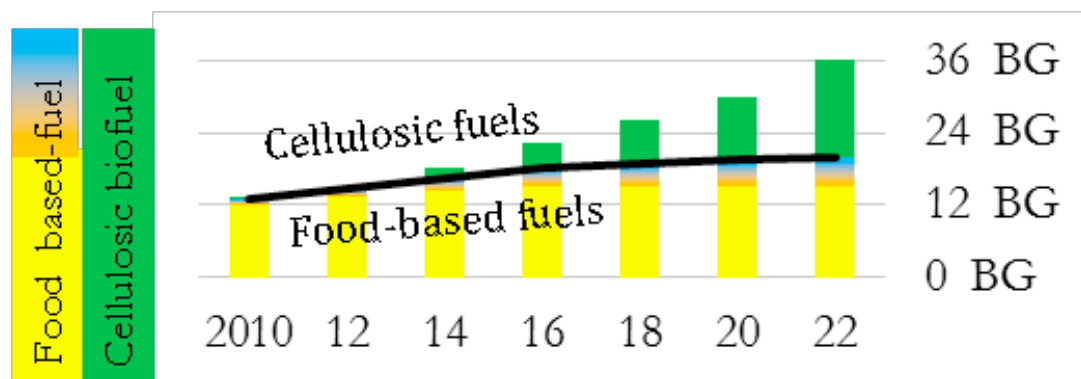
Union of Concerned Scientists, 2012.

## Mandates vs. projections



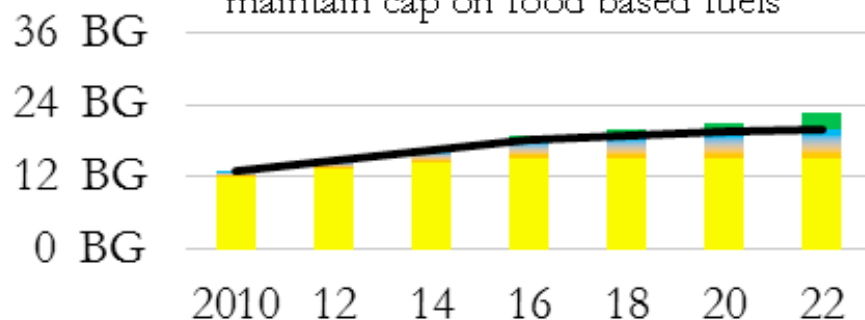
Data source: Energy Information Agency Data

## Original RFS Structure



## 20BG+ RFS

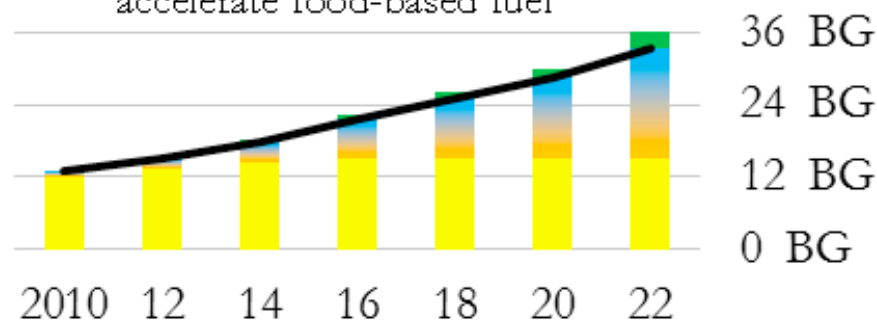
maintain cap on food based fuels



## 36BG RFS

accelerate food-based fuel

or



# Class exercise

Part 1: Stay in your class project teams. Imagine yourself as EPA policy-makers confronting the situation that you have just heard about.

Make a list of the sorts of issues and considerations that may come up in making a policy decision. For example:

- Are the regulators being lobbied? Being sued in the courts?
- What political, institutional constraints do regulators face?
- What information do the regulators need to be able to make a decision? Does this information exist? What uncertainties exist?
- How can regulators improve the commercial prospects of cellulosic biofuel technologies?

Report back to the class about the top 4 considerations.

# Possible policy-maker challenges

- Policy-makers may be exposed to a matrix of **political demands** from the many constituencies that they are accountable to.
- Policy-makers may struggle with **the state of technical and scientific knowledge**.
- Policy-makers are affected by **institutional factors** like rule-making processes
- Policy-makers think about the **tractability** of various issues to policy-making

# Class Exercise

Part 2. Start looking at the policies that may be relevant to your biofuel.

- RFS: LOOK TO SEE IF YOUR TECHNOLOGY COMES INTO ONE OF THE FUEL CATEGORIES. IF NOT, YOU MAY BE ABLE TO APPLY FOR EPA APPROVAL UNDER THE NEW FUEL PATHWAY PROCEDURE.
- LCFS: LOOK TO SEE IF YOUR TECHNOLOGY COMES WITHIN THE LCFS. IF IT DOES, CHECK WHETHER THE TECHNOLOGY EXCEEDS THE THRESHOLD. TO DO THIS, YOU NEED TO KNOW THE LIFE CYCLE EFFECTS OF YOUR TECHNOLOGY AND THE CARB WEBSITE CAN HELP.
- -RPS: LOOK TO SEE IF YOUR TECHNOLOGY FITS INTO THE RPS AND IF YOU CAN SELL CREDITS OR ENERGY TO THE ELECTRIC UTILITIES.