

Guided Discussion Materials

Introduction to Renewable Fuels: What? How? Why?

Review of Presentation Materials

Name three kinds of transportation fuels that can be made from renewable sources.

Name three ways that renewable fuels are used in transportation today.

Talk about how renewable fuels might be used in transportation in the future.

Name 10 feedstocks, things that can be used to make renewable fuels.

Name two things that can be used to make renewable fuels that are not plant-based.

Different technologies can be used to convert feedstocks to building blocks of fuels, chemicals and other products; and to convert the building blocks to final products. Talk about that part of the "seed-to-wheel" or "waste-to-wheel" value chain for renewable fuels.

Discuss a state, local or national policy designed to influence the production, sale or use of renewable fuels.

What are three important aspects of sustainability?

Discussion Ideas

Multi-factor discussion ideas. For a large class or group, breaking into small groups to discuss elements of the question and rejoining to share thoughts is a good way to involve more people in active discussions.

Why is the phrase, "renewable fuels," more appropriate than "biofuels" when talking about defossilizing transportation fuels?

Often the word "biofuels" is used. That accurately describes fuels made from plants and organic material like manure. But with the possibility of fuels made from recycled plastics, industrial waste gases, water, green hydrogen and captured carbon dioxide, the broader term, "renewable fuels" seems more appropriate. Discuss.

Describe the supply chain or value chain for three kinds of feedstocks from "seed to wheel," or from "waste to wheel".

What are the steps, tasks or products in the supply chain or value chain?

What kinds of jobs are involved?

What could be the benefit of finding uses for leftovers from various steps along that supply chain or value chain, for turning residues or waste into co-products?

For example, in general the corn that goes into a corn ethanol plant comes out as approximately 1/3 ethanol, 1/3 animal feed (some of the oil in this might go to biodiesel production) and 1/3 carbon dioxide that has many uses including dry ice, medical uses, carbonation for beverages, underground sequestration. We also talked about using corn stover and cobs as biofuel feedstock.

Identify waste or residues involved in production of other renewable fuels. Are they feedstock or co-products?

Discuss benefits of specific renewable fuels. Identify questions or concerns you have about specific renewable fuels or about renewable fuels in general.

In a free-market system, fuels have to compete not only on price. What else makes it difficult to bring a new product into an established market? Discuss in general and discuss difficulties in accessing specific end markets related to renewable fuels: neighborhood gas stations, fleets operations and airports.

You might also want to think about the other markets along the supply and value chains.

Discussion can include items such as:

Customer loyalty

Customers not knowing much about the new product

Will it harm me or help me?

Will it harm other people or infrastructure?

If what I'm using now meets my needs, why should I change? "If it ain't broke, don't fix it."

Heard bad things about new product.

Don't know how to use new product.

Established long-term or exclusive contracts between established product producers and sellers

Sellers not wanting to do extra work or incur extra expense to find "shelf space" or pump space for the product and to promote it.

Distrust of the new product

Lack of availability of new product

Friends aren't using new product

Friends warn against using new product

Policy supports use of existing product

Policy hinders or insufficiently supports use of new product Sustainability

Use the discussion of sustainability to bring together all the information and concepts presented in the *Renewable Fuels: What? How? Why?* presentation

Economic

Identify ways to make the process ("seed-to-wheel"; "waste-to-wheel"; "air/water to wheel") more efficient economically.

Discussion can include inputs such as energy, water, feedstock; as well as process elements and transportation of feedstock and finished product.

If renewable fuels cannot be produced and sold at competitive prices, what can be done to bring them into the marketplace?

What can be done to give consumers the option to purchase and use renewable fuels instead of fossil fuels?

Environmental

Identify ways to make the process ("seed-to-wheel"; "waste-to-wheel"; "air/water-to-wheel") more efficient environmentally.

Discussion can include inputs such as energy, water, feedstock; as well as process elements and transportation of feedstock and finished product.

Identify ways that transitioning to renewable fuels is part of transitioning to a "bioeconomy" and "circular economy" based on using agricultural and forest resources and waste resources.

What do you think about the example of the company, Gevo?

Social

Identify social and cultural things that can influence the production and use of renewable fuels.

What kinds of fossil fuels or environmentally harmful fuels are used in your culture? In other cultures? What would it take for your culture and other cultures to transition those uses to environmentally neutral or beneficial renewable fuels?

How could your government system (national, regional, state and local) help or hinder the transition to renewable fuels?

Imagination exercise

Imagine that you have funds to invest or donate to benefit the transition to renewable fuels.

What questions would you have?

What would be your priorities in choosing where to put your funds?

What part of the supply/value chain would you want to support? (Research (Feedstock, Conversion Technology, other), Production, Distribution, Policy Development, Marketing, etc.)

If your motivation is to make money, would your choices be different? Discuss.

If your motivation is to mitigate climate change would your choices be different? Discuss.

What else might motivate someone to fund activities related to renewable fuels?