



507 North Bentz Street, Frederick, MD 21701
301-644-1395
www.AdvancedBiofuelsUSA.org

**Presentation for November 19, 2019 Meeting of Maryland Commission on Climate Change
Mitigation Work Group**

**Renewable Transportation Fuels Are the Most Cost Effective Way to Reduce the Greatest Amount of
GHG in the Shortest Amount of Time**

Joanne Ivancic, Executive Director

Introduction

Slide 2 My name is Joanne Ivancic. I am the executive director of Advanced Biofuels USA, a nonprofit educational organization headquartered in Frederick dedicated to promoting the understanding, development and use of advanced biofuels in the US and around the world. I also serve on the Maryland Clean Energy Center advisory board.

Advanced Biofuels USA is agnostic as to renewable fuels feedstock, conversion processes and products.

Our resources accessed via our website are respected around the world.

Slide 3 I thank Secretary Grumbles for the opportunity to talk about the role of renewable fuels in reducing greenhouse gas emissions and about why they should be included in Maryland's GHG Reduction Plan. I am going to start with some background about renewable fuels as it relates to this Plan. I am going to breeze through as you can get the presentation on our website.

Slide 4 We need to do something about our transportation emissions now, while we wait for EVs to be available, affordable and powered by renewables using "fair trade" batteries.

Slide 5 Maryland should make sure that every vehicle in the state can be fueled with renewables as soon as possible to lower the transportation emissions shown on this graph from the Draft GGRA plan. (*GHGRA Draft Plan page 20*)

As long as vehicles that are creating these emissions are still on the roads, that bar will not be lowered if they don't start using cleaner fuels.

Renewable fuels provide the most cost effective way to reduce the greatest amount of GHG in the shortest amount of time AND it will bring investments and jobs.

Slide 6 According to this graph, also from the draft GGRA plan, only 11% of vehicles in 2030 will be EVs. That leaves 89% of vehicles that will still need liquid fuel along with the plug-in hybrids that are part of that 11%. (Page 69 Draft GHG Reduction Plan)

And, what about fueling those vehicles passing through on major highways like I-95, I-270, I-70? Shouldn't they be able to buy sustainable, non-fossil, low carbon renewable fuel?

How?

Slide 7 As this graph from the California Energy Commission shows, renewable fuels have been the most effective way to reduce transportation's carbon footprint thanks to California's Low Carbon Fuel Standard. Oregon has adopted a similar LCFS and a number of other states are exploring variations on this model. <https://greet.es.anl.gov/>, http://www.lifecycleassociates.com/lca-tools/ca_greet/ and <https://ww3.arb.ca.gov/fuels/lcfs/ca-greet/ca-greet.htm>

Slide 8 How is this accomplished? Blends of ethanol such as 85% ethanol (E85) or E30 which US Department of Energy and others have determined is the "sweet spot" where even today's direct injection engines can operate most efficiently.

Maryland's Clean Cars Act of 2019 charged the Zero Emissions Vehicle Council with developing a plan to facilitate the integration of hydrogen fuel cell vehicles along with plug-in EVs into the State's transportation network. Remember, **ethanol can also be fuel for fuel cells** and, ethanol is renewable. Most of hydrogen is fossil because it is so much cheaper, although it can be renewable.

Slide 9 With a major airport and a number of smaller ones, renewable jetfuel is important. Also biodiesel, renewable diesel. Don't forget non-transportation fuel such as boiler and heating fuel.

Slide 10 Not Just Ethanol; Not Just Corn

Slide 11 In addition to ethanol and renewable hydrogen, there are these fuels that can be renewable.

Slide 12 Not just corn. Many other feedstocks including agricultural and forest waste and residues as well as purpose grown crops.

Slide 13 Not just "bio". Also recycling carbon, carbon capture and use, using waste from used cooking oil, flue gases, tires, municipal solid waste. Could be very important if we can't export plastics to China for this kind of recycling and reuse.

Slide 14 Many kinds of conversion technologies.

Slide 15 Bringing jobs and investment to Maryland. Including enzymatic conversion being researched at Hood College and University of Maryland Eastern Shore.

Slide 16 and work being done with algae—two started at UMD College Park; another at Morgan State.

Dr Stephanie Lansing has done work growing algae as part of a wastewater treatment system (<https://advancedbiofuelsusa.info/double-helping-maryland-researcher-featured-in-new-big-ten-network-video-creates-clean-energy-while-cleaning-bay/>)

Dr. Ryan Powell has developed not only what he calls an agricultural algae system, but also an improved hydrothermal liquefaction system. <https://mantabiofuel.com/>

Morgan State recently received a half million dollar grant from the National Science Foundation for Dr. Viji Sittther and her team for studying the role of nanoparticles in blue-green algae for enhanced biofuel production. <https://advancedbiofuelsusa.info/national-science-foundation-continues-its-support-of-morgan-state-university-stem-research-with-nearly-500k-grant-award/>

Slide 17 Basically, renewable fuels are made by taking a variety of feedstocks, converting them to the building blocks of fuels and chemicals and then putting those through processes to make those products. Often, with bio-based systems high protein animal feed or food supplements are co-products.

Slide 18 The idea is to recycle carbon that has already been in the atmosphere rather than taking it out of deep storage.

Renewable diesel has 80% lower emissions compared to conventional diesel, and one third lower fine particulates and one third lower hydrocarbons, a quarter lower carbon monoxide, 9% lower nitrogen oxides and reduced toxic aromatics. <https://www.neste.us/neste-my/serious-sustainability>

Renewable Natural Gas (biomethane), when derived from dairy waste is given negative carbon emission ratings under the California Low Carbon Fuel Standard. <https://www.mjbradley.com/sites/default/files/RNGEconomics07152019.pdf>

On a net basis (accounting for all production, transportation, all the way to combustion) even corn ethanol E85 reduces GHG emissions by 43% according to a USDA 10-year comprehensive study. By 2022 that will be a 50% reduction. <https://www.usda.gov/media/press-releases/2017/01/12/usda-releases-new-report-lifecycle-greenhouse-gas-balance-ethanol>

Slide 19 Other Benefits

Slide 20 Home-grown fuels enhance energy security and energy independence.

Slide 21 Renewable fuels, particularly ethanol substitute in gasoline for carcinogenic toxins such as MTBE which has been banned in many states with key litigation from Maryland cases of severe drinking water pollution.

Slide 22 Using ethanol fuel decreases carcinogens such as benzene and toluene and lowers particulate pollution. <https://fixourfuel.com/white-papers/> And it's a less expensive source of octane.

Biodiesel and renewable diesel are low sulfur, clean burning fuels with fewer particulates (soot) which means less maintenance. <https://advancedbiofuelsusa.info/tag/bio-based-diesel-benefits/> Same goes for renewable jetfuel. <https://advancedbiofuelsusa.info/tag/jetfuel/>

Slide 23 Here are some more benefits that may result from making and using renewable fuels.

Slide 24 And here are lists of the types of jobs related to renewable fuels from feedstock through conversion to marketing/delivery/sales. And various business and policy-related jobs.

Slide 25 Summary and Proposals

Slide 26 Renewable fuels for transportation provide the quickest way to reduce the carbon footprint because they can be used in existing planes, trains, automobiles and equipment. Sometimes with no modification.

This is especially important for vehicles owned and bought by lower income people. And for rural residents and delivery services; and those who have long commutes, particularly because they are responsible for more vehicle miles traveled than people in cities—and they don't have public transit alternatives. It also provides fuels for interstate traffic, particularly long haul trucks.

Slide 28 These aspects also make this the least expensive alternative. (<https://e85prices.com/> for daily prices).

Slide 29 And, as we have seen before, the greatest reduction of greenhouse gases in the near term.

Slide 30 Proposals

The plan calls for \$1.2 million/year to add infrastructure just for EVs. It should also provide financial support infrastructure and promotion of renewable fuels for today's needs.

To fill the gaps in the current GHG Reduction legislation, look at California's Low Carbon Fuel Standard as a model. Oregon has adopted a version and many other states are also looking at this. Some of these ideas could be incorporated into the regional Transportation and Climate Initiative (TCI) currently under consideration.

The Diesel Technology Forum, based in Frederick, highlights places such as Oakland, CA, that have converted municipal fleets and equipment to renewable fuels. They noticed not only GHG benefits, but less maintenance and wear-and-tear. <https://advancedbiofuelsusa.info/?s=Oakland>

San Francisco has had biodiesel-electric hybrid buses for many years. <https://advancedbiofuelsusa.info/san-francisco-gets-new-biodiesel-electric-bus-many-more-to-come/>

New York requires 5% biodiesel in heating fuel. <http://www.biodieselmagazine.com/articles/2516143/new-york-governor-signs-bill-requiring-biodiesel-in-heating-oil>

Cities, counties and businesses should use renewables as much as possible in existing vehicles and equipment. <https://advancedbiofuelsusa.info/how-to-de-fossilize-your-fleet/>

We've also proposed a disappearing carbon user fee to be paid at the pump. It would create market demand for renewable fuels because they would be less expensive. <https://advancedbiofuelsusa.info/advanced-biofuels-usa-expands-disappearing-gas-tax-proposal-to-highlight-environmental-justice-issues/>

And if low income and poor air quality areas are given funding priority from the proceeds of the fee/tax for upgraded fuel pumps that offer more renewable fuels, then cleaner, less-polluting and less expensive options will benefit those most in need of these benefits of renewable fuels.

For people who will be driving liquid-fueled vehicles now and for many years to come, this will mean cleaner fuel at lower prices and immediate improvement of emissions from older vehicles.

Conclusion

Increasing use of renewable fuels is the most cost effective way to reduce the greatest amount of GHG in the shortest amount of time, that could also incentivize investment in environmentally beneficial Maryland businesses and jobs.

Renewable transportation fuels must be a key part of Maryland GHG reduction, economic development and transportation plans.

Slide 31 Contact information

Advanced Biofuels USA, 507 North Bentz Street, Frederick, MD 21701 301-644-1395
Info@advancedbiofuelsusa.org

Additional Notes:

Nutrient Management

Two biofuel projects in Maryland even have nutrient management potential to prevent toxic algae blooms and dead zones in the Chesapeake Bay and elsewhere. Manta Biofuels is taking technology developed at University of Maryland College Park and is developing an agricultural algae-to-heating fuel or biocrude system. (The heating oil market in Maryland accounts for 22% of all of the diesel fuel based emissions according to the EIA.) <https://mantabiofuel.com/>

An energy beet project with elements developed at the University of Maryland Eastern Shore, Hood College and UMBC might have discovered a way to take up legacy phosphorus from years of use of poultry manure for fertilizer. The final product could include chicken feed and aviation biofuel.
<https://advancedbiofuelsusa.info/energy-beet-feasibility-study-finds-navy-best-potential-near-term-customer-for-alcohol-to-jetfuel-product/>

These are just a few examples of the social, economic and environmental benefit that could flow from expanded development and use of biofuels in Maryland.

Additional Slides:

Federal Renewable Fuel Standard projected required volume obligations.