Stopping the Burning of Harmful Fossil Fuels with the Substitution of Renewable Biomass

Written by Alexander Marshall

Imagine a world filled with clean air. Imagine a world where factories like the one seen above are obsolete. Imagine a world in which we don't fear for the future of our planet. Although we, as a society, have already destroyed much of our environment, there is always hope.

Over the last few hundred years, human beings have contributed to a rising global temperature that stems from the mass amounts of fuels burned every year around the world. Since the pre-industrial period (1880-1900), the Earth's surface temperature has climbed 2.14°F. Although this may not seem like a large increase, it is having detrimental effects to our environment. For example, hurricanes are becoming stronger, sea levels are rising, there are more droughts and heat waves, and there have been major changes in precipitation patterns. These are just a few of the long list of negative effects caused by global warming.

This rise in global surface temperature mainly comes for the 43.1 billion tons of CO2 that is released into the atmosphere every year caused from human activities. The main contribution

to this massive amount comes from the burning of fossil fuels to generate heat and electricity. CO2 from fossil fuel burning accounts for about 92% of human-caused global carbon emissions.

Due to this, there is a need to switch to a more renewable fuel source that can put a dent in this large amount of yearly carbon emissions. One promising new technology is the use of renewable biomass sources to produce fuels that can then be used to generate the necessary power. Biomass fuels contribute net zero carbon emissions, and this transition will help reduce the rapid growth of climate change effects.

Biomass is a renewable organic material that is obtained from all kinds of plants. The biomass is produced by plants through photosynthesis and this biomass can be burned directly for energy or it can be used to create more efficient fuels. This biomass is converted to platform molecules in three different ways; pyrolysis, hydrotreating, and gasification. There is still a lot of research being done on the most effective and efficient way to convert these materials into platform molecules. These platform molecules are then used to develop fuels that can be used in replacement of fossil fuels.

There is a very common misconception that surrounds biomass and its use in energy production. Some people think that biomass eliminates the releasing of CO2 into the atmosphere and some people think that these fuels aren't any better because burning them still releases CO2. However, both ideas, although some what correct, are very misleading and not what makes biomass great. It is correct that burning biomass sources will still release CO2 into the atmosphere just like the burning of fossil fuels. However, do to the fact that the biomass is created from photosynthesis which take in CO2, the burning of biomass fuels is considered to have net-zero carbon emissions. Meaning that although it still releases CO2, it cycles the process back by using the CO2 to create more biomass.

One of the largest drawbacks to the transition to biomass fuel production is that it is a much less efficient process compared to fossil fuel combustion. Due to the fact that the technology used to convert biomass to fuels has not been perfected, it is often much more profitable to stay in the fossil fuel business. Although this is true, the main argument to refute this claim is the finite amount of fossil fuel resources. It is projected that fossil fuel sources will show signs of running out as early as 2050. So, although in the short term fossil fuels are more

Commented [a1]: Probably better to use solar, wind, hydro, and nuclear for power, and use biofuels for liquid transportation fuels for vehicles in case we cannot make enough Lithium batteries for a global EV fleet.

What do you think about that idea?

Commented [a2]: This would be true if no fossil energy is used for process energy, like in making fertilizer, harvesting plants, refining to fuels, etc. Today we still use a lot of fossil energy for these steps. So your statement should be "in principle, biofuels can be carbon neutral."

Commented [a3]: Explain the 3 types? Or at least say "we have flexibility in the way we process biomass…"

Commented [a4]: Good topic sentence

Commented [a5]: See above "in principle"

Commented [a6]: Nothing is perfect. Maybe "optimized"

Commented [a7]: I'm not sure. I think the carbon emissions are the key.

profitable, getting into the biomass business early has unbelievable potential, especially when fossil fuel resources begin to become obsolete.

Due to all this, there is a strong need for more research to make biomass energy production a much more effective and profitable process. for the human race to begin to stop the negative effects of climate change, the transition to biomass fuels present one of the most promising options. If we want to create a sustainable and enjoyable life for future generations, we must do everything we can to close the carbon cycle and limit the massive amounts of CO2 being dumped into our atmosphere every year. Although this process is not ready for full transition, active research in this field is brining that date closer and closer to present day.

Commented [a8]: This is good. This good be your tagline. If so, introduce early and often.

Sources

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